BEFORE THE INDUSTRIAL COMMISSION

OF THE STATE OF NORTH DAKOTA

CASE NO. 30873
ORDER NO. 33533

IN THE MATTER OF A HEARING CALLED ON A MOTION OF THE COMMISSION TO CONSIDER THE APPLICATION OF SUMMIT CARBON STORAGE #2, LLC REQUESTING CONSIDERATION FOR THE GEOLOGIC STORAGE OF CARBON DIOXIDE IN THE BROOM CREEK FORMATION FROM THE MIDWEST CARBON EXPRESS PIPELINE IN THE STORAGE FACILITY LOCATED IN SECTIONS 27, 28, 29, 32, 33, 34, AND 35, TOWNSHIP 143 NORTH, RANGE 88 WEST, SECTIONS 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, AND 36, TOWNSHIP 142 NORTH, RANGE 88 WEST, SECTIONS 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, AND 31, TOWNSHIP 142 NORTH, RANGE 87 WEST, AND SECTIONS 1, 2, AND 3, TOWNSHIP 141 NORTH, RANGE 88 WEST, MERCER AND OLIVER COUNTIES, ND PURSUANT TO NORTH DAKOTA ADMINISTRATIVE CODE CHAPTER 43-05-01.

ORDER OF THE COMMISSION

PROCEDURAL HISTORY:

(1) This cause came on for hearing at 9:00 a.m. on the 11th of June, 2024. The hearing ran June 11 through June 13, 2024.

(2) Summit Carbon Storage #2, LLC (SCS #2) made application to the Commission for an order requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline (MCE Pipeline) in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West; Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West; Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West; and Sections 1, 2, and 3, Township 141

North, Range 88 West, Mercer and Oliver Counties, North Dakota, pursuant to North Dakota Administrative Code (NDAC) Chapter 43-05-01.

(3) SCS #2 submitted an application for a Storage Facility Permit and attachments pursuant to NDAC Section 43-05-01-05 and all other provisions of NDAC Chapter 43-05-01 as necessary.

(4) Case Nos. 30873, 30869, 30870, 30871, 30872, 30874, 30875, 30876, 30877, 30878, 30879, and 30880 were combined for the purposes of hearing.

(5) Case No. 30869, also heard on the June 11, 2024 docket, is an application by Summit Carbon Storage #1, LLC (SCS #1) for an order requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the MCE Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West; Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West; Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West; Sections 1, 2, 3, and 12, Township 140 North, Range 88 West; and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, North Dakota, pursuant to NDAC Chapter 43-05-01.

(6) Case No. 30870, also heard on the June 11, 2024 docket, is a motion of the Commission to consider the amalgamation of storage reservoir pore space, pursuant to a Storage Agreement by SCS #1 for use of pore space falling within portions of Sections 31, 32, 33, and 34, Township 142 North, Range 87 West; Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West; Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West; Sections 1, 2, 3, and 12, Township 140 North, Range 88 West; and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, North Dakota, in the Broom Creek Formation, and to determine it has been signed, ratified, or approved by owners of interest owning at least sixty percent of the pore space interest within said lands, pursuant to North Dakota Century Code (NDCC) Section 38-22-10.

(7) Case No. 30871, also heard on the June 11, 2024 docket, is a motion of the Commission to determine the amount of financial responsibility required of SCS #1 for the geologic storage of carbon dioxide from the MCE Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West; Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West; Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West; Sections 1, 2, 3, and 12, Township 140 North, Range 88 West; and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, North Dakota, in the Broom Creek Formation, pursuant to NDAC Section 43-05-01-09.1.

(8) Case No. 30872, also heard on the June 11, 2024 docket, is a motion of the Commission to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West; Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West; Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87

West; Sections 1, 2, 3, and 12, Township 140 North, Range 88 West; and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, North Dakota, subject to the application of SCS #1 for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

(9) Case No. 30874, also heard on the June 11, 2024 docket, is a motion of the Commission to consider the amalgamation of storage reservoir pore space, pursuant to a Storage Agreement by SCS #2 for use of pore space falling within portions of Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West; Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West; Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West; and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, North Dakota, in the Broom Creek Formation, and to determine it has been signed, ratified, or approved by owners of interest owning at least sixty percent of the pore space interest within said lands, pursuant to NDCC Section 38-22-10.

(10) Case No. 30875, also heard on the June 11, 2024 docket, is a motion of the Commission to determine the amount of financial responsibility required of SCS #2 for the geologic storage of carbon dioxide from the MCE Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West; Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West; Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West; and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, North Dakota, in the Broom Creek Formation, pursuant to NDAC Section 43-05-01-09.1.

(11) Case No. 30876, also heard on the June 11, 2024 docket, is a motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West; Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West; Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West; and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, North Dakota, subject to the application of SCS #2 for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

(12) Case No. 30877, also heard on the June 11, 2024 docket, is an application by Summit Carbon Storage #3, LLC (SCS #3) for an order requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the MCE Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West; Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West; Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West; Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West; and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, North Dakota, pursuant to NDAC Chapter 43-05-01.

(13) Case No. 30878, also heard on the June 11, 2024 docket, is a motion of the Commission to consider the amalgamation of storage reservoir pore space, pursuant to a Storage Agreement by SCS #3 for use of pore space falling within portions of Section 36, Township 143 North, Range 87 West; Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West; Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West; Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West; and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, North Dakota, in the Broom Creek Formation, and to determine it has been signed, ratified, or approved by owners of interest owning at least sixty percent of the pore space interest within said lands, pursuant to NDCC Section 38-22-10.

(14) Case No. 30879, also heard on the June 11, 2024 docket, is a motion of the Commission to determine the amount of financial responsibility required of SCS #3 for the geologic storage of carbon dioxide from the MCE Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West; Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West; Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West; Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West; and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, North Dakota, in the Broom Creek Formation, pursuant to NDAC Section 43-05-01-09.1.

(15) Case No. 30880, also heard on the June 11, 2024 docket, is a motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West; Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West; Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West; Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West; and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, North Dakota, subject to the application of SCS #3 for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

(16) The record in these matters was left open to receive additional information from SCS #1, SCS #2, and SCS #3. Such information was received on June 24, 2024 and the record was closed.

(17) The Commission gave at least a thirty-day public notice and comment period for the draft storage facility permit and issued all notices using methods required of all entities under NDCC Section 38-22-06 and NDAC Section 43-05-01-08. Publications were made in The Bismarck Tribune on April 17, May 1, and May 8, 2024, the Center Republican on April 18, May 9, and May 16, 2024, and The Hazen Star on May 2 and May 9, 2024. SCS #2 hand-delivered affidavits to the Commission on June 11, 2024 stating it provided at least a forty-five day notice as required by NDAC Section 43-05-01-08. The comment period for written comments ended at 5:00 PM CDT June 10, 2024. The hearing was open to the public to appear and provide comments.

(18) Counsel for the following landowners (the Landowner Intervenors) filed petitions to intervene in Case Nos. 30869, 30870, 30871, 30872, 30873, 30874, 30875, 30876, 30877, 30878, 30879, and 30880.

(a) The Swenson Living Trust (Swenson Trust) filed a petition on April 18, 2024. The Swenson Trust owns the SE/4 of Section 27, Township 143 North, Range 88 West and the W/2 NE/4 of Section 14, Township 142 North, Range 88 West, Mercer County, North Dakota. The Swenson Trust owns Outlot B of the E/2 NW/4 Less Lot 1 of Section 7, the SW/4 of Section 9, the SE/4 of Section 15, Section 21, and the NW/4 of Section 22, Township 142 North, Range 87 West, Oliver County, North Dakota.

(b) Michael and Bonnie Haupt (Haupt) filed a petition on May 15, 2024. Haupt owns the SW/4 of Section 27 and the SE/4 of Section 35, Township 141 North, Range 88 West, Mercer County, North Dakota.

(c) Paul and Christy Metz (Metz) filed a petition on May 15, 2024. Metz owns Lot 1 of the N/2 SE/4 of Section 4, Township 141 North, Range 87 West, Oliver County, North Dakota.

(d) John Jochim (Jochim) filed a petition on May 15, 2024. Jochim owns the NW/4 of Section 24, Township 142 North, Range 88 West, Mercer County, North Dakota.

(e) Kirk, Linda, and Allen Maize (Maize) filed a petition on May 16, 2024. Maize owns the S/2 SE/4 of Section 20, Township 141 North, Range 87 West, Oliver County, North Dakota.

(f) Glenn and Lisa Gerving (Gerving) filed a petition on May 16, 2024. Gerving owns the E/2 SE/4 of Section 34 and the S/2 SW/4 of Section 35, Township 142 North, Range 87 West, Oliver County, North Dakota and the south 54 acres of the S/2 S/2 of Section 13 and the S/2 SW/4 NW/4 and S/2 SW/4 of Section 24, Township 141 North, Range 88 West, Mercer County, North Dakota.

(g) JoLene M. Rust (Rust) filed a petition on May 16, 2024. Rust owns the SW/4 of Section 13, Township 142 North, Range 88 West, Mercer County, North Dakota.

(h) Michael Bauman (Bauman) filed a petition on May 16, 2024. Bauman owns the SW/4 of Section 24, Township 142 North, Range 88 West, Mercer County, North Dakota.

(i) Gary A. Smith and Cassie Smith (Smith) filed a petition on May 16, 2024. Smith owns the NE/4 and NW/4 of Section 15, the NE/4 of Section 20, the SE/4 including Lot A of Section 22, and the W/2 of Section 23, Township 142 North, Range 87 West, Oliver County, North Dakota.

(j) Kevin and Kimberly Kraft (Kraft) filed a petition on May 22, 2024. Kraft owns a tract of land located in the S/2 (Document No. 80055 at Oliver County) and the SE/4 less and except the previously stated tract in Section 27, Township 142 North, Range 87 West, Oliver County, North Dakota.

(k) Charmayne Liebelt (Liebelt) filed a petition on May 24, 2024. Liebelt owns the S/2 SW/4 of Section 32, Township 143 North, Range 86 West, Oliver County, North Dakota.

(19) Counsel for Intervenor Swenson Trust filed a Motion to Continue Hearing and Request for Scheduling Conference on April 25, 2024. Counsel for SCS #1, SCS #2, and SCS #3 filed a response on April 30, 2024 requesting the Commission deny Intervenor Swenson Trust's Motion for Continuance.

(20) Counsel for Intervenor Swenson Trust filed a Motion to Expedite Discovery on May 16, 2024. Counsel for SCS #1, SCS #2, and SCS #3 filed a response on May 28, 2024 requesting the Commission deny Intervenor Swenson Trust's Motion to Expedite Discovery.

(21) Counsel for Minnkota Power Cooperative, Inc. (Minnkota) petitioned to intervene in Case Nos. 30869, 30870, 30871, 30872, 30873, 30874, 30875, 30876, 30877, 30878, 30879, and 30880 on May 20, 2024. Minnkota holds three carbon dioxide storage facility permits, in Oliver County, North Dakota, the Minnkota Center MRYS Broom Creek Storage Facility #1 (Order No. 31584 entered in Case No. 29030), the Minnkota Center MRYS Deadwood Storage Facility #1 (Order No. 31587 entered in Case No. 29033), and the DCC West Broom Creek Storage Facility #1 (Order No. 32806 entered in Case No. 30122), herein referred to as Project Tundra. The location of Project Tundra is located immediately adjacent to the east of SCS #1, SCS #2, and SCS #3's proposed injection sites. Minnkota seeks to intervene to protect its interest in Project Tundra.

(22) Counsel for SCS #1, SCS #2, and SCS #3 filed a consolidated response to the Landowner Intervenors' Petitions to Intervene on May 28, 2024 requesting the Commission deny Swenson Trust's Petition to Intervene and approve the remaining Landowner Intervenors' Petitions to Intervene only in the proposed storage facilities in which they own acreage within the horizontal boundaries of the storage facility proposed and/or within the one-half mile notice area surrounding the storage facility proposed. The response stated the Landowner Intervenors own the following acreage:

(a) Swenson Trust owns approximately 359.4 acres located within the horizontal boundaries of the storage facility proposed by SCS #2 and/or the one-half mile notice area surrounding the storage facility proposed by SCS #2.

(b) Haupt owns approximately 160 acres located within the horizontal boundaries of the storage facility proposed by SCS #1 and/or the one-half mile notice area surrounding the storage facility proposed by SCS #1.

(c) Metz owns approximately 18.88 acres located within the horizontal boundaries of the storage facility proposed by SCS #1.

(d) Jochim owns approximately 160 acres located within the horizontal boundaries of the storage facility proposed by SCS #2.

(e) Maize owns approximately 80 acres located within the horizontal boundaries of the storage facility proposed by SCS #1.

(f) Gerving owns approximately 393.5 acres located within the horizontal boundaries of the storage facility proposed by SCS #1 and/or the one-half mile notice area surrounding the storage facility proposed by SCS #1.

(g) Rust owns approximately 160 acres located within the horizontal boundaries of the storage facility proposed by SCS #2.

(h) Bauman owns approximately 140 acres located within the horizontal boundaries of the storage facility proposed by SCS #2.

(i) Smith owns approximately 15 acres located within the horizontal boundaries of the storage facility proposed by SCS #2 and/or the one-half mile notice area surrounding the storage facility proposed by SCS #2.

(j) Kraft owns approximately 174.58 acres in the vicinity of the proposed carbon dioxide storage facilities but owns no acreage located within the horizontal boundaries and/or the one-half mile notice area surrounding the storage facilities.

(k) Liebelt owns approximately 80 acres located within the horizontal boundaries of the storage facility proposed by SCS #3.

(23) The Hearing Officer on May 31, 2024 granted the Landowner Intervenors' Petition to Intervene on a limited basis. Haupt, Metz, Maize, and Gerving are granted intervention as it relates to SCS #1 (Case Nos. 30869, 30870, 30871, and 30872). Swenson Trust, Jochim, Rust, Bauman, and Smith are granted intervention as it relates to SCS #2 (Case Nos. 30873, 30874, 30875, and 30876). Liebelt is granted intervention as it relates to SCS #3 (Case Nos. 30877, 30878, 30879, and 30880). Kraft's intervention will not be considered insofar as it falls outside the lands proposed by SCS #1, SCS #2, and SCS #3.

(24) The Hearing Officer on June 3, 2024 granted Minnkota's Petition to Intervene, however at the hearing Minnkota must demonstrate its correlative rights are impacted by SCS #1, SCS #2, and SCS #3's proposed storage facilities.

(25) Counsel for the Landowner Intervenors submitted a Request for Telephonic Testimony on June 6, 2024. Counsel for SCS #1, SCS #2, and SCS #3 submitted a Request for Telephonic Testimony on June 7, 2024.

(26) The Hearing Officer granted Landowner Intervenors and SCS #1, SCS #2, and SCS #3's Requests for Telephonic Testimony on June 7, 2024.

(27) The Hearing Officer denied Intervenor Swenson Trust's Motion to Continue Hearing, Request for Scheduling Conference, and Motion to Expedite Discovery on June 7, 2024. These motions were filed on the grounds that Intervenor Swenson Trust was not afforded adequate time to review, analyze, and assess the impacts the storage facility permit would have on Intervenor Swenson Trust's property. The following facts are relevant to the Commission's denial of the motions:

(a) Swenson Trust was served notice of the hearing on April 16, 2024 pursuant to NDAC Section 43-05-01-08 by the applicant, SCS #2.

(b) Swenson Trust's legal counsel, Braaten Law Firm, submitted an open records request to the Commission on June 14, 2023 requesting all documents and correspondence related to the SCS #1, SCS #2, and SCS #3 (collectively called Summit in Paragraphs (b) through (d)) storage facility permit applications and Commission staff provided Reservoir Characterization Using Epicentre (RESCUE) files from Petrel and Computer Modeling Group (CMG) software packages to Braaten Law Firm on June 23, 2023 as part of that request. RESCUE files are an open standard for the transfer of data from geologic models. The RESCUE files alongside the technical details within the storage facility permit applications could be used to evaluate and assess the impacts of the storage facility permits.

(c) Braaten Law Firm, submitted a subsequent open records request to the Commission on August 24, 2023 requesting all new documents and correspondence related to the Summit storage facility permit applications and Commission staff provided the CMG DAT file, as part of that request by file transfer share on August 25, 2023. The CMG DAT file contains information about a numerical model used to review, analyze, and assess the impacts of the storage facility permits.

(d) Braaten Law Firm submitted a subsequent open records request to the Commission on March 12, 2024. Commission staff responded on March 18, 2024 that the request was too broad. Braaten Law Firm responded on March 27, 2024 disagreeing the request was too vague but understanding the Commission's position and would respond accordingly. Braaten Law Firm submitted a later request on May 15, 2024 (Exhibit LO-83), requesting all electronic data files and load files related to the Summit applications for geochemical modeling, geological model, and numerical simulation, including all input files and geophysical logs. The Commission has discovered that an incorrect date was referenced in its response to the May 15, 2024 request asking for the CMG numerical reservoir simulation model files. The CMG numerical reservoir simulation model files were previously provided to Braaten Law Firm as part of the August 24, 2023 request instead of the referenced September 21, 2023 which was an open records request submitted by Braaten Law Firm requesting information on gas storage applications pursuant to NDCC Chapter 38-25.

(e) If, as Braaten Law Firm contends, any of the open records requests were not fulfilled, Braaten Law Firm did not inform Commission staff that numerical modeling files

were not received and did not take any action under NDCC Chapter 44-04 including requesting an attorney general's opinion on the alleged denial pursuant to NDCC Section 44-04-21.1.

(28) Counsel for Minnkota filed a letter dated June 10, 2024 stating Minnkota and SCS #1, SCS #2, and SCS #3 (collectively called Summit in this paragraph) had reached an agreement with respect to Minnkota's concerns. Summit and Minnkota agreed to language that is being proposed to be added to SCS #3's Storage Agreement's Section 3.12 – Border Agreements. Minnkota no longer anticipates offering testimony in Case Nos. 30869, 30870, 30871, 30872, 30873, 30874, 30875, 30876, 30877, 30878, 30879, and 30880. Minnkota did not appear at the hearings on June 11 through June 13, 2024 to provide testimony and the language proposed in this letter was included in the amended Storage Agreement provided by SCS #3 on June 24, 2024.

(29) Counsel for the Landowner Intervenors filed a Motion to Compel on June 10, 2024. Counsel for SCS #1, SCS #2, and SCS #3 (collectively called Summit in this paragraph) testified at the hearing on June 11, 2024 that Summit did not have the opportunity to review the Motion to Compel yet but would respond. Counsel for Summit provided a response on June 20, 2024 requesting the Commission deny the Motion to Compel.

(30) The record in these matters was closed on June 24, 2024.

(31) Counsel for the Landowner Intervenors filed multiple motions and briefs after the record had closed. The Commission has recorded these motions but finds they are not part of the official record and sufficient information has not been provided to reconsider the prior denial noted in aforementioned Paragraph (27):

(a) Counsel for the Landowner Intervenors filed an Objection to SCS #1, SCS #2, and SCS #3's submittal of supplements on June 27, 2024. Counsel for SCS #1, SCS #2, and SCS #3 filed a response on July 8, 2024 stating the Objection is meritless as the Commission could make a decision on the applications with or without the supplements provided on June 24, 2024.

(b) Counsel for the Landowner Intervenors filed a Petition of Reconsideration of Denial of Motion to Continue Hearing on July 2, 2024. Counsel for SCS #1, SCS #2, and SCS #3 filed a response on July 12, 2024 requesting the Commission deny the request. Counsel for the Landowner Intervenors filed a subsequent response to SCS #1, SCS #2, and SCS #3 on July 18, 2024.

(c) The Hearing Officer denied the Petition of Reconsideration of Denial of Motion to Continue Hearing on August 15, 2024 on the basis that sufficient information was not provided to reconsider the prior denial decision.

(d) Counsel for the Landowner Intervenors filed a Motion for Supplemental Hearing and Motion to Compel SCS #1, SCS #2, and SCS #3 to produce discovery requests on August 29, 2024. Counsel for SCS #1, SCS #2, and SCS #3 filed a response on September 12, 2024 requesting the Commission deny both requests. Counsel for the

Landowner Intervenors subsequently submitted a brief to further support their Motion for Supplemental Hearing and Motion to Compel on September 18, 2024.

(e) Counsel for the Landowners Intervenors filed declarations on November 4, 2024 indicating they have ran two versions of the model and are looking at submitting comments within the next 30 days on their model runs to the Commission. Counsel for SCS #1, SCS #2, and SCS #3 filed a response on November 12, 2024 requesting the Commission reject the Landowner Intervenors' attempts to stall the proceedings and deny their request for a supplemental hearing and proceed with a decision.

(f) Counsel for the Landowner Intervenors filed a declaration on December 9, 2024 stating they submitted an open records request to the Commission for the model files on November 13, 2024 and received the files on November 20, 2024 by flash drive; that the Landowner Intervenors' expert confirmed the files received by the Commission were the same files received from the Energy and Environmental Research Center (EERC); and that Landowner Intervenors require additional time now that they have received the model files from the Commission. The Commission notes the Landowner Intervenors' filing from August 29, 2024 stated EERC provided the modeling files to the Landowner Intervenors' Counsel on July 2, 2024.

(32) As of June 24, 2024 the record was closed. The Motion to Compel seeks to admit evidence after the record was closed and is hereby denied. The Commission finds that Landowner Intervenors' Motion to Compel is untimely because it was filed after the Commission held an evidentiary hearing on SCS #1, SCS #2, and SCS #3's applications, and since then the record has been closed with respect to accepting evidence. As such, the Commission finds that Landowner Intervenors' Discovery request would not serve any purpose.

(33) The Motion for Supplemental Hearing also seeks to introduce evidence after the record was closed. Moreover, the motion seeks to require the production of evidence that the Commission has already provided to Counsel for the Landowner Intervenors. Landowner Intervenors dispute that the Commission provided this information. Notwithstanding Landowner Intervenors' argument, Counsel for them did not raise the issue until the hearings had begun. Following the initial open records request, Landowner Intervenors never informed the Commission it did not receive the materials or take any action under NDCC Chapter 44-04 including request an attorney general's opinion, arguing that the Commission failed to respond to its initial request for the production of the materials. The Commission stands by its position that it provided the information pursuant to the open records request. As such, Landowner Intervenors were in possession of the information before the hearings and had ample opportunity to consider it. The Motion for Supplemental Hearing is hereby denied.

(34) At the hearings and in their various motions the Landowner Intervenors argue the Commission has violated their constitutional rights including due process. As part of issuing this order, however, the Commission notes it does not determine the constitutionality of North Dakota statues and laws. The Commission finds NDCC Section 38-22-10 to be the current law.

**THE COMMISSION FINDS:**

PUBLIC COMMENTS:

(35) The Commission received a letter dated April 28, 2024 from Fay Horn (Horn) formerly known as Fay Hill of Washburn, North Dakota. The letter states Horn is strongly opposed to the proposed carbon dioxide storage facility as it could negatively affect the land, environment, and minerals. Horn also states that Summit Carbon Storage has a bad reputation with landowners, such as going onto property without consent. The Commission notes Horn was identified as a mineral owner or surface owner for the BK Fischer storage facility requiring notification by SCS #2.

SCS #2 provided supplements on June 24, 2024 including a response to Horn that applicants have acquired in excess of 92% of the pore space lease agreements across all three units with broad landowner support and have acquired 100% voluntary easements for its flow lines in the sequestration area. The Commission notes Exhibit 5A, 5B, and 5C show SCS #1, SCS #2, and SCS #3 have leased approximately 89.14%, 92.43%, and 96.77%, respectively, across the three proposed storage facilities. The Commission finds Horn provided no evidence to support her position that the carbon dioxide storage facility would negatively affect the land, environment, and minerals and finds the storage facility permit application as proposed will not endanger the environment or negatively affect the land or minerals located within the storage facility area.

(36) The Commission received a letter May 6, 2024 from Gary Boeckel (Boeckel) of Stanton, North Dakota. The letter states Boeckel is opposed to the storage of carbon dioxide because the roads will be ruined, and the other states should build their own storage facilities rather than send it to North Dakota. The Commission notes Boeckel was identified as a mineral owner or surface owner, for the BK Fischer storage facility requiring notification by SCS #2.

SCS #2 provided supplements on June 24, 2024 including a response to Boeckel that applicants have worked with and will continue working with the appropriate townships and counties regarding road use and road repair. The Commission notes it does not have jurisdiction over road use or road repair and NDCC Section 38-22-01 states in part, that it is in the public interest to promote the geologic storage of carbon dioxide and that doing so will help benefit the state and global environment by reducing greenhouse gas emissions.

(37) The Commission received a letter from the State Historical Society of North Dakota (SHPO) dated May 15, 2024 indicating it reviewed the application of SCS #2. SHPO stated seismic testing can adversely affect certain types of sensitive cultural sites and is requesting its office be contacted regarding areas to avoid prior to any seismic testing. Additionally, SHPO states a Class III (pedestrian survey) of cultural resources is underway for the pipeline but is unable to verify if the survey includes all the injection wells, monitoring wells, and any of the new ground disturbance associated with access to these wells and recommends each of those sites be surveyed and that the survey follow “North Dakota SHPO Guidelines Manual for Cultural Resource Inventory Projects”.

SCS #2 was questioned by Commission staff on June 11, 2024 if they intended to meet SHPO’s requests. SCS #2 responded it would.

(38) The Commission received a similarly templated letter from five mineral owners listed below opposing the proposed storage facility permit because it will interfere and negatively impact their mineral right property interests. The mineral owners state that future development of their minerals will be more difficult, costly, and very likely unfeasible if the application is approved. If the application is allowed to proceed as proposed, Summit [sic; reference to Summit is equivalent to SCS #2] would be permitted to declare without challenge that minerals do not exist in the pore space or are of such little value as to not warrant compensation, which encourages a taking of property without compensation to the surface and mineral owner. Additionally, the mineral owners state that the proposal is in direct opposition to NDCC Section 47-31-08, which states, "In the relationship between a severed mineral owner and a pore space estate, this chapter does not change or alter the common law as of April 9, 2009, as it relates to the rights belonging to, or the dominance of, the mineral estate." The mineral owners state that prior to any approval, SCS #2 must first be required to negotiate with them, as a mineral owner, a fair price for the severance or use of their property and any consequential impacts to their mineral interest.

(a) A letter dated May 30, 2024 from Victorie Brown of Solomons, Maryland.

(b) A letter dated June 7, 2024 from Mark Schultz of Reston, Virginia.

(c) A letter dated June 8, 2024 from Brenda L. Lipp of Bismarck, North Dakota.

(d) A letter dated June 9, 2024 from Eric Schultz of Almont, North Dakota.

(e) A letter dated June 10, 2024 from Meda Schultz of Maple Valley, Washington.

SCS #2 filed a copy of the "Notice of Hearing" pursuant to NDAC Section 43-05-01-08(2) and the affidavit of service lists the five mineral owners or their addresses above as notified parties.

There has been no historic hydrocarbon exploration, production, or studies suggesting there is an economically viable supply of hydrocarbons from formations above or below the Broom Creek Formation within the proposed storage facility area. There has been historic production approximately 13 miles to the northwest of the storage facility from the Entze #29 1 well (File No. 7616). SCS #2 testified at the hearing and summarized in a provided supplement on June 24, 2024 that the storage facility area will not negatively impact mineral interests and future development. SCS #2 states that in the event hydrocarbons are discovered in commercial quantities below the Broom Creek Formation, a horizontal well could be used to produce the hydrocarbons while avoiding drilling through the carbon dioxide plume or a vertical well could be drilled using proper controls via increased drilling mud weight determined from real-time Broom Creek Formation bottom hole pressure data. SCS #2 also testified there are no existing mines that have plans to mine coal within the storage facility area during the project's operational period.

NDCC Section 47-31-03, states "title to pore space in all strata underlying the surface of lands and waters is vested in the owner of the overlying surface estate." The Commission notes that when the surface and mineral estate is severed, the surface estate owns the pore space and is compensated for storage. Pursuant to NDCC Section 38-22-08(6) if minerals are present in the pore space the mineral owner must be compensated. The Commission received no compelling information to

indicate the storage reservoir contains commercially valuable minerals, or that underlying or overlying minerals would be stranded.

(39) The Commission received an email on June 10, 2024 from Meda Schultz (Schultz) in general opposition of all three storage facility permit applications submitted by SCS #1, SCS #2, and SCS #3 (collectively called Summit in this paragraph). Schultz brings up the following concerns, not previously stated in the aforementioned Paragraph (38).

(a) Schultz believes an agreement to Summit's proposal is a continuance to the ongoing reliance of the old, dying, and harmful oil, gas, and chemical industries. Schultz states it is time to look for new energy sources.

(b) Schultz believes Summit's proposal puts North Dakota's safety at potential risk as carbon dioxide capture, transport, and storage has a limited history to demonstrate it can be done in a safe manner.

(c) Schultz believes Summit's proposal allocates North Dakota's resources to other jurisdictions and owners, as the majority of the contributors come from out of state causing North Dakota's resources to be consumed for the benefit of those out-of state. Additionally, Summit is expected to receive an $85 per metric ton tax credit but only provide $0.50 per metric ton back to the property owner, resulting in further inequity.

(d) Schultz believes Summit's proposal allows it to take what is not its to take. Summit plans to consume pore space that may be void or may contain other gases that could hold value, which should be retained by the existing surface or mineral owners.

(e) Schultz questions who inherits the risk and cost after Summit is no longer a storage facility owner after a 10-year period as allowed by North Dakota law.

The Commission notes Schultz was identified as a mineral owner for the TB Leingang and BK Fischer storage facilities requiring notification by SCS #1 and SCS #2.

Summit provided supplements on June 24, 2024 including a response to Schultz, stating the project serves to support the bio-fuel and agricultural industries, not the oil, gas and chemical industries.

NDCC Section 38-22-10 states "If a storage operator does not obtain the consent of all persons who own the storage reservoir's pore space, the commission may require that the pore space owned by nonconsenting owners be included in a storage facility and subject to geologic storage."

NDCC Section 38-22-08(14) states "That all nonconsenting pore space owners are or will be equitably compensated." Summit testified all pore space owners would be compensated in the same fashion regardless of if they signed a pore space lease. The Commission notes pore space owners within the storage facility will economically benefit from the development of their pore space resource for the storage of carbon dioxide.

The Commission notes the following in response to Schultz's question related to who inherits the risk and cost after a storage facility is closed. NDCC Section 38-22-17(6) states in part, that once a certificate of project completion is issued, title to the storage facility and to the stored carbon dioxide is acquired by the state, including rights and interests in and all responsibilities associated with, the stored carbon dioxide; and monitoring and managing the storage facility is the state's responsibility to be overseen by the Commission. Storage operators shall pay the Commission a fee, pursuant to NDCC Section 38-22-15, on each ton of carbon dioxide injected for storage to be deposited in the carbon dioxide storage facility trust fund. This special fund is appropriated to defray expenses the Commission may incur in long-term monitoring and management of a closed facility. The Commission notes that NDCC Section 38-22-17 states in part, that a certificate of project completion may not be issued until at least ten years after carbon dioxide injections end, provided the storage operator can show the carbon dioxide in the storage reservoir has become stable and is reasonably expected to remain within the storage reservoir boundary.

The information and opinions included in Schultz's letter that were not herein addressed are either inapplicable, irrelevant to the application, unsubstantiated, or previously addressed.

(40) The Commission received an email from Dakota Resource Council (DRC) on June 10, 2024. DRC believes North Dakota's amalgamation law is unconstitutional because equitable compensation is not a substitute for the safeguards guaranteed by the Constitution of North Dakota and NDCC Chapter 32-15, which require just compensation, by condemnation hearing with jury, to be paid for land or real property taken by eminent domain. Northwest Landowners Association has a pending lawsuit in district court on this issue. DRC is requesting the North Dakota Industrial Commission (NDIC) wait to rule on Case Nos. 30869-30880, or any other case until the courts determine the constitutionality of North Dakota's amalgamation law.

SCS #2 provided supplements on June 24, 2024 including a response to DRC, stating the NDIC should continue to proceed according to the NDCC [sic; SCS #2 meant to reference NDCC Chapter 38-22] and that DRC's comments are tantamount to judicial activism. The Commission notes the constitutionality of NDCC Section 38-22-10 has been previously responded to in Paragraph (34) above.

(41) The Commission received similarly templated emails from Emma Schmit and Janet Miller (Schmit and Miller) on June 10, 2024. They are in opposition to the three storage facility permits submitted by SCS #1, SCS #2, and SCS #3 (collectively called Summit in this paragraph) for the following reasons:

(a) Schmit and Miller believe North Dakota's Class VI program has a notable gap from the Environmental Protection Agency (EPA) in addressing environmental justice concerns.

(b) Schmit and Miller believe North Dakota should suspend further actions until the ongoing legal challenges to North Dakota's amalgamation laws reach a definitive resolution in Court to protect the interests and rights of all involved parties.

(c) Schmit and Miller believe allowing Summit to annually store up to 18 million metric tons of carbon dioxide could severely disrupt industries that depend on carbon dioxide, such as fruit and vegetable preservation, beverage production, and pharmaceutical manufacturing.

(d) Schmit and Miller believe Summit's applications, submitted on February 6, 2024, fail to acknowledge its expansion with additional ethanol plants and this change necessitates a more detailed review to ensure accurate and transparent information before any decisions are made.

(e) Schmit and Miller also believe the environmental risks, including induced seismicity and leakage into water sources, are too high considering the long-term stability of carbon dioxide is not guaranteed and carbon capture storage technology is still evolving and unproven on the proposed scale and North Dakota should not bear the risk of this experimental approach.

The Commission notes that neither Schmit nor Miller were identified as a mineral owner or surface owner requiring notification for any of the three storage facilities.

Summit provided supplements on June 24, 2024 including a response to Schmit and Miller, stating it believes the NDIC has jurisdiction.

The Commission notes the following in response to Schmit and Miller's concerns relating to the addition of more ethanol plants since the applications were submitted on February 6, 2024:

Summit testified the applications are requesting commercial permits for operation and injection of carbon dioxide that allow the flexibility to receive carbon dioxide from a variety of industrial sources. Summit referenced Exhibit 3A that includes the addition of 27 ethanol plants to the revised Figure PS-2 included with the applications submitted on February 6, 2024. Summit explained the MCE Pipeline system is designed to accommodate a carbon dioxide stream that is at least 95% carbon dioxide with the anticipated stream being greater than 98.25% carbon dioxide once delivered to the storage facilities. Summit testified the 57 ethanol plants currently contracted emit approximately 16 million metric tons of carbon dioxide that could be captured.

NDAC Section 43-05-01-07.2 requires the Commission to prepare a draft permit and fact sheet when a storage facility permit application is complete. The description of the facilities and the quantity and quality of the carbon dioxide stream testified to reflect what was provided on the fact sheet for the draft permits.

NDAC Section 43-05-01-11.4 states in part "the storage operator shall prepare, maintain, and comply with a testing and monitoring plan to verify that the geological sequestration project is operating as permitted and is not endangering underground sources of drinking water." Summit has submitted a testing and monitoring plan, as summarized in Table 5-2 of each application, that accounts for passive seismicity monitoring and leak detection monitoring at the well bore.

NDAC Section 43-05-01-14 requires the storage operator to have an integrated leak detection system and to report any leaks detected at the well or surface facilities. The submitted testing and monitoring plan accounts for leak detection monitoring at the well and surface facilities.

The information and opinions included in Schmit and Miller's email that were not herein addressed are either inapplicable, irrelevant to the application, unsubstantiated, or previously addressed.

(42) The Commission received an email on June 10, 2024 from Kathy Carter (Carter) of Rockford, Iowa. Carter is in opposition to the three storage facility permits submitted by SCS #1, SCS #2, and SCS #3 (collectively called Summit in this paragraph). Carter questions whether anyone can be certain that carbon dioxide will stay within the pipeline, injection wells, and injection zone, notes Summit's lack of experience with building a pipeline or injection wells, and the dangers of carbon dioxide creating carbonic acid as reasons for opposition.

The Commission notes Carter was not identified as a mineral owner or surface owner requiring notification for any of the three storage facilities.

Summit provided supplements on June 24, 2024 including a response to Carter, stating these concerns were addressed in its applications and through testimony at the hearings. The Commission agrees.

(43) The Commission received an email on June 10, 2024 from Lisa Ritzert (Ritzert). Ritzert is in opposition to the proposed storage facility. Ritzert believes carbon capture and sequestration is an underregulated industry that needs greater consideration for people, community, and resource protection and safety before pipelines of this nature can be considered. Ritzert states the intentions of these pipelines have not been clear and continues to change, but in any case, its clear monetary profits are being put ahead of people.

The Commission notes that Ritzert was not identified as a mineral owner or surface owner requiring notification for any of the three storage facilities.

SCS #2 provided supplements on June 24, 2024 including a response to Ritzert, stating it provided testimony that the flow lines that are part of the sequestration projects will be built in accordance with standards set forth in 49 CFR 195 (Code of Federal Regulations –Transportation of Hazardous Liquids by Pipeline).

The information and opinions included in Ritzert's email are directed at the transportation of carbon dioxide by pipeline rather than on the storage of carbon dioxide.

(44) The Commission received an email on June 10, 2024 from Paul Schock (Schock) in support of the three storage facility permits submitted by SCS #1, SCS #2, and SCS #3 (collectively called Summit in this paragraph). Schock owns land in Sections 19 and 33, Township 142 North, Range 88 West, Mercer County, North Dakota. Schock stated Summit has been very transparent, open, and honest and believes the project will sustain and enhance the agricultural industry, provide jobs and tax revenue for the counties and state, and provide supplemental income to

farmers and ranchers. The Commission notes Schock was identified as a surface owner for the BK Fischer storage facility requiring notification by SCS #2.

(45) The Commission received an email on June 10, 2024 from Gary and Carla Poeckes of Lake View Services, LLC (LVS), located in Beulah and Trenton, North Dakota, in support of the three storage facility permits submitted by SCS #1, SCS #2, and SCS #3 (collectively called Summit in this paragraph). LVS is a crane and trucking company that has been serving western North Dakota for 13 years and has worked with Summit for the past two years to maintain their well sites. LVS states Summit is easy to communicate with, pays its bills promptly, and is always willing to assist them.

(46) The Commission received a letter on June 10, 2024 from North Dakota State Representative, Anna Novak (Novak) of District 33 in support of the three storage facility permits submitted by SCS #1, SCS #2, and SCS #3. Novak states North Dakota's significant history of carbon management, the benefit to economic development, and the level of voluntary landowner support for the storage facilities as reasons for her support. The Commission notes Novak was not identified as a mineral owner or surface owner requiring notification for any of the three storage facilities.

(47) Kenneth Hintz (Hintz) appeared on June 13, 2024 to provide testimony. Hintz testified to owning the NE/4 of Section 9 and the NE/4 of Section 17, Township 142 North, Range 86 West, Oliver County, North Dakota. Hintz is in support of Summit Carbon Solution's project (sic; Hintz reference to Summit Carbon Solution's project is equivalent to the storage facility permit applications for SCS #1, SCS #2, and SCS #3) because it will provide new industry for North Dakota, provide supplemental income for farmers and ranchers, and new tax dollars for the county. Hintz explains he has worked with the company since 2021, and the experiences have been good and open. The Commission notes Hintz was identified as a surface owner for the KJ Hintz storage facility requiring notification by SCS #3.

(48) SCS #2 provided supplements on June 24, 2024 including a response to those who submitted written comments in support of the three storage facility permits. SCS #2 believes the supporting comments are indicative of the over 450 landowners who entered into voluntary agreements for the development of their pore space.

INTERVENOR EXAMINATION:

*CROSS EXAMINATION:*

(49) Counsel for the Landowner Intervenors appeared in these consolidated matters, cross examined SCS #1, SCS #2, and SCS #3 (collectively called Summit in this Intervenor Examination Section) and provided direct examination as to why the storage facility permits should be denied by the Commission.

(50) Counsel for the Landowner Intervenors questioned the accuracy of the North American Industry Classification System (NAICS) code provided in Summit's testimony. Summit, during

later testimony, provided the correct NAICS code for the proposed capture sources (ethanol facilities). The corrected NAICS code meets NDAC Section 43-05-01-07.1(3)(c).

(51) Counsel for the Landowner Intervenors questioned Summit on what "mechanical" miscalculation means in Article 2.4 (Correcting Errors) of the Storage Agreement. Summit responded it was a typographical error that should read "mathematical" miscalculation and would provide a supplement amending the Storage Agreement. The amended Storage Agreement submitted on June 24, 2024 corrected the typographical.

(52) Counsel for the Landowner Intervenors questioned Summit on its reasoning to include the following terms within the Storage Agreement and Exhibit D to the Storage Agreement (Pore Space Lease):

Storage Agreement
(a) Article 3.3 (Amendment of Leases and Other Agreements)

(b) Article 7.1 (Warranty and Indemnity)

(c) Article 10.2 (Waiver of Rights to Partition)

(d) Article 16.2 (Joinder in Dual Capacity)

Pore Space Lease
(a) Warranty of Title within Section 18 (Warranty of Title and Quiet Enjoyment)

(b) Section 25 (Confidentiality)

Summit agreed to strike the terms above and provide a supplement amending the Storage Agreement and Pore Space Lease. The amended Storage Agreement and Pore Space Lease submitted on June 24, 2024 has the terms above stricken.

(53) Counsel for the Landowner Intervenors asked Summit why it chose not to include the no surface facilities clause to the Pore Space Lease agreement. Summit responded it did not anticipate that to be a difficult addition. The amended Storage Agreement submitted on June 24, 2024 added a No Surface Occupancy clause as the first paragraph under Article 8 (Easements or Use of Surface) which states in part that unless agreed to in writing with the owner of the surface estate, the operator shall not place any surface facilities on the surface estate owned by any pore space owner within the boundaries of the facility area.

(54) Counsel for the Landowner Intervenors asked Summit to clarify Section 34 (Insurance) in the Pore Space Lease and add a waiver of subrogation with respect to the insurance it is carrying for the landowners. Summit responded it would submit an amended Pore Space Lease. The amended Pore Space Lease submitted on June 24, 2024 includes a term that the policy shall be endorsed or include a provision waiving insurer rights of subrogation against the Lessor.

(55) Counsel for the Landowner Intervenors asked Summit to explain its understanding of NDCC Section 38-22-17 where it states in part, "Once a certificate is issued: Title to the storage facility and to the stored carbon dioxide transfers, without payment of any compensation to the State." Summit responded its understanding is that Summit would transfer the leasehold rights as well as the stored carbon dioxide. NDCC Section 38-22-16 states in part, "The storage operator has title to the carbon dioxide injected into and stored in a storage reservoir and holds title until the commission issues a certificate of project completion." NDCC Section 38-22-17 states in part that, "Once a certificate is issued: Title acquired by the state includes all rights and interests in, and all responsibilities associated with, the stored carbon dioxide."

(56) Counsel for the Landowner Intervenors asked Summit if its geologic model could be replicated without the 3D seismic survey information. Summit explained the 3D seismic information was used to interpret the variograms used in the geologic model and the variogram information is available in the permit application so a third-party could replicate the geologic model but it would not be an exact duplicate as the 3D seismic data was used to interpret seismic horizons for the structural model. The Commission notes that seismic data is proprietary and the use of seismic data is not required pursuant to NDAC Section 43-05-01-05(1)(b)(2)(k).

(57) Counsel for the Landowner Intervenors asked Summit if the land that sits in between the area of reviews, as shown in Exhibit LO-63, would see pressure interference due to the injection into the three proposed storage facilities and if such pressure interference would limit the ability to inject into the pore space in the reservoir located across the questioned lands. Summit responded that an operator could still develop and store carbon dioxide in the pore space but that the regulatory limitation placed on the bottom hole pressure might impact potential injection rates. The Commission agrees.

*DIRECT EXAMINATION:*

(58) Counsel for the Landowner Intervenors called upon five witnesses, Shane Bofto (Bofto) of Hydro Solutions, Inc., Paul Ted Doughty (Doughty) of PTD Geoscience, LLC, Paul Michael Button (Button) of Button Petroleum Management LLC, Chris Stockness (Stockness) of Shenhon Company, and Kurt Michael Swenson (Swenson) who is one of the Landowner Intervenors, representing the Swenson Trust.

(59) Bofto testified he is capable and ready to run the geochemical model in the PHREEQC software once the data and input files are received. Summit previously testified PHREEQC is a free model that anyone can use and all input data used in the PHREEQC models is described in the permit application. The Commission notes the PHREEQC software is a public domain geochemical modeling software available from the U.S. Geological Survey and agrees that the data to replicate the PHREEQC modeling is available within the storage facility permit application.

(60) Button testified he is capable and ready to run the numerical simulation model using Computer Modeling Group Ltd. (CMG) software once the data and input files are received. The Commission stands by its assertion that Counsel for the Landowner Intervenors had or could have had this information as discussed in aforementioned Paragraph (27).

(61) Stockness testified he was hired by the Landowner Intervenors to perform a valuation or credible analysis on the pore space rights of the Landowner Intervenors' lands in Mercer and Oliver Counties, North Dakota. Stockness stated he was unable to provide an opinion on what fair market value is of pore space located in Mercer, Oliver, and Morton Counties, North Dakota. The Commission notes it does not set or evaluate the fair market value of pore space as those terms are negotiated between the applicant (storage operator) and the pore space owners.

(62) Swenson testified to being the trustee for the Swenson Trust, which owns the lands mentioned in aforementioned Paragraph (18a). Swenson also testified to recently signing a purchase agreement for more land interest in Section 20, Township 142 North, Range 87, Oliver County, North Dakota and having options on another 480 acres in that area. Swenson testified he is not against the applicant Summit or the proposed storage facilities, but he does disagree with the use of taxpayer funds to reward their unconstitutional taking of private property. Swenson testified to the following, as being the reasons, the Commission should deny these applications:

(a) Swenson believes NDCC Chapter 38-22 amalgamation law is a taking of private property that does not allow the private owner a constitutionally guaranteed judicial hearing or trial by a jury to determine just compensation if an agreement is not reached between the private owner and applicant.

(b) Swenson believes Summit has not made a good-faith effort to get his consent for the pore space owned by himself, the Swenson Trust, and the group of landowners he is representing (Landowner Intervenors).

(c) Swenson does not believe Summit's proposed storage facilities are accomplishing the policy goals listed under NDCC Chapter 38-22.

(d) Swenson testified he does not believe equitable compensation is occurring or that the Commission has the information available to determine if equitable compensation is being met as required by NDCC Chapter 38-22.

(e) Swenson testified he has been severely prejudiced by the State's lack of enforcement of North Dakota Rules of Civil Procedure as he has not received one piece of discovery from Summit. Swenson testified he believes he has been unfairly treated as his Petition to Intervene was only granted for the BK Fischer application submitted by SCS #2 but Minnkota, who is to see smaller pressure increases in its leased pore space, as shown in Exhibit LO-86, was granted approval to petition in all three storage facilities.

(f) Swenson testified he believes the storage facility boundary that determines which pore space owners are paid is arbitrary and inaccurate.

(g) Swenson believes the pore space he owns outside of the storage facility area boundaries will be negatively affected, as shown by Exhibit LO-63, by the injection operations. Swenson testified that much of his land will have pressure trespass in the

pore space rendering him unable to use it for a net cash flow and that he is not being paid for his pore space being damaged.

(h) Swenson testified Summit has not submitted into the record any evidence of a potential vapor release model, concentration gradients of the carbon dioxide that may be released, and its potential impact to public receptors should a release occur. Swenson believes this information is necessary before making a determination on whether the project could endanger human health.

The Commission notes the following in response to Swenson's testimony:

(a) At the hearings and in their various motions the Landowner Intervenors argue the Commission has violated their constitutional rights including due process. As part of issuing this order, however, the Commission notes it does not determine the constitutionality of North Dakota statues and laws. The Commission finds NDCC Section 38-22-10 to be the current law.

(b) NDCC Section 38-22-08(4) requires the storage operator to make a good-faith effort to get the consent of all persons who own the storage reservoir's pore space and NDCC Section 38-22-08(5) requires the storage operator to obtain the consent of persons who own at least sixty percent of the storage reservoir's pore space. Summit testified that through good-faith negotiations with over 450 landowners, it acquired pore space agreements for over 146,500 acres and during those negotiations made changes to the pore space agreement, including a 50% increase in the royalty payment rate, the addition of a Favored Nations clause, and offering of a no surface facilities clause (No Surface Occupancy). Exhibit 5A, 5B, and 5C show SCS #1, SCS #2, and SCS #3 have leased approximately 89.14%, 92.43%, and 96.77%, respectively, across the three proposed storage facilities. A good-faith effort does not always result in an agreement between parties and a good-faith effort was made by Summit as indicated by the large percentage of consenting pore space owners.

(c) The approval of Summit's three storage facility permit applications is in the public interest by promoting the policy stated in NDCC Section 38-22-01.

(d) NDCC Section 38-22-08(14) requires that all nonconsenting pore space owners are or will be equitably compensated. "Equitably compensated" in this statute is not to be interpreted as assessing or setting the fair market value of pore space. Summit's one-phase formula based on surface acres and implementation of the Favored Nation clause under Section 32 of the Pore Space Lease agreement will equitably compensate all pore space owners within the storage facilities. The Commission does not set or evaluate the fair market value of pore space as those terms are negotiated between the applicant (storage operator) and the pore space owners; however over 90% of the pore space owners across the three storage facilities signed pore space lease agreements, indicating the majority of the pore space owners agree they are being fairly compensated for the use of their pore space.

(e) Minnkota's Petition to Intervene was granted only upon Minnkota demonstrating its correlative rights are impacted.

(f) Swenson is not qualified to evaluate the accuracy of the storage facility boundary. The storage facility permit application and testimony provided by Summit at the hearing adequately define the horizontal and vertical boundaries of the storage reservoir.

(g) Swenson is not qualified to evaluate the effect the injection operations and associated pressure front may have on his pore space. This topic has been discussed in aforementioned Paragraph (57).

(h) Dispersion models are not required to be submitted with storage facility permit applications. The storage facility permit application's geologic and area of review evaluations indicate the confining zone properties and lack of pathways for migration present across the storage reservoir will prevent carbon dioxide from leaking out of or for other substances to leak into the storage reservoir, as required pursuant to NDCC Section 38-22-08(8) and (9). The storage facility permit application includes a testing and monitoring plan, postinjection site care and facility closure plan, and emergency and remedial response plan, and these plans if followed will ensure compliance with NDCC Section 38-22-08(13). The storage facility permit as proposed will not endanger human health nor unduly endanger the environment and will not adversely affect surface waters or formations containing fresh water, as required pursuant to NDCC Section 38-22-08(7) and (10).

TECHNICAL REVIEW:

(63) SCS #2's application provides adequate data to show suitability of the Broom Creek Formation for geologic storage of carbon dioxide in the facility area. SCS #2 testified the storage facility was suitable and feasible for carbon dioxide injection and storage pursuant to NDCC Section 38-22-08(2). The Commission agrees.

(64) SCS #2's application provides adequate modeling of the storage reservoir for delineation of the facility area pursuant to NDAC Section 43-05-01-05, provides adequate monitoring to detect if carbon dioxide is migrating into properties outside of the facility area pursuant to NDAC Section 43-05-01-11.4, and should a vertical or lateral release of carbon dioxide from the facility occur, emergency and remedial plans are in place pursuant to NDAC Section 43-05-01-13.

(65) NDCC Section 38-22-08(6) requires the Commission to find whether the storage facility contains commercially valuable minerals and, if it does, a permit may be issued only if the Commission is satisfied that the interests of the mineral owners or mineral lessees will not be adversely affected or have been addressed in an arrangement entered into by the mineral owners or mineral lessees and the storage operator. The proposed storage facility does not contain commercially valuable minerals. The amalgamated storage reservoir pore space to be utilized is not hydrocarbon bearing as determined from test data included with the application. There has

been no historic hydrocarbon exploration, production, or studies suggesting there is an economic supply of hydrocarbons from formations above or below the Broom Creek Formation within the proposed storage facility area. Lignite coal is mined near the proposed storage facility area from the Sentinel Butte Formation, within the Beulah Horizon of the Beulah-Zap Interval. Coal seams exist in the Bullion Creek Formation. All coal seams present in the Fort Union Group above the facility area will not be impacted by this project as there are no current or future planned mining activities within the proposed storage facility area. SCS #2 testified if operators decide to drill wells for hydrocarbon exploration or production in the future, the lateral extent of the stabilized plume and the pressure differential are minor enough to allow for either horizontal drilling without penetrating the stored carbon dioxide or vertical drilling with proper controls, for hydrocarbon exploration below the Broom Creek Formation. The Commission agrees.

(66) The MCE Pipeline is an approximately 2,500-mile proposed carbon dioxide transmission pipeline that will be constructed, owned, and operated by SCS Carbon Transport LLC (SCS CT). SCS #2 testified the MCE Pipeline will be capable of transporting up to 18.5 million metric tons of carbon dioxide annually from anthropogenic sources, including ethanol facilities and other industries across the Midwest, including Iowa, Minnesota, Nebraska, South Dakota, and North Dakota, to be stored in three storage facilities, namely the TB Leingang, BK Fischer, and KJ Hintz located in Mercer, Morton, and Oliver Counties, near the city of Beulah, North Dakota, respectively owned and operated by SCS #1, SCS #2, and SCS #3. SCS #2 testified Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC are all wholly owned subsidiaries of SCS Permanent Carbon Storage LLC (SCS PCS), and SCS Carbon Transport LLC and SCS Permanent Carbon Storage LLC are both wholly owned subsidiaries of Summit Carbon Solutions, LLC. SCS #2 testified at the time of the hearing, 57 ethanol plants had signed contracts, including Tharaldson Ethanol in Casselton, North Dakota.

(67) The dynamic reservoir simulation for SCS #2's application indicated approximately 4.92 million metric tons of carbon dioxide annually or 98.3 million metric tons over the 20-year injection period, could be stored, without exceeding the maximum bottom hole pressure constraint, derived as 90% of the formation fracture pressure of the Broom Creek Formation and a well head pressure of 2,100 psi during injection. The capacity for the three storage facilities combined was modeled to be approximately 17.6 million metric tons of carbon dioxide annually or 352 million metric tons over the 20-year injection period. SCS #2 testified the 57 ethanol plants account for approximately 16 million metric tons of carbon dioxide annually and should additional volumes be contracted that would exceed the capacity of the three storage facilities, an additional storage facility permit would be pursued.

(68) SCS CT has submitted a permit to the North Dakota Public Service Commission (PSC) for approximately 332 miles of the MCE Pipeline that is within the state of North Dakota. Transition from the PSC jurisdiction transmission line (MCE Pipeline) to the flow lines for the three storage facilities will be at the terminus point located in Section 5, Township 141 North, Range 86 West, Oliver County, North Dakota. The entire length of the approximately 5.4-mile flow line to be utilized for carbon dioxide transportation from the junction off the TB Leingang flow line, where a launcher/receiver is proposed to be in Section 5, Township 141 North, Range 87 West, Oliver County, North Dakota (the TB/BK junction is considered part of the injection facility for the proposed BK Fischer storage facility) is under the jurisdiction of the Commission.

(69) The 16-inch and 24-inch flow line will be high-strength carbon steel pipe constructed in accordance with American Petroleum Institute (API) 5L X-70 PSL 2 (2018) requirements and is anticipated to have maximum operating pressure of 2,183 psig and maximum design flow rate of 314.5 million standard cubic feet per day. The flow line will have an impressed current cathodic protection (ICCP) system installed to mitigate external corrosion. SCS #2 testified the flow lines for all three storage facilities, the MCE Pipeline, and the ICCP system will be constructed and operated in compliance with the Pipeline and Hazardous Materials Safety Administration's Title 49 of the Code of Federal Regulations, Part 195. SCS #2 testified the flow line would be operated in a manner that would not exceed the surface and bottom hole pressure constraints of the injection wells.

(70) The flow line will be equipped with flowmeters, pressure gauges, and a Supervisory Control and Data Acquisition (SCADA) system to detect leaks. The SCADA system will be integrated to allow SCS #1, SCS #2, SCS #3, SCS PCS, and SCS CT to share operational data and controls in real-time to ensure operational parameters are safely maintained between all injection sites. Carbon dioxide gas detection stations will be placed on the injection well heads and inside the pump and metering buildings. SCS #2 testified the flow line will be owned by SCS #2 but operated by SCS CT, as a single integrated system, with the SCS #1 flow line, SCS #3 flow line, and MCE Pipeline.

SCS #2 testified each injection well will have a dedicated mass flowmeter in addition to a mass flowmeter located at the terminus point (custody transfer point from MCE Pipeline to SCS #1's flow line). SCS #2 was questioned by Commission staff at the hearing on June 12, 2024 if it would be opposed to a requirement to add flowmeters at the beginning of each individual flow line to show custody transfer to SCS #2 and SCS #3, to which SCS #2 had no opposition. SCS #2 provided a supplemental filing on June 24, 2024 to clarify prior testimony, to add it does not object to the requirement but does not believe the additional custody transfer points (flowmeters) will add significant value to the accuracy of the metering and leak detection system. SCS #2 explains the addition of these flowmeters would require additional resources to calibrate meters and stream quality analyzers and require the addition of a 24-inch smart tool receiver and launcher. SCS #2 recommends such additions be contemplated in the future should one of the storage facilities be sold.

(71) The projected composition of the commingled carbon dioxide stream being transported by the MCE Pipeline at the time of this application is anticipated to be at least 98.25% carbon dioxide, less than 1.44% nitrogen, less than 0.31% oxygen, with trace quantities of water, hydrocarbons, hydrogen sulfide, sulfur, and glycol. The MCE Pipeline and storage facility have been conservatively designed to accommodate a carbon dioxide stream that is 95% carbon dioxide, 2% oxygen, and 3% nitrogen. The carbon dioxide stream composition used in the dynamic reservoir simulation was 98.25% carbon dioxide which SCS #2 testified represents the anticipated average carbon dioxide stream based on compositional tests from the 57 ethanol plant sources and provides for a more representative plume boundary. SCS #2 testified a test would be required for any new proposed sources to confirm their carbon dioxide stream meets or exceeds 95% carbon dioxide. Carbon dioxide stream test results for any new proposed sources shall be submitted to the Commission, for review through the Department of Mineral Resources Oil and Gas Division. The

Commission finds SCS #2 has demonstrated the carbon dioxide stream is of a quality that allows it to be safely and efficiently stored in the storage reservoir pursuant to NDCC Section 38-22-08(3).

(72) The BK Fischer #1 well (File No. 40124) is a stratigraphic test well that will be drilled, tested, logged, and constructed to Class VI requirements, located 1,035 feet from the north line and 458 feet from the east line of Section 22, Township 142 North, Range 88 West, Mercer County, North Dakota. This well is to be converted to a Class VI injection well.

(73) The BK Fischer #2 well (File No. 40125) is a stratigraphic test well that will be drilled, tested, logged, and constructed to Class VI requirements, located 1,035 feet from the north line and 358 feet from the east line of Section 22, Township 142 North, Range 88 West, Mercer County, North Dakota. This well is to be converted to a Class VI injection well.

(74) The Archie Erickson #2 well (File No. 38622), located 902 feet from the south line and 794 feet from the west line of Section 12, Township 142 North, Range 88 West, Mercer County, North Dakota, is a stratigraphic test well that was used for reservoir characterization and constructed to Class VI requirements. This well is to be utilized as a direct method of monitoring the injection zone pursuant to NDAC Section 43-05-01.11.4.

(75) SCS #2 created a geologic model based on site characterization as required by NDAC Section 43-05-01-05.1 to delineate the area of review. Data utilized included seismic survey data, geophysical logs from nearby wells, and core data. Structural surfaces were interpolated with SLB's (formerly Schlumberger) Petrel software, and included formation top depths, data collected from the ANG #1 (Class I well), Flemmer #1 (File No. 34243), BNI #1 (File No. 34244), J-LOC #1 (File No. 37380), Liberty #1 (File No. 37672), MAG #1 (File No. 37833), Coteau #1 (File No. 38379), Milton Flemmer #1 (File No. 38594), Archie Erickson #2 (File No. 38622), and Slash Lazy H #5 (File No. 38701) wells; three 3D seismic surveys conducted at the Milton Flemmer #1, Archie Erickson #2, and Slash Lazy H #5; the J-LOC #1 and BNI #1; and the Liberty #1 locations; and one 5 mile long 2D seismic line near the J-LOC #1, BNI #1, and Liberty #1 locations. Well log data was used to pick formation tops, interpret lithology, estimate petrophysical properties, and determine a time-depth shift for seismic data in the Amsden Formation, the lower confining zone, the undifferentiated Spearfish/Opeche Formations, the upper confining zone, and the Broom Creek Formation, the injection zone. Geostatistics were used to distribute petrophysical properties within the model. Seismic data was used to reinforce interpolation of the formation tops to create structural surfaces, and to distribute lithologies and geologic properties in the model.

The numerical simulation model permeability was tuned globally by applying a permeability multiplier to match the reservoir properties estimated from the Milton Flemmer #1 data. SCS #2 explained that the Milton Flemmer #1 injectivity test results, well logs, and core analysis, and area seismic data were reviewed before deciding to use a 2.5 multiplier and its technical experts are confident in using this multiple based on their years of experience studying the Broom Creek Formation. The Commission notes the use of permeability multipliers is typical in reservoir modeling and finds the use of the 2.5 multiple reasonable given the information provided, the lack of operational data for history matching, and the requirement for storage operators to reevaluate the model at a minimum once every five years pursuant to NDAC Section 43-05-01-05.1.

Sensitivity analyses are used to determine how input parameters affect a model's output. SCS #2 testified sensitivity analyses were ran on injection rates, bottom hole pressure conditions, well head temperatures, and well head pressures, and certainty cases were run on property distribution. SCS #2 explained that a model without sensitivity analyses done would provide enough insight to be able to safely inject for at least five years until the first reevaluation requirement. The Commission agrees.

Based on the reservoir pressure calculated at the BK Fischer #1 well, critical threshold pressure for this storage facility exists in the Broom Creek Formation prior to injection. For area of review delineation purposes, critical threshold pressure has the same meaning as pressure front, defined in NDAC Section 43-05-01-01. The EPA's "UIC Program Class VI Well Area of Review Evaluation and Corrective Action Guidance" lists several methods to estimate an acceptable pressure increase for over-pressurized reservoirs, including a multiphase numerical model designed to model leakage through a single well bore, or through multiple well bores in the formation. SCS #2 used this method to determine cumulative leakage potential along a hypothetical leaky well bore without injection occurring, estimated to be 0.006 cubic meters over 20 years. Incremental leakage with injection occurring was estimated to be a maximum of 0.014 cubic meters over 20 years. A value of 1 cubic meter is the lowest meaningful value that can be produced by the Analytical Solution for Leakage in Multilayered Aquifers (ASLMA) model as smaller values likely represent statistical noise. An actual leaky well bore or transmissive conduit would likely communicate with the Inyan Kara Formation. SCS #2's application noted no indications of communication between the Broom Creek Formation and Inyan Kara Formation were observed, and that nothing in fluid samples indicated communication to an Underground Source of Drinking Water (USDW).

The predicted extent of the carbon dioxide plume from beginning to end of life of the project, at the time when the carbon dioxide plume ceases to migrate into adjacent cells of the geologic model, was used to define the area of review in this case. Pursuant to NDAC Section 43-05-01-05(1)(b)(2) the area of review included a one-mile buffer around the storage facility boundaries. Time lapse seismic surveys will be used to monitor the extent of the carbon dioxide plume.

SCS #2 testified plume stabilization is evaluated by reviewing the rate of change in the carbon dioxide plume area over time using one-year time steps and a rate cutoff of less than 0.2 square miles of change per year was used to determine the stabilized plume boundary; a carbon dioxide saturation cutoff of 5% was used to define the stabilized plume boundary because 5% is the lowest detectable limit using seismic surveys; and a variable buffer was used on the stabilized plume boundary so the storage facility area included describable lands.

(76) The area proposed to be included within the storage facility is as follows:

TOWNSHIP 143 NORTH, RANGE 88 WEST
ALL OF SECTION 33 AND 34, THE SW/4 NW/4, SW/4 AND S/2 SE/4 OF SECTION 27, THE S/2 N/2 AND S/2 OF SECTION 28, THE SE/4 NE/4 AND SE/4 OF SECTION 29, THE SW/4 AND E/2 OF SECTION 32, AND THE W/2 AND W/2 E/2 OF SECTION 35,

TOWNSHIP 142 NORTH, RANGE 88 WEST
ALL OF SECTIONS 3, 4, 5, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 33, 34, 35, 36, THE S/2 OF SECTION 1, THE W/2 NE/4, NW/4 AND S/2 OF SECTION 2, THE E/2 E/2 OF SECTION 6, THE E/2 OF SECTION 7, THE E/2, SE/4 NW/4 AND NE/4 SW/4 OF SECTION 18, THE E/2 OF SECTION 19, THE E/2 E/2 OF SECTION 30, AND THE NW/4 AND E/2 OF SECTION 32,

TOWNSHIP 142 NORTH, RANGE 87 WEST
ALL OF SECTIONS 7, 18, 19, 30, THE S/2 SW/4 OF SECTION 5, THE SW/4, W/2 SE/4 AND SE/4 SE/4 OF SECTION 6, THE W/2 OF SECTION 8, THE W/2 OF SECTION 17, THE W/2 OF SECTION 20, THE W/2 OF SECTION 29, AND THE NW/4 OF SECTION 31,

TOWNSHIP 141 NORTH, RANGE 88 WEST
ALL OF SECTION 2, THE NW/4 OF SECTION 1 AND THE N/2 AND SE/4 OF SECTION 3.

ALL IN MERCER AND OLIVER COUNTIES AND COMPRISING OF 28,844.57 ACRES, MORE OR LESS.

(77) In Archie Erickson #2 well, the Spearfish and Opeche Formations, hereinafter referred to as the Spearfish/Opeche Formations, unconformably overlie the Broom Creek Formation. The Minnekahta Formation is absent in the Archie Erickson #2 well, and where it does not exist, the Spearfish and Opeche Formations are considered undifferentiated. The Broom Creek Formation, the upper confining Spearfish/Opeche Formations, and the lower confining Amsden Formation are laterally extensive throughout the area of review.

(78) Core analysis of the Broom Creek Formation in the Archie Erickson #2 well shows sufficient permeability to be suitable for the desired injection rates and pressures without risk of creating fractures in the injection zone. Thin-section and SEM-EDS (energy-dispersive spectroscopy) micrograph investigation shows the Broom Creek Formation's most porous sample shows isolated grains of moderately sorted, subrounded quartz and subangular feldspar grains. The least porous sample is located at the Broom Creek Formation and Amsden Formation boundary and primarily consists of anhydrite, dolomite, quartz and illite clay. Microfracture testing in the Archie Erickson #2 well, at a depth of 6,080 feet determined the breakdown pressure of the Broom Creek Formation to be 8,226 psi, with a fracture propagation pressure of 4,202 psi, and a fracture closure pressure of 4,098 psi, yielding a formation fracture gradient of 0.691 psi/ft.

Core analysis of the overlying Spearfish/Opeche Formations shows sufficiently low permeability to stratigraphically trap carbon dioxide and displaced fluids. Thin-section and SEM-EDS micrograph investigation show the Spearfish/Opeche Formations' most porous sample displays well-compacted angular and poorly sorted quartz and feldspar grains, with contacts separated by a clay matrix and iron oxides, forming isolated and discontinuous pore spaces. The least porous sample is located at the Spearfish/Opeche Formations and Broom Creek Formation boundary and primarily consists of a clay matrix with embedded quartz and feldspar clasts. Microfracture testing in the Archie Erickson #2 well at 5,802 feet observed no formation breakdown with a maximum

of 9,002 psi applied. The inability to break down the Spearfish/Opeche Formations indicates the formations are very tight competent rock and exhibit sufficient geologic integrity to contain the injected carbon dioxide. The maximum bottom hole pressures of 3,633 psi and 3,624 psi, respectively for the BK Fischer #1 and BK Fischer #2 injection wells, are estimated to be 90% of the formation fracture pressure as calculated by the 0.691 psi/ft fracture gradient of the Broom Creek Formation multiplied by the depth of the top perforation in the injection zone. Injection formation breakdown would be observed and recorded if permitted operational pressures were exceeded before compromising the confining zone.

Core analysis of the underlying Amsden Formation shows sufficiently low permeability to stratigraphically contain carbon dioxide and displaced fluids. Thin-section and SEM-EDS micrograph investigation shows the most porous sample has moderately sorted, fine- to medium-grained quartz and feldspar grains with intergranular pore space filled with dolomite or anhydrite. This layer is isolated and confined between an ultralow permeable layer of clay-rich quartz dolomite above and an anhydrite-rich layer below.

(79) SCS #2 has defined the horizontal and vertical boundaries of the storage reservoir and buffers have been included to ensure the storage facility is operated safely and as contemplated pursuant to NDCC Section 38-22-08(12).

(80) The in situ fluid of the Broom Creek Formation in this area is in excess of 10,000 parts per million of total dissolved solids.

(81) Investigation of wells within the area of review found no vertical penetrations of the confining or injection zones requiring corrective action. The area of review will be reevaluated at a period not to exceed five years from beginning of injection operations.

(82) The Fox Hills Formation is the deepest USDW within the area of review. Its base is situated at a depth of 1,640 feet at the location of the Archie Erickson #2 well, leaving approximately 4,205 feet between the base of the Fox Hills Formation and the top of the Broom Creek Formation.

(83) Fluid sampling of shallow USDWs has been performed to establish a geochemical baseline, with additional localized baseline sampling proposed for the Fox Hills Formation and other shallow wells under investigation. Future sampling is proposed in SCS #2's application pursuant to NDAC Section 43-05-01-11.4. A baseline of groundwater samples will be established and submitted to the Commission, for review through the Department of Mineral Resources Oil and Gas Division prior to injection operations.

(84) Soil sampling is proposed pursuant to NDAC Section 43-05-01-11.4. A baseline of soil gas concentrations will be established and submitted to the Commission, for review through the Department of Mineral Resources Oil and Gas Division prior to injection operations. Soil gas profile stations will be located near the BK Fischer #1 and BK Fischer #2 injection wells and Archie Erickson #2 monitoring well locations.

(85) The top of the Inyan Kara Formation is at 4,406 feet, approximately 2,766 feet below the base of the Fox Hills Formation at the location of the Archie Erickson #2 well and it provides an additional zone of monitoring between the Fox Hills Formation and the Broom Creek Formation to detect vertical carbon dioxide or fluid movement.

(86) No known or suspected regional faults or fractures with transmissibility have been identified during the site-specific characterization. Formation imaging logs show primarily resistive fractures commonly filled with anhydrite, a few conductive fractures filled with clay, and one conductive partially resistive fracture filled with quartz and clay within the Spearfish/Opeche Formations. Core analysis confirmed fractures observed in the Spearfish/Opeche Formations were tectonic, vertical to subvertical, mainly closed, and cemented with anhydrite. One minor fault present in the Spearfish/Opeche Formations shows normal faulting with minor offset. Based on analysis, the fault appears to be isolated and does not interact with any fracture network and would not be a conduit for fluid migration. The Amsden Formation is considered to be nonfractured, however a few conductive and resistive fractures filled with quartz, were identified with the presence of horizontal compaction features (stylolites). Core analysis confirmed the fractures were discontinuous and closed. Drilling induced fractures were not identified in the Spearfish/Opeche, Broom Creek, and Amsden Formations, but were found in the Mowry Formation located above the Spearfish/Opeche Formations. Seismic data used to characterize the subsurface within the project area showed no indication of faulting with sufficient vertical extent to transect the storage reservoir and confining zones. SCS #2 testified the fractures found through formation imaging logs and core analysis were filled with precipitated minerals and all fractures, including the minor fault, lack sufficient permeability or vertical extent to act as fluid pathways.

(87) Fluid samples from the Inyan Kara Formation and Broom Creek Formation suggest they are hydraulically isolated from each other, supporting that the confining formations above the Broom Creek Formation are not compromised by migration pathways.

(88) Geochemical simulation performed with a conservative injection stream and data obtained from the confining and injection zones determined no observable change in injection rate or pressure, and simulations of conservatively high carbon dioxide exposure to the cap rock determined geochemical changes will be minor and only at the contact with the injection zone and will not cause substantive deterioration compromising confinement. The injection stream composition used for geochemical modeling contained a higher amount of oxygen than the anticipated stream to represent the conservative scenario because oxygen is the most reactive constituent in the anticipated injection steam. The confining zones have adequate thickness to both act as immediate containment and provide a measurable vertical buffer.

(89) Risk of induced seismicity is not a concern based on existing studies of major faults within the area of review, tectonic boundaries, and relatively stable geologic conditions surrounding the proposed injection site. SCS #2 testified a passive seismicity monitoring array would be installed to provide continuous near-real-time reporting of seismic events and once the layout is known it will be submitted to the Commission, for review through the Department of Mineral Resources Oil and Gas Division prior to injection operations.

(90) The storage facility permit application, testimony provided at the hearing, and information detailed in the aforementioned paragraphs in the Technical Review section provide evidence that the storage facility as proposed will:

(a) Not adversely affect surface waters or formations containing surface waters pursuant to NDCC Section 38-22-08(7).

(b) Prevent carbon dioxide from escaping the storage reservoir pursuant to NDCC Section 38-22-08(8).

(c) Not allow substances to enter the storage reservoir that could compromise the objectives of NDCC Chapter 38-22 or the integrity of the storage reservoir pursuant to NDCC Section 38-22-08(9).

(d) Not endanger human health nor unduly endanger the environment, pursuant to NDCC Section 38-22-08(10) as supported by aforementioned Paragraphs (a) through (c) above.

(e) Have established monitoring facilities and protocols to assess the location and migration of carbon dioxide injected for storage and the storage operator will ensure compliance with all permit, statutory, and administrative requirements pursuant to NDCC 38-22-08(13).

(91) NDAC Section 43-05-01-11.3(3) requires the storage facility operator to maintain pressure on the annulus that exceeds the operating injection pressure, unless the Commission determines that such a requirement might harm the integrity of the well or endanger USDWs. SCS #2 testified its intention to submit a variance request with the injection permit to use less than a 300 psi nitrogen cushion to maintain constant positive pressure on the well annulus in each injection well. The Commission believes placing pressure on the annulus that exceeds the operating injection pressure will create a risk of micro annulus by debonding of the long string casing-cement sheath during the operational life of the well. A micro annulus would harm external mechanical integrity and provide a potential pathway for endangerment of USDWs.

(92) The two injection wells are proposed to be equipped with distributed temperature sensing (DTS) and distributed acoustic sensing (DAS) fiber optic cables enabling continuously monitored external mechanical integrity. The planned monitoring well, Archie Erickson #2 is equipped with DTS/DAS.

(93) SCS #2 testified Summit's project (reference to Summit's project means the three storage facilities, TB Leingang, BK Fischer, and KJ Hintz and the MCE Pipeline which are owned by subsidiaries of Summit Carbon Solutions, LLC) will benefit the agricultural and energy industries of North Dakota, the U.S. economy, and the ethanol plant participants (sources of carbon dioxide).

SCS #2 testified the project will benefit North Dakota by developing carbon capture storage (CCS) infrastructure, such as carbon dioxide pipeline infrastructure that will be a common carrier system

that could be used by others, by commercially deploying CCS it provides support for others doing the same, and by benefiting the regional corn market as it will provide a significant demand for regional corn. By extension the corn market will have an impact on land prices and commodity prices that would benefit the U.S. economy. SCS #2 testified the project will benefit the ethanol plant partners as it will allow them to lower their carbon intensity score and enable them to participate in emerging low carbon fuel markets, both for fuel transportation and potentially sustainable aviation fuels. The Tharaldson Ethanol Plant, located in Casselton, North Dakota, is a plant partner that consumes approximately 15-20% of the corn grown in North Dakota annually.

More information is needed before establishing storage fees pursuant to NDAC Section 43-05-01-17 for the TB Leingang, BK Fischer, and KJ Hintz storage facilities.

(94) The approval of this application is in the public interest by promoting the policy established by the North Dakota Legislature pursuant to NDCC Section 38-22-01.

(95) The application submitted and testimony provided at the hearing, meet all requirements set by the Commission as required by NDCC Section 38-22-08(1).

IT IS THEREFORE ORDERED:

(1) The creation of the BK Fischer Broom Creek Storage Facility in Mercer and Oliver Counties, North Dakota, is hereby authorized and approved.

(2) Summit Carbon Storage #2, LLC, its assigns and successors, is hereby authorized to store carbon dioxide in the Broom Creek Formation in the BK Fischer Broom Creek Storage Facility.

(3) The BK Fischer Broom Creek Storage Facility shall extend to and include the following lands in Mercer and Oliver Counties, North Dakota:

TOWNSHIP 143 NORTH, RANGE 88 WEST
ALL OF SECTION 33 AND 34, THE SW/4 NW/4, SW/4 AND S/2 SE/4 OF SECTION 27, THE S/2 N/2 AND S/2 OF SECTION 28, THE SE/4 NE/4 AND SE/4 OF SECTION 29, THE SW/4 AND E/2 OF SECTION 32, AND THE W/2 AND W/2 E/2 OF SECTION 35,

TOWNSHIP 142 NORTH, RANGE 88 WEST
ALL OF SECTIONS 3, 4, 5, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 33, 34, 35, 36, THE S/2 OF SECTION 1, THE W/2 NE/4, NW/4 AND S/2 OF SECTION 2, THE E/2 E/2 OF SECTION 6, THE E/2 OF SECTION 7, THE E/2, SE/4 NW/4 AND NE/4 SW/4 OF SECTION 18, THE E/2 OF SECTION 19, THE E/2 E/2 OF SECTION 30, AND THE NW/4 AND E/2 OF SECTION 32,

TOWNSHIP 142 NORTH, RANGE 87 WEST
ALL OF SECTIONS 7, 18, 19, 30, THE S/2 SW/4 OF SECTION 5, THE SW/4, W/2 SE/4 AND SE/4 SE/4 OF SECTION 6, THE W/2 OF SECTION 8, THE W/2 OF SECTION 17, THE W/2 OF SECTION 20, THE W/2 OF SECTION 29, AND THE NW/4 OF SECTION 31,

TOWNSHIP 141 NORTH, RANGE 88 WEST
ALL OF SECTION 2, THE NW/4 OF SECTION 1 AND THE N/2 AND SE/4 OF SECTION 3.

ALL IN MERCER AND OLIVER COUNTIES AND COMPRISING OF 28,844.57 ACRES, MORE OR LESS.

(4) Injection into the BK Fischer Broom Creek Storage Facility shall not occur until Summit Carbon Storage #2, LLC has met the financial responsibility demonstration pursuant to Order No. 33535.

(5) This authorization does not convey authority to inject carbon dioxide into the BK Fischer Broom Creek Storage Facility; an approved permit to inject for the BK Fischer #1 (File No. 40124) and BK Fischer #2 (File No. 40125) wells shall be issued by the Commission prior to injection operations commencing.

(6) The authorization granted herein is conditioned on the operator receiving and complying with all provisions of the injection permit issued by the Department of Mineral Resources Oil and Gas Division of the Industrial Commission and complying with all applicable provisions of NDAC Chapter 43-05-01 and this order.

(7) Definitions.

"Area of review" in this case means an area encompassing a buffer around the facility area of one mile.

"Broom Creek Formation" in this case means the stratigraphic interval from below the base of the undifferentiated Spearfish/Opeche Formations, found at a depth of 5,845 feet below the Kelly Bushing, to above the top of the Amsden Formation, found at a depth of 6,148 feet below the Kelly Bushing, as identified by the Array Induction Gamma log performed in the Archie Erickson #2 well (File No. 38622), located in SW/4 SW/4 of Section 12, Township 142 North, Range 88 West, Mercer County, North Dakota.

"Cell" in this case means individual cell blocks of the geologic model; each cell is approximately 1,000 feet by 1,000 feet.

"Facility area" means the areal extent of the storage reservoir as defined in Paragraph (3) above, that includes lands within the lateral boundary of the carbon dioxide plume from beginning of injection to the time the carbon dioxide plume ceases to migrate into adjacent geologic model cells.

"Storage facility" means the reservoir, underground equipment, and surface facilities and equipment used or proposed to be used in the geologic storage operation. Pursuant to NDCC Section 38-22-02, it does not include pipelines used to transport carbon dioxide to the storage facility.

(8) The storage facility operator shall comply with all conditions of this order, the permit to inject, and applicable provisions of NDAC Chapter 43-05-01. Any noncompliance constitutes a violation and is grounds for enforcement action, including but not limited to termination, revocation, or modification of this order pursuant to NDAC Section 43-05-01-12.

(9) In an administrative action, it shall not be a defense that it would have been necessary for the storage facility operator to halt or reduce the permitted activity in order to maintain compliance with this order, the permit to inject, and applicable provisions of NDAC Chapter 43-05-01.

(10) The storage facility operator shall take all reasonable steps to minimize or correct any adverse impact on the environment resulting from noncompliance with this order, the permit to inject, and applicable provisions of NDAC Chapter 43-05-01.

(11) The storage facility operator shall implement and maintain the provided emergency and remedial response plan pursuant to NDAC Section 43-05-01-13.

(12) The storage facility operator shall notify the Director within 24 hours of any release of carbon dioxide from the storage facility, flow lines, or of carbon dioxide detected outside of the injection zone. Where the Director or the storage facility operator obtains evidence that the injected carbon dioxide stream and associated pressure front may endanger an underground source of drinking water, the storage facility operator shall cease injection immediately, implement the emergency and remedial response plan approved by the Commission (insofar as the Commission has jurisdiction), and take all steps reasonably necessary to identify and characterize any release.

(13) The storage facility operator shall at all times properly operate and maintain all storage facilities which are installed or used by the storage facility operator to achieve compliance with the conditions of this order, the permit to inject, and applicable provisions of NDAC Chapter 43-05-01. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls, including appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems only when necessary to achieve compliance.

(14) This order may be modified, revoked and reissued, or terminated pursuant to NDAC Section 43-05-01-12. The filing of a request by the storage facility operator for and order modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any condition contained herein.

(15) The injection well permit or the permit to operate an injection well does not convey any property rights of any sort or any exclusive privilege.

(16) The storage facility operator shall furnish to the Director, within a time specified, any information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this order, or to determine compliance thereof. The storage facility operator shall also furnish to the Director, upon request, copies of records required to be kept by this order, the permit to inject, and applicable provisions of NDAC Chapter 43-05-01.

(17) The storage facility operator shall allow the Director, or an authorized representative, upon presentation of credentials and other documents as may be required by law, to:

(a) Enter upon the storage facility premises where records must be kept pursuant to this order and NDAC Chapter 43-05-01.

(b) At reasonable times, have access to and copy any records that must be kept pursuant to this order and NDAC Chapter 43-05-01.

(c) At reasonable times, inspect any facilities, equipment, including monitoring and control equipment, practices, or operations regulated or required pursuant to this order, the permit to inject, and NDAC Chapter 43-05-01.

(d) At reasonable times, sample or monitor for the purposes of assuring compliance, any substances or parameters at any location.

(18) The storage facility operator shall maintain and comply with the proposed testing and monitoring plan pursuant to NDAC Section 43-05-01-11.4.

(19) The storage facility operator shall comply with the reporting requirements provided in NDAC Section 43-05-01-18. The mass of carbon dioxide injected, the volume of carbon dioxide stream injected, and the average and maximum injection rate, surface injection pressure, and down-hole temperature and pressure data shall be reported monthly to the Director on or before the fifth day of the second succeeding month once injection commences regardless of the status of operations, until the injection well is properly plugged and abandoned.

(20) The storage facility operator must obtain an injection well permit under NDAC Section 43-05-01-10 and injection wells must meet the construction and completion requirements in NDAC Section 43-05-01-11.

(21) The storage facility operator shall notify the Director at least 48 hours in advance to witness all mechanical integrity tests of the tubing-casing annulus in the injection well. The packer must be set within 100 feet of the upper most perforation and in the chrome enhanced casing, as an exception to NDAC Section 43-05-01-11. However, the packer must also be set within confining zone lithology, within carbon dioxide resistant cement, and not interfere with down-hole monitoring equipment.

(22) The storage facility operator shall maintain and comply with the prepared plugging plan pursuant to NDAC Section 43-05-01-11.5.

(23) The storage facility operator shall establish mechanical integrity prior to commencing injection and maintain mechanical integrity pursuant to NDAC Section 43-05-01-11.1.

(24) The storage facility operator shall implement the worker safety plan pursuant to NDAC Section 43-05-01-13.

(25) The storage facility operator shall comply with leak detection and reporting requirements pursuant to NDAC Section 43-05-01-14.

(26) The storage facility operator shall implement the proposed corrosion monitoring and prevention program pursuant to NDAC Section 43-05-01-15.

(27) The storage facility operator shall prepare, maintain, and comply with an area of review and corrective action plan pursuant to NDAC Section 43-05-01-05.1, if deemed necessary by the Commission.

(28) The storage facility operator shall maintain financial responsibility pursuant to NDAC Section 43-05-01-09.1 and Order No. 33535.

(29) The storage facility operator shall maintain and comply with the proposed post-injection site care and facility closure plan pursuant to NDAC Section 43-05-01-19.

(30) The storage facility operator shall notify the Director within 24 hours of failure or malfunction of surface or bottom hole gauges in the proposed BK Fischer #1 and BK Fischer #2 injection wells and Archie Erickson #2 monitoring well.

(31) The storage facility operator shall implement surface air and soil gas monitoring as proposed.

(32) This storage facility authorization and permit shall be docketed for a review hearing at least once every five years from commencement of injection to determine whether it should be modified, revoked, or minor modification made, pursuant to NDAC Section 43-05-01-05.1(4).

(33) The storage operator shall file minor modification to the permit requests pursuant to NDAC Section 43-05-01-12.1 through a Facility Sundry Notice form.

(34) The storage facility operator shall pay fees pursuant to NDAC Section 43-05-01-17 annually, on or before the last business day in June, for the prior year's injection, unless otherwise approved by the Director.

(35) The storage facility operator must obtain a Commission determination by separate hearing on whether the current proposed carbon dioxide sources contribute to the energy and agricultural production economy of North Dakota. The storage operator shall not receive authorization to inject until the fees are determined by subsequent hearing and order of the Commission.

(36) For each new additional carbon dioxide source, the storage facility operator must obtain a Commission determination on whether the source contributes to the energy and agriculture production economy of North Dakota, before it is approved to be stored. If the Commission deems a carbon dioxide source does not contribute to the energy and agricultural production economy of North Dakota, the fees will be determined by hearing, pursuant to NDAC Section 43-05-01-17(1)(b).

(37) The operator shall implement a data sharing plan that provides for real-time sharing of data between Summit Carbon Storage #2, LLC, Summit Carbon Storage #1, LLC, Summit Carbon Storage #3, LLC, and SCS Carbon Transport LLC. If a discrepancy in the shared data is observed, the party observing the data discrepancy shall notify all other parties, take action to determine the cause, and record the instance. Copies of such records must be filed with the Commission upon request.

(38) This order shall remain in full force and effect until further order of the Commission.

Dated this 12th day of December, 2024.

INDUSTRIAL COMMISSION
STATE OF NORTH DAKOTA

/s/ Doug Burgum, Governor

/s/ Drew H. Wrigley, Attorney General

/s/ Doug Goehring, Agriculture Commissioner

Outlook

## Summit Carbon Storage (Case Nos. 30869-30880)

**From** Desirae Zaste <desirae@braatenlawfirm.com>

**Date** Mon 12/9/2024 1:49 PM

**To** -Info-Oil & Gas Division <oilandgasinfo@nd.gov>; Forsberg, Sara L. <slforsberg@nd.gov>; Bender, Lawrence <LBender@fredlaw.com>; TThrone@thronelaw.com <TThrone@thronelaw.com>; Gludt, Tyler <tgludt@fredlaw.com>; Bohrer, Mark F. <mbohrer@nd.gov>; Garner, David P. <dpgarner@nd.gov>; Knutson, Amy N. <anknutson@nd.gov>; Joshua A. Swanson <jswanson@vogellaw.com>

**Cc** Derrick Braaten <derrick@braatenlawfirm.com>

4 attachments (10 MB)

Ex. A -241113 Anderson (DMR) ltr from DB re ORR.pdf; Ex. B - Re_ November 13-2024 records request.pdf; 241209 Declaration of Service.pdf; Declaration of Derrick Braaten.pdf;

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Good afternoon,

Attached for filing and service are the following documents:

- **Declaration of Derrick Braaten;**
- **Exhibit A – November 13, 2024 open records request;**
- **Exhibit B – November 20, 2024 response to open records request; and**
- **Declaration of Service.**

**Desirae Zaste**

**Litigation Manager/Certified Paralegal**

**BRAATEN LAW FIRM**
109 N. 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
Fax: 701-221-5842
www.braatenlawfirm.com

**PRIVILEGED COMMUNICATION**
**This e-mail message is intended only for the named recipient(s) above and is covered by the Electronic Communications Privacy Act, 18 U.S.C. Sections 2510-2521. This e-mail is confidential and may contain information that is privileged, attorney work product or exempt from disclosure under applicable law. Recipients should not file copies of this e-mail with publicly accessible records. If you have received this message in error, please immediately notify the sender by return e-mail and delete this e-mail message from your computer. Thank you for your cooperation.**

**NORTH DAKOTA INDUSTRIAL COMMISSION**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case No(s). 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## DECLARATION OF DERRICK BRAATEN

1. I am writing this declaration to update the North Dakota Industrial Commission (NDIC).

2. An open records request was sent to the North Dakota Industrial Commission on November 13, 2024 requesting the DAT, SRS, OUT, LOG, and RST modeling files. Attached hereto as Exhibit A is a true and correct copy of the November 13, 2024 open records request.

3. On November 20, 2024, in response to my November 13, 2024 open records request, Michael Ziesch emailed indicating the files were on a thumb drive and our office could pick up the files. Attached hereto as Exhibit B is a true and correct copy of the November 20, 2024 email in response to the open records request.

4. The flash drive contained these files:

| Name | Date modified | Extension |
|---|---|---|
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_**LGR**_threesite | 1/11/2024 | dat |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_**LGR**_threesite | 11/9/2023 | err |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_**LGR**_threesite | 11/9/2023 | log |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_**LGR**_threesite | 11/9/2023 | out |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_**LGR**_threesite | 11/9/2023 | sr3 |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_**No LGR**_threesite | 11/9/2023 | dat |

5. On December 5, 2024, Paul Button, the Landowners' expert, confirmed that these were the same files we received from the EERC after he used a software program to compare the bytes and other metadata.

6. Landowners require additional time now that they have been able to obtain and confirm the model files. In order to show that the plume has been arbitrarily reduced in size in the model, and the pressure front and its impact on pore space is not accounted for, Landowners require additional time to analyze the model and generate mapping units to show the precise extent of the

inaccuracies of the mapping for purposes of amalgamation and compensation. The NDIC has inexplicably refused to produce the mapping files in its possession until the past month – and many months *after* the hearing in this matter. Now that the NDIC has finally produced the mapping files, it is unfair and highly prejudicial and a violation of due process to proceed to decision without giving the Landowners a fair opportunity to analyze the files and produce evidence in support of their valuation case that was impossible to present because of the failure to provide these files by the NDIC.

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on the 9th day of December, 2024 at Bismarck, ND, United States.

Derrick Braaten

BRAATEN
Law Firm

November 13, 2024

Nathan Anderson
Director, Oil and Gas Division
Department of Mineral Resources
1016 East Calgary Avenue
Bismarck, ND 58503

**Re: Open Records Request**

Mr. Anderson:

In the past year and a half, I have submitted to DMR several open records requests. The requests relate to applications filed by three LLCs, Summit Carbon Storage #1, Summit Carbon Storage #2, and Summit Carbon Storage #3, regarding their requests for permits for underground storage of carbon dioxide. In response to these requests, while I have received some of the materials requested, I have not received certain files included in those requests, files dealing with the applicants' reservoir simulation modeling, that is, the CMG modeling files, computer files used by and produced from the CMG modeling software running reservoir simulations regarding the applicants' proposed injection into and use of the reservoir for storage. In particular, I have not received the DAT, SRS, OUT, LOG, and RST modeling files. My past records' requests and DMR's responses are summarized below.

While I suppose it is possible that DMR does not have these files, I believe it probably does. If in fact DMR does not have them, please let me know that. But if you do have them, this is a request pursuant to N.D. Cent. Code § 44-04-18 for those files.

On June 9, 2023, the three Summit Carbon applicants submitted to DMR draft applications for storage. On June 12, DMR's Tamara Madche informed the applicants that while DMR could not start an immediate review of the applications, a check for completeness was conducted and several "issues" were found. One concerned the "CMG Modeling Files," about which Ms. Madche stated, "Need: the DAT, SRS, OUT, LOG, and RST files for the model." Exh. 1 (enclosed).

On June 14, 2023, as modified on June 20, I submitted a records request. Exh. 2 (enclosed). In response, on June 21 DMR provided me with a thumb drive containing, according to DMR's Michael Ziesch, "[t]he related data sets." *Id.* However, the DAT, SRS, OUT, LOG, and RST modeling files were not on the thumb drive, but perhaps DMR had not yet received these files from the applicants in response to Ms. Madche's June 9 request for them.

On August 24, 2023, and also on September 7 and September 21 of that year, I submitted to DMR records requests. Exhs. 3-5 (enclosed). DMR responded, but the responses did not include any of the DAT, SRS, OUT, LOG, or RST modeling files. *Id.*

In February of 2024, the three Summit Carbon LLCs filed applications for carbon dioxide storage. On May 15, 2024, I submitted to DMR a records request. Exh. 6 (enclosed). Mr. Ziesch responded on May 21, but his responses did not include any of the DAT, SRS, OUT, LOG, or RST modeling files. *Id.* Mr. Ziesch stated that on September 21, 2023, DMR had provided to me "all modeling input and results files" and also that: "The CMG files, previously provided on 9-21-2023, are the modeling files still being used for the applications. There are no updates to them." I never received anything from DMR on September 21. (Perhaps Mr. Ziesch was referring to the thumb drive provided to me on June 21, 2023, but if so, the modeling files were not on it.)

Again, if DMR, or any other Industrial Commission agency, does not have the DAT, SRS, OUT, LOG, or RST modeling files, please let me know, but if DMR or any other Industrial Commission agency does have them, please provide them to me in electronic format by emailing them to my paralegal Desirae Zaste at desirae@braatenlawfirm.com. If it is necessary to mail them, send them to Braaten Law Firm, Suite 100, 109 N. 4th St., Bismarck, ND 58501-4003.

You have my pre-authorization to bill me up to $300.00 to fulfill this records request. If you have any questions about anything in this letter, please contact me.

Sincerely,

Derrick Braaten

Enclosures: Exhibits 1-6

Outlook

## RE: Summit Carbon Solutions - Draft applications

**From** Madche, Tamara J. </O=EXCHANGELABS/OU=EXCHANGE ADMINISTRATIVE GROUP (FYDIBOHF23SPDLT)/CN=RECIPIENTS/CN=6A42AF0567B24222973A8F24B8BDE405-MADCHE, TAM>

**Date** Mon 6/12/2023 10:06 AM

**To** Jay Volk <jvolk@summitcarbon.com>; Suggs, Richard A. <rasuggs@nd.gov>

**Cc** Amanda Hoffer <ahoffer@summitcarbon.com>; Wade Boeshans <wboeshans@summitcarbon.com>; Jeffrey Skaare <jskaare@summitcarbon.com>; Jacobson, Lonny <ljacobson@undeerc.org>; Regorrah, Josh <jregorrah@undeerc.org>; Anagnost, Katherine <kanagnost@undeerc.org>; Olsen, Caitlin <colsen@undeerc.org>; Connors, Kevin <kconnors@undeerc.org>; Kalenze, Nicholas <nkalenze@undeerc.org>; Bender, Lawrence <LBender@fredlaw.com>

All,

We have received and were able to download the files provided for the three SFP applications. It's unlikely we'll have time to start the review of these applications in full until July as our focus is being switched back to our current docketed application for June 30th, so don't hesitate to continue refining these draft applications in the meantime. I will let you know when we begin our review process, that way we can ensure we're looking at the latest versions.

I did do a quick cursory check for completeness and found the following issues:

- CMG Modeling Files
  - Need: DAT, SRS, OUT, LOG, and any RST files for the model.
- Application appendices needed for each SFP application:
  - Testing and Monitoring Plan Summary – these have been provided on the past two applications and are considered an expectation going forward. The case files end up very large and unwieldly for SFPs, so this compiled summary was created to help provide a quicker reference point that helps both the operator and the regulatory body through the life of the project.
  - Quality Assurance Surveillance Plan (QASP) – I did not see this appendix. I did notice within the Testing and Monitoring section that you had QASP subsections. I am going to ask that these be pulled and placed in their own appendix to remain consistent with past applications. It's very likely we'll ask that additional items (such as figures or reference documents) be added in the QASP as we review the application and by having them all in one appendix it will help aid in less reference points having to be updated in Section 5, Section 6, and the Regulatory Compliance Table.
  - Appendix C – Geochemical Interactions – Unless you can provide a good argument for moving this information into an appendix, we are going to ask that it be placed back in Section 2 under its respective zone sub-sections. From a reviewer stance we review all the geological exhibits including the geochemical and geomechanical information together by zone, so not only is it not consistent with past applications but it makes the review a bit disjointed.
  - Section 12 – Financial Assurance – I wouldn't expect you to know the exact financial instrument types you intend to use at the draft stage of the SFPs, but it will be preferred that you have that nailed down in the narrative prior to us docketing the application.

If you have any questions on the comments above, please let me know.

Thanks,

**EXHIBIT 1**

Tammy Madche

*Geologist*

**From:** Jay Volk <jvolk@summitcarbon.com>
**Sent:** Friday, June 9, 2023 2:58 PM
**To:** Madche, Tamara J. <tjmadche@nd.gov>; Suggs, Richard A. <rasuggs@nd.gov>
**Cc:** Amanda Hoffer <ahoffer@summitcarbon.com>; Wade Boeshans <wboeshans@summitcarbon.com>; Jeffrey Skaare <jskaare@summitcarbon.com>; Jacobson, Lonny <ljacobson@undeerc.org>; Regorrah, Josh <jregorrah@undeerc.org>; Anagnost, Katherine <kanagnost@undeerc.org>; Olsen, Caitlin <colsen@undeerc.org>; Connors, Kevin <kconnors@undeerc.org>; Kalenze, Nicholas <nkalenze@undeerc.org>; Bender, Lawrence <LBender@fredlaw.com>
**Subject:** Summit Carbon Solutions - Draft applications

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Tammy and Richard,

Summit Carbon Solutions, LLC respectfully submits for the review and consideration of the North Dakota Industrial Commission, three applications for carbon dioxide storage facility permits**, as follows**:

- **Applicant:** Summit Carbon Storage #1, LLC for the injection site called TB Leingang;
- **Applicant:** Summit Carbon Storage #2, LLC for the injection site called BK Fischer; and
- **Applicant:** Summit Carbon Storage #3, LLC for the injection site called KJ Hintz.

These applications were prepared pursuant to and in accordance with Chapter 38-22 of the North Dakota Century Code and Chapter 43-05-01 of the North Dakota Administrative Code.

Please watch your email for a separate message with the link to **access the application contents that will be provided by the end of business today.**

In addition, please note any questions in relation to this submittal please feel free to reach out to myself as the primary contact for Summit Carbon Solutions and Lonny Jacobson as the primary contact for any EERC correspondence.

We look forward to the results of your review.

Sincerely,

Jay Volk

JAY M. VOLK, PHD | SEQUESTRATIONS - DIRECTOR OF HEALTH, SAFETY & ENVIRONMENTAL
M: (701) 400-1004 | jvolk@summitcarbon.com
3442 E. CENTURY AVE., BISMARCK, ND 58503

SUMMIT CARBON SOLUTIONS

Outlook

## RE: Open Record Request re: Summit Carbon Solutions

**From** Derrick Braaten <derrick@braatenlawfirm.com>
**Date** Tue 6/20/2023 4:49 PM
**To** Ziesch, Michael D. <mdziesch@nd.gov>

Please transfer the data to a thumb drive and I'm happy to pay the charges when we pick it up.

Thanks again,
Derrick

**Derrick Braaten**

BRAATEN Law Firm

**BRAATEN LAW FIRM**
109 N. 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
Fax: 701-221-5842
www.braatenlawfirm.com

**PRIVILEGED COMMUNICATION**
**This e-mail message is intended only for the named recipient(s) above and is covered by the Electronic Communications Privacy Act, 18 U.S.C. Sections 2510-2521. This e-mail is confidential and may contain information that is privileged, attorney work product or exempt from disclosure under applicable law. Recipients should not file copies of this e-mail with publicly accessible records. If you have received this message in error, please immediately notify the sender by return e-mail and delete this e-mail message from your computer. Thank you for your cooperation.**

**From:** Ziesch, Michael D. <mdziesch@nd.gov>
**Sent:** Tuesday, June 20, 2023 4:28 PM
**To:** Derrick Braaten <derrick@braatenlawfirm.com>
**Subject:** RE: Open Record Request re: Summit Carbon Solutions

[Warning: External Sender]
We estimate a hard copy of the data would be approximately 1,200 pages.

The related data sets we have are approximately 3.3G and would take about an hour to transfer onto a thumb drive.

We spent approximately an hour reviewing your request, so the cost estimate for processing will be $25 as the first hour is free.

Additionally, the cost of either print copy, or the cost of the thumb drive, which would likely be nominal. We would need to put the data on a device that is ours because we can't introduce external hard drives for security reasons.

**EXHIBIT 2**

Please let me know if you want me to proceed with the request and, if so, what format you'd like it in.

**From:** Derrick Braaten <derrick@braatenlawfirm.com>
**Sent:** Tuesday, June 20, 2023 4:18 PM
**To:** Ziesch, Michael D. <mdziesch@nd.gov>
**Subject:** Re: Open Record Request re: Summit Carbon Solutions

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Thank you. Will you please provide the draft application for a storage facility permit and any correspondence related to that from May 1, 2023 to June 20, 2023?

Derrick Braaten
Braaten Law Firm
109 North 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
Fax: 701-221-5842
derrick@braatenlawfirm.com
www.braatenlawfirm.com
PRIVILEGED COMMUNICATION
This e-mail message is intended only for the named recipient(s) above and is covered by the Electronic Communications Privacy Act, 18 U.S.C. Sections 2510-2521. This e-mail is confidential and may contain information that is privileged, attorney work product or exempt from disclosure under applicable law. Recipients should not file copies of this e-mail with publicly accessible records. If you have received this message in error, please immediately notify the sender by return e-mail and delete this e-mail message from your computer.

---

**From:** Ziesch, Michael D. <mdziesch@nd.gov>
**Sent:** Tuesday, June 20, 2023 3:26:13 PM
**To:** Derrick Braaten <derrick@braatenlawfirm.com>
**Subject:** RE: Open Record Request re: Summit Carbon Solutions

[Warning: External Sender]

Mr. Braaten, we were able to get staff together this afternoon to review your request.

Our office has not received an application for amalgamation, nor do we have any class VI applications for the entity referenced. We do have a draft application for a storage facility permit.

Finally, your request for correspondence is too broad to process. It needs to have a more specific topic and date range.

Michael Ziesch
*EGIS Staff Officer*

701.328.8029 (o) • mdziesch@nd.gov • www.dmr.nd.gov

NORTH Dakota | Mineral Resources
Be Legendary.

701.328-8020 • oilandgasinfo@nd.gov • 600 E Boulevard Ave, Dept. 405 • Bismarck, ND 58505

**From:** Derrick Braaten <derrick@braatenlawfirm.com>
**Sent:** Thursday, June 15, 2023 12:26 PM
**To:** -Info-Oil & Gas Division <oilandgasinfo@nd.gov>
**Cc:** Kadrmas, Bethany R. <brkadrmas@nd.gov>; Steven Price <steven@braatenlawfirm.com>
**Subject:** RE: Open Record Request re: Summit Carbon Solutions

You don't often get email from derrick@braatenlawfirm.com. Learn why this is important

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

I understand and no problem, thank you for letting me know.

**Derrick Braaten**

BRAATEN Law Firm

**BRAATEN LAW FIRM**
109 N. 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
Fax: 701-221-5842
www.braatenlawfirm.com

**PRIVILEGED COMMUNICATION**
**This e-mail message is intended only for the named recipient(s) above and is covered by the Electronic Communications Privacy Act, 18 U.S.C. Sections 2510-2521. This e-mail is confidential and may contain information that is privileged, attorney work product or exempt from disclosure under applicable law. Recipients should not file copies of this e-mail with publicly accessible records. If you have received this message in error, please immediately notify the sender by return e-mail and delete this e-mail message from your computer. Thank you for your cooperation.**

**From:** -Info-Oil & Gas Division <oilandgasinfo@nd.gov>
**Sent:** Thursday, June 15, 2023 10:16 AM
**To:** Derrick Braaten <derrick@braatenlawfirm.com>; -Info-Oil & Gas Division <oilandgasinfo@nd.gov>
**Cc:** Kadrmas, Bethany R. <brkadrmas@nd.gov>
**Subject:** RE: Open Record Request re: Summit Carbon Solutions

[Warning: External Sender]

Mr. Braaten, your request has been received and is being reviewed. We have special hearings this week,

scheduled for Wed-Fri that are impacting staff availability.

Michael Ziesch
*EGIS Staff Officer*

701.328.8029 (o) • mdziesch@nd.gov • www.dmr.nd.gov

NORTH Dakota | Mineral Resources
Be Legendary.

701.328-8020 • oilandgasinfo@nd.gov • 600 E Boulevard Ave, Dept. 405 • Bismarck, ND 58505

**From:** Derrick Braaten <derrick@braatenlawfirm.com>
**Sent:** Wednesday, June 14, 2023 12:03 PM
**To:** -Info-Oil & Gas Division <oilandgasinfo@nd.gov>
**Cc:** Kadrmas, Bethany R. <brkadrmas@nd.gov>; Helms, Lynn D. <lhelms@nd.gov>; Hicks, Bruce E. <bhicks@nd.gov>
**Subject:** Open Record Request re: Summit Carbon Solutions

You don't often get email from derrick@braatenlawfirm.com. Learn why this is important

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

I understand that Summit Carbon Solutions or one of its subsidiaries or affiliates such as SCS Carbon Transport or another related entity has filed an application with the ND Industrial Commission requesting an order amalgamating property interests and/or seeking a Class VI well permit or permits. I am writing to request all such applications and all correspondence and other documents related to the application, as well as all correspondence generally with Summit Carbon Solutions or its affiliates, authorized agents and representatives. I authorize you to charge up to $250.00 to respond to this request and would prefer all materials in electronic format to the maximum extent possible. I understand that there are likely short timeframes for such applications and hearings so hope to receive these materials as soon as possible and I am happy to discuss ways to expedite the request or make your response more efficient. Please let me know if you have any questions or would like to discuss anything in this request.

Sincerely,

**Derrick Braaten**

BRAATEN Law Firm

**BRAATEN LAW FIRM**
109 N. 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
Fax: 701-221-5842
www.braatenlawfirm.com

**PRIVILEGED COMMUNICATION**

**This e-mail message is intended only for the named recipient(s) above and is covered by the Electronic Communications Privacy Act, 18 U.S.C. Sections 2510-2521. This e-mail is confidential and may contain information that is privileged, attorney work product or exempt from disclosure under applicable law. Recipients should not file copies of this e-mail with publicly accessible records. If you have received this message in error, please immediately notify the sender by return e-mail and delete this e-mail message from your computer. Thank you for your cooperation.**

BRAATEN
Law Firm

August 24, 2023

**Via Email Only**

North Dakota Industrial Commission
Department of Mineral Resources
Oil & Gas Division
600 E. Blvd. Ave. Dept. 405
Bismarck, ND 58505-0840
oilandgasinfo@nd.gov

**Re: Records Request -- Applications for Permits**

I am writing to request a copy of records from your office, pursuant to N.D.C.C. § 44-04-18. Summit Carbon Solutions, LLC submitted three applications for carbon dioxide storage facility permits on June 9th, 2023. I am writing to request all correspondence and other documents related to the applications, as well as all correspondence generally with Summit Carbon Solutions or its affiliates, authorized agents and representatives, from June 21st, 2023 to August 24th, 2023.

To the maximum extent possible, I request that you provide all records to me in electronic format by emailing them to my paralegal Steven Price at steven@braatenlawfirm.com. If it is necessary to mail responsive records, they may be sent to me at the address below.You have my pre-authorization to bill up to $300.00 to fulfill this records request. If you have any questions about anything in this letter, do not hesitate to contact me.

Sincerely,

Derrick Braaten

**EXHIBIT 3**

BRAATEN
Law Firm

September 7, 2023

**Via Email Only**

North Dakota Industrial Commission
Department of Mineral Resources
Oil & Gas Division
600 E. Blvd. Ave. Dept. 405
Bismarck, ND 58505-0840
oilandgasinfo@nd.gov

**Re: Records Request -- Applications for Permits**

I am writing to request a copy of records from your office pursuant to N.D.C.C. § 44-04-18. Summit Carbon Storage #1, LLC was recently granted a permit for the TB LEINGANG 2, SE NE 18-141N-87W, Oliver Co., API – 33-065-00027, well file #40178. I am writing to request all correspondence and other documents related to all permit applications submitted by Summit Carbon Storage #1, LLC, or its affiliates, authorized agents, and representatives, from January 1, 2023 to September 6, 2023.

To the maximum extent possible, I request that you provide all records to me in electronic format by emailing them to my paralegal Steven Price at steven@braatenlawfirm.com. If it is necessary to mail responsive records, they may be sent to me at the address below. You have my pre-authorization to bill up to $300.00 to fulfill this records request. If you have any questions about anything in this letter, do not hesitate to contact me.

Sincerely,

Derrick Braaten

**EXHIBIT 4**

BRAATEN
Law Firm

September 21, 2023

**Via Email Only**

North Dakota Industrial Commission
Department of Mineral Resources
Oil & Gas Division
600 E. Blvd. Ave. Dept. 405
Bismarck, ND 58505-0840
oilandgasinfo@nd.gov

**Re: Records Request Applications for Permits**

I am writing to request a copy of records from your office, pursuant to N.D.C.C. § 44-04-18. Please provide all applications for permits pursuant to N.D.C.C. ch. 38-25, including any associated or related correspondence, documents, and notes related to the applications for permits.

To the maximum extent possible, I request that you provide all records to me in electronic format by emailing them to my paralegal Desirae Zaste at desirae@braatenlawfirm.com. If it is necessary to mail responsive records, they may be sent to me at the address below.

You have my pre-authorization to bill up to $300.00 to fulfill this records request. If you have any questions about anything in this letter, do not hesitate to contact me. Thank you for your assistance.

Sincerely,

Derrick Braaten

DB/dnz

**EXHIBIT 5**

BRAATEN
Law Firm

May 15, 2024

**Via Email Only**

North Dakota Industrial Commission
Department of Mineral Resources
Oil & Gas Division
600 E. Blvd. Ave. Dept. 405
Bismarck, ND 58505-0840
oilandgasinfo@nd.gov

**Re: Records Request**

I am writing to request a copy of records from your office, pursuant to N.D.C.C. § 44-04-18. Please provide the following data electronic files and/or load files submitted to the Oil and Gas Division by applicants Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC:

- All the input files, field and analytical data, and the model geochemical database used to evaluate the CO2 effects on the upper and lower confining layers, including but not limited to all inputs and data files used to run the United States Geological Survey's USGS's PHREEQC model.
- All the input files, field and analytical data , and the model geochemical database used to run Computer Modelling Group Ltd.'s GEM model and software or any similar model or software used for the same purposes.
- Geophysical Logs that penetrate injection and confining zones, seismic survey data and core sample measurements, all measurements and data for acoustic impedance, total porosity, effective porosity, permeability, and facies.
- All the input files, field and analytical data, and the model, including but not limited to all inputs and data files used to run SLB's Petrel model in any manner related to Summit's applications.
- All 3D numerical reservoir simulation model data decks, output files and graphing files of the Storage Reservoir in original electronic format. Without limiting the foregoing, such files may commonly be stored in Slumberger Eclipse or Petrel format, CMG (Canadian Modeling Group) Imex format, or other similar format.

To the maximum extent possible, I request that you provide all records to me in electronic format by emailing them to my paralegal Desirae Zaste at desirae@braatenlawfirm.com. If it is necessary to mail responsive records, they may be sent to me at the address below.

**EXHIBIT 6**

You have my pre-authorization to bill up to $300.00 to fulfill this records request. If you have any questions about anything in this letter, do not hesitate to contact me. Thank you for your assistance.

Sincerely,

Derrick Braaten

DB/dnz

Outlook

## Re: open records request from 5-15-2024

**From** Ziesch, Michael D. <mdziesch@nd.gov>
**Date** Tue 5/21/2024 10:26 AM
**To** Desirae Zaste <desirae@braatenlawfirm.com>

[Warning: External Sender]

Regarding the open records request received on 5-15-2024 for Summit Carbon Storage facilities. Please see responses in red below each of the submitted topics.

The agency has previously provided (9-21-2023) all modeling input and results files submitted and used for the application by Summit. Agency staff validated the inputs and parameters in the submitted model via CMG software. Field and analytical data of your request are available through the agency website in log and well files.

• All the input files, field and analytical data, and the model geochemical database used to evaluate the CO2 effects on the upper and lower confining layers, including but not limited to all inputs and data files used to run the United States Geological Survey's USGS's PHREEQC model.

Results received from applicant is in the related case files and available on the agency website. The agency did not receive software files for PHREEQC model. Model and geochemical database documentation can be obtained from the USGS.gov PHREEQC webpage.

• All the input files, field and analytical data , and the model geochemical database used to run Computer Modelling Group Ltd.'s GEM model and software or any similar model or software used for the same purposes.

The agency did not receive Geochem GEM model files. Results of Geochem modeling are summarized in the application packet, available in the case file. The geochemical equations used in the model are internal to the CMG GEM software.

• Geophysical Logs that penetrate injection and confining zones, seismic survey data and core sample measurements, all measurements and data for acoustic impedance, total porosity, effective porosity, permeability, and facies.

Geophysical logs data are available via Premium Subscription on the agency Scout Ticket. Well files contain the core analysis and are also available on agency website via Premium Subscription. Related wells that penetrate the area of review are identified in section 4 of each application package. Seismic survey results are not provided to the agency, they are owned by the company conducting the survey.

• All the input files, field and analytical data, and the model, including but not limited to all inputs and data files used to run SLB's Petrel model in any manner related to Summit's applications.

The agency does not receive Petrel model files other than exports from the CMG files previously provided on 9-21-2023 open records request.

• All 3D numerical reservoir simulation model data decks, output files and graphing files of the Storage Reservoir in original electronic format. Without limiting the foregoing, such files may commonly be stored in Slumberger Eclipse or Petrel format, CMG (Canadian Modeling Group) Imex format, or other similar format.

The CMG files, previously provided on 9-21-2023, are the modeling files still being used for the applications. There are no updates to them.

Michael Ziesch
*EGIS Staff Officer*

701.328.8029 (o) • mdziesch@nd.gov • www.dmr.nd.gov

NORTH Dakota | Mineral Resources
Be Legendary.™

701.328-8020 • oilandgasinfo@nd.gov • 600 E Boulevard Ave, Dept. 474 • Bismarck, ND 58505

Outlook

**Re: November 13-2024 records request**

**From** Ziesch, Michael D. <mdziesch@nd.gov>
**Date** Wed 11/20/2024 3:34 PM
**To** Derrick Braaten <derrick@braatenlawfirm.com>; Desirae Zaste <desirae@braatenlawfirm.com>

[Warning: External Sender]

Mr. Braaten, our office has compiled the requested files and copied them to a thumb drive for delivery. Would you like to have one of your staff members come by our office for pickup, or I can arrange to have one of our staff members deliver the device to your office.

Due to the size of the files we had to purchase a flash drive from Best Buy. The cost of the device was $16.99 an invoice will be included. No other charges were incurred in processing the request.

Please let me know how you'd like to proceed.

Michael Ziesch
*EGIS Staff Officer*

701.328.8029 (o) • mdziesch@nd.gov • www.dmr.nd.gov

NORTH Dakota | Mineral Resources
Be Legendary.

701.328-8020 • oilandgasinfo@nd.gov • 600 E Boulevard Ave, Dept. 474 • Bismarck, ND 58505

**NORTH DAKOTA INDUSTRIAL COMMISSION**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case No(s). 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

---

## DECLARATION OF SERVICE

---

[¶1] I hereby certify that true and correct copies of the following documents:

- **Declaration of Derrick Braaten;**
- **Exhibit A – November 13, 2024 open records request;**
- **Exhibit B – November 20, 2024 response to open records request; and**
- **Declaration of Service.**

were, on the 9th day of December, 2024 sent via electronic mail to the following:

North Dakota Industrial Commission
oilandgasinfo@nd.gov
slforsberg@nd.gov

Mark Bohrer
mbohrer@nd.gov

Lawrence Bender
Attorney at Law
lbender@fredlaw.com

Tyler Gludt
Attorney at Law
TGludt@fredlaw.com

Thomas Throne
Attorney at Law
tthrone@thronelaw.com

Joshua Swanson
Attorney for Intervenor Minnkota
jswanson@vogellaw.com

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on this 9th day of December, 2024 at Bismarck, North Dakota.

Desirae Zaste

Outlook

## Summit Carbon Solutions - NDIC Case Nos. 30869-30880

**From** Hughes, Bethany <BHughes@fredlaw.com>

**Date** Tue 11/12/2024 9:32 AM

**To** Bohrer, Mark F. <mbohrer@nd.gov>; Garner, David P. <dpgarner@nd.gov>; derrick@braatenlawfirm.com <derrick@braatenlawfirm.com>; Joshua A. Swanson <jswanson@vogellaw.com>

**Cc** Forsberg, Sara L. <slforsberg@nd.gov>; Knutson, Amy N. <anknutson@nd.gov>; Bender, Lawrence <LBender@fredlaw.com>; Etter, Mary <METter@fredlaw.com>

2 attachments (906 KB)

Summit Carbon Storage - NDIC Case Nos. 30869 to 30880 - Response to Landowner Intervenors' Declarations-c.pdf; Summit Carbon Storage - COS - NDIC Case Nos. 30869 to 30880 - Response to Landowner Intervenors' Declarations-c.pdf;

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Attached please find the following documents for filing and service with respect to the above-referenced case numbers.

1. Response to Landowner Intervenors' Declarations; and
2. Certificate of Service.

Thanks,

**Bethany Hughes**
*Legal Administrative Assistant/Paralegal*
Fredrikson & Byron, P.A.
304 East Front Ave, Suite 400, Bismarck, ND 58504-5639
Direct: 701-221-8641 | Main: 701.221.8700 | Fax: 701-221-8750

***This is a transmission from the law firm of Fredrikson & Byron, P.A. and may contain information which is privileged, confidential, and protected by the attorney-client or attorney work product privileges. If you are not the addressee, note that any disclosure, copying, distribution, or use of the contents of this message is prohibited. If you have received this transmission in error, please destroy it and notify us immediately at our telephone number (701) 221-8700. The name and biographical data provided above are for informational purposes only and are not intended to be a signature or other indication of an intent by the sender to authenticate the contents of this electronic message.***

**BEFORE THE INDUSTRIAL COMMISSION**
**OF THE STATE OF NORTH DAKOTA**

**CASE NOS. 30869–30880**

**In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34,**

**Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission**

**may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon**

**Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## RESPONSE OF SUMMIT CARBON STORAGE #1, LLC, SUMMIT CARBON STORAGE #2, LLC, AND SUMMIT CARBON STORAGE #3, LLC TO THE DECLARATIONS FILED BY LANDOWNER INTERVENORS[1]

[1] Landowner Intervenors are the Swenson Living Trust, Michael Bauman, Glenn and Lisa Gerving, Michael and Bonnie Haupt, John Jochim, Kevin and Kimberly Kraft, Charmayne Liebelt, Kirk and Linda Maize and Allen Maize, Paul and Christy Metz, JoLene M. Rust, and Gary and Cassie Smith.

## INTRODUCTION

On November 4, 2024, without seeking permission from the North Dakota Industrial Commission ("Commission"), Landowner Intervenors filed two declarations: the Declaration of Derrick Bratten (the "Braaten Declaration") and the Declaration of Paul Button (the "Button Declaration") (collectively, the "Declarations"). Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC (collectively, "Summit") now seek leave of the Commission to respond to these filings.

Summit respectfully requests that the Commission carefully consider this response and recognize that the recent Declarations from Landowner Intervenors appear to reflect a strategic intent to obstruct Summit's project. Summit does not oppose the information within these Declarations, provided the Commission equally weighs Summit's response, which clarifies the detrimental impact of these continued delays.

For the reasons outlined below, Summit urges the Commission to reject this latest attempt by Landowner Intervenors to stall these proceedings, deny their request for a supplemental hearing, and proceed with a decision on each of Summit's applications without further delay.

## STATEMENT OF RELEVANT FACTS

### I. Landowner Intervenors' pattern of dilatory tactics in the above-captioned cases.

Landowner Intervenors' efforts throughout these proceedings have been focused primarily on delaying a decision by the Commission. These efforts began on April 25, 2024, when Landowner Intervenors filed a motion to continue the hearing on Summit's applications to a later date. On June 7, 2024, the Commission denied Landowner Intervenors' motion to continue. *See* Order on Motion for Expedited Discovery and Motion for Continuance of Hearing.

The Commission held a hearing on Summit's applications on June 11, 12 and 13 of 2024. *See* Hr'g Recording.[2] At the hearing, Landowner Intervenors—through their attorney—conducted extensive cross-examination of Summit's witnesses relating to the modeling efforts performed by Summit and the Energy & Environmental Research Center ("EERC"), including questioning about the models themselves. *Id.* In fact, the majority of the hearing was devoted to Landowner Intervenors' cross-examination of Summit's witnesses and the presentation of Landowner Intervenors' own witnesses. *Id.*[3] At the conclusion of the hearing, Landowner Intervenors renewed their motion to continue the hearing. *Id.* The Commission again denied the motion. *Id.*

On July 2, 2024, Landowner Intervenors continued their efforts to delay a decision by filing a Petition for Reconsideration of Denial of Motion to Continue Hearing. Landowner Intervenors requested the Commission continue the hearing on Summit's applications (which had already concluded). On August 15, 2024, the Commission denied Landowner Intervenors' Petition for Reconsideration of Denial of Motion to Continue Hearing. *See* Order on Petition for Reconsideration of Denial of Motion to Continue Hearing.

Two weeks later, on August 29, 2024, the Landowner Intervenors filed with the Commission another request for delay. Rather than requesting to continue the hearing that had long since concluded, Landowner Intervenors moved the Commission for a supplemental hearing arguing the same was necessary to "allow [Landowner Intervenors] to present evidence related to the reservoir computer modeling and parameters used in that model." *See* Intervenor Landowners' Motion for Supplemental Hearing, ¶ 1. In their supporting brief, Landowner Intervenors

---

[2] The recording of the hearing in this matter can be accessed using the following hyperlink: https://www.youtube.com/@NDDMR.

[3] The hearing on Summit's application lasted approximately 23 ½ hours over the course of 3 days. Landowner Intervenors consumed approximately 80% of that time through cross examination and presentation of their witnesses.

represented to the Commission that they first received the modeling information from the EERC on July 2, 2024, and "a first run of the model will take 24.7 days." *See* Brief in Support of Intervenor Landowners' Motion for Supplemental Hearing. Contrary to these representations, Landowner Intervenors had previously requested and received the modeling information from the Commission on June 23, 2023 – more than one year earlier. *See* Summit's Response to Intervenor Landowners' Motion for Supplemental Hearing, ¶ 13 (referring to the Commission's May 21, 2024 response to Landowner Intervenors' May 15, 2024 open records request).[4]

## II. The Declarations foreshadow Landowner Intervenors' continued efforts to delay a decision by the Commission.

On November 4, 2024, approximately 500 days after receiving the modeling information from the Commission, and approximately 125 days after receiving the same modeling information from the EERC, Landowner Intervenors filed with the Commission the reservoir computer modeling information they sought to introduce at the supplemental hearing requested in their Motion for Supplemental Hearing. *See generally* Braaten Declaration and Button Declaration. From Landowner Intervenors' filings, it appears they provided their expert, Mr. Paul Button, a petroleum engineer, with the GEM simulation model submitted to the Commission by the EERC in the above-referenced cases (the "Model"). *See* Button Declaration, ¶ 2. Although the Braaten Declaration indicates more time is needed for his expert Mr. Button to run the simulation model with a 2.7 multiplier, Mr. Button confirms in his declaration he has already done so and attaches plume maps as exhibits to his declaration. *See* Braaten Declaration, ¶ 2; *see also* Button Declaration, ¶ 4. Mr. Button indicates he ran the model using global permeability multipliers of 1, 2.5, and 2.7 to simulate the plume size for each of Summit's proposed Broom Creek storage

[4] The Commission has not yet ruled on Landowner Intervenors motion for a supplemental hearing.

facilities on January 1, 2044. *Id.* Mr. Button's results are depicted on Exhibit A to the Button Declaration. *See* Button Declaration, Ex. A.

Mr. Button does not provide opinions or conclusions related to his modeling efforts. The omission of these opinions is explained by Mr. Braaten's declaration, which foreshadows Landowner Intervenors' forthcoming attempts to further delay a decision with the vague promise of evidence to be made available at some time in the future. Mr. Braaten states that Landowner Intervenors need "additional time to analyze the model runs," and that within the next 30 days, Landowner Intervenors "could generate maps and specific impacted acreages based on plume area and extent as well as pressure fronts." *See* Braaten Declaration, ¶¶ 3, 4.

## ARGUMENT

### I. Summit's ongoing efforts and obligations with respect to the subject storage facilities.

As the Commission and Landowner Intervenors are aware, Summit's obligations with respect to the storage facilities will not cease if the Commission issues storage facility permits to Summit. State law requires and Summit has committed to re-evaluating the area of review ("AOR") and its corrective action plan not less than one time every five (5) years. *See* N.D.A.C. § 43-05-01-05.1; *see also* Summit's Applications in Case Nos. 30869–30880, § 4.3. As part of Summit's re-evaluation, Summit will either "a) demonstrate to the [Commission] using monitoring data and modeling results that no plan amendment is necessary or b) submit an amended AOR and corrective action plan for [Commission] approval." *Id.*

At the hearing on the above-referenced applications, Summit provided testimony that it will conduct 3D seismic on the storage facilities by the end of years two, four and nine following commencement of injection operations and then at least one time every five years thereafter. *See* **Exhibit A** (Excerpt of Transcript from June 12, 2024 Hearing). In response to a request by Commission staff at the hearing on Summit's applications, Summit agreed to report to the

Commission if "anything looks significantly off" based on the 3D seismic conducted at the two-year mark. *Id.* And Summit has submitted to the Commission a Storage Agreement for each of Summit's proposed storage facilities and each Storage Agreement provides for the procedure to enlarge the storage facility and the re-allocation of each pore space owner's interest in the storage facility upon such enlargement. *See* Case Nos. 30869–30880.

The above measures exist to ensure that any permits issued to Summit can be adjusted in response to developments not anticipated by Summit's modeling (or Landowner Intervenors' modeling). For these reasons, and for those set forth below, the Commission should reject Landowner Intervenors' delay tactics, deny Landowner Intervenors' request for a supplemental hearing and proceed with a decision on Summit's applications.

## II. The Commission should not delay its decision based on Landowner Intervenors' estimated timelines.

Landowner Intervenors argue that the modeling performed by their experts will somehow show: (1) the boundaries of each of Summit's three storage facilities need to be expanded to include additional acreage, and (2) certain Landowner Intervenors and other pore space owners within the proposed storage facilities should be compensated based on the pressure fronts and volumetric capacity of the pore space. As noted above, Landowner Intervenors took great liberty in cross-examining Summit's witnesses on these issues at the hearing earlier this year. Now, Landowner Intervenors attempt to draw the Commission's attention with the promise of additional modeling information and other yet-to-be-presented evidence they contend should be considered before the Commission issues its decision. But the recent submissions should be viewed for what they are—one more attempt to delay the Commission's decision.

The Commission now has before it the additional modeling information that Landowner Intervenors sought to admit at a supplemental hearing. Desiring to further delay the Commission's

decision on Summit's applications, Landowner Intervenors have indicated their intent to submit more of the same information to the Commission within thirty (30) days of November 4, 2024. However, Landowner Intervenors' have already demonstrated that it takes between 125 and 500 days for their expert to compile this information, not 24.7 days as previously suggested by the Landowner Intervenors.

The Commission should not further delay its decision on Summit's application based on Landowner Intervenors' promises for submission of additional modeling information sometime in the future. There is no guarantee Landowner Intervenors will adhere to their self-imposed timelines, and the proceedings to date indicate the opposite is more likely. Accordingly, the Commission should render a decision on Summit's applications without waiting for more evidence or a supplemental hearing.

## III. The Landowner Intervenors' concerns regarding plume migration are alleviated and addressed by the statutes, rules and orders of the Commission.

The Commission need not delay its decision on Summit's applications in anticipation of receiving additional modeling information from Landowner Intervenors. The modeling simulations and information submitted by Summit *and* Landowner Intervenors will be subject to confirmation when Summit performs 3D seismic two years after injection operations commence and the AOR is reevaluated in accordance with N.D.A.C. § 43-05-01-05.1. While Summit and the Landowner Intervenors could continue to submit modeling information based on multiple combinations of different variables for the Commission's consideration, this would be an exercise in futility. The modeling information merely provides a "best prediction" of plume migration based on the variables put into the model. No party will know or understand the actual migration until after injection operations have commenced, 3D seismic and other monitoring activities are

conducted, and models are updated with actual data by Summit in accordance with the Commission's rules and orders.

To that end, the Commission has continuing jurisdiction over Summit and Summit's proposed storage facilities and may re-evaluate (or cause Summit to re-evaluate) the AOR and the storage facility boundaries at any time. *See* N.D.C.C. § 38-22-03(5). As set forth above, Summit committed that it will notify the Commission if Summit's monitoring activities indicate that the plume is reacting or migrating other than as predicted by Summit's models, including if the data suggests that the plume may travel outside of the horizontal boundaries of a storage facility. Furthermore, Summit's testing, monitoring and reporting plans require Summit to submit injection data to the Commission on a monthly, quarterly and annual basis, and to submit Summit's seismic data by the end of the second, fourth and ninth years following commencement of injection operations.

Consistent with the Commission's continuing jurisdiction and authority, the Commission may modify the storage facility boundaries and require Summit to include additional pore space owners within an enlarged storage facility if the injection and seismic data support such a modification. Any interested person (which includes any person who has or will suffer actual injury or economic damage) may request that the Commission review Summit's permit for the reasons set forth in N.D.A.C. § 43-05-01-12, which include changes to the storage facility area. Last, any nonconsenting pore space owners within the enlarged facility must be equitably compensated in accordance with § 38-22-08(14) of the North Dakota Century Code.

Accordingly, the information Landowner Intervenors' promise to present is likely to have little, if any, impact on the Commission's decision at present. The concerns that appear to motivate Landowner Intervenors can (and will) be more adequately addressed after more information about

the operation of the storage facility has become available. If Landowner Intervenors concerns are not allayed by the information obtained, they can request review of Summit's permits at that time. The Commission should thus put an end to Landowner Intervenors' delay tactics and render a decision on Summit's applications.

## IV. The Commission has already considered and rejected a pore volume formula for determining equitable compensation.

The Landowner Intervenors have indicated their intent to argue that pore space owners should be compensated based on the volume and storage capacity of the pore space for each individual pore space owner. However, the Landowner Intervenors' objection to Summit's pore space compensation formula is fundamentally flawed and disregards both established regulatory precedent and robust geologic data. Summit's formula, grounded in surface acreage, aligns precisely with what the Commission has approved for every previous permit issued for storage facilities. Yet the Landowner Intervenors advocate for an alternative formula based on each landowner's estimated pore space volume and storage capacity, specifically targeting variations in thickness, porosity, and permeability within the reservoir beneath their properties.

This proposal is a clear overreach, ignoring the Commission's repeated findings and conclusions in similar cases, as well as the specific geologic data outlined in Summit's application. In fact, the Commission has consistently ruled that "capillary trapping, relative permeability hysteresis, and a lack of local area history matching data from injection of carbon dioxide into the saline Broom Creek Formation reservoir provides reasonable doubt for the utility of a pore volume formula." *See* Order No. 32807, Case No. 30123 (DCC West); *see also* Order No. 32475, Case No. 29889 (Blue Flint); *see also* Order No. 32251, Case No. 29451 (DGC). In previous storage facility permit application hearings, the Commission concluded that, for the Broom Creek Formation in the area of the proposed Summit storage facilities, "the 100% weighting on surface

acreage is acceptable and that the one-phase formula is protective of correlative rights and should not be modified." *Id.*

Landowner Intervenors' formula demands would upend a tried-and-true framework that has been carefully calibrated to ensure fair compensation and protect all stakeholders. Their insistence on a more granular approach not only misrepresents the scientific data but is at odds with a regulatory standard designed to protect correlative rights. The Commission's stance is clear, consistent, and well-grounded in both law and science—Summit's surface acreage-based compensation model should stand unchallenged. Furthermore, Landowner Intervenors have not indicated they will be able to provide new or additional local history matching data to overcome the conclusion the Commission has reached in prior matters. To the extent Landowner Intervenors could have provided such data, the time to do so was at the originally scheduled hearing on Summit's applications.

## CONCLUSION

Delaying the permit process is often seen as a powerful tool in opposing infrastructure projects, sometimes even more effective than direct opposition. Here, any additional hearing on Summit's model variations would not provide meaningful enhancement to the evidentiary record in these cases. Only the actual injection of carbon dioxide, coupled with subsequent monitoring, testing, and analysis, can yield further valuable data. Landowner Intervenors already had the opportunity to challenge Summit's models in a hearing, and the validity of those models will ultimately be determined through required post-injection monitoring. The due process afforded to Landowner Intervenors during the hearing was substantial, and the Commission's issuance of storage facility permits still allows for future review if Landowner Intervenors submit a justified request.

Further, the Commission has consistently rejected the use of a pore volume formula to determine compensation for pore space due to technical uncertainties, such as capillary trapping and a lack of local data on carbon dioxide injection in the Broom Creek Formation. Despite the Landowner Intervenors' proposal to base compensation on individual pore volume and storage capacity, they have not provided new data to address these concerns. Any relevant data concerning a pore volume formula was available to the Landowner Intervenors well in advance of the hearings in June and could have been presented at that time.[5] Landowner Intervenors refused to do so with the intent to argue that more information and time were necessary. Summit submits that the Landowner Intervenors should not be allowed to benefit from this approach which was clearly a delay tactic. Landowner Intervenors made a strategic choice that carried the risk of not presenting their full case in a timely manner and should not be rewarded for this decision.

While the resources expended on Landowner Intervenors' efforts are regrettable, they are not unexpected. If the Landowner Intervenors' objective is to derail or delay Summit's project to the point of economic infeasibility, the rights and remedies available to them under the law, *e.g.*, the right and ability for Landowner Intervenors to request a review of Summit's permit(s) pursuant to N.D.A.C. § 43-05-01-12, do not further this objective and likely do not appeal to Landowner Intervenors. A similar strategy was observed in the parallel pipeline hearings before the North Dakota Public Service Commission, where the intervenors in that case employed similar delay tactics—filing for continuances, petitions for reconsideration, and requests for supplemental hearings—in an effort to block Summit's pipeline project. These strategies should not be

[5] *See*, *e.g.*, Section 2.3 of Summit's Applications; *see also* Figure 2-10a and Figure 2-10b (Isopach maps of Broom Creek Formation).

condoned, and the Commission should not be unwittingly complicit in Landowner Intervenors' extralegal efforts to delay Summit's pipeline project.

For the reasons set forth herein, Summit respectfully requests that the Commission reject Landowner Intervenors' delay strategy, deny their requests for a supplemental hearing, and proceed to render a decision on the merits of Summit's applications.

Dated this 12th day of November, 2024.

By: _____

Lawrence Bender (#03908)
Tyler J. Gludt (#06587)
lbender@fredlaw.com
tgludt@fredlaw.com
**FREDRIKSON & BYRON, P.A.**
304 East Front Avenue, Suite 400
Bismarck, ND 58504
(701) 221-8700
*Attorneys for Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC and Summit Carbon Storage #3, LLC*

#84466460v1

A. It's my understanding ano beds. We'll clarify.

Q. Okay. And so, regardless, we'd want those locations identified.

A. Yeah.

Q. And I think, John, you testified to this earlier, but there's some narrative on 5-29 that indicates that you will be running 3D seismic at years two, four and nine. It is the intent to run 3D seismic as early as year two after injection?

A. (BY MR. HUNT) That's -- yes. Yeah, and in the narrative it says "by year two," so just to be clear.

Q. Okay. But my point -- my confirmation is that there will be a sequence of 3D seismic run shortly after beginning injection and another one prior to the five-year review?

A. Correct.

Q. Okay. I'll point out that if anything looks significantly off at that two-year mark, it is expected that you will report that and we'll begin the determination whether or not we need to accelerate that hearing.

A. Understood.

Q. On page 5-32 there's the narrative about

**BEFORE THE INDUSTRIAL COMMISSION**
**OF THE STATE OF NORTH DAKOTA**

**CASE NOS. 30869–30880**

**In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34,**

**Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission**

**may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon**

**Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the**

**geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## CERTIFICATE OF SERVICE

[¶ 1] I, the undersigned, hereby certify that a true and correct copy of the following document:

1. Response of Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC to the Declarations Filed by Landowner Intervenors.

was, on November 12, 2024, filed electronically with the North Dakota Industrial Commission and served upon the following via electronic mail:

Mark Bohrer
mbohrer@nd.gov

David Garner
dpgarner@nd.gov

Sara Forsberg
slforsberg@nd.gov

Amy Knutson
anknutson@nd.gov

Derrick Braaten
derrick@braatenlawfirm.com

Joshua Swanson
jswanson@vogellaw.com

Dated this 12th day of November, 2024.

By: _____

Lawrence Bender (#03908)
lbender@fredlaw.com
**FREDRIKSON & BYRON, P.A.**
304 East Front Avenue, Suite 400
Bismarck, ND 58504
(701) 221-8700
*Attorneys for Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC and Summit Carbon Storage #3, LLC*

#84461936v1

Outlook

## Summit Carbon Storage (Case Nos. 30869-30880)

**From** Desirae Zaste <desirae@braatenlawfirm.com>

**Date** Mon 11/4/2024 9:06 AM

**To** -Info-Oil & Gas Division <oilandgasinfo@nd.gov>; Forsberg, Sara L. <slforsberg@nd.gov>; Bender, Lawrence <LBender@fredlaw.com>; TThrone@thronelaw.com <TThrone@thronelaw.com>; Gludt, Tyler <tgludt@fredlaw.com>; Bohrer, Mark F. <mbohrer@nd.gov>; Garner, David P. <dpgarner@nd.gov>; Knutson, Amy N. <anknutson@nd.gov>; Joshua A. Swanson <jswanson@vogellaw.com>; Helms, Lynn D. <lhelms@nd.gov>

**Cc** Derrick Braaten <derrick@braatenlawfirm.com>

4 attachments (2 MB)

Declaration of Derrick Braaten.pdf; Declaration of Paul Button.pdf; Ex. A -Gas Saturation comp with Perm Mult.pdf; 241104 Declaration of Service.pdf;

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Good morning,

Attached for filing and service are the following documents:

- **Declaration of Derrick Braaten;**
- **Declaration of Paul Button;**
- **Exhibit A - Slides; and**
- **Declaration of Service.**

Thank you.

**Desirae Zaste**

**Litigation Manager/Certified Paralegal**

**BRAATEN LAW FIRM**
109 N. 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
Fax: 701-221-5842
www.braatenlawfirm.com

**PRIVILEGED COMMUNICATION**

**This e-mail message is intended only for the named recipient(s) above and is covered by the Electronic Communications Privacy Act, 18 U.S.C. Sections 2510-2521. This e-mail is confidential and may contain information that is privileged, attorney work product or exempt from disclosure under applicable law. Recipients should not file copies of this e-mail with publicly accessible records. If you**

**have received this message in error, please immediately notify the sender by return e-mail and delete this e-mail message from your computer. Thank you for your cooperation.**

**NORTH DAKOTA INDUSTRIAL COMMISSION**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case No(s). 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## DECLARATION OF DERRICK BRAATEN

1. I am writing this declaration to update the North Dakota Industrial Commission and provide further support for the pending request for additional time to submit post-hearing evidence.

2. The Landowners' expert has managed to run two versions of the model, one without a permeability adjustment as used by Summit and one with the adjustment of 2.5. We are working on a run at 2.7, the actual number from the injection tests on which the adjustment was based. Additionally we are modeling pressure fronts and identifying other potential inaccuracies in the plume model that lead to an incorrect allocation of compensation to acreages and pore space for the Landowners.

3. We'd like to use this information to further explore the acreage impacted by the facility. Our ultimate goal is to provide adjusted acreages for its consideration for amalgamation and compensation for the injections for our clients. We need additional time to analyze the model runs and run models with adjusted parameters in order to produce the data and evidence needed to support our claims. Specifically we could generate maps and specific impacted acreages based on plume area and extent as well as pressure fronts.

4. We are currently working on additional model runs and generating additional evidence right now and hope to be able to submit this to the commission within the next 30 days.

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on the 4th day of November, 2024 at Bismarck, ND, United States.

Derrick Braaten

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case No(s). 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## DECLARATION OF PAUL BUTTON

1. I am a Petroleum Engineer with experience modeling and operating oil and gas reservoirs, and I currently reside in Butte, Montana.
2. Attached hereto as Exhibit A is a true and correct copy of slides created using a GEM simulation model to simulate a carbon sequestration project in Broom Creek Formation in Central North Dakota. The base simulation model was provided to Button Petroleum Management by the Braaten Law Firm. The model was originally built and run by the EERC.
3. Three separate simulations were completed using the model and modification to determine the sensitivity to rock permeability. The original model was built by the EERC and Summit Carbon Solutions based upon core, log, seismic and well test data to simulate the effects of carbon sequestration on the aquifer and confining zones. During the construction of the model the permeability values were distributed within the grid blocks based upon industry accepted practices. The original model uses a global permeability multiplier of 2.5. This means that all the cells in the model have their permeability value originally derived from the core, log, and seismic properties increased 250% to match the results of an injectivity test.
4. The model was run with modifications to the permeability multiplier to determine the change in the areal extent of the injected gas plume. The model was run with the original 2.5 global permeability modifier, a global permeability multiplier of 1 to rely just on the core, log and seismic distribution of permeability and a 2.7 multiplier which

the EERC expert testified was the global permeability multiplier that was originally recommended.

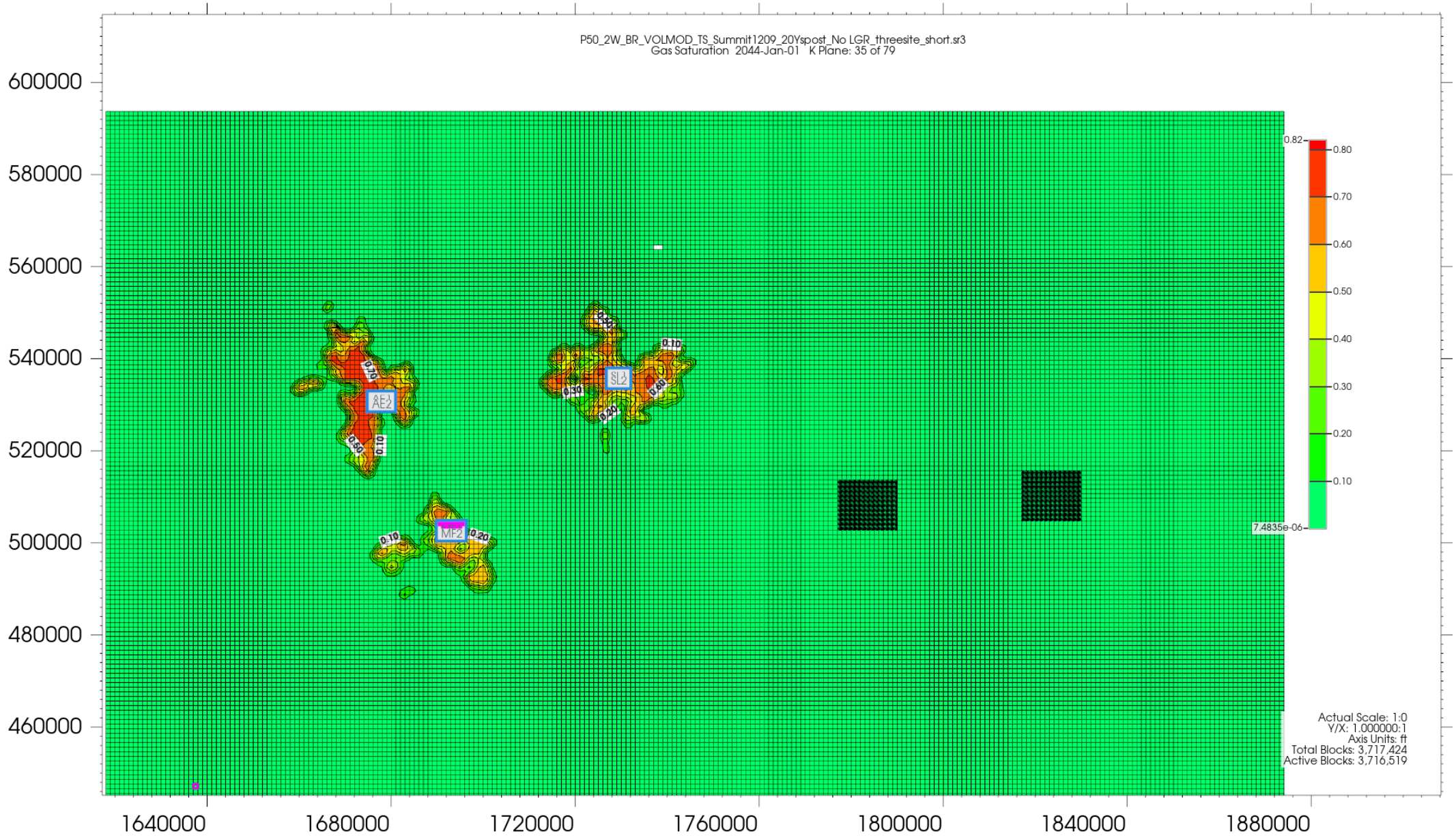
5. Screen shots of the gas saturation within the model are presented in the accompanying slides. The plume size is depicted in each case at Jan 1, 2044. The pictures are of an individual layer within the Broom Creek formation. The gas plume does vary with layer based upon the model properties. The gas plume is pictured for each of the model runs with the 2.5, 1.0 and 2.7 global permeability modifier.

**I declare under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.**

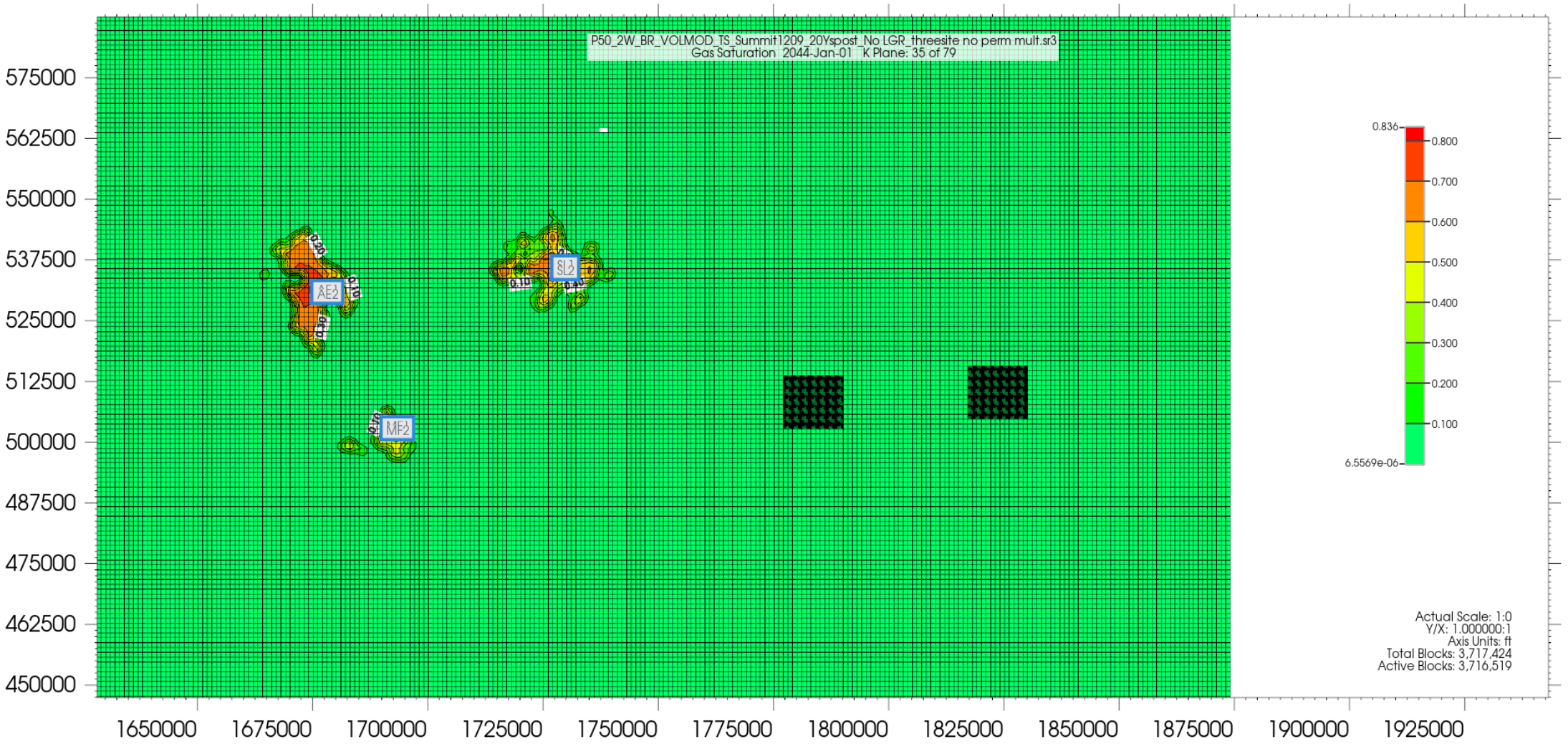
Executed this 1st day of November, 2024 in Butte, Montana.

Paul Button

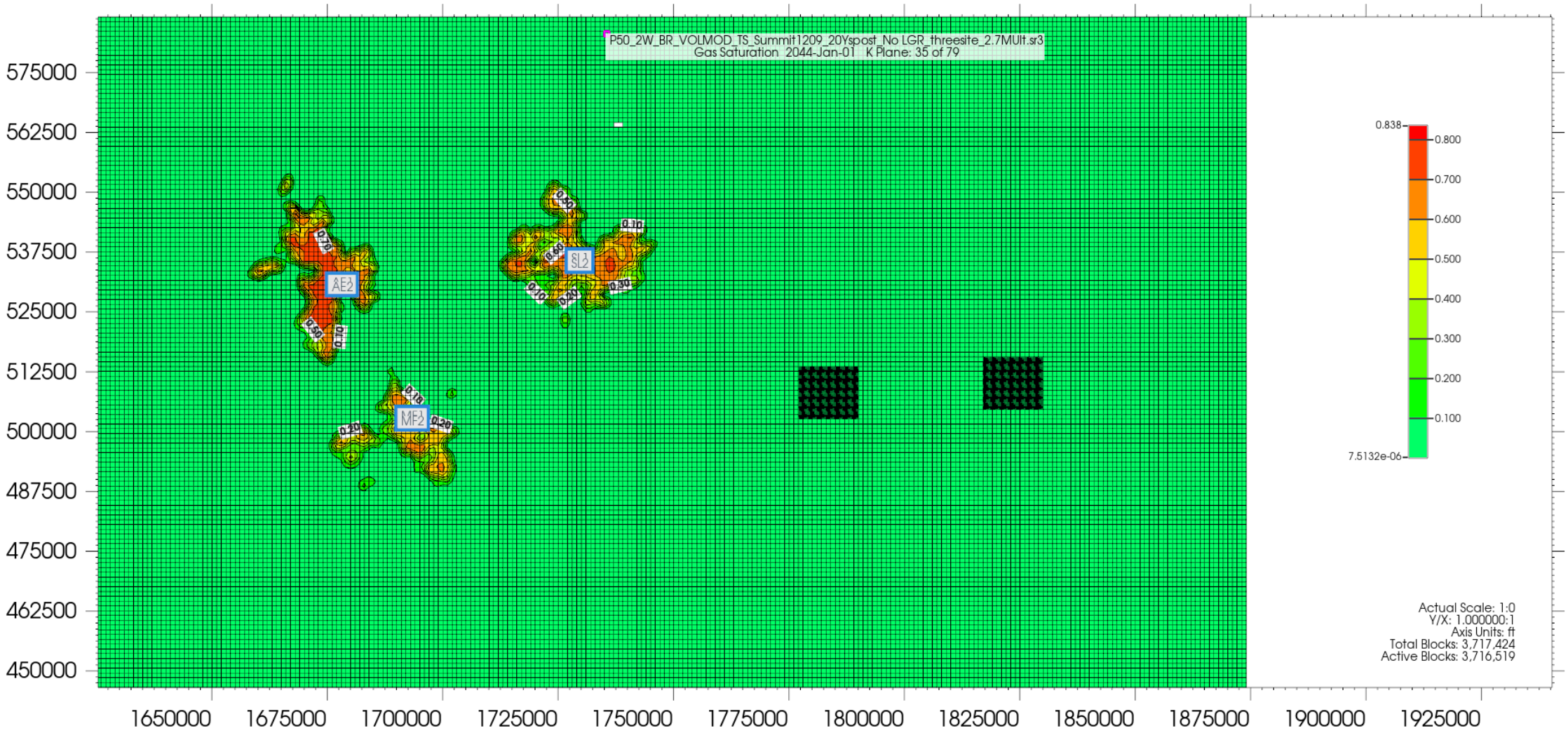
# Model Gas Saturation




Gas saturation map after 20 years of injection with 2.5 global permeability multiplier




Gas saturation map after 20 years of injection with no global permeability multiplier




Gas saturation map after 20 years of injection with 2.7 global permeability multiplier

**NORTH DAKOTA INDUSTRIAL COMMISSION**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case No(s). 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

---

## DECLARATION OF SERVICE

---

[¶1] I hereby certify that true and correct copies of the following documents:

- **Declaration of Derrick Braaten;**
- **Declaration of Paul Button;**
- **Exhibit A - Slides; and**
- **Declaration of Service.**

were, on the 4th day of November, 2024 sent via electronic mail to the following:

North Dakota Industrial Commission
oilandgasinfo@nd.gov
slforsberg@nd.gov

Mark Bohrer
mbohrer@nd.gov

Lawrence Bender
Attorney at Law
lbender@fredlaw.com

Tyler Gludt
Attorney at Law
TGludt@fredlaw.com

Thomas Throne
Attorney at Law
tthrone@thronelaw.com

Joshua Swanson
Attorney for Intervenor Minnkota
jswanson@vogellaw.com

Lynn Helms
lhelms@nd.gov

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on this 4th day of November, 2024 at Bismarck, North Dakota.

Desirae Zaste

Outlook

## RE: Summit Carbon Storage (Case Nos. 30869-30880)

**From** Derrick Braaten <derrick@braatenlawfirm.com>
**Date** Wed 9/18/2024 4:31 PM
**To** Desirae Zaste <desirae@braatenlawfirm.com>; -Info-Oil & Gas Division <oilandgasinfo@nd.gov>; Forsberg, Sara L. <slforsberg@nd.gov>; Bender, Lawrence <LBender@fredlaw.com>; TThrone@thronelaw.com <TThrone@thronelaw.com>; Gludt, Tyler <tgludt@fredlaw.com>; Bohrer, Mark F. <mbohrer@nd.gov>; Garner, David P. <dpgarner@nd.gov>; Knutson, Amy N. <anknutson@nd.gov>; Joshua A. Swanson <jswanson@vogellaw.com>; Helms, Lynn D. <lhelms@nd.gov>

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

All,

I just want to note an error in the brief filed today where I indicated the hearing notice was issued 45 days before the hearing. I had intended to reference the minimum notice period but referenced the actual period, and that period was actually 56 days. I just wanted to amend that error and my apologies for any confusion.

Thank you,

**Derrick Braaten**

**BRAATEN LAW FIRM**
109 N. 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
Fax: 701-221-5842
www.braatenlawfirm.com

**PRIVILEGED COMMUNICATION**
**This e-mail message is intended only for the named recipient(s) above and is covered by the Electronic Communications Privacy Act, 18 U.S.C. Sections 2510-2521. This e-mail is confidential and may contain information that is privileged, attorney work product or exempt from disclosure under applicable law. Recipients should not file copies of this e-mail with publicly accessible records. If you have received this message in error, please immediately notify the sender by return e-mail and delete this e-mail message from your computer. Thank you for your cooperation.**

---

**From:** Desirae Zaste <desirae@braatenlawfirm.com>
**Sent:** Wednesday, September 18, 2024 2:15 PM
**To:** oilandgasinfo@nd.gov; Forsberg, Sara L. <slforsberg@nd.gov>; Bender, Lawrence <LBender@fredlaw.com>; TThrone@thronelaw.com; Gludt, Tyler <tgludt@fredlaw.com>; mbohrer@nd.gov; dpgarner@nd.gov; Knutson, Amy N. <anknutson@nd.gov>; jswanson@vogellaw.com; lhelms@nd.gov
**Cc:** Derrick Braaten <derrick@braatenlawfirm.com>
**Subject:** Summit Carbon Storage (Case Nos. 30869-30880)

Good afternoon,

Attached for filing and service are the following documents:

**• Reply Brief in Support of Intervenor Landowners' Motion to Compel Responses to Written Discovery and Motion for Supplemental Hearing;**
**• Declaration of Derrick Braaten in Support of Motion to Compel;**
**• Exhibit A - Conferral; and**
**• Declaration of Service.**

**Desirae Zaste**

**Litigation Manager/Certified Paralegal**

**BRAATEN LAW FIRM**
109 N. 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
Fax: 701-221-5842
www.braatenlawfirm.com

**PRIVILEGED COMMUNICATION**
**This e-mail message is intended only for the named recipient(s) above and is covered by the Electronic Communications Privacy Act, 18 U.S.C. Sections 2510-2521. This e-mail is confidential and may contain information that is privileged, attorney work product or exempt from disclosure under applicable law. Recipients should not file copies of this e-mail with publicly accessible records. If you have received this message in error, please immediately notify the sender by return e-mail and delete this e-mail message from your computer. Thank you for your cooperation.**

Outlook

## Summit Carbon Storage (Case Nos. 30869-30880)

**From** Desirae Zaste <desirae@braatenlawfirm.com>

**Date** Wed 9/18/2024 2:17 PM

**To** -Info-Oil & Gas Division <oilandgasinfo@nd.gov>; Forsberg, Sara L. <slforsberg@nd.gov>; Bender, Lawrence <LBender@fredlaw.com>; TThrone@thronelaw.com <TThrone@thronelaw.com>; Gludt, Tyler <tgludt@fredlaw.com>; Bohrer, Mark F. <mbohrer@nd.gov>; Garner, David P. <dpgarner@nd.gov>; Knutson, Amy N. <anknutson@nd.gov>; Joshua A. Swanson <jswanson@vogellaw.com>; Helms, Lynn D. <lhelms@nd.gov>

**Cc** Derrick Braaten <derrick@braatenlawfirm.com>

4 attachments (1 MB)

Decl of DB - Reply.pdf; Ex. A - Conferral.pdf; Reply Brief.pdf; 240918 Declaration of Service-Reply.pdf;

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Good afternoon,

Attached for filing and service are the following documents:

- **Reply Brief in Support of Intervenor Landowners' Motion to Compel Responses to Written Discovery and Motion for Supplemental Hearing;**
- **Declaration of Derrick Braaten in Support of Motion to Compel;**
- **Exhibit A - Conferral; and**
- **Declaration of Service.**

**Desirae Zaste**

**Litigation Manager/Certified Paralegal**

**BRAATEN LAW FIRM**
109 N. 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
Fax: 701-221-5842
www.braatenlawfirm.com

**PRIVILEGED COMMUNICATION**

**This e-mail message is intended only for the named recipient(s) above and is covered by the Electronic Communications Privacy Act, 18 U.S.C. Sections 2510-2521. This e-mail is confidential and may contain information that is privileged, attorney work product or exempt from disclosure under applicable law. Recipients should not file copies of this e-mail with publicly accessible records. If you have received this message in error, please immediately notify the sender by return e-mail and delete this e-mail message from your computer. Thank you for your cooperation.**

**NORTH DAKOTA INDUSTRIAL COMMISSION**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case No(s). 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**REPLY BRIEF IN SUPPORT OF INTERVENOR LANDOWNERS' MOTION TO COMPEL RESPONSES TO WRITTEN DISCOVERY AND MOTION FOR SUPPLEMENTAL HEARING**

Summit Carbon Storage #s 1, 2, and 3 ("Summit") make numerous claims that are patently false. For example, Summit argues that there is no such thing as an application for amalgamation, yet this very caption includes an "application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space…." Summit argues that "this proceeding" started in June of 2023 when it submitted draft applications for review to NDIC. That is false. This proceeding started with notice to the affected landowners issued just 45 days before the hearing. Indeed, while Summit argues that the "proceeding" apparently began in June of 2023, this is clearly contradicted by *its own applications* which were dated February 2024 and which contained a certification signed by Summit's Executive Vice President for Summit Carbon Solutions, LLC on February 6, 2024. *See* Permit Application Certification.

For Summit to argue that Derrick Braaten having made a record request a year ago is somehow attributable to clients he'd never spoken to at that time is preposterous. Throughout this proceeding the NDIC and Summit have trampled on the Landowners' due process rights and continue to do so. Arguing that the Landowners are somehow required to retain experts and obtain copies of applications before the applications are even completed or filed and prepare for a proceeding before there is any notice of the proceeding is ludicrous and violates Landowners' due process rights.

On top of this, Summit also argues that it was the fault of the Landowners because the attorney they hired did not know the NDIC withheld modeling files from a prior open record request and then continued to do so in response to every record request made to it by Derrick

Braaten thereafter. Given that everything produced in June 2023 was part of a "draft" application and the NDIC did not disclose the modeling files in June, this is irrelevant to the record request made in May of 2024 after this proceeding actually began. That was a legitimate request that the NDIC mistakenly told Landowners it need not comply with. It was wrong.

Summit also argues that the Landowners were dilatory in issuing discovery. This is double-speak. Summit itself refused to respond to the discovery because the NDIC refused to grant the landowners' interventions in a timely manner. *See* Response to Motion to Expedited Discovery, filed May 28, 2024. Despite specific and explicit requests to expedite, the NDIC intentionally sat on the intervention petition to ensure that the intervenor landowners did not have time for discovery. *See* Petition to Intervene [of the Swenson Living Trust] filed April 18, 2024 and Order on Petition to Intervene for Swenson Trust dated May 31, 2024. This type of direct and open sabotage of a litigant by an agency is the epitome of a procedural due process violation. Summit then relies on this sabotage to argue that it was the *Landowners* who delayed their own discovery requests. Given Summit's objection that it would not respond to discovery issued prior to a grant of intervention, it is disingenuous for Summit to now claim that Landowners abandoned the discovery efforts issued before the grant of intervention. It was not a choice Landowners made – Summit could have responded but refused and issued a perfunctory objection that no intervention was granted so it need not and would not respond.

Summit is also disingenuous when it claims there was no certification document indicating that a conferral took place. The Declaration of Derrick Braaten explicitly provided that certification. *See* Declaration of Derrick Braaten in Support of Motion to Compel, ¶3 filed on August 29, 2024. To the extent Summit claims that the certification did not have enough detail, it is pretending that the conferral was not its own and that it was not a participant – in other words,

Summit is well aware of the details of the conferral that took place over the course of days. And of course it should be noted that Summit never did argue that there was no conferral – it disingenuously and pointlessly argued that there was not enough detail in Landowners' *certification* of a conferral despite having all of that detail itself. The conferral did in fact take place. The Declaration was sufficient. This type of guile is also the hallmark of violations of due process and shows Summit's lack of good faith. But given the higher standard being imposed on Landowners here, the entire written conferral is attached. *See* Decl. of Derrick Braaten and Exhibit A attached to the Decl. of Derrick Braaten.

This Commission made a mistake. For whatever reason, rather than simply providing the files in its possession, it acted in concert with Summit to prevent the landowners from obtaining the modeling files and other data before the hearing that both had in their possession. This prevented the Landowners from having due process. The Commission has one chance to fix this mistake, by requiring Summit to meaningfully respond to the Landowners' discovery and holding a supplemental hearing, or at least providing intervenor landowners the opportunity to submit additional evidence in writing after discovery is complete.

Finally, Summit claims that the goal of Landowners is to cause delay. The prior *motion to expedite* by Landowners begs a number of questions in response to that allegation by Summit and is sufficient response. Summit also claims the Landowners cannot explain what they will do with the discovery. Summit knows exactly what Landowners will do with the model and that is precisely why it is fighting so hard to prevent discovery (and the same goes for the Commission). It was abundantly clear at the hearing that the model was run with an arbitrary 2.5 factor adjustment to the permeability across the entire model. Landowners' engineer and the engineer from EERC both agree that results in a *smaller* border and storage facility, thus leaving certain landowners out of

payment. Landowners could show that without that arbitrary adjustment, they would be in the storage area. Summit claimed it would not adjust past payments if its storage area boundaries turn out to be too narrow. Only by running the model, and then *rerunning the model* without the 2.5 factor permeability adjustment can this be done. Similarly, EERC's witness testified that EERC only modeled the plume out to 5% CO2 because that is the limit of detection for equipment it uses. That is arbitrary and if CO2 is going to enter a landowners' pore space it is trespass regardless of whether it is at a 4% concentration or a 5% concentration. In order to illustrate the difference in boundaries for these percentages, Landowners again have to make adjustments to the model parameters and rerun the model. One additional example is the pressure analysis – these pressures will create interference with use of pore space by Landowners outside of the storage boundaries and this is an issue related to the validity of that boundary. Landowners need to run the model and understand the pressure variations on their individual properties in order to present that evidence, but have thus far been stymied by Summit and the Commission. These are only three of numerous examples of how the Landowners would use the model.[1]

The Commission is making decisions that have massive impacts on the Landowners' property and property rights. This is no mere licensing proceeding. This proceeding effectuates significant alterations in property rights. Such proceedings are of a very different nature than a Class II permit proceeding, for example, and the due process requirements are profoundly more robust in these proceedings than in a mere licensing proceeding. This is being missed by Summit

[1] Summit also claims that landowners already have the model from EERC. Landowners have ***a*** model from EERC (because apparently EERC has integrity and provides data that supports its work, and this is likely because it is made up of scientists who respect the scientific process). Whether it is the same model that was submitted by Summit to the NDIC is unknown. Of course both Summit and the NDIC could immediately resolve this uncertainty and authenticate the model files Landowners' obtained by simply emailing the files in their possession to Landowners. The ongoing refusal to do so while spending time and resources attempting to prevent Landowners' from having due process is again in bad faith by all involved and a blatant violation of the Landowners' due process rights. This entire proceeding is appallingly unconstitutional. This is the final chance to provide due process.

and the Commission and it will lead to reversal if not corrected. Even if the Commission had the power to "amalgamate" property rights as it claims under Chapter 38-22 (it does not), that authority would not be allowed without more process than the Landowners received here. So the law is unconstitutional and the application of the law by the Commission is also unconstitutional. One of these can be remedied now.

DATED this 18th day of September, 2024.

**BRAATEN LAW FIRM**

*/s/ Derrick Braaten*

Derrick Braaten (ND #06394)
109 North 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
Email: derrick@braatenlawfirm.com

*Attorneys for Intervenors the Swenson Living Trust, Bauman, Gerving, Haupt, Jochim, Kraft, Liebelt, Maize, Metz, Rust, and Smith*

**NORTH DAKOTA INDUSTRIAL COMMISSION**

**OIL AND GAS DIVISION**

**In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**Case No(s). 30869**
**30870**
**30871**
**30872**
**30873**
**30874**
**30875**
**30876**
**30877**
**30878**
**30879**
**30880**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## DECLARATION OF DERRICK BRAATEN IN SUPPORT OF MOTION TO COMPEL

1. I am an attorney for the Intervenor Landowners ("Landowners"), in the above-captioned matter.
2. I represent the Landowners in matters involving the applications submitted by Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, and Summit Carbon Storage #3, LLC ("SCS").
3. I certify that I have conferred in good faith to obtain this discovery without the Commission's intervention. Attached as Exhibit A is a true and correct copy of the correspondence between myself and Summit's legal counsel regarding the conferral to obtain the discovery without the Commission's intervention.
4. As detailed in the attached Exhibit A, I reached out to Lawrence Bender on August 19, 2024 at 3:27 p.m. attaching a copy of my draft brief for the motion to compel and asking for a discussion if it would be productive.
5. Lawrence Bender emailed a response on August 19, 2024 at 4:19 p.m. indicating he will discuss with his client but his belief was "much of wat you seek is available from the Commission." *See* Exhibit A.
6. I again emailed Lawrence Bender on August 26, 2024 at 1:31 p.m. asking if Summit's position has changed. Mr. Bender responded on August 26, 2024 at 1:35 p.m. clarifying the request. I responded on August 27, 2024 at 7:16 a.m. Mr. Bender then emailed on August 28, 2024 at 8:53 a.m. indicating that his "client will not agree to your proposal." *Id.*

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on the 18th day of September, 2024 at Bismarck, ND, United States.

Derrick Braaten

**From:** Bender, Lawrence
**To:** Derrick Braaten
**Cc:** Desirae Zaste; Bender, Lawrence
**Subject:** RE: Swenson Living Trust et al. - NDIC Case Nos. 30869-30880 - Brief re Motion to Compel Discovery
**Date:** Wednesday, August 28, 2024 8:53:18 AM
**Attachments:** image001.jpg
image002.gif
image003.jpg
image004.jpg

[Warning: External Sender]

Derrick:

Sorry for the delay in responding. My client will not agree to your proposal.

STAFF BIOGRAPHIES | PRACTICE AREAS | CONTACT US

**Lawrence Bender**
**Attorney**

lbender@fredlaw.com

Main – 701-221-8700

**Fredrikson & Byron, P.A.**
304 East Front Avenue
Suite 400
Bismarck, ND 58504-5639

Biography | Download My Contact Info as V-Card

WWW.FREDLAW.COM

**This is a transmission from the law firm of Fredrikson & Byron, P.A. and may contain information which is privileged, confidential, and protected by the attorney-client or attorney work product privileges. If you are not the addressee, note that any disclosure, copying, distribution, or use of the contents of this message is prohibited. If you have received this transmission in error, please destroy it and notify us immediately at our telephone number (701) 221-8700.**

**Fredrikson's Bismarck office is moving.**

***Please note that as of March 25, 2024, our new address is:***

Fredrikson & Byron, P.A.
304 East Front Ave, Suite 400
Bismarck, ND 58504-5639
Main: 701.221.8700

**From:** Derrick Braaten <derrick@braatenlawfirm.com>
**Sent:** Tuesday, August 27, 2024 7:16 AM
**To:** Bender, Lawrence <LBender@fredlaw.com>
**Cc:** Desirae Zaste <desirae@braatenlawfirm.com>; Bender, Lawrence <LBender@fredlaw.com>

**Subject:** Re: Swenson Living Trust et al. - NDIC Case Nos. 30869-30880 - Brief re Motion to Compel Discovery

**CAUTION: EXTERNAL E-MAIL**

---

What do you mean, doesn't everyone do discovery after the hearing?

Kidding, it's a fair question. I intend to file a motion requesting a supplementary hearing or the ability to submit my evidence from the model in document form if no hearing is held. I have some files I'm working with but I don't know if they are the model without Summit or the NDIC producing the model used by Tammy and Rich for the application/parameter review.

I intend to file my motion at close of business Wednesday unless I hear that Summit would like to discuss production or confer about it somehow.

Thanks,
Derrick

**Derrick Braaten**

**Braaten Law Firm**
109 N. 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
Fax: 701-221-5842
www.braatenlawfirm.com

**PRIVILEGED COMMUNICATION**
**This e-mail message is intended only for the named recipient(s) above and is covered by the Electronic Communications Privacy Act, 18 U.S.C. Sections 2510-2521. This e-mail is confidential and may contain information that is privileged, attorney work product or exempt from disclosure under applicable law. Recipients should not file copies of this e-mail with publicly accessible records. If you have received this message in error, please immediately notify the sender by return e-mail and delete this e-mail message from your computer. Thank you for your cooperation.**

---

**From:** Bender, Lawrence <LBender@fredlaw.com>
**Sent:** Monday, August 26, 2024 1:35 PM
**To:** Derrick Braaten <derrick@braatenlawfirm.com>
**Cc:** Desirae Zaste <desirae@braatenlawfirm.com>; Bender, Lawrence <LBender@fredlaw.com>

**Subject:** RE: Swenson Living Trust et al. - NDIC Case Nos. 30869-30880 - Brief re Motion to Compel Discovery

[Warning: External Sender]

Derrick:

I do not want to misrepresent what you are requesting. You want to conduct discovery even though the hearing has concluded and your several requests for a continuance have been denied?


STAFF BIOGRAPHIES | PRACTICE AREAS | CONTACT US

**Lawrence Bender**
**Attorney**

lbender@fredlaw.com

Main – 701-221-8700

**Fredrikson & Byron, P.A.**
304 East Front Avenue
Suite 400
Bismarck, ND 58504-5639

Biography | Download My Contact Info as V-Card

WWW.FREDLAW.COM



**This is a transmission from the law firm of Fredrikson & Byron, P.A. and may contain information which is privileged, confidential, and protected by the attorney-client or attorney work product privileges. If you are not the addressee, note that any disclosure, copying, distribution, or use of the contents of this message is prohibited. If you have received this transmission in error, please destroy it and notify us immediately at our telephone number (701) 221-8700.**


**Fredrikson's Bismarck office is moving.**

***Please note that as of March 25, 2024, our new address is:***

Fredrikson & Byron, P.A.
304 East Front Ave, Suite 400
Bismarck, ND 58504-5639
Main: 701.221.8700

---

**From:** Derrick Braaten <derrick@braatenlawfirm.com>
**Sent:** Monday, August 26, 2024 1:31 PM
**To:** Bender, Lawrence <LBender@fredlaw.com>
**Cc:** Desirae Zaste <desirae@braatenlawfirm.com>; Bender, Lawrence <LBender@fredlaw.com>
**Subject:** Re: Swenson Living Trust et al. - NDIC Case Nos. 30869-30880 - Brief re Motion to Compel Discovery

[redacted]

CAUTION: EXTERNAL E-MAIL

---

Lawrence,

Will you please let me know if your client's position has changed by close of business on Wednesday? If I don't hear from you by then I'll presume Summit continues to oppose production and file my motion.

Thank you,
Derrick

**Derrick Braaten**

**Braaten Law Firm**
109 N. 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
Fax: 701-221-5842
www.braatenlawfirm.com

**PRIVILEGED COMMUNICATION**
**This e-mail message is intended only for the named recipient(s) above and is covered by the Electronic Communications Privacy Act, 18 U.S.C. Sections 2510-2521. This e-mail is confidential and may contain information that is privileged, attorney work product or exempt from disclosure under applicable law. Recipients should not file copies of this e-mail with publicly accessible records. If you have received this message in error, please immediately notify the sender by return e-mail and delete this e-mail message from your computer. Thank you for your cooperation.**

---

**From:** Bender, Lawrence <LBender@fredlaw.com>
**Sent:** Monday, August 19, 2024 4:19:27 PM
**To:** Derrick Braaten <derrick@braatenlawfirm.com>
**Cc:** Desirae Zaste <desirae@braatenlawfirm.com>; Bender, Lawrence <LBender@fredlaw.com>
**Subject:** RE: Swenson Living Trust et al. - NDIC Case Nos. 30869-30880 - Brief re Motion to Compel Discovery

[Warning: External Sender]

Derrick:

I will of course discuss with my client. However, I believe much of what

you seek is available from the Commission. I know you requested the information and there is a dispute between you and the NDIC as to what was provided to you. I say this not to anger you, but I am certain my client will ask why you do not seek what you want from the NDIC.

Nevertheless, I will discuss with my client and get back to you.

STAFF BIOGRAPHIES | PRACTICE AREAS | CONTACT US

**Lawrence Bender**
**Attorney**

lbender@fredlaw.com

Main – 701-221-8700

**Fredrikson & Byron, P.A.**
304 East Front Avenue
Suite 400
Bismarck, ND 58504-5639

Biography | Download My Contact Info as V-Card

WWW.FREDLAW.COM

**This is a transmission from the law firm of Fredrikson & Byron, P.A. and may contain information which is privileged, confidential, and protected by the attorney-client or attorney work product privileges. If you are not the addressee, note that any disclosure, copying, distribution, or use of the contents of this message is prohibited. If you have received this transmission in error, please destroy it and notify us immediately at our telephone number (701) 221-8700.**

**Fredrikson's Bismarck office is moving.**

***Please note that as of March 25, 2024, our new address is:***

Fredrikson & Byron, P.A.

304 East Front Ave, Suite 400

Bismarck, ND 58504-5639

Main: 701.221.8700

---

**From:** Derrick Braaten <derrick@braatenlawfirm.com>
**Sent:** Monday, August 19, 2024 3:27 PM
**To:** Bender, Lawrence <LBender@fredlaw.com>
**Cc:** Desirae Zaste <desirae@braatenlawfirm.com>
**Subject:** Swenson Living Trust et al. - NDIC Case Nos. 30869-30880 - Brief re Motion to Compel Discovery

**CAUTION: EXTERNAL E-MAIL**

---

Lawrence:

I am preparing to file a motion to compel discovery in NDIC Case Nos. 30869-30880 and I am writing to ask if you believe additional discussion on any of these items might be productive. I presume that your position has not changed and that you will not agree to produce these documents or files or appear for a deposition. I am happy to discuss if you think there may be ways to resolve the concerns raised in this draft brief, so please let me know at your earliest convenience if you feel a discussion might be productive.

Thank you,
Derrick

**Derrick Braaten**

**BRAATEN LAW FIRM**
109 N. 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
Fax: 701-221-5842
www.braatenlawfirm.com

**PRIVILEGED COMMUNICATION**
**This e-mail message is intended only for the named recipient(s) above and is covered by the Electronic Communications Privacy Act, 18 U.S.C. Sections 2510-2521. This e-mail is confidential and may contain information that is privileged, attorney work product or exempt from disclosure under applicable law. Recipients should not file copies of this e-mail with publicly accessible records. If you have received this message in error, please immediately notify the sender by return e-mail and delete this e-mail message from your computer. Thank you for your cooperation.**

**NORTH DAKOTA INDUSTRIAL COMMISSION**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case No(s). 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

---

## DECLARATION OF SERVICE

---

[¶1] I hereby certify that true and correct copies of the following documents:

- **Reply Brief in Support of Intervenor Landowners' Motion to Compel Responses to Written Discovery and Motion for Supplemental Hearing;**
- **Declaration of Derrick Braaten in Support of Motion to Compel;**
- **Exhibit A - Conferral; and**
- **Declaration of Service.**

were, on the 18th day of September, 2024 sent via electronic mail to the following:

North Dakota Industrial Commission
oilandgasinfo@nd.gov
slforsberg@nd.gov

Mark Bohrer
mbohrer@nd.gov

Lawrence Bender
Attorney at Law
lbender@fredlaw.com

Tyler Gludt
Attorney at Law
TGludt@fredlaw.com

Thomas Throne
Attorney at Law
tthrone@thronelaw.com

Joshua Swanson
Attorney for Intervenor Minnkota
jswanson@vogellaw.com

Lynn Helms
lhelms@nd.gov

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on this 18th day of September, 2024 at Bismarck, North Dakota.

Desirae Zaste

Outlook

## Summit Carbon Storage (NDIC Case Nos. 30869-30880)

**From** Etter, Mary <METter@fredlaw.com>

**Date** Thu 9/12/2024 3:53 PM

**To** Bohrer, Mark F. <mbohrer@nd.gov>; Garner, David P. <dpgarner@nd.gov>; Forsberg, Sara L. <slforsberg@nd.gov>; ankuntson@nd.gov <ankuntson@nd.gov>; Derrick Braaten <derrick@braatenlawfirm.com>; Joshua A. Swanson <jswanson@vogellaw.com>

**Cc** Bender, Lawrence <LBender@fredlaw.com>; Gludt, Tyler <TGludt@fredlaw.com>; TThrone@thronelaw.com <TThrone@thronelaw.com>; Desirae Zaste <desirae@braatenlawfirm.com>

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Good afternoon,

Please see the following documents, contained in the link below, for filing and service in the above-referenced cases:

1. Response to Intervenor Landowners' Motion for Supplemental Hearing;
2. Response to Intervenor Landowners' Motion to Compel Responses to Written Discovery;
3. Declaration of Lawrence Bender in Support of Summit's Response to Intervenor Landowners' Motion for Supplemental Hearing;
4. Exhibits A-F to Declaration of Lawrence Bender; and
5. Certificate of Service.

https://fredriksonandbyron.sharefile.com/public/share/web-s07821fe072a34606803a2b9e63647f3f

Let me know if you have any difficulty opening the link or the documents contained therein.

Thank you,
Mary

***Mary Etter***
*Legal Administrative Assistant to Jason R.S. Cassady,*
*Justin G. Hughes, and Spencer D. Ptacek*
Fredrikson & Byron, P.A.
304 East Front Ave, Suite 400 | Bismarck, ND 58504-5639
Direct: 701.221.8642 | Main: 701.221.8700| metter@fredlaw.com
www.fredlaw.com

Fredrikson

*Fredrikson's Bismarck office has moved, please note our new address.*

***This is a transmission from the law firm of Fredrikson & Byron, P.A. and may contain information which is privileged, confidential, and protected by the attorney-client or attorney work product privileges. If you are not the addressee, note that any disclosure, copying, distribution, or use of the contents of this message is prohibited. If you have received this transmission in error, please destroy it and notify us immediately at our telephone number (701) 221-8700.***

**BEFORE THE INDUSTRIAL COMMISSION**
**OF THE STATE OF NORTH DAKOTA**

**CASE NOS. 30869–30880**

**In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1,**

**11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by**

**nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of**

**carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the**

**geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## RESPONSE TO INTERVENOR LANDOWNERS' MOTION FOR SUPPLEMENTAL HEARING

[¶ 1] Applicants Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC (collectively, "Summit") submit this brief in response to the Motion for Supplemental Hearing ("Motion") filed with the North Dakota Industrial Commission

("Commission") on August 29, 2024 by the Landowner Intervenors.[1] For the reasons explained below, the Commission should deny Landowner Intervenors' Motion.

## STATEMENT OF RELEVANT FACTS

### I. Timeline of pre-hearing information and records requests by Landowner Intervenors relevant to the Motion.

[¶ 2] The following sets forth a timeline of events preceding the hearing held by the Commission in the above-captioned cases on June 11-13, 2024, with a focus on information and document requests made by Landowner Intervenors to the Commission and the Commission's responses thereto:

#### A. Summit commences the above-captioned cases and counsel for Landowner Intervenors immediately requests documents related thereto.

[¶ 3] On June 9, 2023, Summit commences the above-captioned cases by filing three separate initial draft applications (collectively, the "Applications") with the Commission requesting permits for the geological storage of carbon dioxide. *See* Declaration of Derrick Braaten, Ex. D. Thereafter, between June 14, 2023, and June 23, 2023, several exchanges took place between Derrick Braaten, counsel for the Landowner Intervenors, and the Commission.

[¶ 4] On June 14, 2023, Derrick Braaten e-mailed the Commission indicating that he was aware that Summit had filed an application with the Commission "requesting an order amalgamating property interests and/or seeking a Class VI well permit or permits." *Id.* Ex. A. Mr. Braaten also requested "all such applications and all correspondence and other documents related to the application, as well as correspondence generally with [Summit], or its affiliates, authorized agents and representatives." *Id.*, Ex. A.

---

[1] Landowner Intervenors are the Swenson Living Trust, Michael Bauman, Glenn and Lisa Gerving, Michael and Bonnie Haupt, John Jochim, Kevin and Kimberly Kraft, Charmayne Liebelt, Kirk and Linda Maize and Allen Maize, Paul and Christy Metz, JoLene M. Rust, and Gary and Cassie Smith.

[¶ 5] The next day, Michael Ziesch responded to Mr. Braaten's June 14, 2023, request indicating that the request had been received and was being reviewed. *Id.*, Ex. B. Five days later, on June 20, 2023, Mr. Ziesch responded to Mr. Braaten's request indicating that the Commission "has not received an application for amalgamation, nor do we have any class VI applications for the entity referenced," but that the Commission does have "a draft application for a storage facility permit." Mr. Ziesch further told Mr. Braaten that his request for correspondence was "too broad to process," and that the request needs to have a more specific topic and date range. *Id.* The same day, Mr. Braaten responded by requesting Summit's "draft application for a storage facility permit and any correspondence related to that from May 1, 2023 to June 20, 2023." *Id.*

[¶ 6] In response to Mr. Braaten's revised request, Mr. Ziesch informed Mr. Braaten that a hard copy of the requested data would be approximately 1,200 pages and that the related data sets are approximately 3.3G and would take about an hour to transfer onto a thumb drive. *Id.* Mr. Ziesch further indicates that the cost to process the request is $25, plus the cost of a thumb drive. *Id.* Mr. Braaten then requested that the data be transferred to a thumb drive and stated that he will pay the charges when "we pick it up." *Id.*

[¶ 7] Thereafter, on June 23, 2023, Mr. Ziesch notified Mr. Braaten that the request had been compiled and was available for pickup. *Id.* Mr. Ziesch also indicates that the total cost to process the request, including the cost of the thumb drive, is $30.62. *Id.* In his declaration in support of the present Motion, Mr. Braaten confirmed that "[a] thumb drive of files was picked up on June 23, 2023." *See* Declaration of Derrick Braaten, ¶ 3.

**B. Landowner Intervenors wait two months before engaging in a second series of document requests to the Commission.**

[¶ 8] During the month of July 2023, there is no indication that Landowner Intervenors' counsel communicated with the Commission or otherwise followed up with the Commission

regarding information provided or not provided by the Commission in response to his prior open records requests. *See generally* Declaration of Derrick Braaten. Thereafter, beginning August 24, 2023, Landowner Intervenors' counsel again made a series of requests to the Commission for documents related to the above-captioned cases.

[¶ 9] On August 24, 2023, Mr. Braaten e-mailed a letter to the Commission requesting "all correspondence and other documents related to the [Applications], as well as all correspondence generally with [Summit] or its affiliates, authorized agents and representatives, from June 21st, 2023 to August 24th, 2023." *See* Declaration of Derrick Braaten, Ex. I. On September 7, 2023, Mr. Braaten e-mailed another letter to the Commission requesting "all correspondence and other documents related to all permit applications submitted by [Summit], or its affiliates, authorized agents, and representatives, from January 1, 2023 to September 6, 2023." *Id.*, Ex. J. And then on September 21, 2023, Mr. Braaten e-mailed a letter to the Commission requesting "all applications for permits pursuant to N.D.C.C. ch. 38-25, including any associated or related correspondence, documents, and notes related to the applications for permits." *See* Declaration of Derrick Braaten, Ex. E. Michael Ziesch responded to Mr. Braaten's September 21, 2023, request stating that "our office has not received any applications under NDCC 38-25." *See* Declaration of Derrick Braaten, Ex. F.

### C. Landowner Intervenors wait more than five months to make any follow-up requests to the Commission.

[¶ 10] After making the requests described in the preceding section, Landowner Intervenors' counsel waited over five months, until March 12, 2024, to follow up with the Commission. During the months of October 2023 through February 2024, there is no indication that Landowner Intervenors' counsel communicated with the Commission or otherwise followed

up with the Commission regarding information provided or not provided by the Commission in response to counsel's prior open records requests. *See generally* Declaration of Derrick Braaten.

[¶ 11] On March 12, 2024, counsel for Landowner Intervenors e-mailed another letter to the Commission requesting "all applications for permits pursuant to N.D.C.C. ch. 38-22 and N.D.C.C. ch 38-25 from September 1, 2023 to present, including any associated or related correspondence, documents, and notes related to the applications for permits."[2] *See* Declaration of Lawrence Bender, Ex. A. On March 18, 2024, Michael Ziesch responded to Mr. Braaten's letter by requesting that Mr. Braaten "narrow [the request] in terms of scope and topic." *Id.*, Ex. B. Nine days later, on March 27, 2024, Mr. Braaten responded to Mr. Ziesch's e-mail by stating that he "disagrees that the request is overly broad," but that he does "understand the position of the [Commission] however and we will respond accordingly." *Id.*

**D. The Commission schedules a hearing in the above-captioned cases and Landowner Intervenors make a fourth series of document requests.**

[¶ 12] On April 16, 2024, the Commission noticed a hearing in the above-captioned cases to take place on June 11-12, 2024. During the month of April 2024, there is no indication that Landowner Intervenors' counsel communicated with the Commission or otherwise followed up with the Commission regarding information provided or not provided by the Commission in response to any of the above-described open records requests. *See generally* Declaration of Derrick Braaten.

---

[2] To be certain, this open records request was for all applications for permits filed with the Commission under the stated chapters of the North Dakota Century Code. Mr. Braaten's June 20, 2023 open records request was specific to the storage facility applications filed by Summit.

[¶ 13] Nearly two months after being asked to narrow their most recent open records request, and only 27 days before the hearing, the Landowner Intervenors made a new request to the Commission. The details of that request and the Commission's response are as follows:

May 15, 2024: Derrick Braaten e-mails a letter to the Commission requesting the following data submitted by Summit:

- All input files, field and analytical data, and the model geochemical database used to evaluate the CO2 effects on the upper and lower confining layers, including but not limited to all inputs and data files used to run the United States Geological Survey's USGS's PHREEQC model
- All the input files, field and analytical data, and the model geochemical database used to run Computer Modelling Group Ltd.'s GEM model and software or any similar model or software used for the same purposes.
- Geophysical Logs that penetrate injection and confining zones, seismic survey data and core sample measurements, all measurements and data for acoustic impedance, total porosity, effective porosity, permeability, and facies.
- All the input files, field and analytical data, and the model, including but not limited to all inputs and data files used to run SLB's Petrel model in any matter related to Summit's applications.
- All 3D numerical reservoir simulation model data decks, output files and graphing files of the Storage Reservoir in original electronic format. Without limiting the foregoing, such files may be commonly stored in Slumberger Eclipse or Petrel format, CMG (Canadian Modeling Group) Imex format, or other similar format.

May 21, 2024: Michael Ziesch responds to Mr. Braaten's May 15, 2024 request as follows:

Regarding the open records request received on 5-15-2024 for Summit Carbon Storage facilities. Please see responses in red below each of the submitted topics.
The agency has previously provided (9-21-2023) all modeling input and results files submitted and used for the application by Summit. Agency staff validated the inputs and parameters in the submitted model via CMG software. Field and analytical data of your request are available through the agency website in log and well files.

- All the input files, field and analytical data, and the model geochemical database used to evaluate the CO2 effects on the upper and lower confining layers, including but not

limited to all inputs and data files used to run the United States Geological Survey's USGS's PHREEQC model.
Results received from applicant is in the related case files and available on the agency website. The agency did not receive software files for PHREEQC model. Model and geochemical database documentation can be obtained from the USGS.gov PHREEQC webpage.

- All the input files, field and analytical data , and the model geochemical database used to run Computer Modelling Group Ltd.'s GEM model and software or any similar model or software used for the same purposes.
The agency did not receive Geochem GEM model files. Results of Geochem modeling are summarized in the application packet, available in the case file. The geochemical equations used in the model are internal to the CMG GEM software.

- Geophysical Logs that penetrate injection and confining zones, seismic survey data and core sample measurements, all measurements and data for acoustic impedance, total porosity, effective porosity, permeability, and facies.
Geophysical logs data are available via Premium Subscription on the agency Scout Ticket. Well files contain the core analysis and are also available on agency website via Premium Subscription. Related wells that penetrate the area of review are identified in section 4 of each application package. Seismic survey results are not provided to the agency, they are owned by the company conducting the survey.

- All the input files, field and analytical data, and the model, including but not limited to all inputs and data files used to run SLB's Petrel model in any manner related to Summit's applications.
The agency does not receive Petrel model files other than exports from the CMG files previously provided on 9-21-2023 open records request.

- All 3D numerical reservoir simulation model data decks, output files and graphing files of the Storage Reservoir in original electronic format. Without limiting the foregoing, such files may commonly be stored in Slumberger Eclipse or Petrel format, CMG (Canadian Modeling Group) Imex format, or other similar format.
The CMG files, previously provided on 9-21-2023, are the modeling files still being used for the applications. There are no updates to them.

## II. Summary of relevant events leading up to June 2024 hearing.

[¶ 14] As set forth above, the Commission has indicated the Landowner Intervenors received the CMG and modeling input and results files from the Commission on September 21, 2023. Landowner Intervenors acknowledge that the thumb drive obtained by Landowner Intervenors from the Commission on June 23, 2023 contained an e-mail dated June 12, 2023 from Tamara Madche to Summit requesting "CMG Modeling Files . . . Need: DAT, SRS, OUT, LOG, and any REST files for the model." *See* Declaration of Derrick Braaten, ¶¶ 3-5.

[¶ 15] Landowner Intervenors argue that they never received the same CMG Modeling Files requested by Tamara Madche in her June 12, 2023 e-mail to Summit; however, if this true, Landowner Intervenors waited approximately 10 months (June 23, 2023 to May 15, 2024) to make an open records request to the Commission, and subsequently to the Energy & Environmental Research Center ("EERC"), specifically requesting such files. *See generally* Landowner Intervenors' Motion; *see also* Declaration of Derrick Braaten, Ex. G. Landowner Intervenors never sent a letter or otherwise indicated to the Commission that the Commission's responses to Landowner Intervenors' many open records requests were deficient in any way. *See generally* Landowner Intervenors' Motion. Michael Ziesch confirmed that Mr. Braaten did not follow up to Mr. Ziesch's March 18, 2024 response requesting that Mr. Braaten narrow his March 12, 2024 open records request. *See* Declaration of Lawrence Bender, Ex. C.

[¶ 16] Furthermore, Landowner Intervenors acknowledge in their Motion that they received the reservoir modeling inputs and results files from the EERC on July 2, 2024. *See* Declaration of Derrick Braaten, ¶ 15; *see also* Declaration of Derrick Braaten, Ex. L. Yet, Landowner Intervenors continue to argue they need Summit and the Commission to provide the same files. *See generally* Brief in Support of Intervenor Landowners' Motion for Supplemental Hearing.

[¶ 17] Finally, despite making open records requests related to the Applications as early as June 14, 2023, the Landowner Intervenors waited nearly a year to retain experts for the purpose of reviewing the documents, data, and information obtained. Landowner Intervenors' expert witnesses testified that they were not retained until approximately one month prior to the commencement of the June 11–13, 2024 hearing and/or spent less than 15 hours reviewing Summit's Applications on Summit's Applications. *See* Declaration of Lawrence Bender, Ex. D.

## ARGUMENT

[¶ 18] Landowner Intervenors request a supplemental hearing for the purpose of presenting evidence they are either in the process of gathering or have yet to gather. Summit is not aware of any authority for such a request, or for an additional hearing on its Applications, and Landowner Intervenors cite none. Even if the Landowner Intervenors were authorized to request an additional hearing from the Commission, they have wholly failed to show they possess evidence materially different from what was already presented at the hearing. Moreover, Landowner Intervenors cannot show that their failure to present such evidence at the hearing was justified, when it is undisputed that they knew of Summit's Applications nearly a year in advance of the hearing, they were actively engaged in making open records requests related to those applications, and they were able to retain experts to assist them with the technical aspects of their requests. Accordingly, Landowner Intervenors' motion should be denied.

### I. Landowner Intervenors do not cite to any authority to support their request for an additional hearing.

[¶ 19] Landowner Intervenors do not cite to any authority that allows the Commission to hold another hearing in these cases, and Summit is not aware of any such authority. Landowner Intervenors' Motion appears to be a "petition to reopen" the proceedings in this case. Admittedly, other agencies, such as the Public Service Commission, the Department of Financial Institutions,

or the Pesticide Control Board, specifically allow a proceeding to be "reopened," typically for purposes of admitting "additional" evidence. *See, e.g.*, N.D.A.C. § 69-02-06-01 ("At any time after the conclusion of a hearing, but before the final order is issued . . . any party may file a petition to reopen the proceeding for the purpose of taking additional evidence."); *see also* N.D.A.C. § 13-01.1-0601 ("After the conclusion of a hearing, but before the board issues its final order, any party may file with the board a petition to reopen the proceeding for the purpose of taking additional evidence."); *see also* N.D.A.C. § 60-02-06-01 ("At any time after the conclusion of a hearing, but before entry of the final order by the commissioner, any party to a proceeding may file with the commissioner a petition to reopen the proceeding for the purpose of taking additional evidence."). Unlike those other administrative agencies, however, the Commission does not have administrative rules allowing for the reopening of a proceeding. Even if they did, Landowner Intervenors have failed to show what "additional" evidence would be admitted, as explained further in the following section. Because Landowner Intervenors fail to present the Commission with any authority for it to grant the relief they now seek, their motion should be denied.

## II. Landowner Intervenors fail to allege sufficient grounds for a supplemental hearing.

[¶ 20] Even if the Commission had rules that allowed Landowner Intervenors to reopen the record in the above-captioned cases, Landowner Intervenors have failed to allege sufficient grounds for doing so. Landowner Intervenors admit in their brief that they are "currently working with their experts and Computer Modeling Group Ltd. to set up and run the model input files received from [Energy & Environmental Research Center], but it is estimated a first run of the model will take 24.7 days." *See* Brief in Support of Intervenor Landowners' Motion for Supplemental Hearing, p. 10; *see also* Declaration of Derrick Braaten, ¶ 18. Landowner Intervenors merely imply that their reservoir modeling, which they admit is based on the same data

inputs utilized by the EERC, will produce different results than the modeling conducted by EERC and/or the Commission. *See* Brief in Support of Intervenor Landowners' Motion for Supplemental Hearing, p. 10. However, the rules adopted by other agencies for reopening proceedings require a showing of "material changes of fact or law alleged to have occurred since the conclusion of the hearing." *See* N.D.A.C. § 69-02-06-01(1) ("The petition mut set forth clearly the facts claimed to constitute the grounds requiring reopening of the proceeding, including any material changes of fact or law alleged to have occurred since the conclusion of the hearing."). Accordingly, even if Landowner Intervenors were entitled to petition the Commission to reopen the proceedings, their Motion fails because Landowner Intervenors have not alleged any material change in fact or law in their Motion.

[¶ 21] Landowner Intervenors instead point to broad legal theories of fairness while ignoring the fact that Landowner Intervenors were allowed to meaningfully participate in the hearings in this case by conducting extensive cross-examination of Summit's witnesses and calling their own witnesses. As discussed in greater detail below, there is no question Landowner Intervenors knew of the Applications nearly a year before the hearing thereon was held and had ample opportunity during that time to gather evidence to present at that hearing through open records requests. The fact that they failed to diligently gather evidence does not mean that their surprise and unpreparedness at the hearing was "unfair." Landowner Intervenors' fairness arguments are merely an attempt to distract from Landowner Intervenors' failure to understand the documents the Commission had provided to them and their further failure to meaningfully follow up with the Commission on those documents in the twelve months preceding the June 2024 hearing on Summit's Applications.

[¶ 22] Ultimately, while it is certain that holding an additional hearing and reopening the evidentiary record would allow Landowner Intervenors to further delay a decision in this case, there is no indication that the evidence Landowner Intervenors wish to present at the hearing would materially alter the factual record in this case. Landowner Intervenors' interest in correcting their own avoidable mistakes is not one that deserves protection, particularly where Landowner Intervenors' efforts to delay these proceedings are prejudicial to Summit's interest in a just, speedy, and inexpensive determination of the above-captioned cases. For this reason, Landowner Intervenors' request for a supplemental hearing should be denied.

## III. Landowner Intervenors have received due process.

[¶ 23] Landowner Intervenors have been afforded due process by the Commission in this case. "Due process prescribes that the participant in an administrative proceeding be given notice of the general nature of the questions to be heard, and an opportunity to prepare and to be heard on those questions." *St. Alexius Med. Ctr. v. N.D. Dep't Human Res.*, 2018 ND 36, ¶ 27, 906 N.W.2d 343 (quoting *Estate of Robertson*, 492 N.W.2d 599, 602 (N.D. 1992)). "Notice is adequate if it apprises the party of the nature of the proceedings so that there is no unfair surprise." *Id.* "[A] a person challenging an agency action must be adequately informed in advance of the questions to be addressed at the hearing so that the person can be prepared to present evidence and arguments on those questions." *Id.* "The notice must adequately specify the issue to be considered." *Id.*

[¶ 24] Landowner Intervenors insist that they were denied the opportunity for meaningful participation in the hearing because they did not receive the documents, data, or information they wanted (or at least that they now want) from the Commission or from Summit. As indicated in the preceding paragraph, the North Dakota Supreme Court has held that due process in an administrative proceeding requires only "notice of the general nature of the questions to be heard,

and an opportunity to prepare and to be heard on those questions." *Id.* As explained below, there can be no dispute that Landowner Intervenors were aware of the "general nature of the questions to be heard" in the above-captioned cases as early as June 14, 2023. As also explained below, there can be no dispute that in the year between that date and the hearing, Landowner Intervenors had ample "opportunity to prepare and to be heard on those questions." Finally, there can be no dispute that Landowner Intervenors squandered the opportunity to gather and prepare evidence by waiting until the last minute to retain experts and make specific, detailed requests for the data they now complain of not receiving. For the reasons explained below, Landowner Intervenors did receive due process in these cases and are not entitled to a new hearing. Thus, their motion should be denied.

### A. Landowner Intervenors failed to diligently gather the evidence they now wish to present to the Commission.

[¶ 25] Landowner Intervenors argue that "[t]he files produced in June of 2023 . . . only include 'Rescue' files, not 'results' files," and that "those files have not been provided to my office by the [Commission] in any response to any records request." *See* Declaration of Derrick Braaten, ¶ 11. However, Commission staff, in response to Landowner Intervenors' May 15, 2024 open records request to the Commission, indicate that "all modeling input and results files submitted and used for the application by Summit," were previously provided to Landowner Intervenors on September 21, 2023. *See* Declaration of Derrick Braaten, Ex. H. (emphasis added). The Commission's May 21, 2024 response to Landowner Intervenors' May 15, 2024 open records request is specific in both what was provided to Landowner Intervenors (modeling input and results files) and when it was provided (September 21, 2023). *Id.* Accordingly, and despite Landowner Intervenors' arguments to the contrary, it appears that Landowner Intervenors were in possession of the reservoir modeling input and results files that they sought as early as September

of 2023. Landowner Intervenors were, at the time, simply unaware that they were in possession of the information they now argue they never received.

[¶ 26] Assuming, *arguendo*, that Landowner Intervenors never received the reservoir modeling input and results files from the Commission, Landowner Intervenors offer no explanation for waiting approximately 10 months, until May 15, 2024, on the eve of the June 2024 hearing on Summit's Applications, to specifically request the CMG Modeling data and results files that they argue were never provided to them by the Commission. Landowner Intervenors were aware that the Commission had specifically requested CMG modeling files from Summit as early as June 23, 2023. Yet, Landowner Intervenors continued to inexplicably make very broad and general open records request to the Commission for "applications" and related "documents" and "correspondence."

[¶ 27] Finally, on May 15, 2024, Landowner Intervenors requested, with specificity, the modeling files and data that they required to run the models from the Commission. This specific open records request appears to have been made at approximately the same time that Landowner Intervenors engaged their expert witnesses to assist with their case. This request, and the Commission's response, demonstrate that Landowner Intervenors did not understand the documents and information the Commission had provided to them until after they had obtained expert assistance on the eve of the June 2024 hearing. The belated retention of experts also likely explains Landowner Intervenors' assertion, for the first time, at the June 2024 hearing that they never received the specific modeling inputs and results files they now insist are critically important. *See* Declaration of Lawrence Bender, ¶ 7. If Landowner Intervenors failed to obtain the evidence they wished to present in time for the hearing, it was not due to any unfair procedure employed by the Commission or Summit in this case; rather, it was their failure to diligently gather

that evidence in the year prior to the hearing on the Applications, or, as discussed in greater detail in the following section, it was due to their lack of diligence in hiring experts to assist them in gathering such evidence.

### B. Landowner Intervenors' failed to timely retain experts to assist in analyzing the information received by Landowner Intervenors through their numerous open records requests to the Commission.

[¶ 28] Landowner Intervenors allege that they "used every method available to obtain the [data and information the Commission considers] prior to the hearing, but due to stonewalling by Summit and the Commission these efforts were unsuccessful." *See* Brief in Support of Intervenor Landowners' Motion for Supplemental Hearing, pg. 11. Summit disagrees. Landowner Intervenors did make numerous open records requests and did conduct discovery on Summit. If these efforts were unsuccessful, it was not because of "stonewalling by Summit and the Commission," but rather because Landowner Intervenors failed to get the expert help necessary to use these methods effectively until it was too late.

[¶ 29] Landowner Intervenors' experts testified at the June 2024 hearing that they had been retained less than 30 days before the hearing or that they had spent less than 15 hours reviewing Summit's Applications and other information in preparation for their testimony. As the Commission is well aware, this is not enough time to prepare for a hearing that covers many highly technical subject matters in applications that comprise thousands of pages of materials.

[¶ 30] If Landowner Intervenors had retained their expert witnesses sooner than May of 2024, their experts would have had more time to prepare and would have been able to assist the Landowner Intervenors in their evidence gathering efforts. If the Commission is to believe Landowner Intervenors' claim that they never received the modeling data they sought, Landowner Intervenors have offered no reason for why they never followed up with the Commission to specifically request such information until May 15, 2024. If the reason for this failure was their

lack of expertise on the subject matter, they have offered no reason for why they failed to retain experts until many months after they had requested and received the relevant records. Had experts been hired promptly, Landowner Intervenors could have submitted a detailed open records request to the Commission and/or EERC well in advance of the June 2024 hearing. In fact, this is exactly what Landowner Intervenors did, albeit too late, when they submitted their May 15, 2024, open records request to the Commission and their post-hearing open records request to the EERC.

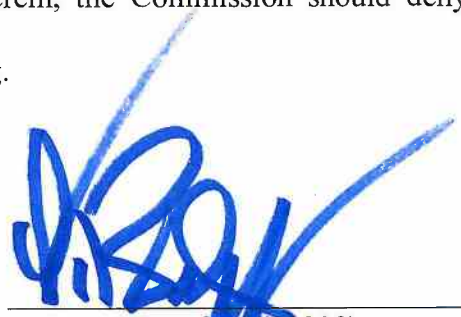
[¶ 31] The consequences of their evidence gathering without the assistance of technical experts are evident from the sequence of events set forth in the statement of facts, above. Landowner Intervenors made numerous open records requests to the Commission from June 2023 to September 2023 without the assistance of experts knowledgeable in the field of reservoir modeling. These requests were general and broad, signaling that Landowner Intervenors did not understand the rules and regulations pertaining to the geologic storage of carbon dioxide. Specifically, in June of 2023, counsel for Landowner Intervenors made an open records request for "all applications for an order amalgamating property interests." As correctly pointed out by Commission staff in its response, the Commission would not be in possession of an application to amalgamate property interests because no such application exists. The Commission requires a permit to operate a storage facility. Amalgamation may be required in connection therewith, but not applied for separately. *See* N.D.C.C. §§ 38-22-02(4), 38-22-04 and 38-22-10. In its response to Landowner Intervenors' open records request, Commission staff offer assistance to Landowner Intervenors by indicating that the Commission does "have a draft application for a storage facility permit." Counsel for Landowner Intervenors then responds by requesting the draft applications for a storage facility permit.

[¶ 32] The follow-up open records requests made by Landowner Intervenors' counsel to the Commission further indicate that Landowner Intervenors simply did not know what information the Commission had provided to them, nor what information to request from the Commission, even though they should have, and could have, had they retained their expert witnesses sooner than a month prior to the June 2024 hearing on Summit's Applications. Because neither Summit nor the Commission prevented Landowner Intervenors from hiring experts or making open records requests for the data they now seek, Landowner Intervenors have not been treated unfairly in the above-captioned cases and due process does not entitle them to an additional hearing.

## CONCLUSION

[¶ 33] In conclusion, the reopening of these proceedings to allow Landowner Intervenors an opportunity to correct their avoidable mistakes is both prejudicial and unfair to Summit. For this reason and the other reasons set forth herein, the Commission should deny Landowner Intervenors' Motion for a Supplemental Hearing.

Dated this 12th day of September, 2024.

By: 

Lawrence Bender (#03908)
Tyler J. Gludt (#06587)
lbender@fredlaw.com
tgludt@fredlaw.com
**FREDRIKSON & BYRON, P.A.**
304 East Front Avenue, Suite 400
Bismarck, ND 58504
(701) 221-8700

*Attorneys for Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC and Summit Carbon Storage #3, LLC*

#83626614v2

**BEFORE THE INDUSTRIAL COMMISSION**
**OF THE STATE OF NORTH DAKOTA**

**CASE NOS. 30869–30880**

**In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1,**

**11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by**

**nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of**

**carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the**

**Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## RESPONSE TO INTERVENOR LANDOWNERS' MOTION TO COMPEL RESPONSES TO WRITTEN DISCOVERY

[¶ 1] Applicants Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC (collectively, "Summit") submit this brief in response to the Motion to Compel Responses to Written Discovery filed with the North Dakota Industrial Commission ("Commission") on August 29, 2024 by the Landowner Intervenors.[1] Landowner

[1] Landowner Intervenors are the Swenson Living Trust, Michael Bauman, Glenn and Lisa Gerving, Michael and Bonnie Haupt, John Jochim, Kevin and Kimberly Kraft, Charmayne Liebelt, Kirk and Linda Maize and Allen Maize, Paul and Christy Metz, JoLene M. Rust, and Gary and Cassie Smith.

Intervenors' motion to compel depends in large part on the success of their motion for supplemental hearing. If Landowner Intervenors' motion for a supplemental hearing is denied, the Commission should deny Landowner Intervenors' motion to compel. Because no additional hearing is warranted, no further discovery should be permitted. For this reason, and for the reasons set forth below, the Commission should deny Landowner Intervenors' motion.

## STATEMENT OF RELEVANT FACTS

[¶ 2] Summit's brief in response to the Landowner Intervenors' motion for supplemental hearing, filed herewith, sets forth a summary of document requests made by Landowner Intervenors to the Commission before and after receiving notice of the hearing ("Hearing") held in these cases on June 11-13, 2024. That statement of facts is incorporated herein by reference.

[¶ 3] On April 16, 2024, the Landowner Intervenors received notice of the Hearing. Br. Supp. Intervenor Landowners' Mot. Compel Resps. Written Discovery, p. 7. Two days later, one of the Landowner Intervenors petitioned to intervene in the above-captioned action filed a petition to intervene. *Id.* The remaining Landowner Intervenors waited a month or more before filing petitions to intervene on May 16, 2024, and May 24, 2024. The Commission issued orders granting Landowner Intervenors' petitions to intervene a week later.

[¶ 4] The Swenson Living Trust ("Trust") attempted to conduct discovery in the above-captioned cases before intervening. These attempts included three sets of written discovery directed at Summit on May 2, 6, and 10, 2024, as well as an attempted corporate deposition noticed on May 9, 2024. *See, e.g.*, Decl. Derrick Braaten Supp. Mot. Compel, Exs. A–C (Aug. 29, 2024); Decl. Derrick Braaten Supp. Mot. Compel, Ex. 1 (June 10, 2024). On May 16, 2024, the Trust requested the Commission shorten Summit's time to respond to its three sets of pre-intervention written discovery. *See, e.g.*, Brief Supp. Mot. Expedite Discovery, pp. 15–16.

[¶ 5] After the Commission granted its petition for intervention, the Trust abandoned the foregoing efforts and joined with the remaining Landowner Intervenors to serve three sets of

"amended" written discovery requests and an "amended" corporate deposition notice for "Summit Carbon Solutions" on May 31, 2024. *See, e.g.*, Decl. Derrick Braaten Supp. Mot. Compel, Exs. D–F (Aug. 29, 2024); Decl. Derrick Braaten Supp. Mot. Compel, Ex. 2 (June 10, 2024). On June 4, 2024, Landowner Intervenors served three "amended" corporate deposition notices for Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC, with all three depositions scheduled to take place in less than two days, at 9:00 AM CT on June 6, 2024. Decl. Derrick Braaten Supp. Mot. Compel, Exs. 4–6 (June 10, 2024).

[¶ 6] On June 5, 2024, Summit objected to the proposed corporate depositions on several grounds and indicated it would not be appearing. Decl. Derrick Braaten Supp. Mot. Compel, Ex. 7 (June 10, 2024). On June 10, 2024, one day before the hearing, Landowner Intervenors filed a motion to compel related to their corporate deposition notices. *See, e.g.*, Mot. Compel. Summit responded to the motion to compel on June 20, 2024, and Landowner Intervenors filed their reply on June 27, 2024. *See* Resp. Mot. Compel; Intervenor Landowners' Reply Br. Supp. Mot. Compel. Summit served responses and objections to the Landowner Intervenors' three sets of requests on July 2, 2024, after the close of evidence and the conclusion of the June 11-13, 2024, hearing. Decl. Derrick Braaten Supp. Mot. Compel, Exs. G–I (Aug. 29, 2024). The Landowner Intervenors' May 31, 2024, written discovery requests and the Landowner Intervenors' June 4, 2024, corporate deposition notices, as well as Summit's responses and objections thereto, are the subject of the Landowner Intervenors' present motion.[2]

---

[2] In connection with their argument that Summit should be compelled to submit to a corporate deposition, Landowner Intervenors appear to assert that Summit's applications in the above-captioned cases are "void." The consequences of this assertion are not elaborated on, nor does it appear to be germane to the relief requested by the Landowner Intervenors in the present motion, so Summit does not address the matter in this brief. If the Landowner Intervenors wish to obtain some sort of declaration from the Commission that Summit's applications are invalid, that request should be made by motion, in which case Summit would address the matter in a responsive brief.

## ARGUMENT

[¶ 7] Landowner Intervenors move the Commission to compel more complete responses to several requests for production and an interrogatory and to compel Summit to appear for a deposition. Landowner Intervenors' motion should be denied for at least two reasons, each explained in greater detail below. First, the motion is untimely because the Hearing concluded months ago and therefore there is no further opportunity to present evidence in these cases. Second, Landowner Intervenors' motion to compel is facially invalid because they failed to include the certification required by Rule 37(a) of the North Dakota Rules of Civil Procedure.

### I. Landowner Intervenors' motion to compel is untimely.

[¶ 8] Landowner Intervenors have brought the present motion to compel *after* the Commission held an evidentiary hearing on Summit's applications in the above-captioned cases. There are no other evidentiary hearings scheduled and the Commission has closed the record with respect to accepting evidence in support of or in opposition to the applications. A motion to compel at this stage of the proceedings serves no purpose. "It is obvious that a motion to compel discovery in a proceeding must be filed before trial." *513 E. Rich St. Co. v. McGreevy*, 20030WL 21101280, *2 (Ct. App. Ohio, May 15, 2003); *see also State ex rel. Foy v. Vanderbilt Cap. Advisors, LLC*, 511 P.3d 329, 339 (Ct. App. N.M. 2020) (upholding denial of motion to compel made almost three months after evidentiary hearing noting that "[t]he lateness of the motion to compel would be sufficient reason by itself to deny it"). The Commission should thus deny the Landowner Intervenors' motion as untimely.

[¶ 9] Though Rule 37 does not include a specific time limit for motions to compel, a limit is implicit in the scope of discovery allowed by the North Dakota Rules of Civil Procedure. Rule 26 describes the scope of discovery in a civil proceeding and provides in relevant part as follows:

> Parties may obtain discovery regarding any nonprivileged matter that is relevant to any party's claim or defense . . . . For good cause, the court may order the discovery of any matter relevant to the subject matter involved in the action. Relevant

> information need not be admissible at the trial if the discovery appears reasonably calculated to lead to the discovery of admissible evidence.

N.D.R.Civ.P. 26(b)(1)(A). Like a court, the Commission may only order discovery of "relevant" information, and relevant information must, at a minimum, appear "reasonably calculated to lead to the discovery of admissible evidence." *Id.* Discovery pursued after the conclusion of an evidentiary hearing is not reasonably calculated to lead to the discovery of admissible evidence because the time for admission of evidence has passed.

[¶ 10] Landowner Intervenors' rebuttal to the foregoing is presumably that they have requested an additional hearing for the taking of additional evidence. That motion should be denied for the reasons stated in Summit's response thereto, filed herewith, and if that motion is denied, the present motion must also fail.

## II. Landowner Intervenors' motion to compel does not include a proper certification.

[¶ 11] A motion to compel must "include a certification that the movant has in good faith conferred or attempted to confer with the person or party failing to make discovery in an effort to obtain it without court action." N.D.R.Civ.P. 37(a)(1). The North Dakota Supreme Court has explained that "a facially valid motion to compel requires two components, an actual certification document and performance." *Meuchel v. Red Trail Energy, LLC*, 2024 ND 44, ¶ 24, 4 N.W.3d 203. As explained below, Landowner Intervenors' motion does not include a proper certification document. Accordingly, for this additional reason, the Landowner Intervenors' motion should be denied.

[¶ 12] The Landowner Intervenors' motion to compel must be accompanied by "an actual certification document" to be valid. *Meuchel*, 2024 ND 44, ¶ 24. The North Dakota Supreme Court has described the certification requirement as follows:

> Although Rule 37 does not identify detailed certification requirements, to effectuate the underlying policy of the rule, counsel seeking court-facilitated discovery must adequately set forth in the motion essential facts sufficient to enable the court to

> pass a preliminary judgment on the adequacy and sincerity of the good faith conferment between the parties. That is, a certificate must include, *inter alia,* the names of the parties who conferred or attempted to confer, the manner by which they communicated, the dispute at issue, as well as the dates, times, and results of their discussions, if any.

*Id.* ¶ 26 (citations omitted) (internal quotation marks omitted).

[¶ 13] In an effort to meet the certification requirement described above, Landowner Intervenors submitted the Declaration of Derrick Braaten in Support of Motion to Compel with their motion. The extent of the certification is Mr. Braaten's assertion that "I certify that I have conferred in good faith to obtain this discovery without the Commission's intervention." Decl. Derrick Braaten Supp. Mot. Compel, ¶ 3. This statement does not include "the names of the parties who conferred or attempted to confer, the manner by which they communicated, the dispute at issue, as well as the dates, times, and results of their discussions, if any." *Meuchel*, 2024 ND 44, ¶ 26. As such, the Landowner Intervenors have failed to file a proper certification document with their motion to compel. Their motion is thus facially invalid and must be denied.[3]

## CONCLUSION

[¶ 14] The Landowner Intervenors' motion to compel hinges in large part on the Commission granting their motion for supplemental hearing. Summit has argued persuasively in response to that motion that the Landowner Intervenors' request for a second hearing should be denied. For that reason, and for the reasons set forth above, the Commission should also deny the Landowner Intervenors' motion to compel.

---

[3] Even though Landowner Intervenors' motion to compel should be denied for the reasons set forth in this brief, if the Commission were to schedule a second hearing in the above-captioned cases, Summit would be willing to promptly confer with Landowner Intervenors regarding the documents and information sought by the present motion in an effort to resolve the parties' discovery disputes without further action by the Commission.

Dated this 12th day of September, 2024.

By: _____

Lawrence Bender (#03908)
Tyler J. Gludt (#06587)
lbender@fredlaw.com
tgludt@fredlaw.com
**FREDRIKSON & BYRON, P.A.**
304 East Front Avenue, Suite 400
Bismarck, ND 58504
(701) 221-8700

*Attorneys for Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC and Summit Carbon Storage #3, LLC*

#83712446v1

**BEFORE THE INDUSTRIAL COMMISSION**
**OF THE STATE OF NORTH DAKOTA**

**CASE NOS. 30869–30880**

**In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1,**

**11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by**

**nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of**

**carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the**

**geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## DECLARATION OF LAWRENCE BENDER IN SUPPORT OF SUMMIT'S RESPONSE TO INTERVENOR LANDOWNERS' MOTION FOR SUPPLEMENTAL HEARING

STATE OF NORTH DAKOTA )
) ss:
COUNTY OF BURLEIGH )

Lawrence Bender, being first duly sworn upon oath, states and alleges as follows:

[¶ 1] I am counsel for the above-named applicants Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC (collectively, "Summit"). In that capacity I am familiar with and have personal knowledge of the facts set forth below.

[¶ 2] On June 25, 2024, I submitted an open records request to the North Dakota Industrial Commission, Department of Mineral Resources, Oil and Gas Division (the "Commission"), requesting that the Commission provide copies of the information it provided to Mr. Derrick Braaten in response to Mr. Braaten's May 15, 2024 open records request to the Commission.

[¶ 3] In response to my June 25, 2024 open records request, the Commission provided a copy of a March 12, 2024 e-mail from Desirae Zaste to the Commission in which Ms. Zaste attaches an open records request dated March 12, 2024 from Mr. Braaten to the Commission. A true and correct copy of Desirae Zaste's e-mail to the Commission, and Mr. Braaten's March 12, 2024 open records request to the Commission is attached hereto as **Exhibit A**.

[¶ 4] In response to my June 25, 2024 open records request, the Commission provided a copy of the Commission's March 18, 2024 response to Mr. Braaten's March 12, 2024 open records request. A true and correct copy of Michael Ziesch's March 18, 2024 e-mail to Desirae Zaste is attached hereto as **Exhibit B**.

[¶ 5] In response to my June 25, 2024 open records request, the Commission provided a copy of Mr. Braaten's March 27, 2024 response to Mr. Ziesch's March 18, 2024 e-mail to Desirae Zaste. A true and correct copy of Mr. Braaten's March 27, 2024 e-mail to Mr. Ziesch is attached hereto as **Exhibit B**.

[¶ 6] In response to my June 25, 2024 open records request, the Commission indicated that Mr. Braaten never followed up with the Commission to narrow Mr. Braaten's March 12, 2024 open records request. A true and correct copy of the July 10, 2024 e-mail I received from Michael Ziesch is attached hereto as **Exhibit C**.

[¶ 7] At the Commission's June 2024 hearing on Summit's storage facility permit applications, I participated in an off-the-record conversation with intervenors' counsel, Mr. Derrick Braaten; the Director of Mineral Resources, Mr. Lynn Helms; the hearing officer, Mr. David Garner; and possibly one or two other members of Commission staff. During this conversation, Mr. Braaten claimed that the Commission never provided the reservoir modeling input and results files utilized in connection with Summit's applications in response to any of Mr. Braaten's open records requests. Mr. Helms and Commission staff insisted that the reservoir modeling input and results files were in fact provided to Mr. Braaten.

[¶ 8] On June 12, 2024, Mr. Braaten called Shane Bofto, P. Ted Doughty, and Paul Button as expert witnesses at the hearing on Summit's storage facility permit applications. Each of said expert witnesses testified that they were either hired approximately a month prior to the commencement of the June 2024 hearing and/or that they had spent less than 15 hours reviewing Summit's applications and other materials in preparation of their testimony. A true and correct copy of excerpts from the transcript of Mr. Bofto's testimony at the June 11, 2024 hearing is attached hereto as **Exhibit D**. A true and correct copy of excerpts from the transcript of Mr. Doughty's testimony at the June 11, 2024 hearing is attached hereto as **Exhibit E**. A true and correct copy of excerpts from the transcript of Mr. Button's testimony at the June 11, 2024 hearing is attached hereto as **Exhibit F**.

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on the 12th day of September, 2024, at Bismarck, North Dakota, USA.

By: _____

Lawrence Bender (#03908)
lbender@fredlaw.com
**FREDRIKSON & BYRON, P.A.**
304 East Front Avenue, Suite 400
Bismarck, ND 58504
(701) 221-8700

#83728317v1

**BEFORE THE INDUSTRIAL COMMISSION**
**OF THE STATE OF NORTH DAKOTA**

**CASE NOS. 30869–30880**

**In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1,**

**11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic**

**storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation,**

**and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143**

**North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## CERTIFICATE OF SERVICE

[¶ 1] I, the undersigned, hereby certify that a true and correct copy of the following documents:

1. Response to Intervenor Landowners' Motion for Supplemental Hearing;
2. Response to Intervenor Landowners' Motion to Compel Responses to Written Discovery;
3. Declaration of Lawrence Bender in Support of Summit's Response to Intervenor Landowners' Motion for Supplemental Hearing; and
4. Exhibits A-F to Declaration of Lawrence Bender

were, on September 12, 2024, filed electronically with the North Dakota Industrial Commission and served upon the following via electronic mail:

Mark Bohrer
mbohrer@nd.gov

David Garner
dpgarner@nd.gov

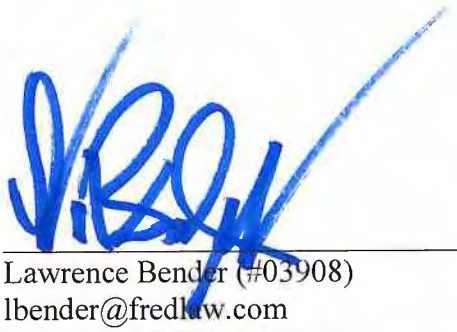
Sara Forsberg
slforsberg@nd.gov

Amy Knutson
anknutson@nd.gov

Derrick Braaten
derrick@braatenlawfirm.com

Joshua Swanson
jswanson@vogellaw.com

Dated this 12th day of September, 2024.

By: 

Lawrence Bender (#03908)
lbender@fredlaw.com
**FREDRIKSON & BYRON, P.A.**
304 East Front Avenue, Suite 400
Bismarck, ND 58504
(701) 221-8700
*Attorneys for Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC and Summit Carbon Storage #3, LLC*

#83762613v1

**EXHIBIT A**

BRAATEN
Law Firm

March 12, 2024

**Via Email Only**

North Dakota Industrial Commission
Department of Mineral Resources
Oil & Gas Division
600 E. Blvd. Ave. Dept. 405
Bismarck, ND 58505-0840
oilandgasinfo@nd.gov

**Re: Records Request Applications for Permits**

I am writing to request a copy of records from your office, pursuant to N.D.C.C. § 44-04-18. Please provide all applications for permits pursuant to N.D.C.C. ch. 38-22 and N.D.C.C. ch. 38-25 from September 21, 2023 to present, including any associated or related correspondence, documents, and notes related to the applications for permits.

To the maximum extent possible, I request that you provide all records to me in electronic format by emailing them to my paralegal Desirae Zaste at desirae@braatenlawfirm.com. If it is necessary to mail responsive records, they may be sent to me at the address below.

You have my pre-authorization to bill up to $300.00 to fulfill this records request. If you have any questions about anything in this letter, do not hesitate to contact me. Thank you for your assistance.

Sincerely,

Derrick Braaten

DB/dnz

NORTH Dakota | Mineral Resources
Be Legendary.

701.328-8020 · oilandgasinfo@nd.gov · 600 E Boulevard Ave, Dept. 474 · Bismarck, ND 58505

**From:** Desirae Zaste <desirae@braatenlawfirm.com>
**Sent:** Tuesday, March 12, 2024 9:56 AM
**To:** -Info-Oil & Gas Division <oilandgasinfo@nd.gov>
**Cc:** Derrick Braaten <derrick@braatenlawfirm.com>
**Subject:** Open Records Request

You don't often get email from desirae@braatenlawfirm.com. Learn why this is important

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Good morning,

Attached is a letter from Attorney Braaten regarding an open records request. If you have any questions, please let us know. Thank you.

**DESIRAE ZASTE** | Certified Paralegal
desirae@braatenlawfirm.com

**BRAATEN LAW FIRM**
109 N. 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
Fax: 701-221-5842
www.braatenlawfirm.com

**PRIVILEGED COMMUNICATION**
**This e-mail message is intended only for the named recipient(s) above and is covered by the Electronic Communications Privacy Act, 18 U.S.C. Sections 2510-2521. This e-mail is confidential and may contain information that is privileged, attorney work product or exempt from disclosure under applicable law. Recipients should not file copies of this e-mail with publicly accessible records. If you have received this message in error, please immediately notify the sender by return e-mail and delete this e-mail message from your computer. Thank you for your cooperation.**

**EXHIBIT B**

## Ziesch, Michael D.

**From:** Derrick Braaten <derrick@braatenlawfirm.com>
**Sent:** Wednesday, March 27, 2024 12:48 PM
**To:** Ziesch, Michael D.
**Cc:** Desirae Zaste
**Subject:** FW: Open Records Request
**Attachments:** 240312 ORR to NDIC re permits and applications under 38-22 & 38-25.pdf

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Mr. Ziesch:

I disagree that the request is overly broad. There are a limited number and type of permits that can be requested under those two chapters of code. I do understand the position of the NDIC however and we will respond accordingly.

Thank you,

**Derrick Braaten**

BRAATEN LAW FIRM
109 N. 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
Fax: 701-221-5842
www.braatenlawfirm.com

**PRIVILEGED COMMUNICATION**
**This e-mail message is intended only for the named recipient(s) above and is covered by the Electronic Communications Privacy Act, 18 U.S.C. Sections 2510-2521. This e-mail is confidential and may contain information that is privileged, attorney work product or exempt from disclosure under applicable law. Recipients should not file copies of this e-mail with publicly accessible records. If you have received this message in error, please immediately notify the sender by return e-mail and delete this e-mail message from your computer. Thank you for your cooperation.**

**From:** Ziesch, Michael D. <mdziesch@nd.gov>
**Sent:** Monday, March 18, 2024 3:22 PM
**To:** Desirae Zaste <desirae@braatenlawfirm.com>
**Subject:** FW: Open Records Request

[Warning: External Sender]

Good afternoon, we have reviewed the request and would ask that you narrow it in terms of scope and topic. It's too vague requesting for 38-22 and 38-25, those are broad sections of code.

Regards,

Michael Ziesch
*EGIS Staff Officer*

701.328.8029 (o) · mdziesch@nd.gov · www.dmr.nd.gov

**EXHIBIT C**

**From:** Ziesch, Michael D. <mdziesch@nd.gov>
**Sent:** Wednesday, July 10, 2024 3:16 PM
**To:** Bender, Lawrence <LBender@fredlaw.com>
**Subject:** Re: records request

CAUTION: EXTERNAL E-MAIL

---

Mr. Bender, attached are the related correspondence from Braaten Law and responses by DMR to the May 15th request.

In addition, the open record request and response from March 12th which was not narrowed in scope and followed up on by Braaten Law.

The open record request from June 18th you were CC'd on the emails (regarding confidentiality status process).

Michael Ziesch
*EGIS Staff Officer*

701.328.8029 (o) • mdziesch@nd.gov • www.dmr.nd.gov

NORTH Dakota | Mineral Resources
Be Legendary.

701.328-8020 • oilandgasinfo@nd.gov • 600 E Boulevard Ave, Dept. 474 • Bismarck, ND 58505

this, but I asked -- my question was specific to being involved in an application with a state that had primacy.

A. None with a state that had primacy.

Q. Other than the applications that are before the Commission today, have you ever reviewed an application for a Class VI well?

A. Back to my previous statement, I believe I did when I was drafting the program to look at what an application looks like. I just don't recall because it was so long ago on what it was.

Q. That would have been back in the 2012 period, 2014 period; is that right?

A. Somewhere in there.

Q. And would those have been applications before the EPA?

A. Yes.

Q. Okay. When were you hired by the intervenors in this case?

A. Oh, it's been a month or so.

Q. Okay. You don't know the exact date? I mean, today is the 11th. Would it have been probably May 11?

A. It could have been about that time, but I don't know specifics.

Q. What were you asked to do on May -- on May 11?

MR. BRAATEN: I'm going to object to that characterization of testimony. I don't believe he testified to doing something on the 11th.

HEARING EXAMINER GARNER: Overruled.

Q. (MR. BENDER CONTINUING) Okay. What -- okay. I guess you can answer the question.

A. What was I -- could you repeat that question again?

Q. What were you asked to do when you were hired for this project?

MR. BRAATEN: I'm going to object to questions eliciting communications between me and the experts.

HEARING EXAMINER GARNER: Overruled.

MR. BRAATEN: You can go ahead, Shane.

MR. BOFTO: Oh, okay. Just to provide my experience with the Class VI guidance and programs that I had early on and just my general environmental background information.

Q. (MR. BENDER CONTINUING) And how many hours do you believe you've worked on this project since you were retained?

A. Outside of this, probably 15 reviewing

documents and such and --

Q. And have you had an opportunity to review each one of the -- what I'm going to refer to as the final form of applications for the three applications that are before the Commission?

A. I've generally reviewed them, yes, and -- I'm trying to think if I've done any others. So I'd say I generally reviewed the three applications.

Q. Okay. And when you say reviewed them, did you just -- did you just read them or did you do anything beyond reading? Did you do any independent research?

A. I looked closely at some of the models on what were being used and what they did exactly.

Q. Okay. And if I -- and please correct me if I'm wrong, Shane, but I understood your testimony when Mr. Braaten was asking you some questions that you -- if you'd had the materials that he requested from the Industrial Commission, you could have run a model in a relatively short period of time. Was that your testimony?

A. Yes. I specifically referenced the PHREEQC model by U -- that is put out by the USGS.

Q. Okay. And do you have the necessary

within their stimulation -- their simulation area. Excuse me. So there's very little data within their application with which to evaluate exactly how they derive their permeability parameters for the AOR that they're applying for.

Q. Mr. Doughty, do you recall approximately how long ago you were asked about the possibility of working on this matter?

A. It was, what, a month ago, maybe three weeks ago, something like that.

Q. And are you ready, willing and able to conduct additional review and particularly review of seismic data if you receive it?

A. Yes, I am.

MR. BRAATEN: No further questions.

HEARING EXAMINER GARNER: Attorney Bender.

**CROSS-EXAMINATION**

**BY MR. BENDER:**

Q. Mr. Doughty, are you -- Mr. Doughty, are you in a position today to make any recommendations to the Commission as to whether this application should be approved or denied?

A. I am.

Q. And what are your conclusions?

A. I would recommend that it's denied on the

A. Let me --
Q. How many hours -- just let me ask the questions. Just let me ask the questions.
A. Okay.
Q. How many hours of time have you spent working on this project?
A. I have -- up until the start of this hearing, I spent 14-and-a-half hours working on it.
Q. Okay. And what were you asked to do?
MR. BRAATEN: Same objection to privileged communications with experts.
HEARING EXAMINER GARNER: Overruled.
MR. BUTTON: What was I asked to do?
Q. (MR. BENDER CONTINUING) Yes.
A. I was asked by Mr. Braaten to evaluate the impact of the pore space of his clients.
Q. Okay. And to do that at this point in time, all you have done is reviewed the applications that were submitted to the Commission; is that correct?
A. No.
Q. You didn't review the applications?
A. I did review the applications, but that is not all that I've done.
Q. What else did you do in the 15 hours that

## Summit Carbon Storage (Case Nos. 30869-30880)

Desirae Zaste <desirae@braatenlawfirm.com>

Thu 8/29/2024 1:01 PM

To:-Info-Oil & Gas Division <oilandgasinfo@nd.gov>;Forsberg, Sara L. <slforsberg@nd.gov>;Bender, Lawrence <LBender@fredlaw.com>;TThrone@thronelaw.com <TThrone@thronelaw.com>;Gludt, Tyler <tgludt@fredlaw.com>;Bohrer, Mark F. <mbohrer@nd.gov>;Garner, David P. <dpgarner@nd.gov>;Knutson, Amy N. <anknutson@nd.gov>;Joshua A. Swanson <jswanson@vogellaw.com>;Helms, Lynn D. <lhelms@nd.gov>
Cc:Derrick Braaten <derrick@braatenlawfirm.com>

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Good afternoon,

Below is a link containing the following documents for filing and service:

- **Intervenor Landowners' Motion for Supplemental Hearing;**
- **Brief in Support of Intervenor Landowners' Motion for Supplemental Hearing;**
- **Declaration of Derrick Braaten;**
- **Exhibit A – Request submitted via email on June 14, 2023 to NDIC Oil and Gas Division;**
- **Exhibit B – Subsequent emails with Michael Ziesch, EGIS Staff Officer;**
- **Exhibit C - Index of the files produced in response to the June 14th request;**
- **Exhibit D – Email from Tamara Madche to Jay Volk on June 12, 2023;**
- **Exhibit E - Letter to the NDIC Oil and Gas Division, submitted via email on September 21, 2023;**
- **Exhibit F - Email response of Mr. Ziesch sent September 22, 2023;**
- **Exhibit G - Letter to the NDIC Oil and Gas Division, submitted via email on May 15, 2024;**
- **Exhibit H - May 21st, 2024 email response of Mr. Ziesch to the request;**
- **Exhibit I – August 24, 2023 letter to Department of Mineral Resources regarding a record request;**
- **Exhibit J – September 7, 2023 letter to Department of Mineral Resources regarding a record request;**
- **Exhibit K – Open records request to EERC dated June 17, 2024;**
- **Exhibit L – EERC email response sent on July 2, 2024;**
- **Exhibit M – Excerpt from transcript of NDIC hearing testimony given June 11, 2024;**
- **Exhibit N – Excerpt from transcript of NDIC hearing testimony given June 12, 2024;**
- **Intervenor Landowners' Motion to Compel;**
- **Brief in Support of Intervenor Landowners' Motion to Compel Responses to Written Discovery;**
- **Exhibit A - Landowners Interrogatories and Request for Production of Documents to Applicants (Set 1);**
- **Exhibit B - Landowners Interrogatories and Request for Production of Documents to Applicants (Set 2);**
- **Exhibit C - Landowners Interrogatories and Request for Production of Documents to Applicants (Set 3);**
- **Exhibit D - Intervenor Landowners' Amended Interrogatories and Request for Production of Documents to Applicants (Set 1);**
- **Exhibit E - Intervenor Landowners' Amended Interrogatories and Request for Production of Documents to Applicants (Set 2);**

- **Exhibit F - Intervenor Landowners' Amended Interrogatories and Request for Production of Documents to Applicants (Set 3);**
- **Exhibit G - Response of Applicants to Intervenors' Landowners' Amended Interrogatories and Request for Production of Documents (Set 1)**;
- **Exhibit H - Response of Applicants to Intervenors' Landowners' Amended Interrogatories and Request for Production of Documents (Set 2);**
- **Exhibit I - Response of Applicants to Intervenors' Landowners' Amended Interrogatories and Request for Production of Documents (Set 3);**
- **Exhibit J - Transcript of Hearing Volume II – (Pages 277-552);**
- **Declaration of Kurt Swenson in Support of Motion to Compel;**
- **Exhibit 1 – Notice of Assignment dated July 18, 2024;**
- **Exhibit 2 – Notice of Assignment dated July 24, 2024; and**
- **Declaration of Service.**

NDIC Case Nos 30869-30880

**Desirae Zaste | Certified Paralegal**

**BRAATEN LAW FIRM**
109 N. 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
Fax: 701-221-5842
www.braatenlawfirm.com

**PRIVILEGED COMMUNICATION**
**This e-mail message is intended only for the named recipient(s) above and is covered by the Electronic Communications Privacy Act, 18 U.S.C. Sections 2510-2521. This e-mail is confidential and may contain information that is privileged, attorney work product or exempt from disclosure under applicable law. Recipients should not file copies of this e-mail with publicly accessible records. If you have received this message in error, please immediately notify the sender by return e-mail and delete this e-mail message from your computer. Thank you for your cooperation.**

**NORTH DAKOTA INDUSTRIAL COMMISSION**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case No(s). 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## INTERVENOR LANDOWNERS' MOTION TO COMPEL

[¶1] Intervenor Landowners hereby move the Commission for an order compelling Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, Summit Carbon Storage #3, LLC, and Summit Carbon Solutions, LLC (hereafter collectively "Summit") to produce certain items requested in discovery for which Summit has not asserted any valid objection. This Motion is supported by the Brief in Support, Declaration, and Exhibits filed herewith.

DATED this 29th day of August, 2024.

**BRAATEN LAW FIRM**

*/s/ Derrick Braaten*

Derrick Braaten (ND #06394)
109 North 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
derrick@braatenlawfirm.com

*Attorneys for Intervenors the Swenson Living Trust, Bauman, Gerving, Haupt, Jochim, Kraft, Liebelt, Maize, Metz, Rust, and Smith*

**NORTH DAKOTA INDUSTRIAL COMMISSION**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case No(s). 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## BRIEF IN SUPPORT OF INTERVENOR LANDOWNERS' MOTION TO COMPEL RESPONSES TO WRITTEN DISCOVERY

### I. FACTS

On April 16, 2024, Intervenor Landowners received notice that the Commission would hold a hearing on the applications in mid-June. On April 18—two days after receiving notice—Swenson Trust promptly filed a petition to intervene. The other Intervenor Landowners filed their own petitions in the following days.

Intervenor Landowners served their first set of discovery requests on Summit on May 2, 2024. *See* Exhibit A, attached to the Decl. of Derrick Braaten. They then served their second and third sets of discovery requests on May 6 and May 10, 2024, respectively. *See* Exhibits B and C, attached to the Decl. of Derrick Braaten.

On May 16, with the hearing quickly approaching, Intervenor Landowners filed a motion to expedite discovery, as an alternative to a previously filed motion to continue the hearing. One of these two alternatives was necessary for procedural fairness because the subject matter is technical, and Intervenor Landowners' experts needed sufficient time to review the data on which the Commission will base its decision. "[F]airness requires that the agency afford interested parties an opportunity to challenge the underlying factual data relied on by the agency." *Chemical Mfrs. Ass'n v. U.S. E.P.A.*, 870 F.2d 177, 200 (5th Cir. 1989).

The Commission waited until May 31, 2024 to grant Intervenors' Petitions to Intervene, providing Summit a way to delay responding to discovery rather than expediting it as was requested.

In support of its May 16 motion to expedite discovery, Intervenor Landowners explained that it was necessary because of the compressed timeline of events, among other reasons. Intervenor

Landowners supported their motion with a declaration of Paul Button, who specifically stated what was needed, why it was needed, and when it was needed.

On June 7, 2024, the Commission denied Intervenor Landowners' request for expedited discovery. It stated that the "Trust offered conclusory statements regarding its need for discovery" and cited the opinion of Summit's representative, Jeff Skaare, who said that the request was for a large volume of information, and it would not be feasible to respond to the requests. On this basis, the Commission held "it would not be possible for Summit to comply with such an order and the burden would be significant to Summit," and it denied the motion.[1]

The hearing commenced four days later, without Intervenor Landowners having the benefit of discovery.

Intervenor Landowners had served amended discovery requests on May 31, the date the Commission belatedly granted their petitions to intervene, but Summit did not respond to these requests until July 2—two months after being served the first set of discovery and three weeks

[1] The Commission's denial of the motion for expedited discovery was incorrect both factually and legally. First, its decision was based on a factual inaccuracy because the Trust supported its motion with the declaration of Paul Button concerning what information was needed and why—far from merely "conclusory statements." Second, the decision was based on a misapprehension of the law because the Trust did not have the burden to offer more than "conclusory statements regarding its need for discovery." The century code specifically provides that "discovery may be obtained in accordance with the North Dakota Rules of Civil Procedure." N.D.C.C. § 28-32-33. These rules do not require the parties to explain their need for discovery. Instead, "parties may obtain discovery regarding any nonprivileged matter that is relevant to any party's claim or defense, including the existence, description, nature, custody, condition, and location of any documents, electronically stored information, or other tangible things and the identity and location of persons who know of any discoverable matter." N. D. R. Civ. P., Rule 26(b)(1)(A). At most, the Trust needed to explain the reason discovery needed to be expedited, not the need for the discovery itself. Given that the Trust was not given the materials which were *in the Commission's possession* and could have simply been provided with almost zero effort by the Commission, expediting discovery would have been as simple as the Commission providing the files in its possession or ordering Summit to do so, just as the Commission had previously required it to send the load files for staff review. It refused to do so without stating any justification, requiring the Trust and other landowners whose due process rights have been trampled to obtain them from outside sources through other means.

after the hearing. *See* Exhibits D, E, and F, attached to the Decl. of Derrick Braaten. Although Summit had ample time to respond to the discovery requests before the hearing, it sat on its hands enabled by the Commission's intentional inaction.

## II. LAW & ARGUMENT

North Dakota Rules application here allow broad discovery in civil matters, whereby "[p]arties may obtain discovery regarding any nonprivileged matter that is relevant to any party's claim or defense." N.D.R.Civ.P. 26(b)(1)(A). The discovery rules should be construed "liberally." *See Marmon v. Hodny*, 287 N.W.2d 470, 476 (N.D. 1980). Additionally, Rule 37 confers "broad discretion" to compel discovery upon a party's motion. *Voracheck v. Citizens State Bank of Lankin*, 421 N.W.2d 45, 50 (N.D. 1988); *see* N.D.R.Civ.P. 37(a)(1). Intervenor Landowners certify they have conferred in good faith to obtain this discovery without the Commission's intervention. *See* Decl. of Derrick Braaten, ¶3.

### A. The Commission should order Summit to provide a complete response to Request for Production Nos. 2, 3, 4, 5, 6 (Set 1).

Among the documents requested in these RFPs, Landowners asked repeatedly for "field and analytical data" such as the data used to evaluate the $CO_2$ effects on the upper and lower confining layers…." The seismic field and analytical data (i.e. raw and processed data) was used for numerous purposes and was used generally to support all of the activities references in RFP Nos. 2-6. *See* Exhibit G, attached to the Declaration of Derrick Braaten. Summit's witnesses testified at the hearing repeatedly to how critical the seismic data was to their analysis. *See* Exhibit J, attached to the Declaration of Derrick Braaten, 216:19 - 217:5; 220:23 - 221:9; 246:24 – 247:16; 256:13-23; 258:3-9; 259:22 - 260:3; 261:9-19; 264:5 - 265:6; 265:16-21; 269:20 - 270:1. This request includes any raw or processed seismic data that would have been used to create the application and indeed, as was stated over and over by Summit's representatives, the data was

pivotal to numerous of the analyses conducted in support of the application and forms a fundamental basis for engineering decisions made as part of developing the application and model on which it is based. RFP No. 5 specifically requests all seismic survey data and acoustic impedance data, and all raw and processed seismic data is responsive to all five of these requests for production and it must be provided.

### B. The Commission should order Summit to provide a complete response to Request for Production Nos. 8 & 9 (Set 1).

In Request for Production No. 8, Landowners asked for all electronic files or data provided to the ND Industrial Commission, Dept. of Mineral Resources, or Oil and Gas Division. In Request for Production No. 9, Landowners asked for "all 3D numerical reservoir simulation model data decks, output files and graphing files of the Storage Reservoir in original electronic format." *See* Exhibit G, attached to the Decl. of Derrick Braaten. Summit responded to both by refusing to provide any data or files, and as with numerous other responses, it claimed "Landowners have made an open records request to the Commission and are in receipt of the information requested in this Discovery Request."

The Commission should order Summit to provide all CMG Modeling Files including DAT, SRS, OUT, LOG, and any RST files for the model as they were provided to the Commission because the Commission has refused to provide them to Landowners, and now that error is compounded because Summit refuses to produce them on the basis that the Commission produced them.

### C. The Commission should order Summit to provide a complete response to Request for Production No. 16 (Set 1).

Landowners requested all "reservoir pressure data for the Storage Reservoir" and Summit refused to produce any files or data claiming once again that "Landowners have made an open records request to the Commission and are in receipt of the information requested in this Discovery

Request." But the Commission did not provide all of the pressure data available, such as electronic files and data associated with any modular formation dynamics tester (MDT) data and analyses, and if the Commission is in possession of these it has similarly refused to produce them to Landowners. Summit should be ordered to provide a complete response to this Request for Production No. 16.

### D. The Commission should order Summit to provide a complete response to Request for Production Nos. 1 & 4 (Set 2).

Summit's response to Request for Production No. 1 (Set 2) is misleading. Landowners requested "all agreements for use of or damage to the pore space of any property that are in your possession." Summit responds stating "that a copy of the pore space lease is attached as Exhibit D to the Storage Facility Agreement submitted as part of its applications in the above-captioned cases." *See* Exhibit H, attached to the Decl. of Derrick Braaten. Summit similarly points to its own lease for its response to RFP 4 (Set 2).

Summit cannot credibly contend that it has no agreements for use of or damage to the pore space of any property in its possession other than a copy of its own pore space lease attached to its application. It should be ordered to produce the other agreements in its possession.

### E. The Commission should order Summit to provide a complete response to Request for Production No. 6 (Set 2).

Landowners requested all correspondence related to Summit's applications between Summit and the NDIC. Given that the NDIC's response to Landowner's requests for data and information has been to refer Landowners to its website and Summit's applications, it is critical and relevant for Landowners to have the correspondence between Summit and the NDIC. The NDIC has not produced these records in response to Landowners' open record requests as Summit contends, and Summit should be ordered to produce these records to aid Landowners in their search for data and information relevant to the property rights being taken from them in this proceeding. Presumably

Summit has been responsive to requests for files and data from the Commission staff, so this correspondence would significantly aid Landowners' search for data and files.

### F. The Commission should order Summit to provide a complete response to Interrogatory No. 1 (Set 3).

Among its discovery requests, Intervenor Landowners sought information concerning "CO2 pressure relief devices or vent systems or other mechanical devices designed for relieving pressure from a pipe," including discharge pipe sizes. *See* Interrogatory No. 1 of Exhibit I, attached to the Decl. of Derrick Braaten. Summit responded with improper, boilerplate objections and stated that it provided responsive testimony at the hearing.

However, Summit did not provide responsive testimony at the hearing. Instead, its expert, Mr. Powell, said that the information was contained in a piping and instrumentation diagram that he would willingly provide. *See* Exhibit J, 491:5-9. This diagram has not been provided, and the Commission should order Summit to provide it because it is encompassed by the discovery request and Summit testified under oath that it would provide these diagrams, a commitment now proven hollow and false. *Id*.

### G. The Commission should order Summit to provide a complete response to Request for Production No. 1 (Set 3).

Summit's response to Request for Production No. 1 in Set 3 of the discovery requests was also insufficient. *See* Exhibit I, attached to the Decl. of Derrick Braaten. The Request stated:

> Please produce any above-ground vapor dispersion modeling results such as from any engineered pressure relief systems, including all data and input files and load files. Without limiting the generality of the forgoing, specifically provide all data inputs for the following: weather conditions modeled, topography assumptions modeled, flow rate of CO2 over time, total quantity of CO2 released and total time of release modeled, and predicted CO2 concentrations at any public receptors such as roads, buildings, and dwellings.

Summit, again, responded with improper, boilerplate objections and also an objection that the information requested was protected from open record requests under N.D.C.C. § 44-04-24 and

subject to a protective order entered by the North Dakota Public Service Commission, citing Docket No. 364, Case No. PU-22-391. This objection is misplaced because the protective order applies only to testing done on the mainline, while this request seeks information concerning the surface facilities at the injection point *after* the terminus of the mainline, as discussed at the June 12 hearing. Exh. J, 477:2-25.

### H. The Commission should order Summit to appear at a 30(b)(6) deposition.

Summit argues that the Intervenor Landowner's did not serve the 30(b)(6) on the correct entity and it did not need to appear at the deposition. Summit was being wholly deceptive in not appearing for its noticed deposition and deceiving Intervenor Landowners and the Commission as to why it was not required to appear in its response to the motion to compel. *See* Response to Motion to Compel, ¶¶2-3.

Summit recently provided Intervenor Swenson Living Trust copies of a notice of assignment on July 18, 2024 and July 24, 2024. *See* Exhibits 1 and 2, attached to the Decl. of Kurt Swenson. The July 18, 2024 notice of assignment assigned Summit Carbon Solutions, LLC to SCS Permanent Carbon Storage, LLC and the July 24, 2024 notice of assignment assigned SCS Permanent Carbon Storage, LLC to Summit Carbon Storage #2. *Id.* Summit Carbon Solutions was indeed the real party in interest when served with the deposition notice because it owned the pertinent interests at the time of service. Summit Carbon Storage, #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC were not proper applicants at the time of the applications submitted to the North Dakota Industrial Commission. To the extent the Commission will hold to corporate formalities it must do so consistently, and in this case if that is done, all three applications are void because they were submitted by entities with no ownership interests pertinent to the applications when they were submitted. It is abuse of process to apply

strict corporate formalities to Intervenor Landowners and ignore those same formalities to benefit the improper applicants.

The notice of deposition was properly served when it was served on Summit Carbon Solutions and Summit's argument should fail and it should be ordered to appear for a deposition and reimburse the Intervenor's their reasonable attorney's fees and expenses for the first deposition.

## III. CONCLUSION

For the foregoing reasons, the Commission should grant Intervenor Landowner's motion and order Summit to supplement its responses as indicated herein.

DATED this 29th day of August, 2024.

**BRAATEN LAW FIRM**

*/s/ Derrick Braaten*
Derrick Braaten (ND #06394)
109 North 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
Email: derrick@braatenlawfirm.com

*Attorneys for Intervenors the Swenson Living Trust, Bauman, Gerving, Haupt, Jochim, Kraft, Liebelt, Maize, Metz, Rust, and Smith*

**NORTH DAKOTA INDUSTRIAL COMMISSION**

**OIL AND GAS DIVISION**

**In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**Case No(s). 30869**
**30870**
**30871**
**30872**
**30873**
**30874**
**30875**
**30876**
**30877**
**30878**
**30879**
**30880**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## DECLARATION OF DERRICK BRAATEN IN SUPPORT OF MOTION TO COMPEL

1. I am an attorney for the Intervenor Landowners ("Landowners"), in the above-captioned matter.
2. I represent the Landowners in matters involving the applications submitted by Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, and Summit Carbon Storage #3, LLC ("SCS").
3. I certify that I have conferred in good faith to obtain this discovery without the Commission's intervention.
4. Attached hereto as Exhibit A is a true and correct copy of Landowners Interrogatories and Request for Production of Documents to Applicants (Set 1).
5. Attached hereto as Exhibit B is a true and correct copy of Landowners Interrogatories and Request for Production of Documents to Applicants (Set 2).
6. Attached hereto as Exhibit C is a true and correct copy of Landowners Interrogatories and Request for Production of Documents to Applicants (Set 3).
7. Attached hereto as Exhibit D is a true and correct copy of Intervenor Landowners' Amended Interrogatories and Request for Production of Documents to Applicants (Set 1). No substance of the questions had been changed when the amended discovery was served.
8. Attached hereto as Exhibit E is a true and correct copy of Intervenor Landowners' Amended Interrogatories and Request for Production of Documents to Applicants (Set

2). No substance of the questions had been changed when the amended discovery was served.

9. Attached hereto as Exhibit F is a true and correct copy of Intervenor Landowners' Amended Interrogatories and Request for Production of Documents to Applicants (Set 3). No substance of the questions had been changed when the amended discovery was served.
10. Attached hereto as Exhibit G is a true and correct copy of Response of Applicants to Intervenors' Landowners' Amended Interrogatories and Request for Production of Documents (Set 1).
11. Attached hereto as Exhibit H is a true and correct copy of Response of Applicants to Intervenors' Landowners' Amended Interrogatories and Request for Production of Documents (Set 2).
12. Attached hereto as Exhibit I is a true and correct copy of Response of Applicants to Intervenors' Landowners' Amended Interrogatories and Request for Production of Documents (Set 3).
13. Attached hereto as Exhibit J is a true and correct copy of the Transcript of Hearing Volume II – (Pages 277-552).

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on the 29th day of August, 2024 at Bismarck, ND, United States.

Derrick Braaten

**NORTH DAKOTA INDUSTRIAL COMMISSION**

**OIL AND GAS DIVISION**

**In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**Case No(s). 30869**
**30870**
**30871**
**30872**
**30873**
**30874**
**30875**
**30876**
**30877**
**30878**
**30879**
**30880**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## DECLARATION OF KURT SWENSON IN SUPPORT OF MOTION TO COMPEL

1. I am the trustee of the Swenson Living Trust, an intervenor in the above-captioned matter.
2. Attached hereto as Exhibit 1 is a true and correct copy of a Notice of Assignment dated July 18, 2024 that I received. The Notice of Assignment is from Summit Carbon Solutions, LLC to SCS Permanent Carbon Storage, LLC.
3. Attached hereto as Exhibit 2 is a true and correct copy of a Notice of Assignment dated July 24, 2024 that I received. The Notice of Assignment is from SCS Permanent Carbon Storage, LLC to Summit Carbon Storage #2.

**I declare under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.**

Executed this 28th day of August, 2024 in Beulah, North Dakota.

Kurt M Swenson
Kurt M Swenson (Aug 28, 2024 15:17 CDT)

Kurt Swenson
Trustee of the Swenson Living Trust

# Declaration of Kurt Swenson in Support of Motion to Compel

Final Audit Report 2024-08-28

| | |
|---|---|
| Created: | 2024-08-28 |
| By: | Desirae Zaste (desirae@braatenlawfirm.com) |
| Status: | Signed |
| Transaction ID: | CBJCHBCAABAAA_00j81QAadhiCIhLvhjbj0b2l4zA2EM |

## "Declaration of Kurt Swenson in Support of Motion to Compel" History

Document created by Desirae Zaste (desirae@braatenlawfirm.com)
2024-08-28 - 5:52:15 PM GMT

Document emailed to kurt.swenson@mapmechanical.com for signature
2024-08-28 - 5:53:24 PM GMT

Email viewed by kurt.swenson@mapmechanical.com
2024-08-28 - 8:15:58 PM GMT

Signer kurt.swenson@mapmechanical.com entered name at signing as Kurt M Swenson
2024-08-28 - 8:17:51 PM GMT

Document e-signed by Kurt M Swenson (kurt.swenson@mapmechanical.com)
Signature Date: 2024-08-28 - 8:17:53 PM GMT - Time Source: server

Agreement completed.
2024-08-28 - 8:17:53 PM GMT

Adobe Acrobat Sign

North Dakota Industrial Commission
Oil and Gas Division
Case Nos. 30869-30880

Exhibit 2 to Declaration of Kurt Swenson
in Support of Motion to Compel

SUMMIT CARBON SOLUTIONS

July 24, 2024

Faye and Kurt Swenson, Trustees of the Swenson Living Trust
5775 21st St SW
Beulah, ND 58523

Re: Notice of Assignment
SCS Permanent Carbon Storage, LLC to Summit Carbon Storage #2

Dear Faye and Kurt Swenson, Trustees of the Swenson Living Trust,

As part of our plans for development of a Storage Facility Permit, SCS Permanent Carbon Storage, LLC has assigned, in whole or in part, its interest in your "Exclusive Option to Lease Pore Space" (Option); and "Pore Space Lease" (Lease) to a wholly owned subsidiary, Summit Carbon Storage #2, LLC. You are receiving this letter pursuant to the terms and conditions of the Option and Lease. There is nothing that you need to do with this letter, however, we are always interested in hearing from you.

If you have any questions or concerns, please feel free to call us at (701) 505-8676. If we do not answer, please leave us a message and we will have a representative call you. If you would prefer email, please send us any questions, or concerns to: option-info@summitcarbon.com.

Sincerely,

Jeffrey L. Skaare

North Dakota Industrial Commission
Oil and Gas Division
Case Nos. 30869-30880

Exhibit 1 to Declaration of Kurt Swenson
in Support of Motion to Compel

SUMMIT CARBON SOLUTIONS

July 18, 2024

Faye and Kurt Swenson, Trustees of the Swenson Living Trust
5775 21st St SW
Beulah, ND 58523

Re: Notice of Assignment
Summit Carbon Solutions, LLC to SCS Permanent Carbon Storage, LLC

Dear Faye and Kurt Swenson, Trustees of the Swenson Living Trust,

As part of our plans for development, Summit Carbon Solutions, LLC has assigned its interest in your "Exclusive Option to Lease Pore Space" (Option) and "Pore Space Lease" (Lease) to a wholly owned subsidiary, SCS Permanent Carbon Storage, LLC. You are receiving this letter pursuant to the terms and conditions of the Option and Lease. There is nothing that you need to do with this letter, however, we are always interested in hearing from you.

If you have any questions or concerns, please feel free to call us at (701) 505-8676. If we do not answer, please leave us a message, and we will have a representative call you. If you would prefer email, please send us any questions or concerns to: option-info@summitcarbon.com.

Sincerely,

Jeffrey L. Skaare

PO Box 2655 Bismarck, ND 58502

North Dakota Industrial Commission
Oil and Gas Division
Case Nos. 30869-30880

Exhibit A to Declaration of Derrick Braaten
in Support of Motion to Compel

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case No(s). 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## LANDOWNERS INTERROGATORIES AND REQUEST FOR PRODUCTION OF DOCUMENTS TO APPLICANTS (SET 1)

PLEASE TAKE NOTICE, that The Swenson Living Trust, ("Landowners"), hereby require Applicants, Summit Carbon Storage #1, LLC, Summit Carbon Storage #2 , and Summit Carbon Storage #3, LLC ("SCS" or "Summit"), to answer the following interrogatories, signed and under oath, and produce and permit Landowners to inspect and copy documents responsive to the document requests contained herein in accordance with Rules 33 and 34 of the North Dakota Rules of Civil Procedure. Your answers must be in writing and signed by someone authorized to sign on behalf of, and whose signature binds, Summit. Documents should be made available at the office of Braaten Law Firm, 109 N. 4th St., Suite 100, Bismarck, North Dakota, or copies of said documents may be forwarded to Landowners attorneys (in native, electronic format). A copy of the answers and responses, together with your objections, if any, must be served within thirty (30) days from the date of service, or within such other time as the court may allow, or parties agree.

### INSTRUCTIONS

1. These interrogatories and requests for production are deemed to be continuing in nature and should you, your counsel, or anyone representing your interest become aware of or acquire any additional knowledge or documents which affect the accuracy or completeness of any answers herein, or which relate to the matters into which these requests for production inquire, it is hereby demanded that such knowledge and documents be immediately transferred to the undersigned attorney by way of supplemental answers and responses to the full extent required by Rule 26(e), N.D.R.Civ.P.

2. In answering these interrogatories and requests for production, you are required to furnish all information and responsive documents in the possession of you, your attorney, accountants, advisors, or other persons directly employed by you.

3. Your attention is directed to Rule 34 of the North Dakota Rules of Civil Procedure, which provides that any party who produces documents for inspection "must produce documents as they are kept in the usual course of business or must organize and label them to correspond to the categories in the request." If the requested documents are stored only on software or otherwise are "computer based information," regardless of whether you produce as kept in the usual course of business or by category, you are directed to produce the raw data along with codes and programs necessary for translating it into usable form, or produce the information in a finished, usable form. In either case, all necessary glossaries, keys, indices, metadata, and software necessary for interpretation of the material should be produced unless software is proprietary in nature, in which case native format should be produced with an indication of the software types required to view and process the data.

4. **Produce electronic records in their native format.** Without limiting the generality of the foregoing, Word documents should be produced in .docx or .doc format, emails should be produced in Outlook or .eml format, ArcGIS shapefiles should be produced in .shp, .shx and .dbf formats (and when available .prj, .xml, .sbn, and .sbx), and Excel spreadsheets should be produced in .xlsx, .xls, or .csv format. To the maximum extent feasible, file structures should be maintained, especially when a data or document database is linked to an ArcGIS map, website, or other such file.

5. In responding to the requests for production, for each document or any portion thereof which you have withheld based on privilege, describe the factual basis for your claim of

privilege in sufficient detail to permit adjudication of the validity of that claim, including the following:

a. A brief description of the type of document or communication;

b. The date of the document or communication;

c. The name, title and job description of the transmitter of the document or communication;

d. The name, title, and job description of the person to whom the document or communication was addressed;

e. The name, title, and job description of each person who has received or had access to the document or communication;

f. A brief description of the subject matter of the document or communication; and

g. The nature of the privilege claim.

6. In responding to the Requests for Production, for each document or any portion thereof which has been lost, discarded or destroyed, identify such document as completely as possible, providing as much of the following information as possible:

a. The type of document;

b. Its date;

c. The date or approximate date it was lost, discarded, or destroyed;

d. The reason(s) for disposing of the document (if discarded or destroyed);

e. The identity of all person(s) authorizing or having knowledge of the circumstances surrounding the disposal of the document;

f. The identity of the person(s) who lost, discarded or destroyed the document; and

g. The identity of all persons having knowledge of the contents thereof.

7. Each interrogatory and request for production (as well as these instructions) may contain one or more terms that are defined below. You should construe each defined term

according to the meaning of that word as set forth below. All other words should be construed consistent with customary usage given the context in which the words appear such that, in each instance, you should construe any word to bring that word within the scope of the discovery request in which it appears. Consistent with the above, the singular usage of a word shall be considered to include within its meaning the plural, and vice versa; the conjunctive shall be considered to include within its meaning the disjunctive, and vice versa; and the feminine shall be considered to include within its meaning the masculine, and vice versa.

## DEFINITIONS

As used in these Interrogatories and Request for Production of Documents, the following terms shall have the meanings and definitions as indicated:

1. "SCS" or "Summit" means the applicants in NDIC Case Nos. 30870, 30871, 30872 (for "Summit Carbon Storage #1, LLC,"); 30873, 30874, 30875, 30876 (for "Summit Carbon Storage #2,") and 30877, 30878, 30879, 30880 (for "Summit Carbon Storage #3, LLC,") and each of those entities' authorized agents.

2. "Landowner" means The Swenson Living Trust.

3. "Storage Reservoir" means the reservoir and formation into which Summit intends to inject CO2 within the Areas of Review as well as the confining layers, as defined and depicted by Summit's applications herein (*see e.g.* Figure 1-1, NDIC Case No. 30869) including but not limited to the Storage Reservoir as defined by Section 1.15 of the Storage Agreement included with Summit's applications in NDIC Case No. 30869, and <u>includes</u> the confining layers/zones, to wit:

> the Pore Space and confining subsurface strata underlying the Facility Area described as the Opeche/Spearfish (Upper Confining Zone), Broom Creek (Injection Zone), and Amsden (Lower Confining Zone) Formation(s) and which are defined as identified by the well logging suite performed at one stratigraphic well,

the Milton Flemmer 1 well (NDIC File No. 38594) located in the NW¼ of the NE¼, Section 35, Township 141 North, Range 88 West, Mercer County, North Dakota. The Storage Reservoir is defined as the stratigraphic interval from below the top of the Opeche/Spearfish Formation found at a depth of 5,587 feet below the Kelly Bushing, to above the base of the Amsden Formation, found at a depth of 6,421 feet below the Kelly Bushing, as identified by the Array Induction Gamma log run in the Milton Flemmer 1 well. The logging suite included triple combo (gamma ray [GR], density porosity, and resistivity), caliper, spectral GR, combinable magnetic resonance (CMR), elemental capture spectroscopy (ESC), dipole sonic including four-arm caliper and inclinometer, and an image log. Further, the acquired logs were used to pick formation top depths and interpret lithology, petrophysical properties, and time-to-depth shifting of seismic data obtained from three 3D seismic surveys and one 5-mile long 2D seismic line covering an area totaling 208 miles in and around the Milton Flemmer 1 stratigraphic well. Formation top depths were picked from the top of the Pierre Formation to the base of the Amsden Formation. The average depth of the top of the Opeche/Spearfish Formation (Upper Confining Zone) across the storage facility area is 5,464 total vertical depth (TVD). The average depth of the base of the Amsden Formation (Lower Confining Summit Carbon Storage #1, LLC – Broom Creek 5 Zone) across the storage facility area is 6,270 feet TVD. The average thickness of the Storage Reservoir across the storage facility area is 806 feet.

4. "Communication" means any oral or written utterance, notation, or statement of any nature, by and to whomever, including, but not limited to, correspondence, text messages, chat messages, emails, letters, and any other oral or written conversations, dialogues, discussions, interviews, or consultations, between or among two or more persons.

5. "Document" means all documents or electronically stored information discoverable under N.D.R.Civ.P. 34 - including writings, drawings, graphs, charts, photographs, sound recordings, images, and other data or data compilations - stored in any medium from which information can be obtained either directly or, if necessary, after translation by you into a reasonably usable form. Documents and electronically stored information encompasses and includes all file formats in which electronically stored information is or can be stored or saved, and always includes the native file format if one exists.

6. "ESI" or "electronically stored information" means all electronically stored information discoverable under N.D.R.Civ.P. 34 - including writings, databases, shapefiles, electronic or computer files, graphs, charts, photographs, sound recordings, images, and other data or data compilations - stored in any medium from which information can be obtained either directly or, if necessary, after translation by you into a reasonably usable form. ESI encompasses and includes all file formats in which electronically stored information is or can be stored or saved, and always includes the native file format if one exists.

7. "Identification," "identify," or "identity," when used in reference to (a) a natural person, requires you to state his or her full name and residential and business addresses; (b) a corporation, requires you to state its full corporate name and any names under which it does business, its state of incorporation, the address of its principal place of business, and the addresses of all of its offices in the State of North Dakota; (c) a business, requires you to state the full name or style under which the business is conducted, its business address or addresses, the types of businesses in which it is engaged, the geographic area in which it conducts those businesses, and the identity of the person or persons who own, operate, and control the business; (d) a document, requires you to state the number of pages and the nature of the document (e.g., letter or memorandum), and if not apparent on the face of the document or ESI, its title, its date, the name or names of its authors and recipients, and its present location and custodian; (e) a communication, requires you, if any part of the communication was written, to identify the document or documents which refer to or evidence the communication, and, to the extent that the communication was non-written, to identify the persons participating in the communication and to state the date, manner, place, and substance of the communication.

8. "Person" means any individual acting in any capacity as well as any entity or organization, including divisions, departments, and other units of the organization, and shall include such organizations as public or private corporations, partnerships, joint ventures, voluntary or unincorporated associations, sole proprietorships, trusts, estates, governmental agencies, commissions, bureaus, or departments.

9. "Representative" means any agent, employee, servant, officer, director, attorney, or other person acting or purporting to act on behalf of the person in question.

10. "You," "your," or "yourself" refer to "SCS" or "Summit", each of its agents, representatives, and attorneys, and each person acting or purporting to act on its behalf.

## INTERROGATORIES

**INTERROGATORY NO. 1:** Identify the petroleum engineers or reservoir engineers who made any material contribution to Summit's applications or the materials provided in support of Summit's applications in NDIC Case Nos. 30869-30880.

**INTERROGATORY NO. 2:** Identify the geologists who made any material contribution to Summit's applications or the materials provided in support of Summit's applications in NDIC Case Nos. 30869-30880.

**INTERROGATORY NO. 3:** List any other individuals not listed in Interrogatories 1 and 2 who made any material contribution to Summit's applications or the materials provided in support of Summit's applications in NDIC Case Nos. 30869-30880.Identify each and every person whom you expect to call or may call as a witness at trial.

**INTERROGATORY NO. 4:** Identify all witnesses Summit plans to testify in support of Summit's applications in NDIC Case Nos. 30869-30880.

**INTERROGATORY NO. 5:** Identify all exhibits Summit plans to offer in support of Summit's applications in NDIC Case Nos. 30869-30880.

## REQUESTS FOR PRODUCTION

**REQUEST NO. 1:** Please produce the underlying data and electronic files necessary to run the model used to create the images of the pressure differentials contained in Figures 3-14(a-d) in Summit's application in NDIC Case No. 30869.

**REQUEST NO. 2:** Please produce all the input files, field and analytical data , and the model geochemical database used to evaluate the CO2 effects on the upper and lower confining layers, including but not limited to all inputs and data files used to run the United States Geological Survey's USGS's Phreeqc geochemical model.

**REQUEST NO. 3:** Please produce all the input files, field and analytical data , and the model geochemical database used to run Computer Modelling Group Ltd.'s GEM model and software or any similar model or software used for the same purposes.

**REQUEST NO. 4:** Please produce all the input files, field and analytical data , and the model geochemical database used to run any modelling or analysis of critical threshold pressures or areal extent of review or impact and pressure buildup, or which was used to do any kind of analysis related to EPA Method 1 or EPA Method 2 or Analytical Solution for Leakage in Multilayered Aquifers – ASLMA, or any risk-based area-of-review analysis.

**REQUEST NO. 5:** Please produce the following data and files as referenced by Summit in its application in NDIC Case No. 30873: Geophysical Logs that penetrate injection and confining zones, Seismic survey data and core sample measurements, Acoustic impedance, total porosity, effective porosity, permeability, facies, and SLB's Petrel was used to interpolate structural surfaces for zones.

**REQUEST NO. 6:** Please produce all the input files, field and analytical data, and the model geochemical database used to evaluate the CO2 effects on the upper and lower confining layers, including but not limited to all inputs and data files used to run Computer Modelling Group Ltd.'s GEM model and software or any similar model or software used for the same purposes.

**REQUEST NO. 7:** Please produce all data from any parameter referenced or described in Table 2-1: Model Parameters for Multiphase Fluid Modeling of Geologic Sequestration as that table appears in EPA Guidance - AOR Evaluation and Corrective Action Guidance (Guidance page 11) as found here: AOR Evaluation and Corrective Action Guidance - https://www.epa.gov/sites/default/files/2015-07/documents/epa816r13005.pdf.

**REQUEST NO. 8:** Please produce all electronic files and data provided to the North Dakota Industrial Commission or its Department of Mineral Resources or Oil and Gas Division in association with or related to the applications in NDIC Case Nos. 30869-30880.Please produce the general ledger detail (or account activity report) for the account for Drain #11 starting January 1, 2011 through present, on an annual basis (i.e. January 1, 2011 to December 31, 2011, and January 1, 2012 to December 31, 2012, etc.).

**REQUEST NO. 9:** Please produce all 3D numerical reservoir simulation model data decks, output files and graphing files of the Storage Reservoir in original electronic format. Without limiting the foregoing, such files may commonly be stored in Slumberger Eclipse format, CMG (Canadian Modeling Group) Imex format, or other similar format. The purpose of this request is to obtain the simulation model of the proposed storage facilities and associated reservoir, along with input and output files in Summit's possession for this simulation model.

**REQUEST NO. 10:** Please produce structure maps of the injection zone top, structure maps for major sub zones, and/or structure maps of confining zones for the Storage Reservoir and the confining zones as defined therein. Such maps include those created based upon formation tops

from well logs, 3D seismic reflectors, and interpretation of geologic deposition environment to give a representation of the elevation change across the target reservoir.

**REQUEST NO. 11:** Please produce all gross and net thickness isopach maps for the Storage Reservoir.

**REQUEST NO. 12:** Please produce pore volume (PV) maps and hydrocarbon pore volume (HCPV) maps of the Storage Reservoir, regardless of when compiled and regardless of whether created by Summit.

**REQUEST NO. 13:** Please produce all well logs (raw data plus processed and interpreted copies) from anywhere in or near the Storage Reservoir. Specially please produce the well logs in .las or other digital format, including any and all well logs utilized by Summit in developing its applications herein.

**REQUEST NO. 14:** Please produce any databases, spreadsheets, or other documents containing porosity, permeability, saturation, and other rock properties such as (minerology, geomechanical properties etc) for the Storage Reservoir in original electronic format and, if available, in Excel spreadsheet format.

**REQUEST NO. 15:** Please produce water chemistry and any other liquid or solid sampling data for water or other substances in the Storage Reservoir. Please include any gas solubility testing that was performed on the water samples for CO2 or injected gas stream.

**REQUEST NO. 16:** Please produce all spreadsheets, databases, and other documents or compilations containing reservoir pressure data for the Storage Reservoir, including but not limited to all bottom hole pressure data, surface pressure data, and fluid level measurements. If a spreadsheet is not available, then please produce all Documents containing this information.

**REQUEST NO. 17:** Please produce all relative permeability data for the Storage Reservoir, including core test information. If multiple cores have been tested, please produce all test data.

**REQUEST NO. 18:** Please produce all capillary pressure data for all cores tested in the Storage Reservoir.

**REQUEST NO. 19:** Please produce all routine core analysis data for the Storage Reservoir.

**REQUEST NO. 20:** Please produce all spreadsheets of reservoir temperature data in the Storage Reservoir, including spreadsheets indexing reservoir temperature data to well name and API number. If this information is not available in spreadsheet format, then please produce all Documents containing this information.

**REQUEST NO. 21:** Please produce all written interpretations of micro-seismic data obtained from the Storage Reservoir.

Dated this 2nd day of May, 2024.

**BRAATEN LAW FIRM**

*/s/ Derrick Braaten*

Derrick Braaten (ND #06394)
derrick@braatenlawfirm.com
109 North 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
Fax: 701-221-5842

*Attorneys for the Swenson Living Trust*

North Dakota Industrial Commission
Oil and Gas Division
Case Nos. 30869-30880

Exhibit B to Declaration of Derrick Braaten
in Support of Motion to Compel

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case No(s). 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## LANDOWNERS INTERROGATORIES AND REQUEST FOR PRODUCTION OF DOCUMENTS TO APPLICANTS (SET 2)

PLEASE TAKE NOTICE, that The Swenson Living Trust, ("Landowners"), hereby require Applicants, Summit Carbon Storage #1, LLC, Summit Carbon Storage #2 , and Summit Carbon Storage #3, LLC ("SCS" or "Summit"), to answer the following interrogatories, signed and under oath, and produce and permit Landowners to inspect and copy documents responsive to the document requests contained herein in accordance with Rules 33 and 34 of the North Dakota Rules of Civil Procedure. Your answers must be in writing and signed by someone authorized to sign on behalf of, and whose signature binds, Summit. Documents should be made available at the office of Braaten Law Firm, 109 N. 4th St., Suite 100, Bismarck, North Dakota, or copies of said documents may be forwarded to Landowners attorneys (in native, electronic format). A copy of the answers and responses, together with your objections, if any, must be served within thirty (30) days from the date of service, or within such other time as the Commission may allow, or parties agree.

### INSTRUCTIONS

1. These interrogatories and requests for production are deemed to be continuing in nature and should you, your counsel, or anyone representing your interest become aware of or acquire any additional knowledge or documents which affect the accuracy or completeness of any answers herein, or which relate to the matters into which these requests for production inquire, it is hereby demanded that such knowledge and documents be immediately transferred to the undersigned attorney by way of supplemental answers and responses to the full extent required by Rule 26(e), N.D.R.Civ.P.

2. In answering these interrogatories and requests for production, you are required to furnish all information and responsive documents in the possession of you, your attorney, accountants, advisors, or other persons directly employed by you.

3. Your attention is directed to Rule 34 of the North Dakota Rules of Civil Procedure, which provides that any party who produces documents for inspection "must produce documents as they are kept in the usual course of business or must organize and label them to correspond to the categories in the request." If the requested documents are stored only on software or otherwise are "computer based information," regardless of whether you produce as kept in the usual course of business or by category, you are directed to produce the raw data along with codes and programs necessary for translating it into usable form, or produce the information in a finished, usable form. In either case, all necessary glossaries, keys, indices, metadata, and software necessary for interpretation of the material should be produced unless software is proprietary in nature, in which case native format should be produced with an indication of the software types required to view and process the data.

4. **Produce electronic records in their native format.** Without limiting the generality of the foregoing, Word documents should be produced in .docx or .doc format, emails should be produced in .msg (Outlook) or .eml format, ArcGIS shapefiles should be produced in .shp, .shx and .dbf formats (and when available .prj, .xml, .sbn, and .sbx), and Excel spreadsheets should be produced in .xlsx, .xls, or .csv format. To the maximum extent feasible, file structures should be maintained, especially when a data or document database is linked to an ArcGIS map, website, or other such file.

5. In responding to the requests for production, for each document or any portion thereof which you have withheld based on privilege, describe the factual basis for your claim of

privilege in sufficient detail to permit adjudication of the validity of that claim, including the following:

a. A brief description of the type of document or communication;

b. The date of the document or communication;

c. The name, title and job description of the transmitter of the document or communication;

d. The name, title, and job description of the person to whom the document or communication was addressed;

e. The name, title, and job description of each person who has received or had access to the document or communication;

f. A brief description of the subject matter of the document or communication; and

g. The nature of the privilege claim.

6. In responding to the Requests for Production, for each document or any portion thereof which has been lost, discarded or destroyed, identify such document as completely as possible, providing as much of the following information as possible:

a. The type of document;

b. Its date;

c. The date or approximate date it was lost, discarded, or destroyed;

d. The reason(s) for disposing of the document (if discarded or destroyed);

e. The identity of all person(s) authorizing or having knowledge of the circumstances surrounding the disposal of the document;

f. The identity of the person(s) who lost, discarded or destroyed the document; and

g. The identity of all persons having knowledge of the contents thereof.

7. Each interrogatory and request for production (as well as these instructions) may contain one or more terms that are defined below. You should construe each defined term

according to the meaning of that word as set forth below. All other words should be construed consistent with customary usage given the context in which the words appear such that, in each instance, you should construe any word to bring that word within the scope of the discovery request in which it appears. Consistent with the above, the singular usage of a word shall be considered to include within its meaning the plural, and vice versa; the conjunctive shall be considered to include within its meaning the disjunctive, and vice versa; and the feminine shall be considered to include within its meaning the masculine, and vice versa.

## DEFINITIONS

As used in these Interrogatories and Request for Production of Documents, the following terms shall have the meanings and definitions as indicated:

1. "SCS" or "Summit" means the applicants in NDIC Case Nos. 30869, 30870, 30871, 30872 (for "Summit Carbon Storage #1, LLC,"); 30873, 30874, 30875, 30876 (for "Summit Carbon Storage #2,") and 30877, 30878, 30879, 30880 (for "Summit Carbon Storage #3, LLC,") and each of those entities' authorized agents.

2. "Landowner" means The Swenson Living Trust.

3. "Storage Reservoir" means the reservoir and formation into which Summit intends to inject CO2 and the confining zones within the Areas of Review as defined and depicted by Summit's applications herein (*see e.g.* Figure 1-1, NDIC Case No. 30869) including but not limited to the Storage Reservoir as defined by Section 1.15 of the Storage Agreement included with Summit's applications in NDIC Case No. 30869, to wit:

> the Pore Space and confining subsurface strata underlying the Facility Area described as the Opeche/Spearfish (Upper Confining Zone), Broom Creek (Injection Zone), and Amsden (Lower Confining Zone) Formation(s) and which are defined as identified by the well logging suite performed at one stratigraphic well, the Milton Flemmer 1 well (NDIC File No. 38594) located in the NW¼ of the NE¼, Section 35, Township 141 North, Range 88 West, Mercer County, North Dakota.

> The Storage Reservoir is defined as the stratigraphic interval from below the top of the Opeche/Spearfish Formation found at a depth of 5,587 feet below the Kelly Bushing, to above the base of the Amsden Formation, found at a depth of 6,421 feet below the Kelly Bushing, as identified by the Array Induction Gamma log run in the Milton Flemmer 1 well. The logging suite included triple combo (gamma ray [GR], density porosity, and resistivity), caliper, spectral GR, combinable magnetic resonance (CMR), elemental capture spectroscopy (ESC), dipole sonic including four-arm caliper and inclinometer, and an image log. Further, the acquired logs were used to pick formation top depths and interpret lithology, petrophysical properties, and time-to-depth shifting of seismic data obtained from three 3D seismic surveys and one 5-mile long 2D seismic line covering an area totaling 208 miles in and around the Milton Flemmer 1 stratigraphic well. Formation top depths were picked from the top of the Pierre Formation to the base of the Amsden Formation. The average depth of the top of the Opeche/Spearfish Formation (Upper Confining Zone) across the storage facility area is 5,464 total vertical depth (TVD). The average depth of the base of the Amsden Formation (Lower Confining Summit Carbon Storage #1, LLC – Broom Creek 5 Zone) across the storage facility area is 6,270 feet TVD. The average thickness of the Storage Reservoir across the storage facility area is 806 feet.

4. "Communication" means any oral or written utterance, notation, or statement of any nature, by and to whomever, including, but not limited to, correspondence, text messages, chat messages, emails, letters, and any other oral or written conversations, dialogues, discussions, interviews, or consultations, between or among two or more persons.

5. "Document" means all documents or electronically stored information discoverable under N.D.R.Civ.P. 34 - including writings, drawings, graphs, charts, photographs, sound recordings, images, and other data or data compilations - stored in any medium from which information can be obtained either directly or, if necessary, after translation by you into a reasonably usable form. Documents and electronically stored information encompasses and includes all file formats in which electronically stored information is or can be stored or saved, and always includes the native file format if one exists.

6. "ESI" or "electronically stored information" means all electronically stored information discoverable under N.D.R.Civ.P. 34 - including writings, databases, shapefiles,

electronic or computer files, graphs, charts, photographs, sound recordings, images, and other data or data compilations - stored in any medium from which information can be obtained either directly or, if necessary, after translation by you into a reasonably usable form. ESI encompasses and includes all file formats in which electronically stored information is or can be stored or saved, and always includes the native file format if one exists.

7. "Identification," "identify," or "identity," when used in reference to (a) a natural person, requires you to state his or her full name and residential and business addresses; (b) a corporation, requires you to state its full corporate name and any names under which it does business, its state of incorporation, the address of its principal place of business, and the addresses of all of its offices in the State of North Dakota; (c) a business, requires you to state the full name or style under which the business is conducted, its business address or addresses, the types of businesses in which it is engaged, the geographic area in which it conducts those businesses, and the identity of the person or persons who own, operate, and control the business; (d) a document, requires you to state the number of pages and the nature of the document (e.g., letter or memorandum), and if not apparent on the face of the document or ESI, its title, its date, the name or names of its authors and recipients, and its present location and custodian; (e) a communication, requires you, if any part of the communication was written, to identify the document or documents which refer to or evidence the communication, and, to the extent that the communication was non-written, to identify the persons participating in the communication and to state the date, manner, place, and substance of the communication.

8. "Person" means any individual acting in any capacity as well as any entity or organization, including divisions, departments, and other units of the organization, and shall include such organizations as public or private corporations, partnerships, joint ventures, voluntary

or unincorporated associations, sole proprietorships, trusts, estates, governmental agencies, commissions, bureaus, or departments.

9. "Representative" means any agent, employee, servant, officer, director, attorney, or other person acting or purporting to act on behalf of the person in question.

10. "Summit's applications" means all of Summit's applications and documents and other materials in support in NDIC Case Nos. 30869, 30870, 30871, 30872; 30873, 30874, 30875, 30876; 30877, 30878, 30879, 30880.

11. "You," "your," or "yourself" refer to "SCS" or "Summit", and its authorized agents.

## INTERROGATORIES

**INTERROGATORY NO. 1:** Identify all software programs necessary to open or run or execute any electronic files that are themselves responsive to or which contain data and information responsive to any of Landowners written interrogatories or requests for production of documents. Please exclude from your answer any software programs needed to open files with the following extensions: .doc, .docx, .pdf, .xlsx, .csv, .eml, .msg, as well as common audio-visual file types that can be opened with freely-available software such as .jpg/.jpeg, .tiff, and .mp4 files.

**INTERROGATORY NO. 2:** State whether Summit possesses documents related to any exchange of valuable consideration (including but not limited to monetary compensation even if nominal) for the right to use or damage the pore space of a property.

**INTERROGATORY NO. 3:** Describe how Summit determined the amounts it paid to property owners for use of or damage to their pore space for its activities related to Summit's applications.

**INTERROGATORY NO. 4:** State the amounts that Summit has paid to property owners for use of or damage to pore space for injections of CO2.

**INTERROGATORY NO. 5:** State how Summit determines if a property owner has been "equitably compensated" as that phrase is used in N.D.C.C. § 38-22-08(14), and what criteria it uses to make this determination.

**INTERROGATORY NO. 6:** Identify the factual basis in Summit's applications or the materials submitted in support of Summit's applications that might support or that Summit will use to support a finding that property owners have been "equitably compensated" as that phrase is used in N.D.C.C. § 38-22-08(14).

**INTERROGATORY NO. 7:** Identify the factual basis in any documents or information sources other than Summit's applications that might support or that Summit will use to support a finding that property owners have been "equitably compensated" as that phrase is used in N.D.C.C. § 38-22-08(14).

**INTERROGATORY NO. 8:** Identify the sections of Summit's applications that support a finding that "[t]hat the proposed storage facility will not adversely affect surface waters or formations containing fresh water" as is stated at N.D.C.C. § 38-22-08(7). If Summit claims that any documents or information outside of Summit's applications support such a finding, identify those documents and information.

**INTERROGATORY NO. 9:** Identify the source of any carbon dioxide that will be injected pursuant to Summit's applications that is created or produced or originates in North Dakota.

## REQUESTS FOR PRODUCTION

**REQUEST NO. 1:** Please produce all agreements for use of or damage to the pore space of any property that are in your possession.

**REQUEST NO. 2:** Without limiting the generality of Request No. 1, please produce all agreements that might support or that Summit will use to support a finding "[t]hat the storage operator has obtained the consent of persons who own at least sixty percent of the storage reservoir's pore space" as required by N.D.C.C. § 38-22-08(5).

**REQUEST NO. 3:** Without limiting the generality of Request No. 1, produce all agreements that might support or that Summit will use to support a finding that "all nonconsenting pore space owners are or will be equitably compensated" as stated in N.D.C.C. § 38-22-08(14).

**REQUEST NO. 4:** Please produce all documents containing data or information indicating or indicative of market values for any rights associated with the use of or damage to a property's pore space.

**REQUEST NO. 5:** Without limiting the generality of the foregoing requests, please produce all agreements for use of or damage to any surface estate necessary for Summit to complete construction of the facilities described in Summit's applications, including but not limited to its injections wells (but for clarification not those agreements necessary for the interstate transmission line subject to siting proceedings before the ND Public Service Commission).

**REQUEST NO. 6:** Please produce all correspondence related to Summit's applications between Summit and the North Dakota Industrial Commission and its Department of Mineral Resources and its Oil and Gas Division (collectively "NDIC") and any authorized agents of the NDIC, and all correspondence between your authorized agents and the NDIC (including any individuals copied on or submitting Summit's applications) related to Summit's applications.

Dated this 6th day of May, 2024

**BRAATEN LAW FIRM**

*/s/ Derrick Braaten*

Derrick Braaten (ND #06394)
derrick@braatenlawfirm.com
109 North 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911

*Attorneys for the Swenson Living Trust*

North Dakota Industrial Commission
Oil and Gas Division
Case Nos. 30869-30880

Exhibit C to Declaration of Derrick Braaten
in Support of Motion to Compel

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case No(s). 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## LANDOWNERS INTERROGATORIES AND REQUEST FOR PRODUCTION OF DOCUMENTS TO APPLICANTS (SET 3)

PLEASE TAKE NOTICE, that The Swenson Living Trust, ("Landowners"), hereby require Applicants, Summit Carbon Storage #1, LLC, Summit Carbon Storage #2 , and Summit Carbon Storage #3, LLC ("SCS" or "Summit"), to answer the following interrogatories, signed and under oath, and produce and permit Landowners to inspect and copy documents responsive to the document requests contained herein in accordance with Rules 33 and 34 of the North Dakota Rules of Civil Procedure. Your answers must be in writing and signed by someone authorized to sign on behalf of, and whose signature binds, Summit. Documents should be made available at the office of Braaten Law Firm, 109 N. 4th St., Suite 100, Bismarck, North Dakota, or copies of said documents may be forwarded to Landowners attorneys (in native, electronic format). A copy of the answers and responses, together with your objections, if any, must be served within thirty (30) days from the date of service, or within such other time as the Commission may allow, or parties agree.

### INSTRUCTIONS

1. These interrogatories and requests for production are deemed to be continuing in nature and should you, your counsel, or anyone representing your interest become aware of or acquire any additional knowledge or documents which affect the accuracy or completeness of any answers herein, or which relate to the matters into which these requests for production inquire, it is hereby demanded that such knowledge and documents be immediately transferred to the undersigned attorney by way of supplemental answers and responses to the full extent required by Rule 26(e), N.D.R.Civ.P.

2. In answering these interrogatories and requests for production, you are required to furnish all information and responsive documents in the possession of you, your attorney, accountants, advisors, or other persons directly employed by you.

3. Your attention is directed to Rule 34 of the North Dakota Rules of Civil Procedure, which provides that any party who produces documents for inspection "must produce documents as they are kept in the usual course of business or must organize and label them to correspond to the categories in the request." If the requested documents are stored only on software or otherwise are "computer based information," regardless of whether you produce as kept in the usual course of business or by category, you are directed to produce the raw data along with codes and programs necessary for translating it into usable form, or produce the information in a finished, usable form. In either case, all necessary glossaries, keys, indices, metadata, and software necessary for interpretation of the material should be produced unless software is proprietary in nature, in which case native format should be produced with an indication of the software types required to view and process the data.

4. **Produce electronic records in their native format.** Without limiting the generality of the foregoing, Word documents should be produced in .docx or .doc format, emails should be produced in .msg (Outlook) or .eml format, ArcGIS shapefiles should be produced in .shp, .shx and .dbf formats (and when available .prj, .xml, .sbn, and .sbx), and Excel spreadsheets should be produced in .xlsx, .xls, or .csv format. To the maximum extent feasible, file structures should be maintained, especially when a data or document database is linked to an ArcGIS map, website, or other such file.

5. In responding to the requests for production, for each document or any portion thereof which you have withheld based on privilege, describe the factual basis for your claim of

privilege in sufficient detail to permit adjudication of the validity of that claim, including the following:

a. A brief description of the type of document or communication;

b. The date of the document or communication;

c. The name, title and job description of the transmitter of the document or communication;

d. The name, title, and job description of the person to whom the document or communication was addressed;

e. The name, title, and job description of each person who has received or had access to the document or communication;

f. A brief description of the subject matter of the document or communication; and

g. The nature of the privilege claim.

6. In responding to the Requests for Production, for each document or any portion thereof which has been lost, discarded or destroyed, identify such document as completely as possible, providing as much of the following information as possible:

a. The type of document;

b. Its date;

c. The date or approximate date it was lost, discarded, or destroyed;

d. The reason(s) for disposing of the document (if discarded or destroyed);

e. The identity of all person(s) authorizing or having knowledge of the circumstances surrounding the disposal of the document;

f. The identity of the person(s) who lost, discarded or destroyed the document; and

g. The identity of all persons having knowledge of the contents thereof.

7. Each interrogatory and request for production (as well as these instructions) may contain one or more terms that are defined below. You should construe each defined term

according to the meaning of that word as set forth below. All other words should be construed consistent with customary usage given the context in which the words appear such that, in each instance, you should construe any word to bring that word within the scope of the discovery request in which it appears. Consistent with the above, the singular usage of a word shall be considered to include within its meaning the plural, and vice versa; the conjunctive shall be considered to include within its meaning the disjunctive, and vice versa; and the feminine shall be considered to include within its meaning the masculine, and vice versa.

## DEFINITIONS

As used in these Interrogatories and Request for Production of Documents, the following terms shall have the meanings and definitions as indicated:

1. "SCS" or "Summit" means the applicants in NDIC Case Nos. 30869, 30870, 30871, 30872 (for "Summit Carbon Storage #1, LLC,"); 30873, 30874, 30875, 30876 (for "Summit Carbon Storage #2,") and 30877, 30878, 30879, 30880 (for "Summit Carbon Storage #3, LLC,") and each of those entities' authorized agents.

2. "Landowner" means The Swenson Living Trust.

3. "Storage Reservoir" means the reservoir and formation into which Summit intends to inject CO2 and the confining zones within the Areas of Review as defined and depicted by Summit's applications herein (*see e.g.* Figure 1-1, NDIC Case No. 30869) including but not limited to the Storage Reservoir as defined by Section 1.15 of the Storage Agreement included with Summit's applications in NDIC Case No. 30869, to wit:

> the Pore Space and confining subsurface strata underlying the Facility Area described as the Opeche/Spearfish (Upper Confining Zone), Broom Creek (Injection Zone), and Amsden (Lower Confining Zone) Formation(s) and which are defined as identified by the well logging suite performed at one stratigraphic well, the Milton Flemmer 1 well (NDIC File No. 38594) located in the NW¼ of the NE¼, Section 35, Township 141 North, Range 88 West, Mercer County, North Dakota.

> The Storage Reservoir is defined as the stratigraphic interval from below the top of the Opeche/Spearfish Formation found at a depth of 5,587 feet below the Kelly Bushing, to above the base of the Amsden Formation, found at a depth of 6,421 feet below the Kelly Bushing, as identified by the Array Induction Gamma log run in the Milton Flemmer 1 well. The logging suite included triple combo (gamma ray [GR], density porosity, and resistivity), caliper, spectral GR, combinable magnetic resonance (CMR), elemental capture spectroscopy (ESC), dipole sonic including four-arm caliper and inclinometer, and an image log. Further, the acquired logs were used to pick formation top depths and interpret lithology, petrophysical properties, and time-to-depth shifting of seismic data obtained from three 3D seismic surveys and one 5-mile long 2D seismic line covering an area totaling 208 miles in and around the Milton Flemmer 1 stratigraphic well. Formation top depths were picked from the top of the Pierre Formation to the base of the Amsden Formation. The average depth of the top of the Opeche/Spearfish Formation (Upper Confining Zone) across the storage facility area is 5,464 total vertical depth (TVD). The average depth of the base of the Amsden Formation (Lower Confining Summit Carbon Storage #1, LLC – Broom Creek 5 Zone) across the storage facility area is 6,270 feet TVD. The average thickness of the Storage Reservoir across the storage facility area is 806 feet.

4. "Communication" means any oral or written utterance, notation, or statement of any nature, by and to whomever, including, but not limited to, correspondence, text messages, chat messages, emails, letters, and any other oral or written conversations, dialogues, discussions, interviews, or consultations, between or among two or more persons.

5. "Document" means all documents or electronically stored information discoverable under N.D.R.Civ.P. 34 - including writings, drawings, graphs, charts, photographs, sound recordings, images, and other data or data compilations - stored in any medium from which information can be obtained either directly or, if necessary, after translation by you into a reasonably usable form. Documents and electronically stored information encompasses and includes all file formats in which electronically stored information is or can be stored or saved, and always includes the native file format if one exists.

6. "ESI" or "electronically stored information" means all electronically stored information discoverable under N.D.R.Civ.P. 34 - including writings, databases, shapefiles,

electronic or computer files, graphs, charts, photographs, sound recordings, images, and other data or data compilations - stored in any medium from which information can be obtained either directly or, if necessary, after translation by you into a reasonably usable form. ESI encompasses and includes all file formats in which electronically stored information is or can be stored or saved, and always includes the native file format if one exists.

7. "Identification," "identify," or "identity," when used in reference to (a) a natural person, requires you to state his or her full name and residential and business addresses; (b) a corporation, requires you to state its full corporate name and any names under which it does business, its state of incorporation, the address of its principal place of business, and the addresses of all of its offices in the State of North Dakota; (c) a business, requires you to state the full name or style under which the business is conducted, its business address or addresses, the types of businesses in which it is engaged, the geographic area in which it conducts those businesses, and the identity of the person or persons who own, operate, and control the business; (d) a document, requires you to state the number of pages and the nature of the document (e.g., letter or memorandum), and if not apparent on the face of the document or ESI, its title, its date, the name or names of its authors and recipients, and its present location and custodian; (e) a communication, requires you, if any part of the communication was written, to identify the document or documents which refer to or evidence the communication, and, to the extent that the communication was non-written, to identify the persons participating in the communication and to state the date, manner, place, and substance of the communication.

8. "Person" means any individual acting in any capacity as well as any entity or organization, including divisions, departments, and other units of the organization, and shall include such organizations as public or private corporations, partnerships, joint ventures, voluntary

or unincorporated associations, sole proprietorships, trusts, estates, governmental agencies, commissions, bureaus, or departments.

9. "Representative" means any agent, employee, servant, officer, director, attorney, or other person acting or purporting to act on behalf of the person in question.

10. "Summit's applications" means all of Summit's applications and documents and other materials in support in NDIC Case Nos. 30869, 30870, 30871, 30872; 30873, 30874, 30875, 30876; 30877, 30878, 30879, 30880.

11. "You," "your," or "yourself" refer to "SCS" or "Summit", and its authorized agents.

## INTERROGATORIES

**INTERROGATORY NO. 1:** For any installed CO2 pressure relief devices or CO2 vent systems or other mechanical devices designed for relieving pressure from a pipe, at any of the surface facilities constructed for purposes of Summit's applications, please provide the following:

a. Rated capacity of each device or system;

b. Quantity of each device or system;

c. Discharge pipe size(s);

d. Discharge pipe outlet(s) direction (vertical or horizontal); and

e. If horizontal, state direction of discharge.

## REQUESTS FOR PRODUCTION

**REQUEST FOR PRODUCTION NO. 1:** Please produce any above-ground vapor dispersion modeling results such as from any engineered pressure relief systems, including all data and input files and load files. Without limiting the generality of the forgoing, specifically provide

all data inputs for the following: weather conditions modeled, topography assumptions modeled, flow rate of CO2 over time, total quantity of CO2 released and total time of release modeled, and predicted CO2 concentrations at any public receptors such as roads, buildings, and dwellings.

Dated this 10th day of May, 2024

**BRAATEN LAW FIRM**

*/s/ Derrick Braaten*

Derrick Braaten (ND #06394)
derrick@braatenlawfirm.com
109 North 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911

*Attorneys for the Swenson Living Trust*

North Dakota Industrial Commission
Oil and Gas Division
Case Nos. 30869-30880

Exhibit D to Declaration of Derrick Braaten
in Support of Motion to Compel

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case No(s). 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## INTERVENORS' LANDOWNERS' AMENDED INTERROGATORIES AND REQUEST FOR PRODUCTION OF DOCUMENTS TO APPLICANTS (SET 1)

PLEASE TAKE NOTICE, that Intervenors Landowners, The Swenson Living Trust, Michael Bauman, Glenn and Lisa Gerving, Michael and Bonnie Haupt, John Jochim, Kevin and Kimberly Kraft, Charmayne Liebelt, Kirk and Linda Maize and Allen Maize, Paul and Christy Metz, JoLene M. Rust, and Gary and Cassie Smith, ("Landowners"), hereby require Applicants, Summit Carbon Storage #1, LLC, Summit Carbon Storage #2 , and Summit Carbon Storage #3, LLC ("SCS" or "Summit"), to answer the following interrogatories, signed and under oath, and produce and permit Landowners to inspect and copy documents responsive to the document requests contained herein in accordance with Rules 33 and 34 of the North Dakota Rules of Civil Procedure. Your answers must be in writing and signed by someone authorized to sign on behalf of, and whose signature binds, Summit. Documents should be made available at the office of Braaten Law Firm, 109 N. 4th St., Suite 100, Bismarck, North Dakota, or copies of said documents may be forwarded to Landowners attorneys (in native, electronic format). A copy of the answers and responses, together with your objections, if any, must be served within thirty (30) days from the date of service, or within such other time as the court may allow, or parties agree.

### INSTRUCTIONS

1. These interrogatories and requests for production are deemed to be continuing in nature and should you, your counsel, or anyone representing your interest become aware of or acquire any additional knowledge or documents which affect the accuracy or completeness of any answers herein, or which relate to the matters into which these requests for production inquire, it is hereby demanded that such knowledge and documents be immediately transferred to the

undersigned attorney by way of supplemental answers and responses to the full extent required by Rule 26(e), N.D.R.Civ.P.

2. In answering these interrogatories and requests for production, you are required to furnish all information and responsive documents in the possession of you, your attorney, accountants, advisors, or other persons directly employed by you.

3. Your attention is directed to Rule 34 of the North Dakota Rules of Civil Procedure, which provides that any party who produces documents for inspection "must produce documents as they are kept in the usual course of business or must organize and label them to correspond to the categories in the request." If the requested documents are stored only on software or otherwise are "computer based information," regardless of whether you produce as kept in the usual course of business or by category, you are directed to produce the raw data along with codes and programs necessary for translating it into usable form, or produce the information in a finished, usable form. In either case, all necessary glossaries, keys, indices, metadata, and software necessary for interpretation of the material should be produced unless software is proprietary in nature, in which case native format should be produced with an indication of the software types required to view and process the data.

4. **Produce electronic records in their native format.** Without limiting the generality of the foregoing, Word documents should be produced in .docx or .doc format, emails should be produced in Outlook or .eml format, ArcGIS shapefiles should be produced in .shp, .shx and .dbf formats (and when available .prj, .xml, .sbn, and .sbx), and Excel spreadsheets should be produced in .xlsx, .xls, or .csv format. To the maximum extent feasible, file structures should be maintained, especially when a data or document database is linked to an ArcGIS map, website, or other such file.

5. In responding to the requests for production, for each document or any portion thereof which you have withheld based on privilege, describe the factual basis for your claim of privilege in sufficient detail to permit adjudication of the validity of that claim, including the following:

a. A brief description of the type of document or communication;

b. The date of the document or communication;

c. The name, title and job description of the transmitter of the document or communication;

d. The name, title, and job description of the person to whom the document or communication was addressed;

e. The name, title, and job description of each person who has received or had access to the document or communication;

f. A brief description of the subject matter of the document or communication; and

g. The nature of the privilege claim.

6. In responding to the Requests for Production, for each document or any portion thereof which has been lost, discarded or destroyed, identify such document as completely as possible, providing as much of the following information as possible:

a. The type of document;

b. Its date;

c. The date or approximate date it was lost, discarded, or destroyed;

d. The reason(s) for disposing of the document (if discarded or destroyed);

e. The identity of all person(s) authorizing or having knowledge of the circumstances surrounding the disposal of the document;

f. The identity of the person(s) who lost, discarded or destroyed the document; and

g. The identity of all persons having knowledge of the contents thereof.

7. Each interrogatory and request for production (as well as these instructions) may contain one or more terms that are defined below. You should construe each defined term according to the meaning of that word as set forth below. All other words should be construed consistent with customary usage given the context in which the words appear such that, in each instance, you should construe any word to bring that word within the scope of the discovery request in which it appears. Consistent with the above, the singular usage of a word shall be considered to include within its meaning the plural, and vice versa; the conjunctive shall be considered to include within its meaning the disjunctive, and vice versa; and the feminine shall be considered to include within its meaning the masculine, and vice versa.

**DEFINITIONS**

As used in these Interrogatories and Request for Production of Documents, the following terms shall have the meanings and definitions as indicated:

1. "SCS" or "Summit" means the applicants in NDIC Case Nos. 30869, 30870, 30871, 30872 (for "Summit Carbon Storage #1, LLC,"); 30873, 30874, 30875, 30876 (for "Summit Carbon Storage #2,") and 30877, 30878, 30879, 30880 (for "Summit Carbon Storage #3, LLC,") and each of those entities' authorized agents.

2. "Landowner" means The Swenson Living Trust, Michael Bauman, Glenn and Lisa Gerving, Michael and Bonnie Haupt, John Jochim, Kevin and Kimberly Kraft, Charmayne Liebelt, Kirk and Linda Maize and Allen Maize, Paul and Christy Metz, JoLene M. Rust, and Gary and Cassie Smith.

3. "Storage Reservoir" means the reservoir and formation into which Summit intends to inject CO2 within the Areas of Review as well as the confining layers, as defined and depicted by Summit's applications herein (*see e.g.* Figure 1-1, NDIC Case No. 30869) including but not

limited to the Storage Reservoir as defined by Section 1.15 of the Storage Agreement included with Summit's applications in NDIC Case No. 30869, and includes the confining layers/zones, to wit:

> the Pore Space and confining subsurface strata underlying the Facility Area described as the Opeche/Spearfish (Upper Confining Zone), Broom Creek (Injection Zone), and Amsden (Lower Confining Zone) Formation(s) and which are defined as identified by the well logging suite performed at one stratigraphic well, the Milton Flemmer 1 well (NDIC File No. 38594) located in the NW¼ of the NE¼, Section 35, Township 141 North, Range 88 West, Mercer County, North Dakota. The Storage Reservoir is defined as the stratigraphic interval from below the top of the Opeche/Spearfish Formation found at a depth of 5,587 feet below the Kelly Bushing, to above the base of the Amsden Formation, found at a depth of 6,421 feet below the Kelly Bushing, as identified by the Array Induction Gamma log run in the Milton Flemmer 1 well. The logging suite included triple combo (gamma ray [GR], density porosity, and resistivity), caliper, spectral GR, combinable magnetic resonance (CMR), elemental capture spectroscopy (ESC), dipole sonic including four-arm caliper and inclinometer, and an image log. Further, the acquired logs were used to pick formation top depths and interpret lithology, petrophysical properties, and time-to-depth shifting of seismic data obtained from three 3D seismic surveys and one 5-mile long 2D seismic line covering an area totaling 208 miles in and around the Milton Flemmer 1 stratigraphic well. Formation top depths were picked from the top of the Pierre Formation to the base of the Amsden Formation. The average depth of the top of the Opeche/Spearfish Formation (Upper Confining Zone) across the storage facility area is 5,464 total vertical depth (TVD). The average depth of the base of the Amsden Formation (Lower Confining Summit Carbon Storage #1, LLC – Broom Creek 5 Zone) across the storage facility area is 6,270 feet TVD. The average thickness of the Storage Reservoir across the storage facility area is 806 feet.

4. "Communication" means any oral or written utterance, notation, or statement of any nature, by and to whomever, including, but not limited to, correspondence, text messages, chat messages, emails, letters, and any other oral or written conversations, dialogues, discussions, interviews, or consultations, between or among two or more persons.

5. "Document" means all documents or electronically stored information discoverable under N.D.R.Civ.P. 34 - including writings, drawings, graphs, charts, photographs, sound recordings, images, and other data or data compilations - stored in any medium from which

information can be obtained either directly or, if necessary, after translation by you into a reasonably usable form. Documents and electronically stored information encompasses and includes all file formats in which electronically stored information is or can be stored or saved, and always includes the native file format if one exists.

6. "ESI" or "electronically stored information" means all electronically stored information discoverable under N.D.R.Civ.P. 34 - including writings, databases, shapefiles, electronic or computer files, graphs, charts, photographs, sound recordings, images, and other data or data compilations - stored in any medium from which information can be obtained either directly or, if necessary, after translation by you into a reasonably usable form. ESI encompasses and includes all file formats in which electronically stored information is or can be stored or saved, and always includes the native file format if one exists.

7. "Identification," "identify," or "identity," when used in reference to (a) a natural person, requires you to state his or her full name and residential and business addresses; (b) a corporation, requires you to state its full corporate name and any names under which it does business, its state of incorporation, the address of its principal place of business, and the addresses of all of its offices in the State of North Dakota; (c) a business, requires you to state the full name or style under which the business is conducted, its business address or addresses, the types of businesses in which it is engaged, the geographic area in which it conducts those businesses, and the identity of the person or persons who own, operate, and control the business; (d) a document, requires you to state the number of pages and the nature of the document (e.g., letter or memorandum), and if not apparent on the face of the document or ESI, its title, its date, the name or names of its authors and recipients, and its present location and custodian; (e) a communication, requires you, if any part of the communication was written, to identify the document or documents

which refer to or evidence the communication, and, to the extent that the communication was non-written, to identify the persons participating in the communication and to state the date, manner, place, and substance of the communication.

8. "Person" means any individual acting in any capacity as well as any entity or organization, including divisions, departments, and other units of the organization, and shall include such organizations as public or private corporations, partnerships, joint ventures, voluntary or unincorporated associations, sole proprietorships, trusts, estates, governmental agencies, commissions, bureaus, or departments.

9. "Representative" means any agent, employee, servant, officer, director, attorney, or other person acting or purporting to act on behalf of the person in question.

10. "You," "your," or "yourself" refer to "SCS" or "Summit", each of its agents, representatives, and attorneys, and each person acting or purporting to act on its behalf.

## INTERROGATORIES

**INTERROGATORY NO. 1:** Identify the petroleum engineers or reservoir engineers who made any material contribution to Summit's applications or the materials provided in support of Summit's applications in NDIC Case Nos. 30869-30880.

**INTERROGATORY NO. 2:** Identify the geologists who made any material contribution to Summit's applications or the materials provided in support of Summit's applications in NDIC Case Nos. 30869-30880.

**INTERROGATORY NO. 3:** List any other individuals not listed in Interrogatories 1 and 2 who made any material contribution to Summit's applications or the materials provided in support of Summit's applications in NDIC Case Nos. 30869-30880.Identify each and every person whom you expect to call or may call as a witness at trial.

**INTERROGATORY NO. 4:** Identify all witnesses Summit plans to testify in support of Summit's applications in NDIC Case Nos. 30869-30880.

**INTERROGATORY NO. 5:** Identify all exhibits Summit plans to offer in support of Summit's applications in NDIC Case Nos. 30869-30880.

## REQUESTS FOR PRODUCTION

**REQUEST NO. 1:** Please produce the underlying data and electronic files necessary to run the model used to create the images of the pressure differentials contained in Figures 3-14(a-d) in Summit's application in NDIC Case No. 30869.

**REQUEST NO. 2:** Please produce all the input files, field and analytical data , and the model geochemical database used to evaluate the CO2 effects on the upper and lower confining layers, including but not limited to all inputs and data files used to run the United States Geological Survey's Phreeqc geochemical model.

**REQUEST NO. 3:** Please produce all the input files, field and analytical data , and the model geochemical database used to run Computer Modelling Group Ltd.'s GEM model and software or any similar model or software used for the same purposes.

**REQUEST NO. 4:** Please produce all the input files, field and analytical data , and the model geochemical database used to run any modelling or analysis of critical threshold pressures or areal extent of review or impact and pressure buildup, or which was used to do any kind of analysis related to EPA Method 1 or EPA Method 2 or Analytical Solution for Leakage in Multilayered Aquifers – ASLMA, or any risk-based area-of-review analysis.

**REQUEST NO. 5:** Please produce the following data and files as referenced by Summit in its application in NDIC Case No. 30873: Geophysical Logs that penetrate injection and confining zones, Seismic survey data and core sample measurements, Acoustic impedance, total

porosity, effective porosity, permeability, facies, and SLB's Petrel was used to interpolate structural surfaces for zones.

**REQUEST NO. 6:** Please produce all the input files, field and analytical data, and the model geochemical database used to evaluate the CO2 effects on the upper and lower confining layers, including but not limited to all inputs and data files used to run Computer Modelling Group Ltd.'s GEM model and software or any similar model or software used for the same purposes.

**REQUEST NO. 7:** Please produce all data from any parameter referenced or described in Table 2-1: Model Parameters for Multiphase Fluid Modeling of Geologic Sequestration as that table appears in EPA Guidance - AOR Evaluation and Corrective Action Guidance (Guidance page 11) as found here: AOR Evaluation and Corrective Action Guidance - https://www.epa.gov/sites/default/files/2015-07/documents/epa816r13005.pdf.

**REQUEST NO. 8:** Please produce all electronic files and data provided to the North Dakota Industrial Commission or its Department of Mineral Resources or Oil and Gas Division in association with or related to the applications in NDIC Case Nos. 30869-30880.

**REQUEST NO. 9:** Please produce all 3D numerical reservoir simulation model data decks, output files and graphing files of the Storage Reservoir in original electronic format. Without limiting the foregoing, such files may commonly be stored in Slumberger Eclipse format, CMG (Canadian Modeling Group) Imex format, or other similar format. The purpose of this request is to obtain the simulation model of the proposed storage facilities and associated reservoir, along with input and output files in Summit's possession for this simulation model.

**REQUEST NO. 10:** Please produce structure maps of the injection zone top, structure maps for major sub zones, and/or structure maps of confining zones for the Storage Reservoir and the confining zones as defined therein. Such maps include those created based upon formation tops

from well logs, 3D seismic reflectors, and interpretation of geologic deposition environment to give a representation of the elevation change across the target reservoir.

**REQUEST NO. 11:** Please produce all gross and net thickness isopach maps for the Storage Reservoir.

**REQUEST NO. 12:** Please produce pore volume (PV) maps and hydrocarbon pore volume (HCPV) maps of the Storage Reservoir, regardless of when compiled and regardless of whether created by Summit.

**REQUEST NO. 13:** Please produce all well logs (raw data plus processed and interpreted copies) from anywhere in or near the Storage Reservoir. Specially please produce the well logs in .las or other digital format, including any and all well logs utilized by Summit in developing its applications herein.

**REQUEST NO. 14:** Please produce any databases, spreadsheets, or other documents containing porosity, permeability, saturation, and other rock properties such as (minerology, geomechanical properties etc) for the Storage Reservoir in original electronic format and, if available, in Excel spreadsheet format.

**REQUEST NO. 15:** Please produce water chemistry and any other liquid or solid sampling data for water or other substances in the Storage Reservoir. Please include any gas solubility testing that was performed on the water samples for CO2 or injected gas stream.

**REQUEST NO. 16:** Please produce all spreadsheets, databases, and other documents or compilations containing reservoir pressure data for the Storage Reservoir, including but not limited to all bottom hole pressure data, surface pressure data, and fluid level measurements. If a spreadsheet is not available, then please produce all Documents containing this information.

**REQUEST NO. 17:** Please produce all relative permeability data for the Storage Reservoir, including core test information. If multiple cores have been tested, please produce all test data.

**REQUEST NO. 18:** Please produce all capillary pressure data for all cores tested in the Storage Reservoir.

**REQUEST NO. 19:** Please produce all routine core analysis data for the Storage Reservoir.

**REQUEST NO. 20:** Please produce all spreadsheets of reservoir temperature data in the Storage Reservoir, including spreadsheets indexing reservoir temperature data to well name and API number. If this information is not available in spreadsheet format, then please produce all Documents containing this information.

**REQUEST NO. 21:** Please produce all written interpretations of micro-seismic data obtained from the Storage Reservoir.

Dated this 31st day of May, 2024.

**BRAATEN LAW FIRM**

*/s/ Derrick Braaten*

Derrick Braaten (ND #06394)
derrick@braatenlawfirm.com
109 North 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
Fax: 701-221-5842

*Attorneys for the Swenson Living Trust, Bauman, Gerving, Haupt, Jochim, Kraft, Liebelt, Maize, Metz, Rust, and Smith*

North Dakota Industrial Commission
Oil and Gas Division
Case Nos. 30869-30880

Exhibit E to Declaration of Derrick Braaten
in Support of Motion to Compel

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case No(s). 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## INTERVENORS' LANDOWNERS' AMENDED INTERROGATORIES AND REQUEST FOR PRODUCTION OF DOCUMENTS TO APPLICANTS (SET 2)

PLEASE TAKE NOTICE, that Intervenors Landowners, The Swenson Living Trust, Michael Bauman, Glenn and Lisa Gerving, Michael and Bonnie Haupt, John Jochim, Kevin and Kimberly Kraft, Charmayne Liebelt, Kirk and Linda Maize and Allen Maize, Paul and Christy Metz, JoLene M. Rust, and Gary and Cassie Smith, ("Landowners"), hereby require Applicants, Summit Carbon Storage #1, LLC, Summit Carbon Storage #2 , and Summit Carbon Storage #3, LLC ("SCS" or "Summit"), to answer the following interrogatories, signed and under oath, and produce and permit Landowners to inspect and copy documents responsive to the document requests contained herein in accordance with Rules 33 and 34 of the North Dakota Rules of Civil Procedure. Your answers must be in writing and signed by someone authorized to sign on behalf of, and whose signature binds, Summit. Documents should be made available at the office of Braaten Law Firm, 109 N. 4th St., Suite 100, Bismarck, North Dakota, or copies of said documents may be forwarded to Landowners attorneys (in native, electronic format). A copy of the answers and responses, together with your objections, if any, must be served within thirty (30) days from the date of service, or within such other time as the Commission may allow, or parties agree.

### INSTRUCTIONS

1. These interrogatories and requests for production are deemed to be continuing in nature and should you, your counsel, or anyone representing your interest become aware of or acquire any additional knowledge or documents which affect the accuracy or completeness of any answers herein, or which relate to the matters into which these requests for production inquire, it is hereby demanded that such knowledge and documents be immediately transferred to the

undersigned attorney by way of supplemental answers and responses to the full extent required by Rule 26(e), N.D.R.Civ.P.

2. In answering these interrogatories and requests for production, you are required to furnish all information and responsive documents in the possession of you, your attorney, accountants, advisors, or other persons directly employed by you.

3. Your attention is directed to Rule 34 of the North Dakota Rules of Civil Procedure, which provides that any party who produces documents for inspection "must produce documents as they are kept in the usual course of business or must organize and label them to correspond to the categories in the request." If the requested documents are stored only on software or otherwise are "computer based information," regardless of whether you produce as kept in the usual course of business or by category, you are directed to produce the raw data along with codes and programs necessary for translating it into usable form, or produce the information in a finished, usable form. In either case, all necessary glossaries, keys, indices, metadata, and software necessary for interpretation of the material should be produced unless software is proprietary in nature, in which case native format should be produced with an indication of the software types required to view and process the data.

4. **Produce electronic records in their native format.** Without limiting the generality of the foregoing, Word documents should be produced in .docx or .doc format, emails should be produced in .msg (Outlook) or .eml format, ArcGIS shapefiles should be produced in .shp, .shx and .dbf formats (and when available .prj, .xml, .sbn, and .sbx), and Excel spreadsheets should be produced in .xlsx, .xls, or .csv format. To the maximum extent feasible, file structures should be maintained, especially when a data or document database is linked to an ArcGIS map, website, or other such file.

5. In responding to the requests for production, for each document or any portion thereof which you have withheld based on privilege, describe the factual basis for your claim of privilege in sufficient detail to permit adjudication of the validity of that claim, including the following:

a. A brief description of the type of document or communication;

b. The date of the document or communication;

c. The name, title and job description of the transmitter of the document or communication;

d. The name, title, and job description of the person to whom the document or communication was addressed;

e. The name, title, and job description of each person who has received or had access to the document or communication;

f. A brief description of the subject matter of the document or communication; and

g. The nature of the privilege claim.

6. In responding to the Requests for Production, for each document or any portion thereof which has been lost, discarded or destroyed, identify such document as completely as possible, providing as much of the following information as possible:

a. The type of document;

b. Its date;

c. The date or approximate date it was lost, discarded, or destroyed;

d. The reason(s) for disposing of the document (if discarded or destroyed);

e. The identity of all person(s) authorizing or having knowledge of the circumstances surrounding the disposal of the document;

f. The identity of the person(s) who lost, discarded or destroyed the document; and

g. The identity of all persons having knowledge of the contents thereof.

7. Each interrogatory and request for production (as well as these instructions) may contain one or more terms that are defined below. You should construe each defined term according to the meaning of that word as set forth below. All other words should be construed consistent with customary usage given the context in which the words appear such that, in each instance, you should construe any word to bring that word within the scope of the discovery request in which it appears. Consistent with the above, the singular usage of a word shall be considered to include within its meaning the plural, and vice versa; the conjunctive shall be considered to include within its meaning the disjunctive, and vice versa; and the feminine shall be considered to include within its meaning the masculine, and vice versa.

**DEFINITIONS**

As used in these Interrogatories and Request for Production of Documents, the following terms shall have the meanings and definitions as indicated:

1. "SCS" or "Summit" means the applicants in NDIC Case Nos. 30869, 30870, 30871, 30872 (for "Summit Carbon Storage #1, LLC,"); 30873, 30874, 30875, 30876 (for "Summit Carbon Storage #2,") and 30877, 30878, 30879, 30880 (for "Summit Carbon Storage #3, LLC,") and each of those entities' authorized agents.

2. "Landowner" means The Swenson Living Trust, Michael Bauman, Glenn and Lisa Gerving, Michael and Bonnie Haupt, John Jochim, Kevin and Kimberly Kraft, Charmayne Liebelt, Kirk and Linda Maize and Allen Maize, Paul and Christy Metz, JoLene M. Rust, and Gary and Cassie Smith.

3. "Storage Reservoir" means the reservoir and formation into which Summit intends to inject CO2 and the confining zones within the Areas of Review as defined and depicted by Summit's applications herein (*see e.g.* Figure 1-1, NDIC Case No. 30869) including but not limited

to the Storage Reservoir as defined by Section 1.15 of the Storage Agreement included with Summit's applications in NDIC Case No. 30869, to wit:

> the Pore Space and confining subsurface strata underlying the Facility Area described as the Opeche/Spearfish (Upper Confining Zone), Broom Creek (Injection Zone), and Amsden (Lower Confining Zone) Formation(s) and which are defined as identified by the well logging suite performed at one stratigraphic well, the Milton Flemmer 1 well (NDIC File No. 38594) located in the NW¼ of the NE¼, Section 35, Township 141 North, Range 88 West, Mercer County, North Dakota. The Storage Reservoir is defined as the stratigraphic interval from below the top of the Opeche/Spearfish Formation found at a depth of 5,587 feet below the Kelly Bushing, to above the base of the Amsden Formation, found at a depth of 6,421 feet below the Kelly Bushing, as identified by the Array Induction Gamma log run in the Milton Flemmer 1 well. The logging suite included triple combo (gamma ray [GR], density porosity, and resistivity), caliper, spectral GR, combinable magnetic resonance (CMR), elemental capture spectroscopy (ESC), dipole sonic including four-arm caliper and inclinometer, and an image log. Further, the acquired logs were used to pick formation top depths and interpret lithology, petrophysical properties, and time-to-depth shifting of seismic data obtained from three 3D seismic surveys and one 5-mile long 2D seismic line covering an area totaling 208 miles in and around the Milton Flemmer 1 stratigraphic well. Formation top depths were picked from the top of the Pierre Formation to the base of the Amsden Formation. The average depth of the top of the Opeche/Spearfish Formation (Upper Confining Zone) across the storage facility area is 5,464 total vertical depth (TVD). The average depth of the base of the Amsden Formation (Lower Confining Summit Carbon Storage #1, LLC – Broom Creek 5 Zone) across the storage facility area is 6,270 feet TVD. The average thickness of the Storage Reservoir across the storage facility area is 806 feet.

4. "Communication" means any oral or written utterance, notation, or statement of any nature, by and to whomever, including, but not limited to, correspondence, text messages, chat messages, emails, letters, and any other oral or written conversations, dialogues, discussions, interviews, or consultations, between or among two or more persons.

5. "Document" means all documents or electronically stored information discoverable under N.D.R.Civ.P. 34 - including writings, drawings, graphs, charts, photographs, sound recordings, images, and other data or data compilations - stored in any medium from which information can be obtained either directly or, if necessary, after translation by you into a

reasonably usable form. Documents and electronically stored information encompasses and includes all file formats in which electronically stored information is or can be stored or saved, and always includes the native file format if one exists.

6. "ESI" or "electronically stored information" means all electronically stored information discoverable under N.D.R.Civ.P. 34 - including writings, databases, shapefiles, electronic or computer files, graphs, charts, photographs, sound recordings, images, and other data or data compilations - stored in any medium from which information can be obtained either directly or, if necessary, after translation by you into a reasonably usable form. ESI encompasses and includes all file formats in which electronically stored information is or can be stored or saved, and always includes the native file format if one exists.

7. "Identification," "identify," or "identity," when used in reference to (a) a natural person, requires you to state his or her full name and residential and business addresses; (b) a corporation, requires you to state its full corporate name and any names under which it does business, its state of incorporation, the address of its principal place of business, and the addresses of all of its offices in the State of North Dakota; (c) a business, requires you to state the full name or style under which the business is conducted, its business address or addresses, the types of businesses in which it is engaged, the geographic area in which it conducts those businesses, and the identity of the person or persons who own, operate, and control the business; (d) a document, requires you to state the number of pages and the nature of the document (e.g., letter or memorandum), and if not apparent on the face of the document or ESI, its title, its date, the name or names of its authors and recipients, and its present location and custodian; (e) a communication, requires you, if any part of the communication was written, to identify the document or documents which refer to or evidence the communication, and, to the extent that the communication was non-

written, to identify the persons participating in the communication and to state the date, manner, place, and substance of the communication.

8. "Person" means any individual acting in any capacity as well as any entity or organization, including divisions, departments, and other units of the organization, and shall include such organizations as public or private corporations, partnerships, joint ventures, voluntary or unincorporated associations, sole proprietorships, trusts, estates, governmental agencies, commissions, bureaus, or departments.

9. "Representative" means any agent, employee, servant, officer, director, attorney, or other person acting or purporting to act on behalf of the person in question.

10. "Summit's applications" means all of Summit's applications and documents and other materials in support in NDIC Case Nos. 30869, 30870, 30871, 30872; 30873, 30874, 30875, 30876; 30877, 30878, 30879, 30880.

11. "You," "your," or "yourself" refer to "SCS" or "Summit", and its authorized agents.

## INTERROGATORIES

**INTERROGATORY NO. 1:** Identify all software programs necessary to open or run or execute any electronic files that are themselves responsive to or which contain data and information responsive to any of Landowners written interrogatories or requests for production of documents. Please exclude from your answer any software programs needed to open files with the following extensions: .doc, .docx, .pdf, .xlsx, .csv, .eml, .msg, as well as common audio-visual file types that can be opened with freely-available software such as .jpg/.jpeg, .tiff, and .mp4 files.

**INTERROGATORY NO. 2:** State whether Summit possesses documents related to any exchange of valuable consideration (including but not limited to monetary compensation even if nominal) for the right to use or damage the pore space of a property.

**INTERROGATORY NO. 3:** Describe how Summit determined the amounts it paid to property owners for use of or damage to their pore space for its activities related to Summit's applications.

**INTERROGATORY NO. 4:** State the amounts that Summit has paid to property owners for use of or damage to pore space for injections of CO2.

**INTERROGATORY NO. 5:** State how Summit determines if a property owner has been "equitably compensated" as that phrase is used in N.D.C.C. § 38-22-08(14), and what criteria it uses to make this determination.

**INTERROGATORY NO. 6:** Identify the factual basis in Summit's applications or the materials submitted in support of Summit's applications that might support or that Summit will use to support a finding that property owners have been "equitably compensated" as that phrase is used in N.D.C.C. § 38-22-08(14).

**INTERROGATORY NO. 7:** Identify the factual basis in any documents or information sources other than Summit's applications that might support or that Summit will use to support a finding that property owners have been "equitably compensated" as that phrase is used in N.D.C.C. § 38-22-08(14).

**INTERROGATORY NO. 8:** Identify the sections of Summit's applications that support a finding that "[t]hat the proposed storage facility will not adversely affect surface waters or formations containing fresh water" as is stated at N.D.C.C. § 38-22-08(7). If Summit claims that any documents or information outside of Summit's applications support such a finding, identify those documents and information.

**INTERROGATORY NO. 9:** Identify the source of any carbon dioxide that will be injected pursuant to Summit's applications that is created or produced or originates in North Dakota.

## REQUESTS FOR PRODUCTION

**REQUEST NO. 1:** Please produce all agreements for use of or damage to the pore space of any property that are in your possession.

**REQUEST NO. 2:** Without limiting the generality of Request No. 1, please produce all agreements that might support or that Summit will use to support a finding "[t]hat the storage operator has obtained the consent of persons who own at least sixty percent of the storage reservoir's pore space" as required by N.D.C.C. § 38-22-08(5).

**REQUEST NO. 3:** Without limiting the generality of Request No. 1, produce all agreements that might support or that Summit will use to support a finding that "all nonconsenting pore space owners are or will be equitably compensated" as stated in N.D.C.C. § 38-22-08(14).

**REQUEST NO. 4:** Please produce all documents containing data or information indicating or indicative of market values for any rights associated with the use of or damage to a property's pore space.

**REQUEST NO. 5:** Without limiting the generality of the foregoing requests, please produce all agreements for use of or damage to any surface estate necessary for Summit to complete construction of the facilities described in Summit's applications, including but not limited to its injections wells (but for clarification not those agreements necessary for the interstate transmission line subject to siting proceedings before the ND Public Service Commission).

**REQUEST NO. 6:** Please produce all correspondence related to Summit's applications between Summit and the North Dakota Industrial Commission and its Department of Mineral

Resources and its Oil and Gas Division (collectively "NDIC") and any authorized agents of the NDIC, and all correspondence between your authorized agents and the NDIC (including any individuals copied on or submitting Summit's applications) related to Summit's applications.

Dated this 31st day of May, 2024

**BRAATEN LAW FIRM**

*/s/ Derrick Braaten*

Derrick Braaten (ND #06394)
derrick@braatenlawfirm.com
109 North 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911

*Attorneys for the Swenson Living Trust, Bauman, Gerving, Haupt, Jochim, Kraft, Liebelt, Maize, Metz, Rust, and Smith*

North Dakota Industrial Commission
Oil and Gas Division
Case Nos. 30869-30880

Exhibit F to Declaration of Derrick Braaten
in Support of Motion to Compel

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case No(s). 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## INTERVENOR LANDOWNERS' AMENDED INTERROGATORIES AND REQUEST FOR PRODUCTION OF DOCUMENTS TO APPLICANTS (SET 3)

PLEASE TAKE NOTICE, that Intervenors Landowners, The Swenson Living Trust, Michael Bauman, Glenn and Lisa Gerving, Michael and Bonnie Haupt, John Jochim, Kevin and Kimberly Kraft, Charmayne Liebelt, Kirk and Linda Maize and Allen Maize, Paul and Christy Metz, JoLene M. Rust, and Gary and Cassie Smith, ("Landowners"), hereby require Applicants, Summit Carbon Storage #1, LLC, Summit Carbon Storage #2 , and Summit Carbon Storage #3, LLC ("SCS" or "Summit"), to answer the following interrogatories, signed and under oath, and produce and permit Landowners to inspect and copy documents responsive to the document requests contained herein in accordance with Rules 33 and 34 of the North Dakota Rules of Civil Procedure. Your answers must be in writing and signed by someone authorized to sign on behalf of, and whose signature binds, Summit. Documents should be made available at the office of Braaten Law Firm, 109 N. 4th St., Suite 100, Bismarck, North Dakota, or copies of said documents may be forwarded to Landowners' attorneys (in native, electronic format). A copy of the answers and responses, together with your objections, if any, must be served within thirty (30) days from the date of service, or within such other time as the Commission may allow, or parties agree.

### INSTRUCTIONS

1. These interrogatories and requests for production are deemed to be continuing in nature and should you, your counsel, or anyone representing your interest become aware of or acquire any additional knowledge or documents which affect the accuracy or completeness of any answers herein, or which relate to the matters into which these requests for production inquire, it is hereby demanded that such knowledge and documents be immediately transferred to the

undersigned attorney by way of supplemental answers and responses to the full extent required by Rule 26(e), N.D.R.Civ.P.

2. In answering these interrogatories and requests for production, you are required to furnish all information and responsive documents in the possession of you, your attorney, accountants, advisors, or other persons directly employed by you.

3. Your attention is directed to Rule 34 of the North Dakota Rules of Civil Procedure, which provides that any party who produces documents for inspection "must produce documents as they are kept in the usual course of business or must organize and label them to correspond to the categories in the request." If the requested documents are stored only on software or otherwise are "computer based information," regardless of whether you produce as kept in the usual course of business or by category, you are directed to produce the raw data along with codes and programs necessary for translating it into usable form, or produce the information in a finished, usable form. In either case, all necessary glossaries, keys, indices, metadata, and software necessary for interpretation of the material should be produced unless software is proprietary in nature, in which case native format should be produced with an indication of the software types required to view and process the data.

4. **Produce electronic records in their native format.** Without limiting the generality of the foregoing, Word documents should be produced in .docx or .doc format, emails should be produced in .msg (Outlook) or .eml format, ArcGIS shapefiles should be produced in .shp, .shx and .dbf formats (and when available .prj, .xml, .sbn, and .sbx), and Excel spreadsheets should be produced in .xlsx, .xls, or .csv format. To the maximum extent feasible, file structures should be maintained, especially when a data or document database is linked to an ArcGIS map, website, or other such file.

5. In responding to the requests for production, for each document or any portion thereof which you have withheld based on privilege, describe the factual basis for your claim of privilege in sufficient detail to permit adjudication of the validity of that claim, including the following:

a. A brief description of the type of document or communication;

b. The date of the document or communication;

c. The name, title and job description of the transmitter of the document or communication;

d. The name, title, and job description of the person to whom the document or communication was addressed;

e. The name, title, and job description of each person who has received or had access to the document or communication;

f. A brief description of the subject matter of the document or communication; and

g. The nature of the privilege claim.

6. In responding to the Requests for Production, for each document or any portion thereof which has been lost, discarded or destroyed, identify such document as completely as possible, providing as much of the following information as possible:

a. The type of document;

b. Its date;

c. The date or approximate date it was lost, discarded, or destroyed;

d. The reason(s) for disposing of the document (if discarded or destroyed);

e. The identity of all person(s) authorizing or having knowledge of the circumstances surrounding the disposal of the document;

f. The identity of the person(s) who lost, discarded or destroyed the document; and

g. The identity of all persons having knowledge of the contents thereof.

7. Each interrogatory and request for production (as well as these instructions) may contain one or more terms that are defined below. You should construe each defined term according to the meaning of that word as set forth below. All other words should be construed consistent with customary usage given the context in which the words appear such that, in each instance, you should construe any word to bring that word within the scope of the discovery request in which it appears. Consistent with the above, the singular usage of a word shall be considered to include within its meaning the plural, and vice versa; the conjunctive shall be considered to include within its meaning the disjunctive, and vice versa; and the feminine shall be considered to include within its meaning the masculine, and vice versa.

**DEFINITIONS**

As used in these Interrogatories and Request for Production of Documents, the following terms shall have the meanings and definitions as indicated:

1. "SCS" or "Summit" means the applicants in NDIC Case Nos. 30869, 30870, 30871, 30872 (for "Summit Carbon Storage #1, LLC,"); 30873, 30874, 30875, 30876 (for "Summit Carbon Storage #2,") and 30877, 30878, 30879, 30880 (for "Summit Carbon Storage #3, LLC,") and each of those entities' authorized agents.

2. "Landowner" means The Swenson Living Trust, Michael Bauman, Glenn and Lisa Gerving, Michael and Bonnie Haupt, John Jochim, Kevin and Kimberly Kraft, Charmayne Liebelt, Kirk and Linda Maize and Allen Maize, Paul and Christy Metz, JoLene M. Rust, and Gary and Cassie Smith.

3. "Storage Reservoir" means the reservoir and formation into which Summit intends to inject CO2 and the confining zones within the Areas of Review as defined and depicted by Summit's applications herein (*see e.g.* Figure 1-1, NDIC Case No. 30869) including but not limited

to the Storage Reservoir as defined by Section 1.15 of the Storage Agreement included with Summit's applications in NDIC Case No. 30869, to wit:

> the Pore Space and confining subsurface strata underlying the Facility Area described as the Opeche/Spearfish (Upper Confining Zone), Broom Creek (Injection Zone), and Amsden (Lower Confining Zone) Formation(s) and which are defined as identified by the well logging suite performed at one stratigraphic well, the Milton Flemmer 1 well (NDIC File No. 38594) located in the NW¼ of the NE¼, Section 35, Township 141 North, Range 88 West, Mercer County, North Dakota. The Storage Reservoir is defined as the stratigraphic interval from below the top of the Opeche/Spearfish Formation found at a depth of 5,587 feet below the Kelly Bushing, to above the base of the Amsden Formation, found at a depth of 6,421 feet below the Kelly Bushing, as identified by the Array Induction Gamma log run in the Milton Flemmer 1 well. The logging suite included triple combo (gamma ray [GR], density porosity, and resistivity), caliper, spectral GR, combinable magnetic resonance (CMR), elemental capture spectroscopy (ESC), dipole sonic including four-arm caliper and inclinometer, and an image log. Further, the acquired logs were used to pick formation top depths and interpret lithology, petrophysical properties, and time-to-depth shifting of seismic data obtained from three 3D seismic surveys and one 5-mile long 2D seismic line covering an area totaling 208 miles in and around the Milton Flemmer 1 stratigraphic well. Formation top depths were picked from the top of the Pierre Formation to the base of the Amsden Formation. The average depth of the top of the Opeche/Spearfish Formation (Upper Confining Zone) across the storage facility area is 5,464 total vertical depth (TVD). The average depth of the base of the Amsden Formation (Lower Confining Summit Carbon Storage #1, LLC – Broom Creek 5 Zone) across the storage facility area is 6,270 feet TVD. The average thickness of the Storage Reservoir across the storage facility area is 806 feet.

4. "Communication" means any oral or written utterance, notation, or statement of any nature, by and to whomever, including, but not limited to, correspondence, text messages, chat messages, emails, letters, and any other oral or written conversations, dialogues, discussions, interviews, or consultations, between or among two or more persons.

5. "Document" means all documents or electronically stored information discoverable under N.D.R.Civ.P. 34 - including writings, drawings, graphs, charts, photographs, sound recordings, images, and other data or data compilations - stored in any medium from which information can be obtained either directly or, if necessary, after translation by you into a

reasonably usable form. Documents and electronically stored information encompasses and includes all file formats in which electronically stored information is or can be stored or saved, and always includes the native file format if one exists.

6. "ESI" or "electronically stored information" means all electronically stored information discoverable under N.D.R.Civ.P. 34 - including writings, databases, shapefiles, electronic or computer files, graphs, charts, photographs, sound recordings, images, and other data or data compilations - stored in any medium from which information can be obtained either directly or, if necessary, after translation by you into a reasonably usable form. ESI encompasses and includes all file formats in which electronically stored information is or can be stored or saved, and always includes the native file format if one exists.

7. "Identification," "identify," or "identity," when used in reference to (a) a natural person, requires you to state his or her full name and residential and business addresses; (b) a corporation, requires you to state its full corporate name and any names under which it does business, its state of incorporation, the address of its principal place of business, and the addresses of all of its offices in the State of North Dakota; (c) a business, requires you to state the full name or style under which the business is conducted, its business address or addresses, the types of businesses in which it is engaged, the geographic area in which it conducts those businesses, and the identity of the person or persons who own, operate, and control the business; (d) a document, requires you to state the number of pages and the nature of the document (e.g., letter or memorandum), and if not apparent on the face of the document or ESI, its title, its date, the name or names of its authors and recipients, and its present location and custodian; (e) a communication, requires you, if any part of the communication was written, to identify the document or documents which refer to or evidence the communication, and, to the extent that the communication was non-

written, to identify the persons participating in the communication and to state the date, manner, place, and substance of the communication.

8. "Person" means any individual acting in any capacity as well as any entity or organization, including divisions, departments, and other units of the organization, and shall include such organizations as public or private corporations, partnerships, joint ventures, voluntary or unincorporated associations, sole proprietorships, trusts, estates, governmental agencies, commissions, bureaus, or departments.

9. "Representative" means any agent, employee, servant, officer, director, attorney, or other person acting or purporting to act on behalf of the person in question.

10. "Summit's applications" means all of Summit's applications and documents and other materials in support in NDIC Case Nos. 30869, 30870, 30871, 30872; 30873, 30874, 30875, 30876; 30877, 30878, 30879, 30880.

11. "You," "your," or "yourself" refer to "SCS" or "Summit", and its authorized agents.

## INTERROGATORIES

**INTERROGATORY NO. 1:** For any installed CO2 pressure relief devices or CO2 vent systems or other mechanical devices designed for relieving pressure from a pipe, at any of the surface facilities constructed for purposes of Summit's applications, please provide the following:

a. Rated capacity of each device or system;

b. Quantity of each device or system;

c. Discharge pipe size(s);

d. Discharge pipe outlet(s) direction (vertical or horizontal); and

e. If horizontal, state direction of discharge.

## REQUESTS FOR PRODUCTION

**REQUEST FOR PRODUCTION NO. 1:** Please produce any above-ground vapor dispersion modeling results such as from any engineered pressure relief systems, including all data and input files and load files. Without limiting the generality of the forgoing, specifically provide all data inputs for the following: weather conditions modeled, topography assumptions modeled, flow rate of CO2 over time, total quantity of CO2 released and total time of release modeled, and predicted CO2 concentrations at any public receptors such as roads, buildings, and dwellings.

Dated this 31st day of May, 2024

**BRAATEN LAW FIRM**

*/s/ Derrick Braaten*

Derrick Braaten (ND #06394)
derrick@braatenlawfirm.com
109 North 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911

*Attorneys for Intervenors the Swenson Living Trust, Bauman, Gerving, Haupt, Jochim, Kraft, Liebelt, Maize, Metz, Rust, and Smith*

North Dakota Industrial Commission
Oil and Gas Division
Case Nos. 30869-30880

Exhibit G to Declaration of Derrick Braaten
in Support of Motion to Compel

**BEFORE THE INDUSTRIAL COMMISSION**
**OF THE STATE OF NORTH DAKOTA**

**CASE NOS. 30869–30880**

**In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1,**

**11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by**

**nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of**

**carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the**

**geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## RESPONSE OF APPLICANTS TO INTERVENORS' LANDOWNERS' AMENDED INTERROGATORIES AND REQUEST FOR PRODUCTION OF DOCUMENTS (SET 1)

Applicants Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC (collectively, "Summit"), by and through their counsel, Lawrence Bender, Fredrikson & Byron, P.A., 304 East Front Avenue, Suite 400, Bismarck, ND 58504-5639, respond to the Amended Interrogatories and Request for Production of Documents (Set 1) submitted by The Swenson Living Trust; Michael Bauman, Glenn and Lisa Gerving, Michael and Bonnie Haupt, John Jochim, Kevin and Kimberly Kraft, Charmayne Liebelt, Kirk

and Linda Maize and Allen Maize, Paul and Christy Metz, JoLene M. Rust, and Gary and Cassie Smith (collectively, "Landowners") on May 31, 2024 in the above-captioned proceedings (each a "Discovery Request" and collectively, the "Discovery Requests"). Summit's response is made without waiving or intending to waive any objection as to relevance, privilege, or admissibility of any information provided in response to the Discovery Requests in any subsequent proceeding of this or any other action on any ground. A partial answer to any Discovery Request that has been objected to, in whole or in part, is not intended to be a waiver of the objection. By responding to the Discovery Requests, Summit is not admitting that any aspect of the Discover Requests is factually accurate or relevant to this proceeding.

## GLOBAL OBJECTIONS

The following Global Objections apply to each of the Discovery Requests—even if not separately restated below in response to a particular Discovery Request.

Summit objects to all Discovery Requests to the extent they seek the discovery of documents which are privileged for the reasons that they (a) are subject to the attorney-client privilege; (b) are covered by the "work product" doctrine; and/or (c) were prepared in anticipation of litigation or for trial by or for Summit or its representatives, including its employees, consultants, or agents.

Summit objects to all Discovery Requests to the extent they are beyond the scope of discovery allowed pursuant to Rules 26, 33, 34, and 36 of the North Dakota Rules of Civil Procedure.

Summit objects to all Discovery Requests to the extent they seek identification or production of "all documents" of a particular description. It is impossible to guarantee that all such documents have been identified or located. Summit states, however, that in response to these

requests, it has made a diligent search of records kept in the ordinary course of business in those locations likely to contain relevant information.

Summit objects to the Landowners' definitions and instructions to the extent such definitions and instructions exceed or are inconsistent with the requirements imposed upon Summit under the North Dakota Rules of Civil Procedure or Chapter 28-32 of the North Dakota Century Code.

Summit objects to the Discovery Requests because they are unduly burdensome and disproportionate to the needs of this proceeding because they seek irrelevant information.

Summit objects inasmuch as the Discovery Requests seek information relating to anything other than Summit's sequestration facilities in North Dakota. Only Summit's North Dakota sequestration facilities are covered by its applications in this proceeding.

Summit objects inasmuch as the Discovery Requests seek information that contains proprietary or confidential business information or is subject to trade-secret protections or that contains information for which Summit owes a third party an obligation of confidentiality or privacy, whether contractual or under any federal or state laws or regulations.

Summit objects to all Discovery Requests that seek, and disclaims any obligation to identify or furnish, documents or information that the Landowners actually or constructively possesses or to which the Landowners have access through alternative means.

Summit objects inasmuch as the Discovery Requests seek information from third parties and information that is not within Summit's possession, custody, control, or personal knowledge of Summit.

Summit objects and responds to the Discovery Requests based upon information and documents available as of the date hereof and reserves the right to supplement and amend the responses.

Subject to the foregoing objections and conditions, and subject to the specific additional objections made with respect to each request, Summit responds to the Landowners' Discovery Requests as follows:

## RESPONSE TO INTERROGATORIES

**INTERROGATORY NO. 1:**

*Identify the petroleum engineers or reservoir engineers who made any material contribution to Summit's applications or the materials provided in support of Summit's applications in NDIC Case Nos. 30869-30880.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the North Dakota Industrial Commission ("Commission" or "NDIC") to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states the following individuals made material contributions in support of Summit's applications or the materials provided in support of Summit's applications in NDIC Case Nos 30869-30880:

Todd Jiang, Principal Reservoir Engineer
Energy & Environmental Research Center (EERC)
15 N. 23rd St., Stop 9018
Grand Forks, ND 58202-9018

Guangwei Ren, Senior Reservoir Engineer
Energy & Environmental Research Center (EERC)
15 N. 23rd St., Stop 9018
Grand Forks, ND 58202-9018

Chantsalmaa Dalhkaa, Principal Reservoir Engineer
Energy & Environmental Research Center (EERC)
15 N. 23rd St., Stop 9018
Grand Forks, ND 58202-9018

Nessa Mahmoud, Geochemist
Energy & Environmental Research Center (EERC)
15 N. 23rd St., Stop 9018
Grand Forks, ND 58202-9018

Tim Shenk, Senior Operations Specialist
Energy & Environmental Research Center (EERC)
15 N. 23rd St., Stop 9018
Grand Forks, ND 58202-9018

Agustinus Zandy, Principal Operations Specialist
Energy & Environmental Research Center (EERC)
15 N. 23rd St., Stop 9018
Grand Forks, ND 58202-9018

Michael Warmack, Distinguished Oil & Gas Facilities Engineer
Energy & Environmental Research Center (EERC)
15 N. 23rd St., Stop 9018
Grand Forks, ND 58202-9018

**INTERROGATORY NO. 2:**

*Identify the geologists who made any material contribution to Summit's applications or the materials provided in support of Summit's applications in NDIC Case Nos. 30869-30880.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states the following individuals made material contributions in support of Summit's applications or the materials provided in support of Summit's applications in NDIC Case Nos 30869-30880:

Remington Leger, Principal Geoscientist
15 N. 23rd St., Stop 9018
Grand Forks, ND 58202-9018

Amanda Livers-Douglas, Assistant Director for Integrated Subsurface Projects
15 N. 23rd St., Stop 9018
Grand Forks, ND 58202-9018

Sofiane Djezzar, Geoscientist
15 N. 23rd St., Stop 9018
Grand Forks, ND 58202-9018

Kyle McBride, Geophysicist
15 N. 23rd St., Stop 9018
Grand Forks, ND 58202-9018

John Hunt, Senior Geoscientist & MRV Specialist
15 N. 23rd St., Stop 9018
Grand Forks, ND 58202-9018

Arash Abarghani, Senior Research Scientist
15 N. 23rd St., Stop 9018
Grand Forks, ND 58202-9018

Caitlin Olsen, Principal Policy and Regulatory Specialist
15 N. 23rd St., Stop 9018
Grand Forks, ND 58202-9018

Kevin Connors, Assistant Director for Regulatory Compliance and Energy Policy
15 N. 23rd St., Stop 9018
Grand Forks, ND 58202-9018

Kyle Glazewski, Assistant Director for Research, Community Benefits & Stakeholder Engagement
15 N. 23rd St., Stop 9018
Grand Forks, ND 58202-9018

Josh Regorrah, Permitting & Regulatory Specialist
15 N. 23rd St., Stop 9018
Grand Forks, ND 58202-9018

Steve Smith, Assistant Director for Integrated Analytical Solutions
15 N. 23rd St., Stop 9018
Grand Forks, ND 58202-9018

Bret Fossum, Principal Research Engineer
15 N. 23rd St., Stop 9018
Grand Forks, ND 58202-9018

Core Laboratories Petro Services
2550 W 2nd Ave Unit 110
Denver, CO 80219

Wagner Petrographic
122 North 1800 West, #7
Lindon, UT 84042

**INTERROGATORY NO. 3:**

*List any other individuals not listed in Interrogatories 1 and 2 who made any material contribution to Summit's applications or the materials provided in support of Summit's applications in NDIC Case Nos. 30869-30880. Identify each and every person whom you expect to call or may call as a witness at trial.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states, with respect to the first question, that the following individuals made material contributions in support of Summit's applications or the materials provided in support of Summit's applications in the NDIC Case Nos 30869-30880:

Lonny Jacobson, Assistant Director for Subsurface Field Operations
Energy & Environmental Research Center (EERC)
15 N. 23rd St., Stop 9018
Grand Forks, ND 58202-9018

Wade Boeshans, Executive Vice President
Summit Carbon Solutions
3442 E. Century Ave.
Bismarck, ND 58503

Jay Volk, Ph.D., Sequestration – Director of Health, Safety & Environmental
Summit Carbon Solutions
3442 E. Century Ave.
Bismarck, ND 58503

Jeffrey L. Skaare, J.D., C.P.L., Sequestration – Director of Land Legal & Regulatory Affairs
Summit Carbon Solutions
3442 E. Century Ave.
Bismarck, ND 58503

Luis Piasco, Senior Project Manager Sequestration Drilling and Engineering
Summit Carbon Solutions
3442 E. Century Ave.
Bismarck, ND 58503

Jean Oddy, Sequestration Project Engineer
Summit Carbon Solutions
3442 E. Century Ave.
Bismarck, ND 58503

Jamey Backus, Project Manager – Sequestration Facilities
Summit Carbon Solutions
3442 E. Century Ave.
Bismarck, ND 58503

With respect to the second question, the individuals listed in response to Interrogatory No. 4, below, testified at the hearing on the above-captioned cases.

**INTERROGATORY NO. 4:**

*Identify all witnesses Summit plans to testify in support of Summit's applications in NDIC Case Nos. 30869-30880.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any.

Subject to and notwithstanding the objections, Summit states that the following individuals testified at the hearing in support of Summit's applications:

Wade Boeshans
Jeffrey L. Skaare
Amanda Livers-Douglas
Caitlin Olsen
John Hunt
Jean Oddy
James Powell
Jay Volk
Jamey Backus

**INTERROGATORY NO. 5:**

*Identify all exhibits Summit plans to offer in support of Summit's applications in NDIC Case Nos. 30869-30880.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that an exhibit list setting forth all exhibits offered by Summit and admitted at the hearing on the above-captioned cases was provided to the Landowners at the hearing.

**RESPONSE TO REQUESTS FOR PRODUCTION**

**REQUEST NO. 1:**

*Please produce the underlying data and electronic files necessary to run the model used to create the images of the pressure differentials contained in Figures 3-14(a-d) in Summit's application in NDIC Case No. 30869.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that all the underlying data and electronic files utilized to run the models has been submitted to the Commission and is publicly available via an open records request. Summit further states that, upon information and belief, Landowners have made an open records request to the Commission and are in receipt of the information requested in this Discovery Request.

**REQUEST NO. 2:**

*Please produce all the input files, field and analytical data, and the model geochemical database used to evaluate the CO2 effects on the upper and lower confining layers, including but not limited to all inputs and data files used to run the United States Geological Survey's Phreeqc geochemical model.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that the requested information has been submitted to the Commission and is publicly available via an open records request. Summit

further states that, upon information and belief, Landowners have made an open records request to the Commission and are in receipt of the information requested in this Discovery Request.

**REQUEST NO. 3:**

*Please produce all the input files, field and analytical data, and the model geochemical database used to run Computer Modelling Group Ltd.'s GEM model and software or any similar model or software used for the same purposes.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that the requested information has been submitted to the Commission and is publicly available via an open records request. Summit further states that, upon information and belief, Landowners have made an open records request to the Commission and are in receipt of the information requested in this Discovery Request.

**REQUEST NO. 4:**

*Please produce all the input files, field and analytical data, and the model geochemical database used to run any modelling or analysis of critical threshold pressures or areal extent of review or impact and pressure buildup, or which was used to do any kind of analysis related to EPA Method 1 or EPA Method 2 or Analytical Solution for Leakage in Multilayered Aquifers – ASLMA, or any risk-based area-of-review analysis.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that the requested information has been submitted to the Commission and is publicly available via an open records request. Summit further states that, upon information and belief, Landowners have made an open records request to the Commission and are in receipt of the information requested in this Discovery Request.

**REQUEST NO. 5:**

*Please produce the following data and files as referenced by Summit in its application in NDIC Case No. 30873: Geophysical Logs that penetrate injection and confining zones, Seismic survey data and core sample measurements, Acoustic impedance, total porosity, effective porosity, permeability, facies, and SLB's Petrel was used to interpolate structural surfaces for zones.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that the requested information has been submitted to the Commission and is publicly available via an open records request. Summit further states that, upon information and belief, Landowners have made an open records request to the Commission and are in receipt of the information requested in this Discovery Request.

**REQUEST NO. 6:**

*Please produce all the input files, field and analytical data, and the model geochemical database used to evaluate the CO2 effects on the upper and lower confining layers, including but not limited to all inputs and data files used to run Computer Modelling Group Ltd.'s GEM model and software or any similar model or software used for the same purposes.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that the requested information has been submitted to the Commission and is publicly available via an open records request. Summit further states that, upon information and belief, Landowners have made an open records request to the Commission and are in receipt of the information requested in this Discovery Request.

**REQUEST NO. 7:**

*Please produce all data from any parameter referenced or described in Table 2-1: Model Parameters for Multiphase Fluid Modeling of Geologic Sequestration as that table appears in EPA Guidance - AOR Evaluation and Corrective Action Guidance (Guidance page 11) as found here: AOR Evaluation and Corrective Action Guidance - https://www.epa.gov/sites/default/files/2015-07/documents/epa816r13005.pdf.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence

for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that the requested information has been submitted to the Commission and is publicly available via an open records request. Summit further states that, upon information and belief, Landowners have made an open records request to the Commission and are in receipt of the information requested in this Discovery Request.

**REQUEST NO. 8:**

*Please produce all electronic files and data provided to the North Dakota Industrial Commission or its Department of Mineral Resources or Oil and Gas Division in association with or related to the applications in NDIC Case Nos. 30869-30880.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that the requested information has been submitted to the Commission and is publicly available via an open records request. Summit further states that, upon information and belief, Landowners have made an open records request to the Commission and are in receipt of the information requested in this Discovery Request.

**REQUEST NO. 9:**

*Please produce all 3D numerical reservoir simulation model data decks, output files and graphing files of the Storage Reservoir in original electronic format. Without limiting the foregoing, such files may commonly be stored in Slumberger Eclipse format, CMG (Canadian Modeling Group) Imex format, or other similar format. The purpose of this request is to obtain the*

*simulation model of the proposed storage facilities and associated reservoir, along with input and output files in Summit's possession for this simulation model.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that the requested information has been submitted to the Commission and is publicly available via an open records request. Summit further states that, upon information and belief, Landowners have made an open records request to the Commission and are in receipt of the information requested in this Discovery Request.

**REQUEST NO. 10:**

*Please produce structure maps of the injection zone top, structure maps for major sub zones, and/or structure maps of confining zones for the Storage Reservoir and the confining zones as defined therein. Such maps include those created based upon formation tops from well logs, 3D seismic reflectors, and interpretation of geologic deposition environment to give a representation of the elevation change across the target reservoir.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that the requested information has

been submitted to the Commission and is publicly available via an open records request. Summit further states that, upon information and belief, Landowners have made an open records request to the Commission and are in receipt of the information requested in this Discovery Request.

**REQUEST NO. 11:**

*Please produce all gross and net thickness isopach maps for the Storage Reservoir.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that, to the best of its knowledge, net thickness isopach maps have not been created and that gross thickness isopach maps have been submitted to the Commission and are publicly available via an open records request. Summit further states that, upon information and belief, Landowners have made an open records request to the Commission and are in receipt of the gross thickness isopach maps.

**REQUEST NO. 12:**

*Please produce pore volume (PV) maps and hydrocarbon pore volume (HCPV) maps of the Storage Reservoir, regardless of when compiled and regardless of whether created by Summit.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any.

Subject to and notwithstanding the objections, Summit states that, to the best of its knowledge, this information has not been created.

**REQUEST NO. 13:**

*Please produce all well logs (raw data plus processed and interpreted copies) from anywhere in or near the Storage Reservoir. Specially please produce the well logs in .las or other digital format, including any and all well logs utilized by Summit in developing its applications herein.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that the requested information has been submitted to the Commission and is publicly available via an open records request. Summit further states that, upon information and belief, Landowners have made an open records request to the Commission and are in receipt of the information requested in this Discovery Request.

**REQUEST NO. 14:**

*Please produce any databases, spreadsheets, or other documents containing porosity, permeability, saturation, and other rock properties such as (minerology, geomechanical properties etc) for the Storage Reservoir in original electronic format and, if available, in Excel spreadsheet format.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that the requested information has been submitted to the Commission and is publicly available via an open records request. Summit further states that, upon information and belief, Landowners have made an open records request to the Commission and are in receipt of the information requested in this Discovery Request.

**REQUEST NO. 15:**

*Please produce water chemistry and any other liquid or solid sampling data for water or other substances in the Storage Reservoir. Please include any gas solubility testing that was performed on the water samples for CO2 or injected gas stream.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that the requested information has been submitted to the Commission and is publicly available via an open records request. Summit further states that, upon information and belief, Landowners have made an open records request to the Commission and are in receipt of the information requested in this Discovery Request.

**REQUEST NO. 16:**

*Please produce all spreadsheets, databases, and other documents or compilations containing reservoir pressure data for the Storage Reservoir, including but not limited to all bottom hole pressure data, surface pressure data, and fluid level measurements. If a spreadsheet is not available, then please produce all Documents containing this information.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that the requested information has been submitted to the Commission and is publicly available via an open records request. Summit further states that, upon information and belief, Landowners have made an open records request to the Commission and are in receipt of the information requested in this Discovery Request.

**REQUEST NO. 17:**

*Please produce all relative permeability data for the Storage Reservoir, including core test information. If multiple cores have been tested, please produce all test data.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that the requested information has been submitted to the Commission and is publicly available via an open records request. Summit

further states that, upon information and belief, Landowners have made an open records request to the Commission and are in receipt of the information requested in this Discovery Request.

**REQUEST NO. 18:**

*Please produce all capillary pressure data for all cores tested in the Storage Reservoir.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that the requested information has been submitted to the Commission and is publicly available via an open records request. Summit further states that, upon information and belief, Landowners have made an open records request to the Commission and are in receipt of the information requested in this Discovery Request.

**REQUEST NO. 19:**

*Please produce all routine core analysis data for the Storage Reservoir.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that the requested information has been submitted to the Commission (Core Library) and is publicly available via an open records request. Summit further states that, upon information and belief, Landowners have made an open

records request to the Commission and are in receipt of the information requested in this Discovery Request.

**REQUEST NO. 20:**

*Please produce all spreadsheets of reservoir temperature data in the Storage Reservoir, including spreadsheets indexing reservoir temperature data to well name and API number. If this information is not available in spreadsheet format, then please produce all Documents containing this information.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that the requested information has been submitted to the Commission and is publicly available via an open records request. Summit further states that, upon information and belief, Landowners have made an open records request to the Commission and are in receipt of the information requested in this Discovery Request.

**REQUEST NO. 21:**

*Please produce all written interpretations of micro-seismic data obtained from the Storage Reservoir.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence

for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states they have not created any micro seismic data and thus have not produced any written interpretations thereof.

**AS TO OBJECTIONS TO THE AMENDED INTERROGATORIES AND REQUEST FOR PRODUCTION OF DOCUMENTS (SET 1) FROM INTERVENOR LANDOWNERS:**

Dated this 1st day of July, 2024.

FREDRIKSON & BYRON, P.A.

By: _____

LAWRENCE BENDER, ND Bar #03908
304 East Front Avenue, Suite 400
Bismarck, ND 58504
(701) 221-8700
lbender@fredlaw.com

*Attorneys for Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC*

#82909475v1

**AS TO ANSWERS TO THE AMENDED INTERROGATORIES AND REQUEST FOR PRODUCTION OF DOCUMENTS (SET 1) FROM INTERVENOR LANDOWNERS:**

Summit Carbon Storage #1, LLC
Summit Carbon Storage #2, LLC
Summit Carbon Storage #3, LLC

By: _____
Wade Boeshans
Its: Executive Vice President

Subscribed and sworn to before me
this 1st day of July, 2024.

_____

My commission expires:_____

ESTEE CARR
Notary Public
State of North Dakota
My Commission Expires Sept. 14, 2027

North Dakota Industrial Commission
Oil and Gas Division
Case Nos. 30869-30880

Exhibit H to Declaration of Derrick Braaten
in Support of Motion to Compel

**BEFORE THE INDUSTRIAL COMMISSION**
**OF THE STATE OF NORTH DAKOTA**

**CASE NOS. 30869–30880**

**In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1,**

**11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by**

**nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of**

**carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the**

**geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## RESPONSE OF APPLICANTS TO INTERVENORS' LANDOWNERS' AMENDED INTERROGATORIES AND REQUEST FOR PRODUCTION OF DOCUMENTS (SET 2)

Applicants Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC (collectively, "Summit"), by and through their counsel, Lawrence Bender, Fredrikson & Byron, P.A., 304 East Front Avenue, Suite 400, Bismarck, ND 58504-5639, respond to the Amended Interrogatories and Request for Production of Documents (Set 2) submitted by The Swenson Living Trust; Michael Bauman, Glenn and Lisa Gerving, Michael and Bonnie Haupt, John Jochim, Kevin and Kimberly Kraft, Charmayne Liebelt, Kirk

and Linda Maize and Allen Maize, Paul and Christy Metz, JoLene M. Rust, and Gary and Cassie Smith (collectively, "Landowners") on May 31, 2024 in the above-captioned proceedings (each a "Discovery Request" and collectively, the "Discovery Requests"). Summit's response is made without waiving or intending to waive any objection as to relevance, privilege, or admissibility of any information provided in response to the Discovery Requests in any subsequent proceeding of this or any other action on any ground. A partial answer to any Discovery Request that has been objected to, in whole or in part, is not intended to be a waiver of the objection. By responding to the Discovery Requests, Summit is not admitting that any aspect of the Discover Requests is factually accurate or relevant to this proceeding.

## GLOBAL OBJECTIONS

The following Global Objections apply to each of the Discovery Requests—even if not separately restated below in response to a particular Discovery Request.

Summit objects to all Discovery Requests to the extent they seek the discovery of documents which are privileged for the reasons that they (a) are subject to the attorney-client privilege; (b) are covered by the "work product" doctrine; and/or (c) were prepared in anticipation of litigation or for trial by or for Summit or its representatives, including its employees, consultants, or agents.

Summit objects to all Discovery Requests to the extent they are beyond the scope of discovery allowed pursuant to Rules 26, 33, 34, and 36 of the North Dakota Rules of Civil Procedure.

Summit objects to all Discovery Requests to the extent they seek identification or production of "all documents" of a particular description. It is impossible to guarantee that all such documents have been identified or located. Summit states, however, that in response to these

requests, it has made a diligent search of records kept in the ordinary course of business in those locations likely to contain relevant information.

Summit objects to the Landowners' definitions and instructions to the extent such definitions and instructions exceed or are inconsistent with the requirements imposed upon Summit under the North Dakota Rules of Civil Procedure or Chapter 28-32 of the North Dakota Century Code.

Summit objects to the Discovery Requests because they are unduly burdensome and disproportionate to the needs of this proceeding because they seek irrelevant information.

Summit objects inasmuch as the Discovery Requests seek information relating to anything other than Summit's sequestration facilities in North Dakota. Only Summit's North Dakota sequestration facilities are covered by its applications in this proceeding.

Summit objects inasmuch as the Discovery Requests seek information that contains proprietary or confidential business information or is subject to trade-secret protections or that contains information for which Summit owes a third party an obligation of confidentiality or privacy, whether contractual or under any federal or state laws or regulations.

Summit objects to all Discovery Requests that seek, and disclaims any obligation to identify or furnish, documents or information that the Landowners actually or constructively possesses or to which the Landowners have access through alternative means.

Summit objects inasmuch as the Discovery Requests seek information from third parties and information that is not within Summit's possession, custody, control, or personal knowledge of Summit.

Summit objects and responds to the Discovery Requests based upon information and documents available as of the date hereof and reserves the right to supplement and amend the responses.

Subject to the foregoing objections and conditions, and subject to the specific additional objections made with respect to each request, Summit responds to the Landowners' Discovery Requests as follows:

## RESPONSE TO INTERROGATORIES

**INTERROGATORY NO. 1:**

*Identify all software programs necessary to open or run or execute any electronic files that are themselves responsive to or which contain data and information responsive to any of Landowners written interrogatories or requests for production of documents. Please exclude from your answer any software programs needed to open files with the following extensions: .doc, .docx, .pdf, .xlsx, .csv, .eml, .msg, as well as common audio-visual file types that can be opened with freely-available software such as .jpg/.jpeg, .tiff, and .mp4 files.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that the following software programs may be necessary to open, run, or execute the specified electronic files: Petrel Geoscience Core, Petrel Well Correlation, Ikon/RokDoc, GEM MAX, Builder, Results, CMOST, Kappa, S&P

Global/Kingdom, Techlog Base, Pore Pressure Prediction, Wellbore Stability, Quanti.Elan, Quanti, Techlog Python, TechData Plus, TechStat, Wellbore Imaging.

**INTERROGATORY NO. 2:**

*State whether Summit possesses documents related to any exchange of valuable consideration (including but not limited to monetary compensation even if nominal) for the right to use or damage the pore space of a property.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that it has used a pore space lease for the right to utilize pore space and that such document provides for valuable consideration in exchange for such right.

**INTERROGATORY NO. 3:**

*Describe how Summit determined the amounts it paid to property owners for use of or damage to their pore space for its activities related to Summit's applications.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any.

Subject to and notwithstanding the objections, Summit states that it provided testimony responsive to this Discovery Request at the hearing on the above-captioned cases.

**INTERROGATORY NO. 4:**

*State the amounts that Summit has paid to property owners for use of or damage to pore space for injections of CO2.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that it provided testimony responsive to this Discovery Request at the hearing on the above-captioned cases.

**INTERROGATORY NO. 5:**

*State how Summit determines if a property owner has been "equitably compensated" as that phrase is used in N.D.C.C. § 38-22-08(14), and what criteria it uses to make this determination.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that it provided testimony responsive to this Discovery Request at the hearing on the above-captioned cases.

**INTERROGATORY NO. 6:**

Identify the factual basis in Summit's applications or the materials submitted in support of Summit's applications that might support or that Summit will use to support a finding that property owners have been "equitably compensated" as that phrase is used in N.D.C.C. § 38-22-08(14).

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that it provided testimony responsive to this Discovery Request at the hearing on the above-captioned cases.

**INTERROGATORY NO. 7:**

*Identify the factual basis in any documents or information sources other than Summit's applications that might support or that Summit will use to support a finding that property owners have been "equitably compensated" as that phrase is used in N.D.C.C. § 38-22-08(14).*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that it provided testimony responsive to this Discovery Request at the hearing on the above-captioned cases.

**INTERROGATORY NO. 8:**

*Identify the sections of Summit's applications that support a finding that "[t]hat the proposed storage facility will not adversely affect surface waters or formations containing fresh water" as is stated at N.D.C.C. § 38-22-08(7). If Summit claims that any documents or information outside of Summit's applications support such a finding, identify those documents and information.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that it provided testimony responsive to this Discovery Request at the hearing on the above-captioned cases and that most sections of Summit's applications relate to the secure storage of $CO_2$ in the Broom Creek Formation and the protection of underground sources of drinking water.

**INTERROGATORY NO. 9:**

*Identify the source of any carbon dioxide that will be injected pursuant to Summit's applications that is created or produced or originates in North Dakota.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that it provided testimony responsive

to this Discovery Request at the hearing on the above-captioned cases, i.e., the Tharaldson Ethanol Plant is currently the only contracted source of carbon dioxide originating in North Dakota.

**RESPONSE TO REQUESTS FOR PRODUCTION**

**REQUEST NO. 1:**

*Please produce all agreements for use of or damage to the pore space of any property that are in your possession.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that a copy of the pore space lease is attached as Exhibit D to the Storage Facility Agreement submitted as part of its applications in the above-captioned cases.

**REQUEST NO. 2:**

*Without limiting the generality of Request No. 1, please produce all agreements that might support or that Summit will use to support a finding "[t]hat the storage operator has obtained the consent of persons who own at least sixty percent of the storage reservoir's pore space" as required by N.D.C.C. § 38-22-08(5).*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence

for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that it provided documents and testimony responsive to this Discovery Request at the hearing on the above-captioned cases, i.e., Summit Exhibits 5A, 5B and 5C.

**REQUEST NO. 3:**

*Without limiting the generality of Request No. 1, produce all agreements that might support or that Summit will use to support a finding that "all nonconsenting pore space owners are or will be equitably compensated" as stated in N.D.C.C. § 38-22-08(14).*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that it provided documents and testimony responsive to this Discovery Request at the hearing on the above-captioned cases, i.e., the Storage Agreement and pore pace lease.

**REQUEST NO. 4:**

*Please produce all documents containing data or information indicating or indicative of market values for any rights associated with the use of or damage to a property's pore space.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence

for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that it provided documents and testimony responsive to this Discovery Request at the hearing on the above-captioned cases, i.e., the compensation paid under the pore pace lease and negotiations with hundreds of pore space owners.

**REQUEST NO. 5:**

*Without limiting the generality of the foregoing requests, please produce all agreements for use of or damage to any surface estate necessary for Summit to complete construction of the facilities described in Summit's applications, including but not limited to its injections wells (but for clarification not those agreements necessary for the interstate transmission line subject to siting proceedings before the ND Public Service Commission).*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that it provided documents and testimony responsive to this Discovery Request at the hearing on the above-captioned cases, i.e., the pore pace lease.

**REQUEST NO. 6:**

*Please produce all correspondence related to Summit's applications between Summit and the North Dakota Industrial Commission and its Department of Mineral Resources and its Oil and Gas Division (collectively "NDIC") and any authorized agents of the NDIC, and all*

*correspondence between your authorized agents and the NDIC (including any individuals copied on or submitting Summit's applications) related to Summit's applications.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit also objects to this Discovery Request because it is overly broad in that it requests "all correspondence" and because the Discovery Request is unduly burdensome at this late stage in the proceedings. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that the requested information is on file with the Commission and is publicly available via an open records request.

**AS TO OBJECTIONS TO THE AMENDED INTERROGATORIES AND REQUEST FOR PRODUCTION OF DOCUMENTS (SET 2) FROM INTERVENOR LANDOWNERS:**

Dated this 1st day of July, 2024.

FREDRIKSON & BYRON, P.A.

By: _____

LAWRENCE BENDER, ND Bar #03908
304 East Front Avenue, Suite 400
Bismarck, ND 58504
(701) 221-8700
lbender@fredlaw.com

*Attorneys for Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC*

#82910929v1

**AS TO ANSWERS TO THE AMENDED INTERROGATORIES AND REQUEST FOR PRODUCTION OF DOCUMENTS (SET 2) FROM INTERVENOR LANDOWNERS:**

Summit Carbon Storage #1, LLC
Summit Carbon Storage #2, LLC
Summit Carbon Storage #3, LLC

By: _____
Wade Boeshans
Its: Executive Vice President

Subscribed and sworn to before me this 1st day of July, 2024.

_____

My commission expires:_____

ESTEE CARR
Notary Public
State of North Dakota
My Commission Expires Sept. 14, 2027

North Dakota Industrial Commission
Oil and Gas Division
Case Nos. 30869-30880

Exhibit I to Declaration of Derrick Braaten
in Support of Motion to Compel

**BEFORE THE INDUSTRIAL COMMISSION**
**OF THE STATE OF NORTH DAKOTA**

**CASE NOS. 30869–30880**

**In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1,**

**11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by**

**nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of**

**carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the**

**geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## RESPONSE OF APPLICANTS TO INTERVENOR LANDOWNERS' AMENDED INTERROGATORIES AND REQUEST FOR PRODUCTION OF DOCUMENTS (SET 3)

Applicants Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC (collectively, "Summit"), by and through their counsel, Lawrence Bender, Fredrikson & Byron, P.A., 304 East Front Avenue, Suite 400, Bismarck, ND 58504-5639, respond to the Amended Interrogatories and Request for Production of Documents (Set 3) submitted by The Swenson Living Trust; Michael Bauman, Glenn and Lisa Gerving, Michael and Bonnie Haupt, John Jochim, Kevin and Kimberly Kraft, Charmayne Liebelt, Kirk

and Linda Maize and Allen Maize, Paul and Christy Metz, JoLene M. Rust, and Gary and Cassie Smith (collectively, "Landowners") on May 31, 2024 in the above-captioned proceedings (each a "Discovery Request" and collectively, the "Discovery Requests"). Summit's response is made without waiving or intending to waive any objection as to relevance, privilege, or admissibility of any information provided in response to the Discovery Requests in any subsequent proceeding of this or any other action on any ground. A partial answer to any Discovery Request that has been objected to, in whole or in part, is not intended to be a waiver of the objection. By responding to the Discovery Requests, Summit is not admitting that any aspect of the Discover Requests is factually accurate or relevant to this proceeding.

## GLOBAL OBJECTIONS

The following Global Objections apply to each of the Discovery Requests—even if not separately restated below in response to a particular Discovery Request.

Summit objects to all Discovery Requests to the extent they seek the discovery of documents which are privileged for the reasons that they (a) are subject to the attorney-client privilege; (b) are covered by the "work product" doctrine; and/or (c) were prepared in anticipation of litigation or for trial by or for Summit or its representatives, including its employees, consultants, or agents.

Summit objects to all Discovery Requests to the extent they are beyond the scope of discovery allowed pursuant to Rules 26, 33, 34, and 36 of the North Dakota Rules of Civil Procedure.

Summit objects to all Discovery Requests to the extent they seek identification or production of "all documents" of a particular description. It is impossible to guarantee that all such documents have been identified or located. Summit states, however, that in response to these

requests, it has made a diligent search of records kept in the ordinary course of business in those locations likely to contain relevant information.

Summit objects to the Landowners' definitions and instructions to the extent such definitions and instructions exceed or are inconsistent with the requirements imposed upon Summit under the North Dakota Rules of Civil Procedure or Chapter 28-32 of the North Dakota Century Code.

Summit objects to the Discovery Requests because they are unduly burdensome and disproportionate to the needs of this proceeding because they seek irrelevant information.

Summit objects inasmuch as the Discovery Requests seek information relating to anything other than Summit's sequestration facilities in North Dakota. Only Summit's North Dakota sequestration facilities are covered by its applications in this proceeding.

Summit objects inasmuch as the Discovery Requests seek information that contains proprietary or confidential business information or is subject to trade-secret protections or that contains information for which Summit owes a third party an obligation of confidentiality or privacy, whether contractual or under any federal or state laws or regulations.

Summit objects to all Discovery Requests that seek, and disclaims any obligation to identify or furnish, documents or information that the Landowners actually or constructively possesses or to which the Landowners have access through alternative means.

Summit objects inasmuch as the Discovery Requests seek information from third parties and information that is not within Summit's possession, custody, control, or personal knowledge of Summit.

Summit objects and responds to the Discovery Requests based upon information and documents available as of the date hereof and reserves the right to supplement and amend the responses.

Subject to the foregoing objections and conditions, and subject to the specific additional objections made with respect to each request, Summit responds to the Landowners' Discovery Requests as follows:

**RESPONSE TO INTERROGATORIES**

**INTERROGATORY NO. 1:**

*For any installed CO2 pressure relief devices or CO2 vent systems or other mechanical devices designed for relieving pressure from a pipe, at any of the surface facilities constructed for purposes of Summit's applications, please provide the following:*

*a. Rated capacity of each device or system;*

*b. Quantity of each device or system;*

*c. Discharge pipe size(s);*

*d. Discharge pipe outlet(s) direction (vertical or horizontal); and*

*e. If horizontal, state the direction of discharge.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that it provided testimony responsive to this Discovery Request at the hearing on the above-captioned cases.

## RESPONSE TO REQUESTS FOR PRODUCTION

**REQUEST FOR PRODUCTION NO. 1:**

*Please produce any above-ground vapor dispersion modeling results such as from any engineered pressure relief systems, including all data and input files and load files. Without limiting the generality of the forgoing, specifically provide all data inputs for the following: weather conditions modeled, topography assumptions modeled, flow rate of CO2 over time, total quantity of CO2 released and total time of release modeled, and predicted CO2 concentrations at any public receptors such as roads, buildings, and dwellings.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit also objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Summit further objects to this Discovery Request because it seeks confidential information that has been deemed a "security system plan" exempt for open record requests pursuant to N.D.C.C. § 44-04-24 and subject to a protective order issued by the North Dakota Public Service Commission. *See* Docket No. 364, Case No. PU-22-391.

**AS TO OBJECTIONS TO THE AMENDED INTERROGATORIES AND REQUEST FOR PRODUCTION OF DOCUMENTS (SET 3) FROM INTERVENOR LANDOWNERS:**

Dated this 1st day of July, 2024.

FREDRIKSON & BYRON, P.A.

By: _____

LAWRENCE BENDER, ND Bar #03908
304 East Front Avenue, Suite 400
Bismarck, ND 58504
(701) 221-8700
lbender@fredlaw.com

*Attorneys for Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC*

#82913300v1

**AS TO ANSWERS TO THE AMENDED INTERROGATORIES AND REQUEST FOR PRODUCTION OF DOCUMENTS (SET 3) FROM INTERVENOR LANDOWNERS:**

Summit Carbon Storage #1, LLC
Summit Carbon Storage #2, LLC
Summit Carbon Storage #3, LLC

By: _____
Wade Boeshans
Its: Executive Vice President

Subscribed and sworn to before me
this 1st day of July, 2024.

_____

My commission expires:_____

ESTEE CARR
Notary Public
State of North Dakota
My Commission Expires Sept. 14, 2027

North Dakota Industrial Commission
Oil and Gas Division
Case Nos. 30869-30880

Exhibit J to Declaration of Derrick Braaten
in Support of Motion to Compel

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

| | | |
|---|---|---|
| In re application of Summit | : Case No(s). | 30869 |
| Carbon Storage #1, LLC requesting | : | 30870 |
| consideration for the geologic | : | 30871 |
| storage of carbon dioxide in the | : | 30872 |
| Broom Creek Formation from the | : | 30873 |
| Midwest Carbon Express Pipeline in | : | 30874 |
| the storage facility located in | : | 30875 |
| Sections 31, 32, 33, and 34, | : | 30876 |
| Township 142 North, Range 87 West, | : | 30877 |
| Sections 1, 11, 12, 13, 14, 15, | : | 30878 |
| 22, 23, 24, 25, 26, 35, and 36, | : | 30879 |
| Township 141 North, Range 88 West, | : | 30880 |
| Sections 2, 3, 4, 5, 6, 7, 8, 9, | : | |
| 10, 11, 14, 15, 16, 17, 18, 19, | : | |
| 20, 21, 22, 23, 25, 26, 27, 28, | : | |
| 29, 30, 31, 32, 33, 34, and 35, | : | |
| Township 141 North, Range 87 West, | : | |
| Sections 1, 2, 3, and 12, Township | : | |
| 140 North, Range 88 West and | : | |
| Sections 4, 5, 6, and 7, Township | : | |
| 140 North, Range 87 West, Mercer, | : | |
| Morton, and Oliver Counties, ND. | : | |
| | | |
| In re application of Summit | : | |
| Carbon Storage #1, LLC to | : | |
| consider the amalgamation of the | : | |
| storage reservoir pore space, in | : | |
| which the Commission may require | : | |
| that the pore space owned by | : | |
| nonconsenting owners be included | : | |
| in the geologic storage, as | : | |
| required to operate the Summit | : | |
| Carbon Storage #1, LLC storage | : | |
| facility located in Sections 31, | : | |
| 32, 33, and 34, Township 142 | : | |
| North, Range 87 West, Sections 1, | : | |
| 11, 12, 13, 14, 15, 22, 23, 24, | : | |
| 25, 26, 35, and 36, Township 141 | : | |
| North, Range 88 West, Sections 2, | : | |
| 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, | : | |
| 15, 16, 17, 18, 19, 20, 21, 22, | : | |
| 23, 25, 26, 27, 28, 29, 30, 31, | : | |

32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re application of Summit Carbon Storage #1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35,

Township 141 North, Range 87 West,:
Sections 1, 2, 3, and 12, Township:
140 North, Range 88 West and :
Sections 4, 5, 6, and 7, Township :
140 North, Range 87 West, Mercer, :
Morton, and Oliver Counties, ND, :
subject to the application of :
Summit Carbon Storage #1, LLC for :
the geologic storage of carbon :
dioxide in the Broom Creek :
Formation, and enact such special :
field rules as may be necessary. :

In re application of Summit :
Carbon Storage #2, LLC requesting :
consideration for the geologic :
storage of carbon dioxide in the :
Broom Creek Formation from the :
Midwest Carbon Express Pipeline :
in the storage facility located in:
Sections 27, 28, 29, 32, 33, 34, :
and 35, Township 143 North, Range :
88 West, Sections 1, 2, 3, 4, 5, :
6, 7, 8, 9, 10, 11, 12, 13, 14, :
15, 16, 17, 18, 19, 20, 21, 22, :
23, 24, 25, 26, 27, 28, 29, 30, :
32, 33, 34, 35, and 36, Township :
142 North, Range 88 West, Sections:
5, 6, 7, 8, 17, 18, 19, 20, 29, :
30, and 31, Township 142 North, :
Range 87 West, and Sections 1, 2, :
and 3, Township 141 North, Range :
88 West, Mercer and Oliver :
Counties, ND. :

In re application of Summit :
Carbon Storage #2, LLC to :
consider the amalgamation of the :
storage reservoir pore space, in :
which the Commission may require :
that the pore space owned by :
nonconsenting owners be included :
in the geologic storage, as :
required to operate the Summit :
Carbon Storage #2, LLC storage :
facility located in Sections 27, :
28, 29, 32, 33, 34, and 35, :

Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.

In re application of Summit Carbon Storage #2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.

In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13,

14, 15, 16, 17, 18, 19, 20, 21, :
22, 23, 24, 25, 26, 27, 28, 29, :
30, 32, 33, 34, 35, and 36, :
Township 142 North, Range 88 West,:
Sections 5, 6, 7, 8, 17, 18, 19, :
20, 29, 30, and 31, Township 142 :
North, Range 87 West, and Sections:
1, 2, and 3, Township 141 North, :
Range 88 West, Mercer and Oliver :
Counties, ND, subject to the :
application of Summit Carbon :
Storage #2, LLC for the geologic :
storage of carbon dioxide in the :
Broom Creek Formation, and enact :
such special field rules as may :
be necessary. :

In re application of Summit :
Carbon Storage #3, LLC requesting :
consideration for the geologic :
storage of carbon dioxide in the :
Broom Creek Formation from the :
Midwest Carbon Express Pipeline in:
the storage facility located in :
Section 36, Township 143 North, :
Range 87 West, Sections 19, 20, :
21, 28, 29, 30, 31, 32, 33, 34, :
35, and 36, Township 143 North, :
Range 86 West, Sections 1, 2, 11, :
12, 13, 14, and 24, Township 142 :
North, Range 87 West, Sections 1, :
2, 3, 4, 5, 6, 7, 8, 9, 10, 11, :
12, 13, 14, 15, 16, 17, 18, 19, :
20, 21, 22, 23, 24, 25, 26, 27, :
28, 29, 30, 32, 33, 34, and 35, :
Township 142 North, Range 86 :
West, and Sections 6, 7, 17, 18, :
19, and 20, Township 142 North, :
Range 85 West, Oliver County, ND. :

In re application of Summit :
Carbon Storage #3, LLC to consider:
the amalgamation of the storage :
reservoir space, in which the :
Commission may require that the :
pore space owned by nonconsenting :
owners be included in the geologic:

storage, as required to operate :
the Summit Carbon Storage #3, LLC :
storage facility located in :
Section 36, Township 143 North, :
Range 87 West, Sections 19, 20, :
21, 28, 29, 30, 31, 32, 33, 34, :
35, and 36, Township 143 North, :
Range 86 West, Sections 1, 2, 11, :
12, 13, 14, and 24, Township 142 :
North, Range 87 West, Sections 1, :
2, 3, 4, 5, 6, 7, 8, 9, 10, 11, :
12, 13, 14, 15, 16, 17, 18, 19, :
20, 21, 22, 23, 24, 25, 26, 27, :
28, 29, 30, 32, 33, 34, and 35, :
Township 142 North, Range 86 West,:
and Sections 6, 7, 17, 18, 19, and:
20, Township 142 North, Range 85 :
West, Oliver County, ND, in the :
Broom Creek Formation. :

In re application of Summit :
Carbon Storage #3, LLC for an :
order of the Commission :
determining the amount of :
financial responsibility for the :
geologic storage of carbon dioxide:
from the Midwest Carbon Express :
Pipeline in the storage facility :
located in Section 36, Township :
143 North, Range 87 West, Sections:
19, 20, 21, 28, 29, 30, 31, 32, :
33, 34, 35, and 36, Township 143 :
North, Range 86 West, Sections 1, :
2, 11, 12, 13, 14, and 24, :
Township 142 North, Range 87 West,:
Sections 1, 2, 3, 4, 5, 6, 7, 8, :
9, 10, 11, 12, 13, 14, 15, 16, 17,:
18, 19, 20, 21, 22, 23, 24, 25, :
26, 27, 28, 29, 30, 32, 33, 34, :
and 35, Township 142 North, Range :
86 West, and Sections 6, 7, 17, :
18, 19, and 20, Township 142 :
North, Range 85 West, Oliver :
County, ND, in the Broom Creek :
Formation. :

In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

**TRANSCRIPT OF HEARING**

**VOLUME II - (Pages 277 - 552)**

**Taken At**
**1000 East Calgary Avenue**
**Bismarck, North Dakota**
**June 12, 2024**

**BEFORE DAVID P. GARNER**
**-- HEARING EXAMINER --**

**A P P E A R A N C E S**

NDIC STAFF PRESENT:

MR. LYNN HELMS
MR. MARK BOHRER
MR. RICHARD SUGGS
MS. TAMARA MADCHE
MR. TRAVIS STOLLDORF
MS. ASHLEIGH THIEL
MR. DAVID TABOR
MR. STEPHEN FRIED
MR. CALEB ALBERTSON
MS. SARA FORSBERG

--------

MR. LAWRENCE BENDER
MR. TYLER J. GLUDT
Fredrikson & Byron, P.A.
Attorneys at Law
Suite 400
304 East Front Avenue
Bismarck, North Dakota 58504

-- and --

MR. S. THOMAS THRONE
Throne Law Office, P.C.
Attorneys at Law
P.O. Drawer 6590
Sheridan, Wyoming 82801

FOR THE SUMMIT CARBON STORAGE #1, SUMMIT CARBON STORAGE #2 AND SUMMIT CARBON STORAGE #3.

--------

**A P P E A R A N C E S (Cont'd)**

MR. DERRICK BRAATEN
MS. DESIRAE ZASTE, Paralegal
Braaten Law Firm
Attorneys at Law
Suite 100
109 North Fourth Street
Bismarck, North Dakota 58501

FOR THE INTERVENORS, THE SWENSON LIVING TRUST, BAUMAN, GERVING, HAUPT, JOCHIM, KRAFT, LIEBELT, MAIZE, METZ, RUST, AND SMITH.

---

# TABLE OF CONTENTS

## INDEX OF PROCEEDINGS

Page

Opening Discussion..... 289

---

## CERTIFICATE

Certificate of Court Reporter.....Page 552

---

## APPLICANT'S WITNESSES

AMANDA DOUGLAS/CAITLIN OLSEN

Continued Cross-Examination by Mr. Braaten..... Page 291

Examination by Ms. Madche..... Page 355

Examination by Mr. Stolldorf..... Page 370

Examination by Mr. Suggs..... Page 371

Redirect Examination by Mr. Bender..... Page 389

Further Examination by Mr. Suggs..... Page 393

JAMES POWELL/JOHN HUNT/JAY VOLK/JEAN ODDY

Direct Examination by Mr. Bender..... Page 396

Direct Examination by Mr. Bender..... Page 398

Direct Examination by Mr. Bender..... Page 403

Direct Examination by Mr. Bender..... Page 408

T A B L E O F C O N T E N T S (Cont'd)

Examination by Ms. Madche..... Page 411
Examination by Mr. Stolldorf..... Page 432
Examination by Mr. Suggs..... Page 441

CAITLIN OLSEN/WADE BOESHANS/AMANDA DOUGLAS/JAMEY BACKUS

Redirect Examination by Mr. Bender..... Page 448
Redirect Examination by Mr. Bender..... Page 458
Redirect Examination by Mr. Bender..... Page 461
Direct Examination by Mr. Bender..... Page 467
Examination by Ms. Madche..... Page 470
Recross-Examination by Mr. Braaten..... Page 473

JEAN ODDY/CAITLIN OLSEN/JIMMY POWELL/WADE BOESHANS

Cross-Examination by Mr. Braaten..... Page 484

---

INTERVENORS' WITNESSES

SHANE BOFTO

Direct Examination by Mr. Braaten..... Page 503
Cross-Examination by Mr. Bender..... Page 513
Examination by Mr. Helms..... Page 525
Redirect Examination by Mr. Braaten..... Page 526

T A B L E O F C O N T E N T S (Cont'd)

P. TED DOUGHTY

Direct Examination by Mr. Braaten..... Page 527

Cross-Examination by Mr. Bender..... Page 532

PAUL BUTTON

Direct Examination by Mr. Braaten..... Page 537

Cross-Examination by Mr. Bender..... Page 545

---

CLAIMANT'S EXHIBITS

| Exhibit No. | Offered | Received |
|---|---|---|
| 1C-1 | 461 | 461 |
| 8B | 457 | 458 |

---

INTERVENORS' EXHIBITS

| Exhibit No. | Offered | Received |
|---|---|---|
| LO-18 | 511 | 511 |
| LO-19 | 511 | 511 |
| LO-20 | 511 | 511 |
| LO-56 | 505 | 505 |
| LO-57 | 540 | 540 |
| LO-58 | 530 | 530 |
| LO-82 | 511 | 511 |
| LO-83 | 333 | 333 |

---

289

(The following proceedings were had and made of record herein, commencing at 9:06 a.m., Wednesday, the 12th day of June, 2024:)

HEARING EXAMINER GARNER: We are on the record for hearings in the matters listed in the North Dakota Industrial Commission Hearing Docket for June 12. I'm David Garner, hearing examiner for these hearings. We're at the hearing room for the Department of Mineral Resources, Oil & Gas Division, and it is 9:08 a.m.

We will resume our hearings for Case Numbers 30869 through 30880. I notice new counsel appeared at the table, so I'll give everyone an opportunity for all interested parties to please come forward again.

MR. BENDER: Thank you, Mr. Examiner. I'll introduce Tom. He doesn't need any introduction, but with us today is Tom Throne. He's going to be assisting with Summit in this application.

HEARING EXAMINER GARNER: Okay.

MR. BRAATEN: Derrick Braaten, Braaten Law Firm, on behalf of the landowner intervenors. With me is my paralegal, Desirae Zaste, and client Kirk Swenson.

290

MR. BENDER: I apologize. I thought you were just looking for an introduction of the new counsel.

HEARING EXAMINER GARNER: No, that's --

MR. BENDER: Did you want me to make another appearance or --

HEARING EXAMINER GARNER: No. That's fine.

MR. BENDER: Okay.

HEARING EXAMINER GARNER: That's fine. Just a quick note. We're going to resume with the cross-examination of the two witnesses that were being crossed by Mr. Braaten yesterday. Change, though. We're going to then at that point in time allow Summit to call its remaining witnesses, give the Commission a chance to respond to them -- or question them. And then you'll have the remainder of the time to cross-examine those witnesses.

MR. BRAATEN: Okay. And, Your Honor, I don't want to be difficult or take up time. I just want to put on the record that I do object to that process.

HEARING EXAMINER GARNER: Okay.

MR. HELMS: 6:30.

HEARING EXAMINER GARNER: Oh, I'm sorry.

291

And we're going to have a deadline today again of 6:30 p.m., and if we are not done, we will be back here tomorrow morning at 9 a.m.

Okay. With that, I think we can proceed.

MR. HELMS: They're still under oath.

HEARING EXAMINER GARNER: They're still under oath.

**CONTINUED CROSS-EXAMINATION**

**BY MR. BRAATEN:**

Q. I wasn't going to ask this, but since it came up, do you understand that you're still under oath?

**A.** (BY MS. DOUGLAS) I do.

Q. Okay. We were discussing the $CO_2$ plume model yesterday, and I want to start by just asking if you have an understanding within the regulatory framework for Class 6 wells why a plume model is constructed?

**A.** I do.

Q. And what is that understanding?

**A.** So under the North Dakota UIC Class VI regulations, a geologic model is constructed to help define the horizontal and vertical boundaries of a storage reservoir.

Q. For what purpose or reason?

292

**A.** The purpose of this is to define the boundaries of the storage reservoir, in this case which would be the storage facility, which the regulations require pore space owners within that storage facility to be equitably compensated. Also, the modeling and simulation, it's constructed to help delineate the area of review, which is also a requirement of the statutes to delineate the area of review.

Q. And the delineation of the area of review is also the primary requirement or reason for creating that model under the Safe Drinking Water Act?

**A.** So we're talking about two sets of regulations here. So in -- in North Dakota UIC Class VI regulations, as I mentioned, the modeling is a tool to determine the AOR in the storage facility area. The Safe Water Drinking Act, under that, I believe, the EOA has its own set of UIC Class VI rules, which the North Dakota UIC Class VI rules are based on and are more stringent than. In the EPA rules, it is my understanding that modeling and simulation is used to define an area of review as well.

Q. Is North Dakota's underground injection

293

control program regulation for Class VI wells adopted pursuant to the Safe Drinking Water Act?

**A.** It is, and it is more stringent in terms that it goes above and beyond and also has stipulations for a storage facility area, pore space leasing, which the EPA UIC Class VI rules do not.

Q. And when the EPA promulgated its Class VI rules, the methodologies it used for delineating -- delineating an area of review were focused on the purpose and function of protecting USDWs; right?

**A.** That's correct, and North Dakota Administrative Code is as well. So they define the area of review as the region surrounding the geologic sequestration project where underground sources of drinking water may be endangered by the $CO_2$ injection activities.

Q. And so you're modeling the areal extent of the $CO_2$ plume because the regulations require you to do that in order to protect drinking water sources?

**A.** Modeling the simulation is required to evaluate potential impact and endangerment on any underground sources of drinking water in which you're required to define an area of review where you're required to monitor and ensure that you're

294

not endangering any underground sources of drinking water.

Q. You've noticed -- you've noted a couple of times that North Dakota's regulations are more stringent than the EPA regulations. That's because the EPA regulations require that any state being granted primacy have a set of regulations that are more stringent than EPA's?

**A.** I'm not familiar with the specific requirements. I know that they can't be any lesser.

Q. Okay. I've handed you what has been marked as Exhibit LO-83. Can you tell me if you've seen that document before?

**A.** I personally have not.

Q. And when you say "I personally have not," are you aware of others who have that you're thinking of?

**A.** Not specifically, no.

Q. If you look at the bullet points in the middle, you'll notice a number of descriptions of various data and input files. Is there anything in those bullet points that you can identify that was not provided to the Industrial Commission by EERC?

**A.** Upon request from the Commission, the EERC

295

had provided the DMR with the .DAT file, which is our simulation model input file for CMG, as well as our results file in the form of a .SR3, as well as shapefiles for the maps that were generated. Outside of those data sets, we did not provide any additional data to the DMR.

Q. You said for the maps that were provided outside of the data. What maps are you referring to?

**A.** The maps in the storage facility area. So we provided shapefiles for the storage facility boundary, the area of review boundary and such.

Q. Okay. And you're saying you provided the shapefiles but not necessarily the particular maps you generated from them?

**A.** Correct.

Q. Okay.

**A.** Let me correct for that. The maps are provided in the permit itself, so we didn't provide maps separately. They're within the permit itself.

Q. Okay. That's fair.

So this first one, all of the input files for the PHREEQC model were provided to the Commission?

**A.** No. As I stated, just the .DAT file for

296

the numerical simulations which were used to define the horizontal and the vertical boundaries of the reservoir.

Q. You didn't give them an input file for the PHREEQC model?

**A.** We did not, no. It was not requested.

Q. It's in your possession, though?

**A.** The EERC has the data.

Q. Sorry. Yes. EERC.

And EERC is Summit's agent and representative with respect to that data?

**A.** The ownership of the data is governed under our specific contracts with Summit including our NDA with them that govern data ownership.

Q. EERC has a nondisclosure agreement with Summit?

**A.** Yes.

Q. Who proposed that?

**A.** I was not involved in those discussions. It's a standard -- standard practice we have with most of our clients, though.

Q. Is that because your licenses for the computer modeling programs are academic licenses?

**A.** No. Commercial licenses were procured for this project as this was a commercially contracted

297

project.
Q. Did Summit compensate for the cost of the subscriptions for the programs on a commercial basis?
A. The EERC procured commercial licenses and the costs of those commercial licenses were billed to Summit. Yes.
Q. Okay. Were they temporary subscriptions?
A. Yes. So the licenses have a time period associated with them. Commonly, we procure licenses on the order of a month, two-month, three-month licenses, depending on the duration of the time period in the project we need the license to perform the scope.
Q. So I want to go back to my prior question. Other than the input model for the PHREEQC model -- sorry. Let me start over.
Other than the input file for the PHREEQC model, is there anything listed in these bullet points that was not provided by EERC to the Industrial Commission?
A. Yes. As I mentioned, the only input data that was provided can be found in your last bullet point in terms of what I would call the simulation -- or the numerical reservoir simulation

298

model data decks and the output files. Those were the two pieces of data which I am saying is the .DAT file and the .SR3 file. Those are the only two data sets from this list that were provided.
Q. So if you look at the third bullet point, is there anything there that was provided to the Industrial Commission?
A. Yes. Thank you for correcting me. So all core analysis data was provided to the Industrial Commission as well as the North Dakota Geological Survey through submission to the North Dakota core library staff. And as required, all well log data, formation testing, fluid analysis was provided as -- as part of completions reports for the three stratigraphic test wells that were drilled. So those were technically provided.
Q. When you look through these bullet points on this letter, do you have an understanding of what is being referenced in all of these? Is there anything you don't understand what is being referenced?
A. No. I understand.
Q. If I asked you to go back to EERC today and sit down and pull together an external hard drive and put this data on that external hard drive

299

and give it to me, approximately how long would it take you to do that?
A. That would involve the procurement of commercial licenses to access.
Q. No. Assuming that you have a commercial license, which you do for all of this, if you needed to go to your office, take all of this data and put it on an external hard drive, how long would that take you?
A. Days to weeks.
Q. It would take you weeks to put this data on a hard drive? You're telling me that?
A. To ensure that we have the proper data, QC it, and we ran multiple iterations.
Q. No. I'm asking you to take this data that you understand what all of it is, export it, transfer those files onto an external hard drive, how long?
A. One to two weeks.
Q. It would take you one to two weeks to transfer those files to a hard drive, but you can start from scratch with publicly available data and replicate and recreate that entire model in four weeks?
A. So the publicly available data would be

300

coming from single data bases. The way the EERC's file structure and the iterations of our models, the amount of data we have, it's my opinion knowing our data storage, the amount of data we have, the different iterations of modeling simulations done for this project, I would estimate it would take our staff that amount of time to ensure that we had the proper data to be transferred.
Q. But you keep saying -- you're saying ensure we have the proper data to be transferred. I'm saying physically how long does it take to click the buttons on the computer to tell the files in the computer to transfer them to an external hard drive and how long does it take the computer to process that file transfer and get it onto the external hard drive? I'm not talking about quality control or review.
A. Okay. I can't speculate. I don't know the size of the data in terms of megabytes, gigabytes or the speed to upload it.
Q. So you have no idea how long it would take to put this on an external hard drive and send it to us?
A. I gave you an estimated range of what I believe it would take.

301

Q. Three weeks?
A. I believe I said one to two.
Q. One to two weeks.
And you're still saying that you could also replicate the entire model yourself from public data in just four weeks? Can you explain that?
A. I believe I did already answer that.
Q. Why does it only take two weeks to transfer the files onto a hard drive but you can take and recreate everything in four weeks?
A. I believe I already answered that.
Q. And you think that sounds plausible?
A. I gave a range and in my opinion of what it would take.
Q. Okay. Were you asked to do that at any point?
A. No.
Q. Were you at any point advised that you might need to make data available to an opposing party in any kind of legal proceeding for Summit?
A. I was made aware that data may be requested. Not specifically that it would need to be provided.
Q. Were you told that it would not need to be

302

provided?
MR. BENDER: I'm going to object insofar as it might get into issues on attorney/client privilege. So if any of this was discussed with you while I was present on the phone or whatever or Ty, I'd instruct you not to answer it.
MR. BRAATEN: Are you asserting the privilege on behalf of Summit or EERC?
MR. BENDER: Summit.
Q. (MR. BRAATEN CONTINUING) At any time when there was no representative of Summit, other than Mr. Bender, were you told that -- or there was no representative of Summit present for the conversation, at any point were you told that you would not need to provide data?
A. No. I was involved in discussions to determine what it would take for us to provide that data. I was not told we would not have to provide it. I was told as a potential we may have to.
Q. Who were you told that by?
A. Mr. Lonny Jacobson who is our direct point of communication with the Summit team.
Q. Is he with EERC or Summit?
MR. BENDER: Your Honor, I'm going to object. We're getting into issues having to do

303

with discovery. These issues are before the Commission in a motion to compel. I don't think it's appropriate to try to litigate that here. We haven't had an opportunity to respond to that motion to compel, so I'm going to object to this whole line of questioning.
HEARING EXAMINER GARNER: I'm going to overrule.
MR. BENDER: Okay. Thank you.
Q. (MR. BRAATEN CONTINUING) Who does Lonny -- did you say Lonny Jacobson?
A. Yeah.
Q. Who does he work for?
A. The Energy & Environmental Research Center.
Q. Okay. When did you talk to him about the potential of having to provide data?
A. Can you clarify "provide data"? To whom?
Q. We just talked about a conversation you had had with Lonny in which you indicated that you had not been told that you would not need to provide data. Do you recall that conversation?
A. I do. It was after discovery was submitted.
Q. And when you say "after discovery was

304

submitted," are you referring to the request for data and information that were sent by me on behalf of the intervenors?
A. Correct.
Q. Okay. What did he ask you about that data?
A. What effort and software licenses would be needed to compile that data.
Q. And just tell me fully what your response to that was when you talked to him at that time?
A. We provided him with a specific list of the software licenses needed, the data as well as things, like I discussed yesterday, about some of the data sets being acquired from data brokers that the specific digitized logs in question are governed by a license agreement.
Q. Did you make a determination that because of those license agreements you were unwilling to provide those data sets?
A. EERC did not make that determination. We provided information to Summit on what it would take for us to produce those data sets.
Q. With respect to everything that's listed in Exhibit 83 in those bullet points, first, EERC has itself all of that data related to Summit's

305

project; right?
**A.** Yes.
Q. And has EERC provided all of that data to Summit itself?
**A.** I'm unsure. I don't believe we have provided every piece of data yet.
Q. So Summit doesn't even have all of the data that EERC has?
**A.** I can't comment on that with certainty.
Q. Well, did you just say that EERC has not provided all of this data to Summit?
MS. DOUGLAS: Could you read back what I stated?
(Record read as requested.)
MS. DOUGLAS: So I believe I said I'm unsure, I'm uncertain about that. I don't have a definitive answer.
Q. (MR. BRAATEN CONTINUING) Okay. What did Lonny tell you about his conversations with Summit about it?
**A.** That we would just not have to provide it at this time. A determination was not made on whether we would be providing it or not.
Q. At any point were you asked to start compiling the data in the potential event that you

306

did have to provide it?
**A.** No, because as I mentioned, we'd be required to procure software licenses.
Q. For what?
**A.** To open the model, take out any data. For example, to open the Petrel model, we'd need a Petrel license in order to take out the digitized well logs that are governed by that license agreement.
Q. So the temporary subscriptions you had for the models, have those lapsed at this point?
**A.** They have.
Q. Okay. So you didn't want to export the data because in order to do that, you would have had to buy another subscription just to export the data out of the models?
**A.** Again, the EERC's contracted to perform this scope by Summit Carbon Storage, and so they would have had to approve and authorize us to procure the software.
Q. And they didn't want to pay for the software?
MR. BENDER: If you know.
MS. DOUGLAS: I -- I don't know. I was not involved in those discussions.

307

Q. (MR. BRAATEN CONTINUING) Well, you're the one that just told me that the need to procure new licenses was part of the reason for not exporting or starting on the export of the data; right?
**A.** We would need to be authorized by Summit to start those activities.
Q. And they never did that?
**A.** No.
Q. Did Lonny ask them if they would like to authorize that?
**A.** I'm not privy to those discussions.
Q. The PHREEQC model is a free model, though, that anyone can use and there would be no barrier with subscriptions to putting all that data together; right?
**A.** Correct. As I testified, though, yesterday, I believe that all of the input data used for that is described in the permit itself.
Q. Have you personally had any direct communications with the employees or members of the North Dakota Industrial Commission about this matter in the last two weeks?
**A.** I have not, no.
Q. Do you know if Lonny has?
**A.** I'm not aware if he has or not, but I do

308

not believe he has.
Q. As part of your work on the -- the Summit project, did you do any work related to the surface facilities?
**A.** No, I did not.
Q. There was a comment yesterday that I believe -- and you can correct me if I'm wrong, but I believe you said that these injection wells will not endanger human health. Would you agree with that?
**A.** I believe Caitlin testified to human health.
Q. Okay. And did I hear it right or do you agree that the testimony was that these injection wells, the Class VI wells, will not endanger human health?
**A.** (BY MS. OLSEN) I believe I testified to the injection wells have engineering protocol in place that would not endanger human health or the environment in relation to $CO_2$ injection activities.
Q. Thank you. In making that statement, did you consider the potential of $CO_2$ releases from those surface facilities such as valves, blowouts, things of that nature?
**A.** That was discussed later on in the permit.

309

So my references to that are in relation to the injection well and the review that was done on the injection well specifically.

Q. Would it also be accurate to say specifically with respect to the things that happen downhole at the injection well?

**A.** The engineering safeguards in place downhole are such that they would prevent migration of $CO_2$ into USDWs or the atmosphere.

Q. What about the engineering safeguards between the terminus point of the Midwest Carbon Express Pipeline and the wellhead?

**A.** (BY MS. DOUGLAS) We believe we have witnesses coming up who are better suited to testify to that.

Q. Okay. We had a discussion yesterday about the permeability adjustment with the 2.5 multiplier. Do you recall that?

**A.** I do.

Q. Did you or Lonny have conversations with Summit at any point regarding that issue?

**A.** We did.

Q. And what were those conversations?

**A.** So as I testified yesterday, the results showed a slightly higher permeability that could

310

have been used to justify a higher multiplier. In discussions with EERC and Summit, EERC providing technical advisement to use a lower value, those discussions included discussions with Summit from a business case. They wanted to permit the site to take a certain amount of $CO_2$ and store $CO_2$ within a certain area.

And so through sensitivity modeling and business considerations, it was a joint determination to use 2.5. Additionally, the Commission has approved a permit for the Broom Creek Formation that has used 2.5 as well.

Q. What were the business considerations Summit expressed regarding the use of the 2.5 factor?

**A.** Again, I just discussed the amount of $CO_2$ they were targeting and the area -- the area to be permitted for $CO_2$. I discussed a little bit yesterday I didn't want to overestimate the storage facility area and then not inject that amount of $CO_2$ to where we would be over-leasing the area and not using it.

Q. So Summit was -- Summit's preference would be that that perm adjustment be a lower number based on that business consideration?

311

**A.** Through discussions with EERC and Summit, the 2.5 multiplier was selected.

Q. But specifically because in part of Summit's business considerations of wanting to keep the storage facility as small as possible for the amount of $CO_2$ they want to inject; right?

**A.** I wouldn't say it's as small as possible. There's just some consideration to not overestimate the area needed.

Q. Because if they reduce the size or the boundary of that storage facility, then if there are people just on the other side of that, they don't need to pay for any property rights for that; is that accurate?

**A.** Can you repeat that?

Q. If they reduce the geographic areal extent of the storage facility boundary, it reduces the number of landowners for whom they need to compensate for the use of the property rights and that's the business consideration; right?

**A.** It's a fact a smaller storage facility area would result in less landowners having to be permitted. The -- the business consideration wasn't related to number of landowners as it was area.

312

Q. What business interest does Summit have in reducing the size or boundary of that storage facility if it's not related to not having to compensate landowners?

**A.** I --

MR. BENDER: If you know the answer.

MS. DOUGLAS: I don't know that. I'd have to defer to Summit.

Q. (MR. BRAATEN CONTINUING) And so the compensation of landowners is the only thing you know of as a business consideration that they would have been thinking about in --

MR. BENDER: I think that's a mischaracterization of her testimony. Can you ask the question again?

Q. (MR. BRAATEN CONTINUING) Sure. You've testified to the business consideration of the need to lease landowners; right?

**A.** Yes.

Q. And that's the only business consideration that you've testified to related to Summit's consideration of which permeability adjustment factor to use?

**A.** Yes, but it's not the only business consideration. There's also operational costs

313

associated with monitoring. If they -- they use a permeability multiplier in a larger permeability multiplier as we discussed, it may result in a larger plume, likely a larger associated pressure front, larger AOR that would require additional acreage to monitor, meaning additional monitoring costs.

Q. And every five years or so Summit is going to rerun the models based on the data acquired thus far from that monitoring; right?

**A.** Yeah. So the regulations require a reevaluation of the AOR determination, no less than every five years, meaning that Summit will be using operational and monitoring data to history match, calibrate their models and confirm their permitted AOR and storage facility area are still sufficient.

Q. What if they found out it wasn't?

**A.** So the North Dakota Century Code 43-05-01-12 --

MR. BENDER: Let me -- let me correct you. That's the Administrative Code.

MS. DOUGLAS: Thank you for that correction.

Q. (MR. BRAATEN CONTINUING) 43-05-01, and what was the next one?

314

**A.** 12. Dash 12.

Q. Okay.

**A.** Okay. This contains the -- the regulation language regarding any changes to the storage facility area on that reevaluation. If it was deemed that the $CO_2$ would potentially go outside the boundaries and Summit determined they needed to expand the area, they would need to go through the modification process.

Q. And the result being potentially an adjustment to the boundaries of the storage facility?

**A.** That would require a major modification which I believe requires an additional hearing at that point if they needed to modify the permitted boundaries.

Q. But if the data indicated that the storage facility boundary had not been modeled in a way that was accurately reflecting the conditions in the last five years, that is a potential result of the five-year review, that you redraw the storage facility boundary; right?

**A.** Potentially.

Q. And if you did that, what do you do about all the payments you've made to the landowners so

315

far?

**A.** I can't speak to that.

Q. Is there any process you're aware of that would address that?

**A.** Again, I believe it would be addressed in that major modification proceedance, which would be a hearing just like the one we're in today.

Q. Were there any communications about using the 2.5 multiplier between EERC and the Industrial Commission?

**A.** I can't recall specifically. Potentially in their review of initial permit drafts submitted, it could have been discussed.

Q. If you had used 2.7 for the factor instead of 2.5, how many more acres of property would have been included in the storage facility?

**A.** I can't speak to that. We did not run that case.

Q. Okay. Do you have any sense of what that might be?

**A.** I do not because simulations are a complex, multi-physics approach, and so adjusting the permeability is not a straight ratio to plume size.

Q. Would you agree that it would result in

316

some additional acreage?

**A.** Yes, I believe I stated that.

Q. Just a couple minutes ago you made a reference to sensitivity analysis. Do you recall that?

**A.** Yes.

Q. What do you mean by "sensitivity analysis"?

**A.** So the EERC performs sensitivity analysis. Some of that is discussed in -- in the permit as well. We looked at parameters that affectively -- or could affect simulation results. In addition to that, to the sensitivity analysis, we also did uncertainty analysis to look at how various properties and distribution of properties, such as permeability, could potentially impact the -- the model and the simulation results.

Q. And that's essentially doing quality control to test the predictive utility of your model?

**A.** I wouldn't classify it as testing the utility of our model. We did those things to determine what parameters we thought were appropriate and justifiable for use in the model.

Q. Could you do that assessment of the

317

parameters chosen without running sensitivity analysis on the model?
**A.** Could you repeat that?
Q. Could you assess the propriety of the parameters used in the model without running any sensitivity analysis on it? Let me ask a different question.
What properties did you run sensitivity analysis on?
**A.** Sensitivity analysis, you said?
Q. Yep.
**A.** So we ran sensitivity analysis on injection rates, bottomhole pressure conditions, wellhead temperatures, wellhead pressures.
Q. For what purpose?
**A.** So on page 3-15, we have a paragraph talking about sensitivity analysis.
Q. And you indicate that because of the availability of data in the form of well logs, core sample data and rock fluid properties, the need for typical sensitivity studies of influential reservoir parameters has been reduced. Has it been eliminated?
**A.** No, which is why we ran a sensitivity analysis.

318

Q. What's the difference between the sensitivity analysis you ran and what you would refer to here as typical sensitivity studies?
**A.** Typical sensitivity studies would vary more parameters potentially. So we felt confident in site-specific data to define limits of certain variables so we didn't need to test those.
Q. Up until you ran the injection test?
**A.** I -- I don't understand the question.
Q. Well, what were the parameters you were comfortable with that you didn't need to run sensitivity analysis on?
**A.** Things like model size, grid cell size, boundary conditions. We ran certainty cases on property distribution. We didn't necessarily run sensitivity cases on property distribution.
Q. Would you have been confident using your model to develop this application for Summit with running zero sensitivity analysis?
**A.** I think it points back to your questions earlier where you asked about what is the intent of running these models to define the storage facility area in an area of review taking into consideration the required five-year reevaluation, the amount of $CO_2$ that would be injected in -- in that time. I

319

believe running a model without sensitivity analysis would -- would still provide enough insight to be able to safely inject for those -- at least those five years until the reevaluation time period.
Q. So you're comfortable with a larger margin of error in the first five years?
**A.** Given the amount of $CO_2$ that will be injected, the proposed $CO_2$ plume size, other variables such as the area of review evaluation that looked at proximity of legacy wellbores and things like that, given the testing and monitoring plan, yes.
Q. Because ultimately what we're talking about here are pressures and the extent of the plume, and given what's going to be injected in the first five years, you don't have those same safety concerns in those first five years; would that be fair?
**A.** Could you restate that?
Q. You're comfortable with a greater margin of error in the first five years; right?
**A.** Given the amount of $CO_2$ that would be injected, that's -- that's correct, because we're -- the model as a whole was used to define a

320

boundary which is for 20 years of injection plus a period of postinjection plus a buffer. So within that five years, we're talking about a much smaller area.
Q. And if it's not exact, it's not going to be problematic because you're not going to have injected enough to get out to that boundary by that time anyway?
**A.** That's my belief. Correct.
Q. Except that you're treating all of the landowners inside that boundary exactly the same with the first ton that goes down that well and everyone on the outside of that line exactly the same, meaning they get nothing; right?
MR. BENDER: If -- if you understand how the allocation formula works for paying royalties, you can answer the question, but if you don't, I would not -- I would not answer it if I were you.
MS. DOUGLAS: Could you restate your question?
MR. BRAATEN: I can't even remember. May I have you read it back, please?
(Record read as requested.)
Q. (MR. BRAATEN CONTINUING) With respect to compensation.

321

**A.** I guess I don't understand your question. If the $CO_2$'s still in the boundaries, you're in compliance with your permit and you're compensating those within the boundary.

Q. Regardless of where that $CO_2$ is actually?

**A.** I guess to Mr. Bender's point, I'm not comfortable talking on the compensation rates for landowners or how that's going to be distributed across owners within the area.

Q. And so to the extent you ran sensitivity analysis on the model and to the extent you're comfortable with the predictive utility of the model in the ways that you used it for this application, it was never a consideration to you how that would affect how landowners get compensated?

**A.** This modeling and simulation was done to define the boundaries. Summit made decisions related to compensation of pore space owners.

HEARING EXAMINER GARNER: Why don't we take a ten-minute break.

(Recessed at 10:00 a.m. and reconvened at 10:12 a.m.)

HEARING EXAMINER GARNER: We are back on the record. Mr. Braaten, you can resume your

322

questioning.

Q. (MR. BRAATEN CONTINUING) You had mentioned that the Industrial Commission had previously accepted the use of a 2.5 factor. Was that for the Project Tundra project?

**A.** For those permits, correct.

Q. And was the EERC similarly involved with developing those applications?

**A.** We were involved, but they had -- we were involved.

Q. Did someone from EERC make that determination in the prior case? That was a bad question. Let me ask it again.

Did someone from EERC make the determination to use the 2.5 permeability adjustment factor in the prior proceedings related to Project Tundra in which EERC was involved?

**A.** I can say we participated in those discussions. I can't provide more details on who made the determination and the parties involved as that project is -- is still actively being conducted and is governed by an NDA with Minnkota.

Q. If you were going to assess someone else's work developing the same models that EERC developed for Summit's application, how would you go about

323

assessing those models that were developed by others?

MR. BENDER: Do you understand what he's talking about when he says "assess"?

MS. DOUGLAS: I was just going to ask, assessing for what purposes?

Q. (MR. BRAATEN CONTINUING) If you were asked to determine if the inputs and parameters and ways in which the models were set up and run would be acceptable to you in your professional experience such that they would support an application for Class VI wells.

**A.** The EERC's been contracted in this capacity before, so I'm speaking from direct experience here. Typically, that review process would come in the form of presentations about inputs and assumptions used in the model by those that created the model. We would evaluate their inputs and assumptions for reasonability and if they're justifiable based on the data sets that they had available to them, and we'd take into considerations Class VI requirements related to compliance. But EERC has not in these roles -- where we've been contracted to perform this work before, we have not reviewed people's models or

324

rerun their simulations to -- to double-check things in that manner. We've reviewed their inputs and assumptions through presentations, reviews of reports, that type of thing.

Q. Presentations by whom?

**A.** As I mentioned, those that generated the models presented to us their inputs and assumptions. A lot of the information that would have been in those presentations is captured -- for our models that information is similarly captured in the storage facility permits.

Q. Did you run the model at a 2.7 adjustment factor for permeability?

**A.** I just previously mentioned earlier today that we did not.

Q. Why not?

**A.** We didn't feel it was necessary. We made a decision to run it with 2.5 and so we ran it with 2.5.

Q. Would it have cost you anything to run it at 2.7?

**A.** Yes, it would have cost us time, so --

Q. How much time?

**A.** -- hours, and it would have cost us time running it with the model license. So we only

325

have -- we pay for a model license for a month. Running the model would tie up that license for a week or so.

Q. Because that's how long it takes to run the model?

**A.** A model this size typically could be anywhere from two days to a week of run time, depending on if any errors are encountered and you have to restart the model.

Q. Meaning that if you had to restart the model, it could take up to a week?

**A.** Potentially.

Q. Could it take longer than a week?

**A.** Potentially, if there are model errors which can't be necessarily predicted when the simulator is going to experience a numerical error and give an error file.

Q. But you think an engineer could replicate it in four weeks?

**A.** You asked me how much time it would take to -- to build a model and I said four weeks to build the model. That's different than running the simulations.

Q. Okay. So several weeks to replicate the model and then at least another week to run it?

326

**A.** Correct.

Q. So it's your testimony that another engineer could both replicate and run that model in five weeks?

**A.** If the model they built ran and didn't experience any numerical errors that they would have to troubleshoot.

Q. Have you ever set up and run a model that didn't have any numerical errors that had to be troubleshooted?

**A.** Myself personally, no.

Q. There's a binder directly in front of you there with a number of tabbed exhibits. If you don't mind, can I have you open it to landowner -- or LO-63.

**A.** I'm there.

Q. Are there features on this map that you recognize from the shapefiles submitted by Summit to the DMR?

**A.** These appear to be the storage facility boundaries and the AOR for the three permits.

Q. Are you also familiar with the maps that were produced to indicate the 5-, 10- and 20-year pressure increases in the area of the injectors?

**A.** Yes, I'm familiar with those.

327

Q. And does it appear that one of those is also overlaid on this exhibit?

**A.** It does appear that way, but it's difficult to see given the color scale for that layer.

Q. You are familiar with the maps that were generated to indicate the areal extent of the pressure increases in the reservoir that were in the application; right?

**A.** I am.

Q. And so you'd agree that there will be increases in the pressure in the formation well outside the boundaries of the storage facility?

**A.** Yes. If we may, I'd like to speak off page 4-2 of the permit.

Q. Okay.

**A.** Figure 4-1.

Q. And just for the record, the permit being referenced is Exhibit 1A?

**A.** Correct. So this map is showing the predicted maximum subsurface pressure due to injection from the three sites. So this is at 20 years is where -- of injection is where we see the maximum. And as you can see, the pressure increase extends beyond the proposed facility

328

boundaries in the area of review.

Q. What variable of Darcy's law limits the amount and rate at which you can inject $CO_2$?

**A.** I don't think I could speak to that without the equation in front of me.

Q. What limits your ability to inject $CO_2$ into these Class VI wells? Let me ask that again.

What limits the rate and amount of $CO_2$ that you can inject into that reservoir through these Class VI wells?

**A.** So the bottomhole pressure constraint is the -- the regulatory constraint that dictates the amount of $CO_2$ that can be injected into these wells. So that bottomhole pressure constraint is derived as 90 percent of the fracture pressure gradient. So bottomhole pressure is the regulatory constraint for the Class VI.

Q. And the bottomhole pressure is obviously directly impacted by existing pressures in the formation; right?

**A.** That's correct.

Q. Are you familiar with the intervention by Minnkota in this proceeding?

**A.** Generally.

Q. Are you familiar with where the well is

329

that they had concerns about?
**A.** Yes.
Q. Is Summit's project going to affect the ultimate bottomhole pressure that limits Minnkota's project?
**A.** There will be pressure interference.
Q. Can I have you go back to Exhibit LO-63?
**A.** I'm there.
Q. Do you see in the legend there there's a number of different colors, and I'll agree with you the color scale's a bit off, but down near the bottom next to Swenson there's a white color. Do you see that?
**A.** Yep.
Q. Do you see the land that sits right in between the areas of review of the three different storage facilities?
**A.** Yes.
Q. Is there going to be pressure interference with Mr. Swenson's lands and pore space?
**A.** Define "pressure interference with."
Q. From the Class VI injectors that Summit is going to inject $CO_2$ into.
**A.** There will be a pressure increase in the reservoir due to injection. The map does show the

330

pressure increase will be in the pore space below that land.
Q. Which would similarly limit the ability to inject into the pore space in that part of the reservoir based on limits to bottomhole pressure that are being affected by that pressure interference by Summit's Class VI wells?
**A.** Yes, potentially.
Q. How much is Summit compensating for that?
**A.** They're not required to compensate based on North Dakota Class VI laws. They're required to compensate for use of pore space for $CO_2$ storage. Injection will cause pressure increase.
Q. Which reduces the availability of pore space for storage of substances?
**A.** No. The pore space is still there. It's not taking the pore space away.
Q. It reduces the availability of the pore space for the storage of substances?
**A.** I don't agree with that characterization.
Q. Why not?
**A.** An operator could come in and still develop that and store $CO_2$ in that pore space.
Q. Subject to a bottomhole pressure limitation that has been significantly impacted by

331

the three Class VI wells surrounding him; right?
**A.** For the amount. Bottomhole pressure might impact potential injection rates, not necessarily the volumes that could be stored there. So one thing to note that while injection operations will increase pressure, when injection stops or if injection rates are limited, after injection stops pressure will die off in the reservoir, and we have a map that demonstrates that.
During operations, you know, if Summit's injecting at a lower rate, there will be a lower pressure increase. It could also, you know, shut in wells which would result -- or decrease -- which would result in additional pressure decreasing there. The pressure increase is temporary, but a developer could come in and still inject $CO_2$ there.
Q. And you show equilibrium of pressures ten years after operations; right?
**A.** The permit has a map that demonstrates this pressure decrease. It doesn't represent pressure equilibrium.
Q. What would you project that to be in time from the end of operations?
**A.** We did not simulate that.
Q. Would you expect it to be more than

332

20 years?
**A.** We'd have to simulate that.
Q. Significant pressure interference for at least 30 years of Mr. Swenson's pore space caused by the Summit project?
**A.** Again, it would limit injection rates. It wouldn't limit the total volumes that could be stored on his land. So to answer your question, there would be a pressure increase of approximately 500 psi up to a thousand psi increase over the current pressure of the Broom Creek today for up to 30 years.
Q. What's the economic incentive for injecting $CO_2$ into the pore space?
**A.** Can you clarify that question?
Q. Is Summit being paid in the form of tax credits by the federal government to inject $CO_2$ in the pore space?
**A.** I believe Wade testified yesterday as to the -- the economic drivers behind their project. I can't answer questions on that.
Q. Will the 45Q credits be in place in the same form and amount 30 years from now?
MR. BENDER: Objection. Calls for speculation.

333

HEARING EXAMINER GARNER: Overruled.
MS. DOUGLAS: As written today?
Q. (MR. BRAATEN CONTINUING) Correct.
**A.** No. But as I mentioned, while Summit's operating, there's nothing that would preclude an operator from coming in and injecting to store $CO_2$. The same amount of pore space would still exist. They would just have to inject at lower injection rates, but they could still get the same amount of $CO_2$ in that pore space over time.
Q. How much longer amount of time?
**A.** We have not run that model.
MR. BRAATEN: Real quick, I apologize, on the prior exhibit, LO-83, I did not move to admit, and I would move to admit LO-83.
MR. BENDER: Did you say 83 or 63?
MR. BRAATEN: 83.
MR. BENDER: Oh, that one. I'm sorry.
MR. BRAATEN: I'm skipping back.
HEARING EXAMINER GARNER: Any objections?
MR. BENDER: No objection.
HEARING EXAMINER GARNER: The exhibit is admitted.
Q. (MR. BRAATEN CONTINUING) You talked yesterday briefly about the area of review and

334

corrective action. Did you look at the old wells that have been P and A'd around the area of the storage facilities?
**A.** (BY MS. OLSEN) We did.
Q. What did you look at in those wells?
**A.** Particular to this permit, there are no legacy wells in this area.
Q. Within the area of review?
**A.** Within the area of review for the TB Leingang, that's correct.
Q. Did you look at the legacy wells that are closest but not within your area of review?
**A.** We did not evaluate wells outside of the area of review.
Q. Okay. Are you aware of the Fritz-Lutz 1 well?
**A.** I don't believe that was in the area of review.
Q. Are you aware of where it is in relation to the area of review?
**A.** Which area of review?
Q. Any of them.
**A.** Not at this moment.
Q. And are you familiar with the Richter 1 well?

335

**A.** I recall the Richter 1 well.
Q. Did you assess that well in any way as part of your work on the Summit project?
**A.** No. Class VI rules only require evaluation of wells within the area of review.
Q. Can I have you turn to Figure 4-1, the pressure map we were taking a look at a moment ago.
**A.** (BY MS. DOUGLAS) We're there.
Q. Are the dots on this pressure map indicative of wells?
**A.** Yes.
Q. Are you generally familiar with the two wells I mentioned being to the southwest of the storage facility represented on this map? Sorry. I don't know who I'm talking to. Either of you who knows.
**A.** Not based on the current map. They're not labeled or have well names, so I can't identify them based on this map.
Q. And just based on your familiarity with your location, does it appear that the -- let me ask a different question.
Based on your familiarity with the Richter 1 well, is it your understanding that that well is generally to the south or southwest of the storage

336

facilities?
**A.** (BY MS. OLSEN) I don't recall that information, but if you say it is.
Q. So if we look directly south from the SCS1 injection wells that is indicated on the map with the green triangle, if you go south of that until you're outside of the area of review and storage facility boundaries, almost directly south in blue there is a dot and it is a dot directly south of the green triangle and within the area that I believe is indicated as a 400 psi pressure differential. Do you see where I'm pointing at that?
**A.** I do.
Q. Does that well have surface casing below the depth of the uppermost freshwater aquifer or U.S. drinking water aquifer?
**A.** I don't have that information in front of me.
Q. Have you assessed the integrity of the plugs on that well?
**A.** For this permit, only wells within the area of review are required to be assessed.
Q. I understand. But as a factual matter regardless of a requirement, did you assess the

337

integrity of the plugs on that well?
**A.** I did not.
Q. And did EERC assess that?
**A.** I don't recall.
Q. Do you know if Summit assessed that?
**A.** I don't know.
Q. You'd agree that the reservoir pressures in the area of that well are going to increase by 400 psi based on your modeling as indicated on this map at Figure 4-1?
**A.** That's correct.
Q. Did you run an MIT on the well?
**A.** We did not. I assume the well is plugged.
Q. When was it plugged?
**A.** I don't know. Most of the wells in this area are vintage and drilled in the '70s. That's my assumption.
Q. Or even earlier?
**A.** Sure.
Q. Some of them plugged before the 1950s even?
**A.** Perhaps.
Q. So plug job that's 70 years old now?
**A.** Seven years?
Q. 70.

338

**A.** Perhaps.
Q. And it was plugged before we had the oil and gas conservation laws on the books in North Dakota we have now?
**A.** Plugging rules were different, yep.
Q. How much time and expense would be required to pressure up an MIT and run it at 400 psi on that well?
**A.** (BY MS. DOUGLAS) That -- that well's abandoned and so it's -- it's not accessible at the surface. You'd have to redrill out the plugs and recomplete it to get any information out of it.
Q. Was there an assessment of whether that might need to be replugged?
**A.** No. Again, Caitlin's testified and stated here a couple times we're only required to evaluate the wells in our AOR.
I would like to say -- point out, we did look at potential leakage or ribbing of leakage in that well. So if I could direct you to page 3-41 to map -- to the map in Figure 3-2. So we modeled a case here assuming hypothetical leakage pathways, again, hypothetical leakage pathways, meaning that there's a leakage pathway through plugs for this model. If there was a leakage pathway due to the

339

pressure increase -- maximum pressure increase from injection, we're estimating over the life of the project only .005 meters cubed of formation fluid could leak up through that well, again assuming it's leaking, into overlying formations.
So, again, we have not evaluated that particular well. It's outside of our AOR. We don't believe that there is endangerment of USDWs due to leakage.
Q. But if the plugs were bad, your modeling indicates that fluids from the formation would travel up that well in some amount to the freshwater drinking aquifer that is not protected by a surface casing?
**A.** The Broom Creek as it sits today is overpressurized. If those plugs were bad because the Broom Creek is overpressurized, fluids would already be flowing.
Q. How much psi would it take to bust those plugs?
**A.** I don't have that calculation.
Q. So you don't know if the pressure formation would cause those plugs to burst right now?
**A.** (BY MS. OLSEN) Class G cement is

340

typically rated to 5,000 psi.
Q. Is that what they used in 1945?
**A.** I'd have to look at the plugging records to look at that specific well.
Q. Do they have plugging records?
**A.** I don't know.
Q. Do you have any familiarity with how wells were plugged in North Dakota in the 1940s?
**A.** Generally, yes.
Q. Based on what?
**A.** My experience working for the Department of Mineral Resources.
Q. If you put a Class VI injector on the Swenson land and ran it at the same rates and volumes that Summit is going to run its wells, would that have any impact on Summit's project?
**A.** (BY MS. DOUGLAS) Yes, potentially.
Q. Do you think Mr. Swenson could get a Class II disposal well into the Broom Creek Formation permitted on his land in between the three Class VI injectors?
**A.** So my understanding is that the -- the Commission -- and I might not be using the proper terms -- but if they grant this permit, they will define this as a field, and so my understanding is

341

Mr. Swenson could permit the Class II or a Class VI well on his land. He would have to work with the Commission and make sure that he abides by any Commission orders related to those field rights.

Q. Given your knowledge of the technical feasibility of that, do you think the Commission's going to grant that permit?

**A.** I think development of any subsurface resources in the state require the cooperation of many entities, including landowners and project developers.

Q. How is Summit cooperating with Mr. Swenson to allow him to develop his pore space subject to the pressure increases caused by Summit's Class VI wells?

**A.** Is Mr. Swenson actively trying to develop those?

Q. Do you have the answer to my question?

**A.** I don't have any knowledge of Mr. Swenson actively trying to develop those.

Q. And so if Summit is preventing him from developing those, what does it matter if he's actively trying to develop them right now or not?

**A.** Could you clarify how Summit's --

Q. Why are you saying it's significant or

342

relevant whether or not Mr. Swenson is actively trying to develop a Class II well?

**A.** Your question you asked me, I believe -- and it can be repeated back here, but I believe you asked why is Summit preventing Mr. Swenson from developing his pore space.

Q. Okay. Well, if I asked that, I apologize. My intended question is has Summit worked with Mr. Swenson or reached out or talked to him about how their operations are going to affect his ability to use his pore space?

**A.** I was not privy to the discussions between Summit and Mr. Swenson.

Q. Would you agree there's going to be about a 900 psi pressure increase in the pore space in the reservoir under Mr. Swenson's land?

**A.** Approximately, yes.

Q. Is the max bottomhole pressure about 3,000, 3,500? What's the max bottomhole pressure on the BK Fischer?

**A.** It's on the range of, yeah, 3,600 psi to 3,800 psi, depending on what site-specific data --

Q. So you're going to increase the pressure in his pore space by approximately 25 percent of the max bottomhole pressure?

343

**A.** I've not done the specific calculations, but if you're saying that's what it is --

Q. Is 900 approximately one-fourth of 3600?

**A.** Yep.

Q. There was testimony yesterday about the delineation of the $CO_2$ plume boundary, and I believe the testimony was that it was determined to be at a 5 percent concentration of $CO_2$ in the aquifer as the edge of the $CO_2$ plume; is that right?

**A.** That's correct.

Q. And can you tell me again why 5 percent?

**A.** Yes. So there's several studies out there that suggest that 5 percent is the detection limit for monitoring techniques, particularly 3D seismic.

Q. Would it be fair and accurate to say that at the bottom of the injector, bottomhole, you've got about a hundred percent $CO_2$ in the formation, would that be fair, during injections?

**A.** Right -- right at the injection well?

Q. Right. I'm just saying if you start aground like right at -- where you're injecting, we can make an assumption that the $CO_2$ is a hundred percent of the fluid right there; right? Within one inch of the bottom of the well -- actually, let me ask you something. Are they perforating the

344

well?

**A.** They will be perforating the well.

Q. Okay.

**A.** Or -- yes, they will be perforating the well.

Q. Is there going to be a lateral?

**A.** No.

Q. Okay. So within the wellbore we're at a hundred percent $CO_2$?

**A.** Correct.

Q. And you're indicating the edge of the plume is 5 percent $CO_2$?

**A.** Correct.

Q. Does the concentration of $CO_2$ become more diluted in a linear manner as you move away from the wellbore?

**A.** No, not necessarily. I'd like to point you to page 3-25 and 3-26.

Q. Okay.

**A.** So these are showing cross-sections through the simulated plume. These are representing the gas saturation in the model cells. So saturation of $CO_2$ is also dictated by the porosity and permeability of the rock, so you'll note -- so, again, this has the 5 percent

345

saturation cutoff. You'll note along the wellbore you see an area of white, so this is on Figure 3-15a. Even at the wellbore saturation is below 5 percent due to the porosity and permeability in that model layer.

So it's -- it's dependent on porosity and permeability and how the $CO_2$ would flow in the formation.

And just a point of clarification, saturation will never be a hundred percent. $CO_2$ injection can never move all of the formation fluid out of -- out of the rock.

Q. Okay. Thank you. If we held constant permeability and porosity, would the $CO_2$ become more diluted in a linear or logarithmic function as you move away from the wellbore?

**A.** Not directly linear or logarithmic, but generally it would. At the edges of the plume is where you see more mixing of $CO_2$ with -- with brine.

Q. So, generally speaking, if we were to plot the reduction in $CO_2$ concentration on a linear scale out to 1 percent, and let's pretend we can measure, would the area of that line representing 6 percent to 1 percent be much longer than the rest of the line?

346

**A.** Based on the volumes being simulated here, no, it would be much, much smaller because you'd have a larger area with higher saturation.

Q. Would the area over which the saturation changes from 10 percent to 0 percent be significantly longer than the area over which it changes from 20 percent to 10 percent?

**A.** I can't really make an educated guess on that --

Q. What would you expect?

**A.** -- at this time.

Q. Would you expect that area from 10 to 0 percent to take longer or be longer than the area from 10 to -- or 20 to 10 percent based on what you know about how it dilutes as it moves away from the wellbore as an engineer?

**A.** Again, I don't think I could -- could speak on that.

Q. Okay. And the 5 percent, again, though, was chosen because that's essentially the detection limit and that's the lowest limit you can detect with running the models? Sorry. Let me start over.

The 5 percent is used because that is the detection limit from the seismic?

347

**A.** Correct. Based on published studies --

Q. Okay.

**A.** -- from other carbon capture and storage sites that are in operation.

Q. But you agree that's not actually the border or the edge of where the actual $CO_2$ being injected is traveling to?

**A.** As discussed, it's the boundary we can detect.

Q. How?

**A.** With seismic.

Q. But only to a 5 percent concentration of $CO_2$; right?

**A.** Yep.

Q. So we know that there is $CO_2$ outside of that boundary if that boundary is set at 5 percent. It sure doesn't go from 5 percent to 0 within a millimeter; right?

**A.** There's the potential for $CO_2$ to be --

Q. It's not just potential. Just as a matter of physics, there's obviously $CO_2$ outside of that boundary; right?

**A.** Yeah.

Q. Is there a plan to put two different wellbores in at each injector site?

348

**A.** That's my understanding.

Q. Is the intent to do any kind of directional drilling with the wellbores?

**A.** I believe so, but I can defer questions of that to a witness who can answer in more detail.

Q. Okay. Did someone generate a PHI-H map for the reservoir in the area -- areas of review?

**A.** I don't believe one was provided in the permit and I'm not sure if one was produced.

Q. Would the -- would EERC have produced the PHI-H map if one was produced?

**A.** Yes.

Q. Can I have you look at Figure 3-1?

**A.** I'm there.

Q. It says the distributed PHIE property along a roughly west-east cross-section. It seems obvious, but I want to make sure I understand. The little callout in the upper left with the red line, does that indicate the cross-section?

**A.** That does. The red line's the path of the cross-section.

Q. Okay. Do you see the vertical line for the Archie Erickson 2?

**A.** I do.

Q. And do you see just to the left of that

349

there's a couple areas with some fairly significant pockets of red, I'll call them?

**A.** Yep.

Q. And then if we look over at the Milton Flemmer, just to the right of that there's an area that is mostly blue and green with just a little yellow. Do you see where that is?

**A.** I do.

Q. If we took a hundred-foot diameter core in that area with the red splotches just to the left of the Archie Erickson and then we took a hundred-foot diameter core in that area with the blue and green just to the right of the Milton Flemmer, would one of those cores contain more available pore space for the storage of substances than the other?

**A.** Yes. If we're -- we're -- in a hypothetical case if we're assuming that this model is a hundred percent accurate and represents the rocks there, where you have higher porosity, you're going to have more pore space just mathematically.

Q. And there's also a difference -- if we did that same exercise, there's also a difference in the amount of pore space available for storage based on the vertical extent of the formation;

350

right?

**A.** You're saying based on the thickness?

Q. Correct.

**A.** Yes. That would be a factor in that calculation -- sorry. That would be a factor of the calculation, would be height, if you're calculating volume.

Q. And would a PHI-H map show us geographically what the various values were, taking into account the porosity as well as the thickness?

**A.** It would for the realization of the model in the permit. One thing to understand, while we use site-specific data as controls, we used variograms and other means to distribute properties to the best of our ability. It doesn't mean that the model will be a hundred percent accurate, which is why we have that five-year reevaluation period in case our model -- or the actual subsurface geology is slightly different than our model, so that we can account for those differences in how bottomhole pressure is responding to injection as well as how the $CO_2$ plume is migrating in the reservoir.

Q. But if we look at Figure 3-1 in that area of red just to the left of the Archie Erickson,

351

you're not saying that the model just randomly allocated an area of higher porosity to that specific location based on, you know, a factor of variability. It's doing that because it is predicting that that actually has more porosity there in that specific location; right?

**A.** It's being informed by control points, but we did uncertainty analysis looking at a hundred different cases for property distribution -- sorry, not a hundred -- a thousand different cases for property distribution. We chose the one P50 case which we feel is the most likely.

Q. And you couldn't have done that unless you were able to do sensitivity analysis?

**A.** Uncertainty analysis.

Q. Sorry.

**A.** But, yes, that's correct. Those are the steps we performed to determine which model we had the highest confidency in being the most probable case.

Q. And it's important to do that; right?

**A.** When you're the operator looking to define the boundaries of your storage facility area, it's important as you will be obligated to operate and $CO_2$ must stay within those bounds.

352

Q. What if you're the landowner with pore space on the outside of that boundary, is it important for them?

**A.** I don't understand what context it would be important for them. The operator's required to keep $CO_2$ within their boundaries. If $CO_2$ is going to go outside their boundaries, they're in noncompliance with their permit. If they have to adjust their boundaries, they are going to have to amalgamate or acquire that additional pore space outside, go through this major modification and hearing process to get that approved.

Q. With respect to the compensation being paid to the landowners whose property is being used by Summit, is there any consideration given to the actual porosity or actual thickness of their pore space?

**A.** I believe Summit chose to treat all landowners within the storage facility area equally, meaning that the compensation is based by a total amount of $CO_2$ injected and they're given the proportional payment for the amount of land they have within the storage facility area. They did not use a volumetric approach. So in a volumetric approach landowners would be paid for the actual

353

amount of $CO_2$. Why that's not done is it -- it would -- it would benefit the landowners directly around the injection well, so Summit chose to treat all landowners within the storage facility area equally instead of --

Q. Accurately?

**A.** I don't agree with that classification.

Q. Well, they're not paying the landowners based on the amount of $CO_2$ being stored in their pore space; right?

**A.** Summit's paying for the use of the pore space, so they are leasing the pore space.

Q. Are they leasing the pore space from my clients?

**A.** My understanding is that your clients are outside of the storage facility area boundary, so their pore space is not being leased for storage of $CO_2$.

Q. Can I have you flip back to Landowner 63.

**A.** I'm there.

Q. If you see the different colors next to the names and you look at the map, there are blocks of colors both within and without the storage areas, areas of review and outside of those boundaries?

354

**A.** Yep.

Q. I apologize. Bear with me one moment. I think I may be done.

Is there a place in the permit application where thickness or porosity is broken down by landowner or tract?

**A.** No.

Q. Okay. Whether it's in the application or not, was that ever done or attempted by EERC, to your knowledge?

**A.** No.

Q. How does it affect the accuracy of your 3D seismic if you are not doing it on certain tracts?

**A.** It has the potential to reduce the resolution and quality of the seismic data.

Q. And does it reduce the resolution and quality just for that area specifically or does that lack of seismic in that area impact the quality of the other data?

**A.** So the quality of the seismic data is dependent on the fold as well as the source receiver offsets, so it's dependent -- the quality of the image is dependent on the fold within each area. Fold is lower when you aren't allowed to have source and receivers in a specific tract.

355

However, if you have sufficient source receiver offset, the quality of data will be lesser for shallower formations, but you would -- depending on the side of the land where you don't have source and receivers, you may still have source -- sufficient source and receiver offset to produce high-quality images with a seismic of the deeper formations.

Again, that's going to be dependent on the depth of the reservoir, the source receiver offset and the area where receivers and source weren't allowed to be placed or operated.

MR. BRAATEN: I don't have any further questions.

HEARING EXAMINER GARNER: Any questions from the staff?

**EXAMINATION**

**BY MS. MADCHE:**

Q. I have some questions. I would like to start out with some of the questions that were deferred to this group from earlier. Let's see here.

So you had given testimony on the location of coal reserves and coal leases within the three storage facility permits. Would you be able to

356

answer approximately how close mining activity currently is from proposed equipment, aboveground infrastructure for the three facilities? So to repeat, for each three storage facility permits, what's the proximity to current mining activity to date from the aboveground surface infrastructure? And if you need to defer that, that's fine. Just let me know.

**A.** (BY MS. DOUGLAS) All right. I'm going to point you to the Exhibit 2.

MR. BENDER: It's 1B.

MS. DOUGLAS: 1B. Exhibit 1B, page 280. This is the Archie Erickson/BK Fischer permit.

Q. (MS. MADCHE CONTINUING) Yep.

**A.** Figure 2-50. So these reflect the closest mining operations from the Coyote Creek and Beulah Mine which are the closest mining operations to any of the three storage facility areas. And you can see on this map green shows future mining activities and brown shows mined out -- or areas where mining has already taken place. And you can see the approximate distance from those to the proposed injection sites as well as the flowlines. So here the scale we're looking at, I believe those are townships. So it's approximately three to

357

four miles, the surface facilities are, from the future mining activities.

Q. And just to confirm, yesterday in your testimony you had stated that there were no active coal leases where surface infrastructure was planned for the three facilities; correct?

**A.** Correct.

Q. So earlier I had asked a question on why the Milton Flemmer 1 was used as the type log in Article 1.15 for all three storage agreements. Could you elaborate as to why?

**A.** I can. So the Milton Flemmer well penetrates the entire thickness of the Amsden, so it was used as the type log so that we could accurately represent the depth to the top and the bottom of the Amsden and the thickness. The other two stratigraphic test wells drilled for the other storage facility areas do not penetrate the entire Amsden. That is why the Milton Flemmer 1 well was used as the type log for all three storage facilities.

Q. When it comes to the royalty payments, would you agree that due to the lack of history matching data that we have that there would be more uncertainties to allocating via volumetric versus

358

the tract participation as Summit has chosen to go forward with?

**A.** I would agree with that. I'd also add that there are limitations for using monitoring methods to quantify the amount of $CO_2$ in a given area in the subsurface. Monitoring methods such as 3D seismic and time lapse changes that can be captured in 3D seismic are susceptible to both changes in pressure and changes in fluid saturation, so you would not be able to accurately separate out effects of pressure from $CO_2$ saturation in order to assure you're compensating landowners using a volumetric approach.

Q. So now I'm going to move forward to questions that I have from Section 2 on the geologic exhibits. For the storage facility permit for the TB Leingang, what was the maximum pressure applied during the microfracture testing in the Milton Flemmer 1 well within the Spearfish/Opeche Formation?

**A.** I'll defer that question to a later witness who was involved in those tests.

Q. Would you be able to state who it's being deferred to specifically?

**A.** Ms. Jean Oddy.

359

Q. Okay. As it pertains to all three of the storage facility permits and to their stratigraphic test wells, can you explain how you determined which sand package within the Broom Creek you target for your microfracture in situ stress test to determine the fracture propagation pressure gradient?

**A.** I'll also have to defer that to Ms. Oddy.

Q. Okay. For all three of the applications and the three stratigraphic test wells, was the next dissipation zone above the injection zone, so your Inyan Kara, sampled at all three facilities?

**A.** I believe so, yes.

Q. And did those samples show evidence that the formations are currently hydraulically separated?

**A.** That's our interpretation of the data, yes.

Q. And in all three storage facility permits, has any Fox Hills wells been sampled?

**A.** (BY MS. OLSEN) There's historical groundwater sampling data in Appendix B throughout each of the three permits. Plans to test those wells in the baseline sampling plan are described in Section 5 and will be testified to later.

360

Q. So just to confirm, you reviewed any data that already existed which would be in Appendix B, but no baseline sampling has started in the Fox Hills?

**A.** That's correct.

Q. Core plugs taken from the base of the upper confining zone in the Milton Flemmer 1 well had a fairly high anhydrite weight percentage, around 86 to 98 percent. Similar in the Archie Erickson, there was around 95 and a half percent shown. Did geochemical modeling indicate that it was likely that the boundary between the two formations would dissolve due to that percentage of anhydrite?

**A.** (BY MS. DOUGLAS) Geochemical modeling done for the upper confining zone showed little to no dissolution of anhydrite due to geochemical reactions with the modeled $CO_2$.

Q. And would that apply for both the TB Leingang and the BK Fischer?

**A.** That's correct.

Q. So I'm going to ask some questions related to the formation imaging logs. Would you be the correct witness to answer for all three storage facility permit applications? I only ask because

361

it was discussed that you were going to have another witness at the end that would talk about differences between the three facilities, or are you good with answering them?

**A.** We're good with answering the questions to all three.

Q. Okay. So in the Milton Flemmer 1 well, both in the formation imaging logs and within the thin sections specifically where high anhydrite content existed, there were a handful of fractures that were shown. Can you please explain why these fractures don't pose a risk to the storage facility?

**A.** You said for the upper confining zone?

Q. Yes.

**A.** Could you point to specifically what depth interval?

Q. So in figure 2-33 and into 2-34 in the TB Leingang application, it shows that there are a handful of resistive litho-bound fractures present in the Opeche/Spearfish interval. Why are these fractures not a concern as far as containment?

**A.** They're not a concern for containment because they're commonly filled. In the case of the resistive bound fractures, they're commonly

362

filled with anhydrite.

Q. So they wouldn't have transmissibility to have $CO_2$ move through them?

**A.** Correct. They wouldn't have transmissibility in the sense of they wouldn't have sufficient permeability.

Q. So now in the BK Fischer application, similarly in the Archie Erickson 2 well, the investigation also found fractures, including one minor fault. I would have the same questions for that one. I'll let you get to the -- the figure here. So Figure 2-30 (c) specifically would show some of the fractures and the minor fault that was found within the Opeche/Spearfish interval.

**A.** For this well the fractures were also commonly filled either with anhydrite or clay. In the case of the minor fault, it -- it appears to be isolated. It doesn't appear to transect a sufficient vertical extent to -- to serve as a fluid migration pathway or to be transmissible. Meaning it's a minor fault and it doesn't cut through the entirety of the upper confining zone.

Q. And similarly in the last application, in the Slash Lazy H 5 well there were fractures found and a minor fault in the Amsden Formation.

363

**A.** Again, the minor fault -- or the fractures are commonly filled, in this case commonly with anhydrite. Similarly, given the geometry of this minor fault, it appears to be isolated and does not have properties to -- for it to serve as a fluid migration pathway.

Q. So I want to go back to the BK Fischer application. In the 3D seismic survey that was done across these three storage facilities, was the Stanton fault that was suspected to run through the northwest corner of the BK Fischer storage facility area found in the 3D seismic?

**A.** No. The proposed location of the Stanton fault is on the edge of the 3D seismic survey. We saw no indication of the fault or any deformation associated with the fault.

Q. So now I'm going to move to questions related to Section 3 for the model and simulation. Do you know what the geographical projection was used in Petrel for the geologic model?

**A.** I don't have that information on hand, but perhaps I could provide it after a break.

Q. Okay. And what is the cell size in the model both within and outside of the refinement grid?

364

**A.** Outside the refinement grid, it's a thousand by a thousand feet. Within the refinement grid, I believe it's 250 feet by 250 feet.

Q. So on Figure 2-3 on page 2-5 that shows a boundary for the simulation model, could you explain why the boundary was centered as shown in that figure within the geologic model?

**A.** Are you asking why the simulation model extent was centered within the geologic model extent?

Q. Yes. Or how it was determined as far as placement for the centering with it?

**A.** So the -- the simulation model extent was selected to cover Summit's sites and have enough of a boundary -- or have enough cells as to model the pressure plume and not have artifacts due to boundary conditions. Additionally, we wanted to incorporate the nearest site, the DCC West site, to evaluate potential pressure interference.

Q. In the numerical simulation, are all three facilities injecting across the same 20-year injection period?

**A.** Yes. That's what was modeled.

Q. In this section it's stated that the TDS value of the Broom Creek measured from the Milton

365

Flemmer 1 was used as the input for the numerical simulation. Can you explain why the Milton Flemmer 1 sample was chosen out of the three?

**A.** Yes. So the Milton 1 sample was the -- the meeting of the three values. We selected that as it was a site-specific value close to what could be considered an average between the three.

Q. And could you explain what effect the TDS input would have on the $CO_2$ plume?

**A.** Yeah. A higher TDS could potentially result in a smaller plume.

Q. Similarly, it's stated that the temperature and pressure gradients derived from the Milton Flemmer 1 were used in the simulation. Similarly the reasoning behind why the Milton Flemmer 1 was chosen?

**A.** One of the reasons being wanting to apply the same reservoir conditions associated with the salinity value.

Q. And could you explain what effect temperature has on the $CO_2$ plume? Movement, to clarify.

**A.** A difference in temperature could result in either a larger or smaller plume.

Q. So let's say like an increase in

366

temperature.

**A.** I can't recall at the moment. I could provide that answer potentially after a break.

Q. You had noted earlier that the $CO_2$ stream used in the geochemical modeling was done at 95 percent $CO_2$ and 2 percent oxygen to be more conservative because oxygen is likely what's going to be most reactive. Could you explain additionally -- so in earlier testimony with group one, they had stated that the minimum requirement for the $CO_2$ purity would be 95 percent to be able to take $CO_2$ from sources to send to these storage facilities. Can you explain why in the numerical simulation 98.25 percent was used instead of 95 percent? 95 percent being the minimum cutoff for Summit to take $CO_2$ from third-party sources.

**A.** Just to clarify, that's what Wade testified to, 95 not 98.

Q. Correct. But the model uses 98.25 percent. I'm just asking why 98.25 percent was used in the numerical simulation.

**A.** Sure. So 98 percent is the expected operational composition.

Q. And could you just explain what effect $CO_2$ purity also has on the $CO_2$ plume movement? So like

367

a higher $CO_2$ purity would have what influence on $CO_2$ plume movement?

**A.** In this case because of the compositions where we're talking about, the potential would be changes in plume size, but they -- it would be very minimal.

Q. As proposed well injectors are drilled, so for the three applications the six injectors haven't been drilled yet. As they are drilled and logging and coring and testing data is gathered, that planned to be incorporated into the geologic model and an updated simulation ran prior to starting injection?

**A.** I don't know specific plans to update the model, but I believe regulations require validation of the proposed model inputs with the injection well data, including the injection test that's required for each injection well.

Q. So to confirm, if -- if the results indicated a substantial change and the regulatory group requested that it be done, at that time it would likely be done?

**A.** By the regulatory group you mean the DMR?

Q. DMR.

**A.** Yes, we would.

368

Q. At what frequency will plume predictions be updated once operations are underway?

**A.** No less than every five years.

Q. So I'd like to go to Figure 3-6 on page 3-10 in the TB Leingang application.

**A.** I'm there.

Q. For all of the applications when showing the permeability curves used for siltstone and anhydrite, they were used equivalently. Could you explain why you're using the same? So to clarify, can you explain why the same permeability curve is used for siltstone and anhydrite?

**A.** Sure. That's related in part to the core analysis sampling and the data points available. Because siltstone and anhydrite are expected to be low permeability and porosity lithologies, we felt it was sufficient to apply this data set to both lithologies in the model.

Q. So I'd like to move to Table 3-5 on page 3-35.

**A.** I'm there.

Q. So for all of the applications when having this table shown for the EPA Method 1, you are using the proposed locations of one of the injection wells, being the TB Leingang 1, the BK

369

Fischer 1 and the KJ Hintz 1. Considering these wells haven't been drilled yet, can you explain how these values are derived?

**A.** Sure. So these values are taken from the geologic model and the simulation model.

Q. And can you explain why it was chosen to use these rather than the three stratigraphic test wells?

**A.** Given that we modeled to populate these, you'll note that, for example -- so I'd -- just trying to find a map I'd like to point you to. So I'd like to point you to page 3-22. So here is a map of the -- the average pressure change after 20 years of injection. Again, the AOR was defined using pressure data from the simulations. If you look at -- here in this case the green triangle represents the injection well and just to the southwest of that, that gray triangle represents the Milton Flemmer well, and you can see that there is a large difference in pressure between those two locations. So in that sense it was more appropriate to use data from the injection well location to be able to evaluate pressure change.

MS. MADCHE: That is all the questions I have. Thank you.

370

**EXAMINATION**

**BY MR. STOLLDORF:**

Q. Moving on to Section 4, I have some questions about locations. If you guys can't answer these, just let me know who can. Start on page 4-4, Figure 4-2. Just an AOR map showing occupied structures, among other things. How far exactly -- or approximately how far away from the facility are -- are occupied structures?

MR. BENDER: We have another witness who can provide that unless you know.

MR. STOLLDORF: Do you know who just so I know who to ask?

MR. BENDER: It will be Jimmy Powell.

MR. STOLLDORF: Jimmy.

Q. (MR. STOLLDORF CONTINUING) For the TB Leingang, BK Fischer and KJ Hintz wells, have any baseline samples been taken from these wells to date?

**A.** (BY MS. OLSEN) Not in this part of the Summit project.

Q. Okay.

**A.** Water -- Fox Hill -- you mean groundwater monitoring wells; correct?

Q. Correct.

371

**A.** Yep.

Q. This one is just related to the KJ Hintz facility area of review. The Raymond Jensen 1-34 well, File No. 4942, is a plugged and abandoned well within that facility. Can you briefly explain the protective measures that are being made to monitor the $CO_2$ plume movement near that well?

**A.** 3D seismic surveys will be taken at least every five years as part of the testing and monitoring plan to track the plume. And at or around year 19, Summit proposes putting in an additional groundwater monitoring well in the Fox Hills Formation nearby that legacy wellbore.

Q. Do you know how -- approximately how close?

**A.** I don't think the final location has been determined yet.

MR. STOLLDORF: Okay. That's all I have.

**EXAMINATION**

**BY MR. SUGGS:**

Q. Okay. Bear with me. A lot of my questions have been asked at different levels, so I'm going to have to pan through this as I go.

But I'm also going to start with a couple of questions that were deferred. One being the --

372

looking at Figure 1-1 on 1-2 -- on page 1-2 of the Leingang application. Okay. I'll start with the odd shape of the $CO_2$ plume as it exists in the modeled stabilized $CO_2$ extent. Is there any explanation for why we don't see $CO_2$ in that central area, the southwest central area?

**A.** (BY MS. DOUGLAS) Yeah. In this region of the model, we had low porosity and permeability layers. That's why you don't see predicted migration of $CO_2$ plume there.

Q. The low PHIE and perm, I guess, layers that exist in that area, were they arbitrarily -- and when I say "arbitrarily," just purely due to the variograms were they assessed or was there additional seismic evaluation that supported that low porosity/perm area?

**A.** There is additional seismic data that was used as control points and to -- to support the distribution of properties, but it should be noted that seismic data has resolution images for resolving thicknesses of different porosity and permeability layers, so there's potentially some uncertainty.

Q. Okay. So I guess in that explanation, did it just -- I'm going to tie this back to some of

373

the discussion on the depositional environment. Would the seismic in that area indicate it was partially interdunal or do you see the dune structures there or not?

**A.** Correct. That would suggest the low porosity and permeabilities typically associated with those interdunal dolomites as well as anhydrite deposits.

Q. Okay. And then I asked this as well earlier, but in Township 141 North, Range 88 West, Section 35, you'll note that on this exhibit, at least, the stabilized $CO_2$ plume extent does appear to contact the storage facility area border. Do you know what the distance is between there? What kind of buffer is applied at approximately around that area?

**A.** Yes. So regarding the stabilized $CO_2$ plume extent, it's a short distance, you know, on the order of 10 feet, but I would like to point out the red line is the $CO_2$ extent at the end of injection. So we feel that that buffer is reasonable, and we will, you know, reevaluate the predicted plume movement and our storage facility area boundaries no less than every five years to confirm that.

Q. So just to clarify, the red line is the

374

extent of the $CO_2$ migration at the end of the 20-year injection cycle?

**A.** Correct.

Q. And the gray that goes outside of that would be where the model is predicting that $CO_2$ to migrate during a ten-year postinjection phase?

**A.** Correct.

Q. Okay. Moving on to Sections 2 and 3, on page 2-17 -- I've got to get there myself. The narrative right above the figure indicates that the net sandstone thickness in the simulation model area ranges from 6 feet to 397 feet with an average of 140 feet. Can you point me at -- somewhere on the figure below, Figure 2-10a where it would approach 6, or is that a typo in any way?

**A.** I believe the typo should say -- I believe those values are from the geologic model extent, not the simulation model extent, so that is an error.

Q. Okay. So that wouldn't be -- so what should that read, then?

**A.** Because it's sandstone thickness, I'd have to calculate that from the model. I can't derive that from the thickness map.

Q. I guess looking at the isopach of the

375

Broom Creek, then, do you see anywhere on that map that you're presenting where the thickness would approach 6 feet? I mean in glancing at it, I thought the -- the thinnest that was represented was on the order of a hundred feet.

**A.** Yes. That's why I believe that that's an error. It should say those values are from the geologic model extent where the Broom Creek actually --

Q. Oh.

**A.** -- does pinch out, not the simulation model.

Q. Got you. So not the simulation, but the whole --

**A.** Correct.

Q. -- geologic?

**A.** So that -- I believe that sentence is in error.

Q. And that'd be where it would punch out to the northeast and the Broom Creek wouldn't exist --

**A.** Correct.

Q. -- far northeast of the whole model area?

**A.** Correct.

Q. Okay. Page 2-22. At the bottom of that page you indicate that there's, I guess, a sample

376

bias towards the sandstones that were sampled. Does that sample bias affect the overall model in any way?

**A.** No. So the core samples were used to calibrate petrophysical logs of porosity -- calculated porosity and permeability, and those logs were what were used to help derive model properties. So I -- I don't believe that that bias impacted the model in a significant fashion.

Q. Figure 2-16 on page 2-25.

**A.** I'm there.

Q. At the very top of the Broom Creek here, you have an anhydrite facies identified in column 7 on that figure. And then in column 8 when you upscale those for the modeling purposes, it's being applied the siltstone facies. Is there any effect on the modeling due to that or is there a reason that was applied instead of the anhydrite facies?

**A.** There is not an effect of that. Both the anhydrite and siltstone are populated as low porosity and permeability.

Q. So functionally they both act as confining layers in the modeling?

**A.** That's correct.

Q. That drives me to the geochemical side of

377

this so I'm going to jump probably largely over into Appendix C, but bear with me. The -- the narrative -- so I'm looking at C-15 and 16 here -- or sorry -- Figures C-15 and 16. I think I'm on C-12.

**A.** Figure C-15 and 16 or page --

Q. So the narrative that I'm asking about is on page C-12 where you reference Figures C-9 and 10, which those figures are on pages C-15 and C-16.

**A.** Okay.

Q. This narrative indicates that dolomite is the primary entity in dissolution and that anhydrite is precipitating it. I just want to confirm that.

**A.** That's correct.

Q. Okay. So in previous applications, the anhydrite has been identified as a primary dissolving element in those models, in those geochemical analyses. So I guess my questions here are what is different about the modeling that was done here or the chemistry of the water or the chemistry of the rock that is causing anhydrite to be a precipitant instead of a dissolving --

**A.** I don't have that answer readily available.

378

Q. Is that something that may be provideable in short term or is that something I might need a supplemental response on?

**A.** I could potentially provide it after a break.

Q. Okay. I guess I'll -- I guess I'll ask that if it's not something that can be answered in testimony after a break, that it would be submitted as explanation in supplemental.

**A.** Okay.

Q. Still on C-12 here -- bear with me. So actually on page C-14, Figure C-8. In this figure, the bottom figure, shows that mineral trapping is still on the negative side of the equation so more dissolution has taken place than precipitation at this point through the extent of what's presented on this figure; correct?

**A.** Yes. So what this figure is showing is why there's negative amount for mineral trapping. It's because of that dolomite being dissolved and that those dissolved carbonates are being attributed to as carbon that was added into the system.

Q. Okay. In previous testimony you indicated that it would be on the order of hundreds of years

379

before true mineralization started happening for $CO_2$ in the storage reservoir. Have you projected that out? Do you know a rough time frame when that negative trend starts moving the other way?

**A.** We have not modeled that.

Q. Okay. C-18.

**A.** Maybe just one point very quickly. Sorry, we're going back to Figure C-8. You can see by the slope of the curve, after $CO_2$ injection ends, we have less of that mineral trapping and that slows down over time.

Q. But you still haven't taken it to the point of when that actually reverses? It's just --

**A.** That's correct.

Q. -- expected or anticipated that it does reverse?

**A.** Correct.

Q. Okay. Going on to page C-18, the -- the narrative here for your PHREEQC model, and you've testified to this earlier, that you used the diffusion process for the mechanism by which the $CO_2$ would enter. And, conversely, if you look at later in the -- in the appendix when you're talking about the lower confining zone and the simulation that was done there, you're talking about advection and

380

dispersion. Can you elaborate a little bit on why the two different mechanisms are used for the two different confining zones?

**A.** Yes. So diffusion was used for the upper confining zone as $CO_2$ is a buoyant fluid which is -- so $CO_2$ is a buoyant fluid which is why we needed to use advection and dispersion which allowed the $CO_2$ to dissolve in -- in -- in brine and the density to allow it to enter the model cells for the lower confining zone.

Q. So for the lower confining zone -- sorry, I'm going to have to ask you to clarify that. Focus on why diffusion was used for the upper confining zone modeling.

**A.** I don't think I can elaborate and provide that specific answer at this time, but I could potentially provide it after a break.

Q. Okay. Probably the same situation, if I don't get that answer as part of testimony, I might want it as a supplemental.

**A.** Correct. We would be able to provide that.

Q. Page C-18 still. The formation brine for the simulation that was done on the Opeche and as well as the -- or the Opeche/Spearfish as well as

381

what was done on the Amsden for the lower confining zone, in both cases you used the brine composition as it was determined from Broom Creek samples?

**A.** That's correct.

Q. Can you elaborate on why?

**A.** Just let me confirm something real quickly.

So it's my understanding given the porosity and permeability of at least the Opeche/Spearfish, we weren't able to collect a fluid sample due to the immobility of the water due to low permeability. Therefore, we used the Broom Creek as a representative sample as we don't believe the composition will vary greatly.

Q. Okay. Still on page C-18, Table C-4 the average mineral composition of the Opeche/Spearfish that was used here, can you confirm which facies within the Spearfish that would represent -- or the Opeche/Spearfish?

**A.** This sample -- the average sample here is approximately 60 percent mineral weight anhydrite, so I'd interpret that as anhydrite.

Q. On page C-19, middle paragraph there when you're discussing Figure C-13, you indicate that the net change due to precipitation or dissolution,

382

in this case you're referencing C2, which is a cell within the model that was done, has less than 5 kilograms per cubic meter net change. That net change, is that positive or negative?

**A.** I'd have to clarify how that was calculated and provide that as a supplement.

Q. I don't think I could confirm or guesstimate with the figure in front of me which way that would be going, so if we could confirm that as well.

**A.** Yep. We could provide that as a supplement.

Q. Page C-25, similar question. This happens to be the -- Table C-6 on page C-25 -- averaged mineral composition for the Amsden formation that's being presented in this table. Could you elaborate and confirm which facies that were represented in your modeling?

**A.** I'd characterize that as a -- well, it would be represented as a dolostone in our model.

Q. Okay. I guess a similar question on page C-28. The narrative at the -- in the bottom paragraph, again you're referencing an overall net porosity change as less than 2 percent. And can you tell me whether that's a positive change or a

383

negative?

**A.** I would like to provide that as a supplement.

Q. Okay. Then back up to Section 3, page 3-7, I believe. The bottom paragraph on page 3-7 you discuss the distances from the edge of the model and the volume modifiers that were applied as boundary conditions. Can you spend just a few moments confirming what those distances are measured from and to within the model? And then -- well, I'll let you do that first.

**A.** So those distances are measured from the Broom Creek extent interpreted by the EERC which is shown on page 2-16 in Figure 2-9.

Q. So the distance you're referencing there is the distance from the edge of the Broom Creek to the edge of the modeled area?

**A.** To the edge of the simulation modeled --

Q. The whole simulation.

**A.** -- area. That is correct.

Q. Okay. And then when applying your volume modifiers as boundary conditions, can you elaborate on what the effect of those are within the model?

**A.** Yes. So we applied the volume modifiers to represent the fact that we don't have an

384

infinitely acting aquifer where the Broom Creek pinches out. Because we don't have an infinitely acting aquifer, there will be differences in how pressure responds in the reservoir due to that pinch-out. And so these modifiers were applied to take into account that difference in boundary condition between an infinitely acting aquifer and the closed boundary.

And so the volume modifier is used in the CMG calculations with the boundary condition to account for the specific distance beyond the model where that pinch-out occurs, and so that is accounted for with the boundary conditions as it relates to the simulated pressure.

Q. So the -- the cell -- the modifier being applied to a boundary cell allows -- allows that cell to act as if it has a larger volume than its individual cell size?

**A.** That's correct. To allow the computational simulator to account for how that pressure would respond outside of the model.

Q. So the smaller values have less distance or less volume in the reservoir in that direction --

**A.** Correct.

385

Q. -- towards a pinch-out or towards a boundary of the -- the -- I guess the Broom Creek as a whole as opposed to what's actually simulated within the model?

**A.** That's correct.

Q. So this was asked a little bit, so I'm on page 3-8, the description your capillary pressure curves, and you indicate that they were derived from mercury capture -- mercury injection capillary pressure testing on the cores; right?

**A.** Correct.

Q. But then that they were modified. Can you elaborate on the need why they were -- why it was necessary to modify those core-derived values and what that process looked like?

**A.** So those values were calculated using data for -- from a single sample, so we looked at the porosity and permeability from that sample to upscale it to the ranges of the porosity and permeability reflected in our model.

Q. Okay. When you say that, was that -- when you say the single sample, you're referring to the single sample that was used to derive the two confining zones, being anhydrite facies values and siltstone facies values, or am I -- yeah, siltstone

386

and anhydrite.

**A.** We took capillary entry pressure data from a single sample from those units to derive these curves.

Q. Okay. And so, I guess, the modification of that mercury -- mercury-injection-derived data to be representative for $CO_2$ injection, what was done to, I guess, adjust the mercury fluid properties to the $CO_2$ fluid properties?

**A.** I could provide that answer after a break.

Q. Okay. Same, I guess, question or same response, then, if it's something that doesn't come as part of direct testimony, we'll want supplemental explanation for it.

Down in the AOR page 4-14, it was actually referenced in a number of locations, including on page 4-12 in Table 4-6, but there's a reference that's being used to the Tongue River Formation for a freshwater aquifer. I just -- I guess I'm just going to point out and confirm that Tongue River isn't a formation recognized on the North Dakota stratigraphic column at this time. There's an RI 59 -- Report of Investigation 59 that was published in 1977 that proposed renaming the Tongue River and the Ludlow as they correlate from Montana and

387

Wyoming to the Slope and -- drawing a blank on the other one and I don't have it written here -- but rename those two formations. The Tongue River as you're referencing here would be equivalent to those two formations that are represented on the geologic strat column in North Dakota; correct? Or can we confirm that?

**A.** (BY MS. OLSEN) We can confirm that.

Q. Okay. On page 4-16, there's a line here in your narrative that reads, "The Pierre Formation is the thickest shale formation in the AOR and primary geologic barrier between the USDWs and the injection zone."

The primary barrier would be the upper confining zone; correct?

**A.** (BY MS. DOUGLAS) That's correct. So that's a misstatement.

Q. It would just be an additional barrier --

**A.** Correct.

Q. -- of significant thickness as what's indicated?

**A.** Yeah. We -- we consider it as a tertiary confining zone because there's the primary confining zone, a secondary confining zone, and then we consider the -- everything between the

388

Inyan Kara Formation and the Fox Hills as a tertiary confining zone.

Q. One last item I'm going to jump -- it kind of mixes between the AOR and the -- and Section 3. It's actually on 3-42 I think where the -- page 3-42 where the narrative is. Right at the bottom of this page there's a statement, "Therefore, the AOR is delineated as the storage facility area plus a 1-mile buffer."

This immediately follows a discussion of the risk-based AOR approach that was taken, but the one-mile buffer that's applied for that AOR, is that -- is there any importance to the one mile that's being used or is that just a value that is chosen?

**A.** I can confirm during break, but to my understanding, that the AOR at a minimum has to be the storage facility area plus a one-mile buffer, but I will confirm that my understanding is correct during the break.

MR. SUGGS: Okay. That'll be all I've got on these sections.

HEARING EXAMINER GARNER: Okay. At this time why don't we take a break for lunch for an hour.

389

(Recessed at 12:29 p.m. and reconvened at 1:30 p.m.)

HEARING EXAMINER GARNER: Okay. We are back on the record.

Attorney Bender, how would you like to proceed? Are we going to answer some questions that were pending?

MR. BENDER: Yes. I don't know if I should say we'll recall -- we'll bring back Amanda Douglas who -- and there were some questions posed for her and she said she needed a little time during the break to research those answers. What we were proposing, perhaps to save some time, is she can read what she believes to be the question and then she can give the answer. And then there was a question or two also that Caitlin Olsen got that needed a little time to respond to. So I can just ask Amanda a few questions and proceed that way, if that's okay with you, Mr. Examiner.

HEARING EXAMINER GARNER: Is that okay? That's fine.

**REDIRECT EXAMINATION**

**BY MR. BENDER:**

Q. All right. Amanda, before we took the break, when you were answering some questions that

390

were posed to you by the Commission staff, I believe it was your testimony that if you had a little time during the break, you could take a look at some of your notes and some of the documents you have and respond to those questions; is that correct?

**A.** (BY MS. DOUGLAS) That's correct.

Q. Do you want to just walk through the questions as you understood them and then provide us with the responses?

**A.** Yes.

Q. Okay.

**A.** With respect to the projection system used, it was NAD27 North Dakota State Plane South U.S. feet.

The Commission had a question about generally how would having a higher reservoir temperature impact plume size. So it should be noted that temperature isn't the main driver in dictating plume size. There's other parameters that are more sensitive or the -- the -- the $CO_2$ plume size is more sensitive to other parameters. But generally a higher temperature could result in a bigger plume.

I had a question on why we saw

391

precipitation of anhydrite and dissolution of dolomite and what constituents in the water chemistry or the mineralogy used for those models was different than previous permit submitted that would cause this. We would like to provide that answer as a supplement.

I had questions about the transport mechanisms for the PHREEQC modeling. For the upper confining zone, diffusion is expected to be the dominant transport mechanism due to the buoyancy of the $CO_2$. At the boundary between the reservoir and the confining zone, the reservoir will have a higher $CO_2$ concentration, so diffusion will allow the movement of gas from an area of high concentration to an area of low concentration.

So with respect to advection and dispersion, these are the expected dominant transport mechanisms for the lower confining zone. So dispersion in the sense of the $CO_2$ mixing and forming saturated brine and that saturated brine mixing with unsaturated CO -- brine that's unsaturated with $CO_2$ and the different densities between the two and that mixing by dispersion, so between that and advection, those are the expected dominant transport mechanisms, and that's why those

392

were used for the lower confining zone.

And there was a question on the use of MICP data and calculated relative permeability data, and we'd like to provide that as a supplement.

Q. That's all you have? Those were the questions you received; is that correct? Those are the questions?

**A.** Those are the questions I received. There is one more question that I received that Ms. Olsen will be providing the answer to.

MR. BENDER: Mr. Examiner, unless there's other questions from the staff of Ms. Douglas, I would move to Ms. Olsen.

HEARING EXAMINER GARNER: Okay. That's fine.

Q. (MR. BENDER CONTINUING) Caitlin, can you recite for us what the question was that you're going to address for us now?

**A.** (BY MS. OLSEN) Yeah. The first question, Rich, I believe you asked -- I don't remember the order in the questions, but you had asked about the nomenclature for some of those aquifers and namely the Tongue River. The new name that is more recently used is Bullion Creek, and so that is the

393

same formation. We're talking about the same thing there, just to clarify.

And then the second question you had asked about the AOR and the minimum one-mile buffer outside of the storage facility area. That language comes from 43-05-01-05 and it's -- that language is outside throughout that rule, and it references it -- the area several times. And just to give an example, it will say something like the evaluation must do X, Y, Z in the facility area and within one mile of its outside boundaries.

So the AOR, when we talk about reviewing wells and items inside of the AOR, is the storage facility area and one-mile boundary pursuant to 43-05-01-05.

MR. BENDER: Okay. If there's no questions from the staff, Mr. Examiner, we're ready to move forward with our next witness as we talked. Oh, I'm sorry.

MR. SUGGS: I did have a couple questions that weren't addressed.

**FURTHER EXAMINATION**

**BY MR. SUGGS:**

Q. The net positive or net negative?

**A.** (BY MS. DOUGLAS) I had stated earlier

394

that we'd like to provide those, too, as supplements.

Q. Okay. As a supplement still. Okay. And then I apologize, but I did have one set of questions that I forgot to hit and I have to find it again in my notes. Page 2-66.

MR. BRAATEN: Of Exhibit 1A?

MR. SUGGS: Yes.

MR. BRAATEN: Thank you.

Q. (MR. SUGGS CONTINUING) And I guess the narrative actually starts on page 2-65 regarding your Mohr-Coulomb Critical Stress Analysis of Faults. The faults that you have depicted in Figure 2-42, can you identify what depths those were identified at or what range of -- there's been testimony that there's no faults in the injection reservoir or the confining zones. So where are these faults coming from? How were they identified?

**A.** Yes. So the 3D seismic survey acquired over the project area led to the identification of several deep faults within the storage -- all three storage facility areas. These faults originate within the Precambrian basement and all of them terminate below the top of the Interlake Formation,

395

which is approximately 3,000 feet below the Broom Creek Formation.

Q. So they're all deep --

**A.** Correct.

Q. -- features?

Okay. And those are some of the items that are identified or at least visibly identifiable on Figure 2-41 on page 2-64?

**A.** That's correct.

MR. SUGGS: Okay. Thank you.

MR. BENDER: Okay. Mr. Examiner, if there aren't any further questions, our plan now is to call four new witnesses, and then we will recall Caitlin Olsen to do the comparison between what we've discussed in great detail, which is the Leingang with the Fischer and the Hintz. And then we're going to recall Wade Boeshans to talk about the amendment that the Commission received a letter on from Minnkota.

HEARING EXAMINER GARNER: Okay.

MR. BENDER: So our first witness will be James Powell.

HEARING EXAMINER GARNER: Mr. Powell, please raise your right hand.

396

**JAMES POWELL,**

being first duly sworn, was examined and testified as follows:

**DIRECT EXAMINATION**

**BY MR. BENDER:**

Q. You go by Jimmy; is that correct?

**A.** Yes, sir.

Q. Will you state your full name for the record?

**A.** James Earnest Powell.

Q. And, Jimmy, by whom are you employed?

**A.** Summit Carbon Solutions.

Q. And in what capacity?

**A.** Chief operating officer.

Q. What I'd like you to do is briefly highlight for the examiner, Commission staff and opposing counsel your educational background and work experience.

**A.** Okay. I have a bachelor of science in engineering, and I have about 35 years of experience in the energy industry, predominantly upstream/midstream, with the last 25 leading large projects such as this, both internationally and in the U.S.

Q. Okay. So I'm just going to have a

question or two for you having to do with engineering and operational design. To what standard will the flowlines be constructed?

**A.** The flowlines, like the remainder of the pipeline system, will be constructed -- designed, constructed and operated in accordance with DOT regulations, CFR 49, 195.

Q. Okay. And can you explain how the three entities that have made application for the storage permits are going to work together and monitor this system and utilize the data that's provided throughout the SCADA system?

**A.** Yeah. So from receipt of the $CO_2$ molecules at the capture facilities through transportation of the pipeline system and through -- to the sequestration system to the injection site and subsurface, it will all be operated as one integrated system under one supervisory control and data acquisition system, and it will be controlled from a single control center.

MR. BENDER: And, Mr. Examiner, after I finish with a few questions of these other witnesses, Mr. Powell will be available for questions from the staff. So if I can move to the next witness, I'll do so.



HEARING EXAMINER GARNER: Sure.

MR. BENDER: Next witness is John Hunt.

HEARING EXAMINER GARNER: Mr. Hunt. Please raise your right hand.

**JOHN HUNT,**

being first duly sworn, was examined and testified as follows:

**DIRECT EXAMINATION**

**BY MR. BENDER:**

Q. John, would you state your name for the record, please?

**A.** (BY MR. HUNT) John Hunt.

Q. And, John, by whom are you employed?

**A.** By EERC.

Q. And in what capacity?

**A.** I'm a senior geoscientist and measurement reporting verification, or MRV, specialist.

Q. And can you briefly provide for the Commission staff your educational background and work experience?

**A.** Sure. So I hold bachelor of science and master of science degrees in geology. I'm a licensed professional geologist. And prior to the EERC, I worked at Chesapeake Energy as a petroleum geologist.



Q. Okay. And you're going to talk just a little bit about -- at least from questions from me, about Section 5 of the application which is -- has to do with testing and monitoring; is that correct?

**A.** That's correct.

Q. Okay. And my first question is can you provide a brief summary of Table 5-2 in the application?

**A.** Yes. So Table 5-2 begins on page 5-4 of the TB Leingang application or Exhibit 1A. And let me back up here just a little bit. So the testing and monitoring plan, the full plan is laid out between Tables 5-1, 5-2 and 6-1. So 5-1 being the preinjection plan, 5-2 is the operational plan and 6-1 is the postinjection plan. We're hitting the highlights of Table 5-2 simply because this makes up the bulk of testing and monitoring and includes all of the different various activities that Summit will -- will perform.

And so let's -- yeah, again, let's go to Table 5-2. This is an overview of the operational testing and monitoring plan. And just to start us off, a brief description of the -- of really what's contained in this table. So if we're looking at



the columns and we're stepping left to right, we see the first thing is the Monitoring Type. I'll touch on that a little bit more in a minute, but essentially, you know, whether it's a $CO_2$ stream or surface facilities, the wellbores or the environment, those generally make up the monitoring types.

Then we step over and we have the Parameter, so what parameters are we interested in measuring. And then the next column describes the activity that will collect those data. Then we have the primary purpose of the activity listed, the equipment and any tests associated with gathering that data. The location where that data will be gathered and a sampling frequency described.

Finally, in the last three columns, we have how that data -- what data will make its way into the reporting to DMR. So we have the Report Content, the Reporting Method and then the Reporting Schedule specified.

So how I like to think about this plan overall is you're really following the $CO_2$ stream as it enters the sequestration facility, and you're first and foremost analyzing the $CO_2$ stream in terms

401

of composition and end-to-end metering. So those are some of the things highlighted in the rows within the $CO_2$ Stream Analysis section. There's also the Surface Facilities Leakage Detected -- Detection Plan as well as the Corrosion Prevention and Detection Plan. Those generally at a high level have already been touched on a little bit so I won't go into great detail there.

And then we move to the wellbore sections. Now the $CO_2$ stream has traveled through the surface facilities and it's entered the wellbore, so here we're primarily focused on activities that look at monitoring wellbore integrity. So, for example, pressure, temperature gauges, fiberoptic cable, all of which provide continuous readings to monitor the -- the operations of those wells, of the injection wells.

And, finally, we have -- I guess continuing on the wellbore monitoring part, we also include a Downhole Corrosion Detection Plan, and the key activity there is the pulse neutron log which is also feeding into the wellbore mechanical and integrity piece where we have periodic pulse neutron logs planned to be acquired throughout the life of the project.

402

And then, finally, the -- so now we've injected the $CO_2$ into the storage reservoir and what we're interested in is monitoring the volume in a targeted way as that $CO_2$ expands within the storage reservoir and ultimately that volume contained within the area of review boundary. So we have a Near Surface monitoring plan, which is primarily made up of soil, gas and groundwater -- I guess wholly made up of soil, gas and groundwater sampling, and then an Above-Zone Monitoring Interval, which is defined as the Opeche/Spearfish to the Skull Creek. Again, pulse neutron logging for logging saturations, and then the fiberoptic cable to look at temperature.

And -- and then, finally, we end with the monitoring of the storage reservoir itself which, again, will be conducted with the fiberoptic cable to monitor the temperature profile of the storage reservoir as well as casing-conveyed pressure temperature gauges on the injection wells and -- and also a downhole pressure temperature gauge installed in the reservoir monitoring well. And then we have planned 3D seismic surveys as has been testified to a little bit prior to this point, as well as a plan for monitoring seismicity with a

403

surface array of seismometers.

MR. BENDER: No further questions of this witness. And the next witness will be -- yeah, next witness is going to be Jay Volk.

HEARING EXAMINER GARNER: Jay Volk. Mr. Volk, please raise your right hand.

**JAY VOLK,**

being first duly sworn, was examined and testified as follows:

**DIRECT EXAMINATION**

**BY MR. BENDER:**

Q. Jay, can you state your full name for the record, please?

**A.** (BY MR. VOLK) Yes. Thank you, Lawrence. Jay Volk.

Q. And, Jay, by whom are you employed?

**A.** Summit Carbon Storage.

Q. In what capacity?

**A.** I am the sequestration director of health, safety, environmental.

Q. Okay. And can you provide for us briefly your educational background and work experience?

**A.** Yes. Lawrence, I have a bachelor's degree, master's degree and PhD -- PhD from North Dakota State University. My PhD is in the

404

department of natural resources with range sciences. My work history has largely been through BNI Coal. Spent approximately 17 years there working on permitting, compliance, testing and monitoring, financial assurance plans and site closures. The last two years I've been employed with Summit Carbon Solutions working within the Class VI regulations.

Q. You're going to have to slow down a little bit.

**A.** I apologize. Thank you for the reminder.

Q. And, Jay, you're here today to discuss Section 7, which is emergency and remedial response plans; is that correct?

**A.** That is correct.

Q. As well as financial assurance which appears in Section 12; is that correct?

**A.** That is correct.

Q. Okay. So you'll be able to handle questions from the Commission staff on those two subject areas; is that correct?

**A.** That is correct.

Q. Okay. Let me just ask you a question or two, first with respect to emergency and remedial response. Can you tell us generally what is the

405

purpose of emergency and remedial response plans?
**A.** Yes. Lawrence, the purpose of the ERRP in Section 7 is really to provide guidance for a quick, safe and effective response plan to keep the community and -- community, workers and the environment safe. Items that we look at included in there are definitions and reviews of local resources --
Q. Slow down a little bit.
**A.** I am sorry for a second time.
Looking at areas such as what are the local resources in the areas, identification of potential events, as well as the response to the events.
Q. And can you explain for us, slowly, the interactions that you've had with local first responders in Oliver, Mercer and Morton Counties?
**A.** Yes. Our interactions between the three counties have really included a multilayered approach to outreach. We've engaged all three counties with LEPC meetings. We've worked within dispersion methodology of meetings. We've worked individually with LEC portfolio holders, as well as with local responders on an individual basis through safety tours or landowner meetings.

406

Q. Okay. Jay, let's shift gears a bit and talk a little bit about Section 12, which is Financial Assurance Demonstration Plan. Can you provide for us a brief overview of the methodologies used to determine the financial assurance? And if you have to direct the Commission's attention to any part of the application, that'd be great.
**A.** Thank you, Lawrence. And I would direct you to Table 12 -- or excuse me -- 12-1 on page 12-2. The methodology that we used in developing the financial assurance plan really consisted of known cost, which included areas such as plugging in injection wells, the PISC -- the PISC plans, testing and monitoring, as well as site closures and the flowline abandonment sections.
Other areas we looked at were estimated costs, and that was used to determine the ERRP as well as endangerment to USDWs. We also looked at previous literature as well as previous Class VI permits in developing the financial assurance plan.
Q. Okay. And can you provide for us an overview of the cost estimates associated with the financial assurances?
**A.** Yes. So, again, referring to Table 12-1,

407

for the TB Leingang, the plugging and injection well cost was 1,166,000. Likewise, the PISC storage and facility monitoring was 4,225,000, as well as the flowline plugged and abandoned at 243,000.
And, I apologize, I'd have to ask -- the PISC and storage facility is 4,225,000 if I misspoke on that. The ERRP is 11,100,000. And the endangerment of USDW is 2,695,000. And that gives a total of 20,316,000 between the three -- or excuse me -- between the TB Leingang.
I do want to make a quick reference before I move on to the other two sites is what is covered by the surety bond versus pollution liability policies is also outlaid in Table 12-1 in which the plugging of injection wells, PISC storage facility and monitoring, flowline plugged and abandonment cost, as well a site closure and remediation will be covered under a surety. Whereas, an ERRP as well as the endangerment of USDWs, a pollution liability policy will be used.
Again, there is minor differences between SCS2 and SCS3 in which the total bond for SCS2 proposed is $20,868,800 as well as the KJ Hintz at $20,817,800.

408

Cumulatively, the three are bonded at just over $62 million.
MR. BENDER: Mr. Examiner, that's all the questions I have for this witness. We do have another witness that we'd like to call at this time, Jean Oddy.
HEARING EXAMINER GARNER: Ms. Oddy, please raise your right hand.

**JEAN ODDY,**

being first duly sworn, was examined and testified as follows:

**DIRECT EXAMINATION**

**BY MR. BENDER:**

Q. Jean, would you state your full name for the record, please?
**A.** (BY MS. ODDY) Jean Oddy.
Q. And by whom are you employed?
**A.** Summit Carbon Solutions.
Q. In what capacity?
**A.** Sequestration project engineer.
Q. And could you briefly highlight for the Commission staff your educational background and work experience?
**A.** Yes. I have a bachelor of science in petroleum engineering from Montana Technological

409

University. Before Summit I worked for Neset, which is an engineering and geological consulting firm, in which most of my responsibilities was around drilling engineering, design and operations, as well as plugging and abandonment projects in the Williston Basin, including wells such as Class II saltwater disposal wells. And I joined Summit last year in January.

Q. Okay. And you're here to discuss any questions the Commission staff might have about well design, casing, cementing, plugging and completion; is that correct?

**A.** That's correct.

Q. Okay. A question or two having to do with well design and casing. Can you -- excuse me. With respect to Section 9, can you describe the well construction plan design? And if you have to refer to a particular figure or exhibit, please do so.

**A.** Yes. I'd like to direct your attention to Figure 9-1 on page 9-2. So in this well construction program, starting with the surface section, the surface hole will be drilled with freshwater-based drilling fluid down to a depth within the Pierre Formation. Surface casing will

410

then be set and placed at least 50 feet below the base of the lowest underground source of drinking water. Surface casing will then be set and cemented in place from the surface casing shoe all the way to the surface of the ground to provide isolation to and from the underground source of drinking water.

Moving on to the next section, we've got the long string casing, so that section will be drilled and cored at specific intervals. And then in accordance to Class VI regulations and administrative code, corrosion resistant alloy casing will be set in place to a depth below the Broom Creek Formation which is in the Amsden. The long string casing will then be cemented in place with $CO_2$ resistant cement from the shoe all the way through the Mowry Formation, then cemented to surface.

MR. BENDER: Mr. Examiner, that's all the questions I have for this witness.

I would point out that at this point in time, given the space that we have here for witnesses to sit, I would like to give the Commission an opportunity to ask these witnesses questions, and then also point out that we do have

411

two other individuals who are in the audience. And in the event these witnesses have some questions that they feel can be better answered by someone else, I would bring those people up. One is Jamey Backus, B-a-k-k-e-s [sic], and the other is Luis -- how do I pronounce that?

MR. POWELL: Piasco.

MR. BENDER: Piasco, P-i-a-s-o [sic].

HEARING EXAMINER GARNER: Okay. Any questions from the staff?

**EXAMINATION**

**BY MS. MADCHE:**

Q. I will go ahead and start. As before I'm going to start with what I think are deferred questions for this group. Early on Richard Suggs had asked on whether or not you would be able to provide industrial codes that best reflect the capture sources, such as the ethanol facilities. Is that something that you can provide at this time?

**A.** (BY MR. VOLK) Yes. The ethanol NAICS is 325193 reflecting as asked for the capture NAICS code, and that is for ethanol.

Q. Earlier an answer was provided for approximately how many miles of the MCE pipeline

412

transmission pipeline system is within the North Dakota PSC jurisdiction. 352 miles was provided, but I believe, Jimmy, you would be able to confirm that number?

**A.** (BY MR. POWELL) Yes. It's 3 -- approximately 332 miles are in the jurisdiction of the Public Service Commission. In the delta roughly 19 miles is within the NDIC jurisdiction. So Wade had it accurate and correct. But the PSC is 332.

Q. Okay. I had asked earlier on with the first group yesterday on whether or not royalties were being paid on the full $CO_2$ stream or just the $CO_2$ mass of the stream. Is there anyone in this group that can confirm that or is that something that would need to be a supplemental?

MR. BENDER: No one can answer that. We'll have to supply you with supplemental information on that one.

MS. MADCHE: Okay.

Q. (MS. MADCHE CONTINUING) In Section 2 earlier I had asked what the maximum pressure was applied during the microfracture testing in the Milton Flemmer 1 that was done across the Spearfish/Opeche Formation.

413

**A.** (BY MS. ODDY) Yes. I would like to direct your attention to Figure 2-7 on the TB Leingang 1 permit.

Q. I'm ready.

**A.** So relative to Milton Flemmer 1, the maximum injection pressure is highlighted with the black square box on the image on the upper section there, and from that graph it looks like around 5580 psi was -- was pumped as a maximum. However, after evaluation, there was no breakdown pressure observed at that maximum pressure injected.

And then referring to Table 2-4, we do have a summary on the Opeche/Spearfish microfracture stress test breaking down your breakdown pressure as well as your propagation pressure.

Q. So some additional questions as it pertains to the microfracture testing that was done. A question that I had posed earlier was how do you determine which sand package within the Broom Creek to target for these tests?

**A.** So prior to the micro in situ stress tests, we ran logs such as your magnetic resonance log as well as an FMI log and sonic log, and in combination of that along with the core photos that

414

we observed, along with some field description, were able to pick the representative sand package within the Broom Creek Formation and pick the test steps.

Q. Could you elaborate a little bit more on what makes a representative sample?

**A.** Yes. So I'm going to go back here to another figure. Figure 2-5. We looked at the sonic log, and on column 7 we've got the facies there, so we looked at, you know, a good, thick sandstone package. And then looking at the magnetic resonance log, that showed us good porosity in that test point. Then looking at making sure there are no visible bedding or fractures within the core photos that was -- that was collected and any field description that was noted by the geologists on site.

Q. So just to confirm, you're looking for a sand package that would represent good porosity and permeability but without fractures that could possibly affect the results of the MBT test?

**A.** That's right.

Q. So as a follow-up to that, on average to date across the Broom Creek on previous applications, the frac grading has between 0.69 psi

415

per foot to 0.712 psi per foot. Could you explain why we're seeing a larger variation across these three facilities, specifically as it relates to the Slash Lazy H 5 which was at 0.784 psi per foot which would be above that range, or what you anticipate might have caused it to be higher than what we've seen to date on past applications?

**A.** So with that for the KJH -- or sorry -- the Slash Lazy H 5, cause of that could potentially be activities during the drilling operation that may impact. Also could be some bedding within the FMI logs that was observed.

However, we are willing to, you know, work with the DMR on solutions on confirming that -- that value at the KJH sites. It is also part of our plan to perform an in situ stress test in the KJH, at least on one of the wells. In addition, we are planning on performing an injectivity test in the injection wells again to confirm these values, and that also applies in all six injection wells.

Q. Would you be able to explain what effect the frac gradient has on the $CO_2$ plume size?

MR. BENDER: That's probably a question that we'll have to recall Amanda to answer.

MS. MADCHE: Okay. And am I correct that

416

we'll want to do that at the end as far as recalling?

MR. BENDER: Yeah. What I thought we'd do is after we finish with this group, once again, because of the size of the group, we're going --

MS. MADCHE: Sure.

MR. BENDER: -- to have to recall Wade Boeshans and also Caitlin, and perhaps we could bring Amanda up at the same time and get that done if the examiner's okay with that.

HEARING EXAMINER GARNER: I am okay with that. I was going to allow cross of these four before they go to sit down and bring them back up and sit down and bring them back up. Does that work? Is that fine?

MR. BENDER: I mean, there's a lot of people. I think it's a lot of cross. We can finish our -- the remaining witnesses, I think, very quickly. That's kind of what I had in mind this morning, but it's certainly your call, Mr. Examiner.

HEARING EXAMINER GARNER: Mr. Braaten, any input? Are you okay waiting with the other witnesses to be called and then we can -- then you'll have an opportunity to cross any one of the

417

witnesses and recall them up here.
MR. BRAATEN: Yeah. I think with respect to that, I just want to be clear on record that specifically because what I'm running into now is difficulty with scheduling with experts and when they're going to be here, but thinking about what Mr. Bender is saying whether I cross these folks now or cross all of these folks right after, I don't think that's going to help me on anything else, so --
HEARING EXAMINER GARNER: Okay.
MR. BRAATEN: -- I'm okay with that --
HEARING EXAMINER GARNER: Okay.
MR. BRAATEN: -- but reserving my prior objections --
HEARING EXAMINER GARNER: Sure.
MR. BRAATEN: -- on the scheduling.
HEARING EXAMINER GARNER: Your objection's noted, so we'll go then with your witnesses.
MR. BENDER: Thank you.
Q. (MS. MADCHE CONTINUING) Okay. Just to continue on the microfracture testing which you've already given some testimony on, just confirming that we would want to see a microfracture test done on either the KJ Hintz 1 or 2 just to confirm that

418

value which was proposed in the testing and monitoring plan.
Let's see here. So as it pertains to the -- how the microfracture test data is used in the simulation to calculate the bottomhole pressure constraints that are used in the model, if the results do come out substantially different on the KJ Hintz 1 or 2, whichever you decide to do to confirm that result, it is likely DMR would want the model reran because of the bottomhole pressure constraint being affected by that frac gradient.
**A.** Understood.
Q. Okay. I'm now moving into Section 5, so I would like to go to Table 5-3. So on this table you have the $CO_2$ stream composition specification that must be met for you to, I believe, accept a third-party source. My question related to this is whether or not all the sources you currently have contracts with have had samples taken or FEED studies completed to confirm they meet or exceed that stream composition?
**A.** (BY MR. POWELL) So the individual quality spec for each course is greater than 95 percent --
Q. Okay.
**A.** -- carbon dioxide, and we did -- we had

419

done a stack test at each facility, and that will be done -- the plants typically do them annually. Unless we have a reason to do them intermittently, we'll follow their schedule, but the individual spec is not greater than 95 percent $CO_2$.
Q. Yeah. I think the confusion was the narrative right above Table 5-3 since it states, "Any new $CO_2$ streams from third-party entities not accounted for at the time of permitting must also meet or exceed the specification once commingled."
And you're saying at a minimum at the source side they would be greater than 95 percent with the anticipation that the commingled stream would be greater than 98.25 percent; correct?
**A.** Correct. And it's my recollection I think all but one of the 57 sources were 98 percent or higher. There was one facility that was about 96. So commingled, yes, it would be greater than the 98 percent.
Q. And for any new sources that might come down the line, I'm guessing additionally you would want a stack test done before to confirm that they're going to meet the specifications to take that source?
**A.** You're correct.

420

Q. Could you -- yeah, we would require that that data be submitted to us before we would approve new sources too.
**A.** Okay.
Q. Could you elaborate on how the baseline isotopic signature of the $CO_2$ stream will be resampled if new sources are added later on?
MR. HUNT: So I think I can respond.
MR. POWELL: Okay. Go ahead because I was just going to read a paragraph, but go ahead, John.
**A.** (BY MR. HUNT) Okay. So in the event that a new source is added and approved by DMR, Summit would sample that new commingled $CO_2$ stream within one year after adding that additional $CO_2$ source to get its composition and isotopic signature.
Q. (MS. MADCHE CONTINUING) Let's see. Will the meters that exist -- or sorry. Let me rephrase that.
Will meters exist at all the outlets at the $CO_2$ source facilities, both in state and out of state, to be able to account for how much $CO_2$ mass and total injection stream volumes each individual source is contributing?
**A.** (BY MR. POWELL) Yes. So Coriolis meters will be installed consistently throughout the

421

system.
Q. And how do you plan to ratio those mass and volumes back to the individual three storage facility permits for reporting?
**A.** So I'm not the measurement expert, but it would be reconciled. We'll have custody transfer from the -- on the outlet or discharge side of the capture facilities, and then we'll have -- we'll have a measurement station at the terminus of the main line. And then we'll have Coriolis meters or measurement facilities at each of the injection sites. And so it'll be a mass balance from volume in from each of the 57 source plants all the way through what's injected at each of the well sites and that'll be reconciled.
Q. So I want to move us to Figure 5-3 on page 5-12 of the TB Leingang application. So this figure shows a generalized flow diagram. Could you walk us through this figure specifically as it relates to the capabilities to isolate individual flowlines from each other and how pigging of the flowline system will take place?
**A.** Yes, and I'd -- this is a difficult diagram to do that from. If you start from right to left -- so each line segment on the discharge

422

side of a capture facility will have a launcher. And so -- and then each pipe diameter change within the pipeline system will also have a launcher and receiver. And then when you get to the sequestration site, there will be a receiver at each of the well sites.
So if you're looking right to left, so in a common pipeline diameter size, you know, the launcher will be the initiation of that pipe segment, and then it'll go through right to left and then you will be -- for instance, at the sequestration site before it reaches the injection facility, then it will go through a receiver, and then downstream will be a meter or measurement station which will include a gas chromatograph, Coriolis meter and pump. And then the -- the -- the line of demarcation will be on the inlet valve upstream of the shutdown valve at the injection facility.
Q. So just to confirm, with the three -- with the three individual flowlines, are you able to pig those separately?
**A.** Yes. Each pipe diameter will be able to be pigged independently. So in the sequestration where we have 16, 20 and 24, each of those diameter

423

changes, the entire segment will be able to be pigged independently.
Q. And as a follow-up, are there any plans for an isolation valve at the junction of where the BK Fischer flowline, called NDL-325, splits off from the TB Leingang flowline known as NDL-327?
**A.** I may -- may need help from Jamey if that's a diameter change.
MR. BENDER: Okay. We'll bring him up later.
Q. (MS. MADCHE CONTINUING) Can you confirm the land description of where that junction occurs at those two flowlines? Looking at the prior figure, Figure 5-2 it looks like it's Section 5, Township 141 North, Range 87, but it's pretty small scale on the map.
**A.** It looks correct to me as well, but it is small scale.
MR. POWELL: And, again, perhaps Jamey can confirm, Lawrence.
Q. (MS. MADCHE CONTINUING) So now I'd like to go to Table 5-4 on page 5-14. In this table the flowline has a maximum rate of 936 million standard cubic feet per day, approximately equivalent to 18 million metric tons a year. Earlier on in the

424

project summary, the modeling had shown that this facility, the TB Leingang specifically, would be able to take 124.4 million metric tons over a 20-year period which would average around 6.22 million metric tons annually. Can you please confirm there's no intent to send -- even though the line has the capacity to send the full 18 million metric tons, there's no intent to send it all to this one facility?
**A.** That is correct. There is no intent.
Q. And on average, what do you anticipate the flow rate to be on this flowline?
MR. POWELL: Again, I'm going to have to defer to Jamey for that, Lawrence. Sorry.
Q. (MS. MADCHE CONTINUING) Similarly, on the BK Fischer application instead, and on its Table 5-4 on page 5-14, it has a maximum rate of 314.5 million standard cubic feet per day, equivalent to around 6 million metric tons a year, and its modeling had more of an annual amount of 4.92 million metric tons.
So, again, just confirming again that you would not be exceeding what the modeling had showed in those bottomhole pressure constraints even if the flowline capacity would allow you to?

425

**A.** That's correct.
Q. And I'm interested in what the average flow rates will be for all three flowlines for when that gets deferred.
MR. BENDER: That's another Jamey question?
MR. POWELL: Yes.
Q. (MS. MADCHE CONTINUING) So, additionally, on that table, for all three of the applications a typical operating pressure has a 900 psi range, roughly, going from 1250 to 2150 psi. And this might be a question that you need to defer again. I'm wanting to know why such a big range was given and whether or not you have -- kind of more within that range where you actually typically plan to be for all three facilities.
**A.** The range is just -- it's to keep the $CO_2$ in super critical state, and so that's the range from 1250 to 2150, and it's really applicable over the -- predominantly over the pipeline system because over the 2500 miles we have about -- including -- excluding the pumps at the discharge site of the capture facilities, we have 17, I believe -- if I recollect properly, 17 intermediate pump stations, so you have that pressure gradient

426

from the discharge down to the suction side of the -- of the next intermediate pump station, so that's the range of pressures.
As it says, the maximum operating pressure is 28 -- 2183, but the discharge set points will be 2160, and then we'd run the surge analysis and, of course, you know that's 110 percent so that's, according to the math off the top of my head, about 2400.
Q. So a couple follow-ups to that. In the modeling, the model was done as being pressure constrained both on bottomhole pressure and wellhead pressure and not weight constrained. I'm curious as to why you have a maximum discharge pressure of 2160 psi when the wellhead pressure constraint in the model was only 2100 psi.
**A.** Yeah, I might have to defer that one.
MR. BENDER: Jamey again.
Q. (MS. MADCHE CONTINUING) And just a statement, because this isn't a weight-constrained model, typically DMR would be going forward with setting a wellhead pressure constraint based on the model and not on operating conditions.
When it comes to kind of the fluctuation that you had mentioned that you have on the

427

pressure to keep it in a super critical state, will the metering that you're planning to use be able to handle those fluctuations knowing that the density of $CO_2$ is affected greatly by both temperature and pressure and both the temperature and pressure on this Table 5-4 is a fairly substantial range?
**A.** Yes, it is. It will. The Coriolis meters can handle that variation.
Q. And are those mass flow meters or volumetric meters?
**A.** Again, I'm not the measurement expert, but I believe that they're mass flow meters.
MR. BENDER: Do you have the answer?
MR. HUNT: No.
MR. BENDER: Okay.
Q. (MS. MADCHE CONTINUING) So some questions related to the corrosion prevention and monitoring detection that's being implemented for all three storage facilities. Can you elaborate a little bit more on the ER -- the ER probes that are proposed and the impressed current cathodic protection system that's going to be used along the flowline system?
**A.** (BY MR. HUNT) Yes. So for the ER probe, DMR can think of those as -- you know, you guys are

428

familiar with a corrosion coupon. So imagine this as a miniaturized corrosion coupon that is then attached to a probe that's then attached to the -- to the flowline where it's subjugated to the -- the stream continuously, and in real time there will be continuous measurements of the electrical resistance of that -- of that miniaturized coupon or -- or that probe, said another way. Those -- those resistivity measurements are sensitive to changes in mass and thickness in particular.
Q. What material is the composition of the ER probes?
**A.** So they will be of the flowline material as well as the wellbore material.
Q. So there will be two probes at at least each injection site?
**A.** That is my understanding.
Q. And with the impressed current cathodic protection system, is that combined as far as the same system that's going to be across the flowline and the transmission pipeline operated as a continuous protection?
**A.** (BY MR. POWELL) It is.
Q. Referencing back to that Figure 5-2, I'm just looking for confirmation on what the land

429

description would be for the terminus point. Again, on this one it looks like it's Section 5, Township 141 North, Range 86 West.

MR. BENDER: Is that something we can supply you in a supplement?

MS. MADCHE: Yeah. Both of those locations could be confirmed in a supplement. That would be fine.

Q. (MS. MADCHE CONTINUING) So a question on the seal pot system that is planned to be used to maintain the tubing/casing annulus pressure to approximately 300 psi. Are you anticipating any on-site tank storage such as vessels needing to be on site for that system that would be holding, like, packer fluid or brine, not necessarily a nitrogen vessel?

**A.** (BY MS. ODDY) At this time I don't believe we plan on having storage tanks for corrosion-inhibited fluid, but we will have the nitrogen seal pot like you said adjacent to the wellhead.

Q. I guess just a note. If at any point those plans do change, secondary containment such as a dike would be required around any brine storage or the packer fluid.

430

And also a note that a Sundry variance would be required to have the 300 psi annulus pressure just because currently as rule requires, it's to be greater than the injection pressure.

**A.** Understood.

Q. I believe this has already been answered earlier in part, but just to confirm, no baseline soil, gas sampling or groundwater sampling has taken place yet; correct?

**A.** (BY MR. HUNT) That is correct.

Q. And that would be anticipated to begin approximately a year in advance of injection operations beginning?

**A.** That is also correct.

Q. So this question is specific to the KJ Hintz and it may need to be deferred. I'm just looking for how that year 19 was determined for the year to install the Fox Hills monitoring well next to the Raymond Jensen 1-34 P&A well.

**A.** Yeah. So in general the idea there was, as has been testified to, you know, previously, seismic surveys will be acquired at least every five years, so, you know, year 2, year 4, year 9, year 14, year 19. And so the idea there was that as Summit is monitoring the $CO_2$ plume expanding in

431

the storage reservoir, we don't anticipate at this time that that legacy wellbore will see $CO_2$ and certainly within that time frame.

But, you know, taking a proactive approach and after taking the seismic data and then reviewing that data to see how is the $CO_2$ plume progressing, is it conforming to expectations, so that year 19 really just allows some of the opportunity, the -- the optionality to wait to install that well until, you know, it is needed. And, of course, if it's determined that it may be needed prior to then, then they have that option as well.

Q. So I want to reference Section 5.7.2. Let me get a page number. So that would be page 5-26 in the TB Leingang application. And it's paragraph 4, and this language is in all three applications. There's a statement that Summit reserves the right to evaluate and modify, if necessary, appropriate groundwater sampling locations and frequency. Just a note that any changes to the frequency or locations should go through DMR for approval and review.

**A.** Yes. Acknowledged.

Q. And that would apply as well as far as any

432

changes made to the near surface monitoring during the PISC period.

**A.** Understood.

Q. Could you give a little more testimony on the local passive seismicity array that's planned to monitor for potential induced seismicity?

**A.** Sure. So at this time Summit has plans to install multiple seismometers at the site. At this time -- well, a specific layout or design or number of stations is unknown, but prior to injection Summit would request bids from vendors to put together a site-specific strategy.

We understand today that by multiple -- in order to properly triangulate and locate any seismicity events, you would need at least three seismometer stations as a minimum.

Q. Just a statement that once a layout's known, that information should be provided to DMR.

**A.** Understood.

MS. MADCHE: Let's see. I think that's all I have currently. Thank you.

**EXAMINATION**

**BY MR. STOLLDORF:**

Q. Jimmy, I asked a question earlier that they punted to you, so I'll ask it again. At its

433

closest, approximately how far away is the facility for the TB Leingang from an occupied dwelling?

**A.** (BY MR. POWELL) I apologize because I don't have each site memorized, but I believe the closest dwelling to either -- any of the well sites is about 4400 feet -- I'm sorry -- 2200 feet. 2200 feet. I believe the furthest is about 4100 feet. But it's 2200 feet. And we can clarify if that's Leingang or if that's one of the other two.

MS. MADCHE: I think we might just ask that a supplemental is provided as far as the proximity of how close the flowline is for each individual one to the closest dwelling.

MR. POWELL: Okay. And I believe the closest dwelling to a flowline at either location is 700 feet, but we could provide the exact distances for all three.

MS. MADCHE: Could you add to that also closest distance to a wind turbine, specifically for the TB Leingang application?

MR. POWELL: Yes, we can do that.

MS. MADCHE: Sorry to jump in.

Q. (MR. STOLLDORF CONTINUING) So Section 7, the Emergency Remedial and Response Plan, that's

434

you, Jay; is that correct?

**A.** (BY MR. VOLK) Yes.

Q. Under the Section 7.6 -- I'll let everybody get there. It indicates that the company organizational structure is still in flux and in development. Do you know -- I'd note that it's expected that we -- to complete that before being provided authorization to inject. We would expect that to be nailed down.

**A.** Without a doubt. We're continuing to work on, as the rest of the project continues to develop, an integrated response plan as well which will be consistent with this one, and we will supply that when done and prior to injection.

Q. Okay. So this is in the PISC section. Hopefully one of you can answer this. For all three applications on Figure 6-2 -- give me a second and I'll get a page number for you. That is page 6-6 in Exhibit 1A for the TB Leingang application.

Can you -- oh, sorry. Are you guys there?

Explain how the $CO_2$ extent ten-year postinjection boundary was determined?

**A.** (BY MR. HUNT) I think we would want to bring one of the other witnesses up to answer that.

435

MR. STOLLDORF: Probably Amanda?

MR. BENDER: (Nods head.)

Q. (MR. STOLLDORF CONTINUING) What's the setback being proposed for the flowlines?

**A.** (BY MR. POWELL) Again, the setbacks for the flowlines, similar to the -- to the pipeline in North Dakota that's under PSC jurisdiction, complies with State law, 500 feet as a minimum.

Q. What type of notification system's in place should residents or -- and/or businesses need to be notified in an emergency?

**A.** (BY MR. VOLK) We've had numerous conversations with Oliver County, Mercer County and Morton County, and this is an area we've determined to work cumulatively on and develop. So right now there's multiple systems being used between Mercer County and Morton County. I believe Mercer County and Oliver are both using reverse 911. Morton County is using that as well as I believe some secondary options.

So we have committed to continuing working with all three counties to provide the data needed to make sure the notification system is -- is going to be consistent throughout all three counties.

Q. How often do you plan on doing training

436

with these local emergency response teams?

**A.** On an annual basis at minimum. I believe it's not to exceed 15 months, but it is on the annual basis.

MR. POWELL: Yeah. I'll just add that since we know that North Dakota -- and I'm not sure of a specific -- Jay, you could help me on Mercer or Morton or Oliver, but a lot of the counties have volunteer fire departments and sometimes those personnel interchange or are unavailable, so we've committed to providing training on a more frequent basis as needed.

Q. (MR. STOLLDORF CONTINUING) I hope you guys will -- someone here at the table will be able to answer this one, but this has come up in the past, but are there any special considerations for DMR field inspection staff to be coming onto the sites? Do you have -- or do you have any -- are you aware of any issues that might bring up, having a DMR inspector on site -- some of the sites?

**A.** (BY MR. VOLK) As expected, unrestricted access for any regulatory items such as DMR access. With that being said, previous work I've done has always provided on-site hazard training for and up to and including inspectors so they have the proper

437

notices of what is out there or what needs to be out there. And if any special training would be required for those inspectors, we will make sure that's available.

Q. Would you be able to provide us --

MR. SUGGS: Sorry.

MR. STOLLDORF: Oh, go ahead.

MR. SUGGS: On that note, if there is anything anticipated, at this time I would ask that it be provided as a supplemental for what you'd anticipate the DMR inspection staff needing to have under their belt or have training for accessing your facilities.

MR. VOLK: We will provide that.

MR. SUGGS: Thank you.

Q. (MR. STOLLDORF CONTINUING) As it relates to Sections 9, 10 and 11, the construction plugging and completion plans for the Class VI wells and monitoring wells, we just want to note that it will require typical DMR approvals prior to executing, just so you understand.

**A.** (BY MS. ODDY) Understood.

Q. I want to move to Section 11, the injection well. I have one question -- or a couple questions. Can I -- okay. Then we'll go to 12.

438

Sorry. Excuse me.

You're approximating it'll cost about $583,000 to plug one injection well. Are you guys considering that it's going to probably require a big rig to handle that size of tubing?

**A.** That's correct. With a 7-inch tubing, we will need a bigger workover rig. In addition to that, the anticipation of the plugging plan is also to set $CO_2$ resistant cement. So those estimated costs are included in the plugging costs.

Q. Okay. And you touched on this earlier about the surety bonds, but you're proposing to use a surety bond for the injection well plugging phase and the PISC phase. Are you planning to have one surety bond or two separate bonds for each phase?

**A.** (BY MR. VOLK) At this point in time we have not one -- allocated -- or we have not committed to a certain provider, so that'll be forthcoming, at minimum 30 to 60 days prior to injection it would be submitted to you. We know we will be using the surety and the pollution liability for those, and I can't today tell you in certainty if those will be split between the phases you asked.

MS. MADCHE: I'm just going to jump in,

439

and not necessarily a recommendation but something to consider is clearly as you work through closing one of these facilities, plugging the injection wells is going to be the first item. If they are on separate sureties, that would allow you the ability to request one to be released while maintaining the other one for continued PISC monitoring. So, again, just something to consider.

MR. VOLK: Appreciate that, and we will provide additional information to you.

Q. (MR. STOLLDORF CONTINUING) Can you elaborate a little more on the emergency and remedial response plan and how the endangerment to USW -- or underground sources of drinking water costs were determined?

**A.** I just want to make sure I'm getting to the right figure. If you bear with me for one second. There it is. So I'm going to direct your reference to page 12-10 and Table 12-7. So, first of all, I want to start off with what the actual scenario was used to determine the estimated cost on ERRP as well as to your specific question the USDWs.

The scenario that was used was a well failure or integrity issue with the well in which a

440

containment -- loss in containment event happened. To get into more specific details on that, I will have Jean talk through that. But to the specific cost as it relates to the USDWs, it is broken out between -- in Table 12-7, the general response actions, delineation and water replacement at 1.89 million as well as the quarterly monitoring which is dictated on a ten-year period for 750,000. And then the plugging and abandonment cost of the groundwater -- groundwater monitoring wells in that area is another 55,000, which came up to 2.6 million.

Q. And you did mention that the failure mechanism is a loss of a containment event?

**A.** That's correct.

Q. Okay. Just want to note that the average -- okay. I don't need to. All right. Never mind.

MS. MADCHE: No. I do have a follow-up on that. Clearly, the costs are slightly different for all three facilities for the emergency remedial response. Can you just kind of go over what parameters were used to determine those costs that would cause that fluctuation?

MR. VOLK: Yes. The difference largely

441

comes into on the general response delineation and water replacement line item. What we tried to do is look at more site-specific characterizations in those areas, how many wells, what would be their water replacement cost, and that was the distinguishing difference that drove the number up or down.

MR. STOLLDORF: Nothing further for me.

**EXAMINATION**

**BY MR. SUGGS:**

Q. Just a couple of additional items. I'm going to jump back up to 5-13. The second-to-last paragraph on that page related to custody transfer of the $CO_2$, the way that's described is that the $CO_2$ when it reaches the terminus point will become the custody of SCS1 and it will remain that way until it goes down the hole at any of the three different facilities. Am I understanding that intention correctly?

**A.** (BY MR. POWELL) So that's page 5-15?

Q. Page 5-13, the second-to-last paragraph.

**A.** Oh, sorry. All right. That's my understanding.

Q. Okay. As the flowlines are anticipated to be owned by the individual storage facilities,

442

SCS1, 2 and 3, would Summit be opposed to a requirement that would require a flow meter at each -- I guess at the beginning of each of the individual flowlines and an actual custody transfer happening as it moves from one line into the other?

**A.** So versus having measurement at the terminus of the main line for the -- sorry. As opposed to just having the single meter at the terminus of the main line at the -- at the jurisdiction breakpoint and then an individual meter at each well pad or well site, you're suggesting or recommending that we'd have an intermediate meter, then, at the beginning of each of the laterals from that segment of main line, flowline to each well site.

Q. (MR. SUGGS CONTINUING) Yeah. I think you would end up with at least two additional meters in play, one being where the $CO_2$ would go north to the KJ Hintz facility and one at the point where it goes west from the Leingang to the Fischer.

**A.** I'm not opposed to that.

Q. Okay. With respect to the cathodic protection system that's being proposed, has that already been designed at this point?

**A.** It hasn't been -- the impressed current

443

cathodic protection system?

Q. Yeah.

**A.** Generally. We're going to have to -- since we've added additional source points and additional laterals along the whole system, we're going to have to go back and rebalance the system and figure out if the location of the ground well -- the ground beds have changes, where they need to be expanded, et cetera. So it needs to be reconfigured upstream of the sequestration area.

Q. Okay.

**A.** As far as the sequestration area, it's generally been designed but we'll refine.

Q. Okay. So that is still under works and will be refined?

**A.** Correct.

Q. Okay. So when that is determined, we'll want the location of the ano beds identified, and pursuant -- there's -- on page 5-15 in Section 5.3.1, there's indication of -- what am I reading -- Summit Carbon Solutions will supply DMR with a map of cathodic protection boreholes to meet the requirements of 43-05-01-5. Do you anticipate actually drilling any cathodic protection boreholes or will this system entirely utilize ano beds?

444

**A.** It's my understanding ano beds. We'll clarify.

Q. Okay. And so, regardless, we'd want those locations identified.

**A.** Yeah.

Q. And I think, John, you testified to this earlier, but there's some narrative on 5-29 that indicates that you will be running 3D seismic at years two, four and nine. It is the intent to run 3D seismic as early as year two after injection?

**A.** (BY MR. HUNT) That's -- yes. Yeah, and in the narrative it says "by year two," so just to be clear.

Q. Okay. But my point -- my confirmation is that there will be a sequence of 3D seismic run shortly after beginning injection and another one prior to the five-year review?

**A.** Correct.

Q. Okay. I'll point out that if anything looks significantly off at that two-year mark, it is expected that you will report that and we'll begin the determination whether or not we need to accelerate that hearing.

**A.** Understood.

Q. On page 5-32 there's the narrative about

445

the traffic light system for the passive seismicity, and you have the cutoff points of 2.7, 4.0 and 4.5. Can you elaborate on what the significance of those values as cutoff points are?

**A.** So 2.7 is the point at which humans can begin to feel seismicity, and so that's why that one is listed there. For events 4 and 4.5, I don't have off by memory -- I would need to go and refer back to the team on that one.

Q. Okay. If that's something that can't be provided in short notice or short period as part of this testimony, possibly a supplemental just confirming what the importance of those values is in that system.

**A.** Understood.

Q. And I think this one is for Jay. On 7-17, the last sentence under the 5 -- sorry -- 7.5.1 section, it reads, "In addition, assistance has been secured from local emergency services to implement this ERRP."

Which emergency services have you specifically worked with and secured their assistance in execution?

**A.** (BY MR. VOLK) So we continue to develop this. This is an overarching plan. We have

446

reached out to, as I've said, Morton County, Oliver County as well as Mercer County, including the fire departments in numerous of the surrounding towns. A couple of them are Beulah, Hazen, Center, Zap. So without having what I would call -- and I'm going to say maybe that statement today is not totally defined as the ERRP isn't, but continued working agreements with -- or continued working with them to commit to: One, I understand there's a memorandum of understanding of mutual aid between all of them or actually statewide now. So they have recognized that. Two is they've recognized that we will continue to work together in developing that plan and know they have different capabilities between the units. And that is what we're going to continue to work on to supply what I would call as an integrated plan between all three counties.

Q. So in -- I guess with respect to this statement in the application --

**A.** We have not secured an agreement, so I would say that wording probably should be changed at this point.

Q. Okay.

**A.** I would say commitment's a better word

447

than agreement.

MR. SUGGS: That's all I need. Thank you.

HEARING EXAMINER GARNER: Okay. Before we recall those witnesses, why don't we take a ten-minute break.

MR. BENDER: Okay.

(Recessed at 2:56 p.m. and reconvened at 3:12 p.m.)

HEARING EXAMINER GARNER: We are back on the record. Attorney Bender, you wanted to recall some witnesses.

MR. BENDER: Yes. We're going to recall Caitlin Olsen.

HEARING EXAMINER GARNER: Microphone.

MR. BENDER: Oh, sorry. We're going to recall Caitlin Olsen. We're going to recall Wade Boeshans. And then to answer some of the questions that came up from staff, we'll be recalling Amanda Douglas, and then we'll have one new witness. As you may recall, there were questions to the previous group and they were deferred to Jamey Backus.

And I apologize, I misspelled his name earlier when there was a question on it. It's B-a-c-k-u-s.

448

So with that in mind, we'll call Caitlin Olsen back.

HEARING EXAMINER GARNER: Ms. Olsen, just a reminder, you're still under oath.

**REDIRECT EXAMINATION**

**BY MR. BENDER:**

Q. Caitlin, I'm going to show you what's been previously marked as Exhibit 8B. Can you tell me what 8B is?

**A.** (BY MS. OLSEN) 8B is the Storage Facility Permit Application Comparison Summary Table.

Q. And when we started the hearings, I briefly explained to the --

MR. SUGGS: Lawrence, have you handed that out yet?

HEARING EXAMINER GARNER: Do you have one?

MR. SUGGS: No.

Q. (MR. BENDER CONTINUING) When we started the hearing, Caitlin, you may recall me talking very briefly about the fact that we were going to spend a lot of time on the Leingang application and then we were going to sort of do -- contrast and compare Leingang with Fischer and Hintz after that. Do you recall that?

**A.** I do.

449

Q. Okay. And is 8B sort of a visual aid and you being able to go through and make those comparisons?

**A.** That's right.

Q. Okay. Let's start -- I'm not going to interrupt you much, but why don't you start by first talking about the various columns and what your method was for laying this out and then you can explain it to the Commission.

**A.** Sure. So the intent of this comparison summary table was just to lay out the differences between all three permits. Listening to the hearings today, I feel like most of those points have been covered by DMR or otherwise in testimony.

But you'll see here across the top the column named SFP Permit Section, that relates to the section of the permit that we're talking about. Then you'll see Summit Carbon Storage #1, TB Leingang/Milton Flemmer 1, that's referring to permit number one, the TB Leingang permit. Likewise, the second column is the BK Fischer permit. And the third column is the KJ Hintz permit.

Q. Okay. Then let's -- why don't we start out first with the Project Summary, and what I'll

450

probably do is have you explain that in detail, and then we can kind of walk through the -- the other sections and you can probably more abbreviate your discussion of it.

**A.** Sure. So as Wade testified to the project summary earlier today, the only material difference in the three permits in relation to the project summary is the applicant name listed. All other aspects of Wade's testimony apply to the TB Leingang, the BK Fischer and the KJ Hintz as you'll see noted in that row.

Q. Okay. Let's go to the next column -- or not the next column, the next row.

**A.** Section 1, Pore Space Access. There's minimal content changes between the permits, as you'll see noted. There is one thing to specify in the BK Fischer permit and that is that there is Coyote Creek -- Coyote Creek mining -- mine land located within the hearing notification area.

Q. And I think as a result of some questions that came to Amanda, she pointed that out in one of the exhibits; is that correct?

**A.** That's right.

Q. Let's go on then to Section 2.

**A.** That's the geologic exhibits portion of

451

the storage facility permit. You'll remember as Amanda testified to yesterday and earlier today that the model extents used across all three permits are the same. Logging efforts are the same. Microfracture in situ stress tests were performed in all three wells and all three -- excuse me -- all three permits, and all three permits used the same 2D and 3D seismic surveys.

The differences that we'll talk about here mainly have to do with site-specific characterization work. You'll note that in the TB Leingang permit the Minnekahta Formation is present as Amanda had testified to earlier. The Minnekahta Formation is absent in the BK Fischer permit and in the KJ Hintz permit.

Again, site-specific storage complex formation data is -- varies between all three permits as noted here. That includes core data, log testing, things like that.

And the last point to make sure on Section 2, Geologic Exhibits, is that the number of borehole image logs varies between all three permits.

Q. All right. Then let's go to Section 3, please.

452

**A.** Section 3 discusses the geologic model construction and numerical simulation of $CO_2$ as Amanda had testified to previously. The same data inputs were used. Again, as described in Section 2, the same model was used across all three permits. The same simulation was performed where all three well sites were simulated as injecting at the same time. You'll note here that there are minor variations in Section 3 where site-specific data is used to derive individual injection pressures, rates, temperatures and critical threshold pressure estimations. Those are the only differences of material value.

Q. All right. Then we'll go -- the next row is Section 4, the Area of Review. Can you briefly discuss what's contained in that row?

**A.** Area of review, as I testified to earlier, uses the same groundwater sampling method across all three permits. The methodology remains the same. There are site-specific differences that have to do with the number of wells based on the specific area of review and what wells exist there.

Other differences include other site-specific surface features which may include springs, mining land as I discussed previously, and

453

any legacy oil or gas wells. To note, there are no legacy oil and gas present in the TB Leingang or BK Fischer area of review. There is one KJ -- there is one legacy oil and gas well in the KJ Hintz permit as I had testified to earlier.

Q. I'm going to try to get some points here with the court reporter, so can you slow down just a little bit?

**A.** I thought I was.

Q. Let's go to the next section, Section 5.

**A.** Section 5 discusses the testing and monitoring plan. Across all three permits, leak detection plans are similar. Flowline corrosion, prevention plans are similar, and baseline testing and logging plans are similar. There are minimal differences for mechanical integrity testing across all three permits.

You'll note that in the TB Leingang permit the Milton Flemmer 1 will use tubing-conveyed gauges, as Jean had previously testified to in Section 9. The other two stratigraphic monitoring -- excuse me -- stratigraphic test/monitoring wells will use casing-conveyed gauges. Environmental monitoring plans, again, are site specific but the methodology remains the same.

454

Q. Okay. The next section, please.

**A.** Section 6, the Postinjection Site Care and Facility Closure Plan. The monitoring programs are similar across all three storage facility permits. There are minimal differences related to monitoring well-specific details, for example, the maximum pressures seen across each storage facility.

Q. All right. And then Section 7 I have labeled on my exhibit Emergency and Remedial Response Plan. Can you discuss that for us, please?

**A.** The content between all three permits is the same materially.

Q. Okay. And Section 8?

**A.** Again, the material content is the same and there are no -- no large differences.

Q. And Section 9?

**A.** All three storage facility permits abide by the same North Dakota rules and regulations, such as requiring surface casing 50 foot below the lowermost USDW and $CO_2$ resistant cement casing within the injection reservoir zones.

You'll note that the biggest differences are that the Milton Flemmer 1 stratigraphic test well and monitoring well was drilled deeper. It

455

was drilled to 12,000 feet. The other two wells, the Archie Erickson and the Slash Lazy H, were drilled to approximately around 6,000 feet. That would result in just differences in cementing. Some are two stages for the shorter wells and some are three stages in those completions.

Q. All right. Let's go to Section 10, the plugging plan.

**A.** There are no material differences in the plugging plans across all three permits. Plug placement will vary based on formation depths, you know, depending on where those formations exist within each specific wellbore.

Q. And Section 11, Injection Well and Storage Operations?

**A.** Again, the Milton Flemmer 1 well, since it will be using tubing-conveyed pressure gauges, tubing will be installed in the Milton Flemmer 1 well. Prior to injection operations beginning in that storage facility permit in the TB Leingang, that well will be plugged back. It's currently drilled to about 12,000 feet.

There will be no tubing installed in either the Archie Erickson monitoring well or the Slash Lazy H monitoring well.

456

There are site-specific differences in maximum bottomhole pressures, injection amounts, et cetera, as seen in Table 11-1.

Q. Okay. And Jay spent some time comparing and contrasting the financial assurance. So keeping that in mind, can you just discuss Section 12 for us?

**A.** Yeah. Jay did a great job testifying to the differences already. There are minimal differences between all three storage facility permits. The total bond amount between the three storage facility permits varies slightly, and those minimal differences are related to the cost estimates of the postinjection site care and facilities plan, and namely the number of monitoring wells at each site, the reservoir monitoring well design characteristics, flowline lengths and costs associated with endangerment of USDWs.

Q. All right. Now let's spend a little time with the appendices that are attached to each one of the applications. Let's start with Appendix A.

**A.** There are no material differences between all three permits other than they use site-specific information.

457

Q. And Appendix B?
**A.** There are, again, no material differences in Appendix B, Freshwater Well Sampling Analysis, other than the results are site specific.
Q. And Appendix C?
**A.** There are no material differences in Appendix C across all three storage facility permits. You'll note here that site-specific information, namely XRD data, was used to inform mineralogical compositions for injection zone and confining zones. Again, stratigraphic well-specific water ionic compositions were used and, therefore, the simulation results are site specific.
Q. And Appendix D?
**A.** There are no material differences between the three storage facility permits. You'll note that TB Leingang does list information for those tubing-conveyed pressure temperature gauges.
Q. And then finally Appendix E?
**A.** There's no material differences. The differences relate to the permits themselves.
MR. BENDER: Mr. Examiner, you know, I don't -- I think I'll offer the exhibit, and I don't have any other further -- I don't have any

458

further questions for Ms. Olsen.
HEARING EXAMINER GARNER: Any objections?
MR. BRAATEN: No objection.
HEARING EXAMINER GARNER: Exhibit is admitted.
You can proceed to your next witness.
MR. BENDER: Next witness is Wade Boeshans.
HEARING EXAMINER GARNER: And just a reminder, Mr. Boeshans, you're still under oath.
MR. BOESHANS: Yes.

**REDIRECT EXAMINATION**

**BY MR. BENDER:**

Q. Wade, while we're handing out the exhibits, I'm just going to have you direct your attention to what's been previously marked as Exhibit 1C-1.
MR. BENDER: Derrick, can you tell me when you get a copy?
MR. BRAATEN: Sure. Okay. I'm ready.
MR. BENDER: Okay. Thank you.
Q. (MR. BENDER CONTINUING) Wade, can you tell me what Exhibit 1C-1 is?
**A.** (BY MR. BOESHANS) It is the storage agreement for SCS3 for the KJ Hintz storage site.

459

Q. And can you briefly describe the amendment to the Hintz storage unit that Summit is proposing with this exhibit?
**A.** Yes. So in this exhibit it includes an amendment in what is labeled in here as Section 3.12.
Q. And can you explain to the Commission staff why Summit is proposing the addition of Section 3.12 to the Hintz storage agreement?
**A.** Yes. So as you're aware in the -- from the previous -- or my testimony yesterday, the KJ Hintz is in proximity to the DCC facilities. I think I mentioned yesterday -- or I did mention yesterday that approximately, you know, three miles between the storage boundary of -- storage area boundary of the KJ Hintz and the DCC West facility. And so Summit and Minnkota have been in discussions around a border agreement in terms of how we would work together to, you know, manage our storage operations or cooperate in storage operations. And so this amendment outlines what we have agreed to in terms of general terms, and those discussions have advanced to this point.
Q. It's my understanding, Wade, that the -- the Hintz storage agreement already has language

460

for a border agreement -- for the parties to enter into a boarding -- border -- I'm having trouble talking here -- border agreement. Why was it necessary to add Section 3.12?
**A.** Yeah. So you're correct in that the application or the border -- the storage agreement in the application includes border agreements. This section is specific to a border agreement between Summit SCS3 and the DCC facilities.
And so we thought it was prudent at this time given our discussions to lay out the general terms that we've agreed to at this point in anticipation of finalizing that border agreement of coming here, but this would set forth in essence the -- call it general terms and expectations of the border agreement which the parties have agreed to work together on. We believe it's in our best interest to do so, and so we're submitting it here today.
Q. So it's Summit's request and Minnkota's request that the storage agreement for the Hintz storage facility be amended to include the language which is set forth in 3.12; is that a fair statement?
**A.** Yes. That's correct.

461

MR. BENDER: That's all the questions I have for this witness. Offer that exhibit which is Exhibit 1C-1.

HEARING EXAMINER GARNER: Any objection?

MR. BRAATEN: I don't have an objection to the admission of the exhibit. I have an objection to the amendment itself to the application at this point given the circumstances, but not to the admission of that exhibit into the record.

HEARING EXAMINER GARNER: We will note your objection and admit the exhibit.

MR. BENDER: Mr. Examiner, we'd now like to move to Amanda Douglas. If you recall, there were some questions when we had the larger group up here that we believe Amanda can respond to. So I believe she's still sworn.

HEARING EXAMINER GARNER: Yeah. Just a reminder you're still under oath.

MS. DOUGLAS: Understood.

**REDIRECT EXAMINATION**

**BY MR. BENDER:**

Q. Do you want to handle it the way you did last time, Amanda, where you indicate what the question is and then respond?

**A.** (BY MS. DOUGLAS) Yes. And DMR staff, if

462

I -- I miss any, please let me know.

The first question I believe that was asked and deferred was how a fracture pressure gradient influenced $CO_2$ plume size. Generally, the fracture pressure gradient is used to calculate the bottomhole pressure constraint, so 90 percent of the fracture pressure gradient is used to define the bottomhole pressure constraint as required by regulations. A higher fracture pressure gradient would result in a higher bottomhole pressure allowing for more injection of $CO_2$ which would generally result in a larger plume.

However, I'd like to point out in the modeling cases that we ran in the permits in Section 3, the 2100 psi wellhead pressure constraint was met prior to the bottomhole pressure constraint being met. So in this case the higher fracture pressure gradient at one of the sites is not dictating a larger plume size for the case -- simulation case presented in the permit application.

Q. That's -- I believe that's the only question that -- oh, there's another one?

**A.** I was just pausing. Sorry.

Q. Oh, okay.

463

**A.** Waiting for --

Q. That was a long pause, so --

**A.** Waiting for the Commission to -- to write their notes.

Another question I believe -- Travis, you asked a question on stabilized plume. Could you please restate your question, or postinjection period?

MR. STOLLDORF: Oh, okay. Hang on one second. Yeah. On Figure 6-2, can you explain the $CO_2$ extent ten-year postinjection -- how that ten-year postinjection boundary was determined? It's on page 6-6 or 6, dash, 6.

MS. DOUGLAS: Yep. So the simulation model was used to simulate the 20 years of injection and several years postinjection. And so the plume as labeled here is showing the $CO_2$ plume extent at ten years postinjection as determined -- as predicted by that modeling simulation.

MR. STOLLDORF: Okay. What parameters are used to determine when the plume is stable -- when the plume is stabilized?

MS. DOUGLAS: So plume stabilization is determined by looking at the rate of change in plume area over time. So the rate of change in the

464

plume area over time decreases, and so we used -- we calculated the rate of change over one-year time steps and looked at the point in time where rate of change slowed down. And in that case the cutoff was determined to be less than two square miles of change per year in plume area, and that was used as our cutoff to determine when the $CO_2$ plume stabilized. .2 -- .2 miles, sorry, if I misstated.

MS. MADCHE: And that's using the 5 percent saturation cutoff as well within those square footage movements?

MS. DOUGLAS: That's correct.

MR. STOLLDORF: Thank you. That's all I had.

MS. DOUGLAS: So, Tammy, you asked a question about the pressure from the flowlines and the wellhead pressure used in modeling. Could you restate that question?

MS. MADCHE: Yes. So on Table 11-1 on page 11-2, for all three applications there's a note that maximum injection pressure during operations will be limited to surface equipment pressure ratings and the maximum bottomhole pressure constraint. In Table 11-1 and in Section 3 in the model you report that you used a wellhead

465

pressure constraint of 2100 psi alongside the bottomhole pressure constraints. However, in the testing and monitoring section in Table 5-4, the flowline maximum operating pressure is listed at 2183 psi along with a maximum discharge pressure of 2160 psi. So my question was why those operational values on the flowline are higher than the wellhead pressure constraint that was used in the model.

MS. DOUGLAS: So can you restate the value? Did you say it was 2,160?

MS. MADCHE: 2183 for max operating pressure, 2160 for max discharge pressure.

MR. BENDER: Do you want to hand that off to Jamey or --

MS. DOUGLAS: Yes.

MR. BENDER: Reluctantly?

MS. DOUGLAS: So before Lawrence introduces Jamey, then, you guys had a question on the stoplight system and the magnitude of earthquakes used in that stoplight system. So John described 2.7 is the low value for that stoplight system. Again, that's the threshold for a felt earthquake.

Greater than a magnitude of 4 was chosen essentially for that next step in the stoplight

466

system. At an earthquake magnitude level 4, that's where the magnitude of the earthquake would be sufficient to -- it's generally described by the USGS as shake or rattle dishes. That's how the USGS describes it. So at that point the stoplight system states that SCS will stop injection, perform inspection on surface facilities and wells to ensure there's no damage, and then reduce operations while a detailed analysis is done to determine whether or not injection operations caused that or that could have been a natural earthquake that their monitoring array is just picking up.

And then over 4.5 is the cutoff for complete stop of operations and working with the regulator to determine if any changes to injection operations are needed.

MR. SUGGS: So why the 4.5? What's the significance of that transition?

MS. DOUGLAS: So as you get from 4 moving up till 5, so earthquake magnitude 5 -- as described by the USGS, at earthquake magnitude 5, that's where you might start seeing potential damages to structure, such as cracked drywall, things like that. And so 4.5 is below that 5

467

threshold to provide that safeguard to make sure that operations are shut down before any earthquakes are induced that could cause damage.

MR. SUGGS: Okay. Thank you.

MS. DOUGLAS: Were there any other questions that you recalled that were deferred?

MS. MADCHE: No.

MS. DOUGLAS: Okay.

MR. BENDER: We'll now call Jamey Backus, I think, who can respond to the remaining questions. Jamey will -- and Jamey has not been sworn.

HEARING EXAMINER GARNER: I'm going to swear him in.

MR. BENDER: Okay.

**JAMEY BACKUS,**

being first duly sworn, was examined and testified as follows:

**DIRECT EXAMINATION**

**BY MR. BENDER:**

Q. Jamey, state your full name for the record.

**A.** Jamey Backus.

Q. And, Jamey, I misspelled your name earlier, so will you spell your last name?

468

**A.** B-a-c-k-u-s.

Q. And, Jamey, by whom are you employed?

**A.** Summit Carbon Solutions.

Q. In what capacity?

**A.** Project manager of topside facilities.

Q. Okay. And can you spend just a few moments providing us with a summary of your educational background and work experience?

**A.** Bachelor's degree in mechanical engineering. I worked at DGC for a number of years, which is the chemical plant up near Beulah, and then I also worked in coal-fired power generation in roles such as engineer, maintenance superintendent and plant manager.

Q. And what are some of your duties and responsibilities with respect to your employment at Summit?

**A.** That would be design of the topside facilities and equipment selection.

Q. Okay. I don't have any other questions. He's available for the questions that -- I don't remember exactly what they were, but I think Tammy may have had a few, or do you recall the questions?

**A.** Well, I think I can -- I'll go through all the ones I have and then let me know if I forgot

469

any.
So if we begin with the max pressure one that Amanda referenced, the max operating pressure of the pipe is set by thickness, flange ratings, et cetera. The maximum output pressure of the pump is set by the pump manufacturer, but we will have controls in place so that the wellhead pressure never exceeds the 2100 psi.
MS. MADCHE: Sounds good.
MR. BACKUS: Okay. The other question, the block valve where NDL-327 breaks off to NDL-325, we did not have intentions of putting a block valve there. Now, with the discussion of potentially putting a Coriolis meter there, we may revisit that, but we did not originally have intentions of putting one there because the mileage of the pipeline in that area did not require it.
MS. MADCHE: So I guess I would just state we would probably highly recommend it just because it gives you that extra ability to isolate between the facilities since they are owned by separate LLCs.
MR. BACKUS: You'd asked about location of where NDL-327 goes to 325, that is 141 North, 87 West, Section 5. The terminus point is 141 North,

470

86 West, Section 5.
MS. MADCHE: Okay.
MR. BACKUS: Those were the ones that I had.

**EXAMINATION**

**BY MS. MADCHE:**

Q. Okay. So additional ones I have were what you anticipate the average flow rate to be for the three individual flowlines?

**A.** Yeah. So I would -- I would reference the Section 11 for each one of the applications, and our average -- average injection rate between the two wells utilizing the 2100 psi wellhead constraint, I would -- I would utilize the total of that number as to what will actually flow through the line to the -- to the well site.

Q. So just to confirm, you plan to maximize right up until the 2100 psi wellhead pressure constraint?

**A.** Depending on flow coming in from the capture facilities --

Q. Sure.

**A.** -- you know, the 16 -- I'll talk in rough numbers -- the 16 million tons that is currently slated.

471

MS. MADCHE: Okay. I'm just checking to make sure I don't have anything else here. I think that's all I have for deferred questions. I'll let anyone else go. I do have one question on the Exhibit 8B afterwards, so --
MR. BENDER: When you say "afterwards," I'm sorry, I don't mean to question you, but --
MS. MADCHE: Anyone else in DMR that --
MR. BENDER: Oh, I see.
MS. MADCHE: -- has --
MR. BENDER: Okay.
MS. MADCHE: -- deferred questions. Sorry.
MR. BENDER: Okay. Thank you.
HEARING EXAMINER GARNER: I think you can ask, Tammy.
Q. (MS. MADCHE CONTINUING) All right. So on Exhibit 8B, on page 5 of 6 I think there might be a typo on the KJ Hintz column under Section 12, number 2. It states, "Additional groundwater monitoring well and soil gas profile station has been added at legacy well 4942." Based on the figure in the application it's an additional Fox Hills monitoring, not a soil gas station, just to confirm. And that would be figure -- give me a

472

second.
**A.** (BY MS. OLSEN) You're correct. That's a typo. There is not a soil gas station planned near that additional legacy well. Just a Fox Hills monitoring well.
MS. MADCHE: Okay. Thank you.
HEARING EXAMINER GARNER: Well, at this time I guess we'll move to cross-examination unless there's anything else.
MR. BENDER: Yeah. And I will -- I'll accommodate Derrick in any way. If you would prefer the -- that other group of people that we had up a few moments ago and have -- and do your -- conduct your cross-examination on those witnesses first or if you want to use this group, whatever you prefer, I'll try to accommodate you.
MR. BRAATEN: Give me just one moment, please. Maybe for efficiency, if you don't mind, I can just start with some of the questions I had for these witnesses and then finish that and recall any that I need that were up prior.
MR. BENDER: I guess I'll try not to object, but I would hope you would keep it to --
MR. BRAATEN: Yeah. I have questions based on this testimony.

473

MR. BENDER: On the direct we just had?
MR. BRAATEN: Yeah.
MR. BENDER: Okay. Fine.

**RECROSS-EXAMINATION**

**BY MR. BRAATEN:**

Q. Ms. Douglas, I think you had testified about the plume stabilization parameters and indicated that the stabilization cutoff was determined to be when less than .2 square miles of change occurred in any given year at the 5 percent saturation cutoff; do I have that right?

**A.** (BY MS. DOUGLAS) Correct.

Q. Did you also model -- let me start over.

Did you run the model to determine the total duration over which the plume would keep moving regardless of rate?

**A.** I can't recall off of the top of my head. I know we modeled it for a significant postinjection duration. I was not directly involved in determination of stabilized plume so I don't have that information readily available.

Q. Who made the determination for stabilized plume or who was involved with that?

**A.** Apologies, I don't have those names readily available.

474

Q. Was it people at EERC?

**A.** Yes.

Q. Okay. There was some discussion of the stoplight system. Why not notify DMR of events between a 4 and a 4.5?

**A.** That's not included here as written, but I think that'd be prudent to add that.

Q. Okay. Ms. Olsen, you testified on Exhibit 8B regarding the different depths for the three wells. Do you have an understanding as to why they drilled the three different wells to those specific depths?

**A.** (BY MS. OLSEN) Generally, yes.

Q. And just generally, what is your understanding?

**A.** My understanding is they were drilling the Milton Flemmer to get core data from deeper formations.

Q. Okay. Did they complete or are there plans to complete that at a higher interval at some point with a plug?

**A.** There are no plans, to my knowledge.

MR. BRAATEN: I have some questions, Lawrence, related to surface facilities, and Mr. Volk did some testifying but it sounds like

475

Mr. Backus has an understanding as well. Do you mind if I ask him the questions, and if he can't answer, we can call Jay Volk up?

MR. BENDER: I have no problem with that. It may save time if you just try that approach.

Q. (MR. BRAATEN CONTINUING) Okay. Mr. Backus, can I have you turn to the generalized flow diagram on page 5-12 of Exhibit 1A?

**A.** (BY MR. BACKUS) Okay.

Q. Can you describe the purpose of the blowdown which is indicated on the generalized flow diagram?

**A.** Thank you. In hopes of not getting called up, I didn't bring my glasses.

Oh, the blowdown on the receiver?

Q. Correct.

**A.** Yes. That would be for when the -- when a pig is received in there and the receiver is isolated, that blows down the pressure and $CO_2$ so that the pig can be removed and data can be retrieved from it.

Q. Are there emergency pressure relief valves on the system anywhere as far as what we're looking at in the generalized flow diagram?

**A.** There is a thermal relief valve, but not

476

emergency pressure relief valve.

Q. How do you deal with an unexpected spike in pressures coming through this system?

**A.** I think that is dealt with through controls of the pipeline pump pressure control valves to maintain pressures that are -- that can be withheld within the existing facility.

Q. Can you explain that a little more?

**A.** In order to have a pressure spike, something would need to do that, and a pump would be the obvious thing, and there are controls on the pump, be it vari -- variable frequency drive or just the nature of the pump that would keep it underneath of the failure pressure of the piping -- or the maximum operating pressure, I should say. I'm sorry.

Q. Do you believe there's a 0 percent chance of pressure causing some kind of a release from the surface facilities post Midwest Carbon Express' terminus point?

**A.** I don't know that I can say there is a 0 percent chance of that ever happening.

Q. Have you done any kind of dispersion modeling to determine the areas in which you would need to provide notice to people if you did have a

477

release in one of those sites?
MR. BENDER: Before you answer that question, I want to caution you that there's been some -- there's been a dispersion model that's been prepared and it's been submitted to the Public Service Commission and it's confidential. So you can answer the question, but be very careful that you don't answer it in a way that provides information with the model that was supplied to the PSC.
MR. BACKUS: I can say that I was not personally involved with any of the dispersion modeling that has been done.
MR. BRAATEN: And fair objection, Lawrence. I'm actually not trying to get into that.
MR. BENDER: I appreciate that.
Q. (MR. BRAATEN CONTINUING) But my understanding of the dispersion model with the PSC is that that relates to the main line and to that, and I'm asking just specifically if there was any dispersion modeling done post main line on the flowlines in those facilities?
**A.** I was not involved in any of that.
Q. Okay. And so you're not saying there

478

wasn't one done. You're just saying you don't know?
**A.** Yes. That's what I'm saying.
Q. Okay. Is there -- do you know of anyone else that's testifying that would know whether or not one was done?
**A.** You could ask Mr. Powell.
Q. Okay. If Mr. Powell didn't know, is there anyone else that would?
**A.** He would be the one to ask that question to.
Q. Okay. What is the purpose of the thermal relief valve?
**A.** So in cases where you can isolate a section of pipe and it would be full of $CO_2$ at pressure, if it heats up through whatever means, say the sun is shining on that pipe, the $CO_2$ will expand and this -- the thermal relief makes sure it does not exceed safe operating limits.
Q. How does the thermal relief valve do that?
**A.** More than likely it would be the type of thermal relief valve that is spring operated, so as the pressure would increase, it would relieve that and then close again.
Q. Is the valve opened based on temperature

479

or pressure?
**A.** The valve would open based on pressure.
Q. What pressure?
**A.** I believe that number is 5 percent over maximum operating pressure.
Q. Wouldn't that risk a failure if the max operating pressure is based on the manufacturer's recommendations?
**A.** No, I don't believe it would. That -- that is a normal thing when you talk about, say, a vessel. Normally they operate -- the pressure safety valve in that case is normally set 10 percent over -- 5 to 10 percent over the operating pressure.
Q. And when you say "the operating pressure," are you saying the max operating pressure as established by the manufacturer of the pipe?
**A.** I'm saying the 900-pound class standard we are working off of, that operating pressure, as set by ASME, I believe.
Q. Okay. Does the valve, then, close by itself automatically once it gets back down below that pressure?
**A.** It does.
Q. Okay. So I asked you earlier about a

480

dispersion model, but are you aware of any testing done on predicted maximum release from the line through that valve?
**A.** Because -- because of that thermal relief valve?
Q. Correct.
**A.** Yes, I am.
Q. And what -- what kind of studies were done to determine what the maximum release would be from that thermal relief valve?
**A.** It was -- a third party performed a study based on a temperature rise in that line and the thermal expansion of the $CO_2$ given the size of the line and the volume contained in, how much it would need to relieve.
Q. As well as the intended flow rate?
**A.** Yes.
Q. And operating pressure?
**A.** Yes. Well, it -- when you say flow rate, do you mean through the valve or through the line?
Q. I don't know.
**A.** I can say this: If that would happen, it is because everything is stopped. There is no flow through the line and valves are closed.
Q. Okay. Yeah, so through the valve.

481

What was the maximum amount of $CO_2$ predicted to be released from the thermal valve in the scenario you described?

**A.** Approximately .136 tons per minute.

Q. And did they determine the maximum length of time they thought such a release would potentially occur under those parameters?

**A.** Based on the largest segment of line that one of these exists on, I think there would be approximately three tons of $CO_2$. That would be if you emptied the line completely, which would be highly unlikely, but that would be if you emptied the line completely.

Q. So when the thermal valve is released, does that trigger other valves to stop flow in the line or do you have to manually shut that off?

**A.** Well, as I said for -- for that to trip, that means that there is no injection going into that well. We have isolated the valves because it is only as the temperature warms up, the pressure would increase to release that. So there would be no replacement $CO_2$ coming into that line. It's simply to protect the line.

Q. Okay. Do you have an understanding of how far three tons of $CO_2$ would disperse under natural

482

wind and weather conditions?

**A.** I do not.

Q. I'm not sure who this question is for, but I think there was some testimony about who would be operating the flowlines, so not the main line, Midwest Carbon Express, but the flowlines. Was there testimony that the flowlines would be owned by the storage facilities but operated by SCS Transport?

**A.** (BY MR. BOESHANS) That's correct.

Q. And when did that arrangement -- when was that arrangement decided upon?

**A.** That -- I don't know that I can give you a specific timeline in which that decision was made.

Q. Was it within --

**A.** I think it was generally that the intent that -- from my recollection, it was always the intent that it would be an integrated system operated -- connected with a common control system as Jamey described earlier.

Q. Are there any contracts signed between the various entities to formalize that relationship for operating the flowlines?

**A.** We do not have interoperating agreements in place today between the entities.

483

Q. Or any other kinds of contracts to govern that?

**A.** Not at this time.

Q. I apologize, I'm jumping around a little now, but, Ms. Douglas, I think you had talked about this traffic light system, and under the event of greater than 4.01 one of the plans is to continue operations at a reduced rate and/or below a revised maximum operation pressure. How would you make those determinations as to how much to reduce the rate or the maximum operation pressure?

**A.** (BY MS. DOUGLAS) At this time what's specified is injection rate would be reduced to no less than 50 percent.

Q. How do you decide if it'll be 50 or 55 or 60, for example?

**A.** So as part of this stoplight system and as this traffic light system is part of this seismic monitoring, we'd be acquiring continuous seismic data. So we'd take into account not just that larger event but if there were other events, how many, their magnitude, time duration, as well as their epicenters.

Q. Mr. Backus, do you know what the diameter is of the thermal valve?

484

**A.** (BY MR. BACKUS) 1 inch, I believe.

Q. Okay. Are there any other pressure relief systems post terminus of the Midwest Carbon Express that we haven't discussed?

MR. BENDER: I think I'd rather have you address that question to Jimmy. He's more familiar with those things, and he'll be coming up after this.

MR. BRAATEN: Okay. Okay. I think that's all the questions I have for these witnesses. I have a few, I think, for Mr. Powell and Ms. -- one -- well, a couple quick ones for Ms. Oddy.

MR. BENDER: Do you want the whole group or --

MR. BRAATEN: No, I think -- well, I think we can start here. I think that they may be able to answer them all.

MR. BENDER: Okay.

**CROSS-EXAMINATION**

**BY MR. BRAATEN:**

Q. Ms. Oddy -- am I saying that right, Oddy?

**A.** (BY MS. ODDY) Yes. Oddy.

Q. You made a reference to $CO_2$ resistant cement. Can you describe what that is?

**A.** Yep. So as part of the design plan, we

485

have consulted with contractors who specialize on cementing design in the basin, and part of that is evaluating the downhole pressures and temperatures as well as the interactions between the $CO_2$ stream as well as the formation water in accordance to the regulations. And so we're not looking at your conventional oil and gas cement, primary cement. The cementing system is tailored to provide resistance to $CO_2$ with additions to different chemicals and different formulations within the cement.

Q. Other than the pH, are there other properties of the cement that are specific to $CO_2$ resistant cement that make it different than your regular cement used for plugging wells in the oil patch?

**A.** So -- yeah, so for both plugging as well as primary cementing in our -- in our injection wells and monitoring wells, some parameters I can name off the top of my head is the permeability would be significantly reduced in the formulation. Those -- I can't recall any other parameters. Like I said, we contracted specialized cementing contractors.

Q. So just as a general matter, would the

486

lower permeability in that cement result from a greater clay content?

**A.** So it would just mean that, generally speaking, there'd be less chances on interactions with, you know, potential oxidation or any chemical reactions downhole.

Q. What do they add to the cement to prevent oxidation or chemical reactions downhole that is different than the cement used for normal cementing or plugs in the oil patch?

**A.** I'm not privy to the specific additives by the contractor.

Q. Do you know if anyone at Summit or EERC is?

**A.** Again, we've contracted technical experts from a cementing company and so they would know the -- they, as in the contractor, have, you know, a proprietary formulation of the cement system, and then it would just be our responsibility to make sure that those are rated for the bottomhole pressures that we expect.

Q. What is the name of the contractor?

**A.** So the two commonly contracted out for carbon portfolios would be either Schlumberger or Halliburton.

487

Q. Okay. Is there any requirement to use $CO_2$ resistant cement in these wells?

**A.** So under Administrative Code 43-05-1-11 -- this would be in my own summarization, but in the selection of casing and cement, you know, where -- some of the factors that we need to take into place in the design is bottomhole pressures, temperatures, as well as the potential corrosiveness when $CO_2$ is introduced with formation water.

Q. And the cement both used to cement in a casing as well as the plugs interacts with $CO_2$ in the reservoir with these wells, the injectors?

**A.** With respect to the injection wells, yes, it would be -- yep, because it'd be isolating the injection zone. So it would -- the $CO_2$ would be going through the casing into the cement into the reservoir.

Q. Did they use $CO_2$ resistant cement to cement in the casing or plug the Raymond Jensen well?

**A.** I don't have the details of what type of grade of cement that was used in the Raymond Jensen well.

Q. Why wouldn't that be as important as knowing the cement in the injector wells?

488

**A.** We don't anticipate, as per Caitlin or Amanda -- I can't remember which one, but we don't anticipate the $CO_2$ plume at this time to reach the Raymond Jensen well. However, it is part of the area of review and therefore that was reviewed as -- as Caitlin testified to.

Q. Okay. And the surface casing for the Raymond Jensen well is not 50 feet below the lowest USDW; right?

**A.** I'd have to -- I'd have to refer to that diagram.

Q. Would you mind taking a look?

**A.** Oh, this is the TB Leingang.

Q. You know, I might be able to speed this up. Are you confident that the depth of the casing of the Raymond Jensen is in the application?

**A.** I do not know. I'd have to refer back to the --

Q. Okay. I'll have you go ahead and look.

**A.** Can you repeat your question, please?

Q. Is the surface casing for the Raymond Jensen well 50 feet -- at least 50 feet below the lowest USDW?

**A.** According to the diagram here, I guess I'm not sure in this area what would be considered what

489

the lowest underground source of drinking water is.
Q. What's the depth of the surface casing?
**A.** On the diagram it's 330 -- 330 feet.
Q. Okay.
MR. BENDER: Mr. Braaten, if you don't mind, I think Caitlin can address that question, if you want.
MR. BRAATEN: Oh, okay. Thank you.
MS. OLSEN: Can you repeat the question? Sorry.
Q. (MR. BRAATEN CONTINUING) Is the surface casing of the Raymond Jensen at least 50 feet below the lowest USDW?
**A.** (BY MS. OLSEN) It's not.
Q. Okay. When you did the model for the leaky well scenario, were you doing that based on the location of the Raymond Jensen well?
**A.** No, we did that leaky well scenario to delineate the AOR using the risk-based AOR method.
Q. Okay. I'm going to -- just a couple more here, and I'm not sure who this one's for, but it relates to the -- the valves in the surface facilities we discussed. And, Mr. Powell, I think these were for you.
But the first question is have you

490

designed that system to accommodate a situation with a blocked flow in the system?
**A.** (BY MR. POWELL) Yes. So the general flow diagram is not the piping and instrument diagram. So the thermal relief was just to relieve pressure in that bypass on that valve. So, yes, in all segments where the -- a segment could be isolated by a valve or shut in, yes, there is pressure relief in those segments.
As far as design pressure, the pipe is designed for 195. It's hydro tested to 125 percent of that maximum operating pressure. The valves were designed at Class 900 and bench-tested to 150 percent of pressure.
THE REPORTER: Can I have you speak up, please?
MR. POWELL: Oh, sorry. I'll repeat it.
So as far as the design pressure of the pipeline, it's per 195 regulation and then it's hydro tested to 125 percent of the MAOP, which would be 125 percent of the 2183. The valves are designed to Class 900 and that pressure value and then they're bench-tested at 150 percent of that.
Q. (MR. BRAATEN CONTINUING) Why was the piping and instrumentation diagram not provided as

491

part of the application?
**A.** I can't answer that question.
Q. Can it be provided?
**A.** Yes.
Q. Rather than asking you to identify the location and size of every valve in there, would you be willing to simply provide the piping and instrumentation diagram?
**A.** Yes.
Q. Oh, what is the diameter of those other valves that you just discussed?
**A.** Again, we'll reference them on the piping and instrument diagram. To Jamey's testimony, they're typically 1-inch to 2-inch valves.
Q. But the diameter of those valves will be listed on the piping and instrumentation?
**A.** Not the diameter of the valve. The size of the valve. The valves themselves are standard, at least in my experience, but the connections to the piping, to the carrier pipe, that's typically three-quarter inch to 1 inch, but we'll have that on the P&I data.
Q. Okay.
**A.** And just to clarify, any relief of pressure would not be external to the pipe. It

492

would be relieved into the pipeline. So if it's -- if you've got pressure relief between two segments -- a segment of the pipe that could be isolated with two closed valves, the pressure would be iso -- or relieved downstream. It would not be released to the atmosphere. So that wasn't clear from what I heard before.
Q. Okay. Thank you. So the only valve that would release to the atmosphere would be the temperature valve --
**A.** No. The temperature.
Q. -- or thermal valve? Sorry.
**A.** The thermal relief should be -- should be via tubing connected downstream. So if you have those two -- if there's pressure built up in that valve bypass, which would typically be closed in normal operation, then you could -- to Mr. Backus' testimony, you could have a thermal pressure buildup, and if that's the case, there's a set point on that valve, 110 percent, whatever it is -- we'll have that set point and that should be indicated on the P&ID, at least at this point. Then when it reaches that set point, it relieves downstream of that closed valve so it relieves the pressure on that piping, that segment of piping.

493

Q. The thermal valve releases the pressure downstream?
A. That thermal relief valve relieves the pressure from that small segment of bypass piping downstream of the closed valve.
Q. So it doesn't release anything to the atmosphere?
A. No. The only thing that would be released to the atmosphere is where you saw the blowdown referenced. That would be a controlled blowdown or release to the atmosphere if that were needed for normal or abnormal operating conditions.
Q. What kind of a spike in pressure would you expect if you had a valve shutdown at the wellhead?
A. Again, these -- these set points -- I'll back up.
I mentioned earlier in previous testimony about a surge analysis. So that surge analysis is -- was conducted on every -- or every main line valve, including in the flowline segments, was evaluated for an inadvertent closing. And the regulation is 110 percent of maximum operating pressure so it cannot exceed that. And in our case I believe the maximum was 107 percent. We can tell you exactly what the segments were in the

494

flowlines, I don't remember off the top of my head, but they were less than 110 percent.
Q. What was the time duration that was modeled over?
A. The -- the valves themselves are all actuated and have the capability to close in seconds, and we can confirm, but I believe the time frame was minutes, two to five minutes.
Q. So if all of your pressure relief systems relieves pressure within the line downstream and you have a valve unexpectedly shut at the wellhead, how do you relieve that pressure?
A. You're talking about upstream of the wellhead --
Q. Right.
A. -- to the inlet valve?
Q. Right. Yeah.
A. If it's the segment up -- well, let me back up.
Because there's -- remember, this is all automatically or automated or controlled by a control center, and there are -- there will be tight operating pressure boundaries. So they're continually seeing when any pressure changes may happen in a line, so -- and if -- there will be set

495

points, and I can't tell you what they are at this ten seconds, but there will be an alarm and then there will be a secondary alarm. And so the control center operator will have notification if there's a -- if there's a pressure increase, and so there will be procedures or protocol they take to relieve that pressure before there's a buildup that would overpressure any equipment, whether it's that inlet valve to the wellhead or that segment of piping. So there shouldn't be a situation even in an abnormal operating condition where that equipment will be overpressured.
Q. But the protocol you mention for ensuring that that doesn't get overpressured relies on human judgment?
A. No. There will be an automatic -- or you can't have automatic set points, but, yes, the first -- the first response would be from an individual in the control center. That's correct. Per procedures on what to do in a what-if situation.
Q. Will there be protocols provided to the DMR or any regulatory bodies with respect to the decision tree for the person making that decision?
A. Those will be in the standard operating

496

procedures. So I'm not -- I don't have the experience with the DMR to see if that's something that they are -- that they want to audit or interested in reviewing. If they do, they would be available. They're not confidential or will not be confidential.
Let me clarify. We're not going to publish them on the website, but if a regulatory body wants to see our operating procedures, absolutely.
Q. Mr. Powell, were you here during my questioning of, I believe, Ms. Douglas when I was asking about what Summit would do if after, for example, the five-year review you determined that you needed to change the boundaries of the storage facility and then my questions following that were about how you would allocate compensation in that event? Did you -- were you here during that testimony?
A. I was.
Q. So let's just take as a hypothetical a situation where Summit makes the determination after five years that the data on the ground justifies adjusting those storage facility boundaries. What is Summit's plan with respect to

497

how to adjust the compensation to the landowners that has been paid up until that point?

**A.** I don't have that knowledge of how the -- how the compensation may or may not be adjusted to landowners.

Q. Is there anyone else in the company that would have that knowledge?

**A.** I'll defer to Mr. Boeshans.

Q. Okay.

MR. BRAATEN: I'm not trying to get out of order, Lawrence, but do you mind -- this is like right near the end. Do you mind if we have Mr. Boeshans come up?

MR. BENDER: If you're getting close to the end, I don't have any problem with that.

Q. (MR. BRAATEN CONTINUING) Mr. Boeshans, do you have an under -- well, I'll just start over.

In the hypothetical scenario that five years down the road Summit determines that it wants to adjust the boundary of the storage facility based on the data it gets from its monitoring activities, how would it allocate or reallocate payments already made to the owners in the storage facility?

**A.** (BY MR. BOESHANS) So in that situation,

498

what I would see is, you know, it's an it-depends answer. It depends on what the adjustment is to the boundary. And then if we were going to make an adjustment to the boundary, it would be -- you know, be decided, you know, by hearing like this with the Commission because that would be a major modification to the permit.

And so at that time we would have more information around what the change is, the adjustment is, how much -- how long it's been operated and have a -- probably have -- we'd have a recommendation in terms of how to do that. We don't have a plan exactly today in terms of how that would happen.

Q. If you expand the storage facility after five years, the boundary of the -- I'm going to start over.

If Summit were to make a major modification and expand the border of the storage facility through a hearing with the DMR, would you agree that you need to pay the new owners now being included in the storage facility for prior injections?

MR. BENDER: I'm going to object because I think you're asking for a legal conclusion.

499

MR. BRAATEN: That's fair.

Q. (MR. BRAATEN CONTINUING) But what I'm actually asking is what Summit's opinion would be on that issue. Not whether they need to, just whether you would.

**A.** So you're asking me if there was an adjustment -- your situation, if there was an adjustment after five years and we had been injecting, would we pay the landowners that were added to the unit?

Q. For the past injections.

**A.** For the past injections. I don't know that I can answer that. It's a -- I think you'd have to understand more about that situation, what led to the changing of the units.

Q. What more do you want to understand? What information are you missing to make the determination?

**A.** Well, I'm missing the historical operation and what led to the need for a change.

Q. Well, let's presume -- sorry. This was implied, but I should be explicit. You're going to change the size of the storage facility because you've determined that it was inaccurate and that the plume is going to move further than you

500

originally anticipated such that you need to expand the boundary of the storage facility.

MR. BENDER: And I'm going to object. You've asked that question previously in a little bit different manner and he said he needs to know more information before he can answer the question -- answer the question. So I'm going to object.

HEARING EXAMINER GARNER: I'm going to let him answer if he knows.

MR. BOESHANS: I don't know.

Q. (MR. BRAATEN CONTINUING) You don't know what?

**A.** I don't know the answer to your question right now.

Q. So Summit won't make a commitment to pay owners added into an expanded storage facility for prior injections?

MR. BENDER: Objection. Asked and answered.

HEARING EXAMINER GARNER: Sustained.

Q. (MR. BRAATEN CONTINUING) Was the answer no?

MR. BENDER: He said he didn't know.

Q. (MR. BRAATEN CONTINUING) Okay. But if

501

you don't know whether or not Summit will make a commitment to do that, then the answer is that they're not making a commitment right now to do that; right?

MR. BENDER: Objection. I mean, we've covered this ground now three times.

HEARING EXAMINER GARNER: Sustained.

Q. (MR. BRAATEN CONTINUING) Does anyone at Summit know the answer to that question?

MR. BENDER: Objection.

MR. BRAATEN: What's the objection?

HEARING EXAMINER GARNER: He can -- he can answer that one.

MR. BOESHANS: I don't know. It's not a question that I've raised with anybody at Summit.

Q. (MR. BRAATEN CONTINUING) Has anyone else at Summit raised the question with you or anyone else that you're aware of?

**A.** Not that I'm aware of.

Q. I apologize if someone did ask this, but there was a question earlier -- Mr. Powell, I think it might have been deferred to you, but -- or Mr. Boeshans -- with respect to the payments being made to landowners on the $CO_2$ stream, is that -- are those payments being made based on the full stream

502

or the actual $CO_2$ mass in the stream?

MR. BENDER: I'm going to object. You seem to be using the past tense. You said that we have paid or am I misunderstanding you?

MR. BRAATEN: Well, I can -- I'll just change it to avoid that.

MR. BENDER: Okay.

MR. BRAATEN: I see what you're saying.

Q. (MR. BRAATEN CONTINUING) So when you go to pay landowners for injections, is it your intent to pay based on the full stream of substances injected or the $CO_2$ mass in the stream?

**A.** The intent is to pay on the -- the full stream as it's defined in the storage agreement --

Q. Okay.

**A.** -- which is associated substances.

MR. BRAATEN: Okay. No further questions.

HEARING EXAMINER GARNER: I believe the staff might have some questions. Already answered? Okay. Lawrence, any further witnesses?

MR. BENDER: Not at this time.

HEARING EXAMINER GARNER: Okay.

MR. BRAATEN: Could we take a break?

HEARING EXAMINER GARNER: Take a break before you call?

503

MR. BRAATEN: Yeah.

HEARING EXAMINER GARNER: Sure. Take a ten-minute break.

(Recessed at 4:42 p.m. and reconvened at 4:59 p.m.)

HEARING EXAMINER GARNER: We are back on the record. Attorney Braaten, you can proceed with your first witness.

MR. BRAATEN: All right. We are calling Shane Bofto to appear by phone. Shane, can you hear me okay?

MR. BOFTO: I can hear you.

HEARING EXAMINER GARNER: Okay. Let me swear him in real quick.

MR. BRAATEN: Okay. Shane, the hearing examiner is going to swear you in.

**SHANE BOFTO,**

being first duly sworn, was examined and testified as follows:

**DIRECT EXAMINATION**

**BY MR. BRAATEN:**

Q. Shane, can you state your full name and spell your last name for us?

**A.** My name is Shane Bofto. Last name is B-o-f-t-o.

504

Q. And by whom are you employed?

**A.** HydroSolutions, Incorporated.

Q. And just generally speaking, what kind of company is HydroSolutions, Incorporated?

**A.** We're a services, disabled veteran-owned, small business associated with consulting and environmental and water resources.

Q. Okay. Can you describe your educational background, please?

**A.** Sure. I have a bachelor of science in chemical engineering from Montana State University and an M.B.A. from the University of Mary in Bismarck.

Q. And can you give us a description of your professional experience from college up until you began with HydroSolutions?

**A.** Sure. I initially out of college worked at a petroleum refinery in the environmental health and safety department. I then went to work out in Seattle where I focused on mining internationally, consulting primarily in water quality, acid rock drainage and treatment.

Following that, I moved back to Montana and was a general environmental engineering consultant and went through several companies till

505

I ended up here at HydroSolutions.
Q. And approximately how long have you been working at HydroSolutions?
**A.** Since -- since 2004.
Q. And can I have you pull up Exhibit No. LO-56, Shane?
**A.** I have it.
MR. BENDER: Can you just give me a minute to get there?
MR. BRAATEN: It's his résumé.
MR. BENDER: Okay. I'm there. Thank you.
Q. (MR. BRAATEN CONTINUING) Does this curriculum vitae accurately reflect your educational and professional qualifications and experience, Mr. Bofto?
**A.** Yes, it does.
MR. BRAATEN: Move to admit Exhibit LO-56.
HEARING EXAMINER GARNER: Any objections?
MR. BENDER: No objection.
HEARING EXAMINER GARNER: Motion granted.
Q. (MR. BRAATEN CONTINUING) And, Shane, can you describe for us with respect to your work at HydroSolutions the kinds of clients and the kinds of work that you've been involved in?
**A.** At HydroSolutions, clients mainly consist

506

of private individuals, ag and ranching clients, federal, state and local governments and municipalities. We have a GSA contract with the federal government. We work with developers, conservation groups and other NGOs and then companies including mining, oil and gas pipelines, and we also work with attorneys.
Q. And as a general matter, you mentioned environmental consulting services, but can you give us just some specific examples of the kinds of projects and the kinds of consult -- different kinds of consulting work that the folks at HydroSolutions do?
**A.** Generally, we provide independent services and environmental engineering, hydrogeology, remedial investigations, remediation, permitting, water resource development, compliance, due diligence, environmental impact statements and expert work.
Q. And, Mr. Bofto, are you familiar with the applications and the Class VI well permit applications that bring us to the hearing today?
**A.** Yes, I've briefly reviewed them.
Q. And do you have any -- we've talked generally about the experience of HydroSolutions

507

and your experience. Do you have any experience on particular or specific projects that you think informs your ability to work on -- or work in this proceeding or on this matter?
**A.** Yes. Several projects come to mind. In 2011, the Wyoming Land Quality Division issued an RFP that resulted in a competitive bid, and HydroSolutions was hired where I was the project manager to look at mining regulations in Wyoming, specifically with respect to rare earth elements in mining. And we reviewed all of the regulations and permitting process with respect to Wyoming and implications of kind of a different mining type that the state wasn't used to seeing. It was out of the ordinary.
And following that, the Montana Board of Oil and Gas Conservation issued an RFP and we were awarded that to explore primacy for the Class VI program in 2014. They were looking at setting up a program and reviewing it as an exploratory project to see if they wanted to gain primacy, and this was about the time -- a little after the time North Dakota did that same pursuit, so we followed it very closely.
Q. And so did Montana end up submitting an

508

application to obtain primacy for its Class VI program?
**A.** We provided the State with a draft program and we went back and forth with them, and ultimately they had an administrative decision at that time to not submit for primacy.
Q. And as you were working on the -- drafting the Class VI program for Montana, did you review any documents or guidance that informed your understanding of how to develop a Class VI program?
**A.** Yes. I heavily relied on a lot of BPA documents. Specifically for the Class VI program, there were a lot of guidance documents associated with implementing programs, well characterization, area of review, recordkeeping, to name a few.
Q. Can I have you turn to Exhibit LO-18?
**A.** I have it.
Q. Is this one of the guidance documents you just referenced that helped inform your understanding of the Class VI program while you were drafting Montana's regulations?
**A.** Yes, it was one of the documents I used to understand and outline our draft program.
Q. And can you just describe briefly the topic of this guidance?

509

A. Sure. The guidance generally provides information regarding modeling and recommendations for delineating the area of review. It also describes the circumstances under which the AOR or area of review is to be reevaluated, and also describes how to perform an AOR reevaluation and development of corrective actions.

Q. Okay. Let me have you turn to Exhibit LO-19.

A. All right. I have it.

Q. Is this also one of the documents you referenced that you reviewed to inform your understanding of Class VI regulatory regimes?

A. Yes, it was one of the documents I used to understand and so outline the draft program.

Q. And can you just describe generally what the topic of this document is and what it covers?

A. It provided a basic framework for the permitting process and the required activities through the Class VI injection well and activities associated with that.

Q. Okay. Can I have you turn to Exhibit LO-20?

A. I have it up.

Q. Is this also one of the guidance documents

510

you referenced a moment ago that informed your understanding of the Class VI well program when you were drafting Montana's regulations?

A. Yes. I used it similar to the others.

Q. Okay. And just generally speaking, what does this guidance document cover topically?

A. I would say it provides a general outline of the data to be collected and how to use the data to identify potential risks and eliminate unacceptable sites. It also provides information for inputs into whatever geologic model is chosen for use to evaluate any geological modeling.

Q. Okay. And now I'm going to have you -- it's marked a little out of order here, but there's an Exhibit LO-82. I'll have you switch -- or flip to Exhibit LO-82.

MR. BRAATEN: And, Lawrence this one didn't get into the binder. I've got an extra copy.

MR. BOFTO: Okay. I'm pulling it up. Yes, I have this one.

Q. (MR. BRAATEN CONTINUING) I'm sorry, Mr. Bofto, I might have missed it. Did you get yourself to that exhibit?

A. Yes, I have -- have that exhibit, the one

511

for recordkeeping and reporting, generally.

Q. And specifically Exhibit 82 that indicates it's the Underground Injection Control Program Class VI Well Recordkeeping, Reporting, and Data Management Guidance for Owners and Operators. Is that the exhibit you have up?

A. Yes.

Q. Okay. Is this also one of the guidance documents that you reviewed that informs your understanding of the Class VI program that you used in developing Montana's regulation?

A. Yes.

Q. Okay.

MR. BRAATEN: Move to admit Exhibits 18, 19, 20 and 82.

HEARING EXAMINER GARNER: Any objections?

MR. BENDER: No objection.

HEARING EXAMINER GARNER: Exhibits are admitted.

Q. (MR. BRAATEN CONTINUING) Mr. Bofto, can I have you now open up -- or turn to Exhibit No. 21?

A. I have that up.

Q. Do you have an understanding of what the first two sentences of this data tool mean?

A. Yes.

512

Q. And can you tell us what that is?

A. Under the rule that's cited there, that the owners and operators must submit the project information -- their geological sequestration project information directly to the EPA and I take it through the geologic sequestration data tool in that this requirement applies regardless of primacy, whether it's still EPA or a particular state or entity has primacy.

Q. Mr. Bofto, are you ready, willing and able and have you been ready, willing and able for the past three weeks to assist in running and analyzing models related to these Class VI well applications had you received data and input files to do so?

A. I'm capable and ready to run the geochemical model PHREEQ, given that if I had the input files and the right thermal dynamic database or a reference to it if -- if the reference one that comes with the model, is unaltered.

MR. BRAATEN: No further questions.

HEARING EXAMINER GARNER: Mr. Bender, any questions?

MR. BENDER: Yeah, I do.

513

**CROSS-EXAMINATION**

**BY MR. BENDER:**

Q. Mr. Bofoto [sic], my name is Lawrence Bender and I represent the applicant, Summit, in this case. Nice to meet you today.

**A.** Nice to meet you.

Q. Okay.

**A.** My name is Bofto.

Q. Okay. Thank you for correcting me. I appreciate that. Do you mind if I call --

**A.** No problem.

Q. Do you mind if I call you Shane?

**A.** Please do.

Q. Okay. Thank you. I want to just delve a bit into your discussion about what you did for the State of Montana. First of all, what was the time period in which you were working on that? I think you said it was about the time that North Dakota was adopting its rules, but I want to make sure that I understood that correctly.

**A.** Yes. I believe I started it in 2012, but a lot of these documents that I had just referenced were in draft form, so a lot of it we waited for the final versions of the EPA guidance documents to be issued. And I believe my last final draft was

514

submitted to the Board of Oil and Gas following discussions with them in mid to late 2014.

Q. Okay. And when you -- when you referred to these documents were in draft form, I'm sure you're talking about Exhibits LO-18, 19 -- let's see here -- looks like 20 and is it 83?

MR. BRAATEN: 82.

Q. (MR. BENDER CONTINUING) 82. Is that correct?

**A.** They may have included some of those, but there were also some other guidance documents and some of the things I'm trying to recall with the environmental justice, bonding, things like that. So that was why we waited a little while longer so we could work with final documents that were included. I think they're currently included on EPA's Class VI website.

Q. And what was it that you were requested to do by the Montana Oil and Gas Conservation Commission?

**A.** To review that type of information and draft a program that the State could use for their primacy application should they desire to go after primacy for the Class VI program.

Q. And were involved in drafting the statutes

515

that were necessary for the Montana Board of Oil and Gas to adopt the rules or were you -- was that statutory enactment already in place and all you were asked to do was prepare the regulations?

**A.** I was asked -- I was not involved with the statutes or anything like that. I was just involved with gathering information that the board needed to get the primacy application in place.

Q. Are the statutes already in place in Montana and that all they're lacking at this point in time is the regulations?

**A.** I believe at that time there was a statute associated with it that was in place.

Q. Okay.

**A.** It's been a while, but I seem to recall it was in place prior to them issuing approval for us to do this work.

Q. Okay. And I believe you said you started in 2012, probably finished in 2014; is that correct?

**A.** That sounds about right.

Q. Okay. Approximately -- well, strike that.

During that period of time, were you working full-time on this project?

**A.** No.

516

Q. Okay. Were you working on the project by yourself?

**A.** No. I was part of a team of other consultants and internal people. We had an attorney because there was a portion where we had to draft a letter from I believe the attorney general or something to EPA and there were several other documents that needed to be drafted that were best suited for an attorney. And I had another company that had petroleum engineers and petroleum geologists associated that were reviewing some of the draft documents at that time as well.

Q. Okay. Well, thank you for that. I had misunderstood your testimony. I thought that you were primarily responsible for doing all the work. But since it was a team, let me ask you a couple questions about that. What were -- what were your specific responsibilities on that team?

**A.** I was the project manager, and areas -- I would collect information as well as derive information that I could and I put them into the draft program. I took and I followed a lot of the guidance to establish, you know, a general procedure for permitting.

Q. And did you ultimately draft some rules

517

that were submitted to the Oil and Gas Conservation Commission?
**A.** Not at that time.
Q. When you say "not at that time," you're talking about the period from 2012 to 2014?
**A.** I'm talking -- well, I never drafted any rules based on the draft program.
Q. Okay. I misunderstood you then. I -- I had understood you to testify when Mr. Braaten was asking you questions that you drafted the rules but the -- the board ultimately made a decision that it was not going to adopt the rules. Did I misunderstand?
**A.** I drafted a permitting program for somebody that we could run past EPA so someone could get a permit for a Class VI well should Montana get primacy.
Q. Okay.
**A.** Does that make sense?
Q. I think so.
Do you know why the board never went forward with the rules?
**A.** No, that was an administrative decision far above my pay grade.
Q. Okay. Let's talk a little bit more about

518

your experience. You've explained to us that as a result of reviewing these guidance documents that have now been entered into the record, I think it was 17, 18, 19, 20 and also 82, you were involved in this project. Have you ever been involved in making application in a state that has primacy for a Class VI permit?
**A.** No.
Q. Okay. You haven't been -- I apologize. I wasn't listening to my question very well when I asked it. Did I -- well, let me rephrase it.
Have you ever been involved in any way in making a Class VI application to a state that has primacy?
**A.** No.
Q. Okay. Have you ever reviewed an application, other than the one before the Commission -- or the ones that are before the Commission today, for a Class VI permit?
**A.** I'm trying to recall. I may have looked at some when I was drafting a program. I have a faint recollection that I tried to look at others that had gone through EPA at the time. I just cannot recall the specifics.
Q. Yeah. And I apologize, I think I said

519

this, but I asked -- my question was specific to being involved in an application with a state that had primacy.
**A.** None with a state that had primacy.
Q. Other than the applications that are before the Commission today, have you ever reviewed an application for a Class VI well?
**A.** Back to my previous statement, I believe I did when I was drafting the program to look at what an application looks like. I just don't recall because it was so long ago on what it was.
Q. That would have been back in the 2012 period, 2014 period; is that right?
**A.** Somewhere in there.
Q. And would those have been applications before the EPA?
**A.** Yes.
Q. Okay. When were you hired by the intervenors in this case?
**A.** Oh, it's been a month or so.
Q. Okay. You don't know the exact date? I mean, today is the 11th. Would it have been probably May 11?
**A.** It could have been about that time, but I don't know specifics.

520

Q. What were you asked to do on May -- on May 11?
MR. BRAATEN: I'm going to object to that characterization of testimony. I don't believe he testified to doing something on the 11th.
HEARING EXAMINER GARNER: Overruled.
Q. (MR. BENDER CONTINUING) Okay. What -- okay. I guess you can answer the question.
**A.** What was I -- could you repeat that question again?
Q. What were you asked to do when you were hired for this project?
MR. BRAATEN: I'm going to object to questions eliciting communications between me and the experts.
HEARING EXAMINER GARNER: Overruled.
MR. BRAATEN: You can go ahead, Shane.
MR. BOFTO: Oh, okay. Just to provide my experience with the Class VI guidance and programs that I had early on and just my general environmental background information.
Q. (MR. BENDER CONTINUING) And how many hours do you believe you've worked on this project since you were retained?
**A.** Outside of this, probably 15 reviewing

521

documents and such and --
Q. And have you had an opportunity to review each one of the -- what I'm going to refer to as the final form of applications for the three applications that are before the Commission?
**A.** I've generally reviewed them, yes, and -- I'm trying to think if I've done any others. So I'd say I generally reviewed the three applications.
Q. Okay. And when you say reviewed them, did you just -- did you just read them or did you do anything beyond reading? Did you do any independent research?
**A.** I looked closely at some of the models on what were being used and what they did exactly.
Q. Okay. And if I -- and please correct me if I'm wrong, Shane, but I understood your testimony when Mr. Braaten was asking you some questions that you -- if you'd had the materials that he requested from the Industrial Commission, you could have run a model in a relatively short period of time. Was that your testimony?
**A.** Yes. I specifically referenced the PHREEQC model by U -- that is put out by the USGS.
Q. Okay. And do you have the necessary

522

software packages that you would need to run the model?
**A.** Yes, I do. It's on my computer now.
Q. Okay. Can you tell me what some of those programs are?
**A.** I'm specifically talking about the PHREEQC model. It's downloaded freely from the USGS, and I have routinely used the program through my career and have used it to write specific reports.
Q. And do you believe that that's the only software you would need to analyze the information that Summit has filed with the Industrial Commission on this matter?
**A.** It's the only one that I'm focused on.
Q. Okay. Do you agree with me that there are other software programs?
MR. BRAATEN: I'm going to object to the form of the question.
MR. BENDER: What's that?
MR. BRAATEN: I object to the form of the question. There are.
MR. BENDER: Well, let him answer.
HEARING EXAMINER GARNER: If he can understand it, he can answer it.
MR. BOFTO: There are numerous geochemical

523

models outside of PHREEQ. There's Geochem Workbench® that I've used and several others, but the application specifically said they used PHREEQC and that was the one I was focused on.
Q. (MR. BENDER CONTINUING) But you don't know if this PHREEQC is the only program that would be necessary to evaluate the information that's been supplied to the Commission, do you?
MR. BRAATEN: For the --
MR. BOFTO: I'm just going off the application that said that was the program that they used.
Q. (MR. BENDER CONTINUING) Okay.
**A.** I did not see any other geochemical programs to evaluate the upper and lower confining units.
Q. Okay. Tell me a little bit about your experience working in North Dakota. I know you said you went to the University of Mary. Have you done any work in your current role with -- I believe it's HydroSolutions. Have you worked in North Dakota with that company?
**A.** Yes. I've had probably -- probably six or seven projects in the last ten years in North Dakota.

524

Q. What were those projects?
**A.** Some of them were work with attorneys for oil and gas impacted sites. Done some incidental air quality work there from facilities. Trying to think. Looked at different reviewing remediation plans for cleanup for saline impacts or produced water impacts.
Q. Okay. So it sounds to me, and please correct me if I'm wrong, that most of that work that you've done in North Dakota has been from the standpoint of surface issues; is that a -- is that a fair statement?
**A.** No. There's been other issues associated with contaminated groundwater and cleanup.
Q. Okay. Have you ever been involved in North Dakota in making application to the Commission relative to saltwater disposal wells or Class II wells?
**A.** I've been part of such projects exploring commercial Class II saltwater disposal wells.
Q. Ever prepare an application to the Commission for a saltwater disposal well?
**A.** I've provided information for somebody else to submit a Class II application.
Q. Okay. What sort of information did you

525

supply?
A. Looked at things like deriving maximum pressure at the wellhead. Working with other geologists in my company, suitable formations. Looking at areas of review for other wells that could be within the area of review, things along that line.
Q. But you never were involved in a saltwater disposal application in North Dakota where you were the lead individual in making that application; isn't that correct?
A. That'd be fair to say.
MR. BENDER: No further questions.
HEARING EXAMINER GARNER: Any questions from the staff? Any redirect, Mr. Braaten? Oh, I'm sorry, you do.

**EXAMINATION**

**BY MR. HELMS:**

Q. Shane, this is Lynn Helms with the Industrial Commission. Nice to meet you, maybe some day face-to-face.
A. Nice to meet you.
Q. Yes.
North Dakota made its application for Class VI primacy on June 21 of 2013 and received

526

final approval April 24 of 2018. Shane, did you comment on North Dakota's application?
A. No, I did not.
Q. Did you review the North Dakota documents when you were preparing Montana's prospective documents?
A. I seem to recall that we were following at that time whether North Dakota was going to draft their own specific rules or adopt it by rule, and that was -- we had a lot of discussions about that on whether Montana should or shouldn't, and I seem to recall North Dakota going back and forth maybe once on what the appropriate action was, and we were going to try to learn at that point from you.
MR. HELMS: Okay. Thank you.

**REDIRECT EXAMINATION**

**BY MR. BRAATEN:**

Q. Mr. Bofto, do you have a copy of -- well, do you recall signing an engagement letter for this matter?
A. Yes.
Q. And do you recall the date of that?
A. May 1.
MR. BRAATEN: Okay. No further questions.
HEARING EXAMINER GARNER: Okay. You can

527

call your next witness. Can I get the name?
MR. BRAATEN: Ted Doughty.
HEARING EXAMINER GARNER: Doughty. Okay.
MR. BRAATEN: Yeah.
MS. ZASTE: He has a first initial, P, but he goes by Ted. So it's P. Ted Doughty.
HEARING EXAMINER GARNER: Gotcha.
MR. BRAATEN: Mr. Doughty, we're getting some feedback from you. Can you mute -- well, no, we're still getting feedback. Can you mute -- what was it -- what did you -- okay.

**P. TED DOUGHTY,**

being first duly sworn, was examined and testified as follows:

**DIRECT EXAMINATION**

**BY MR. BRAATEN:**

Q. Mr. Doughty, can you state your full name and spell your last name for us, please?
A. It's Paul Ted Doughty, D-o-u-g-h-t-y.
Q. And you go by Ted; right?
A. Yes, I do.
Q. Okay. Can you tell me briefly your educational background?
A. I have a bachelor's in geology from Washington University in St. Louis, a master's in

528

geophysics from the University of Montana, and a PhD from Queen's University in Ontario, Canada.
Q. And can you start by just briefly describing your professional background?
A. Yes, sir. So I've worked with Exxon -- I worked in the Exxon research lab for four years in the late '90s. I taught at Eastern Washington University for eight years as a professor. And since 2008 I've been a consultant on my own working for various companies like Talisman Energy, Halliburton, various other companies in the Rockies.
Q. Can you tell us a little bit about the kinds of work you did with your time at Exxon?
A. Yes. So at Exxon I was in the fault -- fault seal group, also did -- which is analyzing how fault seal in the various environments in the -- in the -- we did a whole research project looking at fault seal across the entire -- all the basins that Exxon worked in.
I also did 3D seismic interpretation in various basins across the world. Did a lot of field research on the Bakken and various other groups in the western U.S. as analogs for subsurface formations.

529

Q. And can I have you pull up in front of you, Ted, the Exhibit LO-58?
**A.** I'm not in the office, so if you describe it to me, though, I can do that.
Q. Do you recall the information contained on your curriculum vitae?
**A.** Your -- can you repeat the question?
Q. So I'll tell you Exhibit 58 is your curriculum vitae. Are you familiar with --
**A.** Oh.
Q. -- the contents of your curriculum vitae?
**A.** Oh, yes. Yes, sir. Yes.
Q. Okay. And does that accurately describe your educational and professional background and experience.
**A.** Yes, sir. With the exception of several items that I left off that I did recently. I actually was the well site geologist on the J-Loc Minnkota well that was drilled as part of their carbon sequestration project. I logged -- personally logged 1600 feet of core on site for that project.
Q. Okay.
**A.** And I've also done a lot of helium exploration in the last, oh, six months.

530

MR. BRAATEN: Okay. Move to admit LO-58.
HEARING EXAMINER GARNER: Any objection?
MR. BENDER: No objection. Oh, thank you. No objection.
HEARING EXAMINER GARNER: The exhibit is admitted.
MR. BENDER: My mike was off.
HEARING EXAMINER GARNER: Exhibit is admitted.
Q. (MR. BRAATEN CONTINUING) And, Ted, did you review the applications submitted by EERC and Summit that bring us here today?
**A.** Yes, I have, in extensive detail.
Q. And can you start by just describing to us the areas of those applications regarding which you would have particular expertise?
**A.** Yes. So they have core data on the Broom Creek Formation of which I mentioned I personally logged all the J-Loc wells. So I'm familiar with that. Also I have expertise in 3D seismic interpretation. I haven't seen their 3D seismic, but it's a critical part of their application, as well as the formation mechanical integrity work that they did doing the testing in their test well.
Q. What data would you need in order to

531

create a PHI-H map to map out the porosity and permeability of a reservoir?
**A.** So from what I've seen of their applications, the -- there's only one -- no, there's three -- I think there's three -- there's two wells that are close together and another well in their AOR which encompasses about -- actually, I'm not sure how big the AOR is, but if you take their simulation area, there's 26 wells in the simulation area -- or the simulation area, there's 26 wells. It's about a well per 55 square miles which is not very many data points. So within the AOR there's only 3 data points. There's no legacy wells.
So you would need to coordinate it, which they provided, but as well it appears like the seismic data was a critical part of how they defined the reservoir properties in the AOR. There's only -- like I mentioned, there's very few wells within the AOR. So we'd need access to the 3D seismic to actually do a facies analysis to determine what the seismic data tells you about the reservoir within that AOR.
And within that application, there's only one map that shows the permeability distribution

532

within their stimulation -- their simulation area. Excuse me. So there's very little data within their application with which to evaluate exactly how they derive their permeability parameters for the AOR that they're applying for.
Q. Mr. Doughty, do you recall approximately how long ago you were asked about the possibility of working on this matter?
**A.** It was, what, a month ago, maybe three weeks ago, something like that.
Q. And are you ready, willing and able to conduct additional review and particularly review of seismic data if you receive it?
**A.** Yes, I am.
MR. BRAATEN: No further questions.
HEARING EXAMINER GARNER: Attorney Bender.

**CROSS-EXAMINATION**

**BY MR. BENDER:**

Q. Mr. Doughty, are you -- Mr. Doughty, are you in a position today to make any recommendations to the Commission as to whether this application should be approved or denied?
**A.** I am.
Q. And what are your conclusions?
**A.** I would recommend that it's denied on the

533

basis that the applicant did not -- has not provided enough of the data from which the Commission or another party could evaluate how they came up with some of their reservoir properties.

Q. Okay.

**A.** Without the 3D seismic, you cannot determine the distribution of permeability and porosity across the AOR.

Q. Okay. And I believe it was your testimony at this point in time all you have reviewed is the three applications; is that correct?

**A.** That is correct. And --

Q. And you haven't reviewed -- you haven't reviewed the other data that's on file with the Commission?

**A.** I've reviewed the data that's publicly available.

Q. Okay.

**A.** Yes.

Q. Did you -- have you seen a letter dated May 15, 2024, from Mr. Braaten to the Commission requesting certain information?

**A.** I have not seen the letter. I've heard that there's a motion to compel.

Q. Okay. Do you know if the Commission

534

indicates that they supplied that information to Mr. Braaten?

**A.** I do not.

Q. Okay. You talked a little bit about a PHI-H map, and I don't want to put -- I don't want to testify for you, but I understood you to say that a PHI-H map would have been important for the Commission in this case. Is that a -- is that a fair statement of your testimony?

**A.** Yes, that is a fair statement. If you -- if you want to understand where the $CO_2$'s going as you inject it, you need a PHI-H map to determine the -- the storage capacity to the formation.

Q. Okay. And you --

**A.** And like I -- like I said earlier, there's only three data points within the AOR. So I'm -- I don't quite understand how the EERC came up with such a complex map of permeability and porosity without having additional data. It should have been provided in their submittal.

Q. Okay. And I think you also indicated that you were involved -- you sat the -- the well for Minnkota's -- the J-Loc?

**A.** The J-Loc.

Q. Yeah, the J-Loc.

535

**A.** Yep. J-Loc. Yep.

Q. So you know somewhat about that -- you know some things about that application that was made to the Commission for a Class VI well; is that correct?

**A.** I -- no. I don't -- I set the well. I described the core. I was not involved in anything after they drilled the well.

Q. You knew the --

**A.** But I.

Q. -- you know the Commission granted the application; correct?

**A.** Yes.

Q. Do --

**A.** But I wasn't involved in it. I do know what the core looked like and somewhat of the reservoir properties of the Broom Creek.

Q. And, you know, thank you for all that, but we can get through this a little bit quicker if you just answer my questions.

Do you know --

MR. BRAATEN: I think he did.

MR. BENDER: Well, I think he went on a little bit more than he needed to, but I'll move on.

536

Q. (MR. BENDER CONTINUING) Do you know if Minnkota submitted a PHI-H map in its application?

**A.** I do not.

Q. Are you familiar with the application that was filed by Blue Flint?

**A.** No.

Q. Do you know if they submitted a PHI-H map?

**A.** I do not.

Q. Are you familiar with the application that was submitted by Dakota Gasification?

**A.** No.

Q. Do you know if they submitted a PHI map -- PHI-H map?

**A.** No.

Q. Are you familiar with the application that was filed by Red Trail?

**A.** No.

Q. Do you know if they submitted a PHI-H map?

**A.** No.

Q. Do you know all those applications were granted by the Commission?

**A.** No.

MR. BENDER: No further questions.

HEARING EXAMINER GARNER: Any questions from the staff?

537

Redirect, Attorney Braaten?
MR. BRAATEN: No, I don't have any further questions. Thank you very much, Mr. Doughty.
MR. DOUGHTY: Thank you.
HEARING EXAMINER GARNER: Okay. You can call your next witness.
MR. BRAATEN: We are calling Paul Button.
HEARING EXAMINER GARNER: Button?
MR. BRAATEN: Yes.

**PAUL BUTTON,**

being first duly sworn, was examined and testified as follows:

**DIRECT EXAMINATION**

**BY MR. BRAATEN:**

Q. Mr. Button, can you state your full name and tell us -- well, let's start there. Just state your full name, please.

**A.** My name is Paul Michael Button.

Q. And can you give us a business or residential address?

**A.** My residential address is 1119 South Ophir Street in Butte, Montana.

Q. All right. Can you tell us just a little bit about your educational background?

**A.** I have a bachelor of science degree in

538

petroleum engineering from Montana Tech.

Q. All right. And tell us a bit about your professional experience.

**A.** My professional experience is I've worked 26 years as a petroleum engineer. I started off my career as a reservoir engineer for Marathon Oil Company working the Yates Field in West Texas doing simulation on gas oil gravity drainage with nitrogen injection and then converting it over to $CO_2$ injection.

From there I moved to -- on to Kinder Morgan when they acquired the Yates asset. I did a little bit of reservoir simulation on Yates, and then I worked the SACROC $CO_2$ flood unit in Scurry County, Texas.

After I left Kinder Morgan, I worked for SM Energy in Billings, Montana, for a number of years doing enhanced oil recovery studies on fields in the state of Wyoming. Also worked several water floods and shale development wells within the Powder River Basin, Richland County, Montana, and a little bit of experience in Divide County, North Dakota.

From there I left SM Energy and I went out on my own as a consultant. I did numerous

539

consulting jobs for multiple clients, including purchase and acquisition, evaluation, State evaluations and reservoir simulation for enhanced oil recovery on the Poplar Dome in Montana.

I then joined a company called Poplar Resources as a vice president where we implemented a pilot for enhanced -- a nitrogen injection flood. And I have been with that ever since.

And then I also started a startup for a battery energy storage corporation. We do compressed air energy storage. And I'm currently working both the Poplar job, the consulting job, and battery energy storage job.

Q. Okay. Can I have you turn in the exhibits to what we marked as LO-57?

**A.** Yes.

Q. Let me know, do you have that in front of you now?

**A.** Yes, I do.

Q. And what is Exhibit 57?

**A.** I would call it my résumé or CV.

Q. Okay. And does this CV accurately reflect your educational and professional experience and qualifications?

**A.** I would probably -- I caught a couple of

540

errors in here. The Button Petroleum Management, it was no longer active until recently again, so I would add that through 2024.

Q. Okay.

**A.** And I believe the name of the -- my educational school is no longer accurate because it's no longer Montana Tech of the University of Montana. I believe it's the Montana Technological University.

Q. Okay. Other than those, does the Exhibit 57 accurately reflect your professional and educational experience and qualifications?

**A.** Yes.

MR. BRAATEN: Move to admit Exhibit 57.
MR. BENDER: No objection.
HEARING EXAMINER GARNER: Exhibit is admitted.

Q. (MR. BRAATEN CONTINUING) Mr. Button, can you tell me if you have any experience with Class II wells or permitting Class II wells?

**A.** Yes. I have permitted a num -- a number of Class II wells in the state of Montana.

Q. And with respect to any of those Class II wells, was it necessary to obtain an aquifer exemption?

541

**A.** Yes. We worked on an aquifer exemption for one of the wells within the Poplar unit, east Poplar unit.

Q. Okay. Was there any kind of a volumetric limit imposed as part of that aquifer exemption?

**A.** Yes, I believe so.

MR. BENDER: Objection. Relevance.

HEARING EXAMINER GARNER: Overruled.

Q. (MR. BRAATEN CONTINUING) And are you familiar with the manner in which the volumetric limits are calculated for aquifer exemptions by either the EPA or state authorities?

**A.** I am familiar with how the volumetric extensions were calculated and approved for the permits that I worked on. Yes.

Q. Okay. And so with respect to the permits you worked on, can you just provide a general description of how those volumetric limits are calculated for the aquifer exemptions?

**A.** Basically, these were pretty simple calculations in that you would calculate the -- the volume within a given X number of foot radius that you believe you'll affect with the water injection, you know, so you get a volume of a cylinder, multiply it by your porosity, divide it by your

542

formation volume factor of water and that is the volume that will be affected.

Q. Do you have experience with reservoir modeling and -- well, you've already talked about this. Can you tell us a little bit about the experience you have with EOR and water floods with respect specifically to field development analysis?

**A.** Yes. I've had several major modeling projects over my career. The first one was for Yates field. We spent quite a few years looking at and running sensitivities on gas oil gravity drainage, enhanced oil recovery process as far as looking at gas oil contact movement speed versus the drainage of oil from the matrix in the reservoir. We also looked at viscosity effects with the injection of different gases and the swelling effects in the oil with different composition of injected gases, whether it was nitrogen, $CO_2$ or a mixture of recycled gas to determine the most effective recovery and most economic recovery mechanism with an EOR process.

My other major modeling project which I've worked on most recently is developing a full-field simulation model to model the history and also the enhanced oil recovery potential for Poplar Dome in

543

Montana, the East Poplar unit. That is a 70-year-old field that's probably undergone primary depletion with a strong natural water drive where I deal with gas on the top of it and expose the matrix to gas oil gravity drainage and determine if that was an economically feasible project.

Q. And can you tell us about any other specific experiences you have related to doing reservoir modeling and analysis?

**A.** I'm currently working on setting up the parameters to look at natural -- or compressed air storage in salt caverns and looking at the pressure volume and temperature effects and the rock stress effects within salt caverns to determine the feasibility for the active storage reservoirs.

Q. Mr. Button, do you have an understanding of different ways that pore space can be used in a commercial manner?

**A.** Yes, I do.

Q. And if a landowner wants to make a commercial use of pore space, can you tell us what you understand to be the options for making that commercial use of pore space?

**A.** It's basically three options of which there can be multiple derivatives of each option,

544

but either you remove fluid and market it as a -- as a quantity, you temporarily store something in your pore space, or you permanently sequester something in your pore space.

Q. And how would you assess the degree to which the pore space of a given landowner is being used in a way that forecloses other commercial uses?

**A.** I guess I would attempt to evaluate the change in the pressure volume temperature of the fluids contained within the pore space, and knowing that there are certain constraints on the upper end of the pressure and certain constraints on the lower end of the pressure and try to determine what the current impacts, what the proposed impacts and what the -- the final limits were of that pore space.

Q. Mr. Button, if you were provided with the data decks and input files required to run models in CMG and Schlumberger's Petrel software for this project, would you be ready, willing and able to run those models and analyze them for the intervenors?

**A.** The CMG model, I would be ready to upload those and run those and do some sensitivity

545

analysis on those models. As far as the Petrel model, the Petrel model is a static model. It's basically a geologic database, so those -- unless you're trying to redistribute properties or something like that, there's -- it's not a dynamic model where the answer changes, so I don't think there's nothing -- there's nothing to run there.

MR. BRAATEN: Understood. No further questions.

HEARING EXAMINER GARNER: Attorney Bender.

**CROSS-EXAMINATION**

**BY MR. BENDER:**

Q. Mr. Button, you -- you spent some time describing your experience as an engineer and involved in various enhanced oil recovery projects around the country. Is that a fair statement?

**A.** Yes.

Q. And you also talked about a compressed air project that you're working on. Do you recall that?

**A.** Yes.

Q. And in those projects, both the enhanced oil recovery projects and the compressed air project, you were involved in running some models; is that a fair statement?

546

**A.** Yes.

Q. Okay. Would you agree with me that running -- preparing and running models for enhanced oil recovery projects and a compressed air project is different than preparing and running a model for $CO_2$ storage?

**A.** Can you clarify what you mean by "different"?

Q. Well, if you've run -- or prepared and run models for $CO_2$ on a number of projects, are you going to have more knowledge and experience than someone who has not run models for $CO_2$, only for enhanced oil recovery and compressed air?

**A.** Well, the models that I've ran for enhanced oil recovery, especially for when I worked the Yates field, those directly involved the injection of $CO_2$ in the pore space --

Q. Okay.

**A.** -- so they're not too dissimilar. The only -- the main dissimilar between those two models is that in the carbon sequestration, the $CO_2$'s interaction is primarily with water, where in those other models it was with both water and oil. So they were actually more complex.

Q. Okay. Are you familiar with the data

547

requests that Mr. Braaten made to the Industrial Commission?

**A.** I --

Q. Pardon me?

**A.** Yes, I am.

Q. Okay.

**A.** Yes, I am.

Q. Okay. And are you familiar with the type of data that would be contained within a CMG data file?

**A.** Yes, I am.

Q. Could someone produce a PHI-H map if they had a CMG data file?

**A.** I believe that within CMG's program you could get that, yes.

Q. Okay. And are you aware that it's the -- in the Commission's position that they provided a CMG data file to Mr. Braaten?

**A.** I am not aware of the CMG data file, if Mr. Braaten is in possession of it or -- I am certainly not in possession of that CMG data file.

Q. He didn't provide it to you?

**A.** I have not seen it, no.

Q. Is it a fair statement that -- well, let me back -- strike that.

548

**A.** Let me --

Q. How many hours -- just let me ask the questions. Just let me ask the questions.

**A.** Okay.

Q. How many hours of time have you spent working on this project?

**A.** I have -- up until the start of this hearing, I spent 14-and-a-half hours working on it.

Q. Okay. And what were you asked to do?

MR. BRAATEN: Same objection to privileged communications with experts.

HEARING EXAMINER GARNER: Overruled.

MR. BUTTON: What was I asked to do?

Q. (MR. BENDER CONTINUING) Yes.

**A.** I was asked by Mr. Braaten to evaluate the impact of the pore space of his clients.

Q. Okay. And to do that at this point in time, all you have done is reviewed the applications that were submitted to the Commission; is that correct?

**A.** No.

Q. You didn't review the applications?

**A.** I did review the applications, but that is not all that I've done.

Q. What else did you do in the 15 hours that

549

you've spent on this project?
**A.** I have looked through the well files of the wells in the immediate area to see what information was available.
Q. How many hours did you spend reviewing the applications?
**A.** Probably the majority of the 14 hours.
Q. Okay.
**A.** But I don't have a specific number, but I could get that number for you.
Q. More than ten?
**A.** I would say yes. Probably in the ten range.
Q. Well, you said more than 10. Would it be 11 or 12?
**A.** We'll go with more than ten.
Q. Okay. And then the other -- the only other time you would have -- well, strike that.
The additional time you would have spent between 10 hours and 15 hours would have been to review some logs; is that what you said?
**A.** I did not say I reviewed logs. I said I reviewed the well files on the Commission website.
Q. Okay. What are in the well files?
**A.** The well files contain the core reports

550

and some of that type of information. They have like casing size and the drilling completion information, things like that.
Q. Okay. Would you agree with me that you really haven't reviewed enough to make any sort of recommendation to the Commission whether this application should be granted or denied?
**A.** Absolutely.
MR. BENDER: Okay. No further questions.
HEARING EXAMINER GARNER: Any questions from the staff?
Mr. Braaten, any redirect?
MR. BUTTON: Are you waiting for a response from me?
MR. BRAATEN: Sorry. No, Mr. Button, that was on me. I'm just taking a moment to review my notes to see if I have anything else to ask. Give me one moment, please.
I have nothing further.
HEARING EXAMINER GARNER: Okay. I know you said you only expected to get through three witnesses, but you still have 20 minutes.
MR. BRAATEN: I'm -- yeah, I'm sorry, I have one more, but he is no longer available.
HEARING EXAMINER GARNER: He's not

551

available right now?
MR. BRAATEN: Right.
HEARING EXAMINER GARNER: Let's go off the record for a minute.
(Recessed at 6:10 p.m. and reconvened at 6:11 p.m.)
HEARING EXAMINER GARNER: Okay. We are back on the record, and we are going to recess these hearings and resume tomorrow morning at 9 a.m. That concludes our hearings for the day.
(Recessed at 6:12 p.m., Wednesday, the 12th day of June, 2024.)
---

552

CERTIFICATE OF COURT REPORTER

I, Stephanie A. Smith, a Registered Professional Reporter,
DO HEREBY CERTIFY that I recorded in shorthand the foregoing proceedings had and made of record at the time and place hereinbefore indicated.
I DO HEREBY FURTHER CERTIFY that the foregoing typewritten pages contain an accurate transcript of my shorthand notes then and there taken.
Dated at Bismarck, North Dakota, this 3rd day of July, 2024.

Stephanie A. Smith
Registered Professional Reporter

## #

**#3** [1] - 284:20

## $

**$20,817,800** [1] - 407:25
**$20,868,800** [1] - 407:24
**$583,000** [1] - 438:3
**$62** [1] - 408:2

## '

**'70s** [1] - 337:16
**'90s** [1] - 528:7

## 0

**0** [5] - 346:5, 346:13, 347:17, 476:17, 476:22
**0.69** [1] - 414:25
**0.712** [1] - 415:1
**0.784** [1] - 415:4
**005** [1] - 339:3

## 1

**1** [65] - 277:4, 277:8, 277:12, 277:15, 277:19, 277:21, 278:1, 278:6, 278:10, 278:14, 278:21, 279:1, 279:4, 279:12, 279:16, 280:1, 280:5, 280:14, 280:18, 280:23, 281:4, 281:15, 281:16, 282:4, 282:5, 282:17, 282:18, 283:4, 283:5, 284:18, 334:15, 334:24, 335:1, 335:24, 345:22, 345:24, 357:9, 357:19, 358:19, 360:7, 361:7, 365:1, 365:3, 365:4, 365:14, 365:16, 368:23, 368:25, 369:1, 412:24, 413:3, 413:5, 417:25, 418:8, 449:18, 449:19, 450:14, 453:19, 454:24, 455:16, 455:18, 484:1, 491:21, 526:23
**1,166,000** [1] - 407:2
**1-1** [1] - 372:1
**1-2** [2] - 372:1
**1-34** [2] - 371:3, 430:19
**1-inch** [1] - 491:14
**1-mile** [1] - 388:9
**1.15** [1] - 357:10
**1.89** [1] - 440:7
**10** [26] - 277:10, 277:23, 278:12, 278:23, 279:12, 280:2, 280:14, 280:24, 281:16, 282:6, 282:19, 283:6, 326:23, 346:5, 346:7, 346:12, 346:14, 373:19, 377:9, 437:17, 455:7, 479:12, 479:13, 549:14, 549:20
**100** [1] - 285:4
**1000** [1] - 283:19
**107** [1] - 493:24
**109** [1] - 285:5
**10:00** [1] - 321:22
**10:12** [1] - 321:23
**11** [27] - 277:8, 277:10, 277:21, 277:23, 278:10, 278:12, 278:21, 278:23, 279:12, 280:2, 280:14, 280:24, 281:15, 281:16, 282:4, 282:6, 282:17, 282:19, 283:4, 283:6, 437:17, 437:23, 455:14, 470:11, 519:23, 520:2, 549:15
**11,100,000** [1] - 407:8
**11-1** [3] - 456:3, 464:19, 464:24
**11-2** [1] - 464:20
**110** [4] - 426:7, 492:20, 493:22, 494:2
**1119** [1] - 537:21
**11th** [2] - 519:22, 520:5
**12** [31] - 277:8, 277:12, 277:21, 278:2, 278:10, 278:14, 278:21, 279:1, 279:12, 280:2, 280:15, 280:24, 281:15, 281:17, 282:5, 282:6, 282:17, 282:19, 283:5, 283:6, 283:20, 289:7, 314:1, 404:17, 406:2, 406:10, 437:25, 456:7, 471:19, 549:15
**12,000** [2] - 455:1, 455:22
**12-1** [3] - 406:10, 406:25, 407:15
**12-10** [1] - 439:19
**12-2** [1] - 406:11
**12-7** [2] - 439:19, 440:5
**124.4** [1] - 424:3
**125** [3] - 490:11, 490:20, 490:21
**1250** [2] - 425:11, 425:19
**12:29** [1] - 389:1
**12th** [2] - 289:3, 551:11
**13** [16] - 277:8, 277:21, 278:10, 278:21, 279:12, 280:2, 280:15, 280:24, 281:15, 281:17, 282:5, 282:6, 282:17, 282:19, 283:5, 283:6
**136** [1] - 481:4
**14** [22] - 277:8, 277:10, 277:21, 277:23, 278:11, 278:12, 278:21, 278:23, 279:12, 280:2, 280:15, 281:1, 281:15, 281:17, 282:5, 282:6, 282:17, 282:19, 283:5, 283:6, 430:24, 549:7
**14-and-a-half** [1] - 548:8
**140** [9] - 277:12, 277:13, 278:2, 278:3, 278:15, 278:16, 279:2, 279:3, 374:13
**141** [17] - 277:9, 277:11, 277:22, 278:1, 278:11, 278:14, 278:22, 279:1, 279:16, 280:6, 280:18, 281:4, 373:10, 423:15, 429:3, 469:24, 469:25
**142** [24] - 277:7, 277:20, 278:10, 278:20, 279:14, 279:15, 280:3, 280:5, 280:16, 280:18, 281:2, 281:3, 281:15, 281:18, 281:19, 282:5, 282:8, 282:9, 282:18, 282:20, 282:21, 283:5, 283:8, 283:9
**143** [12] - 279:11, 280:1, 280:13, 280:23, 281:13, 281:14, 282:2, 282:4, 282:15, 282:16, 283:2, 283:4
**15** [21] - 277:8, 277:10, 277:21, 277:23, 278:11, 278:12, 278:21, 278:23, 279:13, 280:2, 280:15, 281:1, 281:17, 282:6, 282:19, 283:6, 436:3, 520:25, 533:21, 548:25, 549:20
**150** [2] - 490:13, 490:23
**16** [18] - 277:10, 277:23, 278:12, 278:23, 279:13, 280:2, 280:15, 281:1, 281:17, 282:6, 282:19, 283:6, 377:3, 377:4, 377:6, 422:25, 470:23, 470:24
**1600** [1] - 529:21
**17** [24] - 277:10, 277:23, 278:12, 278:23, 279:13, 279:15, 280:2, 280:4, 280:15, 280:17, 281:1, 281:3, 281:17, 281:19, 282:6, 282:8, 282:19, 282:21, 283:6, 283:8, 404:3, 425:23, 425:24, 518:4
**18** [24] - 277:10, 277:23, 278:13, 278:23, 279:13, 279:15, 280:2, 280:4, 280:15, 280:17, 281:1, 281:3, 281:17, 281:19, 282:6, 282:8, 282:19, 282:21, 283:6, 283:8, 423:24, 424:7, 511:14, 518:4
**19** [32] - 277:10, 277:23, 278:13, 278:23, 279:13, 279:15, 280:2, 280:4, 280:15, 280:17, 281:1, 281:3, 281:13, 281:17, 281:19, 282:3, 282:6, 282:8, 282:16, 282:19, 282:21, 283:3, 283:6, 283:8, 371:11, 412:8, 430:17, 430:24, 431:8, 511:15, 514:5, 518:4
**1940s** [1] - 340:8
**1945** [1] - 340:2
**195** [3] - 397:7, 490:11, 490:19
**1950s** [1] - 337:20
**1977** [1] - 386:24
**1:30** [1] - 389:2
**1A** [5] - 327:19, 394:7, 399:11, 434:19, 475:8
**1B** [3] - 356:11, 356:12
**1C-1** [4] - 288:13, 458:17, 458:23, 461:3

## 2

**2** [50] - 277:9, 277:12, 277:22, 278:2, 278:12, 278:14, 278:22, 279:1, 279:8, 279:12, 279:16, 279:19, 279:23, 280:1, 280:5, 280:8, 280:9, 280:14, 280:18, 280:23, 281:4, 281:6, 281:15, 281:16, 282:4, 282:6, 282:17, 282:18, 283:4, 283:6, 284:19, 348:23, 356:10, 358:15, 362:8, 366:6, 374:8, 382:24, 412:21, 417:25, 418:8, 430:23, 442:1, 450:24, 451:21, 452:5, 464:8, 471:20, 473:9
**2,160** [1] - 465:10
**2,695,000** [1] - 407:9
**2-10a** [1] - 374:14
**2-16** [2] - 376:10, 383:14
**2-17** [1] - 374:9
**2-22** [1] - 375:24
**2-25** [1] - 376:10

**2-3** [1] - 364:4
**2-30** [1] - 362:12
**2-33** [1] - 361:18
**2-34** [1] - 361:18
**2-4** [1] - 413:12
**2-41** [1] - 395:8
**2-42** [1] - 394:14
**2-5** [2] - 364:4, 414:8
**2-50** [1] - 356:15
**2-64** [1] - 395:8
**2-65** [1] - 394:11
**2-66** [1] - 394:6
**2-7** [1] - 413:2
**2-9** [1] - 383:14
**2-inch** [1] - 491:14
**2.5** [11] - 309:17, 310:10, 310:12, 310:14, 311:2, 315:9, 315:15, 322:4, 322:15, 324:18, 324:19
**2.6** [1] - 440:12
**2.7** [6] - 315:14, 324:12, 324:21, 445:2, 445:5, 465:21
**20** [36] - 277:10, 277:23, 278:13, 278:23, 279:13, 279:15, 280:2, 280:4, 280:15, 280:17, 281:1, 281:3, 281:13, 281:17, 281:19, 282:3, 282:7, 282:9, 282:16, 282:19, 282:21, 283:3, 283:7, 283:9, 320:1, 327:23, 332:1, 346:7, 346:14, 369:14, 422:25, 463:15, 511:15, 514:6, 518:4, 550:22
**20,316,000** [1] - 407:10
**20-year** [4] - 326:23, 364:21, 374:2, 424:4
**2004** [1] - 505:4
**2008** [1] - 528:9
**2011** [1] - 507:6
**2012** [4] - 513:21, 515:19, 517:5, 519:12
**2013** [1] - 525:25
**2014** [5] - 507:19, 514:2, 515:19, 517:5, 519:13
**2018** [1] - 526:1
**2024** [6] - 283:20, 289:3, 533:21, 540:3, 551:12, 552:14
**21** [18] - 277:10, 277:23, 278:13, 278:23, 279:13, 280:2, 280:15, 281:1, 281:14, 281:17, 282:3, 282:7, 282:16, 282:19, 283:3, 283:7, 511:21, 525:25
**2100** [6] - 426:16, 462:15, 465:1, 469:8, 470:13, 470:18
**2150** [2] - 425:11, 425:19
**2160** [4] - 426:6, 426:15, 465:6, 465:12
**2183** [4] - 426:5, 465:5, 465:11, 490:21
**22** [16] - 277:8, 277:10, 277:21, 277:23, 278:11, 278:13, 278:21, 278:23, 279:13, 280:2, 280:15, 281:1, 281:17, 282:7, 282:19, 283:7
**2200** [3] - 433:6, 433:7, 433:8
**23** [16] - 277:8, 277:10, 277:21, 277:24, 278:11, 278:13, 278:21, 278:23, 279:13, 280:2, 280:15, 281:1, 281:17, 282:7, 282:19, 283:7
**24** [18] - 277:8, 277:21, 278:11, 278:21, 279:13, 280:2, 280:15, 281:1, 281:15, 281:17, 282:5, 282:7, 282:17, 282:19, 283:5, 283:7, 422:25, 526:1
**2400** [1] - 426:9
**243,000** [1] - 407:5
**25** [18] - 277:8, 277:10, 277:22, 277:24, 278:11, 278:13, 278:21, 278:23, 279:13, 280:2, 280:15, 281:1, 281:17, 282:7, 282:19, 283:7, 342:24, 396:22
**250** [2] - 364:3
**2500** [1] - 425:21
**26** [19] - 277:8, 277:10, 277:22, 277:24, 278:11, 278:13, 278:21, 278:23, 279:13, 280:3, 280:15, 281:1, 281:17, 282:7, 282:20, 283:7, 531:9, 531:11, 538:5
**27** [16] - 277:10, 277:24, 278:13, 278:23, 279:11, 279:13, 279:23, 280:3, 280:13, 280:15, 280:22, 281:1, 281:17, 282:7, 282:20, 283:7
**277** [1] - 283:16
**28** [21] - 277:10, 277:24, 278:13, 278:23, 279:11, 279:13, 279:24, 280:3, 280:13, 280:16, 280:22, 281:1, 281:14, 281:18, 282:3, 282:7, 282:16, 282:20, 283:3, 283:7, 426:5
**280** [1] - 356:12
**289** [1] - 286:4
**29** [24] - 277:11, 277:24, 278:13, 278:24, 279:11, 279:13, 279:15, 279:24, 280:3, 280:4, 280:13, 280:16, 280:17, 280:22, 281:1, 281:3, 281:14, 281:18, 282:3, 282:7, 282:16, 282:20, 283:3, 283:7
**291** [1] - 286:12
**2:56** [1] - 447:7
**2D** [1] - 451:8

## 3

**3** [37] - 277:9, 277:12, 277:23, 278:2, 278:12, 278:14, 278:22, 279:1, 279:12, 279:16, 280:1, 280:5, 280:14, 280:18, 280:23, 281:4, 281:10, 281:16, 281:21, 282:1, 282:6, 282:11, 282:18, 283:6, 283:10, 363:18, 374:8, 383:4, 388:4, 412:5, 442:1, 451:24, 452:1, 452:9, 462:15, 464:25, 531:13
**3,000** [2] - 342:19, 395:1
**3,500** [1] - 342:19
**3,600** [1] - 342:21
**3,800** [1] - 342:22
**3-1** [2] - 348:13, 350:24
**3-10** [1] - 368:5
**3-15** [1] - 317:16
**3-15a** [1] - 345:3
**3-2** [1] - 338:21
**3-22** [1] - 369:12
**3-25** [1] - 344:18
**3-26** [1] - 344:18
**3-35** [1] - 368:20
**3-41** [1] - 338:20
**3-42** [2] - 388:5, 388:6
**3-5** [1] - 368:19
**3-6** [1] - 368:4
**3-7** [2] - 383:5, 383:6
**3-8** [1] - 385:7
**3.12** [4] - 459:6, 459:9, 460:4, 460:23
**30** [24] - 277:11, 277:24, 278:13, 278:24, 279:13, 279:15, 280:3, 280:4, 280:16, 280:17, 281:2, 281:3, 281:14, 281:18, 282:3, 282:7, 282:16, 282:20, 283:3, 283:7, 332:4, 332:12, 332:23, 438:19
**300** [2] - 429:12, 430:2
**304** [1] - 284:12
**30869** [2] - 277:3, 289:12
**30870** [1] - 277:4
**30871** [1] - 277:4
**30872** [1] - 277:5
**30873** [1] - 277:5
**30874** [1] - 277:6
**30875** [1] - 277:6
**30876** [1] - 277:7
**30877** [1] - 277:7
**30878** [1] - 277:8
**30879** [1] - 277:8
**30880** [2] - 277:9, 289:12
**31** [16] - 277:7, 277:11, 277:20, 277:24, 278:9, 278:13, 278:20, 278:24, 279:15, 280:4, 280:17, 281:3, 281:14, 282:3, 282:16, 283:3
**314.5** [1] - 424:18
**32** [24] - 277:7, 277:11, 277:20, 278:1, 278:9, 278:13, 278:20, 278:24, 279:11, 279:14, 279:24, 280:3, 280:13, 280:16, 280:22, 281:2, 281:14, 281:18, 282:3, 282:7, 282:16, 282:20, 283:3, 283:7
**325** [1] - 469:24
**325193** [1] - 411:22
**33** [24] - 277:7, 277:11, 277:20, 278:1, 278:9, 278:13, 278:20, 278:24, 279:11, 279:14, 279:24, 280:3, 280:13, 280:16, 280:22, 281:2, 281:14, 281:18, 282:3, 282:7, 282:16, 282:20, 283:3, 283:7
**330** [2] - 489:3
**332** [2] - 412:6, 412:10
**333** [2] - 288:22
**34** [24] - 277:7, 277:11, 277:20, 278:1, 278:10, 278:13, 278:20, 278:24, 279:11, 279:14, 279:24, 280:3, 280:13, 280:16, 280:23, 281:2, 281:14, 281:18, 282:3, 282:7, 282:16, 282:20, 283:3, 283:7
**35** [26] - 277:8, 277:11, 277:22, 278:1, 278:11, 278:14, 278:21, 278:24, 279:11, 279:14, 279:24, 280:3, 280:13, 280:16, 280:23, 281:2, 281:14, 281:18, 282:4, 282:7,

282:16, 282:20, 283:4, 283:7, 373:11, 396:20
**352** [1] - 412:2
**355** [1] - 286:13
**36** [16] - 277:8, 277:22, 278:11, 278:21, 279:14, 280:3, 280:16, 281:2, 281:13, 281:14, 282:2, 282:4, 282:15, 282:16, 283:2, 283:4
**3600** [1] - 343:3
**370** [1] - 286:14
**371** [1] - 286:15
**389** [1] - 286:16
**393** [1] - 286:17
**396** [1] - 286:21
**397** [1] - 374:12
**398** [1] - 286:22
**3:12** [1] - 447:8
**3D** [19] - 343:14, 354:12, 358:7, 358:8, 363:8, 363:12, 363:14, 371:8, 394:20, 402:23, 444:8, 444:10, 444:15, 451:8, 528:21, 530:20, 530:21, 531:21, 533:6
**3rd** [1] - 552:13

## 4

**4** [25] - 277:9, 277:13, 277:23, 278:2, 278:12, 278:15, 278:22, 279:2, 279:12, 280:1, 280:14, 280:24, 281:16, 282:6, 282:18, 283:6, 370:3, 430:23, 431:17, 445:7, 452:15, 465:24, 466:1, 466:20, 474:5
**4,225,000** [2] - 407:3, 407:7
**4-1** [3] - 327:17, 335:6, 337:10
**4-12** [1] - 386:17
**4-14** [1] - 386:15
**4-16** [1] - 387:9
**4-2** [2] - 327:15, 370:6
**4-4** [1] - 370:6
**4-6** [1] - 386:17
**4.0** [1] - 445:3
**4.01** [1] - 483:7
**4.5** [6] - 445:3, 445:7, 466:14, 466:18, 466:25, 474:5
**4.92** [1] - 424:21
**400** [4] - 284:12, 336:11, 337:9, 338:7
**403** [1] - 286:23
**408** [1] - 286:24
**4100** [1] - 433:8
**411** [1] - 287:3
**43-05-01** [1] - 313:24
**43-05-01-05** [2] - 393:6, 393:15
**43-05-01-12** [1] - 313:19
**43-05-01-5** [1] - 443:23
**43-05-1-11** [1] - 487:3
**432** [1] - 287:4
**4400** [1] - 433:6
**441** [1] - 287:5
**448** [1] - 287:8
**457** [1] - 288:14
**458** [2] - 287:9, 288:14
**45Q** [1] - 332:22
**461** [3] - 287:10, 288:13
**467** [1] - 287:11
**470** [1] - 287:12
**473** [1] - 287:13
**484** [1] - 287:17
**49** [1] - 397:7
**4942** [2] - 371:4, 471:22
**4:42** [1] - 503:4
**4:59** [1] - 503:5

## 5

**5** [55] - 277:9, 277:13, 277:23, 278:2, 278:12, 278:15, 278:22, 279:2, 279:12, 279:15, 280:1, 280:4, 280:14, 280:17, 280:24, 281:3, 281:16, 282:6, 282:18, 283:6, 326:23, 343:8, 343:11, 343:13, 344:12, 344:25, 345:4, 346:19, 346:24, 347:12, 347:16, 347:17, 359:25, 362:24, 382:2, 399:3, 415:4, 415:9, 418:13, 423:14, 429:2, 445:17, 453:10, 453:11, 464:10, 466:21, 466:22, 466:25, 469:25, 470:1, 471:18, 473:10, 479:4, 479:13
**5,000** [1] - 340:1
**5-1** [2] - 399:14
**5-12** [2] - 421:17, 475:8
**5-13** [2] - 441:12, 441:21
**5-14** [2] - 423:22, 424:17
**5-15** [2] - 441:20, 443:19
**5-2** [8] - 399:8, 399:10, 399:14, 399:15, 399:17, 399:22, 423:14, 428:24
**5-26** [1] - 431:15
**5-29** [1] - 444:7
**5-3** [3] - 418:14, 419:7, 421:16
**5-32** [1] - 444:25
**5-4** [5] - 399:10, 423:22, 424:17, 427:6, 465:3
**5.3.1** [1] - 443:20
**5.7.2** [1] - 431:14
**50** [8] - 410:1, 454:20, 483:14, 483:15, 488:8, 488:22, 489:12
**500** [2] - 332:10, 435:8
**503** [1] - 287:22
**505** [2] - 288:20
**511** [8] - 288:18, 288:19, 288:19, 288:21
**513** [1] - 287:23
**525** [1] - 287:24
**526** [1] - 287:25
**527** [1] - 288:4
**530** [2] - 288:21
**532** [1] - 288:5
**537** [1] - 288:8
**540** [2] - 288:20
**545** [1] - 288:9
**55** [2] - 483:15, 531:11
**55,000** [1] - 440:11
**552** [2] - 283:16, 286:8
**5580** [1] - 413:9
**57** [5] - 419:16, 421:13, 539:20, 540:11, 540:14
**58** [1] - 529:8
**58501** [1] - 285:5
**58504** [1] - 284:13
**59** [2] - 386:23

## 6

**6** [34] - 277:9, 277:13, 277:23, 278:3, 278:12, 278:15, 278:22, 279:2, 279:12, 279:15, 280:1, 280:4, 280:14, 280:17, 280:24, 281:3, 281:16, 281:19, 282:6, 282:8, 282:18, 282:21, 283:6, 283:8, 291:17, 345:23, 374:12, 374:15, 375:3, 424:19, 454:2, 463:13, 471:18
**6,000** [1] - 455:3
**6-1** [2] - 399:14, 399:16
**6-2** [2] - 434:17, 463:10
**6-6** [2] - 434:19, 463:13
**6.22** [1] - 424:5
**60** [3] - 381:21, 438:19, 483:16
**63** [2] - 333:16, 353:19
**6590** [1] - 284:16
**6:10** [1] - 551:5
**6:11** [1] - 551:6
**6:12** [1] - 551:11
**6:30** [2] - 290:24, 291:2

## 7

**7** [30] - 277:9, 277:13, 277:23, 278:3, 278:12, 278:15, 278:22, 279:2, 279:12, 279:15, 280:1, 280:4, 280:14, 280:17, 280:24, 281:3, 281:16, 281:19, 282:6, 282:8, 282:18, 282:21, 283:6, 283:8, 376:13, 404:13, 405:3, 414:9, 433:24, 454:8
**7-17** [1] - 445:16
**7-inch** [1] - 438:6
**7.5.1** [1] - 445:17
**7.6** [1] - 434:3
**70** [2] - 337:23, 337:25
**70-year-old** [1] - 543:2
**700** [1] - 433:17
**750,000** [1] - 440:8

## 8

**8** [18] - 277:9, 277:23, 278:12, 278:22, 279:12, 279:15, 280:1, 280:4, 280:14, 280:17, 280:24, 281:3, 281:16, 282:6, 282:18, 283:6, 376:14, 454:14
**82** [5] - 511:2, 511:15, 514:7, 514:8, 518:4
**82801** [1] - 284:17
**83** [4] - 304:24, 333:16, 333:17, 514:6
**85** [4] - 281:20, 282:9, 282:22, 283:9
**86** [11] - 281:15, 281:18, 282:4, 282:8, 282:17, 282:21, 283:4, 283:8, 360:9, 429:3, 470:1
**87** [26] - 277:7, 277:11, 277:13, 277:21, 278:1, 278:3, 278:10, 278:14, 278:16, 278:20, 279:1, 279:3, 279:16, 280:5, 280:18, 281:4, 281:13, 281:16, 282:3, 282:5, 282:15, 282:18, 283:3, 283:5, 423:15, 469:24
**88** [21] - 277:9, 277:12, 277:22, 278:2, 278:12, 278:15, 278:22, 279:2, 279:12, 279:14, 279:17, 280:1, 280:4, 280:6, 280:14, 280:16, 280:19, 280:23, 281:2, 281:5, 373:10

**8B** [8] - 288:14, 448:8, 448:9, 448:10, 449:1, 471:5, 471:18, 474:9

## 9

**9** [19] - 277:9, 277:23, 278:12, 278:22, 279:12, 280:2, 280:14, 280:24, 281:16, 282:6, 282:19, 283:6, 291:3, 409:16, 430:23, 437:17, 453:21, 454:17, 551:10
**9-1** [1] - 409:21
**9-2** [1] - 409:21
**90** [2] - 328:15, 462:6
**900** [5] - 342:15, 343:3, 425:10, 490:13, 490:22
**900-pound** [1] - 479:18
**911** [1] - 435:18
**936** [1] - 423:23
**95** [9] - 360:10, 366:6, 366:11, 366:15, 366:18, 418:23, 419:5, 419:12
**96** [1] - 419:17
**98** [5] - 360:9, 366:18, 366:22, 419:16, 419:19
**98.25** [4] - 366:14, 366:20, 419:14
**9:06** [1] - 289:2
**9:08** [1] - 289:10

## A

**A'd** [1] - 334:2
**a.m** [6] - 289:2, 289:10, 291:3, 321:22, 321:23, 551:10
**abandoned** [3] - 338:10, 371:4, 407:4
**abandonment** [4] - 406:16, 407:17, 409:5, 440:9
**abbreviate** [1] - 450:3
**abide** [1] - 454:18
**abides** [1] - 341:3
**ability** [7] - 328:6, 330:3, 342:11, 350:15, 439:6, 469:20, 507:3
**able** [29] - 319:3, 351:14, 355:25, 358:10, 358:23, 366:11, 369:23, 380:21, 381:10, 404:19, 411:16, 412:3, 414:2, 415:21, 420:21, 422:21, 422:23, 423:1, 424:3, 427:2, 436:14, 437:5, 449:2, 484:16, 488:14, 512:10, 512:11, 532:11, 544:21
**abnormal** [2] - 493:12, 495:11
**Above-Zone** [1] - 402:10
**aboveground** [2] - 356:2, 356:6
**absent** [1] - 451:14
**absolutely** [2] - 496:10, 550:8
**academic** [1] - 296:23
**accelerate** [1] - 444:23
**accept** [1] - 418:16
**acceptable** [1] - 323:10
**accepted** [1] - 322:4
**access** [4] - 299:4, 436:22, 531:20
**Access** [1] - 450:14
**accessible** [1] - 338:10
**accessing** [1] - 437:12
**accommodate** [3] - 472:11, 472:16, 490:1
**accordance** [3] - 397:6, 410:11, 485:5
**according** [2] - 426:8, 488:24
**account** [7] - 350:10, 350:20, 384:6, 384:11, 384:20, 420:21, 483:20
**accounted** [2] - 384:13, 419:9
**accuracy** [1] - 354:12
**accurate** [8] - 309:4, 311:14, 343:15, 349:19, 350:16, 412:9, 540:6, 552:10
**accurately** [8] - 314:19, 353:6, 357:15, 358:10, 505:13, 529:13, 539:22, 540:11
**acid** [1] - 504:21
**acknowledged** [1] - 431:24
**acquire** [1] - 352:10
**acquired** [6] - 304:14, 313:9, 394:20, 401:24, 430:22, 538:12
**acquiring** [1] - 483:19
**acquisition** [2] - 397:19, 539:2
**acreage** [2] - 313:6, 316:1
**acres** [1] - 315:15
**Act** [3] - 292:13, 292:18, 293:2
**act** [2] - 376:22, 384:17
**acting** [3] - 384:1, 384:3, 384:7
**action** [2] - 334:1, 526:13
**actions** [2] - 440:6, 509:7
**active** [3] - 357:4, 540:2, 543:15
**actively** [5] - 322:21, 341:16, 341:20, 341:23, 342:1
**activities** [11] - 293:17, 307:6, 308:20, 356:20, 357:2, 399:19, 401:12, 415:10, 497:22, 509:19, 509:20
**activity** [5] - 356:1, 356:5, 400:11, 400:12, 401:21
**actual** [8] - 347:6, 350:18, 352:16, 352:25, 439:20, 442:4, 502:1
**actuated** [1] - 494:6
**add** [7] - 358:3, 433:19, 436:5, 460:4, 474:7, 486:7, 540:3
**added** [7] - 378:22, 420:7, 420:12, 443:4, 471:22, 499:10, 500:17
**adding** [1] - 420:14
**addition** [5] - 316:12, 415:17, 438:7, 445:18, 459:8
**additional** [25] - 295:6, 313:5, 313:6, 314:14, 316:1, 331:14, 352:10, 371:12, 372:15, 372:17, 387:18, 413:17, 420:14, 439:10, 441:11, 442:17, 443:4, 443:5, 470:7, 471:20, 471:23, 472:4, 532:12, 534:19, 549:19
**additionally** [5] - 310:10, 364:17, 366:9, 419:21, 425:8
**additions** [1] - 485:9
**additives** [1] - 486:11
**address** [6] - 315:4, 392:19, 484:6, 489:6, 537:20, 537:21
**addressed** [2] - 315:5, 393:21
**adjacent** [1] - 429:20
**adjust** [4] - 352:9, 386:8, 497:1, 497:20
**adjusted** [1] - 497:4
**adjusting** [2] - 315:22, 496:24
**adjustment** [11] - 309:17, 310:24, 312:22, 314:11, 322:16, 324:12, 498:2, 498:4, 498:10, 499:7, 499:8
**administrative** [3] - 410:12, 508:5, 517:23
**Administrative** [3] - 293:13, 313:21, 487:3
**admission** [2] - 461:6, 461:9
**admit** [7] - 333:14, 333:15, 461:11, 505:17, 511:14, 530:1, 540:14
**admitted** [6] - 333:23, 458:5, 511:19, 530:6, 530:9, 540:17
**adopt** [3] - 515:2, 517:12, 526:9
**adopted** [1] - 293:2
**adopting** [1] - 513:19
**advance** [1] - 430:12
**advanced** [1] - 459:23
**advection** [4] - 379:25, 380:7, 391:16, 391:24
**advised** [1] - 301:19
**advisement** [1] - 310:3
**affect** [8] - 316:12, 321:15, 329:3, 342:10, 354:12, 376:2, 414:21, 541:23
**affected** [4] - 330:6, 418:11, 427:4, 542:2
**affectively** [1] - 316:11
**afterwards** [2] - 471:5, 471:6
**ag** [1] - 506:1
**agent** [1] - 296:10
**ago** [8] - 316:3, 335:7, 472:13, 510:1, 519:11, 532:7, 532:9, 532:10
**agree** [16] - 308:9, 308:14, 315:25, 327:11, 329:10, 330:20, 337:7, 342:14, 347:5, 353:7, 357:23, 358:3, 498:21, 522:15, 546:2, 550:4
**agreed** [3] - 459:21, 460:12, 460:16
**agreement** [17] - 296:15, 304:16, 306:9, 446:21, 447:1, 458:25, 459:9, 459:18, 459:25, 460:1, 460:3, 460:6, 460:8, 460:13, 460:16, 460:21, 502:14
**agreements** [5] - 304:18, 357:10, 446:8, 460:7, 482:24
**aground** [1] - 343:21
**ahead** [6] - 411:13, 420:9, 420:10, 437:7, 488:19, 520:17
**aid** [2] - 446:10, 449:1
**air** [7] - 524:4, 539:11, 543:11, 545:18, 545:23, 546:4, 546:13
**alarm** [2] - 495:2, 495:3
**ALBERTSON** [1] - 284:7
**allocate** [2] - 496:17, 497:22
**allocated** [2] - 351:2, 438:17
**allocating** [1] - 357:25
**allocation** [1] - 320:16
**allow** [8] - 290:15, 341:13, 380:9, 384:19, 391:13, 416:12, 424:25, 439:5
**allowed** [3] - 354:24, 355:12, 380:7
**allowing** [1] - 462:11
**allows** [3] - 384:16, 431:8

**alloy** [1] - 410:12
**almost** [1] - 336:8
**alongside** [1] - 465:1
**amalgamate** [1] - 352:10
**amalgamation** [3] - 277:16, 279:19, 281:22
**Amanda** [16] - 389:9, 389:18, 389:24, 415:24, 416:9, 435:1, 447:18, 450:21, 451:2, 451:13, 452:3, 461:13, 461:15, 461:23, 469:3, 488:2
**AMANDA** [1] - 286:11
**amended** [1] - 460:22
**amendment** [5] - 395:18, 459:1, 459:5, 459:21, 461:7
**amount** [32] - 278:7, 280:10, 282:12, 300:3, 300:4, 300:7, 310:6, 310:16, 310:20, 311:6, 318:24, 319:8, 319:23, 328:3, 328:8, 328:13, 331:2, 332:23, 333:7, 333:9, 333:11, 339:12, 349:24, 352:21, 352:22, 353:1, 353:9, 358:5, 378:19, 424:20, 456:11, 481:1
**amounts** [1] - 456:2
**Amsden** [7] - 357:13, 357:16, 357:19, 362:25, 381:1, 382:15, 410:14
**analogs** [1] - 528:24
**analyses** [1] - 377:19
**Analysis** [3] - 394:12, 401:3, 457:3
**analysis** [31] - 298:9, 298:13, 316:4, 316:8, 316:9, 316:13, 316:14, 317:2, 317:6, 317:9, 317:10, 317:12, 317:17, 317:25, 318:2, 318:12, 318:19, 319:2, 321:11, 351:8, 351:14, 351:15, 368:14, 426:6, 466:9, 493:18, 531:21, 542:7, 543:9, 545:1
**analyze** [2] - 522:11, 544:22
**analyzing** [3] - 400:25, 512:12, 528:16
**AND** [3] - 277:2, 284:19, 285:9
**anhydrite** [22] - 360:8, 360:14, 360:17, 361:9, 362:1, 362:16, 363:3, 368:9, 368:12, 368:15, 373:8, 376:13, 376:18, 376:20, 377:13, 377:17, 377:22, 381:21, 381:22, 385:24, 386:1, 391:1
**annual** [3] - 424:20, 436:2, 436:4
**annually** [2] - 419:2, 424:5
**annulus** [2] - 429:11, 430:2
**ano** [3] - 443:18, 443:25, 444:1
**answer** [51] - 301:8, 302:6, 305:17, 312:6, 320:17, 320:18, 332:8, 332:21, 341:18, 348:5, 356:1, 360:24, 366:3, 370:5, 377:24, 380:16, 380:19, 386:10, 389:6, 389:15, 391:6, 392:11, 411:24, 412:17, 415:24, 427:13, 434:16, 434:25, 436:15, 447:17, 475:3, 477:2, 477:7, 477:8, 484:17, 491:2, 498:2, 499:13, 500:6, 500:7, 500:10, 500:14, 500:22, 501:2, 501:9, 501:13, 520:8, 522:22, 522:24, 535:20, 545:6
**answered** [6] - 301:12, 378:7, 411:3, 430:6, 500:20, 502:19
**answering** [3] - 361:4, 361:5, 389:25
**answers** [1] - 389:12
**anticipate** [8] - 415:6, 424:11, 431:1, 437:11, 443:23, 470:8, 488:1, 488:3
**anticipated** [5] - 379:15, 430:11, 437:9, 441:24, 500:1
**anticipating** [1] - 429:12
**anticipation** [3] - 419:13, 438:8, 460:13
**anyway** [1] - 320:8
**AOR** [32] - 292:17, 313:5, 313:12, 313:16, 326:21, 338:17, 339:7, 369:14, 370:6, 386:15, 387:11, 388:4, 388:8, 388:11, 388:12, 388:17, 393:4, 393:12, 393:13, 489:19, 509:4, 509:6, 531:7, 531:8, 531:13, 531:18, 531:20, 531:23, 532:5, 533:8, 534:16
**apologies** [1] - 473:24
**apologize** [13] - 290:1, 333:13, 342:7, 354:2, 394:4, 404:11, 407:6, 433:3, 447:23, 483:4, 501:20, 518:9, 518:25
**appear** [7] - 326:20, 327:1, 327:3, 335:21, 362:18, 373:12, 503:10
**appearance** [1] - 290:6
**appeared** [1] - 289:13
**appendices** [1] - 456:21
**Appendix** [10] - 359:22, 360:2, 377:2, 456:22, 457:1, 457:3, 457:5, 457:7, 457:15, 457:20
**appendix** [1] - 379:23
**applicable** [1] - 425:19
**applicant** [3] - 450:8, 513:4, 533:1
**APPLICANT'S** [1] - 286:10
**application** [75] - 277:3, 277:15, 278:5, 279:4, 279:7, 279:18, 280:8, 280:9, 281:6, 281:9, 281:21, 282:11, 283:10, 289:20, 318:18, 321:14, 322:25, 323:12, 327:9, 354:4, 354:8, 361:19, 362:7, 362:23, 363:8, 368:5, 372:2, 397:9, 399:3, 399:9, 399:11, 406:8, 421:17, 424:16, 431:16, 433:21, 434:20, 446:20, 448:21, 460:6, 460:7, 461:7, 462:21, 471:23, 488:16, 491:1, 508:1, 514:23, 515:8, 518:6, 518:13, 518:17, 519:2, 519:7, 519:10, 523:3, 523:11, 524:16, 524:21, 524:24, 525:9, 525:10, 525:24, 526:2, 530:22, 531:24, 532:3, 532:21, 535:3, 535:12, 536:2, 536:4, 536:9, 536:15, 550:7
**Application** [1] - 448:11
**applications** [32] - 322:8, 359:9, 360:25, 367:8, 368:7, 368:22, 377:16, 414:25, 415:7, 425:9, 431:17, 434:17, 456:22, 464:20, 470:11, 506:21, 506:22, 512:13, 519:5, 519:15, 521:4, 521:5, 521:9, 530:11, 530:15, 531:4, 533:11, 536:20, 548:19, 548:22, 548:23, 549:6
**applied** [10] - 358:18, 373:15, 376:16, 376:18, 383:7, 383:24, 384:5, 384:16, 388:12, 412:23
**applies** [2] - 415:20, 512:7
**apply** [5] - 360:19, 365:17, 368:17, 431:25, 450:9
**applying** [2] - 383:21, 532:5
**appreciate** [3] - 439:9, 477:17, 513:10
**approach** [10] - 315:22, 352:24, 352:25, 358:13, 374:15, 375:3, 388:11, 405:20, 431:4, 475:5
**appropriate** [5] - 303:3, 316:24, 369:22, 431:19, 526:13
**approval** [3] - 431:22, 515:16, 526:1
**approvals** [1] - 437:20
**approve** [2] - 306:19, 420:3
**approved** [5] - 310:11, 352:12, 420:12, 532:22, 541:14
**approximate** [1] - 356:22
**approximating** [1] - 438:2
**April** [1] - 526:1
**aquifer** [13] - 336:16, 336:17, 339:13, 343:8, 384:1, 384:3, 384:7, 386:19, 540:24, 541:1, 541:5, 541:11, 541:19
**aquifers** [1] - 392:23
**arbitrarily** [2] - 372:12, 372:13
**Archie** [8] - 348:23, 349:11, 350:25, 356:13, 360:9, 362:8, 455:2, 455:24
**Area** [1] - 452:15
**area** [116] - 292:7, 292:8, 292:10, 292:18, 292:23, 293:5, 293:10, 293:14, 293:24, 295:10, 295:12, 310:7, 310:17, 310:20, 310:21, 311:9, 311:22, 311:25, 313:16, 314:5, 314:8, 318:23, 319:10, 320:4, 321:9, 326:24, 328:1, 333:25, 334:2, 334:7, 334:8, 334:9, 334:12, 334:14, 334:17, 334:20, 334:21, 335:5, 336:7, 336:10, 336:23, 337:8, 337:16, 345:2, 345:23, 346:3, 346:4, 346:6, 346:12, 346:13, 348:7, 349:5, 349:10, 349:12, 350:24, 351:2, 351:23, 352:19, 352:23, 353:4, 353:16, 354:17, 354:18, 354:24, 355:11, 358:6, 363:12, 371:3, 372:6, 372:12, 372:16, 373:2, 373:13, 373:16, 373:23, 374:12, 375:22, 383:17, 383:20, 388:9, 388:18, 391:14, 391:15, 393:5, 393:8, 393:10,

393:14, 394:21, 402:6, 435:14, 440:11, 443:10, 443:12, 450:19, 452:17, 452:22, 453:3, 459:15, 463:25, 464:1, 464:6, 469:17, 488:5, 488:25, 508:15, 509:3, 509:5, 525:6, 531:9, 531:10, 532:1, 549:3
**areal** [3] - 293:18, 311:16, 327:7
**areas** [19] - 329:16, 348:7, 349:1, 353:24, 356:18, 356:20, 357:18, 394:23, 404:21, 405:11, 405:12, 406:13, 406:17, 441:4, 476:24, 516:19, 525:5, 530:15
**arrangement** [2] - 482:11, 482:12
**array** [3] - 403:1, 432:5, 466:12
**Article** [1] - 357:10
**artifacts** [1] - 364:16
**ASHLEIGH** [1] - 284:6
**ASME** [1] - 479:20
**aspects** [1] - 450:9
**asserting** [1] - 302:7
**assess** [7] - 317:4, 322:23, 323:4, 335:2, 336:25, 337:3, 544:5
**assessed** [4] - 336:20, 336:23, 337:5, 372:14
**assessing** [2] - 323:1, 323:6
**assessment** [2] - 316:25, 338:13
**asset** [1] - 538:12
**assist** [1] - 512:12
**assistance** [2] - 445:18, 445:23
**assisting** [1] - 289:19
**associated** [16] - 297:10, 313:1, 313:4, 363:16, 365:18, 373:6, 400:13, 406:23, 456:18, 502:16, 504:6, 508:13, 509:21, 515:13, 516:11, 524:13
**assume** [1] - 337:13
**assuming** [4] - 299:5, 338:22, 339:4, 349:18
**assumption** [2] - 337:17, 343:22
**assumptions** [4] - 323:17, 323:19, 324:3, 324:8
**assurance** [6] - 404:5, 404:16, 406:6, 406:12, 406:21, 456:5
**Assurance** [1] - 406:3
**assurances** [1] - 406:24
**assure** [1] - 358:12
**atmosphere** [6] - 309:9, 492:6, 492:9, 493:7, 493:9, 493:11
**attached** [3] - 428:3, 456:21
**attempt** [1] - 544:9
**attempted** [1] - 354:9
**attention** [4] - 406:7, 409:20, 413:2, 458:16
**attorney** [3] - 516:5, 516:6, 516:9
**Attorney** [6] - 389:5, 447:10, 503:7, 532:16, 537:1, 545:10
**attorney/client** [1] - 302:3
**attorneys** [2] - 506:7, 524:2
**Attorneys** [3] - 284:11, 284:16, 285:4
**attributed** [1] - 378:22
**audience** [1] - 411:1
**audit** [1] - 496:3
**authorities** [1] - 541:12
**authorization** [1] - 434:8
**authorize** [2] - 306:19, 307:10
**authorized** [1] - 307:5
**automated** [1] - 494:21
**automatic** [2] - 495:16, 495:17
**automatically** [2] - 479:22, 494:21
**availability** [3] - 317:19, 330:14, 330:18
**available** [18] - 299:22, 299:25, 301:20, 323:21, 349:15, 349:24, 368:14, 377:25, 397:23, 437:4, 468:21, 473:21, 473:25, 496:5, 533:17, 549:4, 550:24, 551:1
**Avenue** [2] - 283:19, 284:12
**average** [13] - 365:7, 369:13, 374:12, 381:16, 381:20, 414:23, 424:4, 424:11, 425:2, 440:17, 470:8, 470:12
**averaged** [1] - 382:14
**avoid** [1] - 502:6
**awarded** [1] - 507:18
**aware** [13] - 294:17, 301:22, 307:25, 315:3, 334:15, 334:19, 436:19, 459:10, 480:1, 501:18, 501:19, 547:16, 547:19

## B

**B-a-c-k-u-s** [2] - 447:25, 468:1
**B-o-f-t-o** [1] - 503:25
**bachelor** [5] - 396:19, 398:21, 408:24, 504:10, 537:25
**bachelor's** [3] - 403:23, 468:9, 527:24
**background** [11] - 396:17, 398:19, 403:22, 408:22, 468:8, 504:9, 520:21, 527:23, 528:4, 529:14, 537:24
**Backus** [7] - 411:5, 447:22, 467:9, 467:23, 475:1, 475:7, 483:24
**BACKUS** [8] - 287:7, 467:16, 469:10, 469:23, 470:3, 475:9, 477:11, 484:1
**Backus'** [1] - 492:17
**bad** [3] - 322:12, 339:10, 339:16
**Bakken** [1] - 528:23
**BAKKES** [1] - 411:5
**balance** [1] - 421:12
**barrier** [4] - 307:13, 387:12, 387:14, 387:18
**base** [2] - 360:6, 410:2
**based** [38] - 292:21, 310:25, 313:9, 323:20, 330:5, 330:10, 335:17, 335:19, 335:20, 335:23, 337:9, 340:10, 346:1, 346:14, 347:1, 349:25, 350:2, 351:3, 352:20, 353:9, 388:11, 409:24, 426:22, 452:21, 455:11, 471:22, 472:25, 478:25, 479:2, 479:7, 480:12, 481:8, 489:16, 489:19, 497:21, 501:25, 502:11, 517:7
**baseline** [6] - 359:24, 360:3, 370:18, 420:5, 430:7, 453:14
**basement** [1] - 394:24
**bases** [1] - 300:1
**basic** [1] - 509:18
**basin** [1] - 485:2
**Basin** [2] - 409:6, 538:21
**basins** [2] - 528:20, 528:22
**basis** [6] - 297:4, 405:24, 436:2, 436:4, 436:12, 533:1
**battery** [2] - 539:10, 539:13
**BAUMAN** [1] - 285:7
**bear** [5] - 354:2, 371:21, 377:2, 378:11, 439:17
**become** [3] - 344:14, 345:14, 441:15
**bedding** [2] - 414:14, 415:11
**beds** [4] - 443:8, 443:18, 443:25, 444:1
**BEFORE** [1] - 283:22
**began** [1] - 504:16
**begin** [4] - 430:11, 444:22, 445:6, 469:2
**beginning** [5] - 430:13, 442:3, 442:13, 444:16, 455:19
**begins** [1] - 399:10
**behalf** [3] - 289:23, 302:8, 304:2
**behind** [2] - 332:20, 365:15
**belief** [1] - 320:9
**believes** [1] - 389:14
**below** [15] - 330:1, 336:15, 345:3, 374:14, 394:25, 395:1, 410:1, 410:13, 454:20, 466:25, 479:22, 483:8, 488:8, 488:22, 489:12
**belt** [1] - 437:12
**bench** [2] - 490:13, 490:23
**bench-tested** [2] - 490:13, 490:23
**BENDER** [121] - 284:10, 289:16, 290:1, 290:5, 290:9, 302:2, 302:9, 302:24, 303:9, 306:23, 312:6, 312:13, 313:20, 320:15, 323:3, 332:24, 333:16, 333:18, 333:21, 356:11, 370:10, 370:14, 389:8, 389:23, 392:12, 392:17, 393:16, 395:11, 395:21, 396:5, 397:21, 398:2, 398:9, 403:2, 403:11, 408:3, 408:13, 410:19, 411:8, 412:17, 415:23, 416:3, 416:7, 416:16, 417:20, 423:9, 425:5, 426:18, 427:13, 427:15, 429:4, 435:2, 447:6, 447:12, 447:15, 448:6, 448:18, 457:23, 458:7, 458:13, 458:18, 458:21, 458:22, 461:1, 461:12, 461:21, 465:13, 465:16, 467:9, 467:15, 467:20, 471:6, 471:9, 471:11, 471:14, 472:10, 472:22, 473:1, 473:3, 475:4, 477:2, 477:17, 484:5, 484:13, 484:18, 489:5, 497:14, 498:24, 500:3, 500:19, 500:24, 501:5, 501:10, 502:2, 502:7, 502:21, 505:8, 505:11, 505:19, 511:17, 512:23, 513:2, 514:8, 520:7, 520:22, 522:19, 522:22, 523:5, 523:13, 525:13, 530:3, 530:7,

532:18, 535:23, 536:1, 536:23, 540:15, 541:7, 545:12, 548:14, 550:9
**Bender** [8] - 302:12, 389:5, 417:7, 447:10, 512:21, 513:4, 532:16, 545:10
**Bender's** [1] - 321:6
**Bender.....** [4] - 286:16, 287:8, 287:9, 287:10
**Bender.....** [5] - 286:21, 286:22, 286:23, 286:24, 287:11
**Bender.....** [3] - 287:23, 288:5, 288:9
**benefit** [1] - 353:2
**best** [4] - 350:15, 411:17, 460:17, 516:9
**better** [3] - 309:14, 411:3, 446:25
**between** [52] - 309:11, 315:9, 318:1, 329:16, 340:20, 342:12, 360:12, 361:3, 365:7, 369:20, 373:14, 384:7, 387:12, 387:25, 388:4, 391:11, 391:23, 391:24, 395:14, 399:14, 405:18, 407:10, 407:11, 407:22, 414:25, 435:16, 438:23, 440:5, 446:10, 446:15, 446:17, 449:12, 450:15, 451:17, 451:22, 454:12, 456:10, 456:11, 456:23, 457:16, 459:15, 460:9, 469:20, 470:12, 474:5, 482:21, 482:25, 485:4, 492:2, 520:14, 546:20, 549:20
**Beulah** [3] - 356:16, 446:4, 468:11
**beyond** [4] - 293:4, 327:25, 384:11, 521:12
**bias** [3] - 376:1, 376:2, 376:8
**bid** [1] - 507:7
**bids** [1] - 432:11
**big** [3] - 425:13, 438:5, 531:8
**bigger** [2] - 390:24, 438:7
**biggest** [1] - 454:23
**billed** [1] - 297:6
**Billings** [1] - 538:17
**binder** [2] - 326:12, 510:18
**Bismarck** [5] - 283:19, 284:13, 285:5, 504:13, 552:13
**bit** [29] - 310:18, 329:11, 380:1, 385:6, 399:2, 399:12, 400:3, 401:7, 402:24, 404:10, 405:9, 406:1, 406:2, 414:5, 427:19, 453:8, 500:5, 513:15, 517:25, 523:17, 528:13, 534:4, 535:19, 535:24, 537:24, 538:2, 538:13, 538:22, 542:5
**BK** [14] - 342:20, 360:20, 362:7, 363:7, 363:11, 368:25, 370:17, 423:5, 424:16, 449:21, 450:10, 450:17, 451:14, 453:2
**black** [1] - 413:7
**blank** [1] - 387:1
**block** [2] - 469:11, 469:13
**blocked** [1] - 490:2
**blocks** [1] - 353:22
**blowdown** [4] - 475:11, 475:15, 493:9, 493:10
**blowouts** [1] - 308:23
**blows** [1] - 475:19
**Blue** [1] - 536:5
**blue** [3] - 336:8, 349:6, 349:13
**BNI** [1] - 404:3
**Board** [3] - 507:16, 514:1, 515:1
**board** [3] - 515:7, 517:11, 517:21
**boarding** [1] - 460:2
**bodies** [1] - 495:23
**body** [1] - 496:9
**Boeshans** [9] - 395:17, 416:8, 447:17, 458:8, 458:10, 497:8, 497:13, 497:16, 501:23
**BOESHANS** [7] - 287:15, 458:11, 458:24, 482:10, 497:25, 500:11, 501:14
**BOESHANS/AMANDA** [1] - 287:6
**Bofoto** [1] - 513:3
**Bofto** [9] - 503:10, 503:24, 505:15, 506:20, 510:23, 511:20, 512:10, 513:8, 526:18
**BOFTO** [7] - 287:20, 503:12, 503:17, 510:20, 520:18, 522:25, 523:10
**BOHRER** [1] - 284:4
**bond** [5] - 407:14, 407:23, 438:13, 438:15, 456:11
**bonded** [1] - 408:1
**bonding** [1] - 514:13
**bonds** [2] - 438:12, 438:15
**books** [1] - 338:3
**border** [12] - 347:6, 373:13, 459:18, 460:1, 460:2, 460:3, 460:6, 460:7, 460:8, 460:13, 460:16, 498:19
**borehole** [1] - 451:22
**boreholes** [2] - 443:22, 443:24
**bottom** [9] - 329:12, 343:16, 343:24, 357:16, 375:24, 378:13, 382:22, 383:5, 388:7
**bottomhole** [27] - 317:13, 328:11, 328:14, 328:16, 328:18, 329:4, 330:5, 330:24, 331:2, 342:18, 342:19, 342:25, 343:16, 350:21, 418:5, 418:10, 424:24, 426:12, 456:2, 462:6, 462:8, 462:10, 462:16, 464:23, 465:2, 486:20, 487:7
**bound** [2] - 361:20, 361:25
**boundaries** [22] - 291:23, 292:2, 296:2, 314:7, 314:11, 314:16, 321:2, 321:18, 326:21, 327:13, 328:1, 336:8, 351:23, 352:6, 352:7, 352:9, 353:25, 373:23, 393:11, 494:23, 496:15, 496:25
**boundary** [44] - 295:12, 311:11, 311:17, 312:2, 314:18, 314:22, 318:14, 320:1, 320:7, 320:11, 321:4, 343:6, 347:8, 347:16, 347:22, 352:2, 353:16, 360:12, 364:5, 364:6, 364:15, 364:17, 383:8, 383:22, 384:6, 384:8, 384:10, 384:13, 384:16, 385:2, 391:11, 393:14, 402:6, 434:23, 459:15, 459:16, 463:12, 497:20, 498:3, 498:4, 498:16, 500:2
**bounds** [1] - 351:25
**box** [1] - 413:7
**BPA** [1] - 508:11
**BRAATEN** [102] - 285:2, 289:22, 290:19, 291:9, 302:7, 302:10, 303:10, 305:18, 307:1, 312:9, 312:16, 313:24, 320:21, 320:24, 322:2, 323:7, 333:3, 333:13, 333:17, 333:19, 333:24, 355:13, 394:7, 394:9, 417:2, 417:12, 417:14, 417:17, 458:3, 458:20, 461:5, 472:17, 472:24, 473:2, 473:5, 474:23, 475:6, 477:14, 477:18, 484:9, 484:15, 484:20, 489:8, 489:11, 490:24, 497:10, 497:16, 499:1, 499:2, 500:12, 500:22, 500:25, 501:8, 501:11, 501:16, 502:5, 502:8, 502:9, 502:17, 502:23, 503:1, 503:9, 503:15, 503:21, 505:10, 505:12, 505:17, 505:21, 510:17, 510:22, 511:14, 511:20, 512:20, 514:7, 520:3, 520:13, 520:17, 522:17, 522:20, 523:9, 526:17, 526:24, 527:2, 527:4, 527:8, 527:16, 530:1, 530:10, 532:15, 535:22, 537:2, 537:7, 537:9, 537:14, 540:14, 540:18, 541:9, 545:8, 548:10, 550:15, 550:23, 551:2
**Braaten** [19] - 285:3, 289:22, 290:13, 321:25, 416:22, 489:5, 503:7, 517:9, 521:18, 525:15, 533:21, 534:2, 537:1, 547:1, 547:18, 547:20, 548:15, 550:12
**Braaten....** [1] - 287:25
**Braaten.....** [1] - 287:13
**Braaten.....** [3] - 287:22, 288:4, 288:8
**Braaten.....** [1] - 287:17
**Braaten.....** [1] - 286:12
**break** [17] - 321:21, 363:22, 366:3, 378:5, 378:8, 380:17, 386:10, 388:16, 388:20, 388:24, 389:12, 389:25, 390:3, 447:5, 502:23, 502:24, 503:3
**breakdown** [2] - 413:10, 413:15
**breaking** [1] - 413:14
**breakpoint** [1] - 442:10
**breaks** [1] - 469:11
**brief** [3] - 399:8, 399:24, 406:4
**briefly** [14] - 333:25, 371:5, 396:15, 398:18, 403:21, 408:21, 448:13, 448:20, 452:15, 459:1, 506:23, 508:24, 527:22, 528:3
**brine** [9] - 345:19, 380:8, 380:23, 381:2, 391:20, 391:21, 429:15, 429:24
**bring** [11] - 389:9, 411:4, 416:9, 416:13, 416:14, 423:9, 434:25, 436:19, 475:14, 506:22, 530:12
**broken** [2] - 354:5, 440:4
**brokers** [1] - 304:14
**Broom** [36] - 277:5, 278:4, 278:17, 279:5, 279:9, 280:7, 280:19, 281:7, 281:11, 282:10, 282:22,

283:11, 310:11, 332:11, 339:15, 339:17, 340:19, 359:4, 364:25, 375:1, 375:8, 375:20, 376:12, 381:3, 381:12, 383:13, 383:16, 384:1, 385:2, 395:1, 410:14, 413:21, 414:3, 414:24, 530:17, 535:17
**brown** [1] - 356:20
**buffer** [7] - 320:2, 373:15, 373:21, 388:9, 388:12, 388:18, 393:4
**build** [2] - 325:21, 325:22
**buildup** [2] - 492:19, 495:7
**built** [2] - 326:5, 492:15
**bulk** [1] - 399:18
**bullet** [7] - 294:20, 294:23, 297:19, 297:23, 298:5, 298:17, 304:24
**Bullion** [1] - 392:25
**buoyancy** [1] - 391:10
**buoyant** [2] - 380:5, 380:6
**burst** [1] - 339:23
**business** [14] - 310:5, 310:9, 310:13, 310:25, 311:4, 311:20, 311:23, 312:1, 312:11, 312:17, 312:20, 312:24, 504:6, 537:19
**businesses** [1] - 435:10
**bust** [1] - 339:19
**Butte** [1] - 537:22
**BUTTON** [4] - 288:7, 537:10, 548:13, 550:13
**Button** [3] - 537:7, 537:18, 540:1
**button** [7] - 537:8, 537:15, 540:18, 543:16, 544:18, 545:13, 550:15
**buttons** [1] - 300:12
**buy** [1] - 306:15
**BY** [85] - 291:9, 291:13, 308:17, 309:13, 334:4, 335:8, 336:2, 338:9, 339:25, 340:17, 355:18, 356:9, 359:21, 360:15, 370:2, 370:20, 371:20, 372:7, 387:8, 387:16, 389:23, 390:7, 392:20, 393:23, 393:25, 396:5, 398:9, 398:12, 403:11, 403:14, 408:13, 408:16, 411:12, 411:21, 412:5, 413:1, 418:22, 420:11, 420:24, 427:24, 428:23, 429:17, 430:10, 432:23, 433:3, 434:2, 434:24, 435:5, 435:12, 436:21, 437:22, 438:16, 441:10, 441:20, 444:11, 445:24, 448:6, 448:10, 458:13, 458:24, 461:21, 461:25, 467:20, 470:6, 472:2, 473:5, 473:12, 474:13, 475:9, 482:10, 483:12, 484:1, 484:20, 484:22, 489:14, 490:3, 497:25, 503:21, 513:2, 525:18, 526:17, 527:16, 532:18, 537:14, 545:12
**bypass** [3] - 490:6, 492:16, 493:4
**Byron** [1] - 284:11

## C

**C-12** [3] - 377:5, 377:8, 378:11
**C-13** [1] - 381:24
**C-14** [1] - 378:12
**C-15** [4] - 377:3, 377:4, 377:6, 377:9
**C-16** [1] - 377:9
**C-18** [4] - 379:6, 379:18, 380:23, 381:15
**C-19** [1] - 381:23
**C-25** [2] - 382:13, 382:14
**C-28** [1] - 382:22
**C-4** [1] - 381:15
**C-6** [1] - 382:14
**C-8** [2] - 378:12, 379:8
**C-9** [1] - 377:8
**C2** [1] - 382:1
**cable** [3] - 401:14, 402:14, 402:17
**CAITLIN** [1] - 287:6
**Caitlin** [13] - 308:11, 389:16, 392:17, 395:14, 416:8, 447:13, 447:16, 448:1, 448:7, 448:19, 488:1, 488:6, 489:6
**Caitlin's** [1] - 338:15
**calculate** [4] - 374:23, 418:5, 462:5, 541:21
**calculated** [8] - 376:6, 382:6, 385:16, 392:3, 464:2, 541:11, 541:14, 541:19
**calculating** [1] - 350:7
**calculation** [3] - 339:21, 350:5, 350:6
**calculations** [3] - 343:1, 384:10, 541:21
**CALEB** [1] - 284:7
**Calgary** [1] - 283:19
**calibrate** [2] - 313:15, 376:5
**callout** [1] - 348:18
**Canada** [1] - 528:2
**cannot** [3] - 493:23, 518:24, 533:6
**capabilities** [2] - 421:20, 446:15
**capability** [1] - 494:6
**capable** [1] - 512:15
**capacity** [9] - 323:14, 396:13, 398:15, 403:18, 408:19, 424:7, 424:25, 468:4, 534:13
**capillary** [3] - 385:7, 385:9, 386:2
**capture** [9] - 347:3, 385:9, 397:14, 411:18, 411:22, 421:8, 422:1, 425:23, 470:21
**captured** [3] - 324:9, 324:10, 358:8
**CARBON** [3] - 284:18, 284:19, 284:19
**Carbon** [34] - 277:4, 277:6, 277:15, 277:19, 278:6, 278:8, 279:4, 279:8, 279:10, 279:19, 279:23, 280:8, 280:9, 280:12, 281:6, 281:10, 281:12, 281:21, 282:1, 282:11, 282:14, 283:10, 306:18, 309:11, 396:12, 403:17, 404:7, 408:18, 443:21, 449:18, 468:3, 476:19, 482:6, 484:3
**carbon** [15] - 277:5, 278:8, 279:5, 279:9, 280:11, 281:7, 281:11, 282:13, 283:11, 347:3, 378:22, 418:25, 486:24, 529:20, 546:21
**carbonates** [1] - 378:21
**Care** [1] - 454:2
**care** [1] - 456:14
**career** [3] - 522:8, 538:6, 542:9
**careful** [1] - 477:7
**carrier** [1] - 491:20
**case** [25] - 292:2, 310:5, 315:18, 322:12, 338:22, 349:18, 350:18, 351:11, 351:20, 361:24, 362:17, 363:2, 367:3, 369:16, 382:1, 462:17, 462:19, 462:20, 464:4, 479:12, 492:19, 493:23, 513:5, 519:19, 534:8
**Case** [2] - 277:3, 289:11
**cases** [7] - 318:14, 318:16, 351:9, 351:10, 381:2, 462:14, 478:14
**casing** [24] - 336:15, 339:14, 402:19, 409:11, 409:15, 409:25, 410:3, 410:4, 410:9, 410:13, 410:15, 453:23, 454:20, 454:21, 487:5, 487:12, 487:17, 487:20, 488:7, 488:15, 488:21, 489:2, 489:12, 550:2
**casing-conveyed** [2] - 402:19, 453:23
**cathodic** [6] - 427:21, 428:18, 442:22, 443:1, 443:22, 443:24
**caught** [1] - 539:25
**caused** [4] - 332:4, 341:14, 415:6, 466:11
**causing** [2] - 377:22, 476:18
**caution** [1] - 477:3
**caverns** [2] - 543:12, 543:14
**cell** [7] - 318:13, 363:23, 382:1, 384:15, 384:16, 384:17, 384:18
**cells** [3] - 344:22, 364:15, 380:9
**cement** [24] - 339:25, 410:16, 438:9, 454:21, 484:24, 485:7, 485:11, 485:13, 485:14, 485:15, 486:1, 486:7, 486:9, 486:18, 487:2, 487:5, 487:11, 487:17, 487:19, 487:22, 487:25
**cemented** [3] - 410:4, 410:15, 410:17
**cementing** [8] - 409:11, 455:4, 485:2, 485:8, 485:18, 485:23, 486:9, 486:16
**center** [4] - 397:20, 494:22, 495:4, 495:19
**Center** [2] - 303:15, 446:4
**centered** [2] - 364:6, 364:9
**centering** [1] - 364:12
**central** [2] - 372:5, 372:6
**Century** [1] - 313:18
**certain** [8] - 310:6, 310:7, 318:6, 354:13, 438:18, 533:22, 544:12, 544:13
**certainly** [3] - 416:20, 431:3, 547:21
**certainty** [3] - 305:9, 318:14, 438:23
**CERTIFICATE** [2] - 286:6, 552:1
**Certificate** [1] - 286:8
**CERTIFY** [2] - 552:5, 552:9
**cetera** [3] - 443:9, 456:3, 469:5
**CFR** [1] - 397:7
**chance** [3] - 290:16, 476:17, 476:22
**chances** [1] - 486:4
**change** [24] - 290:13, 367:20,

369:13, 369:23, 381:25, 382:3, 382:4, 382:24, 382:25, 422:2, 423:8, 429:23, 463:24, 463:25, 464:2, 464:4, 464:6, 473:10, 496:15, 498:9, 499:20, 499:23, 502:6, 544:10
**changed** [1] - 446:22
**changes** [16] - 314:4, 346:5, 346:7, 358:7, 358:9, 367:5, 423:1, 428:10, 431:21, 432:1, 443:8, 450:15, 466:16, 494:24, 545:6
**changing** [1] - 499:15
**characteristics** [1] - 456:17
**characterization** [4] - 330:20, 451:11, 508:14, 520:4
**characterizations** [1] - 441:3
**characterize** [1] - 382:19
**check** [1] - 324:1
**checking** [1] - 471:1
**chemical** [4] - 468:11, 486:5, 486:8, 504:11
**chemicals** [1] - 485:10
**chemistry** [3] - 377:21, 377:22, 391:3
**Chesapeake** [1] - 398:24
**chief** [1] - 396:14
**chose** [3] - 351:11, 352:18, 353:3
**chosen** [9] - 317:1, 346:20, 358:1, 365:3, 365:16, 369:6, 388:15, 465:24, 510:11
**chromatograph** [1] - 422:15
**circumstances** [2] - 461:8, 509:4
**cited** [1] - 512:2
**CLAIMANT'S** [1] - 288:11
**clarification** [1] - 345:9
**clarify** [15] - 303:18, 332:15, 341:24, 365:22, 366:17, 368:10, 373:25, 380:12, 382:5, 393:2, 433:8, 444:2, 491:24, 496:7, 546:7
**Class** [63] - 291:17, 291:21, 292:16, 292:20, 293:1, 293:6, 293:8, 308:15, 323:12, 323:22, 328:7, 328:10, 328:17, 329:22, 330:7, 330:11, 331:1, 335:4, 340:13, 340:18, 340:20, 341:1, 341:14, 342:2, 404:8, 406:20, 409:6, 410:11, 437:18, 490:13, 490:22, 506:21, 507:18, 508:1, 508:8, 508:10, 508:12, 508:20, 509:13, 509:20, 510:2, 511:4, 511:10, 512:13, 514:17, 514:24, 517:16, 518:7, 518:13, 518:19, 519:7, 520:19, 524:18, 524:20, 524:24, 525:25, 535:4, 540:19, 540:20, 540:22, 540:23
**class** [2] - 339:25, 479:18
**classification** [1] - 353:7
**classify** [1] - 316:21
**clay** [2] - 362:16, 486:2
**cleanup** [2] - 524:6, 524:14
**clear** [3] - 417:3, 444:13, 492:6
**clearly** [2] - 439:2, 440:20
**click** [1] - 300:12
**client** [1] - 289:24
**clients** [8] - 296:21, 353:14, 353:15, 505:23, 505:25, 506:1, 539:1, 548:16
**close** [9] - 356:1, 365:6, 371:15, 433:13, 478:24, 479:21, 494:6, 497:14, 531:6
**closed** [6] - 384:8, 480:24, 492:4, 492:16, 492:24, 493:5
**closely** [2] - 507:24, 521:14
**closest** [8] - 334:12, 356:15, 356:17, 433:1, 433:5, 433:14, 433:16, 433:20
**closing** [2] - 439:2, 493:21
**closure** [1] - 407:18
**Closure** [1] - 454:3
**closures** [2] - 404:6, 406:16
**CMG** [9] - 295:2, 384:10, 544:20, 544:24, 547:9, 547:13, 547:18, 547:19, 547:21
**CMG's** [1] - 547:14
**CO** [1] - 391:21
**CO2** [160] - 291:14, 293:17, 293:19, 308:20, 308:22, 309:9, 310:6, 310:16, 310:18, 310:20, 311:6, 314:6, 318:25, 319:8, 319:9, 319:23, 321:5, 328:3, 328:6, 328:8, 328:13, 329:23, 330:12, 330:23, 331:16, 332:14, 332:17, 333:6, 333:10, 343:6, 343:8, 343:9, 343:17, 343:22, 344:9, 344:12, 344:14, 344:23, 345:7, 345:10, 345:14, 345:19, 345:21, 347:6, 347:13, 347:15, 347:19, 347:21, 350:22, 351:25, 352:6, 352:21, 353:1, 353:9, 353:18, 358:5, 358:11, 360:18, 362:3, 365:9, 365:21, 366:4, 366:6, 366:11, 366:12, 366:16, 366:24, 366:25, 367:1, 371:7, 372:3, 372:4, 372:5, 372:10, 373:12, 373:17, 373:20, 374:1, 374:5, 379:1, 379:9, 379:21, 380:5, 380:6, 380:7, 386:7, 386:9, 390:21, 391:11, 391:13, 391:19, 391:22, 397:13, 400:4, 400:23, 400:25, 401:3, 401:10, 402:2, 402:4, 410:16, 412:13, 412:14, 415:22, 418:15, 419:5, 419:8, 420:6, 420:13, 420:14, 420:20, 420:21, 425:17, 427:4, 430:25, 431:2, 431:6, 434:22, 438:9, 441:14, 442:18, 452:2, 454:21, 462:4, 462:11, 463:11, 463:17, 464:7, 475:19, 478:15, 478:17, 480:13, 481:1, 481:10, 481:22, 481:25, 484:23, 485:4, 485:9, 485:13, 487:1, 487:9, 487:12, 487:16, 487:19, 488:3, 501:24, 502:1, 502:12, 538:10, 538:14, 542:19, 546:6, 546:10, 546:12, 546:17
**CO2's** [3] - 321:2, 534:11, 546:22
**coal** [4] - 355:24, 357:5, 468:12
**Coal** [1] - 404:3
**coal-fired** [1] - 468:12
**code** [2] - 410:12, 411:23
**Code** [4] - 293:13, 313:18, 313:21, 487:3
**codes** [1] - 411:17
**collect** [3] - 381:10, 400:11, 516:20
**collected** [2] - 414:16, 510:8
**college** [2] - 504:15, 504:17
**color** [3] - 327:4, 329:11, 329:12
**colors** [3] - 329:10, 353:21, 353:23
**column** [12] - 376:13, 376:14, 386:22, 387:6, 400:10, 414:9, 449:16, 449:21, 449:22, 450:12, 450:13, 471:19
**columns** [3] - 400:1, 400:17, 449:7
**combination** [1] - 413:25
**combined** [1] - 428:19
**comfortable** [5] - 318:11, 319:6, 319:21, 321:7, 321:12
**coming** [10] - 300:1, 309:14, 333:6, 394:18, 436:17, 460:14, 470:20, 476:3, 481:22, 484:7
**commencing** [1] - 289:2
**comment** [3] - 305:9, 308:6, 526:2
**commercial** [11] - 296:24, 297:3, 297:5, 297:6, 299:4, 299:5, 524:20, 543:18, 543:21, 543:23, 544:7
**commercially** [1] - 296:25
**commingled** [4] - 419:10, 419:13, 419:18, 420:13
**Commission** [64] - 277:17, 278:6, 279:20, 280:10, 280:21, 281:23, 282:12, 283:1, 289:6, 290:16, 294:24, 294:25, 295:24, 297:21, 298:7, 298:10, 303:2, 307:21, 310:11, 315:10, 322:3, 340:23, 341:3, 341:4, 390:1, 390:16, 395:18, 396:16, 398:19, 404:20, 408:22, 409:10, 410:24, 412:7, 449:9, 459:7, 463:3, 477:6, 498:6, 514:20, 517:2, 518:18, 518:19, 519:6, 521:5, 521:20, 522:13, 523:8, 524:17, 524:22, 525:20, 532:21, 533:3, 533:15, 533:21, 533:25, 534:8, 535:4, 535:11, 536:21, 547:2, 548:19, 549:23, 550:6
**Commission's** [3] - 341:6, 406:7, 547:17
**commit** [1] - 446:9
**commitment** [3] - 500:16, 501:2, 501:3
**commitment's** [1] - 446:25
**committed** [3] - 435:21, 436:11, 438:18
**common** [2] - 422:8, 482:19
**commonly** [7] - 297:10, 361:24, 361:25, 362:16, 363:2, 486:23
**communication** [1] - 302:22
**communications** [4] - 307:20, 315:8, 520:14, 548:11
**community** [2] - 405:5
**companies** [4] - 504:25, 506:6, 528:10, 528:11
**Company** [1] - 538:7

**company** [8] - 434:4, 486:16, 497:6, 504:4, 516:10, 523:22, 525:4, 539:5
**compare** [1] - 448:23
**comparing** [1] - 456:4
**comparison** [2] - 395:14, 449:10
**Comparison** [1] - 448:11
**comparisons** [1] - 449:3
**compel** [3] - 303:2, 303:5, 533:24
**compensate** [5] - 297:2, 311:19, 312:4, 330:10, 330:12
**compensated** [2] - 292:5, 321:16
**compensating** [3] - 321:3, 330:9, 358:12
**compensation** [9] - 312:10, 320:25, 321:7, 321:19, 352:13, 352:20, 496:17, 497:1, 497:4
**competitive** [1] - 507:7
**compile** [1] - 304:8
**compiling** [1] - 305:25
**complete** [4] - 434:7, 466:15, 474:19, 474:20
**completed** [1] - 418:20
**completely** [2] - 481:11, 481:13
**completion** [3] - 409:12, 437:18, 550:2
**completions** [2] - 298:14, 455:6
**complex** [4] - 315:22, 451:16, 534:18, 546:24
**compliance** [4] - 321:3, 323:23, 404:4, 506:17
**complies** [1] - 435:8
**composition** [11] - 366:23, 381:2, 381:14, 381:16, 382:15, 401:1, 418:15, 418:21, 420:15, 428:11, 542:18
**compositions** [3] - 367:3, 457:10, 457:12
**compressed** [6] - 539:11, 543:11, 545:18, 545:23, 546:4, 546:13
**computational** [1] - 384:20
**computer** [5] - 296:23, 300:12, 300:13, 300:14, 522:3
**concentration** [7] - 343:8, 344:14, 345:21, 347:12, 391:13, 391:15
**concern** [2] - 361:22, 361:23
**concerns** [2] - 319:18, 329:1
**concludes** [1] - 551:10
**conclusion** [1] - 498:25
**conclusions** [1] - 532:24
**condition** [3] - 384:7, 384:10, 495:11
**conditions** [11] - 314:19, 317:13, 318:14, 364:17, 365:18, 383:8, 383:22, 384:13, 426:23, 482:1, 493:12
**conduct** [2] - 472:14, 532:12
**conducted** [3] - 322:22, 402:17, 493:19
**confidency** [1] - 351:19
**confident** [3] - 318:5, 318:17, 488:15
**confidential** [3] - 477:6, 496:5, 496:6
**confining** [25] - 360:7, 360:16, 361:14, 362:22, 376:22, 379:24, 380:3, 380:5, 380:10, 380:11, 380:14, 381:1, 385:24, 387:15, 387:23, 387:24, 388:2, 391:9, 391:12, 391:18, 392:1, 394:17, 457:11, 523:15
**confirm** [32] - 313:15, 357:3, 360:1, 367:19, 373:24, 377:14, 381:6, 381:17, 382:7, 382:9, 382:17, 386:20, 387:7, 387:8, 388:16, 388:19, 412:3, 412:15, 414:18, 415:19, 417:25, 418:9, 418:20, 419:22, 422:20, 423:11, 423:20, 424:6, 430:7, 470:17, 471:25, 494:7
**confirmation** [2] - 428:25, 444:14
**confirmed** [1] - 429:7
**confirming** [5] - 383:9, 415:14, 417:23, 424:22, 445:13
**conforming** [1] - 431:7
**confusion** [1] - 419:6
**connected** [2] - 482:19, 492:14
**connections** [1] - 491:19
**Conservation** [3] - 507:17, 514:19, 517:1
**conservation** [2] - 338:3, 506:5
**conservative** [1] - 366:7
**consider** [12] - 277:16, 278:18, 279:19, 280:9, 280:21, 281:21, 283:1, 308:22, 387:22, 387:25, 439:2, 439:8
**consideration** [15] - 277:4, 279:8, 281:10, 310:25, 311:8, 311:20, 311:23, 312:11, 312:17, 312:20, 312:22, 312:25, 318:23, 321:14, 352:15
**considerations** [5] - 310:9, 310:13, 311:4, 323:22, 436:16
**considered** [2] - 365:7, 488:25
**considering** [2] - 369:1, 438:4
**consist** [1] - 505:25
**consisted** [1] - 406:13
**consistent** [2] - 434:13, 435:24
**consistently** [1] - 420:25
**constant** [1] - 345:13
**constituents** [1] - 391:2
**constrained** [3] - 426:12, 426:13, 426:20
**constraint** [16] - 328:11, 328:12, 328:14, 328:16, 418:11, 426:16, 426:22, 462:6, 462:8, 462:16, 462:17, 464:24, 465:1, 465:8, 470:14, 470:19
**constraints** [5] - 418:6, 424:24, 465:2, 544:12, 544:13
**constructed** [6] - 291:18, 291:22, 292:6, 397:3, 397:5, 397:6
**construction** [4] - 409:17, 409:22, 437:17, 452:2
**consult** [1] - 506:11
**consultant** [3] - 504:25, 528:9, 538:25
**consultants** [1] - 516:4
**consulted** [1] - 485:1
**consulting** [7] - 409:2, 504:6, 504:21, 506:9, 506:12, 539:1, 539:12
**Cont'd** [3] - 285:1, 287:1, 288:1
**contact** [2] - 373:13, 542:13
**contain** [3] - 349:14, 549:25, 552:10
**contained** [7] - 399:25, 402:5, 452:16, 480:14, 529:5, 544:11, 547:9
**containment** [6] - 361:22, 361:23, 429:23, 440:1, 440:14
**contains** [1] - 314:3
**contaminated** [1] - 524:14
**content** [5] - 361:10, 450:15, 454:12, 454:15, 486:2
**Content** [1] - 400:20
**contents** [1] - 529:11
**context** [1] - 352:4
**continually** [1] - 494:24
**continue** [5] - 417:22, 445:24, 446:13, 446:16, 483:7
**CONTINUED** [1] - 291:8
**continued** [3] - 439:7, 446:7, 446:8
**Continued** [1] - 286:12
**continues** [1] - 434:11
**continuing** [3] - 401:19, 434:10, 435:21
**CONTINUING** [61] - 302:10, 303:10, 305:18, 307:1, 312:9, 312:16, 313:24, 320:24, 322:2, 323:7, 333:3, 333:24, 356:14, 370:16, 392:17, 394:10, 412:21, 417:21, 420:16, 423:11, 423:21, 424:15, 425:8, 426:19, 427:16, 429:9, 433:24, 435:3, 436:13, 437:16, 439:11, 442:16, 448:18, 458:22, 471:17, 475:6, 477:18, 489:11, 490:24, 497:16, 499:2, 500:12, 500:22, 500:25, 501:8, 501:16, 502:9, 505:12, 505:21, 510:22, 511:20, 514:8, 520:7, 520:22, 523:5, 523:13, 530:10, 536:1, 540:18, 541:9, 548:14
**continuous** [4] - 401:15, 428:6, 428:22, 483:19
**continuously** [1] - 428:5
**contract** [1] - 506:3
**contracted** [7] - 296:25, 306:17, 323:13, 323:24, 485:23, 486:15, 486:23
**contractor** [3] - 486:12, 486:17, 486:22
**contractors** [2] - 485:1, 485:24
**contracts** [4] - 296:13, 418:19, 482:21, 483:1
**contrast** [1] - 448:22
**contrasting** [1] - 456:5
**contributing** [1] - 420:23
**control** [12] - 293:1, 300:17, 316:19, 351:7, 372:18, 397:18, 397:20, 476:5, 482:19, 494:22, 495:4, 495:19
**Control** [1] - 511:3
**controlled** [3] - 397:19, 493:10, 494:21
**controls** [4] - 350:13, 469:7, 476:5, 476:11
**conventional** [1] - 485:7
**conversation** [3] - 302:14, 303:19, 303:22

**conversations** [4] - 305:19, 309:20, 309:23, 435:13
**conversely** [1] - 379:22
**converting** [1] - 538:9
**conveyed** [5] - 402:19, 453:19, 453:23, 455:17, 457:19
**cooperate** [1] - 459:20
**cooperating** [1] - 341:12
**cooperation** [1] - 341:9
**coordinate** [1] - 531:15
**copy** [3] - 458:19, 510:19, 526:18
**core** [18] - 298:9, 298:11, 317:19, 349:9, 349:12, 360:6, 368:13, 376:4, 385:14, 413:25, 414:15, 451:18, 474:17, 529:21, 530:17, 535:7, 535:16, 549:25
**core-derived** [1] - 385:14
**cored** [1] - 410:10
**cores** [2] - 349:14, 385:10
**coring** [1] - 367:10
**Coriolis** [5] - 420:24, 421:10, 422:16, 427:7, 469:14
**corner** [1] - 363:11
**corporation** [1] - 539:10
**correct** [106] - 293:12, 295:16, 295:18, 304:4, 307:16, 308:7, 313:20, 319:24, 320:9, 322:6, 326:1, 327:20, 328:21, 333:3, 334:10, 337:11, 343:10, 344:10, 344:13, 347:1, 350:3, 351:17, 357:6, 357:7, 360:5, 360:21, 360:24, 362:4, 366:19, 370:24, 370:25, 373:5, 374:3, 374:7, 375:15, 375:21, 375:23, 376:24, 377:15, 378:17, 379:14, 379:17, 380:21, 381:4, 383:20, 384:19, 384:25, 385:5, 385:11, 387:6, 387:15, 387:16, 387:19, 388:19, 390:6, 390:7, 392:7, 395:4, 395:9, 396:6, 399:5, 399:6, 404:14, 404:15, 404:17, 404:18, 404:21, 404:22, 409:12, 409:13, 412:9, 415:25, 419:14, 419:15, 419:25, 423:17, 424:10, 425:1, 430:9, 430:10, 430:14, 434:1, 438:6, 440:15, 443:16, 444:18, 450:22, 460:5, 460:25, 464:12, 472:2, 473:12, 475:16, 480:6, 482:10, 495:19, 514:9, 515:20, 521:16, 524:9, 525:11, 533:11, 533:12, 535:5, 535:12, 548:20
**correcting** [2] - 298:8, 513:9
**correction** [1] - 313:23
**corrective** [2] - 334:1, 509:7
**correctly** [2] - 441:19, 513:20
**correlate** [1] - 386:25
**corrosion** [6] - 410:12, 427:17, 428:1, 428:2, 429:19, 453:13
**Corrosion** [2] - 401:5, 401:20
**corrosion-inhibited** [1] - 429:19
**corrosiveness** [1] - 487:9
**cost** [14] - 297:2, 324:20, 324:22, 324:24, 406:13, 406:23, 407:2, 407:18, 438:2, 439:21, 440:4, 440:9, 441:5, 456:13
**costs** [10] - 297:6, 312:25, 313:7, 406:18, 438:10, 439:15, 440:20, 440:23, 456:18
**Coulomb** [1] - 394:12
**counsel** [3] - 289:12, 290:3, 396:17
**Counties** [9] - 277:14, 278:4, 278:17, 279:3, 279:17, 280:6, 280:19, 281:5, 405:17
**counties** [6] - 405:19, 405:21, 435:22, 435:24, 436:8, 446:18
**country** [1] - 545:16
**County** [17] - 281:20, 282:9, 282:22, 283:9, 435:13, 435:14, 435:17, 435:19, 446:1, 446:2, 538:15, 538:21, 538:22
**couple** [14] - 294:3, 316:3, 338:16, 349:1, 371:24, 393:20, 426:10, 437:24, 441:11, 446:4, 484:12, 489:20, 516:16, 539:25
**coupon** [3] - 428:1, 428:2, 428:7
**course** [3] - 418:23, 426:7, 431:11
**Court** [1] - 286:8
**court** [1] - 453:7
**COURT** [1] - 552:1
**cover** [2] - 364:14, 510:6
**covered** [4] - 407:13, 407:19, 449:14, 501:6
**covers** [1] - 509:17
**Coyote** [3] - 356:16, 450:18
**cracked** [1] - 466:24
**create** [1] - 531:1
**created** [1] - 323:18
**creating** [1] - 292:12
**credits** [2] - 332:17, 332:22
**Creek** [41] - 277:5, 278:4, 278:17, 279:5, 279:9, 280:7, 280:20, 281:7, 281:11, 282:10, 282:22, 283:11, 310:12, 332:11, 339:15, 339:17, 340:19, 356:16, 359:4, 364:25, 375:1, 375:8, 375:20, 376:12, 381:3, 381:13, 383:13, 383:16, 384:1, 385:2, 392:25, 395:2, 402:12, 410:14, 413:21, 414:3, 414:24, 450:18, 530:18, 535:17
**critical** [5] - 425:18, 427:1, 452:11, 530:22, 531:17
**Critical** [1] - 394:12
**Cross** [5] - 286:12, 287:17, 287:23, 288:5, 288:9
**cross** [13] - 290:12, 290:18, 344:20, 348:16, 348:19, 348:21, 416:12, 416:17, 416:25, 417:7, 417:8, 472:8, 472:14
**CROSS** [5] - 291:8, 484:19, 513:1, 532:17, 545:11
**Cross-Examination** [5] - 286:12, 287:17, 287:23, 288:5, 288:9
**cross-examination** [3] - 290:12, 472:8, 472:14
**CROSS-EXAMINATION** [5] - 291:8, 484:19, 513:1, 532:17, 545:11
**cross-examine** [1] - 290:18
**cross-section** [3] - 348:16, 348:19, 348:21
**cross-sections** [1] - 344:20
**crossed** [1] - 290:13
**cubed** [1] - 339:3
**cubic** [3] - 382:3, 423:24, 424:18
**cumulatively** [2] - 408:1, 435:15
**curious** [1] - 426:14
**current** [8] - 332:11, 335:17, 356:5, 427:21, 428:18, 442:25, 523:20, 544:15
**curriculum** [4] - 505:13, 529:6, 529:9, 529:11
**curve** [2] - 368:11, 379:9
**curves** [3] - 368:8, 385:8, 386:4
**custody** [4] - 421:6, 441:13, 441:16, 442:4
**cut** [1] - 362:21
**cutoff** [10] - 345:1, 366:15, 445:2, 445:4, 464:4, 464:7, 464:10, 466:14, 473:8, 473:11
**CV** [2] - 539:21, 539:22
**cycle** [1] - 374:2
**cylinder** [1] - 541:24

## D

**D-o-u-g-h-t-y** [1] - 527:19
**Dakota** [38] - 283:19, 284:13, 285:5, 289:6, 291:21, 292:15, 292:20, 293:12, 298:10, 298:11, 307:21, 313:18, 330:11, 338:4, 340:8, 386:21, 387:6, 390:14, 403:25, 412:2, 435:7, 436:6, 454:19, 507:23, 513:18, 523:18, 523:22, 523:25, 524:10, 524:16, 525:9, 525:24, 526:4, 526:8, 526:12, 536:10, 538:23, 552:13
**DAKOTA** [1] - 277:1
**Dakota's** [3] - 292:25, 294:4, 526:2
**damage** [2] - 466:8, 467:3
**damages** [1] - 466:24
**Darcy's** [1] - 328:2
**dash** [2] - 314:1, 463:13
**DAT** [3] - 295:1, 295:25, 298:3
**Data** [1] - 511:4
**data** [135] - 294:22, 295:5, 295:6, 295:8, 296:8, 296:11, 296:12, 296:14, 297:22, 298:1, 298:2, 298:4, 298:9, 298:12, 298:25, 299:7, 299:11, 299:13, 299:15, 299:22, 299:25, 300:1, 300:3, 300:4, 300:8, 300:10, 300:19, 301:6, 301:20, 301:22, 302:15, 302:18, 303:17, 303:18, 303:22, 304:2, 304:6, 304:8, 304:12, 304:14, 304:19, 304:22, 304:25, 305:3, 305:6, 305:8, 305:11, 305:25, 306:5, 306:14, 306:16, 307:4, 307:14, 307:17, 313:9, 313:14, 314:17, 317:19, 317:20, 318:6, 323:20, 342:22, 350:13, 354:15, 354:19, 354:20, 355:2, 357:24, 359:17, 359:22, 360:1, 367:10, 367:17, 368:14, 368:17, 369:15, 369:22,

372:17, 372:20, 385:16, 386:2, 386:6, 392:3, 392:4, 397:11, 397:19, 400:11, 400:14, 400:18, 418:4, 420:2, 431:5, 431:6, 435:22, 451:17, 451:18, 452:3, 452:10, 457:9, 474:17, 475:20, 483:20, 491:22, 496:23, 497:21, 510:8, 511:24, 512:6, 512:14, 530:17, 530:25, 531:12, 531:13, 531:17, 531:22, 532:2, 532:13, 533:2, 533:14, 533:16, 534:16, 534:19, 544:19, 546:25, 547:9, 547:13, 547:18, 547:19, 547:21
**database** [2] - 512:17, 545:3
**date** [6] - 356:6, 370:19, 414:24, 415:7, 519:21, 526:22
**Dated** [1] - 552:13
**dated** [1] - 533:20
**David** [1] - 289:7
**DAVID** [2] - 283:22, 284:6
**days** [3] - 299:10, 325:7, 438:19
**DCC** [4] - 364:18, 459:12, 459:16, 460:9
**deadline** [1] - 291:1
**deal** [2] - 476:2, 543:4
**dealt** [1] - 476:4
**decide** [2] - 418:8, 483:15
**decided** [2] - 482:12, 498:5
**decision** [7] - 324:18, 482:14, 495:24, 508:5, 517:11, 517:23
**decisions** [1] - 321:18
**decks** [2] - 298:1, 544:19
**decrease** [2] - 331:13, 331:20
**decreases** [1] - 464:1
**decreasing** [1] - 331:14
**deemed** [1] - 314:6
**deep** [2] - 394:22, 395:3
**deeper** [3] - 355:7, 454:25, 474:17
**defer** [9] - 312:8, 348:4, 356:7, 358:21, 359:8, 424:14, 425:12, 426:17, 497:8
**deferred** [12] - 355:21, 358:24, 371:25, 411:14, 425:4, 430:16, 447:21, 462:3, 467:6, 471:3, 471:12, 501:22
**define** [14] - 291:23, 292:1, 292:23, 293:13, 293:24, 296:1, 318:6, 318:22, 319:25, 321:18, 329:21, 340:25, 351:22, 462:7
**defined** [5] - 369:14, 402:11, 446:7, 502:14, 531:18
**definitions** [1] - 405:7
**definitive** [1] - 305:17
**deformation** [1] - 363:15
**degree** [5] - 403:24, 468:9, 537:25, 544:5
**degrees** [1] - 398:22
**delineate** [3] - 292:7, 292:8, 489:19
**delineated** [1] - 388:8
**delineating** [3] - 293:9, 293:10, 509:3
**delineation** [4] - 292:10, 343:6, 440:6, 441:1
**delta** [1] - 412:7
**delve** [1] - 513:14
**demarcation** [1] - 422:17
**demonstrates** [2] - 331:9, 331:19
**Demonstration** [1] - 406:3
**denied** [3] - 532:22, 532:25, 550:7
**densities** [1] - 391:22
**density** [2] - 380:8, 427:3
**department** [2] - 404:1, 504:19
**Department** [2] - 289:9, 340:11
**departments** [2] - 436:9, 446:3
**dependent** [5] - 345:6, 354:21, 354:22, 354:23, 355:9
**depicted** [1] - 394:13
**depletion** [1] - 543:3
**depositional** [1] - 373:1
**deposits** [1] - 373:8
**depth** [8] - 336:16, 355:10, 357:15, 361:16, 409:24, 410:13, 488:15, 489:2
**depths** [4] - 394:14, 455:11, 474:9, 474:12
**derivatives** [1] - 543:25
**derive** [7] - 374:23, 376:7, 385:23, 386:3, 452:10, 516:20, 532:4
**derived** [6] - 328:14, 365:13, 369:3, 385:8, 385:14, 386:6
**deriving** [1] - 525:2
**DERRICK** [1] - 285:2
**Derrick** [2] - 289:22, 472:11
**derrick** [1] - 458:18
**describe** [10] - 409:16, 459:1, 475:10, 484:24, 504:8, 505:22, 508:24, 509:16, 529:3, 529:13
**described** [11] - 307:18, 359:24, 400:16, 441:14, 452:4, 465:21, 466:3, 466:22, 481:3, 482:20, 535:7
**describes** [4] - 400:10, 466:5, 509:4, 509:6
**describing** [3] - 528:4, 530:14, 545:14
**description** [8] - 385:7, 399:24, 414:1, 414:16, 423:12, 429:1, 504:14, 541:18
**descriptions** [1] - 294:21
**design** [13] - 397:2, 409:4, 409:11, 409:15, 409:17, 432:9, 456:17, 468:18, 484:25, 485:2, 487:7, 490:10, 490:18
**designed** [7] - 397:5, 442:24, 443:13, 490:1, 490:11, 490:13, 490:22
**DESIRAE** [1] - 285:3
**Desirae** [1] - 289:24
**desire** [1] - 514:23
**detail** [5] - 348:5, 395:15, 401:8, 450:1, 530:13
**detailed** [1] - 466:9
**details** [4] - 322:19, 440:2, 454:6, 487:21
**detect** [2] - 346:21, 347:9
**Detected** [1] - 401:4
**detection** [5] - 343:13, 346:20, 346:25, 427:18, 453:13
**Detection** [3] - 401:5, 401:6, 401:20
**determination** [13] - 304:17, 304:20, 305:22, 310:10, 313:12, 322:12, 322:15, 322:20, 444:22, 473:20, 473:22, 496:22, 499:18
**determinations** [1] - 483:10
**determine** [26] - 292:17, 302:17, 316:23, 323:8, 351:18, 359:6, 406:5, 406:18, 413:20, 439:21, 440:23, 463:21, 464:7, 466:10, 466:16, 473:14, 476:24, 480:9, 481:5, 531:22, 533:7, 534:12, 542:20, 543:5, 543:14, 544:14
**determined** [19] - 314:7, 343:7, 359:3, 364:11, 371:17, 381:3, 430:17, 431:11, 434:23, 435:14, 439:15, 443:17, 463:12, 463:18, 463:24, 464:5, 473:9, 496:14, 499:24
**determines** [1] - 497:19
**determining** [3] - 278:7, 280:10, 282:12
**develop** [11] - 318:18, 330:23, 341:13, 341:16, 341:20, 341:23, 342:2, 434:12, 435:15, 445:24, 508:10
**developed** [2] - 322:24, 323:1
**developer** [1] - 331:16
**developers** [2] - 341:11, 506:4
**developing** [9] - 322:8, 322:24, 341:22, 342:6, 406:12, 406:21, 446:14, 511:11, 542:23
**development** [6] - 341:8, 434:6, 506:17, 509:7, 538:20, 542:7
**DGC** [1] - 468:10
**diagram** [13] - 421:18, 421:24, 475:8, 475:12, 475:24, 488:11, 488:24, 489:3, 490:4, 490:25, 491:8, 491:13
**diameter** [11] - 349:9, 349:12, 422:2, 422:8, 422:23, 422:25, 423:8, 483:24, 491:10, 491:15, 491:17
**dictated** [2] - 344:23, 440:8
**dictates** [1] - 328:12
**dictating** [2] - 390:20, 462:19
**die** [1] - 331:8
**difference** [9] - 318:1, 349:22, 349:23, 365:23, 369:20, 384:6, 440:25, 441:6, 450:6
**differences** [25] - 350:20, 361:3, 384:3, 407:22, 449:11, 451:9, 452:13, 452:20, 452:23, 453:16, 454:5, 454:16, 454:23, 455:4, 455:9, 456:1, 456:9, 456:10, 456:13, 456:23, 457:2, 457:6, 457:16, 457:21, 457:22
**different** [39] - 300:5, 317:6, 325:22, 329:10, 329:16, 335:22, 338:5, 347:24, 350:19, 351:9, 351:10, 353:21, 371:22, 372:21, 377:20, 380:2, 380:3, 391:4, 391:22, 399:19, 418:7, 440:20, 441:17, 446:14, 474:9, 474:11, 485:9, 485:10, 485:14, 486:9, 500:5, 506:11, 507:13, 524:5, 542:16, 542:17, 543:17, 546:5,

546:8
**differential** [1] - 336:12
**difficult** [3] - 290:20, 327:4, 421:23
**difficulty** [1] - 417:5
**diffusion** [5] - 379:21, 380:4, 380:13, 391:9, 391:13
**digitized** [2] - 304:15, 306:7
**dike** [1] - 429:24
**diligence** [1] - 506:18
**diluted** [2] - 344:15, 345:15
**dilutes** [1] - 346:15
**dioxide** [10] - 277:5, 278:8, 279:5, 279:9, 280:11, 281:7, 281:11, 282:13, 283:11, 418:25
**DIRECT** [8] - 396:4, 398:8, 403:10, 408:12, 467:19, 503:20, 527:15, 537:13
**direct** [12] - 302:21, 307:19, 323:14, 338:20, 386:13, 406:6, 406:9, 409:20, 413:2, 439:18, 458:15, 473:1
**Direct** [8] - 286:21, 286:22, 286:23, 286:24, 287:11, 287:22, 288:4, 288:8
**direction** [1] - 384:24
**directional** [1] - 348:3
**directly** [10] - 326:12, 328:19, 336:4, 336:8, 336:9, 345:17, 353:2, 473:19, 512:5, 546:16
**director** [1] - 403:19
**disabled** [1] - 504:5
**discharge** [8] - 421:7, 421:25, 425:22, 426:1, 426:5, 426:14, 465:5, 465:12
**discovery** [3] - 303:1, 303:23, 303:25
**discuss** [6] - 383:6, 404:12, 409:9, 452:16, 454:10, 456:6
**discussed** [15] - 302:4, 304:13, 308:25, 310:16, 310:18, 313:3, 315:13, 316:10, 347:8, 361:1, 395:15, 452:25, 484:4, 489:23, 491:11
**discusses** [2] - 452:1, 453:11
**discussing** [2] - 291:14, 381:24
**discussion** [7] - 309:16, 373:1, 388:10, 450:4, 469:13, 474:3, 513:15
**Discussion.....** [1] - 286:4
**discussions** [15] - 296:19, 302:16, 306:25, 307:11, 310:2, 310:4, 311:1, 322:19, 342:12, 459:17, 459:22, 460:11, 514:2, 526:10
**dishes** [1] - 466:4
**disperse** [1] - 481:25
**dispersion** [12] - 380:1, 380:7, 391:17, 391:19, 391:23, 405:22, 476:23, 477:4, 477:12, 477:19, 477:22, 480:1
**disposal** [6] - 340:19, 409:7, 524:17, 524:20, 524:22, 525:9
**dissimilar** [2] - 546:19, 546:20
**dissipation** [1] - 359:11
**dissolution** [5] - 360:17, 377:12, 378:15, 381:25, 391:1
**dissolve** [2] - 360:13, 380:8
**dissolved** [2] - 378:20, 378:21
**dissolving** [2] - 377:18, 377:23
**distance** [8] - 356:22, 373:14, 373:18, 383:15, 383:16, 384:11, 384:22, 433:20
**distances** [4] - 383:6, 383:9, 383:12, 433:18
**distinguishing** [1] - 441:6
**distribute** [1] - 350:14
**distributed** [2] - 321:8, 348:15
**distribution** [8] - 316:15, 318:15, 318:16, 351:9, 351:11, 372:19, 531:25, 533:7
**Divide** [1] - 538:22
**divide** [1] - 541:25
**DIVISION** [1] - 277:2
**Division** [2] - 289:10, 507:6
**DMR** [26] - 295:1, 295:6, 326:19, 367:23, 367:24, 400:19, 415:14, 418:9, 420:12, 426:21, 427:25, 431:22, 432:18, 436:17, 436:20, 436:22, 437:11, 437:20, 443:21, 449:14, 461:25, 471:8, 474:4, 495:23, 496:2, 498:20
**DO** [2] - 552:5, 552:9
**Docket** [1] - 289:6
**document** [3] - 294:14, 509:17, 510:6
**documents** [21] - 390:4, 508:9, 508:12, 508:13, 508:18, 508:22, 509:11, 509:14, 509:25, 511:9, 513:22, 513:24, 514:4, 514:11, 514:15, 516:8, 516:12, 518:2, 521:1, 526:4, 526:6
**dolomite** [3] - 377:11, 378:20, 391:2
**dolomites** [1] - 373:7
**dolostone** [1] - 382:20
**Dome** [2] - 539:4, 542:25
**dominant** [3] - 391:10, 391:17, 391:25
**done** [45] - 291:2, 300:5, 309:2, 321:17, 343:1, 351:13, 353:1, 354:3, 354:9, 360:16, 363:9, 366:5, 367:21, 367:22, 377:21, 379:25, 380:24, 381:1, 382:2, 386:8, 412:24, 413:19, 416:9, 417:24, 419:1, 419:2, 419:22, 426:11, 434:14, 436:23, 466:9, 476:23, 477:13, 477:22, 478:1, 478:6, 480:2, 480:8, 521:7, 523:20, 524:3, 524:10, 529:24, 548:18, 548:24
**dot** [2] - 336:9
**DOT** [1] - 397:6
**dots** [1] - 335:9
**double** [1] - 324:1
**double-check** [1] - 324:1
**doubt** [1] - 434:10
**Doughty** [9] - 527:2, 527:6, 527:8, 527:17, 527:19, 532:6, 532:19, 537:3
**DOUGHTY** [3] - 288:3, 527:12, 537:4
**doughty** [1] - 527:3
**Douglas** [7] - 389:10, 392:13, 447:19, 461:13, 473:6, 483:5, 496:12
**DOUGLAS** [34] - 291:13, 305:12, 305:15, 306:24, 309:13, 312:7, 313:22, 320:19, 323:5, 333:2, 335:8, 338:9, 340:17, 356:9, 356:12, 360:15, 372:7, 387:16, 390:7, 393:25, 461:19, 461:25, 463:14, 463:23, 464:12, 464:15, 465:9, 465:15, 465:17, 466:20, 467:5, 467:8, 473:12, 483:12
**DOUGLAS/CAITLIN** [1] - 286:11
**DOUGLAS/JAMEY** [1] - 287:7
**down** [23] - 298:24, 320:12, 329:11, 354:5, 379:11, 386:15, 404:9, 405:9, 409:24, 413:14, 416:13, 416:14, 419:21, 426:1, 434:9, 441:7, 441:17, 453:7, 464:4, 467:2, 475:19, 479:22, 497:19
**downhole** [6] - 309:6, 309:8, 402:21, 485:3, 486:6, 486:8
**Downhole** [1] - 401:20
**downloaded** [1] - 522:7
**downstream** [7] - 422:14, 492:5, 492:14, 492:24, 493:2, 493:5, 494:10
**draft** [13] - 508:3, 508:23, 509:15, 513:23, 513:25, 514:4, 514:22, 516:6, 516:12, 516:22, 516:25, 517:7, 526:8
**drafted** [4] - 516:8, 517:6, 517:10, 517:14
**drafting** [6] - 508:7, 508:21, 510:3, 514:25, 518:21, 519:9
**drafts** [1] - 315:12
**drainage** [5] - 504:22, 538:8, 542:12, 542:14, 543:5
**Drawer** [1] - 284:16
**drawing** [1] - 387:1
**drilled** [16] - 298:15, 337:16, 357:17, 367:7, 367:9, 369:2, 409:23, 410:10, 454:25, 455:1, 455:3, 455:22, 474:11, 529:19, 535:8
**drilling** [7] - 348:3, 409:4, 409:24, 415:10, 443:24, 474:16, 550:2
**Drinking** [3] - 292:12, 292:18, 293:2
**drinking** [10] - 293:16, 293:20, 293:23, 294:1, 336:17, 339:13, 410:2, 410:7, 439:14, 489:1
**drive** [12] - 298:25, 299:8, 299:12, 299:17, 299:21, 300:14, 300:16, 300:22, 301:10, 476:12, 543:3
**driver** [1] - 390:19
**drivers** [1] - 332:20
**drives** [1] - 376:25
**drove** [1] - 441:6
**drywall** [1] - 466:24
**due** [17] - 327:21, 329:25, 338:25, 339:9, 345:4, 357:23, 360:13, 360:17, 364:16, 372:13, 376:17, 381:11, 381:25, 384:4, 391:10, 506:17
**duly** [8] - 396:2, 398:6,

403:8, 408:10, 467:17, 503:18, 527:13, 537:11
**dune** [1] - 373:3
**duration** [5] - 297:12, 473:15, 473:19, 483:22, 494:3
**during** [15] - 331:10, 343:18, 358:18, 374:6, 388:16, 388:20, 389:12, 390:3, 412:23, 415:10, 432:1, 464:21, 496:11, 496:18, 515:23
**duties** [1] - 468:15
**dwelling** [4] - 433:2, 433:5, 433:14, 433:16
**dynamic** [2] - 512:17, 545:5

## E

**early** [3] - 411:15, 444:10, 520:20
**Earnest** [1] - 396:10
**earth** [1] - 507:10
**earthquake** [6] - 465:23, 466:1, 466:2, 466:12, 466:21, 466:22
**earthquakes** [2] - 465:20, 467:3
**east** [2] - 348:16, 541:2
**East** [3] - 283:19, 284:12, 543:1
**Eastern** [1] - 528:7
**economic** [3] - 332:13, 332:20, 542:21
**economically** [1] - 543:6
**edge** [8] - 343:9, 344:11, 347:6, 363:14, 383:6, 383:16, 383:17, 383:18
**edges** [1] - 345:18
**educated** [1] - 346:8
**educational** [13] - 396:17, 398:19, 403:22, 408:22, 468:8, 504:8, 505:14, 527:23, 529:14, 537:24, 539:23, 540:6, 540:12
**EERC** [37] - 294:24, 294:25, 296:8, 296:9, 296:10, 296:15, 297:5, 297:20, 298:23, 302:8, 302:23, 304:20, 304:24, 305:3, 305:8, 305:10, 310:2, 311:1, 315:9, 316:9, 322:7, 322:11, 322:14, 322:17, 322:24, 323:23, 337:3, 348:10, 354:9, 383:13, 398:14, 398:24, 474:1, 486:13, 530:11, 534:17
**EERC's** [3] - 300:1, 306:17, 323:13
**effect** [7] - 365:8, 365:20, 366:24, 376:16, 376:19, 383:23, 415:21
**effective** [2] - 405:4, 542:20
**effects** [5] - 358:11, 542:15, 542:17, 543:13, 543:14
**efficiency** [1] - 472:18
**effort** [1] - 304:7
**efforts** [1] - 451:4
**eight** [1] - 528:8
**either** [10] - 335:15, 362:16, 365:24, 417:25, 433:5, 433:16, 455:24, 486:24, 541:12, 544:1
**elaborate** [12] - 357:11, 380:1, 380:15, 381:5, 382:16, 383:22, 385:13, 414:5, 420:5, 427:19, 439:12, 445:3
**electrical** [1] - 428:6
**element** [1] - 377:18
**elements** [1] - 507:10
**eliciting** [1] - 520:14
**eliminate** [1] - 510:9
**eliminated** [1] - 317:23
**Emergency** [2] - 433:25, 454:9
**emergency** [11] - 404:13, 404:24, 405:1, 435:11, 436:1, 439:12, 440:21, 445:19, 445:21, 475:22, 476:1
**employed** [7] - 396:11, 398:13, 403:16, 404:6, 408:17, 468:2, 504:1
**employees** [1] - 307:20
**employment** [1] - 468:16
**emptied** [2] - 481:11, 481:12
**enact** [3] - 279:6, 281:7, 283:12
**enactment** [1] - 515:3
**encompasses** [1] - 531:7
**encountered** [1] - 325:8
**end** [14] - 331:23, 361:2, 373:20, 374:1, 401:1, 402:15, 416:1, 442:17, 497:12, 497:15, 507:25, 544:12, 544:14
**end-to-end** [1] - 401:1
**endanger** [3] - 308:9, 308:15, 308:19
**endangered** [1] - 293:16
**endangering** [1] - 294:1
**endangerment** [7] - 293:22, 339:8, 406:19, 407:9, 407:20, 439:13, 456:18
**ended** [1] - 505:1
**ends** [1] - 379:9
**energy** [4] - 396:21, 539:10, 539:11, 539:13
**Energy** [5] - 303:14, 398:24, 528:10, 538:17, 538:24
**engaged** [1] - 405:20
**engagement** [1] - 526:19
**engineer** [8] - 325:18, 326:3, 346:16, 408:20, 468:13, 538:5, 538:6, 545:14
**engineering** [13] - 308:18, 309:7, 309:10, 396:20, 397:2, 408:25, 409:2, 409:4, 468:10, 504:11, 504:24, 506:15, 538:1
**engineers** [1] - 516:10
**enhanced** [10] - 538:18, 539:3, 539:7, 542:12, 542:25, 545:15, 545:22, 546:4, 546:13, 546:15
**ensure** [5] - 293:25, 299:13, 300:7, 300:10, 466:8
**ensuring** [1] - 495:13
**enter** [3] - 379:22, 380:9, 460:1
**entered** [2] - 401:11, 518:3
**enters** [1] - 400:24
**entire** [6] - 299:23, 301:5, 357:13, 357:18, 423:1, 528:19
**entirely** [1] - 443:25
**entirety** [1] - 362:22
**entities** [5] - 341:10, 397:9, 419:8, 482:22, 482:25
**entity** [2] - 377:12, 512:9
**entry** [1] - 386:2
**environment** [4] - 308:20, 373:1, 400:6, 405:6
**environmental** [10] - 403:20, 453:24, 504:7, 504:18, 504:24, 506:9, 506:15, 506:18, 514:13, 520:21
**Environmental** [1] - 303:14
**environments** [1] - 528:17
**EOA** [1] - 292:19
**EOR** [2] - 542:6, 542:21
**EPA** [14] - 292:22, 293:6, 293:8, 294:5, 294:6, 368:23, 512:5, 512:8, 513:24, 516:7, 517:15, 518:23, 519:16, 541:12
**EPA's** [2] - 294:8, 514:17
**epicenters** [1] - 483:23
**equally** [2] - 352:20, 353:5
**equation** [2] - 328:5, 378:14
**equilibrium** [2] - 331:17, 331:21
**equipment** [6] - 356:2, 400:13, 464:22, 468:19, 495:8, 495:12
**equitably** [1] - 292:5
**equivalent** [3] - 387:4, 423:24, 424:19
**equivalently** [1] - 368:9
**ER** [4] - 427:20, 427:24, 428:11
**Erickson** [7] - 348:23, 349:11, 350:25, 360:10, 362:8, 455:2, 455:24
**Erickson/BK** [1] - 356:13
**error** [7] - 319:7, 319:22, 325:16, 325:17, 374:19, 375:7, 375:18
**errors** [5] - 325:8, 325:14, 326:6, 326:9, 540:1
**ERRP** [7] - 405:2, 406:18, 407:8, 407:19, 439:22, 445:20, 446:7
**especially** [1] - 546:15
**essence** [1] - 460:14
**essentially** [4] - 316:18, 346:20, 400:4, 465:25
**establish** [1] - 516:23
**established** [1] - 479:17
**establishing** [3] - 278:19, 280:21, 283:1
**estimate** [1] - 300:6
**estimated** [4] - 300:24, 406:17, 438:9, 439:21
**estimates** [2] - 406:23, 456:14
**estimating** [1] - 339:2
**estimations** [1] - 452:12
**et** [3] - 443:9, 456:2, 469:4
**ethanol** [3] - 411:18, 411:21, 411:23
**evaluate** [14] - 293:22, 323:18, 334:13, 338:16, 364:19, 369:23, 431:19, 510:12, 523:7, 523:15, 532:3, 533:3, 544:9, 548:15
**evaluated** [2] - 339:6, 493:21
**evaluating** [1] - 485:3
**evaluation** [6] - 319:10, 335:5, 372:15, 393:10, 413:10, 539:2
**evaluations** [1] - 539:3
**event** [8] - 305:25, 411:2, 420:11, 440:1, 440:14, 483:6, 483:21, 496:18
**events** [6] - 405:13, 405:14, 432:15, 445:7, 474:4, 483:21
**evidence** [1] - 359:14
**exact** [3] - 320:5, 433:17, 519:21
**exactly** [8] - 320:11, 320:13, 370:8, 468:22, 493:25, 498:13, 521:15, 532:3
**examination** [3] - 290:12, 472:8, 472:14
**Examination** [28] - 286:12,

286:13, 286:14, 286:15, 286:16, 286:17, 286:21, 286:22, 286:23, 286:24, 287:3, 287:4, 287:5, 287:8, 287:9, 287:10, 287:11, 287:12, 287:13, 287:17, 287:22, 287:23, 287:24, 287:25, 288:4, 288:5, 288:8, 288:9
**EXAMINATION** [28] - 291:8, 355:17, 370:1, 371:19, 389:22, 393:22, 396:4, 398:8, 403:10, 408:12, 411:11, 432:22, 441:9, 448:5, 458:12, 461:20, 467:19, 470:5, 473:4, 484:19, 503:20, 513:1, 525:17, 526:16, 527:15, 532:17, 537:13, 545:11
**examine** [1] - 290:18
**examined** [8] - 396:2, 398:6, 403:8, 408:10, 467:17, 503:18, 527:13, 537:11
**Examiner** [1] - 461:12
**examiner** [13] - 289:7, 289:16, 389:19, 392:12, 393:17, 395:11, 396:16, 397:21, 408:3, 410:19, 416:21, 457:23, 503:16
**EXAMINER** [85] - 283:23, 289:4, 289:21, 290:4, 290:7, 290:10, 290:23, 290:25, 291:6, 303:7, 321:20, 321:24, 333:1, 333:20, 333:22, 355:15, 388:23, 389:3, 389:20, 392:15, 395:20, 395:23, 398:1, 398:3, 403:5, 408:7, 411:9, 416:11, 416:22, 417:11, 417:13, 417:16, 417:18, 447:3, 447:9, 447:14, 448:3, 448:16, 458:2, 458:4, 458:9, 461:4, 461:10, 461:17, 467:13, 471:15, 472:7, 500:9, 500:21, 501:7, 501:12, 502:18, 502:22, 502:24, 503:2, 503:6, 503:13, 505:18, 505:20, 511:16, 511:18, 512:21, 520:6, 520:16, 522:23, 525:14, 526:25, 527:3, 527:7, 530:2, 530:5, 530:8, 532:16, 536:24, 537:5, 537:8, 540:16, 541:8, 545:10, 548:12, 550:10, 550:20, 550:25, 551:3, 551:7
**examiner's** [1] - 416:10
**example** [7] - 306:6, 369:10, 393:9, 401:13, 454:6, 483:16, 496:14
**examples** [1] - 506:10
**exceed** [5] - 418:20, 419:10, 436:3, 478:19, 493:23
**exceeding** [1] - 424:23
**exceeds** [1] - 469:8
**except** [1] - 320:10
**exception** [1] - 529:16
**excluding** [1] - 425:22
**excuse** [7] - 406:10, 407:11, 409:15, 438:1, 451:7, 453:22, 532:2
**executing** [1] - 437:20
**execution** [1] - 445:23
**exemption** [3] - 540:25, 541:1, 541:5
**exemptions** [2] - 541:11, 541:19
**exercise** [1] - 349:23
**exhibit** [19] - 327:2, 333:14, 333:22, 373:11, 409:18, 454:9, 457:24, 458:4, 459:3, 459:4, 461:2, 461:6, 461:9, 461:11, 510:24, 510:25, 511:6, 530:5, 540:16
**Exhibit** [34] - 288:12, 288:17, 294:13, 304:24, 327:19, 329:7, 356:10, 356:12, 394:7, 399:11, 434:19, 448:8, 458:17, 458:23, 461:3, 471:5, 471:18, 474:9, 475:8, 505:5, 505:17, 508:16, 509:9, 509:23, 510:15, 510:16, 511:2, 511:21, 529:2, 529:8, 530:8, 539:20, 540:11, 540:14
**Exhibits** [3] - 451:21, 511:14, 514:5
**EXHIBITS** [2] - 288:11, 288:16
**exhibits** [7] - 326:13, 358:16, 450:22, 450:25, 458:15, 511:18, 539:14
**exist** [7] - 333:7, 372:12, 375:20, 420:17, 420:19, 452:22, 455:12
**existed** [2] - 360:2, 361:10
**existing** [2] - 328:19, 476:7
**exists** [2] - 372:3, 481:9
**expand** [5] - 314:8, 478:18, 498:15, 498:19, 500:1
**expanded** [2] - 443:9, 500:17
**expanding** [1] - 430:25
**expands** [1] - 402:4
**expansion** [1] - 480:13
**expect** [6] - 331:25, 346:10, 346:12, 434:8, 486:21, 493:14
**expectations** [2] - 431:7, 460:15
**expected** [10] - 366:22, 368:15, 379:15, 391:9, 391:17, 391:24, 434:7, 436:21, 444:21, 550:21
**expense** [1] - 338:6
**experience** [32] - 323:11, 323:15, 325:16, 326:6, 340:11, 396:18, 396:21, 398:20, 403:22, 408:23, 468:8, 491:19, 496:2, 504:15, 505:15, 506:25, 507:1, 518:1, 520:19, 523:18, 529:15, 538:3, 538:4, 538:22, 539:23, 540:12, 540:19, 542:3, 542:6, 545:14, 546:11
**experiences** [1] - 543:8
**expert** [3] - 421:5, 427:11, 506:19
**expertise** [2] - 530:16, 530:20
**experts** [4] - 417:5, 486:15, 520:15, 548:11
**explain** [25] - 301:6, 359:3, 361:11, 364:6, 365:2, 365:8, 365:20, 366:8, 366:13, 366:24, 368:10, 368:11, 369:2, 369:6, 371:5, 397:8, 405:15, 415:1, 415:21, 434:22, 449:9, 450:1, 459:7, 463:10, 476:8
**explained** [2] - 448:13, 518:1
**explanation** [4] - 372:5, 372:24, 378:9, 386:14
**explicit** [1] - 499:22
**exploration** [1] - 529:25
**exploratory** [1] - 507:20
**explore** [1] - 507:18
**exploring** [1] - 524:19
**export** [4] - 299:16, 306:13, 306:15, 307:4
**exporting** [1] - 307:3
**expose** [1] - 543:4
**Express** [9] - 277:6, 278:8, 279:10, 280:12, 281:12, 282:14, 309:12, 482:6, 484:3
**Express'** [1] - 476:19
**expressed** [1] - 310:14
**extends** [1] - 327:25
**extensions** [1] - 541:14
**extensive** [1] - 530:13
**extent** [24] - 293:18, 311:16, 319:15, 321:10, 321:11, 327:7, 349:25, 362:19, 364:9, 364:10, 364:13, 372:4, 373:12, 373:18, 373:20, 374:1, 374:17, 374:18, 375:8, 378:16, 383:13, 434:22, 463:11, 463:18
**extents** [1] - 451:3
**external** [8] - 298:24, 298:25, 299:8, 299:17, 300:13, 300:16, 300:22, 491:25
**extra** [2] - 469:20, 510:18
**Exxon** [5] - 528:5, 528:6, 528:14, 528:15, 528:20

## F

**face** [2] - 525:21
**face-to-face** [1] - 525:21
**facies** [9] - 376:13, 376:16, 376:18, 381:17, 382:17, 385:24, 385:25, 414:9, 531:21
**Facilities** [1] - 401:4
**facilities** [44] - 308:4, 308:23, 329:17, 334:3, 336:1, 356:3, 357:1, 357:6, 357:21, 359:12, 361:3, 363:9, 364:21, 366:13, 397:14, 400:5, 401:11, 411:18, 415:3, 420:20, 421:8, 421:11, 425:16, 425:23, 427:19, 437:13, 439:3, 440:21, 441:18, 441:25, 456:15, 459:12, 460:9, 466:7, 468:5, 468:19, 469:21, 470:21, 474:24, 476:19, 477:23, 482:8, 489:23, 524:4
**Facility** [2] - 448:10, 454:3
**facility** [96] - 277:6, 277:20, 278:9, 279:10, 279:23, 280:12, 281:12, 282:2, 282:14, 292:3, 292:5, 292:18, 293:5, 295:10, 295:11, 310:20, 311:5, 311:11, 311:17, 311:21, 312:3, 313:16, 314:5, 314:12, 314:18, 314:22, 315:16, 318:22, 324:11, 326:20, 327:13, 327:25, 335:14, 336:8, 351:23, 352:19, 352:23, 353:4, 353:16, 355:25, 356:4, 356:18, 357:18, 358:16, 359:2, 359:19, 360:25, 361:13, 363:11, 370:9, 371:3, 371:5, 373:13, 373:23, 388:9, 388:18, 393:5, 393:10, 393:14, 394:23, 400:24, 407:3, 407:7, 407:16, 419:1,

419:17, 421:4, 422:1, 422:13, 422:19, 424:2, 424:9, 433:1, 442:19, 451:1, 454:4, 454:7, 454:18, 455:20, 456:10, 456:12, 457:7, 457:17, 459:16, 460:22, 476:7, 496:16, 496:24, 497:20, 497:24, 498:15, 498:20, 498:22, 499:23, 500:2, 500:17
**fact** [3] - 311:21, 383:25, 448:20
**factor** [10] - 310:15, 312:23, 315:14, 322:4, 322:16, 324:13, 350:4, 350:5, 351:3, 542:1
**factors** [1] - 487:6
**factual** [1] - 336:24
**failure** [4] - 439:25, 440:13, 476:14, 479:6
**faint** [1] - 518:22
**fair** [14] - 295:21, 319:19, 343:15, 343:18, 460:23, 477:14, 499:1, 524:12, 525:12, 534:9, 534:10, 545:16, 545:25, 547:24
**fairly** [3] - 349:1, 360:8, 427:6
**familiar** [20] - 294:9, 326:22, 326:25, 327:6, 328:22, 328:25, 334:24, 335:12, 428:1, 484:6, 506:20, 529:9, 530:19, 536:4, 536:9, 536:15, 541:10, 541:13, 546:25, 547:8
**familiarity** [3] - 335:20, 335:23, 340:7
**far** [20] - 313:10, 315:1, 361:22, 364:11, 370:7, 370:8, 375:22, 416:1, 428:19, 431:25, 433:1, 433:12, 443:12, 475:23, 481:25, 490:10, 490:18, 517:24, 542:12, 545:1
**fashion** [1] - 376:9
**fault** [15] - 362:10, 362:13, 362:17, 362:21, 362:25, 363:1, 363:4, 363:10, 363:14, 363:15, 363:16, 528:15, 528:16, 528:17, 528:19
**Faults** [1] - 394:13
**faults** [5] - 394:13, 394:16, 394:18, 394:22, 394:23
**feasibility** [2] - 341:6, 543:15
**feasible** [1] - 543:6
**features** [3] - 326:17, 395:5, 452:24
**federal** [3] - 332:17, 506:2, 506:4
**FEED** [1] - 418:19
**feedback** [2] - 527:9, 527:10
**feeding** [1] - 401:22
**feet** [30] - 364:2, 364:3, 373:19, 374:12, 374:13, 375:3, 375:5, 390:15, 395:1, 410:1, 423:24, 424:18, 433:6, 433:7, 433:8, 433:17, 435:8, 455:1, 455:3, 455:22, 488:8, 488:22, 489:3, 489:12, 529:21
**felt** [3] - 318:5, 368:16, 465:22
**few** [10] - 383:8, 389:18, 397:22, 468:6, 468:23, 472:13, 484:11, 508:15, 531:19, 542:10
**fiberoptic** [3] - 401:14, 402:13, 402:17
**Field** [1] - 538:7
**field** [17] - 278:19, 279:6, 280:21, 281:8, 283:1, 283:12, 340:25, 341:4, 414:1, 414:16, 436:17, 528:23, 542:7, 542:10, 542:23, 543:2, 546:16
**fields** [1] - 538:18
**Figure** [25] - 335:6, 337:10, 338:21, 345:2, 348:13, 350:24, 362:12, 364:4, 368:4, 370:6, 372:1, 374:14, 378:12, 379:8, 381:24, 383:14, 394:14, 395:8, 409:21, 413:2, 421:16, 423:14, 428:24, 434:17, 463:10
**figure** [25] - 327:17, 356:15, 361:18, 362:11, 364:7, 374:10, 374:14, 376:10, 376:14, 377:6, 378:12, 378:13, 378:17, 378:18, 382:8, 409:18, 414:8, 421:18, 421:19, 423:14, 439:17, 443:7, 471:23, 471:25
**Figures** [2] - 377:4, 377:8
**figures** [1] - 377:9
**File** [1] - 371:4
**file** [17] - 295:1, 295:2, 295:3, 295:25, 296:4, 297:18, 298:3, 300:2, 300:15, 325:17, 533:14, 547:10, 547:13, 547:18, 547:19, 547:21
**filed** [3] - 522:12, 536:5, 536:16
**files** [14] - 294:22, 295:22, 298:1, 299:17, 299:21, 300:12, 301:10, 512:14, 512:17, 544:19, 549:2, 549:23, 549:24, 549:25
**filled** [4] - 361:24, 362:1, 362:16, 363:2
**final** [7] - 371:16, 513:24, 513:25, 514:15, 521:4, 526:1, 544:16
**finalizing** [1] - 460:13
**finally** [5] - 400:17, 401:18, 402:1, 402:15, 457:20
**Financial** [1] - 406:3
**financial** [10] - 278:7, 280:11, 282:13, 404:5, 404:16, 406:5, 406:12, 406:21, 406:24, 456:5
**fine** [8] - 290:8, 290:10, 356:7, 389:21, 392:16, 416:15, 429:8, 473:3
**finish** [4] - 397:22, 416:4, 416:18, 472:20
**finished** [1] - 515:19
**fire** [2] - 436:9, 446:2
**fired** [1] - 468:12
**firm** [1] - 409:3
**Firm** [2] - 285:3, 289:23
**first** [38] - 295:22, 304:24, 319:7, 319:17, 319:18, 319:22, 320:12, 383:11, 392:20, 395:21, 396:2, 398:6, 399:7, 400:2, 400:25, 403:8, 404:24, 405:16, 408:10, 412:12, 439:4, 439:19, 449:7, 449:25, 462:2, 467:17, 472:15, 489:25, 495:18, 503:8, 503:18, 511:24, 513:16, 527:5, 527:13, 537:11, 542:9
**Fischer** [18] - 342:20, 356:13, 360:20, 362:7, 363:7, 363:11, 369:1, 370:17, 395:16, 423:5, 424:16, 442:20, 448:23, 449:21, 450:10, 450:17, 451:14, 453:3
**five** [24] - 313:8, 313:13, 314:20, 314:21, 318:24, 319:4, 319:7, 319:17, 319:18, 319:22, 320:3, 326:4, 350:17, 368:3, 371:9, 373:24, 430:23, 444:17, 494:8, 496:14, 496:23, 497:18, 498:16, 499:8
**five-year** [5] - 314:21, 318:24, 350:17, 444:17, 496:14
**flange** [1] - 469:4
**Flemmer** [21] - 349:5, 349:14, 357:9, 357:12, 357:19, 358:19, 360:7, 361:7, 365:1, 365:2, 365:14, 365:16, 369:19, 412:24, 413:5, 449:19, 453:19, 454:24, 455:16, 455:18, 474:17
**Flint** [1] - 536:5
**flip** [2] - 353:19, 510:15
**flood** [2] - 538:14, 539:7
**floods** [2] - 538:20, 542:6
**flow** [19] - 345:7, 421:18, 424:12, 425:3, 427:9, 427:12, 442:2, 470:8, 470:15, 470:20, 475:8, 475:11, 475:24, 480:16, 480:19, 480:23, 481:15, 490:2, 490:3
**flowing** [1] - 339:18
**flowline** [21] - 406:16, 407:4, 407:17, 421:22, 423:5, 423:6, 423:23, 424:12, 424:25, 427:22, 428:4, 428:13, 428:20, 433:13, 433:16, 442:15, 453:13, 456:17, 465:4, 465:7, 493:20
**flowlines** [19] - 356:23, 397:3, 397:4, 421:21, 422:21, 423:13, 425:3, 435:4, 435:6, 441:24, 442:4, 464:16, 470:9, 477:23, 482:5, 482:6, 482:7, 482:23, 494:1
**fluctuation** [2] - 426:24, 440:24
**fluctuations** [1] - 427:3
**fluid** [18] - 298:13, 317:20, 339:3, 343:23, 345:11, 358:9, 362:20, 363:5, 380:5, 380:6, 381:11, 386:8, 386:9, 409:24, 429:15, 429:19, 429:25, 544:1
**fluids** [3] - 339:11, 339:17, 544:11
**flux** [1] - 434:5
**FMI** [2] - 413:24, 415:12
**focus** [1] - 380:13
**focused** [5] - 293:10, 401:12, 504:20, 522:14, 523:4
**fold** [3] - 354:21, 354:23, 354:24
**folks** [3] - 417:7, 417:8, 506:12
**follow** [5] - 414:23, 419:4, 423:3, 426:10, 440:19
**follow-up** [3] - 414:23, 423:3, 440:19
**follow-ups** [1] - 426:10

**followed** [2] - 507:23, 516:22
**following** [7] - 289:1, 400:23, 496:16, 504:23, 507:16, 514:1, 526:7
**follows** [9] - 388:10, 396:3, 398:7, 403:9, 408:11, 467:18, 503:19, 527:14, 537:12
**foot** [7] - 349:9, 349:12, 415:1, 415:4, 454:20, 541:22
**footage** [1] - 464:11
**FOR** [2] - 284:18, 285:6
**forecloses** [1] - 544:7
**foregoing** [2] - 552:6, 552:10
**foremost** [1] - 400:25
**forgot** [2] - 394:5, 468:25
**form** [10] - 295:3, 317:19, 323:16, 332:16, 332:23, 513:23, 514:4, 521:4, 522:18, 522:20
**formalize** [1] - 482:22
**Formation** [30] - 277:5, 278:4, 278:17, 279:6, 279:9, 280:7, 280:20, 281:7, 281:11, 282:10, 282:23, 283:11, 310:12, 340:19, 358:20, 362:25, 371:13, 386:18, 387:10, 388:1, 394:25, 395:2, 409:25, 410:14, 410:17, 412:25, 414:3, 451:12, 451:14, 530:18
**formation** [24] - 298:13, 327:12, 328:20, 339:3, 339:11, 339:23, 343:17, 345:8, 345:11, 349:25, 360:23, 361:8, 380:23, 382:15, 386:21, 387:11, 393:1, 451:17, 455:11, 485:5, 487:9, 530:23, 534:13, 542:1
**formations** [11] - 339:5, 355:3, 355:8, 359:15, 360:13, 387:3, 387:5, 455:12, 474:18, 525:4, 528:25
**forming** [1] - 391:20
**formula** [1] - 320:16
**formulation** [2] - 485:21, 486:18
**formulations** [1] - 485:10
**FORSBERG** [1] - 284:8
**forth** [4] - 460:14, 460:23, 508:4, 526:12
**forthcoming** [1] - 438:19
**forward** [6] - 289:15, 358:2, 358:14, 393:18, 426:21, 517:22
**four** [10] - 299:23, 301:6, 301:11, 325:19, 325:21, 357:1, 395:13, 416:12, 444:9, 528:6
**fourth** [1] - 343:3
**Fourth** [1] - 285:5
**Fox** [8] - 359:20, 360:3, 370:23, 371:12, 388:1, 430:18, 471:23, 472:4
**frac** [3] - 414:25, 415:22, 418:11
**fracture** [7] - 328:15, 359:6, 462:3, 462:5, 462:7, 462:9, 462:18
**fractures** [12] - 361:10, 361:12, 361:20, 361:22, 361:25, 362:9, 362:13, 362:15, 362:24, 363:1, 414:15, 414:20
**frame** [3] - 379:3, 431:3, 494:8
**framework** [2] - 291:17, 509:18
**Fredrikson** [1] - 284:11
**free** [1] - 307:12
**freely** [1] - 522:7
**frequency** [5] - 368:1, 400:15, 431:20, 431:21, 476:12
**frequent** [1] - 436:11
**Freshwater** [1] - 457:3
**freshwater** [4] - 336:16, 339:13, 386:19, 409:24
**freshwater-based** [1] - 409:24
**FRIED** [1] - 284:7
**Fritz** [1] - 334:15
**Fritz-Lutz** [1] - 334:15
**front** [7] - 313:5, 326:12, 328:5, 336:18, 382:8, 529:1, 539:17
**Front** [1] - 284:12
**full** [17] - 396:8, 399:13, 403:12, 408:14, 412:13, 424:7, 467:21, 478:15, 501:25, 502:11, 502:13, 503:22, 515:24, 527:17, 537:15, 537:17, 542:23
**full-field** [1] - 542:23
**full-time** [1] - 515:24
**fully** [1] - 304:9
**function** [2] - 293:11, 345:15
**functionally** [1] - 376:22
**FURTHER** [2] - 393:22, 552:9
**furthest** [1] - 433:7
**future** [2] - 356:19, 357:2

## G

**gain** [1] - 507:21
**Garner** [1] - 289:7
**GARNER** [85] - 283:22, 289:4, 289:21, 290:4, 290:7, 290:10, 290:23, 290:25, 291:6, 303:7, 321:20, 321:24, 333:1, 333:20, 333:22, 355:15, 388:23, 389:3, 389:20, 392:15, 395:20, 395:23, 398:1, 398:3, 403:5, 408:7, 411:9, 416:11, 416:22, 417:11, 417:13, 417:16, 417:18, 447:3, 447:9, 447:14, 448:3, 448:16, 458:2, 458:4, 458:9, 461:4, 461:10, 461:17, 467:13, 471:15, 472:7, 500:9, 500:21, 501:7, 501:12, 502:18, 502:22, 502:24, 503:2, 503:6, 503:13, 505:18, 505:20, 511:16, 511:18, 512:21, 520:6, 520:16, 522:23, 525:14, 526:25, 527:3, 527:7, 530:2, 530:5, 530:8, 532:16, 536:24, 537:5, 537:8, 540:16, 541:8, 545:10, 548:12, 550:10, 550:20, 550:25, 551:3, 551:7
**GAS** [1] - 277:2
**Gas** [6] - 289:9, 507:17, 514:1, 514:19, 515:2, 517:1
**gas** [22] - 338:3, 344:22, 391:14, 402:8, 402:9, 422:15, 430:8, 453:1, 453:2, 453:4, 471:21, 471:24, 472:3, 485:7, 506:6, 524:3, 538:8, 542:11, 542:13, 542:19, 543:4, 543:5
**gases** [2] - 542:16, 542:18
**Gasification** [1] - 536:10
**gathered** [2] - 367:10, 400:15
**gathering** [2] - 400:14, 515:7
**gauge** [1] - 402:21
**gauges** [6] - 401:14, 402:20, 453:20, 453:24, 455:17, 457:19
**gears** [1] - 406:1
**general** [15] - 430:20, 440:5, 441:1, 459:22, 460:11, 460:15, 485:25, 490:3, 504:24, 506:8, 510:7, 516:7, 516:23, 520:20, 541:17
**generalized** [4] - 421:18, 475:7, 475:11, 475:24
**generally** [29] - 328:24, 335:12, 335:25, 340:9, 345:18, 345:20, 390:17, 390:23, 400:6, 401:6, 404:25, 443:3, 443:13, 462:4, 462:12, 466:3, 474:13, 474:14, 482:16, 486:3, 504:3, 506:14, 506:25, 509:1, 509:16, 510:5, 511:1, 521:6, 521:8
**generate** [1] - 348:6
**generated** [4] - 295:4, 295:15, 324:6, 327:7
**generation** [1] - 468:13
**Geochem** [1] - 523:1
**geochemical** [9] - 360:11, 360:15, 360:17, 366:5, 376:25, 377:19, 512:16, 522:25, 523:14
**geographic** [1] - 311:16
**geographical** [1] - 363:19
**geographically** [1] - 350:9
**geologic** [30] - 277:4, 277:18, 278:8, 279:5, 279:8, 279:22, 280:11, 281:6, 281:10, 281:24, 282:13, 283:11, 291:22, 293:15, 358:16, 363:20, 364:7, 364:9, 367:11, 369:5, 374:17, 375:8, 375:16, 387:6, 387:12, 450:25, 452:1, 510:11, 512:6, 545:3
**Geologic** [1] - 451:21
**geological** [3] - 409:2, 510:12, 512:4
**Geological** [1] - 298:10
**geologist** [3] - 398:23, 398:25, 529:18
**geologists** [3] - 414:17, 516:11, 525:4
**geology** [3] - 350:19, 398:22, 527:24
**geometry** [1] - 363:3
**geophysics** [1] - 528:1
**geoscientist** [1] - 398:16
**GERVING** [1] - 285:7
**gigabytes** [1] - 300:20
**given** [23] - 319:8, 319:12, 319:16, 319:23, 327:4, 341:5, 352:15, 352:21, 355:23, 358:5, 363:3, 369:9, 381:8, 410:22, 417:23, 425:13, 460:11, 461:8, 473:10, 480:13, 512:16, 541:22, 544:6
**glancing** [1] - 375:3
**glasses** [1] - 475:14
**GLUDT** [1] - 284:10
**gotcha** [1] - 527:7

**govern** [2] - 296:14, 483:1
**governed** [4] - 296:12, 304:16, 306:8, 322:22
**government** [2] - 332:17, 506:4
**governments** [1] - 506:2
**grade** [2] - 487:22, 517:24
**gradient** [10] - 328:15, 359:7, 415:22, 418:11, 425:25, 462:4, 462:5, 462:7, 462:9, 462:18
**gradients** [1] - 365:13
**grading** [1] - 414:25
**grant** [2] - 340:24, 341:7
**granted** [5] - 294:7, 505:20, 535:11, 536:21, 550:7
**graph** [1] - 413:8
**gravity** [3] - 538:8, 542:11, 543:5
**gray** [2] - 369:18, 374:4
**great** [4] - 395:15, 401:8, 406:8, 456:8
**greater** [10] - 319:21, 418:23, 419:5, 419:12, 419:14, 419:18, 430:4, 465:24, 483:7, 486:2
**greatly** [2] - 381:14, 427:4
**green** [6] - 336:6, 336:10, 349:6, 349:13, 356:19, 369:16
**grid** [4] - 318:13, 363:25, 364:1, 364:3
**ground** [5] - 410:5, 443:7, 443:8, 496:23, 501:6
**groundwater** [12] - 359:22, 370:23, 371:12, 402:8, 402:9, 430:8, 431:20, 440:10, 452:18, 471:20, 524:14
**group** [15] - 355:21, 366:9, 367:21, 367:23, 411:15, 412:12, 412:15, 416:4, 416:5, 447:21, 461:14, 472:12, 472:15, 484:13, 528:16
**groups** [2] - 506:5, 528:24
**GSA** [1] - 506:3
**guess** [28] - 321:1, 321:6, 346:8, 372:11, 372:24, 374:25, 375:25, 377:19, 378:6, 382:21, 385:2, 386:5, 386:8, 386:11, 386:19, 394:10, 401:18, 402:8, 429:22, 442:3, 446:19, 469:18, 472:8, 472:22, 488:24, 520:8, 544:9
**guessing** [1] - 419:21
**guesstimate** [1] - 382:8
**guidance** [14] - 405:3, 508:9, 508:13, 508:18, 508:25, 509:1, 509:25, 510:6, 511:8, 513:24, 514:11, 516:23, 518:2, 520:19
**Guidance** [1] - 511:5
**guys** [6] - 370:4, 427:25, 434:21, 436:14, 438:3, 465:18

## H

**half** [1] - 360:10
**Halliburton** [2] - 486:25, 528:11
**hand** [6] - 363:21, 395:24, 398:4, 403:6, 408:8, 465:13
**handed** [2] - 294:12, 448:14
**handful** [2] - 361:10, 361:20
**handing** [1] - 458:14
**handle** [5] - 404:19, 427:3, 427:8, 438:5, 461:22
**hang** [1] - 463:9
**hard** [10] - 298:24, 298:25, 299:8, 299:12, 299:17, 299:21, 300:14, 300:16, 300:22, 301:10
**HAUPT** [1] - 285:8
**hazard** [1] - 436:24
**Hazen** [1] - 446:4
**head** [5] - 426:8, 435:2, 473:17, 485:20, 494:1
**health** [6] - 308:9, 308:12, 308:16, 308:19, 403:19, 504:18
**hear** [3] - 308:13, 503:11, 503:12
**heard** [2] - 492:7, 533:23
**HEARING** [86] - 283:15, 283:23, 289:4, 289:21, 290:4, 290:7, 290:10, 290:23, 290:25, 291:6, 303:7, 321:20, 321:24, 333:1, 333:20, 333:22, 355:15, 388:23, 389:3, 389:20, 392:15, 395:20, 395:23, 398:1, 398:3, 403:5, 408:7, 411:9, 416:11, 416:22, 417:11, 417:13, 417:16, 417:18, 447:3, 447:9, 447:14, 448:3, 448:16, 458:2, 458:4, 458:9, 461:4, 461:10, 461:17, 467:13, 471:15, 472:7, 500:9, 500:21, 501:7, 501:12, 502:18, 502:22, 502:24, 503:2, 503:6, 503:13, 505:18, 505:20, 511:16, 511:18, 512:21, 520:6, 520:16, 522:23, 525:14, 526:25, 527:3, 527:7, 530:2, 530:5, 530:8, 532:16, 536:24, 537:5, 537:8, 540:16, 541:8, 545:10, 548:12, 550:10, 550:20, 550:25, 551:3, 551:7
**Hearing** [1] - 289:6
**hearing** [13] - 289:7, 289:8, 314:14, 315:7, 352:12, 444:23, 448:19, 450:19, 498:5, 498:20, 503:15, 506:22, 548:8
**hearings** [7] - 289:5, 289:8, 289:11, 448:12, 449:13, 551:9, 551:10
**heats** [1] - 478:16
**heavily** [1] - 508:11
**height** [1] - 350:6
**held** [1] - 345:13
**helium** [1] - 529:24
**HELMS** [5] - 284:3, 290:24, 291:5, 525:18, 526:15
**Helms** [1] - 525:19
**Helms.....** [1] - 287:24
**help** [6] - 291:23, 292:7, 376:7, 417:9, 423:7, 436:7
**helped** [1] - 508:19
**HEREBY** [2] - 552:5, 552:9
**herein** [1] - 289:2
**hereinbefore** [1] - 552:7
**high** [5] - 355:7, 360:8, 361:9, 391:14, 401:6
**high-quality** [1] - 355:7
**higher** [17] - 309:25, 310:1, 346:3, 349:20, 351:2, 365:10, 367:1, 390:17, 390:23, 391:13, 415:6, 419:17, 462:9, 462:10, 462:17, 465:7, 474:20
**highest** [1] - 351:19
**highlight** [2] - 396:16, 408:21
**highlighted** [2] - 401:2, 413:6
**highlights** [1] - 399:17
**highly** [2] - 469:19, 481:12
**Hill** [1] - 370:23
**Hills** [7] - 359:20, 360:4, 371:13, 388:1, 430:18, 471:24, 472:4
**Hintz** [22] - 369:1, 370:17, 371:2, 395:16, 407:24, 417:25, 418:8, 430:16, 442:19, 448:23, 449:22, 450:10, 451:15, 453:4, 458:25, 459:2, 459:9, 459:12, 459:16, 459:25, 460:21, 471:19
**hired** [3] - 507:8, 519:18, 520:12
**historical** [2] - 359:21, 499:19
**history** [4] - 313:14, 357:23, 404:2, 542:24
**hit** [1] - 394:5
**hitting** [1] - 399:16
**hold** [1] - 398:21
**holders** [1] - 405:23
**holding** [1] - 429:14
**hole** [2] - 409:23, 441:17
**Honor** [2] - 290:19, 302:24
**hope** [2] - 436:13, 472:23
**hopefully** [1] - 434:16
**hopes** [1] - 475:13
**horizontal** [2] - 291:23, 296:2
**hour** [1] - 388:25
**hours** [10] - 324:24, 520:23, 548:2, 548:5, 548:8, 548:25, 549:5, 549:7, 549:20
**human** [5] - 308:9, 308:11, 308:15, 308:19, 495:14
**humans** [1] - 445:5
**hundred** [11] - 343:17, 343:22, 344:9, 345:10, 349:9, 349:12, 349:19, 350:16, 351:8, 351:10, 375:5
**hundred-foot** [2] - 349:9, 349:12
**hundreds** [1] - 378:25
**Hunt** [2] - 398:2, 398:12
**hunt** [1] - 398:3
**HUNT** [9] - 398:5, 398:12, 420:8, 420:11, 427:14, 427:24, 430:10, 434:24, 444:11
**HUNT/JAY** [1] - 286:19
**hydraulically** [1] - 359:15
**hydro** [2] - 490:11, 490:20
**hydrogeology** [1] - 506:15
**HydroSolutions** [11] - 504:2, 504:4, 504:16, 505:1, 505:3, 505:23, 505:25, 506:13, 506:25, 507:8, 523:21
**hypothetical** [5] - 338:22, 338:23, 349:18, 496:21, 497:18

## I

**idea** [3] - 300:21, 430:20, 430:24
**identifiable** [1] - 395:8

**identification** [2] - 394:21, 405:12
**identified** [7] - 376:13, 377:17, 394:15, 394:19, 395:7, 443:18, 444:4
**identify** [5] - 294:23, 335:18, 394:14, 491:5, 510:9
**II** [12] - 283:16, 340:19, 341:1, 342:2, 409:6, 524:18, 524:20, 524:24, 540:20, 540:22, 540:23
**image** [3] - 354:23, 413:7, 451:22
**images** [2] - 355:7, 372:20
**imagine** [1] - 428:1
**imaging** [2] - 360:23, 361:8
**immediate** [1] - 549:3
**immediately** [1] - 388:10
**immobility** [1] - 381:11
**impact** [9] - 293:22, 316:16, 331:3, 340:16, 354:18, 390:18, 415:11, 506:18, 548:16
**impacted** [4] - 328:19, 330:25, 376:9, 524:3
**impacts** [4] - 524:6, 524:7, 544:15
**implement** [1] - 445:20
**implemented** [2] - 427:18, 539:6
**implementing** [1] - 508:14
**implications** [1] - 507:13
**implied** [1] - 499:22
**importance** [2] - 388:13, 445:13
**important** [6] - 351:21, 351:24, 352:3, 352:5, 487:24, 534:7
**imposed** [1] - 541:5
**impressed** [3] - 427:21, 428:18, 442:25
**inaccurate** [1] - 499:24
**inadvertent** [1] - 493:21
**incentive** [1] - 332:13
**inch** [4] - 343:24, 484:1, 491:21
**incidental** [1] - 524:3
**include** [5] - 401:20, 422:15, 452:23, 452:24, 460:22
**included** [14] - 277:18, 279:21, 281:24, 310:4, 315:16, 405:6, 405:19, 406:13, 438:10, 474:6, 498:22, 514:10, 514:16
**includes** [4] - 399:18, 451:18, 459:4, 460:7
**including** [12] - 296:13, 341:10, 362:9, 367:17, 386:16, 409:6, 425:22, 436:25, 446:2, 493:20, 506:6, 539:1
**incorporate** [1] - 364:18
**incorporated** [1] - 367:11
**Incorporated** [2] - 504:2, 504:4
**increase** [18] - 327:25, 329:24, 330:1, 330:13, 331:6, 331:12, 331:15, 332:9, 332:10, 337:8, 339:1, 342:15, 342:23, 365:25, 478:23, 481:21, 495:5
**increases** [4] - 326:24, 327:8, 327:12, 341:14
**independent** [2] - 506:14, 521:13
**independently** [2] - 422:24, 423:2
**INDEX** [1] - 286:2
**indicate** [10] - 317:18, 326:23, 327:7, 348:19, 360:11, 373:2, 375:25, 381:24, 385:8, 461:23
**indicated** [13] - 303:20, 314:17, 336:5, 336:11, 337:9, 367:20, 378:24, 387:21, 473:8, 475:11, 492:22, 534:21, 552:8
**indicates** [7] - 339:11, 374:10, 377:11, 434:4, 444:8, 511:2, 534:1
**indicating** [1] - 344:11
**indication** [2] - 363:15, 443:20
**indicative** [1] - 335:10
**individual** [16] - 384:18, 405:24, 418:22, 419:4, 420:22, 421:3, 421:20, 422:21, 433:14, 441:25, 442:4, 442:10, 452:10, 470:9, 495:19, 525:10
**individually** [1] - 405:23
**individuals** [2] - 411:1, 506:1
**induced** [2] - 432:6, 467:3
**Industrial** [12] - 289:6, 294:24, 297:21, 298:7, 298:9, 307:21, 315:9, 322:3, 521:20, 522:12, 525:20, 547:1
**industrial** [1] - 411:17
**industry** [1] - 396:21
**infinitely** [3] - 384:1, 384:2, 384:7
**influence** [1] - 367:1
**influenced** [1] - 462:4
**influential** [1] - 317:21
**inform** [3] - 457:9, 508:19, 509:12
**information** [38] - 304:2, 304:21, 324:8, 324:10, 336:3, 336:18, 338:12, 363:21, 412:19, 432:18, 439:10, 456:25, 457:9, 457:18, 473:21, 477:9, 498:9, 499:17, 500:6, 509:2, 510:10, 512:4, 512:5, 514:21, 515:7, 516:20, 516:21, 520:21, 522:11, 523:7, 524:23, 524:25, 529:5, 533:22, 534:1, 549:4, 550:1, 550:3
**informed** [3] - 351:7, 508:9, 510:1
**informs** [2] - 507:3, 511:9
**infrastructure** [3] - 356:3, 356:6, 357:5
**inhibited** [1] - 429:19
**initial** [2] - 315:12, 527:5
**initiation** [1] - 422:9
**inject** [13] - 310:20, 311:6, 319:3, 328:3, 328:6, 328:9, 329:23, 330:4, 331:16, 332:17, 333:8, 434:8, 534:12
**injected** [13] - 318:25, 319:9, 319:16, 319:24, 320:7, 328:13, 347:7, 352:21, 402:2, 413:11, 421:14, 502:12, 542:18
**injecting** [7] - 331:11, 332:14, 333:6, 343:21, 364:21, 452:7, 499:9
**Injection** [2] - 455:14, 511:3
**injection** [97] - 292:25, 293:17, 308:8, 308:14, 308:18, 308:20, 309:2, 309:3, 309:6, 317:13, 318:8, 320:1, 327:22, 327:23, 329:25, 330:13, 331:3, 331:5, 331:6, 331:7, 332:6, 333:8, 336:5, 339:2, 343:19, 345:11, 350:21, 353:3, 356:23, 359:11, 364:22, 367:13, 367:16, 367:17, 367:18, 368:25, 369:14, 369:17, 369:22, 373:20, 374:2, 379:9, 385:9, 386:6, 386:7, 387:13, 394:16, 397:16, 401:17, 402:20, 406:14, 407:1, 407:16, 413:6, 415:19, 415:20, 420:22, 421:11, 422:12, 422:18, 428:16, 430:4, 430:12, 432:10, 434:14, 437:24, 438:3, 438:13, 438:20, 439:3, 444:10, 444:16, 452:10, 454:22, 455:19, 456:2, 457:10, 462:11, 463:16, 464:21, 466:6, 466:10, 466:16, 470:12, 481:18, 483:13, 485:18, 487:14, 487:16, 509:20, 538:9, 538:10, 539:7, 541:23, 542:16, 546:17
**injections** [6] - 343:18, 498:23, 499:11, 499:12, 500:18, 502:10
**injectivity** [1] - 415:18
**injector** [4] - 340:13, 343:16, 347:25, 487:25
**injectors** [6] - 326:24, 329:22, 340:21, 367:7, 367:8, 487:13
**inlet** [3] - 422:17, 494:16, 495:9
**input** [14] - 294:22, 295:2, 295:22, 296:4, 297:16, 297:18, 297:22, 307:17, 365:1, 365:9, 416:23, 512:14, 512:17, 544:19
**inputs** [8] - 323:8, 323:17, 323:19, 324:2, 324:7, 367:16, 452:4, 510:11
**inside** [2] - 320:11, 393:13
**insight** [1] - 319:3
**insofar** [1] - 302:2
**inspection** [3] - 436:17, 437:11, 466:7
**inspector** [1] - 436:20
**inspectors** [2] - 436:25, 437:3
**install** [3] - 430:18, 431:10, 432:8
**installed** [4] - 402:22, 420:25, 455:18, 455:23
**instance** [1] - 422:11
**instead** [6] - 315:14, 353:5, 366:14, 376:18, 377:23, 424:16
**instruct** [1] - 302:6
**instrument** [2] - 490:4, 491:13
**instrumentation** [3] - 490:25, 491:8, 491:16
**integrated** [4] - 397:18, 434:12, 446:17, 482:18
**integrity** [7] - 336:20, 337:1, 401:13, 401:23, 439:25, 453:16, 530:23
**intended** [2] - 342:8, 480:16
**intent** [11] - 318:21, 348:2, 424:6, 424:8, 424:10, 444:9, 449:10, 482:16, 482:18, 502:10, 502:13
**intention** [1] - 441:18
**intentions** [2] - 469:12, 469:16
**interaction** [1] - 546:22
**interactions** [4] - 405:16,

405:18, 485:4, 486:4
**interacts** [1] - 487:12
**interchange** [1] - 436:10
**interdunal** [2] - 373:3, 373:7
**interest** [2] - 312:1, 460:18
**interested** [5] - 289:14, 400:9, 402:3, 425:2, 496:4
**interference** [6] - 329:6, 329:19, 329:21, 330:7, 332:3, 364:19
**Interlake** [1] - 394:25
**intermediate** [3] - 425:24, 426:2, 442:13
**intermittently** [1] - 419:3
**internal** [1] - 516:4
**internationally** [2] - 396:23, 504:20
**interoperating** [1] - 482:24
**interpret** [1] - 381:22
**interpretation** [3] - 359:17, 528:21, 530:21
**interpreted** [1] - 383:13
**interrupt** [1] - 449:6
**Interval** [1] - 402:11
**interval** [4] - 361:17, 361:21, 362:14, 474:20
**intervals** [1] - 410:10
**INTERVENORS** [1] - 285:6
**intervenors** [4] - 289:23, 304:3, 519:19, 544:23
**INTERVENORS'** [2] - 287:19, 288:16
**intervention** [1] - 328:22
**introduce** [1] - 289:17
**introduced** [1] - 487:9
**introduces** [1] - 465:18
**introduction** [2] - 289:18, 290:2
**investigation** [1] - 362:9
**Investigation** [1] - 386:23
**investigations** [1] - 506:16
**involve** [1] - 299:3
**involved** [29] - 296:19, 302:16, 306:25, 322:7, 322:9, 322:10, 322:17, 322:20, 358:22, 473:20, 473:23, 477:12, 477:24, 505:24, 514:25, 515:5, 515:7, 518:4, 518:5, 518:12, 519:2, 524:15, 525:8, 534:22, 535:7, 535:15, 545:15, 545:24, 546:16
**Inyan** [2] - 359:12, 388:1
**ionic** [1] - 457:12
**iso** [1] - 492:5
**isolate** [3] - 421:20, 469:20, 478:14
**isolated** [6] - 362:18, 363:4, 475:19, 481:19, 490:7, 492:4
**isolating** [1] - 487:15
**isolation** [2] - 410:6, 423:4
**isopach** [1] - 374:25
**isotopic** [2] - 420:6, 420:15
**issue** [3] - 309:21, 439:25, 499:4
**issued** [3] - 507:6, 507:17, 513:25
**issues** [6] - 302:3, 302:25, 303:1, 436:19, 524:11, 524:13
**issuing** [1] - 515:16
**it'd** [1] - 487:15
**it'll** [4] - 421:12, 422:10, 438:2, 483:15
**it-depends** [1] - 498:1
**item** [3] - 388:3, 439:4, 441:2
**items** [6] - 393:13, 395:6, 405:6, 436:22, 441:11, 529:17
**iterations** [3] - 299:14, 300:2, 300:5
**itself** [8] - 295:19, 295:20, 304:25, 305:4, 307:18, 402:16, 461:7, 479:22

## J

**J-Loc** [6] - 529:18, 530:19, 534:23, 534:24, 534:25, 535:1
**Jacobson** [2] - 302:21, 303:11
**James** [2] - 395:22, 396:10
**JAMES** [2] - 286:19, 396:1
**JAMEY** [1] - 467:16
**Jamey** [17] - 411:4, 423:7, 423:19, 424:14, 425:5, 426:18, 447:21, 465:14, 465:18, 467:9, 467:11, 467:21, 467:23, 467:24, 468:2, 482:20
**Jamey's** [1] - 491:13
**January** [1] - 409:8
**Jay** [13] - 403:4, 403:5, 403:12, 403:15, 403:16, 404:12, 406:1, 434:1, 436:7, 445:16, 456:4, 456:8, 475:3
**JAY** [1] - 403:7
**JEAN** [2] - 287:15, 408:9
**Jean** [6] - 358:25, 408:6, 408:14, 408:16, 440:3, 453:20
**Jensen** [10] - 371:3, 430:19, 487:20, 487:22, 488:4, 488:8, 488:16, 488:22, 489:12, 489:17
**Jimmy** [7] - 370:14, 370:15, 396:6, 396:11, 412:3, 432:24, 484:6
**job** [5] - 337:23, 456:8, 539:12, 539:13
**jobs** [1] - 539:1
**JOCHIM** [1] - 285:8
**John** [7] - 398:2, 398:10, 398:12, 398:13, 420:10, 444:6, 465:20
**JOHN** [1] - 398:5
**joined** [2] - 409:7, 539:5
**joint** [1] - 310:9
**judgment** [1] - 495:15
**July** [1] - 552:14
**jump** [5] - 377:1, 388:3, 433:23, 438:25, 441:12
**jumping** [1] - 483:4
**junction** [2] - 423:4, 423:12
**June** [5] - 283:20, 289:3, 289:7, 525:25, 551:12
**jurisdiction** [5] - 412:2, 412:6, 412:8, 435:7, 442:10
**justice** [1] - 514:13
**justifiable** [2] - 316:24, 323:20
**justifies** [1] - 496:24
**justify** [1] - 310:1

## K

**Kara** [2] - 359:12, 388:1
**keep** [9] - 300:9, 311:4, 352:6, 405:4, 425:17, 427:1, 472:23, 473:15, 476:13
**keeping** [1] - 456:6
**key** [1] - 401:21
**kilograms** [1] - 382:3
**kind** [16] - 301:21, 348:2, 373:15, 388:3, 416:19, 425:14, 426:24, 440:22, 450:2, 476:18, 476:23, 480:8, 493:13, 504:3, 507:13, 541:4
**Kinder** [2] - 538:11, 538:16
**kinds** [7] - 483:1, 505:23, 506:10, 506:11, 506:12, 528:14
**Kirk** [1] - 289:24
**KJ** [17] - 369:1, 370:17, 371:2, 407:24, 417:25, 418:8, 430:15, 442:19, 449:22, 450:10, 451:15, 453:3, 453:4, 458:25, 459:11, 459:16, 471:19
**KJH** [3] - 415:8, 415:15, 415:17
**knowing** [4] - 300:3, 427:3, 487:25, 544:11
**knowledge** [7] - 341:5, 341:19, 354:10, 474:22, 497:3, 497:7, 546:11
**known** [3] - 406:13, 423:6, 432:18
**knows** [2] - 335:16, 500:10
**KRAFT** [1] - 285:8

## L

**lab** [1] - 528:6
**labeled** [4] - 335:18, 454:9, 459:5, 463:17
**lack** [2] - 354:18, 357:23
**lacking** [1] - 515:10
**laid** [1] - 399:13
**Land** [1] - 507:6
**land** [13] - 329:15, 330:2, 332:8, 340:14, 340:20, 341:2, 342:16, 352:22, 355:4, 423:12, 428:25, 450:18, 452:25
**Landowner** [1] - 353:19
**landowner** [7] - 289:23, 326:14, 352:1, 354:6, 405:25, 543:20, 544:6
**landowners** [23] - 311:18, 311:22, 311:24, 312:4, 312:10, 312:18, 314:25, 320:11, 321:8, 321:15, 341:10, 352:14, 352:19, 352:25, 353:2, 353:4, 353:8, 358:12, 497:1, 497:5, 499:9, 501:24, 502:10
**lands** [4] - 278:19, 280:22, 283:2, 329:20
**language** [6] - 314:4, 393:6, 393:7, 431:17, 459:25, 460:22
**lapse** [1] - 358:7
**lapsed** [1] - 306:11
**large** [3] - 369:20, 396:22, 454:16
**largely** [3] - 377:1, 404:2, 440:25
**larger** [13] - 313:2, 313:4, 313:5, 319:6, 346:3, 365:24, 384:17, 415:2, 461:14, 462:12, 462:19, 483:21
**largest** [1] - 481:8
**last** [21] - 297:23, 307:22, 314:20, 362:23, 388:3, 396:22, 400:17, 404:6, 409:7, 441:12, 441:21, 445:17, 451:20, 461:23,

467:25, 503:23, 503:24, 513:25, 523:24, 527:18, 529:25
**late** [2] - 514:2, 528:7
**lateral** [1] - 344:6
**laterals** [2] - 442:14, 443:5
**launcher** [3] - 422:1, 422:3, 422:9
**Law** [6] - 284:11, 284:15, 284:16, 285:3, 285:4, 289:22
**law** [2] - 328:2, 435:8
**LAWRENCE** [1] - 284:10
**Lawrence** [14] - 403:14, 403:23, 405:2, 406:9, 423:20, 424:14, 448:14, 465:17, 474:24, 477:15, 497:11, 502:20, 510:17, 513:3
**laws** [2] - 330:11, 338:3
**lay** [2] - 449:11, 460:11
**layer** [2] - 327:5, 345:5
**layers** [4] - 372:9, 372:11, 372:22, 376:23
**laying** [1] - 449:8
**layout** [1] - 432:9
**layout's** [1] - 432:17
**Lazy** [5] - 362:24, 415:4, 415:9, 455:2, 455:25
**lead** [1] - 525:10
**leading** [1] - 396:22
**leak** [2] - 339:4, 453:12
**Leakage** [1] - 401:4
**leakage** [7] - 338:19, 338:22, 338:23, 338:24, 338:25, 339:9
**leaking** [1] - 339:5
**leaky** [2] - 489:16, 489:18
**learn** [1] - 526:14
**lease** [1] - 312:18
**leased** [1] - 353:17
**leases** [2] - 355:24, 357:5
**leasing** [4] - 293:6, 310:21, 353:12, 353:13
**least** [18] - 319:4, 325:25, 332:4, 371:8, 373:12, 381:9, 395:7, 399:2, 410:1, 415:17, 428:15, 430:22, 432:15, 442:17, 488:22, 489:12, 491:19, 492:22
**LEC** [1] - 405:23
**led** [3] - 394:21, 499:15, 499:20
**left** [11] - 348:18, 348:25, 349:10, 350:25, 400:1, 421:25, 422:7, 422:10, 529:17, 538:16, 538:24
**legacy** [11] - 319:11, 334:7, 334:11, 371:13, 431:2, 453:1, 453:2, 453:4, 471:22, 472:4, 531:13
**legal** [2] - 301:21, 498:25
**legend** [1] - 329:9
**Leingang** [32] - 334:10, 358:17, 360:20, 361:19, 368:5, 368:25, 370:17, 372:2, 395:16, 399:11, 407:1, 407:11, 413:3, 421:17, 423:6, 424:2, 431:16, 433:2, 433:9, 433:21, 434:19, 442:20, 448:21, 448:23, 449:20, 450:10, 451:12, 453:2, 453:18, 455:20, 457:18, 488:13
**Leingang/Milton** [1] - 449:19
**length** [1] - 481:5
**lengths** [1] - 456:18
**LEPC** [1] - 405:21
**less** [14] - 311:22, 313:12, 368:3, 373:24, 379:10, 382:2, 382:24, 384:22, 384:23, 464:5, 473:9, 483:14, 486:4, 494:2
**lesser** [2] - 294:11, 355:2
**letter** [6] - 298:18, 395:18, 516:6, 526:19, 533:20, 533:23
**level** [2] - 401:7, 466:1
**levels** [1] - 371:22
**liability** [3] - 407:14, 407:21, 438:22
**library** [1] - 298:12
**license** [9] - 297:13, 299:6, 304:16, 304:18, 306:7, 306:8, 324:25, 325:1, 325:2
**licensed** [1] - 398:23
**licenses** [13] - 296:22, 296:23, 296:24, 297:5, 297:6, 297:9, 297:11, 297:12, 299:4, 304:7, 304:12, 306:3, 307:3
**LIEBELT** [1] - 285:8
**life** [2] - 339:2, 401:25
**light** [3] - 445:1, 483:6, 483:18
**likely** [7] - 313:4, 351:12, 360:12, 366:7, 367:22, 418:9, 478:21
**likewise** [2] - 407:2, 449:21
**limit** [8] - 330:3, 332:6, 332:7, 343:13, 346:21, 346:25, 541:5
**limitation** [1] - 330:25
**limitations** [1] - 358:4
**limited** [2] - 331:7, 464:22
**limits** [13] - 278:19, 280:22, 283:2, 318:6, 328:2, 328:6, 328:8, 329:4, 330:5, 478:19, 541:11, 541:18, 544:16
**line** [38] - 303:6, 320:13, 345:23, 345:25, 348:18, 348:22, 373:20, 373:25, 387:9, 419:21, 421:10, 421:25, 422:17, 424:7, 441:2, 442:5, 442:7, 442:9, 442:14, 470:16, 477:20, 477:22, 480:2, 480:12, 480:14, 480:20, 480:24, 481:8, 481:11, 481:13, 481:16, 481:22, 481:23, 482:5, 493:19, 494:10, 494:25, 525:7
**line's** [1] - 348:20
**linear** [4] - 344:15, 345:15, 345:17, 345:21
**list** [3] - 298:4, 304:11, 457:18
**listed** [8] - 289:5, 297:19, 304:23, 400:12, 445:7, 450:8, 465:4, 491:16
**listening** [2] - 449:12, 518:10
**literature** [1] - 406:20
**litho** [1] - 361:20
**litho-bound** [1] - 361:20
**lithologies** [2] - 368:16, 368:18
**litigate** [1] - 303:3
**LIVING** [1] - 285:7
**LLC** [16] - 277:4, 277:15, 277:19, 278:6, 279:4, 279:8, 279:19, 279:23, 280:8, 280:9, 281:6, 281:10, 281:21, 282:1, 282:11, 283:10
**LLCs** [1] - 469:22
**LO-18** [3] - 288:18, 508:16, 514:5
**LO-19** [2] - 288:19, 509:9
**LO-20** [2] - 288:19, 509:23
**LO-56** [3] - 288:20, 505:6, 505:17
**LO-57** [2] - 288:20, 539:15
**LO-58** [3] - 288:21, 529:2, 530:1
**LO-63** [2] - 326:15, 329:7
**LO-82** [3] - 288:21, 510:15, 510:16
**LO-83** [4] - 288:22, 294:13, 333:14, 333:15
**Loc** [6] - 529:18, 530:19, 534:23, 534:24, 534:25, 535:1
**local** [8] - 405:7, 405:12, 405:16, 405:24, 432:5, 436:1, 445:19, 506:2
**locate** [1] - 432:14
**located** [13] - 277:6, 277:20, 278:9, 278:19, 279:10, 279:23, 280:13, 280:22, 281:12, 282:2, 282:15, 283:2, 450:19
**location** [14] - 335:21, 351:3, 351:6, 355:23, 363:13, 369:23, 371:16, 400:14, 433:16, 443:7, 443:18, 469:23, 489:17, 491:6
**locations** [8] - 368:24, 369:21, 370:4, 386:16, 429:7, 431:20, 431:22, 444:4
**log** [11] - 298:12, 357:9, 357:14, 357:20, 401:21, 413:24, 414:9, 414:12, 451:19
**logarithmic** [2] - 345:15, 345:17
**logged** [3] - 529:20, 529:21, 530:19
**logging** [5] - 367:10, 402:12, 402:13, 451:4, 453:15
**logs** [13] - 304:15, 306:8, 317:19, 360:23, 361:8, 376:5, 376:7, 401:24, 413:23, 415:12, 451:22, 549:21, 549:22
**Lonny** [8] - 302:21, 303:11, 303:20, 305:19, 307:9, 307:24, 309:20
**look** [29] - 294:20, 298:5, 298:17, 316:14, 334:1, 334:5, 334:11, 335:7, 336:4, 338:19, 340:3, 340:4, 348:13, 349:4, 350:24, 353:22, 369:16, 379:22, 390:3, 401:12, 402:14, 405:6, 441:3, 488:12, 488:19, 507:9, 518:22, 519:9, 543:11
**looked** [16] - 316:11, 319:11, 385:15, 385:17, 406:17, 406:19, 414:8, 414:10, 464:3, 518:20, 521:14, 524:5, 525:2, 535:16, 542:15, 549:2
**looking** [25] - 290:2, 351:8, 351:22, 356:24, 372:1, 374:25, 377:3, 399:25, 405:11, 414:11, 414:13, 414:18, 422:7, 423:13, 428:25, 430:17, 463:24, 475:23, 485:6, 507:19, 525:5, 528:19, 542:10, 542:13, 543:12
**looks** [7] - 413:8, 423:14, 423:17, 429:2, 444:20, 514:6, 519:10
**loss** [2] - 440:1, 440:14

**Louis** [1] - 527:25
**low** [9] - 368:16, 372:8, 372:11, 372:16, 373:5, 376:20, 381:12, 391:15, 465:21
**lower** [15] - 310:3, 310:24, 331:11, 333:8, 354:24, 379:24, 380:9, 380:11, 381:1, 391:18, 392:1, 486:1, 523:15, 544:14
**lowermost** [1] - 454:21
**lowest** [6] - 346:21, 410:2, 488:8, 488:23, 489:1, 489:13
**Ludlow** [1] - 386:25
**Luis** [1] - 411:5
**lunch** [1] - 388:24
**Lutz** [1] - 334:15
**LYNN** [1] - 284:3
**Lynn** [1] - 525:19

## M

**M.B.A** [1] - 504:12
**MADCHE** [39] - 284:5, 355:18, 356:14, 369:24, 411:12, 412:20, 412:21, 415:25, 416:6, 417:21, 420:16, 423:11, 423:21, 424:15, 425:8, 426:19, 427:16, 429:6, 429:9, 432:20, 433:11, 433:19, 433:23, 438:25, 440:19, 464:9, 464:19, 465:11, 467:7, 469:9, 469:18, 470:2, 470:6, 471:1, 471:8, 471:10, 471:12, 471:17, 472:6
**Madche.....** [3] - 286:13, 287:3, 287:12
**magnetic** [2] - 413:23, 414:12
**magnitude** [7] - 465:19, 465:24, 466:1, 466:2, 466:21, 466:22, 483:22
**main** [10] - 390:19, 421:10, 442:7, 442:9, 442:14, 477:20, 477:22, 482:5, 493:19, 546:20
**maintain** [2] - 429:11, 476:6
**maintaining** [1] - 439:7
**maintenance** [1] - 468:13
**MAIZE** [1] - 285:8
**major** [7] - 314:13, 315:6, 352:11, 498:6, 498:18, 542:8, 542:22
**majority** [1] - 549:7
**manage** [1] - 459:19
**Management** [2] - 511:5, 540:1
**manager** [4] - 468:5, 468:14, 507:9, 516:19
**manner** [5] - 324:2, 344:15, 500:5, 541:10, 543:18
**manually** [1] - 481:16
**manufacturer** [2] - 469:6, 479:17
**manufacturer's** [1] - 479:7
**MAOP** [1] - 490:20
**map** [39] - 326:17, 327:20, 329:25, 331:9, 331:19, 335:7, 335:9, 335:14, 335:17, 335:19, 336:5, 337:10, 338:21, 348:6, 348:11, 350:8, 353:22, 356:19, 369:11, 369:13, 370:6, 374:24, 375:1, 423:16, 443:22, 531:1, 531:25, 534:5, 534:7, 534:12, 534:18, 536:2, 536:7, 536:12, 536:13, 536:18, 547:12
**maps** [9] - 295:4, 295:7, 295:8, 295:10, 295:14, 295:18, 295:20, 326:22, 327:6
**Marathon** [1] - 538:6
**margin** [2] - 319:6, 319:21
**mark** [1] - 444:20
**MARK** [1] - 284:4
**marked** [5] - 294:13, 448:8, 458:16, 510:14, 539:15
**market** [1] - 544:1
**Mary** [2] - 504:12, 523:19
**mass** [9] - 412:14, 420:21, 421:2, 421:12, 427:9, 427:12, 428:10, 502:1, 502:12
**master** [1] - 398:22
**master's** [2] - 403:24, 527:25
**match** [1] - 313:14
**matching** [1] - 357:24
**material** [12] - 428:11, 428:13, 428:14, 450:6, 452:13, 454:15, 455:9, 456:23, 457:2, 457:6, 457:16, 457:21
**materially** [1] - 454:13
**materials** [1] - 521:19
**math** [1] - 426:8
**mathematically** [1] - 349:21
**matrix** [2] - 542:14, 543:5
**matter** [10] - 307:22, 336:24, 341:22, 347:20, 485:25, 506:8, 507:4, 522:13, 526:20, 532:8
**matters** [1] - 289:5
**max** [9] - 342:18, 342:19, 342:25, 465:11, 465:12, 469:2, 469:3, 479:6, 479:16
**maximize** [1] - 470:17
**maximum** [31] - 327:21, 327:24, 339:1, 358:17, 412:22, 413:6, 413:9, 413:11, 423:23, 424:17, 426:4, 426:14, 454:6, 456:2, 464:21, 464:23, 465:4, 465:5, 469:5, 476:15, 479:5, 480:2, 480:9, 481:1, 481:5, 483:9, 483:11, 490:12, 493:22, 493:24, 525:2
**MBT** [1] - 414:21
**MCE** [1] - 411:25
**mean** [13] - 316:7, 350:15, 367:23, 370:23, 375:3, 416:16, 471:7, 480:20, 486:3, 501:5, 511:24, 519:22, 546:7
**meaning** [7] - 313:6, 313:13, 320:14, 325:10, 338:23, 352:20, 362:21
**means** [3] - 350:14, 478:16, 481:18
**measure** [1] - 345:22
**measured** [3] - 364:25, 383:10, 383:12
**measurement** [7] - 398:16, 421:5, 421:9, 421:11, 422:14, 427:11, 442:6
**measurements** [2] - 428:6, 428:9
**measures** [1] - 371:6
**measuring** [1] - 400:10
**mechanical** [4] - 401:22, 453:16, 468:9, 530:23
**mechanism** [4] - 379:21, 391:10, 440:14, 542:21
**mechanisms** [4] - 380:2, 391:8, 391:18, 391:25
**meet** [8] - 418:20, 419:10, 419:23, 443:22, 513:5, 513:6, 525:20, 525:22
**meeting** [1] - 365:5
**meetings** [3] - 405:21, 405:22, 405:25
**megabytes** [1] - 300:19
**members** [1] - 307:20
**memorandum** [1] - 446:10
**memorized** [1] - 433:4
**memory** [1] - 445:8
**mention** [3] - 440:13, 459:13, 495:13
**mentioned** [14] - 292:16, 297:22, 306:2, 322:3, 324:6, 324:14, 333:4, 335:13, 426:25, 459:13, 493:17, 506:8, 530:18, 531:19
**Mercer** [14] - 277:13, 278:3, 278:16, 279:3, 279:17, 280:6, 280:19, 281:5, 405:17, 435:13, 435:16, 435:17, 436:7, 446:2
**mercury** [5] - 385:9, 386:6, 386:8
**mercury-injection-derived** [1] - 386:6
**met** [3] - 418:16, 462:16, 462:17
**meter** [8] - 382:3, 422:14, 422:16, 442:2, 442:8, 442:11, 442:13, 469:14
**metering** [2] - 401:1, 427:2
**meters** [10] - 339:3, 420:17, 420:19, 420:24, 421:10, 427:7, 427:9, 427:10, 427:12, 442:17
**method** [3] - 449:8, 452:18, 489:19
**Method** [2] - 368:23, 400:20
**methodologies** [2] - 293:9, 406:5
**methodology** [4] - 405:22, 406:11, 452:19, 453:25
**methods** [2] - 358:5, 358:6
**metric** [6] - 423:25, 424:3, 424:5, 424:8, 424:19, 424:21
**METZ** [1] - 285:8
**Michael** [1] - 537:18
**MICP** [1] - 392:3
**micro** [1] - 413:22
**microfracture** [9] - 358:18, 359:5, 412:23, 413:14, 413:18, 417:22, 417:24, 418:4, 451:5
**microphone** [1] - 447:14
**mid** [1] - 514:2
**middle** [2] - 294:21, 381:23
**Midwest** [10] - 277:6, 278:8, 279:10, 280:12, 281:12, 282:14, 309:11, 476:19, 482:6, 484:3
**might** [21] - 301:20, 302:3, 315:20, 331:2, 338:14, 340:23, 378:2, 380:19, 409:10, 415:6, 419:20, 425:12, 426:17, 433:11, 436:19, 466:23, 471:18, 488:14, 501:22, 502:19, 510:23
**migrate** [1] - 374:6
**migrating** [1] - 350:22
**migration** [5] - 309:8, 362:20, 363:6, 372:10, 374:1
**mike** [1] - 530:7

**mile** [6] - 388:12, 388:13, 388:18, 393:4, 393:11, 393:14
**mileage** [1] - 469:16
**miles** [11] - 357:1, 411:25, 412:2, 412:6, 412:8, 425:21, 459:14, 464:5, 464:8, 473:9, 531:11
**millimeter** [1] - 347:18
**million** [12] - 408:2, 423:23, 423:25, 424:3, 424:5, 424:8, 424:18, 424:19, 424:21, 440:7, 440:12, 470:24
**Milton** [21] - 349:4, 349:13, 357:9, 357:12, 357:19, 358:19, 360:7, 361:7, 364:25, 365:2, 365:4, 365:14, 365:15, 369:19, 412:24, 413:5, 453:19, 454:24, 455:16, 455:18, 474:17
**mind** [14] - 326:14, 416:19, 440:18, 448:1, 456:6, 472:18, 475:2, 488:12, 489:6, 497:11, 497:12, 507:5, 513:10, 513:12
**mine** [1] - 450:18
**Mine** [1] - 356:17
**mined** [1] - 356:20
**Mineral** [2] - 289:9, 340:12
**mineral** [6] - 378:13, 378:19, 379:10, 381:16, 381:21, 382:15
**mineralization** [1] - 379:1
**mineralogical** [1] - 457:10
**mineralogy** [1] - 391:3
**miniaturized** [2] - 428:2, 428:7
**minimal** [6] - 367:6, 450:15, 453:15, 454:5, 456:9, 456:13
**minimum** [9] - 366:10, 366:15, 388:17, 393:4, 419:11, 432:16, 435:8, 436:2, 438:19
**mining** [14] - 356:1, 356:5, 356:16, 356:17, 356:19, 356:21, 357:2, 450:18, 452:25, 504:20, 506:6, 507:9, 507:11, 507:13
**Minnekahta** [2] - 451:12, 451:13
**Minnkota** [6] - 322:22, 328:23, 395:19, 459:17, 529:19, 536:2
**Minnkota's** [3] - 329:4, 460:20, 534:23
**minor** [9] - 362:10, 362:13, 362:17, 362:21, 362:25, 363:1, 363:4, 407:22, 452:9
**minute** [7] - 321:21, 400:3, 447:5, 481:4, 503:3, 505:8, 551:4
**minutes** [4] - 316:3, 494:8, 550:22
**mischaracterization** [1] - 312:14
**miss** [1] - 462:1
**missed** [1] - 510:23
**missing** [2] - 499:17, 499:19
**misspelled** [2] - 447:23, 467:24
**misspoke** [1] - 407:8
**misstated** [1] - 464:8
**misstatement** [1] - 387:17
**misunderstand** [1] - 517:13
**misunderstanding** [1] - 502:4
**misunderstood** [2] - 516:14, 517:8
**MIT** [2] - 337:12, 338:7
**mixes** [1] - 388:4
**mixing** [4] - 345:19, 391:19, 391:21, 391:23
**mixture** [1] - 542:19
**model** [130] - 291:15, 291:17, 291:22, 292:12, 295:2, 295:23, 296:5, 297:16, 297:19, 298:1, 299:23, 301:5, 306:5, 306:6, 307:12, 316:17, 316:20, 316:22, 316:24, 317:2, 317:5, 318:13, 318:18, 319:1, 319:25, 321:11, 321:13, 323:17, 323:18, 324:12, 324:25, 325:1, 325:2, 325:5, 325:6, 325:9, 325:11, 325:14, 325:21, 325:22, 325:25, 326:3, 326:5, 326:8, 333:12, 338:25, 344:22, 345:5, 349:18, 350:11, 350:16, 350:18, 350:19, 351:1, 351:18, 363:18, 363:20, 363:24, 364:5, 364:7, 364:8, 364:9, 364:13, 364:15, 366:19, 367:12, 367:15, 367:16, 368:18, 369:5, 372:8, 374:5, 374:11, 374:17, 374:18, 374:23, 375:8, 375:12, 375:22, 376:2, 376:7, 376:9, 379:19, 380:9, 382:2, 382:20, 383:7, 383:10, 383:23, 384:11, 384:21, 385:4, 385:20, 418:6, 418:10, 426:11, 426:16, 426:21, 426:23, 451:3, 452:1, 452:5, 463:15, 464:25, 465:8, 473:13, 473:14, 477:4, 477:9, 477:19, 480:1, 489:15, 510:11, 512:16, 512:19, 521:21, 521:24, 522:2, 522:7, 542:24, 544:24, 545:2, 545:6, 546:6
**modeled** [11] - 314:18, 338:21, 360:18, 364:23, 369:9, 372:4, 379:5, 383:17, 383:18, 473:18, 494:4
**modeling** [37] - 292:6, 292:16, 292:22, 293:18, 293:21, 296:23, 300:5, 310:8, 321:17, 337:9, 339:10, 360:11, 360:15, 366:5, 376:15, 376:17, 376:23, 377:20, 380:14, 382:18, 391:8, 424:1, 424:20, 424:23, 426:11, 462:14, 463:19, 464:17, 476:24, 477:13, 477:22, 509:2, 510:12, 542:4, 542:8, 542:22, 543:9
**models** [28] - 300:2, 306:11, 306:16, 313:9, 313:15, 318:22, 322:24, 323:1, 323:9, 323:25, 324:7, 324:10, 346:22, 377:18, 391:3, 512:13, 521:14, 523:1, 544:19, 544:22, 545:1, 545:24, 546:3, 546:10, 546:12, 546:14, 546:21, 546:23
**modification** [7] - 314:9, 314:13, 315:6, 352:11, 386:5, 498:7, 498:19
**modified** [1] - 385:12
**modifier** [2] - 384:9, 384:15
**modifiers** [4] - 383:7, 383:22, 383:24, 384:5
**modify** [3] - 314:15, 385:14, 431:19
**Mohr** [1] - 394:12
**Mohr-Coulomb** [1] - 394:12
**molecules** [1] - 397:13
**moment** [8] - 334:23, 335:7, 354:2, 366:2, 472:17, 510:1, 550:16, 550:18
**moments** [3] - 383:9, 468:7, 472:13
**monitor** [7] - 293:25, 313:6, 371:7, 397:10, 401:15, 402:18, 432:6
**Monitoring** [2] - 400:2, 402:10
**monitoring** [54] - 313:1, 313:6, 313:10, 313:14, 319:12, 343:14, 358:4, 358:6, 370:24, 371:10, 371:12, 399:4, 399:13, 399:18, 399:23, 400:6, 401:13, 401:19, 402:3, 402:7, 402:16, 402:22, 402:25, 404:5, 406:15, 407:3, 407:17, 418:2, 427:17, 430:18, 430:25, 432:1, 437:19, 439:8, 440:7, 440:10, 453:12, 453:22, 453:24, 454:3, 454:5, 454:25, 455:24, 455:25, 456:16, 456:17, 465:3, 466:12, 471:21, 471:24, 472:5, 483:19, 485:19, 497:21
**Montana** [24] - 386:25, 408:25, 504:11, 504:23, 507:16, 507:25, 508:8, 513:16, 514:19, 515:1, 515:10, 517:17, 526:11, 528:1, 537:22, 538:1, 538:17, 538:21, 539:4, 540:7, 540:8, 540:22, 543:1
**Montana's** [4] - 508:21, 510:3, 511:11, 526:5
**month** [6] - 297:11, 297:12, 325:1, 519:20, 532:9
**months** [2] - 436:3, 529:25
**Morgan** [2] - 538:12, 538:16
**morning** [3] - 291:3, 416:20, 551:9
**Morton** [10] - 277:14, 278:3, 278:16, 279:3, 405:17, 435:14, 435:17, 435:18, 436:8, 446:1
**most** [11] - 296:21, 337:15, 351:12, 351:19, 366:8, 409:3, 449:13, 524:9, 542:20, 542:23
**mostly** [1] - 349:6
**motion** [7] - 278:18, 280:21, 283:1, 303:2, 303:5, 505:20, 533:24
**move** [24] - 333:14, 333:15, 344:15, 345:11, 345:16, 358:14, 362:3, 363:17, 368:19, 392:14, 393:18, 397:24, 401:9, 407:13, 421:16, 437:23, 461:13, 472:8, 499:25, 505:17, 511:14, 530:1, 535:24, 540:14
**moved** [2] - 504:23, 538:11
**movement** [7] - 365:21, 366:25, 367:2, 371:7, 373:23, 391:14, 542:13

**movements** [1] - 464:11
**moves** [2] - 346:15, 442:5
**moving** [7] - 370:3, 374:8, 379:4, 410:8, 418:13, 466:20, 473:16
**Mowry** [1] - 410:17
**MR** [325] - 284:3, 284:4, 284:4, 284:5, 284:6, 284:7, 284:7, 284:10, 284:10, 284:15, 285:2, 289:16, 289:22, 290:1, 290:5, 290:9, 290:19, 290:24, 291:5, 291:9, 302:2, 302:7, 302:9, 302:10, 302:24, 303:9, 303:10, 305:18, 306:23, 307:1, 312:6, 312:9, 312:13, 312:16, 313:20, 313:24, 320:15, 320:21, 320:24, 322:2, 323:3, 323:7, 332:24, 333:3, 333:13, 333:16, 333:17, 333:18, 333:19, 333:21, 333:24, 355:13, 356:11, 370:2, 370:10, 370:12, 370:14, 370:15, 370:16, 371:18, 371:20, 388:21, 389:8, 389:23, 392:12, 392:17, 393:16, 393:20, 393:23, 394:7, 394:8, 394:9, 394:10, 395:10, 395:11, 395:21, 396:5, 397:21, 398:2, 398:9, 398:12, 403:2, 403:11, 403:14, 408:3, 408:13, 410:19, 411:7, 411:8, 411:21, 412:5, 412:17, 415:23, 416:3, 416:7, 416:16, 417:2, 417:12, 417:14, 417:17, 417:20, 418:22, 420:8, 420:9, 420:11, 420:24, 423:9, 423:19, 424:13, 425:5, 425:7, 426:18, 427:13, 427:14, 427:15, 427:24, 428:23, 429:4, 430:10, 432:23, 433:3, 433:15, 433:22, 433:24, 434:2, 434:24, 435:1, 435:2, 435:3, 435:5, 435:12, 436:5, 436:13, 436:21, 437:6, 437:7, 437:8, 437:14, 437:15, 437:16, 438:16, 439:9, 439:11, 440:25, 441:8, 441:10, 441:20, 442:16, 444:11, 445:24, 447:2, 447:6, 447:12, 447:15, 448:6, 448:14, 448:17, 448:18, 457:23, 458:3, 458:7, 458:11, 458:13, 458:18, 458:20, 458:21, 458:22, 458:24, 461:1, 461:5, 461:12, 461:21, 463:9, 463:20, 464:13, 465:13, 465:16, 466:18, 467:4, 467:9, 467:15, 467:20, 469:10, 469:23, 470:3, 471:6, 471:9, 471:11, 471:14, 472:10, 472:17, 472:22, 472:24, 473:1, 473:2, 473:3, 473:5, 474:23, 475:4, 475:6, 475:9, 477:2, 477:11, 477:14, 477:17, 477:18, 482:10, 484:1, 484:5, 484:9, 484:13, 484:15, 484:18, 484:20, 489:5, 489:8, 489:11, 490:3, 490:17, 490:24, 497:10, 497:14, 497:16, 497:25, 498:24, 499:1, 499:2, 500:3, 500:11, 500:12, 500:19, 500:22, 500:24, 500:25, 501:5, 501:8, 501:10, 501:11, 501:14, 501:16, 502:2, 502:5, 502:7, 502:8, 502:9, 502:17, 502:21, 502:23, 503:1, 503:9, 503:12, 503:15, 503:21, 505:8, 505:10, 505:11, 505:12, 505:17, 505:19, 505:21, 510:17, 510:20, 510:22, 511:14, 511:17, 511:20, 512:20, 512:23, 513:2, 514:7, 514:8, 520:3, 520:7, 520:13, 520:17, 520:18, 520:22, 522:17, 522:19, 522:20, 522:22, 522:25, 523:5, 523:9, 523:10, 523:13, 525:13, 525:18, 526:15, 526:17, 526:24, 527:2, 527:4, 527:8, 527:16, 530:1, 530:3, 530:7, 530:10, 532:15, 532:18, 535:22, 535:23, 536:1, 536:23, 537:2, 537:4, 537:7, 537:9, 537:14, 540:14, 540:15, 540:18, 541:7, 541:9, 545:8, 545:12, 548:10, 548:13, 548:14, 550:9, 550:13, 550:15, 550:23, 551:2
**MRV** [1] - 398:17
**MS** [95] - 284:5, 284:6, 284:8, 285:3, 291:13, 305:12, 305:15, 306:24, 308:17, 309:13, 312:7, 313:22, 320:19, 323:5, 333:2, 334:4, 335:8, 336:2, 338:9, 339:25, 340:17, 355:18, 356:9, 356:12, 356:14, 359:21, 360:15, 369:24, 370:20, 372:7, 387:8, 387:16, 390:7, 392:20, 393:25, 408:16, 411:12, 412:20, 412:21, 413:1, 415:25, 416:6, 417:21, 420:16, 423:11, 423:21, 424:15, 425:8, 426:19, 427:16, 429:6, 429:9, 429:17, 432:20, 433:11, 433:19, 433:23, 437:22, 438:25, 440:19, 448:10, 461:19, 461:25, 463:14, 463:23, 464:9, 464:12, 464:15, 464:19, 465:9, 465:11, 465:15, 465:17, 466:20, 467:5, 467:7, 467:8, 469:9, 469:18, 470:2, 470:6, 471:1, 471:8, 471:10, 471:12, 471:17, 472:2, 472:6, 473:12, 474:13, 483:12, 484:22, 489:9, 489:14, 527:5
**multi** [1] - 315:22
**multi-physics** [1] - 315:22
**multilayered** [1] - 405:19
**multiple** [6] - 299:14, 432:8, 432:13, 435:16, 539:1, 543:25
**multiplier** [6] - 309:18, 310:1, 311:2, 313:2, 313:3, 315:9
**multiply** [1] - 541:25
**municipalities** [1] - 506:3
**must** [5] - 351:25, 393:10, 418:16, 419:9, 512:3
**mute** [2] - 527:9, 527:10
**mutual** [1] - 446:10

## N

**NAD27** [1] - 390:14
**NAICS** [2] - 411:21, 411:22
**nailed** [1] - 434:9
**name** [26] - 392:24, 396:8, 398:10, 403:12, 408:14, 447:23, 450:8, 467:21, 467:24, 467:25, 485:20, 486:22, 503:22, 503:23, 503:24, 508:15, 513:3, 513:8, 527:1, 527:17, 527:18, 537:15, 537:17, 537:18, 540:5
**named** [1] - 449:16
**namely** [3] - 392:23, 456:15, 457:9
**names** [3] - 335:18, 353:22, 473:24
**narrative** [13] - 374:10, 377:3, 377:7, 377:11, 379:19, 382:22, 387:10, 388:6, 394:11, 419:7, 444:7, 444:12, 444:25
**natural** [5] - 404:1, 466:11, 481:25, 543:3, 543:11
**nature** [2] - 308:24, 476:13
**ND** [12] - 277:14, 278:4, 278:17, 279:3, 279:17, 280:7, 280:19, 281:5, 281:20, 282:9, 282:22, 283:9
**NDA** [2] - 296:14, 322:22
**NDIC** [2] - 284:2, 412:8
**NDL-325** [2] - 423:5, 469:12
**NDL-327** [3] - 423:6, 469:11, 469:24
**Near** [1] - 402:7
**near** [6] - 329:11, 371:7, 432:1, 468:11, 472:3, 497:12
**nearby** [1] - 371:13
**nearest** [1] - 364:18
**necessarily** [7] - 295:14, 318:15, 325:15, 331:3, 344:17, 429:15, 439:1
**necessary** [11] - 279:6, 281:8, 283:12, 324:17, 385:14, 431:19, 460:4, 515:1, 521:25, 523:7, 540:24
**need** [48] - 289:17, 297:13, 301:20, 301:23, 301:25, 302:15, 303:21, 306:6, 307:2, 307:5, 311:13, 311:18, 312:17, 314:8, 317:20, 318:7, 318:11, 338:14, 356:7, 378:2, 385:13, 412:16, 423:7, 425:12, 430:16, 432:15, 435:10, 438:7, 440:17, 443:9, 444:22, 445:8, 447:2, 472:21, 476:10, 476:25, 480:15, 487:6, 498:21, 499:4, 499:20, 500:1, 522:1, 522:11, 530:25, 531:15, 531:20, 534:12
**needed** [19] - 299:7, 304:8, 304:12, 311:9, 314:7, 314:15, 380:6, 389:11, 389:17, 431:10, 431:12, 435:22, 436:12, 466:17, 493:11, 496:15, 515:8, 516:8, 535:24
**needing** [2] - 429:13, 437:11
**needs** [3] - 437:1, 443:9, 500:5

**negative** [6] - 378:14, 378:19, 379:4, 382:4, 383:1, 393:24
**Neset** [1] - 409:1
**net** [7] - 374:11, 381:25, 382:3, 382:23, 393:24
**neutron** [3] - 401:21, 401:24, 402:12
**never** [9] - 307:7, 321:14, 345:10, 345:11, 440:18, 469:8, 517:6, 517:21, 525:8
**new** [13] - 289:12, 290:2, 307:2, 392:24, 395:13, 419:8, 419:20, 420:3, 420:7, 420:12, 420:13, 447:19, 498:21
**next** [24] - 313:25, 329:12, 353:21, 359:11, 393:18, 397:25, 398:2, 400:10, 403:3, 403:4, 410:8, 426:2, 430:18, 450:12, 450:13, 452:14, 453:10, 454:1, 458:6, 458:7, 465:25, 527:1, 537:6
**NGOs** [1] - 506:5
**nice** [4] - 513:5, 513:6, 525:20, 525:22
**nine** [1] - 444:9
**nitrogen** [5] - 429:16, 429:20, 538:9, 539:7, 542:19
**No(s)** [1] - 277:3
**nomenclature** [1] - 392:23
**noncompliance** [1] - 352:8
**nonconsenting** [3] - 277:18, 279:21, 281:23
**nondisclosure** [1] - 296:15
**none** [1] - 519:4
**normal** [4] - 479:10, 486:9, 492:17, 493:12
**normally** [2] - 479:11, 479:12
**north** [1] - 442:18
**NORTH** [1] - 277:1
**North** [102] - 277:7, 277:9, 277:11, 277:12, 277:13, 277:21, 277:22, 278:1, 278:2, 278:3, 278:10, 278:11, 278:14, 278:15, 278:16, 278:20, 278:22, 279:1, 279:2, 279:3, 279:11, 279:14, 279:15, 279:16, 280:1, 280:3, 280:5, 280:6, 280:14, 280:16, 280:18, 280:19, 280:23, 281:2, 281:4, 281:4, 281:13, 281:14, 281:16, 281:18, 281:19, 282:2, 282:4, 282:5, 282:8, 282:9, 282:15, 282:17, 282:18, 282:20, 282:22, 283:2, 283:4, 283:5, 283:8, 283:9, 283:19, 284:13, 285:5, 285:5, 289:6, 291:21, 292:15, 292:20, 292:25, 293:12, 294:4, 298:10, 298:11, 307:21, 313:18, 330:11, 338:3, 340:8, 373:10, 386:21, 387:6, 390:14, 403:24, 412:1, 423:15, 429:3, 435:7, 436:6, 454:19, 469:24, 469:25, 507:22, 513:18, 523:18, 523:22, 523:24, 524:10, 524:16, 525:9, 525:24, 526:2, 526:4, 526:8, 526:12, 538:22, 552:13
**northeast** [2] - 375:20, 375:22
**northwest** [1] - 363:11
**note** [22] - 290:11, 331:5, 344:25, 345:1, 369:10, 373:11, 429:22, 430:1, 431:21, 434:6, 437:8, 437:19, 440:16, 451:11, 452:8, 453:1, 453:18, 454:23, 457:8, 457:17, 461:10, 464:21
**noted** [9] - 294:3, 366:4, 372:19, 390:19, 414:17, 417:19, 450:11, 450:16, 451:18
**notes** [5] - 390:4, 394:6, 463:4, 550:17, 552:11
**nothing** [6] - 320:14, 333:5, 441:8, 545:7, 550:19
**notice** [4] - 289:12, 294:21, 445:11, 476:25
**noticed** [1] - 294:3
**notices** [1] - 437:1
**notification** [4] - 435:9, 435:23, 450:19, 495:4
**notified** [1] - 435:11
**notify** [1] - 474:4
**num** [1] - 540:21
**number** [26] - 294:21, 310:24, 311:18, 311:24, 326:13, 329:10, 386:16, 412:4, 431:15, 432:9, 434:18, 441:6, 449:20, 451:21, 452:21, 456:15, 468:10, 470:15, 471:20, 479:4, 538:17, 540:21, 541:22, 546:10, 549:9, 549:10
**Numbers** [1] - 289:12
**numbers** [1] - 470:24
**numerical** [10] - 296:1, 297:25, 325:16, 326:6, 326:9, 364:20, 365:1, 366:13, 366:21, 452:2
**numerous** [4] - 435:12, 446:3, 522:25, 538:25

## O

**oath** [6] - 291:5, 291:7, 291:12, 448:4, 458:10, 461:18
**object** [13] - 290:21, 302:2, 302:25, 303:5, 472:23, 498:24, 500:3, 500:8, 502:2, 520:3, 520:13, 522:17, 522:20
**objection** [20] - 332:24, 333:21, 458:3, 461:4, 461:5, 461:6, 461:11, 477:14, 500:19, 501:5, 501:10, 501:11, 505:19, 511:17, 530:2, 530:3, 530:4, 540:15, 541:7, 548:10
**objection's** [1] - 417:18
**objections** [5] - 333:20, 417:15, 458:2, 505:18, 511:16
**obligated** [1] - 351:24
**observed** [3] - 413:11, 414:1, 415:12
**obtain** [2] - 508:1, 540:24
**obvious** [2] - 348:17, 476:11
**obviously** [2] - 328:18, 347:21
**occupied** [3] - 370:7, 370:9, 433:2
**occur** [1] - 481:7
**occurred** [1] - 473:10
**occurs** [2] - 384:12, 423:12
**odd** [1] - 372:3
**ODDY** [7] - 286:19, 408:9, 408:16, 413:1, 429:17, 437:22, 484:22
**Oddy** [9] - 358:25, 359:8, 408:6, 408:7, 408:16, 484:12, 484:21, 484:22
**ODDY/CAITLIN** [1] - 287:15
**OF** [3] - 283:15, 286:2, 552:1
**offer** [2] - 457:24, 461:2
**Offered** [2] - 288:12, 288:17
**Office** [1] - 284:15
**office** [2] - 299:7, 529:3
**officer** [1] - 396:14
**offset** [3] - 355:2, 355:6, 355:10
**offsets** [1] - 354:22
**often** [1] - 435:25
**OIL** [1] - 277:2
**oil** [25] - 338:2, 453:1, 453:2, 453:4, 485:7, 485:15, 486:10, 506:6, 524:3, 538:8, 538:18, 539:4, 542:11, 542:12, 542:13, 542:14, 542:17, 542:25, 543:5, 545:15, 545:23, 546:4, 546:13, 546:15, 546:23
**Oil** [7] - 289:9, 507:17, 514:1, 514:19, 515:1, 517:1, 538:6
**old** [2] - 334:1, 337:23
**Oliver** [17] - 277:14, 278:4, 278:16, 279:3, 279:17, 280:6, 280:19, 281:5, 281:20, 282:9, 282:22, 283:9, 405:17, 435:13, 435:18, 436:8, 446:1
**OLSEN** [14] - 286:11, 308:17, 334:4, 336:2, 339:25, 359:21, 370:20, 387:8, 392:20, 448:10, 472:2, 474:13, 489:9, 489:14
**Olsen** [10] - 389:16, 392:10, 392:14, 395:14, 447:13, 447:16, 448:2, 448:3, 458:1, 474:8
**OLSEN/JIMMY** [1] - 287:15
**OLSEN/WADE** [1] - 287:6
**on-site** [2] - 429:13, 436:24
**once** [6] - 368:2, 416:4, 419:10, 432:17, 479:22, 526:13
**one** [119] - 295:22, 299:19, 299:20, 301:2, 301:3, 307:2, 313:25, 315:7, 327:1, 331:4, 333:18, 343:3, 343:24, 348:8, 348:9, 348:11, 349:14, 350:12, 351:11, 354:2, 362:9, 362:11, 365:17, 366:10, 368:24, 371:2, 371:25, 379:7, 387:2, 388:3, 388:12, 388:13, 388:18, 392:10, 393:4, 393:11, 393:14, 394:4, 397:17, 397:18, 411:4, 412:17, 412:19, 415:17, 416:25, 419:16, 419:17, 420:14, 424:9, 426:17, 429:2, 433:9, 433:14, 434:13, 434:16, 434:25, 436:15, 437:24, 438:3, 438:14, 438:17, 439:3, 439:6, 439:7, 439:17, 442:5, 442:18, 442:19, 444:16, 445:7, 445:9, 445:16, 446:9, 447:19, 448:16, 449:20, 450:16, 450:21, 453:3, 453:4,

456:21, 462:18, 462:23, 463:9, 464:2, 469:2, 469:16, 470:11, 471:4, 472:17, 477:1, 478:1, 478:6, 478:10, 481:9, 483:7, 484:12, 488:2, 501:13, 508:18, 508:22, 509:11, 509:14, 509:25, 510:17, 510:21, 510:25, 511:8, 512:18, 518:17, 521:3, 522:14, 523:4, 531:4, 531:25, 541:2, 542:9, 550:18, 550:24
**one's** [1] - 489:21
**one-fourth** [1] - 343:3
**one-mile** [4] - 388:12, 388:18, 393:4, 393:14
**one-year** [1] - 464:2
**ones** [5] - 468:25, 470:3, 470:7, 484:12, 518:18
**Ontario** [1] - 528:2
**Opeche** [1] - 380:24
**Opeche/Spearfish** [8] - 361:21, 362:14, 380:25, 381:10, 381:16, 381:19, 402:11, 413:13
**open** [5] - 306:5, 306:6, 326:14, 479:2, 511:21
**opened** [1] - 478:25
**Opening** [1] - 286:4
**operate** [5] - 277:19, 279:22, 282:1, 351:24, 479:11
**operated** [8] - 355:12, 397:6, 397:17, 428:21, 478:22, 482:8, 482:19, 498:11
**operating** [26] - 333:5, 396:14, 425:10, 426:4, 426:23, 465:4, 465:11, 469:3, 476:15, 478:19, 479:5, 479:7, 479:13, 479:15, 479:16, 479:19, 480:18, 482:5, 482:23, 490:12, 493:12, 493:22, 494:23, 495:11, 495:25, 496:9
**operation** [6] - 347:4, 415:10, 483:9, 483:11, 492:17, 499:19
**operational** [7] - 312:25, 313:14, 366:23, 397:2, 399:15, 399:22, 465:6
**operations** [21] - 331:5, 331:10, 331:18, 331:23, 342:10, 356:16, 356:17, 368:2, 401:16, 409:4, 430:13, 455:19, 459:20, 464:22, 466:9, 466:10, 466:15, 466:17, 467:2, 483:8
**Operations** [1] - 455:15
**operator** [4] - 330:22, 333:6, 351:22, 495:4
**operator's** [1] - 352:5
**Operators** [1] - 511:5
**operators** [1] - 512:3
**Ophir** [1] - 537:21
**opinion** [3] - 300:3, 301:14, 499:3
**opportunity** [6] - 289:14, 303:4, 410:24, 416:25, 431:9, 521:2
**opposed** [4] - 385:3, 442:1, 442:8, 442:21
**opposing** [2] - 301:20, 396:17
**option** [2] - 431:12, 543:25
**optionality** [1] - 431:9
**options** [3] - 435:20, 543:22, 543:24
**order** [17] - 278:6, 280:10, 282:12, 293:20, 297:11, 306:7, 306:14, 358:12, 373:19, 375:5, 378:25, 392:22, 432:14, 476:9, 497:11, 510:14, 530:25
**orders** [1] - 341:4
**ordinary** [1] - 507:15
**organizational** [1] - 434:5
**originally** [2] - 469:15, 500:1
**originate** [1] - 394:23
**otherwise** [1] - 449:14
**outlaid** [1] - 407:15
**outlet** [1] - 421:7
**outlets** [1] - 420:19
**outline** [3] - 508:23, 509:15, 510:7
**outlines** [1] - 459:21
**output** [2] - 298:1, 469:5
**outreach** [1] - 405:20
**outside** [24] - 295:5, 295:8, 314:6, 320:13, 327:13, 334:13, 336:7, 339:7, 347:15, 347:21, 352:2, 352:7, 352:11, 353:16, 353:24, 363:24, 364:1, 374:4, 384:21, 393:5, 393:7, 393:11, 520:25, 523:1
**over-leasing** [1] - 310:21
**overall** [3] - 376:2, 382:23, 400:23
**overarching** [1] - 445:25
**overestimate** [2] - 310:19, 311:8
**overlaid** [1] - 327:2
**overlying** [1] - 339:5
**overpressure** [1] - 495:8
**overpressured** [2] - 495:12, 495:14
**overpressurized** [2] - 339:16, 339:17
**overrule** [1] - 303:8
**overruled** [5] - 333:1, 520:6, 520:16, 541:8, 548:12
**overview** [3] - 399:22, 406:4, 406:23
**own** [5] - 292:19, 487:4, 526:9, 528:9, 538:25
**owned** [7] - 277:17, 279:21, 281:23, 441:25, 469:21, 482:7, 504:5
**Owners** [1] - 511:5
**owners** [10] - 277:18, 279:21, 281:24, 292:4, 321:9, 321:19, 497:23, 498:21, 500:17, 512:3
**ownership** [2] - 296:12, 296:14
**oxidation** [2] - 486:5, 486:8
**oxygen** [2] - 366:6, 366:7

## P

**P&A** [1] - 430:19
**P&I** [1] - 491:22
**P&ID** [1] - 492:22
**P.A** [1] - 284:11
**P.C** [1] - 284:15
**p.m** [10] - 291:2, 389:1, 389:2, 447:7, 447:8, 503:4, 503:5, 551:5, 551:6, 551:11
**P.O** [1] - 284:16
**P50** [1] - 351:11
**package** [5] - 359:4, 413:20, 414:2, 414:11, 414:19
**packages** [1] - 522:1
**packer** [2] - 429:15, 429:25
**pad** [1] - 442:11
**page** [57] - 317:16, 327:15, 338:20, 344:18, 356:12, 364:4, 368:5, 368:20, 369:12, 370:6, 372:1, 374:9, 375:24, 375:25, 376:10, 377:6, 377:8, 378:12, 379:18, 380:23, 381:15, 381:23, 382:13, 382:14, 382:21, 383:5, 383:14, 385:7, 386:15, 386:17, 387:9, 388:6, 388:7, 394:6, 394:11, 395:8, 399:10, 406:11, 409:21, 421:17, 423:22, 424:17, 431:15, 434:18, 434:19, 439:19, 441:13, 441:20, 441:21, 443:19, 444:25, 463:13, 464:20, 471:18, 475:8
**Page** [30] - 286:3, 286:8, 286:12, 286:13, 286:14, 286:15, 286:16, 286:17, 286:21, 286:22, 286:23, 286:24, 287:3, 287:4, 287:5, 287:8, 287:9, 287:10, 287:11, 287:12, 287:13, 287:17, 287:22, 287:23, 287:24, 287:25, 288:4, 288:5, 288:8, 288:9
**pages** [2] - 377:9, 552:10
**Pages** [1] - 283:16
**paid** [6] - 332:16, 352:14, 352:25, 412:13, 497:2, 502:4
**pan** [1] - 371:23
**paragraph** [8] - 317:16, 381:23, 382:23, 383:5, 420:10, 431:16, 441:13, 441:21
**paralegal** [1] - 289:24
**Paralegal** [1] - 285:3
**Parameter** [1] - 400:9
**parameters** [19] - 316:11, 316:23, 317:1, 317:5, 317:22, 318:5, 318:10, 323:8, 390:20, 390:22, 400:9, 440:23, 463:20, 473:7, 481:7, 485:19, 485:22, 532:4, 543:11
**pardon** [1] - 547:4
**part** [28] - 298:14, 307:3, 308:2, 311:3, 330:4, 335:3, 368:13, 370:20, 371:9, 380:19, 386:13, 401:19, 406:7, 415:15, 430:7, 445:11, 483:17, 483:18, 484:25, 485:2, 488:4, 491:1, 516:3, 524:19, 529:19, 530:22, 531:17, 541:5
**partially** [1] - 373:3
**participated** [1] - 322:18
**participation** [1] - 358:1
**particular** [8] - 295:14, 334:6, 339:7, 409:18, 428:10, 507:2, 512:8, 530:16
**particularly** [2] - 343:14, 532:12
**parties** [4] - 289:14, 322:20, 460:1, 460:16
**party** [6] - 301:21, 366:16, 418:17, 419:8, 480:11, 533:3
**passive** [2] - 432:5, 445:1
**past** [7] - 415:7, 436:16, 499:11, 499:12, 502:3, 512:12, 517:15
**patch** [2] - 485:16, 486:10
**path** [1] - 348:20

**pathway** [4] - 338:24, 338:25, 362:20, 363:6
**pathways** [2] - 338:22, 338:23
**Paul** [3] - 527:19, 537:7, 537:18
**PAUL** [2] - 288:7, 537:10
**pause** [1] - 463:2
**pausing** [1] - 462:24
**pay** [10] - 306:21, 311:13, 325:1, 498:21, 499:9, 500:16, 502:10, 502:11, 502:13, 517:24
**paying** [3] - 320:16, 353:8, 353:11
**payment** [1] - 352:22
**payments** [5] - 314:25, 357:22, 497:23, 501:23, 501:25
**pending** [1] - 389:7
**penetrate** [1] - 357:18
**penetrates** [1] - 357:13
**people** [7] - 311:12, 411:4, 416:17, 472:12, 474:1, 476:25, 516:4
**people's** [1] - 323:25
**per** [12] - 382:3, 415:1, 415:4, 423:24, 424:18, 464:6, 481:4, 488:1, 490:19, 495:20, 531:11
**percent** [66] - 328:15, 342:24, 343:8, 343:11, 343:13, 343:17, 343:23, 344:9, 344:12, 344:25, 345:4, 345:10, 345:22, 345:23, 345:24, 346:5, 346:7, 346:13, 346:14, 346:19, 346:24, 347:12, 347:16, 347:17, 349:19, 350:16, 360:9, 360:10, 366:6, 366:11, 366:14, 366:15, 366:20, 366:22, 381:21, 382:24, 418:23, 419:5, 419:12, 419:14, 419:16, 419:19, 426:7, 462:6, 464:10, 473:10, 476:17, 476:22, 479:4, 479:13, 483:14, 490:11, 490:14, 490:20, 490:21, 490:23, 492:20, 493:22, 493:24, 494:2
**percentage** [2] - 360:8, 360:13
**perforating** [3] - 343:25, 344:2, 344:4
**perform** [7] - 297:14, 306:17, 323:24, 399:20, 415:16, 466:6, 509:6
**performed** [4] - 351:18, 451:6, 452:6, 480:11
**performing** [1] - 415:18
**performs** [1] - 316:9
**perhaps** [6] - 337:22, 338:1, 363:22, 389:13, 416:8, 423:19
**period** [17] - 297:9, 297:13, 319:5, 320:2, 350:17, 364:22, 424:4, 432:2, 440:8, 445:11, 463:8, 513:17, 515:23, 517:5, 519:13, 521:22
**periodic** [1] - 401:23
**perm** [2] - 310:24, 372:11
**permanently** [1] - 544:3
**permeabilities** [1] - 373:6
**permeability** [34] - 309:17, 309:25, 312:22, 313:2, 315:23, 316:16, 322:15, 324:13, 344:24, 345:4, 345:7, 345:14, 362:6, 368:8, 368:11, 368:16, 372:8, 372:22, 376:6, 376:21, 381:9, 381:12, 385:18, 385:20, 392:3, 414:20, 485:20, 486:1, 531:2, 531:25, 532:4, 533:7, 534:18
**permit** [45] - 295:19, 295:20, 307:18, 308:25, 310:5, 310:11, 315:12, 316:10, 321:3, 327:15, 327:18, 331:19, 334:6, 336:22, 340:24, 341:1, 341:7, 348:9, 350:12, 352:8, 354:4, 356:13, 358:16, 360:25, 391:4, 413:3, 449:17, 449:20, 449:22, 449:23, 450:17, 451:1, 451:12, 451:14, 451:15, 453:5, 453:18, 455:20, 462:20, 498:7, 506:21, 517:16, 518:7, 518:19
**Permit** [2] - 448:11, 449:16
**permits** [36] - 322:6, 324:11, 326:21, 355:25, 356:4, 359:2, 359:19, 359:23, 397:10, 406:21, 421:4, 449:12, 450:7, 450:15, 451:4, 451:7, 451:8, 451:18, 451:23, 452:6, 452:19, 453:12, 453:17, 454:4, 454:12, 454:18, 455:10, 456:11, 456:12, 456:24, 457:8, 457:17, 457:22, 462:14, 541:15, 541:16
**permitted** [6] - 310:18, 311:23, 313:15, 314:15, 340:20, 540:21
**permitting** [8] - 404:4, 419:9, 506:16, 507:12, 509:19, 516:24, 517:14, 540:20
**person** [1] - 495:24
**personally** [7] - 294:15, 294:16, 307:19, 326:11, 477:12, 529:21, 530:18
**personnel** [1] - 436:10
**pertains** [3] - 359:1, 413:18, 418:3
**Petrel** [6] - 306:6, 306:7, 363:20, 544:20, 545:1, 545:2
**Petroleum** [1] - 540:1
**petroleum** [7] - 398:24, 408:25, 504:18, 516:10, 538:1, 538:5
**petrophysical** [1] - 376:5
**pH** [1] - 485:12
**phase** [4] - 374:6, 438:13, 438:14, 438:15
**phases** [1] - 438:23
**PhD** [4] - 403:24, 403:25, 528:2
**PHI** [13] - 348:6, 348:11, 350:8, 531:1, 534:5, 534:7, 534:12, 536:2, 536:7, 536:12, 536:13, 536:18, 547:12
**PHI-H** [12] - 348:6, 348:11, 350:8, 531:1, 534:5, 534:7, 534:12, 536:2, 536:7, 536:13, 536:18, 547:12
**PHIE** [2] - 348:15, 372:11
**phone** [2] - 302:5, 503:10
**photos** [2] - 413:25, 414:15
**PHREEQ** [2] - 512:16, 523:1
**PHREEQC** [11] - 295:23, 296:5, 297:16, 297:18, 307:12, 379:19, 391:8, 521:24, 522:6, 523:3, 523:6
**physically** [1] - 300:11
**physics** [2] - 315:22, 347:21
**Piasco** [2] - 411:7, 411:8
**PIASO** [1] - 411:8
**pick** [2] - 414:2, 414:3
**picking** [1] - 466:13
**piece** [2] - 305:6, 401:23
**pieces** [1] - 298:2
**Pierre** [2] - 387:10, 409:25
**pig** [3] - 422:21, 475:18, 475:20
**pigged** [2] - 422:24, 423:2
**pigging** [1] - 421:21
**pilot** [1] - 539:7
**pinch** [4] - 375:11, 384:5, 384:12, 385:1
**pinch-out** [3] - 384:5, 384:12, 385:1
**pinches** [1] - 384:2
**pipe** [11] - 422:2, 422:9, 422:23, 469:4, 478:15, 478:17, 479:17, 490:10, 491:20, 491:25, 492:3
**Pipeline** [7] - 277:6, 278:9, 279:10, 280:12, 281:12, 282:14, 309:12
**pipeline** [13] - 397:5, 397:15, 411:25, 412:1, 422:3, 422:8, 425:20, 428:21, 435:6, 469:17, 476:5, 490:19, 492:1
**pipelines** [1] - 506:6
**piping** [11] - 476:14, 490:4, 490:25, 491:7, 491:12, 491:16, 491:20, 492:25, 493:4, 495:10
**PISC** [9] - 406:14, 406:15, 407:2, 407:7, 407:16, 432:2, 434:15, 438:14, 439:7
**place** [21] - 308:19, 309:7, 332:22, 354:4, 356:21, 378:15, 410:4, 410:13, 410:15, 421:22, 430:9, 435:10, 469:7, 482:25, 487:6, 515:3, 515:8, 515:9, 515:13, 515:16, 552:7
**placed** [2] - 355:12, 410:1
**placement** [2] - 364:12, 455:11
**plan** [37] - 319:13, 347:24, 359:24, 371:10, 395:12, 399:13, 399:15, 399:16, 399:23, 400:22, 402:7, 402:25, 405:4, 406:12, 406:21, 409:17, 415:16, 418:2, 421:2, 425:15, 429:18, 434:12, 435:25, 438:8, 439:13, 445:25, 446:14, 446:17, 453:12, 455:8, 456:15, 470:17, 484:25, 496:25, 498:13
**Plan** [7] - 401:5, 401:6, 401:20, 406:3, 433:25, 454:3, 454:10
**Plane** [1] - 390:14
**planned** [7] - 357:6, 367:11, 401:24, 402:23, 429:10, 432:5, 472:3
**planning** [3] - 415:18, 427:2, 438:14
**plans** [19] - 359:23, 367:14, 404:5, 404:14, 405:1, 406:15, 423:3, 429:23, 432:7, 437:18, 453:13, 453:14, 453:15, 453:24, 455:10, 474:20, 474:22, 483:7, 524:6
**plant** [2] - 468:11, 468:14

**plants** [2] - 419:2, 421:13
**plausible** [1] - 301:13
**play** [1] - 442:18
**plot** [1] - 345:20
**plug** [5] - 337:23, 438:3, 455:10, 474:21, 487:20
**plugged** [9] - 337:13, 337:14, 337:20, 338:2, 340:8, 371:4, 407:4, 407:17, 455:21
**plugging** [18] - 338:5, 340:3, 340:5, 406:14, 407:1, 407:16, 409:5, 409:11, 437:17, 438:8, 438:10, 438:13, 439:3, 440:9, 455:8, 455:10, 485:15, 485:17
**plugs** [11] - 336:21, 337:1, 338:11, 338:24, 339:10, 339:16, 339:20, 339:23, 360:6, 486:10, 487:12
**plume** [55] - 291:14, 291:17, 293:19, 313:4, 315:23, 319:9, 319:16, 343:6, 343:9, 344:12, 344:21, 345:18, 350:22, 364:16, 365:9, 365:11, 365:21, 365:24, 366:25, 367:2, 367:5, 368:1, 371:7, 371:10, 372:3, 372:10, 373:12, 373:17, 373:22, 390:18, 390:20, 390:22, 390:24, 415:22, 430:25, 431:6, 462:4, 462:12, 462:19, 463:6, 463:17, 463:21, 463:22, 463:23, 463:25, 464:1, 464:6, 464:7, 473:7, 473:15, 473:20, 473:23, 488:3, 499:25
**plus** [4] - 320:1, 320:2, 388:9, 388:18
**pockets** [1] - 349:2
**point** [60] - 290:14, 297:24, 298:5, 301:17, 301:19, 302:14, 302:21, 305:24, 306:11, 309:11, 309:21, 314:15, 321:6, 338:18, 344:17, 345:9, 356:10, 361:16, 369:11, 369:12, 373:19, 374:13, 378:16, 379:7, 379:13, 386:20, 402:24, 410:21, 410:25, 414:13, 429:1, 429:22, 438:16, 441:15, 442:19, 442:24, 444:14, 444:19, 445:5, 446:23, 451:20, 459:23, 460:12, 461:8, 462:13, 464:3, 466:5, 469:25, 474:21, 476:20, 492:20, 492:21, 492:22, 492:23, 497:2, 515:10, 526:14, 533:10, 548:17
**pointed** [1] - 450:21
**pointing** [1] - 336:12
**points** [21] - 294:20, 294:23, 297:20, 298:17, 304:24, 318:20, 351:7, 368:14, 372:18, 426:5, 443:4, 445:2, 445:4, 449:13, 453:6, 493:15, 495:1, 495:17, 531:12, 531:13, 534:16
**policies** [1] - 407:15
**policy** [1] - 407:21
**pollution** [3] - 407:14, 407:20, 438:21
**pool** [3] - 278:19, 280:22, 283:2
**Poplar** [7] - 539:4, 539:5, 539:12, 541:2, 541:3, 542:25, 543:1
**populate** [1] - 369:9
**populated** [1] - 376:20
**pore** [48] - 277:16, 277:17, 279:20, 279:21, 281:23, 292:4, 293:5, 321:19, 329:20, 330:1, 330:4, 330:12, 330:14, 330:16, 330:17, 330:18, 330:23, 332:4, 332:14, 332:18, 333:7, 333:10, 341:13, 342:6, 342:11, 342:15, 342:24, 349:15, 349:21, 349:24, 352:1, 352:10, 352:16, 353:10, 353:11, 353:12, 353:13, 353:17, 543:17, 543:21, 543:23, 544:3, 544:4, 544:6, 544:11, 544:16, 546:17, 548:16
**Pore** [1] - 450:14
**porosity** [27] - 344:24, 345:4, 345:6, 345:14, 349:20, 350:10, 351:2, 351:5, 352:16, 354:5, 368:16, 372:8, 372:21, 373:6, 376:5, 376:6, 376:21, 381:9, 382:24, 385:18, 385:19, 414:13, 414:19, 531:1, 533:8, 534:18, 541:25
**porosity/perm** [1] - 372:16
**portfolio** [1] - 405:23
**portfolios** [1] - 486:24
**portion** [2] - 450:25, 516:5
**pose** [1] - 361:12
**posed** [3] - 389:10, 390:1, 413:19
**position** [2] - 532:20, 547:17
**positive** [3] - 382:4, 382:25, 393:24
**possession** [3] - 296:7, 547:20, 547:21
**possibility** [1] - 532:7
**possible** [2] - 311:5, 311:7
**possibly** [2] - 414:21, 445:12
**post** [3] - 476:19, 477:22, 484:3
**postinjection** [11] - 320:2, 374:6, 399:16, 434:23, 456:14, 463:7, 463:11, 463:12, 463:16, 463:18, 473:19
**Postinjection** [1] - 454:2
**pot** [2] - 429:10, 429:20
**potential** [20] - 293:22, 302:19, 303:17, 305:25, 308:22, 314:20, 331:3, 338:19, 347:19, 347:20, 354:14, 364:19, 367:4, 405:13, 432:6, 466:23, 486:5, 487:8, 510:9, 542:25
**potentially** [18] - 314:6, 314:10, 314:23, 315:11, 316:16, 318:5, 325:12, 325:14, 330:8, 340:17, 365:10, 366:3, 372:22, 378:4, 380:17, 415:9, 469:14, 481:7
**Powder** [1] - 538:21
**POWELL** [18] - 396:1, 411:7, 412:5, 418:22, 420:9, 420:24, 423:19, 424:13, 425:7, 428:23, 433:3, 433:15, 433:22, 435:5, 436:5, 441:20, 490:3, 490:17
**Powell** [11] - 370:14, 395:22, 395:23, 396:10, 397:23, 478:7, 478:8, 484:11, 489:23, 496:11, 501:21
**POWELL/JOHN** [1] - 286:19
**POWELL/WADE** [1] - 287:15
**power** [1] - 468:12
**practice** [1] - 296:20
**Precambrian** [1] - 394:24
**precipitant** [1] - 377:23
**precipitating** [1] - 377:13
**precipitation** [3] - 378:15, 381:25, 391:1
**preclude** [1] - 333:5
**predicted** [7] - 325:15, 327:21, 372:9, 373:22, 463:19, 480:2, 481:2
**predicting** [2] - 351:5, 374:5
**predictions** [1] - 368:1
**predictive** [2] - 316:19, 321:12
**predominantly** [2] - 396:21, 425:20
**prefer** [2] - 472:12, 472:16
**preference** [1] - 310:23
**preinjection** [1] - 399:15
**prepare** [2] - 515:4, 524:21
**prepared** [2] - 477:5, 546:9
**preparing** [3] - 526:5, 546:3, 546:5
**present** [5] - 302:5, 302:13, 361:20, 451:12, 453:2
**PRESENT** [1] - 284:2
**presentations** [4] - 323:16, 324:3, 324:5, 324:9
**presented** [4] - 324:7, 378:16, 382:16, 462:20
**presenting** [1] - 375:2
**president** [1] - 539:6
**pressure** [176] - 313:4, 317:13, 326:24, 327:8, 327:12, 327:21, 327:24, 328:11, 328:14, 328:15, 328:16, 328:18, 329:4, 329:6, 329:19, 329:21, 329:24, 330:1, 330:5, 330:6, 330:13, 330:24, 331:2, 331:6, 331:8, 331:12, 331:14, 331:15, 331:20, 331:21, 332:3, 332:9, 332:11, 335:7, 335:9, 336:11, 338:7, 339:1, 339:22, 341:14, 342:15, 342:18, 342:19, 342:23, 342:25, 350:21, 358:9, 358:11, 358:17, 359:6, 364:16, 364:19, 365:13, 369:13, 369:15, 369:20, 369:23, 384:4, 384:14, 384:21, 385:7, 385:10, 386:2, 401:14, 402:19, 402:21, 412:22, 413:6, 413:10, 413:11, 413:15, 413:16, 418:5, 418:10, 424:24, 425:10, 425:25, 426:4, 426:11, 426:12, 426:13, 426:15, 426:22, 427:1, 427:5, 429:11, 430:3, 430:4, 452:12, 455:17, 457:19, 462:3, 462:5, 462:6, 462:7, 462:8, 462:9, 462:10, 462:15, 462:16, 462:18, 464:16, 464:17, 464:21, 464:23, 464:24, 465:1, 465:2, 465:4, 465:5, 465:8, 465:12, 469:2, 469:3, 469:5, 469:7, 470:18, 475:19, 475:22, 476:1, 476:5, 476:9, 476:14, 476:15, 476:18, 478:16,

478:23, 479:1, 479:2, 479:3, 479:5, 479:7, 479:11, 479:14, 479:15, 479:16, 479:19, 479:23, 480:18, 481:20, 483:9, 483:11, 484:2, 490:5, 490:8, 490:10, 490:12, 490:14, 490:18, 490:22, 491:25, 492:2, 492:4, 492:15, 492:18, 492:25, 493:1, 493:4, 493:13, 493:23, 494:9, 494:10, 494:12, 494:23, 494:24, 495:5, 495:7, 525:3, 543:12, 544:10, 544:13, 544:14
**pressures** [14] - 317:14, 319:15, 328:19, 331:17, 337:7, 426:3, 452:11, 454:7, 456:2, 476:3, 476:6, 485:3, 486:21, 487:7
**presume** [1] - 499:21
**pretend** [1] - 345:22
**pretty** [2] - 423:15, 541:20
**prevent** [2] - 309:8, 486:7
**preventing** [2] - 341:21, 342:5
**prevention** [2] - 427:17, 453:14
**Prevention** [1] - 401:5
**previous** [11] - 377:16, 378:24, 391:4, 406:20, 414:24, 436:23, 447:21, 459:11, 493:17, 519:8
**previously** [9] - 322:4, 324:14, 430:21, 448:8, 452:3, 452:25, 453:20, 458:16, 500:4
**primacy** [16] - 294:7, 507:18, 507:21, 508:1, 508:6, 512:8, 512:9, 514:23, 514:24, 515:8, 517:17, 518:6, 518:14, 519:3, 519:4, 525:25
**primarily** [5] - 401:12, 402:7, 504:21, 516:15, 546:22
**primary** [10] - 292:11, 377:12, 377:17, 387:12, 387:14, 387:23, 400:12, 485:7, 485:18, 543:2
**private** [1] - 506:1
**privilege** [2] - 302:4, 302:8
**privileged** [1] - 548:10
**privy** [3] - 307:11, 342:12, 486:11
**proactive** [1] - 431:4
**probable** [1] - 351:19
**probe** [3] - 427:24, 428:3, 428:8
**probes** [3] - 427:20, 428:12, 428:15
**problem** [3] - 475:4, 497:15, 513:11
**problematic** [1] - 320:6
**procedure** [1] - 516:24
**procedures** [4] - 495:6, 495:20, 496:1, 496:9
**proceed** [5] - 291:4, 389:6, 389:18, 458:6, 503:7
**proceedance** [1] - 315:6
**proceeding** [3] - 301:21, 328:23, 507:4
**PROCEEDINGS** [1] - 286:2
**proceedings** [3] - 289:1, 322:16, 552:6
**process** [12] - 290:22, 300:15, 314:9, 315:3, 323:15, 352:12, 379:21, 385:15, 507:12, 509:19, 542:12, 542:21
**procure** [4] - 297:10, 306:3, 306:20, 307:2
**procured** [2] - 296:24, 297:5
**procurement** [1] - 299:3
**produce** [3] - 304:22, 355:6, 547:12
**produced** [5] - 326:23, 348:9, 348:10, 348:11, 524:6
**Professional** [2] - 552:4, 552:18
**professional** [10] - 323:10, 398:23, 504:15, 505:14, 528:4, 529:14, 538:3, 538:4, 539:23, 540:11
**professor** [1] - 528:8
**profile** [2] - 402:18, 471:21
**program** [25] - 293:1, 409:22, 507:19, 507:20, 508:2, 508:3, 508:8, 508:10, 508:12, 508:20, 508:23, 509:15, 510:2, 511:10, 514:22, 514:24, 516:22, 517:7, 517:14, 518:21, 519:9, 522:8, 523:6, 523:11, 547:14
**Program** [1] - 511:3
**programs** [8] - 296:23, 297:3, 454:3, 508:14, 520:19, 522:5, 522:16, 523:15
**progressing** [1] - 431:7
**Project** [3] - 322:5, 322:17, 449:25
**project** [48] - 293:15, 296:25, 297:1, 297:13, 300:6, 305:1, 308:3, 322:5, 322:21, 329:3, 329:5, 331:22, 332:5, 332:20, 335:3, 339:3, 340:16, 341:10, 370:21, 394:21, 401:25, 408:20, 424:1, 434:11, 450:5, 450:7, 468:5, 507:8, 507:20, 512:3, 512:5, 515:24, 516:1, 516:19, 518:5, 520:12, 520:23, 528:18, 529:20, 529:22, 542:22, 543:6, 544:21, 545:19, 545:24, 546:5, 548:6, 549:1
**projected** [1] - 379:2
**projection** [2] - 363:19, 390:13
**projects** [14] - 396:23, 409:5, 506:11, 507:2, 507:5, 523:24, 524:1, 524:19, 542:9, 545:15, 545:22, 545:23, 546:4, 546:10
**promulgated** [1] - 293:8
**pronounce** [1] - 411:6
**propagation** [2] - 359:6, 413:15
**proper** [5] - 299:13, 300:8, 300:10, 340:23, 436:25
**properly** [2] - 425:24, 432:14
**properties** [15] - 316:15, 317:8, 317:20, 350:14, 363:5, 372:19, 376:8, 386:9, 485:13, 531:18, 533:4, 535:17, 545:4
**property** [9] - 311:13, 311:19, 315:15, 318:15, 318:16, 348:15, 351:9, 351:11, 352:14
**proportional** [1] - 352:22
**proposed** [16] - 296:18, 319:9, 327:25, 356:2, 356:23, 363:13, 367:7, 367:16, 368:24, 386:24, 407:24, 418:1, 427:20, 435:4, 442:23, 544:15
**proposes** [1] - 371:11
**proposing** [4] - 389:13, 438:12, 459:2, 459:8
**proprietary** [1] - 486:18
**propriety** [1] - 317:4
**prospective** [1] - 526:5
**protect** [2] - 293:20, 481:23
**protected** [1] - 339:13
**protecting** [1] - 293:11
**protection** [7] - 427:21, 428:19, 428:22, 442:23, 443:1, 443:22, 443:24
**protective** [1] - 371:6
**protocol** [3] - 308:18, 495:6, 495:13
**protocols** [1] - 495:22
**provide** [51] - 295:5, 295:19, 302:15, 302:17, 302:18, 303:17, 303:18, 303:22, 304:19, 305:21, 306:1, 319:2, 322:19, 363:22, 366:3, 370:11, 378:4, 380:15, 380:17, 380:21, 382:6, 382:11, 383:2, 386:10, 390:9, 391:5, 392:4, 394:1, 398:18, 399:8, 401:15, 403:21, 405:3, 406:4, 406:22, 410:5, 411:17, 411:19, 433:17, 435:22, 437:5, 437:14, 439:10, 467:1, 476:25, 485:8, 491:7, 506:14, 520:18, 541:17, 547:22
**provideable** [1] - 378:1
**provided** [42] - 294:24, 295:1, 295:7, 295:11, 295:13, 295:19, 295:23, 297:20, 297:23, 298:4, 298:6, 298:9, 298:13, 298:16, 301:24, 302:1, 304:11, 304:21, 305:3, 305:6, 305:11, 348:8, 397:11, 411:24, 412:2, 432:18, 433:12, 434:8, 436:24, 437:10, 445:11, 490:25, 491:3, 495:22, 508:3, 509:18, 524:23, 531:16, 533:2, 534:20, 544:18, 547:17
**provider** [1] - 438:18
**provides** [4] - 477:8, 509:1, 510:7, 510:10
**providing** [5] - 305:23, 310:2, 392:11, 436:11, 468:7
**proximity** [4] - 319:11, 356:5, 433:13, 459:12
**prudent** [2] - 460:10, 474:7
**PSC** [5] - 412:2, 412:9, 435:7, 477:10, 477:19
**psi** [27] - 332:10, 336:11, 337:9, 338:8, 339:19, 340:1, 342:15, 342:21, 342:22, 413:9, 414:25, 415:1, 415:4, 425:10, 425:11, 426:15, 426:16, 429:12, 430:2, 462:15, 465:1, 465:5, 465:6, 469:8, 470:13, 470:18
**public** [1] - 301:6
**Public** [2] - 412:7, 477:5
**publicly** [3] - 299:22, 299:25, 533:16
**publish** [1] - 496:8
**published** [2] - 347:1, 386:23
**pull** [3] - 298:24, 505:5, 529:1

**pulling** [1] - 510:20
**pulse** [3] - 401:21, 401:23, 402:12
**pump** [9] - 422:16, 425:25, 426:2, 469:5, 469:6, 476:5, 476:10, 476:12, 476:13
**pumped** [1] - 413:9
**pumps** [1] - 425:22
**punch** [1] - 375:19
**punted** [1] - 432:25
**purchase** [1] - 539:2
**purely** [1] - 372:13
**purity** [3] - 366:11, 366:25, 367:1
**purpose** [9] - 291:25, 292:1, 293:11, 317:15, 400:12, 405:1, 405:2, 475:10, 478:12
**purposes** [2] - 323:6, 376:15
**pursuant** [3] - 293:2, 393:14, 443:19
**pursuit** [1] - 507:23
**put** [11] - 290:21, 298:25, 299:8, 299:11, 300:22, 340:13, 347:24, 432:11, 516:21, 521:24, 534:5
**putting** [5] - 307:14, 371:11, 469:12, 469:14, 469:16

## Q

**QC** [1] - 299:13
**qualifications** [3] - 505:14, 539:24, 540:12
**quality** [12] - 300:16, 316:18, 354:15, 354:17, 354:19, 354:20, 354:22, 355:2, 355:7, 418:22, 504:21, 524:4
**Quality** [1] - 507:6
**quantify** [1] - 358:5
**quantity** [1] - 544:2
**quarter** [1] - 491:21
**quarterly** [1] - 440:7
**Queen's** [1] - 528:2
**questioning** [3] - 303:6, 322:1, 496:12
**questions** [88] - 318:20, 332:21, 348:4, 355:14, 355:15, 355:19, 355:20, 358:15, 360:22, 361:5, 362:10, 363:17, 369:24, 370:4, 371:22, 371:25, 377:19, 389:6, 389:10, 389:18, 389:25, 390:5, 390:9, 391:7, 392:7, 392:8, 392:9, 392:13, 392:22, 393:17, 393:20, 394:5, 395:12, 397:22, 397:24, 399:2, 403:2, 404:20, 408:4, 409:10, 410:20, 410:25, 411:2, 411:10, 411:15, 413:17, 427:16, 437:25, 447:17, 447:20, 450:20, 458:1, 461:1, 461:14, 467:6, 467:11, 468:20, 468:21, 468:23, 471:3, 471:12, 472:19, 472:24, 474:23, 475:2, 484:10, 496:16, 502:17, 502:19, 512:20, 512:22, 516:17, 517:10, 520:14, 521:19, 525:13, 525:14, 526:24, 532:15, 535:20, 536:23, 536:24, 537:3, 545:9, 548:3, 550:9, 550:10
**quick** [6] - 290:11, 333:13, 405:4, 407:12, 484:12, 503:14
**quicker** [1] - 535:19
**quickly** [3] - 379:7, 381:7, 416:19
**quite** [2] - 534:17, 542:10

## R

**radius** [1] - 541:22
**raise** [4] - 395:24, 398:4, 403:6, 408:8
**raised** [2] - 501:15, 501:17
**ran** [14] - 299:14, 317:12, 317:24, 318:2, 318:8, 318:14, 321:10, 324:18, 326:5, 340:14, 367:12, 413:23, 462:14, 546:14
**ranching** [1] - 506:1
**randomly** [1] - 351:1
**Range** [59] - 277:7, 277:9, 277:11, 277:12, 277:13, 277:21, 277:22, 278:1, 278:2, 278:3, 278:10, 278:11, 278:14, 278:15, 278:16, 278:20, 278:22, 279:1, 279:2, 279:3, 279:11, 279:14, 279:16, 279:16, 280:1, 280:4, 280:5, 280:6, 280:14, 280:16, 280:18, 280:19, 280:23, 281:2, 281:4, 281:5, 281:13, 281:15, 281:16, 281:18, 281:20, 282:3, 282:4, 282:5, 282:8, 282:9, 282:15, 282:17, 282:18, 282:20, 282:22, 283:3, 283:4, 283:5, 283:8, 283:9, 373:10, 423:15, 429:3
**range** [14] - 300:24, 301:14, 342:21, 394:15, 404:1, 415:5, 425:10, 425:13, 425:15, 425:17, 425:18, 426:3, 427:6, 549:13
**ranges** [2] - 374:12, 385:19
**rare** [1] - 507:10
**rate** [18] - 328:3, 328:8, 331:11, 423:23, 424:12, 424:17, 463:24, 463:25, 464:2, 464:3, 470:8, 470:12, 473:16, 480:16, 480:19, 483:8, 483:11, 483:13
**rated** [2] - 340:1, 486:20
**rates** [9] - 317:13, 321:7, 331:3, 331:7, 332:6, 333:9, 340:14, 425:3, 452:11
**rather** [3] - 369:7, 484:5, 491:5
**ratings** [2] - 464:23, 469:4
**ratio** [2] - 315:23, 421:2
**rattle** [1] - 466:4
**Raymond** [10] - 371:3, 430:19, 487:20, 487:22, 488:4, 488:8, 488:16, 488:21, 489:12, 489:17
**re** [12] - 277:3, 277:15, 278:5, 278:18, 279:7, 279:18, 280:8, 280:21, 281:9, 281:21, 282:11, 283:1
**reach** [1] - 488:3
**reached** [2] - 342:9, 446:1
**reaches** [3] - 422:12, 441:15, 492:23
**reactions** [3] - 360:18, 486:6, 486:8
**reactive** [1] - 366:8
**read** [8] - 305:12, 305:14, 320:22, 320:23, 374:21, 389:14, 420:10, 521:11
**readily** [3] - 377:24, 473:21, 473:25
**reading** [2] - 443:21, 521:12
**readings** [1] - 401:15
**reads** [2] - 387:10, 445:18
**ready** [9] - 393:17, 413:4, 458:20, 512:10, 512:11, 512:15, 532:11, 544:21, 544:24
**real** [4] - 333:13, 381:6, 428:5, 503:14
**realization** [1] - 350:11
**reallocate** [1] - 497:22
**really** [9] - 346:8, 399:24, 400:23, 405:3, 405:19, 406:12, 425:19, 431:8, 550:5
**reason** [5] - 291:25, 292:11, 307:3, 376:17, 419:3
**reasonability** [1] - 323:19
**reasonable** [1] - 373:21
**reasoning** [1] - 365:15
**reasons** [1] - 365:17
**rebalance** [1] - 443:6
**recalled** [1] - 467:6
**recalling** [2] - 416:2, 447:18
**receipt** [1] - 397:13
**receive** [1] - 532:13
**Received** [2] - 288:12, 288:17
**received** [7] - 392:7, 392:9, 392:10, 395:18, 475:18, 512:14, 525:25
**receiver** [9] - 354:22, 355:1, 355:6, 355:10, 422:4, 422:5, 422:13, 475:15, 475:18
**receivers** [3] - 354:25, 355:5, 355:11
**recently** [4] - 392:25, 529:17, 540:2, 542:23
**recess** [1] - 551:8
**Recessed** [6] - 321:22, 389:1, 447:7, 503:4, 551:5, 551:11
**recite** [1] - 392:18
**recognize** [1] - 326:18
**recognized** [3] - 386:21, 446:12
**recollect** [1] - 425:24
**recollection** [3] - 419:15, 482:17, 518:22
**recommend** [2] - 469:19, 532:25
**recommendation** [3] - 439:1, 498:12, 550:6
**recommendations** [3] - 479:8, 509:2, 532:20
**recommending** [1] - 442:12
**recomplete** [1] - 338:12
**reconciled** [2] - 421:6, 421:15
**reconfigured** [1] - 443:10
**reconvened** [5] - 321:22, 389:1, 447:7, 503:4, 551:5
**record** [19] - 289:2, 289:5, 290:21, 321:25, 327:18, 389:4, 396:9, 398:11, 403:13, 408:15, 417:3, 447:10, 461:9, 467:22, 503:7, 518:3, 551:4, 551:8, 552:7
**Record** [2] - 305:14, 320:23
**recorded** [1] - 552:5
**recordkeeping** [2] - 508:15, 511:1
**Recordkeeping** [1] - 511:4
**records** [2] - 340:3, 340:5
**recovery** [11] - 538:18, 539:4, 542:12, 542:20,

542:21, 542:25, 545:15, 545:23, 546:4, 546:13, 546:15
**recreate** [2] - 299:23, 301:11
**Recross** [1] - 287:13
**RECROSS** [1] - 473:4
**Recross-Examination** [1] - 287:13
**RECROSS-EXAMINATION** [1] - 473:4
**recycled** [1] - 542:19
**Red** [1] - 536:16
**red** [7] - 348:18, 348:20, 349:2, 349:10, 350:25, 373:20, 373:25
**REDIRECT** [5] - 389:22, 448:5, 458:12, 461:20, 526:16
**Redirect** [5] - 286:16, 287:8, 287:9, 287:10, 287:25
**redirect** [3] - 525:15, 537:1, 550:12
**redistribute** [1] - 545:4
**redraw** [1] - 314:21
**redrill** [1] - 338:11
**reduce** [6] - 311:10, 311:16, 354:14, 354:16, 466:8, 483:10
**reduced** [4] - 317:22, 483:8, 483:13, 485:21
**reduces** [3] - 311:17, 330:14, 330:18
**reducing** [1] - 312:2
**reduction** [1] - 345:21
**reevaluate** [1] - 373:22
**reevaluated** [1] - 509:5
**reevaluation** [6] - 313:12, 314:5, 318:24, 319:4, 350:17, 509:6
**refer** [6] - 318:3, 409:18, 445:8, 488:10, 488:17, 521:3
**reference** [11] - 316:4, 377:8, 386:17, 407:12, 431:14, 439:19, 470:10, 484:23, 491:12, 512:18
**referenced** [11] - 298:19, 298:21, 327:19, 386:16, 469:3, 493:10, 508:19, 509:12, 510:1, 513:22, 521:23
**references** [2] - 309:1, 393:8
**referencing** [5] - 382:1, 382:23, 383:15, 387:4, 428:24
**referred** [1] - 514:3
**referring** [6] - 295:8, 304:1, 385:22, 406:25, 413:12, 449:19
**refine** [1] - 443:13
**refined** [1] - 443:15
**refinement** [3] - 363:24, 364:1, 364:2
**refinery** [1] - 504:18
**reflect** [5] - 356:15, 411:17, 505:13, 539:22, 540:11
**reflected** [1] - 385:20
**reflecting** [2] - 314:19, 411:22
**regarding** [8] - 309:21, 310:14, 314:4, 373:17, 394:11, 474:9, 509:2, 530:15
**regardless** [5] - 321:5, 336:25, 444:3, 473:16, 512:7
**regimes** [1] - 509:13
**region** [2] - 293:14, 372:7
**Registered** [2] - 552:3, 552:18
**regular** [1] - 485:15
**regulation** [5] - 293:1, 314:3, 490:19, 493:22, 511:11
**regulations** [23] - 291:22, 292:4, 292:15, 292:16, 293:19, 294:4, 294:5, 294:6, 294:7, 313:11, 367:15, 397:7, 404:8, 410:11, 454:19, 462:9, 485:6, 507:9, 507:11, 508:21, 510:3, 515:4, 515:11
**regulator** [1] - 466:16
**regulatory** [9] - 291:16, 328:12, 328:16, 367:20, 367:23, 436:22, 495:23, 496:8, 509:13
**relate** [1] - 457:22
**related** [21] - 304:25, 308:3, 311:24, 312:3, 312:21, 321:19, 322:16, 323:22, 341:4, 360:22, 363:18, 368:13, 371:2, 418:17, 427:17, 441:13, 454:5, 456:13, 474:24, 512:13, 543:8
**relates** [8] - 384:14, 415:3, 421:20, 437:16, 440:4, 449:16, 477:20, 489:22
**relation** [4] - 308:20, 309:1, 334:19, 450:7
**relationship** [1] - 482:22
**relative** [3] - 392:3, 413:5, 524:17
**relatively** [1] - 521:21
**release** [9] - 476:18, 477:1, 480:2, 480:9, 481:6, 481:21, 492:9, 493:6, 493:11
**released** [5] - 439:6, 481:2, 481:14, 492:6, 493:8
**releases** [2] - 308:22, 493:1
**relevance** [1] - 541:7
**relevant** [1] - 342:1
**relied** [1] - 508:11
**relief** [17] - 475:22, 475:25, 476:1, 478:13, 478:18, 478:20, 478:22, 480:4, 480:10, 484:2, 490:5, 490:9, 491:24, 492:2, 492:13, 493:3, 494:9
**relies** [1] - 495:14
**relieve** [5] - 478:23, 480:15, 490:5, 494:12, 495:7
**relieved** [2] - 492:1, 492:5
**relieves** [4] - 492:23, 492:24, 493:3, 494:10
**reluctantly** [1] - 465:16
**remain** [1] - 441:16
**remainder** [2] - 290:17, 397:4
**remaining** [3] - 290:15, 416:18, 467:10
**remains** [2] - 452:19, 453:25
**remedial** [6] - 404:13, 404:24, 405:1, 439:13, 440:21, 506:16
**Remedial** [2] - 433:25, 454:9
**remediation** [3] - 407:18, 506:16, 524:5
**remember** [7] - 320:21, 392:21, 451:1, 468:22, 488:2, 494:1, 494:20
**reminder** [4] - 404:11, 448:4, 458:10, 461:18
**remove** [1] - 544:1
**removed** [1] - 475:20
**rename** [1] - 387:3
**renaming** [1] - 386:24
**repeat** [8] - 311:15, 317:3, 356:4, 488:20, 489:9, 490:17, 520:9, 529:7
**repeated** [1] - 342:4
**rephrase** [2] - 420:17, 518:11
**replacement** [4] - 440:6, 441:2, 441:5, 481:22
**replicate** [5] - 299:23, 301:5, 325:18, 325:24, 326:3
**replugged** [1] - 338:14
**Report** [2] - 386:23, 400:19
**report** [2] - 444:21, 464:25
**REPORTER** [2] - 490:15, 552:1
**reporter** [1] - 453:7
**Reporter** [2] - 552:4, 552:18
**Reporter.....** [1] - 286:8
**reporting** [4] - 398:17, 400:19, 421:4, 511:1
**Reporting** [3] - 400:20, 400:21, 511:4
**reports** [4] - 298:14, 324:4, 522:9, 549:25
**represent** [6] - 331:20, 357:15, 381:18, 383:25, 414:19, 513:4
**representative** [7] - 296:11, 302:11, 302:13, 381:13, 386:7, 414:2, 414:6
**represented** [5] - 335:14, 375:4, 382:17, 382:20, 387:5
**representing** [2] - 344:22, 345:23
**represents** [3] - 349:19, 369:17, 369:18
**request** [6] - 294:25, 304:1, 432:11, 439:6, 460:20, 460:21
**requested** [7] - 296:6, 301:23, 305:14, 320:23, 367:21, 514:18, 521:20
**requesting** [4] - 277:4, 279:8, 281:10, 533:22
**requests** [1] - 547:1
**require** [17] - 277:17, 279:20, 281:23, 292:4, 293:19, 294:6, 313:5, 313:11, 314:13, 335:4, 341:9, 367:15, 420:1, 437:20, 438:4, 442:2, 469:17
**required** [22] - 277:19, 279:22, 282:1, 293:21, 293:24, 293:25, 298:12, 306:3, 318:24, 330:10, 330:11, 336:23, 338:7, 338:16, 352:5, 367:18, 429:24, 430:2, 437:3, 462:8, 509:19, 544:19
**requirement** [7] - 292:8, 292:11, 336:25, 366:10, 442:2, 487:1, 512:7
**requirements** [3] - 294:10, 323:22, 443:23
**requires** [2] - 314:14, 430:3
**requiring** [1] - 454:20
**reran** [1] - 418:10
**rerun** [2] - 313:9, 324:1
**resampled** [1] - 420:7
**Research** [1] - 303:14
**research** [5] - 389:12, 521:13, 528:6, 528:18, 528:23
**reserves** [2] - 355:24, 431:18
**reserving** [1] - 417:14
**reservoir** [47] - 277:16, 279:20, 281:22, 291:24, 292:2, 296:3, 297:25, 317:22, 327:8, 328:9, 329:25, 330:5, 331:8, 337:7, 342:16, 348:7,

350:23, 355:10, 365:18, 379:2, 384:4, 384:23, 390:17, 391:11, 391:12, 394:17, 402:2, 402:5, 402:16, 402:19, 402:22, 431:1, 454:22, 456:16, 487:13, 487:18, 531:2, 531:18, 531:23, 533:4, 535:17, 538:6, 538:13, 539:3, 542:3, 542:15, 543:9
**reservoirs** [1] - 543:15
**residential** [2] - 537:20, 537:21
**residents** [1] - 435:10
**resistance** [2] - 428:7, 485:9
**resistant** [8] - 410:12, 410:16, 438:9, 454:21, 484:23, 485:14, 487:2, 487:19
**resistive** [2] - 361:20, 361:25
**resistivity** [1] - 428:9
**resolution** [3] - 354:15, 354:16, 372:20
**resolving** [1] - 372:21
**resonance** [2] - 413:23, 414:12
**resource** [1] - 506:17
**Resources** [3] - 289:9, 340:12, 539:6
**resources** [5] - 341:9, 404:1, 405:8, 405:12, 504:7
**respect** [23] - 296:11, 304:23, 309:5, 320:24, 352:13, 390:13, 391:16, 404:24, 409:16, 417:2, 442:22, 446:19, 468:16, 487:14, 495:23, 496:25, 501:23, 505:22, 507:10, 507:12, 540:23, 541:16, 542:7
**respond** [9] - 290:16, 303:4, 384:21, 389:17, 390:5, 420:8, 461:15, 461:24, 467:10
**responders** [2] - 405:17, 405:24
**responding** [1] - 350:21
**responds** [1] - 384:4
**response** [16] - 304:9, 378:3, 386:12, 404:13, 404:25, 405:1, 405:4, 405:13, 434:12, 436:1, 439:13, 440:5, 440:22, 441:1, 495:18, 550:14
**Response** [2] - 433:25, 454:10
**responses** [1] - 390:10
**responsibilities** [3] - 409:3, 468:16, 516:18
**responsibility** [4] - 278:7, 280:11, 282:13, 486:19
**responsible** [1] - 516:15
**rest** [2] - 345:24, 434:11
**restart** [2] - 325:9, 325:10
**restate** [5] - 319:20, 320:19, 463:7, 464:18, 465:9
**result** [17] - 311:22, 313:3, 314:10, 314:20, 315:25, 331:13, 331:14, 365:11, 365:23, 390:23, 418:9, 450:20, 455:4, 462:10, 462:12, 486:1, 518:2
**resulted** [1] - 507:7
**results** [9] - 295:3, 309:24, 316:12, 316:17, 367:19, 414:21, 418:7, 457:4, 457:13
**resume** [4] - 289:11, 290:11, 321:25, 551:9
**retained** [1] - 520:24
**retrieved** [1] - 475:21
**reverse** [2] - 379:16, 435:18
**reverses** [1] - 379:13
**review** [55] - 292:7, 292:9, 292:10, 292:23, 293:10, 293:14, 293:24, 295:12, 300:17, 309:2, 314:21, 315:12, 318:23, 319:10, 323:15, 328:1, 329:16, 333:25, 334:8, 334:9, 334:12, 334:14, 334:18, 334:20, 334:21, 335:5, 336:7, 336:23, 348:7, 353:24, 371:3, 402:6, 431:23, 444:17, 452:17, 452:22, 453:3, 488:5, 496:14, 508:8, 508:15, 509:3, 509:5, 514:21, 521:2, 525:5, 525:6, 526:4, 530:11, 532:12, 548:22, 548:23, 549:21, 550:16
**Review** [1] - 452:15
**reviewed** [21] - 323:25, 324:2, 360:1, 488:5, 506:23, 507:11, 509:12, 511:9, 518:16, 519:6, 521:6, 521:8, 521:10, 533:10, 533:13, 533:14, 533:16, 548:18, 549:22, 549:23, 550:5
**reviewing** [9] - 393:12, 431:6, 496:4, 507:20, 516:11, 518:2, 520:25, 524:5, 549:5
**reviews** [2] - 324:3, 405:7
**revised** [1] - 483:8
**revisit** [1] - 469:15
**RFP** [2] - 507:7, 507:17
**RI** [1] - 386:22
**ribbing** [1] - 338:19
**Rich** [1] - 392:21
**Richard** [1] - 411:15
**RICHARD** [1] - 284:4
**Richland** [1] - 538:21
**Richter** [3] - 334:24, 335:1, 335:23
**rig** [2] - 438:5, 438:7
**rights** [3] - 311:13, 311:19, 341:4
**rise** [1] - 480:12
**risk** [4] - 361:12, 388:11, 479:6, 489:19
**risk-based** [2] - 388:11, 489:19
**risks** [1] - 510:9
**River** [6] - 386:18, 386:20, 386:24, 387:3, 392:24, 538:21
**road** [1] - 497:19
**rock** [6] - 317:20, 344:24, 345:12, 377:22, 504:21, 543:13
**Rockies** [1] - 528:12
**rocks** [1] - 349:20
**role** [1] - 523:20
**roles** [2] - 323:23, 468:13
**room** [1] - 289:8
**rough** [2] - 379:3, 470:23
**roughly** [3] - 348:16, 412:8, 425:11
**routinely** [1] - 522:8
**row** [4] - 450:11, 450:13, 452:14, 452:16
**rows** [1] - 401:2
**royalties** [2] - 320:16, 412:12
**royalty** [1] - 357:22
**rule** [4] - 393:7, 430:3, 512:2, 526:9
**rules** [19] - 279:6, 281:8, 283:12, 292:20, 292:21, 292:22, 293:6, 293:9, 335:4, 338:5, 454:19, 513:19, 515:2, 516:25, 517:7, 517:10, 517:12, 517:22, 526:9
**run** [33] - 315:17, 317:8, 318:11, 318:15, 323:9, 324:12, 324:18, 324:20, 325:4, 325:7, 325:25, 326:3, 326:8, 333:12, 337:12, 338:7, 340:15, 363:10, 426:6, 444:9, 444:15, 473:14, 512:15, 517:15, 521:21, 522:1, 544:19, 544:22, 544:25, 545:7, 546:9, 546:12
**running** [17] - 317:1, 317:5, 318:19, 318:22, 319:1, 324:25, 325:2, 325:22, 346:22, 417:4, 444:8, 512:12, 542:11, 545:24, 546:3, 546:5
**RUST** [1] - 285:9
**résumé** [2] - 505:10, 539:21

## S

**SACROC** [1] - 538:14
**safe** [3] - 405:4, 405:6, 478:19
**Safe** [3] - 292:12, 292:18, 293:2
**safeguard** [1] - 467:1
**safeguards** [2] - 309:7, 309:10
**safely** [1] - 319:3
**safety** [5] - 319:17, 403:20, 405:25, 479:12, 504:19
**saline** [1] - 524:6
**salinity** [1] - 365:19
**salt** [2] - 543:12, 543:14
**saltwater** [5] - 409:7, 524:17, 524:20, 524:22, 525:8
**sample** [16] - 317:20, 365:3, 365:4, 375:25, 376:2, 381:11, 381:13, 381:20, 385:17, 385:18, 385:22, 385:23, 386:3, 414:6, 420:13
**sampled** [3] - 359:12, 359:20, 376:1
**samples** [5] - 359:14, 370:18, 376:4, 381:3, 418:19
**Sampling** [1] - 457:3
**sampling** [10] - 359:22, 359:24, 360:3, 368:14, 400:15, 402:10, 430:8, 431:20, 452:18
**sand** [4] - 359:4, 413:20, 414:2, 414:19
**sandstone** [3] - 374:11, 374:22, 414:11
**sandstones** [1] - 376:1
**SARA** [1] - 284:8
**sat** [1] - 534:22
**saturated** [2] - 391:20
**saturation** [11] - 344:22, 344:23, 345:1, 345:3, 345:10, 346:3, 346:4, 358:10, 358:11, 464:10, 473:11
**saturations** [1] - 402:13
**save** [2] - 389:13, 475:5
**saw** [3] - 363:15, 390:25, 493:9
**SCADA** [1] - 397:12
**scale** [5] - 327:4, 345:21,

356:24, 423:16, 423:18
**scale's** [1] - 329:11
**scenario** [6] - 439:21, 439:24, 481:3, 489:16, 489:18, 497:18
**Schedule** [1] - 400:21
**schedule** [1] - 419:4
**scheduling** [2] - 417:5, 417:17
**Schlumberger** [1] - 486:24
**Schlumberger's** [1] - 544:20
**school** [1] - 540:6
**science** [6] - 396:19, 398:21, 398:22, 408:24, 504:10, 537:25
**sciences** [1] - 404:2
**scope** [2] - 297:14, 306:18
**scratch** [1] - 299:22
**SCS** [2] - 466:6, 482:8
**SCS1** [3] - 336:4, 441:16, 442:1
**SCS2** [2] - 407:23
**SCS3** [3] - 407:23, 458:25, 460:9
**Scurry** [1] - 538:14
**seal** [5] - 429:10, 429:20, 528:16, 528:17, 528:19
**Seattle** [1] - 504:20
**second** [9] - 393:3, 405:10, 434:18, 439:18, 441:12, 441:21, 449:21, 463:10, 472:1
**second-to-last** [2] - 441:12, 441:21
**secondary** [4] - 387:24, 429:23, 435:20, 495:3
**seconds** [2] - 494:7, 495:2
**section** [19] - 348:16, 348:19, 348:21, 364:24, 401:3, 409:23, 410:8, 410:9, 413:7, 434:15, 445:18, 449:17, 450:14, 453:10, 454:1, 454:2, 460:8, 465:3, 478:15
**Section** [52] - 281:13, 282:2, 282:15, 283:2, 358:15, 359:25, 363:18, 370:3, 373:11, 383:4, 388:4, 399:3, 404:13, 404:17, 405:3, 406:2, 409:16, 412:21, 418:13, 423:14, 429:2, 431:14, 433:24, 434:3, 437:23, 443:19, 449:16, 450:24, 451:20, 451:24, 452:1, 452:4, 452:9, 452:15, 453:10, 453:11, 453:21, 454:8, 454:14, 454:17, 455:7, 455:14, 456:6, 459:5, 459:9, 460:4, 462:15, 464:24, 469:25, 470:1, 470:11, 471:19
**sections** [6] - 344:20, 361:9, 388:22, 401:9, 406:16, 450:3
**Sections** [54] - 277:7, 277:8, 277:9, 277:12, 277:13, 277:20, 277:21, 277:22, 278:1, 278:2, 278:9, 278:10, 278:12, 278:14, 278:15, 278:20, 278:21, 278:22, 279:1, 279:2, 279:11, 279:12, 279:14, 279:16, 279:23, 280:1, 280:4, 280:5, 280:13, 280:14, 280:17, 280:18, 280:22, 280:23, 281:3, 281:4, 281:13, 281:15, 281:16, 281:19, 282:3, 282:4, 282:5, 282:8, 282:15, 282:17, 282:18, 282:21, 283:3, 283:4, 283:5, 283:8, 374:8, 437:17
**secured** [3] - 445:19, 445:22, 446:21
**see** [43] - 327:4, 327:23, 327:24, 329:9, 329:13, 329:15, 336:12, 345:2, 345:19, 348:22, 348:25, 349:7, 353:21, 355:21, 356:19, 356:22, 369:19, 372:5, 372:9, 373:3, 375:1, 379:8, 400:2, 417:24, 418:3, 420:16, 431:2, 431:6, 432:20, 449:15, 449:18, 450:11, 450:16, 471:9, 496:2, 496:9, 498:1, 502:8, 507:21, 514:6, 523:14, 549:3, 550:17
**seeing** [4] - 415:2, 466:23, 494:24, 507:14
**seem** [4] - 502:3, 515:15, 526:7, 526:11
**segment** [11] - 421:25, 422:10, 423:1, 442:14, 481:8, 490:7, 492:3, 492:25, 493:4, 494:18, 495:9
**segments** [5] - 490:7, 490:9, 492:3, 493:20, 493:25
**seismic** [36] - 343:14, 346:25, 347:11, 354:13, 354:15, 354:18, 354:20, 355:7, 358:7, 358:8, 363:8, 363:12, 363:14, 371:8, 372:15, 372:17, 372:20, 373:2, 394:20, 402:23, 430:22, 431:5, 444:8, 444:10, 444:15, 451:8, 483:18, 483:19, 528:21, 530:20, 530:21, 531:17, 531:21, 531:22, 532:13, 533:6
**seismicity** [6] - 402:25, 432:5, 432:6, 432:15, 445:2, 445:6
**seismometer** [1] - 432:16
**seismometers** [2] - 403:1, 432:8
**selected** [3] - 311:2, 364:14, 365:5
**selection** [2] - 468:19, 487:5
**send** [5] - 300:22, 366:12, 424:6, 424:7, 424:8
**senior** [1] - 398:16
**sense** [5] - 315:19, 362:5, 369:21, 391:19, 517:19
**sensitive** [3] - 390:21, 390:22, 428:9
**sensitivities** [1] - 542:11
**sensitivity** [23] - 310:8, 316:4, 316:7, 316:9, 316:13, 317:1, 317:6, 317:8, 317:10, 317:12, 317:17, 317:21, 317:24, 318:2, 318:3, 318:4, 318:12, 318:16, 318:19, 319:1, 321:10, 351:14, 544:25
**sent** [1] - 304:2
**sentence** [2] - 375:17, 445:17
**sentences** [1] - 511:24
**separate** [4] - 358:11, 438:15, 439:5, 469:21
**separated** [1] - 359:16
**separately** [2] - 295:20, 422:22
**sequence** [1] - 444:15
**sequester** [1] - 544:3
**sequestration** [14] - 293:15, 397:16, 400:24, 403:19, 408:20, 422:5, 422:12, 422:24, 443:10, 443:12, 512:4, 512:6, 529:20, 546:21
**serve** [2] - 362:19, 363:5
**Service** [2] - 412:7, 477:6
**services** [5] - 445:19, 445:21, 504:5, 506:9, 506:14
**set** [25] - 292:19, 294:7, 323:9, 326:8, 347:16, 368:17, 394:4, 410:1, 410:3, 410:13, 426:5, 438:9, 460:14, 460:23, 469:4, 469:6, 479:12, 479:19, 492:19, 492:21, 492:23, 493:15, 494:25, 495:17, 535:6
**setback** [1] - 435:4
**setbacks** [1] - 435:5
**sets** [7] - 292:14, 295:5, 298:4, 304:14, 304:19, 304:22, 323:20
**setting** [3] - 426:22, 507:19, 543:10
**seven** [2] - 337:24, 523:24
**several** [12] - 325:24, 343:12, 393:8, 394:22, 463:16, 504:25, 507:5, 516:7, 523:2, 529:16, 538:19, 542:8
**SFP** [1] - 449:16
**shake** [1] - 466:4
**shale** [2] - 387:11, 538:20
**shallower** [1] - 355:3
**Shane** [12] - 503:10, 503:15, 503:22, 503:24, 505:6, 505:21, 513:12, 520:17, 521:17, 525:19, 526:1
**SHANE** [2] - 287:20, 503:17
**shape** [1] - 372:3
**shapefiles** [4] - 295:4, 295:11, 295:14, 326:18
**Sheridan** [1] - 284:17
**shift** [1] - 406:1
**shining** [1] - 478:17
**shoe** [2] - 410:4, 410:16
**short** [5] - 373:18, 378:2, 445:11, 521:21
**shorter** [1] - 455:5
**shorthand** [2] - 552:6, 552:11
**shortly** [1] - 444:16
**show** [6] - 329:25, 331:17, 350:8, 359:14, 362:12, 448:7
**showed** [4] - 309:25, 360:16, 414:12, 424:23
**showing** [6] - 327:20, 344:20, 368:7, 370:6, 378:18, 463:17
**shown** [6] - 360:11, 361:11, 364:6, 368:23, 383:14, 424:1
**shows** [7] - 356:19, 356:20, 361:19, 364:4, 378:13, 421:18, 531:25
**shut** [5] - 331:12, 467:2, 481:16, 490:8, 494:11
**shutdown** [2] - 422:18, 493:14
**sic** [2] - 411:5, 513:3
**sic]** [1] - 411:8
**side** [8] - 311:12, 355:4, 376:25, 378:14, 419:12, 421:7, 422:1, 426:1
**signature** [2] - 420:6, 420:15

**signed** [1] - 482:21
**significance** [2] - 445:4, 466:19
**significant** [6] - 332:3, 341:25, 349:1, 376:9, 387:20, 473:18
**significantly** [4] - 330:25, 346:6, 444:20, 485:21
**signing** [1] - 526:19
**siltstone** [7] - 368:8, 368:12, 368:15, 376:16, 376:20, 385:25
**similar** [9] - 360:9, 382:13, 382:21, 435:6, 453:13, 453:14, 453:15, 454:4, 510:4
**similarly** [9] - 322:7, 324:10, 330:3, 362:8, 362:23, 363:3, 365:12, 365:15, 424:15
**simple** [1] - 541:20
**simply** [3] - 399:17, 481:23, 491:7
**simulate** [3] - 331:24, 332:2, 463:15
**simulated** [5] - 344:21, 346:1, 384:14, 385:3, 452:7
**simulation** [43] - 292:6, 292:23, 293:21, 295:2, 297:25, 316:12, 316:17, 321:17, 363:18, 364:5, 364:8, 364:13, 364:20, 365:2, 365:14, 366:14, 366:21, 367:12, 369:5, 374:11, 374:18, 375:11, 375:13, 379:24, 380:24, 383:18, 383:19, 418:5, 452:2, 452:6, 457:13, 462:20, 463:14, 463:19, 531:9, 531:10, 532:1, 538:8, 538:13, 539:3, 542:24
**simulations** [6] - 296:1, 300:5, 315:21, 324:1, 325:23, 369:15
**simulator** [2] - 325:16, 384:20
**single** [7] - 300:1, 385:17, 385:22, 385:23, 386:3, 397:20, 442:8
**sit** [4] - 298:24, 410:23, 416:13, 416:14
**Site** [1] - 454:2
**site** [44] - 310:5, 318:6, 342:22, 347:25, 350:13, 364:18, 365:6, 397:16, 404:5, 406:15, 407:18, 414:17, 422:5, 422:12, 425:23, 428:16, 429:13, 429:14, 432:8, 432:12, 433:4, 436:20, 436:24, 441:3, 442:11, 442:15, 451:10, 451:16, 452:9, 452:20, 452:24, 453:25, 456:1, 456:14, 456:16, 456:24, 457:4, 457:8, 457:13, 458:25, 470:16, 529:18, 529:21
**site-specific** [14] - 318:6, 342:22, 350:13, 365:6, 432:12, 441:3, 451:10, 451:16, 452:9, 452:20, 452:24, 456:1, 456:24, 457:8
**sites** [17] - 327:22, 347:4, 356:23, 364:14, 407:13, 415:15, 421:12, 421:14, 422:6, 433:5, 436:18, 436:20, 452:7, 462:18, 477:1, 510:10, 524:3
**sits** [2] - 329:15, 339:15
**situ** [4] - 359:5, 413:22, 415:16, 451:5
**situation** [8] - 380:18, 490:1, 495:10, 495:21, 496:22, 497:25, 499:7, 499:14
**six** [4] - 367:8, 415:20, 523:23, 529:25
**size** [25] - 300:19, 311:10, 312:2, 315:24, 318:13, 319:9, 325:6, 363:23, 367:5, 384:18, 390:18, 390:20, 390:22, 415:22, 416:5, 422:8, 438:5, 462:4, 462:19, 480:13, 491:6, 491:17, 499:23, 550:2
**skipping** [1] - 333:19
**Skull** [1] - 402:12
**Slash** [5] - 362:24, 415:4, 415:9, 455:2, 455:25
**slated** [1] - 470:25
**slightly** [4] - 309:25, 350:19, 440:20, 456:12
**Slope** [1] - 387:1
**slope** [1] - 379:9
**slow** [3] - 404:9, 405:9, 453:7
**slowed** [1] - 464:4
**slowly** [1] - 405:15
**slows** [1] - 379:10
**SM** [2] - 538:17, 538:24
**small** [6] - 311:5, 311:7, 423:15, 423:18, 493:4, 504:6
**smaller** [6] - 311:21, 320:3, 346:2, 365:11, 365:24, 384:22
**Smith** [2] - 552:3, 552:17
**SMITH** [1] - 285:9
**software** [9] - 304:7, 304:12, 306:3, 306:20, 306:22, 522:1, 522:11, 522:16, 544:20
**soil** [6] - 402:8, 402:9, 430:8, 471:21, 471:24, 472:3
**solutions** [1] - 415:14
**Solutions** [5] - 396:12, 404:7, 408:18, 443:21, 468:3
**someone** [10] - 322:11, 322:14, 322:23, 348:6, 411:3, 436:14, 501:20, 517:15, 546:12, 547:12
**sometimes** [1] - 436:9
**somewhat** [2] - 535:2, 535:16
**somewhere** [2] - 374:13, 519:14
**sonic** [2] - 413:24, 414:9
**sorry** [39] - 290:25, 296:9, 297:17, 333:18, 335:14, 346:22, 350:5, 351:9, 351:16, 377:4, 379:7, 380:11, 393:19, 405:10, 415:8, 420:17, 424:14, 433:6, 433:23, 434:21, 437:6, 438:1, 441:22, 442:7, 445:17, 447:15, 462:24, 464:8, 471:7, 471:13, 476:16, 489:10, 490:17, 492:12, 499:21, 510:22, 525:16, 550:15, 550:23
**sort** [4] - 448:22, 449:1, 524:25, 550:5
**sounds** [5] - 301:13, 469:9, 474:25, 515:21, 524:8
**source** [20] - 354:21, 354:25, 355:1, 355:4, 355:5, 355:6, 355:10, 355:11, 410:2, 410:6, 418:17, 419:12, 419:24, 420:12, 420:14, 420:20, 420:23, 421:13, 443:4, 489:1
**sources** [13] - 293:16, 293:20, 293:23, 294:1, 366:12, 366:16, 411:18, 418:18, 419:16, 419:20, 420:3, 420:7, 439:14
**South** [2] - 390:14, 537:21
**south** [5] - 335:25, 336:4, 336:6, 336:8, 336:9
**southwest** [4] - 335:13, 335:25, 369:18, 372:6
**space** [50] - 277:16, 277:17, 279:20, 279:21, 281:22, 281:23, 292:4, 293:6, 321:19, 329:20, 330:1, 330:4, 330:12, 330:15, 330:16, 330:17, 330:19, 330:23, 332:4, 332:14, 332:18, 333:7, 333:10, 341:13, 342:6, 342:11, 342:15, 342:24, 349:15, 349:21, 349:24, 352:2, 352:10, 352:17, 353:10, 353:12, 353:13, 353:17, 410:22, 543:17, 543:21, 543:23, 544:3, 544:4, 544:6, 544:11, 544:17, 546:17, 548:16
**Space** [1] - 450:14
**speaking** [5] - 323:14, 345:20, 486:4, 504:3, 510:5
**Spearfish** [1] - 381:18
**Spearfish/Opeche** [2] - 358:19, 412:25
**spec** [2] - 418:23, 419:5
**special** [5] - 279:6, 281:8, 283:12, 436:16, 437:2
**specialist** [1] - 398:17
**specialize** [1] - 485:1
**specialized** [1] - 485:23
**specific** [53] - 294:9, 296:13, 304:11, 304:15, 318:6, 340:4, 342:22, 343:1, 350:13, 351:3, 351:6, 354:25, 365:6, 367:14, 380:16, 384:11, 410:10, 430:15, 432:9, 432:12, 436:7, 439:22, 440:2, 440:3, 441:3, 451:10, 451:16, 452:9, 452:20, 452:22, 452:24, 453:25, 454:6, 455:13, 456:1, 456:24, 457:4, 457:8, 457:12, 457:14, 460:8, 474:12, 482:14, 485:13, 486:11, 506:10, 507:2, 516:18, 519:1, 522:9, 526:9, 543:8, 549:9
**specifically** [25] - 294:19, 301:23, 309:3, 309:5, 311:3, 315:11, 354:17, 358:24, 361:9, 361:16, 362:12, 415:3, 417:4, 421:19, 424:2, 433:20, 445:22, 477:21, 507:10, 508:12, 511:2, 521:23, 522:6, 523:3, 542:7
**specification** [2] - 418:15, 419:10
**specifications** [1] - 419:23
**specifics** [2] - 518:24, 519:25
**specified** [2] - 400:21, 483:13
**specify** [1] - 450:16
**speculate** [1] - 300:18

**speculation** [1] - 332:25
**speed** [3] - 300:20, 488:14, 542:13
**spell** [3] - 467:25, 503:23, 527:18
**spend** [5] - 383:8, 448:21, 456:20, 468:6, 549:5
**spent** [8] - 404:3, 456:4, 542:10, 545:13, 548:5, 548:8, 549:1, 549:19
**spike** [3] - 476:2, 476:9, 493:13
**split** [1] - 438:23
**splits** [1] - 423:5
**splotches** [1] - 349:10
**spring** [1] - 478:22
**springs** [1] - 452:25
**square** [5] - 413:7, 464:5, 464:11, 473:9, 531:11
**SR3** [2] - 295:3, 298:3
**St** [1] - 527:25
**stabilization** [3] - 463:23, 473:7, 473:8
**stabilized** [8] - 372:4, 373:12, 373:17, 463:6, 463:22, 464:8, 473:20, 473:22
**stable** [1] - 463:21
**stack** [2] - 419:1, 419:22
**STAFF** [1] - 284:2
**staff** [22] - 298:12, 300:7, 355:16, 390:1, 392:13, 393:17, 396:16, 397:24, 398:19, 404:20, 408:22, 409:10, 411:10, 436:17, 437:11, 447:18, 459:8, 461:25, 502:19, 525:15, 536:25, 550:11
**stages** [2] - 455:5, 455:6
**standard** [8] - 296:20, 397:3, 423:23, 424:18, 479:18, 491:18, 495:25
**standpoint** [1] - 524:11
**Stanton** [2] - 363:10, 363:13
**start** [30] - 291:15, 297:17, 299:22, 305:24, 307:6, 343:20, 346:22, 355:20, 370:5, 371:24, 372:2, 399:23, 411:13, 411:14, 421:24, 439:20, 449:5, 449:6, 449:24, 456:22, 466:23, 472:19, 473:13, 484:16, 497:17, 498:17, 528:3, 530:14, 537:16, 548:7
**started** [8] - 360:3, 379:1, 448:12, 448:18, 513:21, 515:18, 538:5, 539:9
**starting** [3] - 307:4, 367:13, 409:22
**starts** [2] - 379:4, 394:11
**startup** [1] - 539:9
**State** [8] - 390:14, 403:25, 435:8, 504:11, 508:3, 513:16, 514:22, 539:2
**state** [27] - 294:6, 341:9, 358:23, 396:8, 398:10, 403:12, 408:14, 420:20, 420:21, 425:18, 427:1, 467:21, 469:18, 503:22, 506:2, 507:14, 512:9, 518:6, 518:13, 519:2, 519:4, 527:17, 537:15, 537:16, 538:19, 540:22, 541:12
**statement** [15] - 308:21, 388:7, 426:20, 431:18, 432:17, 446:6, 446:20, 460:24, 519:8, 524:12, 534:9, 534:10, 545:16, 545:25, 547:24
**statements** [1] - 506:18
**states** [3] - 419:7, 466:6, 471:20
**statewide** [1] - 446:11
**static** [1] - 545:2
**station** [6] - 421:9, 422:15, 426:2, 471:21, 471:24, 472:3
**stations** [3] - 425:25, 432:10, 432:16
**statute** [1] - 515:12
**statutes** [4] - 292:8, 514:25, 515:6, 515:9
**statutory** [1] - 515:3
**stay** [1] - 351:25
**step** [2] - 400:8, 465:25
**Stephanie** [2] - 552:3, 552:17
**STEPHEN** [1] - 284:7
**stepping** [1] - 400:1
**steps** [3] - 351:18, 414:4, 464:3
**still** [29] - 291:5, 291:6, 291:11, 301:4, 313:16, 319:2, 321:2, 322:21, 330:16, 330:22, 331:16, 333:7, 333:9, 355:5, 378:11, 378:14, 379:12, 380:23, 381:15, 394:3, 434:5, 443:14, 448:4, 458:10, 461:16, 461:18, 512:8, 527:10, 550:22
**stimulation** [1] - 532:1
**stipulations** [1] - 293:5
**STOLLDORF** [18] - 284:5, 370:2, 370:12, 370:15, 370:16, 371:18, 432:23, 433:24, 435:1, 435:3, 436:13, 437:7, 437:16, 439:11, 441:8, 463:9, 463:20, 464:13
**Stolldorf.....** [2] - 286:14, 287:4
**stop** [3] - 466:6, 466:15, 481:15
**stoplight** [7] - 465:19, 465:20, 465:21, 465:25, 466:5, 474:4, 483:17
**stopped** [1] - 480:23
**stops** [2] - 331:6, 331:7
**Storage** [21] - 277:4, 277:15, 277:19, 278:6, 279:4, 279:8, 279:19, 279:23, 280:8, 280:9, 281:6, 281:10, 281:21, 282:1, 282:11, 283:10, 306:18, 403:17, 448:10, 449:18, 455:14
**STORAGE** [3] - 284:18, 284:19, 284:19
**storage** [146] - 277:5, 277:6, 277:16, 277:18, 277:19, 278:8, 278:9, 279:5, 279:9, 279:10, 279:20, 279:22, 279:23, 280:11, 280:12, 281:7, 281:11, 281:12, 281:22, 282:1, 282:2, 282:13, 282:14, 283:11, 291:24, 292:2, 292:3, 292:5, 292:17, 293:5, 295:10, 295:11, 300:4, 310:19, 311:5, 311:11, 311:17, 311:21, 312:2, 313:16, 314:4, 314:11, 314:17, 314:21, 315:16, 318:22, 324:11, 326:20, 327:13, 329:17, 330:12, 330:15, 330:19, 334:3, 335:14, 335:25, 336:7, 347:3, 349:15, 349:24, 351:23, 352:19, 352:23, 353:4, 353:16, 353:17, 353:23, 355:25, 356:4, 356:18, 357:10, 357:18, 357:20, 358:16, 359:2, 359:19, 360:24, 361:12, 363:9, 363:11, 366:12, 373:13, 373:23, 379:2, 388:8, 388:18, 393:5, 393:13, 394:22, 394:23, 397:9, 402:2, 402:4, 402:16, 402:18, 407:3, 407:7, 407:16, 421:3, 427:19, 429:13, 429:18, 429:25, 431:1, 441:25, 451:1, 451:16, 454:4, 454:7, 454:18, 455:20, 456:10, 456:12, 457:7, 457:17, 458:24, 458:25, 459:2, 459:9, 459:15, 459:19, 459:20, 459:25, 460:6, 460:21, 460:22, 482:8, 496:15, 496:24, 497:20, 497:23, 498:15, 498:19, 498:22, 499:23, 500:2, 500:17, 502:14, 534:13, 539:10, 539:11, 539:13, 543:12, 543:15, 546:6
**store** [4] - 310:6, 330:23, 333:6, 544:2
**stored** [3] - 331:4, 332:8, 353:9
**straight** [1] - 315:23
**strat** [1] - 387:6
**strategy** [1] - 432:12
**stratigraphic** [10] - 298:15, 357:17, 359:2, 359:10, 369:7, 386:22, 453:21, 453:22, 454:24, 457:11
**stream** [21] - 366:4, 400:4, 400:23, 400:25, 401:10, 412:13, 412:14, 418:15, 418:21, 419:13, 420:6, 420:13, 420:22, 428:5, 485:4, 501:24, 501:25, 502:1, 502:11, 502:12, 502:14
**Stream** [1] - 401:3
**streams** [1] - 419:8
**Street** [2] - 285:5, 537:22
**Stress** [1] - 394:12
**stress** [6] - 359:5, 413:14, 413:22, 415:16, 451:5, 543:13
**strike** [3] - 515:22, 547:25, 549:18
**string** [2] - 410:9, 410:15
**stringent** [4] - 292:21, 293:3, 294:5, 294:8
**strong** [1] - 543:3
**structure** [3] - 300:2, 434:5, 466:24
**structures** [3] - 370:7, 370:9, 373:4
**studies** [8] - 317:21, 318:3, 318:4, 343:12, 347:1, 418:20, 480:8, 538:18
**study** [1] - 480:11
**subject** [6] - 279:4, 281:5, 283:9, 330:24, 341:13, 404:21
**subjugated** [1] - 428:4
**submission** [1] - 298:11
**submit** [3] - 508:6, 512:3, 524:24
**submittal** [1] - 534:20
**submitted** [18] - 303:24, 304:1, 315:12, 326:18,

378:8, 391:4, 420:2, 438:20, 477:5, 514:1, 517:1, 530:11, 536:2, 536:7, 536:10, 536:12, 536:18, 548:19
**submitting** [2] - 460:18, 507:25
**subscription** [1] - 306:15
**subscriptions** [4] - 297:3, 297:8, 306:10, 307:14
**substances** [5] - 330:15, 330:19, 349:15, 502:11, 502:16
**substantial** [2] - 367:20, 427:6
**substantially** [1] - 418:7
**subsurface** [6] - 327:21, 341:8, 350:18, 358:6, 397:17, 528:25
**suction** [1] - 426:1
**sufficient** [7] - 313:16, 355:1, 355:6, 362:6, 362:19, 368:17, 466:3
**suggest** [2] - 343:13, 373:5
**suggesting** [1] - 442:12
**Suggs** [1] - 411:15
**SUGGS** [18] - 284:4, 371:20, 388:21, 393:20, 393:23, 394:8, 394:10, 395:10, 437:6, 437:8, 437:15, 441:10, 442:16, 447:2, 448:14, 448:17, 466:18, 467:4
**Suggs.....** [1] - 286:17
**Suggs.....** [2] - 286:15, 287:5
**suitable** [1] - 525:4
**Suite** [2] - 284:12, 285:4
**suited** [2] - 309:14, 516:9
**summarization** [1] - 487:4
**Summary** [2] - 448:11, 449:25
**summary** [7] - 399:8, 413:13, 424:1, 449:11, 450:6, 450:8, 468:7
**Summit** [104] - 277:3, 277:15, 277:19, 278:5, 279:4, 279:7, 279:18, 279:22, 280:8, 280:9, 281:6, 281:9, 281:21, 282:1, 282:11, 283:10, 289:19, 290:15, 296:13, 296:16, 297:2, 297:7, 301:21, 302:8, 302:9, 302:11, 302:13, 302:22, 302:23, 304:21, 305:4, 305:7, 305:11, 305:19, 306:18, 307:5, 308:2, 309:21, 310:2, 310:4, 310:14, 310:23, 311:1, 312:1, 312:8, 313:8, 313:13, 314:7, 318:18, 321:18, 326:18, 329:22, 330:9, 332:5, 332:16, 335:3, 337:5, 340:15, 341:12, 341:21, 342:5, 342:8, 342:13, 352:15, 352:18, 353:3, 358:1, 366:16, 370:21, 371:11, 396:12, 399:19, 403:17, 404:7, 408:18, 409:1, 409:7, 420:12, 430:25, 431:18, 432:7, 432:11, 442:1, 443:21, 449:18, 459:2, 459:8, 459:17, 460:9, 468:3, 468:17, 486:13, 496:13, 496:22, 497:19, 498:18, 500:16, 501:1, 501:9, 501:15, 501:17, 513:4, 522:12, 530:12
**SUMMIT** [3] - 284:18, 284:18, 284:19
**Summit's** [18] - 296:10, 304:25, 310:23, 311:4, 312:21, 322:25, 329:3, 330:7, 331:10, 333:4, 340:16, 341:14, 341:24, 353:11, 364:14, 460:20, 496:25, 499:3
**sun** [1] - 478:17
**Sundry** [1] - 430:1
**super** [2] - 425:18, 427:1
**superintendent** [1] - 468:14
**supervisory** [1] - 397:18
**supplement** [8] - 382:6, 382:12, 383:3, 391:6, 392:5, 394:3, 429:5, 429:7
**supplemental** [9] - 378:3, 378:9, 380:20, 386:14, 412:16, 412:18, 433:12, 437:10, 445:12
**supplements** [1] - 394:2
**supplied** [3] - 477:9, 523:8, 534:1
**supply** [6] - 412:18, 429:5, 434:14, 443:21, 446:16, 525:1
**support** [2] - 323:11, 372:18
**supported** [1] - 372:15
**sureties** [1] - 439:5
**surety** [6] - 407:14, 407:19, 438:12, 438:13, 438:15, 438:21
**Surface** [2] - 401:4, 402:7
**surface** [31] - 308:3, 308:23, 336:15, 338:11, 339:14, 356:6, 357:1, 357:5, 400:5, 401:10, 403:1, 409:22, 409:23, 409:25, 410:3, 410:4, 410:5, 410:18, 432:1, 452:24, 454:20, 464:22, 466:7, 474:24, 476:19, 488:7, 488:21, 489:2, 489:11, 489:22, 524:11
**surge** [3] - 426:6, 493:18
**surrounding** [3] - 293:14, 331:1, 446:3
**Survey** [1] - 298:11
**survey** [3] - 363:8, 363:14, 394:20
**surveys** [4] - 371:8, 402:23, 430:22, 451:8
**susceptible** [1] - 358:8
**suspected** [1] - 363:10
**sustained** [2] - 500:21, 501:7
**swear** [3] - 467:14, 503:14, 503:16
**swelling** [1] - 542:17
**SWENSON** [1] - 285:7
**Swenson** [12] - 289:25, 329:12, 340:14, 340:18, 341:1, 341:12, 341:16, 341:19, 342:1, 342:5, 342:9, 342:13
**Swenson's** [3] - 329:20, 332:4, 342:16
**switch** [1] - 510:15
**sworn** [10] - 396:2, 398:6, 403:8, 408:10, 461:16, 467:12, 467:17, 503:18, 527:13, 537:11
**system** [45] - 378:23, 390:13, 397:5, 397:11, 397:12, 397:15, 397:16, 397:18, 397:19, 412:1, 421:1, 421:22, 422:3, 425:20, 427:22, 427:23, 428:19, 428:20, 429:10, 429:14, 435:23, 442:23, 443:1, 443:5, 443:6, 443:25, 445:1, 445:14, 465:19, 465:20, 465:22, 466:1, 466:6, 474:4, 475:23, 476:3, 482:18, 482:19, 483:6, 483:17, 483:18, 485:8, 486:18, 490:1, 490:2
**system's** [1] - 435:9
**systems** [3] - 435:16, 484:3, 494:9

## T

**tabbed** [1] - 326:13
**table** [9] - 289:13, 368:23, 382:16, 399:25, 418:14, 423:22, 425:9, 436:14, 449:11
**Table** [24] - 368:19, 381:15, 382:14, 386:17, 399:8, 399:10, 399:17, 399:22, 406:10, 406:25, 407:15, 413:12, 418:14, 419:7, 423:22, 424:16, 427:6, 439:19, 440:5, 448:11, 456:3, 464:19, 464:24, 465:3
**Tables** [1] - 399:14
**TABOR** [1] - 284:6
**tailored** [1] - 485:8
**Talisman** [1] - 528:10
**TAMARA** [1] - 284:5
**Tammy** [3] - 464:15, 468:22, 471:16
**tank** [1] - 429:13
**tanks** [1] - 429:18
**target** [2] - 359:5, 413:21
**targeted** [1] - 402:4
**targeting** [1] - 310:17
**taught** [1] - 528:7
**tax** [1] - 332:16
**TB** [27] - 334:9, 358:17, 360:19, 361:18, 368:5, 368:25, 370:16, 399:11, 407:1, 407:11, 413:2, 421:17, 423:6, 424:2, 431:16, 433:2, 433:21, 434:19, 449:18, 449:20, 450:9, 451:11, 453:2, 453:18, 455:20, 457:18, 488:13
**TDS** [3] - 364:24, 365:8, 365:10
**team** [5] - 302:22, 445:9, 516:3, 516:16, 516:18
**teams** [1] - 436:1
**Tech** [2] - 538:1, 540:7
**technical** [3] - 310:3, 341:5, 486:15
**technically** [1] - 298:16
**techniques** [1] - 343:14
**Technological** [2] - 408:25, 540:8
**TED** [2] - 288:3, 527:12
**Ted** [7] - 527:2, 527:6, 527:19, 527:20, 529:2, 530:10
**temperature** [22] - 365:13, 365:21, 365:23, 366:1, 390:18, 390:19, 390:23, 401:14, 402:14, 402:18, 402:20, 402:21, 427:4, 427:5, 457:19, 478:25, 480:12, 481:20, 492:10, 492:11, 543:13, 544:10
**temperatures** [4] - 317:14, 452:11, 485:3, 487:8

**temporarily** [1] - 544:2
**temporary** [3] - 297:8, 306:10, 331:15
**ten** [15] - 321:21, 331:17, 374:6, 434:22, 440:8, 447:5, 463:11, 463:12, 463:18, 495:2, 503:3, 523:24, 549:11, 549:12, 549:16
**ten-minute** [3] - 321:21, 447:5, 503:3
**ten-year** [5] - 374:6, 434:22, 440:8, 463:11, 463:12
**tense** [1] - 502:3
**term** [1] - 378:2
**terminate** [1] - 394:25
**terminus** [9] - 309:11, 421:9, 429:1, 441:15, 442:7, 442:9, 469:25, 476:20, 484:3
**terms** [12] - 293:3, 297:24, 300:19, 340:24, 400:25, 459:18, 459:22, 460:12, 460:15, 498:12, 498:13
**tertiary** [2] - 387:22, 388:2
**test** [23] - 298:15, 316:19, 318:7, 318:8, 357:17, 359:3, 359:5, 359:10, 359:23, 367:17, 369:7, 413:14, 414:3, 414:13, 414:21, 415:16, 415:18, 417:24, 418:4, 419:1, 419:22, 454:24, 530:24
**test/monitoring** [1] - 453:23
**tested** [4] - 490:11, 490:13, 490:20, 490:23
**testified** [33] - 307:16, 308:11, 308:17, 309:24, 312:17, 312:21, 332:19, 338:15, 359:25, 366:18, 379:20, 396:2, 398:6, 402:24, 403:8, 408:10, 430:21, 444:6, 450:5, 451:2, 451:13, 452:3, 452:17, 453:5, 453:20, 467:17, 473:6, 474:8, 488:6, 503:18, 520:5, 527:13, 537:11
**testify** [3] - 309:15, 517:9, 534:6
**testifying** [3] - 456:8, 474:25, 478:5
**testimony** [33] - 308:14, 312:14, 326:2, 343:5, 343:7, 355:23, 357:4, 366:9, 378:8, 378:24, 380:19, 386:13, 390:2, 394:16, 417:23, 432:4, 445:12, 449:14, 450:9, 459:11, 472:25, 482:4, 482:7, 491:13, 492:18, 493:17, 496:19, 516:14, 520:4, 521:18, 521:22, 533:9, 534:9
**testing** [24] - 298:13, 316:21, 319:12, 358:18, 367:10, 371:9, 385:10, 399:4, 399:12, 399:18, 399:23, 404:4, 406:15, 412:23, 413:18, 417:22, 418:1, 451:19, 453:11, 453:14, 453:16, 465:3, 480:1, 530:24
**tests** [5] - 358:22, 400:13, 413:21, 413:23, 451:5
**Texas** [2] - 538:7, 538:15
**that'd** [4] - 375:19, 406:8, 474:7, 525:12
**that'll** [3] - 388:21, 421:15, 438:18
**THE** [4] - 284:18, 285:6, 285:7, 490:15
**themselves** [3] - 457:22, 491:18, 494:5
**there'd** [1] - 486:4
**therefore** [3] - 381:12, 457:13, 488:5
**Therefore** [1] - 388:8
**thermal** [18] - 475:25, 478:12, 478:18, 478:20, 478:22, 480:4, 480:10, 480:13, 481:2, 481:14, 483:25, 490:5, 492:12, 492:13, 492:18, 493:1, 493:3, 512:17
**they've** [1] - 446:12
**thick** [1] - 414:10
**thickest** [1] - 387:11
**thickness** [13] - 350:2, 350:10, 352:16, 354:5, 357:13, 357:16, 374:11, 374:22, 374:24, 375:2, 387:20, 428:10, 469:4
**thicknesses** [1] - 372:21
**THIEL** [1] - 284:6
**thin** [1] - 361:9
**thinking** [3] - 294:18, 312:12, 417:6
**thinnest** [1] - 375:4
**third** [6] - 298:5, 366:16, 418:17, 419:8, 449:22, 480:11
**third-party** [3] - 366:16, 418:17, 419:8
**THOMAS** [1] - 284:15
**thousand** [4] - 332:10, 351:10, 364:2
**three** [99] - 297:12, 298:14, 301:1, 326:21, 327:22, 329:16, 331:1, 340:20, 355:24, 356:3, 356:4, 356:18, 356:25, 357:6, 357:10, 357:20, 359:1, 359:9, 359:10, 359:12, 359:19, 359:23, 360:24, 361:3, 361:6, 363:9, 364:20, 365:3, 365:5, 365:7, 367:8, 369:7, 394:22, 397:8, 400:17, 405:18, 405:20, 407:10, 408:1, 415:3, 421:3, 422:20, 422:21, 425:3, 425:9, 425:16, 427:18, 431:17, 432:15, 433:18, 434:17, 435:22, 435:24, 440:21, 441:17, 446:17, 449:12, 450:7, 451:3, 451:6, 451:7, 451:17, 451:22, 452:5, 452:7, 452:19, 453:12, 453:17, 454:4, 454:12, 454:18, 455:6, 455:10, 456:10, 456:11, 456:24, 457:7, 457:17, 459:14, 464:20, 470:9, 474:10, 474:11, 481:10, 481:25, 491:21, 501:6, 512:12, 521:4, 521:8, 531:5, 532:9, 533:11, 534:16, 543:24, 550:21
**three-month** [1] - 297:12
**three-quarter** [1] - 491:21
**threshold** [3] - 452:12, 465:22, 467:1
**THRONE** [1] - 284:15
**Throne** [2] - 284:15, 289:18
**throughout** [6] - 359:22, 393:7, 397:12, 401:24, 420:25, 435:24
**tie** [2] - 325:2, 372:25
**tight** [1] - 494:23
**timeline** [1] - 482:14
**today** [25] - 289:18, 291:1, 298:23, 315:7, 324:14, 332:11, 333:2, 339:15, 404:12, 432:13, 438:22, 446:6, 449:13, 450:6, 451:2, 460:19, 482:25, 498:13, 506:22, 513:5, 518:19, 519:6, 519:22, 530:12, 532:20
**together** [8] - 298:24, 307:15, 397:10, 432:12, 446:13, 459:19, 460:17, 531:6
**Tom** [2] - 289:17, 289:18
**tomorrow** [2] - 291:3, 551:9
**ton** [1] - 320:12
**Tongue** [5] - 386:18, 386:20, 386:24, 387:3, 392:24
**tons** [10] - 423:25, 424:3, 424:5, 424:8, 424:19, 424:21, 470:24, 481:4, 481:10, 481:25
**took** [5] - 349:9, 349:11, 386:2, 389:24, 516:22
**tool** [3] - 292:17, 511:24, 512:6
**top** [9] - 357:15, 376:12, 394:25, 426:8, 449:15, 473:17, 485:20, 494:1, 543:4
**topic** [2] - 508:25, 509:17
**topically** [1] - 510:6
**topside** [2] - 468:5, 468:18
**total** [8] - 332:7, 352:21, 407:10, 407:23, 420:22, 456:11, 470:14, 473:15
**totally** [1] - 446:7
**touch** [1] - 400:3
**touched** [2] - 401:7, 438:11
**tours** [1] - 405:25
**towards** [3] - 376:1, 385:1
**towns** [1] - 446:3
**Township** [59] - 277:7, 277:9, 277:11, 277:12, 277:13, 277:20, 277:22, 278:1, 278:2, 278:3, 278:10, 278:11, 278:14, 278:15, 278:16, 278:20, 278:22, 279:1, 279:1, 279:2, 279:11, 279:14, 279:15, 279:16, 280:1, 280:3, 280:5, 280:6, 280:13, 280:16, 280:17, 280:18, 280:23, 281:2, 281:3, 281:4, 281:13, 281:14, 281:15, 281:18, 281:19, 282:2, 282:4, 282:5, 282:8, 282:9, 282:15, 282:16, 282:18, 282:20, 282:21, 283:2, 283:4, 283:5, 283:8, 283:9, 373:10, 423:15, 429:3
**townships** [1] - 356:25
**track** [1] - 371:10
**tract** [3] - 354:6, 354:25, 358:1
**tracts** [1] - 354:13
**traffic** [3] - 445:1, 483:6, 483:18
**Trail** [1] - 536:16
**training** [5] - 435:25, 436:11, 436:24, 437:2, 437:12
**TRANSCRIPT** [1] - 283:15
**transcript** [1] - 552:11
**transect** [1] - 362:18
**transfer** [8] - 299:17, 299:21, 300:13, 300:15, 301:10, 421:6, 441:13, 442:4

**transferred** [2] - 300:8, 300:10
**transition** [1] - 466:19
**transmissibility** [2] - 362:2, 362:5
**transmissible** [1] - 362:20
**transmission** [2] - 412:1, 428:21
**transport** [4] - 391:7, 391:10, 391:18, 391:25
**Transport** [1] - 482:9
**transportation** [1] - 397:14
**trapping** [3] - 378:13, 378:19, 379:10
**travel** [1] - 339:12
**traveled** [1] - 401:10
**traveling** [1] - 347:7
**Travis** [1] - 463:5
**TRAVIS** [1] - 284:5
**treat** [2] - 352:18, 353:3
**treating** [1] - 320:10
**treatment** [1] - 504:22
**tree** [1] - 495:24
**trend** [1] - 379:4
**triangle** [4] - 336:6, 336:10, 369:16, 369:18
**triangulate** [1] - 432:14
**tried** [2] - 441:2, 518:22
**trigger** [1] - 481:15
**trip** [1] - 481:17
**trouble** [1] - 460:2
**troubleshoot** [1] - 326:7
**troubleshooted** [1] - 326:10
**true** [1] - 379:1
**TRUST** [1] - 285:7
**try** [7] - 303:3, 453:6, 472:16, 472:22, 475:5, 526:14, 544:14
**trying** [12] - 341:16, 341:20, 341:23, 342:2, 369:11, 477:15, 497:10, 514:12, 518:20, 521:7, 524:4, 545:4
**tubing** [8] - 438:5, 438:6, 453:19, 455:17, 455:18, 455:23, 457:19, 492:14
**tubing-conveyed** [3] - 453:19, 455:17, 457:19
**tubing/casing** [1] - 429:11
**Tundra** [2] - 322:5, 322:17
**turbine** [1] - 433:20
**turn** [7] - 335:6, 475:7, 508:16, 509:8, 509:22, 511:21, 539:14
**two** [54] - 290:12, 292:14, 297:11, 298:2, 298:4, 299:19, 299:20, 301:2, 301:3, 301:9, 307:22, 325:7, 335:12, 347:24, 357:17, 360:12, 369:20, 380:2, 385:23, 387:3, 387:5, 389:16, 391:23, 397:1, 404:6, 404:20, 404:24, 407:13, 409:14, 411:1, 423:13, 428:15, 433:10, 438:15, 442:17, 444:9, 444:10, 444:12, 444:20, 446:12, 453:21, 455:1, 455:5, 464:5, 470:13, 486:23, 492:2, 492:4, 492:15, 494:8, 511:24, 531:6, 546:20
**two-month** [1] - 297:11
**two-year** [1] - 444:20
**Ty** [1] - 302:6
**TYLER** [1] - 284:10
**Type** [1] - 400:2
**type** [11] - 324:4, 357:9, 357:14, 357:20, 435:9, 478:21, 487:21, 507:13, 514:21, 547:8, 550:1
**types** [1] - 400:7
**typewritten** [1] - 552:10
**typical** [5] - 317:21, 318:3, 318:4, 425:10, 437:20
**typically** [10] - 323:15, 325:6, 340:1, 373:6, 419:2, 425:15, 426:21, 491:14, 491:20, 492:16
**typo** [4] - 374:15, 374:16, 471:19, 472:3

## U

**U.S** [4] - 336:17, 390:15, 396:24, 528:24
**UIC** [5] - 291:21, 292:15, 292:19, 292:20, 293:6
**ultimate** [1] - 329:4
**ultimately** [5] - 319:14, 402:5, 508:5, 516:25, 517:11
**unacceptable** [1] - 510:10
**unaltered** [1] - 512:19
**unavailable** [1] - 436:10
**uncertain** [1] - 305:16
**uncertainties** [1] - 357:25
**uncertainty** [4] - 316:14, 351:8, 351:15, 372:23
**under** [26] - 291:5, 291:7, 291:11, 291:21, 292:12, 292:18, 296:13, 342:16, 397:18, 407:19, 434:3, 435:7, 437:12, 443:14, 445:17, 448:4, 458:10, 461:18, 471:19, 481:7, 481:25, 483:6, 487:3, 497:17, 509:4, 512:2
**undergone** [1] - 543:2
**underground** [8] - 292:25, 293:15, 293:23, 294:1, 410:2, 410:6, 439:14, 489:1
**Underground** [1] - 511:3
**underneath** [1] - 476:14
**understood** [14] - 390:9, 418:12, 430:5, 432:3, 432:19, 437:22, 444:24, 445:15, 461:19, 513:20, 517:9, 521:17, 534:6, 545:8
**underway** [1] - 368:2
**unexpected** [1] - 476:2
**unexpectedly** [1] - 494:11
**unit** [6] - 459:2, 499:10, 538:14, 541:2, 541:3, 543:1
**units** [4] - 386:3, 446:15, 499:15, 523:16
**University** [11] - 403:25, 409:1, 504:11, 504:12, 523:19, 527:25, 528:1, 528:2, 528:8, 540:7, 540:9
**unknown** [1] - 432:10
**unless** [6] - 351:13, 370:11, 392:12, 419:3, 472:8, 545:3
**unlikely** [1] - 481:12
**unrestricted** [1] - 436:21
**unsaturated** [2] - 391:21, 391:22
**unsure** [2] - 305:5, 305:16
**unwilling** [1] - 304:18
**up** [72] - 290:20, 291:11, 309:14, 318:8, 323:9, 325:2, 325:11, 326:8, 332:10, 332:11, 338:7, 339:4, 339:12, 383:4, 399:12, 399:18, 400:6, 402:8, 402:9, 411:4, 414:23, 416:9, 416:13, 416:14, 417:1, 423:3, 423:9, 434:25, 436:15, 436:19, 436:24, 440:11, 440:19, 441:6, 441:12, 442:17, 447:18, 461:14, 466:13, 466:21, 468:11, 470:18, 472:13, 472:21, 475:3, 475:14, 478:16, 481:20, 484:7, 488:15, 490:15, 492:15, 493:16, 494:18, 494:19, 497:2, 497:13, 504:15, 505:1, 505:5, 507:19, 507:25, 509:24, 510:20, 511:6, 511:21, 511:22, 529:1, 533:4, 534:17, 543:10, 548:7
**update** [1] - 367:14
**updated** [2] - 367:12, 368:2
**upload** [2] - 300:20, 544:24
**upper** [12] - 348:18, 360:7, 360:16, 361:14, 362:22, 380:4, 380:13, 387:14, 391:8, 413:7, 523:15, 544:12
**uppermost** [1] - 336:16
**ups** [1] - 426:10
**upscale** [2] - 376:15, 385:19
**upstream** [3] - 422:18, 443:10, 494:13
**upstream/midstream** [1] - 396:22
**USDW** [5] - 407:9, 454:21, 488:9, 488:23, 489:13
**USDWs** [9] - 293:11, 309:9, 339:8, 387:12, 406:19, 407:20, 439:23, 440:4, 456:19
**uses** [3] - 366:19, 452:18, 544:8
**USGS** [5] - 466:4, 466:5, 466:22, 521:24, 522:7
**USW** [1] - 439:14
**utility** [3] - 316:19, 316:22, 321:12
**utilize** [3] - 397:11, 443:25, 470:14
**utilizing** [1] - 470:13

## V

**validation** [1] - 367:15
**value** [11] - 310:3, 364:25, 365:6, 365:19, 388:14, 415:15, 418:1, 452:13, 465:10, 465:21, 490:22
**values** [15] - 350:9, 365:5, 369:3, 369:4, 374:17, 375:7, 384:22, 385:14, 385:16, 385:24, 385:25, 415:19, 445:4, 445:13, 465:7
**valve** [41] - 422:17, 422:18, 423:4, 469:11, 469:13, 475:25, 476:1, 478:13, 478:20, 478:22, 478:25, 479:2, 479:12, 479:21, 480:3, 480:5, 480:10, 480:20, 480:25, 481:2, 481:14, 483:25, 490:6, 490:8, 491:6, 491:17, 491:18, 492:8, 492:10, 492:12, 492:16, 492:20, 492:24, 493:1, 493:3, 493:5, 493:14, 493:20, 494:11, 494:16, 495:9
**valves** [15] - 308:23, 475:22,

476:6, 480:24, 481:15, 481:19, 489:22, 490:12, 490:21, 491:11, 491:14, 491:15, 491:18, 492:4, 494:5
**vari** [1] - 476:12
**variability** [1] - 351:4
**variable** [2] - 328:2, 476:12
**variables** [2] - 318:7, 319:10
**variance** [1] - 430:1
**variation** [2] - 415:2, 427:8
**variations** [1] - 452:9
**varies** [3] - 451:17, 451:22, 456:12
**variograms** [2] - 350:14, 372:14
**various** [12] - 294:22, 316:14, 350:9, 399:19, 449:7, 482:22, 528:10, 528:11, 528:17, 528:22, 528:23, 545:15
**vary** [3] - 318:4, 381:14, 455:11
**vendors** [1] - 432:11
**verification** [1] - 398:17
**versions** [1] - 513:24
**versus** [4] - 357:25, 407:14, 442:6, 542:13
**vertical** [5] - 291:23, 296:2, 348:22, 349:25, 362:19
**vessel** [2] - 429:16, 479:11
**vessels** [1] - 429:13
**veteran** [1] - 504:5
**veteran-owned** [1] - 504:5
**VI** [49] - 291:21, 292:16, 292:20, 293:1, 293:6, 293:8, 308:15, 323:12, 323:22, 328:7, 328:10, 328:17, 329:22, 330:7, 330:11, 331:1, 335:4, 340:13, 340:20, 341:1, 341:14, 404:8, 406:20, 410:11, 437:18, 506:21, 507:18, 508:1, 508:8, 508:10, 508:12, 508:20, 509:13, 509:20, 510:2, 511:4, 511:10, 512:13, 514:17, 514:24, 517:16, 518:7, 518:13, 518:19, 519:7, 520:19, 525:25, 535:4
**via** [2] - 357:25, 492:14
**vice** [1] - 539:6
**vintage** [1] - 337:16
**viscosity** [1] - 542:15
**visible** [1] - 414:14
**visibly** [1] - 395:7
**visual** [1] - 449:1
**vitae** [4] - 505:13, 529:6, 529:9, 529:11
**Volk** [6] - 403:4, 403:5, 403:6, 403:15, 474:25, 475:3
**VOLK** [11] - 403:7, 403:14, 411:21, 434:2, 435:12, 436:21, 437:14, 438:16, 439:9, 440:25, 445:24
**VOLK/JEAN** [1] - 286:19
**VOLUME** [1] - 283:16
**volume** [17] - 350:7, 383:7, 383:21, 383:24, 384:9, 384:17, 384:23, 402:3, 402:5, 421:12, 480:14, 541:22, 541:24, 542:1, 542:2, 543:13, 544:10
**volumes** [6] - 331:4, 332:7, 340:15, 346:1, 420:22, 421:3
**volumetric** [9] - 352:24, 357:25, 358:13, 427:10, 541:4, 541:10, 541:13, 541:18
**volunteer** [1] - 436:9

## W

**Wade** [11] - 332:19, 366:17, 395:17, 412:9, 416:7, 447:16, 450:5, 458:7, 458:14, 458:22, 459:24
**Wade's** [1] - 450:9
**wait** [1] - 431:9
**waited** [2] - 513:23, 514:14
**waiting** [4] - 416:23, 463:1, 463:3, 550:13
**walk** [3] - 390:8, 421:19, 450:2
**wants** [3] - 496:9, 497:19, 543:20
**warms** [1] - 481:20
**Washington** [2] - 527:25, 528:7
**Water** [3] - 292:12, 292:18, 293:2
**water** [30] - 293:16, 293:20, 293:23, 294:2, 336:17, 370:23, 377:21, 381:11, 391:2, 410:3, 410:7, 439:14, 440:6, 441:2, 441:5, 457:12, 485:5, 487:10, 489:1, 504:7, 504:21, 506:17, 524:7, 538:19, 541:23, 542:1, 542:6, 543:3, 546:22, 546:23
**ways** [3] - 321:13, 323:9, 543:17
**weather** [1] - 482:1
**website** [3] - 496:8, 514:17, 549:23
**Wednesday** [2] - 289:3, 551:11
**week** [5] - 325:3, 325:7, 325:11, 325:13, 325:25
**weeks** [17] - 299:10, 299:11, 299:19, 299:20, 299:24, 301:1, 301:3, 301:6, 301:9, 301:11, 307:22, 325:19, 325:21, 325:24, 326:4, 512:12, 532:10
**weight** [4] - 360:8, 381:21, 426:13, 426:20
**weight-constrained** [1] - 426:20
**well's** [1] - 338:9
**well-specific** [2] - 454:6, 457:12
**wellbore** [15] - 344:8, 344:16, 345:1, 345:3, 345:16, 346:16, 371:13, 401:9, 401:11, 401:13, 401:19, 401:22, 428:14, 431:2, 455:13
**wellbores** [4] - 319:11, 347:25, 348:3, 400:5
**wellhead** [19] - 309:12, 317:14, 426:13, 426:15, 426:22, 429:21, 462:15, 464:17, 464:25, 465:7, 469:7, 470:13, 470:18, 493:14, 494:11, 494:14, 495:9, 525:3
**wells** [92] - 291:17, 293:1, 298:15, 308:8, 308:15, 308:18, 323:12, 328:7, 328:10, 328:13, 330:7, 331:1, 331:13, 334:1, 334:5, 334:7, 334:11, 334:13, 335:5, 335:10, 335:13, 336:5, 336:22, 337:15, 338:17, 340:7, 340:15, 341:15, 357:17, 359:3, 359:10, 359:20, 359:24, 368:25, 369:2, 369:8, 370:17, 370:18, 370:24, 393:13, 401:16, 401:17, 402:20, 406:14, 407:16, 409:6, 409:7, 415:17, 415:19, 415:20, 437:18, 437:19, 439:4, 440:10, 441:4, 451:6, 452:21, 452:22, 453:1, 453:23, 455:1, 455:5, 456:16, 466:7, 470:13, 474:10, 474:11, 485:15, 485:19, 487:2, 487:13, 487:14, 487:25, 524:17, 524:18, 524:20, 525:5, 530:19, 531:6, 531:9, 531:11, 531:14, 531:20, 538:20, 540:20, 540:22, 540:24, 541:2, 549:3
**west** [2] - 348:16, 442:20
**West** [63] - 277:7, 277:9, 277:11, 277:12, 277:13, 277:21, 277:22, 278:1, 278:2, 278:3, 278:10, 278:12, 278:14, 278:15, 278:16, 278:20, 278:22, 279:1, 279:2, 279:3, 279:12, 279:14, 279:16, 279:17, 280:1, 280:4, 280:5, 280:6, 280:14, 280:17, 280:18, 280:19, 280:23, 281:2, 281:4, 281:5, 281:13, 281:15, 281:16, 281:19, 281:20, 282:3, 282:4, 282:5, 282:8, 282:9, 282:15, 282:17, 282:18, 282:21, 282:22, 283:3, 283:4, 283:5, 283:8, 283:9, 364:18, 373:10, 429:3, 459:16, 469:25, 470:1, 538:7
**west-east** [1] - 348:16
**western** [1] - 528:24
**what-if** [1] - 495:20
**whereas** [1] - 407:19
**whichever** [1] - 418:8
**white** [2] - 329:12, 345:2
**whole** [9] - 303:6, 319:25, 375:14, 375:22, 383:19, 385:3, 443:5, 484:13, 528:18
**wholly** [1] - 402:9
**willing** [6] - 415:13, 491:7, 512:10, 512:11, 532:11, 544:21
**Williston** [1] - 409:6
**wind** [2] - 433:20, 482:1
**withheld** [1] - 476:7
**witness** [22] - 348:5, 358:22, 360:24, 361:2, 370:10, 393:18, 395:21, 397:25, 398:2, 403:3, 403:4, 408:4, 408:5, 410:20, 447:19, 458:6, 458:7, 461:2, 503:8, 527:1, 537:6
**WITNESSES** [2] - 286:10, 287:19
**witnesses** [21] - 290:12, 290:15, 290:18, 309:14, 395:13, 397:23, 410:23, 410:24, 411:2, 416:18, 416:24, 417:1, 417:19, 434:25, 447:4, 447:11, 472:14, 472:20, 484:10, 502:20, 550:22
**word** [1] - 446:25

**wording** [1] - 446:22
**Workbench®** [1] - 523:2
**workers** [1] - 405:5
**workover** [1] - 438:7
**works** [2] - 320:16, 443:14
**world** [1] - 528:22
**write** [2] - 463:3, 522:9
**written** [3] - 333:2, 387:2, 474:6
**Wyoming** [6] - 284:17, 387:1, 507:6, 507:9, 507:12, 538:19

## X

**XRD** [1] - 457:9

## Y

**Yates** [5] - 538:7, 538:12, 538:13, 542:10, 546:16
**year** [30] - 314:21, 318:24, 350:17, 371:11, 374:6, 409:8, 420:14, 423:25, 424:19, 430:12, 430:17, 430:18, 430:23, 430:24, 431:8, 434:22, 440:8, 444:10, 444:12, 444:17, 444:20, 463:11, 463:12, 464:2, 464:6, 473:10, 496:14
**years** [42] - 313:8, 313:13, 314:20, 319:4, 319:7, 319:17, 319:18, 319:22, 320:1, 320:3, 327:23, 331:18, 332:1, 332:4, 332:12, 332:23, 337:23, 337:24, 368:3, 369:14, 371:9, 373:24, 378:25, 396:20, 404:3, 404:6, 430:23, 444:9, 463:15, 463:16, 463:18, 468:11, 496:23, 497:19, 498:16, 499:8, 523:24, 528:6, 528:8, 538:5, 538:18, 542:10
**yellow** [1] - 349:7
**yesterday** [17] - 290:13, 291:15, 304:13, 307:17, 308:6, 309:16, 309:24, 310:19, 332:19, 333:25, 343:5, 357:3, 412:12, 451:2, 459:11, 459:13, 459:14
**yourself** [3] - 301:5, 510:24, 516:2

## Z

**Zap** [1] - 446:4
**ZASTE** [2] - 285:3, 527:5
**Zaste** [1] - 289:24
**zero** [1] - 318:19
**zone** [24] - 359:11, 360:7, 360:16, 361:14, 362:22, 379:24, 380:5, 380:10, 380:11, 380:14, 381:2, 387:13, 387:15, 387:23, 387:24, 388:2, 391:9, 391:12, 391:18, 392:1, 457:10, 487:16
**Zone** [1] - 402:10
**zones** [5] - 380:3, 385:24, 394:17, 454:22, 457:11

**NORTH DAKOTA INDUSTRIAL COMMISSION**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case No(s). 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## INTERVENOR LANDOWNERS' MOTION FOR SUPPLEMENTAL HEARING

[¶1] Intervenor Landowners hereby move the Commission for an order setting a supplemental hearing date in order to allow Landowners to present evidence related to the reservoir computer modeling and parameters used in that model, and the manner in which it impacts Landowners' property rights.

[¶2] This Motion is supported by the Brief in Support, Declaration, and Exhibits filed herewith.

DATED this 29th day of August, 2024.

**BRAATEN LAW FIRM**

*/s/ Derrick Braaten*
Derrick Braaten (ND #06394)
109 North 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
derrick@braatenlawfirm.com

*Attorneys for Intervenors the Swenson Living Trust, Bauman, Gerving, Haupt, Jochim, Kraft, Liebelt, Maize, Metz, Rust, and Smith*

**NORTH DAKOTA INDUSTRIAL COMMISSION**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case No(s). 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## BRIEF IN SUPPORT OF INTERVENOR LANDOWNERS' MOTION FOR SUPPLEMENTAL HEARING

### I. BACKGROUND

The Commission held a hearing on Summit's permit applications on June 11, 12, and 13, 2024. Despite taking various approaches to obtain the information necessary to meaningfully participate at the hearing—including serving discovery, filing motions to either expedite discovery or continue the hearing, and filing open records requests—Intervenor Landowners were prevented from obtaining such information, including reservoir computer modeling data. To remedy the procedural due process violations resulting from this lack of information, the Commission should grant Intervenor Landowners' motion and hold a supplemental hearing.

Because the Commission's decision regarding the permits could substantially affect their property rights, Intervenor Landowners have, from the beginning, sought information necessary to meaningfully participate in the Commission's decision-making process. To that end, Intervenor Landowners took different approaches to obtain data and information, all of which proved inadequate. *See generally* Decl. of Derrick Braaten.

First, Intervenor Landowners sought information through the discovery process under § 28-32-33 and the North Dakota Rules of Civil Procedure. Specifically, Intervenor Landowner served discovery requests on May 2, 6, and 10, 2024, and noticed a 30(b)(6) of Summit for June 6, 2024. The Commission did not grant Intervenor Landowner's petition to intervene until May 31, 2024, and Summit openly refused to participate in discovery until the petition was granted. As a direct consequence of the Commission's delay, Summit did not respond to discovery requests until July 2, 2024—three weeks *after* the hearing. Additionally, Summit unilaterally refused to attend the

deposition on grounds that it did not have sufficient notice of the deposition, despite the original notice being served nearly a month beforehand.

Intervenor Landowners attempted to overcome the information gap caused by Summit's refusal to engage in good faith discovery, but the Commission impeded these efforts by denying two motions that would have remedied the problem. The first was Intervenor Landowner's motion to continue the hearing, which, if granted, would have postponed the hearing for a period of time within which Summit would have been required to respond to the discovery requests served after the Commission granted Intervenor Landowner's petition to intervene. The second was Intervenor Landowners' alternative motion for expedited discovery, which, if granted, would have required Summit to respond to the discovery requests before the originally scheduled hearing date.

Beyond the discovery process, Intervenor Landowners also sought information through open records requests, but the Commission inexplicably refused to produce the computer modeling files that Commission staff themselves had asked Summit for on June 12, 2023. *Id.* Presumably the Commission did not have those files yet when it produced records on June 20, 2023 to the undersigned in response to an unrelated open record request, and in any case the Commission made it clear at that time that it did not have "an application for amalgamation, [or] any class VI applications." *Id.* Given this is the source of the computer modeling data, it may also explain why the Commission did not produce the modeling data. Regardless, on May 15, Intervenor Landowners submitted another open records request to the Oil and Gas Division of the Commission, specifically seeking the following:

- All the input files, field and analytical data, and the model geochemical database used to evaluate the CO2 effects on the upper and lower confining layers, including but not limited to all inputs and data files used to run the United States Geological Survey's USGS's PHREEQC model.

- All the input files, field and analytical data , and the model geochemical database used to run Computer Modelling Group Ltd.'s GEM model and software or any similar model or software used for the same purposes.
- Geophysical Logs that penetrate injection and confining zones, seismic survey data and core sample measurements, all measurements and data for acoustic impedance, total porosity, effective porosity, permeability, and facies.
- All the input files, field and analytical data, and the model, including but not limited to all inputs and data files used to run SLB's Petrel model in any manner related to Summit's applications.
  All 3D numerical reservoir simulation model data decks, output files and graphing files of the Storage Reservoir in original electronic format. Without limiting the foregoing, such files may commonly be stored in Slumberger Eclipse or Petrel format, CMG (Canadian Modeling Group) Imex format, or other similar format.

*See* Exhibit G, attached to the Decl. of Derrick Braaten.

The Division responded on May 21, 2024, stating "The agency has previously provided (9-21-2023) all modeling input and results files submitted and used for the application by Summit. Agency staff validated the inputs and parameters in the submitted model via CMG software." *See* Exhibit H, attached to the Decl. of Derrick Braaten. This validation is precisely the goal of Landowners themselves and is why they seek the same files the Commission sought from Summit in June of 2023 and refuses to produce (and presumably did not have yet when it produced files in June of 2023). While it referred Landowners to a prior unrelated open record request from the undersigned related to N.D.C.C. ch. 38-25, the Commissions response to that request on September 22, 2023 was a perfunctory "Ms. Zaste, our office has not received any applications under NDCC 38-25." *See* Exhibit F, attached to the Decl. of Derrick Braaten. This intentional misdirection is alarming and violates due process. Whatever the reason, the only action that comported with due process was for the Commission to provide a legally mandated response to the open record request and produce the computer data and files. It did not, and in the process it not only violated Landowners' due process rights, it also violated the North Dakota open records laws.

Intervenor Landowners learned at the hearing that the models were also in the possession of the EERC, so they filed an open records request on June 17 and received a response on July 2, 2024—three weeks after the hearing. Landowners are currently working with their experts and Computer Modeling Group Ltd. to set up and run the model input files received from EERC, but it is estimated a first run of the model will take 24.7 days. *See* Decl. of Derrick Braaten, ¶18.

Due to the foregoing, Intervenor Landowners did not have the information necessary to fully participate in the hearing and present their own data from the model regarding the impact to their property. The property rights at stake here are significant, and the ability to utilize and present evidence from the same computer model used by the applicant and the Commission is critical to providing Landowners their due process rights in this proceeding.

## II. The Commission will concretize a violation of procedural and substantive due process and significantly exacerbate the impact of a violation of the open record laws if it issues a decision without providing Landowners a fair opportunity for discovery and a supplemental hearing.

It is the express policy of North Dakota to conduct permitting of geologic storage of carbon dioxide "in a manner fair to all interests." N.D.C.C. § 38-22-01. And one of the enumerated grounds for overturning an agency's decision is when the "[t]he rules or procedure of the agency have not afforded the appellant a fair hearing." § 28-32-46(4). *See Schlittenhart v. North Dakota Dept. of Transp.*, 2015 ND 179, ¶ 27, 865 N.W.2d 825 (noting that the Court reviews administrative proceedings to "ensure procedural fairness").

Fairness requires that interested parties have the information necessary to meaningfully participate at the hearing. Generally when an agency oversees a proceeding that involves an opportunity to comment and a hearing the agency must present "the data underlying its proposed action before the close of the comment and hearing period." *National Wildlife Federation v. Marsh*, 568 F.Supp. 985, 994 (D. D.C. 1983). This is because the right to comment or be heard

cannot be meaningful "when one is not apprised of the issues and positions [that are] relevant." *Id.* at 993 (quoting *U.S. Lines v. Federal Maritime Commission*, 584 F.2d 519, 540 (D.C.Cir. 1978)). In other words, an exchange of views and dialogue is only possible if the public is adequately informed, and "without such dialogue any notion of real public participation is necessarily an illusion." *Id.*; *see also Chemical Mfrs. Ass'n v. U.S. E.P.A.*, 870 F.2d 177, 200 (5th Cir. 1989) ("[F]airness requires that the agency afford interested parties an opportunity to challenge the underlying factual data relied on by the agency.").

To ensure Intervenor Landowners' participation in these proceedings is more than illusory, the Commission should grant this motion and hold a supplemental hearing on Summit's permit application. Fairness is required in these proceedings, and fairness requires access to data and information that the Commission considers prior to the hearing. Intervenor Landowners used every method available to obtain the information prior to the hearing, but due to stonewalling by Summit and the Commission these efforts were unsuccessful.

The Commission can remedy these procedural deficiencies by holding a supplemental hearing. Developments after the hearing—including EERC's response to the open records request which has potentially provided the complete modeling files, and Summit's belated responses to discovery—as well as the information obtained in the hearing itself, will allow Intervenor Landowners to meaningfully participate. Landowners have also filed a motion to compel which should be granted to ensure the supplemental hearing allows for *meaningful* participation.[1]

[1] Landowners reiterate that they are in the process of running the modeling files obtained from EERC and are not yet certain these are the complete modeling files. *See* Decl. of Derrick Braaten, ¶18. Production of the files by the Commission or Summit is essential to fully authenticate the modeling files as used for this proceeding, and if Landowners have issues with incomplete files obtained from EERC, they have little recourse as compared to having the computer modeling files directly from the Commission or Summit and produced along with the representation that they are the complete modeling files used for this application as requested from both entities through either an open record request or through discovery in this proceeding.

The holding of a supplemental hearing will not delay the Commission's decision. As noted in Intervenor Landowners' Petition for Reconsideration of Denial of Motion to Continue Hearing, a decision is not expected for months (and there is also no evidence that a delay into winter will slow anything for the applicant). Therefore, there is no justification to preclude Intervenor Landowners from participating in a supplemental hearing.

## III. CONCLUSION

The law requires fairness, and fairness requires access to information. Between Summit's refusal to engage in discovery, the Commission's refusal to either expedite discovery or continue the hearing, and refusal to respond to public records requests, Intervenor Landowners have been blocked from the information required to meaningfully participate at the hearing. By granting this motion, the Commission can rectify the procedural deficiencies and ensure that this proceeding is conducted "in a manner fair to all interests." N.D.C.C. § 38-22-01. Otherwise it risks proving that it is not in fact administering its Class VI program in a manner fair to landowners and compliant with approved law.

DATED this 29th day of August, 2024.

**BRAATEN LAW FIRM**

*/s/ Derrick Braaten*
Derrick Braaten (ND #06394)
109 North 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
Email:
derrick@braatenlawfirm.com

*Attorneys for Intervenors the Swenson Living Trust, Bauman, Gerving, Haupt, Jochim, Kraft, Liebelt, Maize, Metz, Rust, and Smith*

**NORTH DAKOTA INDUSTRIAL COMMISSION**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case No(s). 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## DECLARATION OF DERRICK BRAATEN

1. Attached hereto as Exhibit A is a true and correct copy of a request submitted via email on June 14, 2023 to the NDIC Oil and Gas Division for "applications and all correspondence and other documents...as well as all correspondence generally with Summit Carbon Solutions or its affiliates, authorized agents and representatives" related to "an application with the ND Industrial Commission requesting an order amalgamating property interests and/or seeking a Class VI well permit or permits."

2. Attached hereto as Exhibit B is a true and correct copy of subsequent emails with Michael Ziesch, EGIS Staff Officer, where the request was amended to "storage facility permit" rather than amalgamation application or Class VI permits, and the correspondence was limited to "...May 1, 2023 to June 20, 2023."

3. Attached hereto as Exhibit C is a true and correct copy of an index of the files produced in response to the June 14th request. A thumb drive of files was picked up on June 23, 2023. The index of the files was produced with a program called "Directory List and Print," a software tool for Windows that enables listing and printing the content of any directory.

4. Inspection of the index, and the folders and files themselves, determined that the thumb drive contained the following files.

(a) Three draft "Carbon Dioxide Geologic Storage Facility Permits" for Summit Carbon Storage #1, #2, and #3 in pdf format.

(b) Four emails regarding the draft applications and data in msg format.

(c) 613 GIS Shapefiles for Summit Carbon Storage #1, #2, and #3 in the form of geodatabase files with extensions "atx," "freelist," "gdbindexes," "gdbtable," "horizon," and "spx."

(d) 178 modeling files for the programs CGM and Petrel. The CGM Rescue files are 154 "bin" files and the Petrel Rescue files are 23 "bin" files and one "xml" file.

(e) 138 Core Information, High Resolution Figures, and Individual Section Document files for Summit Carbon Storage #1, #2, and #3 in the form of the following:

| Extension | Count |
|---|---|
| jpg | 35 |
| pdf | 54 |
| png | 11 |
| tif | 9 |
| xlsx | 25 |

5. Attached hereto as Exhibit D is a true and correct copy of one of the four emails listed in 4(b) above. It was sent by Tamara Madche, geologist with the NDIC Oil and Gas Division, to Jay Volk, the Sequestrations Director of Health, Safety, and Environment with Summit Carbon Solutions, on June 12, 2023 regarding the draft applications for carbon dioxide storage facility permits previously emailed by Mr. Volk. In that email, Ms. Madche lists found issues after a cursory check for completeness. One issue is missing CMG modeling files, where Ms. Madche writes the following: "Need: DAT, SRS, OUT, LOG, and any RST files for the model."

6. Attached hereto as Exhibit E is a true and correct copy of a letter to the NDIC Oil and Gas Division, submitted via email on September 21, 2023, requesting "all applications for permits pursuant to N.D.C.C. ch. 38-25, including any associated or related correspondence, documents, and notes related to the applications for permits."

7. Attached hereto as Exhibit F is a true and correct copy of the email response of Mr. Ziesch sent September 22, 2023. Mr. Ziesch wrote that "Ms. Zaste, our office has not received any applications under NDCC 38-25." No files were provided.

8. Attached hereto as Exhibit G is a true and correct copy of a letter to the NDIC Oil and Gas Division, submitted via email on May 15, 2024, requesting "data electronic files and/or load files submitted to the Oil and Gas Division by applicants Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC" to include "All 3D numerical reservoir simulation model data decks, output files and graphing files of the Storage Reservoir in original electronic format. Without limiting the foregoing, such files may commonly be stored in Slumberger Eclipse or Petrel format, CMG (Canadian Modeling Group) Imex format, or other similar format."

9. Attached hereto as Exhibit H is a true and correct copy of the May 21st, 2024 email response of Mr. Ziesch to the request in ¶8. Mr. Ziesch wrote that "The agency has previously provided (9-21-2023) all modeling input and results files submitted and used for the application by Summit. Agency staff validated the inputs and parameters in the submitted model via CMG software" and "The CMG files, previously provided on 9-21-2023, are the modeling files still being used for the applications. There are no updates to them."

10. However, no files were provided in response to the September 21, 2023 records request.

11. The files produced in June of 2023 (under an entirely separate record request) only include "Rescue" files, not "results" files. The EERC records request response at ¶15 below includes the same "Rescue" files, but also a separate folder of "2022 CMG EERC **Results**" that includes 2 DAT files, an OUT file, and a LOG file, three of the files that Ms. Madche at the NDIC noted they would "need" in Exhibit D.

12. If "Agency staff validated the inputs and parameters in the submitted model via CMG software," it must be presumed that Summit provided the agency with the missing CMG modeling files that Ms. Madche noted they would "need" in Exhibit D. Those files have not been provided to my office by the NDIC in any response to any records request. Presuming that Summit simply replied to the June 12, 2023 email from Ms. Madche without turning over any additional data, then that reply should have been included in either of the subsequent records requests on August 24, 2023:

> Summit Carbon Solutions, LLC submitted three applications for carbon dioxide storage facility permits on June 9th, 2023. I am writing to request **all correspondence** and other documents related to the applications, as well as all correspondence generally with Summit Carbon Solutions or its affiliates, authorized agents and representatives, from **June 21st, 2023 to August 24th, 2023**.

or September 7, 2023:

> Summit Carbon Storage #1, LLC was recently granted a permit for the TB LEINGANG 2, SE NE 18-141N-87W, Oliver Co., API – 33-065-00027, well file #40178. I am writing to request **all correspondence** and other documents related to all permit applications submitted by Summit Carbon Storage #1, LLC, or its affiliates, authorized agents, and representatives, from **January 1, 2023 to September 6, 2023**.

13. Attached hereto as Exhibits I and J are true and correct copies of the August 24, 2023 and September 7, 2023 letters to the Department of Mineral Resources regarding records requests.

14. Attached hereto as Exhibit K is a true and correct copy of an open records request to the EERC, submitted via email on June 17, 2024, requesting input files, data decks, data, databases, measurements, logs, output files, and graphing files.

15. Attached hereto as Exhibit L is the EERC email response sent on July 2, 2024. The EERC provided some files that had not been previously provided by the NDIC, including the following:

- A folder titled "2022 CMG EERC Results" containing the following:

(a) 2 DAT files
(b) 1 LOG file
(c) 1 OUT file
(d) 1 ERR file, and
(e) 1 SR3 file.

- Three folders, one for each of the three storage facilities, titled "MDT Files." These are graphs, tables, etc. related to pressure testing.

16. Attached hereto as Exhibit M is a true and correct copy of an excerpt from the transcript of NDIC hearing testimony given June 11th, 2024. Amanda Douglas, assistant director for integrated subsurface projects at the EERC, testified that the .DAT files listed in ¶15 above were, to her understanding, provided to the NDIC.

Q. Are you aware of the GEM model having a single file called -- with a file extension .DAT that you can use to run a model on the program?
**A**. Correct.
Q. Do you have one of those .DAT files that would allow us to run the model you ran in that program?
**A**. For the CO2 simulations or the geochemical simulations?
Q. CO2 simulation.
**A.** Yes, I believe that was provided to the Commission already.
Q. And that could just be taken and loaded into the GEM program to run the model that you ran?
**A.** That's my understanding, yes.

p. 253, lns. 11-25.

17. Attached hereto as Exhibit N is a true and correct copy of an excerpt from the transcript of NDIC hearing testimony given June 12th, 2024. Amanda Douglas again testified that the .DAT files listed in ¶15 above were provided to the NDIC, along with the .SR3 file.

Other than the input file for the PHREEQC model, is there anything listed in these bullet points that was not provided by EERC to the Industrial Commission?

**A.** Yes. As I mentioned, the only input data that was provided can be found in your last bullet point in terms of what I would call the simulation -- or the numerical reservoir simulation model data decks and the output files. Those were the two pieces of data which I am saying is the .DAT file and the .SR3 file. Those are the only two data sets from this list that were provided.

pp. 297-298, lns. 18-4.

18. It is estimated that the first run of the model input files received from the EERC will take 24.7 days to complete. Landowners' experts are in process on this now.

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on the 29th day of August, 2024 at Bismarck, ND, United States.

Derrick Braaten

North Dakota Industrial Commission
Oil and Gas Division
Case Nos. 30869-30880

Exhibit A to Declaration of Derrick Braaten
in Support of Motion for Supplemental Hearing

NORTH Dakota | Mineral Resources
Be Legendary.

701.328-8020 · oilandgasinfo@nd.gov · 600 E Boulevard Ave, Dept. 405 · Bismarck, ND 58505

**From:** Derrick Braaten <derrick@braatenlawfirm.com>
**Sent:** Wednesday, June 14, 2023 12:03 PM
**To:** -Info-Oil & Gas Division <oilandgasinfo@nd.gov>
**Cc:** Kadrmas, Bethany R. <brkadrmas@nd.gov>; Helms, Lynn D. <lhelms@nd.gov>; Hicks, Bruce E. <bhicks@nd.gov>
**Subject:** Open Record Request re: Summit Carbon Solutions

You don't often get email from derrick@braatenlawfirm.com. Learn why this is important

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

I understand that Summit Carbon Solutions or one of its subsidiaries or affiliates such as SCS Carbon Transport or another related entity has filed an application with the ND Industrial Commission requesting an order amalgamating property interests and/or seeking a Class VI well permit or permits. I am writing to request all such applications and all correspondence and other documents related to the application, as well as all correspondence generally with Summit Carbon Solutions or its affiliates, authorized agents and representatives. I authorize you to charge up to $250.00 to respond to this request and would prefer all materials in electronic format to the maximum extent possible. I understand that there are likely short timeframes for such applications and hearings so hope to receive these materials as soon as possible and I am happy to discuss ways to expedite the request or make your response more efficient. Please let me know if you have any questions or would like to discuss anything in this request.

Sincerely,

**Derrick Braaten**

BRAATEN LAW FIRM
109 N. 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
Fax: 701-221-5842
www.braatenlawfirm.com

**PRIVILEGED COMMUNICATION**
**This e-mail message is intended only for the named recipient(s) above and is covered by the Electronic Communications Privacy Act, 18 U.S.C. Sections 2510-2521. This e-mail is confidential and may contain information that is privileged, attorney work product or exempt from disclosure under applicable law. Recipients should not file copies of this e-mail with publicly accessible records. If you have received this message in error, please immediately notify the sender by return e-mail and delete this e-mail message from your computer. Thank you for your cooperation.**

North Dakota Industrial Commission
Oil and Gas Division
Case Nos. 30869-30880

Exhibit B to Declaration of Derrick Braaten
in Support of Motion for Supplemental Hearing

Steven Price

**From:** Ziesch, Michael D. <mdziesch@nd.gov>
**Sent:** Friday, June 23, 2023 7:52 AM
**To:** Derrick Braaten
**Subject:** RE: Open Record Request re: Summit Carbon Solutions

[Warning: External Sender]

Your request has been compiled and available for pickup.

As discussed prior, it was one chargeable hour at $25.00 and the thumb drive was $5.62 for a total of $30.62

**From:** Derrick Braaten <derrick@braatenlawfirm.com>
**Sent:** Tuesday, June 20, 2023 4:49 PM
**To:** Ziesch, Michael D. <mdziesch@nd.gov>
**Subject:** RE: Open Record Request re: Summit Carbon Solutions

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Please transfer the data to a thumb drive and I'm happy to pay the charges when we pick it up.

Thanks again,
Derrick

**Derrick Braaten**

BRAATEN Law Firm

**BRAATEN LAW FIRM**
109 N. 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
Fax: 701-221-5842
www.braatenlawfirm.com

**PRIVILEGED COMMUNICATION**
**This e-mail message is intended only for the named recipient(s) above and is covered by the Electronic Communications Privacy Act, 18 U.S.C. Sections 2510-2521. This e-mail is confidential and may contain information that is privileged, attorney work product or exempt from disclosure under applicable law. Recipients should not file copies of this e-mail with publicly accessible records. If you have received this message in error, please immediately notify the sender by return e-mail and delete this e-mail message from your computer. Thank you for your cooperation.**

**From:** Ziesch, Michael D. <mdziesch@nd.gov>
**Sent:** Tuesday, June 20, 2023 4:28 PM
**To:** Derrick Braaten <derrick@braatenlawfirm.com>
**Subject:** RE: Open Record Request re: Summit Carbon Solutions

[Warning: External Sender]

We estimate a hard copy of the data would be approximately 1,200 pages.

The related data sets we have are approximately 3.3G and would take about an hour to transfer onto a thumb drive.

We spent approximately an hour reviewing your request, so the cost estimate for processing will be $25 as the first hour is free.

Additionally, the cost of either print copy, or the cost of the thumb drive, which would likely be nominal. We would need to put the data on a device that is ours because we can't introduce external hard drives for security reasons.

Please let me know if you want me to proceed with the request and, if so, what format you'd like it in.

---

**From:** Derrick Braaten <derrick@braatenlawfirm.com>
**Sent:** Tuesday, June 20, 2023 4:18 PM
**To:** Ziesch, Michael D. <mdziesch@nd.gov>
**Subject:** Re: Open Record Request re: Summit Carbon Solutions

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Thank you. Will you please provide the draft application for a storage facility permit and any correspondence related to that from May 1, 2023 to June 20, 2023?

Derrick Braaten
Braaten Law Firm
109 North 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
Fax: 701-221-5842
derrick@braatenlawfirm.com
www.braatenlawfirm.com
PRIVILEGED COMMUNICATION
This e-mail message is intended only for the named recipient(s) above and is covered by the Electronic Communications Privacy Act, 18 U.S.C. Sections 2510-2521. This e-mail is confidential and may contain information that is privileged, attorney work product or exempt from disclosure under applicable law. Recipients should not file copies of this e-mail with publicly accessible records. If you have received this message in error, please immediately notify the sender by return e-mail and delete this e-mail message from your computer.

---

**From:** Ziesch, Michael D. <mdziesch@nd.gov>
**Sent:** Tuesday, June 20, 2023 3:26:13 PM
**To:** Derrick Braaten <derrick@braatenlawfirm.com>
**Subject:** RE: Open Record Request re: Summit Carbon Solutions

[Warning: External Sender]

Mr. Braaten, we were able to get staff together this afternoon to review your request.

Our office has not received an application for amalgamation, nor do we have any class VI applications for the entity referenced. We do have a draft application for a storage facility permit.

Finally, your request for correspondence is too broad to process. It needs to have a more specific topic and date range.

Michael Ziesch
*EGIS Staff Officer*

701.328.8029 (o) • mdziesch@nd.gov • www.dmr.nd.gov

NORTH Dakota | Mineral Resources
Be Legendary.

701.328-8020 • oilandgasinfo@nd.gov • 600 E Boulevard Ave. Dept. 405 • Bismarck, ND 58505

---

**From:** Derrick Braaten <derrick@braatenlawfirm.com>
**Sent:** Thursday, June 15, 2023 12:26 PM
**To:** -Info-Oil & Gas Division <oilandgasinfo@nd.gov>
**Cc:** Kadrmas, Bethany R. <brkadrmas@nd.gov>; Steven Price <steven@braatenlawfirm.com>
**Subject:** RE: Open Record Request re: Summit Carbon Solutions

You don't often get email from derrick@braatenlawfirm.com. Learn why this is important

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

I understand and no problem, thank you for letting me know.

**Derrick Braaten**

BRAATEN Law Firm

**BRAATEN LAW FIRM**
109 N. 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
Fax: 701-221-5842
www.braatenlawfirm.com

**PRIVILEGED COMMUNICATION**
**This e-mail message is intended only for the named recipient(s) above and is covered by the Electronic Communications Privacy Act, 18 U.S.C. Sections 2510-2521. This e-mail is confidential and may contain information that is privileged, attorney work product or exempt from disclosure under applicable law. Recipients should not file copies of this e-mail with publicly accessible records. If you have received this message in error, please immediately notify the sender by return e-mail and delete this e-mail message from your computer. Thank you for your cooperation.**

---

**From:** -Info-Oil & Gas Division <oilandgasinfo@nd.gov>
**Sent:** Thursday, June 15, 2023 10:16 AM
**To:** Derrick Braaten <derrick@braatenlawfirm.com>; -Info-Oil & Gas Division <oilandgasinfo@nd.gov>

**Cc:** Kadrmas, Bethany R. <brkadrmas@nd.gov>
**Subject:** RE: Open Record Request re: Summit Carbon Solutions

[Warning: External Sender]

Mr. Braaten, your request has been received and is being reviewed. We have special hearings this week, scheduled for Wed-Fri that are impacting staff availability.

Michael Ziesch
*EGIS Staff Officer*

701.328.8029 (o) • mdziesch@nd.gov • www.dmr.nd.gov

NORTH Dakota | Mineral Resources
Be Legendary.

701.328-8020 • oilandgasinfo@nd.gov • 600 E Boulevard Ave, Dept. 405 • Bismarck, ND 58505

**From:** Derrick Braaten <derrick@braatenlawfirm.com>
**Sent:** Wednesday, June 14, 2023 12:03 PM
**To:** -Info-Oil & Gas Division <oilandgasinfo@nd.gov>
**Cc:** Kadrmas, Bethany R. <brkadrmas@nd.gov>; Helms, Lynn D. <lhelms@nd.gov>; Hicks, Bruce E. <bhicks@nd.gov>
**Subject:** Open Record Request re: Summit Carbon Solutions

You don't often get email from derrick@braatenlawfirm.com. Learn why this is important

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

I understand that Summit Carbon Solutions or one of its subsidiaries or affiliates such as SCS Carbon Transport or another related entity has filed an application with the ND Industrial Commission requesting an order amalgamating property interests and/or seeking a Class VI well permit or permits. I am writing to request all such applications and all correspondence and other documents related to the application, as well as all correspondence generally with Summit Carbon Solutions or its affiliates, authorized agents and representatives. I authorize you to charge up to $250.00 to respond to this request and would prefer all materials in electronic format to the maximum extent possible. I understand that there are likely short timeframes for such applications and hearings so hope to receive these materials as soon as possible and I am happy to discuss ways to expedite the request or make your response more efficient. Please let me know if you have any questions or would like to discuss anything in this request.

Sincerely,

**Derrick Braaten**

BRAATEN Law Firm

**BRAATEN LAW FIRM**
109 N. 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911

Fax: 701-221-5842
www.braatenlawfirm.com

**PRIVILEGED COMMUNICATION**
**This e-mail message is intended only for the named recipient(s) above and is covered by the Electronic Communications Privacy Act, 18 U.S.C. Sections 2510-2521. This e-mail is confidential and may contain information that is privileged, attorney work product or exempt from disclosure under applicable law. Recipients should not file copies of this e-mail with publicly accessible records. If you have received this message in error, please immediately notify the sender by return e-mail and delete this e-mail message from your computer. Thank you for your cooperation.**

North Dakota Industrial Commission
Oil and Gas Division
Case Nos. 30869-30880

Exhibit C to Declaration of Derrick Braaten
in Support of Motion for Supplemental Hearing

| Name | Size MiB | Extension |
|---|---|---|
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2 | 0.04 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 0.00 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 0.00 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 0.00 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 0.00 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 0.00 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 0.00 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 0.00 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 0.00 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 11.30 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 11.43 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 11.54 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 11.62 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 11.69 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 11.74 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 11.78 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 11.82 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 11.85 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 11.88 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 11.90 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 11.92 | bin |

| Name | Size MiB | Extension |
|---|---|---|
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 11.94 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 11.95 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 11.97 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 11.98 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 11.99 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.00 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.01 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.02 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.02 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.03 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.03 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.04 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.05 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.05 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.05 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.06 | bin |

| Name | Size MiB | Extension |
|---|---|---|
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.06 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.06 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.07 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.07 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.07 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.07 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.08 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.08 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.08 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.08 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.08 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.08 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.09 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.09 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.09 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.09 | bin |

| Name | Size MiB | Extension |
|---|---|---|
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.09 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.09 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.09 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.09 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.09 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.09 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.09 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.10 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.10 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.10 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.10 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.10 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.10 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.10 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.10 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.10 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.10 | bin |

| Name | Size MiB | Extension |
|---|---|---|
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.10 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.10 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.10 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.10 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.10 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.10 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.10 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.10 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.10 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.10 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.10 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.10 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.11 | bin |
| P50_2W_BR_VOLMOD_TS_Summit1209_20Yspost_LGR_threesite_RS2.bin | 12.10 | bin |
| Summit_Task3.1_BroomCreek_GeologicModel(1000x1000)_P50 | 0.01 | bin |
| Summit_Task3.1_BroomCreek_GeologicModel(1000x1000)_P50.bin | 48.87 | bin |
| Summit_Task3.1_BroomCreek_GeologicModel(1000x1000)_P50.bin | 0.00 | bin |
| Summit_Task3.1_BroomCreek_GeologicModel(1000x1000)_P50.bin | 0.00 | bin |
| Summit_Task3.1_BroomCreek_GeologicModel(1000x1000)_P50.bin | 0.00 | bin |
| Summit_Task3.1_BroomCreek_GeologicModel(1000x1000)_P50.bin | 0.00 | bin |

| Name | Size MiB | Extension |
|---|---|---|
| Summit_Task3.1_BroomCreek_GeologicModel(1000x1000)_P50.bin | 0.00 | bin |
| Summit_Task3.1_BroomCreek_GeologicModel(1000x1000)_P50.bin | 0.00 | bin |
| Summit_Task3.1_BroomCreek_GeologicModel(1000x1000)_P50.bin | 2.19 | bin |
| Summit_Task3.1_BroomCreek_GeologicModel(1000x1000)_P50.bin | 2.19 | bin |
| Summit_Task3.1_BroomCreek_GeologicModel(1000x1000)_P50.bin | 2.19 | bin |
| Summit_Task3.1_BroomCreek_GeologicModel(1000x1000)_P50.bin | 2.19 | bin |
| Summit_Task3.1_BroomCreek_GeologicModel(1000x1000)_P50.bin | 2.19 | bin |
| Summit_Task3.1_BroomCreek_GeologicModel(1000x1000)_P50.bin | 8.63 | bin |
| Summit_Task3.1_BroomCreek_GeologicModel(1000x1000)_P50.bin | 33.98 | bin |
| Summit_Task3.1_BroomCreek_GeologicModel(1000x1000)_P50.bin | 8.63 | bin |
| Summit_Task3.1_BroomCreek_GeologicModel(1000x1000)_P50.bin | 8.63 | bin |
| Summit_Task3.1_BroomCreek_GeologicModel(1000x1000)_P50.bin | 8.63 | bin |
| Summit_Task3.1_BroomCreek_GeologicModel(1000x1000)_P50.bin | 33.25 | bin |
| Summit_Task3.1_BroomCreek_GeologicModel(1000x1000)_P50.bin | 33.98 | bin |
| Summit_Task3.1_BroomCreek_GeologicModel(1000x1000)_P50.bin | 33.98 | bin |
| Summit_Task3.1_BroomCreek_GeologicModel(1000x1000)_P50.bin | 33.98 | bin |
| Summit_Task3.1_BroomCreek_GeologicModel(1000x1000)_P50.bin | 0.00 | bin |
| Final_SCS_Injection-wellhead-schematic | 2.20 | jpg |
| Final_SCS_Milton Flemmer 1_Well Schematic_Post Well Testing_V006_As-is | 3.26 | jpg |
| Final_SCS_Milton Flemmer 1_Well Schematic_Post Well Testing_V006_Proposed Completion | 3.07 | jpg |
| Final_SCS_Milton Flemmer 1_Well Schematic_Post Well Testing_V006_Proposed P&A | 2.99 | jpg |
| Final_TB Leingang 1 Well Design_VER_008_Proposed Completion Wellbore | 2.64 | jpg |
| Final_TB Leingang 1 Well Design_VER_008_Proposed P&A | 2.61 | jpg |
| Final_TB Leingang 1 Well Design_VER_008_Proposed Wellbore | 2.25 | jpg |
| Final_TB Leingang 2 Well Design_VER_008_Proposed Completion | 2.65 | jpg |
| Final_TB Leingang 2 Well Design_VER_008_Proposed P&A | 2.61 | jpg |
| Final_TB Leingang 2 Well Design_VER_008_Proposed Wellbore | 2.25 | jpg |
| Milton-Flemmer_Monitoring-wellhead | 1.81 | jpg |
| TB-Leingang-1_Trajectory | 2.55 | jpg |
| a00000001.TablesByName | 0.03 | atx |
| a00000004.CatItemsByPhysicalName | 0.02 | atx |
| a00000004.CatItemsByType | 0.00 | atx |

| Name | Size MiB | Extension |
|---|---|---|
| a00000004.FDO_UUID | 0.00 | atx |
| a00000005.CatItemTypesByName | 0.01 | atx |
| a00000005.CatItemTypesByParentTypeID | 0.00 | atx |
| a00000005.CatItemTypesByUUID | 0.00 | atx |
| a00000006.CatRelsByDestinationID | 0.00 | atx |
| a00000006.CatRelsByOriginID | 0.00 | atx |
| a00000006.CatRelsByType | 0.00 | atx |
| a00000006.FDO_UUID | 0.00 | atx |
| a00000007.CatRelTypesByBackwardLabel | 0.01 | atx |
| a00000007.CatRelTypesByDestItemTypeID | 0.00 | atx |
| a00000007.CatRelTypesByForwardLabel | 0.01 | atx |
| a00000007.CatRelTypesByName | 0.01 | atx |
| a00000007.CatRelTypesByOriginItemTypeID | 0.00 | atx |
| a00000007.CatRelTypesByUUID | 0.00 | atx |
| a00000001.TablesByName | 0.02 | atx |
| a00000004.CatItemsByPhysicalName | 0.02 | atx |
| a00000004.CatItemsByType | 0.00 | atx |
| a00000004.FDO_UUID | 0.00 | atx |
| a00000005.CatItemTypesByName | 0.01 | atx |
| a00000005.CatItemTypesByParentTypeID | 0.00 | atx |
| a00000005.CatItemTypesByUUID | 0.00 | atx |
| a00000006.CatRelsByDestinationID | 0.00 | atx |
| a00000006.CatRelsByOriginID | 0.00 | atx |
| a00000006.CatRelsByType | 0.00 | atx |
| a00000006.FDO_UUID | 0.00 | atx |
| a00000007.CatRelTypesByBackwardLabel | 0.00 | atx |
| a00000007.CatRelTypesByDestItemTypeID | 0.00 | atx |
| a00000007.CatRelTypesByForwardLabel | 0.00 | atx |
| a00000007.CatRelTypesByName | 0.00 | atx |
| a00000007.CatRelTypesByOriginItemTypeID | 0.00 | atx |
| a00000007.CatRelTypesByUUID | 0.00 | atx |
| a00000001.TablesByName | 0.02 | atx |

| Name | Size MiB | Extension |
|---|---|---|
| a00000004.CatItemsByPhysicalName | 0.02 | atx |
| a00000004.CatItemsByType | 0.00 | atx |
| a00000004.FDO_UUID | 0.00 | atx |
| a00000005.CatItemTypesByName | 0.01 | atx |
| a00000005.CatItemTypesByParentTypeID | 0.00 | atx |
| a00000005.CatItemTypesByUUID | 0.00 | atx |
| a00000006.CatRelsByDestinationID | 0.00 | atx |
| a00000006.CatRelsByOriginID | 0.00 | atx |
| a00000006.CatRelsByType | 0.00 | atx |
| a00000006.FDO_UUID | 0.00 | atx |
| a00000007.CatRelTypesByBackwardLabel | 0.00 | atx |
| a00000007.CatRelTypesByDestItemTypeID | 0.00 | atx |
| a00000007.CatRelTypesByForwardLabel | 0.00 | atx |
| a00000007.CatRelTypesByName | 0.00 | atx |
| a00000007.CatRelTypesByOriginItemTypeID | 0.00 | atx |
| a00000007.CatRelTypesByUUID | 0.00 | atx |
| a00000001 | 0.02 | freelist |
| a00000004 | 0.07 | freelist |
| a00000006 | 0.00 | freelist |
| a00000001 | 0.01 | freelist |
| a00000004 | 0.06 | freelist |
| a00000006 | 0.00 | freelist |
| a00000001 | 0.01 | freelist |
| a00000004 | 0.07 | freelist |
| a00000006 | 0.00 | freelist |
| gd | 0.00 | gdb |
| timestamp | 0.00 | gdb |
| gd | 0.00 | gdb |
| timestamp | 0.00 | gdb |
| gd | 0.00 | gdb |
| timestamp | 0.00 | gdb |
| a0000000b | 0.00 | gdbindexes |

| Name | Size MiB | Extension |
|---|---|---|
| a0000000c | 0.00 | gdbindexes |
| a0000000d | 0.00 | gdbindexes |
| a0000000e | 0.00 | gdbindexes |
| a00000001 | 0.00 | gdbindexes |
| a0000002a | 0.00 | gdbindexes |
| a00000003 | 0.00 | gdbindexes |
| a00000004 | 0.00 | gdbindexes |
| a00000005 | 0.00 | gdbindexes |
| a0000005a | 0.00 | gdbindexes |
| a0000005c | 0.00 | gdbindexes |
| a0000005e | 0.00 | gdbindexes |
| a00000006 | 0.00 | gdbindexes |
| a0000006a | 0.00 | gdbindexes |
| a0000006b | 0.00 | gdbindexes |
| a0000006c | 0.00 | gdbindexes |
| a0000006d | 0.00 | gdbindexes |
| a0000006e | 0.00 | gdbindexes |
| a0000006f | 0.00 | gdbindexes |
| a00000007 | 0.00 | gdbindexes |
| a0000007a | 0.00 | gdbindexes |
| a0000007b | 0.00 | gdbindexes |
| a0000007c | 0.00 | gdbindexes |
| a0000007d | 0.00 | gdbindexes |
| a0000007e | 0.00 | gdbindexes |
| a00000020 | 0.00 | gdbindexes |
| a00000023 | 0.00 | gdbindexes |
| a00000025 | 0.00 | gdbindexes |
| a00000026 | 0.00 | gdbindexes |
| a00000049 | 0.00 | gdbindexes |
| a00000055 | 0.00 | gdbindexes |
| a00000060 | 0.00 | gdbindexes |
| a00000062 | 0.00 | gdbindexes |

| Name | Size MiB | Extension |
|---|---|---|
| a00000063 | 0.00 | gdbindexes |
| a00000064 | 0.00 | gdbindexes |
| a00000065 | 0.00 | gdbindexes |
| a00000066 | 0.00 | gdbindexes |
| a00000067 | 0.00 | gdbindexes |
| a00000068 | 0.00 | gdbindexes |
| a00000069 | 0.00 | gdbindexes |
| a00000070 | 0.00 | gdbindexes |
| a00000071 | 0.00 | gdbindexes |
| a00000072 | 0.00 | gdbindexes |
| a00000073 | 0.00 | gdbindexes |
| a00000074 | 0.00 | gdbindexes |
| a00000075 | 0.00 | gdbindexes |
| a00000076 | 0.00 | gdbindexes |
| a00000077 | 0.00 | gdbindexes |
| a00000078 | 0.00 | gdbindexes |
| a00000079 | 0.00 | gdbindexes |
| a0000000b | 0.00 | gdbindexes |
| a0000000c | 0.00 | gdbindexes |
| a0000000d | 0.00 | gdbindexes |
| a0000000e | 0.00 | gdbindexes |
| a00000001 | 0.00 | gdbindexes |
| a0000001b | 0.00 | gdbindexes |
| a0000002a | 0.00 | gdbindexes |
| a0000002c | 0.00 | gdbindexes |
| a0000002d | 0.00 | gdbindexes |
| a0000002e | 0.00 | gdbindexes |
| a0000002f | 0.00 | gdbindexes |
| a00000003 | 0.00 | gdbindexes |
| a0000003a | 0.00 | gdbindexes |
| a0000003b | 0.00 | gdbindexes |
| a0000003c | 0.00 | gdbindexes |

| Name | Size MiB | Extension |
|---|---|---|
| a0000003d | 0.00 | gdbindexes |
| a0000003e | 0.00 | gdbindexes |
| a0000003f | 0.00 | gdbindexes |
| a00000004 | 0.00 | gdbindexes |
| a00000005 | 0.00 | gdbindexes |
| a00000006 | 0.00 | gdbindexes |
| a00000007 | 0.00 | gdbindexes |
| a00000027 | 0.00 | gdbindexes |
| a00000028 | 0.00 | gdbindexes |
| a00000029 | 0.00 | gdbindexes |
| a00000030 | 0.00 | gdbindexes |
| a00000031 | 0.00 | gdbindexes |
| a00000032 | 0.00 | gdbindexes |
| a00000033 | 0.00 | gdbindexes |
| a00000034 | 0.00 | gdbindexes |
| a00000035 | 0.00 | gdbindexes |
| a00000036 | 0.00 | gdbindexes |
| a00000037 | 0.00 | gdbindexes |
| a00000038 | 0.00 | gdbindexes |
| a00000039 | 0.00 | gdbindexes |
| a00000040 | 0.00 | gdbindexes |
| a00000041 | 0.00 | gdbindexes |
| a00000042 | 0.00 | gdbindexes |
| a00000044 | 0.00 | gdbindexes |
| a0000000b | 0.00 | gdbindexes |
| a0000000c | 0.00 | gdbindexes |
| a0000000d | 0.00 | gdbindexes |
| a0000000e | 0.00 | gdbindexes |
| a00000001 | 0.00 | gdbindexes |
| a0000001c | 0.00 | gdbindexes |
| a0000002b | 0.00 | gdbindexes |
| a0000002c | 0.00 | gdbindexes |

| Name | Size MiB | Extension |
|---|---|---|
| a0000002d | 0.00 | gdbindexes |
| a0000002e | 0.00 | gdbindexes |
| a0000002f | 0.00 | gdbindexes |
| a00000003 | 0.00 | gdbindexes |
| a0000003a | 0.00 | gdbindexes |
| a0000003b | 0.00 | gdbindexes |
| a0000003c | 0.00 | gdbindexes |
| a0000003d | 0.00 | gdbindexes |
| a0000003e | 0.00 | gdbindexes |
| a0000003f | 0.00 | gdbindexes |
| a00000004 | 0.00 | gdbindexes |
| a00000005 | 0.00 | gdbindexes |
| a00000006 | 0.00 | gdbindexes |
| a00000007 | 0.00 | gdbindexes |
| a00000017 | 0.00 | gdbindexes |
| a00000026 | 0.00 | gdbindexes |
| a00000027 | 0.00 | gdbindexes |
| a00000028 | 0.00 | gdbindexes |
| a00000029 | 0.00 | gdbindexes |
| a00000030 | 0.00 | gdbindexes |
| a00000031 | 0.00 | gdbindexes |
| a00000032 | 0.00 | gdbindexes |
| a00000033 | 0.00 | gdbindexes |
| a00000034 | 0.00 | gdbindexes |
| a00000035 | 0.00 | gdbindexes |
| a00000036 | 0.00 | gdbindexes |
| a00000037 | 0.00 | gdbindexes |
| a00000038 | 0.00 | gdbindexes |
| a00000039 | 0.00 | gdbindexes |
| a00000040 | 0.00 | gdbindexes |
| a00000041 | 0.00 | gdbindexes |
| a0000000b | 0.04 | gdbtable |

| Name | Size MiB | Extension |
|---|---|---|
| a0000000c | 0.00 | gdbtable |
| a0000000d | 0.00 | gdbtable |
| a0000000e | 0.00 | gdbtable |
| a00000001 | 0.00 | gdbtable |
| a00000002 | 0.00 | gdbtable |
| a0000002a | 0.00 | gdbtable |
| a00000003 | 0.01 | gdbtable |
| a00000004 | 4.43 | gdbtable |
| a00000005 | 0.00 | gdbtable |
| a0000005a | 0.01 | gdbtable |
| a0000005c | 0.01 | gdbtable |
| a0000005e | 0.02 | gdbtable |
| a00000006 | 0.01 | gdbtable |
| a0000006a | 0.01 | gdbtable |
| a0000006b | 0.01 | gdbtable |
| a0000006c | 0.01 | gdbtable |
| a0000006d | 0.00 | gdbtable |
| a0000006e | 0.00 | gdbtable |
| a0000006f | 7.16 | gdbtable |
| a00000007 | 0.00 | gdbtable |
| a0000007a | 0.00 | gdbtable |
| a0000007b | 0.00 | gdbtable |
| a0000007c | 0.00 | gdbtable |
| a0000007d | 0.00 | gdbtable |
| a0000007e | 0.00 | gdbtable |
| a00000020 | 0.00 | gdbtable |
| a00000023 | 0.00 | gdbtable |
| a00000025 | 0.00 | gdbtable |
| a00000026 | 0.01 | gdbtable |
| a00000049 | 0.02 | gdbtable |
| a00000055 | 0.00 | gdbtable |
| a00000060 | 0.03 | gdbtable |

| Name | Size MiB | Extension |
|---|---|---|
| a00000062 | 0.00 | gdbtable |
| a00000063 | 0.00 | gdbtable |
| a00000064 | 0.00 | gdbtable |
| a00000065 | 0.00 | gdbtable |
| a00000066 | 0.00 | gdbtable |
| a00000067 | 0.00 | gdbtable |
| a00000068 | 0.00 | gdbtable |
| a00000069 | 0.00 | gdbtable |
| a00000070 | 0.00 | gdbtable |
| a00000071 | 0.00 | gdbtable |
| a00000072 | 0.00 | gdbtable |
| a00000073 | 0.00 | gdbtable |
| a00000074 | 0.00 | gdbtable |
| a00000075 | 0.00 | gdbtable |
| a00000076 | 0.02 | gdbtable |
| a00000077 | 0.00 | gdbtable |
| a00000078 | 0.00 | gdbtable |
| a00000079 | 0.00 | gdbtable |
| a0000000b | 0.03 | gdbtable |
| a0000000c | 0.00 | gdbtable |
| a0000000d | 0.00 | gdbtable |
| a0000000e | 0.00 | gdbtable |
| a0000001b | 0.00 | gdbtable |
| a00000002 | 0.00 | gdbtable |
| a0000002a | 0.03 | gdbtable |
| a0000002c | 0.00 | gdbtable |
| a0000002d | 0.00 | gdbtable |
| a0000002e | 0.00 | gdbtable |
| a0000002f | 0.00 | gdbtable |
| a00000003 | 0.01 | gdbtable |
| a0000003a | 0.05 | gdbtable |
| a0000003b | 7.16 | gdbtable |

| Name | Size MiB | Extension |
|---|---|---|
| a0000003c | 0.00 | gdbtable |
| a0000003d | 0.02 | gdbtable |
| a0000003e | 0.00 | gdbtable |
| a0000003f | 0.00 | gdbtable |
| a00000004 | 2.50 | gdbtable |
| TB-Leingang-2_Trajectory | 2.60 | jpg |
| BK Fischer 1 Well Design_VER_008_Proposed Completion Wellbore | 2.64 | jpg |
| BK Fischer 1 Well Design_VER_008_Proposed P&A Wellbore | 2.64 | jpg |
| BK Fischer 1 Well Design_VER_008_Proposed Wellbore | 2.32 | jpg |
| BK Fischer 2 Well Design_VER_007_Proposed Completion Wellbore | 2.65 | jpg |
| BK Fischer 2 Well Design_VER_007_Proposed P&A Wellbore | 2.64 | jpg |
| BK Fischer 2 Well Design_VER_007_Proposed Wellbore | 2.33 | jpg |
| Final_SCS_Injection-wellhead-schematic | 2.20 | jpg |
| SCS_Archie&Slash-monitoring-wellhead | 2.04 | jpg |
| SCS_Archie_Erickson_2_Well_Schematic_(As Constructed)_VER009_Completed Wellbore | 2.27 | jpg |
| SCS_Archie_Erickson_2_Well_Schematic_(As Constructed)_VER009_Proposed P&A | 2.42 | jpg |
| Final_SCS KJ Hintz 1 Well Design_VER_007_Proposed Completion | 2.61 | jpg |
| Final_SCS KJ Hintz 1 Well Design_VER_007_Proposed P&A | 2.61 | jpg |
| Final_SCS KJ Hintz 1 Well Design_VER_007_Proposed Wellbore | 2.30 | jpg |
| Final_SCS KJ Hintz 2 Well Design_VER_006_Proposed Completion | 2.59 | jpg |
| Final_SCS KJ Hintz 2 Well Design_VER_006_Proposed P&A | 2.60 | jpg |
| Final_SCS KJ Hintz 2 Well Design_VER_006_Proposed Wellbore | 2.28 | jpg |
| Final_SCS_Injection-wellhead-schematic | 2.20 | jpg |
| Final_SCS_Slash Lazy H 5_Well_Schematic_(As Constructed)_VER007_As-Completed | 2.22 | jpg |
| Final_SCS_Slash Lazy H 5_Well_Schematic_(As Constructed)_VER007_Proposed P&A | 2.34 | jpg |
| KJ-Hintz-1_Trajectory | 2.55 | jpg |
| KJ-Hintz-2_Trajectory | 2.53 | jpg |
| SCS_Archie&Slash-monitoring-wellhead | 2.04 | jpg |
| Anagnost_ Katherine shared the folder _SCS SFP Applications - June 9_ 2023_ with you_ | 0.21 | msg |
| RE_ Summit Carbon Solutions  - Draft applications | 0.15 | msg |
| RE_ Voice Mail (42 seconds) | 0.14 | msg |
| Summit Carbon Meeting - Flow Line Discussion | 0.12 | msg |

| Name | Size MiB | Extension |
|---|---|---|
| TBL-MF1_SFP_6.9.2023 | 89.21 | pdf |
| Milton_Flemmer_No_1_Photos_Cores_6-10 | 91.76 | pdf |
| TBL-MF1_Appendix-A_6.9.2023 | 2.28 | pdf |
| TBL-MF1_Appendix-B_6.9.2023 | 0.33 | pdf |
| TBL-MF1_Appendix-C_6.9.2023 | 3.21 | pdf |
| TBL-MF1_Appendix-D_6.9.2023 | 0.93 | pdf |
| TBL-MF1_PROJECT SUMMARY_6.9.2023 | 2.47 | pdf |
| TBL-MF1_Section-1.0_6.9.2023 | 0.35 | pdf |
| TBL-MF1_Section-2.0_6.9.2023 | 36.88 | pdf |
| TBL-MF1_Section-3.0_6.9.2023 | 17.02 | pdf |
| TBL-MF1_Section-4.0_6.9.2023 | 6.55 | pdf |
| TBL-MF1_Section-5.0_6.9.2023 | 4.19 | pdf |
| TBL-MF1_Section-6.0_6.9.2023 | 1.74 | pdf |
| TBL-MF1_Section-7.0_6.9.2023 | 2.37 | pdf |
| TBL-MF1_Section-8.0_6.9.2023 | 0.11 | pdf |
| TBL-MF1_Section-9.0_6.9.2023 | 5.06 | pdf |
| TBL-MF1_Section-10.0_6.9.2023 | 6.42 | pdf |
| TBL-MF1_Section-11.0_6.9.2023 | 3.59 | pdf |
| TBL-MF1_Section-12.0_6.9.2023 | 0.33 | pdf |
| BKF-AE2_SFP_6.9.2023 | 68.03 | pdf |
| a00000005 | 0.00 | gdbtable |
| a00000006 | 0.00 | gdbtable |
| a00000007 | 0.00 | gdbtable |
| a00000027 | 0.01 | gdbtable |
| a00000028 | 0.01 | gdbtable |
| a00000029 | 0.02 | gdbtable |
| a00000030 | 0.02 | gdbtable |
| a00000031 | 0.00 | gdbtable |
| a00000032 | 0.00 | gdbtable |
| a00000033 | 0.00 | gdbtable |
| a00000034 | 0.00 | gdbtable |
| a00000035 | 0.00 | gdbtable |

| Name | Size MiB | Extension |
|---|---|---|
| a00000036 | 0.00 | gdbtable |
| a00000037 | 0.00 | gdbtable |
| a00000038 | 0.00 | gdbtable |
| a00000039 | 0.00 | gdbtable |
| a00000040 | 0.00 | gdbtable |
| a00000041 | 0.00 | gdbtable |
| a00000042 | 0.01 | gdbtable |
| a00000044 | 0.00 | gdbtable |
| a0000000b | 0.00 | gdbtable |
| a0000000c | 0.00 | gdbtable |
| a0000000d | 0.00 | gdbtable |
| a0000000e | 0.03 | gdbtable |
| a00000001 | 0.00 | gdbtable |
| a0000001c | 0.03 | gdbtable |
| a00000002 | 0.00 | gdbtable |
| a0000002b | 0.00 | gdbtable |
| a0000002c | 0.00 | gdbtable |
| a0000002d | 0.00 | gdbtable |
| a0000002e | 0.00 | gdbtable |
| a0000002f | 0.00 | gdbtable |
| a00000003 | 0.01 | gdbtable |
| a0000003a | 0.02 | gdbtable |
| a0000003b | 0.00 | gdbtable |
| a0000003c | 0.00 | gdbtable |
| a0000003d | 0.00 | gdbtable |
| a0000003e | 0.00 | gdbtable |
| a0000003f | 0.00 | gdbtable |
| a00000004 | 2.48 | gdbtable |
| a00000005 | 0.00 | gdbtable |
| a00000006 | 0.00 | gdbtable |
| a00000007 | 0.00 | gdbtable |
| a00000017 | 0.00 | gdbtable |

| Name | Size MiB | Extension |
|---|---|---|
| a00000026 | 0.01 | gdbtable |
| a00000027 | 0.01 | gdbtable |
| a00000028 | 0.02 | gdbtable |
| a00000029 | 0.03 | gdbtable |
| a00000030 | 0.03 | gdbtable |
| a00000031 | 0.00 | gdbtable |
| a00000032 | 0.00 | gdbtable |
| a00000033 | 0.00 | gdbtable |
| a00000034 | 0.00 | gdbtable |
| a00000035 | 0.00 | gdbtable |
| a00000036 | 0.00 | gdbtable |
| a00000037 | 0.00 | gdbtable |
| a00000038 | 0.00 | gdbtable |
| a00000039 | 0.00 | gdbtable |
| a00000040 | 0.01 | gdbtable |
| a00000041 | 7.16 | gdbtable |
| a0000000b | 0.00 | gdbtablx |
| a0000000c | 0.00 | gdbtablx |
| a0000000d | 0.00 | gdbtablx |
| a0000000e | 0.00 | gdbtablx |
| a00000001 | 0.00 | gdbtablx |
| a00000002 | 0.00 | gdbtablx |
| a0000002a | 0.00 | gdbtablx |
| a00000003 | 0.00 | gdbtablx |
| a00000004 | 0.00 | gdbtablx |
| a00000005 | 0.00 | gdbtablx |
| a0000005a | 0.00 | gdbtablx |
| a0000005c | 0.00 | gdbtablx |
| a0000005e | 0.00 | gdbtablx |
| a00000006 | 0.00 | gdbtablx |
| a0000006a | 0.00 | gdbtablx |
| a0000006b | 0.00 | gdbtablx |

| Name | Size MiB | Extension |
|---|---|---|
| a0000006c | 0.00 | gdbtablx |
| a0000006d | 0.00 | gdbtablx |
| a0000006e | 0.00 | gdbtablx |
| a0000006f | 0.20 | gdbtablx |
| a00000007 | 0.00 | gdbtablx |
| a0000007a | 0.00 | gdbtablx |
| a0000007b | 0.00 | gdbtablx |
| a0000007c | 0.00 | gdbtablx |
| a0000007d | 0.00 | gdbtablx |
| a0000007e | 0.00 | gdbtablx |
| a00000020 | 0.00 | gdbtablx |
| a00000023 | 0.00 | gdbtablx |
| a00000025 | 0.00 | gdbtablx |
| a00000026 | 0.00 | gdbtablx |
| a00000049 | 0.00 | gdbtablx |
| a00000055 | 0.00 | gdbtablx |
| a00000060 | 0.00 | gdbtablx |
| a00000062 | 0.00 | gdbtablx |
| a00000063 | 0.00 | gdbtablx |
| a00000064 | 0.00 | gdbtablx |
| a00000065 | 0.00 | gdbtablx |
| a00000066 | 0.00 | gdbtablx |
| a00000067 | 0.00 | gdbtablx |
| a00000068 | 0.00 | gdbtablx |
| a00000069 | 0.00 | gdbtablx |
| a00000070 | 0.00 | gdbtablx |
| a00000071 | 0.00 | gdbtablx |
| a00000072 | 0.00 | gdbtablx |
| a00000073 | 0.00 | gdbtablx |
| a00000074 | 0.00 | gdbtablx |
| a00000075 | 0.00 | gdbtablx |
| a00000076 | 0.00 | gdbtablx |

| Name | Size MiB | Extension |
|---|---|---|
| a00000077 | 0.00 | gdbtablx |
| a00000078 | 0.00 | gdbtablx |
| a00000079 | 0.00 | gdbtablx |
| a0000000b | 0.00 | gdbtablx |
| a0000000c | 0.00 | gdbtablx |
| a0000000d | 0.00 | gdbtablx |
| a0000000e | 0.00 | gdbtablx |
| a00000001 | 0.00 | gdbtablx |
| a0000001b | 0.00 | gdbtablx |
| a00000002 | 0.00 | gdbtablx |
| a0000002a | 0.00 | gdbtablx |
| a0000002c | 0.00 | gdbtablx |
| a0000002d | 0.00 | gdbtablx |
| a0000002e | 0.00 | gdbtablx |
| a0000002f | 0.00 | gdbtablx |
| a00000003 | 0.00 | gdbtablx |
| a0000003a | 0.00 | gdbtablx |
| a0000003b | 0.20 | gdbtablx |
| a0000003c | 0.00 | gdbtablx |
| a0000003d | 0.00 | gdbtablx |
| a0000003e | 0.00 | gdbtablx |
| a0000003f | 0.00 | gdbtablx |
| a00000004 | 0.00 | gdbtablx |
| a00000005 | 0.00 | gdbtablx |
| a00000006 | 0.00 | gdbtablx |
| a00000007 | 0.00 | gdbtablx |
| a00000027 | 0.00 | gdbtablx |
| a00000028 | 0.00 | gdbtablx |
| a00000029 | 0.00 | gdbtablx |
| a00000030 | 0.00 | gdbtablx |
| a00000031 | 0.00 | gdbtablx |
| a00000032 | 0.00 | gdbtablx |

| Name | Size MiB | Extension |
|---|---|---|
| a00000033 | 0.00 | gdbtablx |
| a00000034 | 0.00 | gdbtablx |
| a00000035 | 0.00 | gdbtablx |
| a00000036 | 0.00 | gdbtablx |
| a00000037 | 0.00 | gdbtablx |
| a00000038 | 0.00 | gdbtablx |
| a00000039 | 0.00 | gdbtablx |
| a00000040 | 0.00 | gdbtablx |
| a00000041 | 0.00 | gdbtablx |
| a00000042 | 0.00 | gdbtablx |
| a00000044 | 0.00 | gdbtablx |
| a0000000b | 0.00 | gdbtablx |
| a0000000c | 0.00 | gdbtablx |
| a0000000d | 0.00 | gdbtablx |
| a0000000e | 0.00 | gdbtablx |
| a00000001 | 0.00 | gdbtablx |
| a0000001c | 0.00 | gdbtablx |
| a00000002 | 0.00 | gdbtablx |
| a0000002b | 0.00 | gdbtablx |
| a0000002c | 0.00 | gdbtablx |
| a0000002d | 0.00 | gdbtablx |
| a0000002e | 0.00 | gdbtablx |
| a0000002f | 0.00 | gdbtablx |
| a00000003 | 0.00 | gdbtablx |
| a0000003a | 0.00 | gdbtablx |
| a0000003b | 0.00 | gdbtablx |
| a0000003c | 0.00 | gdbtablx |
| a0000003d | 0.00 | gdbtablx |
| a0000003e | 0.00 | gdbtablx |
| a0000003f | 0.00 | gdbtablx |
| a00000004 | 0.00 | gdbtablx |
| a00000005 | 0.00 | gdbtablx |

| Name | Size MiB | Extension |
|---|---|---|
| a00000006 | 0.00 | gdbtablx |
| a00000007 | 0.00 | gdbtablx |
| Archie_Erickson_No2_Photography | 398.18 | pdf |
| BKF-AE2_Appendix-A_6.9.2023 | 2.01 | pdf |
| BKF-AE2_Appendix-B_6.9.2023 | 0.33 | pdf |
| BKF-AE2_Appendix-C_6.9.2023 | 3.94 | pdf |
| BKF-AE2_Appendix-D_6.9.2023 | 0.97 | pdf |
| BKF-AE2_Project-Summary_6.9.2023 | 3.23 | pdf |
| BKF-AE2_Section-1.0_6.9.2023 | 0.36 | pdf |
| BKF-AE2_Section-2.0_6.9.2023 | 22.81 | pdf |
| BKF-AE2_Section-3.0_6.9.2023 | 10.49 | pdf |
| BKF-AE2_Section-4.0_6.9.2023 | 6.05 | pdf |
| BKF-AE2_Section-5.0_6.9.2023 | 4.16 | pdf |
| BKF-AE2_Section-6.0_6.9.2023 | 1.85 | pdf |
| BKF-AE2_Section-7.0_6.9.2023 | 2.48 | pdf |
| BKF-AE2_Section-8.0_6.9.2023 | 0.11 | pdf |
| BKF-AE2_Section-9.0_6.9.2023 | 2.86 | pdf |
| BKF-AE2_Section-10.0_6.9.2023 | 5.52 | pdf |
| BKF-AE2_Section-11.0_6.9.2023 | 3.45 | pdf |
| BKF-AE2_Section-12.0_6.9.2023 | 0.36 | pdf |
| KJH-SLH5_SFP_6.9.2023 | 70.85 | pdf |
| Slash_Lazy_H5_Cores_6-9_Photos | 100.00 | pdf |
| KJH-SLH5_Appendix-A_6.9.2023 | 2.31 | pdf |
| KJH-SLH5_Appendix-B_6.9.2023 | 0.32 | pdf |
| KJH-SLH5_Appendix-C_6.9.2023 | 4.96 | pdf |
| KJH-SLH5_Appendix-D_6.9.2023 | 0.93 | pdf |
| KJH-SLH5_Project-Summary_6.9.2023 | 3.22 | pdf |
| KJH-SLH5_Section-1.0_6.9.2023 | 0.34 | pdf |
| KJH-SLH5_Section-2.0_6.9.2023 | 17.68 | pdf |
| KJH-SLH5_Section-3.0_6.9.2023 | 16.08 | pdf |
| KJH-SLH5_Section-4.0_6.9.2023 | 6.20 | pdf |
| KJH-SLH5_Section-5.0_6.9.2023 | 4.13 | pdf |

| Name | Size MiB | Extension |
|---|---|---|
| KJH-SLH5_Section-6.0_6.9.2023 | 0.78 | pdf |
| KJH-SLH5_Section-7.0_6.9.2023 | 2.46 | pdf |
| KJH-SLH5_Section-8.0_6.9.2023 | 0.11 | pdf |
| KJH-SLH5_Section-9.0_6.9.2023 | 5.63 | pdf |
| KJH-SLH5_Section-10.0_6.9.2023 | 5.81 | pdf |
| KJH-SLH5_Section-11.0_6.9.2023 | 4.00 | pdf |
| KJH-SLH5_Section-12.0_6.9.2023 | 0.25 | pdf |
| MF1-BC_Sec-2_Image-Log_FigureNo-2-33 | 0.27 | png |
| MF1-BC_Sec-2_Image-Log_FigureNo-2-34 | 0.30 | png |
| MF1-BC_Sec-2_Image-Log_FigureNo-2-36 | 0.28 | png |
| MF1-BC_Sec-2_Image-Log_FigureNo-2-37 | 0.27 | png |
| AE2-BC_Sec-2_Image-Log_FigureNo-2-33 | 0.25 | png |
| AE2-BC_Sec-2_Image-Log_FigureNo-2-34 | 0.24 | png |
| AE2-BC_Sec-2_Image-Log_FigureNo-2-36 | 0.27 | png |
| a00000017 | 0.00 | gdbtablx |
| a00000026 | 0.00 | gdbtablx |
| a00000027 | 0.00 | gdbtablx |
| a00000028 | 0.00 | gdbtablx |
| a00000029 | 0.00 | gdbtablx |
| a00000030 | 0.00 | gdbtablx |
| a00000031 | 0.00 | gdbtablx |
| a00000032 | 0.00 | gdbtablx |
| a00000033 | 0.00 | gdbtablx |
| a00000034 | 0.00 | gdbtablx |
| a00000035 | 0.00 | gdbtablx |
| a00000036 | 0.00 | gdbtablx |
| a00000037 | 0.00 | gdbtablx |
| a00000038 | 0.00 | gdbtablx |
| a00000039 | 0.00 | gdbtablx |
| a00000040 | 0.00 | gdbtablx |
| a00000041 | 0.20 | gdbtablx |
| a0000000b | 0.00 | horizon |

| Name | Size MiB | Extension |
|---|---|---|
| a0000000c | 0.00 | horizon |
| a0000000d | 0.00 | horizon |
| a0000000e | 0.00 | horizon |
| a0000002a | 0.00 | horizon |
| a00000004 | 0.00 | horizon |
| a0000005a | 0.00 | horizon |
| a0000005c | 0.00 | horizon |
| a0000005e | 0.00 | horizon |
| a0000006a | 0.00 | horizon |
| a0000006b | 0.00 | horizon |
| a0000006c | 0.00 | horizon |
| a0000006d | 0.00 | horizon |
| a0000006e | 0.00 | horizon |
| a0000006f | 0.00 | horizon |
| a0000007a | 0.00 | horizon |
| a0000007b | 0.00 | horizon |
| a0000007c | 0.00 | horizon |
| a0000007d | 0.00 | horizon |
| a0000007e | 0.00 | horizon |
| a00000020 | 0.00 | horizon |
| a00000023 | 0.00 | horizon |
| a00000025 | 0.00 | horizon |
| a00000026 | 0.00 | horizon |
| a00000049 | 0.00 | horizon |
| a00000055 | 0.00 | horizon |
| a00000060 | 0.00 | horizon |
| a00000062 | 0.00 | horizon |
| a00000063 | 0.00 | horizon |
| a00000064 | 0.00 | horizon |
| a00000065 | 0.00 | horizon |
| a00000066 | 0.00 | horizon |
| a00000067 | 0.00 | horizon |

| Name | Size MiB | Extension |
|---|---|---|
| a00000068 | 0.00 | horizon |
| a00000069 | 0.00 | horizon |
| a00000070 | 0.00 | horizon |
| a00000071 | 0.00 | horizon |
| a00000072 | 0.00 | horizon |
| a00000073 | 0.00 | horizon |
| a00000074 | 0.00 | horizon |
| a00000075 | 0.00 | horizon |
| a00000076 | 0.00 | horizon |
| a00000077 | 0.00 | horizon |
| a00000078 | 0.00 | horizon |
| a00000079 | 0.00 | horizon |
| a0000000b | 0.00 | spx |
| a0000000c | 0.00 | spx |
| a0000000d | 0.00 | spx |
| a0000000e | 0.00 | spx |
| a0000002a | 0.00 | spx |
| a00000004 | 0.16 | spx |
| a0000005a | 0.00 | spx |
| a0000005c | 0.00 | spx |
| a0000005e | 0.00 | spx |
| a0000006a | 0.00 | spx |
| a0000006b | 0.00 | spx |
| a0000006c | 0.00 | spx |
| a0000006d | 0.00 | spx |
| a0000006e | 0.00 | spx |
| a0000006f | 0.47 | spx |
| a0000007a | 0.00 | spx |
| a0000007b | 0.00 | spx |
| a0000007c | 0.00 | spx |
| a0000007d | 0.00 | spx |
| a0000007e | 0.00 | spx |

| Name | Size MiB | Extension |
|---|---|---|
| a00000020 | 0.00 | spx |
| a00000023 | 0.00 | spx |
| a00000025 | 0.00 | spx |
| a00000026 | 0.00 | spx |
| a00000049 | 0.00 | spx |
| a00000055 | 0.00 | spx |
| a00000060 | 0.00 | spx |
| a00000062 | 0.00 | spx |
| a00000063 | 0.00 | spx |
| a00000064 | 0.00 | spx |
| a00000065 | 0.00 | spx |
| a00000066 | 0.00 | spx |
| a00000067 | 0.00 | spx |
| a00000068 | 0.00 | spx |
| a00000069 | 0.00 | spx |
| a00000070 | 0.00 | spx |
| a00000071 | 0.00 | spx |
| a00000072 | 0.00 | spx |
| a00000073 | 0.00 | spx |
| a00000074 | 0.00 | spx |
| a00000075 | 0.00 | spx |
| a00000076 | 0.00 | spx |
| a00000077 | 0.00 | spx |
| a00000078 | 0.00 | spx |
| a00000079 | 0.00 | spx |
| a0000000b | 0.00 | spx |
| a0000000c | 0.00 | spx |
| a0000000d | 0.00 | spx |
| a0000000e | 0.00 | spx |
| a0000001b | 0.00 | spx |
| a0000002a | 0.00 | spx |
| a0000002c | 0.00 | spx |

| Name | Size MiB | Extension |
|---|---|---|
| a0000002d | 0.00 | spx |
| a0000002e | 0.00 | spx |
| a0000002f | 0.00 | spx |
| a0000003a | 0.00 | spx |
| a0000003b | 0.47 | spx |
| a0000003c | 0.00 | spx |
| a0000003d | 0.00 | spx |
| a0000003e | 0.00 | spx |
| a0000003f | 0.00 | spx |
| a00000004 | 0.07 | spx |
| a00000027 | 0.00 | spx |
| a00000028 | 0.00 | spx |
| a00000029 | 0.00 | spx |
| a00000030 | 0.00 | spx |
| a00000031 | 0.00 | spx |
| a00000032 | 0.00 | spx |
| a00000033 | 0.00 | spx |
| a00000034 | 0.00 | spx |
| a00000035 | 0.00 | spx |
| a00000036 | 0.00 | spx |
| a00000037 | 0.00 | spx |
| a00000038 | 0.00 | spx |
| a00000039 | 0.00 | spx |
| a00000040 | 0.00 | spx |
| a00000041 | 0.00 | spx |
| a00000042 | 0.00 | spx |
| a00000044 | 0.00 | spx |
| a0000000b | 0.00 | spx |
| a0000000c | 0.00 | spx |
| a0000000d | 0.00 | spx |
| a0000000e | 0.00 | spx |
| a0000001c | 0.00 | spx |

| Name | Size MiB | Extension |
|---|---|---|
| a0000002b | 0.00 | spx |
| a0000002c | 0.00 | spx |
| a0000002d | 0.00 | spx |
| a0000002e | 0.00 | spx |
| a0000002f | 0.00 | spx |
| a0000003a | 0.00 | spx |
| a0000003b | 0.00 | spx |
| a0000003c | 0.00 | spx |
| a0000003d | 0.00 | spx |
| a0000003e | 0.00 | spx |
| a0000003f | 0.00 | spx |
| a00000004 | 0.02 | spx |
| a00000017 | 0.00 | spx |
| a00000026 | 0.00 | spx |
| a00000027 | 0.00 | spx |
| a00000028 | 0.00 | spx |
| a00000029 | 0.00 | spx |
| a00000030 | 0.00 | spx |
| a00000031 | 0.00 | spx |
| a00000032 | 0.00 | spx |
| a00000033 | 0.00 | spx |
| a00000034 | 0.00 | spx |
| a00000035 | 0.00 | spx |
| a00000036 | 0.00 | spx |
| a00000037 | 0.00 | spx |
| a00000038 | 0.00 | spx |
| a00000039 | 0.00 | spx |
| a00000040 | 0.00 | spx |
| a00000041 | 0.47 | spx |
| AE2-BC_Sec-2_Image-Log_FigureNo-2-37 | 0.25 | png |
| SLH5-BC_Sec-2_Image-Log_FigureNo-2-33 | 0.29 | png |
| SLH5-BC_Sec-2_Image-Log_FigureNo-2-35 | 0.28 | png |

| Name | Size MiB | Extension |
|---|---|---|
| SLH5-BC_Sec-2_Image-Log_FigureNo-2-36 | 0.27 | png |
| MF1-BC_Sec-2_FaciesModel_FigureNo-2-15 | 5.85 | tif |
| MF1-BC_Sec-2_StratXSection_FigureNo-2-12 | 26.31 | tif |
| MF1-BC_Sec-2_StrucXSection_FigureNo-2-13 | 22.32 | tif |
| AE2-BC_Sec-2_FaciesModel_FigureNo-2-15 | 5.85 | tif |
| AE2-BC_Sec-2_StratXSection_FigureNo-2-12 | 26.31 | tif |
| AE2-BC_Sec-2_StrucXSection_FigureNo-2-13 | 22.32 | tif |
| SLH5-BC_Sec-2_FaciesModel_FigureNo-2-15 | 5.85 | tif |
| SLH5-BC_Sec-2_StratXSection_FigureNo-2-12 | 26.31 | tif |
| SLH5-BC_Sec-2_StrucXSection_FigureNo-2-13 | 22.32 | tif |
| Summit_Processed data_BC Section | 5.31 | xlsx |
| 2201536 Fund 26736 Data4 04-28-22 | 0.69 | xlsx |
| 2201536 Fund 26736 Data5 04-28-22 | 0.69 | xlsx |
| 2201536 Fund 26736 Data6 04-28-22 | 0.69 | xlsx |
| 2201536 Fund 26736 Data7 04-28-22 | 0.69 | xlsx |
| 2201536 Fund 26736 Data8 04-28-22 | 0.37 | xlsx |
| 03 Core Poro-Perm Analysis Report_Summit1-2_Broom Creek_3-23-2022 | 0.05 | xlsx |
| 2200175_Milton_Flemmer_No1_Spectral_Gamma_Cores_6-10_02-11-2022 | 1.06 | xlsx |
| 26736_Summit_Set-2_XRF-XRD_Report_Mibeck_2022-04-02 | 0.23 | xlsx |
| Summit_Archie Erickson #2_Lab Geomechanics Report_BC | 4.80 | xlsx |
| 2202357 HPMI Data1.08.16.22 | 0.68 | xlsx |
| 2202357 HPMI Data2.08.16.22 | 0.68 | xlsx |
| 2202357 HPMI Data3.08.16.22 | 0.67 | xlsx |
| 2202357 HPMI Data4.08.16.22 | 0.52 | xlsx |
| 03 Core Poro-Perm Analysis Report_Summit_3-1_7-12-2022 | 0.05 | xlsx |
| 2202357_EERC_Archie Erickson 2_Client Spectral Gamma_Core 8-11_6.21.2022.xlsm | 0.99 | xlsx |
| 26736_Summit_Set-6_XRF-XRD_Results_Mibeck_2022-07-27 | 1.56 | xlsx |
| Summit_Processed data_Slash Lazy H#5_Broom Creek | 5.14 | xlsx |
| 2201536 HPMI Data1 07-14-22 | 0.67 | xlsx |
| 2201536 HPMI Data2 07-14-22 | 0.67 | xlsx |
| 2201536 HPMI Data3 07-14-22 | 0.67 | xlsx |
| 2201536 HPMI Data4 07-14-22 | 0.36 | xlsx |

| Name | Size MiB | Extension |
|---|---|---|
| 03 Core Poro-Perm Analysis Report_Summit2-1_6-9-2022 | 0.05 | xlsx |
| Slash_Lazy_H5_Spectral_Gamma_Cores_6-9_05-12-2022 | 0.79 | xlsx |
| 26736_Summit_Set-4_XRF-XRD_Results_Mibeck_2022-07-02 | 0.92 | xlsx |
| Summit_Task3.1_BroomCreek_GeologicModel(1000x1000)_P50.crsmeta | 0.00 | xml |
| | 3,387 | |
| **TOTAL** | | |
| **Files: 932 Size: 3,553,129,998 Bytes (3.31 GiB)** | | |
| | | |

North Dakota Industrial Commission
Oil and Gas Division
Case Nos. 30869-30880

Exhibit D to Declaration of Derrick Braaten
in Support of Motion for Supplemental Hearing

**From:** Madche, Tamara J.
**Sent:** Monday, June 12, 2023 10:06 AM
**To:** Jay Volk; Suggs, Richard A.
**Cc:** Amanda Hoffer; Wade Boeshans; Jeffrey Skaare; Jacobson, Lonny; Regorrah, Josh; Anagnost, Katherine; Olsen, Caitlin; Connors, Kevin; Kalenze, Nicholas; Bender, Lawrence
**Subject:** RE: Summit Carbon Solutions - Draft applications

All,

We have received and were able to download the files provided for the three SFP applications. It's unlikely we'll have time to start the review of these applications in full until July as our focus is being switched back to our current docketed application for June 30th, so don't hesitate to continue refining these draft applications in the meantime. I will let you know when we begin our review process, that way we can ensure we're looking at the latest versions.

I did do a quick cursory check for completeness and found the following issues:

- CMG Modeling Files
  - Need: DAT, SRS, OUT, LOG, and any RST files for the model.
- Application appendices needed for each SFP application:
  - Testing and Monitoring Plan Summary – these have been provided on the past two applications and are considered an expectation going forward. The case files end up very large and unwieldly for SFPs, so this compiled summary was created to help provide a quicker reference point that helps both the operator and the regulatory body through the life of the project.
  - Quality Assurance Surveillance Plan (QASP) – I did not see this appendix. I did notice within the Testing and Monitoring section that you had QASP subsections. I am going to ask that these be pulled and placed in their own appendix to remain consistent with past applications. It's very likely we'll ask that additional items (such as figures or reference documents) be added in the QASP as we review the application and by having them all in one appendix it will help aid in less reference points having to be updated in Section 5, Section 6, and the Regulatory Compliance Table.
  - Appendix C – Geochemical Interactions – Unless you can provide a good argument for moving this information into an appendix, we are going to ask that it be placed back in Section 2 under its respective zone sub-sections. From a reviewer stance we review all the geological exhibits including the geochemical and geomechanical information together by zone, so not only is it not consistent with past applications but it makes the review a bit disjointed.
  - Section 12 – Financial Assurance – I wouldn't expect you to know the exact financial instrument types you intend to use at the draft stage of the SFPs, but it will be preferred that you have that nailed down in the narrative prior to us docketing the application.

If you have any questions on the comments above, please let me know.

Thanks,

Tammy Madche
*Geologist*

---

**From:** Jay Volk <jvolk@summitcarbon.com>
**Sent:** Friday, June 9, 2023 2:58 PM
**To:** Madche, Tamara J. <tjmadche@nd.gov>; Suggs, Richard A. <rasuggs@nd.gov>
**Cc:** Amanda Hoffer <ahoffer@summitcarbon.com>; Wade Boeshans <wboeshans@summitcarbon.com>; Jeffrey Skaare <jskaare@summitcarbon.com>; Jacobson, Lonny <ljacobson@undeerc.org>; Regorrah, Josh <jregorrah@undeerc.org>; Anagnost, Katherine <kanagnost@undeerc.org>; Olsen, Caitlin <colsen@undeerc.org>; Connors, Kevin

<kconnors@undeerc.org>; Kalenze, Nicholas <nkalenze@undeerc.org>; Bender, Lawrence <LBender@fredlaw.com>
**Subject:** Summit Carbon Solutions - Draft applications

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Tammy and Richard,

Summit Carbon Solutions, LLC respectfully submits for the review and consideration of the North Dakota Industrial Commission, three applications for carbon dioxide storage facility permits**, as follows**:

- **Applicant:** Summit Carbon Storage #1, LLC for the injection site called TB Leingang;
- **Applicant:** Summit Carbon Storage #2, LLC for the injection site called BK Fischer; and
- **Applicant:** Summit Carbon Storage #3, LLC for the injection site called KJ Hintz.

These applications were prepared pursuant to and in accordance with Chapter 38-22 of the North Dakota Century Code and Chapter 43-05-01 of the North Dakota Administrative Code.

Please watch your email for a separate message with the link to **access the application contents that will be provided by the end of business today**.

In addition, please note any questions in relation to this submittal please feel free to reach out to myself as the primary contact for Summit Carbon Solutions and Lonny Jacobson as the primary contact for any EERC correspondence.

We look forward to the results of your review.

Sincerely,

Jay Volk

**JAY M. VOLK, PHD| SEQUESTRATIONS - DIRECTOR OF HEALTH, SAFETY & ENVIRONMENTAL**
**M: (701) 400-1004**| jvolk@summitcarbon.com
3442 E. CENTURY AVE., BISMARCK, ND 58503

SUMMIT CARBON SOLUTIONS

North Dakota Industrial Commission
Oil and Gas Division
Case Nos. 30869-30880

Exhibit E to Declaration of Derrick Braaten
in Support of Motion for Supplemental Hearing

BRAATEN
Law Firm

September 21, 2023

**Via Email Only**

North Dakota Industrial Commission
Department of Mineral Resources
Oil & Gas Division
600 E. Blvd. Ave. Dept. 405
Bismarck, ND 58505-0840
oilandgasinfo@nd.gov

**Re: Records Request Applications for Permits**

I am writing to request a copy of records from your office, pursuant to N.D.C.C. § 44-04-18. Please provide all applications for permits pursuant to N.D.C.C. ch. 38-25, including any associated or related correspondence, documents, and notes related to the applications for permits.

To the maximum extent possible, I request that you provide all records to me in electronic format by emailing them to my paralegal Desirae Zaste at desirae@braatenlawfirm.com. If it is necessary to mail responsive records, they may be sent to me at the address below.

You have my pre-authorization to bill up to $300.00 to fulfill this records request. If you have any questions about anything in this letter, do not hesitate to contact me. Thank you for your assistance.

Sincerely,

Derrick Braaten

DB/dnz

North Dakota Industrial Commission
Oil and Gas Division
Case Nos. 30869-30880

Exhibit F to Declaration of Derrick Braaten
in Support of Motion for Supplemental Hearing

Steven Price

**From:** Ziesch, Michael D. <mdziesch@nd.gov>
**Sent:** Friday, September 22, 2023 11:31 AM
**To:** Desirae Zaste
**Cc:** Derrick Braaten
**Subject:** RE: Records Request

[Warning: External Sender]

Ms. Zaste, our office has not received any applications under NDCC 38-25.


Michael Ziesch
*EGIS Staff Officer*

701.328.8029 (o) · mdziesch@nd.gov · www.dmr.nd.gov

NORTH Dakota | Mineral Resources
Be Legendary.

701.328-8020 · oilandgasinfo@nd.gov · 600 E Boulevard Ave, Dept. 474 · Bismarck, ND 58505


**From:** Desirae Zaste <desirae@braatenlawfirm.com>
**Sent:** Thursday, September 21, 2023 10:40 AM
**To:** -Info-Oil & Gas Division <oilandgasinfo@nd.gov>
**Cc:** Derrick Braaten <derrick@braatenlawfirm.com>
**Subject:** Records Request


***** CAUTION: This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****


Good morning,

Attached is a letter from Attorney Braaten regarding an open records request. If you have any questions, please let us know. Thank you.


**DESIRAE ZASTE** | Certified Paralegal
desirae@braatenlawfirm.com

BRAATEN Law Firm

**BRAATEN LAW FIRM**
109 N. 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
Fax: 701-221-5842
www.braatenlawfirm.com

**PRIVILEGED COMMUNICATION**
**This e-mail message is intended only for the named recipient(s) above and is covered by the Electronic Communications Privacy Act, 18 U.S.C. Sections 2510-2521. This e-mail is confidential and may contain information that is privileged, attorney work product or exempt from disclosure under applicable law. Recipients should not file copies of this e-mail with publicly accessible records. If you have received this message in error, please immediately notify the sender by return e-mail and delete this e-mail message from your computer. Thank you for your cooperation.**

North Dakota Industrial Commission
Oil and Gas Division
Case Nos. 30869-30880

Exhibit G to Declaration of Derrick Braaten
in Support of Motion for Supplemental Hearing

BRAATEN
Law Firm

May 15, 2024

**Via Email Only**

North Dakota Industrial Commission
Department of Mineral Resources
Oil & Gas Division
600 E. Blvd. Ave. Dept. 405
Bismarck, ND 58505-0840
oilandgasinfo@nd.gov

**Re: Records Request**

I am writing to request a copy of records from your office, pursuant to N.D.C.C. § 44-04-18. Please provide the following data electronic files and/or load files submitted to the Oil and Gas Division by applicants Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC:

- All the input files, field and analytical data, and the model geochemical database used to evaluate the CO2 effects on the upper and lower confining layers, including but not limited to all inputs and data files used to run the United States Geological Survey's USGS's PHREEQC model.
- All the input files, field and analytical data , and the model geochemical database used to run Computer Modelling Group Ltd.'s GEM model and software or any similar model or software used for the same purposes.
- Geophysical Logs that penetrate injection and confining zones, seismic survey data and core sample measurements, all measurements and data for acoustic impedance, total porosity, effective porosity, permeability, and facies.
- All the input files, field and analytical data, and the model, including but not limited to all inputs and data files used to run SLB's Petrel model in any manner related to Summit's applications.
- All 3D numerical reservoir simulation model data decks, output files and graphing files of the Storage Reservoir in original electronic format. Without limiting the foregoing, such files may commonly be stored in Slumberger Eclipse or Petrel format, CMG (Canadian Modeling Group) Imex format, or other similar format.

To the maximum extent possible, I request that you provide all records to me in electronic format by emailing them to my paralegal Desirae Zaste at desirae@braatenlawfirm.com. If it is necessary to mail responsive records, they may be sent to me at the address below.

You have my pre-authorization to bill up to $300.00 to fulfill this records request. If you have any questions about anything in this letter, do not hesitate to contact me. Thank you for your assistance.

Sincerely,

Derrick Braaten

DB/dnz

North Dakota Industrial Commission
Oil and Gas Division
Case Nos. 30869-30880

Exhibit H to Declaration of Derrick Braaten
in Support of Motion for Supplemental Hearing

**From:** Ziesch, Michael D.
**To:** Desirae Zaste
**Subject:** Re: open records request from 5-15-2024
**Date:** Tuesday, May 21, 2024 10:26:03 AM
**Attachments:** image001.png

---

[Warning: External Sender]

Regarding the open records request received on 5-15-2024 for Summit Carbon Storage facilities. Please see responses in red below each of the submitted topics.

The agency has previously provided (9-21-2023) all modeling input and results files submitted and used for the application by Summit. Agency staff validated the inputs and parameters in the submitted model via CMG software. Field and analytical data of your request are available through the agency website in log and well files.

• All the input files, field and analytical data, and the model geochemical database used to evaluate the CO2 effects on the upper and lower confining layers, including but not limited to all inputs and data files used to run the United States Geological Survey's USGS's PHREEQC model.

Results received from applicant is in the related case files and available on the agency website. The agency did not receive software files for PHREEQC model. Model and geochemical database documentation can be obtained from the USGS.gov PHREEQC webpage.

• All the input files, field and analytical data , and the model geochemical database used to run Computer Modelling Group Ltd.'s GEM model and software or any similar model or software used for the same purposes.

The agency did not receive Geochem GEM model files. Results of Geochem modeling are summarized in the application packet, available in the case file. The geochemical equations used in the model are internal to the CMG GEM software.

• Geophysical Logs that penetrate injection and confining zones, seismic survey data and core sample measurements, all measurements and data for acoustic impedance, total porosity, effective porosity, permeability, and facies.

Geophysical logs data are available via Premium Subscription on the agency Scout Ticket. Well files contain the core analysis and are also available on agency website via Premium Subscription. Related wells that penetrate the area of review are identified in section 4 of each application package. Seismic survey results are not provided to the agency, they are owned by the company conducting the survey.

• All the input files, field and analytical data, and the model, including but not limited to all inputs and data files used to run SLB's Petrel model in any manner related to Summit's applications.

The agency does not receive Petrel model files other than exports from the CMG files previously provided on 9-21-2023 open records request.

• All 3D numerical reservoir simulation model data decks, output files and graphing files of the Storage Reservoir in original electronic format. Without limiting the foregoing, such files may commonly be stored in Slumberger Eclipse or Petrel format, CMG (Canadian Modeling Group) Imex format, or other similar format.

The CMG files, previously provided on 9-21-2023, are the modeling files still being used for the applications. There are no updates to them.

Michael Ziesch
*EGIS Staff Officer*

701.328.8029 (o) • mdziesch@nd.gov • www.dmr.nd.gov

701.328-8020 • oilandgasinfo@nd.gov • 600 E Boulevard Ave, Dept. 474 • Bismarck, ND 58505

North Dakota Industrial Commission
Oil and Gas Division
Case Nos. 30869-30880

Exhibit I to Declaration of Derrick Braaten
in Support of Motion for Supplemental Hearing

BRAATEN
Law Firm

August 24, 2023

**Via Email Only**

North Dakota Industrial Commission
Department of Mineral Resources
Oil & Gas Division
600 E. Blvd. Ave. Dept. 405
Bismarck, ND 58505-0840
oilandgasinfo@nd.gov

**Re: Records Request -- Applications for Permits**

I am writing to request a copy of records from your office, pursuant to N.D.C.C. § 44-04-18. Summit Carbon Solutions, LLC submitted three applications for carbon dioxide storage facility permits on June 9th, 2023. I am writing to request all correspondence and other documents related to the applications, as well as all correspondence generally with Summit Carbon Solutions or its affiliates, authorized agents and representatives, from June 21st, 2023 to August 24th, 2023.

To the maximum extent possible, I request that you provide all records to me in electronic format by emailing them to my paralegal Steven Price at steven@braatenlawfirm.com. If it is necessary to mail responsive records, they may be sent to me at the address below.You have my pre-authorization to bill up to $300.00 to fulfill this records request. If you have any questions about anything in this letter, do not hesitate to contact me.

Sincerely,

Derrick Braaten

North Dakota Industrial Commission
Oil and Gas Division
Case Nos. 30869-30880

Exhibit J to Declaration of Derrick Braaten
in Support of Motion for Supplemental Hearing

BRAATEN
Law Firm

September 7, 2023

**Via Email Only**

North Dakota Industrial Commission
Department of Mineral Resources
Oil & Gas Division
600 E. Blvd. Ave. Dept. 405
Bismarck, ND 58505-0840
oilandgasinfo@nd.gov

**Re: Records Request -- Applications for Permits**

I am writing to request a copy of records from your office pursuant to N.D.C.C. § 44-04-18. Summit Carbon Storage #1, LLC was recently granted a permit for the TB LEINGANG 2, SE NE 18-141N-87W, Oliver Co., API – 33-065-00027, well file #40178. I am writing to request all correspondence and other documents related to all permit applications submitted by Summit Carbon Storage #1, LLC, or its affiliates, authorized agents, and representatives, from January 1, 2023 to September 6, 2023.

To the maximum extent possible, I request that you provide all records to me in electronic format by emailing them to my paralegal Steven Price at steven@braatenlawfirm.com. If it is necessary to mail responsive records, they may be sent to me at the address below. You have my pre-authorization to bill up to $300.00 to fulfill this records request. If you have any questions about anything in this letter, do not hesitate to contact me.

Sincerely,

Derrick Braaten

North Dakota Industrial Commission
Oil and Gas Division
Case Nos. 30869-30880

Exhibit K to Declaration of Derrick Braaten
in Support of Motion for Supplemental Hearing

BRAATEN
Law Firm

June 17, 2024

**Via Email Only**

Energy & Environmental Research Center (EERC)
15 North 23rd Street
Grand Forks, North Dakota 58202
eercinfo@undeerc.org

**Re: Records Request**

I am writing to request a copy of records from your office, pursuant to N.D.C.C. § 44-04-18. Please provide the following data electronic files in the possession of the EERC which are related to the applications and requests for relief in NDIC Case Nos. 30869-30880 and which were filed by Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC and/or the following entities: Summit Carbon Solutions, SCS Carbon Transport LLC, SCS Permanent Carbon Storage, LLC:

- All the input files and/or data decks, field and analytical data, and the model geochemical database used to evaluate the CO2 effects on the upper and lower confining layers, including but not limited to all inputs and data files used to run the United States Geological Survey's USGS's PHREEQC model.
- All the input files and or data decks, field and analytical data , and the model geochemical database used to run Computer Modelling Group Ltd.'s GEM model and software or any similar model or software used for the same purposes.
- Geophysical Logs that penetrate injection and confining zones, all seismic survey data and any seismic data whatsoever, core sample measurements, all measurements and data for acoustic impedance, total porosity, effective porosity, permeability, and facies.
- All the input files, field and analytical data, and the model, including but not limited to all inputs and data files used to run SLB's Petrel model in any manner related to Summit's applications.
- All 3D numerical reservoir simulation model data decks, output files and graphing files of the Storage Reservoir in original electronic format. Without limiting the foregoing, such files may commonly be stored in Slumberger Eclipse or Petrel format, CMG (Canadian Modeling Group) Imex format, or other similar format.

To the maximum extent possible, I request that you provide all records to me in electronic format by emailing them to my paralegal Desirae Zaste at desirae@braatenlawfirm.com. If you wish for

us to provide an external hard drive for the records, please let us know and one will be sent. If it is necessary to mail responsive records, they may be sent to me at the address below.

You have my pre-authorization to bill up to $300.00 to fulfill this records request. If you have any questions about anything in this letter, do not hesitate to contact me. Thank you for your assistance.

Sincerely,

Derrick Braaten

DB/dnz

North Dakota Industrial Commission
Oil and Gas Division
Case Nos. 30869-30880

Exhibit L to Declaration of Derrick Braaten
in Support of Motion for Supplemental Hearing

## Desirae Zaste

**From:** Erickson, Thomas A. <terickson@undeerc.org>
**Sent:** Tuesday, July 2, 2024 11:21 AM
**To:** Desirae Zaste
**Cc:** Johnson, Stephanie A.
**Subject:** Open Records Request dated June 17, 2024

[Warning: External Sender]

Mr. Braaten,

The following is in response to your June 17th Open Records Request to the EERC. Below is your original request, along with a response as to what is included and can be accessed electronically per the instructions below. Because each of your requests included several components, we have added numerical identifiers to identify what is, and isn't included. For anything not included, I have provided the corresponding reason per North Dakota Century Code. All items included were also accessible through the Department of Mineral Resources as previously provided to them through the permit process. There is no cost for this request since it had been previously assembled and provided to the State of North Dakota.

- All the input files and/or data decks[1], field and analytical data[2], and the model geochemical database[3] used to evaluate the CO2 effects on the upper and lower confining layers, including but not limited to all inputs and data files used to run the United States Geological Survey's USGS's PHREEQC model[4].
    1. Included
    2. Included
    3. Included
    4. Not included, PHREEQC software is free and publicly available.
- All the input files and or data decks[1], field and analytical data[2], and the model geochemical database[3] used to run Computer Modelling Group Ltd.'s GEM model and software or any similar model[4] or software used for the same purposes.
    1. Included
    2. Included
    3. Included
    4. Not Included, Software license purchase agreement required by vendor.
- Geophysical Logs that penetrate injection and confining zones[1], all seismic survey data and any seismic data whatsoever[2], core sample measurements[3], all measurements and data for acoustic impedance[4], total porosity[5], effective porosity[6], permeability[7], and facies[8].
    1. Not Included – Per NDCC 44-04-18.4 (1) - We understand they MAY have been made available publicly by others
    2. Not Included - Per NDCC 44-04-18.4 (1)
    3. Included
    4. Not Included - Per NDCC 44-04-18.4 (1)
    5. Included
    6. Included
    7. Included
    8. Included
- All the input files[1], field and analytical data[2], and the model[3], including but not limited to all inputs and data files[4] used to run SLB's Petrel model in any manner related to Summit's applications.
    1. Included
    2. Included

3. Included
4. Included

- All 3D numerical reservoir simulation model data decks[1], output files and graphing files of the Storage Reservoir in original electronic format[2]. Without limiting the foregoing, such files may commonly be stored in Slumberger Eclipse or Petrel format, CMG (Canadian Modeling Group) Imex format, or other similar format.
    1. Included
    2. Included

**Instructions for Accessing the Information**

We have an SFTP Site set up for your request. Note: Prior to accessing the site, you will need to pass along the public IP address of the machine used to connect so that we can provide you access.

Here are the credentials for accessing the SFTP file storage site:
Connection String/Host: eerc.scsspsrequestor@eerc.blob.core.windows.net
Username: scsspsrequestor
Password: Exf73AU6xRRdDebdM5p8TytU64ek3Wfi

Here are some instructions on accessing the SFTP file storage site:

1. Before accessing the file storage, the public IP addresses used will need to be passed along and whitelisted. Your public IP address can be found at this link: What Is My IP? Best Way To Check Your Public IP Address. Please forward this IP address to terickson@undeerc.org and I will have it whitelisted and will provide you with confirmation of the same.
2. Download and install an SFTP client. (I use FileZilla, but a list of supported SFTP clients is available here: SFTP support for Azure Blob Storage - Azure Storage | Microsoft Learn)
3. Using your SFTP client, create a new connection using the attached credentials.
    a. In FileZilla, this can be done by navigating to File > Site Manager. Click "New site" at the bottom of the screen. Select "SFTP – SSH File Transfer Protocol" in the Protocol field. Enter the connection string in the Host field and username in the User field. Click "Connect" and enter the password when prompted. You may be asked if you trust this host, select "OK."
4. You should now be connected to the file storage and able to download the files.
    a. In FileZilla, the SFTP storage files will appear in the right panel, and the left panel can be used to navigate to a location on the client computer. To download, select a file, right click, and select "Download."

Please let me know if there are any questions.

Thanks,
Tom

Tom Erickson
COO and VP for Intellectual Property
UND EERC
(701) 777-5153

North Dakota Industrial Commission
Oil and Gas Division
Case Nos. 30869-30880

Exhibit M to Declaration of Derrick Braaten
in Support of Motion for Supplemental Hearing

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

| | | |
|---|---|---|
| In re application of Summit | : Case No(s). | 30869 |
| Carbon Storage #1, LLC requesting | : | 30870 |
| consideration for the geologic | : | 30871 |
| storage of carbon dioxide in the | : | 30872 |
| Broom Creek Formation from the | : | 30873 |
| Midwest Carbon Express Pipeline in | : | 30874 |
| the storage facility located in | : | 30875 |
| Sections 31, 32, 33, and 34, | : | 30876 |
| Township 142 North, Range 87 West, | : | 30877 |
| Sections 1, 11, 12, 13, 14, 15, | : | 30878 |
| 22, 23, 24, 25, 26, 35, and 36, | : | 30879 |
| Township 141 North, Range 88 West, | : | 30880 |
| Sections 2, 3, 4, 5, 6, 7, 8, 9, | : | |
| 10, 11, 14, 15, 16, 17, 18, 19, | : | |
| 20, 21, 22, 23, 25, 26, 27, 28, | : | |
| 29, 30, 31, 32, 33, 34, and 35, | : | |
| Township 141 North, Range 87 West, | : | |
| Sections 1, 2, 3, and 12, Township | : | |
| 140 North, Range 88 West and | : | |
| Sections 4, 5, 6, and 7, Township | : | |
| 140 North, Range 87 West, Mercer, | : | |
| Morton, and Oliver Counties, ND. | : | |
| | | |
| In re application of Summit | : | |
| Carbon Storage #1, LLC to | : | |
| consider the amalgamation of the | : | |
| storage reservoir pore space, in | : | |
| which the Commission may require | : | |
| that the pore space owned by | : | |
| nonconsenting owners be included | : | |
| in the geologic storage, as | : | |
| required to operate the Summit | : | |
| Carbon Storage #1, LLC storage | : | |
| facility located in Sections 31, | : | |
| 32, 33, and 34, Township 142 | : | |
| North, Range 87 West, Sections 1, | : | |
| 11, 12, 13, 14, 15, 22, 23, 24, | : | |
| 25, 26, 35, and 36, Township 141 | : | |
| North, Range 88 West, Sections 2, | : | |
| 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, | : | |
| 15, 16, 17, 18, 19, 20, 21, 22, | : | |
| 23, 25, 26, 27, 28, 29, 30, 31, | : | |

32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re application of Summit Carbon Storage #1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35,

Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.

In re application of Summit Carbon Storage #2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35,

Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.

In re application of Summit Carbon Storage #2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.

In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13,

14, 15, 16, 17, 18, 19, 20, 21, :
22, 23, 24, 25, 26, 27, 28, 29, :
30, 32, 33, 34, 35, and 36, :
Township 142 North, Range 88 West,:
Sections 5, 6, 7, 8, 17, 18, 19, :
20, 29, 30, and 31, Township 142 :
North, Range 87 West, and Sections:
1, 2, and 3, Township 141 North, :
Range 88 West, Mercer and Oliver :
Counties, ND, subject to the :
application of Summit Carbon :
Storage #2, LLC for the geologic :
storage of carbon dioxide in the :
Broom Creek Formation, and enact :
such special field rules as may :
be necessary. :

In re application of Summit :
Carbon Storage #3, LLC requesting :
consideration for the geologic :
storage of carbon dioxide in the :
Broom Creek Formation from the :
Midwest Carbon Express Pipeline in:
the storage facility located in :
Section 36, Township 143 North, :
Range 87 West, Sections 19, 20, :
21, 28, 29, 30, 31, 32, 33, 34, :
35, and 36, Township 143 North, :
Range 86 West, Sections 1, 2, 11, :
12, 13, 14, and 24, Township 142 :
North, Range 87 West, Sections 1, :
2, 3, 4, 5, 6, 7, 8, 9, 10, 11, :
12, 13, 14, 15, 16, 17, 18, 19, :
20, 21, 22, 23, 24, 25, 26, 27, :
28, 29, 30, 32, 33, 34, and 35, :
Township 142 North, Range 86 :
West, and Sections 6, 7, 17, 18, :
19, and 20, Township 142 North, :
Range 85 West, Oliver County, ND. :

In re application of Summit :
Carbon Storage #3, LLC to consider:
the amalgamation of the storage :
reservoir space, in which the :
Commission may require that the :
pore space owned by nonconsenting :
owners be included in the geologic:

storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.

In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.

| | |
|---|---|
| In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary. | : |

**TRANSCRIPT OF HEARING**

**VOLUME I - (Pages 1 - 276)**

**Taken At**
**1000 East Calgary Avenue**
**Bismarck, North Dakota**
**June 11, 2024**

**BEFORE DAVID P. GARNER**
**-- HEARING EXAMINER --**

# A P P E A R A N C E S

NDIC STAFF PRESENT:

MR. LYNN HELMS
MR. MARK BOHRER
MR. RICHARD SUGGS
MS. TAMARA MADCHE
MR. TRAVIS STOLLDORF
MS. ASHLEIGH THIEL
MR. DAVID TABOR
MR. STEPHEN FRIED
MR. CALEB ALBERTSON
MS. SARA FORSBERG

---

MR. LAWRENCE BENDER
MR. TYLER J. GLUDT
Fredrikson & Byron, P.A.
Attorneys at Law
Suite 400
304 East Front Avenue
Bismarck, North Dakota 58504

FOR SUMMIT CARBON STORAGE #1, SUMMIT CARBON STORAGE #2 AND SUMMIT CARBON STORAGE #3.

---

MR. DERRICK BRAATEN
MS. DESIRAE ZASTE, Paralegal
Braaten Law Firm
Attorneys at Law
Suite 100
109 North Fourth Street
Bismarck, North Dakota 58501

FOR THE INTERVENORS, THE SWENSON LIVING TRUST, BAUMAN, GERVING, HAUPT, JOCHIM, KRAFT, LIEBELT, MAIZE, METZ, RUST, AND SMITH.

---

# TABLE OF CONTENTS

## INDEX OF PROCEEDINGS

Page

Opening Comments by Hearing Examiner Garner..... 11

---

## APPLICANT'S WITNESSES

### WADE BOESHANS/JEFFREY SKAARE

Direct Examination by Mr. Bender..... Page 20

Direct Examination by Mr. Bender..... Page 43

Cross-Examination by Mr. Braaten..... Page 61

Examination by Ms. Madche..... Page 192

Examination by Mr. Stolldorf..... Page 195

Further Examination by Ms. Madche..... Page 200

Examination by Mr. Suggs..... Page 200

Examination by Mr. Bohrer..... Page 207

Further Examination by Mr. Suggs..... Page 208

### AMANDA DOUGLAS/CAITLIN OLSEN

Direct Examination by Mr. Bender..... Page 211

Direct Examination by Mr. Bender..... Page 230

Cross-Examination by Mr. Braaten..... Page 238

---

# T A B L E  O F  C O N T E N T S (Cont'd)

## APPLICANT'S EXHIBITS


| Exhibit No. | Offered | Received |
|---|---|---|
| 1A | 23 | 24 |
| 1B | 23 | 24 |
| 1C | 23 | 24 |
| 2A | 25 | 25 |
| 2B | 25 | 25 |
| 2C | 25 | 25 |
| 3A | 30 | 30 |
| 4A | 40 | 41 |
| 5A | 55 | 56 |
| 5B | 55 | 56 |
| 5C | 55 | 56 |


--------

from the package?

A. They're governed by a specific license agreement, so I don't have those terms available now. But there are potential ways that someone else could purchase those digitized logs for those specific wells.

Q. And if they had a license, you could give your copy to them?

A. Again, I'm not sure the specific license terms for the logs in question.

Q. Are you aware of the GEM model having a single file called -- with a file extension .DAT that you can use to run a model on the program?

A. Correct.

Q. Do you have one of those .DAT files that would allow us to run the model you ran in that program?

A. For the $CO_2$ simulations or the geochemical simulations?

Q. $CO_2$ simulation.

A. Yes, I believe that was provided to the Commission already.

Q. And that could just be taken and loaded into the GEM program to run the model that you ran?

A. That's my understanding, yes.

North Dakota Industrial Commission
Oil and Gas Division
Case Nos. 30869-30880

Exhibit N to Declaration of Derrick Braaten
in Support of Motion for Supplemental Hearing

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

| | | |
|---|---|---|
| In re application of Summit | : Case No(s). | 30869 |
| Carbon Storage #1, LLC requesting | : | 30870 |
| consideration for the geologic | : | 30871 |
| storage of carbon dioxide in the | : | 30872 |
| Broom Creek Formation from the | : | 30873 |
| Midwest Carbon Express Pipeline in | : | 30874 |
| the storage facility located in | : | 30875 |
| Sections 31, 32, 33, and 34, | : | 30876 |
| Township 142 North, Range 87 West, | : | 30877 |
| Sections 1, 11, 12, 13, 14, 15, | : | 30878 |
| 22, 23, 24, 25, 26, 35, and 36, | : | 30879 |
| Township 141 North, Range 88 West, | : | 30880 |
| Sections 2, 3, 4, 5, 6, 7, 8, 9, | : | |
| 10, 11, 14, 15, 16, 17, 18, 19, | : | |
| 20, 21, 22, 23, 25, 26, 27, 28, | : | |
| 29, 30, 31, 32, 33, 34, and 35, | : | |
| Township 141 North, Range 87 West, | : | |
| Sections 1, 2, 3, and 12, Township | : | |
| 140 North, Range 88 West and | : | |
| Sections 4, 5, 6, and 7, Township | : | |
| 140 North, Range 87 West, Mercer, | : | |
| Morton, and Oliver Counties, ND. | : | |
| | | |
| In re application of Summit | : | |
| Carbon Storage #1, LLC to | : | |
| consider the amalgamation of the | : | |
| storage reservoir pore space, in | : | |
| which the Commission may require | : | |
| that the pore space owned by | : | |
| nonconsenting owners be included | : | |
| in the geologic storage, as | : | |
| required to operate the Summit | : | |
| Carbon Storage #1, LLC storage | : | |
| facility located in Sections 31, | : | |
| 32, 33, and 34, Township 142 | : | |
| North, Range 87 West, Sections 1, | : | |
| 11, 12, 13, 14, 15, 22, 23, 24, | : | |
| 25, 26, 35, and 36, Township 141 | : | |
| North, Range 88 West, Sections 2, | : | |
| 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, | : | |
| 15, 16, 17, 18, 19, 20, 21, 22, | : | |
| 23, 25, 26, 27, 28, 29, 30, 31, | : | |

32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re application of Summit Carbon Storage #1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35,

Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.

In re application of Summit Carbon Storage #2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35,

Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.

In re application of Summit Carbon Storage #2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.

In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13,

14, 15, 16, 17, 18, 19, 20, 21, :
22, 23, 24, 25, 26, 27, 28, 29, :
30, 32, 33, 34, 35, and 36, :
Township 142 North, Range 88 West,:
Sections 5, 6, 7, 8, 17, 18, 19, :
20, 29, 30, and 31, Township 142 :
North, Range 87 West, and Sections:
1, 2, and 3, Township 141 North, :
Range 88 West, Mercer and Oliver :
Counties, ND, subject to the :
application of Summit Carbon :
Storage #2, LLC for the geologic :
storage of carbon dioxide in the :
Broom Creek Formation, and enact :
such special field rules as may :
be necessary. :

In re application of Summit :
Carbon Storage #3, LLC requesting :
consideration for the geologic :
storage of carbon dioxide in the :
Broom Creek Formation from the :
Midwest Carbon Express Pipeline in:
the storage facility located in :
Section 36, Township 143 North, :
Range 87 West, Sections 19, 20, :
21, 28, 29, 30, 31, 32, 33, 34, :
35, and 36, Township 143 North, :
Range 86 West, Sections 1, 2, 11, :
12, 13, 14, and 24, Township 142 :
North, Range 87 West, Sections 1, :
2, 3, 4, 5, 6, 7, 8, 9, 10, 11, :
12, 13, 14, 15, 16, 17, 18, 19, :
20, 21, 22, 23, 24, 25, 26, 27, :
28, 29, 30, 32, 33, 34, and 35, :
Township 142 North, Range 86 :
West, and Sections 6, 7, 17, 18, :
19, and 20, Township 142 North, :
Range 85 West, Oliver County, ND. :

In re application of Summit :
Carbon Storage #3, LLC to consider:
the amalgamation of the storage :
reservoir space, in which the :
Commission may require that the :
pore space owned by nonconsenting :
owners be included in the geologic:

storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.

In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.

In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

**TRANSCRIPT OF HEARING**

**VOLUME II - (Pages 277 - 552)**

**Taken At**
**1000 East Calgary Avenue**
**Bismarck, North Dakota**
**June 12, 2024**

**BEFORE DAVID P. GARNER**
**-- HEARING EXAMINER --**

# A P P E A R A N C E S

NDIC STAFF PRESENT:

MR. LYNN HELMS
MR. MARK BOHRER
MR. RICHARD SUGGS
MS. TAMARA MADCHE
MR. TRAVIS STOLLDORF
MS. ASHLEIGH THIEL
MR. DAVID TABOR
MR. STEPHEN FRIED
MR. CALEB ALBERTSON
MS. SARA FORSBERG

---

MR. LAWRENCE BENDER
MR. TYLER J. GLUDT
Fredrikson & Byron, P.A.
Attorneys at Law
Suite 400
304 East Front Avenue
Bismarck, North Dakota 58504

-- and --

MR. S. THOMAS THRONE
Throne Law Office, P.C.
Attorneys at Law
P.O. Drawer 6590
Sheridan, Wyoming 82801

FOR THE SUMMIT CARBON STORAGE #1, SUMMIT CARBON STORAGE #2 AND SUMMIT CARBON STORAGE #3.

---

**A P P E A R A N C E S (Cont'd)**

MR. DERRICK BRAATEN
MS. DESIRAE ZASTE, Paralegal
Braaten Law Firm
Attorneys at Law
Suite 100
109 North Fourth Street
Bismarck, North Dakota 58501

FOR THE INTERVENORS, THE SWENSON LIVING TRUST, BAUMAN, GERVING, HAUPT, JOCHIM, KRAFT, LIEBELT, MAIZE, METZ, RUST, AND SMITH.

---

# TABLE OF CONTENTS

## INDEX OF PROCEEDINGS

Page

Opening Discussion..... 289

---

CERTIFICATE

Certificate of Court Reporter.....Page 552

---

APPLICANT'S WITNESSES

AMANDA DOUGLAS/CAITLIN OLSEN

Continued Cross-Examination by Mr. Braaten..... Page 291

Examination by Ms. Madche..... Page 355

Examination by Mr. Stolldorf..... Page 370

Examination by Mr. Suggs..... Page 371

Redirect Examination by Mr. Bender..... Page 389

Further Examination by Mr. Suggs..... Page 393

JAMES POWELL/JOHN HUNT/JAY VOLK/JEAN ODDY

Direct Examination by Mr. Bender..... Page 396

Direct Examination by Mr. Bender..... Page 398

Direct Examination by Mr. Bender..... Page 403

Direct Examination by Mr. Bender..... Page 408

T A B L E  O F  C O N T E N T S (Cont'd)

Examination by Ms. Madche..... Page 411
Examination by Mr. Stolldorf..... Page 432
Examination by Mr. Suggs..... Page 441

CAITLIN OLSEN/WADE BOESHANS/AMANDA DOUGLAS/JAMEY BACKUS

Redirect Examination by Mr. Bender..... Page 448
Redirect Examination by Mr. Bender..... Page 458
Redirect Examination by Mr. Bender..... Page 461
Direct Examination by Mr. Bender..... Page 467
Examination by Ms. Madche..... Page 470
Recross-Examination by Mr. Braaten..... Page 473

JEAN ODDY/CAITLIN OLSEN/JIMMY POWELL/WADE BOESHANS

Cross-Examination by Mr. Braaten..... Page 484

---

INTERVENORS' WITNESSES

SHANE BOFTO

Direct Examination by Mr. Braaten..... Page 503
Cross-Examination by Mr. Bender..... Page 513
Examination by Mr. Helms..... Page 525
Redirect Examination by Mr. Braaten..... Page 526

T A B L E  O F  C O N T E N T S (Cont'd)

P. TED DOUGHTY

Direct Examination by Mr. Braaten..... Page 527

Cross-Examination by Mr. Bender..... Page 532

PAUL BUTTON

Direct Examination by Mr. Braaten..... Page 537

Cross-Examination by Mr. Bender..... Page 545

---

CLAIMANT'S EXHIBITS

| Exhibit No. | Offered | Received |
|---|---|---|
| 1C-1 | 461 | 461 |
| 8B | 457 | 458 |

---

INTERVENORS' EXHIBITS

| Exhibit No. | Offered | Received |
|---|---|---|
| LO-18 | 511 | 511 |
| LO-19 | 511 | 511 |
| LO-20 | 511 | 511 |
| LO-56 | 505 | 505 |
| LO-57 | 540 | 540 |
| LO-58 | 530 | 530 |
| LO-82 | 511 | 511 |
| LO-83 | 333 | 333 |

---

project.

Q. Did Summit compensate for the cost of the subscriptions for the programs on a commercial basis?

A. The EERC procured commercial licenses and the costs of those commercial licenses were billed to Summit. Yes.

Q. Okay. Were they temporary subscriptions?

A. Yes. So the licenses have a time period associated with them. Commonly, we procure licenses on the order of a month, two-month, three-month licenses, depending on the duration of the time period in the project we need the license to perform the scope.

Q. So I want to go back to my prior question. Other than the input model for the PHREEQC model -- sorry. Let me start over.

Other than the input file for the PHREEQC model, is there anything listed in these bullet points that was not provided by EERC to the Industrial Commission?

A. Yes. As I mentioned, the only input data that was provided can be found in your last bullet point in terms of what I would call the simulation -- or the numerical reservoir simulation

model data decks and the output files. Those were the two pieces of data which I am saying is the .DAT file and the .SR3 file. Those are the only two data sets from this list that were provided.

Q. So if you look at the third bullet point, is there anything there that was provided to the Industrial Commission?

A. Yes. Thank you for correcting me. So all core analysis data was provided to the Industrial Commission as well as the North Dakota Geological Survey through submission to the North Dakota core library staff. And as required, all well log data, formation testing, fluid analysis was provided as -- as part of completions reports for the three stratigraphic test wells that were drilled. So those were technically provided.

Q. When you look through these bullet points on this letter, do you have an understanding of what is being referenced in all of these? Is there anything you don't understand what is being referenced?

A. No. I understand.

Q. If I asked you to go back to EERC today and sit down and pull together an external hard drive and put this data on that external hard drive

## Summit Carbon Storage (Case Nos. 30869-30880)

Knutson, Amy N. <anknutson@nd.gov>

Thu 8/15/2024 4:14 PM

To:Joshua A. Swanson <jswanson@vogellaw.com>;Bender, Lawrence <lbender@fredlaw.com>;Derrick Braaten <derrick@braatenlawfirm.com>
Cc:Forsberg, Sara L. <slforsberg@nd.gov>;Garner, David P. <dpgarner@nd.gov>;Helms, Lynn D. <lhelms@nd.gov>;Desirae Zaste <desirae@braatenlawfirm.com>;Hughes, Bethany <BHughes@fredlaw.com>;Etter, Mary <MEtter@fredlaw.com>

2 attachments (715 KB)

2024.08.15 – Order on Petition for Reconsideration of Denial of Motion to Continue Hearing.pdf; 2024.08.15 – Unsworn Declaration of Service by Electronic Mail and Retention of Document.pdf;

Counsel,

On behalf of Hearing Officer Garner, please see attached:

1. ORDER ON PETITION FOR RECONSIDERATION OF DENIAL OF MOTION TO CONTINUE HEARING.

**Please note for all future filings and/or correspondence in this matter to include Hearing Officer David Garner (dpgarner@nd.gov), Lynn Helms (lhelms@nd.gov), Sara Forsberg (slforsberg@nd.gov), and Amy Knutson (anknutson@nd.gov).

Thank you.

Amy Knutson
**Paralegal**
**Civil Litigation Division**
**North Dakota Office of Attorney General**
**500 North 9th Street**
**Bismarck, ND 58501-4509**
**Telephone: (701) 328-3640**
**Fax: (701) 328-4300**

**Confidentiality Notice:**
This electronic mail transmission is intended for the use of the individual or entity to which it is addressed and may contain confidential information belonging to the sender. If you are not the intended recipient, you are hereby notified that any disclosure, copying, distribution, or the taking of any action in reliance on the contents of this information is strictly prohibited. If you have received this transmission in error, please notify the sender immediately by e-mail and delete the original message.

BEFORE THE INDUSTRIAL COMMISSION
OF THE STATE OF NORTH DAKOTA

CASE NOS. 30869–30880

In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND

In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15,

16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.

In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND

In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18,

19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.

In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.

In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage

facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.

In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.

In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections

6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.

In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

---

**ORDER ON PETITION FOR RECONSIDERATION OF DENIAL OF MOTION TO CONTINUE HEARING**

---

[¶ 1] On February 6, 2024, Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit carbon Storage #3, LLC (collectively, "Summit"), filed with the North Dakota Industrial Commission ("Commission") applications for permits for carbon dioxide storage facilities.

[¶ 2] On April 18, 2024, the Swenson Trust ("Trust") filed its Petition to Intervene with the North Dakota Industrial Commission ("Commission"). *See* Petition to Intervene.

[¶ 3] On April 25, 2024, the Trust filed a Motion to Continue Hearing and Request for Scheduling Conference. *See* Brief in Support of Motion to Continue Hearing and Request for Scheduling Conference. The Trust offered conclusory statements regarding its need for discovery in support of its motion.

[¶ 4] Summit filed its Response to Motion to Continue Hearing and Request for Scheduling Conference on April 25, 2024, in opposition to the request. *See* Response to Motion to Continue Hearing and Request for Scheduling Conference. Summit responded stating it will be prejudiced by continuing the hearing given all of the significant, unrecoverable costs that will be incurred should a new hearing be ordered. *Id.* at ¶ 23.

[¶ 5] The Trust did not contact Summit for the purpose of obtaining a stipulated agreement before seeking a continuance as required by N.D. Admin. Code § 98-02-03-07. *Id.* at ¶ 19.

[¶ 6] On June 8, 2024, the Trust's Motion to Continue Hearing was denied.

[¶ 7] On June 11-13, 2024 a three-day hearing was held in these cases.

[¶ 8] On July 2, 2024, the Intervenor Landowners, collectively, filed a petition for reconsideration of the denial of its motion for a continuance. The Intervenors argued that there was ample time to allow an amended application to be developed into a draft permit and fact sheet as required by law, and to allow discovery and due process prior to the Commission making its decision in December. *See* Petition for Reconsideration of Denial of Motion to Continue Hearing.

[¶ 9] On July 8, 2024, Summitt filed its objection with numerous reasons in support of denying the motion to reconsider. *See* Response to Landowners Intervenors' Objection.

[¶ 10] The Commission agrees with Summitt that the Intervenors have not provided a sufficient reason for the Commission to reconsider its order. Once again, Intervenors' petition argues that the Commission should reconsider its order because a continuance is necessary to give Intervenors more time to conduct discovery. The Commission already rejected this argument. By making the same arguments the Commission already rejected, Intervenors are simply asking the Commission to change its mind. This is not sufficient reason to reconsider its previous order.

[¶ 11] The Petition For Reconsideration of Denial of Motion to Continue Hearing is hereby DENIED.

Dated this 15th day of August, 2024.

By: David P. Garner

David P. Garner
Industrial Commission
Hearing Officer

BEFORE THE NORTH DAKOTA INDUSTRIAL COMMISSION
OF THE STATE OF NORTH DAKOTA

CASE NOS. 30869
30870
30871
30872
30873
30874
30875
30876
30877
30878
30879
30880

In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19,

20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.

In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND

In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5,

6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.

In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.

In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek

Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township. 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.

In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.

In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142

North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.

In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

---

**UNSWORN DECLARATION OF SERVICE BY ELECTRONIC MAIL AND RETENTION OF DOCUMENT**

---

[¶1] Amy Knutson states as follows:

[¶2] I am of legal age and on the 15th day of August, 2024, I served the following documents:

1. **ORDER ON PETITION FOR RECONSIDERATION OF DENIAL OF MOTION TO CONTINUE HEARING.**

upon the following by electronic mail as follows:

Derrick Braaten – derrick@braatenlaw.com;
Lawrence Bender – lbender@fredlaw.com;
S. Thomas Throne – tthrone@thronelaw.com
Joshua Swanson – jswanson@vogellaw.com.

[¶3] The original document shall be retained at the North Dakota Department of Mineral Resources, 600 E. Boulevard Ave. – Dept. 405, Bismarck, North Dakota, 58505-0840.

[¶4] I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on the 15th day of August, 2024, at Bismarck, North Dakota, United States.

Amy Knutson

| | |
|---|---|
| **From:** | Desirae Zaste |
| **To:** | -Info-Oil & Gas Division; Forsberg, Sara L.; Bender, Lawrence; TThrone@thronelaw.com; Gludt, Tyler; Bohrer, Mark F.; Garner, David P.; Knutson, Amy N.; Joshua A. Swanson |
| **Cc:** | Derrick Braaten |
| **Subject:** | Summit Carbon Storage (Case Nos. 30869-30880) |
| **Date:** | Thursday, July 18, 2024 1:50:35 PM |
| **Attachments:** | image002.png |

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Good afternoon,

Below is a link containing the following documents for filing and service:

- **Intervenor Landowners' Reply to Petition for Reconsideration of Denial of Motion to Continue Hearing;**
- **Supplemental Declaration of Derrick Braaten in Support of Petition for Reconsideration of Denial of Motion to Continue Hearing;**
- **Exhibit A – email sent by Michael Ziesch on May 21, 2024;**
- **Exhibit B – email sent by Michael Ziesch on September 22, 2023;**
- **Exhibit C - Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC's responses to Intervenor Landowners discovery requests set 1, 2, and 3; and**
- **Declaration of Service.**

Intervenor Landowners Reply to Pet. for Reconsideration

The link will expire August 2, 2024. If you have any issues with the link, please contact me.

**Desirae Zaste¦ Certified Paralegal**

**BRAATEN LAW FIRM**
109 N. 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
Fax: 701-221-5842
www.braatenlawfirm.com

**PRIVILEGED COMMUNICATION**
**This e-mail message is intended only for the named recipient(s) above and is covered by the Electronic Communications Privacy Act, 18 U.S.C. Sections 2510-2521. This e-mail is confidential and may contain information that is privileged, attorney work product or exempt from disclosure under applicable law. Recipients should not file copies of this e-mail with publicly accessible records. If you have received this message in error, please immediately notify the sender by return e-mail and delete this e-mail message from your computer. Thank you for your cooperation.**

**NORTH DAKOTA INDUSTRIAL COMMISSION**

**OIL AND GAS DIVISION**

**In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**Case No(s). 30869**
**30870**
**30871**
**30872**
**30873**
**30874**
**30875**
**30876**
**30877**
**30878**
**30879**
**30880**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## INTERVENOR LANDOWNERS' REPLY TO PETITION FOR RECONSIDERATION OF DENIAL OF MOTION TO CONTINUE HEARING

[¶1] Intervenor Landowners submits their reply to Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC and Summit Carbon Storage #3, LLC's ("Summit") response to the petition for reconsideration of the Commission's denial of Landowners' motion to continue the hearing.

### I. Summit is incorrect when it states the NDIC provided the documentation to Intervenor Landowners.

[¶2] Summit indicates throughout its entire brief allegations that the Intervenor Landowners were in possession of the data and files. One statement made by Summit states, "By virtue of the Commission's September 21, 2023 response to Mr. Braaten's initial open records request in or around September of 2023, Landowner Intervenors have been in possession of most, if not all of the information they sought through their Discovery Requests to Summit… (Summit Brief ¶18). This is false. The North Dakota Industrial Commission provided a response however its response did not provide any data and files and referenced a response to a September 21, 2023 open records request. *See* Exhibit A, attached to the Decl. of Derrick Braaten and excerpt of email below dated May 21, 2024 from Michael Ziesch, EGIS Staff Officer for the North Dakota Mineral Resources:

> Regarding the open records request received on 5-15-2024 for Summit Carbon Storage facilities. Please see responses in red below each of the submitted topics.
> The agency has previously provided (9-21-2023) all modeling input and results files submitted and used for the application by Summit. Agency staff validated the inputs and parameters in the submitted model via CMG software. Field and analytical data of your request are available through the agency website in log and well files.
> • All the input files, field and analytical data, and the model geochemical database used to evaluate the CO2 effects on the upper and lower confining layers, including but not limited to all inputs and

data files used to run the United States Geological Survey's USGS's PHREEQC model.

Results received from applicant is in the related case files and available on the agency website. The agency did not receive software files for PHREEQC model. Model and geochemical database documentation can be obtained from the USGS.gov PHREEQC webpage.

• All the input files, field and analytical data , and the model geochemical database used to run Computer Modelling Group Ltd.'s GEM model and software or any similar model or software used for the same purposes.

The agency did not receive Geochem GEM model files. Results of Geochem modeling are summarized in the application packet, available in the case file. The geochemical equations used in the model are internal to the CMG GEM software.

• Geophysical Logs that penetrate injection and confining zones, seismic survey data and core sample measurements, all measurements and data for acoustic impedance, total porosity, effective porosity, permeability, and facies.

Geophysical logs data are available via Premium Subscription on the agency Scout Ticket. Well files contain the core analysis and are also available on agency website via Premium Subscription. Related wells that penetrate the area of review are identified in section 4 of each application package. Seismic survey results are not provided to the agency, they are owned by the company conducting the survey.

• All the input files, field and analytical data, and the model, including but not limited to all inputs and data files used to run SLB's Petrel model in any manner related to Summit's applications.

The agency does not receive Petrel model files other than exports from the CMG files previously provided on 9-21-2023 open records request.

• All 3D numerical reservoir simulation model data decks, output files and graphing files of the Storage Reservoir in original electronic format. Without limiting the foregoing, such files may commonly be stored in Slumberger Eclipse or Petrel format, CMG (Canadian Modeling Group) Imex format, or other similar format.

The CMG files, previously provided on 9-21-2023, are the modeling files still being used for the applications. There are no updates to them.

[¶3] The response to open records request dated September 21, 2023, that Mr. Ziesch is referencing, is attached hereto as Exhibit B to the Decl. of Derrick Braaten. In this response, it

states, “Ms. Zaste, our office has not received any applications under NDCC 38-25.” This is not the data and files Summit is alleging was given to the Intervenor Landowners. The NDIC failed to give any records in its possession and instead referenced a response provided on September 21, 2023 which simply stated that no applications were received under NDCC 38-25. *Id.* No documents, data, or files were provided. Summit did not provide any documentation and neither did the North Dakota Industrial Commission in response to the open records request. *Id*.

**II. Summit refused to attend the noticed 30b6 deposition.**

[¶4] In addition to not providing any documentation to the Intervenor Landowners, Summit also decided to ignore the noticed 30(b)(6) deposition and refused to attend. As indicated in the Intervenor Landowners motion to compel, Summit was advised of the Intervenor Landowners’ intent to conduct discovery on May 2, 2024. Summit refused to respond until the eleventh hour to basically state they weren’t coming the next day. The deposition notice requested a majority, if not all, of the documentation requested from the NDIC in the open records request. But yet, Summit refused to cooperate and refused to attend the deposition.

**III. Summit failed to provide the documentation in its response to the Intervenor Landowners Discovery.**

[¶5] Summit chose not to provide any documentation whatsoever in its response to the Intervenor Landowners Discovery. Summit responded to the Intervenor Landowners Discovery on July 1, 2024. *See* Exhibit C, attached to the Decl. of Derrick Braaten. Summit did not provide any documentation or files that were requested in the discovery. Instead, Summit indicates numerous times that the information has been made available to the Landowners via an open records request. *Id.* Intervenor Landowners had not and still have not received the files they were

seeking from the North Dakota Industrial Commission despite their open records request. *See* Decl. of Derrick Braaten, ¶6.

## IV. Intervenor Landowners' petition for reconsideration is timely.

[¶6] Pursuant to Rule 54(b), "[a]n interlocutory order may be revised at any time before the entry of a judgment adjudicating all the claims and all the parties' rights and liabilities. N.D. R. Civ. P. 54(b). When a district court is convinced that it incorrectly decided a legal question in an interlocutory ruling, the district court may correct the decision to avoid later reversal." *Ceynar v. Barth*, 2017 ND 286, ¶ 1, 904 N.W.2d 469. *See also* N.D.C.C. § 28-32-33 (applying North Dakota Rules of Civil Procedure in adjudicative administrative proceedings). The hearing examiner can reverse a ruling at any time before a final order.

DATED this 18th day of July, 2024.

**BRAATEN LAW FIRM**

*/s/ Derrick Braaten*
Derrick Braaten (ND #06394)
109 North 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
derrick@braatenlawfirm.com

*Attorneys for Intervenors the Swenson Living Trust, Bauman, Gerving, Haupt, Jochim, Kraft, Liebelt, Maize, Metz, Rust, and Smith*

**NORTH DAKOTA INDUSTRIAL COMMISSION**

**OIL AND GAS DIVISION**

**In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**Case No(s). 30869**
**30870**
**30871**
**30872**
**30873**
**30874**
**30875**
**30876**
**30877**
**30878**
**30879**
**30880**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**SUPPLEMENTAL DECLARATION OF DERRICK BRAATEN IN SUPPORT OF PETITION FOR RECONSIDERATION OF DENIAL OF MOTION TO CONTINUE HEARING**

1. I am an attorney for the Intervenor Landowners ("Landowners"), in the above-captioned matter.
2. I represent the Landowners in matters involving the applications submitted by Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, and Summit Carbon Storage #3, LLC ("SCS").
3. Attached hereto as Exhibit A is a true and correct copy of an email sent by Michael Ziesch on May 21, 2024 regarding the NDIC's response to an open records request received on May 15, 2024.
4. Attached hereto as Exhibit B is a true and correct copy of an email sent by Michael Ziesch on September 22, 2023 regarding the NDIC's response to an open records request received on September 21, 2023 as referenced by the NDIC in Exhibit A.
5. Attached hereto as Exhibit C is a true and correct copy of Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC's responses to Intervenor Landowners discovery requests set 1, 2, and 3.
6. Intervenor Landowners had not and still have not received the files they were seeking from the North Dakota Industrial Commission despite their open records request.

**I declare under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.**

Executed this 18th day of July, 2024 in Bismarck, North Dakota.

**Derrick Braaten**

**From:** Ziesch, Michael D.
**To:** Desirae Zaste
**Subject:** Re: open records request from 5-15-2024
**Date:** Tuesday, May 21, 2024 10:26:03 AM
**Attachments:** image001.png

[Warning: External Sender]

Regarding the open records request received on 5-15-2024 for Summit Carbon Storage facilities. Please see responses in red below each of the submitted topics.

The agency has previously provided (9-21-2023) all modeling input and results files submitted and used for the application by Summit. Agency staff validated the inputs and parameters in the submitted model via CMG software. Field and analytical data of your request are available through the agency website in log and well files.

• All the input files, field and analytical data, and the model geochemical database used to evaluate the CO2 effects on the upper and lower confining layers, including but not limited to all inputs and data files used to run the United States Geological Survey's USGS's PHREEQC model.

Results received from applicant is in the related case files and available on the agency website. The agency did not receive software files for PHREEQC model. Model and geochemical database documentation can be obtained from the USGS.gov PHREEQC webpage.

• All the input files, field and analytical data , and the model geochemical database used to run Computer Modelling Group Ltd.'s GEM model and software or any similar model or software used for the same purposes.

The agency did not receive Geochem GEM model files. Results of Geochem modeling are summarized in the application packet, available in the case file. The geochemical equations used in the model are internal to the CMG GEM software.

• Geophysical Logs that penetrate injection and confining zones, seismic survey data and core sample measurements, all measurements and data for acoustic impedance, total porosity, effective porosity, permeability, and facies.

Geophysical logs data are available via Premium Subscription on the agency Scout Ticket. Well files contain the core analysis and are also available on agency website via Premium Subscription. Related wells that penetrate the area of review are identified in section 4 of each application package. Seismic survey results are not provided to the agency, they are owned by the company conducting the survey.

• All the input files, field and analytical data, and the model, including but not limited to all inputs and data files used to run SLB's Petrel model in any manner related to Summit's applications.

The agency does not receive Petrel model files other than exports from the CMG files previously provided on 9-21-2023 open records request.

• All 3D numerical reservoir simulation model data decks, output files and graphing files of the Storage Reservoir in original electronic format. Without limiting the foregoing, such files may commonly be stored in Slumberger Eclipse or Petrel format, CMG (Canadian Modeling Group) Imex format, or other similar format.

The CMG files, previously provided on 9-21-2023, are the modeling files still being used for the applications. There are no updates to them.

Michael Ziesch
*EGIS Staff Officer*

701.328.8029 (o) • mdziesch@nd.gov • www.dmr.nd.gov

701.328-8020 • oilandgasinfo@nd.gov • 600 E Boulevard Ave, Dept. 474 • Bismarck, ND 58505

**From:** Ziesch, Michael D.
**To:** Desirae Zaste
**Cc:** Derrick Braaten
**Subject:** RE: Records Request
**Date:** Friday, September 22, 2023 11:31:20 AM
**Attachments:** image002.png
image003.jpg

[Warning: External Sender]

Ms. Zaste, our office has not received any applications under NDCC 38-25.

Michael Ziesch
*EGIS Staff Officer*

701.328.8029 (o) · mdziesch@nd.gov · www.dmr.nd.gov

701.328-8020 · oilandgasinfo@nd.gov · 600 E Boulevard Ave, Dept. 474 · Bismarck, ND 58505

**From:** Desirae Zaste <desirae@braatenlawfirm.com>
**Sent:** Thursday, September 21, 2023 10:40 AM
**To:** -Info-Oil & Gas Division <oilandgasinfo@nd.gov>
**Cc:** Derrick Braaten <derrick@braatenlawfirm.com>
**Subject:** Records Request

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Good morning,

Attached is a letter from Attorney Braaten regarding an open records request. If you have any questions, please let us know. Thank you.

**DESIRAE ZASTE** | Certified Paralegal
desirae@braatenlawfirm.com

**BRAATEN LAW FIRM**
109 N. 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911

Fax: 701-221-5842
www.braatenlawfirm.com

**PRIVILEGED COMMUNICATION**
**This e-mail message is intended only for the named recipient(s) above and is covered by the Electronic Communications Privacy Act, 18 U.S.C. Sections 2510-2521. This e-mail is confidential and may contain information that is privileged, attorney work product or exempt from disclosure under applicable law. Recipients should not file copies of this e-mail with publicly accessible records. If you have received this message in error, please immediately notify the sender by return e-mail and delete this e-mail message from your computer. Thank you for your cooperation.**

**BEFORE THE INDUSTRIAL COMMISSION
OF THE STATE OF NORTH DAKOTA**

**CASE NOS. 30869–30880**

**In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1,**

**11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by**

**nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of**

**carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the**

**geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## RESPONSE OF APPLICANTS TO INTERVENORS' LANDOWNERS' AMENDED INTERROGATORIES AND REQUEST FOR PRODUCTION OF DOCUMENTS (SET 1)

Applicants Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC (collectively, "Summit"), by and through their counsel, Lawrence Bender, Fredrikson & Byron, P.A., 304 East Front Avenue, Suite 400, Bismarck, ND 58504-5639, respond to the Amended Interrogatories and Request for Production of Documents (Set 1) submitted by The Swenson Living Trust; Michael Bauman, Glenn and Lisa Gerving, Michael and Bonnie Haupt, John Jochim, Kevin and Kimberly Kraft, Charmayne Liebelt, Kirk

and Linda Maize and Allen Maize, Paul and Christy Metz, JoLene M. Rust, and Gary and Cassie Smith (collectively, "Landowners") on May 31, 2024 in the above-captioned proceedings (each a "Discovery Request" and collectively, the "Discovery Requests"). Summit's response is made without waiving or intending to waive any objection as to relevance, privilege, or admissibility of any information provided in response to the Discovery Requests in any subsequent proceeding of this or any other action on any ground. A partial answer to any Discovery Request that has been objected to, in whole or in part, is not intended to be a waiver of the objection. By responding to the Discovery Requests, Summit is not admitting that any aspect of the Discover Requests is factually accurate or relevant to this proceeding.

## GLOBAL OBJECTIONS

The following Global Objections apply to each of the Discovery Requests—even if not separately restated below in response to a particular Discovery Request.

Summit objects to all Discovery Requests to the extent they seek the discovery of documents which are privileged for the reasons that they (a) are subject to the attorney-client privilege; (b) are covered by the "work product" doctrine; and/or (c) were prepared in anticipation of litigation or for trial by or for Summit or its representatives, including its employees, consultants, or agents.

Summit objects to all Discovery Requests to the extent they are beyond the scope of discovery allowed pursuant to Rules 26, 33, 34, and 36 of the North Dakota Rules of Civil Procedure.

Summit objects to all Discovery Requests to the extent they seek identification or production of "all documents" of a particular description. It is impossible to guarantee that all such documents have been identified or located. Summit states, however, that in response to these

requests, it has made a diligent search of records kept in the ordinary course of business in those locations likely to contain relevant information.

Summit objects to the Landowners' definitions and instructions to the extent such definitions and instructions exceed or are inconsistent with the requirements imposed upon Summit under the North Dakota Rules of Civil Procedure or Chapter 28-32 of the North Dakota Century Code.

Summit objects to the Discovery Requests because they are unduly burdensome and disproportionate to the needs of this proceeding because they seek irrelevant information.

Summit objects inasmuch as the Discovery Requests seek information relating to anything other than Summit's sequestration facilities in North Dakota. Only Summit's North Dakota sequestration facilities are covered by its applications in this proceeding.

Summit objects inasmuch as the Discovery Requests seek information that contains proprietary or confidential business information or is subject to trade-secret protections or that contains information for which Summit owes a third party an obligation of confidentiality or privacy, whether contractual or under any federal or state laws or regulations.

Summit objects to all Discovery Requests that seek, and disclaims any obligation to identify or furnish, documents or information that the Landowners actually or constructively possesses or to which the Landowners have access through alternative means.

Summit objects inasmuch as the Discovery Requests seek information from third parties and information that is not within Summit's possession, custody, control, or personal knowledge of Summit.

Summit objects and responds to the Discovery Requests based upon information and documents available as of the date hereof and reserves the right to supplement and amend the responses.

Subject to the foregoing objections and conditions, and subject to the specific additional objections made with respect to each request, Summit responds to the Landowners' Discovery Requests as follows:

## RESPONSE TO INTERROGATORIES

**INTERROGATORY NO. 1:**

*Identify the petroleum engineers or reservoir engineers who made any material contribution to Summit's applications or the materials provided in support of Summit's applications in NDIC Case Nos. 30869-30880.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the North Dakota Industrial Commission ("Commission" or "NDIC") to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states the following individuals made material contributions in support of Summit's applications or the materials provided in support of Summit's applications in NDIC Case Nos 30869-30880:

Todd Jiang, Principal Reservoir Engineer
Energy & Environmental Research Center (EERC)
15 N. 23rd St., Stop 9018
Grand Forks, ND 58202-9018

Guangwei Ren, Senior Reservoir Engineer
Energy & Environmental Research Center (EERC)
15 N. 23rd St., Stop 9018
Grand Forks, ND 58202-9018

Chantsalmaa Dalhkaa, Principal Reservoir Engineer
Energy & Environmental Research Center (EERC)
15 N. 23rd St., Stop 9018
Grand Forks, ND 58202-9018

Nessa Mahmoud, Geochemist
Energy & Environmental Research Center (EERC)
15 N. 23rd St., Stop 9018
Grand Forks, ND 58202-9018

Tim Shenk, Senior Operations Specialist
Energy & Environmental Research Center (EERC)
15 N. 23rd St., Stop 9018
Grand Forks, ND 58202-9018

Agustinus Zandy, Principal Operations Specialist
Energy & Environmental Research Center (EERC)
15 N. 23rd St., Stop 9018
Grand Forks, ND 58202-9018

Michael Warmack, Distinguished Oil & Gas Facilities Engineer
Energy & Environmental Research Center (EERC)
15 N. 23rd St., Stop 9018
Grand Forks, ND 58202-9018

**INTERROGATORY NO. 2:**

*Identify the geologists who made any material contribution to Summit's applications or the materials provided in support of Summit's applications in NDIC Case Nos. 30869-30880.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states the following individuals made material contributions in support of Summit's applications or the materials provided in support of Summit's applications in NDIC Case Nos 30869-30880:

Remington Leger, Principal Geoscientist
15 N. 23rd St., Stop 9018
Grand Forks, ND 58202-9018

Amanda Livers-Douglas, Assistant Director for Integrated Subsurface Projects
15 N. 23rd St., Stop 9018
Grand Forks, ND 58202-9018

Sofiane Djezzar, Geoscientist
15 N. 23rd St., Stop 9018
Grand Forks, ND 58202-9018

Kyle McBride, Geophysicist
15 N. 23rd St., Stop 9018
Grand Forks, ND 58202-9018

John Hunt, Senior Geoscientist & MRV Specialist
15 N. 23rd St., Stop 9018
Grand Forks, ND 58202-9018

Arash Abarghani, Senior Research Scientist
15 N. 23rd St., Stop 9018
Grand Forks, ND 58202-9018

Caitlin Olsen, Principal Policy and Regulatory Specialist
15 N. 23rd St., Stop 9018
Grand Forks, ND 58202-9018

Kevin Connors, Assistant Director for Regulatory Compliance and Energy Policy
15 N. 23rd St., Stop 9018
Grand Forks, ND 58202-9018

Kyle Glazewski, Assistant Director for Research, Community Benefits & Stakeholder Engagement
15 N. 23rd St., Stop 9018
Grand Forks, ND 58202-9018

Josh Regorrah, Permitting & Regulatory Specialist
15 N. 23rd St., Stop 9018
Grand Forks, ND 58202-9018

Steve Smith, Assistant Director for Integrated Analytical Solutions
15 N. 23rd St., Stop 9018
Grand Forks, ND 58202-9018

Bret Fossum, Principal Research Engineer
15 N. 23rd St., Stop 9018
Grand Forks, ND 58202-9018

Core Laboratories Petro Services
2550 W 2nd Ave Unit 110
Denver, CO 80219

Wagner Petrographic
122 North 1800 West, #7
Lindon, UT 84042

**INTERROGATORY NO. 3:**

*List any other individuals not listed in Interrogatories 1 and 2 who made any material contribution to Summit's applications or the materials provided in support of Summit's applications in NDIC Case Nos. 30869-30880. Identify each and every person whom you expect to call or may call as a witness at trial.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states, with respect to the first question, that the following individuals made material contributions in support of Summit's applications or the materials provided in support of Summit's applications in the NDIC Case Nos 30869-30880:

Lonny Jacobson, Assistant Director for Subsurface Field Operations
Energy & Environmental Research Center (EERC)
15 N. 23rd St., Stop 9018
Grand Forks, ND 58202-9018

Wade Boeshans, Executive Vice President
Summit Carbon Solutions
3442 E. Century Ave.
Bismarck, ND 58503

Jay Volk, Ph.D., Sequestration – Director of Health, Safety & Environmental
Summit Carbon Solutions
3442 E. Century Ave.
Bismarck, ND 58503

Jeffrey L. Skaare, J.D., C.P.L., Sequestration – Director of Land Legal & Regulatory Affairs
Summit Carbon Solutions
3442 E. Century Ave.
Bismarck, ND 58503

Luis Piasco, Senior Project Manager Sequestration Drilling and Engineering
Summit Carbon Solutions
3442 E. Century Ave.
Bismarck, ND 58503

Jean Oddy, Sequestration Project Engineer
Summit Carbon Solutions
3442 E. Century Ave.
Bismarck, ND 58503

Jamey Backus, Project Manager – Sequestration Facilities
Summit Carbon Solutions
3442 E. Century Ave.
Bismarck, ND 58503

With respect to the second question, the individuals listed in response to Interrogatory No. 4, below, testified at the hearing on the above-captioned cases.

**INTERROGATORY NO. 4:**

*Identify all witnesses Summit plans to testify in support of Summit's applications in NDIC Case Nos. 30869-30880.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any.

Subject to and notwithstanding the objections, Summit states that the following individuals testified at the hearing in support of Summit's applications:

Wade Boeshans
Jeffrey L. Skaare
Amanda Livers-Douglas
Caitlin Olsen
John Hunt
Jean Oddy
James Powell
Jay Volk
Jamey Backus

**INTERROGATORY NO. 5:**

*Identify all exhibits Summit plans to offer in support of Summit's applications in NDIC Case Nos. 30869-30880.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that an exhibit list setting forth all exhibits offered by Summit and admitted at the hearing on the above-captioned cases was provided to the Landowners at the hearing.

**RESPONSE TO REQUESTS FOR PRODUCTION**

**REQUEST NO. 1:**

*Please produce the underlying data and electronic files necessary to run the model used to create the images of the pressure differentials contained in Figures 3-14(a-d) in Summit's application in NDIC Case No. 30869.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that all the underlying data and electronic files utilized to run the models has been submitted to the Commission and is publicly available via an open records request. Summit further states that, upon information and belief, Landowners have made an open records request to the Commission and are in receipt of the information requested in this Discovery Request.

**REQUEST NO. 2:**

*Please produce all the input files, field and analytical data, and the model geochemical database used to evaluate the CO2 effects on the upper and lower confining layers, including but not limited to all inputs and data files used to run the United States Geological Survey's Phreeqc geochemical model.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that the requested information has been submitted to the Commission and is publicly available via an open records request. Summit

further states that, upon information and belief, Landowners have made an open records request to the Commission and are in receipt of the information requested in this Discovery Request.

**REQUEST NO. 3:**

*Please produce all the input files, field and analytical data, and the model geochemical database used to run Computer Modelling Group Ltd.'s GEM model and software or any similar model or software used for the same purposes.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that the requested information has been submitted to the Commission and is publicly available via an open records request. Summit further states that, upon information and belief, Landowners have made an open records request to the Commission and are in receipt of the information requested in this Discovery Request.

**REQUEST NO. 4:**

*Please produce all the input files, field and analytical data, and the model geochemical database used to run any modelling or analysis of critical threshold pressures or areal extent of review or impact and pressure buildup, or which was used to do any kind of analysis related to EPA Method 1 or EPA Method 2 or Analytical Solution for Leakage in Multilayered Aquifers – ASLMA, or any risk-based area-of-review analysis.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that the requested information has been submitted to the Commission and is publicly available via an open records request. Summit further states that, upon information and belief, Landowners have made an open records request to the Commission and are in receipt of the information requested in this Discovery Request.

**REQUEST NO. 5:**

*Please produce the following data and files as referenced by Summit in its application in NDIC Case No. 30873: Geophysical Logs that penetrate injection and confining zones, Seismic survey data and core sample measurements, Acoustic impedance, total porosity, effective porosity, permeability, facies, and SLB's Petrel was used to interpolate structural surfaces for zones.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that the requested information has been submitted to the Commission and is publicly available via an open records request. Summit further states that, upon information and belief, Landowners have made an open records request to the Commission and are in receipt of the information requested in this Discovery Request.

**REQUEST NO. 6:**

*Please produce all the input files, field and analytical data, and the model geochemical database used to evaluate the CO2 effects on the upper and lower confining layers, including but not limited to all inputs and data files used to run Computer Modelling Group Ltd.'s GEM model and software or any similar model or software used for the same purposes.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that the requested information has been submitted to the Commission and is publicly available via an open records request. Summit further states that, upon information and belief, Landowners have made an open records request to the Commission and are in receipt of the information requested in this Discovery Request.

**REQUEST NO. 7:**

*Please produce all data from any parameter referenced or described in Table 2-1: Model Parameters for Multiphase Fluid Modeling of Geologic Sequestration as that table appears in EPA Guidance - AOR Evaluation and Corrective Action Guidance (Guidance page 11) as found here: AOR Evaluation and Corrective Action Guidance - https://www.epa.gov/sites/default/files/2015-07/documents/epa816r13005.pdf.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence

for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that the requested information has been submitted to the Commission and is publicly available via an open records request. Summit further states that, upon information and belief, Landowners have made an open records request to the Commission and are in receipt of the information requested in this Discovery Request.

**REQUEST NO. 8:**

*Please produce all electronic files and data provided to the North Dakota Industrial Commission or its Department of Mineral Resources or Oil and Gas Division in association with or related to the applications in NDIC Case Nos. 30869-30880.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that the requested information has been submitted to the Commission and is publicly available via an open records request. Summit further states that, upon information and belief, Landowners have made an open records request to the Commission and are in receipt of the information requested in this Discovery Request.

**REQUEST NO. 9:**

*Please produce all 3D numerical reservoir simulation model data decks, output files and graphing files of the Storage Reservoir in original electronic format. Without limiting the foregoing, such files may commonly be stored in Slumberger Eclipse format, CMG (Canadian Modeling Group) Imex format, or other similar format. The purpose of this request is to obtain the*

*simulation model of the proposed storage facilities and associated reservoir, along with input and output files in Summit's possession for this simulation model.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that the requested information has been submitted to the Commission and is publicly available via an open records request. Summit further states that, upon information and belief, Landowners have made an open records request to the Commission and are in receipt of the information requested in this Discovery Request.

**REQUEST NO. 10:**

*Please produce structure maps of the injection zone top, structure maps for major sub zones, and/or structure maps of confining zones for the Storage Reservoir and the confining zones as defined therein. Such maps include those created based upon formation tops from well logs, 3D seismic reflectors, and interpretation of geologic deposition environment to give a representation of the elevation change across the target reservoir.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that the requested information has

been submitted to the Commission and is publicly available via an open records request. Summit further states that, upon information and belief, Landowners have made an open records request to the Commission and are in receipt of the information requested in this Discovery Request.

**REQUEST NO. 11:**

*Please produce all gross and net thickness isopach maps for the Storage Reservoir.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that, to the best of its knowledge, net thickness isopach maps have not been created and that gross thickness isopach maps have been submitted to the Commission and are publicly available via an open records request. Summit further states that, upon information and belief, Landowners have made an open records request to the Commission and are in receipt of the gross thickness isopach maps.

**REQUEST NO. 12:**

*Please produce pore volume (PV) maps and hydrocarbon pore volume (HCPV) maps of the Storage Reservoir, regardless of when compiled and regardless of whether created by Summit.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any.

Subject to and notwithstanding the objections, Summit states that, to the best of its knowledge, this information has not been created.

**REQUEST NO. 13:**

*Please produce all well logs (raw data plus processed and interpreted copies) from anywhere in or near the Storage Reservoir. Specially please produce the well logs in .las or other digital format, including any and all well logs utilized by Summit in developing its applications herein.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that the requested information has been submitted to the Commission and is publicly available via an open records request. Summit further states that, upon information and belief, Landowners have made an open records request to the Commission and are in receipt of the information requested in this Discovery Request.

**REQUEST NO. 14:**

*Please produce any databases, spreadsheets, or other documents containing porosity, permeability, saturation, and other rock properties such as (minerology, geomechanical properties etc) for the Storage Reservoir in original electronic format and, if available, in Excel spreadsheet format.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that the requested information has been submitted to the Commission and is publicly available via an open records request. Summit further states that, upon information and belief, Landowners have made an open records request to the Commission and are in receipt of the information requested in this Discovery Request.

**REQUEST NO. 15:**

*Please produce water chemistry and any other liquid or solid sampling data for water or other substances in the Storage Reservoir. Please include any gas solubility testing that was performed on the water samples for CO2 or injected gas stream.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that the requested information has been submitted to the Commission and is publicly available via an open records request. Summit further states that, upon information and belief, Landowners have made an open records request to the Commission and are in receipt of the information requested in this Discovery Request.

**REQUEST NO. 16:**

*Please produce all spreadsheets, databases, and other documents or compilations containing reservoir pressure data for the Storage Reservoir, including but not limited to all bottom hole pressure data, surface pressure data, and fluid level measurements. If a spreadsheet is not available, then please produce all Documents containing this information.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that the requested information has been submitted to the Commission and is publicly available via an open records request. Summit further states that, upon information and belief, Landowners have made an open records request to the Commission and are in receipt of the information requested in this Discovery Request.

**REQUEST NO. 17:**

*Please produce all relative permeability data for the Storage Reservoir, including core test information. If multiple cores have been tested, please produce all test data.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that the requested information has been submitted to the Commission and is publicly available via an open records request. Summit

further states that, upon information and belief, Landowners have made an open records request to the Commission and are in receipt of the information requested in this Discovery Request.

**REQUEST NO. 18:**

*Please produce all capillary pressure data for all cores tested in the Storage Reservoir.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that the requested information has been submitted to the Commission and is publicly available via an open records request. Summit further states that, upon information and belief, Landowners have made an open records request to the Commission and are in receipt of the information requested in this Discovery Request.

**REQUEST NO. 19:**

*Please produce all routine core analysis data for the Storage Reservoir.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that the requested information has been submitted to the Commission (Core Library) and is publicly available via an open records request. Summit further states that, upon information and belief, Landowners have made an open

records request to the Commission and are in receipt of the information requested in this Discovery Request.

**REQUEST NO. 20:**

*Please produce all spreadsheets of reservoir temperature data in the Storage Reservoir, including spreadsheets indexing reservoir temperature data to well name and API number. If this information is not available in spreadsheet format, then please produce all Documents containing this information.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that the requested information has been submitted to the Commission and is publicly available via an open records request. Summit further states that, upon information and belief, Landowners have made an open records request to the Commission and are in receipt of the information requested in this Discovery Request.

**REQUEST NO. 21:**

*Please produce all written interpretations of micro-seismic data obtained from the Storage Reservoir.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence

for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states they have not created any micro seismic data and thus have not produced any written interpretations thereof.

**AS TO OBJECTIONS TO THE AMENDED INTERROGATORIES AND REQUEST FOR PRODUCTION OF DOCUMENTS (SET 1) FROM INTERVENOR LANDOWNERS:**

Dated this 1st day of July, 2024.

FREDRIKSON & BYRON, P.A.

By: _____

LAWRENCE BENDER, ND Bar #03908
304 East Front Avenue, Suite 400
Bismarck, ND 58504
(701) 221-8700
lbender@fredlaw.com

*Attorneys for Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC*

#82909475v1

**AS TO ANSWERS TO THE AMENDED INTERROGATORIES AND REQUEST FOR PRODUCTION OF DOCUMENTS (SET 1) FROM INTERVENOR LANDOWNERS:**

Summit Carbon Storage #1, LLC
Summit Carbon Storage #2, LLC
Summit Carbon Storage #3, LLC

By: _____
Wade Boeshans
Its: Executive Vice President

Subscribed and sworn to before me
this 1st day of July, 2024.

_____

My commission expires:_____

ESTEE CARR
Notary Public
State of North Dakota
My Commission Expires Sept. 14, 2027

**BEFORE THE INDUSTRIAL COMMISSION**
**OF THE STATE OF NORTH DAKOTA**

**CASE NOS. 30869–30880**

**In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1,**

**11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by**

**nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of**

**carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the**

**geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## RESPONSE OF APPLICANTS TO INTERVENORS' LANDOWNERS' AMENDED INTERROGATORIES AND REQUEST FOR PRODUCTION OF DOCUMENTS (SET 2)

Applicants Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC (collectively, "Summit"), by and through their counsel, Lawrence Bender, Fredrikson & Byron, P.A., 304 East Front Avenue, Suite 400, Bismarck, ND 58504-5639, respond to the Amended Interrogatories and Request for Production of Documents (Set 2) submitted by The Swenson Living Trust; Michael Bauman, Glenn and Lisa Gerving, Michael and Bonnie Haupt, John Jochim, Kevin and Kimberly Kraft, Charmayne Liebelt, Kirk

and Linda Maize and Allen Maize, Paul and Christy Metz, JoLene M. Rust, and Gary and Cassie Smith (collectively, "Landowners") on May 31, 2024 in the above-captioned proceedings (each a "Discovery Request" and collectively, the "Discovery Requests"). Summit's response is made without waiving or intending to waive any objection as to relevance, privilege, or admissibility of any information provided in response to the Discovery Requests in any subsequent proceeding of this or any other action on any ground. A partial answer to any Discovery Request that has been objected to, in whole or in part, is not intended to be a waiver of the objection. By responding to the Discovery Requests, Summit is not admitting that any aspect of the Discover Requests is factually accurate or relevant to this proceeding.

## GLOBAL OBJECTIONS

The following Global Objections apply to each of the Discovery Requests—even if not separately restated below in response to a particular Discovery Request.

Summit objects to all Discovery Requests to the extent they seek the discovery of documents which are privileged for the reasons that they (a) are subject to the attorney-client privilege; (b) are covered by the "work product" doctrine; and/or (c) were prepared in anticipation of litigation or for trial by or for Summit or its representatives, including its employees, consultants, or agents.

Summit objects to all Discovery Requests to the extent they are beyond the scope of discovery allowed pursuant to Rules 26, 33, 34, and 36 of the North Dakota Rules of Civil Procedure.

Summit objects to all Discovery Requests to the extent they seek identification or production of "all documents" of a particular description. It is impossible to guarantee that all such documents have been identified or located. Summit states, however, that in response to these

requests, it has made a diligent search of records kept in the ordinary course of business in those locations likely to contain relevant information.

Summit objects to the Landowners' definitions and instructions to the extent such definitions and instructions exceed or are inconsistent with the requirements imposed upon Summit under the North Dakota Rules of Civil Procedure or Chapter 28-32 of the North Dakota Century Code.

Summit objects to the Discovery Requests because they are unduly burdensome and disproportionate to the needs of this proceeding because they seek irrelevant information.

Summit objects inasmuch as the Discovery Requests seek information relating to anything other than Summit's sequestration facilities in North Dakota. Only Summit's North Dakota sequestration facilities are covered by its applications in this proceeding.

Summit objects inasmuch as the Discovery Requests seek information that contains proprietary or confidential business information or is subject to trade-secret protections or that contains information for which Summit owes a third party an obligation of confidentiality or privacy, whether contractual or under any federal or state laws or regulations.

Summit objects to all Discovery Requests that seek, and disclaims any obligation to identify or furnish, documents or information that the Landowners actually or constructively possesses or to which the Landowners have access through alternative means.

Summit objects inasmuch as the Discovery Requests seek information from third parties and information that is not within Summit's possession, custody, control, or personal knowledge of Summit.

Summit objects and responds to the Discovery Requests based upon information and documents available as of the date hereof and reserves the right to supplement and amend the responses.

Subject to the foregoing objections and conditions, and subject to the specific additional objections made with respect to each request, Summit responds to the Landowners' Discovery Requests as follows:

## RESPONSE TO INTERROGATORIES

**INTERROGATORY NO. 1:**

*Identify all software programs necessary to open or run or execute any electronic files that are themselves responsive to or which contain data and information responsive to any of Landowners written interrogatories or requests for production of documents. Please exclude from your answer any software programs needed to open files with the following extensions: .doc, .docx, .pdf, .xlsx, .csv, .eml, .msg, as well as common audio-visual file types that can be opened with freely-available software such as .jpg/.jpeg, .tiff, and .mp4 files.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that the following software programs may be necessary to open, run, or execute the specified electronic files: Petrel Geoscience Core, Petrel Well Correlation, Ikon/RokDoc, GEM MAX, Builder, Results, CMOST, Kappa, S&P

Global/Kingdom, Techlog Base, Pore Pressure Prediction, Wellbore Stability, Quanti.Elan, Quanti, Techlog Python, TechData Plus, TechStat, Wellbore Imaging.

**INTERROGATORY NO. 2:**

*State whether Summit possesses documents related to any exchange of valuable consideration (including but not limited to monetary compensation even if nominal) for the right to use or damage the pore space of a property.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that it has used a pore space lease for the right to utilize pore space and that such document provides for valuable consideration in exchange for such right.

**INTERROGATORY NO. 3:**

*Describe how Summit determined the amounts it paid to property owners for use of or damage to their pore space for its activities related to Summit's applications.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any.

Subject to and notwithstanding the objections, Summit states that it provided testimony responsive to this Discovery Request at the hearing on the above-captioned cases.

**INTERROGATORY NO. 4:**

*State the amounts that Summit has paid to property owners for use of or damage to pore space for injections of CO2.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that it provided testimony responsive to this Discovery Request at the hearing on the above-captioned cases.

**INTERROGATORY NO. 5:**

*State how Summit determines if a property owner has been "equitably compensated" as that phrase is used in N.D.C.C. § 38-22-08(14), and what criteria it uses to make this determination.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that it provided testimony responsive to this Discovery Request at the hearing on the above-captioned cases.

**INTERROGATORY NO. 6:**

Identify the factual basis in Summit's applications or the materials submitted in support of Summit's applications that might support or that Summit will use to support a finding that property owners have been "equitably compensated" as that phrase is used in N.D.C.C. § 38-22-08(14).

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that it provided testimony responsive to this Discovery Request at the hearing on the above-captioned cases.

**INTERROGATORY NO. 7:**

*Identify the factual basis in any documents or information sources other than Summit's applications that might support or that Summit will use to support a finding that property owners have been "equitably compensated" as that phrase is used in N.D.C.C. § 38-22-08(14).*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that it provided testimony responsive to this Discovery Request at the hearing on the above-captioned cases.

**INTERROGATORY NO. 8:**

*Identify the sections of Summit's applications that support a finding that "[t]hat the proposed storage facility will not adversely affect surface waters or formations containing fresh water" as is stated at N.D.C.C. § 38-22-08(7). If Summit claims that any documents or information outside of Summit's applications support such a finding, identify those documents and information.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that it provided testimony responsive to this Discovery Request at the hearing on the above-captioned cases and that most sections of Summit's applications relate to the secure storage of $CO_2$ in the Broom Creek Formation and the protection of underground sources of drinking water.

**INTERROGATORY NO. 9:**

*Identify the source of any carbon dioxide that will be injected pursuant to Summit's applications that is created or produced or originates in North Dakota.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that it provided testimony responsive

to this Discovery Request at the hearing on the above-captioned cases, i.e., the Tharaldson Ethanol Plant is currently the only contracted source of carbon dioxide originating in North Dakota.

**RESPONSE TO REQUESTS FOR PRODUCTION**

**REQUEST NO. 1:**

*Please produce all agreements for use of or damage to the pore space of any property that are in your possession.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that a copy of the pore space lease is attached as Exhibit D to the Storage Facility Agreement submitted as part of its applications in the above-captioned cases.

**REQUEST NO. 2:**

*Without limiting the generality of Request No. 1, please produce all agreements that might support or that Summit will use to support a finding "[t]hat the storage operator has obtained the consent of persons who own at least sixty percent of the storage reservoir's pore space" as required by N.D.C.C. § 38-22-08(5).*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence

for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that it provided documents and testimony responsive to this Discovery Request at the hearing on the above-captioned cases, i.e., Summit Exhibits 5A, 5B and 5C.

**REQUEST NO. 3:**

*Without limiting the generality of Request No. 1, produce all agreements that might support or that Summit will use to support a finding that "all nonconsenting pore space owners are or will be equitably compensated" as stated in N.D.C.C. § 38-22-08(14).*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that it provided documents and testimony responsive to this Discovery Request at the hearing on the above-captioned cases, i.e., the Storage Agreement and pore pace lease.

**REQUEST NO. 4:**

*Please produce all documents containing data or information indicating or indicative of market values for any rights associated with the use of or damage to a property's pore space.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence

for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that it provided documents and testimony responsive to this Discovery Request at the hearing on the above-captioned cases, i.e., the compensation paid under the pore pace lease and negotiations with hundreds of pore space owners.

**REQUEST NO. 5:**

*Without limiting the generality of the foregoing requests, please produce all agreements for use of or damage to any surface estate necessary for Summit to complete construction of the facilities described in Summit's applications, including but not limited to its injections wells (but for clarification not those agreements necessary for the interstate transmission line subject to siting proceedings before the ND Public Service Commission).*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that it provided documents and testimony responsive to this Discovery Request at the hearing on the above-captioned cases, i.e., the pore pace lease.

**REQUEST NO. 6:**

*Please produce all correspondence related to Summit's applications between Summit and the North Dakota Industrial Commission and its Department of Mineral Resources and its Oil and Gas Division (collectively "NDIC") and any authorized agents of the NDIC, and all*

*correspondence between your authorized agents and the NDIC (including any individuals copied on or submitting Summit's applications) related to Summit's applications.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit also objects to this Discovery Request because it is overly broad in that it requests "all correspondence" and because the Discovery Request is unduly burdensome at this late stage in the proceedings. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that the requested information is on file with the Commission and is publicly available via an open records request.

**AS TO OBJECTIONS TO THE AMENDED INTERROGATORIES AND REQUEST FOR PRODUCTION OF DOCUMENTS (SET 2) FROM INTERVENOR LANDOWNERS:**

Dated this 1st day of July, 2024.

FREDRIKSON & BYRON, P.A.

By: _____

LAWRENCE BENDER, ND Bar #03908
304 East Front Avenue, Suite 400
Bismarck, ND 58504
(701) 221-8700
lbender@fredlaw.com

*Attorneys for Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC*

#82910929v1

**AS TO ANSWERS TO THE AMENDED INTERROGATORIES AND REQUEST FOR PRODUCTION OF DOCUMENTS (SET 2) FROM INTERVENOR LANDOWNERS:**

Summit Carbon Storage #1, LLC
Summit Carbon Storage #2, LLC
Summit Carbon Storage #3, LLC

By: _____
Wade Boeshans
Its: Executive Vice President

Subscribed and sworn to before me this 1st day of July, 2024.

_____

My commission expires:_____

ESTEE CARR
Notary Public
State of North Dakota
My Commission Expires Sept. 14, 2027

**BEFORE THE INDUSTRIAL COMMISSION**
**OF THE STATE OF NORTH DAKOTA**

**CASE NOS. 30869–30880**

**In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1,**

**11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by**

**nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of**

**carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the**

**geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## RESPONSE OF APPLICANTS TO INTERVENOR LANDOWNERS' AMENDED INTERROGATORIES AND REQUEST FOR PRODUCTION OF DOCUMENTS (SET 3)

Applicants Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC (collectively, "Summit"), by and through their counsel, Lawrence Bender, Fredrikson & Byron, P.A., 304 East Front Avenue, Suite 400, Bismarck, ND 58504-5639, respond to the Amended Interrogatories and Request for Production of Documents (Set 3) submitted by The Swenson Living Trust; Michael Bauman, Glenn and Lisa Gerving, Michael and Bonnie Haupt, John Jochim, Kevin and Kimberly Kraft, Charmayne Liebelt, Kirk

and Linda Maize and Allen Maize, Paul and Christy Metz, JoLene M. Rust, and Gary and Cassie Smith (collectively, "Landowners") on May 31, 2024 in the above-captioned proceedings (each a "Discovery Request" and collectively, the "Discovery Requests"). Summit's response is made without waiving or intending to waive any objection as to relevance, privilege, or admissibility of any information provided in response to the Discovery Requests in any subsequent proceeding of this or any other action on any ground. A partial answer to any Discovery Request that has been objected to, in whole or in part, is not intended to be a waiver of the objection. By responding to the Discovery Requests, Summit is not admitting that any aspect of the Discover Requests is factually accurate or relevant to this proceeding.

## GLOBAL OBJECTIONS

The following Global Objections apply to each of the Discovery Requests—even if not separately restated below in response to a particular Discovery Request.

Summit objects to all Discovery Requests to the extent they seek the discovery of documents which are privileged for the reasons that they (a) are subject to the attorney-client privilege; (b) are covered by the "work product" doctrine; and/or (c) were prepared in anticipation of litigation or for trial by or for Summit or its representatives, including its employees, consultants, or agents.

Summit objects to all Discovery Requests to the extent they are beyond the scope of discovery allowed pursuant to Rules 26, 33, 34, and 36 of the North Dakota Rules of Civil Procedure.

Summit objects to all Discovery Requests to the extent they seek identification or production of "all documents" of a particular description. It is impossible to guarantee that all such documents have been identified or located. Summit states, however, that in response to these

requests, it has made a diligent search of records kept in the ordinary course of business in those locations likely to contain relevant information.

Summit objects to the Landowners' definitions and instructions to the extent such definitions and instructions exceed or are inconsistent with the requirements imposed upon Summit under the North Dakota Rules of Civil Procedure or Chapter 28-32 of the North Dakota Century Code.

Summit objects to the Discovery Requests because they are unduly burdensome and disproportionate to the needs of this proceeding because they seek irrelevant information.

Summit objects inasmuch as the Discovery Requests seek information relating to anything other than Summit's sequestration facilities in North Dakota. Only Summit's North Dakota sequestration facilities are covered by its applications in this proceeding.

Summit objects inasmuch as the Discovery Requests seek information that contains proprietary or confidential business information or is subject to trade-secret protections or that contains information for which Summit owes a third party an obligation of confidentiality or privacy, whether contractual or under any federal or state laws or regulations.

Summit objects to all Discovery Requests that seek, and disclaims any obligation to identify or furnish, documents or information that the Landowners actually or constructively possesses or to which the Landowners have access through alternative means.

Summit objects inasmuch as the Discovery Requests seek information from third parties and information that is not within Summit's possession, custody, control, or personal knowledge of Summit.

Summit objects and responds to the Discovery Requests based upon information and documents available as of the date hereof and reserves the right to supplement and amend the responses.

Subject to the foregoing objections and conditions, and subject to the specific additional objections made with respect to each request, Summit responds to the Landowners' Discovery Requests as follows:

**RESPONSE TO INTERROGATORIES**

**INTERROGATORY NO. 1:**

*For any installed CO2 pressure relief devices or CO2 vent systems or other mechanical devices designed for relieving pressure from a pipe, at any of the surface facilities constructed for purposes of Summit's applications, please provide the following:*

*a. Rated capacity of each device or system;*

*b. Quantity of each device or system;*

*c. Discharge pipe size(s);*

*d. Discharge pipe outlet(s) direction (vertical or horizontal); and*

*e. If horizontal, state the direction of discharge.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit further objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Subject to and notwithstanding the objections, Summit states that it provided testimony responsive to this Discovery Request at the hearing on the above-captioned cases.

## RESPONSE TO REQUESTS FOR PRODUCTION

**REQUEST FOR PRODUCTION NO. 1:**

*Please produce any above-ground vapor dispersion modeling results such as from any engineered pressure relief systems, including all data and input files and load files. Without limiting the generality of the forgoing, specifically provide all data inputs for the following: weather conditions modeled, topography assumptions modeled, flow rate of CO2 over time, total quantity of CO2 released and total time of release modeled, and predicted CO2 concentrations at any public receptors such as roads, buildings, and dwellings.*

**RESPONSE:**

Summit incorporates by reference its Global Objections set forth above. Summit also objects to this Discovery Request because the hearing on the above-captioned cases has taken place and a response to this Discovery Request will not lead to admission of additional relevant evidence for the Commission to consider, nor will it become part of the official record on an appeal, if any. Summit further objects to this Discovery Request because it seeks confidential information that has been deemed a "security system plan" exempt for open record requests pursuant to N.D.C.C. § 44-04-24 and subject to a protective order issued by the North Dakota Public Service Commission. *See* Docket No. 364, Case No. PU-22-391.

**AS TO OBJECTIONS TO THE AMENDED INTERROGATORIES AND REQUEST FOR PRODUCTION OF DOCUMENTS (SET 3) FROM INTERVENOR LANDOWNERS:**

Dated this 1st day of July, 2024.

FREDRIKSON & BYRON, P.A.

By: _____

LAWRENCE BENDER, ND Bar #03908
304 East Front Avenue, Suite 400
Bismarck, ND 58504
(701) 221-8700
lbender@fredlaw.com

*Attorneys for Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC*

#82913300v1

**AS TO ANSWERS TO THE AMENDED INTERROGATORIES AND REQUEST FOR PRODUCTION OF DOCUMENTS (SET 3) FROM INTERVENOR LANDOWNERS:**

Summit Carbon Storage #1, LLC
Summit Carbon Storage #2, LLC
Summit Carbon Storage #3, LLC

By: _____
Wade Boeshans
Its: Executive Vice President

Subscribed and sworn to before me
this 1st day of July, 2024.

_____

My commission expires:_____

ESTEE CARR
Notary Public
State of North Dakota
My Commission Expires Sept. 14, 2027

**BEFORE THE INDUSTRIAL COMMISSION**
**OF THE STATE OF NORTH DAKOTA**

**CASE NOS. 30869–30880**

**In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1,**

**11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by**

**nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of**

**carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the**

**Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## CERTIFICATE OF SERVICE

[¶ 1] I, the undersigned, hereby certify that a true and correct copy of the following documents:

1. Response of Applicants to Intervenors' Landowners' Amended Interrogatories and Request for Production of Documents (Set 1);
2. Response of Applicants to Intervenors' Landowners' Amended Interrogatories and Request for Production of Documents (Set 2); and
3. Response of Applicants to Intervenor Landowners' Amended Interrogatories and Request for Production of Documents (Set 3).

were, on July 1, 2024, served upon the following via electronic mail:

Derrick Braaten
derrick@braatenlawfirm.com

Dated this 1st day of July, 2024.

By: _____

Lawrence Bender (#03908)
lbender@fredlaw.com
**FREDRIKSON & BYRON, P.A.**
304 East Front Avenue, Suite 400
Bismarck, ND 58504
(701) 221-8700
*Attorneys for Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC and Summit Carbon Storage #3, LLC*

#82972464v1

**NORTH DAKOTA INDUSTRIAL COMMISSION**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case No(s). 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

---

## DECLARATION OF SERVICE

---

[¶1] I hereby certify that true and correct copies of the following documents:

- **Intervenor Landowners' Reply to Petition for Reconsideration of Denial of Motion to Continue Hearing;**
- **Supplemental Declaration of Derrick Braaten in Support of Petition for Reconsideration of Denial of Motion to Continue Hearing;**
- **Exhibit A – email sent by Michael Ziesch on May 21, 2024;**
- **Exhibit B – email sent by Michael Ziesch on September 22, 2023;**
- **Exhibit C - Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC's responses to Intervenor Landowners discovery requests set 1, 2, and 3; and**
- **Declaration of Service.**

were, on the 18th day of July, 2024 sent via electronic mail to the following:

North Dakota Industrial Commission
oilandgasinfo@nd.gov
slforsberg@nd.gov

Mark Bohrer
mbohrer@nd.gov

Lawrence Bender
Attorney at Law
lbender@fredlaw.com

Tyler Gludt
Attorney at Law
TGludt@fredlaw.com

Thomas Throne
Attorney at Law
tthrone@thronelaw.com

Joshua Swanson
Attorney for Intervenor Minnkota
jswanson@vogellaw.com

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on this 18th day of July, 2024 at Bismarck, North Dakota.

Desirae Zaste

| | |
|---|---|
| **From:** | Entzi-Odden, Lyn |
| **To:** | Bohrer, Mark F.; Garner, David P.; derrick@braatenlawfirm.com; Joshua A. Swanson |
| **Cc:** | Forsberg, Sara L.; Knutson, Amy N.; Bender, Lawrence; Gludt, Tyler; Hughes, Bethany; Etter, Mary |
| **Subject:** | Summit Carbon Solutions - NDIC Case Nos. 30869-30880 |
| **Date:** | Friday, July 12, 2024 2:49:39 PM |
| **Attachments:** | image002.png<br>Summit - Response to Landowner Intervenors" Petition.pdf<br>Summit - Declaration.pdf<br>Summit - Certificate of Service.pdf |

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Please find attached herewith the following documents for filing with regard to the above-captioned matters:

1. Response to Landowner Intervenors' Petition for Reconsideration of Denial of Motion to Continue Hearing;
2. Declaration of Lawrence Bender in Support of Summit's Response to Landowner Intervenors' Petition for Reconsideration of Denial of Motion to Continue Hearing; and
3. Certificate of Service

Thank you.

Fredrikson

**Lyn Entzi-Odden**
**Office Administrator / Executive Legal Assistant**
304 East Front Avenue | Suite 400 | Bismarck, ND 58501
Ph: 701.221.8741|lodden@fredlaw.com
***Fredrikson's Bismarck office has moved, please note our new address.***

****This is a transmission from the law firm of Fredrikson & Byron, P.A. and may contain information which is privileged, confidential, and protected by the attorney-client or attorney work product privileges. If you are not the addressee, note that any disclosure, copying, distribution, or use of the contents of this message is prohibited. If you have received this transmission in error, please destroy it and notify us immediately at our telephone number (701) 221-8700. The name and biographical data provided above are for informational purposes only and are not intended to be a signature or other indication of an intent by the sender to authenticate the contents of this electronic message.****

**BEFORE THE INDUSTRIAL COMMISSION**
**OF THE STATE OF NORTH DAKOTA**

**CASE NOS. 30869–30880**

**In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1,**

**11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by**

**nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of**

**carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the**

**geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## RESPONSE TO LANDOWNER INTERVENORS' PETITION FOR RECONSIDERATION OF DENIAL OF MOTION TO CONTINUE HEARING

[¶ 1] Applicants Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC (collectively, "Summit") submit this brief in response to the Petition for Reconsideration of Denial of Motion to Continue Hearing ("Petition") filed with the

North Dakota Industrial Commission ("Commission") on July 2, 2024 by the Landowner Intervenors.[1] For the reasons explained below, the Commission should deny the Petition.

## FACTS

[¶ 2] On June 9, 2023, Summit commenced this case by filing three separate initial draft applications (collectively, the "Applications") with the Commission requesting permits for the geologic storage of carbon dioxide. *See* Declaration of Jeff Skarre in Support of Summit's April 30, 2024 Response to Motion for Continuance ("Skaare Decl."), ¶ 4.

[¶ 3] On February 8, 2024, the Commission notified Summit that each of the applications were complete and had been sent to the North Dakota Department of Environmental Quality for review. *Id.* ¶ 5.

[¶ 4] On April 15, 2024, the Commission issued a notice of hearing for the above-captioned cases to be held on June 11 and June 12, 2024 at 9:00 a.m.

[¶ 5] On April 25, 2024, before they were parties to this case, Landowner Intervenors filed a motion to the continue the hearing on the above-captioned cases to a later date so that the Landowner Intervenors had the opportunity to conduct discovery.

[¶ 6] On June 7, 2024, the Commission denied Landowner Intervenors' motion to continue for two reasons. *See* Order Mot. Expedited Disc. and Mot. Continuance Hr'g ¶ 8. First, Landowner Intervenors only "offered conclusory statements regarding [their] need for discovery in support of [their] motion." *Id.* at ¶ 5. Second, Landowner Intervenors "did not contact Summit

[1] Landowner Intervenors are the Swenson Living Trust, Michael Bauman, Glenn and Lisa Gerving, Michael and Bonnie Haupt, John Jochim, Kevin and Kimberly Kraft, Charmayne Liebelt, Kirk and Linda Maize and Allen Maize, Paul and Christy Metz, JoLene M. Rust, and Gary and Cassie Smith.

for the purpose of obtaining a stipulated agreement before seeking a continuance as required by [N.D.A.C.] § 98-02-03-07." *Id.* at ¶ 7.[2]

[¶ 7] The hearing was held on June 11, 12 and 13 of 2024. *See* Hr'g Recording.[3] At the conclusion of the hearing, Landowner Intervenors renewed their motion to continue the hearing. *Id.* at 4:06:55 – 4:07:05 ("I move once again to continue this hearing until a later date."). The Commission denied the motion once again. *Id.* at 4:07:27 – 4:07:28.

[¶ 8] Counsel for Landowner Intervenors conducted extensive cross-examination of Summit's witnesses at the hearing. *See* Hr'g Recording.

[¶ 9] Landowner Intervenors were afforded the opportunity to call their own witnesses at the hearing and did so. *Id.*

[¶ 10] The expert witnesses hired by Landowner Intervenors each testified that they had not been retained by Landowner Intervenors until approximately a month prior to the June 11, 12 and 13, 2024 hearings on the above-captioned matters. *Id.*

[¶ 11] On May 15, 2024, counsel for Landowner Intervenors, Mr. Braaten, made an open records request to the Commission requesting the same or similar information it sought to obtain from Summit through discovery. *See* Landowner Intervenors' Exhibit LO-83 (May 15, 2024 letter from D. Braaten).

[¶ 12] The Commission's response to Mr. Braaten's open records request indicates that the requested information was either (i) previously provided to Mr. Braaten in the Commission's September 21, 2023 response to Mr. Braaten's initial open records request, (ii) not in the Commission's possession, or (iii) available via the Commission's website. Declaration of

---

[2] Section 98-02-03-07, N.D.A.C., states that "[a] party seeking a continuance shall first contact the other parties for the purpose of obtaining a stipulated agreement."

[3] The recording of the hearing in this matter can be accessed using the following hyperlink: https://www.youtube.com/watch?v=LYaG0DKeAe0&t=1643s.

Lawrence Bender in Support of Summit's Response to Landowner Intervenors' Petition for Reconsideration of Denial of Motion to Continue Hearing ("Bender Decl.") ¶ 4.

[¶ 13] On or about September 21, 2023, the Commission responded to an open records request made by counsel for Landowner Intervenors in or around September of 2023. *Id.* ¶ 5.

[¶ 14] By virtue of the Commission's September 21, 2023 response to Mr. Braaten's open records request in or around September of 2023, Landowner Intervenors have been in possession of most, if not all of the information sought through Mr. Braaten's May 15, 2024 open records request since September of 2023, or, in the alternative, had access to such information via the Commission's website. *Id.* ¶ 7.

[¶ 15] On July 1, 2024, Summit timely responded to Sets 1, 2 and 3 of Landowner Intervenors' Amended Interrogatories and Request for Production of Documents (the "Discovery Requests"). *Id.* ¶ 8.

[¶ 16] As indicated in Summit's July 1, 2024 responses to Landowner Intervenors' Discovery Requests, most, if not all, of the information requested by said Discovery Requests was either (i) provided in Summit's responses thereto, (ii) obtained by Landowner Intervenors during the course of the hearings on the above-captioned cases, (iii) available to Landowner Intervenors via an open records request to the Commission, and/or (iv) in Landowner Intervenors' possession as a result an open records request made by Landowner Intervenors to the Commission. *Id.* ¶ 9.

[¶ 17] Some of Landowner Intervenors' Discovery Requests were for information which was subject to license or other restrictions on dissemination to third parties and Summit was prohibited from providing Landowner Intervenors with such information. *Id.* ¶ 10.

[¶ 18] By virtue of the Commission's September 21, 2023 response to Mr. Braaten's initial open records request in or around September of 2023, Landowner Intervenors have been in

possession of most, if not all of the information they sought through their Discovery Requests to Summit in the above-captioned proceedings since September of 2023, or, in the alternative, had access to such information via the Commission's website. *Id.* ¶ 11. Yet, as set forth above, Landowner Intervenors did not retain any experts in this case until approximately one month prior to the June 2024 hearings.

[¶ 19] In addition to his September 2023 and May 2024 open records requests to the Commission, Mr. Braaten made at least one more open records request to the Commission in March of 2024. *Id.* ¶ 6.

[¶ 20] Landowner Intervenors have now filed the Petition requesting that the Commission reconsider its denial of their motion to continue the hearing. *See* Pet. Recons. Den. Mot. Continue Hr'g. In support of their Petition, Landowner Intervenors accuse the Commission of "very openly and explicitly stym[ying] any semblance of due process for the Landowners." *Id.*

[¶ 21] At the time of the filing of this response, the Commission has not issued a final order on Summit's Applications.

## ARGUMENT

[¶ 22] There are many reasons why the Commission should deny Landowner Intervenors' Petition. In addition to the reasons set forth below, the Landowner Intervenors had ample opportunity to seek the information it sought through their Discovery Requests (interrogatories, requests for production and depositions) by making an open records request to the Commission and through cross-examination of Summit's witnesses at the June 11–13, 2024 hearing. The Landowner Intervenors did both, thus rendering the discovery it sought moot. Nevertheless, the Petition should be denied for the following reasons.

[¶ 23] First, the Commission does not have the authority to reconsider its denial of Landowner Intervenors' original motion. The North Dakota Legislature has only granted the Commission the authority to reconsider its "final orders." *See* N.D.C.C. § 28-32-40. The Commission's previous order and ruling denying Landowner Intervenors' motions for a continuance are "procedural orders" that "[are] not a final order." N.D.C.C. § 28-32-42(3). Accordingly, the Commission does not have the authority to reconsider its order and ruling denying Landowner Intervenors' motions for a continuance.

[¶ 24] Second, assuming, *arguendo*, that the Commission's denial of the Landowner Intervenors' motion to continue was a final order, the Landowner Intervenors' Petition is untimely. The Administrative Agencies Practice Act (N.D.C.C. § 28-32-01, et seq.) governs the Landowner Intervenors' Petition. Pursuant to N.D.C.C. § 28-32-40(1), a petition for reconsideration must be filed within fifteen days after notice of the of the final order. As set forth above, notice of the first order denying Landowner Intervenors' motion to continue was provided on June 7, 2024, and the second ruling denying Landowner Intervenors' motion to continue was made on June 13, 2024. In each case, more than fifteen days had passed since notice of the order and ruling were provided and the filing of Landowner Intervenors' Petition with the Commission.

[¶ 25] Third, assuming the Commission did have the authority to reconsider its order denying Landowner Intervenors' motion for a continuance, Landowner Intervenors have not provided a sufficient reason for the Commission to do so. Landowner Intervenors' Petition argues that the Commission should reconsider its order because a continuance is necessary to give Landowner Intervenors more time to conduct discovery. But the Commission already rejected this argument when it denied Landowner Intervenors' original motion. *See* Order Mot. Expedited Disc. and Mot. Continuance Hr'g ¶ 5 (stating that Landowner Intervenors "offered conclusory

statements regarding [their] need for discovery in support of [their] motion"). By making the same arguments the Commission has already rejected, Landowner Intervenors are simply asking the Commission to change its mind. This is not a sufficient reason for an agency to reconsider one of its previous orders. As explained by one court:

> [A]n agency ... may reconsider an action previously taken and come to a different conclusion upon a showing ... that some new or different factual situation exists that justifies the different conclusion. [But] [w]hat is not permitted is a 'mere change of mind' on the part of the agency.

*Maryland v. Exxon Mobil Corp.*, 569 F. Supp. 3d 273, 284 (D. Md. 2021)

[¶ 26] Fourth, it is not possible for the Commission to grant Landowner Intervenors the relief that they request in their Petition. Unlike other administrative agencies, the Commission does not have rules governing the re-opening of a proceeding[4], which is the relief the Landowner Intervenors are requesting, but not entitled to under the Commission's rules or the Administrative Agencies Practice Act. Therefore, Landowner Intervenors are seeking a continuance of the hearing in this matter. A continuance is "[t]he adjournment or postponement of a trial or other proceeding to a future date." *Continuance*, Black's Law Dictionary (12th ed. 2024). The hearing in this matter concluded on June 13, 2024 and cannot be postponed or adjourned to a future date.

[¶ 27] Fifth, before a party can request a continuance from an agency, the party must "first contact the other parties for the purpose of obtaining a stipulated agreement." N.D.A.C. § 98-02-03-07. Landowner Intervenors still have not contacted Summit for the purpose of obtaining a stipulated agreement.

[¶ 28] Sixth, the Commission "may not approve a continuance except for good cause shown." N.D.A.C. § 98-02-03-7. Landowner Intervenors have not even attempted to explain to the

---

[4] *See, e.g.*, N.D.A.C. § 69-02-06-01 ("At any time after the conclusion of a hearing, but before the final order is issued . . . any party may file a petition to reopen the proceeding for the purpose of taking additional evidence.")

Commission how there is a good cause for a continuance in this case other than to offer conclusory statements regarding the need for discovery and denial of due-process rights. However, Landowner Intervenors conveniently ignore the fact that most, if not all, of the information it sought through their Discovery Requests was either (i) provided to the Landowner Intervenors by the Commission in September of 2023, (ii) readily available to the Landowner Intervenors via the Commission's website well in advance of the June 11, 12 and 13 hearings, (iii) obtained by Landowner Intervenors through the course of the hearing on the above-captioned cases, or (iv) provided by Summit in its response to Landowner Intervenors' Discovery Requests. Furthermore, only the Landowner Intervenors are to blame for not engaging their expert witnesses earlier than a month prior to the hearings in these cases to evaluate the information provided to Landowner Intervenors by the Commission in September 2023 and/or the information available on the Commission's website. Landowner Intervenors also refuse to acknowledge the due process they were afforded by participating in the hearing as intervenors, conducting extensive cross-examination of Summit's witnesses, and calling their own witnesses.

[¶ 29] Finally, the Commission has not issued a final order on Summit's Applications nor any order regarding amalgamation of pore space. Accordingly, the Landowner Intervenors' due process arguments are not ripe unless and until such a final order affecting their property rights has been issued.

## CONCLUSION

[¶ 30] For the foregoing reasons, the Commission should deny Landowner Intervenors' Petition.

Dated this 12th day of July, 2024.

By: _____

Lawrence Bender (#03908)
Tyler J. Gludt (#06587)
lbender@fredlaw.com
tgludt@fredlaw.com
**FREDRIKSON & BYRON, P.A.**
304 East Front Avenue, Suite 400
Bismarck, ND 58504
(701) 221-8700

*Attorneys for Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC and Summit Carbon Storage #3, LLC*

#83033604v1

**BEFORE THE INDUSTRIAL COMMISSION**
**OF THE STATE OF NORTH DAKOTA**

**CASE NOS. 30869–30880**

**In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1,**

**11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by**

**nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of**

**carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the**

**geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## DECLARATION OF LAWRENCE BENDER IN SUPPORT OF SUMMIT'S RESPONSE TO LANDOWNER INTERVENORS' PETITION FOR RECONSIDERATION OF DENIAL OF MOTION TO CONTINUE HEARING

STATE OF NORTH DAKOTA )
) ss:
COUNTY OF BURLEIGH )

Lawrence Bender, being first duly sworn upon oath, states and alleges as follows:

[¶ 1] I am counsel for the above-named applicants Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC (collectively, "Summit"). In that capacity I am familiar with and have personal knowledge of the facts set forth below.

[¶ 2] On June 25, 2024, I submitted an open records request to the North Dakota Industrial Commission, Department of Mineral Resources, Oil and Gas Division (the "Commission"), requesting that the Commission provide copies of the information it provided to Mr. Derrick Braaten in response to Mr. Braaten's May 15, 2024 open records request to the Commission.

[¶ 3] On or about July 10, 2024, the Commission responded to my June 25, 2024 open records request with the Commission's e-mail response to Mr. Braaten's May 15, 2024 open records request.

[¶ 4] The Commission's e-mail response to Mr. Braaten's May 15, 2024 open records request indicates that the requested information was either (i) provided to Mr. Braaten in the Commission's September 21, 2023 response to Mr. Braaten's initial open records request, (ii) not in Commission's possession, or (iii) available via the Commission's website.

[¶ 5] On or about July 10, 2024, the Commission responded to my June 25, 2024 open records request with information provided to Mr. Braaten by the Commission on or about September 21, 2023 in response to an open records request made by Mr. Braaten in or around September of 2023.

[¶ 6] On or about July 10, 2024, in response to my June 25, 2024 open records request, the Commission also provided e-mail correspondence indicating that Mr. Braaten had made an additional open records request in March of 2024.

[¶ 7] A review of the information provided to Mr. Braaten in September of 2023, and the Commission's response to Mr. Braaten's May 15, 2024 open records request, indicates that Mr. Braaten had access to most, if not all, of the information he sought through his May 15, 2024 open records request, or, in the alternative, had access to such information via the Commission's website.

[¶ 8] On July 1, 2024, Summit timely responded to Sets 1, 2 and 3 of Landowner Intervenors' Amended Interrogatories and Request for Production of Documents (the "Discovery Requests").

[¶ 9] As indicated in Summit's July 1, 2024 responses to Landowner Intervenors' Discovery Requests, most, if not all, of the information requested by said Discovery Requests was either (i) provided in Summit's responses thereto, (ii) obtained by Landowner Intervenors during the course of the hearings on the above-captioned cases, (iii) available to Landowner Intervenors via an open records request to the Commission, and/or (iv) in Landowner Intervenors possession as a result an open records request made by Landowner Intervenors to the Commission.

[¶ 10] Some of Landowner Intervenors' Discovery Requests were for information which was subject to license or other restrictions on dissemination to third parties and Summit did not provide Landowner Intervenors with such information.

[¶ 11] A review of the information provided to Mr. Braaten in September of 2023, and the Commission's response to Mr. Braaten's May 15, 2024 open records request, indicates and confirms that Mr. Braaten had access to most, if not all, of the information his clients sought through their Discovery Requests to Summit in the above-captioned proceedings, or, in the alternative, had access to such information via the Commission's website.

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on the 12th day of July, 2024, at Bismarck, North Dakota, USA.

By: _____

Lawrence Bender (#03908)
lbender@fredlaw.com
**FREDRIKSON & BYRON, P.A.**
304 East Front Avenue, Suite 400
Bismarck, ND 58504
(701) 221-8700

#83067996v1

**BEFORE THE INDUSTRIAL COMMISSION**
**OF THE STATE OF NORTH DAKOTA**

**CASE NOS. 30869–30880**

**In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1,**

**11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by**

**nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of**

**carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the**

**Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## CERTIFICATE OF SERVICE

[¶ 1] I, the undersigned, hereby certify that a true and correct copy of the following document:

1. Response to Landowner Intervenors' Petition for Reconsideration of Denial of Motion to Continue Hearing; and
2. Declaration of Lawrence Bender in Support of Summit's Response to Landowner Intervenors' Petition for Reconsideration of Denial of Motion to Continue Hearing.

were, on July 12, 2024, filed electronically with the North Dakota Industrial Commission and served upon the following via electronic mail:

Mark Bohrer
mbohrer@nd.gov

David Garner
dpgarner@nd.gov

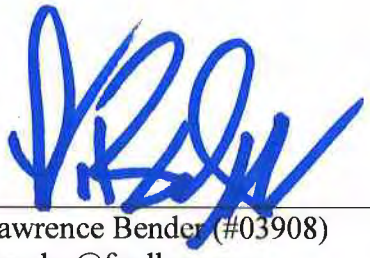
Sara Forsberg
slforsberg@nd.gov

Amy Knutson
anknutson@nd.gov

Derrick Braaten
derrick@braatenlawfirm.com

Joshua Swanson
jswanson@vogellaw.com

Dated this 12th day of July, 2024.

By: 

Lawrence Bender (#03908)
lbender@fredlaw.com
**FREDRIKSON & BYRON, P.A.**
304 East Front Avenue, Suite 400
Bismarck, ND 58504
(701) 221-8700
*Attorneys for Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC and Summit Carbon Storage #3, LLC*

#83084250v1

Fredrikson

Received
JUL 09 2024
ND Oil & Gas Division

**Fredrikson & Byron, P.A.**
Attorneys and Advisors

304 East Front Avenue, Suite 400
Bismarck, ND 58504-5639
Main: 701.221.8700
fredlaw.com

July 9, 2024

***HAND DELIVERED***

Ms. Sara Forsberg
North Dakota Industrial Commission
Oil and Gas Division
600 East Boulevard
Bismarck, North Dakota 58505-0310

**RE: CASE NOS. 30869 – 30880**
**Summit Carbon Solutions, LLC**

Dear Ms. Forsberg:

Please find enclosed herewith transcripts of the hearings held in the captioned matters on June 11 and 12, 2024. Should anyone contact the Commission and require additional copies, the court reporters can be reached as follows:

Emineth & Associates
216 N 2nd Street
Bismarck, ND 58501
701-255-3513

Lexitas Legal
711 North 11th Street
Saint Louis, MO 63101
888-893-3767

Should you have any questions, please advise.

Sincerely,

LAWRENCE BENDER

LB/leo
Enclosure

#83045147v1

**From:** Forsberg, Sara L.
**To:** Bender, Lawrence
**Cc:** Entzi-Odden, Lyn; Derrick Braaten; Hughes, Bethany
**Subject:** RE: Case Nos. 30869-30880 - Supplemental Filings
**Date:** Tuesday, July 9, 2024 1:54:00 PM

---

Lawrence,

Just a quick follow up on this, Commission staff has reviewed the supplemental information you submitted and have no other requests at this time.

Sara

---

**From:** Bender, Lawrence <LBender@fredlaw.com>
**Sent:** Tuesday, June 25, 2024 7:43 AM
**To:** Forsberg, Sara L. <slforsberg@nd.gov>
**Cc:** Entzi-Odden, Lyn <lodden@fredlaw.com>; Derrick Braaten <derrick@braatenlawfirm.com>; Hughes, Bethany <BHughes@fredlaw.com>; Bender, Lawrence <LBender@fredlaw.com>
**Subject:** RE: Case Nos. 30869-30880 - Supplemental Filings

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Thank you.

STAFF BIOGRAPHIES | PRACTICE AREAS | CONTACT US

Fredrikson

**Lawrence Bender**
**Attorney**

lbender@fredlaw.com

Main – 701-221-8700

**Fredrikson & Byron, P.A.**
304 East Front Avenue
Suite 400
Bismarck, ND 58504-5639

Biography | Download My Contact Info as V-Card

WWW.FREDLAW.COM

**This is a transmission from the law firm of Fredrikson & Byron, P.A. and may contain information which is privileged, confidential, and protected by the attorney-client or attorney work product privileges. If you are not the addressee, note that any disclosure, copying, distribution, or use of the contents of this message is prohibited. If you have received this transmission in error, please destroy it and notify us immediately at our telephone number (701) 221-8700.**

**Fredrikson's Bismarck office is moving.**

***Please note that as of March 25, 2024, our new address is:***

Fredrikson & Byron, P.A.
304 East Front Ave, Suite 400
Bismarck, ND 58504-5639
Main: 701.221.8700

**From:** Forsberg, Sara L. <slforsberg@nd.gov>
**Sent:** Tuesday, June 25, 2024 7:36 AM
**To:** Bender, Lawrence <LBender@fredlaw.com>
**Cc:** Entzi-Odden, Lyn <lodden@fredlaw.com>; Derrick Braaten <derrick@braatenlawfirm.com>; Hughes, Bethany <BHughes@fredlaw.com>
**Subject:** RE: Case Nos. 30869-30880 - Supplemental Filings

**CAUTION: EXTERNAL E-MAIL**

---

We did get an email from Bethany yesterday, I personally have not looked at it but did forward to the Summit "group".

---

**From:** Bender, Lawrence <LBender@fredlaw.com>
**Sent:** Tuesday, June 25, 2024 7:31 AM
**To:** Forsberg, Sara L. <slforsberg@nd.gov>
**Cc:** Entzi-Odden, Lyn <lodden@fredlaw.com>; Derrick Braaten <derrick@braatenlawfirm.com>; Bender, Lawrence <LBender@fredlaw.com>; Hughes, Bethany <BHughes@fredlaw.com>
**Subject:** RE: Case Nos. 30869-30880 - Supplemental Filings

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Sara:

I will look in to the items you set forth in your emails.

I did forward a letter to Mark which addressed the comments that the Commission received. You should have been provided a copy of the letter. Let me know if you have not.

STAFF BIOGRAPHIES | PRACTICE AREAS | CONTACT US

Fredrikson

Main – 701-221-8700

**Lawrence Bender**
**Attorney**

lbender@fredlaw.com

**Fredrikson & Byron, P.A.**
304 East Front Avenue
Suite 400
Bismarck, ND 58504-5639

Biography | Download My Contact Info as V-Card
WWW.FREDLAW.COM
**This is a transmission from the law firm of Fredrikson & Byron, P.A. and may contain information which is privileged, confidential, and protected by the attorney-client or attorney work product privileges. If you are not the addressee, note that any disclosure, copying, distribution, or use of the contents of this message is prohibited. If you have received this transmission in error, please destroy it and notify us immediately at our telephone number (701) 221-8700.**

**Fredrikson's Bismarck office is moving.**

***Please note that as of March 25, 2024, our new address is:***

Fredrikson & Byron, P.A.
304 East Front Ave, Suite 400
Bismarck, ND 58504-5639
Main: 701.221.8700

---

**From:** Forsberg, Sara L. <slforsberg@nd.gov>
**Sent:** Tuesday, June 25, 2024 7:27 AM
**To:** Bender, Lawrence <LBender@fredlaw.com>
**Cc:** Entzi-Odden, Lyn <lodden@fredlaw.com>; Derrick Braaten <derrick@braatenlawfirm.com>
**Subject:** FW: Case Nos. 30869-30880 - Supplemental Filings

**CAUTION: EXTERNAL E-MAIL**

---

Good Morning,

Please see the email below from Travis regarding additional information requested.

Thank you.
Sara

---

**From:** Stolldorf, Travis D. <tdstolldorf@nd.gov>
**Sent:** Monday, June 24, 2024 1:55 PM
**To:** Forsberg, Sara L. <slforsberg@nd.gov>
**Cc:** Madche, Tamara J. <tjmadche@nd.gov>; Suggs, Richard A. <rasuggs@nd.gov>
**Subject:** FW: Case Nos. 30869-30880 - Supplemental Filings

Sara,

I reviewed the list from Lawrence and found a couple of things that probably need to be added to the list.

- Add a supplement for Summit's site access policy for DMR inspectors

    - Lawrence's comment on Section 8.0 – *Prior to commencement of injection operations, provide an updated Worker Safety Plan that includes a list of site-specific training and the training itself for DMR inspection staff*
- Address to written comments – Lawrence testified that there might not be much response but that they would respond to written comments by 6/24/24

It looks like everything else was included from our list.

-Travis

---

**From:** Hughes, Bethany <BHughes@fredlaw.com>
**Sent:** Tuesday, June 18, 2024 2:35:48 PM
**To:** Suggs, Richard A. <rasuggs@nd.gov>; Madche, Tamara J. <tjmadche@nd.gov>
**Cc:** derrick@braatenlawfirm.com <derrick@braatenlawfirm.com>; Bender, Lawrence <LBender@fredlaw.com>
**Subject:** Case Nos. 30869-30880 - Supplemental Filings

You don't often get email from bhughes@fredlaw.com. Learn why this is important

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Good Afternoon,

Please see attached from Mr. Bender.

Thanks,

**Bethany Hughes**
*Legal Administrative Assistant/Paralegal*
Fredrikson & Byron, P.A.
**Please note our new address:**
304 East Front Ave, Suite 400, Bismarck, ND 58504-5639
Direct: 701-221-8641 | Main: 701.221.8700 | Fax: 701-221-8750
***This is a transmission from the law firm of Fredrikson & Byron, P.A. and may contain information which is privileged, confidential, and protected by the attorney-client or attorney work product privileges. If you are not the addressee, note that any disclosure, copying, distribution, or use of the contents of this message is prohibited. If you have received this transmission in error, please destroy it and notify us immediately at our telephone number (701) 221-8700. The name and biographical data provided above are for informational purposes only and are not intended to be a signature or other indication of an intent by the sender to authenticate the contents of this electronic message.***

| | |
|---|---|
| **From:** | Hughes, Bethany |
| **To:** | Bohrer, Mark F.; Garner, David P.; derrick@braatenlawfirm.com; Joshua A. Swanson |
| **Cc:** | Forsberg, Sara L.; Knutson, Amy N.; Bender, Lawrence; Etter, Mary |
| **Subject:** | Summit Carbon Solutions - NDIC Case Nos. 30869-30880 |
| **Date:** | Monday, July 8, 2024 11:39:02 AM |
| **Attachments:** | Summit - NDIC Case Nos. 30869 to 30880 - Response to Landowner Intervenors" Objection-c.pdf<br>Summit - COS - NDIC Case Nos. 30869 to 30880 - Response to Landowner Intervenors" Objection-c.pdf |

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Attached please find the following documents for filing and service with respect to the above-referenced case numbers.

1. Response to Landowner Intervenors' Objection; and
2. Certificate of Service.

Thanks,

**Bethany Hughes**
*Legal Administrative Assistant/Paralegal*
Fredrikson & Byron, P.A.
**Please note our new address:**
304 East Front Ave, Suite 400, Bismarck, ND 58504-5639
Direct: 701-221-8641 | Main: 701.221.8700 | Fax: 701-221-8750
***This is a transmission from the law firm of Fredrikson & Byron, P.A. and may contain information which is privileged, confidential, and protected by the attorney-client or attorney work product privileges. If you are not the addressee, note that any disclosure, copying, distribution, or use of the contents of this message is prohibited. If you have received this transmission in error, please destroy it and notify us immediately at our telephone number (701) 221-8700. The name and biographical data provided above are for informational purposes only and are not intended to be a signature or other indication of an intent by the sender to authenticate the contents of this electronic message.***

**BEFORE THE INDUSTRIAL COMMISSION**
**OF THE STATE OF NORTH DAKOTA**

**CASE NOS. 30869–30880**

**In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1,**

**11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by**

**nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of**

**carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the**

**geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## RESPONSE TO LANDOWNER INTERVENORS' OBJECTION

[¶ 1] Applicants Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC (collectively, "Summit") submit this brief in response to the *Objection to Summit Carbon Stroage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC Supplements* ("Objection") filed with the North Dakota Industrial Commission ("Commission") by the Landowner Intervenors.[1]

[1] Landowner Intervenors are the Swenson Living Trust, Michael Bauman, Glenn and Lisa Gerving, Michael and Bonnie Haupt, John Jochim, Kevin and Kimberly Kraft, Charmayne Liebelt, Kirk and Linda Maize and Allen Maize, Paul and Christy Metz, JoLene M. Rust, and Gary and Cassie Smith.

## FACTS

[¶ 2] Summit commenced this case by filing three separate applications (collectively, the "Applications") with the Commission requesting permits for the geologic storage of carbon dioxide (the "Permits"). According to the North Dakota Legislature, "[i]t is in the public interest to promote the geologic storage of carbon dioxide." N.D.C.C. § 38-08-01.

[¶ 3] The Commission recently held a three-day hearing on Summit's Applications. Throughout the course of the hearing, Commission staff requested that Summit supplement, clarify and/or correct very specific portions of its Applications (collectively, the "Commission's Supplemental Requests"). The Landowner Intervenors did not object to the Commission's Supplemental Requests at any time during the course of the three day hearing.

[¶ 4] At the hearing, Landowner Intervenors—through their attorney—conducted extensive cross-examination of Summit's witnesses relating to certain provisions of Summit's Applications. During cross-examination, Landowner Intervenors requested several revisions to the Storage Agreement and Exhibit D thereto, the Pore Space Lease. Summit agreed to make certain of the requested revisions to the Storage Agreement and Pore Space Lease (the "Intervenor Storage Agreement Revisions") at the hearing.

[¶ 5] Commission staff requested that that the Intervenor Storage Agreement Revisions be included in Summit's response to the Commission's Supplemental Requests. To be clear, the Intervenor Storage Agreement Revisions were made solely in response to the Landowner Intervenors' requests during cross-examination and not in response to any of the Commission's Supplemental Requests.

[¶ 6] Summit filed its response to the Supplemental Requests (collectively, the "Supplemental Responses"), including the Intervenor Storage Agreement Revisions, on June 24,

2024. Soon after Summit filed its Supplemental Responses, Landowner Intervenors filed their Objection.

[¶ 7] According to Landowner Intervenors, the "notice and hearing process required by N.D.A.C. § 43-05-01-08 do[es] not allow for these amendments and supplements to an application after issuance of the notice of hearing." Landowner Intervenors' Objection ¶ 2. Landowner Intervenors further state that "[g]iven the significant property interests being stripped from landowners by the Commission in this proceeding, it is critical that the Commission provide the most robust protection of Intervenors' rights to due process." *Id.* at ¶ 3. Finally, Landowner Intervenors argue that "[a]llowing the applicants to literally amend and supplement the application in real time in response to the Intervenors' questioning and the deficiencies pointed out by Commission staff and Intervenors' violates due process." *Id.*

[¶ 8] At the time of the filing of this response, the Commission has not made a decision on Summit's Applications.

## ARGUMENT

[¶ 9] First, the Commission may render a decision on Summit's original Applications in the absence of Summit's Supplemental Responses, and most definitely without considering the Intervenor Storage Agreement Revisions. Second, if the Commission disagrees and finds that it must consider Summit's Supplemental Responses in order to issue the requested Permits, the Commission may do so because there is no statute or regulation that prohibits the Commission from considering this information. Finally, neither Summit's Supplemental Responses, nor the Commission's consideration thereof, would violate Landowner Intervenors' due process rights.

## I. The Commission can issue Summit the requested Permits without considering Summit's Supplemental Responses or the Intervenor Storage Agreement Revisions.

[¶ 10] It is Summit's position that its original Applications are sufficient for the Commission to issue Summit the requested Permits and that Summit's Supplemental Responses were gratuitous. In coordination with Commission staff, Summit produced several iterations of its Applications prior to the Applications being deemed complete and noticed for hearing. Therefore, Summit respectfully requests that the Commission render its decision solely upon the information provided in Summit's original Applications and upon the testimony and evidence received at the hearing on said Applications. If the Commission determines that Summit's original Applications are sufficient to issue Summit the requested Permits, then the Commission may disregard Summit's Supplemental Responses and the Intervenor Storage Agreement Revisions, thus rendering Landowner Intervenors' Objection moot.

## II. Nothing prohibits the Commission from considering Summit's Supplemental Responses.

[¶ 11] Alternatively, if the Commission determines that Summit's original Applications are not sufficient, and that the Commission must consider Summit's Supplemental Responses in order to issue Summit the requested Permits, then it is within the scope of the Commission's authority and jurisdiction to do so.

[¶ 12] First, there are no provisions in N.D.C.C. ch. 38-22 or N.D.A.C. 43-05-01 that prohibit the Commission from considering supplements to an application that are submitted after a hearing. Even if there were, the Commission has the authority to waive such prohibitions. *See* N.D.C.C. § 38-22-03(7).[2]

[2] The Commission has authority "[t]o grant, for good cause, exceptions to this chapters requirements and implementing rules.

[¶ 13] Second, the Commission does have the broad power to set any "application requirements" that the Commission desires. *See* N.D.C.C. § 38-22-05(1)(a) ("A person applying for a permit shall … [c]omply with application requirements set by the commission."). Requiring an applicant to supplement its application after the hearing is necessarily an "application requirement." If the Commission has the authority to require an applicant to supplement its application after the hearing, then the Commission may consider those supplements in rendering its decision thereon under the same authority.

[¶ 14] Last, common sense dictates that the Commission should have the authority to require and consider supplemental information submitted after a hearing. The purpose of the public hearing on Summit's Applications was to allow the public and other interested parties (including the Commission) the opportunity to question and comment on Summit's Applications. The Landowner Intervenors acknowledge this in their Objection and were afforded this opportunity.[3] The purpose of a public hearing is defeated if the Commission does not have the ability to address those comments by requiring the submission of supplemental information. Further to this point, it should be noted that Landowner Intervenors did not take the opportunity to respond to any of Summit's Supplemental Responses or the Intervenor Storage Agreement Revisions and merely submitted their objections to the same.

## III. The Commission would not violate due process by considering Summit's Supplemental Responses.

[¶ 15] Landowner Intervenors repeatedly assert in their Objection that the Commission would violate their due process rights by considering Summit's Supplemental Responses and Intervenor Storage Agreement Revisions.[4] This argument does not carry any weight.

---

[3] *See* Br. ¶ 2 ("The public and many others were invited to comment on the existing [Applications].").

[4] *See, e.g.*, Br. ¶ 3 ("Given the significant property interests being stripped from landowners by the Commission in this proceeding, it is critical that the Commission provide the most robust protection of Intervenors' rights to due

[¶ 16] First, the Landowner Intervenors cannot argue that Summit's Supplemental Responses materially "amend" the original Applications. Most of the Supplement Responses were just that, supplements and clarifications. For example, Summit's Supplemental Responses do not amend the boundaries of the proposed storage facilities, do not amend the capacity of the storage facilities, do not amend the operator of the storage facilities, do not amend the amount or sources of carbon dioxide to be injected into such facilities, and do not amend the compensation to be paid to nonconsenting owners within the storage facilities. In their Objection, the Landowner Intervenors do not identify how any Supplemental Response or Intervenor Storage Agreement Revision prejudice their rights in this proceeding. Furthermore, as stated above, Summit believes that the Commission may render a decision on Summit's Applications without regard to Summit's Supplemental Responses or the Intervenor Storage Agreement Revisions due to the immaterial nature of such responses and revisions.

[¶ 17] Second, and unbelievably, Landowner Intervenors argue against the Intervenor Storage Agreement Revisions that were made in direct response to the concerns raised by Landowner Intervenors at the hearings. In other words, Landowner Intervenors acknowledge that their participation in these proceedings (due process) produced favorable results for the Landowner Intervenors via the Intervenor Storage Agreement Revisions, but are now requesting that the Commission disregard such results for the sole purpose of bolstering a non-existent due process argument. The Landowner Intervenors cannot have it both ways.

[¶ 18] Last, the Commission has not issued a final order on Summit's Applications nor any order regarding amalgamation of pore space. Accordingly, the Landowner Intervenors' due

---

process. Allowing [Summit] to literally amend and supplement the application in real time in response to the Intervenors' questioning and the deficiencies pointed out by Commission staff and Intervenors' violates due process.").

process arguments are not ripe until such a final order affecting their property rights has been issued.

## CONCLUSION

[¶ 19] For the foregoing reasons, Landowner Intervenors' Objection is meritless and the Commission should proceed to render a decision on Summit's Applications with, or without, the Supplemental Responses and/or Intervenor Storage Agreement Revisions.

Dated this 8th day of July, 2024.

By: _____

Lawrence Bender (#03908)
Tyler J. Gludt (#06587)
lbender@fredlaw.com
tgludt@fredlaw.com
**FREDRIKSON & BYRON, P.A.**
304 East Front Avenue, Suite 400
Bismarck, ND 58504
(701) 221-8700

*Attorneys for Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC and Summit Carbon Storage #3, LLC*

#82989275v1

**BEFORE THE INDUSTRIAL COMMISSION**
**OF THE STATE OF NORTH DAKOTA**

**CASE NOS. 30869–30880**

**In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1,**

**11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by**

**nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of**

**carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the**

**Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## CERTIFICATE OF SERVICE

[¶ 1] I, the undersigned, hereby certify that a true and correct copy of the following document:

1. Response to Landowner Intervenors' Objection.

was, on July 8, 2024, filed electronically with the North Dakota Industrial Commission and served upon the following via electronic mail:

Mark Bohrer
mbohrer@nd.gov

David Garner
dpgarner@nd.gov

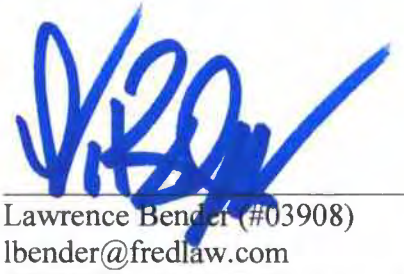
Sara Forsberg
slforsberg@nd.gov

Amy Knutson
anknutson@nd.gov

Derrick Braaten
derrick@braatenlawfirm.com

Joshua Swanson
jswanson@vogellaw.com

Dated this 8th day of July, 2024.

By: 

Lawrence Bender (#03908)
lbender@fredlaw.com
**FREDRIKSON & BYRON, P.A.**
304 East Front Avenue, Suite 400
Bismarck, ND 58504
(701) 221-8700
*Attorneys for Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC and Summit Carbon Storage #3, LLC*

#83024283v1

| | |
|---|---|
| **From:** | Desirae Zaste |
| **To:** | -Info-Oil & Gas Division; Forsberg, Sara L.; Bender, Lawrence; TThrone@thronelaw.com; Gludt, Tyler; Helms, Lynn D.; Garner, David P.; Knutson, Amy N.; Joshua A. Swanson |
| **Cc:** | Derrick Braaten |
| **Subject:** | Summit Carbon Storage (Case Nos. 30869-30880) |
| **Date:** | Tuesday, July 2, 2024 10:42:26 AM |
| **Attachments:** | Petition for Reconsideration.pdf<br>240702 Declaration of Service.pdf |

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Good morning,

Attached for filing and service are the following documents:

- **Petition for Reconsideration of Denial of Motion to Continue Hearing; and**
- **Declaration of Service.**

**Desirae Zaste¦ Certified Paralegal**

**BRAATEN LAW FIRM**
109 N. 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
Fax: 701-221-5842
www.braatenlawfirm.com

**PRIVILEGED COMMUNICATION**
**This e-mail message is intended only for the named recipient(s) above and is covered by the Electronic Communications Privacy Act, 18 U.S.C. Sections 2510-2521. This e-mail is confidential and may contain information that is privileged, attorney work product or exempt from disclosure under applicable law. Recipients should not file copies of this e-mail with publicly accessible records. If you have received this message in error, please immediately notify the sender by return e-mail and delete this e-mail message from your computer. Thank you for your cooperation.**

**NORTH DAKOTA INDUSTRIAL COMMISSION**

**OIL AND GAS DIVISION**

**In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**Case No(s). 30869**
**30870**
**30871**
**30872**
**30873**
**30874**
**30875**
**30876**
**30877**
**30878**
**30879**
**30880**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## PETITION FOR RECONSIDERATION OF DENIAL OF MOTION TO CONTINUE HEARING

[¶1] Intervenor Landowners petitions for reconsideration of the Commission's denial of Landowners' motion to continue the hearing. Lynn Helms indicated that staff will not present a decision for a vote by the Commission until September or October, months from now.[1] The Commission has allowed Summit to amend and supplement its applications post-hearing, has refused to allow any meaningful discovery, and has very openly and explicitly stymied any semblance of due process for the Landowners. The false premise that all parties must rush to a hearing was proven false by the hearing itself, and the numerous amendments and supplements to the application that followed. For the reasons stated in the objection to these supplements and amendments, the Landowners also ask the Commission to reconsider its denial of their motion to continue the hearing. There is ample time to allow an amended application to be developed into a draft permit and fact sheet as required by law, and to allow discovery and due process prior to the Commission making a decision next September. The failure to do so constitutes a violation of the constitutional due process rights of the Landowners.

[1] https://northdakotamonitor.com/2024/06/14/summits-carbon-storage-plans-face-strong-objections-at-permit-hearing/ ("Helms, who is retiring this month, said technical staff with the Department of Mineral Resources will review the information and likely make a recommendation to the full North Dakota Industrial Commission by September or October."); *see also* https://www.dmr.nd.gov/dmr/oilgas/directorscut at 11:56-13:07.

DATED this 2nd day of July, 2024.

**BRAATEN LAW FIRM**

*/s/ Derrick Braaten*

Derrick Braaten (ND #06394)
109 North 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
derrick@braatenlawfirm.com

*Attorneys for Intervenors the Swenson Living Trust, Bauman, Gerving, Haupt, Jochim, Kraft, Liebelt, Maize, Metz, Rust, and Smith*

**NORTH DAKOTA INDUSTRIAL COMMISSION**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case No(s). 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

---

## DECLARATION OF SERVICE

---

[¶1] I hereby certify that true and correct copies of the following documents:

- **Petition for Reconsideration of Denial of Motion to Continue Hearing; and**
- **Declaration of Service.**

were, on the 2nd day of July, 2024 sent via electronic mail to the following:

North Dakota Industrial Commission
oilandgasinfo@nd.gov
slforsberg@nd.gov

Lynn Helms
lhelms@nd.gov

Lawrence Bender
Attorney at Law
lbender@fredlaw.com

Tyler Gludt
Attorney at Law
TGludt@fredlaw.com

Thomas Throne
Attorney at Law
tthrone@thronelaw.com

Joshua Swanson
Attorney for Intervenor Minnkota
jswanson@vogellaw.com

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on this 2nd day of July, 2024 at Bismarck, North Dakota.

Desirae Zaste

| | |
|---|---|
| **From:** | Desirae Zaste |
| **To:** | -Info-Oil & Gas Division; Forsberg, Sara L.; Bender, Lawrence; TThrone@thronelaw.com; Gludt, Tyler; Helms, Lynn D.; Garner, David P.; Knutson, Amy N.; Joshua A. Swanson |
| **Cc:** | Derrick Braaten |
| **Subject:** | Summit Carbon Storage (Case Nos. 30869-30880) |
| **Date:** | Thursday, June 27, 2024 2:32:28 PM |
| **Attachments:** | Intervenor Landowners Reply MTC.pdf<br>Declaration of DB in Support of Motion to Compel-Reply.pdf<br>Ex. 13- 240509 Garner email from Derrick Braaten re schedule.pdf<br>Objection to Supplements.pdf<br>240627 Declaration of Service.pdf |

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Good afternoon,

Attached for filing and service are the following documents:

- **Intervenor Landowners' Reply Brief in Support of Motion to Compel;**
- **Supplemental Declaration of Derrick Braaten in Support of Motion to Compel;**
- **Exhibit 13 -Email sent on May 9, 2024 to Hearing Officer Dave Garner, with courtesy copies to Lawrence Bender, Desirae Zaste, and Lynn D. Helms;**
- **Objection to Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC Supplements; and**
- **Declaration of Service.**

**Desirae Zaste¦ Certified Paralegal**

**BRAATEN LAW FIRM**
109 N. 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
Fax: 701-221-5842
www.braatenlawfirm.com

**PRIVILEGED COMMUNICATION**
**This e-mail message is intended only for the named recipient(s) above and is covered by the Electronic Communications Privacy Act, 18 U.S.C. Sections 2510-2521. This e-mail is confidential and may contain information that is privileged, attorney work product or exempt from disclosure under applicable law. Recipients should not file copies of this e-mail with publicly accessible records. If you have received this message in error, please immediately notify the sender by return e-mail and delete this e-mail message from your computer. Thank you for your cooperation.**

**NORTH DAKOTA INDUSTRIAL COMMISSION**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case No(s). 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## INTERVENOR LANDOWNERS' REPLY BRIEF IN SUPPORT OF MOTION TO COMPEL

Continuing its efforts to evade routine discovery, Summit makes bare assertions and relies on strained interpretations of the rules of procedure. Significantly, Summit does not dispute that Intervenor Landowners extended offers to choose a mutually agreed upon date for the deposition on May 2 and on May 9; it does not dispute that it never responded to these requests; and it does not dispute that it has had actual notice of the deposition and topics of questioning since May 9. Instead, it claims that it can duck its discovery obligations because Intervenor Landowners did not "certify" that it made these conferral attempts in a separate document, a two-way conferral did not occur, and it did not have sufficient notice. However, the Commission should grant Intervenor Landowner's motion because they sufficiently described their conferral attempts to demonstrate that they attempted to confer in good faith; the *only* reason a conferral did not occur is because Summit deliberately ignored Intervenor Landowners; Summit had notice of the deposition nearly a month before its scheduled date. Finally, it is the express policy of North Dakota to conduct procedures relating to the geologic storage of carbon dioxide "in a manner fair to all interests." § 38-22-01, N.D.C.C., and fairness requires the Commission to allow the deposition to go forward.

### A. Intervenor Landowners have complied with the requirements under Rule 37.

#### a. The only reason a conferral did not occur is because Summit ignored Intervenor Landowners' attempts to do so.

Rule 37 requires a party to attempt to obtain discovery in good faith before seeking court intervention. But the party resisting discovery cannot simply refuse to confer and then claim Rule 37 was not satisfied because a conferral did not occur—a sincere attempt to confer is sufficient. *Meuchal v. Red Trail Energy, LLC,* 2024 ND 44, ¶ 27, 4 N.W.3d 203 (collecting cases). Summits'

own case stands for this. *Meuchal*, ¶ 27 ("Conferring requires a party actually communicate by phone or in person, or at least *sincerely attempt to do so*.") (emphasis added).

Summit contends that the Commission should shield it from the deposition because Intervenor Landowners "did not confer or attempt to confer with Summit Storage in good faith." Pls' Resp. at 11. This argument is without merit, and the facts speak for themselves.

On May 2, 2024, counsel for Intervenor Landowners extended an offer to counsel for Summit to coordinate the timing of the deposition, stating in part:

> I would like to put aside some days in late May/early June for the deposition that work for our two schedules at least how busy we both are and are likely to become. Please let me know what days you have available for a deposition.

Ex. 9.

On May 9, after one full week of silence and with the hearing fast approaching, Mr. Braaten scheduled the deposition for June 6 as a placeholder, but again advised Mr. Bender that the date was flexible if it did not work for him:

> I scheduled this to get a date down and I did try to look at what I know of your schedule between PSC hearings, etc. I am open to rescheduling this if we can find a mutually agreeable date though, so just wanted to let you know that right away.

Ex. 10. Weeks go by, and again, silence from Summit. Additionally, on May 9th, an email was sent to Hearing Officer Dave Garner, with courtesy copies to Lawrence Bender, Lynn Helms indicating that a call was placed to Hearing Officer Garner and Summit's counsel on May 3, 2024 to discuss the abbreviated schedule and also indicated the deposition was scheduled for June 6, 2024. *See* Exhibit 13 to Supplemental Declaration of Derrick Braaten.

On May 31, Intervenor Landowners re-noticed the deposition as a formality after being officially joined as a party. Then, on June 4, more than a month after Intervenor Landowners first contacted Summit and just two days before the deposition, Mr. Bender finally communicated. But instead of offering a new date, he did nothing but contend that as a non-party, Summit should have

been served a subpoena instead of a notice. To assuage Summit's concerns, Intervenor Landowners promptly served notices on the three of the Summit storage entities that are technically the parties rather than the Summit entity that actually submitted the applications on behalf of the three other subsidiaries. The topics of questioning and the date remained the same.

But then, on June 5, the day before the deposition, Summit invented new imaginary concerns regarding notice to a third party, Minnkota Power Cooperative, Inc., and a purported lack of particularity with respect to the description of the topics of questioning (which speak for themselves). Mr. Braaten promptly responded, thoroughly summarizing the lengths he took to coordinate the deposition over the preceding weeks and further described the specificity of the topics.

Intervenor Landowners did not engage in a two-way discussion regarding the deposition, but this was no fault of their own. Rule 37 does not require conferral to actually occur because no party can force the other to engage in a discussion—a sincere attempt is sufficient. Clearly Intervenor Landowners met this standard, and the Commission should grant the motion.

**b. Intervenor Landowners certified that they in good faith attempted to confer with Summit.**

The Commission is to look "to the totality of the circumstances to determine the existence or nonexistence of good faith under N.D.R.Civ.P. 37(a)(1)." *PHI Financial Services v. Johnson Law Office, P.C.*, 2016 ND 114, ¶ 11, 881 N.W.2d 216. The North Dakota Supreme Court acknowledged that "[a]though Rule 37 does not identify detailed certification requirements, to effectuate the underlying policy of the rule, counsel seeking court-facilitated discovery must 'adequately set forth in the motion essential facts sufficient to enable the court to pass a preliminary judgment on the adequacy and sincerity of the good faith conferment between the parties.'" *Meuchel*, ¶ 26. In other words, a movant complies with Rule 37's instruction to certify that the

movant has attempted to confer in good faith, so long as it includes sufficient facts to determine whether the movant sincerely attempted to confer.

Here, Intervenor Landowners have clearly set forth sufficient facts for the Commission to determine whether Intervenor Landowners attempted to confer in good faith. The details include summaries of Intervenor Landowners' attempts to coordinate the deposition, the dates on which the attempts were made, the responses (or lack thereof), and the results. Beyond this, Intervenor Landowners attached as exhibits the actual exchanges themselves.

Summit reads into Rule 37 a requirement that the certification be "a separate certification document." Opp. ¶ 14. But there is no such requirement under Rule 37. Although the Court in *Meuchel* recently stated that a certification document is one of two components of a motion to compel—the other being a good faith conferral or attempt to confer (which Summit refused to engage in)—the Court does not state the certification must be a document separate from the motion itself. *Meuchel*, ¶ 24. Indeed, the Court focuses on whether it is presented with sufficient *facts* to determine whether the attempt was sincere. *Meuchel*, ¶¶ 25, 30. Tellingly, in rendering its decision, the *Meuchel* Court approvingly summarizes its prior decision in *PHI Financial Services v. Johnston Law Office, P.C.*, 2016 ND 114, 881 N.W.2d 216— a case in which the movant certified its good faith attempts "in the motion," *PHI*, ¶ 4. *Meuchel*, ¶ 29. *Meuchel* did not hold that the certification cannot be in the motion itself, as such a holding would have been inconsistent with North Dakota case law, *see, e.g.*, *PHI*, 2016 ND 114, and would be against other courts that have considered the issue. *See In re Presto*, 358 B.R. 290, 292 (Bankr. S.D. Tex. 2006) ("[T]his Court concludes that the certification may be included in the body of the Motion.").

**B. The deposition notices comply with Rule 30, and Summit was required to appear absent the filing of a motion for a protective order.**

Summit does not raise any purported technical deficiencies with the revised notices served on June 4. Instead, it claims it did not have adequate notice of the deposition to sufficiently prepare. Opp. ¶ 24. As detailed above, the communications from Mr. Braaten regarding the deposition, the prior-served deposition notices, and the record demonstrate this argument is disingenuous. Summit cannot, in good faith, claim it did not have ample time to prepare when it had notice of the deposition topics since May 9.

Moreover, a party who believes it did not have reasonable notice cannot simply refuse to appear. *Bishop v. Potter*, 2010 WL 2771763, 1 (D. Nev. 2010) ("The noticed party 'does not have the option of sitting back, failing to appear, requiring the noticing party to take action, and then crying foul to the court.'"). And a party that does so, such as Summit, can be sanctioned. *Id.* at 1.

In *Bishop*, the defendant noticed the deposition for April 29 on April 29—the same day. *Id.* at 1. The plaintiff had earlier indicated he would be out of town during that time to care for his mother and explained he would not attend the deposition. *Id.* The defendant went forward with the deposition because of the time constraints of discovery. Awarding sanctions due to the plaintiff's failure to appear, the court noted that "[a]bsent a protective order or an order staying the deposition, the party, including its officer or Rule 30(b)(6) deponents, is required to appear for a properly noticed deposition." *Id.* (citing *Anderson v. Air West, Inc.*, 542 F.2d 1010, 1093 (9th Cir. 1976)). The court held that under the circumstances, the appropriate sanctions were reimbursement for the taking of the deposition and additional time to take the deposition. *Id.* at 2.

Here, Summit stated it would not appear for the depositions noticed for June 6, but it did not file a motion for a protective order or a stay. Intervenor Landowners are not seeking sanctions for this violation of the discovery rules—they simply wish to depose Summit so they can properly assess its plans for carbon storage on their property.

Finally, the purpose of a deposition notice is to inform the other parties of the date, time, and place of the deposition. The notice of a 30(b)(6) also must describe with "reasonable particularity" the topics of questioning so the deponent can adequately prepare. Here, the purpose of Rule 30 was fulfilled as early as May 9, the date the first notice was served. By this time, Summit was clearly aware of the setting of the deposition and the topics of questioning. If it took issue with the notice, it should have raised its concerns in a timely manner rather than prejudice Intervenor Landowners by intentionally waiting until the 11th hour.

**C. Due process and the administrative code entitle Intervenor Landowners to discovery.**

Summit may be correct that there is no "general" constitutional right to discovery in administrative proceedings. Opp. ¶ 26. "This general rule, however, is not dispositive." *Achrulete v. Santa Fe Police Dep. Ex rel. City of Santa Fe*, 137 N.M. 161, ¶ 32, 108 P.3d 1019. Rather, "due process is flexible and calls for such procedural protections as the particular situation demands" *Mathews v. Eldridge*, 424 U.S. 319, 334 (1976) (cleaned up), and "[a]dministrative hearings that affect a property or liberty interest must comply with due process." *Archuleta*, ¶ 31 (emphasis added).

Here, the Commission should grant Intervenor Landowner's motion because it complied with the discovery rules as described above. Thus, although it is unnecessary to delve into the due process interests at stake for purposes of this motion, due process requires discovery when substantial property interests are at stake, and Summit itself has requested amalgamation such that Intervenor Landowner's legal rights will be "substantially affected" by these proceedings. *See* Applicant's Resp. to Swenson Trust's Mot. to Cont. Hearing and Req. for Sched. Conf., at 10-11. Moreover, the administrative code itself allows for discovery, § 28-32-33, N.D.C.C., and it is the

express policy of North Dakota to conduct procedure relating to the geologic storage of carbon dioxide "in a manner fair to all interests." § 38-22-01, N.D.C.C.

## CONCLUSION

The discovery rules should be construed "liberally." *See Marmon v. Hodny*, 287 N.W.2d 470, 476 (N.D. 1980). The Commission should grant Intervenor Landowner's motion because it earnestly and in good faith attempted to confer with Summit regarding the deposition, and Summit failed to respond in kind. Even if the deposition notices in May did not strictly comply with the rules, Summit was on notice and had ample time to prepare for the deposition, and the policy to be promoted by the notice requirement was more than fulfilled. Finally, there is *no* dispute that the June 4 notices were proper, and if Summit took issue with the timing (despite the topics remaining unchanged), then it was required to act by filing a protective order, rather than "sitting back, failing to appear, requiring the noticing party to take action, and then crying foul to the court." *Bishop v. Potter*, 2010 WL 2771763, 1. Although this is grounds for sanctions, the Commission should simply order the deposition to take place.

DATED this 27th day of June, 2024.

**BRAATEN LAW FIRM**

*/s/ Derrick Braaten*
Derrick Braaten (ND #06394)
109 North 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
derrick@braatenlawfirm.com

*Attorneys for Intervenors the Swenson Living Trust, Bauman, Gerving, Haupt, Jochim, Kraft, Liebelt, Maize, Metz, Rust, and Smith*

**NORTH DAKOTA INDUSTRIAL COMMISSION**

**OIL AND GAS DIVISION**

**In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**Case No(s). 30869**
**30870**
**30871**
**30872**
**30873**
**30874**
**30875**
**30876**
**30877**
**30878**
**30879**
**30880**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**SUPPLEMENTAL DECLARATION OF DERRICK BRAATEN IN SUPPORT OF MOTION TO COMPEL**

1. I am an attorney for the Intervenor Landowners ("Landowners"), in the above-captioned matter.
2. I represent the Landowners in matters involving the applications submitted by Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, and Summit Carbon Storage #3, LLC ("SCS").
3. Attached hereto as Exhibit 13 is a true and correct copy of an email sent on May 9, 2024 to Hearing Officer Dave Garner, with courtesy copies to Lawrence Bender, Desirae Zaste, and Lynn D. Helms.

**I declare under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.**

Executed this 27th day of June, 2024 in Bismarck, North Dakota.

**Derrick Braaten**

**From:** Derrick Braaten
**To:** dpgarner@nd.gov
**Cc:** Lawrence Bender (lbender@fredlaw.com); Desirae Zaste; Lynn D. Helms
**Subject:** NDIC Case Nos. 30869-30880
**Date:** Thursday, May 9, 2024 3:22:08 PM
**Attachments:** 1-240502 Interr & RFP Set 1.pdf
image001.jpg
240507 Bender ltr from DB re interr set 1.pdf

---

Mr. Garner:

I represent the Swenson Living Trust, a proposed intervenor in NDIC Case Nos. 30869-30880. I also represent several other landowners who intend to intervene and we will be filing those petitions in the near future. I called and left a voicemail last Friday asking to speak with you and Mr. Bender regarding the extremely abbreviated schedule in this matter. The hearing has been scheduled for June 11-12, and we have submitted a motion requesting additional time to allow us to respond and prepare for a hearing. We are going to do our best to prepare if that motion is not granted, but I am very concerned that it will require a very abbreviated discovery schedule. I have scheduled a deposition for June 6, but I need to obtain the data decks, load files, and other data that was used to run the models developed for the application, and I need to do that with sufficient time to allow my team of experts to both run the models (which can take days depending on the data and how it is set up) and then analyze the results. We need to do all of this before the deposition. I have scheduled that for June 6 and this means I will likely not be able to get a transcript back before our hearing, but I wanted to give us as much time as possible to facilitate the exchange of information. If I can get some of the data decks from the NDIC, I would like to explore that as well.

I would also like to discuss logistics if we could. I have a number of landowners and it would be my preference to stipulate in advance to some of the information regarding their land ownership, deeds, etc. to avoid having to call them to walk through that at the hearing. I can make them available for examination if Mr. Bender wishes, but I'd rather not spend several hours of our time walking through deeds, etc. I also will need some very quick turnaround on the data to get this done in time, so will be asking to expedite the discovery process. I am also concerned that if the NDIC intends to grant out petitions to intervene, we are being significantly prejudiced right now because they have not been granted, and that takes more time away from us as we are trying to prepare. I have served discovery and a deposition notice, but without having our intervention granted I suspect Mr. Bender is free to ignore those. I do apologize for my directness here in addressing the tribunal, but I would ask that the intervention be granted retroactively such that our discovery requests and deposition notice do not need to be re-served, which would reset the time to respond.

I am also planning to get a motion filed tomorrow or Monday formally asking for this relief in the form of expedited discovery and an immediate discovery conference to set deadlines. I have served two rounds of discovery and in the first I focused solely on the data my experts requested in order to conduct their analysis. If there is any way to expedite that data above others I would appreciate that, and also point out that the data I am seeking for my experts is literally a part of the applications here, and I think due process requires that I obtain that in a timely manner for this to be a fair hearing. If there is anything I can do to facilitate this please let me know, and as I said, I am working as fast as I can on a motion to expedite and will have it filed tomorrow or Monday. I have attached a

copy of the discovery we served and a letter clarifying some errors we made – this is the data we are seeking that is part of the application and which our experts require in order to assess the application. If the NDIC is able to assist with sharing any of this data itself I would ask that you please consider that and I will facilitate any way I can.

I look forward to hearing from you and would appreciate if we can get a conference call set up to discuss all of this as soon as possible.

Sincerely,

**Derrick Braaten**

**BRAATEN LAW FIRM**
109 N. 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
Fax: 701-221-5842
www.braatenlawfirm.com

**PRIVILEGED COMMUNICATION**
**This e-mail message is intended only for the named recipient(s) above and is covered by the Electronic Communications Privacy Act, 18 U.S.C. Sections 2510-2521. This e-mail is confidential and may contain information that is privileged, attorney work product or exempt from disclosure under applicable law. Recipients should not file copies of this e-mail with publicly accessible records. If you have received this message in error, please immediately notify the sender by return e-mail and delete this e-mail message from your computer. Thank you for your cooperation.**

**NORTH DAKOTA INDUSTRIAL COMMISSION**

**OIL AND GAS DIVISION**

**In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**Case No(s). 30869**
**30870**
**30871**
**30872**
**30873**
**30874**
**30875**
**30876**
**30877**
**30878**
**30879**
**30880**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## OBJECTION TO SUMMIT CARBON STORAGE #1, LLC, SUMMIT CARBON STORAGE #2, LLC, AND SUMMIT CARBON STORAGE #3, LLC SUPPLEMENTS

[¶1] Intervenor Landowners object to supplements of Summit Carbon Solutions, LLC through its related entities, Summit Cabon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC (collectively, "Summit").

[¶2] The numerous amendments and supplements provided by Summit on its own initiative as well as in response to requests from the Commission are material amendments to the application. The notice and hearing process required by N.D.A.C. § 43-05-01-08 do not allow for these amendments and supplements to an application after issuance of the notice of hearing. The public and many others were invited to comment on the existing applications. *See* Notice of Hearing, Summit Carbon Storage #1, LLC, NDIC Case Nos. 30869-30872, Notice of Hearing, Summit Carbon Storage #2, LLC, NDIC Case Nos. 30873-30876, and Notice of Hearing, Summit Carbon Storage #3, LLC, NDIC Case Nos. 30877-30880. Draft permits and fact sheets were prepared based on the existing applications and the notices were issued in accordance with these. *See* N.D.A.C. § 43-05-01-07.2.

[¶3] Although there are procedures for major and minor modifications of a *permit* following issuance, there are no such allowances for amendment and supplementation of the *applications* themselves upon which the draft permit and fact sheet are based, and which the public is invited to comment and participate in a hearing. *See, e.g.* N.D.A.C. §§ 43-05-01-12, 43-05-01-12.1. Given the significant property interests being stripped from landowners by the Commission in this proceeding, it is critical that the Commission provide the most robust protection of Intervenors' rights to due process. Allowing the applicants to literally amend and supplement the application in

real time in response to the Intervenors' questioning and the deficiencies pointed out by Commission staff and Intervenors' violates due process.

> The very nature of due process negates the concept of inflexible procedures universally applicable to every imaginable situation; instead, the requirements imposed by the Clause are flexible and variable and dependent upon the particular situation being examined. *Wolff v. McDonnell*, *supra*; *Hewitt v. Helms*, *supra*. In determining what process is due under the Fourteenth Amendment, we must consider the private interests at stake in a governmental decision, the governmental interests involved, and the value of procedural requirements.

*Jensen v. Satran*, 332 N.W.2d 222, 227 (N.D. 1983).

[¶4] The private interests at stake are the property of North Dakota citizens. The government's interest at stake is in taking those interests from its private citizens and providing them to Summit to use at any price Summit dictates. The value of providing notice and hearing on the actual application under consideration and not one amended post-hearing is very significant to the ability of the landowners' to protect their property. The applicants are literally amending the contractual agreements the applicants intend to impose on the Intervenors. Putting aside the numerous provisions of both state and federal constitutions that this violates, taking this extreme action without even providing a fair hearing is beyond a due process violation – it is immoral.

[¶5] For these reasons, the Intervenor Landowners object to the supplementation and amendment of the applications post-hearing.

DATED this 27th day of June, 2024.

**BRAATEN LAW FIRM**

*/s/ Derrick Braaten*

Derrick Braaten (ND #06394)
109 North 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
derrick@braatenlawfirm.com

*Attorneys for Intervenors the Swenson Living Trust, Bauman, Gerving, Haupt, Jochim, Kraft, Liebelt, Maize, Metz, Rust, and Smith*

**NORTH DAKOTA INDUSTRIAL COMMISSION**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case No(s). 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

---

## DECLARATION OF SERVICE

---

[¶1] I hereby certify that true and correct copies of the following documents:

- **Intervenor Landowners' Reply Brief in Support of Motion to Compel;**
- **Supplemental Declaration of Derrick Braaten in Support of Motion to Compel;**
- **Exhibit 13 -Email sent on May 9, 2024 to Hearing Officer Dave Garner, with courtesy copies to Lawrence Bender, Desirae Zaste, and Lynn D. Helms;**
- **Objection to Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC Supplements; and**
- **Declaration of Service.**

were, on the 27th day of June, 2024 sent via electronic mail to the following:

North Dakota Industrial Commission
oilandgasinfo@nd.gov
slforsberg@nd.gov

Lynn Helms
lhelms@nd.gov

Lawrence Bender
Attorney at Law
lbender@fredlaw.com

Tyler Gludt
Attorney at Law
TGludt@fredlaw.com

Thomas Throne
Attorney at Law
tthrone@thronelaw.com

Joshua Swanson
Attorney for Intervenor Minnkota
jswanson@vogellaw.com

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on this 27th day of June, 2024 at Bismarck, North Dakota.

Desirae Zaste

Fredrikson

**Fredrikson & Byron, P.A.**
Attorneys and Advisors

304 East Front Avenue, Suite 400
Bismarck, ND 58504-5639
Main: 701.221.8700
fredlaw.com

June 24, 2024

***VIA E-MAIL***

Mr. Mark Bohrer
Assistant Director
North Dakota Industrial Commission
Oil and Gas Division
600 East Boulevard
Bismarck, North Dakota 58505-0310

**RE: Case Nos. 30869 – 30880**
**Summit Carbon Storage #1, LLC**
**Summit Carbon Stroage #2, LLC**
**Summit Carbon Storage #3, LLC**
**Supplemental Filings**

Dear Acting Director Bohrer:

In response to the supplemental filing requests made by Commission staff at the June 11, 12 and 13, 2024 hearing on the above-captioned cases, Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC and Summit Carbon Storage #3, LLC (collectively, "Summit") submit the enclosed responses. A separate response has been provided for each of the three applications submitted by Summit. Each response contains a table outlining the supplemental requests, followed by the substantive responses.

Should you have any questions, please advise.

Sincerely,

LAWRENCE BENDER

LB/tjg
Enclosure(s)
#82895541v1

Cc: Summit Carbon Storage #1, LLC (*via e-mail only*)
Summit Carbon Storage #2, LLC (*via e-mail only*)
Summit Carbon Storage #3, LLC (*via e-mail only*)

Fredrikson

**Fredrikson & Byron, P.A.**
Attorneys and Advisors

304 East Front Avenue, Suite 400
Bismarck, ND 58504-5639
Main: 701.221.8700
fredlaw.com

June 24, 2024

***VIA E-MAIL***

Mr. David P. Garner
Assistant Attorney General
North Dakota Industrial Commission
Oil and Gas Division
600 East Boulevard
Bismarck, North Dakota 58505-0310

**RE: Case Nos. 30869 – 30880**
**Summit Carbon Storage #1, LLC**
**Summit Carbon Stroage #2, LLC**
**Summit Carbon Storage #3, LLC**
**Response to Public Comments**

Dear Assistant Attorney General Garner:

Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC (the "Applicants") completed a review of the public comments submitted in Cases 30869 through 30880 (the "Cases"). In total, there were twenty-five (25) public comments submitted for all the Cases. One person, Ms. Meda Schultz, submitted comments twice, leaving twenty-four (24) comments from different organizations or individuals. There was one general comment from the North Dakota State Historical Society concerning cultural surveys, which was addressed in the hearings, leaving twenty-three (23) comments without responses.

The supportive comments can be categorized as landowner support or general support. The opposition comments can be categorized as mineral owner opposition or general opposition. Twelve (12) mineral owners submitted responses expressing their concerns over future mineral development. Seven (7) parties submitted general opposition including the Dakota Resource Council. Two (2) landowners submitted letters in support. Two (2) other parties submitted responses in support. The list of individuals and entities that submitted comments on the Cases are as follows:

1. Victoria Brown, dated May 30, 2024 (mineral owner)
2. Mark Schultz, dated June 7, 2024 (mineral owner)
3. Brenda L. Lipp, dated June 8, 2024 (mineral owner)
4. Eric R. Schultz, dated June 9, 2024 (mineral owner)
5. Janice Menge, dated May 21, 2024 (mineral owner)

6. Jenny Kirk, dated May 13, 2024 (mineral owner)
7. Donna Dippolito, received May 20, 2024 (mineral owner)
8. Marvel Beell, dated May 12, 2024 (mineral owner)
9. Karen Jacob, dated May 13, 2024 (mineral owner)
10. JoAnn Schumacher, received May 16, 2024 (mineral owner)
11. Marjorie Fairbanks, received May 13, 2024 (mineral owner)
12. Meda Schultz, dated June 10, 2024 (mineral owner) & Meda Schultz, June 10, 2024 (general opposition – 2nd letter)
13. Fay Horn f/k/a Fay Hill, dated April 28,2024 (general opposition)
14. Gary Boeckel, received May 6, 2024 (general opposition)
15. Dakota Resource Council, dated June 10 (general opposition)
16. Emma Schmit, dated June 10, 2024 (general opposition)
17. Janet Miller, dated June 10, 2024 (general opposition)
18. Kathy Carter, dated June 10, 2024 (general opposition)
19. Lisa Ritzert, dated June 10, 2024 (general opposition)
20. Paul Schock, dated June 10, 2024 (landowner support)
21. Jason Pulver, dated June 7, 2024 (landowner support)
22. Anna Novak, State Representative District 33, dated June 10, 2024 (general support)
23. Gary & Carla Poeckes, Lake View Services, LLC, dated June 10, 2024 (general support)

## I. Response to Comments of Mineral Owners.

The concerns of the mineral owners are largely focused on a claim that the mineral interests in the Storage Facility area are negatively impacted from future development. The Applicants addressed these concerns in Section 2.6, *Potential Mineral Zones*, of each their respective applications as follows:

> *In the event that hydrocarbons are discovered in commercial quantities below the Broom Creek Formation, a horizontal well could be used to produce hydrocarbons while avoiding drilling through the CO2 plume, or a vertical well could be drilled using proper controls. Aside from meeting regulatory and jurisdictional requirements, should an operator decide to drill wells for hydrocarbon exploration or production, real-time Broom Creek Formation BHP data will be available while the TB Leingang 1 and TB Leingang 2 wells are in operation, which will allow prospective operators to design an appropriate well control strategy via increased drilling mud weight. Pressure increase in the Broom Creek caused by injection of CO2 will relax postinjection as the area returns to its preinjection pressure profile. Any future wells drilled for hydrocarbon exploration or production that may encounter the CO2 should be designed to include an intermediate casing string placed across the storage reservoir, with CO2-resistant cement used to anchor the casing in place.*

In addition, Ms. Amanda Livers-Douglas testified that as detailed in Section 2.6 of the application, there are active and reclaimed coal mines near the storage facility area. However, no existing mines have plans to mine coal in the storage facility area during the project's operational period. Ms. Livers-Douglas further testified that in the event that hydrocarbons are discovered in commercial quantities below the Broom Creek Formation in the area of the storage facilities,

directional or horizontal wells could be used to produce hydrocarbons while avoiding drilling through the $CO_2$ plume, or a vertical well could be drilled using proper controls.

Further, there are no oil bearing formations or other hydrocarbon reserves located within the boundaries of the storage facilities. While the North Dakota Geological Survey recognizes the Spearfish Formation as the only potential oil bearing formation above the Broom Creek Formation, production from the Spearfish Formation is limited to the northern tier of counties in western North Dakota. Furthermore, there has not been historic hydrocarbon exploration in, or production from, formations below the Broom Creek Formation in the storage facility area. Section 2.6 of each application provides information concerning historical oil production in the area of the storage facility.

## II. General Opposition.

a. Meda Schultz

Ms. Meda Schultz made the following comments: "Summit's proposal serves an old, dying, and harmful industry: the Oil, Gas, and Chemical Industry." Ms. Schultz also indicated, "It is time to look for new energy sources."

**RESPONSE:** The Applicants understand that not everyone is in favor of this project. While the Applicants appreciate Ms. Schultz's response, the Applicants disagree with her position. The project serves to support the bio-fuel and agricultural industries, not the oil, gas and chemical industries.

b. Fay Horn f/k/a Fay Hill

Ms. Fay Hill commented as follows: "Summit Carbon Storage has a bad reputation as far as respect to land owners."

**RESPONSE:** Applicants have acquired in excess of 92% of the pore space lease agreements across all three units with broad landowner support. In addition, Applicants have acquired 100% voluntary easements for its flowlines in the sequestration area.

c. Gary Boekel

Mr. Gary Boekel commented that North Dakota is not the place for carbon dioxide storage. Gary raised concerns about damage to roads.

**RESPONSE:** Applicants have worked with and will continue working with the appropriate townships and counties regarding road use and road repair.

d. Dakota Resource Council

The Dakota Resource Council's comments suggest that the NDIC should not proceed with a decision on this matter until there is a resolution to the constitutionality of amalgamation.

**RESPONSE:** Summit's position is that the NDIC should continue to proceed according to the North Dakota Century Code. DRC's comments are tantamount to judicial activism.

e. Ms. Emma Schmit & Ms. Janet Miller

Ms. Emma Schmit and Ms. Janet Miller submitted comments that are similar to the Dakota Resource Council. Their concerns are primarily focused on a lack of environmental justice (EJ) considerations by the North Dakota Industrial Commission.

**RESPONSE:** Applicants believe that the North Dakota Industrial Commission has jurisdiction.

f. Ms. Kathy Carter

Ms. Kathy Carter's concerns are primarily focused on whether the $CO_2$ will travel through multiple "strata" contaminating underground water sources.

**RESPONSE:** These concerns are addressed by the Applicants both in its applications and through testimony at the hearings.

g. Ms. Lisa Ritzert

Ms. Lisa Ritzert's concerns are primarily focused on pipeline safety.

**RESPONSE:** Applicants stated in their testimony that the flowlines that are a part of the sequestration projects will be built in accordance with standards set forth in 49 CFR 195.

## III. General and Landowner Support.

The Applicants believe that the supporting comments provided in these Cases are indicative of the over 450 landowners who entered into voluntary agreements for the development of their pore space.

Should you have any questions, please advise.

Sincerely,

LAWRENCE BENDER

LB/tjg
#82900553v1

Cc: Summit Carbon Storage #1, LLC (*via e-mail only*)
Summit Carbon Storage #2, LLC (*via e-mail only*)
Summit Carbon Storage #3, LLC (*via e-mail only*)

**BEFORE THE INDUSTRIAL COMMISSION**
**OF THE STATE OF NORTH DAKOTA**

**CASE NOS. 30869–30880**

**In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1,**

**11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by**

**nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of**

**carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the**

**Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## CERTIFICATE OF SERVICE

[¶ 1] I, the undersigned, hereby certify that a true and correct copy of the following documents:

1. Response to the North Dakota Industrial Commission's Supplemental Filing Request; and
2. Response to Public Comments.

were, on June 24, 2024, filed electronically with the North Dakota Industrial Commission and served upon the following via electronic mail:

| | |
|---|---|
| Mark Bohrer<br>mbohrer@nd.gov | David Garner<br>dpgarner@nd.gov |

Sara Forsberg
slforsberg@nd.gov

Amy Knutson
anknutson@nd.gov

Derrick Braaten
derrick@braatenlawfirm.com

Joshua Swanson
jswanson@vogellaw.com

Dated this 24th day of June, 2024.

By: _____

Lawrence Bender (#03908)
lbender@fredlaw.com
**FREDRIKSON & BYRON, P.A.**
304 East Front Avenue, Suite 400
Bismarck, ND 58504
(701) 221-8700
*Attorneys for Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC and Summit Carbon Storage #3, LLC*

#82901726v1

**Storage Facility Permit Application – Supplemental Filing**
June 24, 2024

| SCS1 Doc # | SCS2 Doc # | SCS3 Doc # | Location within Application | Supplement Requested |
|---|---|---|---|---|
| **1A** | **1B** | **1C** | N/A | A listing of all environmental permits, construction approvals, or any other relevant permit received or applied for from the commission or any other federal, state, or local regulatory agency. |
| **2A** | **2B** | **2C** | N/A | Provide the location, including state, of the capture facilities associated with this project. |
| **3A** | **3B** | **3C** | **Section 1.0**<br>Storage Agreement<br>& Pore Space Lease | **Revise the following sections of each Storage Agreement:**<br>Section 2.4 - Correcting Errors (Typographical error; Mechanical to Mathematical)<br>Sections 3.3 - Amendment of Leases and Other Agreements (No change in terms to existing leases)<br>Section 7.1 - Warranty and Indemnity (Limit the warranty requirements consistent with discussion)<br>Section 8.1 - Grant of Easement (Easement terms are limited by no surface facilities clauses & and if a lease is in place, the lease shall be controlling document)<br>Section 10.2 - Waiver of Rights to Partition (Strike)<br>Section 15.1 - Term (Typographical error; bold and underline "Term.")<br>Section 16.2 - Joinder in Dual Capacity (Revise language)<br><br>**Revise Exhibit D - Form of Pore Space Lease**<br>18. Warranty of Title and Quiet Enjoyment (Revise consistent with Section 7.1 above)<br>25. Confidentiality (Strike)<br>34. Insurance (Revise regarding subrogation rights) |
| N/A | N/A | **3C** | **Section 1.0**<br>Storage Agreement | Revise Storage Agreement to include Section 3.12, Border Agreement(s) with Minnkota Power Cooperative, Inc. |
| N/A | N/A | **3C** | Land Description Details | Revise Unit Legal Description (Tract 23 & Tract 56) |
| **4A** | **4B** | **4C** | **Section 3.0** | Provide an explanation on mercury injection capillary pressure data modifications, single sampling performance, and adjustment of the mercury fluid properties to the CO2 fluid properties. |
| **5A** | **5B** | **5C** | **Section 3.0** | Provide an explanation on anhydrite precipitation vs dissolution as modeled in the Broom Creek for this permit, as compared to other Class VI permits. |
| **6A** | N/A | N/A | **Section 4.0** | Identify the distance of the closest wind turbine to the NDL-327 flowline. |
| **7A** | **7B** | **7C** | **Section 5.0** | Identify the distance of the closest occupied dwelling to each flowline and injection site. |
| **8A** | **8B** | **8C** | **Section 5.0** | Clarify statements regarding flowmeters made by Mr. James Powell during the June 12, 2024 hearing. |

| SCS1 Doc # | SCS2 Doc # | SCS3 Doc # | Location within Application | Supplement Requested |
|---|---|---|---|---|
| **9A** | **9B** | **9C** | **Section 5.3.1** Corrosion Prevention | Clarify whether Summit anticipates any cathodic protection boreholes to be drilled or will this system utilize anode beds entirely. |
| **10A** | **10B** | **10C** | **Section 7.5.1** Response Personnel and Equipment | Revise "(A)ssistance has been secured from local emergency services to implement this ERRP," to "(F)urther collaboration with local emergency services will occur to further develop and implement this ERRP," from page 7-17. |
| **11A** | **11B** | **11C** | **Appendix C** | Provide clarification on net change calculation of mineral precipitation vs. dissolution as seen in Figure C-13 and confirm if net change is positive or negative. |
| **12A** | **12B** | **12C** | **Appendix C** | Provide clarification on net change calculation of mineral precipitation vs. dissolution as seen in Figure C-22 and confirm if net change is positive or negative. |

**ACKNOWLEDGEMENTS**

Prior to commencement of injection operations, SCS1, SCS2, and SCS3 will provide an updated Worker Safety Plan that includes a list of site specific training and the training itself for DMR inspection staff.

Prior to commencement of injection operations, SCS1, SCS2, and SCS3 will provide a revised Emergency Remedial Response Plan.

## SUPPLEMENTAL #1B

**Request:** A listing of all environmental permits, construction approvals, or any other relevant permit received or applied for from the commission or any other federal, state, or local regulatory agency.

**Response:** Please see subsequent pages for a table listing permits associated with this project. Please note, identical information is also being provided as a supplement for Summit Carbon Storage #1, LLC and Summit Carbon Storage #3, LLC.

# ENVIRONMENTAL PERMITS, CONSTRUCTION APPROVALS

SUMMIT CARBON SOLUTIONS

| Permit / Approval | Issuing Authority | Status | Description of Permit / Approval | Permit No./Notes |
|---|---|---|---|---|
| **Temporary Use Permit** | Mercer County Board of Commissioners | Received | Archie Erickson 2 - Stratigraphic Test Well | Permit No. 573 |
| **Temporary Use Permit** | Mercer County Board of Commissioners | Received | Milton Flemmer 1 - Stratigraphic Test Well | Permit No. 574 |
| **Temporary Use Permit** | Mercer County Board of Commissioners | Received | BK Fischer 1 & 2 - Stratigraphic Test Wells | Permit No. 616 |
| **Utility Occupancy Application and Permit (Road Crossing Permits)** | | | | |
| | Mercer County Board of Commissioners | Applied For | 60th Ave SW | Permit No. NEP-RDX-TKL-0001-0-NDME |
| | Mercer County Board of Commissioners | Applied For | 24th St SW | Permit No. NEP-RDX-TKL-0002-0-NDME |
| | Mercer County Board of Commissioners | Applied For | 22nd St SW | Premit No. NEP-RDX-TKL-0003-0-NDME |
| | Mercer County Board of Commissioners | Applied For | 62nd Ave SW | Permit No. NEP-RDX-TKL-0004-0-NDME |
| | Mercer County Board of Commissioners | Applied For | 23rd St SW | Permit No. NEP-RDX-TKL-0005-0-NDME |
| **Temporary Construction Entrance Permit** | | | | |
| | Mercer County Road Superintendent | Received | 60th Ave SW | Permit No. 130(23) NEP-RCE-TKL-0001-0-NDME |
| | Mercer County Road Superintendent | Received | 60th Ave SW | Permit No. 129(23) NEP-RCE-TKL-0002-0-NDME |
| | Mercer County Road Superintendent | Received | 24th St SW | Permit No. 128(23) NEP-RCE-TKL-0003-0-NDME |
| | Mercer County Road Superintendent | Received | 24th St SW | Permit No. 127(23) NEP-RCE-TKL-0004-0-NDME |
| | Mercer County Road Superintendent | Received | 22nd St SW | Permit No. 126(23) NEP-RCE-TKL-0005-0-NDME |
| | Mercer County Road Superintendent | Received | 22nd St SW | Permit No. 125(23) NEP-RCE-TKL-0006-0-NDME |
| | Mercer County Road Superintendent | Received | 62nd Ave SW | Permit No. 132(23) NEP-RCE-TKL-0007-0-NDME |
| | Mercer County Road Superintendent | Received | 62nd Ave SW | Permit No. 131(23) NEP-RCE-TKL-0008-0-NDME |
| **Permanent Drive Permit** | | | | |
| | Mercer County Road Superintendent | Received | Permit to construct one commercial driveway on County Roadway - 62nd Ave SW | Access to BK Fischer Well Pad Permit No. 133(23) |
| **Permanent County Road Modifications** | | | | |
| | Mercer County Road Superintendent & Mercer County Board of Commissioners | Received | Approval to modify approximately 1813' of north-south road segment of 62nd Ave SW and adjacent county road ditches starting at the intersection of 21st St SW & 62nd Ave SW south towards BK Fischer well pad common to Sections 22 & 23, T142N, R88W. | Access to BK Fischer Well Pad |

# ENVIRONMENTAL PERMITS, CONSTRUCTION APPROVALS

SUMMIT CARBON SOLUTIONS

| Permit / Approval | Issuing Authority | Status | Description of Permit / Approval | Permit No./Notes |
|---|---|---|---|---|
| **Permanent County Road Modifications** *Continued* | Mercer County Road Superintendent & Mercer County Board of Commissioners | Received | Approval to modify approximately 2320' of east-west road segment, adjacent county road ditches, and approaches of 21st St SW starting at the intersection of 21st St SW & 62nd Ave SW common to Sections 14 & 23, T142N, R88W. | Access to BK Fischer Well Pad |
| **911 Address** | Mercer County Emergency Manager | Received | Milton Flemmer<br>2905 Hwy 49, Glen Ullin, ND 58631 | N/A |
| | Mercer County Emergency Manager | Received | Archie Erickson<br>1970 Hwy 49, Beulah, ND 58523 | N/A |
| | Mercer County Emergency Manager | Received | BK Fischer<br>2145 62nd Ave SW, Beulah, ND 58523 | N/A |
| | Oliver County Emergency Manager | Received | TB Leingang<br>2641 59th Ave SW, Beulah, ND 58523 | N/A |
| | Oliver County Emergency Manager | Received | KJ Hintz<br>5202 20th St SW, Hazen, ND 58545 | N/A |
| | Oliver County Emergency Manager | Received | Slash Lazy H<br>1825 53rd Ave SW, Hazen, ND 58545 | N/A |
| **Oliver County Drive Permit** | | | | |
| | Oliver County Road Superintendent | Received | TB Leingang Pad | N/A |
| | Oliver County Road Superintendent | Received | KJ Hintz Pad | N/A |
| **Utility Occupancy Application and Permit (Road Crossing Permits)** | | | | |
| | Oliver County Board of Commissions | Applied For | 53RD AVE | Permit No. NEP-RDX-TKL-0016-0-NDOL |
| | Oliver County Board of Commissions | Applied For | 54TH AVE | Permit No. NEP-RDX-TKL-0017-0-NDOL |
| | Oliver County Board of Commissions | Applied For | 55TH AVE | Permit No. NEP-RDX-TKL-0018-0-NDOL |
| | Oliver County Board of Commissions | Applied For | 56TH AVE | Permit No. NEP-RDX-TKL-0019-0-NDOL |
| | Oliver County Board of Commissions | Applied For | 57TH AVE | Permit No. NEP-RDX-TKL-0020-0-NDOL |
| | Oliver County Board of Commissions | Applied For | 58TH AVE | Permit No. NEP-RDX-TKL-0021-0-NDOL |
| | Oliver County Board of Commissions | Applied For | 59TH AVE | Permit No. NEP-RDX-TKL-0022-0-NDOL |
| | Oliver County Board of Commissions | Applied For | 21ST ST | Permit No. NEP-RDX-TKL-0023-0-NDOL |
| | Oliver County Board of Commissions | Applied For | 24TH ST | Permit No. NEP-RDX-TKL-0024-0-NDOL |
| | Oliver County Board of Commissions | Applied For | 26TH ST | Permit No. NEP-RDX-TKL-0025-0-NDOL |
| | Oliver County Board of Commissions | Applied For | 25TH ST | Permit No. NEP-RDX-TKL-0026-0-NDOL |
| | Oliver County Board of Commissions | Applied For | 59TH AVE | Permit No. NEP-RDX-TKL-0027-0-NDOL |
| **Construction General Permit** | | | | |
| | North Dakota Department of Environmental Quality Division of Water Quality | Received | Milton Flemmer 1 | Coverage Under the 2020 reissued construction general permit (NDR11-0000)<br>Permit No. NDR111598 |
| | North Dakota Department of Environmental Quality Division of Water Quality | Received | Archie Erickson 2 | Coverage Under the 2020 reissued construction general permit (NDR11-0000)<br>Permit No. NDR111597 |

# ENVIRONMENTAL PERMITS, CONSTRUCTION APPROVALS

SUMMIT CARBON SOLUTIONS

| Permit / Approval | Issuing Authority | Status | Description of Permit / Approval | Permit No./Notes |
|---|---|---|---|---|
| **Construction General Permit** *Continued* | North Dakota Department of Environmental Quality Division of Water Quality | Received | Slash Lazy H 5 | Coverage Under the 2020 reissued construction general permit (NDR11-0000) Permit No. NDR111608 |
| **NDDOT Driveway Permission** | | | | |
| | North Dakota Department of Transportation District 5 - Dickinson | Received | Milton Flemmer1 - Permit to construct/maintain approach from Hwy 49 to well pad | Permit No: 2106 |
| | North Dakota Department of Transportation District 5 - Dickinson | Received | Archie Erickson - Permit to construct/maintain approach from Hwy 49 to well pad | Permit No: 2105 |
| **NDDOT Utility Occupancy Permit** | | | | |
| | North Dakota Department of Transportation District 5 - Dickinson | Received | Permit to bore 24" steel pipe without encasement conveying CO2 across Highway 49 between Sections 1 & 2. T141N. R88W. | Permit No. NEP-RDX-TKL-0034-0-NDDT |
| **Application for Permit for New Well - Vertical Stratigraphic Test** | | | | |
| | North Dakota Industrial Commission - Oil & Gas Division | Received | Milton Flemmer1 - Stratigraphic Test Well | NDIC Well File No. 38594 |
| | North Dakota Industrial Commission - Oil & Gas Division | Received | Archie Erickson 2 - Stratigraphic Test Well | NDIC Well File No. 38622 |
| | North Dakota Industrial Commission - Oil & Gas Division | Received | Slash Lazy H5 - Stratigraphic Test Well | NDIC Well File No. 38701 |
| | North Dakota Industrial Commission - Oil & Gas Division | Received | TB Leingang 1 - Stratigraphic Test Well | NDIC Well File No. 40158 |
| | North Dakota Industrial Commission - Oil & Gas Division | Received | TB Leingang 2 - Stratigraphic Test Well | NDIC Well File No. 40178 |
| | North Dakota Industrial Commission - Oil & Gas Division | Received | BK Fischer 1 - Stratigraphic Test Well | NDIC Well File No. 40124 |
| | North Dakota Industrial Commission - Oil & Gas Division | Received | BK Fischer 2 - Stratigraphic Test Well | NDIC Well File No. 40125 |
| | North Dakota Industrial Commission - Oil & Gas Division | Received | KJ Hintz 1 - Stratigraphic Test Well | NDIC Well File No. 40127 |
| | North Dakota Industrial Commission - Oil & Gas Division | Received | KJ Hintz 2 - Stratigraphic Test Well | NDIC Well File No. 40128 |
| **Class VI Storage Facility Permit** | | | | |
| | North Dakota Industrial Commission - Oil & Gas Division | Applied For | Summit Carbon Storage #1, LLC - TB Leingang | N/A |
| | North Dakota Industrial Commission - Oil & Gas Division | Applied For | Summit Carbon Storage #2, LLC - BK Fischer | N/A |
| | North Dakota Industrial Commission - Oil & Gas Division | Applied For | Summit Carbon Storage #3, LLC - KJ Hintz | N/A |
| **Subpart RR Monitoring, Reporting, and Verification (MRV) Plan** | | | | |
| | U.S. Environmental Protection Agency Greenhouse Gas Reporting Program (GHGRP) | Applied For | Summit Carbon Storage #1, LLC - TB Leingang | N/A |
| | U.S. Environmental Protection Agency Greenhouse Gas Reporting Program (GHGRP) | Applied For | Summit Carbon Storage #2, LLC - BK Fischer | N/A |
| | U.S. Environmental Protection Agency Greenhouse Gas Reporting Program (GHGRP) | Applied For | Summit Carbon Storage #3, LLC - KJ Hintz | N/A |

## SUPPLEMENTAL #2B

**Request**: Provide the location, including state, of the capture facilities associated with this project.

**Response**: Exhibit 3A, MCE Project Overview Map, was provided during the storage facility permit hearing as a revised Figure PS-2, MCE Project overview map. Exhibit 3A updated Summit Carbon Solutions, LLC's partner facilities from 32 to 57. A supplement was requested during the storage facility permit hearing to describe the capture facilities with respect to their locations. Please note, the provided map is not intended to replace Figure PS-2 and an identical map has been provided for Summit Carbon Storage #1, LLC and Summit Carbon Storage #3, LLC.

# SUMMIT CARBON SOLUTIONS SYSTEM OVERVIEW

## Iowa Plants

| Label | Name | City |
|---|---|---|
| ABSE | Absolute Energy LLC | St. Ansgar |
| CLPG | Corn LP | Goldfield |
| GGEM | Golden Grain Energy, LLC | Mason City |
| GPIS | Green Plains Inc. (Superior) | Superior |
| GPSH | Green Plains Inc. (Shenandoah) | Shenandoah |
| HESL | Homeland Energy Solutions | Lawler |
| LDGJ | Louis Dreyfus - Grand Junction | Grand Junction |
| LSCP | Little Sioux Corn Processors | Marcus |
| LWEN | Lincolnway Energy LLC | Nevada |
| PELM | Plymouth Energy LLC | Merrill |
| PLCP | Pine Lake Corn Processors LLC | Steamboat Rock |
| PTAR | POET Bioprocessing (Arthur) | Arthur |
| PTAS | POET Bioprocessing (Ashton) | Ashton |
| PTCN | POET Bioprocessing (Corning) | Corning |
| PTCR | POET Bioprocessing (Coon Rapids) | Coon Rapids |
| PTEB | POET Bioprocessing (Emmetsburg) | Emmetsburg |
| PTFB | POET Bioprocessing (Fairbank) | Fairbank |
| PTGW | POET Bioprocessing (Gowrie) | Gowrie |
| PTHL | POET Bioprocessing (Hanlontown) | Hanlontown |
| PTIF | POET Bioprocessing (Iowa Falls) | Iowa Falls |
| PTJW | POET Bioprocessing (Jewell) | Jewell |
| PTML | POET Bioprocessing (Menlo) | Menlo |
| PTSR | POET Bioprocessing (Shell Rock) | Shell Rock |
| QCCP | Quad County Corn Processors | Galva |
| SECS | Siouxland Energy Cooperative | Sioux Center |
| VLAC | Valero Renewables (Albert City) | Albert City |
| VLCC | Valero Renewables (Charles City) | Charles City |
| VLFD | Valero Renewables (Fort Dodge) | Fort Dodge |
| VLHA | Valero Renewables (Hartley) | Hartley |
| VLLK | Valero Renewables (Lakota) | Lakota |

## South Dakota Plants

| Label | Name | City |
|---|---|---|
| DELW | Dakota Ethanol LLC | Wentworth |
| GEVO | GEVO | Lake Preston |
| GLEA | Glacial Lakes Energy LLC (Aberdeen) | Aberdeen |
| GLEH | Glacial Lakes Energy LLC (Huron) | Huron |
| GLEM | Glacial Lakes Energy LLC (Mina) | Mina |
| GLEW | Glacial Lakes Energy LLC (Watertown) | Watertown |
| NUGE | NuGen Energy, LLC | Marion |
| PTBS | POET Bioprocessing (Big Stone) | Big Stone City |
| PTCH | POET Bioprocessing (Chancellor) | Chancellor |
| PTGR | POET Bioprocessing (Groton) | Groton |
| PTHD | POET Bioprocessing (Hudson) | Hudson |
| PTMT | POET Bioprocessing (Mitchell) | Mitchell |
| REFO | Ringneck Energy & Feed LLC | Onida |
| RFER | Redfield Energy LLC | Redfield |
| VLAU | Valero Renewables (Aurora) | Aurora |

## North Dakota Plants

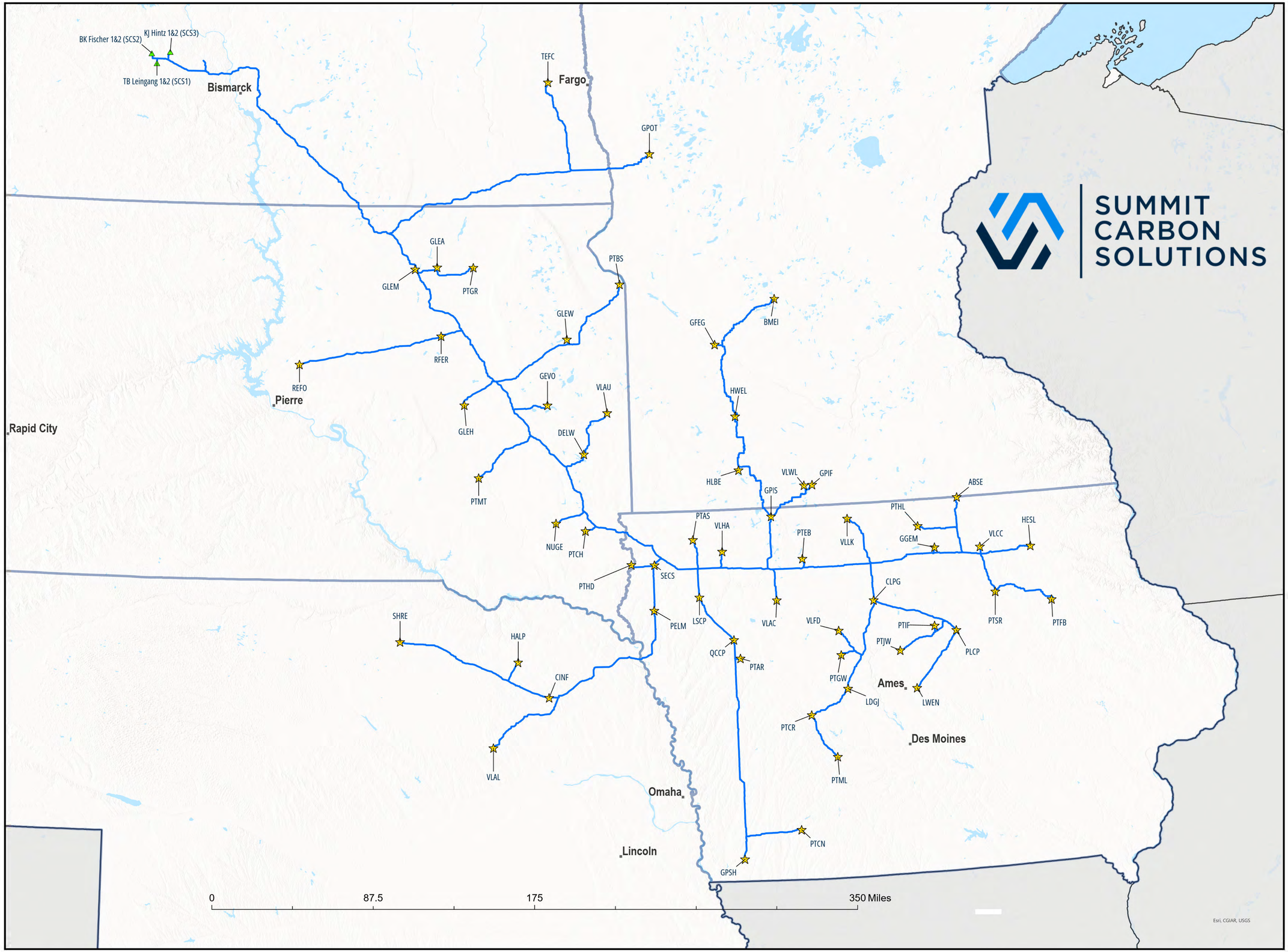
| Label | Name | City |
|---|---|---|
| TEFC | Tharaldson Ethanol | Casselton |

## Minnesota Plants

| Label | Name | City |
|---|---|---|
| BMEI | Bushmills Ethanol Inc | Atwater |
| GFEG | Granite Falls Energy LLC | Granite Falls |
| GPIF | Green Plains Inc. (Fairmont) | Fairmont |
| GPOT | Green Plains Inc. (Otter Tail) | Fergus Falls |
| HLBE | Heron Lake BioEnergy LLC | Heron Lake |
| HWEL | Highwater Ethanol LLC | Lamberton |
| VLWL | Valero Renewables (Welcome) | Welcome |

## Nebraska Plants

| Label | Name | City |
|---|---|---|
| CINF | CIE - Norfolk | Norfolk |
| HALP | Husker Ag LLC | Plainview |
| SHRE | Sand Hills Renewable Energy | Atkinson |
| VLAL | Valero Renewables (Albion) | Albion |



## SUPPLEMENTAL #3B

**Request:** Revise the following sections of each Storage Agreement:

Section 2.4 – Correcting Errors

Sections 3.3 – Amendment of Leases and Other Agreements

Section 7.1 – Warranty and Indemnity

Section 8.1 – No Surface Occupancy

Section 10.2 – Waiver of Rights to Partition

Section 15.1 – Term

Section 16.2 – Joinder in Dual Capacity

Revise Pore Space Lease – EXHIBIT D:

Section 18 – Warranty of Title and Quiet Enjoyment

Section 25 – Confidentiality

Section 34 – Insurance

**Response**: Clean and red lined drafts of each Storage Agreement are enclosed herewith.

## SUPPLEMENTAL #4B

**Request:** Provide an explanation on mercury injection capillary pressure data modifications, single sampling performance, and adjustment of the mercury fluid properties to the CO2 fluid properties.

**Response:** The following narrative provides the requested explanation. Please note, identical information has been provided as a supplement for Summit Carbon Storage #1, LLC and Summit Carbon Storage #3, LLC.

## MERCURY INJECTION CAPILLARY PRESSURE FLUID PROPERTY ADJUSTMENTS AND MODELING MODIFICATIONS

### TBL-MF1/BKF-AE2/KJH-SLH5

Adjustments from mercury fluid properties to carbon dioxide ($CO_2$) fluid properties are necessary to perform numerical simulations. Mercury injection capillary pressure (MICP) must be converted from the laboratory-derived air/mercury system to the brine/$CO_2$ system. Relative permeability is derived using Corey correlation[1] for the brine/$CO_2$ system for all samples tested with varying characteristics throughout the reservoir interval.

Core samples were selected to represent the petrophysical characteristics of each rock type populating the geological model. Samples were tested using the high-pressure mercury injection (HPMI) technique to determine the capillary pressure regime of the reservoir and upper and lower confining zones.

For each sample where HPMI data are available, the pressure and temperature are estimated using the corresponding gradients attained from well-drilling activities.

The brine/$CO_2$ capillary pressure data are calculated from the air/mercury capillary pressure using the relationship below where the interfacial tension (IFT) and contact angle (CA) are measured in the laboratory under reservoir conditions (temperature, pressure, and brine salinity).

Capillary pressure curves are calculated for all samples under laboratory conditions from MICP data considering the porosity and permeability of the core using the rock quality index (RQI) equation where (Equation 1):

$$\text{RQI } (\mu\text{m}) = \sqrt{\frac{K}{\Phi_e}} \qquad \text{[Eq. 1]}$$

where K is the sample permeability (md).
where $\Phi_e$ is the effective porosity of the sample.

Calculated capillary pressure curves from the MICP data were modified and scaled to the numerical simulation model conditions using the model's RQI for the five representative facies (SFP [storage facility permit] Figures 3-5–3-9), using the relationship: *Model (formation) Pc = Lab Pc * (Lab RQI/Model RQI)*. The capillary entry pressure values applied in the model were determined by deriving a ratio between the RQI of core sample data within the modeled region to scale the capillary entry pressure value derived from core testing (SFP Table 3-3) to the numerical simulation model. This resulted in two different ratios derived first from MICP data and second from the RQI porosity and permeability properties for each of the modeled facies. Because of the differences in the statistical distributions of the porosity (guided by seismic inversion) and permeability (based on porosity–permeability regression) and entry pressure by facies across the modeled area vs. each well/core-based calibration data point, the modification or application of the RQI ratio (SFP Table 3-3; Multiplication Factor) for each facies and respective capillary pressure distribution in the simulation model was necessary.

[1] Brooks, R.H., and Corey, A.T., 1964, Hydraulic properties of porous media: Hydrology Papers, Colorado State University, Fort Collins, Colorado, no. 3, 37 p.

## SUPPLEMENTAL #5B

**Request:** Provide an explanation on anhydrite precipitation vs dissolution as modeled in the Broom Creek for this permit, as compared to other Class VI permits.

**Response:** The following narrative provides requested explanation.

## ANHYDRITE PRECIPITATION VS. DISSOLUTION AS MODELED IN THE BROOM CREEK FOR THE SCS PERMITS, AS COMPARED TO OTHER NORTH DAKOTA CLASS VI PERMITS

### TBL-MF1/BKF-AE2/KJH-SLH5

Mineral reaction (dissolution and/or precipitation) is a site-specific, simultaneous, and complex process that depends on many factors such as reservoir conditions (initial temperature, pressure, and salinity), the elevated pressure during injection, $CO_2$ stream composition, amount of $CO_2$ dissolved, resulting pH, mineral composition and their kinetics, and brine chemistry (initial pH, cation/anions and their concentration levels). Dolomite dissolution and subsequent anhydrite precipitation is observed in the Broom Creek Formation geochemical modeling for all three Summit Carbon Solutions (SCS) sites—TBL-MF1, BKF-AE2, and KJH-SLH5—and documented in the storage facility permit applications. Dolomite dissolution is observed during the 20 years of injection and after that during postinjection, where dolomite dissolution decreases gradually.

Mineral reactions in the Broom Creek Formation from five previously approved North Dakota Class VI permits were reviewed as part of this supplemental request. Factors, such as those previously described, were compared to SCS site-specific mineral reactions to understand if conclusions could be drawn as to why SCS sees anhydrite precipitation rather than dissolution and dolomite dissolution rather than precipitation. Across all three SCS permits, these geochemical behaviors may be associated with the high salinity in the formation brine (total dissolved solids >80,000 ppm, i.e., higher ion concentration levels), resulting in high brine acidity from the injection and higher dolomite content over the anhydrite content, creating an aqueous environment undersaturated with respect to dolomite mineral and thus resulting in dolomite dissolution.

Solubility of anhydrite ($CaSO_4$) is controlled by reservoir temperature, pressure, formation brine chemistry ($Ca^{2+}$ and $SO_4^{2-}$ concentration levels), and mineral composition. At high reservoir temperatures and pressures under a favorable aqueous environment with sufficient $Ca^{2+}$ and $SO_4^{2-}$ in the aqueous solution, the anhydrite solubility gradually decreases as carbonate solubility increases because of dolomite dissolution and enhances the precipitation of anhydrite.[2] For the SCS sites, dolomite dissolution (Figure C-7), alongside increasing carbonate solubility, results in $Ca^{2+}$-rich in situ formation brine (3060 mg/L). The resulting formation brine with increased $Ca^{2+}$ ions, coupled with existing high $SO_4^{2-}$concentration (2400 mg/L), would favor precipitation of anhydrite.

[2] Jun, P., Xuelong, W., Haodong, H., Shen, Y., Qingsong, X., and Bin, L.I., 2018, Simulation for the dissolution mechanism of Cambrian carbonate rocks in Tarim Basin, NW China: Petroleum Exploration and Development, v. 45, no. 3, p. 431–441.

## SUPPLEMENTAL #7B

**Request:** Identify the distance of the closest occupied dwelling to each injection site and NDL-325 flowline.

**Response:** The nearest occupied dwelling to the SCS2 injection site (BK Fischer 1 & BK Fischer 2) is over 2,200 feet from the center of the BK Fischer pad. The landowners at this dwelling are participating in the project.

The nearest occupied dwelling to the SCS2 NDL-325 flowline is over 1,100 feet. The landowners at this dwelling are participating in the project.

## SUPPLEMENTAL #8B

**Purpose:** Clarify statements made by Mr. James Powell during June 12, 2024 hearing. Please note, an identical narrative has been provided for Summit Carbon Storage #1, LLC and Summit Carbon Storage #3, LLC.

**Response:** The following narrative has been provided.

## $CO_2$ METERING

## TBL-MF1/BKF-AE2/KJH-SLH5

During the NDIC hearings on June 12, 2024, James Powell was asked "Would Summit be opposed to a requirement that would require a flowmeter at the beginning of the individual flow lines and an actual custody transfer happening as it moves from one line into another?" Although Summit does not object to this requirement, as stated by James Powell, Summit does not believe the additional custody transfer points add significant value to the accuracy of metering and/or the leak detection system.

Summit's leak detection and metering system looks at the system as a whole rather than individual entities. With the existing custody transfer points and flowmeters, at the terminus point as well as each individual injection well, which equates to seven flowmeters across the approximate 20 miles of flowlines, Summit receives the granular metering information required to efficiently operate the leak detection and metering system.

In the unlikely event of a release, under the proposed metering plan, Summit can allocate losses based on the proportion of flow going to the individually impacted sequestration sites from metering data gathered at the terminus as well as the individual injection wells. To further expand how the integrated metering and leak detection system works, between each metered segment a line balance (over/short) will be calculated using each segments flow in and flow out. In the unlikely event that a leak occurs, the flow out of a segment would drop and alert the controller. Under normal operations, a segment would report the same flowrate in, and out. A total system inventory balance uses all receipt/delivery meters plus line pressures along the route to show a real-time total line inventory. The line inventory is designed to catch a small release over time. Summit's segmented line balance divides the pipeline into many smaller segments as opposed to 2500 miles. Multiple leak detection systems will be utilized, the above mentioned are two of five systems incorporated into the pipeline. A rupture detection system installed at approximately 25-mile increments will use speed of sound measurements to detect, locate, and alarm to the controller. A CPM system uses machine learning and reports any deviations from normal operations. Finally, a real-time transient model (RTTM) uses the hydraulic gradients, pump pressures, line pressures, and elevations reflected along the entirety of the pipeline to show the system health. This layered approach does not rely on one method, but each play a part in the overall system protection.

Summit's recommendation would be to require additional custody transfer metering points, in the future, if one of the sites were to be sold. This would align with industry best practices. The ownership demarcation that exists today may not in fact be the point of sale if one were to occur in the future which could then require additional metering. Since no sale has been contemplated, it is Summit's opinion that designing and operating for one would be premature. Likewise, the downside of additional custody transfer points (flowmeters) is on the operations, maintenance, and reliability side. It requires additional resources to calibrate meters and stream quality analyzers. It would also require the addition of a 24" smart tool receiver and launcher.

## SUPPLEMENTAL #9B

**Request:** Clarify whether Summit anticipates any cathodic protection boreholes to be drilled or will this system utilize anode beds entirely.

**Response:** The following narrative provides requested clarification.

## CATHODIC PROTECTION BOREHOLES

As stated in Section 5.3.1, Corrosion Prevention, SCS1, SCS2, and SCS3 will install an impressed current cathodic protection system along the buried flowline to mitigate the threat of external soil corrosion on the line. SCS1, SCS2, and SCS3 plan on using vertical boreholes. Per the existing language in SCS1, SCS2 and SCS3 permits in Section 5.3.1.1; SCS1, SCS2, and SCS3 will provide DMR-O&G with a map of cathodic protection borehole locations to meet N.D.A.C. § 43-05-01-05(1)(a) prior to injection.

## SUPPLEMENTAL #10B

**Request:** Revise "(A)ssistance has been secured from local emergency services to implement this ERRP," to "(F)urther collaboration with local emergency services will occur to further develop and implement this ERRP," from page 7-17.

**Response:** Page 7-17 of Section 5.3.1 has been revised accordingly.

- Pipeline Control dispatches LRT to investigate the incident and notifies the QI.
- CRC arrives at the incident site and completes initial response actions. A designated CRC member will fill the initial IC position.
- The IC will conduct a risk assessment and coordinate with the QI to determine what ICS positions need to be filled for the LRT.
- The QI or IC will establish liaison with the local emergency coordinating agencies, such as the 911 emergency call centers or county emergency managers in lieu of communicating individually with each fire, police, or other public entity.
- If the response exceeds local capabilities, the IC will coordinate with the QI to determine the need for mobilization of a CST.

## 7.5 Response Personnel/Equipment and Training

### *7.5.1 Response Personnel and Equipment*

Designated company personnel will undergo hazardous waste operations and emergency response training (HAZWOPER) in accordance with guidelines produced and maintained by the Occupational Safety and Health Administration (OSHA) (OSHA 29 Code of Federal Regulations [CFR] § 1910.120). In addition, further collaboration with local emergency services will occur ~~assistance has been secured from local emergency services~~ to further develop and implement this ERRP as shown in Figures 7-2 through 7-5.

Equipment (including appropriate PPE) needed in the event of an emergency and remedial response will vary, depending on the emergency event. Response actions (e.g., cessation of injection, well shut-in, and evacuation) will generally not require specialized equipment to implement. However, when specialized equipment is required (such as a drilling rig, logging equipment, or potable water hauling, etc.), one of the primary contacts listed in Table 7-3 is responsible for procurement of this equipment. One of the primary contacts listed in Table 7-3 is also responsible to maintain a list of contractors and equipment vendors (Section 7.6).

The company will provide personnel, training, equipment, instruments, tools, and material as needed to respond to an emergency incident.

- All local company personnel are available for callout as needed for duty on a 24-hour basis to support public safety agencies.
- Additional personnel, if required, will be acquired from agency responders from public safety agencies and/or response contractors.
- If public authorities are involved, they will be given full cooperation and assistance. In no event shall such cooperation and assistance violate safety rules or consist of actions that would endanger the public or employees.

## SUPPLEMENTAL #11B

**Request:** Provide clarification on net change calculation of mineral precipitation vs. dissolution as seen in Figure C-13 and confirm if net change is positive or negative.

**Response:** The following narrative supplies requested information.

## MINERAL PRECIPITATION VS. DISSOLUTION NET CHANGE (FIGURE C-13)

## BKF–AE2

Mineral dissolution and precipitation are simultaneous. Because of dissolution of any reactive in situ minerals, change in mass (initial-dissolved) was calculated for the entire simulation period, and that calculation provides net dissolution of minerals. In C1, net dissolution of all in situ minerals is 0.4 kg. Concurrent precipitation of any primary or secondary minerals was also considered. In C1, net precipitation of all primary or secondary minerals is 0.25 kg. Mineral dissolution dominated over precipitation, and therefore the total change in mass is negative, which is 0.15 kg per cubic meter. In C2, net dissolution of all in situ minerals is 0.3 kg. Concurrent precipitation of any primary or secondary minerals was also taken into consideration. In C2, net precipitation of all primary or secondary minerals is 0.26 kg. Mineral dissolution dominated over precipitation, and therefore the total change in mass is negative, which is 0.04 kg per cubic meter.

## SUPPLEMENTAL #12B

**Request:** Provide clarification on net change calculation of mineral precipitation vs. dissolution as seen in Figure C-22 and confirm if net change is positive or negative.

**Response:** The following narrative supplies requested information.

## NET POROSITY CHANGE (FIGURE C-22)

## BKF–AE2

Change in porosity is dependent on the magnitude of concurrent dissolution and precipitation. If dissolution dominates over precipitation, total solid fraction decreases and porosity increases. If precipitation dominates over dissolution, total solid fraction increases and porosity decreases. Porosity change is calculated by subtracting final porosity from initial porosity for each time step and added to estimate net porosity change for the entire simulation period and converted to a percentage. Net porosity change refers to positive change as total porosity increases by 0.012 fraction, which is equivalent to a less than 2% net change.

# STORAGE AGREEMENT
# BK FISCHER BROOM CREEK – SECURE GEOLOGIC STORAGE
# MERCER & OLIVER COUNTIES, NORTH DAKOTA

**STORAGE AGREEMENT**
**BK FISCHER BROOM CREEK – SECURE GEOLOGIC STORAGE**
**MERCER & OLIVER COUNTIES, NORTH DAKOTA**

**THIS AGREEMENT** ("Agreement") is entered into as of the ___ day of _____, 20__, by the parties who have signed the original of this instrument, a counterpart thereof, ratification and joinder or other instrument agreeing to become a Party hereto.

**RECITALS:**

A. It is in the public interest to promote the geologic storage of carbon dioxide in a manner which will benefit the state and the global environment by reducing greenhouse gas emissions and in a manner which will help ensure the viability of the state's coal and power industries, to the economic benefit of North Dakota and its citizens;

B. To further geologic storage of carbon dioxide, a potentially valuable commodity, may allow for its ready availability if needed for commercial, industrial, or other uses, including enhanced recovery of oil, gas, and other minerals; and

C. For geologic storage, however, to be practical and effective it requires cooperative use of surface and subsurface property interests and the collaboration of property owners, which may require procedures that promote, in a manner fair to all interests, cooperative management, thereby ensuring the maximum use of natural resources.

**AGREEMENT:**

It is agreed as follows:

**ARTICLE 1**
**DEFINITIONS**

As used in this Agreement:

1.1 **Carbon Dioxide** means carbon dioxide in gaseous, liquid, or supercritical fluid state together with incidental associated substances derived from the source materials, capture

process and any substances added or used to enable or improve the injection process.

1.2 **Commission** means the North Dakota Industrial Commission (NDIC) acting by and through the Department of Mineral Resources.

1.3 **Effective Date** is the time and date this Agreement becomes effective as provided in Article 14.

1.4 **Facility Area** is the land described by Tracts in Exhibit "B" and shown on Exhibit "A" containing 28,844.57 acres, more or less.

1.5 **Party** is any individual, corporation, limited liability company, partnership, association, receiver, trustee, curator, executor, administrator, guardian, tutor, fiduciary, or other representative of any kind, any department, agency, or instrumentality of the state, or any governmental subdivision thereof, or any other entity capable of holding an interest in the Storage Reservoir.

1.6 **Pore Space** means a cavity or void, whether natural or artificially created, in any subsurface stratum.

1.7 **Pore Space Interest** is a right to or interest in the Pore Space in any Tract within the boundaries of the Facility Area.

1.8 **Pore Space Owner** is a Party hereto who owns Pore Space Interest.

1.9 **Storage Equipment** is any personal property, lease, easement, and well equipment, plants and other facilities and equipment for use in Storage Operations.

1.10 **Storage Expense** is all costs, expense or indebtedness incurred by the Storage Operator pursuant to this Agreement for or on account of Storage Operations.

1.11 **Storage Facility** is the unitized or amalgamated Storage Reservoir created pursuant to an order of the Commission.

1.12 **Storage Facility Participation** is the percentage shown on Exhibit "C" for allocating payments for use of the Pore Space under each Tract identified in Exhibit "B".

1.13 **Storage Operations** are all operations conducted by the Storage Operator pursuant to this Agreement or otherwise authorized by any lease covering any Pore Space Interest.

1.14 **Storage Operator** is the person or entity named in Section 4.1 of this Agreement.

1.15 **Storage Reservoir** consists of the Pore Space and confining subsurface strata underlying the Facility Area described as the Opeche/Spearfish (Upper Confining Zone), Broom Creek (Injection Zone), and Amsden (Lower Confining Zone) Formation(s) and which are defined as identified by the well logging suite performed at one stratigraphic well, the Archie Erickson 2 well (NDIC File No. 38622) located in the SW¼ of the SW¼ Section 12, Township 142 North, Range 88 West, Mercer County, North Dakota. The Storage Reservoir is defined as the stratigraphic interval from below the top of the Opeche/Spearfish Formation found at a depth of 5,587 feet below the Kelly Bushing, to above the base of the Amsden Formation, found at a depth of 6,421 feet below the Kelly Bushing, as identified by the Array Induction Gamma log run in the Milton Flemmer 1 well (NDIC File No. 38594) located in the NW¼ of the NE¼, Section 35, Township 141 North, Range 88 West, Mercer County, North Dakota. The logging suite included triple combo (gamma ray, density, porosity, and resistivity), caliper, spectral gamma ray, combinable magnetic resonance (CMR), dipole sonic including four-arm caliper and inclinometer, and image log. Further, the acquired logs were used to pick formation top depths and interpret lithology, petrophysical properties, and time-to-depth shifting of seismic data obtained from three 3D seismic surveys and one 5-mile long 2D seismic line covering an area totaling 208 miles in and around the Archie Erickson 2 stratigraphic well. Formation top depths were picked from the top of the Pierre Formation to the top of the Amsden Formation. The average depth of the top of the Opeche/Spearfish Formation (Upper Confining Zone) across the storage facility is 5,587 feet total

vertical depth (TVD). The average depth of the base of the Amsden Formation (Lower Confining Zone) across the storage facility area is 6,359 feet TVD. The average thickness of the Storage Reservoir across the storage facility is 772 feet.

1.16 **Storage Rights** are the rights to explore, develop, and operate lands within the Facility Area for the storage of Storage Substances.#

1.17 **Storage Substances** are Carbon Dioxide and incidental associated substances, fluids, and minerals.

1.18 **Tract** is the land described as such and given a Tract number in Exhibit "B."

1.19 **Transfer Storage Facility** has the meaning given such term in Section 3.7 of this Agreement.

## ARTICLE 2
## EXHIBITS

2.1 **Exhibits.** The following exhibits, which are attached hereto, are incorporated herein by reference:

2.1.1 Exhibit "A" is a map that shows the boundary lines of the BK Fischer Broom Creek Facility Area and the tracts therein;

2.1.2 Exhibit "B" is a schedule that describes the acres of each Tract in the BK Fischer Broom Creek Facility Area;

2.1.3 Exhibit "C" is a schedule that shows the Storage Facility Participation of each Tract; and

2.1.4 Exhibit "D" is a form of Pore Space Lease.

2.2 **Reference to Exhibits.** When reference is made to an exhibit, it is to the exhibit as originally attached or, if revised, to the last revision.

2.3 **Exhibits Considered Correct.** Exhibits "A," "B," "C" and "D" shall be considered to be correct until revised as herein provided.

2.4 **Correcting Errors.** The shapes and descriptions of the respective Tracts have been established by using the best information available. If it subsequently appears that any Tract, mathematical miscalculation or clerical error has been made, Storage Operator, with the approval of Pore Space Owners whose interest is affected, shall correct the mistake by revising the exhibits to conform to the facts. The revision shall not include any re-evaluation of engineering or geological interpretations used in determining Storage Facility Participation. Each such revision of an exhibit made prior to thirty (30) days after the Effective Date shall be effective as of the Effective Date. Each such revision thereafter made shall be effective at 7:00 a.m. on the first day of the calendar month next following the filing for record of the revised exhibit or on such other date as may be determined by Storage Operator and set forth in the revised exhibit.

2.5 **Filing Revised Exhibits.** If an exhibit is revised, Storage Operator shall execute an appropriate instrument with the revised exhibit attached and file the same for record in the county or counties in which this Agreement or memorandum of the same is recorded and shall also file the amended changes with the Commission.

## ARTICLE 3
## CREATION AND EFFECT OF STORAGE FACILITY

3.1 **Unleased Pore Space Interests.** Any Pore Space Owner in the Storage Facility who owns a Pore Space Interest in the Storage Reservoir that is not leased for the purposes of this Agreement and during the term hereof, shall be treated as if it were subject to the Pore Space Lease attached hereto as Exhibit "D".

3.2 **Amalgamation of Pore Space.** All Pore Space Interests in and to the Tracts are hereby amalgamated and combined insofar as the respective Pore Space Interests pertain to the Storage Reservoir, so that Storage Operations may be conducted with respect to said Storage Reservoir as if all of the Pore Space Interests in the Facility Area had been included in a single lease executed by all Pore Space Owners, as lessors, in favor of Storage Operator, as lessee and as

if the lease contained all of the provisions of this Agreement.

3.3 [**Reserved.]**

3.4 **Continuation of Leases and Term Interests.** Injection in to any part of the Storage Reservoir, or other Storage Operations, shall be considered as injection in to or upon each Tract within said Storage Reservoir, and such injection or operations shall continue in effect as to each lease as to all lands and formations covered thereby just as if such operations were conducted on and as if a well were injecting in each Tract within said Storage Reservoir.

3.5 **Titles Unaffected by Storage.** Nothing herein shall be construed to result in the transfer of title of the Pore Space Interest of any Party hereto to any other Party or to Storage Operator.

3.6 **Injection Rights.** Storage Operator is hereby granted the right to inject into the Storage Reservoir any Storage Substances in whatever amounts Storage Operator may deem expedient for Storage Operations, together with the right to drill, use, and maintain injection wells in the Facility Area, and to use for injection purposes.

3.7 **Transfer of Storage Substances from Storage Facility.** Storage Operator may transfer from the Storage Facility any Storage Substances, in whatever amounts Storage Operator may deem expedient for Storage Operations, to any other reservoir, subsurface stratum or formation permitted by the Commission for the storage of carbon dioxide under Chapter 38-22 of the North Dakota Century Code (a "Transfer Storage Facility"), *provided that*, the Pore Space ownership between the Storage Facility and Transfer Storage Facility is common.

3.8 **Receipt of Storage Substances.** Storage Operator may accept and receive into the Storage Facility any Storage Substances, in whatever amounts Storage Operator may deem expedient for Storage Operations, being stored in any other Transfer Storage Facility, *provided*

*that,* the Pore Space ownership between the Storage Facility and Transfer Storage Facility is common.

3.9 **Royalty Payments Upon Transfer.** The transfer or receipt of Storage Substances to or from a Transfer Storage Facility in accordance with Section 3.7 and Section 3.8 shall be disregarded for the purposes of calculating the royalty under any lease covering a Pore Space Interest (including Exhibit "D") and shall not affect the allocation of Storage Substances injected into the Storage Facility through the surface of the Facility Area in accordance with Article 6 of this Agreement.

3.10 **Cooperative Agreements.** Storage Operator may enter into cooperative agreements with respect to lands adjacent to the Facility Area for the purpose of coordinating Storage Operations. Such cooperative agreements may include, but shall not be limited to, agreements regarding the transfer and receipt of Storage Substances pursuant to Sections 3.7 and 3.8 of this Agreement.

3.11 **Border Agreements.** Storage Operator may enter into an agreement or agreements with owners of adjacent lands with respect to operations which may enhance the injection of the Storage Substances in the Storage Reservoir in the Facility Area or which may otherwise be necessary for the conduct of Storage Operations.

## ARTICLE 4
## STORAGE OPERATIONS

4.1 **Storage Operator.** Summit Carbon Storage #2, LLC is hereby designated as the initial Storage Operator. Storage Operator shall have the exclusive right to conduct Storage Operations, which shall conform to the provisions of this Agreement and any lease covering a Pore Space Interest. If there is any conflict between such agreements, this Agreement shall govern.

4.2 **Successor Operators**. The initial Storage Operator and any subsequent operator may, at any time, transfer operatorship of the Storage Facility with and upon the approval of the

Commission.

4.3 **Method of Operation.** Storage Operator shall engage in Storage Operations with diligence and in accordance with good engineering and injection practices.

4.4 **Change of Method of Operation.** As permitted by the Commission nothing herein shall prevent Storage Operator from discontinuing or changing in whole or in part any method of operation which, in its opinion, is no longer in accord with good engineering or injection practices. Other methods of operation may be conducted or changes may be made by Storage Operator from time to time if determined by it to be feasible, necessary or desirable to increase the injection or storage of Storage Substances.

## ARTICLE 5
## TRACT PARTICIPATIONS

5.1 **Tract Participations.** The Storage Facility Participation of each Tract is shown in Exhibit "C." The Storage Facility Participation of each Tract shall be based 100% upon the ratio of surface acres in each Tract to the total surface acres for all Tracts within the Facility Area.

5.2 **Relative Storage Facility Participations.** If the Facility Area is enlarged or reduced, the revised Storage Facility Participation of the Tracts remaining in the Facility Area and which were within the Facility Area prior to the enlargement or reduction shall remain in the same ratio to one another.

## ARTICLE 6
## ALLOCATION OF STORAGE SUBSTANCES

6.1 **Allocation of Tracts.** All Storage Substances injected shall be allocated to the several Tracts in accordance with the respective Storage Facility Participation effective during the period that the Storage Substances are injected. The amount of Storage Substances allocated to each tract, regardless of whether the amount is more or less than the actual injection of Storage Substances from the well or wells, if any, on such Tract, shall be deemed for all purposes to have

been injected into such Tract. Storage Substances transferred or received pursuant to Sections 3.7 and 3.8 of this Agreement shall be disregarded for the purposes of this Section 6.1.

6.2 Distribution within Tracts. The Storage Substances injected and allocated to each Tract shall be distributed among, or accounted for to the Pore Space Owners who own a Pore Space Interest in such Tract in accordance with each Pore Space Owner's Storage Facility Participation effective during the period that the Storage Substances were injected. If any Pore Space Interest in a Tract hereafter becomes divided and owned in severalty as to different parts of the Tract, the owners of the divided interests, in the absence of an agreement providing for a different division, shall be compensated for the storage of the Storage Substances in proportion to the surface acreage of their respective parts of the Tract. Subject to Section 3.9, Storage Substances transferred or received pursuant to Sections 3.7 and 3.8 of this Agreement shall be disregarded for the purposes of this Section 6.2.

## ARTICLE 7
## TITLES

7.1 **Injection When Title Is in Dispute.** If the title or right of any Pore Space Owner claiming the right to receive all or any portion of the proceeds for the storage of any Storage Substances allocated to a Tract is in dispute, Storage Operator shall require that the Pore Space Owner to whom the proceeds thereof are paid to furnish security for the proper accounting thereof to the rightful Pore Space Owner, if the title or right of such Pore Space Owner fails in whole or in part.

7.2 **Payments of Taxes to Protect Title.** The owner of surface rights to lands within the Facility Area is responsible for the payment of any *ad valorem* taxes on all such rights, interests or property, unless such owner and the Storage Operator otherwise agree. If any *ad valorem* taxes are not paid by or for such owner when due, Storage Operator may at any time prior to tax sale or

expiration of period of redemption after tax sale, pay the tax, redeem such rights, interests or property, and discharge the tax lien. Storage Operator shall, if possible, withhold from any proceeds derived from the storage of Storage Substances otherwise due any Pore Space Owner who is a delinquent taxpayer up to an amount sufficient to defray the costs of such payment or redemption; *provided* that such withholding to be credited to the Storage Operator. Such withholding shall be without prejudice to any other remedy available to Storage Operator.

7.3 **Pore Space Interest Titles.** If title to a Pore Space Interest fails, but the tract to which it relates is not removed from the Facility Area, the Party whose title failed shall not be entitled to share under this Agreement with respect to that interest.

## ARTICLE 8
## EASEMENTS OR USE OF SURFACE

8.1 **No Surface Occupancy.** Unless agreed to in writing with the owner of the surface estate, Operator shall not place any surface facilities on the surface estate owned by any Pore Space Owner within the boundaries of the Facility Area. For the purpose of this Agreement, "surface facilities" shall include, but not be limited to, wellsites, pipelines, powerlines, valves or other above-ground facilities.

8.2 **Grant of Easement.** Subject to Section 8.1, Storage Operator shall have the right to use as much of the surface of the land within the Facility Area as may be reasonably necessary for Storage Operations and the injection of Storage Substances.

8.3 **Use of Water.** Storage Operator shall have and is hereby granted free use of water from the Facility Area for Storage Operations, except water from any well, lake, pond or irrigation ditch of a Pore Space Owner; notwithstanding the foregoing, Storage Operator may access any well, lake, or pond as provided in Exhibit "D".

8.4 **Surface Damages.** Storage Operator shall pay surface owners for damage to growing crops, timber, fences, improvements and structures located on the Facility Area that result from Storage Operations.

8.5 **Surface and Sub-Surface Operating Rights.** Subject to Section 8.1, Storage Operator shall have the same rights to use the surface and sub-surface and use of water and any other rights granted to Storage Operator in any lease covering Pore Space Interests. Except to the extent expanded by this Agreement or the extent that such rights are common to the effected leases, the rights granted by a lease may be exercised only on the land covered by that lease. Storage Operator will to the extent possible minimize surface impacts.

## ARTICLE 9
## ENLARGEMENT OF STORAGE FACILITY

9.1 **Enlargement of Storage Facility.** The Storage Facility may be enlarged from time to time to include acreage and formations reasonably proven to be geologically capable of storing Storage Substances. Any expansion must be approved in accordance with the rules and regulations of the Commission.

9.2 **Determination of Tract Participation.** Storage Operator, subject to Section 5.2, shall determine the Storage Facility Participation of each Tract within the Storage Facility as enlarged, and shall revise Exhibits "A", "B" and "C" accordingly and in accordance with the rules, regulations and orders of the Commission.

9.3 **Effective Date.** The effective date of any enlargement of the Storage Facility shall be effective as determined by the Commission.

## ARTICLE 10
## TRANSFER OF TITLE

10.1 **Transfer of Title.** Any conveyance of all or part of any interest owned by any Party hereto with respect to any Tract shall be made expressly subject to this Agreement. No

change of title shall be binding upon Storage Operator, or any Party hereto other than the Party so transferring, until 7:00 a.m. on the first day of the calendar month following thirty (30) days from the date of receipt by Storage Operator of a photocopy, or a certified copy, of the recorded or filed instrument evidencing such a change in ownership.

## ARTICLE 11
## RELATIONSHIP OF PARTIES

11.1 **No Partnership.** The duties, obligations and liabilities arising hereunder shall be several and not joint or collective. This Agreement is not intended to create, and shall not be construed to create, an association or trust, or to impose a partnership duty, obligation or liability with regard to any one or more of the Parties hereto. Each Party hereto shall be individually responsible for its own obligations as herein provided.

11.2 **No Joint Marketing.** This Agreement is not intended to provide, and shall not be construed to provide, directly or indirectly, for any joint marketing of Storage Substances.

11.3 **Pore Space Owners Free of Costs.** This Agreement is not intended to impose, and shall not be construed to impose, upon any Pore Space Owner any obligation to pay any Storage Expense unless such Pore Space Owner is otherwise so obligated.

11.4 **Information to Pore Space Owners.** Each Pore Space Owner shall be entitled to all information in possession of Storage Operator to which such Pore Space Owner is entitled by an existing lease or a lease imposed by this Agreement.

## ARTICLE 12
## LAWS AND REGULATIONS

12.1 **Laws and Regulations.** This Agreement shall be subject to all applicable federal, state and municipal laws, rules, regulations and orders.

## ARTICLE 13
## FORCE MAJEURE

13.1 **Force Majeure.** All obligations imposed by this Agreement on each Party, except for the payment of money, shall be suspended while compliance is prevented, in whole or in part, by a labor dispute, fire, war, civil disturbance, or act of God; by federal, state or municipal laws; by any rule, regulation or order of a governmental agency; by inability to secure materials; or by any other cause or causes, whether similar or dissimilar, beyond reasonable control of the Party. No Party shall be required against their will to adjust or settle any labor dispute. Neither this Agreement nor any lease or other instrument subject hereto shall be terminated by reason of suspension of Storage Operations due to any one or more of the causes set forth in this Article.

## ARTICLE 14
## EFFECTIVE DATE

14.1 **Effective Date.** This Agreement shall become effective as determined by the Commission.

14.2 **Certificate of Effectiveness.** Storage Operator shall file for record in the county or counties in which the land affected is located a certificate stating the Effective Date of this Agreement.

## ARTICLE 15
## TERM

15.1 **Term.** Unless sooner terminated in the manner hereinafter provided or by order of the Commission, this Agreement shall remain in full force and effect until the Commission has issued a certificate of project completion with respect to the Storage Facility in accordance with § 38-22-17 of the North Dakota Century Code.

15.2 **Termination by Storage Operator.** This Agreement may be terminated at any time by the Storage Operator with the approval of the Commission.

15.3 **Effect of Termination.** Upon termination of this Agreement all Storage Operations shall cease. Each lease and other agreement covering Pore Space within the Facility Area shall remain in force for ninety (90) days after the date on which this Agreement terminates, and for such further period as is provided by Exhibit "D" or other agreement.

15.4 **Salvaging Equipment Upon Termination.** If not otherwise granted by Exhibit "D" or other instruments affecting each Tract, Pore Space Owners hereby grant Storage Operator a period of six (6) months after the date of termination of this Agreement within which to salvage and remove Storage Equipment.

15.5 **Certificate of Termination.** Upon termination of this Agreement, Storage Operator shall file for record in the county or counties in which the land affected is located a certificate that this Agreement has terminated, stating its termination date.

## ARTICLE 16
## APPROVAL

16.1 **Original, Counterpart or Other Instrument.** A Pore Space Owner may approve this Agreement by signing the original of this instrument, a counterpart thereof, ratification or joinder or other instrument approving this instrument hereto. The signing of any such instrument shall have the same effect as if all Parties had signed the same instrument.

16.2 **Approval by the North Dakota Industrial Commission.**

Notwithstanding anything in this Article to the contrary, all Tracts within the Facility Area shall be deemed to be qualified for participation if this Agreement is duly approved by order of the Commission.

## ARTICLE 17
## GENERAL

17.1 **Amendments Affecting Pore Space Owners.** Amendments hereto relating wholly to Pore Space Owners may be made with approval by the Commission.

17.4 **Construction.** This agreement shall be construed according to the laws of the State of North Dakota.

## ARTICLE 18
## SUCCESSORS AND ASSIGNS

18.1 **Successors and Assigns.** This Agreement shall extend to, be binding upon, and inure to the benefit of the Parties hereto and their respective heirs, devisees, legal representatives, successors and assigns and shall constitute a covenant running with the lands, leases and interests covered hereby.

[*Remainder of page intentionally left blank. Signature page follows.*]

Executed the date set opposite each name below but effective for all purposes as provided by Article 14.

Dated: _____, 20__

**STORAGE OPERATOR**

Summit Carbon Storage #2, LLC

By:_____
Wade Boeshans
Its: Executive Vice President

#81618782v1

# EXHIBIT A

Tract Map

Attached to and made part of the Storage Agreement
BK Fischer Broom Creek – Secure Geological Storage
Mercer & Oliver Counties, North Dakota

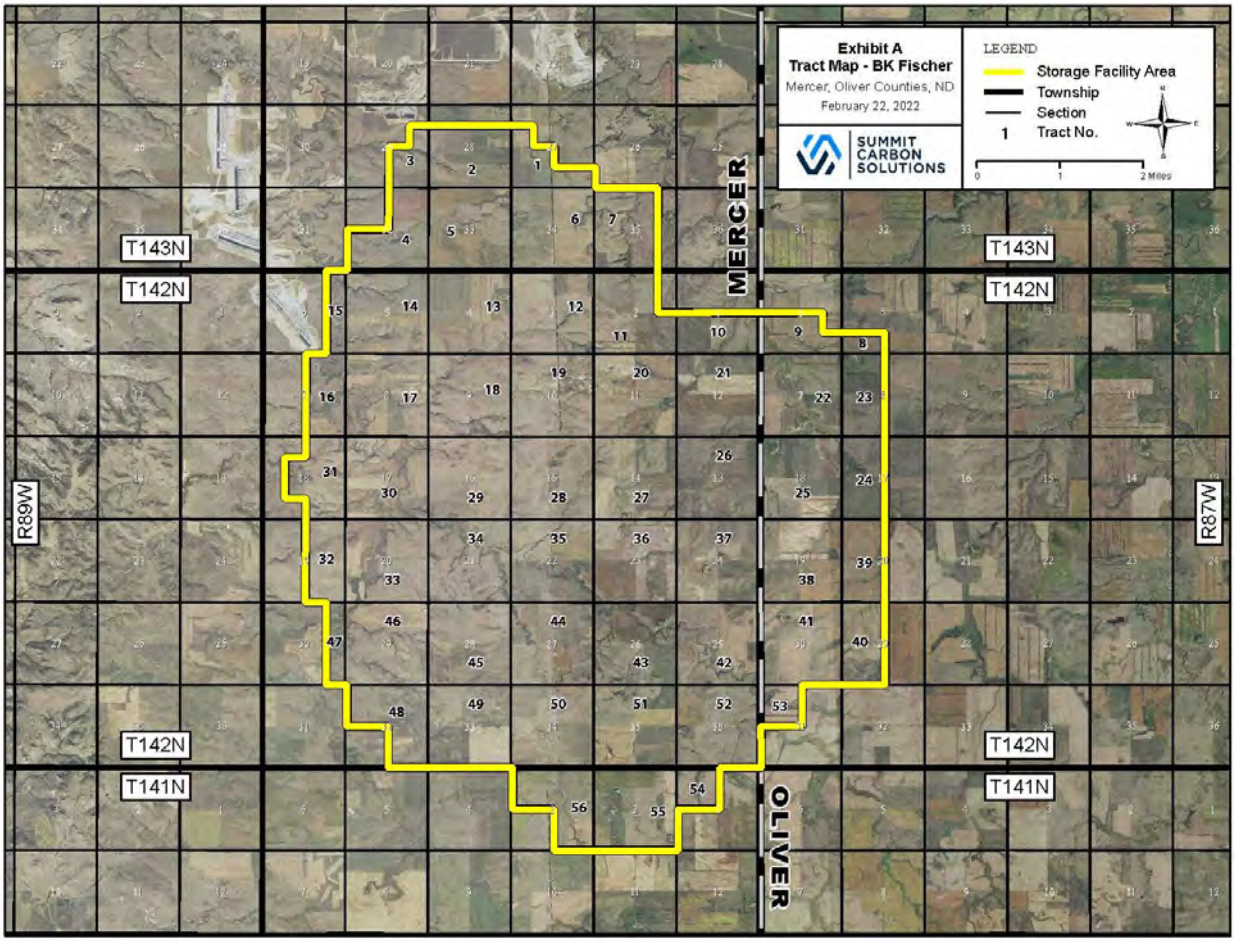


**EXHIBIT B**

Tract Summary

Attached to and made part of the Storage Agreement
BK Fischer Broom Creek – Secure Geological Storage
Mercer & Oliver Counties, North Dakota

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| 1 | Section 27-T143N-R88W | 280 | Donlyn J. Erickson & Roberta Erickson, aka Roberta C. Erickson, as Joint Tenants | 40.0000 | 14.28571429% | 0.13867428% |
| | | | Linda Welk, Life Estate | 80.0000 | 28.57142857% | 0.27734856% |
| | | | Jonathan Welk, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Stacy Welk, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Jonathan Welk | 40.0000 | 14.28571429% | 0.13867428% |
| | | | Stacy Welk | 40.0000 | 14.28571429% | 0.13867428% |
| | | | Kurt M. Swenson & FayE B. Swenson, Trustees of the Swenson Living Trust, dated May 19, 2023, and any amendments thereto | 80.0000 | 28.57142857% | 0.27734856% |
| 2 | Section 28-T143N-R88W | 480 | Shane Kost & Kristi Kost, husband & wife, as Joint Tenants | 80.0000 | 16.66666667% | 0.27734856% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | Ronald E. Gunsch & Janice J. Gunsch, husband & wife, as Tenants in Common | 240.0000 | 50.00000000% | 0.83204568% |
| | | | Myron L. Vigesaa and Nancy L. Vigesaa, Trustees, or their Successors in Trust, Under the Myron L. Vigesaa Revocable Living Trust Dated the 27th Day of June, 2014, and any Amendments thereto | 40.0000 | 8.33333333% | 0.13867428% |
| | | | Nancy L. Vigesaa and Myron L. Vigesaa, Trustees, or their Successors in Trust, Under the Nancy L. Vigesaa Revocable Living Trust Dated the 27th Day of June, 2014, and any Amendments thereto | 40.0000 | 8.33333333% | 0.13867428% |
| | | | Nathan R. Vigesaa & Heather L. Vigesaa, as Joint Tenants | 80.0000 | 16.66666667% | 0.27734856% |
| 3 | Section 29-T143N-R88W | 200 | Lyle Winkler & Patricia A. Winkler, husband & wife, as Joint Tenants | 200.0000 | 100.00000000% | 0.69337140% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| 4 | Section 32-T143N-R88W | 480 | U.S. Bank, N.A., of Fargo, North Dakota, as Trustee of the Darwin H. Mueller Irrevocable Trust | 160.0000 | 33.33333333% | 0.55469712% |
| | | | State of North Dakota | 160.0000 | 33.33333333% | 0.55469712% |
| | | | Shane L. Fischer, as Trustee of the Shane L. Fischer Trust | 80.0000 | 16.66666667% | 0.27734856% |
| | | | Shane Fischer, aka Shane Leo Fischer | 80.0000 | 16.66666667% | 0.27734856% |
| 5 | Section 33-T143N-R88W | 640 | Ronald Gunsch | 317.6500 | 49.63281250% | 1.10124713% |
| | | | Ronald E. Gunsch & Janice J. Gunsch, as Joint Tenants | 2.3500 | 0.36718750% | 0.00814711% |
| | | | Ronald E. Gunsch & Janice J. Gunsch, husband & wife | 320.0000 | 50.00000000% | 1.10939425% |
| 6 | Section 34-T143N-R88W | 640 | Eric Klindworth, aka Eric H. Klindworth & Jacinta Klindworth, aka Jacinta-Jon T. Klindworth, as Joint Tenants | 160.0000 | 25.00000000% | 0.55469712% |
| | | | Ronald Gunsch | 320.0000 | 50.00000000% | 1.10939425% |
| | | | Donlyn J. Erickson & Roberta Erickson, aka Roberta C. Erickson, as Joint Tenants | 160.0000 | 25.00000000% | 0.55469712% |
| 7 | Section 35-T143N-R88W | 480 | Rachel Riedemann, fka Rachel Hushka, fka Rachel Erickson | 160.0000 | 33.33333333% | 0.55469712% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | Donlyn J. Erickson & Roberta Erickson, aka Roberta C. Erickson, as Joint Tenants | 320.0000 | 66.66666667% | 1.10939425% |
| 8 | Section 05-T142N-R87W | 80 | Chad N. Schafer & Lisa L. Schafer, husband & wife, as Joint Tenants | 80.0000 | 100.00000000% | 0.27734856% |
| 9 | Section 06-T142N-R87W | 279.06 | Darell Herman & Sherry Herman, husband & wife, as Joint Tenants | 279.0600 | 100.00000000% | 0.96746112% |
| 10 | Section 01-T142N-R88W | 320 | Noel J. Helm & Betty Helm, aka Betty Jean Helm, husband & wife, as Joint Tenants, Life Estate | 320.0000 | 100.00000000% | 1.10939425% |
| | | | John T. Helm, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Jason J. Helm, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Wayne J. Helm | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Jerome L. Helm | 0.0000 | 0.00000000% | 0.00000000% |
| 11 | Section 02-T142N-R88W | 563.87 | Jason Erickson & Angela Erickson, husband & wife | 81.3600 | 14.42885772% | 0.28206349% |
| | | | Wanda Gustafson, a married person dealing in her sole & separate property, Life Estate | 162.5100 | 28.82047280% | 0.56339893% |
| | | | Lori B. Klein, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | Sara L. Gustafson, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Jason T. Erickson & Angela Erickson, husband & wife, as Joint Tenants | 160.0000 | 28.37533474% | 0.55469712% |
| | | | Robb M. Moore & Heidi K. Moore, husband & wife, as Joint Tenants | 160.0000 | 28.37533474% | 0.55469712% |
| 12 | Section 03-T142N-R88W | 644.63 | Donlyn J. Erickson & Roberta Erickson, aka Roberta C. Erickson, as Joint Tenants | 322.3500 | 50.00542947% | 1.11754136% |
| | | | David A. Orth & Ronni L. Huschka | 20.2875 | 3.14715418% | 0.07033386% |
| | | | Joan Cundall | 20.2875 | 3.14715418% | 0.07033386% |
| | | | Robert H. Orth | 6.7625 | 1.04905139% | 0.02344462% |
| | | | Richard A. Orth | 6.7625 | 1.04905139% | 0.02344462% |
| | | | Kimberly Orth | 6.7625 | 1.04905139% | 0.02344462% |
| | | | Wilfred Orth | 20.2875 | 3.14715418% | 0.07033386% |
| | | | Estate of Cecelia Orth | 81.1300 | 12.58551417% | 0.28126611% |
| | | | David Hottman & Stephanie Hottman, husband & wife, as Joint Tenants | 6.1000 | 0.94627926% | 0.02114783% |
| | | | Donlyn J. Erickson & Roberta Erickson, aka Roberta C. Erickson, as Joint Tenants | 153.9000 | 23.87416037% | 0.53354930% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| 13 | Section 04-T142N-R88W | 644.44 | Tanner Erickson & Heather Erickson, as Joint Tenants | 2.0000 | 0.31034697% | 0.00693371% |
| | | | Donlyn J. Erickson & Roberta Erickson, aka Roberta C. Erickson, as Joint Tenants | 320.2300 | 49.69120477% | 1.11019162% |
| | | | LeeRoy J. Winkler & Sharon L. Winkler, husband & wife, as Joint Tenants, Life Estate | 162.2100 | 25.17069083% | 0.56235888% |
| | | | Roberta Unruh, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Kimberly Dukart, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Amanda Ahlschlager, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Perry Winkler & Beth Winkler, husband & wife, as Joint Tenants | 160.0000 | 24.82775743% | 0.55469712% |
| 14 | Section 05-T142N-R88W | 644.07 | Howard H. Winkler & Bernadette J. Winkler, husband & wife, as Joint Tenants | 162.1100 | 25.16962442% | 0.56201219% |
| | | | Nichole Lee Sailer, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Arnold V. Winkler & Sharon D. Winkler, husband & wife, as Joint Tenants | 161.9600 | 25.14633503% | 0.56149216% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | Russell D. Winkler & Tammy Winkler, husband & wife, as Joint Tenants | 160.0000 | 24.84202028% | 0.55469712% |
| | | | Perry Winkler & Beth Winkler, husband & wife, as Joint Tenants | 160.0000 | 24.84202028% | 0.55469712% |
| 15 | Section 06-T142N-R88W | 160.84 | Casey Lee Voigt and Julie Anne Voigt, Trustees of the Casey Lee Voigt Living Trust dated January 26, 2023, and any amendments thereto | 160.8400 | 100.00000000% | 0.55760928% |
| | | | Donalda Voigt, Contract for Deed Seller | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Karmen Eslinger, Contract for Deed Seller | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Shawn Voigt, Contract for Deed Seller | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Kenneth Voigt, Contract for Deed Seller | 0.0000 | 0.00000000% | 0.00000000% |
| 16 | Section 07-T142N-R88W | 320 | Perry Winkler & Beth Winkler, husband & wife, Life Estate | 160.0000 | 50.00000000% | 0.55469712% |
| | | | Kacey Winkler, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Korey Winkler, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Nancy Flemmer, aka Nancy Lee Flemmer, Life Estate | 160.0000 | 50.00000000% | 0.55469712% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | Cherie Ann Fischer, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Shawn Michael Flemmer, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| 17 | Section 08-T142N-R88W | 640 | LeeRoy J. Winkler & Sharon L. Winkler, husband & wife, as Joint Tenants, Life Estate | 160.0000 | 25.00000000% | 0.55469712% |
| | | | Roberta Unruh, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Kimberly Dukart, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Amanda Ahlschlager, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Perry Winkler & Beth Winkler, husband & wife, Life Estate | 320.0000 | 50.00000000% | 1.10939425% |
| | | | Kacey Winkler, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Korey Winkler, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Nancy Flemmer, aka Nancy Lee Flemmer, Life Estate | 160.0000 | 25.00000000% | 0.55469712% |
| | | | Cherie Ann Fischer, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Shawn Michael Flemmer, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| 18 | Section 09-T142N-R88W | 640 | James A. Swenson & Darlene A. Swenson, as Joint Tenants, Life Estate | 320.0000 | 50.00000000% | 1.10939425% |
| | | | Trent T. Martin & Dawn Martin, as Joint Tenants, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | LeeRoy J. Winkler & Sharon L. Winkler, husband & wife, as Joint Tenants, Life Estate | 160.0000 | 25.00000000% | 0.55469712% |
| | | | Roberta Unruh, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Kimberly Dukart, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Amanda Ahlschlager, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Perry Winkler & Beth Winkler, husband & wife, Life Estate | 160.0000 | 25.00000000% | 0.55469712% |
| | | | Kacey Winkler, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Korey Winkler, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| 19 | Section 10-T142N-R88W | 640 | Donlyn J. Erickson & Roberta Erickson, aka Roberta C. Erickson, as Joint Tenants | 160.0000 | 25.00000000% | 0.55469712% |
| | | | James A. Swenson & Darlene A. Swenson, as Joint Tenants, Life Estate | 158.0000 | 24.68750000% | 0.54776341% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | Trent T. Martin & Dawn Martin, as Joint Tenants, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Trent T. Martin & Dawn Martin, as Joint Tenants | 322.0000 | 50.31250000% | 1.11632796% |
| 20 | Section 11-T142N-R88W | 640 | Fayette L. Cote & Robert V. Cote, as Trustees of the Robert V. Cote and Fayette L. Cote Trust Agreement of April 4, 2016 | 160.0000 | 25.00000000% | 0.55469712% |
| | | | James A. Swenson & Darlene A. Swenson, as Joint Tenants, Life Estate | 160.0000 | 25.00000000% | 0.55469712% |
| | | | Trent T. Martin & Dawn Martin, as Joint Tenants, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Ryan J. Flemmer | 320.0000 | 50.00000000% | 1.10939425% |
| 21 | Section 12-T142N-R88W | 640 | Johnell J. Kusler | 80.0000 | 12.50000000% | 0.27734856% |
| | | | Milda L. Hedblom | 80.0000 | 12.50000000% | 0.27734856% |
| | | | Vivian Viola Hauff, aka Vivian V. Hauff, Life Estate | 80.0000 | 12.50000000% | 0.27734856% |
| | | | Jerry L. Hauff, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Willa Jean Ann Weaver | 80.0000 | 12.50000000% | 0.27734856% |
| | | | Darwin Huber & Susan E. Huber, husband & wife, as Joint Tenants, Life Estate | 160.0000 | 25.00000000% | 0.55469712% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | Daryl D. Huber, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Darren D. Huber, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Jason T. Erickson & Angela Erickson, husband & wife, as Joint Tenants | 160.0000 | 25.00000000% | 0.55469712% |
| 22 | Section 07-T142N-R87W | 637.12 | Trent T. Martin & Dawn Martin, husband & wife, as Joint Tenants | 190.8800 | 29.95981919% | 0.66175367% |
| | | | Kurt M. Swenson & FayE B. Swenson, trustees of the Swenson Living Trust dated May 19, 2023 | 120.5500 | 18.92108237% | 0.41792961% |
| | | | Joseph O. Swenson | 6.0600 | 0.95115520% | 0.02100915% |
| | | | Johnell J. Kusler & Geoffrey E. Tayler, wife and husband | 0.5750 | 0.09024987% | 0.00199344% |
| | | | Milda L. Hedblom, aka Milda K. Hedblom & Edwin Fogelman, wife and husband | 0.5750 | 0.09024987% | 0.00199344% |
| | | | Todd Rueb & Darcy Rueb, husband & wife, as Joint Tenants | 318.4800 | 49.98744350% | 1.10412462% |
| 23 | Section 08-T142N-R87W | 320 | Travis Hellickson & Amber Hellickson, as Joint Tenants | 160.0000 | 50.00000000% | 0.55469712% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | Noel Helm & Betty Helm, husband & wife | 160.0000 | 50.00000000% | 0.55469712% |
| 24 | Section 17-T142N-R87W | 320 | Jason Erickson & Angela Erickson, husband & wife as Joint Tenants | 320.0000 | 100.00000000% | 1.10939425% |
| 25 | Section 18-T142N-R87W | 637 | Johnell J. Kusler | 80.0000 | 12.55886970% | 0.27734856% |
| | | | Milda L. Hedblom | 80.0000 | 12.55886970% | 0.27734856% |
| | | | Jason Erickson & Angela Erickson, husband & wife as Joint Tenants | 158.4500 | 24.87441130% | 0.54932349% |
| | | | Robert Schutt & Alberta E. Schutt, Trustees, or their successors in trust, under the Robert Schutt and Alberta E. Schutt Living Trust, dated December 7, 2015, and any amendments thereto | 316.0500 | 49.61538462% | 1.09570016% |
| | | | Keith Schutt | 2.5000 | 0.39246468% | 0.00866714% |
| 26 | Section 13-T142N-R88W | 640 | Jason T. Erickson & Angela Erickson, husband & wife, as Joint Tenants | 318.8500 | 49.82031250% | 1.10540736% |
| | | | Roughrider Electric Cooperative, Inc. | 1.1500 | 0.17968750% | 0.00398689% |
| | | | Jolene M. Rust, aka JoLene M. Rust | 160.0000 | 25.00000000% | 0.55469712% |
| | | | Ernest J. Vollan, Life Estate | 160.0000 | 25.00000000% | 0.55469712% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | Cynthia K. Nickel, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| 27 | Section 14-T142N-R88W | 640 | Carol M. Kaelberer, Life Estate | 80.0000 | 12.50000000% | 0.27734856% |
| | | | Morgan Nagel, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Garrett Kirchmeier, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Chandler J. Kirchmeier, Remainerman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Kurt M. Swenson and FayE B. Swenson, Trustees, or their successors in interest, of the Swenson Living Trust dated May 19, 2023, and any amendments thereto | 80.0000 | 12.50000000% | 0.27734856% |
| | | | LeeRoy Fischer, aka LeeRoy J. Fischer | 320.0000 | 50.00000000% | 1.10939425% |
| | | | Fayette L. Cote & Robert V. Cote, as Trustees of the Robert V. Cote and Fayette L. Cote Trust Agreement of April 4, 2016 | 160.0000 | 25.00000000% | 0.55469712% |
| 28 | Section 15-T142N-R88W | 640 | Trent Martin & Dawn Martin, husband & wife, as Joint Tenants | 640.0000 | 100.00000000% | 2.21878849% |
| 29 | Section 16-T142N-R88W | 640 | LeeRoy J. Fischer | 320.0000 | 50.00000000% | 1.10939425% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | Perry Winkler & Beth Winkler, husband & wife, Life Estate | 160.0000 | 25.00000000% | 0.55469712% |
| | | | Kacey Winkler, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Korey Winkler, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Norman R. Winkler & Martha E. Winkler, husband & wife, as Joint Tenants | 160.0000 | 25.00000000% | 0.55469712% |
| 30 | Section 17-T142N-R88W | 640 | Doris B. Mutzenberger & James J. Mutzenberger, wife & husband, as Joint Tenants, Life Estate | 158.0000 | 24.68750000% | 0.54776341% |
| | | | Tony Mutzenberger, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Casey Mutzenberger, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Casey Mutzenberger | 2.0000 | 0.31250000% | 0.00693371% |
| | | | Tony Mutzenberger | 207.0000 | 32.34375000% | 0.71763940% |
| | | | Myron Flemmer & Evelyn Flemmer, husband & wife, Contract for Deed Seller | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Perry Winkler & Beth Winkler, as Joint Tenants | 113.0000 | 17.65625000% | 0.39175484% |
| | | | Christopher Palmer & Kayla Palmer, husband & wife, as Joint Tenants | 160.0000 | 25.00000000% | 0.55469712% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| 31 | Section 18-T142N-R88W | 400 | Perry Winkler & Beth Winkler, husband & wife, Life Estate | 80.0000 | 20.00000000% | 0.27734856% |
| | | | Kacey Winkler, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Korey Winkler, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Perry Winkler & Beth Winkler, as Joint Tenants | 120.0000 | 30.00000000% | 0.41602284% |
| | | | Shawn Unruh & Shevelle Unruh, as Joint Tenants | 20.0000 | 5.00000000% | 0.06933714% |
| | | | Austin Jensen & Destinee Jensen, aka Destiny Jensen, as Joint Tenants | 20.0000 | 5.00000000% | 0.06933714% |
| | | | Paulette White, fka Paulette Hogan | 160.0000 | 40.00000000% | 0.55469712% |
| 32 | Section 19-T142N-R88W | 320 | Steven C. Goetz, aka Steve Goetz, a single person, Life Estate | 160.0000 | 50.00000000% | 0.55469712% |
| | | | Shane J. Goetz and Samantha J. Goetz, Remaindermen | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Paul A. Schock | 160.0000 | 50.00000000% | 0.55469712% |
| 33 | Section 20-T142N-R88W | 640 | Christopher Palmer & Kayla Palmer, husband & wife, as Joint Tenants | 160.0000 | 25.00000000% | 0.55469712% |
| | | | Thomas Welk, aka Thomas C. Welk, Life Estate | 240.0000 | 37.50000000% | 0.83204568% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | Amy Dinius, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | David Welk, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Cody S. Thiel & Megan B. Thiel, husband & wife | 240.0000 | 37.50000000% | 0.83204568% |
| 34 | Section 21-T142N-R88W | 640 | Jerry Ballensky and Julie Ballensky, husband & wife, as Joint Tenants | 160.0000 | 25.00000000% | 0.55469712% |
| | | | David Fischer | 160.0000 | 25.00000000% | 0.55469712% |
| | | | Cody S. Thiel & Megan B. Thiel, husband & wife | 160.0000 | 25.00000000% | 0.55469712% |
| | | | Sheila Hildebrand & Steven B. Hildebrand, wife & husband, as Joint Tenants | 160.0000 | 25.00000000% | 0.55469712% |
| 35 | Section 22-T142N-R88W | 640 | Irene Fischer, aka Irene E. Fischer, Life Estate | 320.0000 | 50.00000000% | 1.10939425% |
| | | | Barry R. Fischer | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Brendan B. Flemmer | 297.6000 | 46.50000000% | 1.03173665% |
| | | | Jerry D. Ballensky and Julie Ballensky, husband & wife, as Joint Tenants | 22.4000 | 3.50000000% | 0.07765760% |
| 36 | Section 23-T142N-R88W | 640 | Irene Fischer, aka Irene E. Fischer, Life Estate | 475.0000 | 74.21875000% | 1.64675708% |
| | | | Barry R. Fischer | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Brendan B. Flemmer | 160.0000 | 25.00000000% | 0.55469712% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | Thomas M. Fandrich & Laura Jane Fandrich, husband & wife as Joint Tenants | 5.0000 | 0.78125000% | 0.01733429% |
| 37 | Section 24-T142N-R88W | 640 | Ernest J. Vollan, Life Estate | 320.0000 | 50.00000000% | 1.10939425% |
| | | | Cynthia K. Nickel, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | John M. Jochim | 160.0000 | 25.00000000% | 0.55469712% |
| | | | Michael P. Bauman | 140.0000 | 21.87500000% | 0.48535998% |
| | | | Violet J. Jochim | 20.0000 | 3.12500000% | 0.06933714% |
| 38 | Section 19-T142N-R87W | 637.16 | Robert Schutt & Alberta E. Schutt, Trustees, or their successors in trust, under the Robert Schutt and Alberta E. Schutt Living Trust, dated December 7, 2015, and any amendments thereto | 478.5900 | 75.11300144% | 1.65920310% |
| | | | Jeffrey Schutt | 158.5700 | 24.88699856% | 0.54973952% |
| 39 | Section 20-T142N-R87W | 320 | Robert Schutt & Alberta E. Schutt, Trustees, or their successors in trust, under the Robert Schutt and Alberta E. Schutt Living Trust, dated December 7, 2015, and any amendments thereto | 160.0000 | 50.00000000% | 0.55469712% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | Mark S. Singer | 160.0000 | 50.00000000% | 0.55469712% |
| 40 | Section 29-T142N-R87W | 320 | Jeffrey Schutt | 160.0000 | 50.00000000% | 0.55469712% |
| | | | Robert Schutt & Alberta E. Schutt, Trustees, or their successors in trust, under the Robert Schutt and Alberta E. Schutt Living Trust, dated December 7, 2015, and any amendments thereto | 60.0000 | 18.75000000% | 0.20801142% |
| | | | Ernest J. Vollan, Life Estate | 100.0000 | 31.25000000% | 0.34668570% |
| | | | Cynthia K. Nickel, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| 41 | Section 30-T142N-R87W | 637.96 | Rory C. Flemmer & Jennifer Flemmer, husband & wife, as Joint Tenants | 329.0000 | 51.57063139% | 1.14059596% |
| | | | Jeffrey Schutt | 301.9600 | 47.33212114% | 1.04685215% |
| | | | The North Dakota State Water Commission | 1.0000 | 0.15674964% | 0.00346686% |
| | | | Church of St. Joseph – Beulah Trustee, Inc., a nonprofit corporation, as trustee Church of St. Joseph – Beulah Trustee, Inc., a nonprofit corporation, as trustee | 6.0000 | 0.94049784% | 0.02080114% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| 42 | Section 25-T142N-R88W | 640 | Duane Flemmer & Lori Flemmer, husband & wife, as Joint Tenants | 471.4920 | 73.67062500% | 1.63459535% |
| | | | Elsie Opp, fka Elsie Flemmer, Life Estate, Contract for Deed Seller | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Duane Flemmer, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Linda Flemmer, Contract for Deed Seller & Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Dennis Flemmer, Contract for Deed Seller & Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Ernest J. Vollan, Life Estate | 160.0000 | 25.00000000% | 0.55469712% |
| | | | Cynthia K. Nickel, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Rory C. Flemmer | 8.5080 | 1.32937500% | 0.02949602% |
| 43 | Section 26-T142N-R88W | 640 | Brendan B. Flemmer | 435.9000 | 68.10937500% | 1.51120298% |
| | | | Robb M. Moore & Heidi K. Moore, husband & wife, as Joint Tenants | 44.1000 | 6.89062500% | 0.15288839% |
| | | | Darwin Huber | 54.8100 | 8.56406250% | 0.19001843% |
| | | | Cody Scott Thiel | 105.1900 | 16.43593750% | 0.36467869% |
| 44 | Section 27-T142N-R88W | 640 | Jerry D. Ballensky & Julie Ballensky, husband & wife, as Joint Tenants | 297.6000 | 46.50000000% | 1.03173665% |
| | | | Brendan B. Flemmer | 22.4000 | 3.50000000% | 0.07765760% |
| | | | Cody S. Thiel | 80.0000 | 12.50000000% | 0.27734856% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | Cody S. Thiel, aka Cody Scott Thiel & Megan B. Thiel | 80.0000 | 12.50000000% | 0.27734856% |
| | | | Sheila Hildebrand & Steven B. Hildebrand, wife & husband, as Joint Tenants | 160.0000 | 25.00000000% | 0.55469712% |
| 45 | Section 28-T142N-R88W | 640 | Cody S. Thiel, aka Cody Scott Thiel & Megan B. Thiel | 480.0000 | 75.00000000% | 1.66409137% |
| | | | Cody S. Thiel & Megan B. Thiel, as Joint Tenants | 160.0000 | 25.00000000% | 0.55469712% |
| 46 | Section 29-T142N-R88W | 640 | Emil Vernon Lapp, Jr., aka Emil V. Lapp, Jr. & Donna J. Lapp, husband & wife, as Joint Tenants, Life Estate | 480.0000 | 75.00000000% | 1.66409137% |
| | | | Michael Lapp, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Cody S. Thiel, aka Cody Scott Thiel & Megan B. Thiel | 160.0000 | 25.00000000% | 0.55469712% |
| 47 | Section 30-T142N-R88W | 160 | Clark D. Pochant & Jayne D. Pochant, husband & wife, as Joint Tenants | 73.0100 | 45.63125000% | 0.25311523% |
| | | | Chance Mastel | 5.0000 | 3.12500000% | 0.01733429% |
| | | | Jessica Voegele | 1.9900 | 1.24375000% | 0.00689905% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | Thomas Welk, aka Thomas C. Welk, Life Estate | 80.0000 | 50.00000000% | 0.27734856% |
| | | | Amy Dinius, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | David Welk, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| 48 | Section 32-T142N-R88W | 480 | Walter E. Frank | 160.0000 | 33.33333333% | 0.55469712% |
| | | | Thomas Welk, aka Thomas C. Welk, Life Estate | 120.0000 | 25.00000000% | 0.41602284% |
| | | | Amy Dinius, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | David Welk, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Dwight J. Frank & Beverly A. Frank, husband & wife, Joint Tenants | 200.0000 | 41.66666667% | 0.69337140% |
| 49 | Section 33-T142N-R88W | 640 | Paul A. Schock | 320.0000 | 50.00000000% | 1.10939425% |
| | | | Steven C. Goetz, aka Steve Goetz, a single person, Life Estate | 160.0000 | 25.00000000% | 0.55469712% |
| | | | Shane J. Goetz and Samantha J. Goetz, Remaindermen | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Ruby Emter, Life Estate | 160.0000 | 25.00000000% | 0.55469712% |
| | | | Leeta Olin, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | Tammy Moore, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| 50 | Section 34-T142N-R88W | 640 | Michelle M. Braun | 640.0000 | 100.00000000% | 2.21878849% |
| 51 | Section 35-T142N-R88W | 640 | Darwin Huber & Susan E. Huber, husband & wife, as Joint Tenants, Life Estate | 126.0500 | 19.69531250% | 0.43699733% |
| | | | Daryl D. Huber, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Darren D. Huber, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Cody Scott Thiel | 33.9500 | 5.30468750% | 0.11769980% |
| | | | Brendan B. Flemmer | 320.0000 | 50.00000000% | 1.10939425% |
| | | | Delmer F. Voegele & Cassandra R. Voegele, husband & wife, as Joint Tenants, Life Estate | 160.0000 | 25.00000000% | 0.55469712% |
| 52 | Section 36-T142N-R88W | 640 | Ralph Kemmet | 300.0000 | 46.87500000% | 1.04005711% |
| | | | Duane Flemmer & Lori Flemmer, husband & wife, as Joint Tenants | 160.0000 | 25.00000000% | 0.55469712% |
| | | | Elsie Opp, fka Elsie Flemmer, Life Estate, Contract for Deed Seller | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Duane Flemmer, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Linda Flemmer, Contract for Deed Seller & Remainderman | 0.0000 | 0.00000000% | 0.00000000% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | Dennis Flemmer, Contract for Deed Seller & Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Ralph Kemmet & Dena Kemmet, as Joint Tenants | 20.0000 | 3.12500000% | 0.06933714% |
| | | | Jeffrey Schutt, aka Jeffrey J. Schutt | 160.0000 | 25.00000000% | 0.55469712% |
| 53 | Section 31-T142N-R87W | 158.71 | LeeRoy J. Fischer | 158.7100 | 100.00000000% | 0.55022488% |
| 54 | Section 01-T141N-R88W | 159.81 | Larry Flemmer, aka Larry L. Flemmer | 159.8100 | 100.00000000% | 0.55403842% |
| 55 | Section 02-T141N-R88W | 639.94 | Corey M. Voegele & Roxanne Voegele, husband & wife, as Joint Tenants | 267.7400 | 41.83829734% | 0.92821630% |
| | | | Delmer F. Voegele & Cassandra R. Voegele, husband & wife, as Joint Tenants, Life Estate | 360.0400 | 56.26152452% | 1.24820720% |
| | | | Corey Voegele | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Jack J. Kraft & Deborah Kraft, as Joint Tenants | 12.1600 | 1.90017814% | 0.04215698% |
| 56 | Section 03-T141N-R88W | 479.96 | Delmer F. Voegele & Cassandra R. Voegele, husband & wife, as Joint Tenants, Life Estate | 319.9600 | 66.66388866% | 1.10925557% |
| | | | Eric John Voegele, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | Delmer F. Voegele & Cassandra R. Voegele, husband & wife, as Joint Tenants, Life Estate | 160.0000 | 33.33611134% | 0.55469712% |
| | | | Corey Voegele | 0.0000 | 0.00000000% | 0.00000000% |
| | | | | | | |
| | **Total Acres:** | **28,844.57** | | **28,844.57** | **Total Participation:** | **100.00000000%** |

# EXHIBIT C

Tract Participation Factors

Attached to and made part of the Storage Agreement
BK Fischer Broom Creek – Secure Geological Storage
Mercer & Oliver Counties, North Dakota

| Tract No. | Land Description | Acres | Tract Participation Factor |
|---|---|---|---|
| 1 | Section 27-T143N-R88W | 280 | 0.97071997% |
| 2 | Section 28-T143N-R88W | 480 | 1.66409137% |
| 3 | Section 29-T143N-R88W | 200 | 0.69337140% |
| 4 | Section 32-T143N-R88W | 480 | 1.66409137% |
| 5 | Section 33-T143N-R88W | 640 | 2.21878849% |
| 6 | Section 34-T143N-R88W | 640 | 2.21878849% |
| 7 | Section 35-T143N-R88W | 480 | 1.66409137% |
| 8 | Section 05-T142N-R87W | 80 | 0.27734856% |
| 9 | Section 06-T142N-R87W | 279.06 | 0.96746112% |
| 10 | Section 01-T142N-R88W | 320 | 1.10939425% |
| 11 | Section 02-T142N-R88W | 563.87 | 1.95485667% |
| 12 | Section 03-T142N-R88W | 644.63 | 2.23484004% |
| 13 | Section 04-T142N-R88W | 644.44 | 2.23418134% |
| 14 | Section 05-T142N-R88W | 644.07 | 2.23289860% |
| 15 | Section 06-T142N-R88W | 160.84 | 0.55760928% |
| 16 | Section 07-T142N-R88W | 320 | 1.10939425% |
| 17 | Section 08-T142N-R88W | 640 | 2.21878849% |
| 18 | Section 09-T142N-R88W | 640 | 2.21878849% |
| 19 | Section 10-T142N-R88W | 640 | 2.21878849% |
| 20 | Section 11-T142N-R88W | 640 | 2.21878849% |
| 21 | Section 12-T142N-R88W | 640 | 2.21878849% |
| 22 | Section 07-T142N-R87W | 637.12 | 2.20880394% |
| 23 | Section 08-T142N-R87W | 320 | 1.10939425% |
| 24 | Section 17-T142N-R87W | 320 | 1.10939425% |
| 25 | Section 18-T142N-R87W | 637 | 2.20838792% |
| 26 | Section 13-T142N-R88W | 640 | 2.21878849% |
| 27 | Section 14-T142N-R88W | 640 | 2.21878849% |
| 28 | Section 15-T142N-R88W | 640 | 2.21878849% |
| 29 | Section 16-T142N-R88W | 640 | 2.21878849% |
| 30 | Section 17-T142N-R88W | 640 | 2.21878849% |
| 31 | Section 18-T142N-R88W | 400 | 1.38674281% |
| 32 | Section 19-T142N-R88W | 320 | 1.10939425% |
| 33 | Section 20-T142N-R88W | 640 | 2.21878849% |
| 34 | Section 21-T142N-R88W | 640 | 2.21878849% |
| 35 | Section 22-T142N-R88W | 640 | 2.21878849% |
| 36 | Section 23-T142N-R88W | 640 | 2.21878849% |
| 37 | Section 24-T142N-R88W | 640 | 2.21878849% |
| 38 | Section 19-T142N-R87W | 637.16 | 2.20894262% |

| | | | |
|---|---|---|---|
| 39 | Section 20-T142N-R87W | 320 | 1.10939425% |
| 40 | Section 29-T142N-R87W | 320 | 1.10939425% |
| 41 | Section 30-T142N-R87W | 637.96 | 2.21171610% |
| 42 | Section 25-T142N-R88W | 640 | 2.21878849% |
| 43 | Section 26-T142N-R88W | 640 | 2.21878849% |
| 44 | Section 27-T142N-R88W | 640 | 2.21878849% |
| 45 | Section 28-T142N-R88W | 640 | 2.21878849% |
| 46 | Section 29-T142N-R88W | 640 | 2.21878849% |
| 47 | Section 30-T142N-R88W | 160 | 0.55469712% |
| 48 | Section 32-T142N-R88W | 480 | 1.66409137% |
| 49 | Section 33-T142N-R88W | 640 | 2.21878849% |
| 50 | Section 34-T142N-R88W | 640 | 2.21878849% |
| 51 | Section 35-T142N-R88W | 640 | 2.21878849% |
| 52 | Section 36-T142N-R88W | 640 | 2.21878849% |
| 53 | Section 31-T142N-R87W | 158.71 | 0.55022488% |
| 54 | Section 01-T141N-R88W | 159.81 | 0.55403842% |
| 55 | Section 02-T141N-R88W | 639.94 | 2.21858048% |
| 56 | Section 03-T141N-R88W | 479.96 | 1.66395270% |
| **Total:** | | **28,844.57** | **100.00000000%** |

# EXHIBIT D

Form of Pore Space Lease

Attached to and made part of the Storage Agreement
BK Fischer Broom Creek – Secure Geological Storage
Mercer & Oliver Counties, North Dakota

#
#
#
#

## PORE SPACE LEASE

THIS PORE SPACE LEASE (this "Lease") is made effective as of the Effective Date (as defined below) by and between_____,
whose address is_____,
(whether one or more, "Lessor"), and Summit Carbon Storage #2, LLC, a Delaware limited liability company, whose address is 2321 N. Loop Dr., Ames, IA 50010 (whether one or more, "Lessee"). Lessor and Lessee may be individually referred to herein as a "Party" and collectively as the "Parties".

1. Leased Premises. Lessor, for good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, does hereby grant, demise, lease and let unto Lessee for Lessee's geologic storage operations and other purposes set forth herein, the lands described and incorporated herein by reference in Exhibit A attached (the "Leased Premises").

2. Term.

(a) Initial and Primary Term. This Lease shall commence on the date Lessee executes this Lease ("Effective Date") and continue for an initial term of twenty (20) years ("Initial Term") unless sooner terminated in accordance with the terms of this Lease. As consideration for the Initial Term, Lessee shall pay to Lessor TWENTY-FIVE and NO/100 DOLLARS ($25.00) per acre as a single one-time bonus payment, and an annual rental of Four and No/100 Dollars ($4.00) per acre on or before January 1 of each year of the Initial Term. The annual rental shall increase by TWO percent (2.0%) commencing on January 1, 2026 and on January 1 each year thereafter. The first year's rental has been paid in full, the receipt and sufficiency of which is hereby acknowledged by Lessor. Lessee may, at any time prior to the expiration of the Initial Term, elect to extend the Initial Term for up to an additional twenty (20) years by providing written notice to Lessor and payment of One Hundred and No/100 Dollars ($100.00) per acre (the Initial Term, together with all extensions shall be referred to herein as the "Primary Term"). For the avoidance of doubt, Lessor's consent to any such extension will not be required provided that the foregoing payment is tendered to Lessor prior to the expiration of the Initial Term. Lessee shall pay to Lessor the annual rentals when due throughout the Primary Term; *provided*, *however*, Lessee shall not be liable to Lessor for annual rentals with respect to any portion of the Leased Premises which are or become subject to Permit as set forth in Section 2(b), below.

(b) Operational Term. This Lease shall continue beyond the Primary Term for so long as any portion of the Leased Premises or Lessee's storage facilities located in, on or under the Leased Premises (including without limitation, any Reservoirs) are subject to a permit issued by the North Dakota Industrial Commission (the "Commission") (a "Permit") or under the ownership or control of the State of North Dakota; *provided*, *however*, that all of Lessee's obligations under this Lease shall terminate upon issuance of a certificate of project completion pursuant to Chapter 38-22 of the North Dakota Century Code (the "Operational Term"). If the Primary Term expires and no portion of the Leased Premises or Lessee's storage facilities located in, on or under the Leased Premises is subject to a Permit, this Lease shall terminate, and Lessee shall execute a document evidencing termination of this Lease in recordable form and shall record it in the official records of the county in which the Leased Premises is located. As consideration for the Operational Term, Lessee shall pay to Lessor the royalty set forth in Section 3, below.

3. Royalty. Lessee shall pay to Lessor its proportionate share of FIFTY cents ($0.50) per metric ton of carbon dioxide ($CO_2$) injected into the reservoirs and subsurface pore spaces (as used herein, such terms shall have the meanings set forth in Chapter 38-22 and Chapter 47-31 of the North Dakota Century Code), stratum or strata underlying the Leased Premises (collectively, "Reservoirs"), or reservoirs and subsurface pore spaces, stratum or strata unitized or amalgamated therewith. The royalty shall increase TEN percent (10.0%) on January 1, 2026 and an additional TEN percent (10.0%) every five years thereafter, as outlined on attached Exhibit B. The quantity of $CO_2$ so injected shall be measured by meters installed by Lessee. Lessor's "proportionate share" shall be determined on a net acre basis and the Parties hereby stipulate that the acreage set forth in Section 1 shall be used to calculate Lessor's proportionate share. The quantity of carbon dioxide injected into the Reservoirs or any reservoirs or subsurface pore spaces, stratum or strata unitized or amalgamated therewith shall be determined through the use of metering equipment installed and operated by Lessee at the injection site. All royalties due hereunder for carbon dioxide injected into the Reservoirs or any reservoirs or subsurface pore spaces, stratum or strata unitized or amalgamated therewith during any calendar month shall be paid to Lessor annually on or before March 31st for the prior year's injection volumes. Lessor and Lessee agree that this Lease shall continue as specified herein even in the absence of injection operations and the payment of royalties.

4. Right to Pore Space/Storage of Carbon Dioxide. Lessor grants to Lessee the exclusive right to inject and store carbon dioxide ($CO_2$) and other incidental gaseous substances into the Reservoirs, together with the right to construct, replace, inspect, repair, monitor, maintain, relocate, change the size of such surface or subsurface facilities on the Leased Premises that Lessee determines necessary or desirable for Lessee's storage operations, including, but not limited to fences, pipelines, tanks, reservoirs, electric and communication lines, roadways, underground facilities and equipment, surface facilities and equipment, buildings, structures and other such facilities and appurtenances. Lessor shall not grant any other person the right to inject or store $CO_2$ or any other incidental substances.

5. Facility Right of Ways/Compensation. Lessor grants Lessee the right of reasonable use of the surface of the Leased Premises, including without limitation, the rights of ingress and egress over the Leased Premises together with the right of way over, under and across the Leased Premises and the right from time to time to construct, replace, inspect, repair, monitor, maintain, relocate, change the size of such surface or subsurface facilities on the Leased Premises that Lessee determines necessary or desirable for Lessee's storage operations, including, but not limited to fences, pipelines, tanks, reservoirs, electric and communication lines, roadways, underground facilities and equipment, surface facilities and equipment, buildings, structures and other such facilities and appurtenances, (each a "Facility" and collectively the "Facilities"); *provided*, *however*, that (i) Lessee shall provide Lessor with notice of operations and an offer of damage, disruption and loss of production payments, as each may be applicable, prior to the installation of any such Facilities on the Leased Premises, and (ii) the agreed up terms, including the amount of damage payments to be paid to Lessor, shall be memorialized in an agreement separate from this Lease, such agreement to be consistent with the grant contained herein. Lessee shall be entitled to proceed with the installation of the Facilities while the separate agreement and amount of damage, disruption or loss is being agreed or determined. Lessee shall have the further right to fence the perimeter of any Facility on the Leased Premises and sufficiently illuminate the site for the safety and security of operations.

6. Amalgamation. Lessee, in its sole discretion, shall have the right and power, at any time and from time to time during the term of this Lease to pool, unitize, or amalgamate any reservoirs or subsurface pore spaces, stratum or strata underlying the Leased Premises with any other lands or interests into which such reservoirs or subsurface pore spaces extend and document such unit in accordance with applicable law or agency order. Amalgamated units shall be of such shape and dimensions as Lessee may elect and as are approved by the Commission. Amalgamated areas may include, but are not required to include, land upon which injection or extraction wells have been completed or upon which the injection and/or withdrawal of carbon dioxide and/or related gaseous substances has commenced prior to the effective date of amalgamation. In exercising its amalgamation rights under this Lease and if required by law, Lessee shall record or cause to be recorded a copy of the Commission's amalgamation order or other notice thereof in the county in which the amalgamated unit is located. Amalgamating in one or more instances shall, if approved by the Commission, not exhaust the rights of Lessee to amalgamate Reservoirs or portions of Reservoirs into other amalgamation areas, and Lessee shall have the recurring right to revise any amalgamated area formed under this Lease by expansion or contraction or both. Lessee may dissolve any amalgamated area at any time and document such dissolution by recording an instrument in accordance with applicable law or agency order. Lessee shall have the right to negotiate, on behalf of and as agent for Lessor, any unit, amalgamation, storage or operating agreements with respect to amalgamation of reservoir or pore space interests underlying the Leased Premises or the operation of any amalgamated areas formed under such agreements. To the extent any of the terms of such agreements conflict with the terms of this Lease, the terms of such agreements shall control, and the provisions of this Lease shall be deemed modified to conform to the terms, conditions, and provisions of any such agreements which are approved by the Commission.

7. Lessee Obligations. Lessee shall have no obligation, express or implied, to begin, prosecute or continue storage operations in, upon or under the Leased Premises, or store and/or sell or use all or any portion of the gaseous substances stored thereon. The timing, nature, manner and extent of Lessee's operations, if any, under this Lease shall be at the sole discretion of Lessee. All obligations of Lessee are expressed herein, and there shall be no covenants implied under this Lease, it being agreed that all amounts paid hereunder constitute full and adequate consideration for this Lease.

8. Ownership. Lessee shall at all times be the owner of (i) the carbon dioxide and other gaseous substances stored in the Reservoirs or any reservoirs or subsurface pore spaces, stratum or strata unitized or amalgamated therewith, and (ii) all equipment, buildings, structures, facilities and other property constructed or installed by Lessee on the Leased Premises. Lessee shall have the right, but not the obligation, at any time during this Lease to remove all or any portion of the property or fixtures placed by Lessee on the Lease Premises. Notwithstanding the foregoing, title to the storage facility and to the stored carbon dioxide or other gaseous substances shall be transferred to the State of North Dakota upon issuance of a certificate of project completion by the Commission in accordance with Chapter 38-22 of the North Dakota Century Code.

9. Minerals, Oil and Gas. This Lease is not intended to grant or convey, nor does it grant or convey, any right to or obligation for Lessee to explore for or produce minerals, including oil and gas, that may exist on or under the Leased Premises.

10. Surrender of Leased Premises. Lessee shall have the right, but not the obligation, at any time from time to time to execute and deliver to Lessor a surrender and/or release covering all or any part of the Leased Premises for which the Reservoirs are not being utilized for storage as set forth herein, and upon delivery of such surrender and/or release to Lessor this Lease shall terminate as to such lands, and Lessee shall be released from all further obligations and duties as to the lands so surrendered and/or released, including, without limitation, any obligation to make payments provided for herein, except obligations accrued as of the date of the surrender and/or release. Lessee shall be able to surrender the any and or all of the Leased Premises if not utilizing the Reservoirs located thereunder.

11. Hold Harmless and Indemnification. The Lessee agrees to defend, indemnify, and hold harmless Lessor from any claims by any person that are a direct result of the Lessee's use of the Leased Premises or Reservoirs. Notwithstanding the foregoing, such indemnity/hold harmless obligation excludes (i) any claim or cause of action, or alleged or threatened claim or cause of action, damage, judgment, interest, penalty or other loss arising or resulting from the negligence or intentional acts of Lessor or Lessor's agents, invitees, or licensees; or third parties, and (ii) any claim for exemplary, punitive, special or consequential damages claimed by Lessor. Lessee further accepts liability and indemnifies Lessor for reasonable costs, expenses and attorneys' fees incurred in establishing and litigating the indemnification coverage provided above. The legal defense provided by Lessee to the Lessor under this paragraph must be free of any conflicts of interest even if this requires Lessee to retain separate legal counsel for Lessor.

12. Hazardous Substances. Lessee shall have no liability for any regulated hazardous substances located on the Leased Premises prior to the Effective Date or placed in, on or about the Leased Premises by Lessor or any third-party on or after the Effective Date, and nothing in this Lease shall be construed to impose upon Lessee any obligation for the removal of such regulated hazardous substances. As used herein, "hazardous substances" shall have the meaning set forth in the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) and any amendments thereto, or any other local, state or federal statutes.

13. Termination. A material violation or default of any terms of this Lease by Lessee shall be grounds for termination of the Lease. Lessor shall give Lessee written notice of violation or default and Lessee shall have sixty (60) days after receipt of said notice to substantially cure such violations or defaults. If Lessee fails to substantially cure such violations or defaults within the 60-day cure period, Lessor may terminate the Lease; provided that if it is not possible to cure such violations or defaults within the 60-day cure period, Lessee shall have a reasonable longer period of time to cure such violations or defaults provided it commences cure within the initial 60-day cure period and thereafter diligently pursues such cure. Lessee may terminate the lease with thirty (30) days written notice to Lessor. Upon termination of this Lease, Lessee shall have one hundred eighty (180) days to remove all facilities and property of Lessee located on the Leased Premises. For the avoidance of doubt, Lessee shall not be required to remove any $CO_2$ or other incidental gaseous substances injected into the Reservoirs.

14. Taxes. Lessee shall pay all taxes, if any, levied against its personal property or on its improvements to the Leased Premises. Lessor shall pay for all real estate taxes and other assessments levied upon the Leased Premises. Lessee shall have the right to pay all taxes, assessments and other fees on behalf of Lessor and to deduct the amount so paid from other payments due to Lessor hereunder.

15. Conduct of Operations. In conducting its operations hereunder, Lessee shall use its best efforts to comply with all applicable laws, rules and regulations and ordinances pertaining thereto. Lessee reserves and shall have the right to challenge and/or appeal any law, ruling, regulation, order or other determination and to carry on its operations in accordance with Lessee's interpretation of the same, pending final determination.

16. Force Majeure. Should Lessee be prevented from complying with any express or implied covenant of this Lease or from utilizing the Lease Premises for underground storage purposes by reason of scarcity of or an inability to obtain or to use equipment or material or failure or breakdown of equipment, or by operation of force majeure, any federal or state law or any order, rule or regulation of governmental authority, then while so prevented, Lessee's obligation to comply with such covenant shall be suspended and the primary term of this Lease shall be extended while and so long as Lessee is prevented by any such cause from utilizing the property for underground storage purposes and the time while Lessee is so prevented shall not be counted against Lessee, anything in this Lease to the contrary notwithstanding.

17. Surface Damage Compensation. The bonus and royalty amounts contemplated and paid to Lessor hereunder is compensation for, among other things, damages sustained by Lessor for lost land value, lost use of and access to Lessor's land and lost value of improvements, if any and to the extent applicable. Subject to Lessee's obligation to compensate Lessor for the installation of any Facilities on the Leased Premises pursuant to Section 5 of this Agreement, Lessor agrees that such compensation is just and adequate for any and all such damages and all other damages which Lessor may sustain as a result of Lessee's use of the property for its storage operations.

18. Quiet Enjoyment. Lessor hereby agrees that Lessee, at its option, shall have the right to discharge any tax, mortgage, or other lien upon the Leased Premises, and in the event Lessee does so, Lessee shall be subrogated to such lien with the right to enforce the same and apply royalty payments or any other payments due to Lessor toward satisfying the same.

Lessor warrants that, except as disclosed to Lessee in writing, there are no liens, encumbrances, leases, mortgages, deeds of trust, options, or other exceptions to Lessor's fee title ownership of the Leased Premises (collectively, "Liens") which are not recorded in the public records of the County in which the Leased Premises is located. Lienholders (including tenants), whether or not their Liens are recorded, shall be Lessor's responsibility, and Lessor shall cooperate with Lessee to obtain a non-disturbance agreement from each party that holds a Lien (recorded or unrecorded) that might interfere with Lessee's rights under this Lease. A non-disturbance agreement is an agreement between Lessee and a lienholder which provides that the lienholder shall not disturb Lessee's possession or rights under the Lease or terminate this Lease so long as Lessor is not entitled to terminate this Lease under the provisions hereof.

Lessor shall have the quiet use and enjoyment of the Leased Premises in accordance with the terms of this Lease. Lessor's activities and any grant of rights Lessor makes to any person or entity, whether located on the Leased Premises or elsewhere, shall not, currently or prospectively, materially interfere with activities permitted hereunder. If Lessor has any right to select, determine, prohibit or control the location of sites for drilling, exploitation, production and/or exploration of minerals, hydrocarbons, water, gravel, or any other similar resource in, to or under the Lease Premises, then Lessor shall exercise such right so as to minimize interference with any of the foregoing.

19. Environmental Incentives and Tax Credits. Lessee shall be the owner of (i) any and all credits, benefits, emissions reductions, offsets, and allowances, howsoever entitled, attributable to Lessee's geologic storage operations, including any avoided emissions and the reporting rights related to these avoided emissions, such as 26 U.S.C. §45Q Tax Credits, and any other attributes of Lessee's ownership of the Facilities and Lessee's geologic storage operations ("Environmental Attributes"), and (ii) any and all credits, rebates, subsidies, payments or other incentives that relate to the use of technology incorporated into Lessee's geologic storage operations, environmental benefits of such operations, or other similar programs available from any regulated entity or any governmental authority ("Environmental Incentives"). Lessee is further entitled to the benefit of any

and all (a) investment tax credits, (b) production tax credits, (c) credits under 26 U.S.C. §45Q credits, and (d) similar tax credits or grants under federal, state or local law relating to Lessee's geologic storage operations ("Tax Credits"). Lessor shall (i) cooperate with Lessee in obtaining, securing and transferring all Environmental Attributes and Environmental Incentives and the benefit of all Tax Credits, and (ii) shall allow Lessee to take any actions necessary to install additional equipment on the Facilities to comply with all monitoring and reporting obligations, and allow Lessee's personnel to enter the premises and collect any data Lessee requires to satisfy its obligations required in connection with obtaining Tax Credits and Environmental Attributes. Lessor shall not be obligated to incur any out-of-pocket costs or expenses in connection with such actions unless reimbursed by Lessee. If any Environmental Incentives are paid directly to Lessor, Lessor shall immediately pay such amounts over to Lessee.

20. Assignment. The rights of either Party hereto may be assigned in whole or part. The assigning party shall provide written notice of any assignment within sixty (60) days after such assignment has become effective; *provided, however,* that an assigning party's failure to deliver written notice of assignment within such 60-day period shall not be deemed a breach of this Lease unless such failure is willful and intentional. The Lessor's consent shall not be required for an assignment by the Lessee of this Lease, whether by way of a collateral assignment to its financiers or otherwise.

21. Change of Ownership. No change of ownership in the Leased Premises shall be binding on the Lessee for purpose of making payments to Lessor hereunder until the date Lessor, or Lessor's successors or assigns, furnishes Lessee the recorded original or a certified copy of the instrument evidencing the change in ownership. The Lessor's consent shall not be required for a change in the direct or indirect control of the Lessee.

22. Notices. All notices required to be given under this Lease shall be in writing and addressed to the respective Party at the addresses set forth at the beginning of this Lease unless otherwise directed by either Party.

23. No Waiver. The failure of either Party to insist in any one or more instances upon strict performance of any of the provisions of this Lease or to take advantage of any of its rights hereunder shall not be construed as a waiver of any such provision or the relinquishment of any such rights, but the same shall continue and remain in full force and effect.

24. Notice of Lease. This Lease shall not be recorded in the real property records. Lessee shall cause a memorandum of this Lease to be recorded in the real property records of the county in which the Leased Premises are situated.

25. [Reserved.]

26. Counterparts. This Lease may be executed in any number of counterparts, each of which, when executed and delivered, shall be an original, but all of which shall collectively constitute one and the same instrument.

27. Severability. If any provision of this Lease is found to be invalid, illegal or unenforceable in any respect, such provision shall be deemed to be severed from this Agreement, and the validity, legality and enforceability of the remaining provisions contained herein shall not in any way be affected or impaired thereby.

28. Governing Law. This Lease shall be governed by, construed and enforced in accordance with the laws of the State of North Dakota and the Parties hereby submit to the jurisdiction of the state or federal courts located in the State of North Dakota.

29. Further Assurances. Each Party will execute and deliver all documents, provide all information, and take or forbear from all actions as may be necessary or appropriate to achieve the purposes of this Lease, including without limitation executing a memorandum of this Lease and all documents required to obtain any necessary government approvals.

30. Entire Agreement. This Lease constitutes the entire agreement between the Parties and supersedes all prior negotiations, undertakings, notices, memoranda and agreement between the Parties, whether oral or written, with respect to the subject matter hereof. This Lease may only be amended or modified by a written agreement duly executed by Lessor and Lessee.

31. Cooperation with Financiers. The Lessor hereby acknowledges and consents that Lessee may grant a collateral assignment or leasehold mortgage of Lessee's rights under this Lease to Lessee's debt financiers, it being understood that such collateral assignment or leasehold mortgage would only encumber the leasehold interest created hereunder.

32. Favored Nations. If, at any time within the twelve (12) month period following the Effective Date, Lessee enters into a pore space lease agreement with a third party landowner covering any part of Lessee's storage facility ("Third-Party Lease"), and if any of the payments specified in the Third-Party Lease would have been more favorable to Lessor had Lessor executed a lease agreement similar to the Third-Party Lease, then Lessor and Lessee will amend this Lease so that it reflects compensation terms similar to the Third-Party Lease, and Lessee will pay to Lessor the additional compensation, if any, that Lessor would have been paid had Lessor signed a lease agreement similar to the Third-Party Lease. For the purposes of this Section 32, "Lessee's storage facility" shall mean any storage facility (as such term in defined in ch. 38-22 of the North Dakota Century Code) operated by Lessee within a ten (10) mile radius of the Leased Premises which is subject to a permit is issued by the Commission pursuant to ch. 38-22 of the North Dakota Century Code.

33. Electronic Signatures. This Lease, and any amendments hereto, to the extent signed and delivered by means of electronic transmission in portable document format (pdf) or by DocuSign or similar electronic signature process, shall be treated in all manner and respects as an original contract and shall be considered to have the same binding legal effect as if it were the original signed version thereof delivered in person.

34. Insurance. Lessee shall obtain and maintain in force commercial general liability insurance covering the Facilities and Lessee's activities on the Leased Premises at all times during the term of this Lease, with a minimum occurrence and aggregate limit of one million dollars ($1,000,000). Such insurance coverage for the Facilities and Leased Premises may be provided as part of a blanket policy that covers other Facilities or properties as well. Any such policies shall include Lessor as an additional insured. Lessee, or its insurer, shall provide thirty (30) days prior written notice (except ten (10) days for nonpayment of premium) to Lessor of any cancellation. Lessee shall provide Lessor with copies of certificates of insurance evidencing this coverage upon request by Lessor. The policy shall be endorsed or include a provision waiving insurer rights of subrogation against Lessor.

IN WITNESS WHEREOF, the Parties have executed this Lease effective for all purposes as of the Effective Date.

**LESSOR:**

By: _____

Print: _____

#

By: _____

Print: _____#

#

#

**LESSEE:** SUMMIT CARBON STORAGE #2, LLC

By: _____

Print: _____

Its: _____

# EXHIBIT A

## Leased Premises

## EXHIBIT B

### Royalty Escalation Provision

This Lease is subject to a Royalty Escalation. The royalty shall increase TEN percent (10.0%) on January 1, 2026, and an additional TEN percent (10.0%) every five years thereafter. For the avoidance of doubt, the royalty to be paid is calculated below:

| Date: | Royalty Rate: |
|---|---|
| Beginning January 1, 2026 | $0.550 |
| Beginning January 1, 2031 | $0.605 |
| Beginning January 1, 2036 | $0.666 |
| Beginning January 1, 2041 | $0.733 |
| Beginning January 1, 2046 | $0.806 |
| Beginning January 1, 2051 | $0.887 |
| Beginning January 1, 2056 | $0.976 |
| Beginning January 1, 2061 | $1.074 |
| Beginning January 1, 2066 | $1.181 |
| Beginning January 1, 2071 | $1.299 |
| Beginning January 1, 2076 | $1.429 |

**SUMMIT CARBON STORAGE #2, LLC**

Dated: _____

By: _____

Print: _____

Its: _____

**STORAGE AGREEMENT**
**~~SCS #2~~BK FISCHER BROOM CREEK – SECURE GEOLOGIC STORAGE**
**MERCER & OLIVER COUNTIES, NORTH DAKOTA**

**STORAGE AGREEMENT**
**~~SCS #2~~BK FISCHER BROOM CREEK – SECURE GEOLOGIC STORAGE**
**MERCER & OLIVER COUNTIES, NORTH DAKOTA**

**THIS AGREEMENT** ("Agreement") is entered into as of the ___ day of _____, 20__, by the parties who have signed the original of this instrument, a counterpart thereof, ratification and joinder or other instrument agreeing to become a Party hereto.

**RECITALS:**

A. It is in the public interest to promote the geologic storage of carbon dioxide in a manner which will benefit the state and the global environment by reducing greenhouse gas emissions and in a manner which will help ensure the viability of the state's coal and power industries, to the economic benefit of North Dakota and its citizens;

B. To further geologic storage of carbon dioxide, a potentially valuable commodity, may allow for its ready availability if needed for commercial, industrial, or other uses, including enhanced recovery of oil, gas, and other minerals; and

C. For geologic storage, however, to be practical and effective it requires cooperative use of surface and subsurface property interests and the collaboration of property owners, which may require procedures that promote, in a manner fair to all interests, cooperative management, thereby ensuring the maximum use of natural resources.

**AGREEMENT:**

It is agreed as follows:

**ARTICLE 1**
**DEFINITIONS**

As used in this Agreement:

1.1 **Carbon Dioxide** means carbon dioxide in gaseous, liquid, or supercritical fluid

state together with incidental associated substances derived from the source materials, capture process and any substances added or used to enable or improve the injection process.

1.2 **Commission** means the North Dakota Industrial Commission (NDIC) acting by and through the Department of Mineral Resources.

1.3 **Effective Date** is the time and date this Agreement becomes effective as provided in Article 14.

1.4 **Facility Area** is the land described by Tracts in Exhibit "B" and shown on Exhibit "A" containing 28,844.57 acres, more or less.

1.5 **Party** is any individual, corporation, limited liability company, partnership, association, receiver, trustee, curator, executor, administrator, guardian, tutor, fiduciary, or other representative of any kind, any department, agency, or instrumentality of the state, or any governmental subdivision thereof, or any other entity capable of holding an interest in the Storage Reservoir.

1.6 **Pore Space** means a cavity or void, whether natural or artificially created, in any subsurface stratum.

1.7 **Pore Space Interest** is a right to or interest in the Pore Space in any Tract within the boundaries of the Facility Area.

1.8 **Pore Space Owner** is a Party hereto who owns Pore Space Interest.

1.9 **Storage Equipment** is any personal property, lease, easement, and well equipment, plants and other facilities and equipment for use in Storage Operations.

1.10 **Storage Expense** is all costs, expense or indebtedness incurred by the Storage Operator pursuant to this Agreement for or on account of Storage Operations.

1.11 **Storage Facility** is the unitized or amalgamated Storage Reservoir created pursuant to an order of the Commission.

1.12 **Storage Facility Participation** is the percentage shown on Exhibit "C" for allocating payments for use of the Pore Space under each Tract identified in Exhibit "B".

1.13 **Storage Operations** are all operations conducted by the Storage Operator pursuant to this Agreement or otherwise authorized by any lease covering any Pore Space Interest.

1.14 **Storage Operator** is the person or entity named in Section 4.1 of this Agreement.

1.15 **Storage Reservoir** consists of the Pore Space and confining subsurface strata underlying the Facility Area described as the Opeche/Spearfish (Upper Confining Zone), Broom Creek (Injection Zone), and Amsden (Lower Confining Zone) Formation(s) and which are defined as identified by the well logging suite performed at one stratigraphic well, the Archie Erickson 2 well (NDIC File No. 38622) located in the SW¼ of the SW¼ Section 12, Township 142 North, Range 88 West, Mercer County, North Dakota. The Storage Reservoir is defined as the stratigraphic interval from below the top of the Opeche/Spearfish Formation found at a depth of 5,587 feet below the Kelly Bushing, to above the base of the Amsden Formation, found at a depth of 6,421 feet below the Kelly Bushing, as identified by the Array Induction Gamma log run in the Milton Flemmer 1 well (NDIC File No. 38594) located in the NW¼ of the NE¼, Section 35, Township 141 North, Range 88 West, Mercer County, North Dakota. The logging suite included triple combo (gamma ray, density, porosity, and resistivity), caliper, spectral gamma ray, combinable magnetic resonance (CMR), dipole sonic including four-arm caliper and inclinometer, and image log. Further, the acquired logs were used to pick formation top depths and interpret lithology, petrophysical properties, and time-to-depth shifting of seismic data

obtained from three 3D seismic surveys and one 5-mile long 2D seismic line covering an area totaling 208 miles in and around the Archie Erickson 2 stratigraphic well. Formation top depths were picked from the top of the Pierre Formation to the top of the Amsden Formation. The average depth of the top of the Opeche/Spearfish Formation (Upper Confining Zone) across the storage facility is 5,587 feet total vertical depth (TVD). The average depth of the base of the Amsden Formation (Lower Confining Zone) across the storage facility area is 6,359 feet TVD. The average thickness of the Storage Reservoir across the storage facility is 772 feet.

1.16 **Storage Rights** are the rights to explore, develop, and operate lands within the Facility Area for the storage of Storage Substances.

1.17 **Storage Substances** are Carbon Dioxide and incidental associated substances, fluids, and minerals.

1.18 **Tract** is the land described as such and given a Tract number in Exhibit "B."

1.19 **Transfer Storage Facility** has the meaning given such term in Section 3.7 of this Agreement.

## ARTICLE 2
## EXHIBITS

2.1 **Exhibits.** The following exhibits, which are attached hereto, are incorporated herein by reference:

2.1.1 Exhibit "A" is a map that shows the boundary lines of the ~~SCS #2~~BK Fischer Broom Creek Facility Area and the tracts therein;

2.1.2 Exhibit "B" is a schedule that describes the acres of each Tract in the ~~SCS #2~~BK Fischer Broom Creek Facility Area;

2.1.3 Exhibit "C" is a schedule that shows the Storage Facility Participation of each Tract; and

2.1.4 Exhibit "D" is a form of Pore Space Lease.

2.2 **Reference to Exhibits.** When reference is made to an exhibit, it is to the exhibit as originally attached or, if revised, to the last revision.

2.3 **Exhibits Considered Correct.** Exhibits "A," "B," "C" and "D" shall be considered to be correct until revised as herein provided.

2.4 **Correcting Errors.** The shapes and descriptions of the respective Tracts have been established by using the best information available. If it subsequently appears that any Tract, ~~mechanical~~mathematical miscalculation or clerical error has been made, Storage Operator, with the approval of Pore Space Owners whose interest is affected, shall correct the mistake by revising the exhibits to conform to the facts. The revision shall not include any re-evaluation of engineering or geological interpretations used in determining Storage Facility Participation. Each such revision of an exhibit made prior to thirty (30) days after the Effective Date shall be effective as of the Effective Date. Each such revision thereafter made shall be effective at 7:00 a.m. on the first day of the calendar month next following the filing for record of the revised exhibit or on such other date as may be determined by Storage Operator and set forth in the revised exhibit.

2.5 **Filing Revised Exhibits.** If an exhibit is revised, Storage Operator shall execute an appropriate instrument with the revised exhibit attached and file the same for record in the county or counties in which this Agreement or memorandum of the same is recorded and shall also file the amended changes with the Commission.

## ARTICLE 3
## CREATION AND EFFECT OF STORAGE FACILITY

3.1 **Unleased Pore Space Interests.** Any Pore Space Owner in the Storage Facility who owns a Pore Space Interest in the Storage Reservoir that is not leased for the purposes of

this Agreement and during the term hereof, shall be treated as if it were subject to the Pore Space Lease attached hereto as Exhibit "D".

3.2 **Amalgamation of Pore Space.** All Pore Space Interests in and to the Tracts are hereby amalgamated and combined insofar as the respective Pore Space Interests pertain to the Storage Reservoir, so that Storage Operations may be conducted with respect to said Storage Reservoir as if all of the Pore Space Interests in the Facility Area had been included in a single lease executed by all Pore Space Owners, as lessors, in favor of Storage Operator, as lessee and as if the lease contained all of the provisions of this Agreement.

~~3.3 **Amendment of Leases and Other Agreements.** The provisions of the various leases, agreements, or other instruments pertaining to the respective Tracts or the storage of the Storage Substances therein, including the Pore Space Lease attached hereto as Exhibit "D", are amended to the extent necessary to make them conform to the provisions of this Agreement, but otherwise shall remain in effect.~~

3.3 **[Reserved.]**

3.4 **Continuation of Leases and Term Interests.** Injection in to any part of the Storage Reservoir, or other Storage Operations, shall be considered as injection in to or upon each Tract within said Storage Reservoir, and such injection or operations shall continue in effect as to each lease as to all lands and formations covered thereby just as if such operations were conducted on and as if a well were injecting in each Tract within said Storage Reservoir.

3.5 **Titles Unaffected by Storage.** Nothing herein shall be construed to result in the transfer of title of the Pore Space Interest of any Party hereto to any other Party or to Storage Operator.

3.6 **Injection Rights.** Storage Operator is hereby granted the right to inject into the Storage Reservoir any Storage Substances in whatever amounts Storage Operator may deem expedient for Storage Operations, together with the right to drill, use, and maintain injection wells in the Facility Area, and to use for injection purposes.

3.7 **Transfer of Storage Substances from Storage Facility.** Storage Operator may transfer from the Storage Facility any Storage Substances, in whatever amounts Storage Operator may deem expedient for Storage Operations, to any other reservoir, subsurface stratum or formation permitted by the Commission for the storage of carbon dioxide under Chapter 38-22 of the North Dakota Century Code (a "Transfer Storage Facility"), *provided that*, the Pore Space ownership between the Storage Facility and Transfer Storage Facility is common.

3.8 **Receipt of Storage Substances.** Storage Operator may accept and receive into the Storage Facility any Storage Substances, in whatever amounts Storage Operator may deem expedient for Storage Operations, being stored in any other Transfer Storage Facility, *provided that,* the Pore Space ownership between the Storage Facility and Transfer Storage Facility is common.

3.9 **Royalty Payments Upon Transfer.** The transfer or receipt of Storage Substances to or from a Transfer Storage Facility in accordance with Section 3.7 and Section 3.8 shall be disregarded for the purposes of calculating the royalty under any lease covering a Pore Space Interest (including Exhibit "D") and shall not affect the allocation of Storage Substances injected into the Storage Facility through the surface of the Facility Area in accordance with Article 6 of this Agreement.

3.10 **Cooperative Agreements.** Storage Operator may enter into cooperative agreements with respect to lands adjacent to the Facility Area for the purpose of coordinating

Storage Operations. Such cooperative agreements may include, but shall not be limited to, agreements regarding the transfer and receipt of Storage Substances pursuant to Sections 3.7 and 3.8 of this Agreement.

3.11 **Border Agreements.** Storage Operator may enter into an agreement or agreements with owners of adjacent lands with respect to operations which may enhance the injection of the Storage Substances in the Storage Reservoir in the Facility Area or which may otherwise be necessary for the conduct of Storage Operations.

## ARTICLE 4
## STORAGE OPERATIONS

4.1 **Storage Operator.** Summit Carbon Storage #2, LLC is hereby designated as the initial Storage Operator. Storage Operator shall have the exclusive right to conduct Storage Operations, which shall conform to the provisions of this Agreement and any lease covering a Pore Space Interest. If there is any conflict between such agreements, this Agreement shall govern.

4.2 **Successor Operators**. The initial Storage Operator and any subsequent operator may, at any time, transfer operatorship of the Storage Facility with and upon the approval of the Commission.

4.3 **Method of Operation.** Storage Operator shall engage in Storage Operations with diligence and in accordance with good engineering and injection practices.

4.4 **Change of Method of Operation.** As permitted by the Commission nothing herein shall prevent Storage Operator from discontinuing or changing in whole or in part any method of operation which, in its opinion, is no longer in accord with good engineering or injection practices. Other methods of operation may be conducted or changes may be made by

Storage Operator from time to time if determined by it to be feasible, necessary or desirable to increase the injection or storage of Storage Substances.

## ARTICLE 5
## TRACT PARTICIPATIONS

5.1 **Tract Participations.** The Storage Facility Participation of each Tract is shown in Exhibit "C." The Storage Facility Participation of each Tract shall be based 100% upon the ratio of surface acres in each Tract to the total surface acres for all Tracts within the Facility Area.

5.2 **Relative Storage Facility Participations.** If the Facility Area is enlarged or reduced, the revised Storage Facility Participation of the Tracts remaining in the Facility Area and which were within the Facility Area prior to the enlargement or reduction shall remain in the same ratio to one another.

## ARTICLE 6
## ALLOCATION OF STORAGE SUBSTANCES

6.1 **Allocation of Tracts.** All Storage Substances injected shall be allocated to the several Tracts in accordance with the respective Storage Facility Participation effective during the period that the Storage Substances are injected. The amount of Storage Substances allocated to each tract, regardless of whether the amount is more or less than the actual injection of Storage Substances from the well or wells, if any, on such Tract, shall be deemed for all purposes to have been injected into such Tract. Storage Substances transferred or received pursuant to Sections 3.7 and 3.8 of this Agreement shall be disregarded for the purposes of this Section 6.1.

6.2 Distribution within Tracts. The Storage Substances injected and allocated to each Tract shall be distributed among, or accounted for to the Pore Space Owners who own a Pore Space Interest in such Tract in accordance with each Pore Space Owner's Storage Facility

Participation effective during the period that the Storage Substances were injected. If any Pore Space Interest in a Tract hereafter becomes divided and owned in severalty as to different parts of the Tract, the owners of the divided interests, in the absence of an agreement providing for a different division, shall be compensated for the storage of the Storage Substances in proportion to the surface acreage of their respective parts of the Tract. Subject to Section 3.9, Storage Substances transferred or received pursuant to Sections 3.7 and 3.8 of this Agreement shall be disregarded for the purposes of this Section 6.2.

## ARTICLE 7
## TITLES

~~7.1 **Warranty and Indemnity.** Each Pore Space Owner who, by acceptance of revenue for the injection of Storage Substances into the Storage Reservoir, shall be deemed to have warranted title to its Pore Space Interest, and, upon receipt of the proceeds thereof to the credit of such interest, shall indemnify and hold harmless the Storage Operator and other Parties from any loss due to failure, in whole or in part, of its title to any such interest.~~

~~7.2~~7.1 **Injection When Title Is in Dispute.** If the title or right of any Pore Space Owner claiming the right to receive all or any portion of the proceeds for the storage of any Storage Substances allocated to a Tract is in dispute, Storage Operator shall require that the Pore Space Owner to whom the proceeds thereof are paid to furnish security for the proper accounting thereof to the rightful Pore Space Owner, if the title or right of such Pore Space Owner fails in whole or in part.

~~7.3~~7.2 **Payments of Taxes to Protect Title.** The owner of surface rights to lands within the Facility Area is responsible for the payment of any *ad valorem* taxes on all such rights, interests or property, unless such owner and the Storage Operator otherwise agree. If any *ad*

*valorem* taxes are not paid by or for such owner when due, Storage Operator may at any time prior to tax sale or expiration of period of redemption after tax sale, pay the tax, redeem such rights, interests or property, and discharge the tax lien. Storage Operator shall, if possible, withhold from any proceeds derived from the storage of Storage Substances otherwise due any Pore Space Owner who is a delinquent taxpayer up to an amount sufficient to defray the costs of such payment or redemption; *provided* that such withholding to be credited to the Storage Operator. Such withholding shall be without prejudice to any other remedy available to Storage Operator.

~~7.4~~7.3 **Pore Space Interest Titles.** If title to a Pore Space Interest fails, but the tract to which it relates is not removed from the Facility Area, the Party whose title failed shall not be entitled to share under this Agreement with respect to that interest.

## ARTICLE 8
## EASEMENTS OR USE OF SURFACE

8.1 **No Surface Occupancy.** Unless agreed to in writing with the owner of the surface estate, Operator shall not place any surface facilities on the surface estate owned by any Pore Space Owner within the boundaries of the Facility Area. For the purpose of this Agreement, "surface facilities" shall include, but not be limited to, wellsites, pipelines, powerlines, valves or other above-ground facilities.

~~8.1~~8.2 **Grant of Easement.** Subject to Section 8.1, Storage Operator shall have the right to use as much of the surface of the land within the Facility Area as may be reasonably necessary for Storage Operations and the injection of Storage Substances.

~~8.2~~8.3 **Use of Water.** Storage Operator shall have and is hereby granted free use of water from the Facility Area for Storage Operations, except water from any well, lake, pond or

irrigation ditch of a Pore Space Owner; notwithstanding the foregoing, Storage Operator may access any well, lake, or pond as provided in Exhibit "D".

~~8.3~~8.4 **Surface Damages.** Storage Operator shall pay surface owners for damage to growing crops, timber, fences, improvements and structures located on the Facility Area that result from Storage Operations.

~~8.4~~8.5 **Surface and Sub-Surface Operating Rights.** ~~Except to the extent modified in this Agreement~~Subject to Section 8.1, Storage Operator shall have the same rights to use the surface and sub-surface and use of water and any other rights granted to Storage Operator in any lease covering Pore Space Interests. Except to the extent expanded by this Agreement or the extent that such rights are common to the effected leases, the rights granted by a lease may be exercised only on the land covered by that lease. Storage Operator will to the extent possible minimize surface impacts.

## ARTICLE 9
## ENLARGEMENT OF STORAGE FACILITY

9.1 **Enlargement of Storage Facility.** The Storage Facility may be enlarged from time to time to include acreage and formations reasonably proven to be geologically capable of storing Storage Substances. Any expansion must be approved in accordance with the rules and regulations of the Commission.

9.2 **Determination of Tract Participation.** Storage Operator, subject to Section 5.2, shall determine the Storage Facility Participation of each Tract within the Storage Facility as enlarged, and shall revise Exhibits "A", "B" and "C" accordingly and in accordance with the rules, regulations and orders of the Commission.

9.3 **Effective Date.** The effective date of any enlargement of the Storage Facility shall be effective as determined by the Commission.

## ARTICLE 10
## TRANSFER OF TITLE ~~PARTITION~~

10.1 **Transfer of Title.** Any conveyance of all or part of any interest owned by any Party hereto with respect to any Tract shall be made expressly subject to this Agreement. No change of title shall be binding upon Storage Operator, or any Party hereto other than the Party so transferring, until 7:00 a.m. on the first day of the calendar month following thirty (30) days from the date of receipt by Storage Operator of a photocopy, or a certified copy, of the recorded or filed instrument evidencing such a change in ownership.

~~10.2 **Waiver of Rights to Partition.** Each Party hereto agrees that, during the existence of this Agreement, it will not resort to any action to partition any Tract or parcel within the Facility Area or the facilities used in the development or operation thereof, and to that extent waives the benefits or laws authorizing such partition.~~

## ARTICLE 11
## RELATIONSHIP OF PARTIES

11.1 **No Partnership.** The duties, obligations and liabilities arising hereunder shall be several and not joint or collective. This Agreement is not intended to create, and shall not be construed to create, an association or trust, or to impose a partnership duty, obligation or liability with regard to any one or more of the Parties hereto. Each Party hereto shall be individually responsible for its own obligations as herein provided.

11.2 **No Joint Marketing.** This Agreement is not intended to provide, and shall not be construed to provide, directly or indirectly, for any joint marketing of Storage Substances.

11.3 **Pore Space Owners Free of Costs.** This Agreement is not intended to impose, and shall not be construed to impose, upon any Pore Space Owner any obligation to pay any Storage Expense unless such Pore Space Owner is otherwise so obligated.

11.4 **Information to Pore Space Owners.** Each Pore Space Owner shall be entitled to all information in possession of Storage Operator to which such Pore Space Owner is entitled by an existing lease or a lease imposed by this Agreement.

## ARTICLE 12
## LAWS AND REGULATIONS

12.1 **Laws and Regulations.** This Agreement shall be subject to all applicable federal, state and municipal laws, rules, regulations and orders.

## ARTICLE 13
## FORCE MAJEURE

13.1 **Force Majeure.** All obligations imposed by this Agreement on each Party, except for the payment of money, shall be suspended while compliance is prevented, in whole or in part, by a labor dispute, fire, war, civil disturbance, or act of God; by federal, state or municipal laws; by any rule, regulation or order of a governmental agency; by inability to secure materials; or by any other cause or causes, whether similar or dissimilar, beyond reasonable control of the Party. No Party shall be required against their will to adjust or settle any labor dispute. Neither this Agreement nor any lease or other instrument subject hereto shall be terminated by reason of suspension of Storage Operations due to any one or more of the causes set forth in this Article.

## ARTICLE 14
## EFFECTIVE DATE

14.1 **Effective Date.** This Agreement shall become effective as determined by the Commission.

14.2 **Certificate of Effectiveness.** Storage Operator shall file for record in the county or counties in which the land affected is located a certificate stating the Effective Date of this Agreement.

## ARTICLE 15
## TERM

15.1 **Term.** Unless sooner terminated in the manner hereinafter provided or by order of the Commission, this Agreement shall remain in full force and effect until the Commission has issued a certificate of project completion with respect to the Storage Facility in accordance with § 38-22-17 of the North Dakota Century Code.

15.2 **Termination by Storage Operator.** This Agreement may be terminated at any time by the Storage Operator with the approval of the Commission.

15.3 **Effect of Termination.** Upon termination of this Agreement all Storage Operations shall cease. Each lease and other agreement covering Pore Space within the Facility Area shall remain in force for ninety (90) days after the date on which this Agreement terminates, and for such further period as is provided by Exhibit "D" or other agreement.

15.4 **Salvaging Equipment Upon Termination.** If not otherwise granted by Exhibit "D" or other instruments affecting each Tract, Pore Space Owners hereby grant Storage Operator a period of six (6) months after the date of termination of this Agreement within which to salvage and remove Storage Equipment.

15.5 **Certificate of Termination.** Upon termination of this Agreement, Storage Operator shall file for record in the county or counties in which the land affected is located a certificate that this Agreement has terminated, stating its termination date.

## ARTICLE 16
## APPROVAL

16.1 **Original, Counterpart or Other Instrument.** A Pore Space Owner may approve this Agreement by signing the original of this instrument, a counterpart thereof, ratification or joinder or other instrument approving this instrument hereto. The signing of any such instrument shall have the same effect as if all Parties had signed the same instrument.

~~16.2 **Joinder in Dual Capacity.** Execution as herein provided by any Party as either a~~

~~Pore Space Owner or the Storage Operator shall commit all interests owned or controlled by such Party and any additional interest thereafter acquired in the Facility Area.~~

~~16.3~~16.2 **Approval by the North Dakota Industrial Commission.**

Notwithstanding anything in this Article to the contrary, all Tracts within the Facility Area shall be deemed to be qualified for participation if this Agreement is duly approved by order of the Commission.

## ARTICLE 17
## GENERAL

17.1 **Amendments Affecting Pore Space Owners.** Amendments hereto relating wholly to Pore Space Owners may be made with approval by the Commission.

17.4 **Construction.** This agreement shall be construed according to the laws of the State of North Dakota.

## ARTICLE 18
## SUCCESSORS AND ASSIGNS

18.1 **Successors and Assigns.** This Agreement shall extend to, be binding upon, and inure to the benefit of the Parties hereto and their respective heirs, devisees, legal representatives, successors and assigns and shall constitute a covenant running with the lands, leases and interests covered hereby.

[*Remainder of page intentionally left blank. Signature page follows.*]

Executed the date set opposite each name below but effective for all purposes as provided by Article 14.

Dated: _____, 20__

**STORAGE OPERATOR**

Summit Carbon Storage #2, LLC

By:_____
[~~Name~~]Wade Boeshans
Its: [~~Title~~]Executive Vice President

#81618782v1

# EXHIBIT A

Tract Map

Attached to and made part of the Storage Agreement
~~SCS #2~~BK Fischer Broom Creek – Secure Geological Storage
Mercer & Oliver Counties, North Dakota

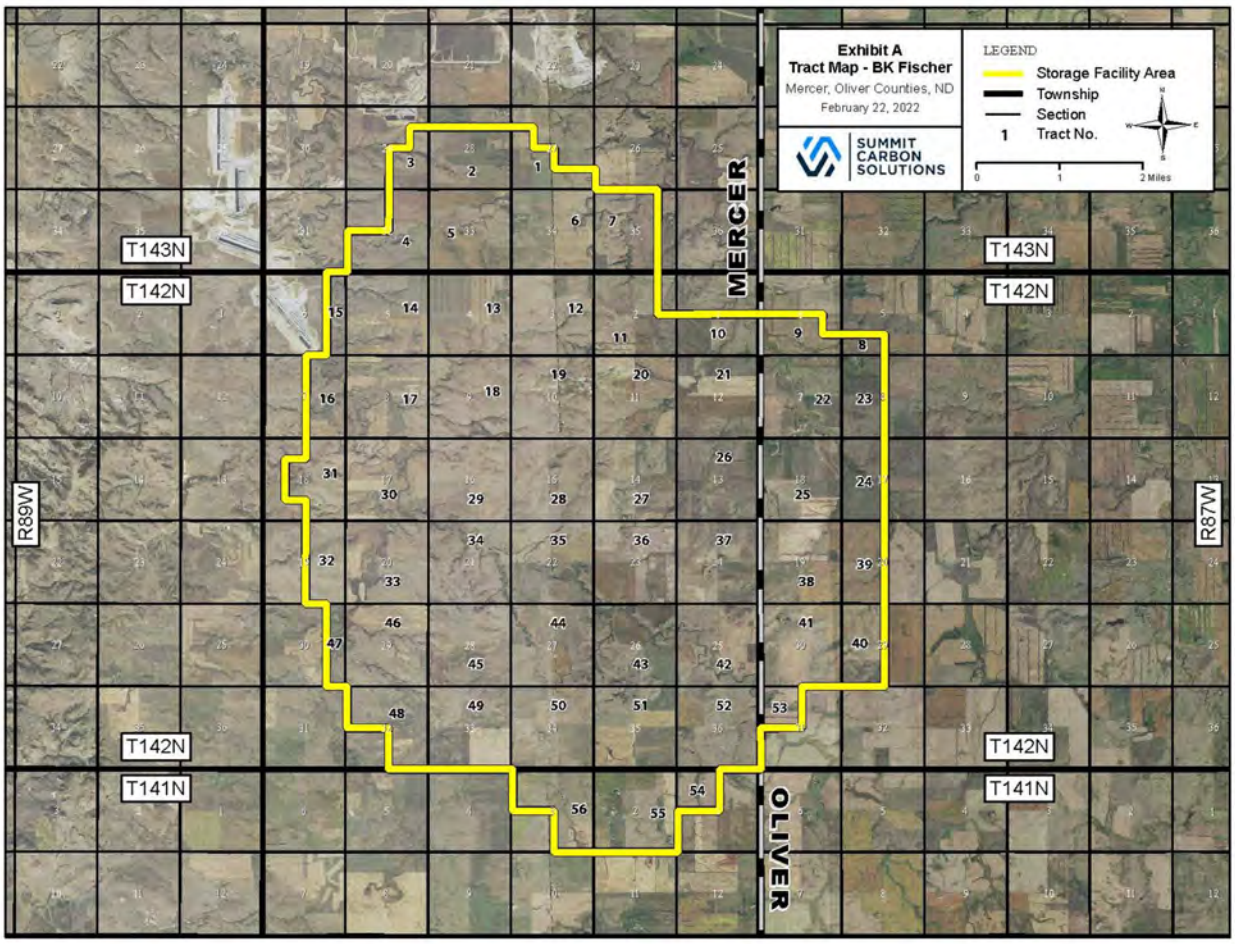


**EXHIBIT B**

Tract Summary

Attached to and made part of the Storage Agreement
~~SCS #2~~BK Fischer Broom Creek – Secure Geological Storage
Mercer & Oliver Counties, North Dakota

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| 1 | Section 27-T143N-R88W | 280 | Donlyn J. Erickson & Roberta Erickson, aka Roberta C. Erickson, as Joint Tenants | 40.0000 | 14.28571429% | 0.13867428% |
| | | | Linda Welk, Life Estate | 80.0000 | 28.57142857% | 0.27734856% |
| | | | Jonathan Welk, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Stacy Welk, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Jonathan Welk | 40.0000 | 14.28571429% | 0.13867428% |
| | | | Stacy Welk | 40.0000 | 14.28571429% | 0.13867428% |
| | | | Kurt M. Swenson & FayE B. Swenson, Trustees of the Swenson Living Trust, dated May 19, 2023, and any amendments thereto | 80.0000 | 28.57142857% | 0.27734856% |
| 2 | Section 28-T143N-R88W | 480 | Shane Kost & Kristi Kost, husband & wife, as Joint Tenants | 80.0000 | 16.66666667% | 0.27734856% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | Ronald E. Gunsch & Janice J. Gunsch, husband & wife, as Tenants in Common | 240.0000 | 50.00000000% | 0.83204568% |
| | | | Myron L. Vigesaa and Nancy L. Vigesaa, Trustees, or their Successors in Trust, Under the Myron L. Vigesaa Revocable Living Trust Dated the 27th Day of June, 2014, and any Amendments thereto | 40.0000 | 8.33333333% | 0.13867428% |
| | | | Nancy L. Vigesaa and Myron L. Vigesaa, Trustees, or their Successors in Trust, Under the Nancy L. Vigesaa Revocable Living Trust Dated the 27th Day of June, 2014, and any Amendments thereto | 40.0000 | 8.33333333% | 0.13867428% |
| | | | Nathan R. Vigesaa & Heather L. Vigesaa, as Joint Tenants | 80.0000 | 16.66666667% | 0.27734856% |
| 3 | Section 29-T143N-R88W | 200 | Lyle Winkler & Patricia A. Winkler, husband & wife, as Joint Tenants | 200.0000 | 100.00000000% | 0.69337140% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| 4 | Section 32-T143N-R88W | 480 | U.S. Bank, N.A., of Fargo, North Dakota, as Trustee of the Darwin H. Mueller Irrevocable Trust | 160.0000 | 33.33333333% | 0.55469712% |
| | | | State of North Dakota | 160.0000 | 33.33333333% | 0.55469712% |
| | | | Shane L. Fischer, as Trustee of the Shane L. Fischer Trust | 80.0000 | 16.66666667% | 0.27734856% |
| | | | Shane Fischer, aka Shane Leo Fischer | 80.0000 | 16.66666667% | 0.27734856% |
| 5 | Section 33-T143N-R88W | 640 | Ronald Gunsch | 317.6500 | 49.63281250% | 1.10124713% |
| | | | Ronald E. Gunsch & Janice J. Gunsch, as Joint Tenants | 2.3500 | 0.36718750% | 0.00814711% |
| | | | Ronald E. Gunsch & Janice J. Gunsch, husband & wife | 320.0000 | 50.00000000% | 1.10939425% |
| 6 | Section 34-T143N-R88W | 640 | Eric Klindworth, aka Eric H. Klindworth & Jacinta Klindworth, aka Jacinta-Jon T. Klindworth, as Joint Tenants | 160.0000 | 25.00000000% | 0.55469712% |
| | | | Ronald Gunsch | 320.0000 | 50.00000000% | 1.10939425% |
| | | | Donlyn J. Erickson & Roberta Erickson, aka Roberta C. Erickson, as Joint Tenants | 160.0000 | 25.00000000% | 0.55469712% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| 7 | Section 35-T143N-R88W | 480 | Rachel Riedemann, fka Rachel Hushka, fka Rachel Erickson | 160.0000 | 33.33333333% | 0.55469712% |
| | | | Donlyn J. Erickson & Roberta Erickson, aka Roberta C. Erickson, as Joint Tenants | 320.0000 | 66.66666667% | 1.10939425% |
| 8 | Section 05-T142N-R87W | 80 | Chad N. Schafer & Lisa L. Schafer, husband & wife, as Joint Tenants | 80.0000 | 100.00000000% | 0.27734856% |
| 9 | Section 06-T142N-R87W | 279.06 | Darell Herman & Sherry Herman, husband & wife, as Joint Tenants | 279.0600 | 100.00000000% | 0.96746112% |
| 10 | Section 01-T142N-R88W | 320 | Noel J. Helm & Betty Helm, aka Betty Jean Helm, husband & wife, as Joint Tenants, Life Estate | 320.0000 | 100.00000000% | 1.10939425% |
| | | | John T. Helm, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Jason J. Helm, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Wayne J. Helm | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Jerome L. Helm | 0.0000 | 0.00000000% | 0.00000000% |
| 11 | Section 02-T142N-R88W | 563.87 | Jason Erickson & Angela Erickson, husband & wife | 81.3600 | 14.42885772% | 0.28206349% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | Wanda Gustafson, a married person dealing in her sole & separate property, Life Estate | 162.5100 | 28.82047280% | 0.56339893% |
| | | | Lori B. Klein, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Sara L. Gustafson, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Jason T. Erickson & Angela Erickson, husband & wife, as Joint Tenants | 160.0000 | 28.37533474% | 0.55469712% |
| | | | Robb M. Moore & Heidi K. Moore, husband & wife, as Joint Tenants | 160.0000 | 28.37533474% | 0.55469712% |
| 12 | Section 03-T142N-R88W | 644.63 | Donlyn J. Erickson & Roberta Erickson, aka Roberta C. Erickson, as Joint Tenants | 322.3500 | 50.00542947% | 1.11754136% |
| | | | David A. Orth & Ronni L. Huschka | 20.2875 | 3.14715418% | 0.07033386% |
| | | | Joan Cundall | 20.2875 | 3.14715418% | 0.07033386% |
| | | | Robert H. Orth | 6.7625 | 1.04905139% | 0.02344462% |
| | | | Richard A. Orth | 6.7625 | 1.04905139% | 0.02344462% |
| | | | Kimberly Orth | 6.7625 | 1.04905139% | 0.02344462% |
| | | | Wilfred Orth | 20.2875 | 3.14715418% | 0.07033386% |
| | | | Estate of Cecelia Orth | 81.1300 | 12.58551417% | 0.28126611% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | David Hottman & Stephanie Hottman, husband & wife, as Joint Tenants | 6.1000 | 0.94627926% | 0.02114783% |
| | | | Donlyn J. Erickson & Roberta Erickson, aka Roberta C. Erickson, as Joint Tenants | 153.9000 | 23.87416037% | 0.53354930% |
| 13 | Section 04-T142N-R88W | 644.44 | Tanner Erickson & Heather Erickson, as Joint Tenants | 2.0000 | 0.31034697% | 0.00693371% |
| | | | Donlyn J. Erickson & Roberta Erickson, aka Roberta C. Erickson, as Joint Tenants | 320.2300 | 49.69120477% | 1.11019162% |
| | | | LeeRoy J. Winkler & Sharon L. Winkler, husband & wife, as Joint Tenants, Life Estate | 162.2100 | 25.17069083% | 0.56235888% |
| | | | Roberta Unruh, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Kimberly Dukart, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Amanda Ahlschlager, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Perry Winkler & Beth Winkler, husband & wife, as Joint Tenants | 160.0000 | 24.82775743% | 0.55469712% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| 14 | Section 05-T142N-R88W | 644.07 | Howard H. Winkler & Bernadette J. Winkler, husband & wife, as Joint Tenants | 162.1100 | 25.16962442% | 0.56201219% |
| | | | Nichole Lee Sailer, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Arnold V. Winkler & Sharon D. Winkler, husband & wife, as Joint Tenants | 161.9600 | 25.14633503% | 0.56149216% |
| | | | Russell D. Winkler & Tammy Winkler, husband & wife, as Joint Tenants | 160.0000 | 24.84202028% | 0.55469712% |
| | | | Perry Winkler & Beth Winkler, husband & wife, as Joint Tenants | 160.0000 | 24.84202028% | 0.55469712% |
| 15 | Section 06-T142N-R88W | 160.84 | Casey Lee Voigt and Julie Anne Voigt, Trustees of the Casey Lee Voigt Living Trust dated January 26, 2023, and any amendments thereto | 160.8400 | 100.00000000% | 0.55760928% |
| | | | Donalda Voigt, Contract for Deed Seller | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Karmen Eslinger, Contract for Deed Seller | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Shawn Voigt, Contract for Deed Seller | 0.0000 | 0.00000000% | 0.00000000% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | Kenneth Voigt, Contract for Deed Seller | 0.0000 | 0.00000000% | 0.00000000% |
| 16 | Section 07-T142N-R88W | 320 | Perry Winkler & Beth Winkler, husband & wife, Life Estate | 160.0000 | 50.00000000% | 0.55469712% |
| | | | Kacey Winkler, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Korey Winkler, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Nancy Flemmer, aka Nancy Lee Flemmer, Life Estate | 160.0000 | 50.00000000% | 0.55469712% |
| | | | Cherie Ann Fischer, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Shawn Michael Flemmer, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| 17 | Section 08-T142N-R88W | 640 | LeeRoy J. Winkler & Sharon L. Winkler, husband & wife, as Joint Tenants, Life Estate | 160.0000 | 25.00000000% | 0.55469712% |
| | | | Roberta Unruh, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Kimberly Dukart, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Amanda Ahlschlager, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Perry Winkler & Beth Winkler, husband & wife, Life Estate | 320.0000 | 50.00000000% | 1.10939425% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | Kacey Winkler, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Korey Winkler, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Nancy Flemmer, aka Nancy Lee Flemmer, Life Estate | 160.0000 | 25.00000000% | 0.55469712% |
| | | | Cherie Ann Fischer, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Shawn Michael Flemmer, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| 18 | Section 09-T142N-R88W | 640 | James A. Swenson & Darlene A. Swenson, as Joint Tenants, Life Estate | 320.0000 | 50.00000000% | 1.10939425% |
| | | | Trent T. Martin & Dawn Martin, as Joint Tenants, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | LeeRoy J. Winkler & Sharon L. Winkler, husband & wife, as Joint Tenants, Life Estate | 160.0000 | 25.00000000% | 0.55469712% |
| | | | Roberta Unruh, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Kimberly Dukart, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Amanda Ahlschlager, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | Perry Winkler & Beth Winkler, husband & wife, Life Estate | 160.0000 | 25.00000000% | 0.55469712% |
| | | | Kacey Winkler, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Korey Winkler, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| 19 | Section 10-T142N-R88W | 640 | Donlyn J. Erickson & Roberta Erickson, aka Roberta C. Erickson, as Joint Tenants | 160.0000 | 25.00000000% | 0.55469712% |
| | | | James A. Swenson & Darlene A. Swenson, as Joint Tenants, Life Estate | 158.0000 | 24.68750000% | 0.54776341% |
| | | | Trent T. Martin & Dawn Martin, as Joint Tenants, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Trent T. Martin & Dawn Martin, as Joint Tenants | 322.0000 | 50.31250000% | 1.11632796% |
| 20 | Section 11-T142N-R88W | 640 | Fayette L. Cote & Robert V. Cote, as Trustees of the Robert V. Cote and Fayette L. Cote Trust Agreement of April 4, 2016 | 160.0000 | 25.00000000% | 0.55469712% |
| | | | James A. Swenson & Darlene A. Swenson, as Joint Tenants, Life Estate | 160.0000 | 25.00000000% | 0.55469712% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | Trent T. Martin & Dawn Martin, as Joint Tenants, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Ryan J. Flemmer | 320.0000 | 50.00000000% | 1.10939425% |
| 21 | Section 12-T142N-R88W | 640 | Johnell J. Kusler | 80.0000 | 12.50000000% | 0.27734856% |
| | | | Milda L. Hedblom | 80.0000 | 12.50000000% | 0.27734856% |
| | | | Vivian Viola Hauff, aka Vivian V. Hauff, Life Estate | 80.0000 | 12.50000000% | 0.27734856% |
| | | | Jerry L. Hauff, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Willa Jean Ann Weaver | 80.0000 | 12.50000000% | 0.27734856% |
| | | | Darwin Huber & Susan E. Huber, husband & wife, as Joint Tenants, Life Estate | 160.0000 | 25.00000000% | 0.55469712% |
| | | | Daryl D. Huber, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Darren D. Huber, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Jason T. Erickson & Angela Erickson, husband & wife, as Joint Tenants | 160.0000 | 25.00000000% | 0.55469712% |
| 22 | Section 07-T142N-R87W | 637.12 | Trent T. Martin & Dawn Martin, husband & wife, as Joint Tenants | 190.8800 | 29.95981919% | 0.66175367% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | Kurt M. Swenson & FayE B. Swenson, trustees of the Swenson Living Trust dated May 19, 2023 | 120.5500 | 18.92108237% | 0.41792961% |
| | | | Joseph O. Swenson | 6.0600 | 0.95115520% | 0.02100915% |
| | | | Johnell J. Kusler & Geoffrey E. Tayler, wife and husband | 0.5750 | 0.09024987% | 0.00199344% |
| | | | Milda L. Hedblom, aka Milda K. Hedblom & Edwin Fogelman, wife and husband | 0.5750 | 0.09024987% | 0.00199344% |
| | | | Todd Rueb & Darcy Rueb, husband & wife, as Joint Tenants | 318.4800 | 49.98744350% | 1.10412462% |
| 23 | Section 08-T142N-R87W | 320 | Travis Hellickson & Amber Hellickson, as Joint Tenants | 160.0000 | 50.00000000% | 0.55469712% |
| | | | Noel Helm & Betty Helm, husband & wife | 160.0000 | 50.00000000% | 0.55469712% |
| 24 | Section 17-T142N-R87W | 320 | Jason Erickson & Angela Erickson, husband & wife as Joint Tenants | 320.0000 | 100.00000000% | 1.10939425% |
| 25 | Section 18-T142N-R87W | 637 | Johnell J. Kusler | 80.0000 | 12.55886970% | 0.27734856% |
| | | | Milda L. Hedblom | 80.0000 | 12.55886970% | 0.27734856% |
| | | | Jason Erickson & Angela Erickson, husband & wife as Joint Tenants | 158.4500 | 24.87441130% | 0.54932349% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | Robert Schutt & Alberta E. Schutt, Trustees, or their successors in trust, under the Robert Schutt and Alberta E. Schutt Living Trust, dated December 7, 2015, and any amendments thereto | 316.0500 | 49.61538462% | 1.09570016% |
| | | | Keith Schutt | 2.5000 | 0.39246468% | 0.00866714% |
| 26 | Section 13-T142N-R88W | 640 | Jason T. Erickson & Angela Erickson, husband & wife, as Joint Tenants | 318.8500 | 49.82031250% | 1.10540736% |
| | | | Roughrider Electric Cooperative, Inc. | 1.1500 | 0.17968750% | 0.00398689% |
| | | | Jolene M. Rust, aka JoLene M. Rust | 160.0000 | 25.00000000% | 0.55469712% |
| | | | Ernest J. Vollan, Life Estate | 160.0000 | 25.00000000% | 0.55469712% |
| | | | Cynthia K. Nickel, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| 27 | Section 14-T142N-R88W | 640 | Carol M. Kaelberer, Life Estate | 80.0000 | 12.50000000% | 0.27734856% |
| | | | Morgan Nagel, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Garrett Kirchmeier, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Chandler J. Kirchmeier, Remainerman | 0.0000 | 0.00000000% | 0.00000000% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | Kurt M. Swenson and FayE B. Swenson, Trustees, or their successors in interest, of the Swenson Living Trust dated May 19, 2023, and any amendments thereto | 80.0000 | 12.50000000% | 0.27734856% |
| | | | LeeRoy Fischer, aka LeeRoy J. Fischer | 320.0000 | 50.00000000% | 1.10939425% |
| | | | Fayette L. Cote & Robert V. Cote, as Trustees of the Robert V. Cote and Fayette L. Cote Trust Agreement of April 4, 2016 | 160.0000 | 25.00000000% | 0.55469712% |
| 28 | Section 15-T142N-R88W | 640 | Trent Martin & Dawn Martin, husband & wife, as Joint Tenants | 640.0000 | 100.00000000% | 2.21878849% |
| 29 | Section 16-T142N-R88W | 640 | LeeRoy J. Fischer | 320.0000 | 50.00000000% | 1.10939425% |
| | | | Perry Winkler & Beth Winkler, husband & wife, Life Estate | 160.0000 | 25.00000000% | 0.55469712% |
| | | | Kacey Winkler, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Korey Winkler, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | Norman R. Winkler & Martha E. Winkler, husband & wife, as Joint Tenants | 160.0000 | 25.00000000% | 0.55469712% |
| 30 | Section 17-T142N-R88W | 640 | Doris B. Mutzenberger & James J. Mutzenberger, wife & husband, as Joint Tenants, Life Estate | 158.0000 | 24.68750000% | 0.54776341% |
| | | | Tony Mutzenberger, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Casey Mutzenberger, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Casey Mutzenberger | 2.0000 | 0.31250000% | 0.00693371% |
| | | | Tony Mutzenberger | 207.0000 | 32.34375000% | 0.71763940% |
| | | | Myron Flemmer & Evelyn Flemmer, husband & wife, Contract for Deed Seller | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Perry Winkler & Beth Winkler, as Joint Tenants | 113.0000 | 17.65625000% | 0.39175484% |
| | | | Christopher Palmer & Kayla Palmer, husband & wife, as Joint Tenants | 160.0000 | 25.00000000% | 0.55469712% |
| 31 | Section 18-T142N-R88W | 400 | Perry Winkler & Beth Winkler, husband & wife, Life Estate | 80.0000 | 20.00000000% | 0.27734856% |
| | | | Kacey Winkler, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | Korey Winkler, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Perry Winkler & Beth Winkler, as Joint Tenants | 120.0000 | 30.00000000% | 0.41602284% |
| | | | Shawn Unruh & Shevelle Unruh, as Joint Tenants | 20.0000 | 5.00000000% | 0.06933714% |
| | | | Austin Jensen & Destinee Jensen, aka Destiny Jensen, as Joint Tenants | 20.0000 | 5.00000000% | 0.06933714% |
| | | | Paulette White, fka Paulette Hogan | 160.0000 | 40.00000000% | 0.55469712% |
| 32 | Section 19-T142N-R88W | 320 | Steven C. Goetz, aka Steve Goetz, a single person, Life Estate | 160.0000 | 50.00000000% | 0.55469712% |
| | | | Shane J. Goetz and Samantha J. Goetz, Remaindermen | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Paul A. Schock | 160.0000 | 50.00000000% | 0.55469712% |
| 33 | Section 20-T142N-R88W | 640 | Christopher Palmer & Kayla Palmer, husband & wife, as Joint Tenants | 160.0000 | 25.00000000% | 0.55469712% |
| | | | Thomas Welk, aka Thomas C. Welk, Life Estate | 240.0000 | 37.50000000% | 0.83204568% |
| | | | Amy Dinius, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | David Welk, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | Cody S. Thiel & Megan B. Thiel, husband & wife | 240.0000 | 37.50000000% | 0.83204568% |
| 34 | Section 21-T142N-R88W | 640 | Jerry Ballensky and Julie Ballensky, husband & wife, as Joint Tenants | 160.0000 | 25.00000000% | 0.55469712% |
| | | | David Fischer | 160.0000 | 25.00000000% | 0.55469712% |
| | | | Cody S. Thiel & Megan B. Thiel, husband & wife | 160.0000 | 25.00000000% | 0.55469712% |
| | | | Sheila Hildebrand & Steven B. Hildebrand, wife & husband, as Joint Tenants | 160.0000 | 25.00000000% | 0.55469712% |
| 35 | Section 22-T142N-R88W | 640 | Irene Fischer, aka Irene E. Fischer, Life Estate | 320.0000 | 50.00000000% | 1.10939425% |
| | | | Barry R. Fischer | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Brendan B. Flemmer | 297.6000 | 46.50000000% | 1.03173665% |
| | | | Jerry D. Ballensky and Julie Ballensky, husband & wife, as Joint Tenants | 22.4000 | 3.50000000% | 0.07765760% |
| 36 | Section 23-T142N-R88W | 640 | Irene Fischer, aka Irene E. Fischer, Life Estate | 475.0000 | 74.21875000% | 1.64675708% |
| | | | Barry R. Fischer | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Brendan B. Flemmer | 160.0000 | 25.00000000% | 0.55469712% |
| | | | Thomas M. Fandrich & Laura Jane Fandrich, husband & wife as Joint Tenants | 5.0000 | 0.78125000% | 0.01733429% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| 37 | Section 24-T142N-R88W | 640 | Ernest J. Vollan, Life Estate | 320.0000 | 50.00000000% | 1.10939425% |
| | | | Cynthia K. Nickel, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | John M. Jochim | 160.0000 | 25.00000000% | 0.55469712% |
| | | | Michael P. Bauman | 140.0000 | 21.87500000% | 0.48535998% |
| | | | Violet J. Jochim | 20.0000 | 3.12500000% | 0.06933714% |
| 38 | Section 19-T142N-R87W | 637.16 | Robert Schutt & Alberta E. Schutt, Trustees, or their successors in trust, under the Robert Schutt and Alberta E. Schutt Living Trust, dated December 7, 2015, and any amendments thereto | 478.5900 | 75.11300144% | 1.65920310% |
| | | | Jeffrey Schutt | 158.5700 | 24.88699856% | 0.54973952% |
| 39 | Section 20-T142N-R87W | 320 | Robert Schutt & Alberta E. Schutt, Trustees, or their successors in trust, under the Robert Schutt and Alberta E. Schutt Living Trust, dated December 7, 2015, and any amendments thereto | 160.0000 | 50.00000000% | 0.55469712% |
| | | | Mark S. Singer | 160.0000 | 50.00000000% | 0.55469712% |
| 40 | Section 29-T142N-R87W | 320 | Jeffrey Schutt | 160.0000 | 50.00000000% | 0.55469712% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | Robert Schutt & Alberta E. Schutt, Trustees, or their successors in trust, under the Robert Schutt and Alberta E. Schutt Living Trust, dated December 7, 2015, and any amendments thereto | 60.0000 | 18.75000000% | 0.20801142% |
| | | | Ernest J. Vollan, Life Estate | 100.0000 | 31.25000000% | 0.34668570% |
| | | | Cynthia K. Nickel, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| 41 | Section 30-T142N-R87W | 637.96 | Rory C. Flemmer & Jennifer Flemmer, husband & wife, as Joint Tenants | 329.0000 | 51.57063139% | 1.14059596% |
| | | | Jeffrey Schutt | 301.9600 | 47.33212114% | 1.04685215% |
| | | | The North Dakota State Water Commission | 1.0000 | 0.15674964% | 0.00346686% |
| | | | Church of St. Joseph – Beulah Trustee, Inc., a nonprofit corporation, as trustee Church of St. Joseph – Beulah Trustee, Inc., a nonprofit corporation, as trustee | 6.0000 | 0.94049784% | 0.02080114% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| 42 | Section 25-T142N-R88W | 640 | Duane Flemmer & Lori Flemmer, husband & wife, as Joint Tenants | 471.4920 | 73.67062500% | 1.63459535% |
| | | | Elsie Opp, fka Elsie Flemmer, Life Estate, Contract for Deed Seller | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Duane Flemmer, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Linda Flemmer, Contract for Deed Seller & Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Dennis Flemmer, Contract for Deed Seller & Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Ernest J. Vollan, Life Estate | 160.0000 | 25.00000000% | 0.55469712% |
| | | | Cynthia K. Nickel, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Rory C. Flemmer | 8.5080 | 1.32937500% | 0.02949602% |
| 43 | Section 26-T142N-R88W | 640 | Brendan B. Flemmer | 435.9000 | 68.10937500% | 1.51120298% |
| | | | Robb M. Moore & Heidi K. Moore, husband & wife, as Joint Tenants | 44.1000 | 6.89062500% | 0.15288839% |
| | | | Darwin Huber | 54.8100 | 8.56406250% | 0.19001843% |
| | | | Cody Scott Thiel | 105.1900 | 16.43593750% | 0.36467869% |
| 44 | Section 27-T142N-R88W | 640 | Jerry D. Ballensky & Julie Ballensky, husband & wife, as Joint Tenants | 297.6000 | 46.50000000% | 1.03173665% |
| | | | Brendan B. Flemmer | 22.4000 | 3.50000000% | 0.07765760% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | Cody S. Thiel | 80.0000 | 12.50000000% | 0.27734856% |
| | | | Cody S. Thiel, aka Cody Scott Thiel & Megan B. Thiel | 80.0000 | 12.50000000% | 0.27734856% |
| | | | Sheila Hildebrand & Steven B. Hildebrand, wife & husband, as Joint Tenants | 160.0000 | 25.00000000% | 0.55469712% |
| 45 | Section 28-T142N-R88W | 640 | Cody S. Thiel, aka Cody Scott Thiel & Megan B. Thiel | 480.0000 | 75.00000000% | 1.66409137% |
| | | | Cody S. Thiel & Megan B. Thiel, as Joint Tenants | 160.0000 | 25.00000000% | 0.55469712% |
| 46 | Section 29-T142N-R88W | 640 | Emil Vernon Lapp, Jr., aka Emil V. Lapp, Jr. & Donna J. Lapp, husband & wife, as Joint Tenants, Life Estate | 480.0000 | 75.00000000% | 1.66409137% |
| | | | Michael Lapp, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Cody S. Thiel, aka Cody Scott Thiel & Megan B. Thiel | 160.0000 | 25.00000000% | 0.55469712% |
| 47 | Section 30-T142N-R88W | 160 | Clark D. Pochant & Jayne D. Pochant, husband & wife, as Joint Tenants | 73.0100 | 45.63125000% | 0.25311523% |
| | | | Chance Mastel | 5.0000 | 3.12500000% | 0.01733429% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | Jessica Voegele | 1.9900 | 1.24375000% | 0.00689905% |
| | | | Thomas Welk, aka Thomas C. Welk, Life Estate | 80.0000 | 50.00000000% | 0.27734856% |
| | | | Amy Dinius, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | David Welk, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| 48 | Section 32-T142N-R88W | 480 | Walter E. Frank | 160.0000 | 33.33333333% | 0.55469712% |
| | | | Thomas Welk, aka Thomas C. Welk, Life Estate | 120.0000 | 25.00000000% | 0.41602284% |
| | | | Amy Dinius, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | David Welk, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Dwight J. Frank & Beverly A. Frank, husband & wife, Joint Tenants | 200.0000 | 41.66666667% | 0.69337140% |
| 49 | Section 33-T142N-R88W | 640 | Paul A. Schock | 320.0000 | 50.00000000% | 1.10939425% |
| | | | Steven C. Goetz, aka Steve Goetz, a single person, Life Estate | 160.0000 | 25.00000000% | 0.55469712% |
| | | | Shane J. Goetz and Samantha J. Goetz, Remaindermen | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Ruby Emter, Life Estate | 160.0000 | 25.00000000% | 0.55469712% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | Leeta Olin, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Tammy Moore, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| 50 | Section 34-T142N-R88W | 640 | Michelle M. Braun | 640.0000 | 100.00000000% | 2.21878849% |
| 51 | Section 35-T142N-R88W | 640 | Darwin Huber & Susan E. Huber, husband & wife, as Joint Tenants, Life Estate | 126.0500 | 19.69531250% | 0.43699733% |
| | | | Daryl D. Huber, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Darren D. Huber, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Cody Scott Thiel | 33.9500 | 5.30468750% | 0.11769980% |
| | | | Brendan B. Flemmer | 320.0000 | 50.00000000% | 1.10939425% |
| | | | Delmer F. Voegele & Cassandra R. Voegele, husband & wife, as Joint Tenants, Life Estate | 160.0000 | 25.00000000% | 0.55469712% |
| 52 | Section 36-T142N-R88W | 640 | Ralph Kemmet | 300.0000 | 46.87500000% | 1.04005711% |
| | | | Duane Flemmer & Lori Flemmer, husband & wife, as Joint Tenants | 160.0000 | 25.00000000% | 0.55469712% |
| | | | Elsie Opp, fka Elsie Flemmer, Life Estate, Contract for Deed Seller | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Duane Flemmer, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | Linda Flemmer, Contract for Deed Seller & Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Dennis Flemmer, Contract for Deed Seller & Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Ralph Kemmet & Dena Kemmet, as Joint Tenants | 20.0000 | 3.12500000% | 0.06933714% |
| | | | Jeffrey Schutt, aka Jeffrey J. Schutt | 160.0000 | 25.00000000% | 0.55469712% |
| 53 | Section 31-T142N-R87W | 158.71 | LeeRoy J. Fischer | 158.7100 | 100.00000000% | 0.55022488% |
| 54 | Section 01-T141N-R88W | 159.81 | Larry Flemmer, aka Larry L. Flemmer | 159.8100 | 100.00000000% | 0.55403842% |
| 55 | Section 02-T141N-R88W | 639.94 | Corey M. Voegele & Roxanne Voegele, husband & wife, as Joint Tenants | 267.7400 | 41.83829734% | 0.92821630% |
| | | | Delmer F. Voegele & Cassandra R. Voegele, husband & wife, as Joint Tenants, Life Estate | 360.0400 | 56.26152452% | 1.24820720% |
| | | | Corey Voegele | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Jack J. Kraft & Deborah Kraft, as Joint Tenants | 12.1600 | 1.90017814% | 0.04215698% |
| 56 | Section 03-T141N-R88W | 479.96 | Delmer F. Voegele & Cassandra R. Voegele, husband & wife, as Joint Tenants, Life Estate | 319.9600 | 66.66388866% | 1.10925557% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | Eric John Voegele, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Delmer F. Voegele & Cassandra R. Voegele, husband & wife, as Joint Tenants, Life Estate | 160.0000 | 33.33611134% | 0.55469712% |
| | | | Corey Voegele | 0.0000 | 0.00000000% | 0.00000000% |
| | | | | | | |
| | **Total Acres:** | **28,844.57** | | **28,844.57** | **Total Participation:** | **100.00000000%** |

# EXHIBIT C

Tract Participation Factors

Attached to and made part of the Storage Agreement
~~SCS #2~~BK Fischer Broom Creek – Secure Geological Storage
Mercer & Oliver Counties, North Dakota

| Tract No. | Land Description | Acres | Tract Participation Factor |
|---|---|---|---|
| 1 | Section 27-T143N-R88W | 280 | 0.97071997% |
| 2 | Section 28-T143N-R88W | 480 | 1.66409137% |
| 3 | Section 29-T143N-R88W | 200 | 0.69337140% |
| 4 | Section 32-T143N-R88W | 480 | 1.66409137% |
| 5 | Section 33-T143N-R88W | 640 | 2.21878849% |
| 6 | Section 34-T143N-R88W | 640 | 2.21878849% |
| 7 | Section 35-T143N-R88W | 480 | 1.66409137% |
| 8 | Section 05-T142N-R87W | 80 | 0.27734856% |
| 9 | Section 06-T142N-R87W | 279.06 | 0.96746112% |
| 10 | Section 01-T142N-R88W | 320 | 1.10939425% |
| 11 | Section 02-T142N-R88W | 563.87 | 1.95485667% |
| 12 | Section 03-T142N-R88W | 644.63 | 2.23484004% |
| 13 | Section 04-T142N-R88W | 644.44 | 2.23418134% |
| 14 | Section 05-T142N-R88W | 644.07 | 2.23289860% |
| 15 | Section 06-T142N-R88W | 160.84 | 0.55760928% |
| 16 | Section 07-T142N-R88W | 320 | 1.10939425% |
| 17 | Section 08-T142N-R88W | 640 | 2.21878849% |
| 18 | Section 09-T142N-R88W | 640 | 2.21878849% |
| 19 | Section 10-T142N-R88W | 640 | 2.21878849% |
| 20 | Section 11-T142N-R88W | 640 | 2.21878849% |
| 21 | Section 12-T142N-R88W | 640 | 2.21878849% |
| 22 | Section 07-T142N-R87W | 637.12 | 2.20880394% |
| 23 | Section 08-T142N-R87W | 320 | 1.10939425% |
| 24 | Section 17-T142N-R87W | 320 | 1.10939425% |
| 25 | Section 18-T142N-R87W | 637 | 2.20838792% |
| 26 | Section 13-T142N-R88W | 640 | 2.21878849% |
| 27 | Section 14-T142N-R88W | 640 | 2.21878849% |
| 28 | Section 15-T142N-R88W | 640 | 2.21878849% |
| 29 | Section 16-T142N-R88W | 640 | 2.21878849% |
| 30 | Section 17-T142N-R88W | 640 | 2.21878849% |
| 31 | Section 18-T142N-R88W | 400 | 1.38674281% |
| 32 | Section 19-T142N-R88W | 320 | 1.10939425% |
| 33 | Section 20-T142N-R88W | 640 | 2.21878849% |
| 34 | Section 21-T142N-R88W | 640 | 2.21878849% |
| 35 | Section 22-T142N-R88W | 640 | 2.21878849% |
| 36 | Section 23-T142N-R88W | 640 | 2.21878849% |
| 37 | Section 24-T142N-R88W | 640 | 2.21878849% |

| | | | |
|---|---|---|---|
| 38 | Section 19-T142N-R87W | 637.16 | 2.20894262% |
| 39 | Section 20-T142N-R87W | 320 | 1.10939425% |
| 40 | Section 29-T142N-R87W | 320 | 1.10939425% |
| 41 | Section 30-T142N-R87W | 637.96 | 2.21171610% |
| 42 | Section 25-T142N-R88W | 640 | 2.21878849% |
| 43 | Section 26-T142N-R88W | 640 | 2.21878849% |
| 44 | Section 27-T142N-R88W | 640 | 2.21878849% |
| 45 | Section 28-T142N-R88W | 640 | 2.21878849% |
| 46 | Section 29-T142N-R88W | 640 | 2.21878849% |
| 47 | Section 30-T142N-R88W | 160 | 0.55469712% |
| 48 | Section 32-T142N-R88W | 480 | 1.66409137% |
| 49 | Section 33-T142N-R88W | 640 | 2.21878849% |
| 50 | Section 34-T142N-R88W | 640 | 2.21878849% |
| 51 | Section 35-T142N-R88W | 640 | 2.21878849% |
| 52 | Section 36-T142N-R88W | 640 | 2.21878849% |
| 53 | Section 31-T142N-R87W | 158.71 | 0.55022488% |
| 54 | Section 01-T141N-R88W | 159.81 | 0.55403842% |
| 55 | Section 02-T141N-R88W | 639.94 | 2.21858048% |
| 56 | Section 03-T141N-R88W | 479.96 | 1.66395270% |
| **Total:** | | **28,844.57** | **100.00000000%** |

**EXHIBIT D**

Form of Pore Space Lease

Attached to and made part of the Storage Agreement
~~SCS #2~~BK Fischer Broom Creek – Secure Geological Storage
Mercer & Oliver Counties, North Dakota

**PORE SPACE LEASE**

THIS PORE SPACE LEASE (this "Lease") is made effective as of the Effective Date (as defined below) by and between_____, whose address is_____, (whether one or more, "Lessor"), and Summit Carbon Storage #2, LLC, a Delaware limited liability company, whose address is 2321 N. Loop Dr., Ames, IA 50010 (whether one or more, "Lessee"). Lessor and Lessee may be individually referred to herein as a "Party" and collectively as the "Parties".

1. Leased Premises. Lessor, for good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, does hereby grant, demise, lease and let unto Lessee for Lessee's geologic storage operations and other purposes set forth herein, the lands described and incorporated herein by reference in Exhibit A attached (the "Leased Premises").

2. Term.

(a) Initial and Primary Term. This Lease shall commence on the date Lessee executes this Lease ("Effective Date") and continue for an initial term of twenty (20) years ("Initial Term") unless sooner terminated in accordance with the terms of this Lease. As consideration for the Initial Term, Lessee shall pay to Lessor TWENTY-FIVE and NO/100 DOLLARS ($25.00) per acre as a single one-time bonus payment, and an annual rental of Four and No/100 Dollars ($4.00) per acre on or before January 1 of each year of the Initial Term. The annual rental shall increase by TWO percent (2.0%) commencing on January 1, 2026 and on January 1 each year thereafter. The first year's rental has been paid in full, the receipt and sufficiency of which is hereby acknowledged by Lessor. Lessee may, at any time prior to the expiration of the Initial Term, elect to extend the Initial Term for up to an additional twenty (20) years by providing written notice to Lessor and payment of One Hundred and No/100 Dollars ($100.00) per acre (the Initial Term, together with all extensions shall be referred to herein as the "Primary Term"). For the avoidance of doubt, Lessor's consent to any such extension will not be required provided that the foregoing payment is tendered to Lessor prior to the expiration of the Initial Term. Lessee shall pay to Lessor the annual rentals when due throughout the Primary Term; *provided*, *however*, Lessee shall not be liable to Lessor for annual rentals with respect to any portion of the Leased Premises which are or become subject to Permit as set forth in Section 2(b), below.

(b) Operational Term. This Lease shall continue beyond the Primary Term for so long as any portion of the Leased Premises or Lessee's storage facilities located in, on or under the Leased Premises (including without limitation, any Reservoirs) are subject to a permit issued by the North Dakota Industrial Commission (the "Commission") (a "Permit") or under the ownership or control of the State of North Dakota; *provided*, *however*, that all of Lessee's obligations under this Lease shall terminate upon issuance of a certificate of project completion pursuant to Chapter 38-22 of the North Dakota Century Code (the "Operational Term"). If the Primary Term expires and no portion of the Leased Premises or Lessee's storage facilities located in, on or under the Leased Premises is subject to a Permit, this Lease shall terminate, and Lessee shall execute a document evidencing termination of this Lease in recordable form and shall record it in the official records of the county in which the Leased Premises is located. As consideration for the Operational Term, Lessee shall pay to Lessor the royalty set forth in Section 3, below.

3. Royalty. Lessee shall pay to Lessor its proportionate share of FIFTY cents ($0.50) per metric ton of carbon dioxide ($CO_2$) injected into the reservoirs and subsurface pore spaces (as used herein, such terms shall have the meanings set forth in Chapter 38-22 and Chapter 47-31 of the North Dakota Century Code), stratum or strata underlying the Leased Premises (collectively, "Reservoirs"), or reservoirs and subsurface pore spaces, stratum or strata unitized or amalgamated therewith. The royalty shall increase TEN percent (10.0%) on January 1, 2026 and an additional TEN percent (10.0%) every five years thereafter, as outlined on attached Exhibit B. The quantity of $CO_2$ so injected shall be measured by meters installed by Lessee. Lessor's "proportionate share" shall be determined on a net acre basis and the Parties hereby stipulate that the acreage set forth in Section 1 shall be used to calculate Lessor's proportionate share. The quantity of carbon dioxide injected into the Reservoirs or any reservoirs or subsurface pore spaces, stratum or strata unitized or amalgamated therewith shall be determined through the use of metering equipment installed and operated by Lessee at the injection site. All royalties due hereunder for carbon dioxide injected into the Reservoirs or any reservoirs or subsurface pore spaces, stratum or strata unitized or amalgamated therewith during any calendar month shall be paid to Lessor annually on or before March 31st for the prior year's injection volumes. Lessor and Lessee agree that this Lease shall continue as specified herein even in the absence of injection operations and the payment of royalties.

4. Right to Pore Space/Storage of Carbon Dioxide. Lessor grants to Lessee the exclusive right to inject and store carbon dioxide ($CO_2$) and other incidental gaseous substances into the Reservoirs, together with the right to construct, replace, inspect, repair, monitor, maintain, relocate, change the size of such surface or subsurface facilities on the Leased Premises that Lessee determines necessary or desirable for Lessee's storage operations, including, but not limited to fences, pipelines, tanks, reservoirs, electric and communication lines, roadways, underground facilities and equipment, surface facilities and equipment, buildings, structures and other such facilities and appurtenances. Lessor shall not grant any other person the right to inject or store $CO_2$ or any other incidental substances.

5. Facility Right of Ways/Compensation. Lessor grants Lessee the right of reasonable use of the surface of the Leased Premises, including without limitation, the rights of ingress and egress over the Leased Premises together with the right of way over, under and across the Leased Premises and the right from time to time to construct, replace, inspect, repair, monitor, maintain, relocate, change the size of such surface or subsurface facilities on the Leased Premises that Lessee determines necessary or desirable for Lessee's storage operations, including, but not limited to fences, pipelines, tanks, reservoirs, electric and communication lines, roadways, underground facilities and equipment, surface facilities and equipment, buildings, structures and other such facilities and appurtenances, (each a "Facility" and collectively the "Facilities"); *provided*, *however*, that (i) Lessee shall provide Lessor with notice of operations and an offer of damage, disruption and loss of production payments, as each may be applicable, prior to the installation of any such Facilities on the Leased Premises, and (ii) the agreed up terms, including the amount of damage payments to be paid to Lessor, shall be memorialized in an agreement separate from this Lease, such agreement to be consistent with the grant contained herein. Lessee shall be entitled to proceed with the installation of the Facilities while the separate agreement and amount of damage, disruption or loss is being agreed or determined. Lessee shall have the further right to fence the perimeter of any Facility on the Leased Premises and sufficiently illuminate the site for the safety and security of operations.

6. Amalgamation. Lessee, in its sole discretion, shall have the right and power, at any time and from time to time during the term of this Lease to pool, unitize, or amalgamate any reservoirs or subsurface pore spaces, stratum or strata underlying the Leased Premises with any other lands or interests into which such reservoirs or subsurface pore spaces extend and document such unit in accordance with applicable law or agency order. Amalgamated units shall be of such shape and dimensions as Lessee may elect and as are approved by the Commission. Amalgamated areas may include, but are not required to include, land upon which injection or extraction wells have been completed or upon which the injection and/or withdrawal of carbon dioxide and/or related gaseous substances has commenced prior to the effective date of amalgamation. In exercising its amalgamation rights under this Lease and if required by law, Lessee shall record or cause to be recorded a copy of the Commission's amalgamation order or other notice thereof in the county in which the amalgamated unit is located. Amalgamating in one or more instances shall, if approved by the Commission, not exhaust the rights of Lessee to amalgamate Reservoirs or portions of Reservoirs into other amalgamation areas, and Lessee shall have the recurring right to revise any amalgamated area formed under this Lease by expansion or contraction or both. Lessee may dissolve any amalgamated area at any time and document such dissolution by recording an instrument in accordance with applicable law or agency order. Lessee shall have the right to negotiate, on behalf of and as agent for Lessor, any unit, amalgamation, storage or operating agreements with respect to amalgamation of reservoir or pore space interests underlying the Leased Premises or the operation of any amalgamated areas formed under such agreements. To the extent any of the terms of such agreements conflict with the terms of this Lease, the terms of such agreements shall control, and the provisions of this Lease shall be deemed modified to conform to the terms, conditions, and provisions of any such agreements which are approved by the Commission.

7. Lessee Obligations. Lessee shall have no obligation, express or implied, to begin, prosecute or continue storage operations in, upon or under the Leased Premises, or store and/or sell or use all or any portion of the gaseous substances stored thereon. The timing, nature, manner and extent of Lessee's operations, if any, under this Lease shall be at the sole discretion of Lessee. All obligations of Lessee are expressed herein, and there shall be no covenants implied under this Lease, it being agreed that all amounts paid hereunder constitute full and adequate consideration for this Lease.

8. Ownership. Lessee shall at all times be the owner of (i) the carbon dioxide and other gaseous substances stored in the Reservoirs or any reservoirs or subsurface pore spaces, stratum or strata unitized or amalgamated therewith, and (ii) all equipment, buildings, structures, facilities and other property constructed or installed by Lessee on the Leased Premises. Lessee shall have the right, but not the obligation, at any time during this Lease to remove all or any portion of the property or fixtures placed by Lessee on the Lease Premises. Notwithstanding the foregoing, title to the storage facility and to the stored carbon dioxide or other gaseous substances shall be transferred to the State of North Dakota upon issuance of a certificate of project completion by the Commission in accordance with Chapter 38-22 of the North Dakota Century Code.

9. Minerals, Oil and Gas. This Lease is not intended to grant or convey, nor does it grant or convey, any right to or obligation for Lessee to explore for or produce minerals, including oil and gas, that may exist on or under the Leased Premises.

10. Surrender of Leased Premises. Lessee shall have the right, but not the obligation, at any time from time to time to execute and deliver to Lessor a surrender and/or release covering all or any part of the Leased Premises for which the Reservoirs are not being utilized for storage as set forth herein, and upon delivery of such surrender and/or release to Lessor this Lease shall terminate as to such lands, and Lessee shall be released from all further obligations and duties as to the lands so surrendered and/or released, including, without limitation, any obligation to make payments provided for herein, except obligations accrued as of the date of the surrender and/or release. Lessee shall be able to surrender the any and or all of the Leased Premises if not utilizing the Reservoirs located thereunder.

11. Hold Harmless and Indemnification. The Lessee agrees to defend, indemnify, and hold harmless Lessor from any claims by any person that are a direct result of the Lessee's use of the Leased Premises or Reservoirs. Notwithstanding the foregoing, such indemnity/hold harmless obligation excludes (i) any claim or cause of action, or alleged or threatened claim or cause of action, damage, judgment, interest, penalty or other loss arising or resulting from the negligence or intentional acts of Lessor or Lessor's agents, invitees, or licensees; or third parties, and (ii) any claim for exemplary, punitive, special or consequential damages claimed by Lessor. Lessee further accepts liability and indemnifies Lessor for reasonable costs, expenses and attorneys' fees incurred in establishing and litigating the indemnification coverage provided above. The legal defense provided by Lessee to the Lessor under this paragraph must be free of any conflicts of interest even if this requires Lessee to retain separate legal counsel for Lessor.

12. Hazardous Substances. Lessee shall have no liability for any regulated hazardous substances located on the Leased Premises prior to the Effective Date or placed in, on or about the Leased Premises by Lessor or any third-party on or after the Effective Date, and nothing in this Lease shall be construed to impose upon Lessee any obligation for the removal of such regulated hazardous substances. As used herein, "hazardous substances" shall have the meaning set forth in the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) and any amendments thereto, or any other local, state or federal statutes.

13. Termination. A material violation or default of any terms of this Lease by Lessee shall be grounds for termination of the Lease. Lessor shall give Lessee written notice of violation or default and Lessee shall have sixty (60) days after receipt of said notice to substantially cure such violations or defaults. If Lessee fails to substantially cure such violations or defaults within the 60-day cure period, Lessor may terminate the Lease; provided that if it is not possible to cure such violations or defaults within the 60-day cure period, Lessee shall have a reasonable longer period of time to cure such violations or defaults provided it commences cure within the initial 60-day cure period and thereafter diligently pursues such cure. Lessee may terminate the lease with thirty (30) days written notice to Lessor. Upon termination of this Lease, Lessee shall have one hundred eighty (180) days to remove all facilities and property of Lessee located on the Leased Premises. For the avoidance of doubt, Lessee shall not be required to remove any $CO_2$ or other incidental gaseous substances injected into the Reservoirs.

14. Taxes. Lessee shall pay all taxes, if any, levied against its personal property or on its improvements to the Leased Premises. Lessor shall pay for all real estate taxes and other assessments levied upon the Leased Premises. Lessee shall have the right to pay all taxes, assessments and other fees on behalf of Lessor and to deduct the amount so paid from other payments due to Lessor hereunder.

15. Conduct of Operations. In conducting its operations hereunder, Lessee shall use its best efforts to comply with all applicable laws, rules and regulations and ordinances pertaining thereto. Lessee reserves and shall have the right to challenge and/or appeal any law, ruling, regulation, order or other determination and to carry on its operations in accordance with Lessee's interpretation of the same, pending final determination.

16. Force Majeure. Should Lessee be prevented from complying with any express or implied covenant of this Lease or from utilizing the Lease Premises for underground storage purposes by reason of scarcity of or an inability to obtain or to use equipment or material or failure or breakdown of equipment, or by operation of force majeure, any federal or state law or any order, rule or regulation of governmental authority, then while so prevented, Lessee's obligation to comply with such covenant shall be suspended and the primary term of this Lease shall be extended while and so long as Lessee is prevented by any such cause from utilizing the property for underground storage purposes and the time while Lessee is so prevented shall not be counted against Lessee, anything in this Lease to the contrary notwithstanding.

17. Surface Damage Compensation. The bonus and royalty amounts contemplated and paid to Lessor hereunder is compensation for, among other things, damages sustained by Lessor for lost land value, lost use of and access to Lessor's land and lost value of improvements, if any and to the extent applicable. Subject to Lessee's obligation to compensate Lessor for the installation of any Facilities on the Leased Premises pursuant to Section 5 of this Agreement, Lessor agrees that such compensation is just and adequate for any and all such damages and all other damages which Lessor may sustain as a result of Lessee's use of the property for its storage operations.

18. ~~Warranty of Title and~~ Quiet Enjoyment. Lessor ~~represents and warrants to Lessee that Lessor is the owner of the surface of the Leased Premises and the pore space located thereunder. Lessor hereby warrants and agrees to defend title to the Leased Premises and the pore space located thereunder and Lessor~~ hereby agrees that Lessee, at its option, shall have the right to discharge any tax, mortgage, or other lien upon the Leased Premises, and in the event Lessee does so, Lessee shall be subrogated to such lien with the right to enforce the same and apply royalty payments or any other payments due to Lessor toward satisfying the same.

Lessor warrants that, except as disclosed to Lessee in writing, there are no liens, encumbrances, leases, mortgages, deeds of trust, options, or other exceptions to Lessor's fee title ownership of the Leased Premises (collectively, "Liens") which are not recorded in the public records of the County in which the Leased Premises is located. Lienholders (including tenants), whether or not their Liens are recorded, shall be Lessor's responsibility, and Lessor shall cooperate with Lessee to obtain a non-disturbance agreement from each party that holds a Lien (recorded or unrecorded) that might interfere with Lessee's rights under this Lease. A non-disturbance agreement is an agreement between Lessee and a lienholder which provides that the lienholder shall not disturb Lessee's possession or rights under the Lease or terminate this Lease so long as Lessor is not entitled to terminate this Lease under the provisions hereof.

Lessor shall have the quiet use and enjoyment of the Leased Premises in accordance with the terms of this Lease. Lessor's activities and any grant of rights Lessor makes to any person or entity, whether located on the Leased Premises or elsewhere, shall not, currently or prospectively, materially interfere with activities permitted hereunder. If Lessor has any right to select, determine, prohibit or control the location of sites for drilling, exploitation, production and/or exploration of minerals, hydrocarbons, water, gravel, or any other similar resource in, to or under the Lease Premises, then Lessor shall exercise such right so as to minimize interference with any of the foregoing.

19. Environmental Incentives and Tax Credits. Lessee shall be the owner of (i) any and all credits, benefits, emissions reductions, offsets, and allowances, howsoever entitled, attributable to Lessee's geologic storage operations, including any avoided emissions and the reporting rights related to these avoided emissions, such as 26 U.S.C. §45Q Tax Credits, and any other attributes of Lessee's ownership of the Facilities and Lessee's geologic storage operations ("Environmental Attributes"), and (ii) any and all credits, rebates, subsidies, payments or other incentives that relate to the use of technology incorporated into Lessee's geologic storage operations, environmental benefits of such operations, or other similar programs available from any regulated entity or any governmental authority ("Environmental Incentives"). Lessee is further entitled to the benefit of any

and all (a) investment tax credits, (b) production tax credits, (c) credits under 26 U.S.C. §45Q credits, and (d) similar tax credits or grants under federal, state or local law relating to Lessee's geologic storage operations ("Tax Credits"). Lessor shall (i) cooperate with Lessee in obtaining, securing and transferring all Environmental Attributes and Environmental Incentives and the benefit of all Tax Credits, and (ii) shall allow Lessee to take any actions necessary to install additional equipment on the Facilities to comply with all monitoring and reporting obligations, and allow Lessee's personnel to enter the premises and collect any data Lessee requires to satisfy its obligations required in connection with obtaining Tax Credits and Environmental Attributes. Lessor shall not be obligated to incur any out-of-pocket costs or expenses in connection with such actions unless reimbursed by Lessee. If any Environmental Incentives are paid directly to Lessor, Lessor shall immediately pay such amounts over to Lessee.

20. Assignment. The rights of either Party hereto may be assigned in whole or part. The assigning party shall provide written notice of any assignment within sixty (60) days after such assignment has become effective; *provided, however,* that an assigning party's failure to deliver written notice of assignment within such 60-day period shall not be deemed a breach of this Lease unless such failure is willful and intentional. The Lessor's consent shall not be required for an assignment by the Lessee of this Lease, whether by way of a collateral assignment to its financiers or otherwise.

21. Change of Ownership. No change of ownership in the Leased Premises shall be binding on the Lessee for purpose of making payments to Lessor hereunder until the date Lessor, or Lessor's successors or assigns, furnishes Lessee the recorded original or a certified copy of the instrument evidencing the change in ownership. The Lessor's consent shall not be required for a change in the direct or indirect control of the Lessee.

22. Notices. All notices required to be given under this Lease shall be in writing and addressed to the respective Party at the addresses set forth at the beginning of this Lease unless otherwise directed by either Party.

23. No Waiver. The failure of either Party to insist in any one or more instances upon strict performance of any of the provisions of this Lease or to take advantage of any of its rights hereunder shall not be construed as a waiver of any such provision or the relinquishment of any such rights, but the same shall continue and remain in full force and effect.

24. Notice of Lease. This Lease shall not be recorded in the real property records. Lessee shall cause a memorandum of this Lease to be recorded in the real property records of the county in which the Leased Premises are situated.

~~25. Confidentiality. Lessor shall maintain in the strictest confidence, for the benefit of Lessee, all information pertaining to the compensation paid under this Lease, any information regarding Lessee and its business or operations on the Leased Premises or on any other lands, the capacity and suitability of any Reservoir or reservoirs and subsurface pore spaces, stratum or strata unitized or amalgamated therewith, and any other information that is deemed proprietary or that Lessee requests or identifies to be held confidential, in each such case whether disclosed by Lessee or discovered by Lessor.~~

25. [Reserved.]

26. Counterparts. This Lease may be executed in any number of counterparts, each of which, when executed and delivered, shall be an original, but all of which shall collectively constitute one and the same instrument.

27. Severability. If any provision of this Lease is found to be invalid, illegal or unenforceable in any respect, such provision shall be deemed to be severed from this Agreement, and the validity, legality and enforceability of the remaining provisions contained herein shall not in any way be affected or impaired thereby.

28. Governing Law. This Lease shall be governed by, construed and enforced in accordance with the laws of the State of North Dakota and the Parties hereby submit to the jurisdiction of the state or federal courts located in the State of North Dakota.

29. Further Assurances. Each Party will execute and deliver all documents, provide all information, and take or forbear from all actions as may be necessary or appropriate to achieve the purposes of this Lease, including without limitation executing a memorandum of this Lease and all documents required to obtain any necessary government approvals.

30. Entire Agreement. This Lease constitutes the entire agreement between the Parties and supersedes all prior negotiations, undertakings, notices, memoranda and agreement between the Parties, whether oral or written, with respect to the subject matter hereof. This Lease may only be amended or modified by a written agreement duly executed by Lessor and Lessee.

31. Cooperation with Financiers. The Lessor hereby acknowledges and consents that Lessee may grant a collateral assignment or leasehold mortgage of Lessee's rights under this Lease to Lessee's debt financiers, it being understood that such collateral assignment or leasehold mortgage would only encumber the leasehold interest created hereunder.

32. Favored Nations. If, at any time within the twelve (12) month period following the Effective Date, Lessee enters into a pore space lease agreement with a third party landowner covering any part of Lessee's storage facility ("Third-Party Lease"), and if any of the payments specified in the Third-Party Lease would have been more favorable to Lessor had Lessor executed a lease agreement similar to the Third-Party Lease, then Lessor and Lessee will amend this Lease so that it reflects compensation terms similar to the Third-Party Lease, and Lessee will pay to Lessor the additional compensation, if any, that Lessor would have been paid had Lessor signed a lease agreement similar to the Third-Party Lease. For the purposes of this Section 32, "Lessee's storage facility" shall mean any storage facility (as such term in defined in ch. 38-22 of the North Dakota Century Code) operated by Lessee within a ten (10) mile radius of the Leased Premises which is subject to a permit is issued by the Commission pursuant to ch. 38-22 of the North Dakota Century Code.

33. Electronic Signatures. This Lease, and any amendments hereto, to the extent signed and delivered by means of electronic transmission in portable document format (pdf) or by DocuSign or similar electronic signature process, shall be treated in all manner and respects as an original contract and shall be considered to have the same binding legal effect as if it were the original signed version thereof delivered in person.

34. Insurance. Lessee shall obtain and maintain in force commercial general liability insurance covering the Facilities and Lessee's activities on the Leased Premises at all times during the term of this Lease, with a minimum occurrence and aggregate limit of one million dollars ($1,000,000). Such insurance coverage for the Facilities and Leased Premises may be provided as part of a blanket policy that covers other Facilities or properties as well. Any such policies shall include Lessor as an additional insured. Lessee, or its insurer, shall provide thirty (30) days prior written notice (except ten (10) days for nonpayment of premium) to Lessor of any cancellation. Lessee shall provide Lessor with copies of certificates of insurance evidencing this coverage upon request by Lessor. The policy shall be endorsed or include a provision waiving insurer rights of subrogation against Lessor.

IN WITNESS WHEREOF, the Parties have executed this Lease effective for all purposes as of the Effective Date.

**LESSOR:**

By: _____

Print: _____

By: _____

Print: _____

**LESSEE:** SUMMIT CARBON STORAGE #2, LLC

By: _____

Print: _____

Its: _____

# EXHIBIT A

## Leased Premises

## EXHIBIT B

### Royalty Escalation Provision

This Lease is subject to a Royalty Escalation. The royalty shall increase TEN percent (10.0%) on January 1, 2026, and an additional TEN percent (10.0%) every five years thereafter. For the avoidance of doubt, the royalty to be paid is calculated below:

| Date: | Royalty Rate: |
|---|---|
| Beginning January 1, 2026 | $0.550 |
| Beginning January 1, 2031 | $0.605 |
| Beginning January 1, 2036 | $0.666 |
| Beginning January 1, 2041 | $0.733 |
| Beginning January 1, 2046 | $0.806 |
| Beginning January 1, 2051 | $0.887 |
| Beginning January 1, 2056 | $0.976 |
| Beginning January 1, 2061 | $1.074 |
| Beginning January 1, 2066 | $1.181 |
| Beginning January 1, 2071 | $1.299 |
| Beginning January 1, 2076 | $1.429 |

**SUMMIT CARBON STORAGE #2, LLC**

Dated: _____

By: _____

Print: _____

Its: _____

| **Summary report:**<br>**Litera Compare for Word 11.3.1.3 Document comparison done on 6/24/2024 11:20:07 AM** | |
|---|---|
| **Style name:** Default Style | |
| **Intelligent Table Comparison:** Active | |
| **Original filename:** SCS Storage #2 - Broom Creek Storage Agreement (Original).docx | |
| **Modified DMS:** iw://ecdbb-mobility.imanage.work/FB1/82898117/1 | |
| **Changes:** | |
| Add | 41 |
| ~~Delete~~ | 44 |
| ~~Move From~~ | 0 |
| Move To | 0 |
| Table Insert | 0 |
| ~~Table Delete~~ | 0 |
| Table moves to | 0 |
| ~~Table moves from~~ | 0 |
| Embedded Graphics (Visio, ChemDraw, Images etc.) | 0 |
| Embedded Excel | 0 |
| Format changes | 0 |
| **Total Changes:** | 85 |

Rec'd late - Not part of official record

**From:** Danso, Bridget Y.
**To:** Forsberg, Sara L.
**Subject:** FW: Webform submission from: Contact > Content
**Date:** Wednesday, June 26, 2024 2:07:47 PM

---

**From:** Department of Mineral Resources, North Dakota <jgranger311@gmail.com>
**Sent:** Sunday, June 23, 2024 9:24 PM
**To:** -Info-Oil & Gas Division <oilandgasinfo@nd.gov>
**Subject:** Webform submission from: Contact > Content

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Submitted on Sun, 06/23/2024 - 21:24

Submitted by: Anonymous

Submitted values are:

**Your First Name**
jean

**Last Name**
granger

**Email Address**
jgranger311@gmail.com

**Phone Number**
1-515-573-6052

**Subject**
I oppose the use of eminent domain

**Comments**
I find it unspeakable, reprehensible, unconstitutional and morally WRONG to force eminent domain on unwilling landowners to seize their land to become a deadly toxic dumpsite that will render that land untouchable/unusable for perpetuity when there are better technologies NOW that will provide financial gain NOW. I don't see the people of North Dakota sanctioning this. I don't see Mother Earth agreeing to do this either. Shame on DMR, the Commission, PSC, Gov Bergum to allow this toxic stain on N. D.'s people. jkg

Rec'd late - not part of official record

**From:** Danso, Bridget Y.
**To:** Forsberg, Sara L.
**Subject:** FW: opposition of use of eminent domain against unwilling landowners towards a CO2 burial site
**Date:** Thursday, June 20, 2024 3:17:17 PM

---

**From:** Department of Mineral Resources, North Dakota <jgranger311@gmail.com>
**Sent:** Monday, June 17, 2024 9:40 PM
**To:** -Info-Oil & Gas Division <oilandgasinfo@nd.gov>
**Subject:** Webform submission from: Contact > Content

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Submitted on Mon, 06/17/2024 - 21:40

**Your First Name**
jean

**Last Name**
granger

**Email Address**
jgranger311@gmail.com

**Phone Number**
1-515-573-6052

**Subject**
opposition of use of eminent domain against unwilling landowners towards a CO2 burial site

**Comments**
America needs to wean off oil - coal - fossil fuels NOW not in 2050. This Summit pipeline only kicks that can further down the road rather than deal with it now. Eminent domain whether it be to facilitate the pipeline or the dump site is totally WRONG. There are better technologies now. Do you personally want to live on or near a dump site - or how about future generations? A lot of questions at this point have NO answers. What you decide today will be your legacy - do you wish your grandson to say you made a bad decision and now I have to live with the consequences? Consider your decision as tho your life depended on it BECAUSE IT DOES. YOU MUST DENY!!!!! jkg

| | |
|---|---|
| **From:** | Hughes, Bethany |
| **To:** | Helms, Lynn D.; derrick@braatenlawfirm.com; Joshua A. Swanson |
| **Cc:** | Garner, David P.; Forsberg, Sara L.; Knutson, Amy N.; Bender, Lawrence |
| **Subject:** | Summit Carbon Solutions - NDIC Case Nos. 30869-30880 |
| **Date:** | Thursday, June 20, 2024 12:30:12 PM |
| **Attachments:** | Summit Carbon Storage - Case Nos. 30869-30880 - Response to Motion to Compel-c.pdf<br>Summit Carbon Storage - Case Nos. 30869-30880 - COS - Response to Motion to Compel-c.pdf |

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Good afternoon,

Please find the attached documents, listed below, for filing and service with respect to the above-referenced case numbers.

1. Response to Motion to Compel; and
2. Certificate of Service.

**Bethany Hughes**
*Legal Administrative Assistant/Paralegal*
Fredrikson & Byron, P.A.
**Please note our new address:**
304 East Front Ave, Suite 400, Bismarck, ND 58504-5639
Direct: 701-221-8641 | Main: 701.221.8700 | Fax: 701-221-8750
***This is a transmission from the law firm of Fredrikson & Byron, P.A. and may contain information which is privileged, confidential, and protected by the attorney-client or attorney work product privileges. If you are not the addressee, note that any disclosure, copying, distribution, or use of the contents of this message is prohibited. If you have received this transmission in error, please destroy it and notify us immediately at our telephone number (701) 221-8700. The name and biographical data provided above are for informational purposes only and are not intended to be a signature or other indication of an intent by the sender to authenticate the contents of this electronic message.***

**BEFORE THE INDUSTRIAL COMMISSION**
**OF THE STATE OF NORTH DAKOTA**

**CASE NOS. 30869–30880**

**In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1,**

**11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by**

**nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of**

**carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the**

**geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## RESPONSE TO MOTION TO COMPEL

[¶ 1] Applicants Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC (collectively, "Summit Carbon Storage") submit this brief in response to the motion to compel filed with the North Dakota Industrial Commission ("Commission") by the Landowner Intervenors.[1] For the reasons explained below, the Commission should deny the Landowner Intervenors' motion.

[1] Landowner Intervenors are the Swenson Living Trust, Michael Bauman, Glenn and Lisa Gerving, Michael and Bonnie Haupt, John Jochim, Kevin and Kimberly Kraft, Charmayne Liebelt, Kirk and Linda Maize and Allen Maize, Paul and Christy Metz, JoLene M. Rust, and Gary and Cassie Smith.

## FACTS

[¶ 2] Summit Carbon Storage commenced this case to obtain a permit for the geologic storage of carbon dioxide.[2] Prior to May 31, 2024, Landowner Intervenors were not parties to this case. Nevertheless, Landowner Intervenors improperly served Summit Carbon Storage with a deposition notice on May 9, 2024. The notice did not name Summit Carbon Storage as the entity to be deposed. Rather, the notice named "Summit Carbon Solutions"—an entirely different entity.

[¶ 3] On May 31, 2024, the Commission authorized Landowner Intervenors to intervene. On the same day, Landowner Intervenors served Summit Carbon Storage with a second deposition notice. This notice also named "Summit Carbon Solutions" as the entity to be deposed rather than Summit Carbon Storage.

[¶ 4] On June 4, 2024, Intervenor Landowners served Summit Carbon Storage with three more deposition notices. These notices named Summit Carbon Storage as the entity to be deposed.[3] The notices also stated that the deposition would take place on June 6, 2024. Finally, the notices instructed Summit Carbon Storage to designate one or more officers to testify on the following topics:

I. Summit's applications and the information contained in and created or submitted in support of the applications and conclusions drawn therefrom in NDIC Case Nos. 30869, 30870, 30871, 30872 (for "Summit Carbon Storage #1, LLC,"); 30873, 30874, 30875, 30876 (for "Summit Carbon Storage #2,") and 30877, 30878, 30879, 30880 (for "Summit Carbon Storage #3, LLC,") (all applications hereafter referred to collectively as "Summit's applications").

---

[2] According to the North Dakota Legislature, "[i]t is in the public interest to promote the geologic storage of carbon dioxide." N.D.C.C. § 38-08-01. Doing so (1) "will benefit the state and the global environment by reducing greenhouse gas emissions," (2) "will help ensure the viability of the state's coal and power industries, to the economic benefit of North Dakota and its citizens," and (3) "may allow for [carbon dioxide's] ready availability if needed for commercial, industrial, or other uses, including enhanced recovery of oil, gas, and other minerals." *Id.*

[3] The first notice named Summit Carbon Storage #1, LLC. The second notice named Summit Carbon Storage #2, LLC. The third notice named Summit Carbon Storage #3, LLC.

a. Summit's applications include all documents submitted to the North Dakota Industrial Commission including its Department of Mineral Resources and its Oil and Gas Division (collectively "NDIC") as part of or in support of or in relation to Summit's applications, and all correspondence between Summit and NDIC whether in writing and whether electronic or physical, and whether written or oral. This topic and the scope of Summit's applications as used herein includes all data files, spreadsheets, databases, and models (including loading files necessary to make data files useable with any model) and all of the information, data, documents, calculations, and non-attorney work product that was created in support of Summit's applications or which was necessary to create or is materially supportive of Summit's applications.

i. Without limiting the generality of the foregoing, this topic includes the following models and associated data:

1. The data and interpretations and inputs for the geologic model created with SLB's Petrel software (Schlumberger, 2020).

2. The data and inputs and model referred to in Section 3.1 of the applications as follows:

a. "The geologic model and properties served as inputs for numerical simulations of CO2 injection using Computer Modelling Group Ltd.'s (CMG's) GEM software (Computer Modelling Group Ltd., 2021). Numerical simulations of CO2 injection were conducted to assess potential CO2 injection rate, disposition of injected CO2, wellhead pressure (WHP), bottomhole pressure (BHP), and pressure changes in the storage reservoir throughout the expected injection time frame and postinjection period. Results of the numerical simulations were then used to determine the project's area of review (AOR) pursuant to North Dakota's geologic CO2 storage regulations."

3. United States Geological Survey's PHREEQC geochemical model and both the data files and data inputs used to run this model and bases for using the chosen inputs.

4. The data and load files and data decks for the SLB Petrel model that was run for Summit's applications.

5. Computer Modelling Group Ltd.'s GEM model and both the data files and data inputs used to run this model and bases for using the chosen inputs.

6. 3D numerical reservoir simulation model data decks, output files and graphing files of the Storage Reservoir in original electronic format. Without limiting the

foregoing, such files may commonly be stored in Schlumberger SEclipse format, CMG (Canadian Modeling Group) Imex format, or other similar format.

7. Input files, field and analytical data, and the model geochemical database (and the sources of the foregoing) used to run any modelling or analysis of critical threshold pressures or areal extent of review or impact and pressure buildup, or which was used to do any kind of analysis related to EPA Method 1 or EPA Method 2 or Analytical Solution for Leakage in Multilayered Aquifers ASLMA, or any risk-based area-of-review analysis.

ii. These models also include the conclusions drawn from the models and the data inputs used, particularly as those conclusions were used to support Summit's applications as referenced in these topics.

iii. The identity of the person most familiar with the workflows described in Section 3.2.3 of Summit's application in NDIC Case No. 30869 and how it was performed for purposes of Summit's applications and the identity of the person who wrote this passage.

iv. The meaning and context and details of how the various processes and functions described in Section 3.2.3 of Summit's applications and how they were actually performed and the models and calculations used to support them.

b. The factual documentation and information that might support or that Summit will use to support a finding "[t]hat the storage operator has obtained the consent of persons who own at least sixty percent of the storage reservoir's pore space" as required by N.D.C.C. § 38-22-08(5).

c. The factual documentation and information that might support or that Summit will use to support any finding in this proceeding "[t]hat the proposed storage facility will not adversely affect surface waters or formations containing fresh water" as is stated at N.D.C.C. § 38-22-08(7).

d. The factual documentation and information that might support or that Summit will use to support any finding in this proceeding that "[t]hat the storage facility will not endanger human health nor unduly endanger the environment" as is stated at N.D.C.C. § 38-22-08(10).

e. The factual documentation and information that might support or that Summit will use to support any finding in this proceeding "[t]hat the horizontal and vertical boundaries of the storage reservoir are defined [and] include buffer areas to ensure that the storage facility is operated safely and as contemplated" as is stated at N.D.C.C. § 38-22-08(12).

f. The factual documentation and information related to or that might support or that Summit will use to support any finding in this proceeding that "all nonconsenting pore space owners are or will be equitably compensated" as that phrase is used in N.D.C.C. § 38-22-08(14) and any documentation, information, data sets, comparable sales, comparable transactions, appraisals, market reports, financial reports, or other documents related to or referencing compensation paid to nonconsenting pore space owners.

i. This subtopic I.b. includes all amounts paid by Summit to any individual or entity for use of or damages to pore space or property rights associated with or related to its storage facility that is the subject of Summit's application and the Storage Reservoir, and all agreements for such use or damages or payments.

ii. This subtopic I.b. includes all reports and agreements in Summit's possession indicating any amount of compensation paid for any kind of use of or damage to pore space or property for CO2 sequestration. If Summit has in its possession any agreement with any property owner for use of property or damage to property arising from use of pore space or property for storage or sequestration of CO2 it is included in this topic.

[¶ 5] On June 5, 2024, counsel for Summit Carbon Storage sent counsel for Landowner Intervenors a letter. The letter explained that Landowner Intervenors' deposition notices did not comply with N.D.R.Civ.P. 30 and therefore Summit Carbon Storage would not be designating a witness for the deposition that Landowner Intervenors noticed for June 6, 2024.

[¶ 6] Counsel for Landowner Intervenors responded to this letter with an email. In his email, counsel for Landowner Intervenors did not offer to confer about the deficiencies of his clients' deposition notices. Instead, counsel for Landowner Intervenors simply stated that he disagreed that the notices were deficient and he intended to move forward with the deposition regardless of whether Summit Carbon Storage produced a witness.

[¶ 7] On June 6, 2024, counsel for Landowner Intervenors held a deposition. Because Summit Carbon Storage was never served with a valid notice of said deposition, Summit Carbon Storage did not produce a witness for said deposition.

[¶ 8] On June 10, 2024, Landowner Intervenors filed a motion to compel. In their motion, they request the Commission to "enter an order compelling the depositions of the three Summit entities" and to "allow procedural due process in this proceeding."

## ARGUMENT

[¶ 9] The argument section of this brief proceeds in three parts. Part I argues that the Commission should deny Landowner Intervenors' motion to compel because the motion does not comply with the requirements of N.D.R.Civ.P. 37. Part II argues that the Commission should deny the motion to compel because none of Landowner Intervenors' deposition notices complied with N.D.R.Civ.P. 30. Part III explains why the Commission denying the motion to compel will not violate Landowner Intervenors' due process rights.

### I. Landowner Intervenors' motion to compel does not comply with the requirements of N.D.R.Civ.P. 37.

[¶ 10] This is an adjudicative proceeding. In such a proceeding, "discovery may be obtained in accordance with the North Dakota Rules of Civil Procedure." N.D.C.C. § 28-32-33(1).

[¶ 11] Rule 37 of the North Dakota Rules of Civil Procedure authorizes a party to file a motion to compel. However, "[t]he motion must include a certification that the movant has in good faith conferred or attempted to confer with the person or party failing to make discovery in an effort to obtain it without court action." N.D.R.Civ.P. 37(a)(1). When interpreting this Rule, the North Dakota Supreme Court has explained that "a facially valid motion to compel requires two components, an actual certification document and performance." *Meuchel v. Red Trail Energy, LLC*, 2024 ND 44, ¶ 24, 4 N.W.3d 203.

[¶ 12] As explained below, Landowner Intervenors and their motion to compel did not satisfy either of these requirements. The Commission should therefore deny their motion.

**A. Landowner Intervenors' motion did not contain an actual certification document.**

[¶ 13] To be valid, Landowner Intervenors' motion to compel must include "an actual certification document." *Meuchel*, 2024 ND 44, ¶ 24. Among other information, the certification must include "the names of the parties who conferred or attempted to confer, the manner by which they communicated, the dispute at issue, as well as the dates, times, and results of their discussions, if any." *Id.* at ¶ 26.

[¶ 14] Landowner Intervenors' motion to compel clearly did not include a separate certification document. And the motion itself cannot constitute the necessary certification document. Nowhere in their motion do Landowner Intervenors "certify" that they attempted to confer with Summit Carbon Storage in good faith. Because Landowners failed to include an actual certification document with their motion to compel, the motion is invalid.

**B. Landowner Intervenors did not confer or attempt to confer with Summit Carbon Storage in good faith.**

[¶ 15] In addition to submitting a document that certifies they conferred or attempted to confer with Summit Carbon Storage in good faith, Landowner Intervenors must actually confer or attempt to confer with Summit Carbon Storage in good faith. *Meuchel*, 2024 ND 44, ¶ 24.

[¶ 16] The North Dakota Supreme Court has explained that "[g]ood faith conferral or attempts to confer generally require more than mere demand letters or emails." *Id.* at ¶ 27. "Conferring requires a party actually communicate by phone or in person, or at least sincerely attempt to do so." *Id.* "[A] a moving party must personally engage in two-way communication with the nonresponding party to meaningfully discuss each contested discovery dispute in a genuine effort to avoid judicial intervention." *Id.* at ¶ 28.

[¶ 17] Landowner Intervenors and their counsel did not "actually communicate by phone or in person" with Summit Carbon Storage and its counsel and they did not "personally engage in

two-way communication with the nonresponding party to meaningfully discuss each contested discovery dispute in a genuine effort to avoid [Commission] intervention." As set forth above, counsel for Landowner Intervenors responded to this letter with an email indicating that he disagreed that the notices were deficient and he intended to move forward with the deposition regardless of whether Summit Carbon Storage produced a witness.

[¶ 18] Because Landowner Intervenors did not confer with Summit Carbon Storage in good faith, the Commission should deny their motion to compel.

## II. Landowner Intervenors' deposition notices did not comply with N.D.R.Civ.P. 30.

[¶ 19] The Commission should also deny Landowner Intervenors' motion to compel because Landowner Intervenors still have not served Summit Carbon Storage with a deposition notice that complies with N.D.R.Civ.P. 30. To date, Landowner Intervenors have served five deposition notices. As explained below, not one of these notices complied with the requirements of N.D.R.Civ.P. 30.

### A. May 9 Deposition Notice

[¶ 20] The deposition notice that Landowner Intervenors served on May 9, 2024, clearly did not comply with N.D.R.Civ.P. 30. That Rule only allows parties to serve deposition notices. *See* N.D.R.Civ.P. 30(a)(1) ("[A] party may, by oral questions, depose any person …") (emphasis added); N.D.R.Civ.P. 30(b)(1) ("A party who wants to depose a person by oral questions must give reasonable written notice to every other party.") (emphasis added). Landowner Intervenors were not parties to this case when they served their deposition notice on May 9, 2024.

[¶ 21] In addition, Rule 30 requires deposition notices to name the person or entity that is to be deposed. *See* N.D.R.Civ.P. 30(b)(1) ("The notice must state … the deponent's name …") (emphasis added); N.D.R.Civ.P. 30(b)(6) ("In its notice or subpoena, a party may name as the

deponent [an] ... entity ...") (emphasis added). The deposition notice that Landowner Intervenors served on May 9, 2024, did not name Summit Carbon Storage as the entity to be deposed. Rather, the notice named Summit Carbon Solutions. Landowner Intervenors cannot use a deposition notice naming Summit Carbon Solutions as a basis for the Commission compelling Summit Carbon Storage to sit for a deposition.

**B. May 31 Deposition Notice**

[¶ 22] The deposition notice that Landowner Intervenors served on May 31, 2024, also did not comply with N.D.R.Civ.P. 30. Again, that Rule requires a deposition notice to name the person or entity to be deposed. *See* N.D.R.Civ.P. 30(b)(1); N.D.R.Civ.P. 30(b)(6). Landowner Intervenors' deposition notice did not name Summit Carbon Storage as the entity to be deposed. Rather, the notice named Summit Carbon Solutions. Again, Landowner Intervenors cannot use a deposition notice that names Summit Carbon Solutions as a basis for the Commission to compel Summit Carbon Storage to attend a deposition.

**C. June 4 Deposition Notices**

[¶ 23] Finally, the deposition notices that Landowner Intervenors served on June 4, 2024, also did not comply with N.D.R.Civ.P. 30. That Rule required Landowner Intervenors to give Summit Carbon Storage "reasonable" notice of the deposition. Federal courts interpreting the Federal Rules of Civil Procedure have determined that ten business days is not reasonable notice. *See, e.g.*, *In re Sulfuric Acid Antitrust Litig.*, 231 F.R.D. 320, 327 (N.D. Ill. 2005).

[¶ 24] Landowner Intervenors' deposition notices gave Summit Carbon Storage two days to designate and prepare one or more officers to be deposed on numerous complicated and broad deposition topics. If ten days' notice is not reasonable, then two days' notice is certainly not reasonable.

## III. Due process does not entitle a party in an administrative proceeding to discovery.

[¶ 25] Landowner Intervenors assert that if the Commission does not compel Summit Carbon Storage to sit for a deposition, their due process rights will be violated. *See, e.g.*, Landowner Intervenors' Br. Supp. Mot. Compel ¶ 1 ("The Commission should … grant Intervenor Landowner's motion to compel and allow procedural due process in this proceeding …"). At the hearing on the applications of Summit Carbon Storage, one Landowner Intervenor threatened to sue the Commission for violating his due process rights if Summit Carbon Storage is not compelled to sit for a deposition:

> We've been highly prejudiced due to the lack of adherence to the North Dakota Rules of Civil Procedure and the State's failure to hold the applicants accountable to our requests. And honestly, Mr. Braaten, they are simply setting themselves up to waste more taxpayer money on a due-process lawsuit pending their decisions made by the people in this room on these permits.
>
> So, as I discussed earlier, the applicant has refused our depositions and our discovery requests. We have had no information provided from them for us to properly prepare for this hearing. While in bed with Summit, the State has denied us as intervenors a fair hearing and our rights of due process guaranteed in law.

Hr'g Recording at 2:53:48 to 2:54:48.[4]

[¶ 26] The Commission should ignore Landowner Intervenors' threats because their due-process arguments are meritless. This is an administrative proceeding. "[T]here is no general

[4] A recording of the hearing in this matter can be accessed through the following hyperlink: https://www.youtube.com/watch?v=LYaG0DKeAe0&t=5s

constitutional right to discovery in administrative proceedings." *Jacobson v. Blaise*, 69 N.Y.S.3d 419, 423 (App. Div. 2018).[5]

[¶ 27] At any rate, even if due process somehow entitled Landowner Intervenors to discovery, Landowner Intervenors have already, in effect, deposed Summit Carbon Storage. Landowner Intervenors' counsel cross-examined Summit Carbon Storage's witnesses for numerous hours, consuming most of the three day hearing on this matter. It is unclear what information Landowner Intervenors believe they will obtain by questioning these witnesses at a deposition that they did not already obtain by questioning them at length during the hearing.

**CONCLUSION**

[¶ 28] For the foregoing reasons, the Commission should deny Landowner Intervenors' motion to compel.

Dated this 20th day of June, 2024.

By: _____

Lawrence Bender (#03908)
lbender@fredlaw.com
**FREDRIKSON & BYRON, P.A.**
304 East Front Avenue, Suite 400
Bismarck, ND 58504
(701) 221-8700
*Attorneys for Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC and Summit Carbon Storage #3, LLC*

#82795484v1

[5] *See also Mathis v. Christian Heating & Air Conditioning, Inc.*, 60 F. Supp. 3d 566, 579 (E.D. Pa. 2014) ("[F]ormal, pre-hearing discovery is not generally required in administrative hearings to satisfy procedural due process."); *California Teachers Assn. v. California Com. on Teacher Credentialing*, 4 Cal. Rptr. 3d 369, 378 (Ct. App. 2003) ("Generally, there is no due process right to prehearing discovery in administrative hearing cases."); *N. L. R. B. v. Interboro Contractors, Inc.*, 432 F.2d 854, 857–58 (2d Cir. 1970) ("It is well settled that parties to judicial or quasi-judicial proceedings are not entitled to pre-trial discovery as a matter of constitutional right.").

**BEFORE THE INDUSTRIAL COMMISSION**
**OF THE STATE OF NORTH DAKOTA**

**CASE NOS. 30869–30880**

**In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1,**

**11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by**

**nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of**

**carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the**

**geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## CERTIFICATE OF SERVICE

[¶ 1] I, the undersigned, hereby certify that a true and correct copy of the following document:

1. Response to Motion to Compel.

was, on June 20, 2024, filed electronically with the North Dakota Industrial Commission and served upon the following via electronic mail:

| | |
|---|---|
| Lynn Helms<br>lhelms@nd.gov | David Garner<br>dpgarner@nd.gov |

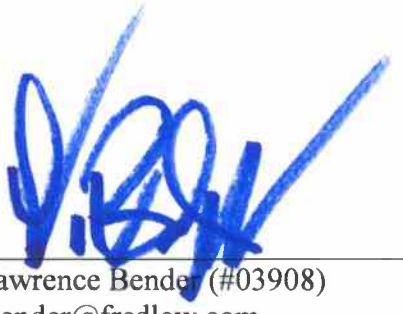
Sara Forsberg
slforsberg@nd.gov

Amy Knutson
anknutson@nd.gov

Derrick Braaten
derrick@braatenlawfirm.com

Joshua Swanson
jswanson@vogellaw.com

Dated this 20th day of June, 2024.

By: 

Lawrence Bender (#03908)
lbender@fredlaw.com
**FREDRIKSON & BYRON, P.A.**
304 East Front Avenue, Suite 400
Bismarck, ND 58504
(701) 221-8700
*Attorneys for Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC and Summit Carbon Storage #3, LLC*

#82858281v1

| | |
|---|---|
| **From:** | Suggs, Richard A. |
| **To:** | Forsberg, Sara L. |
| **Subject:** | FW: Case Nos. 30869-30880 - Supplemental Filings |
| **Date:** | Wednesday, June 19, 2024 8:42:03 AM |
| **Attachments:** | Summit - LTR to NDIC RE Supplemental Filings(82809329.1)-c.pdf<br>Summit - COS - NDIC Case Nos. 30869 to 30880 - Supplemental Filings-c.pdf |

---


## Richard Suggs

*Geology & UIC Class VI Program Manager*
*Oil and Gas Division*
701.328.8031 (o)
rasuggs@nd.gov


---

**From:** Hughes, Bethany <BHughes@fredlaw.com>
**Sent:** Tuesday, June 18, 2024 2:36 PM
**To:** Suggs, Richard A. <rasuggs@nd.gov>; Madche, Tamara J. <tjmadche@nd.gov>
**Cc:** derrick@braatenlawfirm.com; Bender, Lawrence <LBender@fredlaw.com>
**Subject:** Case Nos. 30869-30880 - Supplemental Filings


You don't often get email from bhughes@fredlaw.com. Learn why this is important

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****


Good Afternoon,

Please see attached from Mr. Bender.

Thanks,


**Bethany Hughes**
*Legal Administrative Assistant/Paralegal*
Fredrikson & Byron, P.A.
**Please note our new address:**
304 East Front Ave, Suite 400, Bismarck, ND 58504-5639
Direct: 701-221-8641 | Main: 701.221.8700 | Fax: 701-221-8750



***This is a transmission from the law firm of Fredrikson & Byron, P.A. and may contain information which is privileged, confidential, and protected by the attorney-client or attorney work product privileges. If you are not the addressee, note that any disclosure, copying, distribution, or use of the contents of this message is prohibited. If you have received this transmission in error, please destroy it and notify us immediately at our telephone number (701) 221-8700. The name and biographical data provided above are for informational purposes only and are not intended to be a signature or other indication of an intent by the sender to authenticate the contents of this electronic message.***

Fredrikson

Fredrikson & Byron, P.A.
Attorneys and Advisors

304 East Front Avenue, Suite 400
Bismarck, ND 58504-5639
Main: 701.221.8700
fredlaw.com

June 18, 2024

***VIA E-MAIL***

Mr. Richard Suggs
Ms. Tamara Madche
Department of Mineral Resources
North Dakota Industrial Commission
1016 E. Calgary Avenue
Bismarck, ND 58503

**RE: Supplemental Filings**
**Case Nos. 30869-30880**

Dear Rich and Tammy:

Attached hereto as Exhibit A, please find a list of the supplemental filings requested by Commission staff during the June 11, 12 and 13, 2024 hearing on the above-captioned cases. Please confirm that the items set forth on Exhibit A match your understanding of the supplemental information requested and not yet provided to the Commission. The applicant intends to provide substantive responses to all requests not later than June 24, 2024.

Should you have any questions, please advise.

Sincerely,

/s/ *Lawrence Bender*

LAWRENCE BENDER

LB/tjg
#82809329v1
Enclosure(s)

# EXHIBIT A

| Location within Application | Applicable SFP Application | Supplemental Requested |
|---|---|---|
| **N/A** | **SCS1; SCS2; SCS3** | A listing of all environmental permits, construction approvals, or any other relevant permit received or applied for from the commission or any other federal, state, or local regulatory agency. |
| **Project Summary** | **SCS1; SCS2; SCS3** | Provide the location, including state, of the capture facilities associated with this project. |
| **Section 1.0**<br>Land Description Details | **SCS3** | Revise unit legal descriptions for Tract 23 - Oliver County and Tract 56 - Morton County. |
| **Section 1.0**<br>Storage Agreement & Pore Space Lease | **SCS1; SCS2; SCS3** | **Revise the following sections of each Storage Agreement:**<br>Section 2.4 - Typographical error (Mechanical to Mathematical)<br>Sections 3.3 - Amendment of Leases and Other Agreements (no change in terms to existing leases)<br>Section 7.1 - Warranty and Indemnification (limit the warranty requirements consistent with discussion)<br>Section 8.1 - Grant of Easement (easement terms are limited by no surface facilities clauses & and if a lease is in place, the lease shSCS1; SCS2; SCS3 be controlling document)<br>Section 10.2 - Waiver of Rights to Partition (strike partition regarding sale or subdivision of land but keep the no attempts to sever pore space from surface)<br>Section 15.1 - Term. (correct typo - bold and underline "Term.")<br>Section 16.2 - Joinder in Dual Capacity (revise language)<br><br>**Revise Pore Space Lease (EXHIBIT D to Storage Agreement)**<br>18. Warranty of Title and Quiet Enjoyment (revise consistent with 7.1 above)<br>25. Confidentiality - Strike<br>34. Insurance - revise regarding subrogation rights |
| **Section 1.0**<br>Storage Agreement | **SCS3** | Revise Storage Facility Agreement, Section 3.1.2, to incorporate provided Minnkota border agreement language. |

# EXHIBIT A

| Location within Application | Applicable SFP Application | Supplemental Requested |
|---|---|---|
| **Section 3.0** | **SCS1; SCS2; SCS3** | Provide an explanation on mercury injection capillary pressure data modifications, single sampling performance, and adjustment of the mercury fluid properties to the CO2 fluid properties. |
| **Section 3.0 Appendix C** | **SCS1; SCS2; SCS3** | Provide an explanation on anhydrite precipitation vs dissolution as modeled in the Broom Creek for this permit, as compared to other Class VI permits. |
| **Section 5.0** | **SCS1; SCS2; SCS3** | Identify the distance of the closest dwelling to each flowline and injection site. |
| **Section 5.0** | **SCS1** | Identify the distance of the closest wind turbine to the NDL-327 flowline. |
| **Section 5.3.1** Corrosion Prevention | **SCS1; SCS2; SCS3** | Clarify whether Summit anticipates any cathodic protection boreholes to be drilled or will this system utilize anode beds entirely. |
| **Section 7.5.1** Page 7-17 | **SCS1; SCS2; SCS3** | Revise "Assistance has been secured from local emergency…" to "assistance will be secured" |
| **Section 7.0** | **SCS1; SCS2; SCS3** | Provide revised ERRP to DMR prior to injection |
| **Section 8.0** | **SCS1; SCS2; SCS3** | Prior to commencement of injection operations, provide an updated Worker Safety Plan that includes a list of site specific training and the training itself for DMR inspection staff. |
| **Appendix C** | **SCS1; SCS2; SCS3** | Provide clarification on net change calculation of mineral precipitation vs. dissolution as seen in Figure C-13 and confirm if net change is positive or negative. |
| **Appendix C** | **SCS1; SCS2; SCS3** | Provide clarification on net change calculation of mineral precipitation vs. dissolution as seen in Figure C-22 and confirm if net change is positive or negative. |

**BEFORE THE INDUSTRIAL COMMISSION**
**OF THE STATE OF NORTH DAKOTA**

**CASE NOS. 30869–30880**

**In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36,**

**Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit**

**Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29,**

**30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## CERTIFICATE OF SERVICE

[¶ 1] I, the undersigned, hereby certify that a true and correct copy of the following document:

1. Letter to R. Suggs and T. Madche Regarding Supplemental Filings.

was, on June 18, 2024, forwarded via electronic mail to the following:

Derrick Braaten
derrick@braatenlawfirm.com

Dated this 18th day of June, 2024.

By: /s/ *Lawrence Bender*

Lawrence Bender (#03908)
lbender@fredlaw.com
**FREDRIKSON & BYRON, P.A.**
304 East Front Avenue, Suite 400
Bismarck, ND 58504
(701) 221-8700
*Attorneys for Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC and Summit Carbon Storage #3, LLC*

#82813305v1

| | |
|---|---|
| **From:** | Desirae Zaste |
| **To:** | -Info-Oil & Gas Division; Forsberg, Sara L.; Bender, Lawrence; TThrone@thronelaw.com; Gludt, Tyler; Helms, Lynn D.; Garner, David P.; Knutson, Amy N.; Joshua A. Swanson |
| **Cc:** | Derrick Braaten; Hughes, Bethany; Etter, Mary |
| **Subject:** | Summit Carbon Storage (Case Nos. 30869-30880) |
| **Date:** | Monday, June 17, 2024 3:33:32 PM |
| **Attachments:** | Exhibit List.pdf<br>240617 Declaration of Service.pdf |

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Good afternoon,

Attached for filing and service are copies of the following documents:

- **Intervenors Landowners' Exhibit List; and**
- **Declaration of Service.**

**Desirae Zaste¦ Certified Paralegal**

**BRAATEN LAW FIRM**
109 N. 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
Fax: 701-221-5842
www.braatenlawfirm.com

**PRIVILEGED COMMUNICATION**
**This e-mail message is intended only for the named recipient(s) above and is covered by the Electronic Communications Privacy Act, 18 U.S.C. Sections 2510-2521. This e-mail is confidential and may contain information that is privileged, attorney work product or exempt from disclosure under applicable law. Recipients should not file copies of this e-mail with publicly accessible records. If you have received this message in error, please immediately notify the sender by return e-mail and delete this e-mail message from your computer. Thank you for your cooperation.**

# INTERVENOR LANDOWNERS' EXHIBIT LIST

Applications re: Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC
Case Nos. 30869-30880

| NO. | WITNESS | DESCRIPTION | STIPULATED * | OFFERED | OBJECTION | RESERVED | OVERRULED | SUSTAINED | WITHDRAWN | RECEIVED |
|---|---|---|---|---|---|---|---|---|---|---|
| LO-18 | Shane Bofto | EPA Area of Review and Corrective Action | | X | | | | | | X |
| LO-19 | Shane Bofto | EPA Class VI Implementation Manual | | X | | | | | | X |
| LO-20 | Shane Bofto | EPA Well Site Characterization | | X | | | | | | X |
| LO-33 | Chris Stockness | Asgard SWD Lease Agreement | | X | | | | | | X |
| LO-34 | Chris Stockness | Bowman #1-D Agreement (Thom) | | X | | | | | | X |
| LO-35 | Chris Stockness | Brandvik Saltwater Disposal Facility Lease Agreement | | X | X | | X | | | X |
| LO-36 | Chris Stockness | David 1-12 SWD Lease Agreement | | X | X | | X | | | X |
| LO-37 | Chris Stockness | Interstellar SWD Lease Agreement | | X | X | | X | | | X |
| LO-38 | Chris Stockness | Jackson SWD Lease Agreement | | X | X | | X | | | X |
| LO-39 | Chris Stockness | Kelly Draw PWD Lease Agreement | | X | X | | X | | | X |
| LO-40 | Chris Stockness | Odin SWD Lease Agreement | | X | X | | X | | | X |
| LO-41 | Chris Stockness | T-REX SWD Lease Agreement | | X | X | | X | | | X |
| LO-42 | Chris Stockness | Louisiana Carbon Dioxide Sequestration Agreement | | X | X | | X | | | X |
| LO-43 | Chris Stockness | Bayou Bend CCS LLC TX Carbon Dioxide Transportation and Storage Lease | | X | X | | X | | | X |

# INTERVENOR LANDOWNERS' EXHIBIT LIST

Applications re: Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC
Case Nos. 30869-30880

| NO. | WITNESS | DESCRIPTION | STIPULATED * | OFFERED | OBJECTION | RESERVED | OVERRULED | SUSTAINED | WITHDRAWN | RECEIVED |
|---|---|---|---|---|---|---|---|---|---|---|
| LO-45 | Chris Stockness | Louisiana Carbon-Dioxide Storage Agreement-Air Products Blue Energy LLC | | X | X | | X | | | X |
| LO-46 | Chris Stockness | BLM Negotiated Rate 5-2-2017 | | X | X | | X | | | X |
| LO-47 | Chris Stockness | Texas General Land Office/School Land Board Request for Proposals for Lease of Permanent School Fund Land for Storage of Carbon Dioxide | | X | X | | X | | | X |
| LO-48 | Chris Stockness | Heartland Greenway Pore Space Lease Agreement | | X | X | | X | | | X |
| LO-49 | Chris Stockness | Surface Use and Pore Space Lease | | X | X | | X | | | X |
| LO-51 | Chris Stockness | Option Agreement - Retract - Form | | X | X | | X | | | X |
| LO-52 | Chris Stockness | New Mexico State Land Office Agreement for Natural Gas Storage-UG23 | | X | X | | X | | | X |
| LO-53 | Chris Stockness | Pore Space Lease-Bitner | | X | X | | X | | | X |
| LO-55 | Chris Stockness | Christopher Stockness Curriculum Vitae | | X | | | | | | X |
| LO-56 | Shane Bofto | Shane Bofto Curriculum Vitae | | X | | | | | | X |
| LO-57 | Paul Button | Paul Button Curriculum Vitae | | X | | | | | | X |
| LO-58 | Ted Doughty | P. Ted Doughty Curriculum Vitae | | X | | | | | | X |
| LO-63 | Kurt Swenson | All LO Intervenor Properties and 20 Yr Pressure | | X | X | | | | X | X |

# INTERVENOR LANDOWNERS' EXHIBIT LIST

Applications re: Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC
Case Nos. 30869-30880

| NO. | WITNESS | DESCRIPTION | STIPULATED* | OFFERED | OBJECTION | RESERVED | OVERRULED | SUSTAINED | WITHDRAWN | RECEIVED |
|---|---|---|---|---|---|---|---|---|---|---|
| LO-81 | Kurt Swenson | Swenson Properties Map Image | | X | | | | | | X |
| LO-82 | Shane Bofto | EPA UIC Program Class VI Well Recordkeeping, Reporting, and Data Management Guidance for Owners & Operators | | X | | | | | | X |
| LO-83 | Amanda Douglas | 240515 ORR to NDIC from Derrick Braaten re files | | X | | | | | | X |
| LO-86 | Kurt Swenson | Swenson Trust Land-Minnkota Map | | X | | | | | | X |
| LO-87 | Kurt Swenson | Compare Landowner Revisions to Exclusive Option to Lease Pore Space | | X | | | | | | X |
| LO-88 | Kurt Swenson | Michael L. Haupt ORR - Tundra and Red Trail | | X | | | | | | X |
| LO-89 | Kurt Swenson | Lynn Helms email re carbon dioxide information | | X | | | | | | X |
| LO-90 | Kurt Swenson | Michael Haupt ORR-Blue Flint | | X | X | | X | | | X |

*F -Foundation only
*A -Admitted into Evidence for all purposes

**NORTH DAKOTA INDUSTRIAL COMMISSION**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case No(s). 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

---

## DECLARATION OF SERVICE

---

[¶1] I hereby certify that true and correct copies of the following documents:

- **Intervenors Landowners' Exhibit List; and**
- **Declaration of Service.**

were, on the 17th day of June, 2024 sent via electronic mail to the following:

North Dakota Industrial Commission
oilandgasinfo@nd.gov
slforsberg@nd.gov

Lynn Helms
lhelms@nd.gov

Lawrence Bender
Attorney at Law
lbender@fredlaw.com

Thomas Throne
Attorney at Law
tthrone@thronelaw.com

Joshua Swanson
Attorney for Intervenor Minnkota
jswanson@vogellaw.com

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on this 17th day of June, 2024 at Bismarck, North Dakota.

Desirae Zaste

LO18

United States
Environmental Protection
Agency

# Geologic Sequestration of Carbon Dioxide

# Underground Injection Control (UIC) Program Class VI Well Area of Review Evaluation and Corrective Action Guidance

INDUSTRIAL COMMISSION
STATE OF NORTH DAKOTA
DATE 6/12/24 CASE NO. 30869-880
Introduced By Bofto (HydroSolutions)
Exhibit LO-18
Identified By Bofto.

EXHIBIT
tabbies
LO-18
30869-30880

Office of Water (4606M)

EPA 816-R-13-005

May 2013
BLF-000001

# Disclaimer

The *Federal Requirements under the Underground Injection Control Program for Carbon Dioxide Geologic Sequestration Wells* (75 FR 77230, December 10, 2010), known as the Class VI Rule, establishes a new class of injection well (Class VI).

The Safe Drinking Water Act (SDWA) provisions and U.S. Environmental Protection Agency (EPA) regulations cited in this document contain legally-binding requirements. In several chapters this guidance document makes suggestions and offers alternatives that go beyond the minimum requirements indicated by the Class VI Rule. This is intended to provide information and suggestions that may be helpful for implementation efforts. Such suggestions are prefaced by "may" or "should" and are to be considered advisory. They are not required elements of the rule. Therefore, this document does not substitute for those provisions or regulations, nor is it a regulation itself, so it does not impose legally-binding requirements on EPA, states, or the regulated community. The recommendations herein may not be applicable to each and every situation.

EPA and state decision makers retain the discretion to adopt approaches on a case-by-case basis that differ from this guidance where appropriate. Any decisions regarding a particular facility will be made based on the applicable statutes and regulations. Mention of trade names or commercial products does not constitute endorsement or recommendation for use. EPA is taking an adaptive rulemaking approach to regulating Class VI injection wells, and the agency will continue to evaluate ongoing research and demonstration projects and gather other relevant information as needed to refine the rule. Consequently, this guidance may change in the future without a formal notice and comment period.

While EPA has made every effort to ensure the accuracy of the discussion in this document, the obligations of the regulated community are determined by statutes, regulations or other legally binding requirements. In the event of a conflict between the discussion in this document and any statute or regulation, this document would not be controlling.

Note that this document only addresses issues covered by EPA's authorities under the SDWA. Other EPA authorities, such as Clean Air Act (CAA) requirements to report carbon dioxide injection activities under the Greenhouse Gas Mandatory Reporting Rule (GHG MRR), are not within the scope of this document.

# Executive Summary

EPA's *Federal Requirements Under the Underground Injection Control (UIC) Program for Carbon Dioxide Geologic Sequestration Wells* has been codified in the U.S. Code of Federal Regulations (40 CFR 146.81 *et seq.*), and is referred to as the Class VI Rule. This rule establishes a new class of injection well (Class VI) and sets minimum federal technical criteria for Class VI injection wells for the purposes of protecting underground sources of drinking water (USDWs). This guidance is part of a series of technical guidance documents that EPA is developing to support owners or operators of Class VI wells and UIC Program permitting authorities in the implementation of the Class VI Rule. The Class VI Rule and related documents are available at http://water.epa.gov/type/groundwater/uic/wells_sequestration.cfm.

The Class VI Rule requires owners or operators of Class VI injection wells to delineate the area of review (AoR) for the proposed Class VI well, which is the region surrounding the proposed well where USDWs may be endangered by the injection activity [40 CFR 146.84]. The Class VI Rule requires that the AoR be delineated using computational modeling and the AoR must be reevaluated periodically during the lifetime of the geologic sequestration (GS) project [40 CFR 146.84]. Within the AoR, the owners or operators must identify all potential conduits for fluid movement out of the injection zone, including both geologic features and artificial penetrations [40 CFR 146.84(c)(1)(iii)]. The owner or operator must then evaluate those artificial penetrations that may penetrate the confining layer(s) of the injection project for the quality of casing and cementing, and in the case of abandoned wells, for the quality of plugging and abandonment, and perform corrective action on any identified artificial penetrations that could serve as a conduit for fluid movement [40 CFR 146.84(c)(2), 146.84(c)(3), and 146.84(d)]. The Class VI Rule allows, at the discretion of the UIC Program Director, the use of "phased" corrective action, where certain regions of the AoR are addressed prior to injection and other regions of the AoR are addressed during the injection phase of the project [40 CFR 146.84(b)(2)(iv)].

This guidance provides information regarding modeling requirements and recommendations for delineating the AoR, describes the circumstances under which the AoR is to be reevaluated, and describes how to perform an AoR reevaluation. In addition, the guidance presents information on how to identify, evaluate, and perform corrective action on artificial penetrations located within the AoR.

The introductory section reviews the definition of the AoR and regulations pertaining to AoR and corrective action in the Class VI Rule. Following that section:

- Section 2 addresses computational modeling of GS;
- Section 3 addresses AoR delineation using computational models;
- Section 4 addresses identification, evaluation, and performing corrective action on artificial penetrations within the AoR; and
- Section 5 addresses AoR reevaluation.

For each section, the guidance:

- Explains how to perform activities necessary to comply with AoR and corrective action requirements (e.g., performing computational modeling). Illustrative examples are provided in several cases;
- Provides references to comprehensive reference documents and the scientific literature for additional information; and
- Explains how to report to the UIC Program Director the results of activities related to AoR and corrective action.

# Table of Contents


Disclaimer ..... i
Executive Summary ..... ii
Table of Contents ..... iv
List of Figures ..... vi
List of Tables ..... vii
Acronyms and Abbreviations ..... viii
Definitions ..... ix
Unit Conversions ..... xii

1. Introduction ..... 1
   1.1. Overview of the Class VI Rule AoR and Corrective Action Requirements ..... 2
   1.2. Organization of this Guidance ..... 5

2. Computational Modeling for Geologic Sequestration ..... 7
   2.1. Modeled Processes ..... 10
   2.2. Model Parameters ..... 11
      2.2.1. Intrinsic Permeability ..... 14
      2.2.2. Relative Permeability and Capillary Pressure ..... 16
      2.2.3. Injection Rate ..... 19
      2.2.4. Fluid Properties and Equations of State ..... 19
      2.2.5. Mass-Transfer Coefficients ..... 19
      2.2.6. Mineral Precipitation Kinetic Parameters ..... 20
      2.2.7. Model Orientation and Gridding Parameters ..... 20
   2.3. Computational Approaches ..... 21
      2.3.1. Numerical Approaches ..... 21
      2.3.2. Analytical, Semi-Analytical, and Hybrid Approaches ..... 22
   2.4. Model Uncertainty and Sensitivity Analyses ..... 22
   2.5. Model Calibration ..... 23
   2.6. Existing Codes used for Development of GS Models ..... 28

3. AoR Delineation Using Computational Models ..... 30
   3.1. AoR Delineation Class VI Rule Requirements ..... 30
   3.2. Data Collection and Compilation ..... 31
      3.2.1. Site Hydrogeology ..... 31
      3.2.2. Operational Data ..... 32
   3.3. Model Development ..... 33
      3.3.1. Conceptual Model of the Proposed Injection Site ..... 33
      3.3.2. Determination of Physical Processes to be Included in the Computational Model ..... 36
      3.3.3. Computational Model Design ..... 36
         3.3.3.1. Computational Code Determination ..... 36
         3.3.3.2. Model Spatial Extent, Discretization, and Boundary Conditions ..... 37

3.3.3.3. Model Timeframe ..... 37
3.3.3.4. Parameterization ..... 37
3.3.4. Executing the Computational Model ..... 38
3.4. AoR Delineation Based on Model Results ..... 38
3.4.1. Determination of Threshold Pressure Front ..... 39
3.5. Reporting AoR Delineation Results to the UIC Program Director ..... 48

4. Identifying Artificial Penetrations and Performing Corrective Action ..... 50
4.1. Rule Requirements ..... 50
4.2. Identifying Artificial Penetrations within the AoR ..... 51
4.2.1. Historical Research ..... 52
4.2.2. Site Reconnaissance ..... 53
4.2.3. Aerial and Satellite Imagery Review ..... 53
4.2.4. Geophysical Surveys ..... 53
4.2.4.1. Magnetic Methods ..... 54
4.2.4.3. Electromagnetic Methods ..... 56
4.2.4.4. Ground Penetrating Radar ..... 56
4.3. Assessing Identified Abandoned Wells ..... 56
4.3.1. Abandoned Well Plugging Records Review ..... 57
4.3.2. Abandoned Well Field Testing ..... 60
4.4. Performing Corrective Action on Wells Within the AoR ..... 62
4.4.1. Plugging of Wells within the AoR ..... 65
4.4.2. Remedial Cementing ..... 66
4.5. Reporting Well Identification, Assessment, and Corrective Action to the UIC Program Director ..... 66

5. AoR Reevaluation ..... 68
5.1. Class VI Rule Requirements Related to AoR Reevaluation ..... 68
5.2. Conditions Warranting an AoR Reevaluation ..... 69
5.2.1. Minimum Fixed Frequency ..... 69
5.2.2. Significant Changes in Operations ..... 69
5.2.3. Results from Site Monitoring that Differ From Model Predictions ..... 70
5.2.4. Ongoing Site Characterization ..... 71
5.3. Performing an AoR Reevaluation ..... 71
5.3.1. Demonstrating Adequate Existing AoR Delineation ..... 75
5.3.2. Modifying the Existing AoR Delineation ..... 75

References ..... 78

# List of Figures

Figure 1-1: Flow Chart of Monitoring and Modeling at a GS Project ..... 3
Figure 2-1: Equations of State for Carbon Dioxide ..... 9
Figure 2-2: Example Relative Permeability-Saturation and Capillary Pressure-Saturation Relationships for Water and Carbon Dioxide ..... 17
Figure 2-3: Geologic Schematic of Frio Brine Pilot Project ..... 25
Figure 2-4: Observed and Modeled Carbon Dioxide Arrival at the Observation Well Based on Change in Fluid Density ..... 26
Figure 2-5: Observed and Modeled Pressure Increase at (a) the Injection Well and (b) the Monitoring Well ..... 26
Figure 2-6: Comparison of (a) Initial and (b) Post-Calibration Model Predictions of Carbon Dioxide Plume Evolution ..... 27
Figure 3-1: Hypothetical Conceptual Site Model for Geologic Sequestration ..... 34
Figure 3-2: Fluid Density Functions for Varying Salinities ..... 40
Figure 3-3: Hypothetical Geologic Sequestration Site: Cross Sectional Schematic and Calculations ..... 43
Figure 3-4: Hypothetical Geologic Sequestration Site: Model Predicted Maximum Pressure Within the Injection Zone ..... 45
Figure 3-5: Hypothetical Geologic Sequestration Site: Model Predicted Extent of Supercritical Carbon Dioxide Plume Over Time ..... 46
Figure 3-6: Hypothetical Geologic Sequestration Site: Initial Area of Review Based on Model Results ..... 47
Figure 4-1: Total Field Aeromagnetic Map, Cook Creek Oil Field, Arcadia, Oklahoma ..... 55
Figure 4-2: Examples of Carbon Dioxide Leakage Through Improperly Abandoned Wells ..... 58
Figure 4-3: Well Evaluation Decision Tree ..... 64
Figure 5-1: Hypothetical Geologic Sequestration Site: Comparison of Model Predictions and Plume Monitoring Results at 20 Years of Injection ..... 72
Figure 5-2: Hypothetical Geologic Sequestration Site: Comparison of Model Predictions and Pressure Monitoring Results at 20 Years of Injection ..... 73
Figure 5-3: Hypothetical Geologic Sequestration Site: Initial AoR Delineation and Delineation after Reevaluation ..... 77

# List of Tables

Table 2-1: Model Parameters for Multiphase Fluid Modeling of Geologic Sequestration ..... 12
Table 4-1: Tools for Assessment of the Integrity of Abandoned Wells ..... 62

# Acronyms and Abbreviations

| | |
|---|---|
| AoR | Area of review |
| API | American Petroleum Institute |
| CAA | Clean Air Act |
| CFR | Code of Federal Regulations |
| DOE | United States Department of Energy |
| EPA | United States Environmental Protection Agency |
| GHG MRR | Greenhouse Gas Mandatory Reporting Rule |
| GPR | Ground penetrating radar |
| GS | Geologic sequestration |
| LBNL | Lawrence Berkeley National Laboratory |
| MAE | Mean-absolute error |
| mD | Millidarcies |
| ME | Mean error |
| MIT | Mechanical integrity test |
| MPa | Megapascals |
| PISC | Post-injection site care |
| RCSP | Regional Carbon Sequestration Partnership |
| RMSE | Root-mean squared error |
| SDWA | Safe Drinking Water Act |
| UIC | Underground Injection Control |
| USDW | Underground source of drinking water |
| USGS | United States Department of the Interior, United States Geological Survey |

# Definitions

Key to definition sources:

1: 40 CFR 146.81(d).
2: Definition drafted for the purposes of this document.
3: Class VI Rule Preamble.
4: 40 CFR 144.3.

**Area of Review (AoR)** means the region surrounding the geologic sequestration project where USDWs may be endangered by the injection activity. The area of review is delineated using computational modeling that accounts for the physical and chemical properties of all phases of the injected carbon dioxide stream and displaced fluids, and is based on available site characterization, monitoring, and operational data as set forth in 40 CFR 146.84.[1]

**Boundary condition parameters** refers to the parameters that describe fluid flow rates and/or pressures at the edges of the model domain and in the location of injection/extraction wells.[2]

**Capillary Pressure** refers to the difference of pressures between two phases existing in a system of interconnecting pores or capillaries. The difference in pressure is due to the combination of surface tension and curvature in the capillaries.[2]

**Computational code** refers to a series of interrelated mathematical equations solved by computer to represent the behavior of a complex system. For the purposes of GS, computational models represent, at a minimum, the flow and transport of multiple fluids and components in varying phases through porous media. Computational codes offer the ability to predict fluid flow in the subsurface using scientifically accepted mathematical approximations and theory. The use of computational codes is necessary because the mathematical formulations describing fluid flow are complicated and in many cases, non-linear. Several codes have been specifically developed or tailored for injection activities similar to GS, and can be used for this purpose.[2]

**Computational model** means a mathematical representation of the injection project and relevant features, including injection wells, site geology, and fluids present. For a GS project, site specific geologic information is used as input to a computational code, creating a computational model that provides predictions of subsurface conditions, fluid flow, and carbon dioxide plume and pressure front movement at that site. The computational model includes all model input and predictions (i.e., outputs).[2]

**Confining zone** means a geologic formation, group of formations, or part of a formation stratigraphically overlying the injection zone(s) that acts as barrier to fluid movement. For Class VI wells operating under an injection depth waiver, confining zone means a geologic formation, group of formations, or part of a formation stratigraphically overlying and underlying the injection zone.[1]

**Constitutive relationship** typically means, empirically based approximations used to simplify the system and estimate unknowns in cases where the parameters of the governing equations are not readily available for use in the equation because necessary information is not typically measurable, and thus not directly input into the model. An example of a constitutive relationship is relative permeability-saturation functions. These functions estimate the relative permeability of a particular fluid in a porous media as a function of its saturation at a given location and time. This permeability is then used in the governing equation to predict flow.[2]

**Equation of state** refers to an equation that expresses the equilibrium phase relationship between pressure, volume and temperature for a particular chemical species.[2]

**Geologic sequestration (GS)** means the long-term containment of a gaseous, liquid or supercritical carbon dioxide stream in subsurface geologic formations. This term does not apply to carbon dioxide capture or transport.[1]

**Geophysical surveys** refers to the use of geophysical techniques (e.g., seismic, electrical, gravity, or electromagnetic surveys or well logging methods such as gamma ray and spontaneous potential) to characterize subsurface rock formations.[3]

**Governing equation** refers to the mathematical formulae that form the basis of the computational code are termed governing equations. For GS modeling, they govern the predicted behavior of fluids in the subsurface provided by the code. Governing equations are mathematical approximations for describing flow and transport of fluids and their components in the environment.[2]

**Ground Penetrating Radar (GPR)** refers to a geophysical method that utilizes microwave technology in order to characterize features found in the subsurface.[2]

**Heterogeneity** refers to the spatial variability in the geologic structure and/or physical properties of the site.[2]

**Hysteresis** means the phenomenon where the response of a system depends not only on the present stimulus, but also on the previous history of the medium. For example, in a GS project, relative permeability, capillary pressure, and residual trapping will depend upon the saturation history of the formation.[2]

**Immiscible** refers to the property wherein two or more liquids or phases do not readily dissolve in one another.[2]

**Initial conditions** refers to parameter values at the start of the model simulation.[2]

**Intrinsic permeability** refers to a parameter that describes properties of the subsurface that impact the rate of fluid flow. Larger intrinsic permeability values correspond to greater fluid flow rates. Intrinsic permeability has units of area (distance squared).[2]

**Model calibration** means adjusting model parameters in order to minimize the difference between model predictions and monitoring data at the site.[2]

**Multiphase flow** refers to flow in which two or more distinct phases are present (e.g., liquid, gas, supercritical fluid).[2]

**Numerical Artifacts** refers to model results that are created erroneously based on computational limitations of the model, which may result from improper model development.[2]

**Parameter** means a mathematical variable used in governing equations, equations of state, and constitutive relationships. Parameters describe properties of the fluids present, porous media, and fluid sources and sinks (e.g., injection well). Examples of model parameters include intrinsic permeability, fluid viscosity, and fluid injection rate.[2]

**Relative permeability** refers to a factor, between 0 and 1, that is multiplied by the intrinsic permeability of a formation to compute the effective permeability for a fluid in a particular pore space. When immiscible fluids (e.g., carbon dioxide, water) are present within the pore space of a formation, the ability for flow of those fluids is reduced, due to the blocking effect of the presence of the other fluid. This reduction is represented by relative permeability.[2]

**Sensitivity Analyses** refers to the study of how the output of a model varies based in changes to an input variable or model parameter over a specified range of values. The results of a sensitivity analysis determine the which input variable and model parameter variability have the greatest effect on the model results.[2]

**Stochastic Methods** means the use of probability statistical methods in development of one or more possible realizations of the spatial patterns of the value(s) of a given set of model parameters.[2]

**Underground Injection Control Program** refers to the program EPA, or an approved state, is authorized to implement under the Safe Drinking Water Act (SDWA) that is responsible for regulating the underground injection of fluids by wells injection. This includes setting the federal minimum requirements for construction, operation, permitting, and closure of underground injection wells.[2]

**Underground Source of Drinking Water (USDW)** means an aquifer or its portion which supplies any public water system; or which contains a sufficient quantity of ground water to supply a public water system; and currently supplies drinking water for human consumption; or contains fewer than 10,000 mg/l total dissolved solids; and which is not an exempted aquifer.[4]

# Unit Conversions

| Imperial/Non-Metric Unit | Metric Unit |
|---|---|
| 1 Foot | 0.3048 Meters |
| 1 Mile | 1.609 Kilometers |
| 1 Pound per Square Inch (psi) | 0.006895 Megapascals (MPa) |
| Temperature in Degrees Fahrenheit (°F) | Temperature in Degrees Celsius = (°F – 32) x 0.56 |
| 1 Pound (lb) | 0.4536 Kilograms |
| 1 Megatonne (Mt) | $1 \times 10^6$ Tonnes |
| 1 Metric Ton (tonne; t) | 1,000 kg |
| 1 Cubic Foot | 0.0283 Cubic Meters |

# 1. Introduction

Area of review (AoR) evaluations and corrective action are long-standing permit requirements of the Underground Injection Control (UIC) Program of the U.S. Environmental Protection Agency (EPA). The AoR refers to the delineated region surrounding the injection well(s) wherein the potential exists for underground sources of drinking water (USDWs) to be endangered by the leakage of injectate and/or formation fluids. Typically, for injection well classes other than Class VI, the AoR is defined either as a fixed radius around the injection well or by a relatively simple radial calculation. Owners or operators of injection wells are required to identify any potential conduits for fluid movement, including artificial penetrations (e.g., abandoned well bores) within the AoR, assess the integrity of any artificial penetrations, and perform corrective action where necessary to prevent fluid movement into a USDW [40 CFR 144.55, 146.84(d)].

The Class VI Rule introduces enhanced AoR and corrective action requirements for Class VI injection wells that are tailored to the unique circumstances of geologic sequestration (GS) of carbon dioxide projects [40 CFR 146.84]. The purpose of this guidance is to identify appropriate methods for delineating the AoR and performing corrective action for Class VI injection wells. The intended primary audiences of this guidance document are Class VI injection well owners or operators and their representatives conducting AoR delineation modeling or performing artificial penetration identification, assessment, and corrective action activities. The UIC Program staff who are responsible for reviewing and approving Class VI injection well permit applications and related reports concerning AoR delineation and corrective action are another intended audience of this guidance document.

This document is one of a series of technical guidance documents intended to provide information and possible approaches for addressing various aspects of permitting and operating a Class VI injection well. Three of these companion guidance documents focus on site characterization, well construction, and testing and monitoring:

- The *UIC Program Class VI Well Site Characterization Guidance*;
- The *UIC Program Class VI Well Construction Guidance*; and
- The *UIC Program Class VI Well Testing and Monitoring Guidance.*

These guidance documents are intended to complement each other and to assist owners or operators in preparing permit applications that satisfy the requirements of the Class VI Rule. Class VI injection well regulations are tailored to the characteristics of individual sites. For example, the required site characterization data collected will inform the model development for AoR delineation, and AoR models will be reevaluated, and perhaps change, based on the results of site testing and monitoring data (Figure 1-1). Cross-linkages between guidance documents are noted in the text where appropriate. Additional guidance on developing, presenting, and using the required Class VI project plan information as part of a Class VI injection well permit application is provided in the *UIC Program Class VI Well Project Plan Development Guidance.*

### 1.1. Overview of the Class VI Rule AoR and Corrective Action Requirements

The Class VI Rule defines the AoR as the region surrounding the GS project where USDWs may be endangered by the injection activity [40 CFR 146.84(a)]. The purpose of the AoR and corrective action requirements of the Class VI Rule is to ensure that the areas potentially impacted by a proposed GS operation are delineated, all wells that need corrective action receive it, and that this process is updated throughout the injection project. While the details of all of the requirements are presented in later sections of this guidance, the basic requirements that owners or operators of GS projects must meet include:

- Prepare, maintain, and comply with an AoR and Corrective Action Plan that includes all of the required elements of the plan [40 CFR 146.84(b)];
- Delineate the AoR using computational modeling and identify all wells that require corrective action [40 CFR 146.84(c)];
- Perform all required corrective action on wells in the AoR [40 CFR 146.84(d)];
- Reevaluate the AoR throughout the life of the project [40 CFR 146.84(e)];
- Ensure that the Emergency and Remedial Response Plan and financial responsibility demonstration account for the most recently approved AoR [40 CFR 146.84(f)]; and
- Retain modeling inputs and data used to support AoR reevaluations for 10 years [40 CFR 146.84(g)].

If a vertical leakage pathway out of the injection zone is present, USDWs in the vicinity of a proposed Class VI injection well may be endangered by (1) movement of carbon dioxide into the USDW, impairing drinking water quality through changes in pH, contamination by trace impurities in the injectate (e.g., mercury, hydrogen sulfide), and leaching of metals and/or organics; and (2) movement of non-potable water (e.g., brine) out of the injection formation into a USDW as caused by elevated formation pressures induced by injection. Therefore, the AoR encompasses the region overlying the separate-phase (e.g., supercritical, liquid, or gaseous) carbon dioxide plume and the region overlying the pressure front where fluid pressures are sufficient to force fluids into a USDW. While it may often be the case that the AoR will encompass the boundary of the GS project, within which all project activities will occur, the Class VI Rule does not require that the AoR and overall project boundary be equivalent in all cases.

The Class VI Rule requires that "the AoR is delineated using computational modeling that accounts for the physical and chemical properties of all phases of the injected carbon dioxide stream and is based on available site characterization, monitoring, and operational data" [40 CFR 146.84(a)]. As discussed below, GS computational modeling for Class VI injection wells is complex and requires advanced methods. Additionally, the AoR must be reevaluated at a minimum fixed frequency not to exceed five years, or when monitoring and operational conditions warrant [40 CFR 146.84(e)]. The purpose of Class VI well AoR reevaluations is to

ensure that site monitoring data are used to update modeling results, and that the AoR delineation reflects any changes in operational conditions. The general relationship between site characterization, modeling, and monitoring activities at a GS project is shown in Figure 1-1.

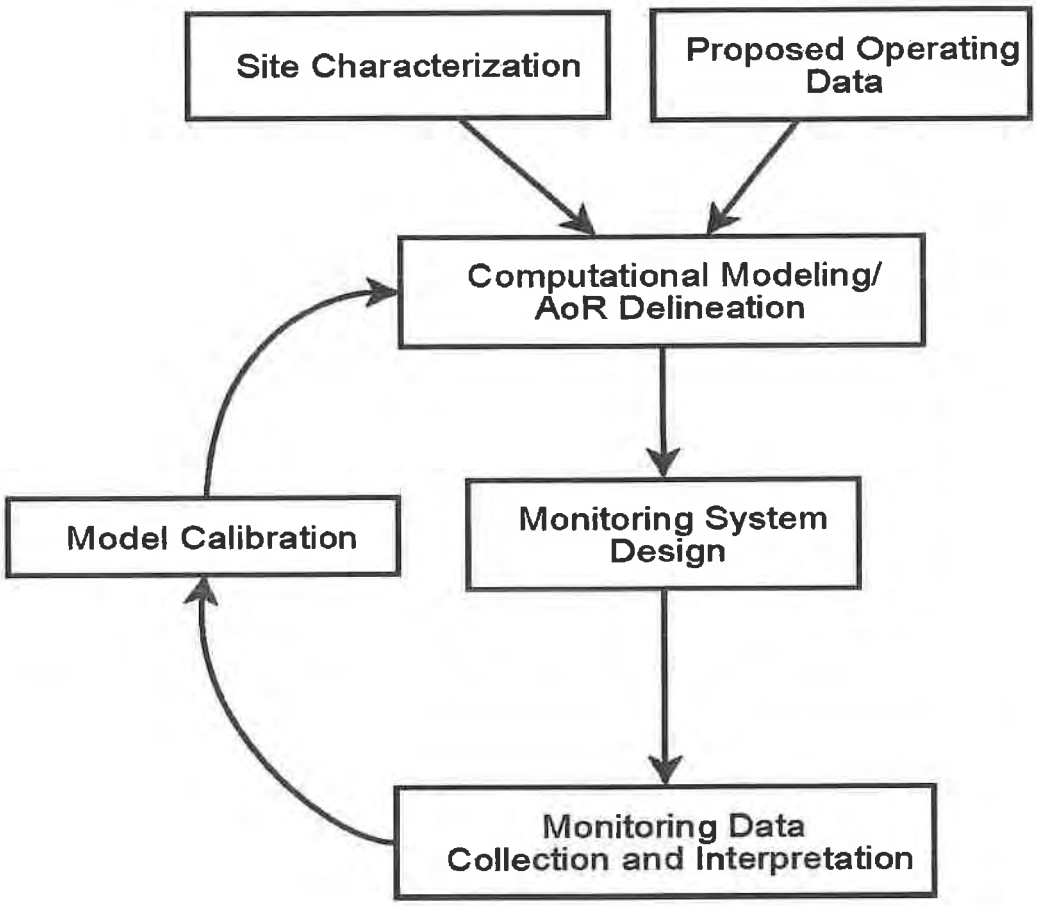



**Figure 1-1: Flow Chart of Monitoring and Modeling at a GS Project.**

An individual Class VI permit must be obtained separately for each injection well, as area permits are not allowed under the Class VI Rule [40 CFR 144.33]. However, EPA anticipates that, in many cases, multiple injection wells will be operated within a single GS project. If approved by the UIC Program Director, AoR delineation and corrective action activities may be performed collectively for all wells included within a single project. All required submittals (e.g., maps of the delineated the AoR and the AoR and Corrective Action Plan) must be submitted separately for each well, however, so that they may be incorporated into each well's Class VI permit. In all cases, EPA recommends that AoR delineation models account for all wells injecting into (including any injection wells associated with other UIC well classes or other Class VI operations) or pumping from the injection zone or any other zones that are hydraulically connected to the injection zone.

The corrective action requirements for Class VI wells are generally similar to those for other injection well classes. However, due to the potentially large AoR of GS projects, EPA has allowed the use of phased corrective action, if approved by the UIC Program Director [40 CFR 146.84(b)(2)(iv)]. If phased corrective action is approved by the UIC Program Director, owners or operators would be allowed to perform corrective action only on the subset of artificial penetrations located within the AoR prior to injection that are located in regions nearest the injection well(s). Corrective action would continue during injection in the remaining regions of the AoR prior to carbon dioxide migration or pressure elevation in that area. EPA encourages owners or operators to perform all necessary corrective action on deficient wells identified during the initial AoR delineation or AoR reevaluations before the end of the injection phase.

As a part of a Class VI permit application, the owner or operator must submit an AoR and Corrective Action Plan that describes the anticipated activities that will be performed to comply with these requirements [40 CFR 146.84(b)]. The AoR and Corrective Action Plan must be approved by the UIC Program Director prior to submittal of the initial AoR delineation and issuance of a permit [40 CFR 146.84(b)]. This plan will facilitate dialogue between the owners or operators and the UIC Program Director to ensure that the UIC Program Director understands and agrees early in the project lifetime with the methods necessary to delineate the AoR and complete all required corrective action. A Class VI AoR and Corrective Action Plan must include the following information [40 CFR 146.84(b)]:

1. The method for delineating the AoR, including the model to be used, assumptions that will be made, and the site characterization data on which the model will be based;
2. The minimum fixed frequency, at least once every five (5) years, that the owner or operator proposes to reevaluate the AoR;
3. The site- and project-specific monitoring and operational conditions that would warrant a reevaluation of the AoR prior to the next routinely scheduled reevaluation;
4. How specific monitoring and operational data (e.g., injection rate and pressure) will be used to inform an AoR reevaluation;

5. How corrective action will be conducted, including what corrective action will be performed prior to injection and what, if any, portions of the AoR will have corrective action addressed on a phased basis and how the phasing will be determined;
6. How corrective action will be adjusted if there are changes in the AoR; and
7. How site access will be guaranteed for future corrective action.

The requirements related to the AoR and Corrective Action Plan are discussed in depth in the *UIC Program Class VI Well Project Plan Development Guidance.*

### 1.2. Organization of this Guidance

This guidance document is organized to generally follow the sequence of AoR delineation and corrective action activities that an owner or operator will perform over the life of a proposed and later permitted Class VI injection project. These activities will generally proceed as described below.

Prior to the issuance of a permit for the construction of a new Class VI well (or the conversion of an existing well):

1. Collection of relevant site characterization and operational data [40 CFR 146.82(a)(3), 146.82(a)(5), 146.82(a)(6), and 146.83];
2. Determination of relevant operational data that will inform the AoR modeling [40 CFR 146.82(a)(7), and 146.82(a)(10)-(11)];
3. Development of an AoR and Corrective Action Plan [40 CFR 146.82(a)(13) and 146.84(b)];
4. Performing AoR modeling and delineation [40 CFR 146.82(a)(2)]; and
5. Identification and assessment of artificial penetrations within the AoR [40 CFR 146.82(a)(4)].

Prior to granting approval for injection:

6. Collection and/or updating of relevant site characterization and operational data that will inform AoR modeling [40 CFR 146.82(c)(2)-(5), 146.82(c)(7), and 146.83];
7. Identification of any needed updates to the AoR and Corrective Action Plan [40 CFR 146.82(c)(9)];
8. Finalizing AoR modeling and delineation [40 CFR 146.82(c)(1)]; and
9. Performing corrective action on those penetrations that may serve as a conduit for fluid movement [40 CFR 146.82(c)(6) and 146.84(d)].

During injection and post-injection site care (PISC):

10. Reevaluation of the AoR periodically, at least once every five (5) years [40 CFR 146.82(c)(9) and 146.84(e)], and updating the AoR and Corrective Action Plan; and

11. If phased corrective action is approved or when additional corrective action is warranted based on AoR reevaluations, performing corrective action [40 CFR 146.82(c)(6) and 146.84(d)].

Activities (1) through (5) must be performed prior to receiving approval to construct a Class VI injection well and activities (6) through (9) must be performed prior to receiving approval to inject carbon dioxide, and their results must be submitted to the UIC Program Director as part of the Class VI injection well permit application [40 CFR 146.82(a)]. The remaining activities will be performed after a permit application has been approved by the UIC Program Director and the Class VI injection well is actively operating.

This guidance document generally focuses on activities (4), (5), (8), (9), (10), and (11), as follows:

- Section 2 provides background on computational modeling of GS activities;
- Section 3 discusses performing computational modeling to delineate the AoR and comply with permit requirements (activities 4 and 8);
- Section 4 focuses on abandoned well identification, assessment, and corrective action on all artificial penetrations within the AoR (activities 5, 9, and 11); and
- Section 5 focuses on reevaluation of the AoR (activity 10).

Site characterization activities (activities 1 and 6) are discussed briefly in this guidance (Section 3.2), and are covered in more detail in the *UIC Program Class VI Well Site Characterization Guidance*. Preparation of the AoR and Corrective Action Plan (activity 3) and identification of any updates (activity 7) are also discussed briefly herein, and in more detail in the *UIC Program Class VI Well Project Plan Development Guidance*.

# 2. Computational Modeling for Geologic Sequestration

This section discusses the fundamentals of computational modeling for GS to provide the necessary background for owners or operators, and to assist in understanding and complying with the Class VI Rule. While computational modeling for GS may entail a vast amount of complex information, the purpose of this section is to provide a brief introduction to the modeling techniques and fundamentals that may be necessary or significant for satisfying the specific rule requirements. Following an introduction that explains the use of modeling in the context of meeting the requirements of the Class VI Rule:

- Section 2.1 discusses the processes that can be modeled;
- Section 2.2 presents a discussion of the parameters that are included in AoR models;
- Section 2.3 presents available computational approaches, including numerical, analytical, semi-analytical, and hybrid approaches;
- Section 2.4 discusses model uncertainty and sensitivity analyses;
- Section 2.5 discusses model calibration; and
- Section 2.6 provides an overview of existing codes used for development of GS models.

The AoR for a Class VI injection project must be delineated using a computational model that accounts for the physical and chemical properties of all phases of the injected carbon dioxide [40 CFR 146.84(a)]. A computational model is based on available data, and it is a mathematical representation of the GS project and relevant features, including injection wells, site geology, and fluids present. As described below, a site-specific computational *model* is designed by incorporating the GS site and operational characteristics into a computational *code*, which is a computer program that has been designed to simulate multiphase flow and other pertinent processes in geologic media based on scientific principles and accepted mathematical (i.e., governing) equations.

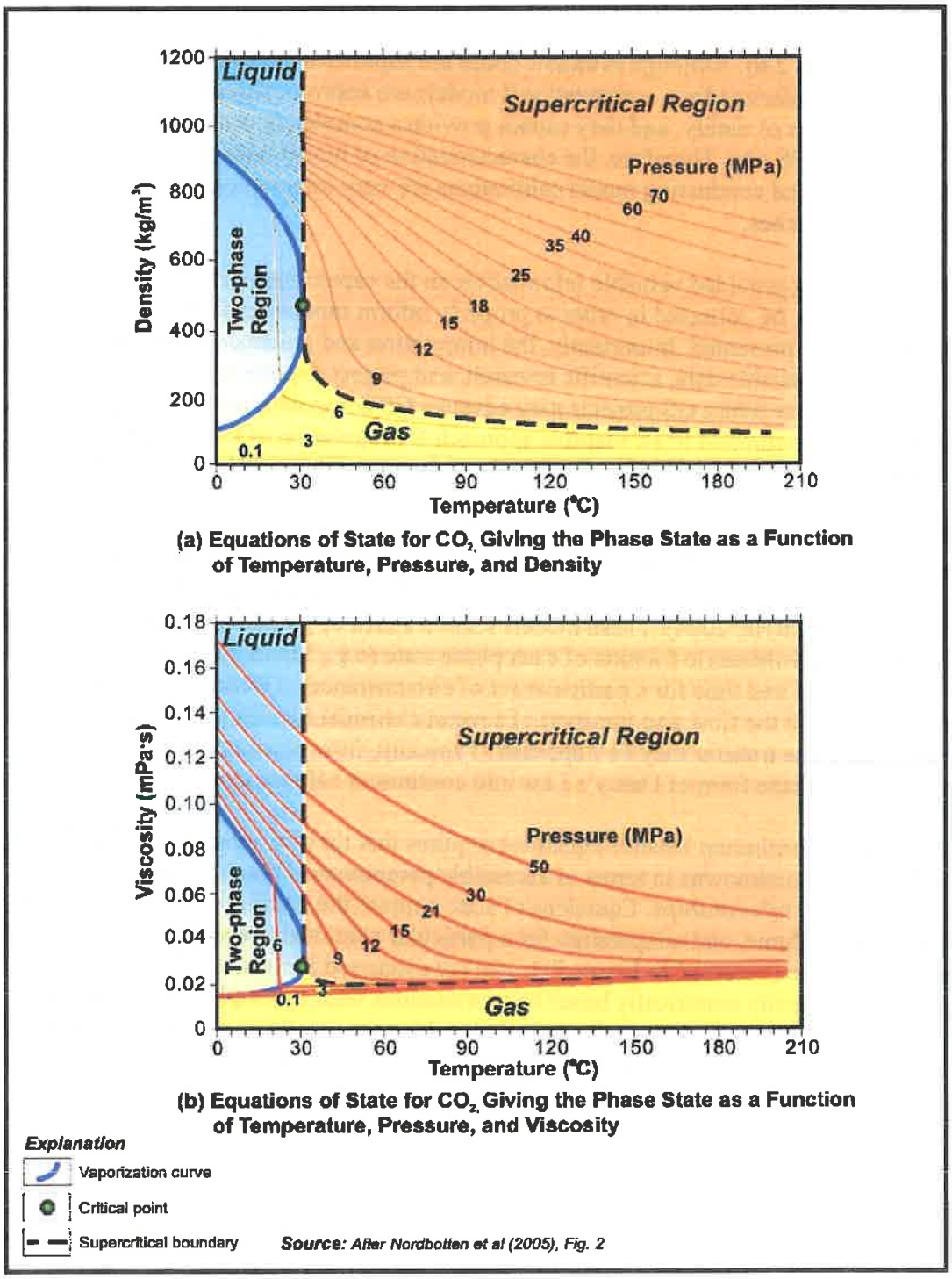
Computational codes that may be used for modeling of GS are necessarily more technically complex than commonly used ground water flow codes because GS modeling considers multiphase (e.g., gas, liquid, supercritical fluid) flow of several fluids (i.e., ground water, carbon dioxide, hydrocarbons), phase changes of carbon dioxide, heat flow, and significant pressure changes. Furthermore, in some cases models consider reactive transport (e.g., chemical reactions between constituents) and geomechanical processes (e.g., induced fault activation). As discussed below, the Class VI Rule requires that the AoR be delineated using models that include multiphase flow [40 CFR 146.84(a)], but not necessarily reactive transport or geomechanical processes. However, inclusion of these processes in the AoR delineation model may be important in some cases and may be required by the UIC Program Director.

Several codes are available that are capable for use in development of adequate models for delineation of the AoR at a GS site and for complying with Class VI injection well permit requirements (Section 2.6). Although available codes are sophisticated and based on the best-available scientific understanding, computational models are approximations and are never perfect representations of reality, and they cannot provide a completely accurate prediction of fluid movement at a GS site. Therefore, the characterization of model uncertainty, using sensitivity analyses, and conducting model calibrations are very important parts of many computational approaches.

Research studies have provided valuable information on the capabilities of available models, what information may be collected in order to properly inform model development, and how the model results may be presented. Importantly, the information and guidance provided here is based on currently available data, scientific research, and project experience. EPA recognizes that data collected from future GS projects may advance GS computational modeling and AoR delineation. EPA is committed to an adaptive approach for regulation of GS projects and may revisit aspects of Class VI federal regulations, and guidance, as new data becomes available.

There is a long history of simulating multiphase flow and transport in porous media using computational models. Comprehensive reviews of multiphase flow in porous media and modeling are provided elsewhere (e.g., Pinder and Gray, 2008; Miller et al., 1998; Gerritsen and Durlofsky, 2005; Finsterle, 2004). These models solve a series of governing equations to predict the composition and volumetric fraction of each phase state (e.g., liquid, gas, supercritical fluid) as a function of space and time for a particular set of circumstances. Governing equations are formulated to describe the flow and transport of several chemical species in several phases, in which interphase mass transfer may be important. Typically, flow equations are derived by substituting a multiphase form of Darcy's Law into continuum balance expressions.

The solution of the continuum balance equations requires that they be supplemented with closure relations that express unknowns in terms of accessible parameters. These include equations of state and constitutive relationships. Equations of state express the equilibrium phase relationship between pressure, volume, and temperature for a particular chemical. Accepted equations of state for carbon dioxide are presented in Figure 2-1, and are discussed in Section 2.2.4. Constitutive relationships are typically empirically based approximations used to simplify the system and estimate unknowns. Examples of constitutive relationships are saturation-relative permeability relationships, interphase mass transfer relations, and solution reaction relations.




(a) Equations of State for $CO_2$ Giving the Phase State as a Function of Temperature, Pressure, and Density

(b) Equations of State for $CO_2$ Giving the Phase State as a Function of Temperature, Pressure, and Viscosity

**Figure 2-1: Equations of State for Carbon Dioxide.**

## 2.1. Modeled Processes

Computational codes used for GS vary in complexity and may include routines for multiphase flow, reactive transport, and geomechanical processes. Traditionally, codes have been developed as separate entities to simulate these processes. Present-day simulators typically address and couple multiphase flow with geomechanical processes or geochemical processes. However, depending on site-specific characteristics, where the geochemical and geomechanical processes are significant, robust simulation of GS may require interactive coupling of all three processes. The Class VI Rule only requires that multiphase flow be included in computational modeling. However, the owner or operator, or the UIC Program Director, may determine that reactive transport and/or geomechanical modeling should also be included for a particular proposed project. For example, reactive transport could be relevant if permeability and/or porosity are predicted, based on previous testing, to change as a result of precipitation/dissolution reactions. Geomechanical processes could be relevant if previous testing has indicated that pressure and stress changes hydrogeologic properties and/or affects confining unit integrity.

Codes used to simulate multiphase flow generally incorporate some or all of the following processes: phase transition behavior of carbon dioxide (gas, liquid, supercritical fluid) and associated buoyancy; dissolution of carbon dioxide in brine and oil and associated increased density; dissolution of water in carbon dioxide; variable viscosity and density of brine and carbon dioxide phases; thermal effects such as cooling or freezing due to carbon dioxide expansion from supercritical and liquid phases; and reduced fluid permeability due to the presence of several immiscible fluids within a pore space.

Codes used to simulate reactive transport generally incorporate rate-limited intra-aqueous reactions, mineral dissolution and precipitation, changes in porosity and permeability due to these reactions, and multi-component gas mixtures. Reactive transport models can be used to determine the impact of carbon dioxide and its co-injectates (e.g., hydrogen sulfide, sulfur dioxide) on aquifer acidification, the concomitant mobilization of metals, and any mineral trapping of carbon dioxide (e.g., precipitation of carbonate minerals). Reactive transport models can also be used to assess corrosion of well construction materials as influenced by carbon dioxide.

The length scales associated with interfacial geochemistry are very small (e.g., micrometers to millimeters) compared to multiphase flow simulation (meters to kilometers). Small grid spacing around these regions may imply associated small time steps, so that the overall problem becomes computationally demanding when trying to couple these reactions to multiphase flow. Data related to geochemical rate parameters are generally lacking (e.g., Knauss et al., 2005; Xu et al., 2006), and have to be estimated for a wide range of possible environmental conditions and mineralogical interfaces. Several common codes that may be used for AoR delineation, such as ECLIPSE, normally do not include routines for reactive transport.

Geomechanical codes can be used to evaluate the effect of reservoir pressurization and buoyancy on the integrity of geologic confining units, reactivation of existing fractures and faults, and rock properties such as porosity and permeability. The amount and spatial distribution of pressure

buildup in a geologic formation will depend on the rate of injection, the permeability and thickness of the injection formation, the mechanistic properties of the rock matrix, the permeability of the confining units, and the presence or absence of permeability barriers, and boundary conditions of the system. Models used to simulate geomechanical processes generally incorporate effective stress/strain relationships, aperture stiffness and associated closing and widening, and variation in porosity and permeability. Geomechanical modeling may require simulation on both a large and small scale (individual fractures), which can be computationally challenging (i.e., require long model processing times on the order of days). When individual fractures are considered, the spatial grid resolution may need to be on the order of meters or less. Therefore, smaller-domain models may be necessary to investigate migration through individual fractures. Generally, simulation of flow through a fractured reservoir requires codes that have been designed for this purpose.

### 2.2. Model Parameters

A parameter is a variable in the governing equations of the model that may be of uniform value throughout the domain, or may vary in space and time. While maintaining salient features of the hydrogeologic system, some system aspects are often lumped together in simulation models and described by effective parameters that are estimated or averaged from several data sources. Relevant parameters for multiphase flow modeling of GS are summarized in Table 2-1, and include hydrogeologic characteristics, fluid properties, chemical properties, fluid injection and withdrawal rates, initial and boundary conditions, system orientation (e.g., model domain, grid cell size), and simulation control parameters. Initial conditions describe parameter values at the start of the model run. Boundary condition parameters describe conditions of the system (e.g., fluid flow rates and/or pressures) at the edges of the model domain and at the location of injection and/or extraction wells. While fluid injection and/or withdrawal rates and simulation control parameters are project specific, other particularly important site- and project-specific parameters for GS include formation intrinsic permeability, porosity, relative permeability, compressibility, fluid viscosity, and fluid density. These parameters are discussed in the following subsections.

Parameter values are to be based on site data to the extent possible. However, as discussed below, in cases where detailed site geologic characterization data are unavailable (i.e., if formation testing is not complete or core samples are not available), parameter values may be estimated from standard values or relationships in the scientific literature. Model calibration, which may occur during AoR reevaluation, consists of adjusting a subset of the estimated parameter values to minimize the difference between model simulations and observed monitoring data. Model parameters may also be adjusted based on newly acquired site characterization data. For example, data gathered during well logging may inform updates to parameter values. See the *UIC Program Class VI Well Site Characterization Guidance* for more information.

**Table 2-1: Model Parameters for Multiphase Fluid Modeling of Geologic Sequestration.**

| Parameter | Description | Estimation Methods | Dimensions |
|---|---|---|---|
| Hydrogeologic Properties | | | |
| Intrinsic Permeability | Represents properties of the subsurface that impact the rate of fluid flow. | See the *UIC Program Class VI Well Site Characterization Guidance*, and Section 2.2.1 of this guidance | $L^2$ |
| Porosity | The relative volume of void space within a formation. Controls the volume of carbon dioxide that may be stored. | See the *UIC Program Class VI Well Site Characterization Guidance* | Dimensionless |
| Capillary Pressure | The pressure difference across the interface of two immiscible fluids (e.g., carbon dioxide and water) | Calculated based on fluid saturations (see Section 2.2.2 of this guidance) | $M/LT^2$ |
| Relative Permeability | Factor that determines the decrease in permeability for a fluid due to the presence of other immiscible fluids | Calculated based on fluid saturations (see Section 2.2.2 of this guidance) | Dimensionless |
| Fluid Pressure | Force acting on a unit area, measure of the potential energy per volume of fluid | See the *UIC Program Class VI Well Site Characterization Guidance* | $M/LT^2$ |
| Temperature | Measure of the internal energy of a fluid | See the *UIC Program Class VI Well Site Characterization Guidance* | Temperature |
| Formation Compressibility | Measure of change in aquifer volume with a change in fluid pressure | See the *UIC Program Class VI Well Site Characterization Guidance* | $LT^2/M$ |
| Water Saturation | The percent of system void space occupied by aqueous fluids | See the *UIC Program Class VI Well Site Characterization Guidance* | Dimensionless |
| Carbon Dioxide Saturation | The percent of system void space occupied by carbon dioxide | Calculated by the computational model | Dimensionless |
| Storativity | The volume of fluid released from storage per unit decline in head per unit area of the formation | See Standard References, e.g., Fetter, 2001 | Dimensionless |
| Fluid Properties | | | |
| Viscosity | Measure of the internal resistance to flow | Calculated based on equations of state, also influenced by fluid composition (see Section 2.2.4 of this guidance) | M/LT |

| Parameter | Description | Estimation Methods | Dimensions |
|---|---|---|---|
| Density | The mass of a fluid per unit volume | Calculated based on equations of state, also influenced by fluid composition (see Section 2.2.4 of this guidance) | $M/L^3$ |
| Composition | Molecular makeup, by volume or mass, of a fluid. Measurement of salinity, concentration of trace compounds | See the *UIC Program Class VI Well Site Characterization Guidance* | $M/L^3$ |
| Fluid Compressibility | The change in volume of a fluid from a unit change in pressure | See Standard References, e.g., Perry and Green, 1984 | $LT^2/M$ |
| Chemical Properties | | | |
| Aqueous Diffusion Coefficient | The rate of chemical transport due to a concentration gradient | See Standard References, e.g., Tamimi et al., 1994 | $L^2/T$ |
| Aqueous Solubility | The maximum concentration of a chemical (e.g., carbon dioxide) dissolved in the aqueous phase | Salinity, temperature and pressure dependent (see Spycher et al., 2003; Spycher and Pruess, 2005) | $M/L^3$ |
| Solubility in Carbon Dioxide | The maximum concentration of a chemical (e.g., water) dissolved in separate-phase carbon dioxide. | Temperature and pressure dependent (see Spycher et al., 2003; Spycher and Pruess, 2005) | $M/L^3$ |
| Fluid injection and withdrawal rates | | | |
| Injection Rates | Injection rates at each well | Planned site operational data | $L^3/T$ |
| Withdrawal Rates | Any fluid withdrawal rates within model domain | Measure rates for wells conducting pumping within the AoR | $L^3/T$ |
| Boundary Conditions | Fluid pressures and/or flow rates at the edges of the model domain | Tested in conjunction with model extent, to ensure no artificial influence on model results | Varies |
| Fluid injection and withdrawal rates (Continued) | | | |
| Initial Conditions | Fluid pressures and/or flow rates within the domain at the beginning of the model run | Based on pre-injection site characterization data, see the *UIC Program Class VI Well Site Characterization Guidance* | Varies |

| Parameter | Description | Estimation Methods | Dimensions |
|---|---|---|---|
| System Orientation and Simulation Controls | | | |
| Model Extent (domain) | The lateral extent of the model in all directions | Tested in conjunction with boundary conditions, to ensure no artificial influence on model results | L |
| Number of Model Layers | Model vertical discretization | Based on conceptual site model of site stratigraphy, see the *UIC Program Class VI Well Site Characterization Guidance* | Dimensionless |
| Layer Thickness | Vertical extent of each model layer | See the *UIC Program Class VI Well Site Characterization Guidance* | L |
| Grid Cell Size | Lateral size of each model cell | May vary throughout domain, as dictated by conceptual model and computational necessities | $L^2$ |
| Model Timeframe | The complete duration of the model run | Tested to ensure long enough to allow for pressure decline to pre-injection conditions | T |
| Time Step Size | The duration of each temporal interval during the model timeframe | Often controlled by code, tested to ensure small enough to not artificially influence results | T |

L = Length; M = Mass; T = Time

### 2.2.1. Intrinsic Permeability

Intrinsic permeability is a property of the solid phase (i.e., porous medium) in the subsurface that impacts the rate of fluid flow. Larger intrinsic permeability values correspond to greater fluid flow rates. Intrinsic permeability has units of length squared and is often reported in the units of millidarcies (mD); one mD is equal to $9.9 \cdot 10^{-16}$ square meters ($m^2$). Typical permeability values for an injection zone at a GS project range from 1 to $10^2$ mD (e.g., Sorensen et al., 2005; Fischer et al., 2005; MGSC, undated; ISGS, 2009). Typical permeability values for a confining unit (e.g., shale) range from $10^{-7}$ to $10^{-4}$ mD (e.g., Soeder, 1988).

Intrinsic permeability incorporates the effects of formation porosity, pore structure, such as pore-size distribution and connectivity, and the presence of fractures or faults. The spatially heterogeneous nature of subsurface materials results in a heterogeneous intrinsic permeability distribution in most formations. Additionally, intrinsic permeability is an anisotropic parameter, in that lateral intrinsic permeability is often significantly larger than vertical intrinsic permeability due to depositional layering. Anisotropy in intrinsic permeability, both vertical and horizontal, may also be an effective property of fractured rock media. Intrinsic permeability is typically estimated from a combination of hydrogeologic field tests (e.g., aquifer tests, pressure

fall-off tests), laboratory core analysis, and geophysical well logging. The *UIC Program Class VI Well Site Characterization Guidance* provides details regarding estimation of formation intrinsic permeability. Intrinsic permeability values are often adjusted during model calibration. See Box 2-1 for more information.

During the development of the computational model, the model developer determines how to estimate values of intrinsic permeability within the entire model domain based on results of site characterization activities at discrete locations. For modeling purposes, the simplest description of intrinsic permeability is a homogenous distribution, which incorporates a single value for the entire subsurface domain based on an average of available data. A model that assumes a homogeneous permeability distribution, however, will not account for heterogeneity (if it exists) that causes preferential flow paths or confining strata, or for the depth dependence of permeability in an updipping formation. Another option is to incorporate a layered distribution, which incorporates a single permeability value for each geologic stratum in the domain, and can be constructed by using geologic maps and cross-sections of the proposed project site.

Alternatively, geostatistical and stochastic methods are available to create a statistical ensemble of possible permeability distributions that incorporate both lateral and vertical heterogeneity based on available site characterization data. Spatial variability of permeability is thus described by a relatively small number of geostatistical parameters. Considering the large areas that are anticipated to be modeled for AoR delineations of proposed Class VI injection well project sites, techniques are among the best methods for incorporating realistic heterogeneity distributions into the computational model with limited data (see inset, Box 3-1).

Compared to homogeneous or layered permeability distributions, depending on the available data, intrinsic permeability fields developed with geostatistical techniques may provide a more realistic representation of conditions within the formation, and resulting models may better represent carbon dioxide migration through high-permeability channels. Commercial software packages are available for use in the development of heterogeneous intrinsic permeability distributions based on available site data (e.g., T-PROGS; Carle, 1999). See Doughty and Pruess (2004), Juanes et al. (2006), Obi and Blunt (2006), and Flett et al. (2007) for examples of the development of heterogeneous profiles based on geostatistical techniques. For more information regarding the use of geostatistical methods, see the *UIC Program Class VI Site Characterization Guidance*.

Several previous studies have evaluated the impact of permeability values on computational modeling results, through the use of parameter sensitivity analyses. Law and Bachu (1996) and Lindeburg (1997) demonstrated that for a homogeneous system, carbon dioxide mobility increases with increased formation permeability. Comparing homogeneous formations and those with layered heterogeneities, Lindeberg (1997) showed that the presence of thin shale layers increases sweep and thus carbon dioxide dissolution. For systems that are heterogeneous in three dimensions, Flett et al. (2007) illustrated that increased heterogeneity resulted in increased lateral migration and therefore dissolution. However, increasing heterogeneity also decreased the rate of residual phase trapping by delaying water imbibition into previously carbon dioxide-filled pore space. Overall, increased heterogeneity resulted in slower carbon dioxide migration and

decreased accumulation at the confining layer compared to a homogeneous case. Pruess (2008) showed that for discharge through a fault, decreased fault permeability resulted in delayed leakage to the surface and an increased maximum leakage rate.

Simulations by Zhou et al. (2008) indicate that patterns of formation pressure increase induced by carbon dioxide injection are sensitive to permeability. Larger formation permeability values resulted in less localized pressure increase surrounding the injection well. In addition, larger confining layer permeability resulted in less pressure buildup throughout the formation due to pressure dissipation and associated brine leakage.

### 2.2.2. Relative Permeability and Capillary Pressure

When immiscible fluids (e.g., carbon dioxide, water) are present within the pore spaces of a geologic formation, the ability for flow of one of those fluids is reduced, due to the blocking effect of the presence of the other fluid. Note that under any reservoir conditions, ground water and carbon dioxide will be immiscible, and ground water and hydrocarbons will be immiscible. Carbon dioxide and hydrocarbons, however, may be miscible or immiscible based on reservoir conditions. The relative permeability is a scaling factor that represents the reduction in the capacity for fluid flow due to the presence of other phases in porous media, with a value between 0 and 1. This value is multiplied by the intrinsic permeability of a geologic formation in order to compute the effective permeability for a fluid in a particular pore space. The relative permeability of a fluid is based on the properties and amounts of all fluids present within the system. The greater the amount of pore space occupied by a particular fluid or phase (measured as fluid saturation), the greater the relative permeability will be for that fluid. Because fluid saturations change over time and location, relative permeability values typically vary during model simulations.

The relative permeability for each fluid is typically calculated as a function of fluid saturations at each location and time within a model. This is achieved via a relative permeability-saturation function. The relative permeability-saturation function shape is based on properties of the porous media and fluids present at a particular site. Residual fluid saturation also impacts the shape of the relative permeability function, and describes the minimum fluid saturation within the porous medium following immiscible fluid displacement. An example relative permeability-saturation function is given in Figure 2-2. Note that this example function has been developed for a specific site (Doughty, 2007) and may not be applicable to other GS sites. Capillary pressure-saturation relationships (also known as characteristic curves) are also of importance because capillary pressure gradients provide a driving force for fluid movement under unsaturated conditions.

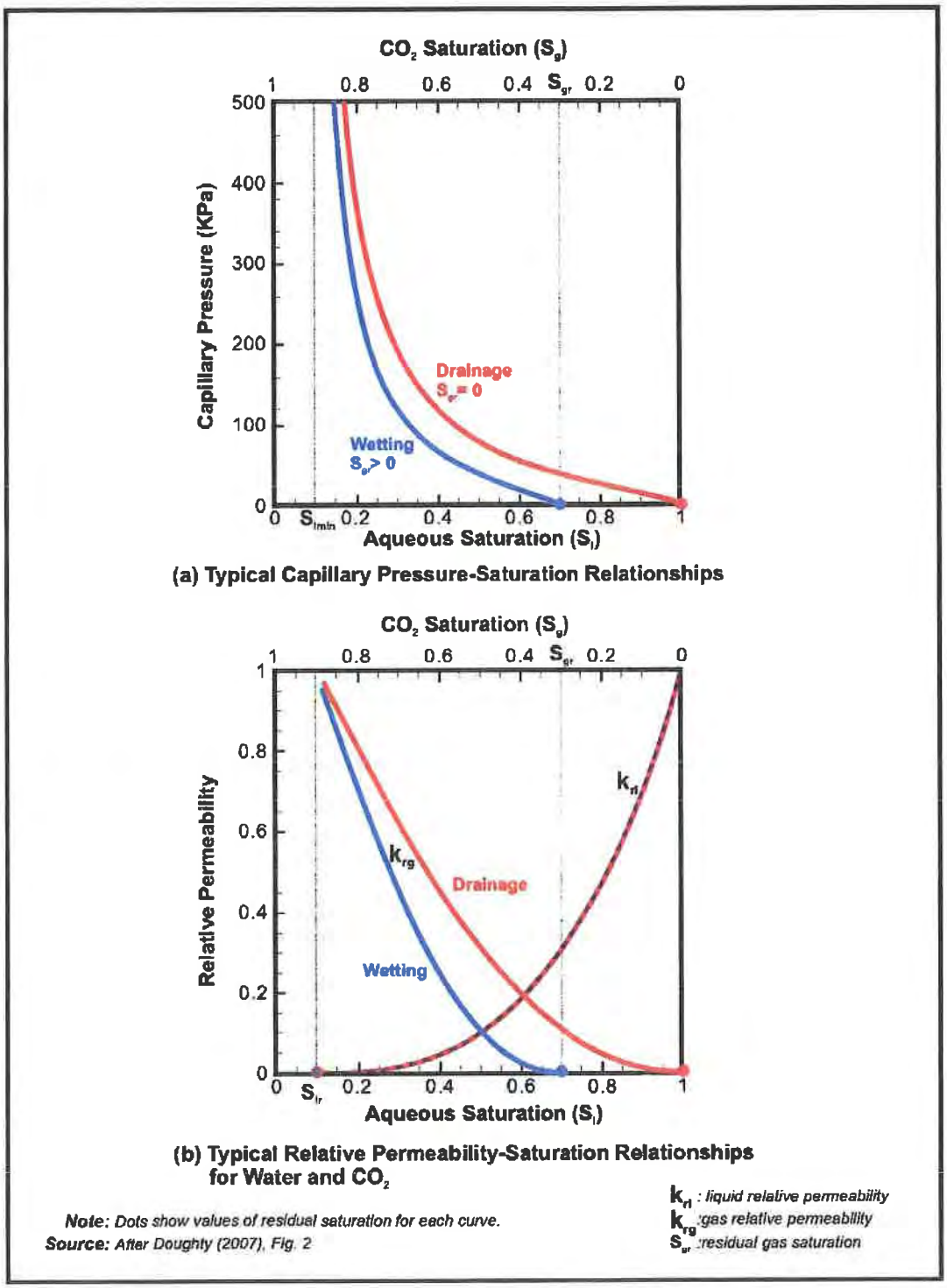



**Figure 2-2: Example Relative Permeability-Saturation and Capillary Pressure-Saturation Relationships for Water and Carbon Dioxide.**
Reproduced with permission of Springer Science + Business Media.

Previous research has shown that model predictions are very sensitive to the shape of the relative permeability-saturation functions used. The *UIC Program Class VI Well Site Characterization Guidance* provides details regarding measurement of relative permeability. Ideally, laboratory core-analysis techniques will be used for experimental measurement of the relative permeability-saturation and capillary pressure-saturation functions for a particular site at reservoir conditions, with carbon dioxide and representative native fluids (e.g., Perrin et al., 2008; Bachu and Bennion, 2008; Plug and Bruining, 2007). If this is not feasible, relative permeability-saturation relationships may be estimated from core analysis using other immiscible fluids (e.g., Doughty et al., 2007). Alternatively, previously reported functions may be used, such as those presented in Figure 2-2, if the experimental system was very similar to the site conditions for which the model will be applied. Relative permeability-saturation relationships are also commonly adjusted during model calibration.

Doughty and Pruess (2004) compared site-specific characteristic curves to "generic" curves at the Frio, TX GS pilot project site and found that the choice of characteristic curves had a significant impact on plume size, shape, and mobility. The authors point out that the differences in plume behavior for different sets of characteristic curves had important implications for operation and monitoring of the pilot test. Similarly, Doughty et al. (2007) found that model results were very sensitive to characteristic curve parameters. The authors constrained the value of characteristic curve parameters by calibration to monitoring data.

Pruess (2008) compared the effect of using three-phase characteristic curves developed for organic liquid-water-air systems (Stone, 1970) and simple linear characteristic curves. The choice of characteristic curves was found to have a significant impact on the observed leakage rate of carbon dioxide through a fault system. The linear characteristic curves resulted in simulated earlier leakage of carbon dioxide to the surface and lower leakage rates. Use of three-phase relationships resulted in small fluid permeability at intermediate saturations due to phase-interference effects.

The impact of using hysteretic versus non-hysteretic characteristic curves has also been compared. Hysteresis refers to the dependence of the shape of the characteristic curve on the history of fluid flow within the formation. For example, characteristic curves are often observed to have a different shape when non-wetting fluids (e.g., supercritical carbon dioxide) are displacing wetting fluids (e.g., formation water), than when wetting fluids are displacing non-wetting fluids. Juanes et al. (2006) showed that consideration of hysteresis and capillary trapping resulted in the carbon dioxide being spatially distributed over a larger area with less accumulation at the confining layer. Doughty (2007) found that results from simulations with non-hysteretic curves did a poor job of matching simulations with hysteretic curves in homogeneous and heterogeneous media. Relative to non-hysteretic cases, simulations including hysteresis exhibited a more mobile plume leading edge (where there is no water imbibition) and a slower trailing edge with a significant amount of residual trapping (due to water imbibition).

### 2.2.3. Injection Rate

The carbon dioxide injection rate at proposed Class VI injection wells is incorporated into the model by assigning the injection rate parameter at a constant or variable-rate boundary condition, or by defining various source terms for specific nodes that correspond to injection location. However, it is important to note that calculated pressure values where injection rates are applied may need to be monitored to identify flow-controlled or pressure-limited cases. Several researchers have reported that increasing the carbon dioxide injection rate results in increased migration rates (e.g., Law and Bachu, 1996; Saripalli and McGrail, 2002; Juanes et al., 2006). Juanes et al. (2006) considered capillary trapping in highly heterogeneous media, and found that increased injection rate resulted in more simulated residual trapping due to invasion of carbon dioxide into a wider range of pore sizes. Therefore, in the long term, increased injection rates actually decreased the final simulated extent of carbon dioxide migration, as more mass was immobilized through capillary forces. Pruess (2008) modeled leakage to the ground surface through a fault system, and simulations indicated that larger injection rates resulted in increased maximum surface discharge rates relative to injection rates.

### 2.2.4. Fluid Properties and Equations of State

The density, viscosity, and phase-state of the carbon dioxide injectate, ground water, and any other fluids that may be present (e.g., hydrocarbons), are important model input parameters. However, these properties change significantly across the temperature and pressure range that will be encountered at GS projects, and they are also affected by salinity. The equations of state describe these fluid properties and the existence of phases as a function of pressure and temperature; they are used by the model to calculate properties at conditions encountered in the simulation as they change with location and time. Graphs developed from accepted equations of state for carbon dioxide are depicted in Figure 2-1. Previous studies have shown that model results are sensitive to the equations of state used (Pruess et al., 2004; Han and McPherson, 2008).

The composition of the injectate will be reflected in several chemical and physical parameters assigned to the carbon dioxide fluid in the model simulations. Several studies have evaluated the impact of common carbon dioxide stream impurities hydrogen sulfide and sulfur dioxide on geochemical reactions and mineral trapping. Both Knauss et al. (2005) and Xu et al. (2007) showed that the addition of hydrogen sulfide had little impact, whereas the addition of sulfur dioxide resulted in a lower pH in the injection zone, less carbon-bearing mineral precipitation, and more formation-mineral dissolution.

### 2.2.5. Mass-Transfer Coefficients

Mass transfer coefficients describe the equilibrium concentration of chemical constituents (e.g., water, carbon dioxide) between separate phases. For example, the equilibrium aqueous concentration of carbon dioxide dissolved in ground water in contact with separate-phase (e.g., supercritical) carbon dioxide is described by a partitioning coefficient. Other mass-transfer

coefficients describe the distribution of constituents between the gaseous, aqueous, separate-phase carbon dioxide, and solid phases. For the case of reactive transport modeling, mass-transfer coefficients describe equilibrium concentration of constituents between mineral and dissolved phases. Similar to fluid properties, mass-transfer coefficients are in many cases temperature and pressure dependent. Mass-transfer coefficients may also be dependent on properties of the formation and fluids present, such as ground water salinity. Reference documents are available that provide many necessary mass-transfer coefficients (e.g., Green and Perry, 2008), and several commonly used codes include necessary mass-transfer coefficients (e.g., TOUGH2-ECO2N; Pruess and Spycher, 2007).

### 2.2.6. Mineral Precipitation Kinetic Parameters

Mineral precipitation is a subset of reactive transport problems and represents a trapping mechanism for carbon dioxide as well as a mechanism for permeability modification. As noted above, the Class VI Rule does not stipulate that reactive transport be considered in AoR delineation modeling. However, the owner or operator, or the UIC Program Director, may determine that reactive transport modeling should be considered for a particular project.

Studies accounting for mineral precipitation typically include precipitation kinetic (i.e., rate) parameters. Although precipitation rates have a large impact on mineral trapping, there is a great deal of uncertainty related to these parameters (Knauss et al., 2005; Xu et al., 2006). Furthermore, complex interrelationships exist between the rates of separate mineral species in a formation. For example, a sensitivity analysis for trapping through dawsonite [$NaAl(CO_3)(OH)_2$] precipitation showed that decreasing dawsonite kinetics resulted in increased formation of other trapping minerals calcite [$CaCO_3$] and magnesite [$MgCO_3$] (Knauss et al., 2005). Izgec et al. (2008) showed that changes in formation permeability resulting from mineralization reactions were very sensitive to kinetic rate parameters. Several modeling studies have indicated that geochemical equilibrium following injection may not occur for thousands of years (e.g., Xu et al., 2006; Gaus et al., 2005).

### 2.2.7. Model Orientation and Gridding Parameters

Numerical modeling requires the developer to define the spatial and temporal domains, grid spacing and gridding routine, and domain boundaries. These features of the model are typically designed with an effort to minimize computational demand and therefore processing time. However, there is potential for erroneous results based on grid features of the model (i.e., numerical artifacts), which can mask or enhance the effects of physical processes. A few studies have focused on evaluating the impacts of numerical artifacts for models of GS.

Doughty and Pruess (2004) tested the impact of varying grid cell sizes for a model of the Frio formation pilot GS project site in Texas. They found that the overall pattern of plume movement was similar for different grid sizes, but overly coarse grids were not able to simulate buoyancy-driven flow within individual sand channels. The authors also observed that the choice of grid block sizes and gridding routine could result in preferential flow in the grid axis direction and

numerical dispersion. Similarly, Juanes et al. (2006) observed that overly coarse grid block sizes that did not capture specific migration pathways overestimated carbon dioxide movement and the amount of capillary trapping. Doughty et al. (2007) note that higher-resolution models are needed for understanding of near well-bore effects. Yamamoto and Doughty (2009) demonstrate that grid refinement may have a substantial effect on overall simulated plume extent. Methods have been developed to establish numerical grids with high resolution in areas of interest (e.g., near well bores and fractures), and lower resolution in other areas, such as near the model area boundaries.

## 2.3. Computational Approaches

Computational codes consist of the set of interrelated mathematical equations (i.e., governing equations, constitutive relationships, and equations of state) that are solved simultaneously in order to predict fluid movement, pressure changes, and other changes, as a function of both location and time. These equations include complex partial differential equations that cannot be easily solved, and require complex estimation techniques. In most cases, numerical approximation methods, discussed below, will be needed to adequately represent the several physical processes necessary to delineate the AoR and comply with the Class VI Rule.

In certain circumstances, simpler analytic and semi-analytic approaches may be used to complement numerical efforts in delineating the AoR. As discussed below, analytic and semi-analytic approaches are not capable of representing several processes and features that are important for predictions of fluid movement, and they often assume simple geometry and homogeneity.

### 2.3.1. Numerical Approaches

Computational models used for practical applications typically consist of a numerical formulation of the governing equations applied over a spatially discretized model domain that defines the spatial extent and resolution of the problem (i.e., the model grid). This formulation is solved by a numerical method, such as finite element or finite difference approximation. The model grid is partitioned into grid cells, smaller spatial sub-units within the model. Fluid and heat flow is then solved between adjoining grid cells, while maintaining a mass and energy balance within the model. Phase changes, mass transfer, and chemical reactions can also be calculated for phases and constituents within a cell. Each cell can be assigned unique parameter values for physical properties (i.e., intrinsic permeability, porosity), allowing for three-dimensional, detailed representations of physical heterogeneity. Numerical models may be used for steady-state problems (in which injection and withdrawal rates are constant and the solution is obtained only for infinite time when system variables become constant and the solution becomes independent of the initial condition) and transient problems (in which injection and withdrawal rates may vary in time, and the solution is obtained at several discrete times during the model timeframe while the system variables exhibit change in time and depend upon the initial condition).

In addition to detailed geologic heterogeneity, numerical models are typically capable of representing density-driven fluid flow (e.g., the buoyancy of carbon dioxide) and the dissolution of carbon dioxide into ground water. Numerical models can also represent irreducible (i.e., residual) fluid saturations (i.e., the amount of fluid being "trapped" in geologic formation pore space even after another immiscible fluid has passed through that area), multiphase flow effects, and the concomitant reduced permeability.

The scale of spatial and temporal discretization of the model affects the accuracy of the solutions to these numerical formulations. Finer scales of time and space reduce numerical solution error. However, computational demand increases as the length scale (e.g., grid cell size) and time scale (e.g., time-step size) decrease, and as additional processes are simulated. Methods have been developed to mitigate increases in computational demand, while focusing on regions and times of interest, such as adaptive grid block size (i.e., mesh) refinement. Another possibility is the use of parallel computing, in which a single problem is broken up and distributed among many processors (e.g., Zhang et al., 2007).

### 2.3.2. Analytical, Semi-Analytical, and Hybrid Approaches

Analytical and semi-analytical models may be used to complement numerical modeling efforts in AoR delineation for Class VI wells. Compared to numerical models, analytical models have much lower computational requirements and therefore lower processing times. Analytical and semi-analytical codes may also be particularly useful for assessing the transport of carbon dioxide through abandoned well bores, which is difficult in numerical models due to the disparity in spatial scales. Analytical and semi-analytical models also may be used as screening tools to quickly assess potential storage sites, or as a relatively simple comparative check on numerical modeling results. Celia and Nordbotten (2009) suggest the use of hybrid numerical-analytical models for cases where a large-scale numerical model could be combined with local analytical models (e.g., describing wells), or the use of semi-analytical solutions where analytical solution is used in the spatial dimension and finite-stepping is used for temporal changes.

However, strictly analytical and semi-analytical models are not able to explicitly account for detailed physical and chemical characteristics of carbon dioxide injected as required under the Class VI Rule. They are also not able to simulate other important processes, such as capillary trapping, or account for varying injection rates or formation heterogeneity. The applicability of these models is limited to simplified cases where an exact function can be found to satisfy the governing equation and boundary and initial conditions. For example, in most cases, these models assume homogenous aquifers (i.e., no variability in physical structure, porosity, or intrinsic permeability). For most formations this is an unrealistic assumption, and it neglects preferential fluid movement through heterogeneous channels within geologic formations.

## 2.4. Model Uncertainty and Sensitivity Analyses

As discussed above, computational models are an approximate representation of reality, and thus predictions exhibit some degree of uncertainty. Model uncertainty is a result of the uncertainties

related to the underlying science of the governing equations and the uncertainty in the parameter values input to represent the actual system (USEPA, 2003). Uncertainty in governing equations and model framework may arise from incomplete scientific data or lack of knowledge, as well as the necessary simplifications that translate scientific concepts into mathematical equations. Parameter uncertainty results from poor data quality (e.g., measurement errors, analytical imprecision, limited sample size), lack of data, and the inherent variability in natural systems. Model predictions depend largely on the values input for a number of key parameters and thus may be significantly impacted by incomplete knowledge, or they may be process and scale dependent. The predictive accuracy of a model improves with improved data quality, increased data quantity, realistic assumptions that reflect observed conditions and scientific knowledge, and a modeling domain (extent and resolution) that sufficiently and accurately represents the GS project.

Significant uncertainty exists in modeling predictions of GS due to the difficulty in determining the geological formation structure and permeability field throughout the extensive area likely to be impacted by proposed large injection volumes, a relative lack of data on the behavior of supercritical carbon dioxide in the subsurface, the drastic changes in transport behavior of carbon dioxide caused by changes in pressure and/or temperature, and the buoyant nature of carbon dioxide relative to native formation ground water.

The impact of parameter uncertainty on modeling results can be characterized through a model sensitivity analysis, which consists of sequentially varying a single parameter in successive model simulations while keeping all other model features constant. Sensitivity analyses provide an indication of those modeling parameters that are most sensitive (i.e., that most impact predictions of carbon dioxide migration, trapping, and pressure changes), and provide guidance for what parameters to focus on during data collection, parameter estimation, and model calibration. Accepted guides to environmental modeling (e.g., NRC, 2007) recommend the use of sensitivity analyses in submission of modeling results. Parameters that are sensitive for a particular model will be based on case-specific circumstances, and will be identified via sensitivity analyses.

### 2.5. Model Calibration

Model calibration consists of using the computational model to simulate a past time period for which monitoring data are available and adjusting relevant model parameters to reduce differences between model results and the observed monitoring data. For example, during initial model development, in-situ pressure data of the injection zone may be available for comparison to model predictions of pre-injection fluid pressures. After the initiation of carbon dioxide injection, monitoring data may be available regarding changes in reservoir pressure and fluid properties that may be used to calibrate the model. It is generally understood that model calibration reduces model error in prediction of future conditions.

Examples of observed data that may be used for model calibration include carbon dioxide saturation values and fluid pressures. Model calibration involves adjustment of model parameters, termed "calibration parameters," in order to minimize the difference between

simulated and observed data values. Calibration parameters for a particular model will be site specific, but they will commonly include intrinsic permeability and relative permeability-saturation function parameters. Calibration may involve incorporating additional heterogeneities or highly-permeable pathways. A case study of model calibration to monitoring data at an early GS research site, the Frio Brine Pilot in Texas, is provided in Box 2-1 of this guidance document.

Model calibration is never perfect, in that simulated and observed values for a computational model will not agree exactly. Calibration statistics are often used to characterize the error difference between model simulations and observed data values. The objective of model calibration is to minimize the value of the calibration statistics to the extent possible, using model parameters values consistent with site data or realistic estimates.

Common calibration statistics include the mean error (ME), mean-absolute error (MAE), and the root-mean squared error (RMSE). The ME is a simple average of the residual error between observed and simulated values and, therefore, positive values will offset negative values. The ME therefore provides an indication of the net bias (positive or negative) of the model simulated values. MAE is similar to the ME, with the important distinction that the sum of the absolute values of the residuals is calculated, thereby eliminating the offset that occurs by adding positive and negative values. The MAE, therefore, is always positive and represents the average difference between observed and simulated values. The RMSE is similar to the MAE, although negative values of the residual between observed and simulated values are eliminated by squaring the difference, and then the square root of the sum is determined prior to computing the average.

Model calibration may be conducted by use of computer programs designed for this purpose (i.e., automated calibration, see Finsterle, 2004), and/or adjusted manually based on best professional judgment. In practice, the automated programs can be cumbersome; therefore, manual parameter adjustment is a more standard practice in the calibration of complex models.

## Box 2-1. Model Calibration Case Study: Frio Brine Pilot Project

Pilot projects of GS can provide valuable insight into modeling predictions and monitoring results comparison. The Frio Brine Pilot Project, in Dayton, TX, is an early experimental project conducted primarily by researchers at the Texas Bureau of Economic Geology and Lawrence Berkeley National Laboratory (LBNL). Two carbon dioxide injection and monitoring experiments (Frio I and Frio II) have been conducted at Frio, supplemented by numerical modeling. In this text box, separate-phase carbon dioxide data from monitoring wells, pressure monitoring data, and geophysical monitoring data are presented. These figures and discussion are taken from Doughty et al. (2007) and Ajo-Franklin et al. (2008).

A geologic schematic of the Frio pilot site is shown in Figure 2-3. For the Frio I pilot, 1,600 metric tons of carbon dioxide were injected over 10 days into a steeply dipping brine-saturated later at a depth of 1,500 m. For the Frio II pilot, approximately 350 metric tons of carbon dioxide was injected at a depth of 1,600 m. A number of pre-injection site characterization, and operational and post-injection monitoring activities were conducted along with both injections.

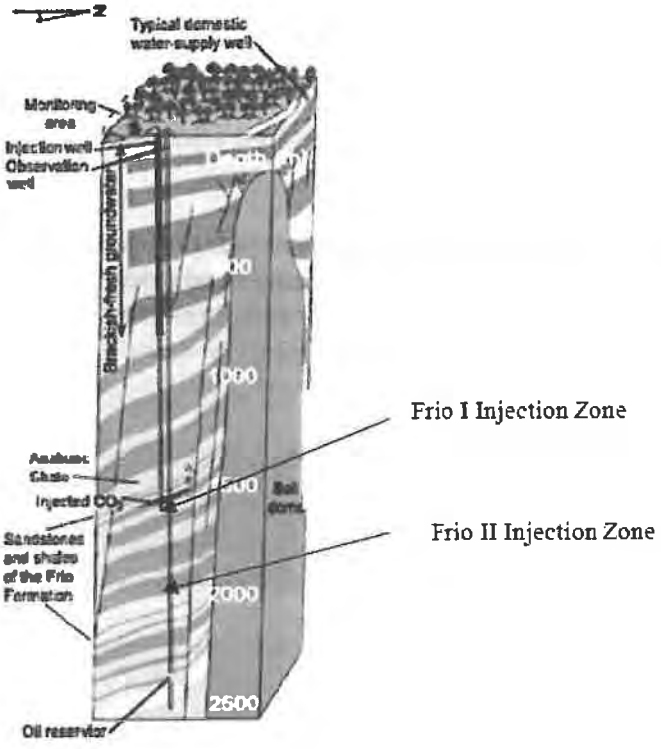



**Figure 2-3: Geologic Schematic of Frio Brine Pilot Project. The arrow at top indicates the north direction.** From: Doughty et al. (2007).Reproduced with permission of Springer Science + Business Media.

For the Frio I pilot, a numerical model was calibrated by constraining the value of several parameters to a variety of monitoring data. Key calibration parameters were determined to be multi-phase flow parameters that describe the relative permeability-saturation relationship

**Box 2-1. Model Calibration Case Study: Frio Brine Pilot Project, *continued***

(referred to in the study as the irreducible liquid saturation, $S_{lr}$) and the van-Genuchten (i.e., characteristic curve) parameter ($m$). The value of these parameters was constrained by several types of monitoring data (see Doughty et al., 2007). The researchers focused on calibration to the arrival time of carbon dioxide at the monitoring well, and pressure monitoring at the injection and monitoring wells. The arrival time of carbon dioxide at the injection well was determined based on a reduction of fluid density collected at the observation well using a U-tube sampling apparatus. The observed arrival time was compared to a series of model runs, varying $S_{lr}$ and $m$ (Figure 2-4). In addition, the observed pressure increase at both the monitoring and the injection wells were compared to model predictions (Figure 2-5). Based on these results, the value of the parameter $S_{lr}$ was constrained to a range of 0.15 to 0.30, and the value of $m$ was constrained to 0.9.

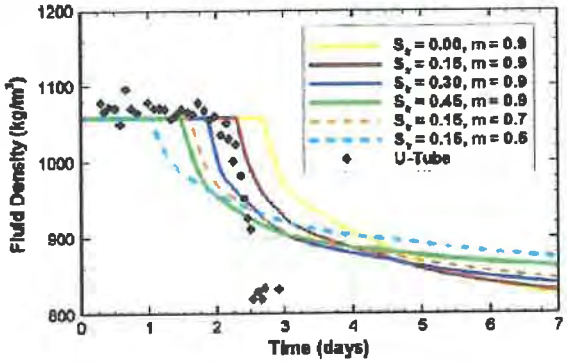



**Figure 2-4: Observed and Modeled Carbon Dioxide Arrival at the Observation Well Based on Change in Fluid Density.** From: Doughty et al. (2007). Reproduced with permission of Springer Science + Business Media.

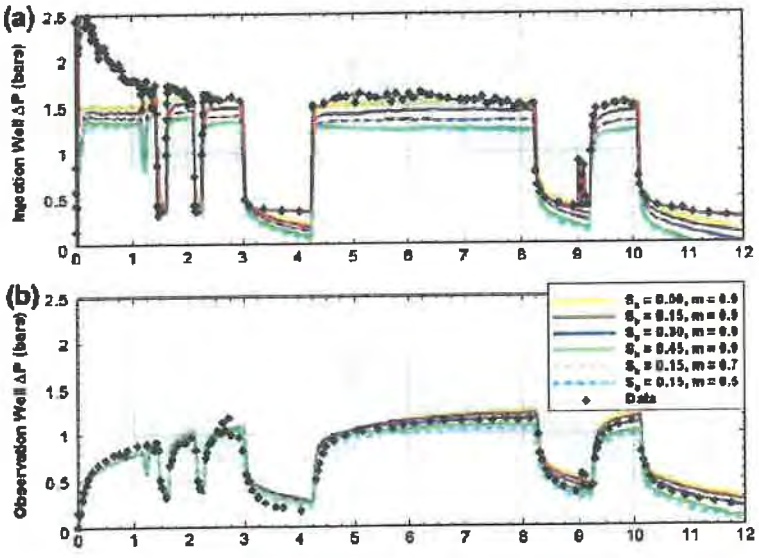
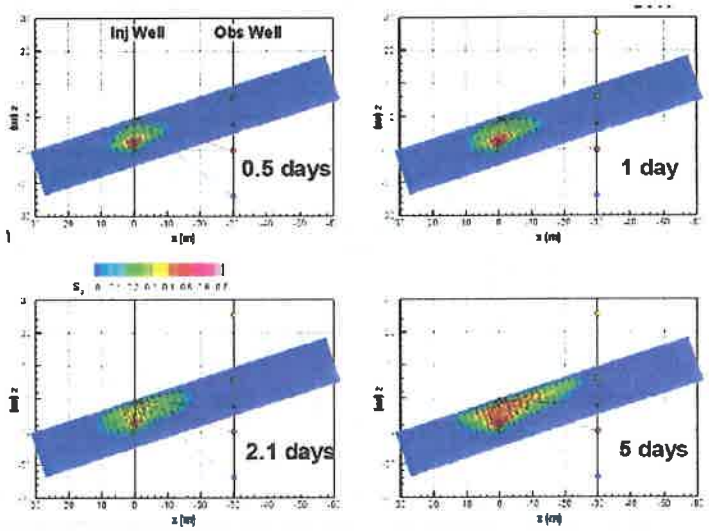


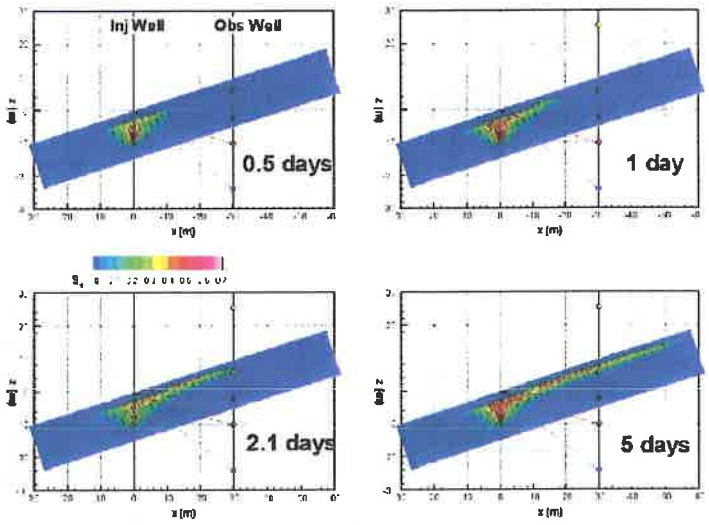

**Figure 2-5: Observed and Modeled Pressure Increase at (a) the Injection Well and (b) the Monitoring Well (from Doughty et al., 2007).** Reproduced with permission of Springer Science + Business Media.

**Box 2-1. Model Calibration Case Study: Frio Brine Pilot Project, *continued***

Frio II used an initial numerical model to predict the evolution of the carbon dioxide plume over time. Observed seismic geophysical data of plume migration showed that a thin finger of carbon dioxide moved further up-dip than initially predicted by the model. The model was calibrated to the seismic monitoring results by, among other changes, increasing the value of the intrinsic permeability throughout the model, and increasing the thickness of a high-permeability channel at the confining zone-injection zone interface. The initial and data-calibrated model results are shown in Figure 2-6.




(a)




(b)

**Figure 2-6: Comparison of (a) Initial and (b) Post-Calibration Model Predictions of Carbon Dioxide Plume Evolution.** From: Ajo-Franklin et al. (2008).

## 2.6. Existing Codes used for Development of GS Models

A wide variety of modeling exercises have been reported in the peer-reviewed literature for GS and have been reviewed previously (Schnaar and Digiulio, 2009). Several computational codes have been developed for multiphase flow and transport problems, and a number of these codes are publicly or commercially available for the owners or operators of a GS project to use in AoR delineation modeling. Codes reported in the literature used for modeling of GS include petroleum reservoir codes (STARS, Law and Bachu, 1996; GEM, Kumar et al., 2004; ECLIPSE, Zhou et al., 2004; Juanes et al., 2006; CHEARS, Flett et al., 2007) and codes that have been developed at U.S. Department of Energy (DOE) national laboratories for a range of multiphase flow and transport problems (STOMP, CRUNCH, Knauss et al., 2005; TOUGH-series, Finsterle, 2004; Xu et al., 2006; Doughty and Pruess, 2004; Doughty, 2007). Additionally, DOE provides a summary of available models that have been used to model processes associated with injection for GS at the Regional Carbon Sequestration Partnership (RCSP) project sites. The document presents the types of data that are needed for various models and how to obtain such information (NETL, 2011). These codes vary not only in the physical processes considered, but also in numerical techniques such as the spatial discretization method, iteration approach, and gridding routines. The codes mentioned above are provided as examples that may be used for GS modeling, and the lists given are not meant to include all available codes, or to suggest preference for certain codes over others.

Codes used for modeling GS consider multiphase flow of carbon dioxide in supercritical, liquid, and gaseous phases including miscible and immiscible displacement, dissolution of carbon dioxide in ground water, density-driven flow, and flow of ground water as impacted by injection. Available codes may also be further categorized based on their ability to consider, or to be adjusted to consider, complex three-dimensionally heterogeneous formations, residual phase trapping and characteristic-curve hysteresis, mineral precipitation/dissolution reactions and subsequent mineral phase trapping and leaching of heavy metals, carbon dioxide sorption in coal-bed methane problems, and leakage through abandoned well bores. Models based on the TOUGH-series codes have been widely reported in the literature and are capable of considering three-dimensional heterogeneous formations, carbon dioxide dissolution, residual phase trapping and characteristic-curve hysteresis, coupled fluid flow and geomechanical processes, and mineral precipitation (e.g., Finsterle, 2004; Doughty, 2007; Xu et al., 2006; Rutqvist et al., 2008).

Several codes were compared for identical GS problems in an LBNL study (Pruess et al., 2004) in order to evaluate code comparability. Ten research groups representing six countries participated in the study. The codes evaluated included TOUGH-series codes (LBNL, CSIRO Petroleum, Industrial Research Limited), ECLIPSE 300 (Los Alamos National Laboratory), and STOMP (Pacific Northwest National Laboratory), among others. The problems considered varied in complexity and included mixture of gases in an open system, radial flow from an injection well, discharge along a fault zone, injection with mineral trapping, and injection with enhanced-oil recovery. For the most part, model results for the different codes were found to be in good agreement. Most discrepancies were traced to differences in the calculation of fluid properties (e.g., viscosity). These results emphasize the need for accurate descriptors of carbon dioxide transport properties and equations of state.

The use of proprietary codes (i.e., codes not available for free to the general public) may prevent full evaluation of model results (e.g., NRC, 2007). There are several aspects of a model that can be proprietary, and some may be more important than others for computational model evaluation. For example, use of a proprietary user interface with a publicly available code may not present a significant problem. Several popular codes in the petroleum-reservoir engineering discipline are proprietary (e.g., ECLIPSE). However, these codes have been used in peer-reviewed studies to model GS, and operators of particular GS sites may prefer to use these codes as they have previous experience with them. As discussed below, when using a proprietary model for AoR delineation, site operators of GS projects are encouraged to clearly disclose to the UIC Program Director the code assumptions and, if necessary, governing equations and equations of state with the permit application.

# 3. AoR Delineation Using Computational Models

Determination of the AoR for proposed Class VI wells will consist of data collection and compilation, development of the site computational model, delineation of the AoR based on model results, and submission of the model results and AoR delineation to the UIC Program Director with the Class VI permit application. The AoR and Corrective Action Plan must describe how the owner or operator plans to conduct these activities and is subject to UIC Program Director approval [40 CFR 146.84(b)].

The AoR delineation model must be submitted with the Class VI permit application—i.e., with the proposed AoR and Corrective Action Plan, as required at 40 CFR 146.82(a)(13)—and the modeled AoR will be finalized after all site data are collected and pre-injection testing is complete, per 40 CFR 146.82(c)(1). Therefore, the submittal, evaluation, and approval of the AoR, as part of the AoR and Corrective Action Plan, may be an iterative process, involving multiple drafts, until all the information required is submitted at the appropriate level of detail as determined by the UIC Program Director. See the *UIC Program Class VI Well Project Plan Development Guidance* for more information on the AoR and Corrective Action Plan. Also see the *UIC Program Class VI Implementation Manual* for additional information on how permitting authorities will review the information submitted by owners or operators.

This section describes the AoR delineation process and provides several quantitative examples revolving around a hypothetical GS site. EPA recommends that model development in all cases be conducted by a professional expert with the understanding of multiphase flow processes and experience with application of sophisticated computational models.

## 3.1. AoR Delineation Class VI Rule Requirements

The following Class VI Rule requirements pertain to AoR delineation:

- 40 CFR 146.84(a): The AoR is the region surrounding the GS project where USDWs may be endangered by the injection activity. The AoR is delineated using computational modeling that accounts for the physical and chemical properties of all phases of the injected carbon dioxide stream and is based on available site characterization, monitoring, and operational data.

- 40 CFR 146.84(c)(1): Owners or operators of Class VI wells must predict, using existing site characterization, monitoring and operational data, and computational modeling, the projected lateral and vertical migration of the carbon dioxide plume and formation fluids in the subsurface from the commencement of injection activities until the plume movement ceases, until pressure differentials sufficient to cause the movement of injected fluids or formation fluids into a USDW are no longer present, or until the end of a fixed time period as determined by the UIC Program Director. The model must:

  (i) Be based on detailed geologic data collected to characterize the injection zone(s), confining zone(s), and any additional zones; and anticipated operating data,

including injection pressures, rates, and total volumes over the proposed life of the GS project;

(ii) Take into account any geologic heterogeneities, other discontinuities, data quality, and their possible impact on model predictions; and

(iii) Consider potential migration through faults, fractures, and artificial penetrations.

## 3.2. Data Collection and Compilation

Computational modeling utilizes the required site characterization data for a proposed Class VI injection well site and applies scientifically accepted principles to estimate the carbon dioxide plume and pressure front migration. The extent to which site and operational conditions are realistically represented determines the validity of the resulting model predictions. Site characterization data inform model parameterization and the development of the model and, therefore, adequate data collection, analysis, and compilation are integral components of model development. Table 2-1 of this guidance provides a summary of important model parameters, many of which are determined based on site characterization data.

A variety of site characterization data are required to be collected for proposed GS projects [40 CFR 146.82 and 146.83]. These data are required to verify that the proposed injection zone at the characterized site has adequate injectivity to accept the injected carbon dioxide at the proposed rate and adequate volume to store the injectate over the lifetime of the project. Furthermore, site characterization data verify that suitable confining zone(s) are present to restrict the upwards movement of carbon dioxide. Additional features of the site, such as baseline geochemistry and pre-injection fluid pressures, inform the interpretation of future monitoring results and support reactive transport modeling if it is chosen to be used. As discussed below, much of the site characterization data collected at the proposed Class VI injection well site are also necessary to inform computational model development and AoR delineation. Site characterization requirements and methods are discussed in more detail in the *UIC Program Class VI Well Site Characterization Guidance.*

### 3.2.1. Site Hydrogeology

Regional and site-specific geology provide the foundations of the computational model used to delineate the AoR. This includes site stratigraphy, including formation elevation and thickness, as presented in cross sections and/or topographic maps. It is recommended that any data regarding structural geology (including folding, and fracture and fault systems) be identified and used when creating the computational model. For each geologic formation at the proposed injection site, hydrogeologic information, including initial fluid pressure, horizontal and vertical gradients, and ground water flow direction and velocity, should be considered. Other important characteristics include intrinsic permeability and porosity of all formations ranging from the uppermost USDW to beneath the injection zone. Where injection depth waiver applications are considered, EPA recommends that these parameters be determined for all formations down to and including the first USDW below the injection zone. See the *UIC Program Class VI Well Injection Depth Waivers Guidance* for additional information. EPA recommends that the

heterogeneity of these characteristics within each formation also be evaluated. Data regarding the heterogeneity of these parameters are of particular importance in representing the injection and confining zone(s). The Class VI Rule requires that AoR computational modeling take into account any geologic heterogeneities and other discontinuities [40 CFR 146.84(c)(1)(ii)].

Thorough characterization of multiphase flow parameters is also recommended to properly inform the computational modeling. These include parameters describing the capillary pressure-saturation and relative permeability-saturation relationships of each formation, with the injection and confining zones being of particular importance. See Figure 2-2 of this guidance for more information. EPA recommends that accepted formulations of these relationships be defined that are as specific to the site and fluids of interest (e.g., brine, carbon dioxide) as possible.

The quantity of data used to inform model development is recommended to be, at least, based on the Class VI Rule site characterization requirements, as discussed in the *UIC Program Class VI Well Site Characterization Guidance*. For pertinent data types, as discussed above, all data collected to comply with site characterization requirements may be considered in the AoR delineation. Furthermore, EPA recommends that any additional pertinent data available in the vicinity of the site, for example from the U.S. Geological Survey (USGS) or other sources, also be included in model development.

Additionally, EPA recommends that the lateral and vertical extents of all formations predicted to exhibit contact with supercritical carbon dioxide or elevated pressure over the lifetime of the proposed GS project be characterized for hydrogeologic properties. This may be an iterative process because initial model estimates of plume and pressure front migration may indicate further migration than previously assumed. In these cases, some additional site characterization in these regions may be requested by the UIC Program Director before a permit is approved.

EPA recommends that adequate data be collected to reasonably estimate site heterogeneity. Collection of sufficient data is always a challenge in geologic studies, and this is compounded by the large areas that may be impacted by GS projects. Use of geophysical site characterization techniques may reduce the burden of site characterization over large areas. See the *UIC Program Class VI Well Site Characterization Guidance* for more information on using geophysical methods to assist with collecting the required site characterization data for a Class VI injection well permit application.

### 3.2.2. Operational Data

The Class VI Rule requires that the AoR computational modeling for a Class VI injection well be based on existing or proposed operational data including injection pressures, rates, and total volumes over the lifetime of the GS project [40 CFR 146.84(c)(1)(i)]. EPA recommends that operational data also include the location and number of injection wells, and the injection well construction details (e.g., total depth, perforated interval). In the case of GS projects with multiple Class VI injection wells, it is important to note that each Class VI well is required to be permitted separately, as area permits are not allowed [40 CFR 144.33(a)(5)]. However, EPA strongly encourages potential Class VI injection well owners or operators to account for all

injection wells associated with the proposed project, or any other injection or extraction wells in the area, when developing the AoR model. EPA recommends that a single AoR delineation model be used for all Class VI injection wells for a single GS project, and that the model include the influences of all relevant wells. EPA also recommends that overlapping pressure perturbations be evaluated for a given basin or hydraulically connected formations to determine any combined risk to USDWs. The owner or operator may consult the UIC Program Director regarding any existing or planned projects in the vicinity of the proposed well.

## 3.3. Model Development

Once adequate data are collected, model development consists of the formation of a conceptual site model, design of the mathematical framework and grid, and parameterization (i.e., determination of input parameter values) (USEPA, 2003). The model is then executed to provide predictions of fluid movement and pressure perturbations during the lifetime of the project.

**A Note Regarding Hypothetical Examples**

Several informative boxes are included within this guidance that provide examples of the AoR delineation and reevaluation process based on a hypothetical site (Box 3-1, Box 3-2, Box 5-1, and Box 5-2). The hypothetical site presented is not intended to be representative of all GS projects. Assumptions and methods used in hypothetical examples may not be valid in all cases. A length scale has not been included on hypothetical site figures, such that an allowable size of the AoR, or distance between wells, is not unintentionally inferred from the figures.

### 3.3.1. Conceptual Model of the Proposed Injection Site

A conceptual site model is a schematic representation of the proposed GS project, including all major geologic elements present in the flow system and any relevant physical processes. In the delineation process, the conceptual model is translated mathematically into a numerical model to be solved for pressure and saturation. The conceptual site model is informed primarily by the collected site characterization data and the proposed operational conditions, such as well-field configuration and injection rates. EPA recommends that descriptions of the conceptual site model present a clear statement and description of each element of the site, as well as any assumptions and hypotheses related to the proposed injection site and the reasoning behind them (e.g., lab experiments, empirical data, or peer-reviewed literature). The conceptual site model also identifies the modeling region in three dimensions. Geologic stratigraphy, any other relevant geologic features, all physical processes that will impact migration of carbon dioxide and ground water, chemical species of interest, location of USDWs and potential conduits, conditions at site boundaries that may inform model boundary conditions, and areas of sparse site characterization data are also identified in the conceptual site model. See Box 3-1 for more information about the conceptual site model.

## Box 3-1. Hypothetical Example of a Conceptual Site Model

A conceptual site model describes the general features of the anticipated Class VI project, using one or several schematics and diagrams. EPA recommends that schematics be used to show the general project orientation, both at the surface and at depth, important site features, and known processes that will impact plume and pressure front evolution at the site. Report text accompanying the conceptual site model schematic describes the relevant features at the site. A hypothetical example conceptual site model schematic is shown in Figure 3-1, and the example accompanying text is below.

For this hypothetical project, three injection wells are planned to inject a total of two million tons of carbon dioxide per year for 30 years. The source of carbon dioxide is a coal-fired power plant located approximately 200 miles to the north of the injection site. The injectate will be supplied via pipeline to the site, delivered to a surface facility, and then supplied separately to each of the injection wells. The injectate will be greater than 99% pure carbon dioxide at all times, containing trace amounts of sulfur dioxide and nitrogen oxides.

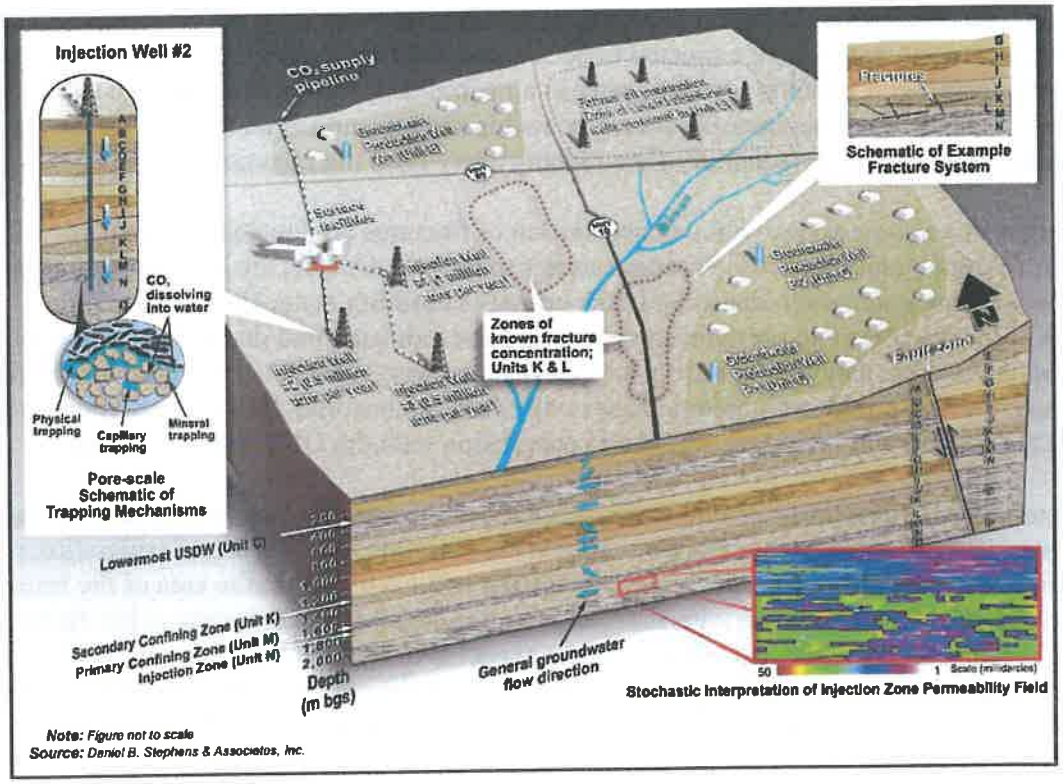



**Figure 3-1: Hypothetical Conceptual Site Model for Geologic Sequestration.**

**Box 3-1. Hypothetical Example of a Conceptual Site Model, *continued***

Injection will occur into a saline formation (Unit N), with a measured salinity of 50,000 mg/L, at a depth of approximately 1,800 meters below ground surface. The formation dips slightly, and carbon dioxide and pressure front movement are expected to be generally greater in the up-dip direction. The permeability of the injection zone has been measured to range from 1 to 50 mD, with lower permeabilities generally at higher elevations and at the contact between the confining and injection zones.

A shale unit, at least 20 meters thick throughout the vicinity, serves as the primary confining unit (Unit M). The depth of the lowermost USDW (Unit C) varies somewhat throughout the vicinity, but it is generally from 200 to 500 meters below ground surface. Intervening layers of sand, shale, and clay units exist between the confining layer and lowermost USDW. A secondary confining zone (Unit K) has been identified.

The majority of carbon dioxide is expected to migrate upwards through the zones of higher permeability until encountering lower permeability zones within the injection zone, or the injection zone/confining zone contact, and be physically trapped. Capillary trapping, mineral trapping, and dissolution of carbon dioxide into ground water will also occur; however, at this point the rate and total amount expected to be sequestered via the different mechanisms has not been quantified. Currently, ground water in all subsurface formations flows generally to the west. It is expected that pressure increases within the injection zone induced by the project will cause ground water to generally flow radially away from the injection wells.

Two relevant geologic zones with a concentration of fractures are located in the vicinity of the project, as shown on Figure 3-1. Fractures exist primarily in Unit K, the secondary confining unit, but also are potentially identified in the primary confining zone, Unit M. Geologic studies of the fractures and preliminary modeling have indicated that due to the orientation and fracture widths, they will not serve as a leakage pathway during carbon dioxide injection. However, these two relevant geologic zones will likely be locations for enhanced monitoring during the lifetime of the project, based on consultation with the UIC Program Director.

A former oil and gas field is located to the northeast of the project. Further analysis, including modeling, is used to determine if carbon dioxide may migrate into this area. If migration is detected, enhanced corrective action and monitoring will occur within the area of the former oil and gas field in consultation with the UIC Program Director. A fault zone exists far to the east of the proposed site. Carbon dioxide is not expected to migrate as far as the fault zone. However, this feature may also be further evaluated over the course of project, along with the potential for brine migration through the fault zone as a result of pressure buildup in the formation.

### 3.3.2. Determination of Physical Processes to be Included in the Computational Model

Prior to developing the computational model for a proposed Class VI injection well AoR delineation, the owner or operator will need to determine what physical processes will be considered in the computational model. This determination is based on the most significant processes identified in the conceptual model, as well as those processes that can be realistically included in the computational model. At a minimum, the Class VI Rule requires that the model include multiphase flow of carbon dioxide and formation fluids [40 CFR 146.84(a) and (c)(1)]. Additional processes may be necessary for certain projects. For example, reactive transport could be relevant if permeability and/or porosity are predicted, based on previous testing, to change as a result of precipitation/dissolution reactions. In addition, geomechanical processes could be relevant if pressure and stress may change hydrogeologic properties. If the aqueous carbon dioxide plume is a potential risk factor, carbon dioxide dissolution into ground water may also be considered in the AoR delineation model.

For some model applications, including reactive transport and geomechanical processes may be impractical. Complications can arise from increases in computational demands (i.e., extremely long computer processing times), lack of meaningful data on mineral precipitation/dissolution kinetics, or the inability of preferred computational code. Furthermore, including these processes may be unnecessary in many cases because the impact on plume and pressure front migration may be relatively minor. The Class VI Rule does not require including reactive transport and geomechanical processes in the AoR delineation modeling. However, the UIC Program Director may request that the owner or operator include these additional processes in AoR delineation modeling in cases where doing so would improve the understanding of plume and pressure migration for the project.

### 3.3.3. Computational Model Design

After a conceptual site model has been developed, and the processes that will be considered have been determined, the next step is to develop the site computational model. This includes the determination of an appropriate computational code, and parameterization (i.e., populating the code with the selected site-specific parameters) in order to develop the model.

#### 3.3.3.1. Computational Code Determination

To create the computational model, EPA recommends that a code be used that includes routines for the relevant physical processes at the site based on peer-reviewed theory and equations, including equations of state for carbon dioxide and other chemical species of interest. EPA recommends that the code also include accurate mass-transfer coefficients, including solubility of carbon dioxide, as a function of primary thermodynamic variables (e.g., temperature, pressure, phase saturations). If using an independently developed or untested code, EPA also recommends that the developer model test cases found in the literature to verify the accuracy of the model before submitting the Class VI injection well permit application to the UIC Program Director (e.g., see Pruess et al., 2004).

#### 3.3.3.2. Model Spatial Extent, Discretization, and Boundary Conditions

The computational model will be designed by determining the spatial boundaries of the problem and spatial discretization. It is recommended that lateral grid spacing be fine enough to resolve heterogeneities, as discussed above (e.g., Doughty and Pruess, 2004). Vertically, the model is recommended to include the injection zone, with sufficient vertical resolution to properly account for buoyant plume migration, and a sufficient section of the primary confining zone to demonstrate to the satisfaction of the UIC Program Director that no leakage is expected to occur through the confining zone. In some cases, the UIC Program Director may require that additional zones be included in the computational model, such as overlying USDWs. Inclusion of additional zones may allow for estimation of vertical leakage rates and pressure changes above the primary confining zone, which may aid in performing risk assessments and designing the Class VI testing and monitoring program.

Boundary conditions are typically based on hydrogeologic conditions in locations corresponding to the edges of the model domain where the domain extends beyond the pressure front and/or plume. Model testing may be conducted to ensure that grid spacing, gridding routine, and boundary conditions do not result in numerical artifacts that impact the model results. If results of such testing indicate artificial impacts, then adjustment of the model may be necessary prior to running the model for a proposed Class VI injection well AoR delineation.

#### 3.3.3.3. Model Timeframe

The Class VI Rule requires that the model used to delineate the AoR for a proposed Class VI injection well be run from the commencement of injection activities until the plume movement ceases, until pressure differentials sufficient to cause the movement of injected fluids or formation fluids into a USDW are no longer present, or until the end of a fixed time period as determined by the UIC Program Director [40 CFR 146.84(c)(1)]. In order to meet these conditions, it may be necessary for the model simulation of the GS project to extend for several hundred or thousands of years (e.g., Flett et al., 2007).

#### 3.3.3.4. Parameterization

Parameterization is the final step in the initial development of the computational model, and it consists of populating the computational code with the selected site-specific parameters. Key parameters include formation intrinsic permeability, porosity, phase-partitioning coefficients, and relative permeability-saturation parameters. Parameter values are based on the site-specific data as much as possible, but may also be based on values and relationships from the scientific literature. Geostatistical techniques can also be used to create a representation of realistic, three-dimensionally heterogeneous conditions in the subsurface. See Section 2.2 of this guidance for more information on model parameters. In some cases, a reasonable range of parameter values may be identified for the purposes of later sensitivity analyses.

### 3.3.4. Executing the Computational Model

The computational model is executed (i.e., solved) after parameterization, and this consists of using the code to calculate phase saturations and composition, fluid pressures, and other system aspects within the model domain for each point in time and space separated by specified intervals (i.e., time step, grid spacing). Model results are typically text files that contain modeled data for each grid cell, during each time step. In some cases, the model results will need to be post-processed following execution of the model before they can be easily visualized and interpreted. For example, model results may need to be transformed to produce site coordinates. Model results of particular interest for Class VI injection well AoR delineation include estimation of the extent of the separate-phase carbon dioxide plume migration and changes in fluid pressures within the injection zone over time. See Section 3.4 for more information on AoR delineation.

The use of an *a priori* AoR delineation based on computational modeling predictions highlights the need for uncertainty and sensitivity analyses for the initial prediction. Conservative predictions will be needed prior to the commencement of injection and the availability of any site-specific data on carbon dioxide migration paths and rates. EPA recommends conducting sensitivity analyses as the principal evaluation tool for characterizing the most and least important sources of error in computational models (USEPA, 2003). Based on these results, maximum-risk scenario simulations can be conducted considering plume extent and pressure perturbation predictions that account for uncertainties in the model.

## 3.4. AoR Delineation Based on Model Results

The planned or predicted AoR submitted with the permit application for a proposed Class VI injection well is required to be based on a delineation of the area where the GS project may cause endangerment of USDWs, which in turn is required to be based on the results of computational modeling [40 CFR 146.84(a) and 40 CFR 146.84(c)(1)]. The boundaries of the AoR are based on simulated predictions of the extent of the separate-phase (i.e., supercritical, liquid, or gaseous) plume and pressure front. As such, EPA recommends that the AoR encompass the maximum extent of the separate-phase plume or pressure front over the lifetime of the project and entire timeframe of the model simulations. The pressure front, as described below, is the extent of pressure increase of sufficient magnitude to force fluids from the injection zone into the formation matrix of a USDW.

In the case of GS projects with multiple Class VI injection wells, the owner or operator must apply for and obtain a Class VI injection well permit for each individual well [40 CFR 144.33(a)(5)]. However, as discussed previously, a single AoR modeling exercise may be conducted for all wells within a single project at the discretion of the UIC Program Director. In all cases, EPA recommends that the AoR delineation boundaries for the cumulative GS project be based on modeling that accounts for the anticipated injection rates from all planned Class VI injection wells.

Box 3-2 provides a hypothetical example of an AoR delineation based on computational modeling results, including the calculation of the threshold pressure that defines the pressure front. The determination of the pressure front in Box 3-2 (Step 2) is consistent with existing standard practices for other well classes of the UIC Program (e.g., Thornhill et al., 1982) and is applicable to any Class VI injection well for which, prior to injection, the injection zone is under-pressurized compared to the lowermost USDW (i.e., Method 1, Section 3.4.1). Determination of the pressure front is discussed in more detail in Section 3.4.1.

### 3.4.1. Determination of Threshold Pressure Front

The pressure front may be defined as the minimum pressure within the injection zone necessary to cause fluid flow from the injection zone into the formation matrix of the USDW through a hypothetical conduit (i.e., artificial penetration) that is perforated in both intervals. Several methods, as described below, are available to estimate the value of the pressure front, and are based on various assumptions. The owner or operator is encouraged to consult with the UIC Program Director to determine which method is appropriate for the proposed GS project. For instance, if an existing aquifer exemption is proposed to be expanded for a GS project, the pressure front may be determined based upon the pressure increase necessary for formation fluids to be displaced into portions of aquifer that are not exempted.

*Method 1. Pressure front based on bringing injection zone and USDW to equivalent hydraulic heads (applicable to under-pressurized case only).*

As stated by Thornhill et al. (1982), the pressure-front component of the AoR is "the area around an injection well where, during injection, the [hydraulic] head of the formation fluid in the injection zone is equal to or greater than the [hydraulic] head of USDWs." Defined this way, the pressure-front ($P_{i,f}$) may be calculated by the following equation:

$$P_{i,f} = P_u + \rho_i g \cdot (z_u - z_i) \qquad \text{[Eq-1]}$$

where $P_u$ is the initial fluid pressure in the USDW, $\rho_i$ is the injection-zone fluid density, g is the acceleration due to gravity, $z_u$ is the representative elevation of the USDW, and $z_i$ is the representative elevation of the injection zone. Similarly, the increase in pressure that may be sustained in the injection zone ($\Delta P_{i,f}$) is given by:

$$\Delta P_{if} = P_u + \rho_i g \cdot (z_u - z_i) - P_i \qquad \text{[Eq-2]}$$

where $P_i$ is the initial pressure in the injection zone. Eq-1 and Eq-2 are subject to the assumption that the hypothetical open borehole is perforated exclusively within the injection zone and USDW.

A positive value of $\Delta P_{i,f}$ (Eq-2) corresponds to an injection reservoir that is under-pressurized relative to the USDW and can accommodate an increase in pressure equal to $\Delta P_{i,f}$ prior to potential fluid migration into the drinking water reservoir. A $\Delta P_{i,f}$ value of zero corresponds to the hydrostatic case, and a negative value of $\Delta P_{i,f}$ relates to a situation where the injection zone is

already over-pressurized and thus subject to potential fluid leakage from the injection reservoir to the drinking water aquifer even prior to the planned GS project. Eq-1 and Eq-2 are only applicable for calculating the allowable pressure increase for the under-pressurized case (i.e., positive value of $\Delta P_{i,f}$). Alternative methods may be applicable for the hydrostatic case or over-pressurized cases (see below).

EPA recommends that Eq-1 and Eq-2 be applied using values of pressure and fluid density (i.e., $P_u$, $P_i$, and $\rho_i$) based on direct measurement of fluid properties in the direct vicinity of the proposed project (i.e., see the *UIC Program Class VI Well Site Characterization Guidance*). Notably, the results of Eq-1 and Eq-2 are sensitive to the injection-zone fluid density ($\rho_i$), which is influenced by the pressure, temperature, and salinity of the injection zone. Salinity, pressure, and temperature tend to increase with depth below the ground surface. If site-specific fluid density values at reservoir conditions are not available, injection zone fluid density may be estimated based on measured salinity, temperature, and pressure. Figure 3-2 presents fluid density as a function of depth below ground surface for several different salinities, based on the method of Peng and Robinson (1976).

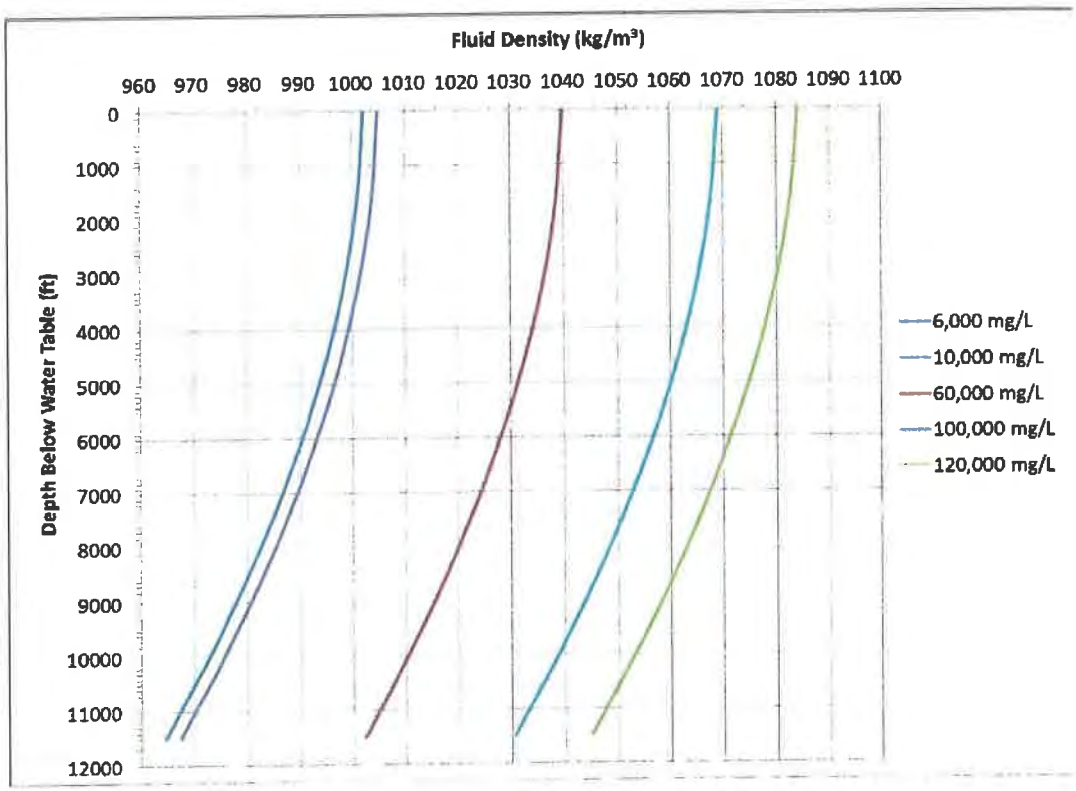



**Figure 3-2: Fluid Density Functions for Varying Salinities.**

Note also that, in using this method, $P_{i,f}$ is a function of the fluid density of the injection zone, the elevation of both formations, and the fluid pressure within the USDW. To the extent that these parameters vary spatially in the vicinity of the project, the value of $P_{i,f}$ may also vary throughout the region of the AoR.

*Method 2. Pressure front based on displacing fluid initially present in the borehole (applicable to hydrostatic case only).*

Under hydrostatic conditions, a pressure increase within the injection zone may be allowable due to the fact that water entering a hypothetical borehole from the injection zone will be more dense than the fluid initially present in that borehole. Fluid from the injection zone will displace the fluid in the borehole, which will flow into the USDW. However, below a calculated threshold pressure, a new pressure equilibrium will be established, and fluid from the injection zone will not intrude into the USDW.

As given by Nicot et al. (2008) and Bandilla et al. (2012), assuming (1) hydrostatic conditions and (2) initially linearly varying densities in the borehole and constant density once the injection-zone fluid is lifted to the top of the borehole (i.e., uniform density approach), the threshold pressure increase ($\Delta P_c$) may be calculated:

$$\Delta P_c = \frac{1}{2} \cdot g \cdot \xi \cdot (z_u - z_i)^2 \qquad \text{[Eq-3]}$$

where $\xi$ is a linear coefficient defined by:

$$\xi = \frac{\rho_i - \rho_u}{z_u - z_i} \qquad \text{[Eq-4]}$$

and where $\rho_u$ is the fluid density of the USDW.

Nicot et al. (2008) also present a solution subject to the assumption of linearly varying densities in the borehole both initially and when the injection zone fluid is lifted to the top of the borehole (i.e., equilibrium approach), rather than the uniform density approach (assumption #2) used to derive Eq-3 (see Nicot, 2008 and Bandilla, 2012). Birkholzer et al. (2011) state that the value of $\Delta P_c$ calculated using the uniform density approach (Eq-3) may be less precise than the equilibrium approach, but it is easier to apply and also more conservative for protection of the USDW.

At pressure increase less than $\Delta P_c$, the fluid originally present in the borehole will leak into the USDW. This fluid leakage from the borehole may be acceptable and not cause degradation of water quality within the USDW, as the volume of water in the borehole may be minor and quickly diluted by water in the surrounding aquifer.

Calculation of the allowable threshold pressure increase using these methods (Eq-3 and Eq-4) is applicable only to the hydrostatic case. In some instances, site-specific fluid pressure and density measurements may not be available at the time of preparing the permit application and initial AoR delineation in order to evaluate if the injection reservoir is over- or under-pressurized. If warranted by previous site knowledge (i.e., no previous large-scale fluid withdrawal or injection from the injection zone), it may be acceptable to initially assume hydrostatic conditions. The owner or operator may choose to use these methods (Eq-3 and Eq-4) for an initial estimate of the

threshold pressure allowable for delineation of the AoR. However, once site-specific data are available for the proposed injection zone following construction of injection or monitoring wells, EPA recommends reevaluation of the hydrostatic assumption. If the reservoir is under-pressurized, the allowable threshold pressure increase may be greater than calculated using Eq-3 (see Method 1, above). However, if the injection reservoir is actually over-pressurized, the allowable pressure increase will be less than calculated using Eq-3.

*Methods for over-pressurized cases.*

In some instances, the desired injection zone may already be over-pressurized relative to the USDW prior to the injection project (i.e., $\Delta P_{i,f}$ value is negative using Eq-2). In this situation, fluid leakage would occur from the injection zone to the USDW through a borehole perforated within both zones even prior to commencing injection. Additional pressure increase within the injection zone owing to the injection associated with the GS project may increase fluid leakage rates. Determination of the allowable pressure increase to be used in AoR delineation for the over-pressurized case may require more sophisticated methods than the analytical equations described above for Methods 1 and 2.

Possible methods to estimate an acceptable pressure increase for over-pressurized reservoirs include:

1. Using similar methods as described in Nicot et al. (2008), some over-pressurization within the injection zone may be allowable without causing sustained fluid leakage, owing to the density differential between the injection zone and USDW. If the value of $\Delta P_c$ using Eq-3 is greater than the absolute value of $\Delta P_{i,f}$ using Eq-2, the difference in magnitude between the two may be used as an estimate of the allowable pressure increase, subject to the assumptions used to derive Eq-3 (see Method 2, above). To date, peer-reviewed research papers on this topic have developed analytical solutions only for the hydrostatic case. Future publications may address the initially over-pressurized case and, if so, these methods may be used to calculate an allowable pressure increase in an over-pressurized reservoir.

2. A multiphase numerical model may be designed to model leakage through a single well bore, or through multiple well bores in the formation (see e.g., Birkholzer et al., 2011). Additional pressure increases up to a certain point within an already over-pressurized injection zone may not cause an appreciable increase in fluid leakage rates through a hypothetical borehole. A sensitivity analysis may be conducted to bound the modeled leakage rates.

3. In conjunction with item #2 above, numerical or analytic ground water modeling may be conducted for the USDW to estimate how additional fluid leakage caused by the injection project is diluted within the USDW and attenuated. Dilution of fluid leakage from a borehole is impacted by the natural background flow rate of water within the USDW, which is turn a function of the hydraulic gradient, aquifer thickness, and hydraulic conductivity. An additional pressure increase may be allowable if it can be demonstrated

to the UIC Program Director that negligible degradation of the USDW would result from increased fluid leakage rates.

## Box 3-2. Hypothetical Example of an AoR Delineation

The AoR is based on the results of computational modeling and encompasses the predicted maximum extent of the separate-phase plume or pressure front over the lifetime of the project. The pressure front is defined as the pressure, within the injection zone, great enough to force fluids from within the injection zone through a hypothetical open conduit into any overlying USDW. This box provides a hypothetical example of an AoR delineation using a stepwise approach. The example scenario is based on the conceptual site model described above (see Box 3-1). First, the threshold pressure that defines the pressure front is determined. Next, maps showing the maximum extent of the plume and pressure front are overlaid and the AoR is delineated.

### Step 1. Determine the Pressure Front

A cross-sectional schematic of the hypothetical scenario is shown in Figure 3-3, which also presents values for fluid density, and pressure (units of megapascals, MPa, equal to $1 \cdot 10^6$ Pa) for each formation.

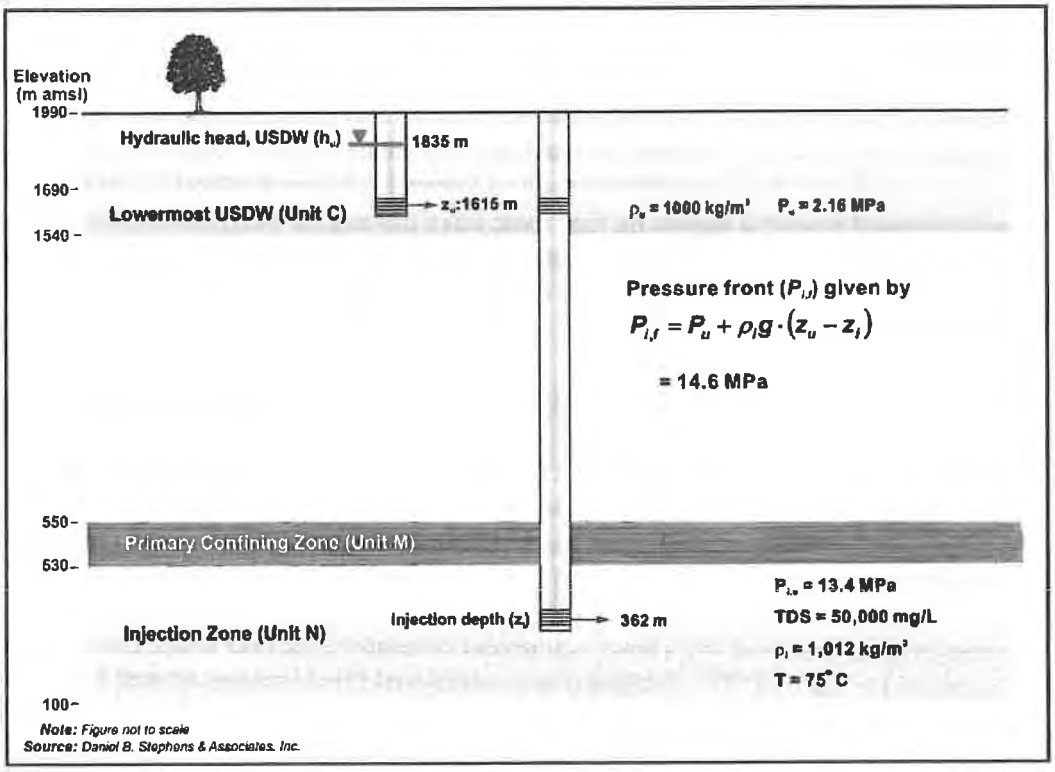



**Figure 3-3: Hypothetical Geologic Sequestration Site: Cross Sectional Schematic and Calculations.**

**Box 3-2. Hypothetical Example of an AoR Delineation, *continued***

The methodology used here is consistent with the determination of the pressure front for other well classes within the UIC Program (e.g., USEPA, 2002). As explained above, in Section 3.4 of this guidance, this methodology is applicable to any proposed Class VI injection well for which, prior to injection, the injection zone is not over-pressurized compared to the lowermost USDW (i.e., the injection zone has a lower or equal hydraulic head as compared to the lowermost USDW).

The pressure front is determined by calculating the minimum pressure within the injection zone ($P_{i,f}$) necessary to cause fluid flow from the injection zone into the formation matrix of the USDW through a hypothetical conduit (i.e., artificial penetration) that is perforated in both intervals. $P_{i,f}$ is calculated using Eq-1 (Section 3.4.1). In this example, $P_{i,f}$ is 14.6 MPa.

Step 2. Inspect Model Results to Determine the Maximum Extent of the Pressure Front ($P_f$)

The computational model will provide a prediction of the pressures within the injection zone over time. For the purpose of AoR delineation, EPA recommends using the pressure distribution corresponding to the time of maximum lateral extent of the pressure front ($P_{i,f}$). This will likely correspond to a time of maximum injection rates during the operational phase of the project or to the end of a long injection period.

EPA recommends contouring these predictions of pressure increase and providing the predictions on a base map of the proposed project area (Figure 3-4). In this recommended contour map, EPA also recommends highlighting the pressure equivalent to $P_{i,f}$. In the hypothetical example provided here, the region encompassed by $P_{i,f}$ includes the three planned Class VI injection well locations and a significant distance surrounding the area of the proposed injection wells.

**Box 3-2. Hypothetical Example of an AoR Delineation, *continued***

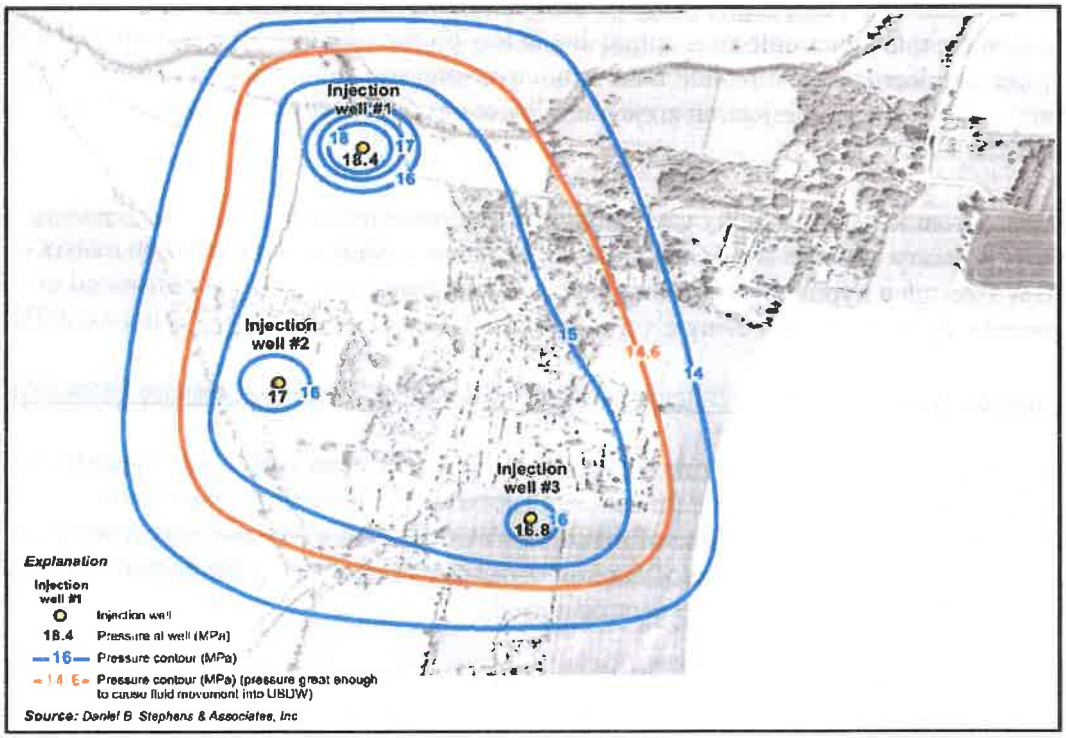



**Figure 3-4: Hypothetical Geologic Sequestration Site: Model Predicted Maximum Pressure Within the Injection Zone.**

Step 3. Inspect Model Results to Determine the Maximum Extent of the Separate-Phase Plume

The computational model will also provide a prediction of the extent of the separate-phase plume as it evolves over time. EPA recommends that these data be also contoured and provided on a base map (Figure 3-5). In the example provided here, the maximum extent of the supercritical plume, as predicted by the model, exists at 50 years after carbon dioxide injection commences.

**Box 3-2. Hypothetical Example of an AoR Delineation, *continued***

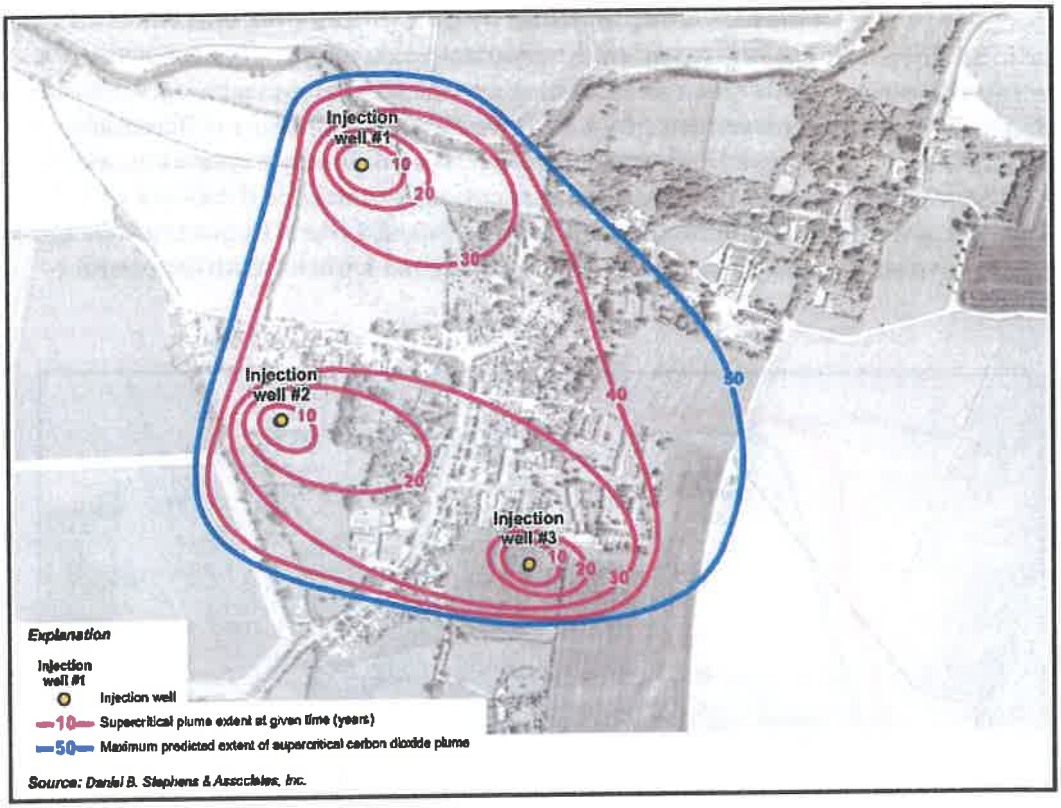



**Figure 3-5: Hypothetical Geologic Sequestration Site: Model Predicted Extent of Supercritical Carbon Dioxide Plume Over Time.**

## Step 4. Delineate the AoR

Lastly, the maximum extent of the separate-phase plume and pressure front is compared and overlaid on the base map (see Figure 3-6). The AoR is delineated by drawing the contour line that encompasses the maximum extent of the separate-phase plume or pressure front (Figure 3-6).

**Box 3-2. Hypothetical Example of an AoR Delineation, *continued***

It is important to note that the region encompassed by the pressure front will not in all cases be larger in all directions than the extent of the separate-phase plume. This is because the pressure front does not include all areas exhibiting any increase in pressure, only pressure great enough to cause fluid movement into a USDW. Therefore, pressure differentials may still exist outside of the pressure front, and separate-phase fluids may migrate beyond the extent of the pressure front. For this reason, it is necessary to calculate the extent of both the plume and pressure front to delineate the AoR for a proposed Class VI injection well and to submit these separate delineation results to the UIC Program Director with the permit application.

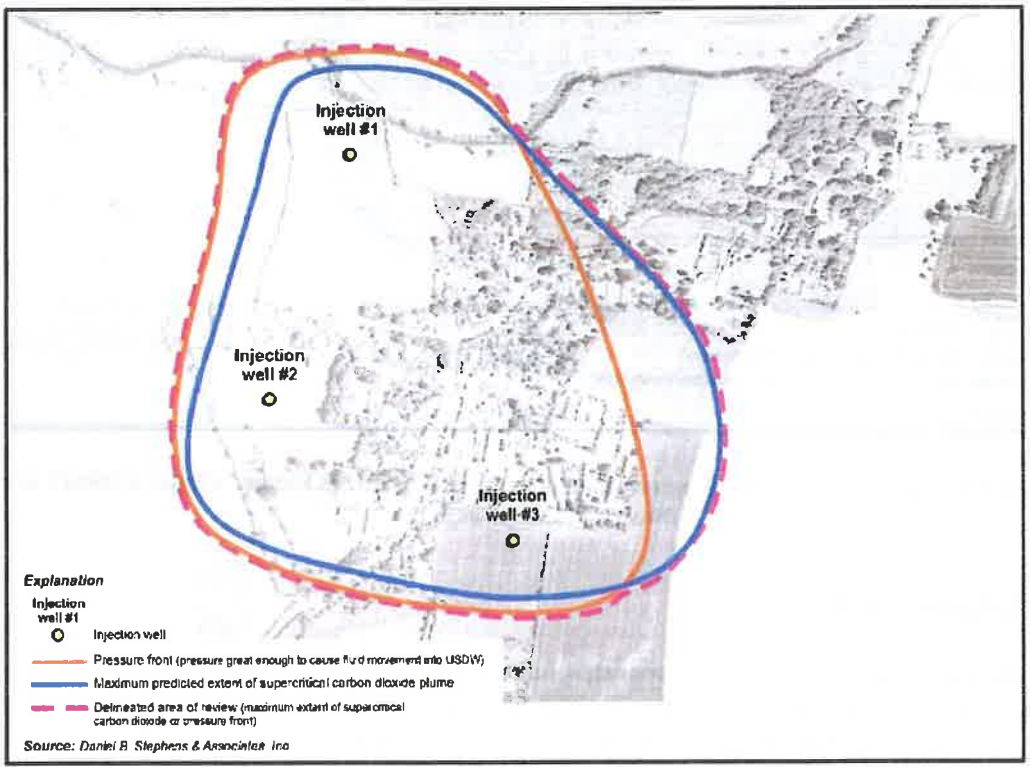



**Figure 3-6: Hypothetical Geologic Sequestration Site: Initial Area of Review Based on Model Results.**

### 3.5. Reporting AoR Delineation Results to the UIC Program Director

The owner or operator is required to submit the AoR and Corrective Action Plan with the initial permit application [40 CFR 146.82(a)(13)]. Information pertaining to how this plan should be submitted is provided in the *UIC Program Class VI Well Project Plan Development Guidance*. The final delineated AoR based on computational modeling is submitted to the UIC Program Director prior to receiving authorization to inject [40 CFR 146.82(c)(1)].

EPA recommends that this permit application submittal include all necessary information for the UIC Program Director to evaluate the AoR delineation results and replicate the computational modeling exercise if he or she elects to do so, as well as all model input and output data and files. This may include providing inputs for the UIC Program Director to use in their verification modeling effort. The owner or operator and the UIC Program Director should discuss the specific needs as the permit application is submitted. For additional information on submitting information to support Class VI permit applications, please see the *UIC Program Class VI Well Recordkeeping, Reporting, and Data Management Guidance for Owners and Operators.*

EPA recommends that the permit application submittal include the following in support of the AoR delineation:

- The conceptual site model and all supporting data on which the model is based, including the description of geologic stratigraphy and any relevant geologic features. See Box 3-1 of this guidance document for more information;
- Attributes of the code used to create the computational model, including the code name, name of developing organization, a full accounting of or reference to the model governing equations, scientific basis, and any simplifying assumptions;
- A description of the model domain, i.e., the model's lateral and vertical extents, geologic layer thickness, and grid cell sizes, as presented on maps and cross-sections;
- An accounting of all equations of state used for all fluids modeled (e.g. ground water, carbon dioxide);
- Any constitutive relationships, such as relative-permeability saturation relationships, and how they were determined;
- Values of all model parameters, as detailed in Table 2-1 of this guidance document, throughout the entire model domain, as a function of time if necessary, including initial conditions and boundary conditions, and a description of how model parameters were determined based on site characterization data. This information may be submitted in tabular or graphical/map formats;
- If required by the UIC Program Director, the owner or operator must also include raw model input and output files [40 CFR 146.82(a)(21)]. These files may be useful in model

verification, or if the UIC Program Director wishes to run alternative simulations/scenarios with the model;

- Model results, including predictions of carbon dioxide and pressure-front migration over the lifetime of the project. EPA recommends that the model results be presented in the form of contour maps, cross sections, and/or graphs showing plume and pressure front migration as a function of time, and that the permit application submittal include the outcome of parameter sensitivity analyses;
- A description of pressure front calculation and delineation of the AoR; and
- If required by the UIC Program Director, the relevant qualifications and professional experience of any individuals and/or consulting firms responsible for model development, AoR delineation, and reevaluation, including examples of previous multiphase modeling studies conducted.

# 4. Identifying Artificial Penetrations and Performing Corrective Action

The purpose of AoR delineation for a proposed GS project is to determine the area where any geologic features or artificial penetrations (e.g., wells) may become conduits for fluid movement out of the injection zone, or additional zones, and potentially cause endangerment to a USDW. Artificial penetrations include any man-made structures, such as wells or mines, which provide a flow path out of the injection zone. The Class VI Rule requires that the owner or operator prepare, maintain, and implement a AoR and Corrective Action Plan that includes a description of how corrective action will be performed on any artificial penetrations through the confining zone and whether such action will be phased [40 CFR 146.84(b)(2)(iv)].

This section discusses the identification and evaluation of artificial penetrations and the performance of required corrective action (if necessary). Monitoring activities necessary for detection of fluid leakage into USDWs are discussed in the *UIC Program Class VI Well Testing and Monitoring Guidance*.

## 4.1. Rule Requirements

The following rule requirements pertain to corrective action within the AoR:

- 40 CFR 146.84(c)(2): Using methods approved by the UIC Program Director, identify all penetrations, including active and abandoned wells and underground mines, in the AoR that may penetrate the confining zone(s). Provide a description of each well's type, construction, date drilled, location, depth, record of plugging and/ or completion, and any additional information the UIC Program Director may require;

- 40 CFR 146.84(c)(3): Determine which abandoned wells in the AoR have been plugged in a manner that prevents the movement of carbon dioxide or other fluids that may endanger USDWs, including use of materials compatible with the carbon dioxide stream;

- 40 CFR 146.84(d): Perform corrective action on all wells in the AoR that are determined to need corrective action, using methods designed to prevent the movement of fluid into or between USDWs, including use of materials compatible with the carbon dioxide stream, where appropriate;

- 40 CFR 146.84(e)(2): During the AoR reevaluation process, identify all wells in the reevaluated AoR that require corrective action in the same manner specified in 40 CFR 146.84(c);

- 40 CFR 146.84(e)(3): Perform corrective action on wells requiring corrective action in the reevaluated AoR in the same manner specified in 40 CFR 146.84(d);

- 40 CFR 146.84(e)(4): Revise the AoR and Corrective Action Plan as necessary whenever the AoR is reevaluated.

### 4.2. Identifying Artificial Penetrations within the AoR

The Class VI Rule requires potential Class VI injection well owners or operators to identify all artificial penetrations located within the delineated AoR, including active and abandoned wells and underground mines, that may penetrate the confining zone, and provide a description of each well's type, construction, date drilled, location, depth, and if applicable, the record of plugging and/or completion, and any additional information the UIC Program Director may require [40 CFR 146.84(c)(2)]. If the identified abandoned wells have been improperly plugged or not plugged at all, such penetrations can provide unimpeded flow conduits out of the injection zone. As such, they must be properly plugged in order to prevent endangerment of USDWs [40 CFR 146.84(d)].

A variety of types of abandoned wells may exist within the delineated AoR of a proposed GS project, including wells constructed prior to federal or state regulation (i.e., in the late 1800s or early 1900s) and any recently decommissioned wells. Wells constructed during early oil exploration, including cable-tool drilled wells, pose the largest risk because these wells may be relatively deep and often consist of an open (i.e., non-cased) well bore over much of their length. These older wells may also not have been documented in state or local records.

Historically, wells no longer in use may not have been plugged and abandoned by today's common standards. Prior to the early 1900s, there were no regulations concerning well abandonment and it is unlikely that those wells were abandoned properly. Even in states regulating well abandonment, it is likely that any wells abandoned before 1952 may have inadequate plugs (Ide et al., 2006). In 1952, the American Petroleum Institute (API) published its standards for cements for oil and gas wells. Prior to that, cement often lacked sufficient additives to achieve the proper cement setting in the conditions experienced in oil and gas wells. As a result, the plugs in many of these older wells failed to set properly and may have experienced channeling and/or cement failure because of fluid intrusion into the improperly set cement. The potential also exists for more recently constructed wells to have been decommissioned improperly. For example, owners or operators may have gone bankrupt and failed to plug their wells or used substandard materials.

Depending on site conditions and corrosion, "properly" plugged wells may also contain zones (i.e., annular spaces) that could serve as a conduit for fluid movement. In other cases, the well plugs may have degraded over time because of a poor cement job and/or corrosive conditions. Even properly plugged wells may have been plugged with types of cement that could degrade when in contact with a carbon dioxide plume. See the *UIC Program Class VI Well Construction Guidance* for information on compatibility of different materials with a carbon dioxide stream.

Detecting abandoned wells can be very challenging in certain locations because of the variety of wells that may exist. In addition, steel casings, the primary detectable portion of the well, were often removed from abandoned wells for recycling and use during World War II (Gochioco and Ruev, 2006). These challenges are compounded by the potentially large AoR delineation determined for a proposed Class VI injection project, and therefore the greater surface area that will have to be evaluated for the presence of artificial penetrations. However, as discussed

below, several methods and sources of information are available to identify those artificial penetrations in a relatively efficient manner. The primary stages of an abandoned well investigation within the AoR include historical research, site reconnaissance, review of aerial and satellite imagery, and one or more geophysical surveys. The reader is referred to additional standard references regarding identification of artificial penetrations for further information (Jordan and Hare, 2002; Frischknecht et al., 1985; ASTM, 2005).

### 4.2.1. Historical Research

Most deep wells that may penetrate the primary confining zone of a proposed GS project site are related to oil and gas exploration and production. Deep well drilling for oil and gas exploration dates back to the 1870s. State and local databases of well exploration may include locations of abandoned wells, and EPA recommends conducting a records review as the first step in abandoned well identification within the delineated AoR for a proposed Class VI injection well. In addition, state and local records will provide information on the time period and types of exploration that have been conducted in an area, and they may also provide information on typical completion and abandonment methods in a given field. This records search will provide a list of known abandoned wells, and it may inform additional stages of abandoned well identification.

State well databases will, in most cases, provide valuable information for assistance with the identification of abandoned wells. Prior to well construction, a government permitting authority requires owners or operators to seek a permit to drill from a specific agency, such as a state natural resources agency, environmental quality agency, or geological survey. Most states maintain records of drilled wells, including location, construction, operating, and plugging information. Although these records can take many forms, many states now have comprehensive databases of these well records that have been digitized and made available online. However, when conducting this historical records search, owners or operators of proposed Class VI injection wells should be aware that older well records may not have been entered into databases. In some cases, the records from different time periods may be filed in separate locations or on separate types of media.

For example, the Wyoming Oil and Gas Conservation Commission maintains a digital database, accessible online, of wells within the state. (See http://wogcc.state.wy.us for more information on this database.) Basic information is available to the public regarding each well, including geophysical survey results where available. The database can be searched by location, well name, and well number, among other fields. The state also has a "well book" available online, which contains records of older wells not entered in the database.

In addition, county records, including survey maps, ownership records, and chain-of-title and property lease history, maintained by local tax assessors and county clerks, list abandoned wells in many cases. Such records may also indicate land use and indicate areas and timeframes in which drilling activities likely occurred. Private data compilation services often maintain detailed databases for the purpose of oil and gas exploration, including information regarding well locations, plugging, and abandonment. Often these services will maintain maps of known well

locations. While these maps can be out of date, most private services have been known to update their database for a fee.

### 4.2.2. Site Reconnaissance

Site reconnaissance includes interviewing local residents and property owners, as well as conducting a physical search for features indicative of abandoned wells. Initial site reconnaissance may be informed by the historical database research. For example, the records search may indicate that, with a great deal of confidence, certain regions of the AoR have never been subject to oil and gas exploration, deep well injection, or any other activity that may result in deep well penetration. In this case, the owners or operators may choose to exclude those areas from any additional well identification efforts.

Local residents that may be well informed regarding abandoned wells include oilfield workers and service company employees, including consultants, and property and drilling-rights ownership brokers. Such informed residents may be able to provide information on the areas and timeframes where past drilling occurred. They may also be able to give additional details in response to specific questions and provide information on locations, completion methods, and plugging of wells.

Surface features that may be indicative of abandoned wells include abandoned well derricks, access roads, brine pits, or vegetation stress associated with brine leakage. Detection of these features at a site indicates the possible likelihood of one or more wells in the area. EPA recommends that, because the AoR is likely to cover a large area, a surface review for such features is most effectively supplemented by use of aerial surveys or photos.

### 4.2.3. Aerial and Satellite Imagery Review

EPA recommends that historical aerial photographs and satellite imagery be used in the identification of abandoned wells. Aerial photographic surveys, taken from airplanes, were conducted beginning in the 1930s and are available from a variety of governmental and private information services. All historical aerial photos within the AoR are recommended to be reviewed for evidence of past drilling activity. Surface features that provide a "signature" of drilling activity include drill derricks, rig platforms, brine pits, power sources, and access roads.

Depending on the resolution of the image, satellite (i.e., remote sensing) images may be used to detect wellheads, derricks, and surface features indicative of abandoned wells. These include spatial patterns indicative of a well site, brine pits, modified topography, and vegetation stress associated with brine leakage.

### 4.2.4. Geophysical Surveys

Geophysical surveys, including magnetic, ground penetrating radar (GPR), and electromagnetic methods, can be used in the detection of abandoned wells. EPA recommends conducting geophysical surveys throughout regions of the AoR that may have been subject to oil and gas

exploration, deep well injection, or any other activity that may result in deep well penetration. Geophysical methods will supplement other identification methods, discussed above. Geophysical methods can help to pinpoint locations of known wells where surface evidence of the well has been removed or can help to identify abandoned wells that are undocumented. The type(s) of geophysical surveys conducted at a proposed Class VI injection well site are based on known site subsurface and surface conditions. In general, at least two different types of geophysical surveys are recommended in order to parse data background noise and to inform the interpretation of survey results. As discussed below, ground or aerial (e.g., aeromagnetic) surveys may be conducted, depending on the size of the area of interest.

#### 4.2.4.1. Magnetic Methods

The magnetic method is one of the oldest and most well developed geophysical techniques, and it is the standard method used for abandoned well detection. Magnetic surveys measure a component of the magnetic field near the land surface. Any anomalies in the magnetic field are caused by subsurface features, which could include abandoned well bores with iron or steel casings. Anomalies associated with well casings are typically distinguishable from the background magnetic field.

Magnetic surveys are applicable to abandoned wells with iron or steel casings or to wellheads in areas with relatively low background magnetic signatures. Areas with significant cultural development on the surface or in the shallow subsurface may have high interferences. Airborne magnetic surveys can detect most wells constructed with approximately 200 feet or more of at least 8-inch casing, and in some cases, very large cavities (Frischknecht et al., 1985). However, open well bores, non-steel casings, or severely corroded casings cannot typically be detected with a magnetic survey.

Ground or aerial (i.e., aeromagnetic) surveys may be conducted, depending on the size of the area of interest. Aeromagnetic surveys will likely be more practical for most GS projects due to the anticipated size of the delineated AoR, as they can collect large amounts of data in a relatively short amount of time. Both ground and aerial surveys are conducted along straight-line transects. EPA recommends that that ground survey transect spacing be no larger than 20–30 feet, and aerial survey transect spacing be no larger than 50–100 feet (Jordan and Hare, 2002).

Magnetic surveys may be conducted to measure the total magnetic field, or the vertical or horizontal field gradients. For the purpose of locating abandoned well bores, the total magnetic field measurement type is recommended. During these surveys, EPA recommends that the operator periodically return to a common point to ensure instrument repeatability, continuously measure diurnal variation in the magnetic field, and avoid high magnetic gradients. Data processing of magnetic surveys includes incorporation of spatial positioning data, correction for diurnal variation, and data filtering.

Figure 4-1 compares aeromagnetic survey results for the Coon Creek oil field in Oklahoma to abandoned wells identified from aerial imagery (USGS, 1995). As shown in the figure, magnetic anomalies associated with well casings are typically apparent. However, this figure also reveals

some of the typical challenges that may be faced by owners or operators in abandoned well bore identification. One challenge is that, due to the presence of other buried infrastructure (e.g., pipes), certain regions exhibit larger magnetic field values even if wells are not present. Additionally, some wells may not be identified in the aeromagnetic survey, most likely because of well casing removals. These challenges demonstrate the benefits of using multiple survey techniques in order to properly identify abandoned wells.

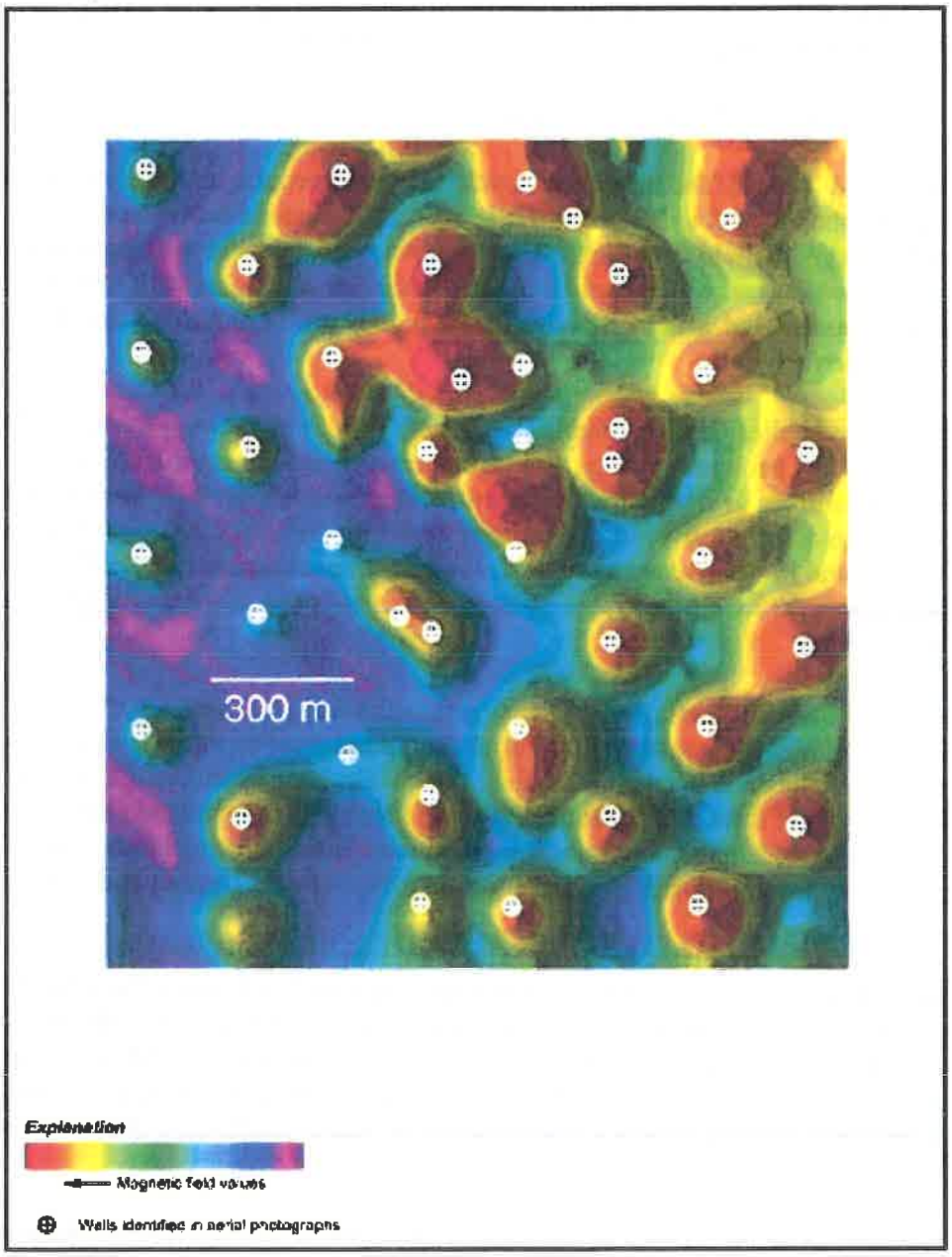



**Figure 4-1: Total Field Aeromagnetic Map, Cook Creek Oil Field, Arcadia, Oklahoma.**
From: USGS (1995).

#### 4.2.4.3. Electromagnetic Methods

Electromagnetic methods used for abandoned well bore detection include frequency-domain and time-domain electromagnetic surveys. These surveys consist of an electromagnetic transmitter that establishes an electromagnetic field measured by a receiver. Similar to magnetic surveys, electromagnetic surveys are non-invasive, as both the transmitter and receiver are positioned above the ground surface. Both surface and aerial electromagnetic surveys are possible. The depth at which these instruments are able to detect objects depends on the size and geometry of the sensor, the size and conductivity of the target, and the potential interference from other sources, such as fences and pipelines. Generally, object detection at depths ranging from a few meters to several hundred meters is possible. Larger and more complex arrays are required at greater depths. Aerial surveys are not likely able to detect small objects, such as well casings, but may detect brine plumes, which may indicate the presence of abandoned wells (Jordan and Hare, 2002).

Abandoned well bore detection using electromagnetic methods is based on the larger conductivity of steel casings and other well materials compared to surrounding soils and geologic formations. These methods may detect anomalous fluids associated with leakage from an abandoned well. Frequency-domain electromagnetic methods can measure current induced in the subsurface by the electromagnetic field established by the transmitter. Induced current establishes a secondary electromagnetic field detected by the receiver. The magnitude of the induced current is a function of subsurface conditions, including conductivity. Time-domain electromagnetic methods measure the decay of the secondary magnetic field created by the induced current, and they can be especially useful for detection of brine leakage.

#### 4.2.4.4. Ground Penetrating Radar

GPR may be used in abandoned well bore detection and in finding other artificial penetrations. Unlike other geophysical methods, GPR does not rely on the presence of a steel or iron well bore, so it may be able to detect open boreholes and non-metallic materials. GPR uses high frequency radio waves to measure the transmission of electromagnetic energy. The investigation depth possible depends on the frequency of the radio waves and the conductivity of the ground. The greater the depth, the less resolution the instrument will have. For small objects, such as well casings, depths are limited to a few meters (Jordan and Hare, 2002). This depth limitation may lessen the value of GPR in areas with large topographical changes. GPR is also slower than magnetic or electromagnetic methods. GPR is likely not as practical to use throughout the delineated AoR as an initial larger scale survey method because the distance between transect lines for sufficient resolution is too small. Instead, EPA recommends using GPR to determine the exact location of abandoned well bores within a given area that have already been identified by earlier, larger scale surveys.

### 4.3. Assessing Identified Abandoned Wells

After all artificial penetrations within the AoR that may penetrate the confining zone have been identified, the owners or operators of a proposed Class VI injection well must evaluate the

potential for each artificial penetration to serve as a conduit for fluid movement. In particular, owners or operators must establish which abandoned wells in the AoR, if any, have not been plugged in a manner that would prevent the movement of carbon dioxide or other fluids that may endanger USDWs [40 CFR 146.84(c)(3)]. To prevent fluid movement, abandoned wells should include a cement plug through the primary confining zone, and/or across the injection zone/confining zone contact, with sufficient integrity to contain separate-phase carbon dioxide and elevated pressures. The type of plugging that is sufficient to contain carbon dioxide and formation fluids from the injection zone will be site specific and should be reviewed with the UIC Program Director. In the absence of an adequate plug across the confining zone, cross-migration may occur where fluids enter a permeable zone below the lowermost USDW and then migrate upward from that zone. See Figure 4-2 for more information. EPA recommends cement surface plugs (typically required by well abandonment regulations), and the UIC Program Director may require additional plugs based on site-specific circumstances.

Evaluation of the wells in the AoR requires a two-step approach. The first step is to review whatever records are available, as outlined in Section 4.3.1, for information relevant to proper plugging. The second step is to perform physical tests on wells that are suspect or for which no records are available.

### 4.3.1. Abandoned Well Plugging Records Review

A records review can aid in reducing the number of identified wells that may need to be evaluated by future field testing. Records of wells that have been recently abandoned, have no mentions of any difficulties experienced during the abandonment procedure, are cased holes, and have plugs and cement situated to isolate the injection zone from other fluid containing zones may be used to justify reduction in the number of follow-up field investigations. If records are incomplete or indicate that the well has not been plugged or was inadequately plugged, follow-up field investigations should be performed. Identified undocumented wells will have no records and will require field investigation in order to determine the quality of plugging, as required in the Class VI Rule [40 CFR 146.84(c)(3)]. The owner or operator may also choose to plug any questionably abandoned wells rather than go through the expense of evaluating the plugs.

There are many elements in existing reports that can help in determining the adequacy of abandonment procedures for identified wells located within the AoR. Some key elements to review include, but are not limited to:

- Well depth and completion;
- Well abandonment date;
- Open hole or cased hole;
- Location of plugs;
- Casing and cementing records;
- Records of mechanical integrity tests (MITs) or logs performed; and
- Well deviation.

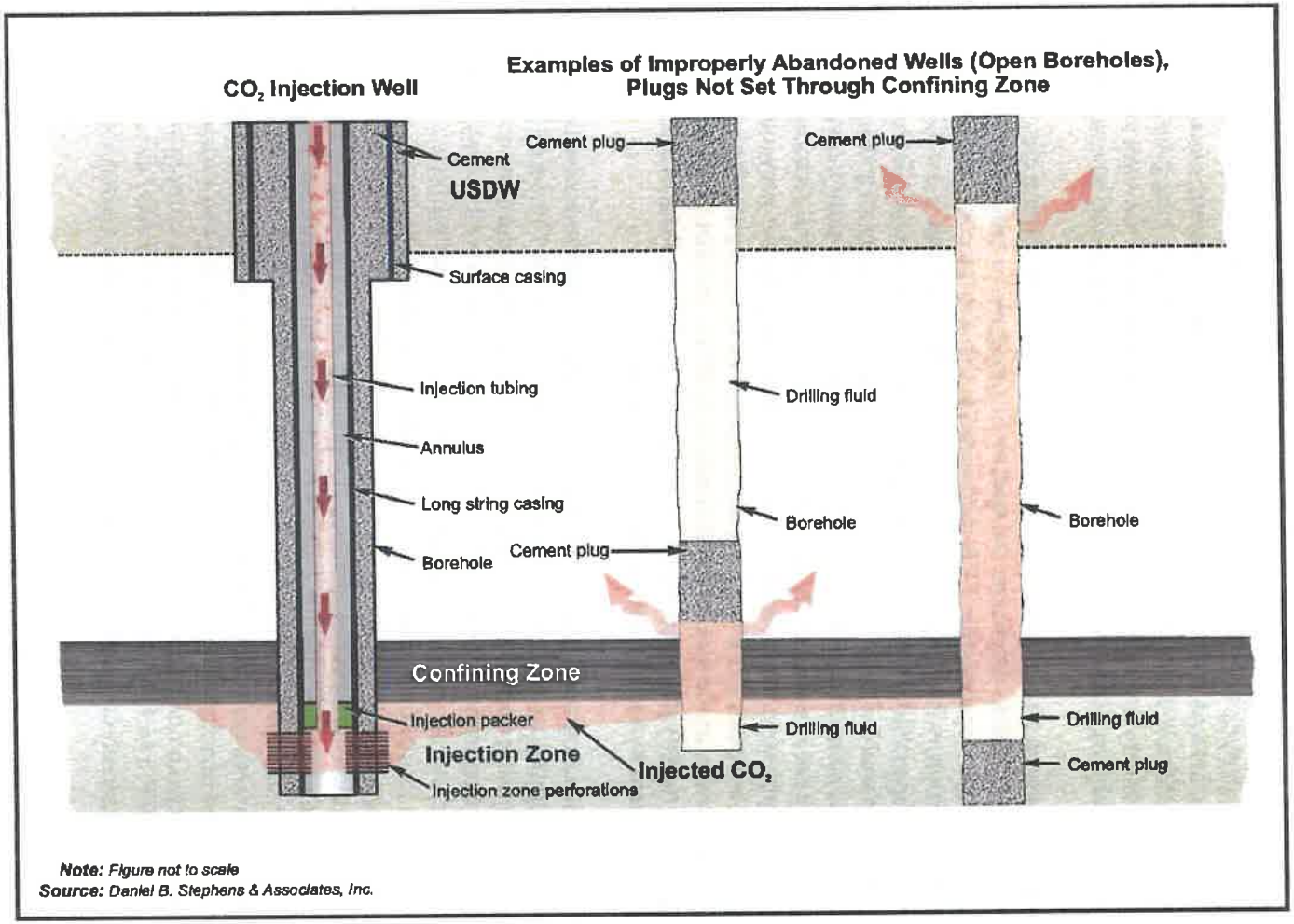



**Figure 4-2: Examples of Carbon Dioxide Leakage Through Improperly Abandoned Wells.**

The well completion depth is important in determining if the identified abandoned well may penetrate the proposed confining zone(s). If the well completion depth is above the confining zone(s), no further action would likely need to be taken. The date of abandonment may also provide information as to the adequacy of the abandonment procedure. Whether the well was abandoned with casing or as an open hole is an important consideration in determining the likelihood that the well might act as a conduit for fluid movement. Open holes are susceptible to cross-migration between aquifers. If the hole is open and there is not a proper plug located at a depth corresponding to the primary confining zone, fluids may migrate out of the injection zone and into a USDW. For cased holes, EPA recommends that integrity of the casing be evaluated.

The location and type of plugs are also important factors, especially in open-hole wells. The plug locations must be reviewed in order to determine the quality of plugging, as required in the Class VI Rule [40 CFR 146.84(c)(3)]. For example, EPA recommends that the injection zone be isolated from all other formations with plugs. This may be especially important if a well was completed in a formation deeper than the proposed injection zone. EPA recommends that any length of the well in the proposed injection zone be properly isolated by means of plugs and casing. Mechanical plugs and cemented casing are not sufficient for the long-term isolation of carbon dioxide, as eventually the metal is likely to corrode and the plug will fail (Randhol et al., 2007). Therefore, cement plugs are considered superior to mechanical plugs for preventing the movement of fluids into or between USDWs. EPA recommends that cement plugs be located across the bottom of any casings, at the base of the lowermost USDW, and that plugging fluid (i.e., composition, specific gravity) characteristics be considered, as drilling fluid of sufficient weight may resist displacement by the injectate or mobilized fluids.

The integrity of any existing casing and cement must be determined in order to assess the quality of well construction and plugging, as required in the Class VI Rule [40 CFR 146.84(c)(3)]. EPA recommends reviewing the casing and cement quality through the proposed injection zone in order to ensure that they are appropriate for contact with carbon dioxide, as well as reviewing any additional well records that may indicate unusual conditions experienced during casing and cementing. Events such as a loss of circulation, well bore stability problems, lack of the use of centralizers, and/or improper removal of drilling mud before cementing can all lead to premature cement or casing failure. Reviewing load calculations, if available, and comparing them to actual events recorded in the drilling log may give the owners or operators an indication of an under-designed casing that may be susceptible to failure. For example, if the casing had a low axial loading stress and stuck pipe was experienced during casing placement, it is possible that the casing may have experienced damage. The materials used for the well casing and cement must also be assessed to see if they are compatible with carbon dioxide, in order to comply with Class VI Rule requirements [40 CFR 146.84(c)(3)]. See the *UIC Program Class VI Well Construction Guidance* for more information on compatibility of different materials with a carbon dioxide stream.

Any tests performed on the well prior to its abandonment can also be useful information. An MIT such as a pressure test, noise log, temperature log, or cement evaluation log can provide information on any known or suspected leaks. If leaks were encountered, EPA recommends determining if the source of the leak was found and repaired. If the leaks were not sealed,

corrective action would be required to be taken to plug the leaks as discussed below [40 CFR 146.84(d)]. Drilling records can yield clues as to areas that might be susceptible to failure. Mud logs and open-hole caliper logs can show areas of weak formations. Weak formations are susceptible to well bore instability and subsequent cement failure. Cement evaluation logs and temperature logs taken at the time of completion can also give an idea of the condition of the cement, although degradation is always possible after well completion. Any corrosion logs will help provide information on the condition of the casing. Results from mechanical caliper logs, electromagnetic thickness logs, or down-hole video can show the casing condition when the well was abandoned. For more information regarding these logs and tests, see the *UIC Program Class VI Well Testing and Monitoring Guidance*.

Evaluation of well records for deviation during drilling may also identify wells more likely to be in need of corrective action, as deviated wells are far more likely to fail than wells with no deviation (Watson, 2009). Events such as well bore collapse during drilling or conditions that placed unusual loads on the casing may also indicate a higher chance of failed well bore integrity. EPA recommends that the design casing load also be checked to ensure adequacy for the actual loads faced by the well.

### 4.3.2. Abandoned Well Field Testing

After all the available records have been reviewed, any wells located within the AoR that cannot be proven to have plugs adequate to prevent migration of carbon dioxide or formation fluids out of the injection zone must be evaluated by field tests in order to determine the quality of plugging, as required in the Class VI Rule [40 CFR 146.84(c)(3)]. Evaluation and corrective action for wells which the plume is not expected to reach in the near future may be phased. If the owner or operator chooses and the UIC Program Director agrees, the evaluation may be omitted and the wells re-plugged. If the integrity of the bottom plug or cement is in question, and records cannot prove that the plugging is adequate, EPA recommends that the surface plug and possibly additional plugs down-hole be drilled out and tests conducted to determine the adequacy of abandonment. There are numerous field tests available to evaluate the integrity of abandoned wells. Several of these tests are discussed in detail in the *UIC Program Class VI Well Testing and Monitoring Guidance*. Additionally, the owner or operator must demonstrate guaranteed site access to wells potentially needing corrective action in the future [40 CFR 146.84(b)(iv)]. The owner or operator is encouraged to consult the UIC Program Director regarding any difficulties in gaining site access in order to evaluate and perform corrective action on any identified improperly plugged abandoned wells.

EPA recommends that both the casing and the cement plugs be evaluated. Casing failure is most common at joints and in weak formations where instability around the well bore can lead to failed cement and to casing buckling. Weak formations are also common areas for cement failure, as are high pressure formations, due to fluid intrusion. Tools used to evaluate the cement and casing include, but are not limited to:

- Multi-finger caliper log;
- Sonic scanner;

- Ultrasonic imaging tool;
- Cement evaluation log;
- Radioactive tracer;
- Cased hole dynamic tester;
- Modular sidewall coring tool; and
- Cased hole fluid test.

Multi-finger caliper logs measure the radius of the borehole in a non-destructive way. They can give a 360-degree picture of the inside of the casing and identify any defects caused by corrosion, erosion, or other events (e.g., dropped tools).

A sonic scanner sends out sound waves and measures the returned waves in receivers. The log provides information on the quality of the casing-cement bond and the cement-formation bond. The sonic scanner averages the results for the entire radius and therefore cannot provide three-dimensional pictures of the cement bond, or determine the reasons for a poor quality cement bond. An ultrasonic imaging tool is another non-destructive tool that uses ultrasonic transmitters and receivers to determine information about the casing and cement. The ultrasonic imaging tool can return 360-degree information on casing thickness, cement thickness, and cement bond. More information on these tools can be found in Duguid and Crow (2007) and Close et al. (2009).

A cement evaluation log is another tool used and log results include information on both the cement and the bond quality. This log provides results that are averaged over the circumference of the well, and testing is typically conducted in combination with an ultrasonic imaging tool to provide more complete information on the three-dimensional picture of the well. In some cases, the cement hardens while the well casing is under pressure and, when pressure is released, microannuli can form between the casing and cement. If unconnected to other cracks, these microannuli cannot transmit fluid, but they will appear in logging results as a potential poor bond. This artifact can be evaluated by performing the cement evaluation log under pressure (Randhol et al., 2007). Radioactive tracers also can be used to detect leaks in casing and cement and fluid leaking along channels in the well bore. Radioactive tracers are injected down the well, and gamma detectors are used to detect any fluid flow.

Cased-hole dynamic testers measure mobility or porosity. They can be used to determine the porosity of the cement. They are semi-destructive tests as they do create a small hole in the casing and cement; however, the hole is patched after the test is run. The instrument works well in highly permeable formations or in cement, while performance in lower porosity formations is still under investigation.

Modular sidewall coring tools take small cores of the casing and cement for analysis in the laboratory. Laboratory analyses can include scanning electron microscopy, X-ray diffraction, and measurements of permeability and density. This is a more destructive test that leaves approximately 1-inch diameter holes in the side of the well, which is then patched with a remedial cement squeeze after testing is completed. Cased-hole fluid testers can be run with the

cased-hole mobility tool, using optical instruments to determine what fluids are present in the formation outside the well bore.

In general, EPA recommends that these tests be run sequentially, from the simplest and least destructive tests to the more complicated and destructive tests. This way, if a flaw is found with a simpler test that determines that the well should be plugged or otherwise remediated, the more expensive and destructive tests may be avoided. The typical order of running the tests is caliper log, sonic and ultrasonic tools, cased-hole mobility and fluid tests, and then sidewall cores (Duguid and Crow, 2007). This set of tools can be used to determine the quality of the casing and cement; if flaws such as degraded cement porosity, casing corrosion, microannuli in the cement, channels between the cement and casing or cement and formation, or missing cement are found, the Class VI Rule requires that corrective action be performed on the well [40 CFR 146.84(d)]. A brief summary of the main methods for evaluating cement and casing condition along with major benefits and disadvantages are included in Table 4-1 below.

**Table 4-1: Tools for Assessment of the Integrity of Abandoned Wells.**

| Tool | Target | Advantages | Disadvantages |
|---|---|---|---|
| Multifinger calipers | Casing | Non-destructive, relatively simple | Only examines interior, only detects casing damage |
| Sonic Logs | Cement | Non-destructive, yields information on cement bond | Results averaged over well circumference, can't indicate reasons for poor quality bond |
| Ultrasonic Logs | Casing, Cement | Non-destructive, can detect flaws in casing and cement, provides three-dimensional images | Sensitive to well fluids |
| Cement evaluation log | Cement | Non-destructive, yields information on quality of cement bond | Results averaged over well circumference |
| Tracers | Leak detection | Can pinpoint routes of leaks, channeling | Radioactive tracers require special handling and may have negative public perception |
| Dynamic Cased Hole Tester | Cement | Can determine porosity of cement | Semi-destructive, untested in low porosity conditions |
| Sidewall coring | Cement | Can give detailed analysis of cement condition | Destructive |

## 4.4. Performing Corrective Action on Wells Within the AoR

The Class VI Rule requires that owners or operators of Class VI injection wells perform corrective action on all artificial penetrations in the AoR that may penetrate the confining zone and are determined to have been plugged and abandoned in a manner such that they could serve

as a conduit for fluid movement and endanger USDWs [40 CFR 146.84(d)]. In performing corrective action, owners or operators must use methods designed to prevent the movement of fluid into or between USDWs, including use of materials compatible with the carbon dioxide stream, where appropriate [40 CFR 146.84(d)]. Figure 4-3 presents a decision tree that illustrates how the various evaluation tools can be used together to evaluate abandoned wells in an efficient and logical manner.

As described above, the Class VI Rule allows owners or operators to perform corrective action on a phased basis, if approved by the UIC Program Director. If a phased approach is approved for performing corrective action for a GS project, EPA recommends that all required corrective action on wells identified as deficient during the permit application process (or AoR reevaluations) receive corrective action prior to the end of the injection phase.

It is possible that some corrective action may be performed during the post-injection phase. For example, if the plume and pressure front movement were to deviate from predictions, this may necessitate corrective action for newly identified artificial penetration during the post-injection phase.

Performing corrective action on improperly abandoned wells is intended to prevent the movement of carbon dioxide or other mobilized fluids into or between USDWs. Acceptable forms of corrective action include well plugging and/or remedial cementing of the improperly abandoned well. In addition to corrective action, EPA recommends performing enhanced monitoring in the vicinity of improperly abandoned wells, including ground water monitoring and using indirect geophysical techniques for obtaining monitoring results. Appropriate monitoring for Class VI injection wells is discussed in the *UIC Program Class VI Well Testing and Monitoring Guidance.*

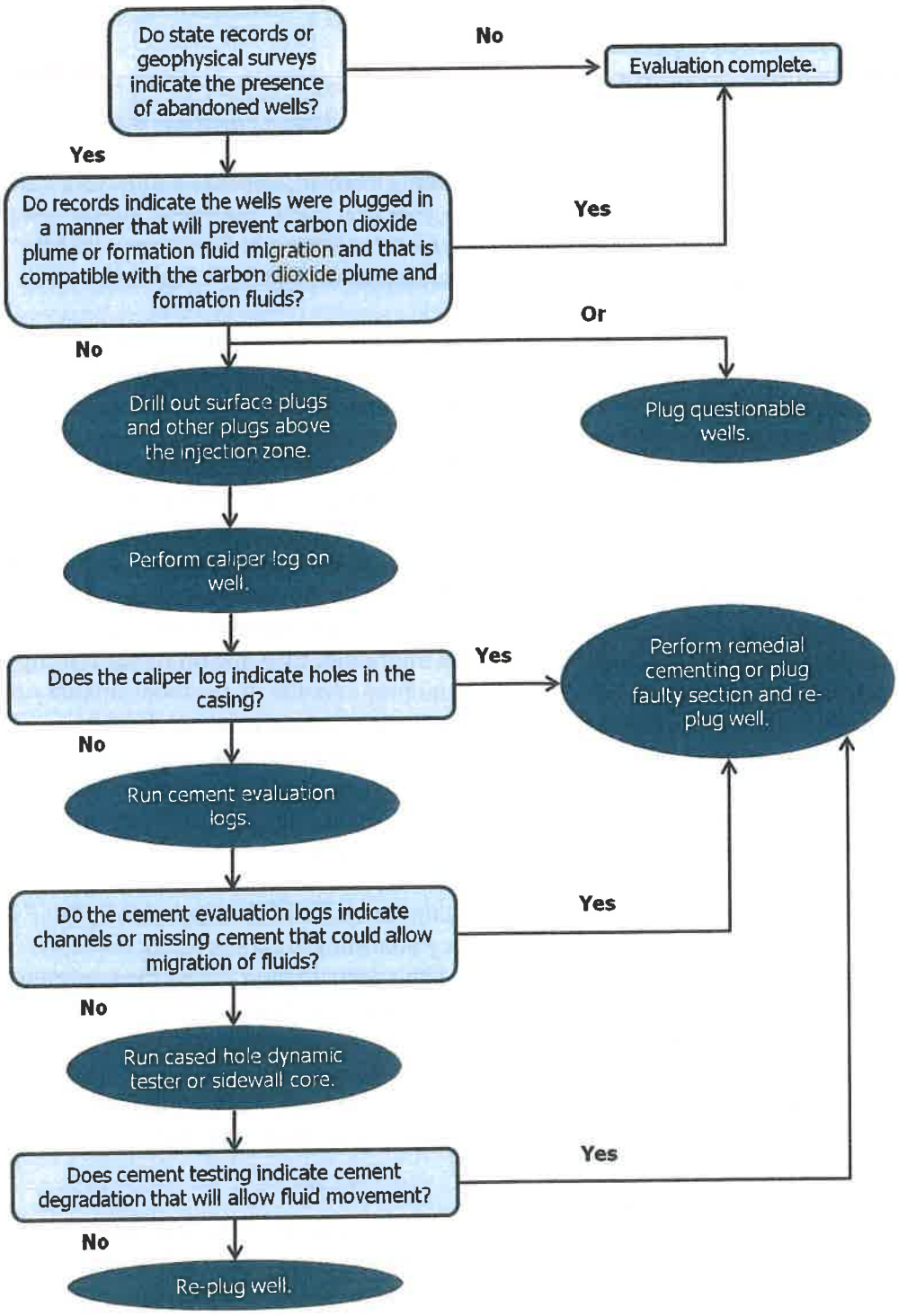



**Figure 4-3: Well Evaluation Decision Tree.**

### 4.4.1. Plugging of Wells within the AoR

Plugging of Class VI injection wells at the cessation of the injection phase of the project is discussed in detail in the *UIC Program Guidance on Class VI Well Plugging, Post-Injection Site Care, and Site Closure*. This section focuses on the plugging of improperly abandoned wells within the AoR prior to the commencement of injection. However, because similarities exist in plugging techniques for abandoned wells and former injection wells, the reader should refer to the *UIC Program Guidance on Class VI Well Plugging, Post-Injection Site Care, and Site Closure* for further detail regarding well plugging techniques for Class VI injection wells.

A well requires plugging if records indicate that an abandoned well was not plugged, was plugged and abandoned improperly, or has not been plugged in a manner that prevents movement of carbon dioxide or other fluids that may endanger USDWs [40 CFR 146.84(c) and (d)]. In addition, where records indicate that a well plug does not exist at a depth corresponding to the primary confining layer of the GS project, EPA recommends that the well have an additional plug set at this depth to meet the requirements of the Class VI Rule. Where records indicate that there are no well plugs below USDWs or other permeable formations that may exhibit cross flow of mobilized fluids, additional plugs may be required by the UIC Program Director for proper corrective action in these zones. Also, in wells that were plugged but the evaluation techniques discussed in Section 4.3 of this guidance document reveal cracks, channels, or annuli in the plug that would allow fluid migration, EPA recommends drilling out and replacing the plug. In addition, if the plug material may corrode in a carbon-dioxide rich environment, EPA recommends replacing it. For wells where casing exists at depths corresponding to the injection and/or confining zone and the annular space may serve as a conduit for fluid movement if not properly cemented, remedial cementing may be necessary or the casing may need to be removed and replaced with a cement plug. See Section 4.4.2 of this guidance document for more information on remedial cementing.

For the plugging of improperly abandoned wells within the AoR, EPA recommends that a plug be set at a depth interval corresponding to the primary confining zone overlying the injection zone of the Class VI injection well. In the absence of an adequate plug across the confining zone, cross-migration may occur wherein fluids enter a permeable zone below the lowermost USDW and then migrate upward from that zone. See Figure 4-2 of this guidance document for more information. However, in order to supplement the confining-zone plug, ideal additional plugging zones include the bottom of any casings and across any USDWs. A surface plug would also typically be required by local well abandonment regulations to ensure that there is no risk of anyone physically falling into the well bore.

To provide the best possible barrier to carbon dioxide migration out of the injection zone, EPA recommends that corrective action be conducted in a manner to provide multiple barriers to carbon dioxide migration and avoid underground cross-flow. Materials that are compatible with the carbon dioxide must be used where appropriate [40 CFR 146.84(d)]. Material compatibility with carbon dioxide is discussed further in the *UIC Program Class VI Well Construction Guidance*.

### 4.4.2. Remedial Cementing

Properly cementing improperly abandoned wells located within the delineated AoR between any existing well casing and the geologic formation, especially through the injection zone, provides an important fluid migration barrier. EPA recommends performing remedial cementing in order to meet the corrective action requirements of the Class VI Rule if a well has been properly plugged but the records, or any testing such as that described in Section 4.3 of this guidance, indicate that the cement surrounding the well bore has failed or has cracks, channels, or annuli that could allow migration of carbon dioxide. Key areas on which to focus remedial cementing include depths corresponding to the injection zone and through any other permeable zones.

Remedial cementing is performed through squeeze cementing, where the cement is emplaced into the affected area. For more information on cement squeezes, refer to Reynolds and Kiker (2003). Increased pressure on the cement forces water out of the cement slurry leaving behind the partially dehydrated cement. Cement squeezes can either be low pressure or high pressure. Low pressure squeezes are used to set a small amount of cement in a given area and operate at a pressure lower than the fracture pressure of the formation. Higher pressure squeezes are used when channels or disconnected microannuli are to be cemented. The higher pressure squeezes may fracture the formation and then allow the cement to flow into disconnected channels.

Cement squeezes can be performed using either a packer or a bradenhead squeeze. The methods differ in how the treated section is isolated from the rest of the well. In the packer squeeze, packers isolate the area to be treated, and a bridge plug isolates the area below the area to be cemented, while a modified packer with a bypass valve isolates the area above the treated area. Cement retainers are used if significant back pressure is expected. A bradenhead squeeze only isolates the area below the area to be cemented. It is typically used only if the casing above the treated area is strong enough to withstand the squeeze pressure. In cement squeezes, either drillable packers or retrievable packers can be used. Drillable packers allow less freedom in placement but better control of the cement. They are preferred if high pressures are maintained on the cement after the squeeze.

Cements used in squeeze cementing can vary depending on the nature of the defect. The Class VI Rule requires that all materials used for cementing of abandoned wells be compatible with the carbon dioxide stream, where appropriate [40 CFR 146.84(d)]. Traditional cements may be supplemented with or replaced by materials such as polymer gels and acrylic grouts. Acrylic grouts can be used for small casing leaks or cases where pressure leak off is detected. High concentration low molecular weight polymers can be used for small to moderate leaks. High molecular weight polymers are typically used for channeling and lost circulation applications. Cement or cement/polymer blends are typically used for severe leaks (Randhol et al., 2007).

## 4.5. Reporting Well Identification, Assessment, and Corrective Action to the UIC Program Director

As discussed in the *UIC Program Class VI Well Project Plan Development Guidance*, the AoR and Corrective Action Plan, submitted with the initial stage of the permit application, must

indicate what well identification and assessments will be used and how corrective action will be conducted [40 CFR 146.84(b)(2)(iv)]. The plan is a condition of the permit and is subject to UIC Program Director approval [40 CFR 146.84(b)].

Owners or operators seeking a Class VI injection well permit are required to report the following information regarding abandoned wells within the AoR that may penetrate the primary confining zone: the well's type, construction, date drilled, location, depth, record of plugging and/or completion, and any additional information required by the UIC Program Director [40 CFR 146.82(a)(4)]. This information may be found in acceptable public and private databases, where available. See Section 4.2.1 for more information. In cases where available records do not provide the necessary information or indicate that the well was plugged improperly, in a questionable manner, or with materials inappropriate for contact with carbon dioxide, then site investigations must be performed to establish the condition of the well, as discussed previously [40 CFR 146.84(c)(3)].

The UIC Program Director will review the submitted well information to ensure completeness and may consult with officials at oil and gas or water agencies to ensure that the well search was thorough. The UIC Program Director will also review well completion records to determine those wells that may penetrate the primary confining zone and will likely compare this list to wells scheduled for corrective action and submitted with the Class VI injection well permit application. For those identified abandoned wells that have been determined by the owner or operator to not require corrective action, the UIC Program Director will likely review the records of plugging and any field testing conducted, to verify that the well does not require corrective action. If information on the depth or condition of the plug(s) is missing, the UIC Program Director may request additional tests or require the well to be re-plugged.

Reports of any tests done on abandoned wells must be submitted to the UIC Program Director with the permit application along with a list of wells for which corrective action will be conducted, as part of the AoR and Corrective Action Plan required at 40 CFR 146.84(b). Before receiving authorization to inject, the owner or operator must submit a report on the status of corrective action [40 CFR 146.82(c)(6)], indicating the number, type, and location of the plugs. EPA recommends that owners or operators also submit any records of remedial cementing with the Class VI injection well permit application, along with cement logs showing the methods used and the results of the remedial cementing. Testing and remedial cementing records for wells which are part of a planned later stage of corrective action may be submitted after that phase is completed.

# 5. AoR Reevaluation

The Class VI Rule requires owners or operators of permitted Class VI injection wells to reevaluate the AoR delineation on a regular basis, at a frequency of at least once every five (5) years [40 CFR 146.84(e)]. The purpose of AoR reevaluation is to ensure that the initial model predictions are adequate for predicting the extent of the separate-phase carbon dioxide plume and pressure front. To this end, AoR reevaluation consists of a comparison of modeling predictions and the required site monitoring data [40 CFR 146.90] and a revision of the model used to delineate the AoR when necessary. Because Class VI injection well permits are granted for the lifetime of the project, AoR reevaluation is the primary opportunity for the owner or operator and the UIC Program Director to assess the project's operation and take additional appropriate actions, if necessary, to protect USDWs. If a revision of the AoR delineation is necessary, a revision of the AoR and Corrective Action Plan is also required [40 CFR 146.84(e)(4)], along with other related project plans that may be dependent on the extent of the delineated AoR, including the Testing and Monitoring Plan [40 CFR 146.90(j)]. It is important to note that a change in the AoR and/or the AoR and Corrective Action Plan after the permit is issued may constitute a modification of the Class VI permit, and would be subject to public notice [40 CFR 144.39(a)(5)(i)].

Reevaluations of the AoR must continue throughout the life of the GS project, including the post-injection phase [40 CFR 146.84(e)]. It is likely that, following cessation of injection, the area of increased pressure will reduce in size as pressures dissipate; therefore, EPA expects that the reviews will entail an examination of monitoring data and confirmation and communication to the UIC Program Director that no modifications to the AoR or amendments to any plans are needed. However, this step is necessary to ensure that USDWs are not endangered and that all of the plans in force (including the PISC and Site Closure Plan and the Emergency and Remedial Response Plan) remain protective of USDWs.

## 5.1. Class VI Rule Requirements Related to AoR Reevaluation

The following Class VI Rule requirements pertain to reevaluation of the AoR:

- 40 CFR 146.84(e): At the minimum fixed frequency, not to exceed five years, as specified in the AoR and Corrective Action Plan, or when monitoring and operational conditions warrant, owners or operators must:

  (1) Reevaluate the AoR in the same manner specified in 40 CFR 146.84(c)(1);

  (2) Identify all wells in the reevaluated AoR that require corrective action in the same manner specified in 40 CFR 146.84(c);

  (3) Perform corrective action on wells requiring corrective action in the reevaluated AoR in the same manner specified in 40 CFR 146.84(d); and

  (4) Submit an amended AoR and Corrective Action Plan or demonstrate to the UIC Program Director through monitoring data and modeling results that no amendment to the AoR and Corrective Action Plan is needed. Any amendments

to the AoR and Corrective Action Plan must be approved by the UIC Program Director, must be incorporated into the permit, and are subject to the permit modification requirements at 40 CFR 144.39 or 144.41, as appropriate.

## 5.2. Conditions Warranting an AoR Reevaluation

AoR reevaluation is required at a minimum fixed frequency of at least once every five years, or when monitoring and operational conditions warrant [40 CFR 146.84(e)]. EPA recommends that monitoring and operational conditions that may warrant a reevaluation of the AoR include:

- Significant changes in site operations that may alter model predictions and the AoR delineation;
- Monitoring results for the injected carbon dioxide plume and/or the associated pressure front that differ significantly from model predictions; or
- New site characterization data obtained that may significantly change model predictions and the delineated AoR.

Any site-specific criteria that will trigger an AoR reevaluation for a particular project must be included in the AoR and Corrective Action Plan [40 CFR 146.84(b)(2)(ii)].

### 5.2.1. Minimum Fixed Frequency

As stated above, the owners or operators of permitted Class VI injection wells must reevaluate the AoR delineation at least once every five years [40 CFR 146.84(e)]. The planned fixed frequency for reevaluation must be included in the AoR and Corrective Action Plan [40 CFR 146.84(b)(2)(i)]. The AoR may need to be reevaluated more frequently than the previously scheduled timeframe based on other factors. In these cases, the schedule for AoR reevaluation may be updated appropriately. At no time may AoR reevaluation occur less than once every five years [40 CFR 146.84(e)].

### 5.2.2. Significant Changes in Operations

Significant changes in operation of the GS project and/or individual Class VI injection wells mandate an AoR reevaluation [40 CFR 146.84(e)]. The UIC Program Director may require an AoR reevaluation prior to approving any operational changes. If allowed by the UIC Program Director, operational changes may occur prior to reevaluation of the AoR. In these cases, EPA recommends that the AoR reevaluation be submitted to the UIC Program Director within an agreed-upon timeframe of instituting such changes, as described in the AoR and Corrective Action Plan.

EPA recommends that proposed operational changes warranting an AoR reevaluation may include, but are not limited to, a change in the location or number of Class VI injection wells injecting into the same injection zone and/or a change in carbon dioxide injection rates, volumes, or pressures outside of the limits of the original permit and AoR delineation. Additional

operational changes that may warrant an AoR reevaluation, if required by the UIC Program Director, include a change in the composition of the injectate or changes in fluid production rates from the injection or overlying zones. Based on the discretion of the UIC Program Director, short-term routine operational changes (e.g., temporary well shut-ins) may not warrant reevaluation of the AoR.

In addition, the owner or operator may choose to perform an AoR reevaluation based on other operational changes, with the approval of the UIC Program Director. Specific operational triggers for an AoR reevaluation for a particular Class VI injection well must be included in the AoR and Corrective Action Plan submitted with the permit application for that particular injection well [40 CFR 146.84(b)(2)(ii)]. Operational changes that trigger a reevaluation may be associated with the GS project under which the permitted Class VI injection well operates or with separate projects that inject carbon dioxide into the same injection formation.

### 5.2.3. Results from Site Monitoring that Differ From Model Predictions

EPA recommends that collection of any monitoring data (required under 40 CFR 146.90) that indicate carbon dioxide and/or pressure front migration significantly different than that predicted by the current AoR delineation model warrant an AoR reevaluation. Specific criteria for differences in monitoring data and model predictions that may trigger an AoR reevaluation for a particular project must be included in the AoR and Corrective Action Plan [40 CFR 146.84(b)(2)(ii)]. In such cases, when monitoring data and modeling predictions differ, the owner or operator is encouraged to notify the UIC Program Director and submit an AoR reevaluation within timeframes that have been established in the AoR and Corrective Action Plan. Methods for monitoring the evolution of the carbon dioxide plume and associated pressure front are discussed in more detail in the *UIC Program Class VI Well Testing and Monitoring Guidance.* An example of evaluation of monitoring results during AoR reevaluation is provided in Box 5-1.

The owner or operator is required to perform monitoring to track the extent of the carbon dioxide plume and the presence or absence of elevated pressure [40 CFR 146.90(g)]. Pressure monitoring is required using direct methods (e.g., pressure transducers) within the injection zone, and indirect methods for plume tracking are also required unless the UIC Program Director determines, based on site-specific geology, that such methods are not appropriate [40 CFR 146.90(g)(1) and (2)]. Additionally, the owner or operator is required to perform periodic monitoring of ground water quality and geochemical changes above the primary confining zone that may be a result of carbon dioxide movement through the confining zone [40 CFR 146.90(d)]. On a site-specific basis, the UIC Program Director may require additional geochemical monitoring within the injection zone as a component of carbon dioxide plume tracking [40 CFR 146.90(i)].

EPA recommends that pressure measurements indicative of pressure-front migration further than that predicted by the current computational model warrant an AoR reevaluation. In practice, this would be indicated by an observed increase in pressure at monitoring wells greater than predicted by the computational model. In some cases, pressure measurements may fluctuate, and

short-term temporary pressure increases (e.g., spikes) may not warrant an AoR reevaluation. EPA recommends that the specific pressure monitoring results that would trigger an AoR reevaluation be included in the AoR and Corrective Action Plan. For example, the owner or operator may specify the magnitude and duration of increased pressure that would trigger an AoR reevaluation for each monitoring well.

Results of carbon dioxide plume and pressure-front tracking using indirect methods, such as periodic geophysical surveys, may also be used for comparison to model predictions. Geophysical survey results provide information over relatively large areas, as opposed to "point" measurements provided by monitoring wells. Geophysical survey results are intended to provide an estimate of the extent of the separate-phase carbon dioxide plume and, in some cases, pressure changes. EPA anticipates that results of indirect monitoring that indicate carbon dioxide migration (1) outside of the boundaries of the current AoR delineation, or (2) at rates significantly greater than current model estimates would also warrant an AoR reevaluation.

EPA also recommends performing an AoR reevaluation if the results of the ground water geochemical sampling indicate separate-phase (i.e., supercritical, liquid, or gaseous) carbon dioxide migration outside of the boundaries of the current AoR delineation, or at rates significantly greater than predicted by the computational model. The presence of separate-phase carbon dioxide in the sampled fluids above the confining zone is evidence of carbon dioxide/fluid migration out of the injection zone and is cause to notify the UIC Program Director pursuant to 40 CFR 146.91(c)(1). In addition, elevated carbon dioxide aqueous concentrations may indicate the presence of separate-phase carbon dioxide in the immediate vicinity of the monitoring well.

### 5.2.4. Ongoing Site Characterization

Site characterization is not a one-time exercise at GS project sites. As additional site characterization data are collected via geophysical surveys, the drilling of new injection or monitoring wells, or from other sources, the data must be subsequently incorporated into the existing computational model used for AoR delineation [40 CFR 146.84(c)(1) and (e)(1)]. Types of data that may be incorporated into a reevaluation include newly identified potential conduits for fluid movement, updated information regarding injection or confining zone extent and thickness, or further characterization of formation heterogeneity. The UIC Program Director may also require an AoR reevaluation based on any newly available site characterization data that may impact current modeling predictions.

## 5.3. Performing an AoR Reevaluation

The first step in performing an AoR reevaluation for a Class VI injection well is a comparison of the available monitoring data and the model predictions. If Class VI owners or operators believe that monitoring and modeling data are consistent and that revision of the model is not necessary, they must demonstrate this to the UIC Program Director in lieu of revising the computational model [40 CFR 146.84(e)(4)]. However, if monitoring data and modeling predictions differ significantly, then the Class VI owner or operator must submit an amended AoR and Corrective



BLF-000084

Action Plan and revise both the computational model and the AoR delineation results [40 CFR 146.84(e)(1) and (4)].

## Box 5-1. Hypothetical Example of an AoR Reevaluation

An AoR reevaluation consists of comparing monitoring results of plume and pressure-front movement to model predictions. In this hypothetical example, a continuation of the scenario presented earlier in Boxes 3-1 and 3-2, the AoR reevaluation required after 20 years of injection is illustrated below. In this example, the previously required AoR reevaluations at 5, 10, and 15 years did not result in any AoR delineation modifications.

### Comparison of Plume Monitoring Data

In this hypothetical scenario, monitoring data are available from eight monitoring wells screened within the injection zone and from an indirect geophysical monitoring technique. Monitoring well data are used to assess the potential presence of separate-phase carbon dioxide at each location. The data indicate that separate-phase carbon dioxide is present at one of the monitoring wells. These data are compared to initial model predictions of plume evolution for 20 years after the commencement of injection (Figure 5-1). Carbon dioxide is detected at MW-6, outside of the areas predicted by the model to exhibit carbon dioxide.

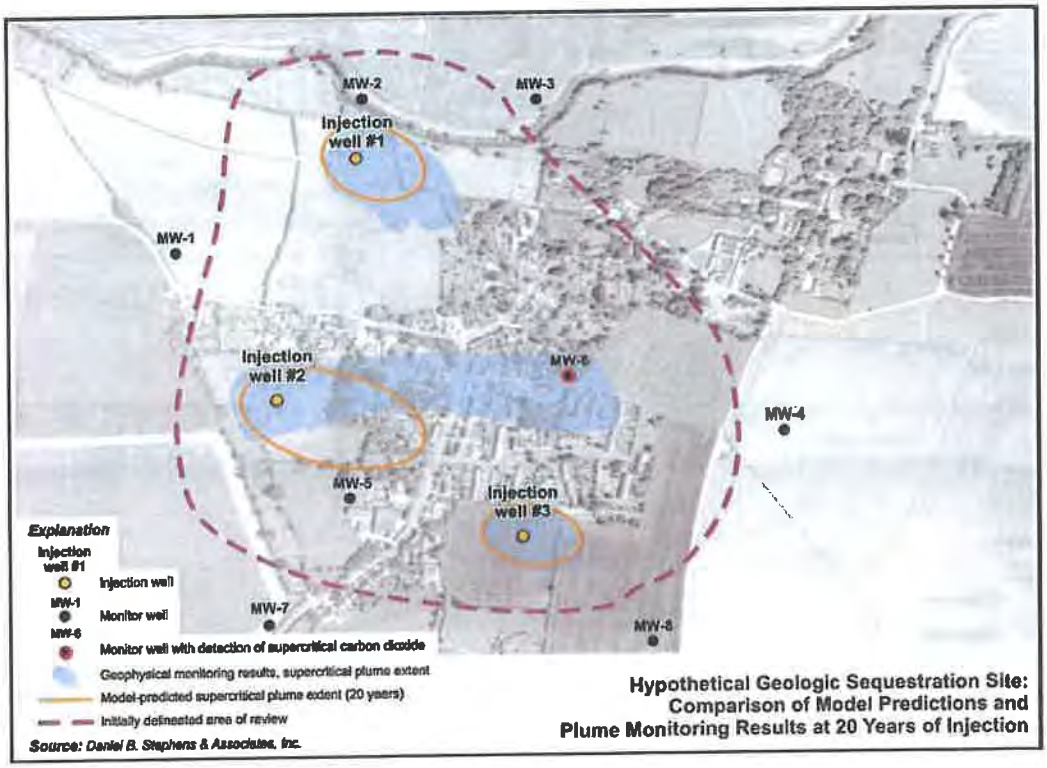



**Figure 5-1: Hypothetical Geologic Sequestration Site: Comparison of Model Predictions and Plume Monitoring Results at 20 Years of Injection.**

## Box 5-1. Hypothetical Example of an AoR Reevaluation, *continued*

Compared to monitoring well data, geophysical data provide a larger-area estimate of the extent of separate-phase carbon dioxide. The geophysical and monitoring-well data are consistent in their general evaluation of where separate-phase carbon dioxide is present. Geophysical data and model results are generally consistent for the plume emanating from Injection Well #3, and inconsistent for Injection Wells #1 and #2. The carbon dioxide plume may have migrated differently than originally predicted for several reasons, as discussed below.

### Comparison of Pressure Monitoring Data

Bottom-hole pressure data are collected at all of the eight monitoring wells. This example focuses on data collected at three of the wells, MW-1, MW-2, and MW-6. For actual projects, EPA recommends that data from all monitoring wells be considered. Graphs of pressure monitoring data over the first 20 years of the project, compared to modeling results, are presented in Figure 5-2.

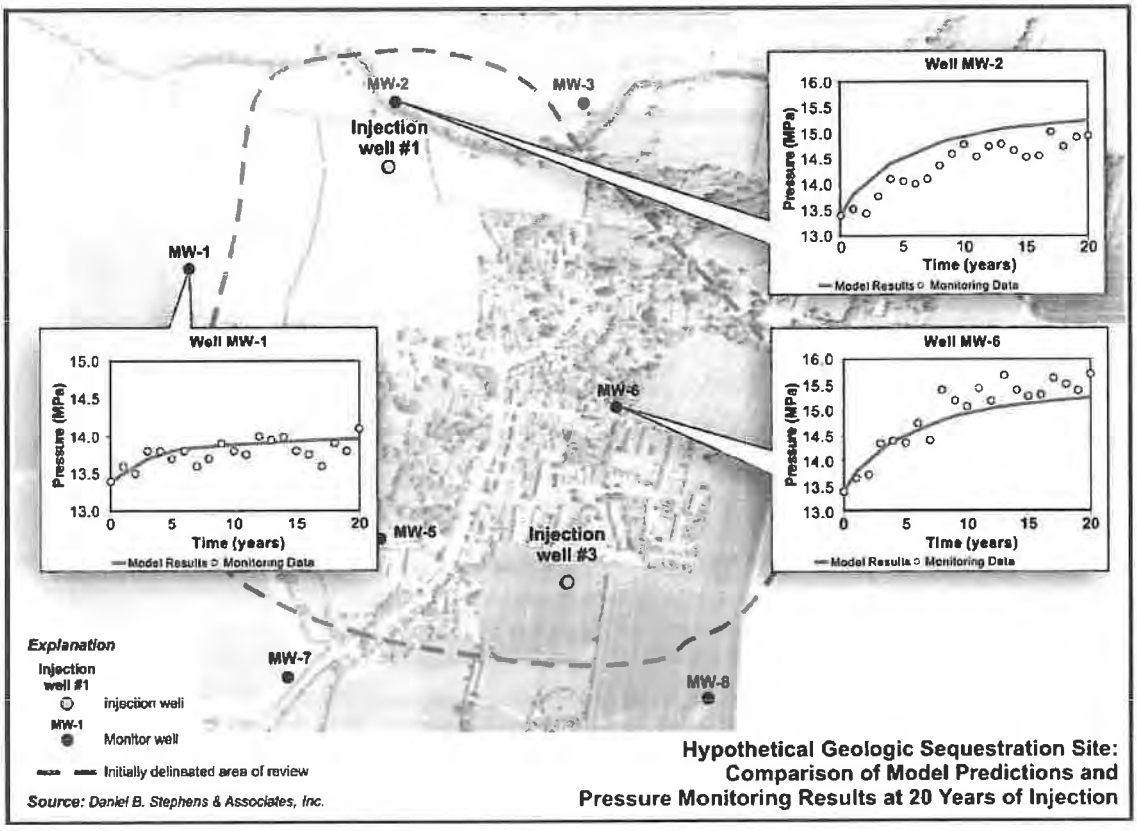



**Figure 5-2: Hypothetical Geologic Sequestration Site: Comparison of Model Predictions and Pressure Monitoring Results at 20 Years of Injection.**

**Box 5-1. Hypothetical Example of an AoR Reevaluation, *continued***

Pressure monitoring data are consistent with modeling predictions on the western edge of the project (MW-1). The general scatter in the monitoring data are expected, and there is no significant bias (i.e., less than, greater than) in comparing the monitoring data and modeling results. Data from the northern portion of the project (MW-2) indicate that actual pressure increases in the injection zone are lower than model predictions. This area has exhibited less of a pressure perturbation caused by injection than originally predicted. In contrast, data from the eastern portion of the site (MW-6) indicate that there has been a larger pressure increase than originally predicted. These data are generally consistent with the plume migration data, presented above, which showed that the plume has migrated further east than originally predicted.

Outcome of Monitoring Data and Model Comparison

This comparison indicates that, after 20 years of injection, modeling results and monitoring data compare favorably in some regions of the site. However, the plume and pressure front appear to have migrated further to the east than initially predicted. This disparity may be due to several factors. Examples include the presence of a high-permeability pathway within the injection zone that had not been fully characterized during initial site characterization, or the dip angle at the injection zone/confining zone interface being larger than originally assumed. Based on this comparison, the operator of the project site, in consultation with the UIC Program Director, decided to calibrate the AoR model and re-delineate the AoR. See Box 5-2 for more information.

### 5.3.1. Demonstrating Adequate Existing AoR Delineation

An AoR reevaluation does not necessarily need to result in revisions or updates to the site computational model. If the owner or operator determines that no changes are necessary, the required reevaluation may consist of demonstrating this to the UIC Program Director [40 CFR 146.84(e)(4)]. EPA recommends that demonstrating the adequacy of the current AoR delineation includes verification that existing operational and site characterization data have been incorporated into the model and that existing monitoring data agree with the modeled predictions.

EPA recommends that the Class VI injection well owners or operators submit any new operational, monitoring, or site characterization data that have been received since the last AoR reevaluation to the UIC Program Director. EPA also recommends that details regarding how this information has been incorporated into the site computational model be presented, as newly received operational or site characterization data may impact model input parameter values.

Integral to demonstrating that the current AoR delineation is adequate is the comparison of monitoring data and model predictions. EPA recommends that this comparison take the form of graphics and informative maps showing the general agreement between monitoring results and model predictions, and that all available monitoring data be considered, including fluid geochemistry monitoring, pressure monitoring, and geophysical surveys.

### 5.3.2. Modifying the Existing AoR Delineation

Any significant differences between operational monitoring results and the existing model predictions that are the basis for the AoR delineation, for example as discussed in Section 5.2.3 of this guidance document, warrant a modification to the existing AoR delineation [40 CFR 146.84(e)]. The steps in revision of the AoR delineation include adjusting the site conceptual model, model calibration (i.e., adjusting model parameters), and presentation of adjusted model results and the newly delineated AoR to the UIC Program Director.

EPA recommends that the site conceptual model be revised based on new site characterization, operational, and, in some cases, monitoring data. The new conceptual site model schematic may be provided to the UIC Program Director along with the AoR reevaluation information, with any changes highlighted. Examples of changes to the conceptual model include new injection wells, newly elucidated geologic features (e.g., stratigraphic layers), or a revised permeability field.

Following revision of the site conceptual model, revision of the existing AoR delineation may require model calibration in order to minimize the differences between monitoring data and model simulations (see Section 2.5 of this guidance). EPA recommends that the relative error difference between monitoring data and model predictions be quantified via the use of calibration statistics (e.g., ME, MAE, RMSE). To the extent possible, the value of the calibration statistics should be minimized during model calibration. The value of the model calibration statistics also informs the expected uncertainty and error in model predictions of future

conditions. Following model calibration, the AoR delineation may be revised using methods described in Section 3.4 of this guidance.

In reporting an AoR computational model and delineation revision, EPA recommends that all model attributes, as given in Section 3.5 of this guidance document, be re-submitted to the UIC Program Director. In addition, EPA recommends that the model calibration process and final AoR delineation results be presented in detail as part of the submission with:

- Adjusted input parameter values listed;
- Graphs comparing observed and modeled values of carbon dioxide migration and fluid pressure;
- Model results showing carbon dioxide and pressure front migration over time included; and
- The value of the model calibration statistics.

The newly delineated AoR may be presented on maps which would highlight similarities and differences in comparison with previous AoR delineations. See Box 5-2, below, for an example of a hypothetical AoR reevaluation.

If a revision of the AoR delineation is necessary, an amendment to the AoR and Corrective Action Plan is also required, along with possible amendments to other related project plans [40 CFR 146.84(e)(4) and (f)]. EPA recommends that the amended AoR and Corrective Action Plan explain any differences in corrective action activities that result from AoR revision, including a demonstration of adequate surface access rights in order to perform the required corrective action activities. See Section 4 for more information on performing corrective action. Furthermore, in some cases, GS project attributes that are outside the scope of the Class VI Rule and the UIC Program, such as pore-space ownership rights, may be related to the size of the AoR. In these cases, the owners or operators are encouraged to consult with the UIC Program Director, or another applicable regulatory agency, following a revision of the AoR in order to proceed.

## Box 5-2. Hypothetical Example of a Presentation of the Revised AoR

After the site computational model has been revised through model calibration to monitoring data, and/or updating with new operational or site characterization parameters, the AoR must be re-delineated [40 CFR 146.84(e)]. See Box 3-2 for more information on AoR delineation; the same general methods should be used during the reevaluation. Once the AoR has been revised, it may be presented on a site base map in comparison to the former AoR delineation (Figure 5-3).

In this hypothetical example, the AoR reevaluation has resulted in an AoR delineation that extends generally farther toward the east than previously. This is consistent with the monitoring data (Box 5-1) indicating further plume and pressure front migration toward the east. The model was revised to match monitoring data by adjusting intrinsic permeability values within the injection zone and the dip angle at the injection/confining zone interface.

The region newly identified as located within the delineated AoR (between the purple and blue contour lines) must be subjected to the artificial penetration identification, assessment, and corrective action procedures as discussed in Section 4 of this guidance document [40 CFR 146.84(e)(2) and (3)]. Furthermore, the revision of the AoR requires revisions to the AoR and Corrective Action Plan and other project plans, as discussed in the *UIC Program Class VI Well Project Plan Development Guidance*. Changes to the AoR and Corrective Action Plan may demonstrate a need to secure new surface access rights for the newly included area. The owner or operator may also contact the applicable regulatory agency for other project attributes (e.g., new pore space ownership rights) that are outside the scope of the Class VI Rule and the UIC Program.

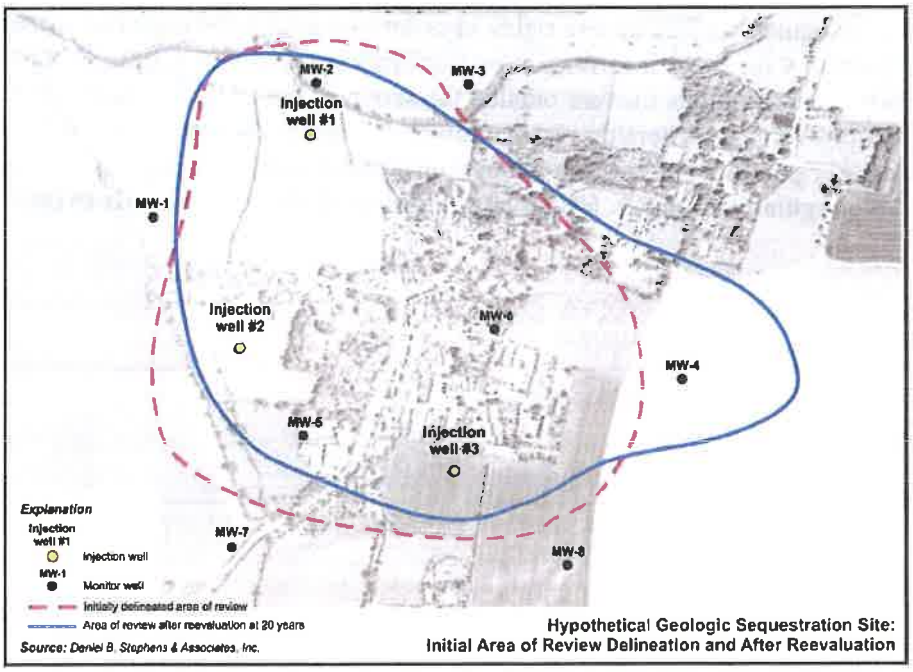



**Figure 5-3: Hypothetical Geologic Sequestration Site: Initial AoR Delineation and Delineation after Reevaluation.**

# References


Ajo-Franklin, J., Doughty, C., & Daley, T.M. 2008. Combining Analysis of Continuous Active-Source Seismic Monitoring (CASSM) and Multiphase Flow Modeling for $CO_2$ Sequestration: The Frio II Brine Pilot. Presented at the 7th Annual Conference on Carbon Capture and Sequestration. May 5-8, Pittsburgh, Pennsylvania.

ASTM International. 2005. Standard guide for locating abandoned wells. Designation D 6285-99 (Reapproved 2005).

Bachu, S., & Bennion, B. 2008. Effects of in-situ conditions on relative permeability characteristics of $CO_2$-brine systems. *Environmental Geology*, 54:1707-1722.

Bandilla, K.W., Kraemer, S.R., & Birkholzer, J.T. 2012. Using semi-analytic solutions to approximate the area of potential impact for carbon dioxide injection, *International Journal of Greenhouse Gas Control*, 8:196-204, ISSN 1750-5836, 10.1016/j.ijggc.2012.02.009.

Birkholzer, J.T., Nicot, J.P., Oldenburg, C.M., Zhou, Q., Kraemer, S., & Bandilla, K. 2011. Brine flow up a well caused by pressure perturbation from geologic carbon sequestration: Static and dynamic evaluations. *International Journal of Greenhouse Gas Control*, 5:850-861.

Carle, S.F. 1999. T-PROGS: Transition Probability Geostatistical Software, Version 2.1.

Celia, M.A., and Nordbotten, J.M. 2009. Practical modeling approaches for geologic storage of carbon dioxide. *Ground Water*, 47:627-638.

Close, D., Cho, D., Horn, F., & Edmundson, H. 2009. The Sound of Sonic: A Historical Perspective and Introduction to Acoustic Logging. *CSEG Recorder* pp. 34-43

Doughty, C., & Pruess, K. 2004. Modeling supercritical carbon dioxide injection in heterogeneous porous media. *Vadose Zone Journal*, 3(3):837–847.

Doughty, C. 2007. Modeling geologic storage of carbon dioxide: Comparison of non-hysteretic and hysteretic characteristic curves. *Energy Conversion and Management* 48: 1768–1781.

Doughty, C., Freifeld, B.M., & Trautz, R.C. 2007. Site characterization for $CO_2$ geologic storage and vice versa – the Frio brine pilot, Texas, USA as a case study. *Environmental Geology*, DOI 10.10007/s00254-007-0942-0.

Duguid, A., & Crow, W. 2007. $CO_2$ Well Integrity and Wellbore Monitoring. Presented at the Carbon Sequestration Leadership Forum (CSLF) 2nd Capacity Building in Emerging Economies Workshop. October 18-19, Porto Alegre, Brazil.

Fetter, C.W. 2001. *Applied Hydrogeology*, 4th Edition. Prentice Hall, Upper Saddle River, NJ. 598p.

Finsterle, S. 2004. Mulitphase inverse modeling: Review and iTOUGH2 applications. *Vadose Zone Journal*, 3:747-762.

Fischer, D.W., LeFever, J.A., LeFever, R.D., Helms, L.D., Sorensen, J.A., Smith, S.A., Steadman, E.N., & Harju, J.A. 2005. Mission Canyon Formation Outline. PCOR Partnership Fact Sheet, May 2005.

Flett M., Gurton, R., & Weir, G. 2007. Heterogeneous saline formations for carbon dioxide disposal: Impact of varying heterogeneity on containment and trapping. *Journal of Petroleum Science and Engineering*, 57:106-118.

Friskchknecht, F.C., Raab, P.V., & van Ee, J.J. 1985. Project Summary: Location of abandoned wells with geophysical methods. EPA-600/SR-84-085.

Gaus, I., Azaroual, M., & Czernichowski-Lauriol, I. 2005. Reactive transport modeling of the impact of carbon dioxide injection on the clayey cap rock at Sleipner (North Sea). *Chemical Geology*, 217:319-337.

Gerritsen, M.G., & Durlofsky, L.J. 2005. Modeling fluid flow in oil reservoirs. *Annual Reviews in Fluid Mechanics*, 37:211-238.

Green, D.W., & Perry, R.H. 2008. *Perry's Chemical Engineers' Handbook*, 8th Edition. McGraw-Hill Book Co., New York, NY.

Gochioco, L.M., & Ruev Jr, F. 2006. Detecting and imaging hard-to-find abandoned wells and pipelines. *The Leading Edge*, March 2006, 358-361.

Han, W.S., & McPherson, B. 2008. Comparison of two equations of state for application of carbon dioxide sequestration. *Advances in Water Resources*, 31:877-890.

Ide, T., Friedmann, S.J., & Herzog, H. 2006. Carbon Dioxide Leakage through Existing Wells: Current Technology and Regulations, presented at the 8th International Conference on Greenhouse Gas Control Technologies. June 2006, Trondheim, Norway.

Illinois State Geological Survey (ISGS). 2009. Enhanced Oil Recovery I: Loudon Single-Well Huff 'n' Puff. Midwest Geologic Sequestration Consortium. Report Issued December 31. U.S. DOE Contract: DE-FC26-03NT41994.

Izgec, O., Demiral, B., Bertlin, H., & Arkin, S. 2008. $CO_2$ injection into saline carbonate aquifer formations II: Comparison of numerical simulations to experiments. *Transport in Porous Media*, 73:57-74.

Jordan, P.W., & Hare, J.L. 2002. Locating Abandoned Wells: A Comprehensive Manual of Methods and Resources. Prepared for Solution Mining Research Institute, Research Project Report No. 2002-SMRI.

Juanes, R., Spiteri, E.J., Orr Jr., F.M., & Blunt, M.J. 2006. Impact of relative permeability hysteresis on geological $CO_2$ storage. *Water Resources Research*, 42. W12418.

Knauss K.G., Johnson, J.W., & Steefel, C.I. 2005. Evaluation of the impact of $CO_2$, co-contaminant gas, aqueous fluid and reservoir rock interactions on the geologic sequestration of $CO_2$. *Chemical Geology*, 217:339-350.

Kumar, A., Noh, M., Pope, G.A., Sephehrnoori, K., Bryant, S., & Lake, L.W. 2004. Reservoir Simulation of Carbon Dioxide Storage in Deep Saline Aquifers. SPE/DOW Fourteenth Symposium on Improved Oil Recovery. April 2004, Tulsa Oklahoma.

Law, D.H.-S., & Bachu, S. 1996. Hydrogeological and numerical analysis of $CO_2$ disposal in deep aquifers in the Alberta sedimentary basin. *Energy Conversion and Management*, 37:1167-1174.

Lindeberg, E. 1997. Escape of $CO_2$ from aquifers. *Energy Conversion and Management*, 38:S235-S240.

Midwest Geologic Sequestration Consortium (MGSC). Undated. Screening Criteria for Geologic Carbon Dioxide Sequestration. http://www.sequestration.org/sc_model.htm

Miller, C.T., Christakos, G., Imhoff, P.T., McBride, J.F., Pedit, J.A., & Trangenstein, J.A. 1998. Mulitphase flow and transport modeling in heterogeneous porous media: challenges and approaches. *Advances in Water Resources*, 21(2): 77-120.

National Energy Technology Laboratory (NETL). 2011. Risk Analysis and Simulation for Geologic Storage of CO2. DOE/NETL-2011-1459. http://www.netl.doe.gov/technologies/carbon_seq/refshelf/BPM_RiskAnalysisSimulation.pdf

National Research Council (NRC). 2007. Models in Environmental Regulatory Decision Making. Prepared by Committee on Models in the Regulatory Decision Process.

Nicot, J.P., Oldenburg, C.M., Bryant, S.L., & Hovorka, S.D. 2008. Pressure perturbation from geologic carbon sequestration: Area-of-review boundaries and borehole leakage driving forces. *Energy Procedia*.

Obi, E.-O. I., & Blunt, M.J. 2006. Streamline-based simulation of carbon dioxide storage in a North Sea aquifer. *Water Resources Research*, 42: W03414.

Peng, D.Y., & Robinson, D.B. 1976. A new two-constant equation of state. *Industrial and Engineering Chemistry Fundamentals*, 15:59-64.

Perrin, J.-C., Krause, M., & Benson, S.M. 2008. Relative permeability properties of the $CO_2$/Brine system in saline aquifers: An experimental study. Presented at the 7th Annual Conference on Carbon Capture and Sequestration. May 5-8, Pittsburgh, Pennsylvania.

Perry, R.H., & Green, D. 1984. *Perry's Chemical Engineers' Handbook*, Sixth Edition. McGraw-Hill Book Co., New York, NY.

Pinder, G.F., & Gray, W.G. 2008. *Essentials of Multiphase Flow in Porous Media*. John Wiley & Sons, Inc., Hoboken, NJ.

Plug, W.J., & Bruining, J. 2007. Capillary pressure for the sand- $CO_2$-water system under various pressure conditions. Application to $CO_2$ sequestration. *Advances in Water Resources*. 30:2339-2353.

Pruess, K., and Spycher, N. 2007. ECO2N – A fluid property module for the TOUGH2 code for studies of $CO_2$ storage in saline aquifers. *Energy Conversion and Management*. 48:1761-1767.

Pruess, K., Garcia, J., Kovscek, T., Oldenburg, T.C., Rutqvist, J., Steefel, C., & Xu, T. 2004. Code intercomparison builds confidence in numerical simulation models for geologic disposal of $CO_2$. *Energy*, 29(9-10):1431-1444.

Pruess, K. 2008. Leakage of $CO_2$ from geologic storage: Role of secondary accumulation at shallow depth. *International Journal of Greenhouse Gas Control*, 2:37-46.

Randhol, P., Valencia, K., Taghipour, A., Akervoll, I., & Carlsen, I.M. 2007. Ensuring Well Integrity in Connection with $CO_2$ Injection. SINTEF report 31.6920.00/02/07.

Reynolds, R.R., & Kiker, R.D. 2003. Produced Water and Associated Issues — A Manual for the Independent Operator. Oklahoma Geological Survey Open File Report 6-2003. Prepared for the South Midcontinent Region of the Petroleum Technology Transfer Council.

Rutqvst, J., Birkholzer, J.T., & Tsang, C.F., 2008. Coupled Reservoir-Geomechanical Analysis of the Potential for Tensile and Shear Failure Associated with $CO_2$ Injection in Multilayered Reservoir Caprock Systems. *International Journal of Rock Mechanics and Mining Sciences*, 45(2):132-143.

Saripalli, P., & McGrail, P. 2002. Semi-analytical approaches to modeling deep well injection of $CO_2$ for geologic sequestration. *Energy Conversion and Management*, 43:185-198.

Schnaar, G., & Digiulio, D.C. 2009. Computational modeling of the geologic sequestration of carbon dioxide. *Vadose Zone Journal*, 8:389-403.

Soeder, D.J. 1988. Porosity and Permeability of Eastern Devonian Gas Shale. SPE Formation Evaluation. March 1988, 116-124.

Sorensen, J.A., Smith, S.A., Fischer, D.W., Steadman, E.N., & Harju, J.A. 2005. Potential Carbon Dioxide Storage Capacity of the Saline Portions of the Lower Cretaceous Aquifer System in the PCOR Partnership Region. PCOR Partnership Fact Sheet, October 2005.

Spycher, N., Pruess, K., & Ennis-King, J. 2003. Carbon dioxide-water mixtures in geologic sequestration of carbon dioxide. I. Assessment and calculation of mutual solubilities from 12 to 100 degrees Celsius and up to 600 bar. *Geochemical et Cosmochimica Acta*, 67:3015-3031.

Spycher, N., & Pruess, K. 2005. Carbon dioxide-water mixtures in geologic sequestration of carbon dioxide. II. Partitioning in chloride brines at 12-100 degrees Celsius and up to 600 bar. *Geochemical et Cosmochimica Acta*, 69:3309-3320.

Stone, H.L. 1970. Probability model for estimating three-phase relative permeability. *Trans. AIME* 249:214-218.

Tamimi, A.E., Rinker, B., & Sandall, O.C. 1994. Diffusion coefficients for hydrogen sulfide, carbon dioxide, and nitrous oxide in water over the temperature range 293-368 K. *Journal of Chemical & Engineering Data*, 39:330-332.

Thornhill, J.T., Short, T.E., & Silka L. 1982. Application of the Area of Review Concept. *Ground Water*, 20:32-38.

United States Environmental Protection Agency (USEPA). 2002. Drinking Water Academy, Underground Injection Control Modules, Lesson 8: Area of Review. http://www.epa.gov/safewater/dwa/pdfs/2%20uic%20modules/dwaUIC-uicpermit2.pdf

USEPA. 2003. Draft Guidance on the Development, Evaluation, and Application of Regulatory Environmental Models. Prepared by The Council for Regulatory Environmental Modeling.

United States Geological Survey (USGS). 1995. Fact Sheet 163-95: Magnetic Surveys for Locating Abandoned Wells.

Watson, T.L. 2009. $CO_2$ Storage: Wellbore Integrity Evaluation and Integrity Across the Caprock, presented at the 2009 SPE Conference on $CO_2$ Capture. November 2-4, San Diego, CA.

Xu, T., Sonnenthal, E., Spycher, N., & Pruess K. 2006. TOUGHREACT—A simulation program for non-isothermal multiphase reactive geochemical transport in variably saturation geologic media: Applications to geothermal injectivity and $CO_2$ geological sequestration. *Computers & Geosciences*, 32:145-165.

Xu, T., Apps, J.A., Pruess, K., & Yamamoto, H. 2007. Numerical modeling of injection and mineral trapping of $CO_2$ with $H_2S$ and $SO_2$ in a sandstone formation. *Chemical Geology*, 242:319-346.

Yamamoto, H., & Doughty, C. 2009. Investigation of gridding effects for numerical simulation of carbon dioxide geologic sequestration," Proceedings of TOUGH Symposium, LBNL., September 2009, Berkeley, CA.

Zhang, K., Doughty, C., Wu, Y.-S., & Pruess, K. 2007. Efficient parallel simulation of $CO_2$ geologic sequestration in saline aquifers, SPE 106026, presented at 2007 SPE Reservoir Simulation Symposium. February 26-28, Houston, TX,.

Zhou, Q., Birkholzer, J.T., Tsang, C.F., & Rutqvist, J. 2008. A method for quick assessment of $CO_2$ storage capacity in closed and semi-closed saline formations. *International Journal of Greenhouse Gas Control,* 2(4):626-639.

Zhou, W., Stenhouse, M.J., Arthur, R., Whittaker, S., Law, D.H.-S., Chalaturnyk, R., & Jazrawi, W. 2004. The IEA Weyburn $CO_2$ monitoring and storage project – modeling of the long-term migration of $CO_2$ from Weyburn. In: Wilson M., Gale, J., Rubin, E.S., Keith, D.W., Gilboy, C.F., Morris, T., & Thambimuthu K. (Eds). Greenhouse gas control technologies: proceedings of the 7th International Conference on Greenhouse Gas Control Technologies. September 5-9, Vancouver, BC.

EPA
United States
Environmental Protection
Agency

# Geologic Sequestration of Carbon Dioxide

# Underground Injection Control (UIC) Program Class VI Implementation Manual for UIC Program Directors

LO19

INDUSTRIAL COMMISSION
STATE OF NORTH DAKOTA
DATE 6/12/24 CASE NO. 30869-880
Introduced By Bofto (Hydro Solutions)
Exhibit LO-19
Identified By Bofto

EXHIBIT
tabbies
LO-19
30869-30880

Office of Water (4606M) EPA 816-R-18-001 January 2018

# Disclaimer

The Class VI injection well classification was established by the *Federal Requirements Under the Underground Injection Control (UIC) Program for Carbon Dioxide ($CO_2$) Geologic Sequestration (GS) Wells* (75 FR 77230, December 10, 2010), referred to as the Class VI Rule, which establishes a new class of injection well (Class VI).

The Safe Drinking Water Act (SDWA) provisions and the United States Environmental Protection Agency (EPA) regulations cited in this document contain legally-binding requirements. While the document recommends basic steps for reviewing project information, it acknowledges and is designed to accommodate potential site-specific considerations and regulatory flexibility inherent in the Class VI Rule. In several sections, this guidance document makes suggestions and offers alternatives that go beyond the minimum requirements indicated by the Class VI Rule. This is intended to provide information and suggestions that may be helpful for implementation efforts. Such suggestions are prefaced by "may" or "should" and are to be considered advisory. They are not required elements of the Rule. Therefore, this document does not substitute for those provisions or regulations, nor is it a regulation itself, so it does not impose legally-binding requirements on the EPA, states, or the regulated community. The recommendations herein may not be applicable to each and every situation.

The EPA and state decision makers retain the discretion to adopt approaches on a case-by-case basis that differ from this guidance where appropriate. Any decisions regarding a particular facility will be made based on the applicable statutes and regulations. Mention of trade names or commercial products does not constitute endorsement or recommendation for use. This guidance may change in the future without a formal notice and comment period.

While the EPA has made every effort to ensure the accuracy of the discussion in this document, the obligations of the regulated community are determined by statutes, regulations, or other legally-binding requirements. In the event of a conflict between the discussion in this document and any statute or regulation, this document would not be controlling.

Note that this document only addresses issues covered by the EPA's authorities under SDWA. Other EPA authorities, such as Clean Air Act (CAA) requirements to report carbon dioxide injection activities under the Greenhouse Gas Reporting Program (GHGRP), are not within the scope of this document.



BLF-000002

# Executive Summary

The United States Environmental Protection Agency's (EPA's) *Federal Requirements Under the Underground Injection Control (UIC) Program for Carbon Dioxide ($CO_2$) Geologic Sequestration (GS) Wells* (75 FR 77230, December 10, 2010), and codified in the U.S. Code of Federal Regulations [40 CFR 146.81 *et seq.*], are known as the Class VI Rule. The Rule establishes a new class of injection wells (Class VI) and sets minimum federal technical criteria for Class VI injection wells for the purpose of protecting underground sources of drinking water (USDWs).

This *UIC Program Class VI Implementation Manual for UIC Program Directors* outlines and describes recommended activities to support Class VI permitting authorities in their review and evaluation of Class VI information over the course of a Class VI project. While the document recommends basic steps for reviewing project information, it acknowledges and is designed to accommodate potential site-specific considerations and regulatory flexibility inherent in the Class VI Rule. This Implementation Manual is intended to be used by Class VI permitting authorities in conjunction with a series of technical guidance documents that support Class VI injection well permit applicants/owners or operators as they conduct required activities.

The Manual is organized into the following sections:

- Section 1, Introduction, provides an overview of the Class VI requirements and Class VI projects. It also describes the EPA-developed tools that can support the UIC Program Director.
- Section 2, UIC Program Responsibilities, describes the roles and responsibilities the UIC Program has throughout the duration of a Class VI Project, including reviewing owner or operator submittals, reporting and recordkeeping responsibilities, communicating about the project, and assuring compliance with permit conditions.
- Section 3, Pre-Permitting Considerations, describes recommended steps that the UIC Program Director can take in advance of the formal submittal of a Class VI permit application, including assisting the applicant in gaining access to the Geologic Sequestration Data Tool (GSDT) and addressing specific topics on which pre-application discussions should be focused.
- Section 4, Reviewing Pre-Construction Information, describes recommended steps to facilitate the evaluation of information submitted in a Class VI permit application, issue a draft permit, and authorize construction or conversion of an injection well.
- Section 5, Reviewing Pre-Operation Information, presents recommendations to the UIC Program for reviewing final geologic data and the results of pre-operational testing and, based on this review, authorizing operation of the Class VI well.
- Section 6, Injection Phase Review, presents recommendations for ensuring that the project is protective of USDWs during injection operations by reviewing testing and monitoring data, evaluating area of review (AoR) reevaluations, and reviewing project plan updates.
- Section 7, Post-Injection Phase Review, describes recommendations regarding how the UIC Program Director should evaluate the information that owners or operators submit during the post-injection phase, including well plugging reports, post-injection monitoring data, non-endangerment demonstrations, and site closure reports.



BLF-000003

# Table of Contents


Executive Summary ..... iii
Table of Contents ..... iv
List of Figures ..... vi
List of Tables ..... vii
List of Appendices ..... viii
Acronyms and Abbreviations ..... ix
Definitions ..... x
1 Introduction ..... 1-1
1.1 Document Purpose ..... 1-1
1.2 UIC Class VI Program Background ..... 1-2
1.3 UIC Class VI Project Overview ..... 1-3
1.4 Available Resources to Support Class VI Permitting ..... 1-4
2 UIC Program Responsibilities ..... 2-1
2.1 Reviewing/Evaluating Submittals and Decision-Making ..... 2-1
2.2 Reporting to the EPA ..... 2-4
2.3 Communicating about Class VI Projects ..... 2-5
2.4 Ensuring Compliance with the Class VI Rule ..... 2-9
3 Pre-Permitting Considerations ..... 3-1
3.1 Class VI Permitting Preparations ..... 3-1
3.2 Permit Applicant Engagement ..... 3-2
3.3 Communication and Outreach ..... 3-8
3.4 Other Pre-Permitting Considerations ..... 3-9
4 Reviewing Pre-Construction Information ..... 4-1
4.1 Evaluation of Pre-Construction Information ..... 4-2
4.1.1 Site Characterization ..... 4-4
4.1.2 AoR and Corrective Action ..... 4-17
4.1.3 Financial Responsibility ..... 4-23
4.1.4 Injection Well Construction ..... 4-28
4.1.5 Pre-Operational Testing ..... 4-33
4.1.6 Proposed Operating Conditions ..... 4-36
4.1.7 Testing and Monitoring ..... 4-39
4.1.8 Injection Well Plugging ..... 4-45
4.1.9 Post-Injection Site Care and Site Closure ..... 4-47
4.1.10 Emergency and Remedial Response ..... 4-51
4.1.11 Injection Depth Waivers ..... 4-53
4.1.12 Aquifer Exemption Expansions ..... 4-59
4.2 Preparing the Permit ..... 4-63
4.3 Planning for the Pre-Operation Review ..... 4-65





BLF-000004

5 Reviewing Pre-Operation Information ..... 5-1
5.1 Evaluation of Pre-Operation Information ..... 5-2
5.1.1 Site Characterization ..... 5-4
5.1.2 AoR and Corrective Action ..... 5-9
5.1.3 Financial Responsibility ..... 5-13
5.1.4 Injection Well Construction ..... 5-15
5.1.5 Operating Conditions ..... 5-18
5.1.6 Testing and Monitoring ..... 5-20
5.1.7 Injection Well Plugging ..... 5-22
5.1.8 Post-Injection Site Care and Site Closure ..... 5-24
5.1.9 Emergency and Remedial Response ..... 5-27
5.1.10 Injection Depth Waivers ..... 5-28
5.2 Authorizing Injection ..... 5-30
5.3 Planning for the Injection Phase Review ..... 5-32
6 Injection Phase Review ..... 6-1
6.1 Testing and Monitoring ..... 6-1
6.1.1 Characteristics of the Carbon Dioxide Stream ..... 6-2
6.1.2 Continuous Monitoring Data ..... 6-3
6.1.3 Corrosion Monitoring Results ..... 6-5
6.1.4 Groundwater Quality Monitoring ..... 6-6
6.1.5 External MITs ..... 6-8
6.1.6 Pressure Fall-Off Test Results ..... 6-9
6.1.7 Plume and Pressure Front Tracking Information ..... 6-10
6.1.8 Surface Air and/or Soil Gas Monitoring ..... 6-12
6.1.9 Other Required Monitoring ..... 6-13
6.2 AoR Reevaluations ..... 6-14
6.3 Project Plan Updates ..... 6-19
6.4 Financial Responsibility Updates ..... 6-22
6.5 Occasional Injection-Phase Reviews ..... 6-24
6.5.1 Workovers, Stimulation, or Other Well Tests ..... 6-24
6.5.2 Emergency Response ..... 6-25
6.5.3 Notification of Adverse Financial Conditions ..... 6-28
6.6 Planning for the Post-Injection Phase Review ..... 6-28
7 Post-Injection Phase Review ..... 7-1
7.1 Injection Well Plugging ..... 7-2
7.2 Reviewing Post-Injection Site Care Information ..... 7-3
7.2.1 PISC and Site Closure Plan Amendments ..... 7-4
7.2.2 Post-Injection Monitoring ..... 7-6
7.3 AoR Reevaluations ..... 7-9
7.4 Project Plan Updates ..... 7-10
7.5 Emergency and Remedial Response ..... 7-11
7.6 Non-Endangerment Demonstrations ..... 7-11
7.7 Site Closure ..... 7-14



BLF-000005

# List of Figures

Figure 1-1: Overview of the Federal Class VI Rule Requirements ..... 1-2
Figure 1-2: The Phases of a Class VI Project ..... 1-5
Figure 2-1: Data Evaluations and Decision-Making ..... 2-2
Figure 2-2: Class VI Project Communications ..... 2-5
Figure 3-1: Reviewing Class VI Permit Applications and Injection Depth Waiver Applications ..... 3-7
Figure 4-1: Site Characterization Review ..... 4-5
Figure 4-2: Examples of Class VI Groundwater Monitoring and Plume and Pressure Front Tracking Activities ..... 4-42
Figure 4-3: Geologic Scenarios for Injection Depth Waivers ..... 4-54
Figure 6-1: Reviewing Testing and Monitoring Results ..... 6-2
Figure 6-2: AoR Reevaluations ..... 6-14
Figure 7-1: Reviewing Non-Endangerment Demonstrations ..... 7-13



BLF-000006

# List of Tables

Table 1-1: Templates to Facilitate Compliance with Federal Class VI Rule Requirements ..... 1-6

Table 4-1: Examples of Cross-Submittal Checks for Conducting Technical Evaluations of Class VI Permit Applications..... 4-2

Table 4-2: Financial Instruments Recommended in the *UIC Program Class VI Financial Responsibility Guidance* ..... 4-26

Table 5-1: Examples of how Pre-Operational Submittals can Inform Considerations for Issuing Authorization to Inject at a Class VI Well ..... 5-3

# List of Appendices

Appendix A: The Geologic Sequestration Data Tool ..... A-1
Appendix B: Useful Websites ..... B-1



BLF-000008

# Acronyms and Abbreviations

| | |
|---|---|
| AoPI | Area of Potential Impact |
| AoR | Area of Review |
| CAA | Clean Air Act |
| CCS | Carbon Capture and Storage |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act |
| CFR | Code of Federal Regulations |
| CIL | Casing Inspection Log |
| CROMERR | Cross-Media Electronic Reporting Regulation |
| EGR | Enhanced Gas Recovery |
| EJ | Environmental Justice |
| EOR | Enhanced Oil Recovery |
| EPA | U.S. Environmental Protection Agency |
| ESA | Electronic Signature Agreement |
| GHGRP | Greenhouse Gas Reporting Program |
| GIS | Geographic Information System |
| GS | Geologic Sequestration |
| GSDT | Geologic Sequestration Data Tool |
| LAS | Log ASCII Standard |
| mg/L | Milligrams per liter |
| MIT | Mechanical Integrity Test |
| MPRSA | Marine Protection, Research, and Sanctuaries Act |
| NRAP | National Risk Assessment Partnership |
| OCSLA | Outer Continental Shelf Lands Act |
| PAM | Program Activity Measure |
| PISC | Post-Injection Site Care |
| ppm | Parts per Million |
| PWSS | Public Water System Supervision Program (under SDWA) |
| QA | Quality Assurance |
| QASP | Quality Assurance Surveillance Plan |
| RCRA | Resource Conservation and Recovery Act |
| SDWA | Safe Drinking Water Act |
| SDWIS | Safe Drinking Water Information System |
| SNC | Significant Noncompliance |
| STOMP | Subsurface Transport over Multiple Phases |
| TDS | Total Dissolved Solids |
| TOUGH | Transport of Unsaturated Groundwater and Heat |
| UIC | Underground Injection Control |
| USDW | Underground Source of Drinking Water |
| USGS | United States Geological Survey |



BLF-000009

# Definitions

Key to definition sources:

1: 40 CFR 144.3.
2: 40 CFR 146.81(d).
3: 40 CFR 144.6(f) and 144.80(f).
4: This definition was developed for the purposes of this document.
5: Class VI Rule Preamble (75 FR 77230).

**Administrator** means the Administrator of the United States Environmental Protection Agency, or an authorized representative.[1]

**Area of Review (AoR)** means the region surrounding the geologic sequestration project where USDWs may be endangered by the injection activity. The area of review is delineated using computational modeling that accounts for the physical and chemical properties of all phases of the injected carbon dioxide stream and displaced fluids, and is based on available site characterization, monitoring, and operational data as set forth in 40 CFR 146.84.[2]

**Carbon dioxide plume** means the extent underground, in three dimensions, of an injected carbon dioxide stream.[2]

**Carbon dioxide stream** means carbon dioxide that has been captured from an emission source (e.g., a power plant), plus incidental associated substances derived from the source materials and the capture process, and any substances added to the stream to enable or improve the injection process. This subpart [subpart H of 40 CFR 146] does not apply to any carbon dioxide stream that meets the definition of a hazardous waste under 40 CFR 261.[2]

**Class VI wells** means wells that are not experimental in nature that are used for geologic sequestration of carbon dioxide beneath the lowermost formation containing a USDW; or, wells used for geologic sequestration of carbon dioxide that have been granted a waiver of the injection depth requirements pursuant to requirements at 40 CFR 146.95; or, wells used for geologic sequestration of carbon dioxide that have received an expansion to the areal extent of an existing Class II enhanced oil recovery or enhanced gas recovery aquifer exemption pursuant to 40 CFR 146.4 and 144.7(d).[3]

**Confining zone** means a geologic formation, group of formations, or part of a formation stratigraphically overlying the injection zone(s) that acts as barrier to fluid movement. For Class VI wells operating under an injection depth waiver, confining zone means a geologic formation, group of formations, or part of a formation stratigraphically overlying and underlying the injection zone(s).[2]

**Corrective action** means the use of Director-approved methods to ensure that wells within the area of review do not serve as conduits for the movement of fluids into underground sources of drinking water (USDW).[2]

**Geologic sequestration (GS)** means the long-term containment of a gaseous, liquid, or supercritical carbon dioxide stream in subsurface geologic formations. This term does not apply to carbon dioxide capture or transport.[2]

**Geologic sequestration project** means an injection well or wells used to emplace a carbon dioxide stream beneath the lowermost formation containing a USDW; or, wells used for geologic sequestration of carbon dioxide that have been granted a waiver of the injection depth requirements pursuant to requirements at 40 CFR 146.95; or, wells used for geologic sequestration of carbon dioxide that have received an expansion to the areal extent of an existing Class II enhanced oil recovery or enhanced gas recovery aquifer exemption pursuant to 40 CFR 146.4 and 144.7(d). It includes the subsurface three-dimensional extent of the carbon dioxide plume, associated area of elevated pressure, and displaced fluids, as well as the surface area above that delineated region.[2]

**Geophysical surveys** refer to the use of geophysical techniques (e.g., seismic, electrical, gravity, or electromagnetic surveys) to characterize subsurface rock formations.[5]

**Injection depth waiver** refers to a waiver of the Class VI injection depth requirements by the UIC Program Director pursuant to the provisions at 40 CFR 146.95.[4]

**Injection zone** means a geologic formation, group of formations, or part of a formation that is of sufficient areal extent, thickness, porosity, and permeability to receive carbon dioxide through a well or wells associated with a geologic sequestration project.[2]

**Injectivity** is the pressure differential over existing reservoir pressure required to inject a unit volume of fluid in a given unit of time. It is typically expressed as psi/bbl/day (psi per barrel per day), but can be expressed in any combination of pressure, volume, and time units.[4]

**Mechanical integrity testing (MIT)** refers to a test performed on a well to confirm that a well maintains internal and external mechanical integrity. MITs are a means of measuring the adequacy of the construction of an injection well and a way to detect problems within the well system.[5]

**Phased corrective action** refers to a provision of the Class VI Rule [40 CFR 146.84(b)(2)(iv)] afforded to Class VI injection well owners or operators to defer some identified corrective action needed within the AoR, but farther away from the injection well, until after injection has commenced, but prior to carbon dioxide plume and pressure front movement into that particular area.[4]

**Plug** means a watertight, gastight seal installed in a borehole or well to prevent movement of fluids; it may be mechanical or composed of cement or other materials capable of zonal isolation.[4]

**Post-injection site care (PISC)** means the appropriate monitoring and other actions (including corrective action) needed following cessation of injection to ensure that USDWs are not endangered, as required under 40 CFR 146.93.[5]

**Pressure front** means the zone of elevated pressure that is created by the injection of carbon dioxide into the subsurface. The pressure front of a carbon dioxide plume refers to a zone where there is a pressure differential sufficient to cause the movement of injected fluids or formation fluids into a USDW.[2]

**Site closure** means the point/time, as determined by the Director following the requirements under 40 CFR 146.93, at which the owner or operator of a geologic sequestration site is released from post-injection site care responsibilities.[2]



BLF-000011

**Transmissive fault or fracture** means a fault or fracture that has sufficient permeability and vertical extent to allow fluids to move between formations.[2]

**Underground Injection Control (UIC) Program** refers to the program the EPA, or an approved state or tribe, is authorized to implement under the Safe Drinking Water Act (SDWA) and that is responsible for regulating the underground injection of fluids by well injection.[4]

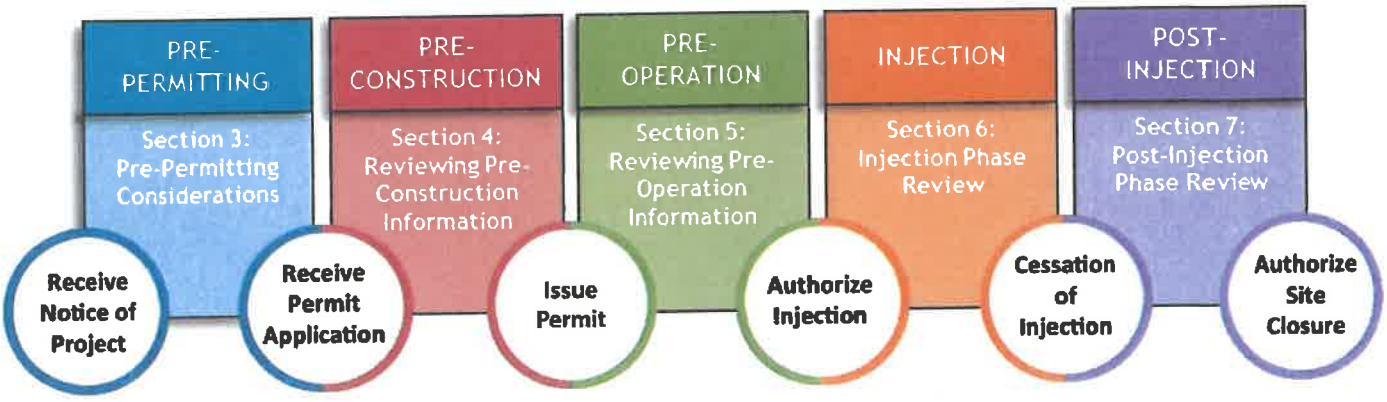
**UIC Program Director** refers to the person responsible for permitting, implementation, and compliance of the UIC Program. For UIC programs administered by the EPA, the UIC Program Director is the EPA Regional Administrator or his/her delegatee; for UIC programs in primacy states, the UIC Program Director is the person responsible for permitting, implementation, and compliance of the state, territorial, or tribal UIC program.[5]

**Underground Source of Drinking Water (USDW)** means an aquifer or its portion which supplies any public water system; or which contains a sufficient quantity of groundwater to supply a public water system; and currently supplies drinking water for human consumption; or contains fewer than 10,000 mg/L total dissolved solids; and which is not an exempted aquifer.[1]



BLF-000012

# Section 1: Introduction



*This page is intentionally blank.*

# 1 Introduction

The United States Environmental Protection Agency's (EPA's) *Federal Requirements Under the Underground Injection Control (UIC) Program for Carbon Dioxide Geologic Sequestration (GS) Wells*, found at 75 FR 77230, December 10, 2010, and codified in the U.S. Code of Federal Regulations [40 CFR 146.81 *et seq.*], are referred to as the Class VI Rule. The Class VI Rule, promulgated under the authority of the Safe Drinking Water Act (SDWA, 42 U.S.C. §300h et al.), outlines federal requirements for the permitting, siting, construction, operation, monitoring, and site closure of Class VI injection wells, which are used to inject carbon dioxide for GS.

The UIC Program Director is responsible for ensuring that owners or operators of Class VI wells properly site, operate, monitor, and close their wells in a manner that protects underground sources of drinking water (USDWs) from endangerment. Throughout the duration of a Class VI project, permitting authorities are responsible for ensuring that:

- Class VI wells are sited and constructed such that USDWs are protected, considering site- and project-specific information collected in the pre-permitting, pre-construction and pre-operation phases;
- Class VI wells operate as planned and in compliance with the regulations as verified by testing and monitoring, in a manner that is protective of USDWs during the injection phase; and
- Post-injection monitoring is conducted until a USDW non-endangerment demonstration is made and approved by the UIC Program Director, the injection well and all monitoring wells are plugged, and the site is closed.

To achieve these goals, UIC Program Directors' activities include: reviewing Class VI permit applications; writing and issuing permits; authorizing injection; documenting decision-making; reviewing testing and monitoring data, the results of Area of Review (AoR) reevaluations, and other reports; responding to emergency situations or violations; addressing compliance issues; authorizing and approving site closure; and providing information about their oversight responsibilities to the EPA.

## 1.1 Document Purpose

This Implementation Manual provides guidance and procedural support to assist UIC Programs in implementing the Class VI Rule and overseeing the activities of owners or operators during the various phases of a Class VI project. Note that, given the complexity and multidisciplinary nature of Class VI projects (i.e., encompassing geology, engineering, modeling, etc.), permitting of Class VI projects will likely necessitate a team approach. In recognition that the activities and recommendations discussed in this Implementation Manual may be undertaken by UIC Program staff, through a team approach, this document refers to the "UIC Program" rather than the "UIC Program Director" unless directly referencing the regulations or specific activities for which a UIC Program Director is uniquely and individually responsible. Section 2 describes the roles of the UIC Program throughout the duration of a Class VI Project. Section 3 provides recommendations for forming a team with the necessary expertise, and Sections 4 through 7 describe the activities the UIC Program (i.e., the UIC Program Director and any team members) should perform during the various phases of a Class VI project.


BLF-000015

The EPA encourages readers to review the Executive Summary and Sections 1 and 2 prior to receipt of a Class VI permit application. Sections 3 through 7 can be used as a reference throughout the duration of a Class VI project.

This Implementation Manual is not intended to provide an exhaustive explanation of the technical attributes of Class VI wells or how owners or operators can meet the Class VI requirements, nor does it address every situation that the UIC Program may encounter. Rather, it offers UIC Programs examples of considerations for reviewing Class VI owner or operator submittals, including where the Class VI Rule affords flexibility. In addition, references are made to other technical guidance documents that contain more specific, detailed guidance on these topics. These documents and other tools that support Class VI permitting are described in Section 1.4.

## 1.2 UIC Class VI Program Background

The Class VI Rule requirements at 40 CFR 146 Subpart H are tailored to the unique nature of carbon dioxide injection for GS, including the large volumes of carbon dioxide injected, the relative buoyancy of carbon dioxide, its mobility within subsurface geologic formations, and its corrosivity in the presence of water to ensure the protection of USDWs. Figure 1-1 summarizes the requirements for Class VI wells. For additional, specific information on the Class VI Rule, see the Class VI Rule and Preamble at 75 FR 77230.

**Figure 1-1: Overview of the Federal Class VI Rule Requirements**

**The Class VI permit information** requirements establish the information that owners or operators must submit to obtain a Class VI permit [40 CFR 146.82].

**The minimum criteria for siting** establish that Class VI wells must be located in areas with a suitable geologic system, including an injection zone that can receive the total anticipated volume of carbon dioxide and confining zone(s) to contain the injected carbon dioxide stream and displaced formation fluids [40 CFR 146.83].

**The AoR and corrective action** provisions require the use of computational modeling to delineate the AoR for proposed Class VI wells and the preparation of, and compliance with, an AoR and Corrective Action Plan for delineating the AoR, performing all necessary corrective action, and periodically reevaluating the AoR and amending the plan if needed [40 CFR 146.84].

**The financial responsibility** requirements establish that owners or operators must demonstrate and maintain financial responsibility for performing corrective action on improperly abandoned wells in the AoR, injection well plugging, post-injection site care (PISC) and site closure activities, and emergency and remedial response [40 CFR 146.85].

**The injection well construction** requirements specify the design and construction of Class VI wells using materials that are compatible with the carbon dioxide stream over the duration of the Class VI project to prevent the endangerment of USDWs [40 CFR 146.86].

**The requirements for logging, sampling, and testing prior to operation** outline activities, including logs, surveys, and tests of the injection well and formations, that must be performed before injection of carbon dioxide may commence [40 CFR 146.87].

**The injection well operating** requirements provide operational measures for Class VI wells to ensure that the injection of carbon dioxide does not endanger USDWs, along with limitations on injection pressure and requirements for automatic shut-off devices [40 CFR 146.88].

**The mechanical integrity** requirements specify continuous monitoring to demonstrate internal mechanical integrity and annual external mechanical integrity tests [40 CFR 146.89].



BLF-000016

**The testing and monitoring** requirements define the elements that must be included in the required Testing and Monitoring Plan submitted with a Class VI permit application and implemented throughout the project to demonstrate the safe operation of the injection well and track the position of the carbon dioxide plume and pressure front [40 CFR 146.90].

**The reporting** requirements establish the periodic timeframes and circumstances for the electronic reporting of Class VI well testing, monitoring, and operating results and requirements for keeping records [40 CFR 146.91].

**The injection well plugging** requirements specify that a Class VI injection well must be properly plugged to ensure that the well does not become a conduit for fluid movement into USDWs in the future [40 CFR 146.92].

**The post-injection site care (PISC) and site closure** requirements address activities that occur following cessation of injection. The owner or operator must continue to monitor the site for 50 years following the cessation of injection, or for an approved alternative timeframe, until it can be demonstrated that no additional monitoring is needed to ensure that the project does not pose an endangerment to USDWs; following this, they must plug the injection and monitoring wells and close the site [40 CFR 146.93].

**The emergency and remedial response** requirements specify that owners or operators of Class VI wells must develop and maintain an approved Emergency and Remedial Response Plan that describes the actions to be taken to address events that may cause endangerment to a USDW or other resources [40 CFR 146.94].

**The Class VI injection depth waiver** requirements provide a process under which Class VI well owners or operators can seek a waiver from the injection depth requirements in order to inject carbon dioxide into non-USDWs that are located above or between USDWs. Including injection depth waiver provisions in a state's regulation is optional [40 CFR 146.95].

## 1.3 UIC Class VI Project Overview

This Implementation Manual is organized by the phases of a Class VI project, from pre-permit application activities and considerations through pre-construction, pre-operation, injection, and post-injection. Specific sections (i.e., 3 through 7) are dedicated to these Class VI project phases and may be referenced independent of other sections. Color is used in the footers and figures to facilitate navigation through the guidance sections on the various phases.

The phases of a Class VI project, as shown in Figure 1-2, include:

- The **pre-permitting phase**, when the applicant prepares the Class VI permit application. The UIC Program is encouraged to communicate with the prospective applicant as they develop the permit application to ensure that all required activities are performed and that the applicant is aware of any related approvals or permits they may need to obtain. See Section 3.
- The **pre-construction phase**, which follows the submittal of a Class VI permit application. This Implementation Manual provides recommendations for reviewing extensive geologic, modeling, hydrogeologic, engineering, and financial information about a proposed Class VI project in the permit application to confirm site-suitability, identify ways to address or mitigate uncertainties about the project, and develop a permit that protects USDWs from endangerment and allows construction of the well. See Section 4.
- The **pre-operation phase**, when the Class VI well owner or operator submits the results of required pre-operational testing, updated information about site geology, the final AoR, any needed amendments to the project plans, and information about the construction and testing of the well. This Implementation Manual provides recommendations for reviewing this information to ensure that any uncertainties

identified during the course of the permit application review have been addressed, verify site-suitability, confirm that the well was constructed or converted appropriately, and ultimately make a determination regarding authorization to inject. See Section 5.

- The **injection phase**, when Class VI well owners or operators conduct injection activities, perform testing and monitoring, and reevaluate the AoR as described in the Class VI permit and project plans. This Implementation Manual provides recommendations for reviewing this information to confirm that the well and the project are operating in compliance with the permit, the carbon dioxide plume and pressure front are behaving as predicted, and USDWs are not endangered. See Section 6.
- The **post-injection phase**, when the Class VI well owner or operator will plug the injection well, monitor the plume and pressure front, and, after demonstrating USDW non-endangerment, close the site. This Implementation Manual provides recommendations for reviewing the information submitted to verify that the project continues to be protective of USDWs and that, following site closure, the injection and monitoring wells at the site will not endanger USDWs. See Section 7.

## 1.4 Available Resources to Support Class VI Permitting

The EPA has developed a series of electronic tools and other resources to support permitting authorities and Class VI well permit applicants/owners or operators in understanding and implementing the requirements of the Class VI Rule.

***The Geologic Sequestration Data Tool and Associated Resources***

The Geologic Sequestration Data Tool (GSDT) can assist the UIC Program in organizing and retaining the large volume of material related to permit application reviews and subsequent project oversight activities. The EPA developed the GSDT to:

- Facilitate compliance with the electronic reporting requirement of the Class VI Rule at 40 CFR 146.91(e), providing reporting modules by which permit applicants/owners or operators can submit required information in an approved electronic format; and
- Support permitting authorities in tracking and managing submissions associated with Class VI reporting, including support for evaluation and oversight activities over the duration of a Class VI project.

Permitting authorities have full access to the GSDT, which allows them to access all submitted materials. They can also use the GSDT to support technical evaluations (including AoR delineation modeling), manage communications with owners or operators, and store all information related to a project. The GSDT allows permitting authorities to review and manipulate information while preserving the integrity of the original submitted data. Permitting authority users are limited to read-only access unless they are assigned to a particular project; however, no users can modify the original, time-stamped files submitted by owners or operators.

See Appendix A for a description of how the GSDT manages information and supports the needs of both permitting authorities and Class VI well permit applicants/owners or operators. See Section 3.1 for additional information on supporting permit applicants with accessing the GSDT.



BLF-000018

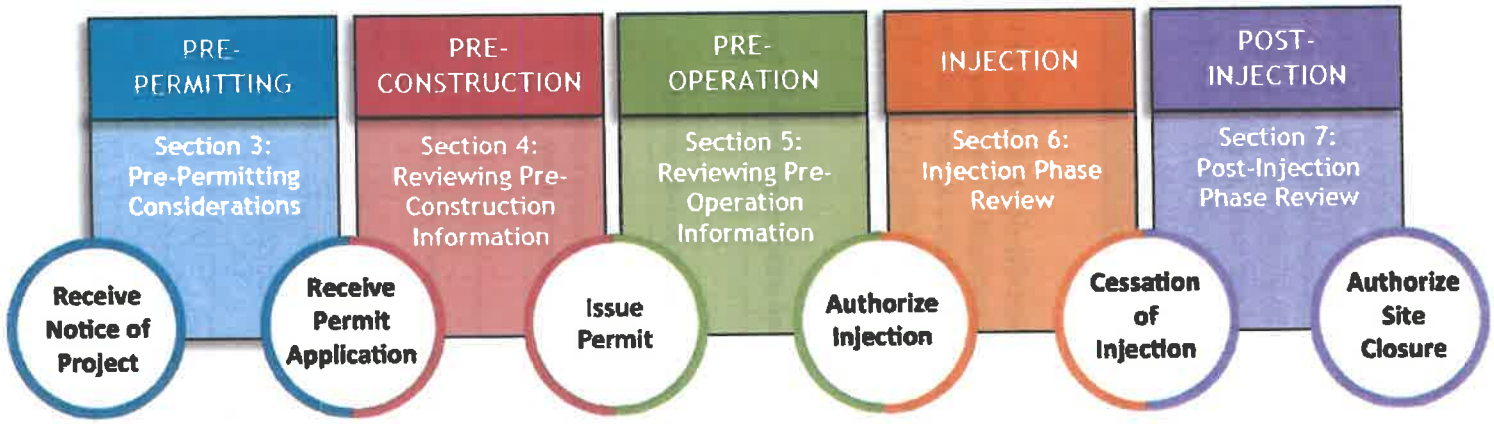



**Figure 1-2: The Phases of a Class VI Project**

The *UIC Program Class VI Well Recordkeeping, Reporting, and Data Management Guidance for Owners and Operators* provides recommendations for complying with the reporting and recordkeeping requirements of the Class VI Rule. It covers electronic reporting in the context of the Class VI Program, the key components and capabilities of the GSDT's reporting modules, and how permit applicants can register to use and access the GSDT. While the primary audience for that guidance is Class VI permit applicants/owners or operators, it may also serve as a useful resource for permitting authorities. For example, it can help facilitate communicating with owners or operators who are using the GSDT or understanding the types of information that owners or operators might submit. The GSDT user guides provide additional support, with step-by-step instructions tailored to each component of the tool. The GSDT also has a resource library that contains available electronic tools, templates, and guidance (see below).

To register for a GSDT account as a permitting authority user, send an email to GSDataTool@epa.gov or request an account at https://epa.velo.pnnl.gov/gs3/.

### *Templates to Support Class VI Permitting*

The EPA developed a series of templates to support the development of various documents associated with Class VI permitting and project oversight. These templates, for materials to be developed by both permit applicants/owners or operators and the UIC Program, can facilitate compliance with the Class VI Rule and promote consistency in Class VI permits issued nationwide. Table 1-1 presents these templates, which are available in the resource library of the GSDT.

**Table 1-1: Templates to Facilitate Compliance with Federal Class VI Rule Requirements**

| Templates | Citation |
|---|---|
| ***Templates to support the submittal and evaluation of the Class VI permit application*** | |
| Narratives for permit application and associated submittals | 40 CFR 146.82(a); 146.82(c) |
| Requests for additional information from the applicant/owner or operator and a spreadsheet to support the development of a testing and monitoring strategy | 40 CFR 144; 146 |
| ***Templates of Class VI permit package elements*** | |
| Permit conditions | 40 CFR 144; 146 |
| Summary of Requirements | 40 CFR 146.82(a)(10); 146.88; 146.91 |
| AoR and Corrective Action Plan | 40 CFR 146.82(a)(13); 146.84(b) |
| Testing and Monitoring Plan | 40 CFR 146.82(a)(15); 146.90 |
| Injection Well Plugging Plan | 40 CFR 146.82(a)(16); 146.92(b) |
| PISC and Site Closure Plan | 40 CFR 146.82(a)(17); 146.93(a) |
| Emergency and Remedial Response Plan | 40 CFR 146.82(a)(19); 146.94(a) |
| Quality Assurance Surveillance Plan (QASP) for testing and monitoring activities | 40 CFR 146.90(k) |
| Well Construction Details | 40 CFR 146.82(a)(11),(12) |
| Financial Assurance Demonstration | 40 CFR 146.82(a)(14); 146.85(a) |
| Stimulation Program | 40 CFR 146.82(a)(9) |



BLF-000020

| Templates | Citation |
|---|---|
| ***Templates to support the issuance of a Class VI permit and required notifications*** | |
| Statement of Basis | 40 CFR 124.7 |
| Fact sheet | 40 CFR 124.8 |
| Letter for public notice of the Class VI permit application | 40 CFR 124.10 |
| Interstate coordination letter about an AoR that crosses jurisdictional boundaries | 40 CFR 146.82(b) |
| Notification to Public Water System Supervision (PWSS) Directors about an injection depth waiver | 40 CFR 146.95(b)(2) |
| ***Templates to support required reporting and notifications during the injection and post-injection phases*** | |
| Semi-annual testing and monitoring reports | 40 CFR 146.91(a) |
| Notice of intent to plug a well and injection well plugging report | 40 CFR 146.92(c),(d) |
| Non-endangerment demonstration narrative | 40 CFR 146.93(b)(3) |
| Notice of intent for site closure and site closure report | 40 CFR 146.93(d),(f) |

### *Financial Responsibility Cost Estimation Tool and Checklists*

To support the evaluation of cost estimates provided pursuant to 40 CFR 146.85(a)(2), the EPA developed the Cost Estimation Tool for Class VI Financial Responsibility Demonstrations. The spreadsheet-based tool estimates costs for required activities, e.g., corrective action, injection well plugging, and post-injection testing and monitoring, based on site-specific information. The cost estimates for each activity are intended to assist the UIC Program in assessing whether the financial responsibility cost estimates in the permit application are adequate, and guide discussions between the UIC Program and permit applicants during the permit application review process.

The EPA also developed a set of electronic checklists to support the evaluation of proposed financial responsibility instruments by tracking the information necessary to determine the adequacy of the financial responsibility demonstration. The Cost Estimation Tool and the checklists are available in the resource library of the GSDT. See Section 4.1.3 for additional information on evaluating financial responsibility demonstrations.

### *Geologic Sequestration Guidance Documents and Fact Sheets*

The EPA developed a series of guidance documents and fact sheets to support Class VI well owners or operators and UIC permitting authorities in meeting the requirements of the Class VI Rule. These documents, described below, are available on the EPA's website at https://www.epa.gov/uic/class-vi-guidance-documents.

The EPA developed the following technical guidance documents to provide recommendations and considerations for meeting the Class VI Rule requirements:

- The **UIC Program Class VI Well Site Characterization Guidance** provides recommendations regarding how to perform activities that will enable an owner or operator to comply with the geologic siting requirements of the Class VI Rule.

- The **UIC Program Class VI Well Area of Review Evaluation and Corrective Action Guidance** describes recommended approaches to apply computational modeling to delineate the AoR, perform corrective action at GS sites, and reevaluate the AoR.
- The **UIC Program Class VI Financial Responsibility Guidance** provides recommendations regarding demonstrating and maintaining financial responsibility for a Class VI well.
- The **UIC Program Class VI Well Construction Guidance** describes recommended procedures and materials for designing and constructing injection wells that address the unique nature of carbon dioxide injection for GS.
- The **UIC Program Class VI Well Testing and Monitoring Guidance** provides recommended approaches for meeting the testing and monitoring requirements of the Class VI Rule, including well testing, groundwater quality monitoring, and carbon dioxide plume and pressure front tracking.
- The **UIC Program Class VI Well Project Plan Development Guidance** describes the elements of the five required Class VI project plans and provides recommendations regarding how an owner or operator might consider the site-specific elements of a Class VI project in developing the plans.
- The **UIC Program Class VI Well Recordkeeping, Reporting, and Data Management Guidance** provides recommendations to owners or operators for complying with the reporting and recordkeeping requirements of the Class VI Rule and using the GSDT.
- The **UIC Program Class VI Well Plugging, Post-Injection Site Care, and Site Closure Guidance** presents recommendations related to plugging the injection and monitoring wells, performing post-injection testing and monitoring, petitioning for an alternate PISC timeframe, making a non-endangerment demonstration, and closing a Class VI site.
- The **UIC Program Class VI Primacy Manual for State Directors** provides procedural support to UIC Program Directors preparing the required UIC primacy application materials to submit to the EPA for review and approval.

The EPA also developed a set of fact sheets and quick reference guides to support the UIC Program on several aspects of Class VI permitting:

- **Additional Tools for UIC Program Directors on Incorporating Environmental Justice (EJ) Considerations into the Class VI Injection Well Permitting Process.** This quick reference guide describes available tools and considerations for incorporating EJ into the Class VI permit application review and approval process.
- **Additional Considerations for UIC Program Directors on Interstate Coordination Requirements for the Class VI Injection Well Permitting Process.** This quick reference guide provides considerations for notifying other state, tribal, and territorial agencies if a Class VI AoR crosses (or comes close to) jurisdictional boundaries.
- **Additional Considerations for UIC Program Directors on the Public Participation Requirements for Class VI Injection Wells.** This quick reference guide presents a series of steps for meeting the public participation requirements of the Class VI Rule.



BLF-000022

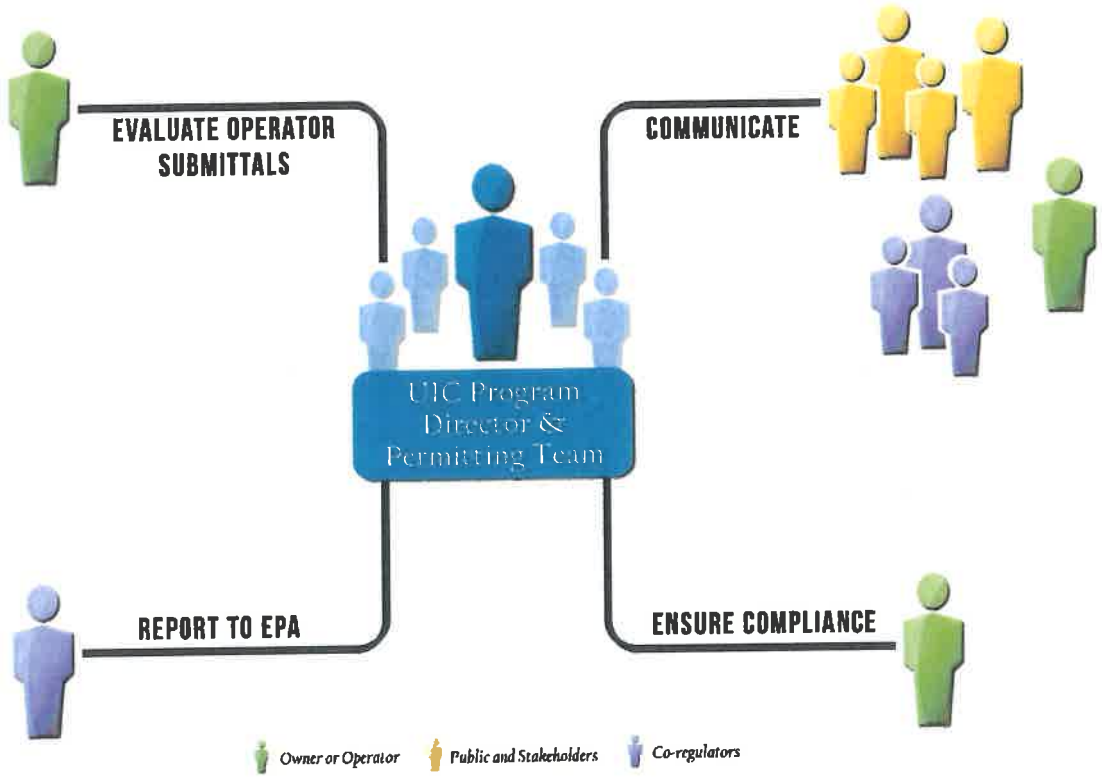
- **Public Participation Considerations for Geologic Sequestration Projects**. This fact sheet is designed to assist UIC Program Directors and Class VI well permit applicants/owners or operators in developing a plan to educate and engage the public on Class VI projects.

***Useful Websites***

The EPA compiled a list of websites that may support the UIC Program in reviewing Class VI permit applicant and/or owner or operator submittals or performing activities associated with evaluating permit applications or Class VI project data. Some of the websites may also support owners or operators as they prepare permit applications and perform activities required under the Class VI Rule. This list of EPA and other federal agency websites is presented in Appendix B.

*This page is intentionally blank.*

# Section 2: UIC Program Responsibilities



*This page is intentionally blank.*

# 2 UIC Program Responsibilities

Throughout the duration of a Class VI Project, the UIC Program will likely conduct many activities and fill many roles associated with implementing the Class VI Rule. This section describes these roles, including:

- Reviewing permit applicant/owner or operator submittals and making risk-based decisions to ensure that USDWs are not endangered (see Section 2.1);
- Reporting to the EPA about Class VI permitting and projects (see Section 2.2);
- Communicating with the Class VI well owner or operator, the public, and co-regulators about Class VI projects (see Section 2.3); and
- Ensuring compliance with permit conditions and the Class VI Rule (see Section 2.4).

## 2.1 Reviewing/Evaluating Submittals and Decision-Making

The permitting, operation, and closure of Class VI projects are guided by a permit that includes enforceable Class VI project plans. Effective oversight of a Class VI project involves identifying the site-specific potential for endangerment to USDWs associated with the injection activity and setting permit conditions to reduce or manage this potential endangerment. Oversight during the injection and post-injection phases involves verifying, through the review of testing and monitoring data, that endangerment to USDWs is being managed (or mitigating the impacts of any unforeseen events).

The UIC Program should consider how various aspects of the site (as presented in the permit application) will ensure non-endangerment of USDWs and, following issuance of the permit, confirm this based on the testing and monitoring data that will be collected throughout all phases of the project. All the information collected and reviewed—and the documentation of that review—will collectively form a robust, defensible permit record.

The review of Class VI project information is likely to be an iterative process (See Figure 2-1). For example, it is possible that not all information needed to make a final permitting decision will be available when the permit application is submitted. Therefore, the UIC Program is encouraged to identify uncertainties to be addressed via required pre-operational testing and/or through permit conditions. Also, during the course of project operations, as testing and monitoring data are collected and AoR reevaluations are performed, the UIC Program should review this information to ensure that the project is in compliance with the permit and USDWs are not endangered—or consider whether any changes to the permit are needed. Finally, the testing and monitoring results and other geologic data collected over the duration of the project should support the eventual goal of a non-endangerment demonstration and enable the UIC Program Director to authorize the owner or operator to perform site closure activities.

While the specific activities vary based on the project phase or the type of information submitted, some basic steps should be followed throughout every phase of the project to ensure the adequate and thorough evaluation of data. These include, as described below: receiving information and confirming that it is complete, evaluating the information submitted, setting or modifying permit conditions, and documenting the evaluation.



BLF-000027

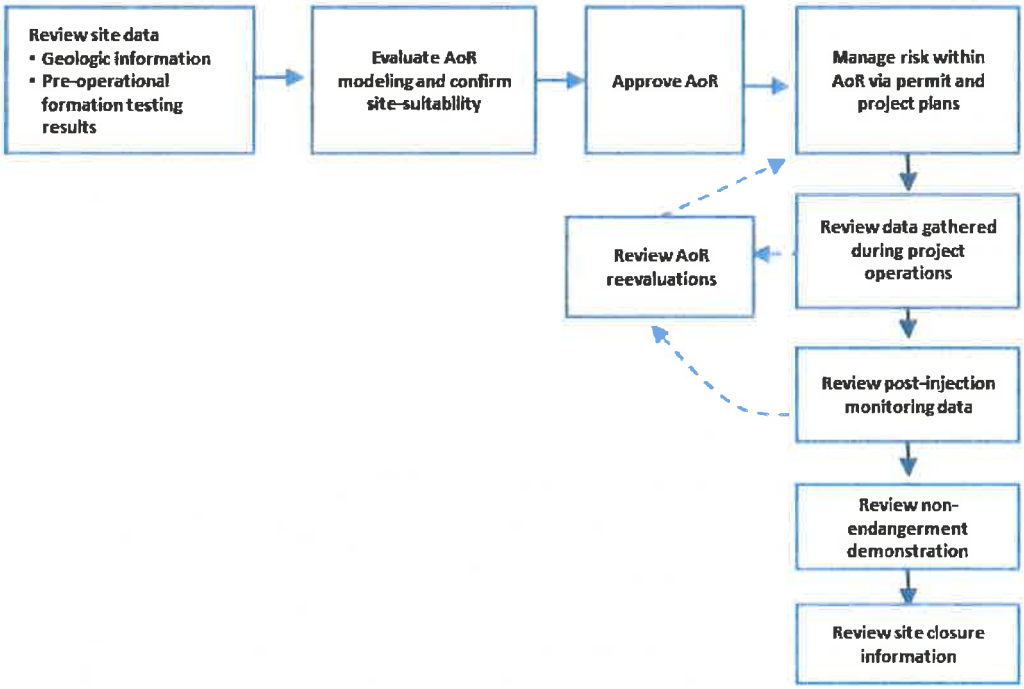



**Figure 2-1: Data Evaluations and Decision-Making**

### *Receiving Information and Confirming Completeness*

The EPA encourages the UIC Program to discuss information needs with the applicant/owner or operator throughout the permit application review process and the duration of the project. Permit applicants/owners or operators should be encouraged to submit all required information electronically via the GSDT (see Section 1.4), as this will facilitate information management and review. The UIC Program should perform a completeness review to confirm that all of the required or needed information was submitted—in sufficient detail and in the right format—to inform the evaluation. If additional information or clarification is needed, the UIC Program should request the information from the owner or operator via the GSDT; this request and the responses will then become part of the permit's administrative record.

### *Conducting a Technical Evaluation*

The UIC Program should carefully review information submitted for compliance with Class VI Rule requirements and to confirm that USDWs are not endangered.

- In the pre-construction and pre-operation phases, the UIC Program should review site-specific information to support a risk-based determination that USDWs will not be endangered by the proposed injection activity. In the pre-construction phase, the UIC Program should review the permit application to confirm that the site is suitable for carbon dioxide injection for GS or identify uncertainties to be addressed via pre-operational testing. In the pre-operation phase, the UIC Program should review updated geologic data and the results of pre-operational testing as described in the permit. This review process is similar to the initial permit application review, but is streamlined to focus on newly acquired information to confirm that identified uncertainties have been addressed and the site is suitable for GS.

- During the injection and post-injection phases, the UIC Program should review site testing and monitoring results, along with the results of AoR reevaluations or amended project plans (and, during post-injection, well plugging and site closure-related information). The purpose of these reviews is to confirm that the project continues to be in compliance with the permit or to identify needed changes to the permit to address changes from predicted site behavior. If unforeseen or emergency events occur, the UIC Program may also need to work with the owner or operator to implement appropriate remedial actions to return the project to compliance and prevent or mitigate endangerment to USDWs (see Section 2.4).

Technical evaluations should involve the input of all members of the permit application review team (see Section 3.1) and the applicant/owner or operator as needed. This approach, recommended throughout this Implementation Manual, will ensure that each aspect of the project is managed appropriately and with consideration to site-specific aspects of the project to ensure USDW protection from endangerment. This Implementation Manual recommends basic steps for performing the review and provides potential site-specific considerations.

### *Setting or Modifying Conditions of the Permit and Project Plans*

The UIC Program should prepare a Class VI permit based on the site-specific information reviewed. Class VI permit packages will likely consist of a permit that includes a set of site- and project-specific plans, including: the required Class VI project plans, a summary of requirements, construction details, financial responsibility information, and a stimulation program (if needed). This permit package will guide well construction, injection operations, and collection of the information necessary to ensure compliance with Class VI requirements and prevent USDW non-endangerment, or, when necessary, guide steps to manage/mitigate endangerment to USDWs. Templates of each piece of the permit package, which include recommended language and places to fill in project-specific details, are available in the resource library of the GSDT. While using the templates is not required, the EPA encourages their use because they are organized to ensure that the information required by the applicable Class VI Rule requirements is included while providing the flexibility to tailor submissions to particular permits.

The permit and plans should be considered "living documents" that can be modified over the duration of the project as new information becomes available, such as during pre-operational testing, via injection or post-injection phase testing and monitoring, or as a result of AoR reevaluations.

Pursuant to the requirements at 40 CFR 124, 144 and 146, the UIC Program Director will perform a series of steps associated with issuing or modifying a Class VI permit. These include: developing Class VI permit conditions, preparing a fact sheet and/or statement of basis about the project and the evaluation, compiling an administrative record for the permitting decision, soliciting and responding to public comments, and finalizing the permit conditions, if needed based on public input.

### *Documenting the Evaluation*

Written materials that document the review of a permit application or project data will support transparent permitting decisions and promote consistency in permitting and project oversight.



BLF-000029

Additionally, if the permit is challenged or an enforcement action is necessary, an administrative record that contains thorough documentation of the review would support a response.

The EPA recommends that the UIC Program document the decision-making process for all Class VI permits, including evaluating Class VI permit applications, preparing Class VI permits and authorizing injection, reviewing data submitted during the injection and post-injection phases, making compliance and enforcement determinations, and modifying Class VI permits when needed. This documentation could describe: the evaluation process; any deficiencies, uncertainties, or data limitations identified in the course of the review; issues raised and discussed with the applicant/owner or operator; and how the final (or modified) permit conditions and associated plans reflect the resolution of these issues. The GSDT can support the development of the administrative record for the permitting decision; see Section 1.4 and Appendix A for additional information.

## 2.2 Reporting to the EPA

UIC Program Directors must report to the EPA on the status of their programs [40 CFR 144.8]. The EPA uses this information to respond to information requests and perform analyses for EPA management, the Office of Management and Budget, the U.S. Government Accountability Office, Congress, and the public.

These reports are submitted to the EPA Regional Administrator if a state agency is the permitting authority or to EPA Headquarters where the EPA is the permitting authority. This section discusses the types of reporting for which UIC Program Directors are responsible.

### *Compliance Reporting*

Reporting on noncompliance and significant noncompliance (SNC) is required for UIC Program compliance evaluation, per 40 CFR 144.8. Instances of noncompliance to be reported include: failure to complete construction elements, modifications to schedules of compliance, failure to complete or provide compliance schedule or monitoring reports, deficient reports, noncompliance with other permit requirements, and all other instances of noncompliance. Specific information to be reported about permittees who are out of compliance with the Class VI Rule includes:

- Noncomplying permittees' names, locations, and permit numbers [40 CFR 144.8(a)(1)(ii)(A)];
- A brief description and the date of each instance of noncompliance [40 CFR 144.8(a)(1)(ii)(B)];
- The date(s) and description(s) of each enforcement action taken by the UIC Program Director [40 CFR 144.8(a)(1)(ii)(C)]; and
- The date compliance was achieved [40 CFR 144.8(a)(1)(ii)(D)].

### *Annual Reporting*

The UIC Program Director submits annual reports to the EPA about Class VI permit review and issuance, mechanical integrity testing and remedial actions, and well inventory. The EPA tracks the following types of information on all injection wells, including Class VI wells:



BLF-000030

- Information on permit determinations (e.g., the number of permits issued and not issued, and permit modifications) and permit file reviews;
- Enforcement actions, including administrative actions and civil and criminal actions;
- Operators of injection wells identified as being in SNC with statutory and regulatory requirements, enforcement actions against SNCs, and return of wells to compliance;
- Contamination of USDWs and well closures; and
- Wells that have remained in SNC for two or more consecutive quarters and have not been returned to compliance or have been subject to a formal enforcement action.

Annual well inventory reports are submitted in February; all remaining annual reports are submitted at the end of the federal fiscal year.

## 2.3 Communicating about Class VI Projects

The UIC Program Director plays a central role in communicating with a Class VI permit applicant/owner or operator, the public and interested stakeholders, and with co-regulators. See Figure 2-2.

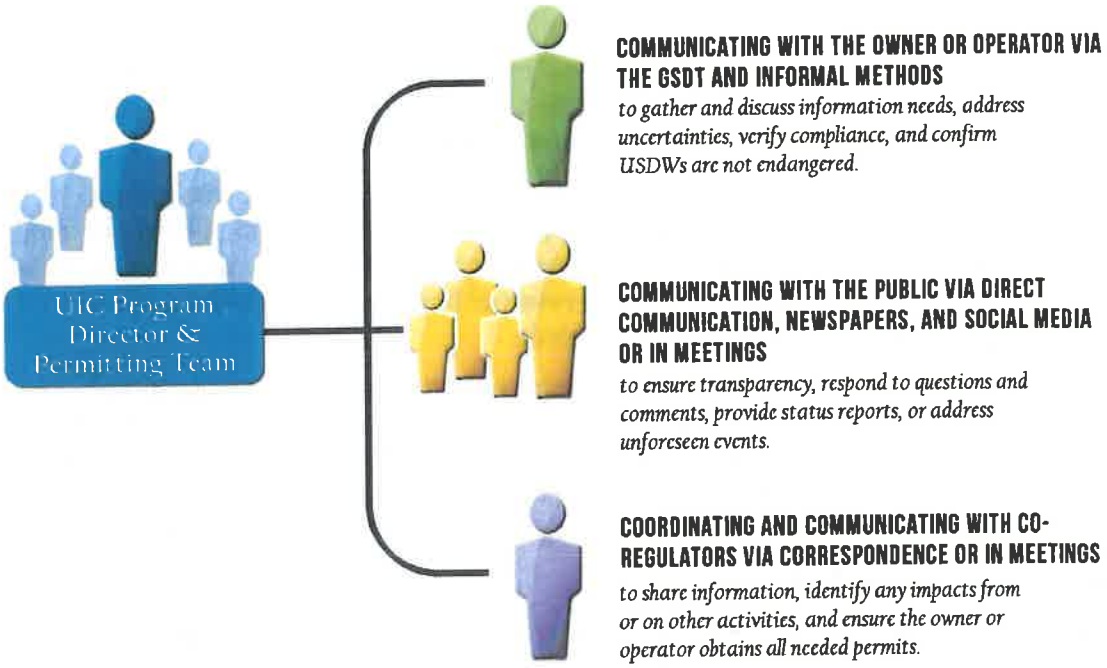



**Figure 2-2: Class VI Project Communications**

Proactive communication with various stakeholders is important, since GS has potentially high public interest and connections to other initiatives (e.g., carbon capture). Transparency in the permitting process and effective communication on Class VI permitting will facilitate information sharing and encourage protective projects.

***Communicating with the Owner or Operator***

Written and verbal communication between the UIC Program and a Class VI permit applicant or an owner or operator is a key component of setting and implementing protective permit conditions. The GSDT can support this by providing a way to share files and by serving as a record of all communications, including requests for information and the applicant's or owner or operator's response (see Section 1.4 and Appendix A). The EPA recommends that the UIC Program document all verbal communication, such as calls and meetings with the applicant, by uploading meeting notes, call logs, or other records to the GSDT.

This Implementation Manual provides specific recommendations for communication throughout the duration of the Class VI project. For example:

- *Before injection commences*, permit application reviews will necessitate communication with the applicant throughout the evaluation. The UIC Program may need to request clarifying information, hold periodic conversations or meetings with the applicant, and share draft materials in the course of performing the review and writing a draft Class VI permit.
- *During and following well construction and pre-operational testing,* interaction with the owner or operator will likely continue as the UIC Program reviews updated information and, if necessary, revises the Class VI permit or project plans.
- *During injection operations*, regular communication can help ensure that project operations are proceeding according to the permit, that testing and monitoring is being performed, and that the results confirm expectations. If an unexpected event or violation were to occur, prompt communication is essential to ensure that USDWs are not endangered and/or any impacts are mitigated.
- *Following cessation of injection*, the owner or operator and UIC Program should coordinate and communicate to ensure that well plugging activities and site closure proceed as planned. Additionally, communication with the owner or operator as post-injection monitoring is performed can help identify whether sufficient data are being generated to support a non-endangerment demonstration (see Section 7.6).

***Communicating with the Public***

The unique and complex nature of Class VI wells and GS highlights the importance of communicating with the public and stakeholders about these projects. Communication and outreach is important throughout the duration of a Class VI project. For example:

- *Before the permit application is submitted.* The EPA recommends that the UIC Program Director and the permit applicant provide information to the public about the proposed project and the pending permit application as early as possible in the site characterization and permit application development process. Targets of this outreach should include the public, including nearby residents and landowners. See Section 3.3 for additional information on communicating during the pre-permitting phase.



BLF-000032

- *During the public comment period for the Class VI permit.* Public notice of the permit application is required at 40 CFR 124 (see Section 4.2). In addition to providing a copy of the draft permit and a fact sheet and/or a statement of basis, the UIC Program may conduct outreach or need to answer questions about the project. For example, the public may be interested in the geology of the site, injection technology, and how the Class VI requirements or specific permit conditions will protect USDWs from endangerment. If the applicant seeks an injection depth waiver or an expansion of the areal extent of an aquifer exemption, a separate, but related public notice is required for these actions (see Sections 4.1.11 and 4.1.12).
- *During well construction.* The period between issuance of a permit (after which the owner or operator may construct or convert the well) and commencement of injection may vary, depending on how long it takes the owner or operator to drill the well and perform pre-operational testing and the UIC Program to evaluate updated information. Providing updates on the status of well construction activities and interactions between the owner or operator and the permitting authority can keep the public informed and address any questions that may arise as the project site is developed. Furthermore, if, following the review of updated information, the permit or any project plans need to be revised, public notice of the draft revised permit is required at 40 CFR 124. During this period, the public may have questions about the reason for the modification or how the permit has changed.
- *During the injection phase.* The EPA recommends providing periodic status updates during injection operations to keep the public informed about the project. Other opportunities for communication with the public may occur during permit modifications or in the unlikely event of a violation or emergency. This communication might take the form of:
    - *Periodic updates on the status of the project.* Status reports can assure the public and stakeholders that the project is progressing as planned, that monitoring and oversight procedures are in place, and that there is no endangerment to USDWs. These updates could provide information on the location of the plume, the most recent results of water quality monitoring or well testing, or the findings of compliance reviews and recent inspections. Such reports could be timed to follow receipt and review of owner or operator submitted reports.
    - *Notice of a permit modification.* If a permit modification is required (e.g., because one or more project plans were modified following an AoR reevaluation), the public may have questions about the reason for the modification. The UIC Program should be prepared to provide information or answer questions about the AoR reevaluation process and results; what monitoring or operating data prompted any project plan revisions; and which plans or other permit conditions were revised. Public notice of non-minor permit modifications is required at 40 CFR 124 (see Section 5.2).
    - *Communication regarding a violation or emergency response.* If any event at the project results in a violation or necessitates an emergency response, the EPA encourages the UIC Program to coordinate with the owner or operator to communicate information about the situation to the public as soon as possible.

Information might include: an explanation of what occurred and whether there is evidence of USDW endangerment; a description of the responses taken; and when the well/project returned to compliance (or when a return to compliance is anticipated). If there is evidence of USDW endangerment, the UIC Program should inform customers of local water systems, nearby land owners, and the public about the event. Alternatively, if the incident did not endanger USDWs, communication can assure stakeholders that the UIC protective measures worked and that their water source was not endangered.

- *After injection has ended.* The EPA encourages the UIC Program to inform the public after the well is plugged or the site is closed to alert interested parties. At this time, the UIC Program should be prepared to provide information or answer questions about injection well plugging procedures, non-endangerment demonstrations, or the conditions that must be met to authorize the owner or operator to perform site closure activities pursuant to 40 CFR 146.93(b).

Available outreach tools include: direct communication, newspapers, and social media, such as blogs, social networks, podcasts, and webcasts. Note that outreach efforts cannot be performed in lieu of meeting the public participation requirements at 40 CFR 124. For additional information on public involvement, see the UIC Quick Reference Guide *Additional Tools and Considerations for UIC Directors on the Public Participation Requirements for Class VI Wells.*

***Coordinating and Communicating with Co-Regulators***

Coordination with co-regulators of other injection well classes, public drinking water utilities, and other federal, state, tribal, or local authorities may be essential at various stages of a Class VI project. Such coordination and transparency among agencies can also help the UIC Program ensure that the owner or operator applies for and receives any other permits (i.e., beyond the Class VI permit) that may be required. Below are examples of the types of coordination about a Class VI project that may be needed:

- The Class VI Rule, at 40 CFR 146.82(b), requires the UIC Program Director to notify, in writing, any states, tribes, or territories within the AoR of the Class VI project based on information provided in a Class VI permit application.
- If the project is anticipated to have an AoR that crosses (or comes close to) boundaries with other states or tribes, the UIC Program should communicate early with other UIC Programs or environmental protection officials in those states or tribes. Such officials might be affiliated with other state/tribal agencies (e.g., health departments). See the *Quick Reference Guide on Interstate Coordination Requirements* on the EPA's website for additional information.
- If the project will operate under an injection depth waiver, the Class VI Rule, at 40 CFR 146.95 requires consultation with the Directors of the Public Water System Supervision Programs of all states, territories, and tribes having jurisdiction within the AoR of the well for which an injection depth waiver is sought. The UIC Program should also inform the EPA Regional Administrator early in the process of reviewing a project's application for an injection depth waiver, as their concurrence regarding the waiver is required (40 CFR 146.95(d)). See Section 4.1.11.



BLF-000034

- If the owner or operator applies to expand the areal extent of an existing aquifer exemption, the UIC Program should alert the appropriate EPA regional office, as the EPA must approve all aquifer exemptions, even if the state has Class VI primacy [40 CFR 144.7(d)]. Informal communication early in the process, while not required, is recommended to ensure that all parties are prepared to discuss and/or respond to the aquifer exemption application. See Section 4.1.12.
- If a pre-existing well (e.g., an injection well, a stratigraphic test well, or a site characterization well) is being re-permitted as a Class VI well, coordination with the authority that originally issued the permit for the well may help the UIC Program Director understand any previous actions taken or conditions established under a previous permit.

Additionally, the UIC Program Director can serve as a liaison with staff in other state or federal agencies that have authority over activities that are related to or may affect or be affected by Class VI injection. Specific activities may vary by region, but might include: other injection activities that could interact with the carbon dioxide plume and pressure front; drilling associated with oil and gas exploration that may reveal new information about the geology of the area; or land use changes that could affect water needs or bring resources/populations into the AoR of the Class VI project. Likewise, the UIC Program Director may seek out the expertise of other permitting authorities to corroborate information submitted in a Class VI permit application or to ensure that a Class VI permitting decision does not interfere with or adversely impact other ongoing injection activities within the area. The EPA encourages the UIC Program Director to reach out to other regulators as needed.

The UIC Program Director can also encourage Class VI permit applicants to consider other potentially applicable statutes and regulations. UIC Programs are encouraged to communicate with these co-regulators who have authority over activities addressed under other applicable statutes, including the Clean Air Act (CAA), Resource Conservation and Recovery Act (RCRA), the Marine Protection, Research, and Sanctuaries Act (MPRSA), and the Outer Continental Shelf Lands Act (OCSLA). See Section 3.4 for information on these authorities and their implementing programs.

## 2.4 Ensuring Compliance with the Class VI Rule

If, during the course of the project, there is an indication that a Class VI project or injection well may be out of compliance with permit conditions or endangering USDWs, appropriate actions to prevent USDW contamination or mitigate any adverse impacts are needed. Examples of Class VI violations include a loss of mechanical integrity, an exceedance of permit limits, or an excursion of carbon dioxide or formation fluids out of the injection zone. Identifying and addressing violations in a timely manner can avoid or reduce impairment to USDWs and ensure that the circumstances that led to a violation do not recur. These situations may be identified in a variety of ways, including:

- *Reviewing project data.* Much of this review involves the comparison of testing and monitoring results to permit limits and project predictions during the injection and post-injection phases. See Sections 6.1 and 7.2.2 for additional information on reviewing testing and monitoring results. Monitoring and operational data must also be evaluated at least once every five years as part of the Class VI permit reviews required at 40 CFR 144.36(a).


BLF-000035

- *During site inspections*, which may be performed by permitting agency staff or authorized agents to verify or witness operations, testing and monitoring, or maintenance procedures. Inspections may involve observing the injection well and monitoring wells; reviewing records to determine performance and compliance history; witnessing mechanical integrity tests (MITs), other tests of the well, workovers, or maintenance activities; or evaluating progress on required remedial procedures.
- *Based on complaints alleging improper operation or maintenance of a Class VI project.* Investigative activities should include establishing the nature and authenticity of the complaint, reviewing records and reports, contacting the owner or operator to discuss the complaint and appropriate remedial actions or responses, and inspecting the site to determine if a problem exists.

The EPA recommends that the UIC Program take the following steps to document, address, and resolve violations of a Class VI permit.

**Document the violation, if one has occurred.** If reviews of project information, site inspections, or complaint investigations indicate that a violation has occurred, document the nature of the violation. If the violation has endangered a USDW, require the owner or operator to take appropriate action to remove or mitigate the threat pursuant to 40 CFR 146.94(b). (See Section 6.5.2 for additional information on responding to USDW endangerment.) Proper documentation of violations is important to define the type and cause of the violation and provide a basis for any enforcement actions that may be needed. All permitting authority staff should be made aware of agency procedures for issuing notices of violation.

**Determine and implement appropriate enforcement action(s), if needed**. Responses may be informal (e.g., technical discussions or correspondence with the owner or operator) or formal (e.g., notices of violation, administrative orders, or judicial actions). Informal actions may be appropriate for one-time or very intermittent exceedances of a permit limit that do not affect carbon dioxide containment, compromise the integrity of the well (e.g., the triggering of a shutdown device that is not related to a loss of mechanical integrity), or endanger any USDWs. However, a pattern or trend in exceedances may be more illustrative of a problem with the Class VI project's operation and may warrant more formal actions.

Document any formal enforcement actions taken using a notice of violation, administrative order, or judicial action, and the owner or operator's response, as applicable. EPA's enforcement authority for UIC wells is contained in SDWA Section 1423. For State Programs, the specific enforcement actions available will depend on the authorities or maximum civil penalties set forth in state regulations. Select actions based on the severity of the violation, its impact on the environment, or the compliance history of the owner or operator. If appropriate, consider modifying, revoking, or suspending the UIC permit, imposing a civil penalty or fine, or initiating criminal prosecution.

**Follow up on violations and enforcement actions.** If a compliance schedule for implementing remedial responses is developed (see Section 6.5.2), check in periodically with the owner or operator to verify that the remedial actions are progressing and that the owner or operator is meeting all milestones. If remedial actions are not progressing, discuss this with the owner or operator or consider whether more formal or additional enforcement is needed.

**Communicate with the public and other stakeholders** about any investigations and their outcome. Explain the nature of the event that led to a compliance investigation, the information reviewed or tests/inspections that were performed, responses taken (including any violations or penalties), any environmental impacts, and when the well/project returned to compliance (or when a return to compliance is anticipated). For more information on public involvement and communication, see Section 2.3.

Additionally, the EPA recommends that the permitting authority document the data generated as a result of inspections or enforcement actions. This information may include: information on inspections (including the date of the inspection and the results), compliance or enforcement actions conducted, and any response and/or remedial action that resulted from inspection and enforcement actions.

**Report information on noncompliance and violations to the EPA**, i.e., in quarterly noncompliance reports. See Section 2.2 for additional information on the timing and requirements at 40 CFR 144.8 for reporting this information.

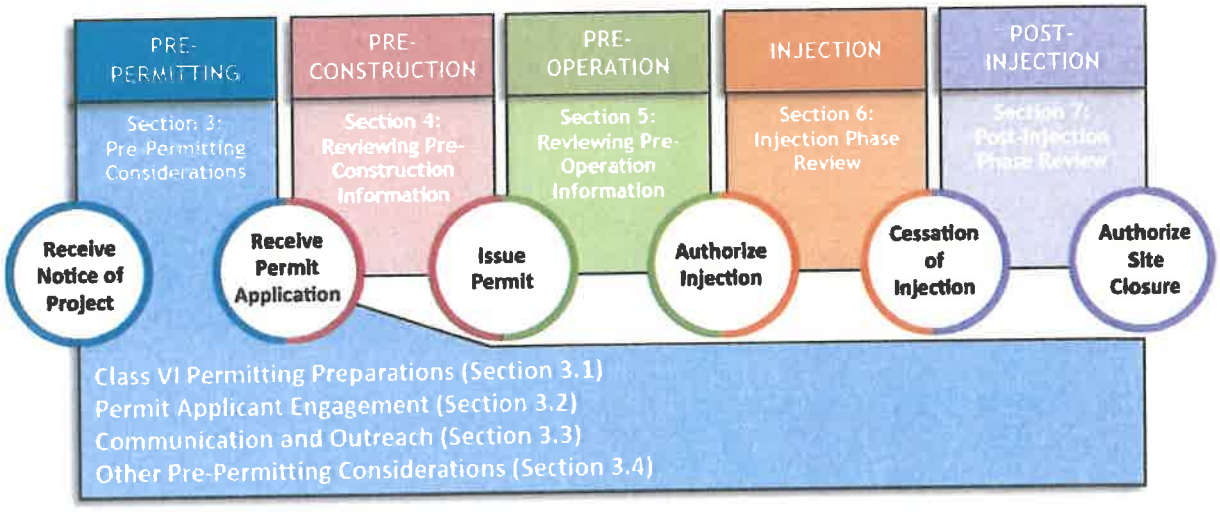

BLF-000037

*This page is intentionally blank.*



BLF-000038

# Section 3: Pre-Permitting Considerations



***This page is intentionally blank.***

# 3 Pre-Permitting Considerations

Coordination between the UIC Program and the permit applicant prior to submittal of the permit application is an important step for efficient and effective permitting. Early discussions will ensure that the applicant is aware of the permit application requirements at 40 CFR 146.82(a) and is able to electronically submit the permit application and other required information. These discussions may also benefit the applicant as they plan how to invest time and resources in site characterization, modeling, and other activities necessary to develop a comprehensive Class VI permit application. Such coordination may also help the UIC Program anticipate the information they will receive and review and assist the applicant in submitting all required information in the appropriate format and level of detail.

The EPA encourages prospective Class VI permit applicants to notify their Class VI permitting authority of their intent to apply for a permit. However, if the UIC Program becomes aware of a potential new project, e.g., in the course of conversations with industry representatives, through the media, or at meetings, permitting authority staff should reach out to the prospective Class VI permit applicant.

This section describes actions that the EPA recommends that the UIC Program take in advance of a formal submittal of a Class VI permit application. This section addresses: assembling the permit review team, specific topics on which pre-application discussions should be focused, recommendations for outreach and communication, and other considerations.

## 3.1 Class VI Permitting Preparations

Internal planning within the permitting agency can ensure an expedient response as soon as the Class VI permit application is formally submitted. This section presents recommendations for this planning step.

**Assemble a permit application review team.** Class VI projects are complex, and a holistic permit application review process that considers each element of the multi-faceted permit application will support the development of a protective Class VI permit and associated project plans. Assemble a team that collectively has the skills and expertise in the technical areas needed to evaluate the information in a Class VI permit application, including areas such as:

- Site characterization, e.g., geologists, hydrogeologists, geochemists, and log analysts/experts to review geologic data submitted with the permit application;
- Modeling, e.g., hydrogeologists and environmental/reservoir modelers to evaluate the models that will be used to delineate the AoR;
- Well construction and testing, e.g., well engineers, log analysts/experts, and geologists to review well construction information and the results of well testing that will be performed during construction of the injection well;
- Finance to review the financial responsibility demonstration, including cost estimates and the proposed financial instruments, e.g., UIC personnel who are familiar with financial responsibility as well as accountants and economists;
- Risk analysis to evaluate emergency and remedial response scenario probabilities and remediation cost estimates submitted with the Emergency and Remedial Response Plan; and
- Policy, legal, and regulatory expertise related to the UIC Program and the Class VI Rule to evaluate compliance with Class VI Rule requirements.


BLF-000041

A team approach involving staff with expertise in these areas can help ensure that each piece of the permit application is evaluated on its own merit. Furthermore, effective communication among the team members will ensure that all elements of the Class VI project (i.e., well, geology, proposed operations) are complementary and that USDWs are not endangered. Sections 4 and 5 provide specific recommended cross-team consultations during the permitting process.

Given the scope of information that supports a permit application, the detailed decisions involved in the permit application evaluation process, and the potentially decades-long duration of some Class VI projects, it is likely that permitting authority staff will change over the course of the project. Documenting the review process and maintaining good records of all decisions and supporting data are important to ensure that historical knowledge of the project, justification for permit conditions, and project data are maintained and accessible following any staffing changes within the permitting agency. The GSDT can support such recordkeeping (see Appendix A).

**Review available resources.** As noted above, reviewing a Class VI permit application is a complex process that will involve experts across a variety of disciplines. Thus, it is important to begin assembling a review team as soon as there is indication that a permit application will be submitted. Work within the Class VI permitting agency to identify appropriate staff (see above). Ensure that all of the staff are able to make the time commitment to review materials (i.e., over several months). The EPA acknowledges that a team approach may require retaining contractor support to assist in any activities where in-house staff do not have the necessary expertise.

Also, the EPA encourages UIC Program managers to ensure that all staff on the review team have the resources they need to accomplish the review, including a GSDT account (see Section 1.4) or specialized software (e.g., to review AoR delineation modeling). Encourage team members to review GS guidance documents, GSDT user guides, or other relevant documents to become familiar with the Class VI permitting process. See Section 1.4 for a list of available tools and resources.

## 3.2 Permit Applicant Engagement

Working with the permit applicant early in the process will help initiate a collaborative relationship and facilitate information sharing and cooperation that will benefit the permit application review. Below are suggested ways in which the UIC Program can engage prospective Class VI permit applicants early in the permitting process.

**Assisting the applicant with obtaining a GSDT account.** Permit applicants should register for a GSDT account before submitting information to the EPA, to ensure that they meet the Class VI electronic reporting requirements at 40 CFR 146.91(e). Permitting authorities can direct applicants to https://epa.velo.pnnl.gov/operators, where a registration form is available for download. GSDT accounts are assigned on a per-project basis irrespective of the number of Class VI wells that will be used for injection at the proposed project. This means that the registration form only needs to be completed once for each project, and that only one set of credentials will be issued to an organization for a particular project. (It is the permit applicant/owner or operator's responsibility to ensure that only authorized individuals or their designees have access to the username and password.)

Following receipt of project-specific user credentials, each individual that will be authorized to formally submit information via the GSDT should complete, notarize, and submit a project-specific Electronic Signature Agreement (ESA). The ESA form (which contains additional



BLF-000042

instructions regarding this process) is available for download on the operator landing page of the GSDT. As soon as they receive GSDT credentials, permit applicant users may log into the GSDT, review the user guides, and even begin populating the forms in the GSDT modules. However, information submittal is contingent on completion of the ESA process. The EPA will keep the completed ESAs on file and use them to designate authorized users for each project within the GSDT. Additional details on GSDT registration, ESAs, and designating authorized users are available in the user documentation for the GSDT.

**Discussing the permit application process.** The EPA recommends that the UIC Program ensure that the applicant is aware of the requirements that Class VI well permit applicants/owners or operators must meet. Encourage applicants to use the technical guidance documents for owners or operators posted on the EPA's website and other available resources such as templates available within the GSDT.

Encourage applicants to collect as much site-specific data as possible before submitting the initial Class VI permit application to facilitate the permit modification process (i.e., between conducting the pre-construction activities required at 40 CFR 146.82(a) and the pre-operation phase activities required at 146.82(c)). This type of proactive planning early in the process helps ensure that the current and potential future conditions at the proposed site have been considered and helps resolve issues related to incomplete or inaccurate information as expeditiously as possible.

If the Class VI project will eventually involve more than one injection well, the EPA recommends that the UIC Program confirm that the applicant is aware of the requirement that a separate Class VI permit application must be submitted for each Class VI well, per 40 CFR 144.33(a)(5). Note that, while the Class VI Rule precludes the use of area permits for Class VI wells, there may be ways to achieve economies of scale where certain aspects of several Class VI projects' permit applications are common. For example, the permit applicant may conduct a single site characterization study, model a single AoR that accounts for the total volume of carbon dioxide to be injected into all injection wells (even if some are planned to come online in the future), or submit common well schematics if each injection well is to have similar construction. Encourage Class VI permit applicants to consider these economies of effort and leverage the GSDT to ensure that each permit application contains all the information at 40 CFR 146.82(a) to allow for a complete review of each permit application.

**Reviewing key pre-permitting considerations.** Some aspects of the planned project may necessitate early discussions prior to preparation and submittal of the permit application. The paragraphs below provide some recommendations for early discussion with a prospective permit applicant related to site characterization, modeling to delineate the AoR, permitting of wells that will be converted to Class VI, and the potential need for an injection depth waiver or aquifer exemption.

### *Site Characterization*

When possible, the EPA encourages the UIC Program to discuss planned site characterization activities with the applicant before they commence. These discussions should highlight the importance that the permit application include sufficient and site-specific geologic data. In addition to informing an understanding of the geologic suitability of the site, the geologic data provides inputs for the AoR delineation model and supports development of the Class VI project plans. Because the Class VI project plans become enforceable conditions of the Class VI permit,

any significant changes to these based on the final geologic data would require a modification of the Class VI permit before injection can be authorized [40 CFR 144.39].

If the applicant plans to use existing data about the site (e.g., data collected in the course of prior hydrocarbon exploration or other activity in the area), discussion regarding the quality and age of the available data may be beneficial. Such a discussion may also inform whether additional data (e.g., over a wider areal extent or in additional formations) might be needed to provide a complete and accurate representation of the site and provide all needed inputs for the AoR delineation model.

If the applicant plans to drill stratigraphic test wells or groundwater sampling wells that may eventually be used for carbon dioxide injection for GS, the UIC Program should inform the applicant that the wells would need to meet Class VI requirements at that point. This discussion should focus on how the stratigraphic or sampling wells might be constructed to facilitate later conversion per 40 CFR 146.81(c), i.e., by using materials that are compatible with carbon dioxide. Refer the applicant to the *UIC Program Class VI Well Construction Guidance* for additional information on carbon dioxide-compatible design.

In discussions with the applicant, the EPA encourages the UIC Program to emphasize the importance of synthesizing geologic data to inform a determination of site-suitability, i.e., that there is sufficient capacity in the injection zone to receive all carbon dioxide to be injected or that the geologic structure is suitable for GS. Encourage the applicant to consult Section 4 of the *UIC Program Class VI Well Site Characterization Guidance* and perform the level of analysis detailed in that document to facilitate the UIC Program's review of the permit application and evaluation of site-suitability.

If sufficient information is available (e.g., based on available information about the proposed site) to make a determination that additional confining zone(s) are needed, the UIC Program should discuss this with the applicant early in the site characterization process. These additional zones may be needed to impede vertical fluid movement, allow for pressure dissipation, or provide additional opportunities for monitoring, mitigation, and remediation, per 40 CFR 146.83(b). Characterization of a secondary confining zone may be needed if:

- The primary confining zone does not exhibit sufficient strength to allow injection at the proposed pressures;
- Known or suspected faults or fractures transect the primary confining zone and would interfere with containment of carbon dioxide;
- The primary confining zone is not sufficiently extensive to cover the entire maximum extent of the carbon dioxide plume and pressure front or it is not sufficiently thick and homogeneous over the entire area; or
- There is insufficient information or conflicting data about the primary confining zone.

Identifying the need for information about additional confining zone(s) as early in the permitting process as possible (ideally during pre-permit application communications) will expedite approval of the site and save resources for the applicant and the permitting authority.

The *UIC Program Class VI Well Site Characterization Guidance* provides additional recommendations on collecting and submitting geologic data.

### *Plans for AoR Delineation Modeling*

The EPA encourages the UIC Program to discuss the applicant's planned approach for computational modeling and AoR delineation to verify that the model will meet the Class VI requirements at 40 CFR 146.84(c)(1)(i)-(iii). The AoR delineation model chosen by the permit applicant should have the capability to account for multiphase flow, the relative buoyancy of carbon dioxide, and three-dimensional geologic heterogeneity. If the applicant plans to use a proprietary model, discuss how they plan to provide sufficient information to inform a complete evaluation of their modeling activities.

A discussion of the AoR and Corrective Action module of the GSDT, including its structure and the types of information that it collects, may support the applicant's compliance with the AoR and corrective action requirements of the Class VI Rule. It may also be helpful to discuss how a prospective Class VI permit applicant can generate and document inputs to facilitate efficient and effective population of the GSDT. See the GSDT user guides for additional information on using the GSDT as part of the AoR delineation/modeling evaluation.

The UIC Program should ask the applicant about the geologic data on which the AoR delineation model will be based (e.g., distributions of rock properties). Discussing modeling needs in advance can ensure that the modeling process will be based on information of a sufficient quantity, quality, and scope (both laterally throughout the AoR and vertically through all relevant subsurface formations). Additionally, these discussions are an opportunity to emphasize the importance of consistency between the geologic information, the information used to develop the model, and the inputs used in model simulations. Designing the model with consideration to planned injection and post-injection phase monitoring can support future model validations associated with AoR reevaluations and non-endangerment demonstrations.

If the Class VI project will eventually involve more than one injection well or if other wells are in close proximity within hydraulically connected formations, the UIC Program should also discuss the merits of modeling the impact of all injection activities as part of the AoR delineation process with the applicant.

The EPA recommends that the UIC Program refer the applicant to the *UIC Program Class VI Well Area of Review Evaluation and Corrective Action Guidance* for recommendations on performing AoR delineation modeling that will meet the requirements of the Class VI Rule.

### *Well Conversion and Re-Permitting*

The EPA recognizes that some owners or operators may elect to use existing, previously constructed infrastructure for GS. Such infrastructure may include previously constructed injection wells (e.g., Class I, II, or V wells), stratigraphic test wells, production wells, or monitoring wells in the project area. The Class VI regulations accommodate this approach pursuant to requirements at 40 CFR 146.81(c), provided the applicant meets all applicable Class VI requirements.

To facilitate re-permitting, the UIC Program should explain to a prospective Class VI well owner or operator that they must apply for and obtain a Class VI permit, per 40 CFR 146.81(c). Such discussions should focus on what existing information about the well or the site may be used in the Class VI permit application (e.g., geologic data on an oil and gas field; construction schematics), and what information required at 40 CFR 146.82(a) will need to be prepared specifically for a Class VI permit application (e.g., project plans). Additionally, this is an



BLF-000045

opportunity to discuss whether the construction of the well would meet the goals of 40 CFR 146.86 and can be converted and what the owner or operator must do to demonstrate that the well meets these goals.

The UIC Program should also explain that, following re-permitting, the Class VI requirements apply, and these wells will be subject to the operational, testing and monitoring, reporting, well plugging, PISC and site closure, and other requirements that apply to all Class VI wells. The EPA recommends that the UIC Program refer the applicant to the *UIC Program Class VI Well Construction Guidance* for additional information on re-permitting existing wells as Class VI wells.

***Injection Depth Waivers***

The requirements at 40 CFR 146.95 allow a Class VI permit applicant to seek a waiver from the Class VI injection depth requirements to allow injection into non-USDW formations while ensuring that USDWs above and below the injection zone are protected from endangerment.

**The Need for Injection Depth Waivers**

The injection depth waiver is a limited use option to allow for injection of carbon dioxide for GS where no alternatives exist for GS below the lowermost USDW. The waiver provisions and the additional requirements at 40 CFR 146.95 serve several purposes, including:

- Addressing concerns about local and regional geologic storage capacity limitations;
- Allowing injection into different formation types and avoiding a blanket prohibition on injection into any types of shallow formations;
- Eliminating the need to establish a minimum injection depth; and
- Ensuring that high quality water remains available in sufficient quantities to meet drinking water needs.

The additional requirements for projects operating under an injection depth waiver ensure the protection of all USDWs above and below the injection zone.

If a proposed project is in a region known to have deep USDWs, the UIC Program should work with the applicant to determine early in the site characterization process whether a USDW lies below the injection zone and, therefore, would require an injection depth waiver. Identifying USDWs may happen as part of the regional evaluation of the site in the early phases of site characterization. Otherwise, if information were to become available after the Class VI permit is issued, suggesting that previously unknown USDWs occur below the injection zone, it would be necessary for the owner or operator to apply for an injection depth waiver and modify the Class VI permit.

If the applicant intends to inject into a non-USDW formation that is above or between USDWs, the EPA recommends that the UIC Program confirm that the applicant is aware of the requirement to submit the waiver application concurrently with the Class VI permit application, and that the waiver application must contain all of the information identified at 40 CFR 146.95(a). Class VI permit applications and waiver application reports are distinct but complementary [40 CFR 146.82(d)]. That is, much of the information in the waiver application report is similar to or an expansion of information required in the Class VI permit application. However, the applicant should include the information in both submittals so that the injection depth waiver application and the permit application can each be evaluated in its entirety. The UIC Program should encourage the applicant to describe the proposed site as completely as possible, addressing USDWs above and below the injection zone—that is, it is not the EPA's intent that the permit application describes only USDWs above the injection zone and the

injection depth waiver application address those below. Rather, both documents should describe USDWs above and below the injection zone to ensure a holistic review of all pertinent information in the context of the applicable requirements.

Figure 3-1 shows how the injection depth waiver and Class VI permit application reviews are parallel. The UIC Program Director's review of the Class VI permit application should consider USDWs above and below the injection zone. The information in the waiver application report should be corroborated by geologic information and the AoR delineation modeling evaluation for the permit application review.

Information about both applications must be made available for public comment [40 CFR 124; 146.95(c)]. Requesting public input on both applications at the same time can help ensure that the public understands that the Class VI permit application involves injection under an injection depth waiver. This also offers efficiencies in evaluating public comments. The waiver application is also subject to review by the PWSS director(s) and must also be reviewed by the EPA Regional Administrator per 40 CFR 146.95(b).

If both applications meet site-suitability and other Class VI requirements, public input is addressed, and the EPA Regional Administrator concurs with issuance of the injection depth waiver, then the UIC Program Director may issue a permit and post waiver information on the EPA's website.

(Adoption of the waiver process is at the discretion of individual UIC primacy programs. If a state or tribe chooses not to make this process available to Class VI well owners or operators under their jurisdiction, the UIC Program should inform applicants that they must inject below the lowermost USDW.)

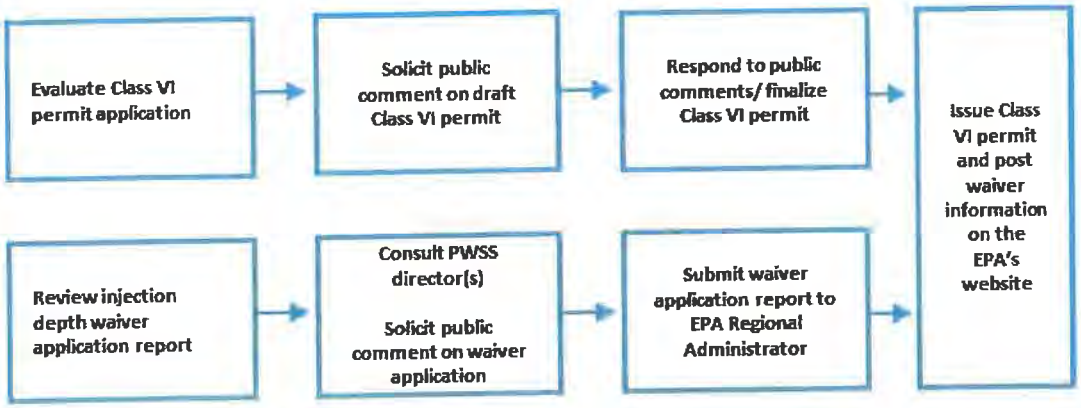



**Figure 3-1: Reviewing Class VI Permit Applications and Injection Depth Waiver Applications**

### *Aquifer Exemptions*

The Class VI Rule and aquifer exemption requirements at 40 CFR 144.7(d) and 146.4(d) enable the use of aquifer exemptions for Class VI projects only in limited circumstances. Aquifer exemptions are not available for new Class VI wells or projects that are re-permitted from well classes other than Class II EOR/EGR. The Class VI Rule establishes the criteria under which

aquifer exemption expansions may be granted for owners or operators of Class II EOR/EGR wells that elect to transition to Class VI injection wells for GS.

If a Class II well owner or operator has made a decision to re-permit their well as a Class VI well and the injection zone has an existing Class II aquifer exemption, discuss the potential need to expand the areal extent of this exemption.

The UIC Program should explain the aquifer exemption application process and the information needed to demonstrate that the aquifer exemption meets the criteria at 40 CFR 146.4; and confirm that the applicant knows that they will need to apply for an aquifer exemption expansion separate from, but concurrent with, the Class VI permit. For additional information, see Section 4.1.12.

### 3.3 Communication and Outreach

Early communication with the public and other regulatory agencies can support awareness of the Class VI project and help meet public notification requirements. The EPA encourages the UIC Program to work with the applicant to identify information about the proposed project and in the permit application that can be shared with the public. Below are recommendations for communications and outreach related to prospective Class VI projects that the UIC Program might consider on a project-specific basis:

- Include residents and landowners near the proposed site in project-related public meetings or hearings as early as possible in the permit application development and review process. Begin to plan for the required public notification procedures at 40 CFR part 124 as well, e.g., by identifying newspapers of general circulation near the proposed site, stakeholders, etc.
- Work with the applicant to develop a communication plan that describes potentially affected parties, potential audiences, communication methods, and key messages. For more guidance on public involvement, see the EPA's UIC Quick Reference Guide *Additional Tools and Considerations for UIC Directors on the Public Participation Requirements for Class VI Wells*.
- If the applicant plans to construct additional injection wells in the future, ensure that the public is aware of planned future developments at the site, including the locations of any monitoring wells. Similarly, if the current Class VI permit application is for a new injection well at the site of an existing Class VI project, explain any relevant information about the project, e.g., compliance history.
- If, based on early information, there is reason to believe that disadvantaged communities (i.e., areas with minority populations, populations below the poverty level, or potentially vulnerable subpopulations) may be within or near the AoR of the project, the UIC Program should plan to perform an environmental justice (EJ) analysis consistent with EJ 2020 Action Agenda priorities. An EJ analysis will help identify whether any portions of the AoR encompass disadvantaged communities. The EJScreen Tool (available on the EPA's website) can support this review; for additional information see Section 1.4 and Appendix B. Where the EJ analysis indicates that the proposed site may be near disadvantaged populations that are also exposed to environmental risks, it may be appropriate to incorporate additional mitigation measures into the Class VI permit, such as monitoring in areas with identified disadvantaged communities. For additional



BLF-000048

information, see the *UIC Quick Reference Guide - Additional Tools for UIC Program Directors Incorporating Environmental Justice Considerations into the Class VI Injection Well Permitting Process*. The Guide describes seven steps for performing an EJ analysis and mapping tools that are available to identify disadvantaged communities within the AoR of a Class VI project.

## 3.4 Other Pre-Permitting Considerations

Some Class VI permit applicants may be subject to other requirements outside of the Class VI Rule. The EPA encourages the UIC Program to: ensure that the applicant is aware of these other requirements (discussed briefly below) that may apply; and work with co-regulators as needed so that permit applications under other regulatory programs are submitted and processed in a timely manner (e.g., optimally before injection is scheduled to commence). For example, a UIC Program may need to alert a Class VI permit applicant regarding the following:

- *Greenhouse Gas Reporting Program (GHGRP) Subpart RR.* GHGRP Subpart RR is complementary to UIC Class VI requirements and provides a mechanism to quantify the amount of carbon dioxide that is sequestered. Monitoring to comply with UIC Class VI requirements can provide the basis for satisfying certain GHGRP Subpart RR monitoring, reporting and verification plan requirements. For more information, see 40 CFR Part 98, Subpart RR.
- *The Conditional Exclusion under RCRA Subtitle C at 40 CFR 261.4.* If a Class VI permit applicant anticipates that the carbon dioxide stream may meet the definition of a RCRA hazardous waste, discuss the applicability of a conditional exclusion under RCRA Subtitle C at 40 CFR 261.4. The RCRA regulations conditionally exclude carbon dioxide streams that are hazardous from the definition of hazardous waste provided that the carbon dioxide stream is intended to be injected into a Class VI well and meets other specific criteria. The regulations exclude these hazardous carbon dioxide streams provided they are captured from emission sources, injected into Class VI wells for purposes of GS, and meet certain other conditions at 40 CFR 261.4(h). If the RCRA regulations are applicable, pursuant to the RCRA regulations, the applicant will need to provide the information necessary to demonstrate that the carbon dioxide streams they will be injecting will be managed in accordance with the conditions at 40 CFR 261.4(h).
- *State/Tribal Permits.* If the applicant plans to drill stratigraphic test wells or groundwater sampling wells that may eventually be used for carbon dioxide injection for GS, confirm that they are aware that they must get the appropriate permits from state/local authorities to drill any such wells.
- *Offshore Authorities.* If the well will be offshore, discuss with the applicant whether permits under the Marine Protection, Research, and Sanctuaries Act (MPRSA) or the Outer Continental Shelf Lands Act (OCSLA) are needed:
    - Under MPRSA, sub-seabed carbon dioxide injection for GS via Class VI wells, may, in certain circumstances, represent ocean dumping subject to regulation under the MPRSA. Application of the MPRSA would entail coordination of the permitting processes under SDWA and MPRSA, pursuant to MPRSA Sections 106(a) and (d).


BLF-000049

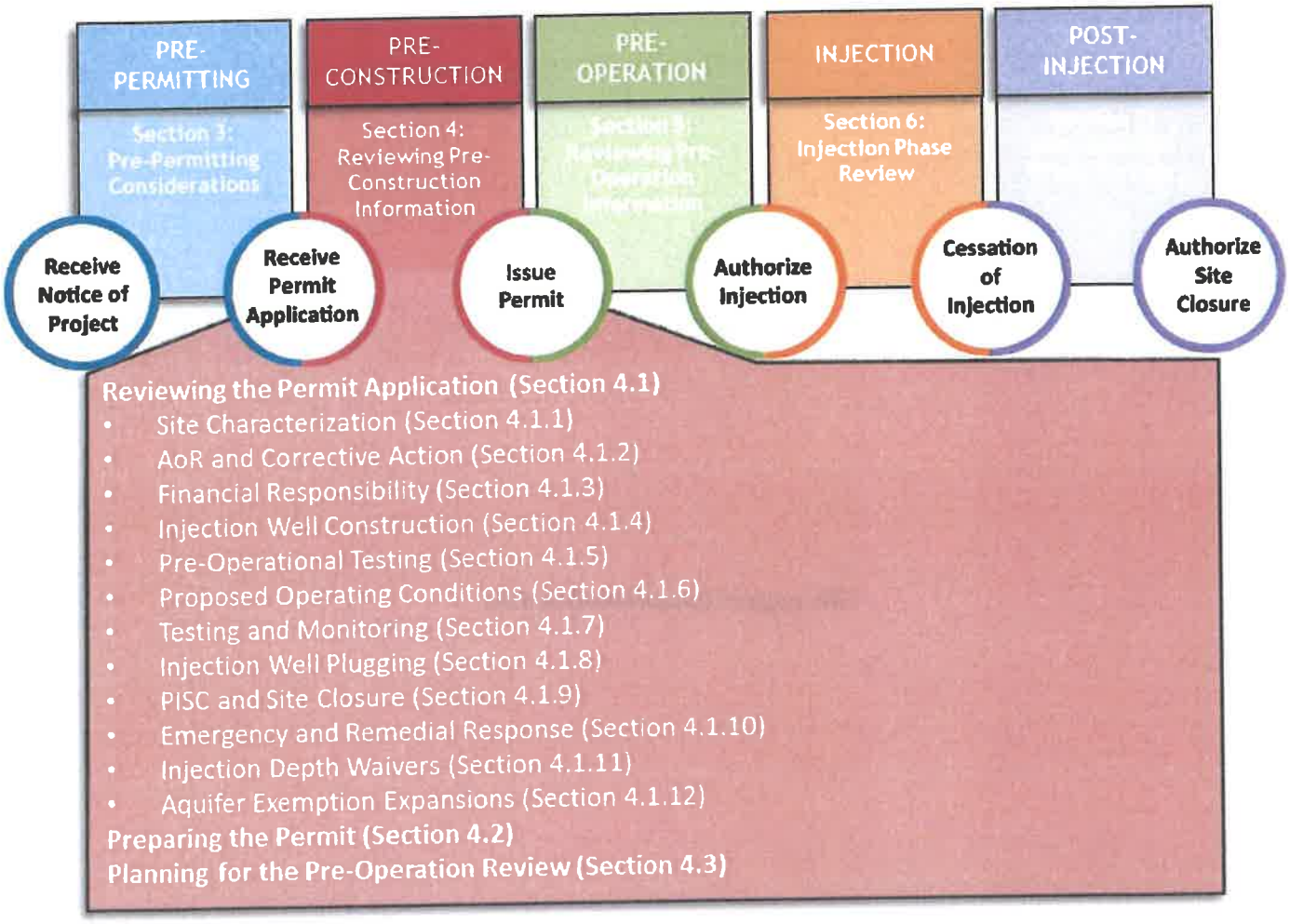
- Under OCSLA, Class VI wells injecting offshore (on the outer continental shelf) but within state territorial waters may be subject to requirements under the OCSLA in addition to the Class VI regulations. The Bureau of Ocean Energy Management, Regulation, and Enforcement, an agency within the Department of the Interior, administers the OCSLA.

- *Other Permits.* Discuss with the applicant any other permits that may be needed for other aspects of the facility. This may include permits under the National Pollution Discharge Elimination System Program under the Clean Water Act.



BLF-000050

# Section 4: Reviewing Pre-Construction Information



***This page is intentionally blank.***

# 4 Reviewing Pre-Construction Information

To apply for a Class VI permit, applicants must develop and submit to the UIC Program Director a range of geologic, hydrogeologic, modeling, engineering, and financial information about a proposed Class VI project [40 CFR 146.82(a)]. Because all of the information needed to evaluate the suitability of a proposed GS site will not be available at the time the permit application is submitted, there will likely be uncertainties regarding some aspects of the proposed site or the injection operation.

**Permit Application Reviews where the Well is Converted for Class VI Injection**

If the owner or operator plans to convert an existing well (pursuant to 40 CFR 146.81(c)), the permit application evaluation will incorporate elements of both the pre-construction and pre-operation phase reviews. The EPA encourages the UIC Program to consider the recommendations in Sections 4 and 5 together. See Section 3.2 for additional information.

The goal of the UIC Program's review of the permit application is to evaluate the suitability of the site based on the available information and to identify ways to address or mitigate any uncertainties about the site. Permitting decisions are technically complex and risk-based, and the UIC Program should consider how various components of the permit application and the data collected throughout all project phases will address site-specific conditions (including identified uncertainties) to ensure non-endangerment of USDWs. All the information collected and reviewed in the course of the permit application evaluation—and the documentation of that review—should collectively form a robust, defensible record of the decision.

During the pre-construction phase, Class VI permit applicants should submit the following types of information to the UIC Program as part of their Class VI permit applications:

- Site characterization information about the local and regional geology and hydrogeology (see Section 4.1.1);
- An AoR delineation based on computational modeling and information on wells in the AoR and their corrective action status (see Section 4.1.2);
- Information demonstrating financial responsibility for corrective action, injection well plugging, post-injection site care (PISC), site closure, and emergency and remedial response (see Section 4.1.3);
- Proposed well construction plans and schematics, a planned pre-operational testing program, and proposed operating data (see Sections 4.1.4 through 4.1.6);
- A series of proposed project plans presenting the applicant's approach to testing and monitoring, plugging the injection well, PISC, site closure, and addressing emergency or unforeseen events (see Sections 4.1.7 through 4.1.10); and
- Supplemental information related to injection depth waivers or aquifer exemption expansions, if applicable (see Sections 4.1.11 and 4.1.12).

Following the UIC Program's review of all information in the permit application and confirmation that the site will be protective of USDWs, a Class VI permit can be issued. See Section 4.2.



BLF-000053

## 4.1 Evaluation of Pre-Construction Information

Class VI permit applications contain a wide range of information, including geologic data, an AoR delineation based on computational modeling, a financial responsibility demonstration, proposed project plans, proposed well construction plans and schematics, a planned pre-operational testing program, and proposed operating data [40 CFR 146.82(a)]. In addition, some permit applicants may need to submit supplemental information related to injection depth waivers [40 CFR 146.95] or aquifer exemption expansions [40 CFR 144.7].

All of this information is inter-related, and the information collected to meet one requirement may inform or be informed by other required submittals or analyses. Therefore, permit writers should ensure that, collectively, all of the information in the permit application is consistent and supports a determination of site-suitability. This necessitates a multi-disciplinary, team-based approach to the permit application review (see Section 3.1). Table 4-1 illustrates some of these relationships and provides examples of how they may affect the pre-construction evaluation process.

**Table 4-1: Examples of Cross-Submittal Checks for Conducting Technical Evaluations of Class VI Permit Applications**

| Required Submittals | Recommended Cross-Submittal Checks for Evaluating the Permit Application |
|---|---|
| Site characterization data [40 CFR 146.82(a)(2),(3),(5),(6); 146.83] | • Geologic and hydrogeologic data collected during site characterization serves as, and should be consistent with, the **AoR delineation modeling** inputs.<br>• Identified uncertainties should inform data collection during **pre-operational testing**.<br>• **Well construction** should be suitable to, and compatible with, geologic data; the appropriate well depth should be informed by information on the depth to the lowermost USDW (unless an injection depth waiver is requested).<br>• **Proposed operating procedures** (e.g., injection rates and volumes) should be appropriate to the storage capacity of the injection zone and the fracture pressure of the confining zone.<br>• The **AoR delineation modeling** can be used to verify the storage capacity of the injection zone.<br>• Monitoring locations and depths in the **Testing and Monitoring Plan** and **PISC and Site Closure Plan** should consider fluid geochemistry/mobilization of contaminants and the presence of fluid migration pathways (e.g., faults or fractures) identified via site characterization. |
| AoR and Corrective Action [40 CFR 146.82(a)(4),(13); 146.84] | • The AoR delineation model inputs should be consistent with and incorporate **site characterization** data and **proposed operating data**; data gaps should be addressed during **pre-operational testing**.<br>• Monitoring locations in the **Testing and Monitoring Plan** and the **PISC and Site Closure Plan** should encompass the entire delineated AoR and be informed by the AoR delineation modeling; they should also account for all wells identified via the corrective action review.<br>• **Financial responsibility instruments** should be adequately funded to address all needed corrective action.<br>• AoR delineation modeling can inform the **site characterization** review, including storage capacity evaluation and an evaluation of the potential for induced seismicity.<br>• The review of an **alternative PISC timeframe demonstration** should consider the AoR delineation modeling. |



BLF-000054

| Required Submittals | Recommended Cross-Submittal Checks for Evaluating the Permit Application |
|---|---|
| Financial responsibility [40 CFR 146.82(a)(14); 146.85] | • Sufficient funds must be available to cover all needed **corrective action** and well plugging, based on the proposed **construction** of the well and the **Injection Well Plugging Plan**.<br>• Financial instruments should be adequately funded to address vulnerabilities and/or endangerment to USDWs identified during **site characterization**, including the potential for induced seismic events.<br>• The financial resources must also cover all activities identified in the **PISC and Site Closure** and **Emergency and Remedial Response plans**. |
| Proposed well construction [40 CFR 146.82(a)(11)(12); 146.86] | • The well materials should be compatible with all fluids with which they may come into contact and the design should consider the depth of all porous formations, as identified during **site characterization**.<br>• The well's design and materials should be appropriate to the **proposed operating parameters**.<br>• The **Injection Well Plugging Plan** should be appropriate to the well as designed and built (e.g., depth). |
| Proposed pre-operational testing [40 CFR 146.82(a)(8); 146.87] | • The planned formation testing should be sufficient to fill any gaps in available **site characterization** data and address key uncertainties in **AoR delineation modeling**.<br>• The planned well testing should inform and confirm the **well construction** specifications and schematics. |
| Proposed operating data [40 CFR 146.82(a)(7),(9),(10); 146.83(a)(1); 146.88] | • The operating parameters should be suitable to the **site's geology**, i.e., to demonstrate that the injection zone has sufficient capacity to store the proposed carbon dioxide volumes.<br>• The **AoR delineation** results should incorporate and support the proposed operating parameters.<br>• The **well's construction** should be adequate to the proposed operating conditions. |
| Testing and Monitoring [40 CFR 146.82(a)(15); 146.89; 146.90] | • The Testing and Monitoring Plan should describe a monitoring strategy that is suitable to the **site's geology** and **proposed operating conditions** and addresses the entire **AoR**.<br>• Appropriate well testing procedures are informed by **well construction, operating conditions**, and carbon dioxide composition as informed by **site characterization**.<br>• Monitoring locations should consider the locations of any wells identified during the **corrective action review**.<br>• The Testing and Monitoring Plan should collect the data needed to support a **non-endangerment demonstration**. |
| Injection Well Plugging [40 CFR 146.82(a)(16); 146.85; 146.92] | • The Injection Well Plugging Plan should be suitable to the proposed **well construction** and the **site geology**, including predicted composition of carbon dioxide-water mixtures.<br>• Plugging procedures should be considered in developing **financial responsibility** cost estimates. |
| PISC and Site Closure [40 CFR 146.82(a)(17); 146.93] | • The PISC and Site Closure Plan should include predictions of post-injection plume movement based on the **modeled AoR**.<br>• Post-injection phase groundwater and carbon dioxide monitoring should be an extension of activities in the **Testing and Monitoring Plan**.<br>• The alternative PISC timeframe and criteria for the non-endangerment demonstration should be based on **AoR delineation modeling** and site-specific **geologic information**.<br>• Post-injection monitoring and site closure activities should be considered in developing the **financial responsibility** cost estimates. |

| Required Submittals | Recommended Cross-Submittal Checks for Evaluating the Permit Application |
|---|---|
| Emergency and Remedial Response [40 CFR 146.82(a)(19); 146.94] | • The Emergency and Remedial Response Plan should address the risk characteristics of the site as informed by the **site characterization** (e.g., of induced seismicity) throughout the extent of the **modeled AoR.**<br>• The **Testing and Monitoring Plan** and **PISC and Site Closure Plan** should collect sufficient data to detect all identified emergency scenarios.<br>• **Financial responsibility** instruments should be adequately funded to address all risks and response actions identified in the Emergency and Remedial Response Plan. |

The following sub-sections describe the evaluation of discrete types of program element information and the suggested outcomes of each review for the pre-construction phase evaluation. Each section describes: the types of information applicants are likely to submit and how the UIC Program can evaluate their completeness; the activities that the EPA recommends that permit writers take to evaluate the information submitted including, where necessary, discussing the information with the applicant or requesting additional or clarifying information; and the suggested outcomes or products of the review.

Because each permit application will be unique and the appropriate activities will be specific to the application being reviewed, the activities described below outline a recommended course of action to accomplish the goal of writing a protective, defensible permit. Therefore, this section also explains where the Class VI Rule affords flexibility to address site-specific circumstances and where exercising authority to request additional information per 40 CFR 146.82(a)(21) or otherwise exercising Director's discretion may be appropriate.

### *4.1.1 Site Characterization*

Class VI permit applicants must provide extensive information about the local and regional geology and hydrogeology of the proposed site [40 CFR 146.82(a)(2),(3),(5),(6)].

The purpose of the UIC Program's evaluation of this information is to inform a determination that the Class VI well will be sited in an area with a suitable geologic system, consisting of an injection zone with sufficient capacity to receive the carbon dioxide to be injected and a confining zone that is free of transmissive faults or fractures per 40 CFR 146.83. The EPA recommends a two-phase approach to reviewing site characterization information (i.e., a review of the geologic information submitted per 40 CFR 146.82(a) and a comprehensive evaluation of that geologic information to confirm site-suitability, per 40 CFR 146.83), as described in the *UIC Program Class VI Well Site Characterization Guidance* and outlined below. The purpose of the UIC Program's review of the geologic information is to verify that the information submitted is accurate and that it provides appropriate and accurate inputs and considerations for AoR delineation modeling, well construction, and planned operation. Figure 4-1 provides an overview of the site characterization review process.

#### *Completeness Review*

Class VI permit applicants will likely submit geologic information about the site in a narrative document that describes: regional geology and hydrogeology; the thickness, mineralogy, porosity, and permeability of the proposed injection zone and overlying formations; suspected faults and fractures; geomechanical properties; seismic history; and the locations and baseline geochemistry of USDWs. This site characterization should be supported by maps, logs, cross



BLF-000056

sections, the results of water quality sampling, and analyses of core samples. It may include a mix of published literature about the area and the results of research by the applicant. Maps and cross sections should be legible and include the names, lithologies, and depths of the injection and confining zones, and illustrate any regional structural features (e.g., folds, faults, domes, etc.). If the applicant is seeking an injection depth waiver, the site characterization should address formations below the injection zone, including the lower confining zone; see Section 4.1.11 for additional information on evaluating these projects.

The applicant's demonstration of site-suitability should be supported by research, modeling, bench top analyses, or geophysical and geologic data that are consistent with information presented elsewhere in the permit application. If, during pre-permit application discussions, an agreement was made regarding the need to characterize additional confining zones to impede vertical fluid movement, allow for pressure dissipation, and provide additional opportunities for monitoring, mitigation, and remediation, per 40 CFR 146.83(b), a UIC Program reviewer should verify that information on these additional zones is submitted.

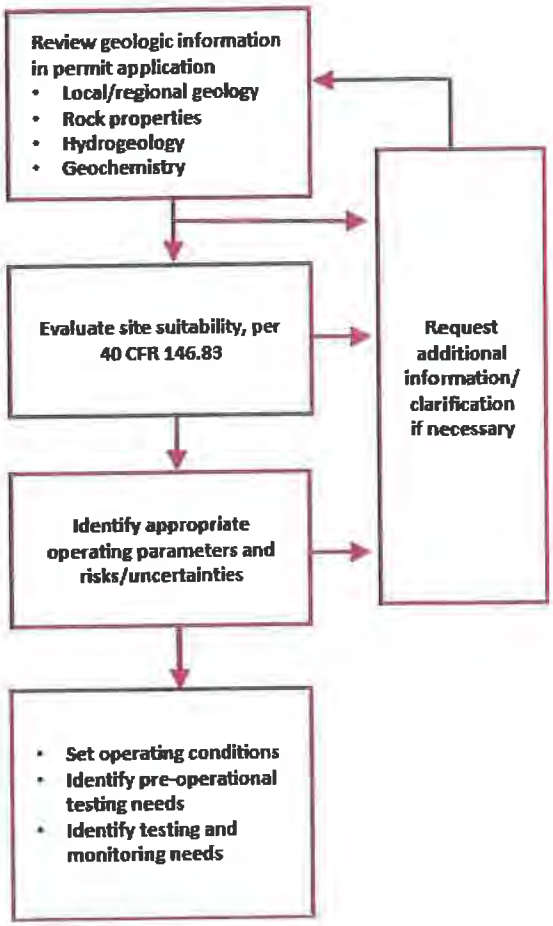



**Figure 4-1: Site Characterization Review**

The EPA encourages UIC Programs to perform a preliminary evaluation of the geologic information to confirm that it contains sufficient information on which to demonstrate that the site is comprised of formations that provide a suitable geologic system. During this preliminary evaluation, the permit writer should verify that the data collected and submitted are complete, that the methods used for analyses and calculations are described in adequate detail, and that quality assurance (QA) procedures are described where appropriate. Additionally, the UIC Program reviewers should confirm that secondary data are from reliable sources (e.g., federal or state agencies) and are recent and representative of the proposed site. The geologic data should represent all formations of interest, from the land surface to the injection zone (or to the lower confining zone, if the applicant is seeking an injection depth waiver). Data should be representative of the entire AoR and optimally provide some information on the general area surrounding the AoR. There should also be background information describing the regional geologic setting.

If any information is missing or is not presented in sufficient detail to inform an evaluation of site-suitability, the EPA recommends initiating a request for additional information or asking clarifying questions to inform and expedite the review.

***Evaluation***

Some of the geologic information submitted is fairly "straightforward," e.g., maps and cross sections, the results of testing and sampling, or research about the site to meet the requirements of 40 CFR 146.82. Conversely, some aspects of the permit application and its review reflect synthesis and integration of site-specific geologic data to support a determination of site-suitability per 40 CFR 146.83.

It may be appropriate to review the more basic information first to verify its accuracy and that it meets the Class VI Rule requirements (e.g., that faults and fractures are non-transmissive) as well as to consider how this information will inform more integrative analyses of site-suitability. Likewise, while the more comprehensive aspects of the review cannot be finalized until the geologic data are verified, the UIC Program should begin to plan for the comprehensive review early in the process to ensure that all of the required information—in appropriate types and levels of detail—will be available to support the review. Some aspects of this more comprehensive review will also need to be performed in coordination with the AoR delineation modeling review (see Section 4.1.2).

Members of the permit application review team are encouraged to work collaboratively, as appropriate, to ensure that a sufficient amount of geologic information will be collected and reviewed to support all aspects of the permit application review. Throughout the course of the review, alerting other members of the review team in a timely manner if there is concern about any aspect of the site's geology that may impact well construction or operations, or other components of the project, will benefit the comprehensive review and the schedule.

The bolded and italicized text below outlines a suggested approach that a UIC Program might employ to evaluate site characterization information, submitted by a Class VI permit applicant, to confirm that an applicant's submittal meets the requirements of the Class VI Rule and informs the establishment of protective permit conditions.

**Review geologic information submitted per 40 CFR 146.82(a).** Review this information to confirm that the geologic site characterization is based on appropriately collected site-specific information or relevant existing data or literature about the proposed site; identify any potential site attributes that may affect its suitability for GS; and identify uncertainties to be addressed via pre-operational testing, operational changes, targeted testing and monitoring, or other permit conditions.

***Review information on regional geology and geologic structure.*** Review the maps and cross sections that the applicant has provided to verify that they are at a scale that shows the location of the project site and places it in a regional context. Verify that the geophysical methods used to characterize the site are suitable for the geologic environment and data needs. Table 2-1 in the *UIC Program Class VI Well Site Characterization Guidance* summarizes the utility of various geophysical survey methods to various types of investigations (e.g., of porosity, thickness). Verify that the surveys were performed at a sufficient resolution such that the size of subsurface features can be distinguished. Geophysical surveys should complement, but not replace information such as logs, outcrop data, or core samples. Verify that delineation of stratigraphic units indicated by geophysical survey data is consistent with maps and well logging information.

***Evaluate information on faults and fractures.*** Verify the extent/areal coverage of any pre-existing or public information (e.g., from the U.S. Geological Survey (USGS) or state geologic



BLF-000058

surveys) to confirm whether or not the information is inclusive of the injection and confining zones throughout the AoR.

If information on faults is based on two-dimensional geophysical surveys, assess whether the location, geometry, depth, or displacement of the faults or fractures can be ascertained. Assess whether units juxtaposed by faulting can be determined based on geophysical surveys along with other information. If faults cannot be definitively identified or ruled out based on the images submitted, or exist but are not adequately characterized, consider requesting additional supporting information. This may include a need for higher resolution geophysical studies, updated processing and imaging from existing surveys, or information from additional sources. If the applicant does not address ambiguous features in geophysical surveys (e.g., seismic reflectors that might represent small faults), request clarifying information. Note that gravity methods are less useful than other geophysical methods for detecting small faults or faults with large displacement occurring in discrete steps; vertical faults are especially difficult to detect using surface gravity methods.

Verify that any demonstration that faults are non-transmissive is supported by adequate data and information about the site (e.g., analyses of core samples, results of geophysical surveys, pore pressure data, maps, and cross sections). Confirm that the methods for any relevant calculations (e.g., calculation of shale gouge ratio or assessment of fault slip tendency) are adequately described. Verify that the applicant's demonstration of fault stability is supported by the information submitted on downhole stresses and reflects anticipated injection pressures. Communicate any concerns about the existence of faults to the AoR delineation modeling team and to the staff reviewing the planned injection and post-injection phase testing and monitoring so that monitoring can target areas of potential concern for carbon dioxide migration.

***Review information about the depth, areal extent, and thickness of the injection and confining zones.*** Evaluate geologic maps, cross sections, and any other maps submitted to ensure that they demonstrate that the identified confining zone extends throughout the AoR and is continuous with no pinchouts. If cross sections do not include all formations of interest (i.e., from the surface to at least the injection zone) or a sufficient extent of the preliminary AoR is not represented, request additional cross sections.

Confirm that any seismic or other geophysical data are of appropriate resolution and lateral extent to provide information on the injection and confining zones throughout the AoR. Ideally, at least two perpendicular profiles that pass close to the proposed injection well will be presented for general site description. Because two-dimensional seismic surveys are not optimal in settings where significant lateral heterogeneity is expected, three-dimensional surveys may be preferable when characterizing sites with complex or variable subsurface geology. If such surveys are performed, consider using them as a baseline for the Testing and Monitoring Plan (see Section 4.1.7).

Verify that geophysical data, core data, well logging data, and other information support consistent conclusions about the properties of the injection and confining zones. Verify that the applicant's interpretation and discussion of stratigraphy, depositional features, and environments incorporate all relevant information. If these are not representative of the entire geographic area or of all depths, incorporate the collection and analysis of additional cores or logs into the pre-operational formation testing program.

If there is variability in the thickness of the injection or confining zones, verify that this would not adversely affect storage or confinement. If the confining zone does not extend throughout the AoR or there is any uncertainty about whether it is sufficiently thick and homogeneous over the entire area, consider requesting information on an additional confining zone(s).

***Review hydrologic and hydrogeologic information.*** Verify that information from existing data sources is reliable and accurate. For example, state water centers, water surveys, or departments of water resources or health are likely to have the most comprehensive databases of water well locations and depths. The USGS and state and local agencies may have the most complete information on USDWs and springs within the AoR.

Coverage from public sources may not be complete. Consider asking the applicant to fill in any information gaps using on-the-ground surveys or hand searches of health or environmental department records, especially if the proposed project is in a populated area.

Verify that the level of detail and the geographic scope of the available information will allow identification and characterization of all USDWs in the AoR. This submittal should also agree with any information submitted with the permit application (or that is otherwise available) on the depths, extent, and groundwater flow patterns of regional USDWs.

If there is a USDW in the AoR, coordinate with staff reviewing the Testing and Monitoring Plan to ensure that the groundwater sampling plan targets USDWs in the area. Also verify that the Emergency and Remedial Response Plan and the financial responsibility cost estimates address the potential contamination of the USDW. Communicate any updates to this information to review team staff evaluating the AoR and Corrective Action Plan.

***Examine geochemical data*** that may have been submitted to meet the requirements at 40 CFR 146.82(a)(6). If the applicant collected fluid samples in advance of drilling the injection well (i.e., via a stratigraphic test well or in existing nearby wells) to provide baseline geochemical data, verify that they conducted a thorough geochemical analysis. A thorough suite of analyses should address basic fluid chemistry and any contaminants that could potentially be mobilized based on available information about the composition of the rock matrix and the composition of the injectate. At a minimum, the analytes should be consistent with those identified in the proposed Testing and Monitoring Plan.

Verify that fluid samples were collected using techniques that preserve downhole pressure conditions at the depths from which they were sampled or that downhole pressure and temperature estimates were available to support modeling of water chemistry speciation under conditions in the injection zone. Also verify that samples were analyzed at accredited or certified labs or at academic/university labs. If unaccredited or uncertified labs were used, it may be appropriate to request additional information about the labs to verify that they are qualified to perform the analyses (i.e., that appropriate QA controls were in place when the analyses were performed); if no information about the lab's accreditation and/or qualifications is available, consider requesting analysis/testing of new samples.

If historical geochemical data are provided, verify that the samples represent formations and locations of interest. If they do not, or the origin of the information is unclear, consider requesting that the applicant perform additional sampling to confirm the information. Also assess any available information on sampling and analytical techniques (including QA information) to verify the quality of the historical data. If data quality is in question, the values may not be



BLF-000060

reliable for assessment of site-suitability, although they may provide some basic context for site or regional geology. If data quality is poor, consider requesting that new samples be taken, if feasible. If there has been injection or production in the area since the samples were taken, consider requesting additional or more recent analyses as part of the pre-operational formation testing program to confirm that the geochemistry has not been significantly altered as a result of these activities.

Verify that fluid chemistry data were obtained from all appropriate formations (i.e., from at least the injection zone and the lowermost USDW above the confining zone) as close to the injection well and in as many locations in the AoR as practicable. Confirm that samples were taken at wells with a sufficient yield to represent the water chemistry of the formations to be sampled. If an insufficient geographic area (e.g., less than the extent of the AoR) is represented and data points are far from the injection well, or the chemical data are extremely limited, consider asking the applicant to conduct additional sampling. If the applicant is seeking an injection depth waiver, review geochemical information from samples taken from below the lower confining zone; see Section 4.1.11 for additional information on evaluating these projects.

If there is a concern that trace metals may be liberated due to changes in pH and affect USDWs, examine (or, if necessary, request) an analysis of formation solids in the injection and confining zones. Verify that appropriate solid phase chemical analytical techniques (i.e., EPA-approved methods) were used, or consider requesting analyses using such techniques. Coordinate with the reviewer of the Testing and Monitoring Plan to ensure that any contaminants that could potentially be liberated/mobilized are monitored as part of the groundwater monitoring program in the plan. Additionally, ensure that all of the chemicals in the baseline analysis are included as groundwater monitoring parameters throughout the duration of the project.

Review water quality sampling information to confirm the location and depth of the lowermost USDW. Verify that the reported lowermost USDW is identified based on total dissolved solids (TDS), and not on other permitting or regulatory requirements related to water resources in the area, such as aquifer usage or the depth to which surface casing must be set in oil and gas wells in the area. Section 2.3.9 of the *UIC Program Class VI Well Site Characterization Guidance* provides information on baseline geochemical characterization.

***Evaluate geomechanical and petrophysical information.*** Verify that the applicant submitted sufficient information to characterize all required geomechanical and petrophysical parameters throughout the project area. This includes porosity, permeability, capillary pressure, and information on fractures, stress, ductility, rock strength, and in situ fluid pressures within the confining zone. Verify that the applicant presented information on and discussed the variability in measurements for the various types of geomechanical and petrophysical data. Because this information should provide the inputs for the AoR delineation modeling, coordinate with the AoR delineation modeling reviewer to verify that the inputs of the applicant's model match this information and that the inputs of the independent modeling incorporate this information. Also confirm that the modeler is aware of any changes to or uncertainties about the geologic data (see Section 4.1.2).

Ideally, any core samples that were taken (or will be taken) should be geographically distributed and of a sufficient number to represent areas close to the proposed well *and* areas that are representative of the entire AoR, accounting for any heterogeneities in the injection and confining zones. (It is likely that core samples may not be taken and analyzed until after

construction is authorized; verify that the pre-operational formation testing program will fill in any information gaps or address uncertainties. See Section 4.1.5.) If there is any indication that samples were damaged during drilling, assess whether that damage was likely to affect the analytical results. If available data are of low quality or inadequate to establish the suitability of the site, consider asking the applicant to collect and analyze new cores under the pre-operational formation testing program.

Confirm that measured permeabilities and porosities are consistent with what is known about the lithologies of the injection and confining zones and that they are reasonable values for injection and confining zones at the proposed operating conditions. Note any discrepancies between laboratory and field or well log-based values and assess whether such discrepancies are expected based on geologic and lithologic features or the methods used. If the applicant used log- and core-based porosity and permeability values to develop estimated permeability distributions, verify that the method used is fully explained and that the choices made in executing the calculations are clear and reasonable. Compare estimated values with log- and core-based values and consider the magnitude of any discrepancies and whether such discrepancies are explained. Coordinate with staff performing the AoR review to compare these data with those used in the AoR delineation. Uncertainties in estimates of formation properties (e.g., porosity, permeability) may be addressed by incorporating this information into sensitivity analyses in the AoR delineation modeling.

Verify that the method used to measure capillary pressure allows measurement at pressures and temperatures representative of the injection zone. Assess the number of samples used and verify that they are representative of any variability in lithology and that there are a sufficient number of samples to assess method variability within a lithology. Assess spatial variability and compare the values against expected pressure at the base of the confining zone should a column of separate-phase carbon dioxide develop. Also verify that measurements of ductility and rock strength are based on appropriate laboratory tests that are suitable for simulating downhole stress conditions.

Verify that information on in situ stress incorporates measurements of vertical stress, maximum horizontal stress, and minimum horizontal stress. Also verify that the applicant used appropriate methods to measure stresses (e.g., integrating density above the point of measurement to estimate vertical stress; ASTM Method D 4645-08 to measure minimum horizontal stress and maximum horizontal stress).

Verify that data submitted for any borehole logs used (e.g., fracture finder/microseismogram logs, caliper logs, or acoustic logs to detect fractures or formation testers to measure pore pressure) are complete and that measurements were taken in locations that are representative of the injection and confining zones.

If seismic data were used to obtain pore pressure estimates or used in conjunction with well logs and other data to develop porosity and permeability distributions, verify that the survey was performed at a sufficient resolution for those purposes and that data processing steps were described and are appropriate. Verify that any assumptions and uncertainties are noted.

***Review information submitted on the mineralogy, petrology and lithologies of the injection and confining zones.*** Verify that the cores on which this information is based were collected from locations representative of the project site and that they include the injection and confining zones—or that cores will be taken as part of the pre-operational formation testing program.

Assess whether adequate core descriptions are provided and whether the cores and samples are likely to provide an indication of variability in mineralogy and overall lithologic heterogeneity that will inform the AoR delineation modeling. For example, other information, such as borehole imaging or the results of other research in the region, can be used to determine the appropriate number of samples to take.

Verify that proper analytical techniques were (or will be) used to characterize core samples. Polarized light microscopy and scanning electron microscopy may be used on thin sections, and powdered samples may be subject to X-ray diffraction. Information should include both macroscopic (hand sample for core descriptions) and microscopic (e.g., percentages of minerals present) analyses.

Note whether the mineralogy suggests any potential for release of trace metals through mineral dissolution when pH is lowered. Also take note of any likely geochemical reactions (e.g., dissolution of carbonates in or near the well or precipitation of carbonates in distal areas) that would affect injectivity, containment, and/or overall performance of the project.

Lithologic and mineralogic information based on analyzed samples should be consistent with other sources, such as information in the scientific literature, maps and cross sections prepared by the USGS or state geological surveys, and well logs. Request additional information if descriptions and analyses are incomplete, inaccurate, or not in agreement with other research.

***Review the seismic history of the site and information on the presence and depths of seismic sources and seismic risk.*** It is likely that the applicant will rely on existing data (e.g., from USGS, the National Oceanic and Atmospheric Administration, state databases, or data generated by state seismic monitoring regimes, if the state has complete coverage) to determine the location and depth of any identified seismic sources. Confirm that the applicant used such reliable sources to compile seismic history data. Verify that the research covers the AoR of the Class VI project over an appropriate historical time period and includes sufficient information on the magnitudes and hypocenters of previous seismic events.

**Addressing Seismicity in the Class VI Permit**

If there was recent seismicity near the proposed site (either natural or injection-induced), consider requiring passive seismic monitoring. The Testing and Monitoring Plan should describe a passive seismic monitoring network across the AoR that can detect seismic events.

Additionally, the Emergency and Remedial Response Plan could include an action plan to address seismic events. Several states and the EPA have developed "stoplight" approaches, in which the response varies based on the magnitude or location of the event and whether it was felt. Responses range from documenting the event to gradually shutting injection operations and investigating the event to immediately shutting the well and performing necessary corrective and/or remedial actions.

If the data are inconclusive or there have been earthquakes in the past, consider asking the applicant to model or otherwise determine, using documented methods, that seismic activity from identified sources will not endanger USDWs. Consider coordinating with the AoR delineation modeling reviewer to evaluate the extent of pressure increase due to injection and whether such an increase could possibly reach any faults or impact fault stability. This evaluation may also include an assessment of potential fluid migration rates if a transmissive fault were intersected by the plume and/or the area affected by the pressure increase.

If any of the geologic or seismic data indicate a substantial likelihood of seismic activity, a fault stability analysis may be needed to demonstrate that seismic activity will not compromise subsurface containment. If there is the potential for seismic activity that may reactivate faults that transect the confining zone(s) and compromise containment, consider whether operational changes can be made and/or passive seismic monitoring can be incorporated into the Testing and Monitoring Plan to manage the risk.

***Review surface air and/or soil gas monitoring data (if submitted).*** If surface air and/or soil gas monitoring will be required as part of the project's testing and monitoring regimen, verify that baseline data have been collected according to established methods. Verify that sampling locations have been established in locations that are representative of the entire AoR and that monitoring will provide information on any areas with potential for carbon dioxide migration (e.g., areas with faults or fractures or abandoned well bores).

**Comprehensively evaluate all geologic information to determine whether it supports a demonstration of site-suitability, per 40 CFR 146.83.** Section 3 of the *UIC Program Class VI Well Site Characterization Guidance* recommends approaches and analyses that applicants can perform to support this determination. This comprehensive evaluation involves reviewing all geologic data (including the information described above) along with any additional analyses, such as the AoR delineation modeling, to support a determination regarding the site's suitability for GS or to identify uncertainties about the site. Some approaches to addressing uncertainties about the site that the UIC Program may consider include: collecting additional data as part of the pre-operational formation testing program, performing sensitivity analyses as part of the independent AoR delineation modeling, adjusting operational parameters, or requiring tailored or increased monitoring during the injection and post-injection phases of the project.

As noted above, while this evaluation depends on the outcome of the geologic data review, planning for this comprehensive review should begin as soon as the permit application is received. Also, it is likely that the final determination of site-suitability will not be made until site-specific pre-operational testing is complete. See Section 5.1.1.

The paragraphs below provide recommendations for this comprehensive determination of suitability including evaluating: facies changes in the injection or confining zones, injection and confining zone structure, compatibility of the carbon dioxide stream with subsurface fluids and minerals, the storage capacity of the injection zone, and integrity of the confining zone(s).

***Determine whether facies changes in the injection or confining zones may impact storage or confinement of carbon dioxide.*** Assess the information on the major facies present and any descriptions regarding their role in storage and confinement of carbon dioxide. Verify that facies interpretations referenced in the permit application are consistent with available geologic data for the site, including geologic and isopach maps, stratigraphic columns, well logging data, available core samples or outcrop data, and seismic data. Verify that information from all of these sources agree and support similar conclusions about the site. This information should also be consistent with the geologic site conceptual model used in the AoR delineation modeling.

Assess whether the facies interpretations are consistent with a determination that the confining zone(s) is sufficiently thick and continuous throughout the AoR to provide confinement. A confining zone of adequate lateral extent is particularly important where there are no structural traps and the carbon dioxide may migrate long distances. Take note of any indication of possible major facies changes that would provide potential preferential flow paths that could result in



BLF-000064

movement of the plume in a particular direction or at an accelerated rate. Consider whether the data suggest that there may be high permeability zones within the confining zone that would provide a potential carbon dioxide migration pathway. If any portions of the AoR are not well characterized or the data suggest heterogeneities in the confining zone, discuss whether a secondary confining zone can be identified and, if appropriate to ensure USDW protection, request that the applicant characterize it.

Also assess whether facies interpretations are consistent with the properties of the injection zone and the injection formation as a whole. Consider the stratigraphy, degree of homogeneity or heterogeneity in lithologies, and petrophysical properties described in the permit application. Note if any features may affect migration of carbon dioxide or brine (e.g., low-permeability zones or potential preferential flow paths).

If the confining zone generally appears to be acceptable, but there are minor uncertainties about homogeneity or facies changes that may allow preferential flow paths for fluid migration, consider including targeted groundwater monitoring and carbon dioxide plume tracking in the Testing and Monitoring and PISC and Site Closure plans. If appropriate, consider requesting additional pre-operational testing (e.g., well logs or core samples for areas other than the injection well).

***Examine the structure of the injection and confining zones.*** Examine data (including maps, cross sections, well logs, and seismic or other geophysical data) to confirm that local and regional geologic structures are conducive to GS and form an adequate confining system.

Verify that the applicant's understanding of the site's structural geology is based on a sufficient amount of data that are representative of the entire project area and encompass major features, especially where the local geology is complex. Also verify that the various data sources provide a consistent portrayal of the presence, types, sizes, and orientations of structural features. Verify that these features (e.g., dip, folds, and faults) are accounted for in, and are consistent with, the geologic conceptual model upon which the AoR delineation is based.

If a structural trap is present (e.g., fold, dome, fault trap), verify that its size and orientation are consistent with the anticipated direction and extent of plume migration. Assess this information in conjunction with AoR delineation modeling results to verify that the trap is sufficiently large to contain the proposed volume of carbon dioxide without evidence of pressure buildup that could fracture the confining zone. Steeply dipping folds or high domes may allow unacceptable stress on the confining zone from buoyant forces, while unfolded, gently-dipping sequences may allow carbon dioxide to migrate long distances. In the latter case, the AoR may be larger, and the potential effects of facies changes should be considered. If trapping is based on the presence of faults that juxtapose the injection zone with low-permeability units, verify that the stability and sealing properties of such faults have been assessed by the applicant.

Where data are incomplete or there is uncertainty regarding the geometry of the structural features or the tops and bottoms of the various units, discuss these uncertainties with the applicant. If necessary, request additional or higher resolution seismic surveys, or ask the applicant to perform additional logging (e.g., logging within wells other than the injection well) as part of their pre-operational testing procedures to refine the geologic conceptual model of the site. Also, consider incorporating additional plume monitoring in areas of concern into the Testing and Monitoring and PISC and Site Closure plans.

***Assess the compatibility of the carbon dioxide stream with subsurface fluids and minerals.*** If the applicant's demonstration of compatibility is based on literature reviews or existing data, these data should closely reflect conditions at the site. For example, the supporting information should be based on earlier studies of the area or of geologic settings that are very similar to the proposed project site. Literature reviews may be appropriate for the pre-drilling characterization of compatibility and should be used to guide formation testing objectives for gathering information to support experimental or modeling studies.

Review the results of any geochemical or reactive transport modeling performed. Verify that the modeling inputs represent: the mineralogy of the injection formation; the results of formation fluid analyses; pressure, temperature, and pH conditions at depth; and injectate composition. Verify that the modeling allows for appropriate precipitation and dissolution reactions and that the thermodynamic and kinetic datasets used are suitable to project-specific conditions. Models should be robust, reproducible, and supported by inputs that are well documented and representative of the site. See Section 3.3.1 of the *UIC Program Class VI Well Site Characterization Guidance* for additional information on the use of modeling to evaluate carbon dioxide compatibility.

Review the results of any benchtop laboratory experiments performed. Confirm that the rock and fluid samples used in the experiments were from the site (ideally near the well) or are similar in composition to those at the site; also confirm that experimental conditions represent the downhole pressure and temperature conditions near the well. Verify that the experiments involved samples that represent any lithologic heterogeneities known to exist in the AoR. If grinding of rock samples or other changes were made to increase reaction rates so as to complete experiments in a feasible amount of time, note whether the implications of this are discussed. Verify that the experiments ran for a sufficient duration to allow the establishment of steady state conditions and that porosity and permeability changes were evaluated post-experiment using appropriate laboratory methods (see also the discussion of porosity and permeability above and Sections 2.3.4 and 2.3.5 of the *UIC Program Class VI Well Site Characterization Guidance*).

Identify whether the results of models or experiments indicate potential interactions between the injected carbon dioxide and native fluids that could affect operational parameters, plume migration, or storage capacity. For example, if potential changes in porosity and permeability (particularly in a reactive formation with a high carbonate content) could affect injectivity during the project, work with the modeling team to ensure that these changes are incorporated into the AoR delineation modeling and that storage capacity estimates and their potential effects (both positive and negative) have been explored. If mineral precipitation or dissolution could liberate trace elements of concern, consider requiring tailored testing and monitoring using appropriate analytical procedures to provide evidence of trace metal contamination of USDWs.

If there are any uncertainties about modeling or experimental results, ensure that appropriate information will be collected during pre-operational testing to provide more site-specific inputs for updating the experiments or re-running the model prior to authorizing injection. If the site is not homogeneous, verify that modeling or experimental work appropriately captured variability throughout the AoR, including information from any core and fluid samples collected from different locations within the AoR.

For information on considerations for evaluating the compatibility of the carbon dioxide stream with well materials, see Section 4.1.4.

***Evaluate estimates of injection zone storage capacity.*** Evaluate the methods used for estimating storage capacity. See the *UIC Program Class VI Well Site Characterization Guidance* for additional information on static models or dynamic models. For site-specific estimates where the geologic data are available and numerical reservoir models are already developed for AoR delineation, dynamic methods are preferred.

Review any modeling the applicant used to estimate storage capacity. Verify that the inputs used in models to estimate storage capacity are representative of the site (e.g., injection zone properties and site-specific trapping mechanisms). Also verify that the inputs reflect the proposed operation (e.g., injection volume, rate, and duration). If the data used are not site-specific, verify that they are representative of site characteristics, particularly in settings where heterogeneity may significantly affect the performance of the project.

If a static method was used to estimate storage capacity, review the information used for consistency with other site and project information and identify any limitations (e.g., lack of heterogeneity or other unaccounted features, such as injectivity, pressure development, or effects of trapping mechanisms). Discuss these limitations with the applicant and consider whether a more refined estimate of storage capacity can be obtained prior to injection or early in the injection phase in conjunction with an AoR reevaluation (see Section 6.2). Compare the resulting storage capacity estimates to the delineated AoR (see Section 4.1.2) and any additional analysis included in the AoR delineation modeling evaluations.

Independent verification of the storage capacity estimates can be performed as part of the AoR delineation modeling. Coordinate with the staff performing the modeling evaluation so that the basis for estimating the storage capacity of the injection zone (i.e., the model inputs used) is consistent with the operational plans for the project and other geologic data submitted with the permit application. The estimated storage capacity should be greater than the total planned carbon dioxide volume, with a safety margin that is commensurate with the level of uncertainty in the estimation method or the inputs on which the estimate was based or any uncertainties about the site geology. Also confirm that the pressures predicted to occur within the geologic system will not exceed 90 percent of the fracture pressure of the injection zone. If additional injection wells are planned or there are other operations in the region injecting into or producing from the same formation or any hydraulically connected formations, confirm that storage capacity estimates incorporate any effects of such operations.

If the storage capacity of the injection zone is less than the total anticipated volume of carbon dioxide to be injected, discuss planned injection operations with the applicant and adjust the permit conditions (i.e., for injection rates and volumes) accordingly.

***Evaluate the integrity of the confining zone(s).*** Compare the pressure distributions predicted by the AoR delineation modeling to the fracture pressure of the injection zone to verify that the proposed injection conditions will not cause an exceedance of the fracture pressure. Also verify that there is an adequate margin of safety or, if appropriate, adjust the operating conditions (e.g., injection rates or total volumes to be injected over the duration of the project).

Consistent with the intent of 40 CFR 146.83, it is important that the confining zone is sufficient to provide a barrier for fluid movement without relying on additional formations (e.g., "thief zones") to receive carbon dioxide were it to migrate out of the injection zone and into formations between the injection zone and the lowermost USDW. While such zones may provide additional protection, they should not be relied upon for confinement. If the applicant discusses such zones



BLF-000067

without providing sufficient detail on the confining zone, request additional information about the proposed confining zone or consider recommending that the applicant characterize an additional confining zone.

Verify that the capillary entry pressure of the confining zone is greater than pressures anticipated to occur in the separate-phase carbon dioxide plume, based on proposed operating data and modeling (with appropriate safety margins, particularly in heterogeneous formations). Such determinations should be made throughout the AoR.

Assess whether information was presented to indicate that any faults within the confining zone are sealing. See Section 3.5.5 of the *UIC Program Class VI Well Site Characterization Guidance* for examples of how fluid migration along faults can occur. Verify that any faults in the area are not expected to adversely impact confinement, are identified based on site-specific data, and have been evaluated at various scales as data and samples allow (e.g., thin section, hand sample, and outcrop). Additionally, verify that any faults in the confining zone will not be reactivated under the proposed operating conditions. For example, verify that a fault stability analysis was based on reliable data and was well documented.

If the primary confining zone does not exhibit sufficient thickness or strength to allow injection at the proposed pressures and volumes with an appropriate safety margin, the UIC Program might consider one of the following options: requesting information on an additional confining zone, adjusting the operating conditions in the permit, or discussing with the applicant the need to select another site. Likewise, if there is uncertainty about the evaluation of confining zone integrity, discuss with the applicant whether additional data can be gathered during pre-operational formation testing or during injection and post-injection monitoring to target areas where fluid migration may be a concern.

***Outcomes***

Following the evaluation of geologic information in the permit application, the UIC Program should consider documenting the review for inclusion in the permit file. An administrative record for the permitting decision that contains documentation of the review could support a response to comments on the permit, a response if the permit were challenged, and future decisions made on the project by either the permit writer or new/different permitting authority personnel. This documentation could include the following:

- A report that confirms the suitability of the site for GS (pending the results of the pre-operational formation testing program) and describes any identified deficiencies, uncertainties, or data limitations and how these limitations or uncertainties will be addressed (e.g., via modifications to operating procedures or testing and monitoring); and
- A document that summarizes the evaluation of seismic risk, including the site-specific information reviewed and the permit conditions designed to minimize the risks associated with seismic events. This type of document is particularly recommended if there is a concern about induced seismicity in the area of the project. The EPA developed an "Injection-Induced Seismicity Decision Model" for Class II oil and gas disposal wells that can be adapted to summarize evaluations of Class VI permit applications.

Any supporting documents should be uploaded to the project's permit package area in the GSDT.



BLF-000068

### *4.1.2 AoR and Corrective Action*

The Class VI Rule requires owners or operators to develop and submit an AoR and Corrective Action Plan as part of their permit application [40 CFR 146.82(a)(4),(13); 146.84(b)]. The plan must document the owner or operator's compliance with the AoR delineation requirements (including the AoR delineation modeling approach), present a comprehensive strategy for AoR reevaluations over the duration of the project, and describe how any necessary corrective action will be conducted.

The purpose of the UIC Program's evaluation of the AoR delineation approach is to assess whether the AoR, as modeled, appropriately represents the area in which USDWs may be endangered by the injection operation, as specified by the Class VI Rule requirements. The delineation of the AoR relies on site characterization and proposed operational data (and the evaluation of the AoR delineation should consider this information). It also informs and supports the development and evaluation of other components of the permit application (such as the determination of site-suitability and strategies for compliance with the testing and monitoring, financial responsibility, and emergency and remedial response requirements).

The UIC Program should also review all corrective action information to ensure that all artificial penetrations that may allow fluid movement into USDWs in the AoR are identified and appropriately addressed by corrective action to ensure that they do not serve as conduits for fluid movement.

***Completeness Review***

Class VI permit applicants will submit a draft AoR and Corrective Action Plan, including detailed modeling information supporting the AoR delineation and information about wells in the AoR. The AoR and Corrective Action Plan should be a narrative document that describes how the AoR delineation was conducted, identifies how the input parameters for the model were selected, and presents proposed strategies for reevaluations and corrective action. Permit applicants will also submit detailed modeling data (e.g., data inputs, information on processes modeled and the simulator used, assumptions, and outputs) to support a full evaluation of the AoR delineation. The UIC Program should verify that the plan provides an accurate and complete benchmark of the initial AoR delineation process, documenting the modeling process at a sufficient level of detail and clarity. Permit applicants should also provide detailed data on the wells in the AoR, information about their condition and depth, and, if necessary, the status of corrective action.

The UIC Program should perform a preliminary assessment of the plan and the modeling information to determine whether the submitted information is sufficient to evaluate: compliance with the rule requirements for computational modeling, AoR reevaluation procedures, and corrective action. As described below, this evaluation may involve conducting semi-independent or independent computational analyses (e.g., multiphase flow simulations of the proposed injection project). Therefore, when performing the preliminary assessment, the UIC Program should ensure that the permit applicant has submitted all information necessary for the comprehensive/technical evaluation. If the applicant used a proprietary model to delineate the AoR, the UIC Program should verify that the applicant provided sufficient information, including the code assumptions, relevant equations, and other information necessary to allow an independent review of the modeling effort. If any additional information or clarification is


BLF-000069

needed, the UIC Program may need to request additional information or clarification to inform a completeness determination.

***Evaluation***

The bolded text below outlines a suggested approach that a UIC Program might employ to evaluate the AoR delineation and information on corrective action, submitted in a Class VI permit application, to confirm that an applicant's submittal meets the Class VI Rule requirements and informs the establishment of protective permit conditions.

**Conduct a comprehensive technical evaluation of the AoR delineation.** This evaluation of the applicant's AoR delineation modeling effort will involve a combination of qualitative and quantitative assessments. The recommendations below apply to a typical evaluation process; however, it is important to note that the evaluation process will need to be tailored to each project's specific conditions and each applicant's computational approach.

There will likely be no site-specific testing and monitoring data for model validation at this stage of a project. Therefore, the evaluation process aims at achieving three main goals:

1. An assessment of the conceptual model to verify that it is consistent with the site characterization component of the permit application (see Section 4.1.1) and that it provides an accurate representation of the geologic and operational systems.
2. An assessment of the computational/numerical model used to delineate the AoR to verify that it: accounts for all applicable chemical and physical characteristics of the injected carbon dioxide and displaced fluids; is constructed to reasonably and accurately represent the geologic and operational systems; and yields the necessary information to delineate the AoR.
3. An evaluation of the methodology used to delineate the AoR, based on the modeling results, to ensure that the AoR accurately represents the area where USDWs must be protected from endangerment.

Because every computational approach is only an approximation of an actual system, ensure that all simplifying assumptions used in the model and the AoR delineation are clearly stated. Furthermore, ensure that the modeling data and the information submitted in the AoR and Corrective Action Plan are sufficiently reproducible and accurate to ensure continuity and consistency in project operations and decision-making, given the typically long duration of Class VI projects. Recommendations for achieving these three goals are provided below.

**Evaluate the conceptual model and model inputs/assumptions** using qualitative methods and/or statistical evaluations (e.g., summary statistics, histograms, etc.) to verify that the model accurately represents the geologic and operational systems. If the project is to operate under an injection depth waiver, this assessment would extend to include information on the lower confining zone.

The data to evaluate include:

- Model Domain, Coordinates, Boundaries, and Other Properties: Evaluating model domain data and relevant figures (e.g., plan and cross-sectional views of the model domain) to ensure that submitted data files (e.g., grid data files) include the extent of the model in all dimensions and accurately represent the project site and injection/confining



BLF-000070

formations, that the domain is sufficiently large to contain the predicted plume and pressure front, and that boundaries reflect the true hydrogeologic setting.

- Rock Properties: Determining whether the rock property data used in the model—such as rock type(s), porosity/permeability/rock type distributions, and constitutive relationships (e.g., relative permeability functions)—are consistent with the geologic data in the permit application. It is also important to ensure that the method for assigning the properties is clearly described and supported by relevant figures (e.g., cross-sectional/plan views of property distributions, graphs of functional forms of constitutive relationships).
- Other Structural Properties: Reviewing model inputs for any structural features that may affect containment of the plume, such as faults, folds, fractures, and permeability barriers. Ensure that all such structures identified during site characterization have been appropriately represented in the model.
- Initial Conditions: Determining if the initial conditions selected in the model accurately represent the baseline conditions established during site characterization. For example, these include the aqueous pressure, temperature, and salinity conditions in the injection formation.
- Operational System: Evaluating injection well construction and operational information to ensure that it is consistent with the relevant components of the permit application and that it incorporates any nearby injection/production operations in the injection formation.
- Model Outputs: Ensuring that the submitted data files adequately represent the extent of the plume and pressure in time-series (i.e., plan view or cross section) and that the submission includes associated images and descriptive time/location information. Other information needed to assess compliance with the rule requirements may include: certain pressure profiles (at injection and/or monitoring wells), carbon dioxide saturation profiles, an assessment of carbon dioxide partitioning into different phases (including trapped carbon dioxide) over time, and flux profiles along model boundaries.
- Sensitivity Analyses: Determining whether sensitivity analyses that are necessary to provide an understanding of model uncertainties were conducted. Note that sensitivity analyses are required to support a demonstration of an alternative PISC timeframe pursuant to 40 CFR 146.93(c)(2)(vi); see Section 4.1.9.

**Assess the applicant's computational/numerical modeling effort** to verify compliance with the rule requirements and appropriateness for the project. This may involve both qualitative evaluation of certain modeling aspects and independent or semi-independent quantitative modeling. Qualitative approaches used in this assessment may include evaluation of the following:

- Simulator: Ensuring that the simulator and references to equations of state present an approach consistent with the requirements of the Class VI Rule.
- Processes Modeled: Evaluating the subsurface processes in the applicant's model to verify that the model accurately accounts for all phases of the carbon dioxide and phase changes, and that the processes modeled are appropriate for the project. This may also include determining whether additional modeling approaches, such as reactive transport or geomechanical simulations, are necessary to accurately represent flow performance

over time, such as in carbonate or basalt formations where reactions with minerals may be significant.

- Model Outputs: Ensuring that the submitted output data files are consistent with the model results given in the narrative portion of the AoR and Corrective Action Plan, and evaluating AoR delineation modeling results to determine compliance with Class VI requirements, such as plume containment in the injection zone or fracture pressure limitations.
- Sensitivity Analyses: Determining whether sensitivity analyses (if used) include appropriate parameters and variabilities.

The quantitative component of the evaluation involves conducting independent or semi-independent modeling to assess the numerical/computational model used by the applicant. Note that the purpose of this effort is not to reproduce the applicant's procedures and arrive at the exact same results. Instead, the goal is to understand and evaluate the applicant's modeling activities and to confirm the general behavior of the system shown in their results. This approach would also allow additional numerical investigations/assessments, if needed. This evaluation may include the following steps:

- Identifying the Independent or Semi-independent Modeling Approach: Select methods and a tool or collection of tools that are appropriate for modeling the geologic and operational system at hand and account for the multiphase nature of carbon dioxide injection operations. Some examples of numerical simulators include Subsurface Transport over Multiple Phases (STOMP) and Transport of Unsaturated Groundwater and Heat (TOUGH). Analytical tools, such as the Area of Potential Impact (AoPI) modeling and mapping tool, may be more suitable to preliminary evaluations or understanding the general behavior of the plume and/or pressure front. More information on modeling tools is available in the *UIC Program Class VI Well Area of Review Evaluation and Corrective Action Guidance.*
- Constructing the Model: Construct a model that accurately represents the geologic and operational system. If the applicant's conceptual model has been confirmed to accurately represent the system, it can be used for this assessment. In some instances, it may be appropriate to use a modified version of the applicant's conceptual/geologic model; for example, to test the effects of certain geologic features, include additional subsurface processes, adjust rock property distributions, or develop an upscaled model for quicker simulation times.
- Independent or Semi-independent Modeling Output and Comparison: Run simulations and produce model outputs to assess plume size/shape, reservoir pressures, carbon dioxide saturation, and other relevant parameters. It may be appropriate to analyze changes in parameter values in time or assess spatial distributions of parameter values at certain times (depending on the results submitted by the applicant). Additional analyses that can be conducted include evaluating the pressure changes within the system to confirm that it never reaches the fracture pressure value or assessing carbon dioxide trapping and dissolution. Identify any significant discrepancies between the results submitted by the applicant and results from the new simulations. It is important to note that identical distributions cannot be expected from two different simulators or with



BLF-000072

different inputs or processes. Therefore, evaluate the results for general consistency and in the context of ensuring non-endangerment of USDWs.

Based on the results of the qualitative and quantitative evaluation, review the AoR delineation modeling proposed by the permit applicant to ensure that it meets the requirements at 40 CFR 146.84. In addition, review the calculations that estimate the critical pressure and evaluate the AoR delineation based on the extent of the plume and pressure front estimates. See the *UIC Program Class VI Well Area of Review Evaluation and Corrective Action Guidance* for more details on methods that could be used for these calculations.

**Review information on the artificial penetrations identified within the AoR.** Confirm that the applicant used appropriate methods to identify all artificial penetrations throughout the AoR using database searches or other means and that the list of artificial penetrations is complete. If the list of artificial penetrations appears to be incomplete, ask the applicant to augment the list (e.g., by conducting more detailed surveys or database searches). See Section 4 of the *UIC Program Class VI Well Area of Review Evaluation and Corrective Action Guidance* for more details on methods that can be used for identifying artificial penetrations.

If any corrective action has already been performed, evaluate whether it was conducted in a manner that will prevent the movement of fluids into or between USDWs. Available forms of corrective action include well plugging and/or remedial cementing of an improperly abandoned well. Verify that corrective action was performed using carbon dioxide-resistant materials that are appropriate to project-specific geochemical conditions and of sufficient strength.

Also, discuss with the applicant which wells will have corrective action performed prior to commencing injection to gain agreement on an appropriate schedule for phased corrective action that is based on a well's location relative to predicted plume movement or well condition (and the corrective action methods they propose to use). If there is any indication that USDWs would be endangered by a phased corrective action approach, require that all corrective action be performed prior to injection; consider planned operating conditions, the physical and chemical characteristics of the carbon dioxide stream, the number of wells that need corrective action, or the rate of movement of the carbon dioxide plume and pressure front. (See Section 2.2 of the *UIC Program Class VI Well Project Plan Development Guidance* for additional considerations regarding Director's discretion to allow phased corrective action.)

**Verify that the applicant's proposed AoR and Corrective Action Plan meets the requirements of 40 CFR 146.84(b) and that it reflects the most up-to-date information on the AoR delineation and the review of corrective action information.** The AoR and Corrective Action Plan incorporated into the Class VI permit will include the results of the initial AoR delineation, the methods and schedule for all planned corrective action, and the results of any corrective action that has been performed. The plan is an important enforceable condition of the permit that will be used as a benchmark to guide AoR delineation modeling for reevaluations over the duration of the project and provide procedures and a justifiable schedule for performing all remaining corrective action on deficient wells. Therefore, the plan will need to be evaluated simultaneously with both the AoR delineation evaluation and the review of corrective action procedures, as described above.

The approved plan should describe the modeling and delineation that define the permitted AoR and incorporate relevant site-specific geologic, well construction, and operational data. Depending on the amount of interaction with the applicant and revisions to the delineation

approach in the course of the permit application review, it may be significantly revised from the initial plan submitted in the permit application.

Evaluate the proposed AoR reevaluation strategy to ensure that it is appropriate to the modeled predictions, operational conditions, and anticipated monitoring schedule. Confirm that the plan describes the conditions that would warrant a change in the AoR reevaluation schedule (e.g., based on the monitoring data that will be collected under the Testing and Monitoring Plan and the PISC and Site Closure Plan, operational changes, or induced seismicity or other unanticipated events). If there are substantial uncertainties in the determinations/models in the permit application that will not be addressed by pre-operational testing activities, consider requiring more frequent reevaluations. This approach may be particularly appropriate early in the injection phase (when unexpected results are most likely to arise), followed by a reduced reevaluation frequency in the out-years of the injection phase if the carbon dioxide plume and pressure front prove to move as predicted. Verify that the AoR delineation model considers planned post-injection phase testing and monitoring to facilitate a comparison of monitoring data and model predictions.

Verify that the corrective action strategies proposed in the AoR and Corrective Action Plan describe a reasonable effort to locate all artificial penetrations in the AoR, establish the condition of each, and identify any improperly plugged wells or other artificial penetrations that may endanger USDWs. Also assess whether planned remedial techniques and materials are appropriate. If phased corrective action is approved, confirm that the plan describes a suitable schedule and that there is adequate financial responsibility coverage for all corrective action (see Section 4.1.3).

**Before finalizing the AoR delineation modeling evaluation and approving the final AoR and Corrective Action Plan, confer with other members of the permit application review team** to determine whether any issues identified in the course of the permit application review may necessitate a revision to the modeling approach. For example, confirm that the most up-to-date geologic information and final operating conditions match the inputs to the AoR delineation model. Ensure that data to be collected under the pre-operational formation testing program will provide geologic information to fill in any data gaps and uncertainties associated with the modeling or the plan. Also, confirm that the final findings of the AoR delineation modeling are reflected in the evaluations of storage capacity and induced seismicity (see Section 4.1.1). If site characterization and modeling investigations suggest that induced seismicity is a concern, ensure that it is addressed in the Emergency and Remedial Response Plan. Confirm, in coordination with others on the review team, that the testing and monitoring strategies proposed for the injection and post-injection phases will produce the necessary data to support AoR reevaluations and the non-endangerment demonstration. A change in the size of the AoR may also necessitate revision of the Testing and Monitoring, PISC and Site Closure, and Emergency and Remedial Response Plans.

Communicate any changes to the AoR delineation or the final plan related to corrective action to the staff reviewing financial responsibility cost estimates to ensure that sufficient resources are set aside to fund corrective action on all wells in the AoR. For example, changes to the corrective action plan (e.g., the number of wells needing corrective action, the depth of newly identified wells, or any changes to the phased corrective action schedule) may affect cost estimates. Additionally, a larger AoR may affect the number of monitoring wells that would need to be



BLF-000074

constructed (and therefore plugged), the resources for which emergency or remedial response may be needed, or the presence of a USDW in the AoR.

If the AoR delineation evaluation for a transitioning Class II project with an existing aquifer exemption results in a larger AoR that includes areas with TDS below 10,000 mg/L, discuss with the applicant the need to expand the areal extent of the aquifer exemption and the need to coordinate an aquifer exemption request with the AoR delineation modeling.

***Outcomes***

Following the review of the AoR delineation, evaluation of corrective action information, and approval of the AoR and Corrective Action Plan, the UIC Program should develop information about the review for inclusion in the permit file. Relevant materials include the following:

- Permit conditions for AoR and corrective action, including the corrective action activities that must be performed prior to injection;
- The approved AoR and Corrective Action Plan as an enforceable condition of the permit;
- A map of the approved delineated AoR; and
- A report documenting the evaluation of the AoR delineation and the corrective action efforts that documents/describes:
    - The approach used for the evaluation and its results;
    - Interactions and communication with the applicant;
    - The independent modeling and the results of the effort;
    - A determination regarding the appropriateness of the modeling approach and how it complies with the Class VI Rule; and
    - Any additional information requested as part of the pre-operational testing program to address identified uncertainties at the project site.

Any supporting documents (e.g., the AoR and Corrective Action Plan and completed reports) should be uploaded to the project's permit package area in the GSDT.

### *4.1.3 Financial Responsibility*

Class VI permit applicants must submit information to demonstrate financial responsibility for corrective action, injection well plugging, PISC and site closure, and emergency and remedial response [40 CFR 146.82(a)(14); 146.85(a)].

The purpose of the UIC Program's review of financial responsibility information is to verify that the proposed instruments are sufficiently funded to cover all applicable activities, in consideration of specific information about the project. The UIC Program should also review the financial instruments to ensure they have appropriate wording and provisions as described at 40 CFR 146.85. The goal of this review is to ensure that, in the event that owners or operators experience financial difficulties, financial resources are available for a third party (i.e., one that is retained by the EPA) to carry out activities related to closing and, if needed, remediating GS sites to ensure that USDWs are not endangered, without the use of taxpayer monies.



BLF-000075

***Completeness Review***

Pursuant to 40 CFR 146.85, the permit applicant will submit cost estimates for corrective action, injection well plugging, PISC and site closure, and emergency and remedial response. Initially, as part of the permit application, applicants may submit only the cost numbers (as itemized tables and narratives about what is included in the cost estimates) and information about the types of financial instruments. (Banks, insurers, or other financial institutions may not provide the specific financial instruments until the UIC Program Director requires the instrument to be active, which may occur very late in the permitting process, i.e., close to the time that construction is authorized.)

To confirm that the submission is complete, the UIC Program should:

- Verify that the cost estimates address each of the covered activities and that the applicant plans to use one or more of the qualifying instruments at 40 CFR 146.85(a)(1) to cover the full amount of the cost estimates.
- Confirm that the applicant provided sufficient detail about what activities, equipment and materials, and assumptions about the project supported the cost estimates, along with information about the "dollar year" in which the estimate was presented and whether discounting was applied to the estimates for any activities.
- Confirm that these activities are consistent with information in other submittals, e.g., the number of wells that need corrective action as described in the AoR and Corrective Action Plan, procedures in the Injection Well Plugging Plan, the number and depth of monitoring wells in the Testing and Monitoring Plan that will need to be plugged, or potential response activities in the Emergency and Remedial Response Plan.

If any information is missing or unclear, the UIC Program should consider requesting additional information or posing clarifying questions.

***Evaluation***

The bolded text below outlines a suggested approach that a UIC permit writer might employ to evaluate financial responsibility cost information and draft financial instruments, submitted in a Class VI permit application, to confirm that an applicant's submittal meets the requirements of the Class VI Rule and informs the establishment of protective permit conditions.

**Review the applicant's cost estimates for each covered activity** to verify that the costs are accurate and sufficient to cover the actual costs of contracting an independent third party to conduct the activities and all related costs. (Note that such estimates may differ from the cost to the applicant of performing these activities using the owner or operator's staff and equipment.) The EPA's Financial Responsibility Cost Estimation Tool can support this evaluation by calculating an acceptable range of costs for relevant GS activities based on information submitted with a Class VI permit application. A copy of the Cost Estimation Tool is available in the resource library of the GSDT.

- Review the cost estimate for performing corrective action to confirm that the estimate is sufficient to cover the costs of the activities outlined in the AoR and Corrective Action Plan and accounts for the number, condition, and depths of all deficient wells in the AoR. It should also address the cost of completing any proposed phased corrective action.

- Verify that the cost estimate for plugging the injection well is sufficient to cover the cost of plugging an injection well of the proposed depth, including providing adequate amounts and types of cement and plugs to seal off all relevant subsurface layers. If the applicant plans to convert the well to another use following GS activities (e.g., for EOR/EGR), confirm that the costs estimated are for the cost of plugging the injection well to the surface (see Section 4.1.8). See Section 4.1.11 for information on financial responsibility for projects operating under injection depth waivers.
- Review the cost estimate for post-injection site care and verify that the estimate properly accounts for performing groundwater monitoring and carbon dioxide plume and pressure front tracking throughout the extent of the AoR. The estimate should account for the depth and proximity of USDWs or other formations that will need to be sampled and the number, frequency, and types of post-injection testing and monitoring that are described in the PISC and Site Closure Plan.
- Review the site closure cost estimate and verify that it accounts for completing all site closure activities described in the PISC and Site Closure Plan, particularly for plugging all of the monitoring wells described in the Testing and Monitoring Plan. Note that, even if the applicant plans to convert any monitoring wells for another use, the site closure cost estimate should cover the cost to plug these wells to the surface.
- Review the cost estimate for emergency and remedial response and verify that it accounts for the presence of all potentially affected resources within the AoR, all known endangerment scenarios, and proximity to nearby USDWs, communities, residences, and drinking water systems, as described in the Emergency and Remedial Response Plan.

**The Financial Responsibility Cost Estimation Tool**

The EPA's Cost Estimation Tool for Class VI Financial Responsibility Demonstrations is designed to provide an "acceptable range of costs" for GS financial responsibility activities based on information submitted with a permit application. The spreadsheet-based tool requests inputs about the proposed site, e.g., well depth, planned duration of the project and PISC timeframe, and size of the AoR. Based on this, it generates a range of cost estimates for required activities, e.g., corrective action, injection well plugging, PISC and site closure and emergency and remedial response. The cost estimates for each activity are intended to be accurate enough for UIC Programs to assess whether the financial responsibility cost estimates in the permit application are likely to be adequate, and can guide discussions between the UIC Program and the applicant during the permit application review process.

If any of the cost estimates do not appear to cover all aspects of the activities they are required to cover, discuss this with the applicant and, if necessary, request updated cost estimates. Verify that cost estimates for activities that will be performed many years into the future (e.g., phased corrective action, well plugging, PISC, or site closure) are appropriately inflated. For additional information on evaluating financial responsibility cost estimates, including whether they are appropriately inflated, see Appendix C of the *UIC Program Class VI Financial Responsibility Guidance*.

**Evaluate the financial instruments the applicant proposes to use.** Confirm that each financial responsibility instrument is suitable to the activities it will cover. Table 4-2 presents the preferred financial instruments for each activity based on the recommendations of the *UIC Program Class VI Financial Responsibility Guidance*.



BLF-000077

**Table 4-2: Financial Instruments Recommended in the *UIC Program Class VI Financial Responsibility Guidance***

| Activity | Financial Instruments |
|---|---|
| Corrective action | Trust funds, letters of credit, surety bonds, escrow accounts, and financial tests and corporate guarantees. |
| Injection well plugging | Trust funds, letters of credit, surety bonds, insurance, and financial tests and corporate guarantees. |
| Post-injection site care and site closure | Trust funds, insurance, and financial tests and corporate guarantees. |
| Emergency and remedial response | Insurance and financial tests and corporate guarantees. (Letters of credit and surety bonds are well-suited to emergency and remedial response during the injection phase.) |

Note that the above lists are not exhaustive of all options available for each GS activity or of all considerations for evaluating the adequacy of the financial instruments. If the applicant proposes instruments that are not included in the list of qualifying instruments at 40 CFR 146.85(a)(1), determine whether these alternative instruments adequately demonstrate financial responsibility and minimize the risk of costs being passed to the public, or what assurances of solvency the applicant can provide.

Confirm that the instruments the applicant proposes to use are secure and meet the requirements for qualifying instruments at 40 CFR 146.85(a) to facilitate enforceability and prevent gaps in coverage over the duration of the project. For example:

- For trust funds, confirm that the third-party administrator has a proven track record of effective management and is financially stable, and that the agreements include a description of the acceptable ways in which the trustee can invest the fund. Verify that the conditions under which payments can be authorized are identified.
- For surety bonds, confirm that the applicant has established a standby trust to receive any funding necessary to address the cost of covered activities. Also, verify that the applicant has demonstrated the financial stability of the surety, i.e., that the surety company is tested and approved under the U.S. Department of Treasury Circular 570.
- For payment bonds, confirm that the agreement specifies that the surety company will pay the bond's face value if the applicant does not provide a substitute demonstration of financial responsibility. For performance bonds, ensure that the agreement specifies that the surety company will pay a qualified third party to complete the activities covered by the bond.
- For a letter of credit, confirm that the letter is issued by a bank or other regulated financially stable institution, requires the issuing institution to provide notice if it does not plan to reissue the letter of credit, and includes a provision for automatic renewal. Confirm that the applicant has established a standby trust to receive any funding necessary to address the cost of covered activities.
- For independent third-party insurance, confirm that the policy has a face value that is at least equal to the estimated cost of the covered GS activities. If necessary, require the applicant to provide a certificate of insurance identifying general policy information and



BLF-000078

a statement indicating that the insurer is providing financial assurance for the insured. Also, review the third party's credit rating or most recent bond rating and calculated financial ratios. If the third-party provider does not have a top credit rating (i.e., AAA, AA, A, or BBB for Standard & Poor's or Aaa, Aa, A, or Baa for Moody's), ensure that the applicant can demonstrate the equivalency of the rating with the recommended ratings.

- For an escrow account, confirm that the escrow agent will submit statements with the value of the escrow account at least annually, has demonstrated appropriate financial stability, and received concurrence on any additional deposits or release funds. Confirm that the trust is invested according to relevant legal requirements and the established agreement. Confirm that the applicant has established a standby trust to receive any funding necessary to address the cost of covered activities. In addition, as needed, approve requests for release of excess funds or ensure that deposits of additional funds will occur if the value of the account falls below GS activity cost estimates.
- For self-insurance, confirm that the applicant has met the required financial coverage criteria and has passed the required financial steps at 40 CFR 146.85(a)(6)(v). Also, review the supporting statements provided (e.g., 10-K report, auditor's opinion on the financial data provided by the Chief Financial Officer or Federal Energy Regulatory Commission Form 2 report) and evaluate the adequacy of the audit conducted.

Verify that the proposed financial instrument(s) have protective conditions of coverage, i.e., with cancellation, renewal, and continuation provisions and other conditions identified at 40 CFR 146.85(a)(4)(i). If any aspects of the proposed instruments are determined to be insufficient or do not meet the Class VI Rule requirements for qualifying instruments, request revisions or replacements to some or all of the instruments. For additional information on financial instruments, see the *UIC Program Class VI Financial Responsibility Guidance*. Additionally, the resource library of the GSDT contains a set of checklists to support the evaluation by tracking the information necessary to determine the adequacy of the applicant's financial responsibility demonstration.

**Financial Responsibility needs for Long-Duration Class VI Projects**

The long duration of some Class VI projects, in particular the long post-injection timeframe, may pose challenges for securing a financial instrument for the duration of the phase or project at the time of permitting. Third-party insurance providers typically issue insurance policies for a relatively short time (e.g., 3 to 5 years), and they may not be willing to issue an insurance policy for a phase that begins ten years in the future. In these situations, it may be necessary to work with the applicant and the third-party provider to establish an instrument that is flexible enough to accommodate the specific situation while adequately meeting the financial responsibility requirements. Provisions such as cancellation and renewal notification are important to ensure adequate time to establish and approve an alternative instrument should the original instrument fail to renew for the duration of the project or phase. For phases that occur far into the future, the applicant may also establish an interim instrument to meet the financial responsibility requirements at the time of permitting if it is not possible to secure the specific instrument at that time.

**Before approving the final cost estimates, coordinate with those performing other aspects of the permit application review** to ensure that the final cost estimates incorporate any changes identified in the course of the review. For example, if the AoR is determined to be larger than initially modeled or predictions about plume behavior change, this may impact the costs

associated with: the number of wells that require corrective action, the number of monitoring wells that would need to be constructed (and therefore plugged), resources for which emergency or remedial response may be needed, or the presence of a USDW in the AoR.

The presence of a USDW in the AoR can significantly affect potential emergency and remedial response costs, as these must address the potential for groundwater treatment per 40 CFR 146.85(a)(2)(iv). (Although the likelihood of any Class VI project encountering an emergency or contamination event is low, all project operators need to be financially capable of addressing an emergency. As such, financial responsibility cost estimates and the value of the instruments will likely be larger than the actual costs incurred at most sites.)

Modifications to the Testing and Monitoring Plan or the PISC and Site Closure Plan in the course of permitting discussions may necessitate revisions to the monitoring well plugging cost estimates. For example, the addition of more or deeper monitoring wells or increases to the length of the post-injection monitoring phase (or modifications to the alternative PISC timeframe) can affect the PISC cost estimate. Changes to the injection well's construction may affect the cost of well plugging. The final approved cost estimates should reflect any such changes to the project.

***Outcomes***

Following the review, the EPA recommends that the UIC Program develop the following financial responsibility information and upload it to the project's permit package area in the GSDT:

- Permit conditions for financial responsibility, including:
    - The type and value of the financial instrument(s) for all required activities based on the approved cost estimates;
    - Requirements to maintain financial resources for each activity until the relevant phase of the operation is complete or site closure is completed; and
    - A schedule for adjusting cost estimates and revising the financial instrument(s);
- A description of the enforceable financial responsibility conditions of the Class VI permit that includes: a summary of cost estimates by activity; copies of the instrument(s) to be used; and a pay-in schedule (if applicable); and
- A report summarizing the evaluation of the applicant's financial responsibility determination. The report might address the independent evaluation of whether the cost estimate is complete and sufficient and an evaluation of the language in the financial instruments.

### *4.1.4 Injection Well Construction*

Class VI permit applicants must submit proposed schematics and construction procedures for the injection well [40 CFR 146.82(a)(11),(12); 146.86].

The purpose of the UIC Program's evaluation of well construction information is to ensure that the injection well will be constructed in a manner that is appropriate to planned operations, is compatible with the carbon dioxide and subsurface chemistry, and will maintain integrity throughout its duration. Reviewing proposed injection well construction plans is necessary to ensure that the proposed well materials and cement have adequate strength and design



BLF-000080

appropriate to the site-specific conditions; and to confirm injectate and formation fluid compatibility.

In addition, the EPA recommends reviewing the procedures for constructing monitoring wells with similar considerations for subsurface conditions to ensure that the monitoring wells will not become conduits for fluid movement. See Section 4.1.11 for additional information on evaluating the construction of wells for projects operating under injection depth waivers.

***Completeness Review***

Class VI permit applicants will submit proposed injection well construction procedures and schematics. The submittal will likely be in the form of a narrative document with associated schematics that describes how the applicant will construct the injection well to meet the goals of 40 CFR 146.86.

The UIC Program should perform a preliminary review of the proposed construction procedures to verify that they provide a sufficient level of detail to inform an evaluation. The applicant should describe the materials and cement to be used and demonstrate that they are compatible with the injectate and formation fluid geochemistry; the construction procedures should also identify the depths of the injection zone, any production zones, any formations with USDWs and other water-bearing formations.

The applicant should demonstrate that the proposed well materials, including casing, tubing, and cement, have sufficient strength to withstand the forces to which they will be subjected. The cementing plan should be sufficiently detailed to demonstrate that a continuous cement sheath will be provided from the injection zone to the surface. The locations of the packer and perforation intervals should be indicated. The applicant should also demonstrate that the well will be equipped with a continuous injection (i.e., injection rate and pressure) and annulus monitoring system, safety valves, and shut-off devices as required at 40 CFR 146.88(e).

If the applicant plans to convert an existing well to a Class VI well, confirm that they have provided information to demonstrate that the well was engineered and constructed to meet the requirements at 40 CFR 146.86(a) to ensure protection of USDWs (per 40 CFR 146.81(c)). They should submit as-built schematics; the results of tests performed during the well's construction; recent MIT results; and other information demonstrating the mechanical integrity, material strength and compatibility, and corrosion resistance of the well.

If any information is missing or is not presented in sufficient detail to inform an evaluation of the well construction or conversion plan, consider the need to request the missing information or send the applicant clarifying questions to inform the review.

***Evaluation***

The bolded text below outlines a suggested approach that a UIC Program might employ to evaluate well construction information, submitted in a Class VI permit application, to confirm that an applicant's submittal meets the requirements of the Class VI Rule and informs the establishment of protective permit conditions.

**Ensure that the materials planned for all well components are compatible with the planned injectate and formation fluids that may be encountered,** and that they can resist corrosion for the duration of the project. Compare the chemical resistances of all proposed well materials to the chemical composition of any fluids with which they may come into contact, including the



BLF-000081

injectate (based on information provided in the permit application), formation fluids (based on any available geochemical data as informed by the site characterization), and resultant mixtures of carbon dioxide and subsurface fluids. Standard construction materials, such as carbon steel and Class G or H cement, may be adequate above the packer if the injectate is dry, i.e., containing less than 50 parts per million (ppm) water. However, if the injectate contains greater than 50 ppm water, corrosion-resistant materials should be used for any components that will contact the injectate, such as casing, tubing, packer, and cement. If sulfide, sulfate, or nitrate is present in either the injectate or formation fluids, confirm that well materials that will contact these fluids are resistant to those chemicals. Consider requiring cement additives or non-Portland cements to increase cement resistance if any of the following conditions are present in the injection well: wet carbon dioxide; high temperatures; presence (or potential presence) of sulfate, nitrate, or sulfide; or high flow rates of formation fluids (containing injected carbon dioxide) contacting the exterior of the well.

If the chemical resistance of any material is in doubt, request that the applicant provide certifications from the manufacturers of those materials or the results of corrosion tests, or consider specifying more frequent, ongoing corrosion testing during the injection phase (this should be described in the Testing and Monitoring Plan). If any of the materials are not compatible with the fluids they will contact over the duration of the project, require that the applicant resubmit construction plans that include materials with the appropriate chemical resistance.

Compare the inside diameter of the casing to the diameter of all equipment that is proposed to be lowered into the well for purposes of logging, monitoring, sampling, or performing workovers as described in the proposed operating plan or Testing and Monitoring Plan. If any piece of equipment is not small enough to fit in the well casing without getting stuck, require the logging equipment to be changed or a larger casing be installed. If the well is proposed to be constructed at an angle departing from vertical, compare the radius of curvature of the well to the length of each piece of equipment. If a deviated well is proposed, consult with the team reviewing geologic information and the AoR delineation modeling reviewer to ensure that the well's design is being considered in their reviews.

**Review the strength of all proposed well materials to ensure that they can resist all of the forces they will encounter.** These forces include burst pressure, collapse pressure, axial loading, compressive forces during installation, thermal stresses, and cyclic stresses caused by cycling injection on and off. For example, compare formation (external) pressure to collapse strength of the materials. Verify that formation pressures are based on, or are consistent with, the geologic characterization or ensure that this information will be collected as part of the pre-operational well testing program. Also, compare the planned injection pressure to the burst strength of the well materials and verify that the tensile strength of all well materials is adequate to sustain anticipated axial loads. If injection will not be continuous, consider the effects of cyclic changes in stress and temperature on well components. If the permit will include gradual shutdown procedures (see Section 4.1.6), verify that these procedures are appropriate to known information about the well's strength.

If it is not clear what stresses the well materials will experience, consider asking the applicant to provide stress calculations or models for the well component(s). If the well materials are not capable of resisting the stresses they will experience during the project, request that the applicant



BLF-000082

propose stronger, alternative materials. Section 2.4 of the *UIC Program Class VI Well Construction Guidance* contains more details on stresses to consider in this review.

**Review the proposed cementing procedures** to ensure that they will provide a continuous sheath of cement from the bottom of each casing string to the surface. Ensure that the cement for the long-string casing will extend into the injection zone. Review the cementing plan to confirm that the cement will ensure external mechanical integrity across all fluid-containing zones in the well bore, especially the injection zone and any USDWs. Verify, in consultation with the reviewer of the geologic information, that all such fluid-containing zones are identified in well schematics and addressed in the cementing plan. Ensure that the surface casing extends below the depth of the lowermost USDW (unless an injection depth waiver is requested).

If necessary, require that cement additives be used. Cement additives may be necessary to ensure chemical compatibility, reduce cement loss, improve resistance to cyclic stress, or increase strength.

If cement staging is proposed, review the cementing plan to ensure that the cement will provide a continuous sheath for the length of the casing. If necessary, ask the applicant to provide information to support these reviews. Verify the necessity of staged cementing by comparing the weight of the cement column to the fracture pressure of relevant subsurface formations. Check records of nearby wells for records of lost cement to determine depths at which stage intervals might be necessary. Review the cementing plan to verify proper setting of each stage, proper bonding between the stages, and that cement ports will not be plugged by prior stages of cementing. Verify that the cement staging plan includes proper procedures, such as temperature logs, to locate each stage in order to form good bonding between stages and confirm that these are documented in the pre-operational well testing program. Refer to Section 2.5.1 of the *UIC Program Class VI Well Construction Guidance* for additional information on staged well cementing.

If the cementing plan as submitted will not provide a sheath of cement covering the entire casing length and provide external mechanical integrity to the well as required at 40 CFR 146.86(b), ask the applicant to submit a revised plan that includes proper cementing procedures.

**Review the submitted well schematics to ensure proper placement of the perforations and packer.** Ensure that the proposed perforations are entirely within the proposed injection zone. Verify that the packer is set within the confining layer and will be constructed of material that is compatible with carbon dioxide and carbon dioxide-water mixtures.

**Check that the well will be equipped with safety valves and shut-off devices** and verify that these devices will be linked to the continuous injection and annulus monitoring system and are designed to shut-in when injection or annulus pressures exceed specified parameters, as described in the operating conditions of the permit. See Section 4.1.6 for additional information about gradual or immediate shutdown of the well. If the well is offshore, verify that the construction plans include downhole shut-off devices. Consider requiring downhole shut-off devices for any onshore wells that have one or more of the following risk factors: high temperature, high pressure, presence of hydrogen sulfide, proximity to populated areas, or high likelihood of damage to the wellhead. Wells without downhole shut-off devices should have surface shut-off devices. Confirm with other members of the review team that activation of these devices is tied to operating requirements and that appropriate responses are described in the Emergency and Remedial Response Plan. Check that pressure gauges and flow meters have


BLF-000083

adequate range and sensitivity to properly measure the planned flow rates and pressures. Confirm that the location of the devices is appropriate (e.g., bottomhole versus wellhead) to yield useful information.

**If an existing well is to be re-permitted as a Class VI well,** ensure, in consideration of requirements at 40 CFR 146.81(c), that the applicant has demonstrated the mechanical integrity, material strength, and material compatibility/corrosion resistance of the well, the ability of the well to accommodate testing and workover equipment, and that appropriate remedial actions have been or will be taken to address any deficiencies. Particular attention is needed to assess the condition of the well materials and cement at or above any USDWs, given the requirement at 40 CFR 146.86(a) that Class VI wells must be constructed to protect all USDWs. Below the lowermost USDW, there is less potential for unacceptable fluid movement to USDWs, so additional flexibility, e.g., the presence of cement across certain intervals, may be appropriate.

This evaluation will likely involve reviewing existing information about the well to ensure that it satisfies the requirements at 40 CFR 146.86(a) or to identify additional testing or repair that may be needed, given that injection pressures and volumes will likely be increased following re-permitting as a Class VI well. For example:

- Consult recent well logs and internal MIT results to verify that the well has retained its original integrity. If recent well logs or MIT results are not available, logs and MITs may need to be performed as part of the pre-operational well testing program.
- Review cementing records and external MIT results to ensure that the cement will prevent migration of all fluids out of the injection zone or between formations. While continuous cement to the surface is not required in converting wells, all subsurface layers containing fluids, such as water or hydrocarbons, should be isolated with cement.
- Review material strength and compatibility in the same manner as with new wells (see above). If any well materials are incompatible with carbon dioxide or the anticipated composition of carbon dioxide-water mixtures, request that they be replaced.

If it cannot be demonstrated that the well has the ability to maintain both internal and external mechanical integrity (i.e., to ensure that the well meets the requirements at 40 CFR 146.81(c)), the well should be repaired and retested. If the well cannot be satisfactorily repaired to meet the requirements, it cannot be used for Class VI injection.

***Outcomes***

Following review of information related to the Class VI well, the UIC Program should develop:

- Permit conditions for well construction that include:
    - Casing of suitable, carbon dioxide-compatible materials;
    - The name of the formation (i.e., the lowermost USDW) to which the surface casing must be cemented and the name of the injection zone to which the long-string casing must be cemented;
    - Construction details, e.g., open hole diameters and intervals, casing specifications, and tubing and packer specifications;
    - Cement materials and volumes and cement emplacement procedures (e.g., circulation of cement, if appropriate);



BLF-000084

- Continuous injection pressure, rate, volume, and temperature and annulus pressure monitoring devices and automatic shut-off systems; and
- Any conditions for construction relevant to operating under an injection depth waiver to ensure that USDWs above and below the injection zone are protected.

- A summary of the enforceable construction conditions of the Class VI permit;
- Final approved well construction schematics;
- A document that identifies any deficiencies in the proposed construction plan and how the UIC Program worked with the applicant to address these, including additional testing or data collection to be performed during well construction; and
- Documentation of the evaluation that the applicant provided sufficient information on which to approve certain components of an existing injection well and a description of these components (if applicable).

Any supporting documents should be uploaded to the project's permit package area in the GSDT.

### *4.1.5 Pre-Operational Testing*

Permit applicants must submit a proposed pre-operational formation and well testing program that describes how they will test the well and analyze the chemical and physical characteristics of the injection and confining zones [40 CFR 146.82(a)(8); 146.87].

The purpose of the UIC Program's review of the proposed pre-operational testing program is to confirm that all tests required at 40 CFR 146.87 are planned and designed to collect the information needed to verify that the well is properly constructed; gather information on subsurface formations and fluid geochemistry; and address identified uncertainties. The UIC Program should also confirm that the pre-operational formation testing program, as proposed, will provide information to support the setting of operating conditions of the permit, provide inputs for modeling to delineate the final AoR (or confirm the assumptions on which the preliminary AoR delineation modeling was based), and establish a baseline for parameters that will be measured during the injection and post-injection phases.

***Completeness Review***

The Class VI permit applicant's proposed pre-operational formation and well testing program will likely be a narrative description of the specific well and geologic tests that the applicant plans to perform to meet the requirements of 40 CFR 146.87.

The UIC Program should perform a preliminary review of the proposed pre-operational formation and well testing program to verify that it describes the specific testing procedures that will be performed, including their timing relative to well construction (i.e., before installation of surface casing and long-string casing). During this review, the UIC Program should confirm that the applicant documented QA procedures (e.g., water quality sampling protocols and custody procedures for core collection and analysis) and provided information about the qualifications of log and core analysts.

***Evaluation***

The bolded text below outlines a suggested approach that a UIC Program might employ to evaluate planned pre-operational testing information, submitted by a Class VI permit applicant, to confirm that the applicant's submittal meets the Class VI requirements and informs the establishment of protective permit conditions.

**Verify that the applicant plans to conduct all tests needed to evaluate that the well is properly drilled and constructed.** Confirm that the applicant plans to employ the best available techniques (as described in industry standard practices and technical guidances) and perform a full suite of logs and tests. Available logs and tests include: deviation checks, cement evaluation, caliper, cement bond, and temperature logs and video inspections. Confirm that the tests are planned to be performed at appropriate phases of well construction (i.e., after the cement for each casing string has been emplaced and allowed to set for the appropriate amount of time). Confirm that internal and external MITs are planned; arrange to witness these tests as necessary.

If the well has already been constructed (i.e., it is to be converted from an existing injection well or a stratigraphic test well), request that the applicant provide documentation of prior logs, MITs, or other tests to inform a demonstration that the well was engineered and constructed to meet the goals of 40 CFR 146.86. Additionally, confirm that the well has mechanical integrity, and that approving the well's construction is appropriate and will not allow injection of carbon dioxide that will endanger USDWs. See the *UIC Program Class VI Well Construction Guidance* for additional information on pre-operational well testing methods.

Additionally, consider the merits of requesting that the applicant tests deep monitoring wells (i.e., those that penetrate the confining zone) prior to project operation, in a similar manner to the pre-operational testing performed on the injection well.

**Verify that the pre-operational formation testing plan includes all logs necessary to evaluate and understand the subsurface geology** of the injection and confining zones, including their thicknesses, lithologies, porosities, and permeabilities. These logs include resistivity, spontaneous potential, porosity, gamma ray, and fracture finder logs. Evaluate the proposed testing in consultation with reviewers of the site's geology and the AoR delineation modeling to ensure that any identified uncertainties about site-specific conditions will be addressed. Section 4 of the *UIC Program Class VI Well Site Characterization Guidance* provides additional information on pre-operational formation testing methods.

**Confirm that the applicant plans to take cores of the injection and confining zones.** If the applicant proposes to submit information on cores previously taken near the injection well, confirm that they represent the properties of the injection and confining zones near the well and provide sufficient and representative information on their porosities, permeabilities, petrologies, and mineralogies to inform the geology review, AoR delineation modeling evaluation, and an assessment of the potential for mobilization of contaminants. Additionally, if there is evidence of heterogeneity (or uncertainty as to the homogeneity of the injection or confining zones), consider whether it would be beneficial to use the discretion afforded at 40 CFR 146.87(b) to request that additional cores be taken and analyzed to characterize the site geology as thoroughly as possible. If necessary to fully characterize the site, consider whether to request that cores be taken from layers in addition to the injection and confining zones and analyzed.



BLF-000086

**Confirm that the applicant plans to determine fracture pressure and analyze the physical and chemical characteristics of the injection and confining zones and the fluids within these formations.** Ensure that the chemical analytes in the fluid analyses will provide sufficient data to assess the compatibility of the well with formation fluids, particularly when the carbon dioxide mixes with formation waters, and to fully characterize subsurface geochemistry and fluid chemistry. Verify that pressure fall-off tests and injectivity tests will provide sufficient data to evaluate that the proposed operations are suitable or to set the injection pressure limit in the permit. Confirm that a step-rate test to determine fracture pressure will be conducted under the appropriate conditions.

**Evaluate any additional testing that is necessary to ensure the integrity of the confining zone and protection of USDWs.** Additional testing may include seismic monitoring to determine if seismic activity may impact the confining zone. Monitoring may also be appropriate to determine whether there are faults that might be activated by injection activities. If surface air and/or soil gas monitoring is identified as part of an approach to monitor for potential carbon dioxide leaks, determine whether this is feasible given site conditions.

If an injection depth waiver is requested, confirm that sufficient formation testing is planned to provide adequate fracture pressure and geochemical data on the confining zones above and below the injection zone. Also ensure that testing of the well during construction will address the need to protect USDWs above and below the injection zone.

**Review a QASP or other documentation of QA procedures** that address the sampling and analysis of fluids or logging procedures in the pre-operational formation testing program. Verify that the appropriate parameters will be measured, including pH, temperature, pressure, and conductivity. Evaluate the equipment the applicant plans to use to conduct the tests (e.g., subsurface pressure gauges).

**Before approving the pre-operational well and formation testing program, consult with other members of the review team,** including the individuals reviewing the geologic information, to determine if there are significant uncertainties or data gaps about the site that could be addressed through well or formation testing. Additionally, confirm that the modelers have complete data inputs to characterize site geology and geochemistry in the model. If any such information is missing or incomplete, consider how the pre-operational formation and well testing program can address the data gaps or uncertainties.

***Outcomes***

Following review and approval of the pre-operational testing program, the UIC Program should incorporate the following information into the permit file:

- Permit conditions for pre-operational testing that must be performed prior to authorizing injection, including requirements to report the results within 60 days after completion of the injection well;
- A pre-operational testing program as an enforceable part of the Class VI permit (if applicable); and
- Documentation of any reviews/evaluations that resulted in changes to or confirmed the appropriateness of the applicant's proposed pre-operational testing.

Any supporting documents (e.g., the pre-operational testing program) should be uploaded to the project's permit package area in the GSDT.

### *4.1.6 Proposed Operating Conditions*

Permit applicants must submit information on the proposed injection well operating conditions [40 CFR 146.82(a)(7),(9),(10); 146.88].

The purpose of the UIC Program's review of the proposed injection pressure, annulus pressure, and planned down-hole shut-off systems is to ensure that injection rates and volumes are appropriate to the site geology (considering any uncertainties identified in the course of site characterization) and the well's construction.

#### *Completeness Review*

The applicant's proposed operating procedures will likely be a narrative document supported by tables and equipment schematics that identifies the proposed injection rates and pressures, the total volume of carbon dioxide to be injected over the duration of the project, and the physical and chemical characteristics of the carbon dioxide stream. The applicant should also present information about the proposed annulus pressure and the fluids to be used to fill the annulus between the casing and tubing. If the applicant proposes that the annulus pressure be less than the injection pressure, the UIC Program should confirm that they provided information to support the need for this condition. If well stimulation is anticipated, the applicant should also submit proposed stimulation procedures.

The UIC Program should perform a preliminary review of the proposed operating procedures to verify that the applicant provided information at a sufficient level of detail to inform an evaluation. During this review, the UIC Program should:

- Confirm that the permit application includes information demonstrating how the operating procedures were developed. For example, a reviewer should ensure that the maximum injection pressure is based on the fracture pressure of the injection zone (or any available information on fracture pressure) and that annulus pressure is suitable to the well's design and will not impact the well's integrity or induce formation fractures.
- Confirm that information about the carbon dioxide stream is based on chemical analyses that were performed pursuant to appropriate QA procedures and represent the source of the carbon dioxide.

If any information is missing or is not presented in sufficient detail to inform an evaluation of the proposed operations, the UIC Program should consider the need to request the missing information or send the applicant clarifying questions to inform the review.

#### *Evaluation*

The bolded text below outlines a suggested approach that a UIC Program might employ to evaluate planned operational information, submitted by a Class VI permit applicant, to confirm that an applicant's submittal meets the requirements of the Class VI Rule and informs the establishment of protective permit conditions.

**Review the proposed maximum injection pressure** to confirm that it is no more than 90 percent of the fracture pressure of the injection zone. If information on the fracture pressure of the injection zone is pending the completion of formation testing, the draft permit conditions will



BLF-000088

need to be reviewed and finalized before injection commences (see Section 5.1.5). If the proposed maximum fracture pressure is greater than 90 percent of the fracture pressure of the injection zone, require a change in the injection pressure to ensure compliance with 40 CFR 146.88(a). If there is uncertainty about the geologic characterization of the site or concerns about induced seismicity, consider whether setting an injection pressure that is less than 90 percent of the fracture pressure of the injection zone is appropriate. Also confirm that the well is designed to be of suitable strength to withstand anticipated pressures and maintain mechanical integrity.

**Review the proposed volume of carbon dioxide to be injected.** Confirm, in consultation with others on the permit application review team, that the injection zone has adequate capacity to receive the total anticipated volume of carbon dioxide (see 40 CFR 146.83(a)(1)) and that the confining zone is appropriately characterized and demonstrated to contain the carbon dioxide (see 40 CFR 146.83(a)(2)). This review should be coordinated with the geologic site characterization evaluation and the AoR delineation modeling review.

**Review the proposed annulus pressure** to ensure that it is greater than the injection pressure. If the applicant proposes that the annulus pressure be less than the injection pressure, verify that this is necessary by confirming that an annulus pressure above the injection pressure could impact the well's integrity or fracture the formation. Compare the annulus pressure to the burst pressure of the casing and the collapse pressure of the tubing and the formation fracture pressure. If the annulus pressure is close to any of these values, consider either requiring stronger tubular materials or reducing the required annulus pressure to a positive value that will not exceed the rated strength of the well casing or tubing or fracture the formation. If the proposed annulus pressure is not greater than the injection pressure and there is no danger to the well integrity caused by raising the pressure, require the annulus pressure to be increased to a pressure greater than the injection pressure. Also, verify that the fluid with which the applicant proposes to fill the annulus between the casing and tubing is compatible with all well components and is non-corrosive.

**If well stimulation is anticipated, review the proposed procedures** to ensure that well integrity will be maintained and that the confining zone will not be fractured. Compare proposed stimulation pressures to well material strength and formation fracture pressures and compare the composition of any stimulation chemicals proposed to the chemical resistance of the well materials. If it appears that any proposed stimulation procedures might harm the well or fracture the confining layer, require that the stimulation plan be revised or do not allow stimulation. If it is not clear whether stimulation procedures might damage the well or confining layer, consider requesting modeling of the stimulation activity and resultant fracture patterns or increased monitoring of pressure and other variables with appropriate safeguards during stimulation.

**Review information about the physical and chemical characteristics of the carbon dioxide stream.** Verify, in consultation with others on the permit application review team, that there are no concerns related to potential interactions with subsurface fluids based on available information about their geochemical composition or implications for the suitability of the well materials. If the carbon dioxide is anticipated to contain any hazardous components, work with the applicant to determine whether they plan to meet applicable requirements under RCRA related to obtaining a conditional exclusion from the definition of hazardous waste under 40 CFR 261.4(h); see Section 3.4.


BLF-000089

**Consider including injection well shutdown procedures in the permit's operating conditions.** The Class VI Rule requires, under certain circumstances, that operators immediately cease injection. However, there may be circumstances where immediately ceasing injection could pose greater endangerment potential (i.e., by placing additional stresses on the well) than a gradual reduction in the injection rate over a number of hours or days. Describing the gradual shutdown procedures in advance can help ensure expeditious implementation of a shutdown process that is appropriate to the well's construction and the situation if the need arises. Either the operating conditions or the Emergency and Remedial Response Plan should specify under what circumstances immediate vs. gradual shutdowns would be employed and the specific procedures to be followed. Consult with the engineer reviewing the well's design to confirm that installation of required automatic shut-off equipment is planned.

**Before establishing the operating conditions in the permit, confer with other members of the permit application review team** to determine whether any issues identified in the course of the review may necessitate revisions. For example, verify that any revised information about the site's geology (i.e., fracture pressure, injection zone storage capacity, seismic history, or the presence of faults or fractures) does not affect the assumptions on which limits on injection pressures or the total carbon dioxide volumes are based. Also, verify that the proposed well construction materials can withstand the stresses that will be imposed by injection at anticipated pressures and the planned well testing procedures. Verify that the proposed injection pressure and volumes are consistent with the inputs of the AoR delineation modeling (or are revised as needed based on adjustments in the approved final AoR delineation model) and any analyses of geologic suitability (particularly storage capacity estimates). Section 4 of the *UIC Program Class VI Well Construction Guidance* provides additional information on operating requirements for Class VI wells.

**Incorporating Project-Specific Startup Procedures**

As with shutdown procedures, there may be situations where gradual startup of injection could help address site-specific uncertainties, e.g., pressure at the well immediately after the start of injection. A gradual or "step-wise" startup of injection could help manage pressure development and ensure that the project does not violate any permit conditions during this period. Consider specifying a schedule (i.e., a number of days or weeks) over which injection rates would gradually increase to permitted levels. Increased monitoring and reporting of operating data or other parameters during the first few days of injection can help verify that startup was successful. Alternatively, reporting of initial monitoring results in advance of the first semi-annual report can help to confirm that the project is operating as anticipated.

***Outcomes***

Following the evaluation and approval of operating requirements, the UIC Program should develop the following:

- Permit conditions for injection well operation, including:
    - Injection limits, including maximum injection pressure and maximum and average daily injection volume and rate limits;
    - The source, location, and percentages of constituents in the carbon dioxide stream;
    - Prohibition of injection between the outermost casing and the well bore;

- A requirement that a positive pressure be maintained on the annulus and mechanical integrity be maintained at all times;
- Requirements for the use and maintenance of an automatic warning and automatic shut-off system; and
- Procedures for gradually shutting down the well and situations where the owner or operator must cease injection (if appropriate).

- A summary of the enforceable operating requirements in the Class VI permit; and
- Documentation of any reviews/evaluations that resulted in changes to the applicant's proposed operating conditions or confirmed the appropriateness of the operating limits.

Any supporting documents should be uploaded to the project's permit package area in the GSDT.

### *4.1.7 Testing and Monitoring*

The Class VI Rule requires Class VI permit applicants to develop and implement a comprehensive testing and monitoring plan for their projects that includes injectate monitoring, corrosion monitoring of the well's tubular, mechanical, and cement components, mechanical integrity testing, pressure fall-off testing, groundwater quality monitoring, carbon dioxide plume and pressure front tracking, and, at the UIC Program Director's discretion, surface air and/or soil gas monitoring [40 CFR 146.82(a)(15); 146.89; 146.90].

The purpose of the UIC Program's evaluation of the applicant's proposed Testing and Monitoring Plan is to ensure that the testing and monitoring procedures will be appropriate to planned operations, the well's construction, and site-specific geologic conditions. The UIC Program should ensure that the Testing and Monitoring Plan is designed to generate information over the duration of the project to:

- Demonstrate that the well is maintaining mechanical integrity, the site is operating as planned, and the carbon dioxide plume and pressure front are behaving as predicted;
- Provide essential points of comparison for modeled predictions, allowing for validation of the AoR delineation model and helping to address uncertainties during AoR reevaluations; and
- Form the basis of the non-endangerment demonstration that must be made before the owner or operator may proceed with site closure.

The UIC Program should also ensure that planned monitoring locations, methods, frequencies, parameters, etc., contribute to a comprehensive, tailored strategy for evaluating the performance of the project against modeled predictions and determining how other required activities will be implemented.

See the *UIC Program Class VI Well Testing and Monitoring Guidance* for additional information on testing and monitoring procedures for Class VI projects; also see the *UIC Program Class VI Well Project Plan Development Guidance* for additional information on evaluating Testing and Monitoring Plans.

***Completeness Review***

Class VI permit applicants will submit a draft Testing and Monitoring Plan, which will likely be in the form of a narrative document that describes the proposed testing and monitoring activities, and be accompanied by any supplemental materials related to or supporting the plan. Ideally, the Testing and Monitoring Plan should explain the purpose of each proposed activity and how its results will contribute to the data needs of the project to inform review of the plan and justify associated permitting decisions. The applicant must also submit a Quality Assurance Surveillance Plan (QASP) for all testing and monitoring activities, per 40 CFR 146.90(k).

The UIC Program should perform a preliminary review of the draft Testing and Monitoring Plan to verify that it provides a sufficient level of detail to inform an evaluation. For example, the plan should describe the methods to be used to perform all required testing and monitoring. The testing frequency, parameters/detection limits, and locations should be clearly described, and the monitoring locations should be representative of the entire delineated AoR in three dimensions. Furthermore, the UIC Program should verify that the plan includes a proposed schedule for all testing and monitoring, ideally with specific dates on or by which various tests will be performed each year. If any information is missing or is not presented in sufficient detail to inform an evaluation of the Testing and Monitoring Plan, the UIC Program should consider the need to request the missing information or send the applicant clarifying questions.

***Evaluation***

The bolded text below outlines a suggested approach that a UIC Program might employ to evaluate a Class VI permit applicant's proposed Testing and Monitoring Plan, to confirm that the submittal meets the requirements of the Class VI Rule and informs the establishment of protective permit conditions.

It is important to note that the post-injection phase groundwater, plume, and pressure front monitoring in the PISC and Site Closure Plan (see Section 4.1.9) is an extension of the injection phase testing and monitoring, and the results from both monitoring programs contribute to the non-endangerment demonstration that the applicant must perform pursuant to 40 CFR 146.93(b). The EPA recommends that the review of the injection and post-injection phase testing and monitoring be done concurrently. To facilitate this type of review, the EPA developed a spreadsheet-based template to summarize a testing and monitoring strategy that complies with 40 CFR 146.90(d) and (g), and that includes baseline, injection, and post-injection activities. The template, which is available in the resource library of the GSDT, can serve as a point of discussion between the applicant and the UIC Program. Figure 4-2 presents an overview of the content of the template (and examples of some, but not all, types of monitoring that could be employed). For additional information and considerations for reviewing testing and monitoring results, see Section 6.1.

**Review the proposed plan to ensure that all of the testing and monitoring activities that are required in the Class VI Rule are included and are appropriate to site-specific geologic and operating conditions.** Throughout the course of the review, consider how the Testing and Monitoring Plan will be implemented over the duration of the project (particularly for long-term projects), and whether any aspect of the plan would need to be modified to address anticipated changes to the site or operations. Discuss with the applicant whether incorporating the deployment of future monitoring technologies into the plan (e.g., bringing additional monitoring wells online after injection commences) may be appropriate. If so, incorporate a deployment



BLF-000092

schedule into the plan to avoid the need for future modifications of the plan and permit. The plan should include specific, quantitative triggers for increasing or decreasing monitoring frequency or adjusting other aspects of the testing and monitoring program.

**Review plans to analyze the carbon dioxide stream.** Verify that the parameters for which the carbon dioxide stream will be analyzed—and the associated analytical procedures—are consistent with those analyzed by the applicant to meet the requirement to characterize the carbon dioxide stream per 40 CFR 146.82(a)(7)(iv). Ensure that these analyses will provide the necessary information for any components of the testing and monitoring strategy that may rely on them—for example, if the owner or operator plans to use a certain constituent of the carbon dioxide stream to help track the migration of the plume, it should be included in the carbon dioxide stream analysis at an appropriate level of precision. If the applicant anticipates that the source of the carbon dioxide will vary over the duration of the project, more frequent carbon dioxide stream analyses may be necessary, and flexibility may be needed to revise the analytical parameters (and associated QA procedures) in the plan.

**Verify that all planned well testing is appropriate to the well's construction and the proposed operating conditions.** The Testing and Monitoring Plan must include plans for quarterly corrosion monitoring; continuous recording of injection pressure, rate, and volume to evaluate internal mechanical integrity; and annual external MITs, including an approved tracer survey (such as an oxygen-activation log) or a temperature or noise log [40 CFR 146.90(b),(c),(e)]. Confirm that corrosion monitoring will be performed using materials representative of the casing, tubing, and packer. If the applicant proposes the use of alternative MITs, evaluate these in the context of the planned construction of the injection well and inform the applicant that the MIT must be approved by the EPA Administrator [40 CFR 146.89(g)]. If appropriate to ensure that an adequate amount of corrosion monitoring is performed, consider requesting that the plan include performing casing inspection logs. Available logging techniques include caliper log, electromagnetic thickness survey, pipe analysis survey, or ultrasonic imaging surveys.

Ensure that the plan includes the sampling and recording frequencies for all continuous monitoring methods. In addition, ensure that the proposed operational monitoring program will detect any triggers for responses specified in the Emergency and Remedial Response Plan (e.g., exceedances of annulus or injection pressures).

**Confirm that the applicant plans to conduct a pressure fall-off test at least once every five years.** Any procedures for pressure fall-off tests that are specified in the Testing and Monitoring Plan should be consistent with the needs of Class VI projects; standardized procedures used for other well classes may not be appropriate.

**Figure 4-2: Examples of Class VI Groundwater Monitoring and Plume and Pressure Front Tracking Activities**

| Monitoring Category/ Class VI Rule Citation | Target Formation | Monitoring Activity | Data Collection Location(s) | Spatial Coverage or Depth | Frequency (Baseline) | Frequency (Injection Phase) | Frequency (Post-Injection) |
|---|---|---|---|---|---|---|---|
| **Groundwater Monitoring Above Confining Zone** *[40 CFR 146.90(d)]* | USDW | Fluid sampling | | | | | |
| | Formation above confining zone | Fluid sampling | | | | | |
| **Indirect Monitoring Above Confining Zone** *[40 CFR 146.90(d)]* | Formation above confining zone | 2D seismic survey | | | | | |
| **Direct Plume Monitoring** *[40 CFR 146.90(g)]* | Injection zone | U-tube fluid sampling | | | | | |
| **Indirect Plume Monitoring** *[40 CFR 146.90(g)]* | Multiple zones | 3D seismic survey | | | | | |
| | Injection zone | Continuous active-source seismic monitoring | | | | | |
| | | Cross-well tomography | | | | | |
| **Direct Pressure Front Monitoring** *[40 CFR 146.90(g)]* | Injection zone | Pressure monitoring | | | | | |
| **Indirect Pressure Front Monitoring** *[40 CFR 146.90(g)]* | Injection zone | InSAR with continuous GPS | | | | | |
| **Other Related Monitoring** *[40 CFR 146.90(i)]* | Multiple | Passive seismic monitoring | | | | | |

**Evaluate the applicant's groundwater quality monitoring.** Confirm that planned groundwater monitoring is sufficient to ensure non-endangerment to USDWs throughout the delineated AoR, considering site-specific conditions, baseline conditions, AoR delineation modeling results, operational parameters, and the presence of artificial penetrations in the AoR. Monitoring wells should be located in the predicted direction of plume movement and in the vicinity of any known or potential fluid migration pathways for carbon dioxide or mobilized fluids. Also, the groundwater monitoring plan should include sampling and analysis for TDS or any contaminants of concern (e.g., mercury or hydrogen sulfide) that could be mobilized. Also confirm that samples will be taken at appropriate depths. In general, the EPA recommends that owners or operators sample in the first reasonably permeable formation above the confining zone (i.e., the first formation from which fluids can be extracted at appreciable volumes for sampling and analysis). Sampling in other zones, such as shallow USDWs used as drinking water sources, can help to demonstrate that USDWs are protected. If the applicant is requesting an injection depth waiver, confirm that the first USDW below the injection zone will be monitored.

Review the schematics of the monitoring wells to ensure that they are sited and constructed such that they will not corrode or provide a conduit for fluid movement that could endanger USDWs. It may be appropriate for those reviewing the injection well construction information to also evaluate the monitoring wells' construction to ensure that the monitoring well materials are suitable to the anticipated composition of the carbon dioxide and carbon dioxide-water mixtures. Ensure that the owner or operator has made arrangements to access the monitoring wells, particularly in cases where the project is anticipated to last for many years.

Because groundwater quality data will eventually support the demonstration of non-endangerment, consider whether the groundwater monitoring plan will collect a sufficient amount of data at/with appropriate locations, methods, frequencies, and parameters to inform the demonstration. If the applicant proposes an alternative PISC timeframe, consider whether the proposed groundwater monitoring frequency will ensure the collection of sufficient data to support the non-endangerment demonstration. To allow comparison of injection and post-injection phase water quality to baseline conditions, sampling and analysis methods and target parameters should be consistent with those used to collect baseline data, either submitted with the permit application or to be gathered during pre-operational testing (see Section 4.1.5). In addition to the direct groundwater sampling required by 40 CFR 146.90(d), indirect methods such as seismic surveys may also be used to monitor conditions above the confining zone.

**Review plans for tracking the extent of the carbon dioxide plume and pressure front.** Verify that plans for carbon dioxide plume and pressure front tracking include the use of both direct methods for tracking the pressure front within the injection zone [40 CFR 146.90(g)(1)] and indirect geophysical techniques to track the extent of the carbon dioxide plume unless, based on site-specific geology, such methods are not appropriate [40 CFR 146.90(g)(2)]. Where possible, a strategy consisting of both direct and indirect plume and pressure front tracking methods is recommended to facilitate comparisons with modeled predictions, allow early identification of unanticipated subsurface behavior or potential impacts to USDWs, and provide data to support a non-endangerment demonstration.

Direct carbon dioxide plume monitoring is performed via geochemical sampling in monitoring wells in the injection zone, while direct pressure front monitoring may be achieved using downhole pressure transducers. As with groundwater monitoring, direct plume and pressure front monitoring strategies should reflect site-specific characteristics and AoR delineation model

predictions. For example, the frequency and timing of sampling in the injection zone should be sufficient to capture the arrival of the plume at specified monitoring locations at the arrival times predicted by the model. Analytical parameters and methods used for injection zone fluid monitoring should be appropriate for the subsurface fluids described during site characterization. Indirect geophysical methods to monitor the plume and pressure front may include seismic, electrical, gravity, electromagnetic, or other techniques. If the applicant submits a plan that does not include indirect plume tracking methods, evaluate the site-specific geology to verify that such methods are not appropriate.

**Review plans for surface air and/or soil gas monitoring (if applicable).** The rule affords the UIC Program Director discretion at 40 CFR 146.90(h) to require surface air and/or soil gas monitoring to detect movement of fluid that could endanger USDWs within the AoR. The need for this monitoring may be informed by or considered to address uncertainties identified during the geologic characterization of the site, e.g., in areas where there may be potential for carbon dioxide movement to the surface. If surface air and/or soil gas monitoring is needed, the applicant may be able to demonstrate that monitoring employed under Subpart RR of 40 CFR Part 98 meets the requirements for the Class VI Testing and Monitoring Plan (additional information on Subpart RR monitoring is presented in Section 3.4).

**Review any additional monitoring proposed by the applicant.** Additional monitoring that an applicant may propose includes passive seismic monitoring, the use of tracers, or surface deformation measurement techniques (such as satellite-based elevation measurements or tiltmeters). If, based on site-specific conditions, additional monitoring is needed to sufficiently assess the behavior of the Class VI project, address uncertainties identified during site characterization, or protect USDWs from endangerment, request that the plan include appropriate additional monitoring using the authority provided at 40 CFR 146.90(i).

**Verify that the plan includes a QASP** that describes the standard procedures and practices that will be employed to ensure data quality for all testing and monitoring procedures. The QASP should describe sampling methods; sample handling and custody; analytical methods; quality control; instrument/equipment testing, inspection, and maintenance; data management, e.g., recordkeeping and tracking practices; and data review, verification, and validation procedures. The QASP does not need to re-state monitoring timing, frequency, location, analytes, etc. (except specifically in the context of quality assurance) or other information that is included in the Testing and Monitoring Plan. Verify that all of the testing activities, analytes, etc., included in the QASP are consistent with the body of the Testing and Monitoring Plan.

**Discuss whether any issues or changes identified by others on the permit application review team might necessitate changes to the Testing and Monitoring Plan.** Most significantly, the locations, frequencies, and analytical parameters tested pursuant to the Testing and Monitoring Plan should allow comparisons against baseline data and/or modeled predictions to support an evaluation of project operations, confirm modeled predictions of the carbon dioxide plume and pressure front movement, and contribute to AoR reevaluations and a non-endangerment demonstration. Therefore, the Testing and Monitoring Plan should be reviewed in conjunction with, and in consideration of, the AoR delineation modeling effort and associated reviews, e.g., a demonstration of an alternative PISC timeframe.

Additionally, changes to the well construction and operating conditions from those described in the initial permit application may have implications for corrosion testing, continuous monitoring,



BLF-000096

and mechanical integrity testing procedures. Concerns about seismicity or uncertainties about the seismic history of the site raised during site characterization may also necessitate the inclusion of passive seismic monitoring.

***Outcomes***

Following the evaluation and approval of the Testing and Monitoring Plan, the UIC Program should incorporate the following information into the permit file:

- Permit conditions for testing and monitoring and MITs;
- The approved Testing and Monitoring Plan as an enforceable condition of the permit;
- An approved QASP that addresses all activities in the Testing and Monitoring Plan;
- Approved plans for construction of all monitoring wells; and
- A report documenting the review of the Testing and Monitoring Plan, including how the approved plan addresses any identified deficiencies in the proposed plan or uncertainties about the site, supports AoR reevaluations and the non-endangerment demonstration, and considers what is known about site geology and the behavior of the carbon dioxide plume and pressure front.

Any supporting documents (e.g., the Testing and Monitoring Plan, the QASP, and any reports documenting the review) should be uploaded to the project's permit package area in the GSDT.

### *4.1.8 Injection Well Plugging*

Class VI permit applicants must submit a plan to plug the injection well in a manner that protects USDWs [40 CFR 146.82(a)(16); 146.92].

The purpose of the UIC Program's evaluation of the proposed Injection Well Plugging Plan is to ensure that the proposed materials and procedures for injection well plugging are appropriate to the well's approved construction and the site's geology and geochemistry. This evaluation is important to ensure that the injection well will not serve as a conduit for fluid movement that could endanger USDWs following cessation of injection.

***Completeness Review***

The draft Injection Well Plugging Plan will likely be a narrative document with associated schematics that describes how the applicant will plug the injection well in accordance with the requirements at 40 CFR 146.92.

The UIC Program should perform a preliminary review of the draft Injection Well Plugging Plan to verify that it provides information at a sufficient level of detail to inform an evaluation. For example, the plan should describe the plugs and the cement to be used and demonstrate that they are compatible with the injectate, formation fluid geochemistry, and subsurface geology. Plugging schematics should identify the depths of the injection zone, any production zones, any formations with USDWs, and other water-bearing formations. The method of plug placement and preliminary cement volume calculations should also be included. If any information is missing or is not presented in sufficient detail to inform an evaluation of the Injection Well Plugging Plan, the UIC Program should consider the need to request the missing information or send the applicant clarifying questions to inform the review.



BLF-000097

***Evaluation***

The bolded text below outlines a suggested approach that a UIC Program might employ to evaluate the proposed Injection Well Plugging Plan, submitted by a Class VI permit applicant, to confirm that the submittal meets the requirements of the Class VI Rule and informs the establishment of protective permit conditions.

**Confirm that the proposed Injection Well Plugging Plan meets the requirements at 40 CFR 146.92.** The review should be done in coordination with reviewing the well's construction and schematics.

Verify that the proposed plugs and cement are suitable to the injectate and formation fluid geochemistry, including any geochemical changes anticipated during the injection phase as informed by an evaluation of geochemistry. Also verify that the plugging is appropriate to the planned construction of the well, e.g., to the sizes and depths of the various casing strings.

Review the Injection Well Plugging Plan against data on subsurface formations to verify that the placement of the plugs and cement are at appropriate depths. Consider the depths of the injection zone, any production zones, any formations with USDWs and other water-bearing formations, or other geologic features.

Review the cement calculations to confirm that the planned cement is sufficient to cover all relevant hydrocarbon- or water-bearing formations. Check that the plug placement procedures are adequate to properly clean the well bore, prevent contamination of the plugging fluid, allow proper fluid stability, and allow for sufficient setting time.

While not required under the Class VI Rule, evaluating monitoring well plugging procedures in conjunction with the same considerations for the review of the Injection Well Plugging Plan will help ensure that the monitoring wells will be plugged in a manner that is appropriate to the subsurface geochemical conditions of the Class VI project and ensure USDW protection.

**Conversion of the Class VI Well Following Injection**

If the applicant intends to convert the injection well to use it for another purpose following cessation of Class VI injection (e.g., to another UIC well class or a monitoring or production well), it may be appropriate to address this in the Injection Well Plugging Plan. For example, if the well will be used for injection into another, shallower formation, such as for enhanced oil or gas recovery (EOR/EGR), the Injection Well Plugging Plan should describe how the well would be plugged from the carbon dioxide injection zone to the hydrocarbon-bearing formation in a way that ensures proper cementing across any intervening porous or water-bearing formations. The plan should also describe procedures for plugging the well to the surface to address the possibility that the planned EOR/EGR operation does not commence or the applicant experiences financial difficulties and is unable to continue the injection operation (in this event, sufficient financial resources would be needed to plug the well, and the financial responsibility cost estimates for well plugging to the surface must be adequate). If the applicant plans to convert the injection well to a monitoring or production well, the Injection Well Plugging Plan should describe how this conversion would be implemented, including flushing the well and removing or changing equipment; procedures for eventual plugging per 40 CFR 146.92 must also be described in the Injection Well Plugging Plan.

**Before approving the final Injection Well Plugging Plan, consult with other members of the permit application review team** to determine whether any questions identified in the course of other aspects of the permit application review may necessitate a revision to the plan. In particular, verify that the final Injection Well Plugging Plan is consistent with the well's approved construction. Additionally, any revised information about the site's geology (e.g., the

depth of subsurface water- and hydrocarbon-bearing formations) and changes to, or uncertainties about, the predicted composition of carbon dioxide-water mixtures may affect the appropriateness of well plugging procedures.

If the applicant is requesting an injection depth waiver, confirm that the proposed well plugging will protect USDWs above and below the injection zone. If any aspects of the proposed Injection Well Plugging Plan change based on the review, alert the staff reviewing the financial responsibility cost estimates that the estimates to plug the well may need to be revised.

For additional information on evaluating Injection Well Plugging Plans, see the *UIC Program Class VI Well Project Plan Development Guidance*. See Section 2 of the *UIC Program Class VI Well Plugging, Post-Injection Site Care, and Site Closure Guidance* for additional information on Class VI injection well plugging procedures.

***Outcomes***

Following the review and approval of the Injection Well Plugging Plan, the UIC Program should develop and upload the following to the project's permit package area in the GSDT:

- Permit conditions for injection well plugging and requirements for advance notice of, and reporting following, plugging the injection well;
- The approved Injection Well Plugging Plan as an enforceable condition of the permit; and
- A report documenting the review of the Injection Well Plugging Plan that describes any deficiencies identified, issues raised and discussed with the applicant, and how the final plan addresses these issues.

### *4.1.9 Post-Injection Site Care and Site Closure*

Class VI permit applicants must submit a PISC and Site Closure Plan that outlines the proposed post-injection monitoring strategies and how non-endangerment of USDWs will be ensured throughout the PISC phase [40 CFR 146.82(a)(17); 146.93]. The applicant may also submit a demonstration of an alternative post-injection site care timeframe per 40 CFR 146.82(a)(18).

The purpose of the UIC Program's review of the PISC and Site Closure Plan is to ensure that planned post-injection phase activities are appropriate to the project and address known uncertainties or data gaps. If the applicant submitted a demonstration of an alternative PISC timeframe, the UIC Program should evaluate the demonstration to ensure that it is suitable to the site-specific conditions, of an appropriate duration, and informed by modeling predictions.

The UIC Program can also use the review as an opportunity to ensure, in coordination with the owner or operator, that the PISC and Site Closure Plan includes appropriate monitoring to validate modeled predictions, inform AoR reevaluations during the post-injection phase, and demonstrate non-endangerment. For additional information on evaluating the PISC and Site Closure Plan, see the *UIC Program Class VI Well Project Plan Development Guidance*.

***Completeness Review***

The draft PISC and Site Closure Plan should be a narrative document that describes how the applicant will meet the requirements at 40 CFR 146.93, including performing post-injection groundwater monitoring and plume and pressure front tracking, plugging the monitoring wells, and closing the site. It should be supported by maps and cross sections depicting the plume and


BLF-000099

pressure front and schematics showing how the monitoring wells will be plugged. The applicant should also submit a QASP or otherwise provide QA procedures for post-injection phase testing and monitoring; for example, by incorporating the necessary information about post-injection monitoring into the Testing and Monitoring Plan's QASP.

If the applicant submits a demonstration of an alternative PISC timeframe as part of the permit application, the UIC Program should verify that it includes the specific technical information required to support an alternative PISC timeframe demonstration at 40 CFR 146.93(c). This may include a combination of new files and references to other components of the permit application, as applicable and appropriate.

Additionally, the UIC Program should perform a preliminary review of the draft PISC and Site Closure Plan to verify that it provides information at a sufficient level of detail to inform an evaluation. For example, the plan should describe the methods the applicant will use to perform all required post-injection testing and monitoring, a schedule for performing all planned testing, analytes/detection limits, and locations that are representative of the entire delineated AoR. The plan should also describe how monitoring wells will be plugged, and include schematics and a description of plugging and cementing procedures. If any information is missing or is not presented in sufficient detail to inform an evaluation of the PISC and Site Closure Plan, consider the need to request the missing information or send the applicant clarifying questions about the plan.

***Evaluation***

The bolded text below outlines a suggested approach that a UIC Program might employ to evaluate a Class VI permit applicant's proposed PISC and Site Closure Plan, to confirm that the submitted information meets the requirements of the Class VI Rule and informs the establishment of protective permit conditions.

**Verify that the predictions of pressure decline and fluid movement in the PISC and Site Closure Plan are consistent with AoR delineation modeling,** reflecting site characterization and proposed operating data. The Class VI Rule requires that the plan describe the pre- and post-injection pressure differential and the predicted position of the carbon dioxide plume and associated pressure front at site closure [40 CFR 146.93(a)(2)(i),(ii)]. Verify that this information is incorporated into the plan and that it is consistent with the outputs of the modeling performed for AoR delineation as verified by those reviewing the AoR information.

**Reducing Monitoring Frequency during PISC**

It is possible that, as pressures decline and the plume and pressure front begin to equilibrate and plume movement slows, less frequent monitoring may be needed. If any decreases in monitoring frequency are proposed, it may be appropriate for the PISC and Site Closure Plan to identify specific quantitative triggers that would result in decreased monitoring activities or frequency. For example, the plan may specify that the frequency of certain monitoring activities could decrease from monthly to semi-annually when pressure (as measured at a certain location) returns to a certain percent above baseline levels. Providing this level of specificity would allow the applicant to reduce the monitoring frequency without needing to amend the plan (and possibly modify the permit). If such triggers are specified, baseline measurements should be taken as part of the pre-operational testing procedures.

**Review the applicant's plans for post-injection monitoring.** The Class VI Rule does not specify monitoring methods that must be used during the post-injection phase; instead, the monitoring program should be tailored to the project-specific characteristics, identified risks, and data needs for the non-endangerment demonstration. The EPA anticipates that, in many cases, post-injection monitoring activities will be an extension of

those performed during the injection phase (and described in the Testing and Monitoring Plan). Although, the agency acknowledges that the Class VI regulations are designed to accommodate new technologies or site-specific monitoring changes (e.g., frequency) on a project-specific basis. (See Section 4.1.7 for additional information on evaluating testing and monitoring strategies for Class VI projects.) Verify that the post-injection monitoring strategy is suitable to track the location of carbon dioxide and other mobilized constituents within the injection zone, track fluid pressures, and monitor the integrity of monitoring wells and former injection wells. As with injection phase monitoring, this monitoring should target any areas of potential USDW endangerment identified in the site characterization process and reflect any contaminants of concern that may be mobilized as a result of geochemical changes. If surface air and/or soil gas monitoring or passive seismic monitoring will be required during the injection phase, consider whether this should continue during part or all of the post-injection monitoring phase.

Verify that the proposed injection and post-injection phase testing and monitoring programs will, as an overall strategy, generate a sufficient amount of data to support AoR reevaluations and a non-endangerment demonstration. This is particularly important if the applicant submits a demonstration of an alternative PISC timeframe. If the applicant plans to request an alternative PISC timeframe, ensure that they understand that the PISC and Site Closure Plan will need to include the collection of a sufficient amount of monitoring data on which to base a non-endangerment demonstration. Because there will be fewer years over which to collect data, more frequent groundwater monitoring or plume and pressure front tracking may be appropriate to ensure collection of sufficient data to validate modeled predictions of pressure decline and reductions in the rate of plume movement. For example, verify that a sufficient number of monitoring samples will be taken at appropriate locations and the number of geophysical surveys will generate a sufficient amount of data on which to base a non-endangerment demonstration. Verify that the QASP addresses all post-injection testing and monitoring activities.

**Review the alternative PISC timeframe demonstration if the applicant submits one.** Evaluate the information provided to ensure that an alternative timeframe would be protective of USDWs, according to the requirements at 40 CFR 146.93(c). Verify that the demonstration agrees with predictions of plume and pressure front movement in the AoR delineation model. However, note that 40 CFR 146.93(c)(2) contains additional requirements for alternative PISC timeframe demonstrations that are not specified for AoR delineations, such as the use of sensitivity analyses to address key areas of uncertainty. Also verify that the geologic data on which the demonstration is based agree with the site characterization component of the permit application, the planned operating data, the physical and chemical characteristics of the carbon dioxide stream, and predicted interactions between carbon dioxide and formation fluids.

**Plans for Carbon Dioxide Production and the PISC Timeframe**

If the applicant plans to eventually produce the carbon dioxide from the formation, they may base a demonstration that an alternative PISC timeframe is appropriate on subsurface pressure reductions associated with withdrawal of the carbon dioxide. Such a demonstration would be acceptable; however, PISC will need to continue until the carbon dioxide is withdrawn and reductions in pressures and the rate of plume movement are observed.

If the alternative PISC timeframe demonstration is not sufficient, does not meet the requirements and criteria at 40 CFR 146.93(c), or the modeling effort does not appropriately address uncertainty, discuss these findings with the permit applicant. Options may include:

- Discussing the information submitted and revising the alternative PISC timeframe demonstration during the pre-construction phase; or
- Using the 50-year default PISC timeframe and relying on operational and monitoring data generated during the injection or post-injection phases to support a stronger demonstration, at a later time, that an alternative timeframe is appropriate. A future change to the PISC timeframe may necessitate an amendment to the PISC and Site Closure Plan.

For additional information on the alternative post-injection site care timeframe, see Section 3.2.2 of the *UIC Program Class VI Well Plugging, Post-Injection Site Care, and Site Closure Guidance*.

**Encourage the applicant to submit proposed non-endangerment demonstration criteria.** While there are no requirements for providing the criteria for the non-endangerment demonstration with the permit application, describing and agreeing upon the criteria that will be used for the non-endangerment demonstration reduces future uncertainty. This can also help ensure that the operator plans to collect the types and amounts of data that are needed to inform a demonstration that site closure is appropriate (per 40 CFR 146.93(b)(3)), particularly if an alternative PISC timeframe is anticipated.

The Class VI Rule does not specify the content of the non-endangerment demonstration. However, the EPA recommends that the non-endangerment demonstration address: available groundwater and plume monitoring data; comparison of monitoring data to model predictions; evaluation of the carbon dioxide plume and reservoir pressure; and an evaluation of any unanticipated events that occurred during the project. See Section 3.4 of the *UIC Program Class VI Well Plugging, Post-Injection Site Care, and Site Closure Guidance* for additional information on non-endangerment demonstrations.

In coordination with the applicant, identify specific criteria on which the non-endangerment demonstration would be made and ensure that the criteria can be supported by the data the applicant proposes to collect during injection and post-injection testing and monitoring. For example, verify that the monitoring data will be able to be compared with baseline data on fluid chemistry collected during the site characterization process and validate modeled predictions of plume and pressure front behavior. Consider specifying these criteria—and what will happen if a demonstration of non-endangerment cannot be made—in the PISC and Site Closure Plan. Additionally, ensure that baseline data have been, or will be, collected prior to commencing injection.

**Review plans for monitoring well plugging and site closure.** Confirm that the applicant proposes to use proper plugs and cement in all monitoring wells and that they are of suitable construction and at appropriate depths. As with injection well plugging, the monitoring well plugging plans should consider the depth of water and hydrocarbon-bearing formations, subsurface geochemistry, and the predicted composition of carbon dioxide-water mixtures. Review the schematics of the monitoring wells' construction and plugging concurrently to ensure consistency.

Confirm that the plan describes site closure and site restoration activities. These may include removing all surface equipment and restoring the site to its prior condition (e.g., planting vegetation).

**Before approving the final PISC and Site Closure Plan, discuss the plan with other members of the permit application review team** to determine whether any issues identified in the course of the permit application review may necessitate changes to the plan. For example, changes to operating procedures or updated geologic information may affect predictions of pressure decline and the position of the plume. Additionally, the non-endangerment demonstration criteria or evaluation of a demonstration of an alternative PISC timeframe should reflect any changes to the evaluation of site geology and the findings of the AoR delineation modeling, account for the approved operating conditions, and reflect data to be gathered during injection and post-injection phase testing and monitoring. Monitoring well plugging procedures should reflect any revised information about the site's geology and predictions about the composition of carbon dioxide-water mixtures.

As with injection-phase testing and monitoring, ensure that the proposed post-injection monitoring program will detect any triggers for responses specified in the Emergency and Remedial Response Plan.

If any aspects of the PISC and Site Closure Plan change based on the review, alert the staff reviewing the financial responsibility cost estimates that the estimates for PISC and/or site closure may need to be revised.

***Outcomes***

Following the review and approval of the PISC and Site Closure Plan and related information, the UIC Program should develop the following information:

- Permit conditions for PISC and site closure;
- The approved PISC and Site Closure Plan as an enforceable condition of the permit;
- An approved QASP for all post-injection testing and monitoring activities;
- A report documenting the review of the PISC and Site Closure Plan that summarizes the review process and how the approved plan addresses any uncertainties about the site and ensures non-endangerment of USDWs; and
- A report that documents the alternative post-injection site care timeframe review, including how the information provided meets the criteria at 40 CFR 146.93(c)(1) and (2) and supports the determination that an alternative post-injection site care timeframe is appropriate.

Any supporting documents (e.g., the final PISC and Site Closure Plan) should be uploaded to the project's permit package area in the GSDT.

### *4.1.10 Emergency and Remedial Response*

The Class VI Rule requires owners or operators to develop and maintain an Emergency and Remedial Response Plan that describes actions to be taken to address events that could potentially cause endangerment to a USDW during the construction, operation, and PISC phases of a project [40 CFR 146.82(a)(19); 146.94].

The purpose of the UIC Program's evaluation of the Emergency and Remedial Response Plan is to ensure expeditious and appropriate responses to protect USDWs from endangerment should an emergency event occur. The UIC Program should ensure that procedures are in place to address

the potential endangerment to all identified resources near the well, based on site-specific information including site geology, the extent of the AoR, and operating conditions.

***Completeness Review***

The draft Emergency and Remedial Response Plan should be a narrative document supported by maps and images that describes how the permit applicant will meet the requirements at 40 CFR 146.94, including how they plan to address any potential emergency or unforeseen event at the well and all resources within the AoR.

The UIC Program should perform a preliminary review of the draft Emergency and Remedial Response Plan to verify that it provides information at a sufficient level of detail to inform an evaluation. For example, the plan should describe all potentially impacted resources throughout the geographic extent of the AoR and include detailed and event-specific procedures to address emergency events. It should also identify response personnel and include a plan to communicate with the public. If any information is missing or is not presented in sufficient detail to inform an evaluation of the Emergency and Remedial Response Plan, the UIC Program should consider the need to request the missing information or send the applicant clarifying questions about the plan.

***Evaluation***

The bolded text below outlines a suggested approach that a UIC Program might employ to evaluate a Class VI permit applicant's proposed Emergency and Remedial Response Plan to confirm that the submittal meets the requirements of the Class VI Rule and informs the establishment of protective permit conditions.

**Review the proposed Emergency and Remedial Response Plan to ensure that it meets the requirements at 40 CFR 146.94,** it accounts for all risks identified within the AoR, and that planned responses will be adequate for mitigating any adverse events that may arise. Some considerations include the following:

- Confirm that, for all resources throughout the approved AoR, the Emergency and Remedial Response Plan identifies potential risk scenarios and adverse events. Special consideration should be given to events with the highest potential of occurring or that may have the highest impacts.
- Verify that planned response activities are appropriate to the risk scenarios and their potential impacts. While the specific details of response planning are not included in the Class VI Rule, the EPA recommends that, for each scenario identified, the plan describe: the anticipated severity of the event, the phase during which the event could occur (i.e., injection and/or post-injection phases), proposed avoidance measures, detection methods, and response actions, including the personnel and equipment that would be employed.
- Confirm that response equipment and trained personnel are available to respond to adverse events. The plan should include contact information for response personnel, a communications plan, and a description of staff training and exercise procedures.

For additional information on evaluating Emergency and Remedial Response Plans, see the *UIC Program Class VI Well Project Plan Development Guidance*.



BLF-000104

**Before approving the final Emergency and Remedial Response Plan, discuss whether any issues identified by others on the permit application review team may necessitate a revision to the plan.** For example, changes reflected in the final approved extent of the AoR may impact what resources should be addressed in the Emergency and Remedial Response Plan. Any uncertainties or new information about the site's geology may necessitate consideration of additional carbon dioxide migration or groundwater contamination scenarios. Concerns about seismic history, the presence of faults in the AoR, or induced seismicity may impact the final procedures for responding to seismic activity. See Section 4.1.11 for additional information on emergency and remedial response planning for projects operating under injection depth waivers.

Confirm that the Testing and Monitoring and PISC and Site Closure plans include procedures for quickly detecting situations that may endanger USDWs, particularly where there is uncertainty about any aspects of the project. Communicate any changes to the final Emergency and Remedial Response Plan to staff reviewing financial responsibility cost estimates to ensure that sufficient resources are set aside for emergency actions.

***Outcomes***

Following review and approval of the Emergency and Remedial Response Plan, the UIC Program should develop the following information for inclusion in the permit file:

- Permit conditions for emergency and remedial response;
- The approved Emergency and Remedial Response Plan as an enforceable condition of the permit; and
- A report documenting the review of the Emergency and Remedial Response Plan that describes any deficiencies identified, issues raised and discussed with the applicant, and how the final plan addresses these issues.

Any supporting documents (e.g., the Emergency and Remedial Response Plan and any reports documenting the review) should be uploaded to the project's permit package area in the GSDT.

### *4.1.11 Injection Depth Waivers*

Class VI permit applicants seeking to inject above the lowermost USDW must submit a request for an injection depth waiver [40 CFR 146.82(d); 146.95(a)]. The injection depth waiver provisions of the Class VI Rule afford flexibility to allow injection into non-USDW formations while ensuring that USDWs above and below the injection zone are protected from endangerment where the lowermost USDW is very deep.

Figure 4-3 illustrates the type of geologic setting under which injection depth waivers would be necessary. The panel on the left presents a "typical" Class VI injection scenario (i.e., where an injection depth waiver would not be needed) and the panel on the right shows injection into a non-USDW that lies above the lowermost USDW, where an injection depth waiver could be needed to allow injection at that site.

The purpose of the UIC Program's evaluation of an injection depth waiver application is to ensure that USDWs above and below the injection zone are protected from endangerment if the project operates under an injection depth waiver. The UIC Program should work with the owner or operator to consider, on a site-specific basis, the implications, benefits, and challenges associated with GS, water availability, and USDW protection where an injection depth waiver is



BLF-000105

being considered. Following the review, the UIC Program Director will forward information to the EPA Regional Administrator, who must concur on the issuance of an injection depth waiver [40 CFR 146.95(d)].

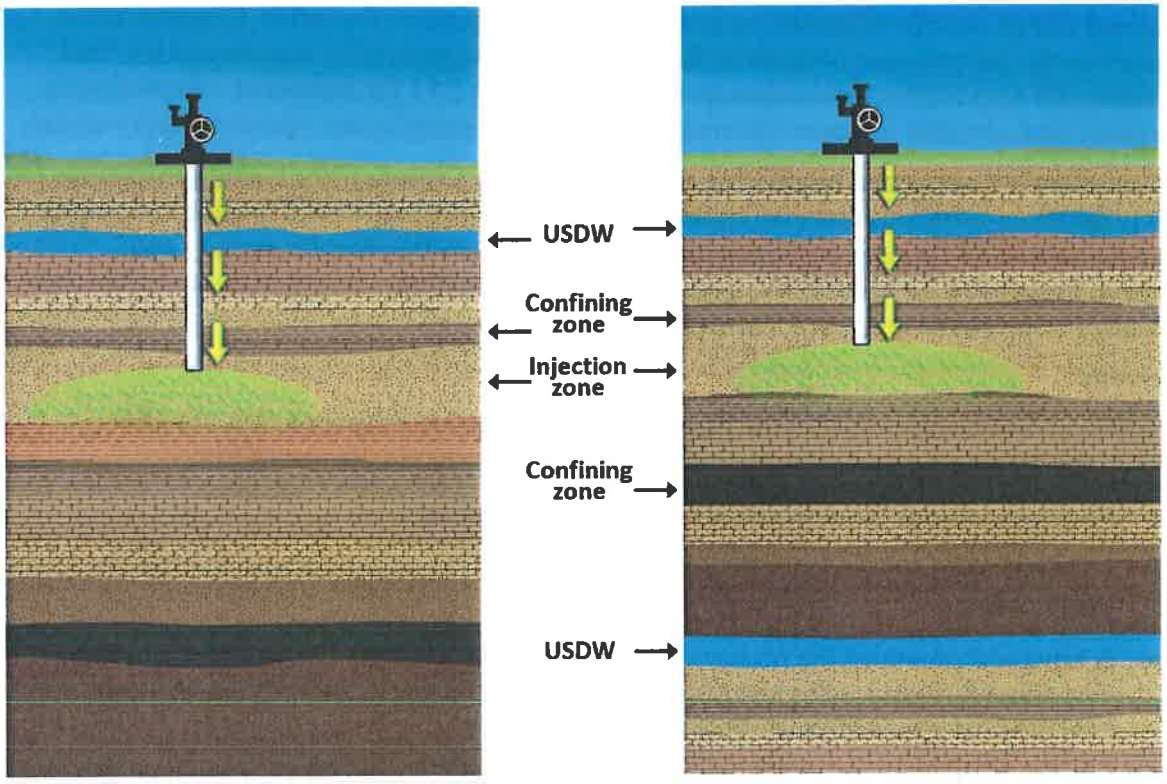



**Figure 4-3: Geologic Scenarios for Injection Depth Waivers**

### *Completeness Review*

Class VI permit applicants seeking an injection depth waiver will likely submit a narrative report that addresses each element at 40 CFR 146.95. The report should include information on the upper and lower confining zones; the storage capacity of the injection zone; information on drinking water resources and water supply needs and plans for securing alternative water resources or treating USDWs; and hydrocarbon or mineral resource exploitation. The waiver application should be supported by maps, logs, model outputs, and other relevant data.

The injection depth wavier application is a separate submittal from the Class VI permit application. Because the permit application and the waiver application report serve different purposes, the applicant must, per 40 CFR 146.95(a), include a demonstration in the injection depth waiver application that is complete and provides the appropriate context (i.e., describes confinement above and below the injection zone). However, the waiver application report may

reference background information in the permit application, provided it is readily available to the reviewer and its relevance to the injection depth waiver is clearly explained in the waiver application report.

The UIC Program should perform a preliminary review to verify that the waiver application includes all of the information required at 40 CFR 146.95(a) and that it is based on the site-specific geology, modeling, and operational data described in the Class VI permit application, with information and data about the lower confining zone at the same level of detail as information in the Class VI permit application. If information provided in the waiver application about the injection zone, the modeled AoR, planned construction, or planned testing and monitoring does not agree with the Class VI permit application, the UIC Program should discuss any discrepancies with the applicant and consider requesting that the waiver application and/or the permit application be revised accordingly.

***Evaluation***

The review of the injection depth waiver application should parallel the review of the Class VI permit application. However, where injection depth waivers are sought, this information will be evaluated in the context of protecting USDWs above *and* below the injection zone.

In addition to evaluating the injection depth waiver application, permitting authorities must consult with the Directors of the PWSS Programs of all states, territories, and tribes, having jurisdiction within the AoR, about the proposed waiver; notify the public; and forward the injection depth waiver application to the EPA Regional Administrator for approval, per 40 CFR 146.95(b) and (c) and as described below.

The bolded text below outlines a suggested approach that a UIC Program might employ to evaluate a Class VI injection depth waiver application, to confirm that an applicant's submittal meets the requirements of the Class VI Rule and to inform: a decision on whether to grant an injection depth waiver, and the establishment of permit conditions that protect USDWs above and below the injection zone.

**Review the injection depth waiver application.** The elements defined at 40 CFR 146.95(b)(1) that the UIC Program Director must document in referring the injection depth waiver to the EPA Regional Administrator are described below. A list of websites and databases that could support the review of information required at 40 CFR 146.95 (b) and (c) is available in the resource library of the GSDT.

- **Review information on the integrity of the upper and lower confining zones** [40 CFR 146.95(b)(1)(i)]. Review the geologic maps, geophysical survey results, geomechanical data (including information on faults and fractures), and permeability and porosity data that were submitted to confirm the presence of laterally continuous, impermeable confining units above and below the injection zone. Verify that adequate data have been submitted, including appropriate data collection/testing methods, number of samples, etc., to characterize confining zones above and below the injection zone.
- **Evaluate the suitability of the injection zone** [40 CFR 146.95(b)(1)(ii)]. Consider whether the injection zone outcrops within the AoR or is hydraulically connected to a USDW above or below the injection zone that could be impacted by the injection. Verify that the injection zone is laterally continuous based on maps, cross sections, and geophysical survey results, and whether confining units above and below it form a clear


BLF-000107

separation between the injection zone and any other formations. Evaluate whether porosity and permeability data support a determination that the injection zone will be suitable for the proposed injection activities and will not allow for unacceptable pressure buildup. Review analyses of formation solids and fluid geochemistry to verify that dissolution or precipitation reactions will not affect injectivity or liberate contaminants.

- **Evaluate the capacity of the geologic formation to sequester carbon dioxide,** considering information submitted on the availability of alternative sites, including their capacity, depth, and location [40 CFR 146.95(b)(1)(iii)]. Review the information submitted by the applicant to ensure that it is consistent with other information about the proposed site provided elsewhere in the injection depth waiver application and in the Class VI permit application, including storage capacity estimates as confirmed by the independent AoR delineation modeling. (The applicant's modeling must also demonstrate that USDWs above and below the injection zone will not be endangered as a result of fluid movement, per 40 CFR 146.95(a)(3).) If alternative injection zones below the lowermost USDW exist, discuss with the applicant whether such formations are more suitable than injection zones above or between USDWs. See Section 4.1.1 for additional information on evaluating confining zone integrity, the suitability of the injection and confining zones, and storage capacity estimates.
- **Verify that the applicant's proposed Emergency and Remedial Response Plan addresses all risks** in the AoR, including any endangerment to USDWs below the injection zone. Also, **review the financial responsibility demonstration** to ensure that the applicant has sufficient resources to respond to potential endangerment to USDWs below the injection zone, including the cost of securing alternative water resources or treating USDWs in the event of contamination [40 CFR 146.95(b)(1)(iv)]. This evaluation should consider the applicant's description of how the Testing and Monitoring Plan and other plans will ensure protection of USDWs above and below the injection zone.
- **Evaluate information regarding community needs, demands, and supply from drinking water resources** and planned needs, and potential and/or future use of USDWs and non-USDWs in the area [40 CFR 146.95(b)(1)(v),(vi),(vii)]. Confirm that the applicant provided information on all drinking water supplies within the AoR. Verify that projections of future uses of USDWs and non-USDWs consider anticipated land use changes over the duration of the Class VI project and that the information provided is consistent with other geologic data presented in the injection depth waiver application and the Class VI permit application. Note that some information that could support an evaluation of water resources (e.g., related to public or private drinking water wells) may not be publicly available for the applicant to access; if so, consider whether UIC Program staff should request this information from the appropriate agency as part of the waiver evaluation.
- **Evaluate information submitted related to any planned or potential hydrocarbon or mineral resource exploitation** near the proposed site [40 CFR 146.95(b)(1)(vii)] to determine if there are any plans to drill through the formation to access resources above or beneath the proposed injection zone(s). Consider mineral rights leases in formations above and below the injection zone, information on current (and potential future) resource exploitation, and whether such activities could provide potential conduits for fluid migration to USDWs.



BLF-000108

- **Evaluate the applicant's proposed plan for securing alternative water resources or treating USDWs** in the event of contamination [40 CFR 146.95(b)(1)(viii)]. Verify that the submitted plans for obtaining alternative drinking water resources are technologically and economically feasible and include adequate quantities of water to address current and projected needs. These plans should be reflected in the Emergency and Remedial Response Plan.

**Review the construction plans for the well to confirm that it will be protective of USDWs above and below the injection zone,** as required at 40 CFR 146.95(f)(2). Confirm that the casing and cement are designed to prevent movement of fluid into unauthorized zones, including USDWs, above and below the injection zone [40 CFR 146.95(f)(2)(ii)]. Verify that any penetrations through the upper or lower confining zone will be plugged or cased and cemented with materials that are compatible with injected and native fluids. Also confirm that the surface casing will extend below any USDWs that lie above the injection zone and be cemented to the surface [40 CFR 146.95(f)(2)(iii)]. See Section 4.1.4 above for additional information on reviewing the construction of Class VI wells.

If the information presented in the waiver application supports a determination that operating under an injection depth waiver will be protective of USDWs above and below the injection zone, initiate consultations and notifications as described below. If there is inadequate information in the application, work with the applicant to determine whether additional information can be provided or to identify other suitable injection zones.

**Consult with the Directors of the PWSS Programs** of all states, territories, and tribes having jurisdiction within the AoR of a well for which an injection depth waiver is sought per 40 CFR 146.95(b)(2). The purpose of this communication is to ensure that water system interests are considered in a waiver application review. While there is no required format or process for the consultation, a recommended template of a letter to a PWSS Director is available in the resource library of the GSDT. Respond to any questions from the PWSS Directors about the project. These questions may cover topics such as: how potential contamination has been considered and expeditious responses will be ensured, the relationship of the injection well to all public water systems and USDWs, or the composition or volumes of carbon dioxide to be injected. Document the results of the consultation.

**Notify the public that an injection depth waiver application has been submitted** per 40 CFR 146.95(c). The public notification of the injection depth waiver can occur concurrently with notification of the Class VI permit application; however, the notice should make it clear that the site, if permitted, would be operating under an injection depth waiver. Include information on the depth of the injection zone; the location of the well; the name and depth of all USDWs; a map of the AoR; the names of any public water supplies affected, reasonably likely to be affected, or served by USDWs in the AoR; and the results of the consultation with the PWSS Director(s). Evaluate and respond to all public comments about the injection depth waiver.

**Provide all relevant information to the EPA Regional Administrator** for concurrence regarding the injection depth waiver. Provide the results of the evaluation of the information listed in 40 CFR 146.95(b)(1), documentation of the PWSS Director consultation, and responses to public comments on the proposed waiver. The EPA Regional Administrator will review all of the information about the project collected during the waiver application and the public notice process and make a final decision regarding the waiver [40 CFR 146.95(d)].

If necessary to support a determination regarding the protectiveness of injection above or between USDWs, the EPA Regional Administrator has the authority to request that additional

information be provided [40 CFR 146.95(d)(1)]. If the EPA Regional Administrator requests additional information, ask the permit applicant for more details. If substantially more or different information is provided and the EPA Regional Administrator requests re-initiation of the public notice process, notify the public of the revised waiver application.

Based on the information provided, the EPA Regional Administrator will provide written concurrence or non-concurrence regarding the waiver. Four outcomes of the review of the injection depth waiver application are possible:

1. If the EPA Regional Administrator concurs with the waiver (and all other aspects of the permit application are acceptable), prepare a draft Class VI permit that identifies the proposed injection zone and includes additional permit conditions for projects operating under injection depth waivers related to well construction and testing and monitoring (see the "outcomes" discussion below for additional information).
2. If the application for a waiver is acceptable in most respects, e.g., the site is generally suitable, but there are deficiencies in the waiver application report (e.g., insufficient data or detail are present to support a determination), work with the applicant to determine whether the waiver application can be updated and resubmitted for approval. Discuss the specific information needs with the owner or operator to determine whether the waiver application can be updated (and, if so, which portions require revision). Re-initiation of the public notification process may be necessary, as determined by the EPA Regional Administrator.
3. If available information indicates that another suitable injection formation exists, the owner or operator may apply for a Class VI permit to inject into that formation. In such cases, the owner or operator would need to resubmit a Class VI permit application, providing specific information about the alternate formation.
4. If an injection depth waiver application is denied because, based on the review, injection above or between USDWs would endanger USDWs and there is no suitable target injection formation for which a waiver would not be required or other injection options exist, then a Class VI permit cannot be issued at the proposed site.

An injection depth waiver may not be issued without written concurrence by the EPA Regional Administrator [40 CFR 146.95(d)(2)].

***Outcomes***

Following the evaluation of the injection depth waiver application, the UIC Program should develop the following information:

- Permit conditions related to operation under the injection depth waiver, such as:
    - Conditions for designing the casing and cement to prevent fluid movement into unauthorized zones, including USDWs, above and below the injection zone [40 CFR 146.95(f)(2)(ii)], including surface casing that extends through the base of the lowest USDW above the injection zone and is cemented to the surface [40 CFR 146.95(f)(2)(iii)];
    - Conditions for additional direct monitoring during the injection and post-injection phases in the first USDW above and the first USDW below the injection formation [40 CFR 146.95(f)(3)(i); 146.95(f)(4)(i)];

- Conditions for additional indirect monitoring during the injection and post-injection phases unless, based on site-specific geology, such methods are not appropriate for the specific site [40 CFR 146.95(f)(3)(ii); 146.95(f)(4)(ii)]; and
- Other conditions that may be necessary, based on site-specific geology, to ensure protection of USDWs above and below the injection zones [40 CFR 146.95(f)(5)], which may include:
  - Injection pressure limits that address the fracture pressures of the confining zones above and below the injection zone;
  - Additional monitoring that may be necessary to identify endangerment of USDWs;
  - Injection well plugging conditions that are necessary to protect USDWs above and below the injection zone; or
  - Emergency and remedial response considerations for impacts on public water supplies affected, likely to be affected, or served by USDWs in the AoR and plans for securing alternative resources or treating USDWs in the event of contamination.

- A report documenting the evaluation of the injection depth waiver application that describes any identified deficiencies or concerns with the waiver application, how uncertainties are being addressed, and a determination that the site is suitable for operating under an injection depth waiver;
- Documentation of consultation with applicable PWSS Director(s), including a copy of the letter and/or other materials sent to the PWSS Director and any information related to the waiver submitted by the PWSS Director(s);
- Information related to public notice of the waiver application, including a copy of the public notice, a record of any public comments received, and the responses to those comments; and
- Information related to documenting the EPA Regional Administrator's evaluation, including copies of all materials submitted to the EPA Regional Administrator and a copy of the EPA Regional Administrator's concurrence with issuance of the waiver.

Any supporting documents or materials related to the injection depth waiver review and any reports documenting the review should be uploaded to the project's permit package area in the GSDT.

### *4.1.12 Aquifer Exemption Expansions*

Class II well owners or operators injecting into an exempted aquifer who have made a decision to transition from Class II to Class VI and anticipate that the carbon dioxide plume and pressure front will expand beyond the area covered by an existing Class II aquifer exemption will need to apply to expand the areal extent of the aquifer exemption. The aquifer exemption requirements in the Class VI Rule afford Class VI permit applicants an opportunity to assess and select a suitable GS site in areas where oil and gas recovery has occurred while also protecting USDWs (i.e., formations/aquifers afforded SDWA protection). By regulation, expansions of the areal extent of

aquifer exemptions are only available and can only be granted to owners or operators of Class II wells with existing aquifer exemptions prior to re-permitting as Class VI.

An owner or operator seeking an aquifer exemption expansion must define the areal limits of the expanded aquifer exemption per 40 CFR 144.7(d)(1) and submit information to support a determination that the proposed Class VI aquifer exemption meets the criteria at 40 CFR 146.4(d).

The purpose of the UIC Program's evaluation of an aquifer exemption application is to ensure, based on site-specific information, that an appropriately sized area is exempted such that the carbon dioxide plume and pressure front remain within the exempted area. The review of the request to expand the areal extent of a Class II aquifer exemption could also take place concurrently with review of an injection depth waiver request (if applicable). This approach can help ensure that the aquifer exemption determination considers the most up-to-date information about the proposed project.

***Completeness Review***

Class II well owners or operators seeking to expand the areal extent of their approved aquifer exemption will apply for an aquifer exemption expansion; this application is a separate submittal from the Class VI permit application. It should be in the form of a narrative that describes the delineated area of the expansion, supported by geologic maps and model outputs and a description of how the aquifer exemption meets the criteria at 40 CFR 146.4.

The UIC Program should perform a preliminary review to confirm that the aquifer exemption application is based on the same or a similar delineation modeling, geologic, and operational data as those on which the Class VI permit application is based. Additionally, the UIC Program should verify that the demonstration that the aquifer exemption meets the criteria at 40 CFR 146.4 includes a description of the water quality analyses to determine the TDS of the aquifer to be exempted and that evaluations of current and future use of the aquifer are based on a thorough review of state and/or local water supply data or other appropriate sources.

***Evaluation***

The bolded and italicized text below outlines a suggested approach that a UIC Program might employ to evaluate information submitted to request an expansion of the areal extent of a Class II aquifer exemption, to confirm that an applicant's submittal meets the requirements of the Class VI Rule and that the expanded aquifer exemption is appropriate.

**Verify that the proposed expanded area of the aquifer exemption is complementary to and based on the same information used to delineate the Class VI AoR.** It is likely that the applicant will use the AoR delineation modeling performed pursuant to 40 CFR 146.84 to delineate the aquifer exemption area. If this is the case, the modeling should account for all geologic data, operational conditions, and any other injection activities (i.e., related to Class II wells); see Section 4.1.2. If the aquifer exemption delineation is based on other modeling or analyses, compare the lateral and vertical extent of the delineated area of the aquifer exemption expansion to ensure that it encompasses, at a minimum, the entire geographic extent of the approved Class VI AoR.



BLF-000112

**Confirm that the proposed aquifer exemption meets the criteria at 40 CFR 146.4(d).** An owner or operator seeking to expand the areal extent of an existing aquifer exemption should submit information to support a determination that the proposed area of the expanded aquifer exemption meets all of the following criteria: it does not currently serve as a source of drinking water; the TDS content of the groundwater is more than 3,000 mg/L and less than 10,000 mg/L; and it is not reasonably expected to supply a public water system.

***Verify that the aquifer is not currently a source of drinking water.*** The EPA interprets water that currently serves as a source of drinking water to include water that is being withdrawn at the time of the aquifer exemption request and water that will be withdrawn in the future by wells that are in existence at the time of the request. Confirm that the applicant evaluated information on all public water suppliers and private wells across the entire AoR for the Class VI well and the area delineated per 40 CFR 144.7, accounting for any anticipated population or land use changes. Verify that the information reviewed is consistent with information from municipal water systems' websites, the Safe Drinking Water Information System (SDWIS), and county or state health department records of drinking water wells. If the applicant is also seeking an injection depth waiver, the information submitted for the aquifer exemption should match the information submitted per 40 CFR 146.95(a).

***Confirm that the TDS is more than 3,000 mg/L and less than 10,000 mg/L.*** This should have been established for the previously exempted areas of the aquifer; TDS information for the expanded area should be consistent with information on formation fluids gathered as part of the Class VI permit application process or that will be collected under the pre-operational formation testing program. Verify that this information is available and that sampling and testing was (or will be) performed properly, i.e., tested in a certified laboratory or using proper QA protocols or pursuant to the Class VI QASP. Also confirm that any reported TDS levels are consistent with other information provided as part of the Class VI site characterization performed per 40 CFR 146.82(a)(6). If there is any uncertainty regarding whether the samples are representative of the entire expanded area (i.e., if there is variability), consider requesting that additional sampling be performed. If the TDS concentration in the proposed aquifer exemption expansion area is lower than 3,000 mg/L, an expansion of the areal extent of an aquifer exemption cannot be granted because it would not meet the requirement that the TDS content be greater than 3,000 mg/L.

***Review information to confirm that the aquifer is not reasonably expected to supply a public water system.*** This determination will likely be related: to water use demands/plans and to the presence of economically valuable mineral, hydrocarbon, or geothermal energy resources (per 40 CFR 146.4(b)(1)). Verify that the applicant provided sufficient information about hydrocarbon recovery in the area of the expansion to support a determination that this criterion was met.

Verify that all three criteria at 40 CFR 146.4(d) are met; if one or more of the criteria is not met, an aquifer exemption expansion may not be granted. However, injection of carbon dioxide at a volume that remains within the previously exempted area may be acceptable, provided all other applicable Class VI requirements are met. Modified operations may be needed to ensure that the carbon dioxide remains within the originally exempted area, and appropriate limits should be specified in the Class VI permit.

**Review and Approval of Aquifer Exemptions**

An expansion of the areal extent of an aquifer exemption for a Class VI project constitutes a substantial revision to a state's approved primacy program and requires an EPA rulemaking and revision of 40 CFR 147 [40 CFR 145.32]. All aquifer exemptions must be approved by EPA, even if the state has Class VI primacy.

Where the state has Class VI primacy, the state UIC Program Director must, following the review of information related to the aquifer exemption, submit a program revision to the EPA region. This review is separate from the review of the Class VI permit application. However, because the supporting information is related, EPA recommends that the UIC Program Director review the aquifer exemption and Class VI permit application at the same time. The state will perform the following activities:

- Review the information in the aquifer exemption application.
- Issue public notice of the proposed exemption. This is recommended, since an expansion to an aquifer exemption for the purposes of GS may be of interest to the public.
- Submit documentation of the review and any other documents required by EPA to the EPA Region.

Once the EPA Region has received information from the state, EPA will evaluate the state's revised program submission, issue a public notice that EPA has received an aquifer exemption, prepare the aquifer exemption rulemaking, and publish notice in the *Federal Register*.

EPA recommends that publication of the *Federal Register* notice about the aquifer exemption be timed to coincide with public notice of the draft Class VI permit (pursuant to requirements at 40 CFR 146.82(a) and 124.10). This would allow a single outreach process so that the public could review materials and submit comments on both actions at the same time.

See the *UIC Program Class VI Primacy Manual for State Directors* for additional information about revising state primacy programs.

### *Outcomes*

Most of the products of the aquifer exemption review at the pre-construction stage will likely be documentation associated with the primacy revision process required for aquifer exemption approvals. Information the state will produce will likely include:

- A report documenting the review of the aquifer exemption, including the evaluation that the expanded areal extent of the aquifer exemption is at least as large as the Class VI AoR and that the aquifer exemption meets the criteria at 40 CFR 146.4(d); and
- Documentation associated with the aquifer exemption review, including:
    - The completeness review;
    - Correspondence with the EPA Regional Administrator; and
    - Information related to public notice of the aquifer exemption and any public comments received.



BLF-000114

## 4.2 Preparing the Permit

In addition to conducting a technical review of the permit application (as described in Section 4.1), a permit writer should perform the following steps in support of a permit decision. Some of these steps may be conducted concurrent with the technical evaluation while others will necessarily follow chronologically after the conclusion of the technical evaluation.

**Finalize the Environmental Justice (EJ) assessment.** If any portions of the AoR are in disadvantaged communities, compare maps of the AoR to maps of known disadvantaged communities and facilities that may adversely affect those communities. If the EJ analysis indicated that the proposed site may be near disadvantaged communities that are also exposed to environmental risks, confirm that any appropriate mitigation measures (e.g., additional monitoring) are included in the Class VI permit. See Section 3.3 for additional information on performing EJ analyses.

**Develop draft Class VI permit conditions** based on the preliminary site and project data submitted with the permit application. Include permit conditions to ensure that the owner or operator will meet all of the requirements of the Class VI Rule. As described earlier, the EPA developed a template for permit text that can be accompanied by a set of enforceable project-specific plans. Using the template will promote consistency among Class VI permits issued nationwide and facilitate the use of this Implementation Manual, which is organized in consideration of this approach. The templates of the Class VI permit (i.e., the main body and the associated enforceable plans) reflect the Class VI requirements and the recommendations in this Implementation Manual. These are available in the resource library of the GSDT. States may develop other template formats; however, the Class VI requirements and the recommendations about the content of the permit still apply.

The permit should also set conditions for reporting and recordkeeping required at 40 CFR 146.91. Identify what must be included in semi-annual reports. Require the owner or operator to report the results of MITs or workovers within 30 days. Identify situations that require "emergency" reporting and activities for which the owner or operator must provide advance notice. Require the owner or operator to submit all reports in an electronic format via the GSDT and identify recordkeeping requirements. See the *UIC Program Class VI Well Recordkeeping, Reporting, and Data Management Guidance for Owners and Operators* for additional information on electronic reporting.

Additionally, the permit should include general permit conditions that address modification, revocation, reissuance, termination, or transfer of permits; severability and confidentiality conditions; and duties and requirements of the permit, e.g., duty to comply, penalties for violations, duty to mitigate, operation and maintenance, duty to provide information, inspection and entry, and signatory requirements.

**Prepare a fact sheet and/or statement of basis** summarizing the project and the evaluation of the permit application. The EPA recommends that the permit writer develop both a fact sheet and a statement of basis about the permitting decision. The statement of basis [40 CFR 124.7] is a way to document the technical review, identify protective permit conditions, and explain the rationale for the regulatory agency's decision-making.

The fact sheet is a public document that explains the permit in lay terms, per 40 CFR 124.8(b). Templates are available in the resource library of the GSDT. Include a brief description of the



BLF-000115

facility, the injectate, the basis for the draft permit conditions, and how the permit writer determined the appropriate conditions. For example, describe the geology, the AoR, USDWs and the injection and confining zones, planned construction of the well, planned operating and monitoring requirements, and plans for plugging the well and performing post-injection monitoring. Explain that a draft permit has been issued, identify where people can obtain a copy of the draft permit, and provide a contact person in the permitting agency.

**Compile all information supporting the administrative record for the permitting decision.** The administrative record should include the permit (incorporating all of the enforceable project plans), reports that document the review of the permit application (e.g., the AoR delineation modeling evaluation report, induced seismicity report, and financial responsibility report), references that the permit application review team consulted during the technical review, and documentation of all communications with the applicant (including email communications, call logs, and summaries of meetings).

The GSDT can facilitate this process because it is a repository of all the documents associated with the permit application. Identify the materials that are to be included in the administrative record and copy or move them into the permit package area for the project. Personal evaluation files, notes, drafts, etc., that are not part of the administrative record can be stored elsewhere in the GSDT for future reference.

**Finalize the draft permit for public notice and comment.** Publish a notice in a newspaper of general circulation near the project site that describes the project, explains the comment submission procedures and deadlines, provides information about planned public hearings, and provides information about where to receive additional information. If an injection depth waiver application and/or aquifer exemption expansion request has been submitted, the EPA recommends providing notice of this concurrently with notice of the permit application, if possible. A sample public notice of a Class VI permit application is available in the resource library of the GSDT. Hold one or more public hearings and document all input provided.

**Conduct outreach to stakeholders,** including any tribes, in or near the AoR. The unique nature of Class VI wells and GS highlights the importance of communicating with the public and among states, tribes, and territories about pending Class VI projects. See Section 2.3 above. Effective communication can ensure transparency in the permitting process, encourage coordination and information sharing, and promote safe, protective projects. In addition to providing a copy of the draft permit and a fact sheet and/or statement of basis, consider providing outreach or be prepared to answer questions from the public about the characteristics of the site, injection technology, the relationship of the well to all nearby public water systems and USDWs, and how public safety and potential contamination have been considered in the development of permit conditions. If any portions of the AoR are in disadvantaged communities, the EPA encourages conducting enhanced public outreach activities to these communities. If the AoR crosses (or comes close to) boundaries with other states, territories or tribes, notify appropriate officials in those jurisdictions (e.g., UIC program or environmental protection officials), per 40 CFR 146.82(b). A template of a letter that can accomplish this required notification is available in the resource library of the GSDT.

Consider posting materials relevant to the permit application online, if possible. For additional information on public outreach, see the UIC Quick Reference Guide *Additional Tools and*



BLF-000116

*Considerations for UIC Directors on the Public Participation Requirements for Class VI Wells,* and the *Fact Sheet on Public Participation Requirements.*

**Review public comments**, including testimony at public hearings; prepare responses; and develop a responsiveness summary document.

**Finalize Class VI permit conditions,** if needed based on the public process, and issue a Class VI permit. Consistent with the regulations, the permit should specify that the applicant is authorized to construct or convert the injection well, but may not commence injection until authorized in writing to do so and that they must meet any new or revised conditions in the permit based on the final geologic data that are collected pursuant to 40 CFR 146.82(c). Identify the final geologic and well data that must be submitted and approved before injection will be authorized, e.g., as-built well schematics, pre-operational testing results, demonstration of mechanical integrity, completion of all required corrective action on wells in the AoR, updated financial responsibility information, submittal of final geologic data, AoR delineation modeling, and project plans. Templates with recommended language are available in the resource library of the GSDT. If the determination is positive, update the project status in the GSDT to show that the project is in the pre-operation phase.

### 4.3 Planning for the Pre-Operation Review

As described above, the Class VI Rule is designed to address the fact that not all of the information needed to evaluate the suitability of a proposed GS site will be available at the time of a Class VI permit application. The information required at 40 CFR 146.82(a), and described in this section, will be collected and submitted before the well is constructed or converted and, accordingly, it will be based on preliminary information.

To address the uncertainties inherent in the pre-construction information (as described in Section 4.2), 40 CFR 146.82(c) requires the collection of information that confirms the assumptions on which the permit determination was based. After the permit is issued, the owner or operator will construct the well and perform the required pre-operational testing. The data collected will augment the regional geologic and hydrogeologic information with data specific to the direct vicinity of the well, e.g., based on cores and sampling during drilling.

The EPA recommends that the UIC Program communicate with the owner or operator while the well is constructed and formation testing is being performed. This can help ensure that all of the information that will be needed to address all uncertainties is collected. If witnessing of any tests (e.g., MITs, logging, sampling, or testing of automatic alarms and shut-off systems) is anticipated, make appropriate arrangements with the owner or operator.

As Section 5 describes, the UIC Program Director will receive additional information for review, generated by a Class VI permit applicant/owner or operator to confirm site-suitability, before the UIC Program Director can authorize injection. The EPA recommends that UIC Programs review Section 5 before the owner or operator submits information required at 40 CFR 146.83(c) to become familiar with, and plan for, the review.



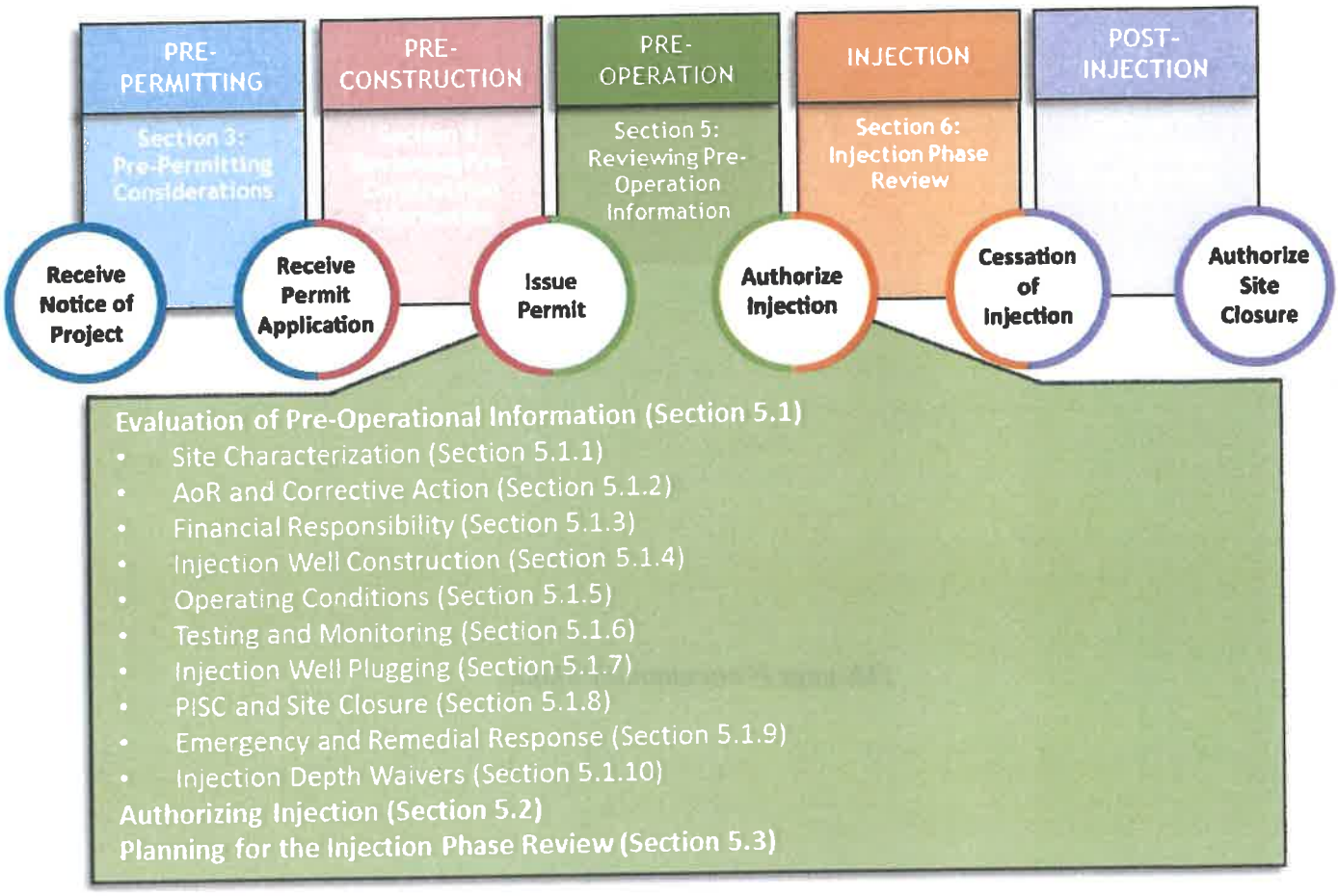
BLF-000117

***This page is intentionally blank.***



BLF-000118

# Section 5: Reviewing Pre-Operation Information



***This page is intentionally blank.***

# 5 Reviewing Pre-Operation Information

Following receipt of the Class VI permit, the owner or operator will construct or convert their well and perform the pre-operational well and formation testing required at 40 CFR 146.87. Class VI well owners or operators must submit the results of all required pre-operational formation testing, updated information about site geology, the final AoR, any needed amendments to the project plans, and information about the construction and testing of the well [40 CFR 146.82(c)].

The primary goal of the pre-operation phase review is to ensure that any uncertainties identified during the course of the permit application review have been addressed. The newly acquired information should strengthen the basis on which the determination of site-suitability was made. Any remaining uncertainties should be addressed by appropriate risk mitigation methods, e.g., by planning targeted monitoring to detect carbon dioxide migration or setting operating limits to ensure confinement of the injected carbon dioxide.

The UIC Program should also confirm that the injection well was constructed to maintain mechanical integrity throughout the duration of the project (particularly in light of information about subsurface geochemistry) and is equipped to monitor injection operations and shut-in if needed.

**Pre-Operation Reviews for Converting Existing Wells**

If the owner or operator converted an existing well (and has completed some or all of the formation testing required at 40 CFR 146.82(c) and 146.87), the permit application may include some of this information. The EPA encourages the UIC Program to consider the recommendations in this section during the permit application review. See Section 3.2 for additional information.

In general, the pre-operation phase review should parallel the initial permit application review. However, this review will likely be streamlined to focus on newly acquired information, particularly information that has changed based on the results of pre-operational testing or other pre-operational activities.

During the pre-operation phase, a UIC Program is likely to receive the following types of information submitted by the owner or operator (per 40 CFR 146.82(c)) for the UIC Program's evaluation:

- Updated geologic information based on the results of pre-operational formation testing (see Section 5.1.1);
- A final AoR delineation based on computational modeling and the status of corrective action on wells in the AoR (see Section 5.1.2);
- Updated financial responsibility information that reflects any changes to the Corrective Action, Injection Well Plugging, PISC and Site Closure, or Emergency and Remedial Response Plans (see Section 5.1.3);
- As-built well construction specifications and any revisions to the proposed operating data (see Sections 5.1.4 and 5.1.5);
- Updates to the Testing and Monitoring Plan, Injection Well Plugging Plan, PISC and Site Closure Plan, and Emergency and Remedial Response Plan (see Sections 5.1.6 through 5.1.9); and

- In addition, some owners or operators may need to submit updated information related to injection depth waivers [40 CFR 146.95]. See Section 5.1.10.

This section provides guidelines and recommendations for how the UIC Program should review the information submitted to confirm compliance with 40 CFR 146.82(c) and verify the suitability of the site. It describes the types of pre-operational information owners or operators will likely submit, how the UIC Program can evaluate the submitted information to ensure USDW protection, and the outcomes or products of the review.

Following the review of well construction information and the results of pre-operational formation and well testing that confirm site-suitability and proper well construction/conversion, the UIC Program Director can authorize injection. See Section 5.2.

## 5.1 Evaluation of Pre-Operation Information

Following construction or conversion of their well and pre-operational testing, Class VI well owners or operators must submit the results of all required pre-operational well and formation testing, updated information about site geology, the final AoR, any needed amendments to the project plans, and information about the construction and testing of the well [40 CFR 146.82(c)].

The UIC Program should evaluate this information to confirm the assumptions on which the permit application, the AoR delineation modeling, or other information that supported the Class VI permit were based. The newly acquired information should strengthen the basis on which the determination of site-suitability was made. Any remaining uncertainties should be addressed by appropriate risk mitigation methods to form a robust, defensible permit record. Table 5-1 presents some examples of how the newly acquired information can inform various aspects of the pre-operation phase review.

The following sub-sections provide guidelines and recommendations for how the UIC Program should review, and where necessary, discuss the information with the owner or operator or request additional or clarifying information, to confirm compliance with 40 CFR 146.82(c) and verify the suitability of the site, focusing on how pre-operational formation testing program results can address uncertainties; make a risk-based determination and issue a modified permit if necessary to ensure protection of USDWs; and authorize injection operations. Each permit application is unique and the appropriate activities will be specific to the application being reviewed. Therefore, the activities described in the sections below outline a recommended course of action to accomplish the goal of evaluating pre-operational information to ensure that the final permit conditions are protective of USDWs.



BLF-000122

**Table 5-1: Examples of how Pre-Operational Submittals can Inform Considerations for Issuing Authorization to Inject at a Class VI Well**

| Required Submittals | Recommended Cross-Submittal Checks and Considerations |
|---|---|
| The final AoR and the status of corrective action on wells in the AoR [40 CFR 146.82(c)(1),(6)] | • A larger AoR may affect: the need for additional corrective action, the areal scope of injection and post-injection phase testing and monitoring, resources to be addressed in the Emergency and Remedial Response Plan, and financial responsibility needs.<br>• Revised estimates of the time for plume and pressure front movement to slow/cease may necessitate revisions to the alternative PISC timeframe and the PISC and Site Closure Plan; financial responsibility needs for PISC may also be affected.<br>• Changes in the estimated speed or direction of plume and pressure front movement may affect the placement of monitoring wells and plume and pressure front tracking activities.<br>• If any planned corrective action is not complete, financial responsibility cost estimates may need to be adjusted. |
| Updated geologic information about the site [40 CFR 146.82(c)(2)] | • The presence of additional fluid-containing or porous formations or geologic features that could allow fluid movement to USDWs should be addressed in injection and monitoring well construction and plugging.<br>• Additional faults/fractures or other geologic features that could be pathways for fluid movement or carbon dioxide leakage should be addressed in the injection and post-injection testing and monitoring plans.<br>• The presence of additional USDWs in the AoR should be addressed in the injection and post-injection phase testing and monitoring programs, the construction and plugging of injection and monitoring wells, and the Emergency and Remedial Response Plan; additional financial resources may be needed to cover associated activities.<br>• New geologic information may affect AoR delineation modeling inputs and, therefore, the size/shape of the AoR.<br>• Increased seismic activity should be addressed in the Testing and Monitoring Plan and Emergency and Remedial Response Plan. |
| Carbon dioxide compatibility information [40 CFR 146.82(c)(3)] | • Updated information about carbon dioxide-formation fluid compatibility may impact carbon dioxide trapping mechanisms, estimates of plume and pressure front behavior, or storage capacity estimates (and the injection volume limits).<br>• Any anticipated geochemical changes that could affect the compatibility of the injectate with well materials should be addressed in the construction/conversion and plugging of injection and monitoring wells. |
| Formation testing results [40 CFR 146.82(c)(4)] | • Logging and testing data should confirm the assumptions on which AoR delineation modeling, site-suitability, and storage capacity estimates (and permitted injection volumes) are based.<br>• Updated fracture pressure calculations based on formation testing results may necessitate modified injection pressure limits.<br>• Updated information about formation fluid properties may affect storage capacity estimates (and volume limits), AoR delineation modeling inputs, and predictions of plume and pressure front migration.<br>• New information about subsurface geochemical reactions may necessitate inclusion of additional geochemical parameters in the Testing and Monitoring and PISC and Site Closure plans. |

| Required Submittals | Recommended Cross-Submittal Checks and Considerations |
|---|---|
| Final well construction procedures; logging and testing data and MIT results [40 CFR 146.82(c)(5),(7),(8)] | • The as-built well specifications should be reviewed before approving well construction/conversion; they may inform approval of monitoring well construction.<br>• Any divergences from the approved well construction procedures should be addressed in the Injection Well Plugging Plan; these may also affect financial responsibility needs.<br>• Logging and testing results and the results of MITs should be reviewed to confirm that the well was constructed or converted properly. |
| Plan amendments or alternative PISC timeframe updates [40 CFR 146.82(c)(9)] | • Amendments to the AoR and Corrective Action, PISC and Site Closure, or Emergency and Remedial Response plans may affect financial responsibility needs.<br>• All amended plans should be checked for needed consistency changes in other plans.<br>• A change to the alternative PISC timeframe may affect financial responsibility needs for PISC and emergency and remedial response. |

### *5.1.1 Site Characterization*

Following the required pre-operational testing, owners or operators must submit: the results of formation testing [40 CFR 146.82(c)(4); 146.87], updates to information on the geologic structure and hydrogeologic properties of the injection zone and overlying formations [40 CFR 146.82(c)(2)], and information on the compatibility of the carbon dioxide stream with fluids in the injection zone and minerals in the injection and confining zones [40 CFR 146.82(c)(3)]. This pre-operational data augments the regional geologic and hydrogeologic information on which the permit application was based to include data specific to the direct vicinity of the well, e.g., based on cores and water samples taken during drilling. This information should also address the key data gaps or uncertainties identified in the initial permit application review, as described in Section 5.1 above.

The purpose of the UIC Program's review of the geologic information collected during the pre-operation phase is to assess whether final geologic data are consistent with and confirm the data that were submitted with the permit application. The UIC Program should review this information to ensure that appropriate assumptions are made in the AoR delineation modeling and other analyses, particularly where supporting data were not available when the Class VI permit application was submitted.

***Completeness Review***

Following completion of formation testing, owners or operators will submit the testing results and any updated geologic information to the UIC Program.

The EPA anticipates that the pre-operational formation testing results will include a combination of graphs/figures, log results, tabular data, and third party materials such as log analyst reports. The UIC Program should:

- Verify that the owner or operator performed all testing required at 40 CFR 146.82(c) and 146.87, including any additional logging or testing that may have been identified as necessary during the initial permit application review;
- Verify that cores and samples were properly collected and that the submission includes the log analyst's report required at 40 CFR 146.87(b);
- Confirm that all parameters specified in the approved pre-operational formation testing program were analyzed and that all QA protocols were followed;

- Confirm that samples were taken at all locations and depths/formations specified in the approved pre-operational formation testing program (including any additional confining zones that may be needed to ensure confinement or containment of the carbon dioxide); and
- Verify that the specified analytical techniques were used and that all chemical analyses were performed at certified or accredited labs following the protocols in the approved QASP.

**Identification of Additional USDWs**

If pre-operational testing identifies the presence of additional USDWs above the injection zone (e.g., if water sampling in deep formations indicates that any formations below the previously identified lowermost USDW are less than 10,000 mg/L), groundwater sampling in the Testing and Monitoring and PISC and Site Closure plans should target all USDWs and the Emergency and Remedial Response Plan should identify appropriate responses to potential contamination of any USDW. Also, the AoR delineation modeling should address all USDWs and the well's construction should protect all USDWs. If any previously unidentified USDWs below the injection zone are detected, the owner or operator would need to obtain an injection depth waiver in order to inject carbon dioxide into the injection zone identified in the permit. See Section 4.1.11.

The EPA recommends that changes to the geologic information be submitted as a narrative document that meets the requirements at 40 CFR 146.82(c). The descriptive material should be a synthesis of the pre-operational formation testing results that highlights any changes to the understanding of the site since the initial permit application review. Ideally, it will address the uncertainties identified in the permit application and provide additional evidence to demonstrate that the site meets the suitability criteria at 40 CFR 146.83.

***Evaluation***

The bolded text below outlines a suggested approach that a UIC Program might employ to evaluate site characterization information, submitted by a Class VI well owner or operator, to confirm that information submitted meets the requirements of the Class VI Rule; confirm that the permit conditions are protective; and facilitate authorization to inject.

**Review the results of logs performed during drilling to evaluate formation properties** (e.g., resistivity, spontaneous potential, porosity, gamma ray, and fracture finder logs). Verify that logging results support consistent findings about subsurface stratigraphy and that they corroborate other geologic data provided in the original permit application or collected via pre-operational testing. Examine information on the depth, thickness, porosity, permeability, and lithology of the injection and confining zones to assess whether it is consistent with information in the initial permit application (including parameters used in AoR delineation modeling). Verify the locations of any USDWs and any hydrocarbon-containing zones. If there are any inconsistences with information available at the time of the initial permit application, assess whether such differences affect site-suitability. For example, if the confining zone exhibits greater permeability than initially predicted, verify that it will still provide adequate containment. If the injection zone is less porous or permeable than indicated by initial data, assess whether storage capacity estimates might need to be revised and whether operating at the approved injection pressure can proceed without the potential for fracture. If multiple confining zones are needed to ensure confinement or containment of the carbon dioxide, verify that the intervening layers between the primary and additional confining zones will impede vertical fluid movement, are free of faults and fractures, and will allow pressure dissipation.



BLF-000125

If additional logs in other wells were requested as part of the permit application review (e.g., to support facies analyses or evaluate the integrity of the confining zone), evaluate the results of these logs to determine whether they confirm assumptions about site-suitability. If well stimulation was performed, verify that the confining zone was not fractured as a result of stimulation.

**Review analyses of whole cores or sidewall cores of the injection and confining zones.** Confirm that information about porosity, permeability, petrology, and mineralogy based on core analyses is consistent with other submitted information on the injection and confining zones. If any information based on this analysis conflicts with geologic data submitted prior to construction, evaluate its impact on site-suitability and operational parameters. For example, consider the effects of porosity and permeability on storage capacity and the permitted total volume of carbon dioxide to be injected or the effects of rock strength on injection pressure limits.

In any new information on the mineralogy, petrology, or lithology of the injection and confining zones affects the understanding of injectivity or containment, or if it suggests any potential for release of trace metals through mineral dissolution, confirm that these considerations are incorporated into the Testing and Monitoring Plan (e.g., via appropriate groundwater testing parameters) and as inputs to the AoR delineation model.

**Review information on formation fluids in the injection zone.** Examine the data provided (including temperature, pH, conductivity, reservoir pressure, and static fluid level or other physical and chemical characteristics of the formation fluids) to determine if they agree with information in the permit application, match AoR delineation modeling outputs, and address any uncertainties identified in the permit application review. If information about the physical and chemical characteristics of the formation fluids is not consistent with information used in the evaluation of compatibility with the carbon dioxide stream, assess whether revisions to the original compatibility assessment are warranted (or review any updates provided by the owner or operator). Verify that the physical and chemical characteristics of the formation fluid are consistent with the inputs of the AoR delineation modeling; confirm that the model reviewer is aware of any changes that may affect the modeling inputs. Assess whether new information about formation fluids indicates the need for any additional protective measures for USDWs (e.g., changes to operating limits or to monitoring parameters/frequencies in the Testing and Monitoring and PISC and Site Closure plans).

If, based on geochemical analysis of formation solids and/or fluids, there is a concern that trace metals may be liberated as a result of interactions with carbon dioxide and affect USDWs, coordinate with the reviewer(s) of the Testing and Monitoring and PISC and Site Closure plans to ensure that any contaminants that could be liberated/mobilized are addressed in the groundwater monitoring program.

**Review information about the fracture pressure of the injection and confining zones.** Review the fracture pressure data (e.g., determined via a step rate test) to verify that the test was performed properly and the fracture pressure was calculated accurately. If the pressure gauges used for the test were not deployed at the bottom of the well, verify that proper correction factors were used.

**Review information on the hydrogeologic characteristics of the injection zone.** Verify that a pressure fall-off test and either a pump test or injectivity test were performed, that proper testing



BLF-000126

and analytical procedures were followed (e.g., that surface gauges were properly corrected to obtain bottom-hole pressure), and that the testing parameters are based on the operating conditions in the permit (e.g., injection pressures). If pressure fall-off tests suggest the presence of faults or fractures near the well bore, determine whether these may be transmissive and could impact confinement. If the results of pressure fall-off tests indicate the presence of newly identified faults or fractures that were not considered in the permit application review, communicate this to the AoR delineation modeling team and to the staff reviewing the planned injection and post-injection phase testing and monitoring to ensure that monitoring will target areas where there is a potential for carbon dioxide migration.

Verify that the results of hydrogeologic testing are consistent with other geologic data. For example, compare transmissivity values calculated from the pressure fall-off test to injection zone permeability values determined from cores.

**Review the results of any additional testing** requested during the permit application review. In addition to the examples cited above, this may include additional or higher resolution geophysical surveys to evaluate the depth, areal extent, and thickness of the injection and confining zones or to explore alternate interpretations of the geologic site conceptual model. Review the results of any surface air and/or soil gas monitoring (if required) that may be appropriate to provide a longer-term baseline against which future results could be compared. If any of this information does not corroborate the initial geologic data or address uncertainties, consider revising the permit conditions.

**Review updates to the geologic site characterization** based on pre-operational formation testing results. The results of the formation testing will support the comprehensive evaluation as described in Section 4.1.1 and the *UIC Program Class VI Well Site Characterization Guidance*. Owners or operators must submit updates to the information on the geologic structure and hydrogeologic properties of the injection zone and overlying formations based on the results of pre-operational formation testing [40 CFR 146.82(c)(2)]. If an injection depth waiver was approved for the project, encourage the owner or operator to include any information relevant to the waiver, including the results of pre-operational formation testing below the lower confining zone, as part of these updates (see Sections 4.1.11 and 5.1.10 for additional information on waivers). Evaluate this information to confirm that the site is suitable for carbon dioxide injection, per 40 CFR 146.83 and in the context of the comprehensive evaluation of site-suitability (as described in Section 4.1.1).

- Assess whether newly acquired information confirms that ***facies interpretations about the injection and confining zones*** are consistent with the descriptions in the permit application. Verify that the confining zone(s) is sufficiently thick and continuous throughout the AoR to provide confinement. Confirm that the injection zone will provide adequate storage. If sampling and analyses of cores from locations in addition to the injection well were requested to evaluate facies in heterogeneous settings or structural features, evaluate the results of these analyses to determine whether they address uncertainties about the site and confirm assumptions about site-suitability.
- Review the results of any logging within wells other than the injection well and whether they confirm that ***the structures of the injection and confining zones*** are conducive to GS and form an adequate confining system. Also, consider whether additional monitoring


BLF-000127

is needed in any areas to address uncertainty; if so, verify that such monitoring has been incorporated into the Testing and Monitoring and PISC and Site Closure plans.

- If any fluid sampling results vary from the assumptions used in geochemical or reactive transport modeling to demonstrate the ***compatibility of the carbon dioxide stream with subsurface fluids and minerals***, verify that the owner or operator has updated the model(s) accordingly. Verify that the modeling results confirm assumptions about injectivity, appropriate operational parameters, etc. Identify whether the results of models or experiments indicate potential compatibility issues that could affect operational parameters, plume migration, carbon dioxide trapping mechanisms, or storage capacity. For information on considerations regarding evaluating the compatibility of the carbon dioxide stream with well materials, see Section 5.1.4.

**Class VI Projects with Aquifer Exemptions**

If an aquifer exemption expansion was approved for the project (see Section 4.1.12), newly acquired information should continue to support the basis for approving the aquifer exemption. Specific considerations include:

- The delineated lateral and vertical extent of the aquifer exemption expansion should encompass, at a minimum, the entire approved, final Class VI AoR (see Section 5.1.2).
- The results of geochemical sampling should confirm that the TDS content of the injection zone is between 3,000 and 10,000 mg/L (see Section 5.1.1).
- Any additional available information should support the determination that the aquifer does not currently serve as a source of drinking water.

If the EPA denied the aquifer exemption, the UIC Program should work with the owner or operator to ensure that the injected carbon dioxide will remain within the confines of the previously approved Class II exemption, e.g., by limiting injection rates or total allowable volumes of carbon dioxide in the Class VI permit.

- If ***estimates of injection zone storage capacity*** change based on pre-operational formation testing results, determine whether adjusting the injection rates and volume limits in the permit is necessary. If any revisions to the geochemical modeling or storage capacity estimation modeling were requested to address uncertainties identified during the permit application review, verify that the updated models incorporate all site-specific data collected during pre-operational testing.
- Compare the fracture pressure to assumptions on which the evaluation of ***confining zone integrity*** was based and to the distribution of pressures in the AoR as predicted by modeling. If information indicates that injection pressures will exceed the fracture pressure of the confining zone or 90 percent of the fracture pressure of the injection zone, consider adjusting operating limits in the permit or requesting information on additional confining zones. See Section 4.1.6 for additional information on using fracture pressure data to set operating limits.

**Review any updated information about seismic activity at the site.** If there has been recent natural or anthropogenic seismic activity at the site, review information collected since the permit was issued to determine whether the frequency or intensity of such events has increased. Also consider whether any newly acquired data indicate an increased risk that seismic activity may reactivate faults and compromise containment. Options to address seismic risk in the permit include: operational changes (e.g., reduced injection rates), incorporation of passive seismic

monitoring into the Testing and Monitoring Plan (if it is not already included), and addressing the potential for induced seismicity in the Emergency and Remedial Response Plan.

**Notify other members of the review team of any relevant changes to geologic information** that may affect other aspects of the review (such as evaluating the AoR delineation modeling) or necessitate revising permit conditions or the plans, as described above. See Section 4.1.1 for additional information on evaluating geologic information about the site.

***Outcomes***

Following the evaluation of final geologic information and pre-operational formation testing results, the UIC Program should consider documenting the review for inclusion in the permit file. This documentation could be informed by reports developed during the permit application review and may include:

- A description of how the results of pre-operational formation testing addressed deficiencies, uncertainties, or data limitations identified during the pre-construction review of geologic information or confirmed assumptions on which the permit decision was based; and
- Any updated information relevant to the evaluation of seismic risk, if necessary, to incorporate any newly acquired information about the potential for induced seismicity, recent seismic events, or revised permit conditions designed to minimize the risks associated with induced seismic events.

The revised reports and any supporting documentation should be uploaded to the project's permit package area in the GSDT.

### *5.1.2 AoR and Corrective Action*

Following the required pre-operational testing, owners or operators must submit: the final AoR delineation [40 CFR 146.82(c)(1)], the status of corrective action on wells in the AoR [40 CFR 146.82(c)(6)], and any amendments to the approved AoR and Corrective Action Plan [40 CFR 146.82(c)(9)].

The purpose of the UIC Program's evaluation of the final AoR, any changes to the AoR and Corrective Plan, and the status of corrective action is to ensure that the AoR appropriately represents the area where USDWs may be endangered due to injection and that all potential conduits for fluid movement that could endanger USDWs in that area are identified and addressed. The primary focus of the UIC Program's evaluation should be to assess whether the data collected during pre-operational testing address the information gaps and/or uncertainties identified during permitting and support the assumptions used and the approach taken during computational modeling. Therefore, the UIC Program should review this information in close coordination with the review of the pre-operational testing results (see Section 5.1.1).

***Completeness Review***

Owners or operators will submit the final AoR delineation (including detailed modeling data to support the delineation), the amended AoR and Corrective Action Plan (if needed), and the status of corrective action. Similar to the proposed plan submitted during the pre-construction phase, the amended plan is expected to be a single narrative document, while the detailed modeling data will likely include a combination of modeling input and output data, short text descriptions, formulae, GIS data/maps, etc. The EPA anticipates that some of the data will be the same as

those used for the initial AoR delineation, while other components of the submission will reflect updated information or new data generated during the pre-operation phase.

The UIC Program should perform a preliminary assessment of the amended AoR and Corrective Action Plan and the final AoR, including the supporting modeling information. The following activities are recommended to ensure that the amended plan is complete:

- Identify the changes made to the AoR delineation, any key updates of the modeling data, and the revisions that have been made to the plan.
- Verify that all changes and amendments are documented comprehensively and consistently. For example, the final AoR delineation should be presented consistently throughout the AoR and Corrective Action Plan and other project submittals.
- Determine whether the submitted information is sufficient to evaluate compliance with the requirements for computational modeling and AoR delineation with an appropriate level of detail and clarity.

**Demonstration that no updates to the AoR and Corrective Action Plan are needed**

In some instances (e.g., for a well-characterized site with substantial data available in the pre-construction phase), the pre-operational testing data may fully support the existing, approved AoR delineation, and no amendments may be needed to the plan. In those cases, the owner or operator should submit a description of how the new data confirm and support the approved AoR delineation and the strategy used to determine this. The corrective action status and any relevant updates to the detailed modeling data supporting the final AoR delineation would still be required in those cases.

If any additional information or clarification is needed, consider sending one or more sets of questions/requests until a determination of completeness can be made.

***Evaluation***

The following recommendations apply to a generic new project and the evaluation process will need to be tailored to each project's specific conditions and each owner or operator's computational approach. For example, in most cases, it is anticipated that no operational testing and monitoring results will be available for model verification/calibration during the pre-operation phase, because injection has not yet begun. However, at some sites, there may be data from historical or nearby injection operations that could also be used to support the AoR delineation process.

Similar to the process used during the pre-construction phase, the evaluation of the final AoR delineation should involve a combination of qualitative and quantitative assessments. The goals of this evaluation include:

1. Verifying that all relevant new information has been appropriately considered in the delineation of the final AoR and identifying areas where new information supports the previous approaches/assumptions.
2. Ensuring that the updated conceptual/geologic model and model inputs are consistent with pre-operational testing results, and evaluating how the newly available information addresses the data gaps/uncertainties associated with the existing AoR delineation.

3. Assessing whether the updated computational/numerical model used to delineate the final AoR complies with 40 CFR 146.84, that it is constructed to reasonably and accurately represent the geologic and operational systems, and that it yields the information necessary to delineate the AoR.
4. Confirming that the methodology used to delineate the AoR (based on the modeling results) is a conservative and reasonable approach to ensure that the AoR accurately represents the area where USDWs may be endangered.
5. Ensuring that all simplifying assumptions are clearly stated, documented, and justified, as are the methods used for integrating new information into the modeling approach.

The bolded text below outlines a suggested approach that a UIC Program might employ to achieve these goals. This approach will help to: confirm that the final AoR delineation meets the requirements of the Class VI Rule; confirm that the permit conditions are protective in light of the pre-operational testing results; and facilitate authorization to inject.

**Assess the completeness of the pre-operational testing data incorporated into the AoR delineation** to ensure that all available relevant information collected pursuant to 40 CFR 146.87 and the permit has been used to support the process. The relevant data are expected to include, at a minimum: information on rock properties, such as porosity, permeability, and constitutive relationships (i.e., capillary pressure-saturation-relative permeability); injection and confining zone geochemistry; geomechanical characteristics of the injection and confining zones; and in situ fluid pressures and temperatures. See Section 5.1.1 for additional information on evaluating pre-operational formation testing data.

**Assess the conceptual/geologic model and model inputs** to evaluate the data/information used in the model. For example, qualitative methods and/or statistical evaluations (e.g., summary statistics, histograms, etc.) could be used to verify that the updates accurately represent the newly available data. Confirm that the updates are supported by all relevant new information. For a detailed description of the evaluation process for various model input categories, see Section 4.1.2.

**Review the owner or operator's computational/numerical modeling effort** to verify compliance with the rule requirements, assess consistency with the approach described in the approved AoR and Corrective Action Plan, and evaluate appropriateness for the project. This may involve both qualitative evaluation of certain modeling aspects and independent or semi-independent quantitative modeling. In addition to the recommendations provided in Section 4.1.2, determine whether any updates to the modeled subsurface processes, such as inclusion of any geochemical reactions, are necessary based on new information.

**Assess the owner or operator's methodology for delineating the AoR** to ensure that it represents the area where USDWs may be endangered. Confirm that an acceptable approach was used to determine the critical pressure (see the *UIC Program Class VI Well Area of Review Evaluation and Corrective Action Guidance*) and that the associated calculations are based on appropriate, site-specific values collected during pre-operational testing (e.g., pressure in various formations, salinity, etc.).

**Review the status of corrective action in the AoR.** Confirm that the owner or operator used appropriate methods to identify all artificial penetrations throughout the final AoR using database searches or other means, and that the list of artificial penetrations is complete. If the list

of artificial penetrations appears to be incomplete, ask the owner or operator to augment the list (e.g., by conducting more detailed surveys or additional well record searches).

Evaluate whether corrective action conducted on all previously determined and/or newly identified wells was completed in a suitable manner, e.g., using carbon dioxide-resistant materials. If phased corrective action was approved as part of the AoR and Corrective Action Plan, confirm that the owner or operator is conducting corrective action based on the pre-determined schedule. In particular, verify that any corrective action that the permit requires to be completed prior to commencement of injection has been performed using appropriate methods and materials.

**Verify that the amended AoR and Corrective Action Plan reflects the most up-to-date information on the AoR delineation and corrective action.** When evaluating the final AoR delineation and corrective action status, as described above, also review the changes made to the narrative plan to ensure that the plan accurately reflects all relevant information. The plan should present the final AoR delineation, describe how the delineation is supported by the newly collected data, and contain any necessary updates to the procedures for corrective action (including phased corrective action, if appropriate) and AoR reevaluation. It should provide an accurate and complete benchmark for future AoR reevaluations and corrective action, with a sufficient level of detail and clarity. See Section 4.1.2 for more information on evaluating the AoR and Corrective Action Plan.

**Periodically confer with other members of the review team** throughout the evaluation process, and before approving the final AoR and the amended AoR and Corrective Action Plan. Ensure that any issues identified during the review of the information submitted under 40 CFR 146.82(c) are considered by the team and that the final AoR is incorporated into any updates to other project plans or permit conditions.

***Outcomes***

Following the review of the final AoR delineation, the amended AoR and Corrective Action Plan, and the status of corrective action, the UIC Program should revise information in the permit file as needed. These materials may include the following:

- Revised permit conditions for AoR and corrective action, if needed;
- Documentation of any corrective action performed since the permit was issued and of any remaining corrective action activities that must be performed under a phased approach, if appropriate (and the schedule for those activities);
- The approved amended AoR and Corrective Action Plan, if needed, as an enforceable condition of the permit;
- An updated map of the approved AoR delineation, if needed; and
- A report documenting the evaluation of the AoR and corrective action submissions, highlighting newly incorporated information about the site and any updates to the independent modeling evaluation approach and results.

The AoR and Corrective Action Plan and any supporting documents should be uploaded to the project's permit package area in the GSDT.

### *5.1.3 Financial Responsibility*

Class VI well owners or operators must update their financial responsibility cost estimates annually or when any of the specified project plans have been updated [40 CFR 146.85(c)(2)]. Given the likelihood that one or more project plans will change during the pre-operation phase, it is possible that an updated cost estimate may be needed during this phase.

The purpose of the UIC Program's review of updated financial responsibility information is to confirm that the cost estimates for corrective action, injection well plugging, PISC, site closure, and emergency and remedial response are adjusted as needed to address any changes to the covered activities that were identified during the pre-operation review. For additional information, see the *UIC Program Class VI Financial Responsibility Guidance*.

***Completeness Review***

The owner or operator will submit updated cost estimates for corrective action, injection well plugging, PISC, site closure, and/or emergency and remedial response. These updates must reflect adjustments for inflation (if it has been at least one year since the instruments were approved), per 40 CFR 146.85(c)(2). Additionally, for any covered activities for which a change is necessary based on new information collected during the pre-operation phase, the owner or operator must submit revised cost estimates to ensure that the financial instruments will be adequately funded.

The UIC Program should verify that any changes to covered activities described in the Class VI project plans are addressed in the cost estimate updates. These may include: the number of wells that need corrective action as described in the AoR and Corrective Action Plan, the number of monitoring wells that need to be plugged following post-injection monitoring or site closure activities described in the PISC and Site Closure Plan, or potential response activities identified in the Emergency and Remedial Response Plan.

***Evaluation***

The bolded text below outlines a suggested approach that a UIC Program might employ to evaluate updated financial responsibility cost information and/or revisions to financial instruments submitted by a Class VI well owner or operator to: confirm that the submittal meets the requirements of the Class VI Rule; confirm that the permit conditions are protective; and facilitate authorization to inject.

**Review any revised cost estimates** in the context of amendments to the AoR and Corrective Action, Well Plugging, PISC and Site Closure, or Emergency and Remedial Response plans. If updated information impacts any of the activities for which financial responsibility is needed (which may result in increases or decreases to the cost estimates), verify that the cost estimates are appropriately updated and accurate. See Section 4.1.3 for additional information on the EPA's Cost Estimation Tool, which can facilitate this review. Below are examples of how updated information about the site may impact financial responsibility cost estimates:

- If the reevaluated AoR is larger than what was delineated in the initial permit application and encompasses additional wells that need corrective action, the cost estimate for corrective action will need to be adjusted. A larger AoR may encompass additional resources that were not identified and addressed in the Emergency and Remedial


BLF-000133

Response Plan. It may also impact the number or depth of monitoring wells that would need to be constructed (and therefore plugged).

- If computational modeling results or other information indicate that a longer PISC timeframe may be necessary before an owner or operator could demonstrate non-endangerment, additional resources will need to be available to cover a longer post-injection testing and monitoring phase.
- If the injection well's construction differs from what was described in the original plan, this may affect the cost to plug the well.
- If pre-operational testing identifies the presence of additional USDWs in the AoR, the cost estimates for emergency and remedial response will need to be sufficient to address potential contamination of those USDWs. Also, if monitoring within these USDWs necessitates more or deeper monitoring wells, PISC and site closure costs may need to be adjusted to cover the increased monitoring well plugging costs.
- If any new information about subsurface formations impacts the well plugging methods or materials to be used, additional financial resources may be needed to plug the injection and/or monitoring wells.

**Review any adjustments to the cost estimates to account for inflation** if it has been at least a year since the financial instruments were established or last updated, as required at 40 CFR 146.85(c)(2). This may be needed, given the time needed to construct the well and perform all required pre-operational testing.

**Review any changes to the financial instruments.** If the owner or operator submits revised financial instruments, confirm that the instruments are suitable to the activities they cover, are adequately funded, and contain required language and conditions of coverage as described at 40 CFR 146.85(a). Verify that financial instruments for all activities are in force and fully funded prior to authorizing injection. If initiation of any instruments was to be deferred until injection commenced, verify that these are in place. Confirm that all applicable milestones in any pay-in schedules have been met. See Section 4.1.3 for additional information on evaluating financial instruments.

***Outcomes***

The UIC Program should revise the permit or other materials as needed following the review of updated financial responsibility information, including:

- Permit conditions for financial responsibility (if applicable);
- Final, fully-funded financial responsibility instruments with appropriate text/conditions to cover all required activities related to corrective action, well plugging, PISC, site closure, and emergency and remedial response;
- An updated description of the enforceable financial responsibility conditions of the permit (if applicable); and
- A report on the evaluation of the owner or operator's financial responsibility cost estimates.



BLF-000134

The revised financial responsibility instruments and any supporting materials should be uploaded to the project's permit package area in the GSDT.

### *5.1.4 Injection Well Construction*

To demonstrate proper construction or conversion and testing of the well, the Class VI Rule requires owners or operators to submit information on final injection well construction procedures [40 CFR 146.82(c)(5)], all available logging and testing program data on the well [40 CFR 146.82(c)(7)], the results of MITs on the injection well [40 CFR 146.82(c)(8)], and information on the compatibility of the carbon dioxide stream with the materials used to construct the well [40 CFR 146.82(c)(3)].

The purpose of the UIC Program's evaluation of information on how the injection well was built and the results of well testing is to confirm that the well was engineered and constructed to meet the requirements at 40 CFR 146.86(a). The UIC Program's evaluation will ensure that the well's construction is appropriate for planned operations and conditions so that it will maintain integrity throughout its life and not become a conduit for fluid movement that could endanger a USDW.

#### *Completeness Review*

Owners or operators will submit the final construction procedures to the UIC Program Director. The submittal will likely be in the form of a narrative document that describes how the injection well was constructed, accompanied by "as-built" schematics and specifications that show the final construction of the well along with cementing records. The specifications should indicate the location of all casing strings and cement, along with the location of the packer and perforated intervals. The schematics should illustrate the shut-off system and any continuous monitoring equipment installed to demonstrate internal mechanical integrity per 40 CFR 146.89 and 146.90.

The owner or operator will also submit the results of logging and testing program data on the well, internal and external MIT results, and information on the compatibility of the carbon dioxide stream with the well materials. The pre-operational testing results will likely include a combination of narrative information (such as log analyst reports), graphs/figures, tabular data, and log results in Log ASCII Standard (LAS) format. Confirm that all required tests were performed and that the results include appropriate analyses and discussions to support a determination that the well is of suitable construction, has mechanical integrity, and that corrosion will not impact well integrity.

Owners or operators who converted their wells should submit post-conversion schematics, the results of any additional tests that were requested in the course of the permit application review, and documentation that any needed repairs were performed.

***Evaluation***

The UIC Program should review information on the well to confirm that construction or conversion of the well took place as planned and that the construction is suitable based on updated geologic data and the results of pre-operational testing. Certain newly acquired information, e.g., about the compatibility of the carbon dioxide stream with the well materials or the location of fluid-containing/porous formations, may also impact proper monitoring well construction and should be considered in reviewing amendments to the Testing and Monitoring Plan (see Section 5.1.6).

The bolded text below outlines a suggested approach that a UIC Program might employ to evaluate as-built well construction information, to confirm that an owner or operator's submittal meets the requirements of the Class VI Rule; confirm that the well was constructed in a manner that is protective of USDWs, and that the permit conditions are appropriate to the well's construction; and facilitate authorization to inject.

**Compare the as-built schematics and construction procedures to those submitted with the permit application and the approved injection well construction plan.** Verify that the well was constructed as planned, including the use of proper lengths and diameters of casing and acceptable materials and cement (i.e., of sufficient strength and corrosion-resistance). Note and document any divergence from the approved construction plans, schematics, and procedures in the permit.

If there are changes from the approved construction plan, confirm that the well was constructed in a manner that will maintain mechanical integrity and prevent migration of fluids into unauthorized zones, as informed by the most up-to-date geologic information. If any of the changes might result in the inability of the well to prevent fluid migration or maintain mechanical integrity, verify that remedial actions were or will be performed (and identify the anticipated timing of such remediation). Confirm that continuous monitoring and recording devices to demonstrate internal mechanical integrity were installed, per 40 CFR 146.88(e) and that the well is equipped with shutoffs and safety devices that are linked to final operating limits (see Section 5.1.5).

If the well is deviated at all from vertical, compare the radius of curvature to the length of monitoring instruments described in the Testing and Monitoring Plan to ensure that the instruments will not become lodged in the bend of the well casing. Likewise, if the diameter of the well is different from what was planned, confirm that instruments required for testing, monitoring, and well workovers will fit in the well.

**Review the results of logs run during well drilling and construction** to evaluate whether the well was properly constructed. Verify that all well logs (e.g., caliper, cement evaluation, temperature, and cement bond) were conducted properly and as described in the permit. Review logs used to determine cement placement and verify that the emplaced cement is continuous and that no channels that would allow unacceptable fluid migration exist. Examine logging records to verify that the depths of well perforations are properly located within the injection zone. Examine cement bond logs to determine the quality of the cement. Independently evaluate the well properties if necessary to achieve a complete understanding of the suitability of the well.

Review cementing records to ensure that cement was circulated to the surface. If cement was not returned to the surface or logs indicate missing or thin cement in any areas, determine whether



BLF-000136

the existing cement is adequate to ensure that there will be no fluid migration along the well bore for the duration of the Class VI project. If the cement is not adequate to prevent migration of fluids, determine if additional cement placement (e.g., through tremie pipes) could provide adequate cement to prevent fluid migration; if so, consider requesting that this be performed.

Review caliper logs and video inspections to evaluate the condition and placement of all well components. Verify that the packer is seated within the confining zone immediately above the injection zone. Ensure that the casing strings were installed as described in the construction plans, and that the casing size is sufficient to accommodate the necessary logging and workover equipment that will be needed to test the well during project operations. Evaluate the condition of the casing. If conditions are observed that indicate the casing cannot maintain its integrity for the duration of the project, require (or confirm) that appropriate repairs are made. Verify that the well was constructed using materials that are of sufficient strength to withstand anticipated stresses for the duration of the Class VI project. If well stimulation was performed, review post-stimulation documentation to verify that the well and cement were not impacted or compromised as a result of stimulation. If any well components were damaged, confirm that the necessary repairs were or will be made (and the anticipated timing of such repairs).

**Review the results of formation testing and analyses of geochemical samples taken** to verify that the assumptions on which well construction plans were based are accurate and that there are no concerns about the compatibility of the well construction materials with the carbon dioxide stream. If any variations have the potential to affect well integrity or cause premature corrosion of the well, discuss with the owner or operator whether any changes to the well materials or cement are needed. If geochemical analyses indicate that the subsurface geochemistry is significantly different than the assumptions on which the approved construction procedures were based, verify (or consider requesting a demonstration) that the well materials are compatible with formation conditions. Also, consider whether more frequent corrosion monitoring or MITs may be appropriate. (For information on the compatibility of carbon dioxide with formation fluids and minerals, see Section 5.1.1.)

**Verify that the well has mechanical integrity.** Examine the results of the pre-operational external MIT to ensure proper cementing. Review the results of the annular pressure test or other internal MIT to verify proper casing installation. If it appears that the well cannot maintain integrity for the duration of the project, require that appropriate repairs are made (or confirm that they have been successfully completed).

Additionally, if the permit included conditions to test deep monitoring wells (see Section 4.1.5), confirm that the tests were performed as required by the permit and verify that the wells were constructed as proposed and have mechanical integrity.

**Verify that any needed remedial actions for wells that were converted** pursuant to 40 CFR 146.81(c) were performed as planned and that all information necessary to demonstrate that the well was engineered and constructed to meet the requirements at 40 CFR 146.86(a) is present. Confirm that the owner or operator performed any needed replacement or remediation of any components or materials. Also, review information about any new materials that were installed to ensure compatibility with the injectate and formation fluids. Examine construction records to ensure proper procedures and adequate cement setting times. Review cement evaluation logs to verify proper cement placement. Evaluate post-remediation internal and external MITs to ensure


BLF-000137

that the well has mechanical integrity. See Section 4.1.4 for additional information on evaluating the construction of converted wells.

**Consider whether any newly acquired information about the project impacts the appropriateness of the well's construction.** For example:

- If geologic testing revealed the presence of additional USDWs or porous formations, confirm that the well was cemented across these zones.
- Confirm that the well shut-in procedures are appropriate based on the most up-to-date information about the site or changes to planned operations.
- Verify that the approved well construction is suitable to the final operating conditions, e.g., related to the materials' strengths versus anticipated pressures.

Also, communicate any changes to the well's construction to reviewers of the Injection Well Plugging Plan and the well testing components of the Testing and Monitoring Plan and of financial responsibility information. For detailed information on the construction of Class VI wells, refer to the *UIC Program Class VI Well Construction Guidance*.

***Outcomes***

Following the review of as-built well construction specifications and pre-operational well testing results, the UIC Program should develop and upload the following to the project's permit package area in the GSDT:

- Final, as-built well construction specifications and schematics that describe all required casings, cement, safety and shutoff devices, and monitoring gauges;
- Revised permit conditions (if applicable);
- Documentation of the review of final schematics, including any divergence from the procedures that were approved with the initial permit, and an evaluation that the procedures and materials used ensure USDW protection;
- Documentation of the review of pre-operational well testing results; and
- An evaluation of the procedures employed to convert the well (if applicable), and documentation that the well was converted in compliance with 40 CFR 146.81(c).

### *5.1.5 Operating Conditions*

Based on the outcomes of their pre-operational testing, owners or operators may submit updates to their planned operating conditions (e.g., injection pressure). It is anticipated that changes to the understanding of the site could impact appropriate operating limits and, if so, this should be addressed in the permit.

The purpose of the UIC Program's review of planned operations is to ensure that the injection rates and volumes in the permit are suitable to the site-specific geology and other project characteristics, particularly in light of pre-operational testing results, to ensure that injection operations will not endanger USDWs.

***Completeness Review***

Class VI well owners or operators may submit updated information about operating procedures, such as the proposed injection rates and pressures, annulus pressure, and the total volume of



BLF-000138

carbon dioxide to be injected over the duration of the project. The updated information will likely be a narrative description supported by graphs or tables that highlight changes to the relevant operating parameters. The UIC Program should verify that any updated information is adequate to inform an evaluation, i.e., the information should be similar in content and level of detail to the operating information submitted with the initial permit application.

***Evaluation***

The bolded text below outlines a suggested approach that a UIC Program might employ to evaluate updated operating information, submitted by a Class VI well owner or operator, to confirm that the submittal meets the requirements of the Class VI Rule; confirm that the permit's operating conditions are appropriate to final geologic and well construction information; and facilitate authorization to inject.

**Confirm that the maximum allowable injection pressure in the permit is appropriate based on pre-operational formation testing results.** Review step rate tests performed after well construction and the results of other logs to verify that information provided in the permit application related to the fracture pressure of the injection and confining zones is correct. If the calculated fracture pressures of the injection and confining zones differ from the assumptions on which injection rates and pressures in the Class VI permit were based and, as a result, the injection pressure exceeds 90 percent of the fracture pressure of the injection zone, revise the permit conditions accordingly. If there is/are any uncertainty or inconsistencies in calculated fracture pressures within the injection or confining zones, consider whether the maximum injection pressure limit may need to be revised to less than 90 percent of the fracture pressure of the injection zone. Verify that any revised information about the site's geology (i.e., seismic history, potential interactions with subsurface fluids or well materials, or the presence of faults or fractures) does not affect the assumptions on which the injection pressure limits in the permit are based.

**Confirm that the total permitted volume of carbon dioxide to be injected is appropriate.** Consult with others on the permit application review team (including those reviewing site geology and the AoR delineation modeling) to confirm that there are no changes to the estimated storage capacity of the injection zone or the properties of the confining zone, and that the site can receive and contain the total volume of carbon dioxide to be injected.

**Confirm that the permitted annular pressure is acceptable in light of pre-operational testing results.** Consider whether any change to the annulus pressure is necessary in light of final well construction (e.g., the strength of the casing and tubing), formation fracture pressure, or injection pressure.

If the owner or operator revises any of the planned operating conditions (e.g., the total volume of carbon dioxide to be injected or the carbon dioxide source/composition), inform other members of the review team—including reviewers of the AoR delineation modeling and well construction—of the changes. Confirm that the well is equipped with shutoffs and safety devices that are tied to final operating limits. See Section 4 of the *UIC Program Class VI Well Construction Guidance* for additional information on Class VI well operating conditions.

***Outcomes***

Following the evaluation of operating requirements in the context of formation and well testing results and other information, develop or update the following:



BLF-000139

- Final operating limits in the permit to reflect any needed changes to maximum injection pressure, volume, or annulus pressure limits;
- The summary of the enforceable operating conditions of the Class VI permit (if applicable); and
- Documentation of any reviews that resulted in changes to or confirmed the operating limits in the permit.

Any final materials should be uploaded to the project's permit package area in the GSDT.

### *5.1.6 Testing and Monitoring*

Owners or operators must submit an amendment to the Testing and Monitoring Plan if needed to address newly identified information gathered via pre-operational testing or other pre-operation phase activities [40 CFR 146.82(c)(9)].

The purpose of the UIC Program's review of any amendments to the Testing and Monitoring Plan is to ensure that the testing and monitoring procedures remain appropriate to planned operations, the well's construction, site-specific geologic and hydrologic conditions, and the predicted behavior of the carbon dioxide plume and pressure front based on final AoR delineation modeling. The UIC Program should also ensure that planned testing and monitoring will generate the data necessary to demonstrate that the project is not endangering USDWs, provide the necessary input data for AoR delineation modeling reevaluations, and provide data points on which the non-endangerment demonstration will be based.

Verifying that the strategy described in the amended Testing and Monitoring Plan is based on the most up-to-date understanding of the site is essential to ensuring that sufficient data will be generated to demonstrate compliance (with the permit conditions and the Class VI Rule) and to inform decision-making at project milestones.

#### *Completeness Review*

An amendment to the Testing and Monitoring Plan will likely be in the same format as the approved Testing and Monitoring Plan, with changes made to address the results of pre-operational testing or any other new information about the site. Optimally, the owner or operator will highlight any changes to the testing and monitoring strategy, including explaining the purpose of any new monitoring methods and how the results will be used.

The UIC Program should perform a preliminary review of the amended Testing and Monitoring Plan to verify that it provides a sufficient level of detail to inform an evaluation. For example, it should describe any newly added testing and monitoring methods, including testing frequency, parameters, detection limits, and locations or depths. These should be representative of the most up-to-date AoR delineation and reflect the presence of any newly identified USDWs or other formations of interest identified through pre-operational testing. If any information is missing or is not presented in sufficient detail to inform an evaluation of the Testing and Monitoring Plan, the UIC Program should consider requesting the missing information or asking clarifying questions. See Section 4.1.7 for additional information on reviewing the completeness of the Testing and Monitoring Plan. Confirm that the owner or operator has updated the QASP if the amended Testing and Monitoring Plan includes any new testing or analytical methods.



BLF-000140

***Evaluation***

The UIC Program should review the amended Testing and Monitoring Plan to confirm that it appropriately reflects all relevant new or updated information about the site. For example:

- Confirm that the plan includes changes to the planned carbon dioxide stream analyses (e.g., analytes or sampling frequency) that are needed to address updated information about the carbon dioxide composition or source.
- Confirm that planned well testing (e.g., corrosion testing, MITs, or continuous monitoring of operational parameters) reflects the most up-to-date information on project operations, well construction, carbon dioxide stream composition and source, and the compatibility of the carbon dioxide stream with well materials.
- Verify that planned groundwater sampling or other above-confining-zone monitoring reflects the most up-to-date information on site characteristics. For example, if formation testing data indicate that mobilization of additional constituents is possible, verify that the groundwater monitoring program includes monitoring for these constituents. If any new USDWs were identified during pre-operational testing, verify that the final plan includes monitoring to ensure that these USDWs are not endangered. Confirm that sampling locations, depths, and frequencies are appropriate based on the most up-to-date computational modeling results. For example, the monitoring strategy may need to be adjusted if the predicted direction of plume movement is substantially different compared to previous expectations or if any new pathways for potential carbon dioxide leakage have been identified.
- Verify that all monitoring wells that need to be installed prior to commencing injection are in place and properly constructed. Review as-built schematics in the context of any updated information about the compatibility of the carbon dioxide stream with well materials (see Section 5.1.4 for similar considerations regarding injection well construction).
- Confirm that plume and pressure front monitoring strategies are appropriate based on the most up-to-date geologic information, planned operational procedures, and computational modeling results. Monitoring locations/depths, spatial coverage, and frequencies should be appropriate to the most up-to-date AoR delineation, predictions of plume and pressure front behavior, and any new information about endangerment to USDWs within the AoR. For example, if predicted plume arrival times at certain monitoring locations have changed, the monitoring schedule may need to be adjusted to ensure that sufficient data are collected to compare with those predictions.
- Confirm that any surface air monitoring and/or soil gas monitoring (if required) remains appropriate based on the results of updated geologic information. The plan should incorporate any revisions to monitoring locations or frequencies that are needed based on the results of baseline testing or information on potential carbon dioxide leakage pathways.
- Review any additional testing and monitoring included in the plan.



BLF-000141

- Request and review a revised QASP if any testing or monitoring activities (or the associated QA/QC needs) change. Verify that the QASP describes standard procedures and practices to ensure data quality for all testing and monitoring procedures.

The *UIC Program Class VI Well Project Plan Development Guidance* provides additional information on evaluating Testing and Monitoring Plan amendments. See the *UIC Program Class VI Well Testing and Monitoring Guidance* for additional information on testing and monitoring procedures for Class VI projects.

***Outcomes***

Following review and approval of the amended Testing and Monitoring Plan, the UIC Program should incorporate the following information into the permit file:

- Updated permit conditions for testing and monitoring and MITs, if modifications are needed based on the pre-operation phase review;
- The approved amended Testing and Monitoring Plan as an enforceable condition of the permit;
- A final, approved QASP that addresses all testing and monitoring activities in the amended Testing and Monitoring Plan;
- Approved construction schematics for all monitoring wells; and
- Follow-up reports or other materials documenting the evaluation, focusing on changes to the plan and highlighting how uncertainties or data limitations were addressed.

The Testing and Monitoring Plan, the QASP, and any associated materials should be uploaded to the project's permit package area in the GSDT.

### *5.1.7 Injection Well Plugging*

Owners or operators must submit any amendments to the approved Injection Well Plugging Plan that are needed to address newly acquired information following pre-operational testing [40 CFR 146.82(c)(9)].

The purpose of the UIC Program's review of the amended Injection Well Plugging Plan is to confirm that the materials and procedures described in the plan are appropriate in light of the well's final construction and any new information about the site's geology and geochemistry, particularly regarding compatibility with the subsurface environment at the site. This review will ensure proper plugging of the injection well to prevent it from becoming a conduit for fluid movement that could endanger USDWs after well plugging.

***Completeness Review***

An amended Injection Well Plugging Plan should be similar to the approved plan. That is, it will likely be a narrative document that includes well schematics and describes how the owner or operator will plug the injection well in accordance with the requirements at 40 CFR 146.92. The plan should highlight and explain any changes that are needed to address modifications to the well's construction, as documented in the construction specifications (see Section 5.1.4), or new information about subsurface geochemistry based on the results of pre-operational formation testing and the compatibility of well materials with subsurface fluids and the injectate. See



BLF-000142

Section 4.1.8 for additional information on reviewing the completeness of the Injection Well Plugging Plan.

***Evaluation***

The bolded text below outlines a suggested approach that a UIC Program might employ to evaluate an amended Injection Well Plugging Plan to: confirm that the owner or operator's submittal meets the requirements of the Class VI Rule; confirm that the permit conditions for well plugging remain appropriate in light of information on the well's final construction and other site information; and facilitate authorization to inject.

**Review the amended Injection Well Plugging Plan in the context of new information.** The review should be done in coordination with reviewing information on the final injection well construction (or conversion) and pre-operational testing results. For example:

- If any aspects of injection well construction varied from the approved procedures, verify that the types and amounts of cement and plugs in the final Injection Well Plugging Plan reflect these changes;
- If any new information is available about the injectate or formation fluid geochemistry (including any anticipated geochemical changes that could affect the compatibility of the injectate with well materials), confirm that the plugging materials and cement described in the Injection Well Plugging Plan are suitable to those conditions; or
- If pre-operational formation testing reveals the presence of any additional USDWs, other fluid-containing or porous formations, or other geologic features that could allow fluid movement that could endanger USDWs, confirm that the plan includes plugs and cement at appropriate depths and that the calculated quantity of cement is sufficient to cover all relevant formations.

If any aspects of the Injection Well Plugging Plan change based on the review, alert the staff reviewing the financial responsibility cost estimates that the estimates to plug the well may need to be revised. Note that changes to the procedures in the Injection Well Plugging Plan may also need to be reflected in the monitoring well plugging procedures; for this, coordinate with the reviewer of the PISC and Site Closure Plan as appropriate.

See Section 4.1.8 for additional information on addressing conversion of the injection well for another purpose following cessation of carbon dioxide injection for GS. This conversion should be addressed in the Injection Well Plugging Plan.

For additional information on evaluating amended Injection Well Plugging Plans, see the *UIC Program Class VI Well Project Plan Development Guidance*. See Section 2 of the *UIC Program Class VI Well Plugging, Post-Injection Site Care and Site Closure Guidance* for additional information on Class VI injection well plugging procedures.

***Outcomes***

Following the review of the amended Injection Well Plugging Plan, the UIC Program should develop and upload the following to the project's permit package area in the GSDT:



BLF-000143

- Updated permit conditions for injection well plugging (e.g., procedures and materials) and associated notifications, if necessary;
- The approved amended Injection Well Plugging Plan as an enforceable condition of the permit; and
- Follow-up reports about any aspects of the review of the Injection Well Plugging Plan that have changed since the permit application review.

### *5.1.8 Post-Injection Site Care and Site Closure*

Owners or operators must submit any amendments to the PISC and Site Closure Plan or updates to the alternative PISC timeframe demonstration that are needed to address information gathered during pre-operational testing [40 CFR 146.82(c)(9)].

The purpose of the UIC Program's review of PISC and Site Closure Plan amendments is to ensure that any needed revisions are made to address information gathered during the pre-operation phase, so that protection of USDWs is ensured following injection operations. In particular, the UIC Program should ensure that the plan encompasses post-injection testing and monitoring throughout the entire AoR for a sufficient duration (as informed by the most up-to-date computational modeling results), reflects any changes in predicted behavior of the carbon dioxide plume and pressure front, and includes monitoring well plugging procedures that are appropriate based on the current understanding of the site. The review of the amended PISC and Site Closure Plan should be closely linked to reviews of the amended AoR and Corrective Action Plan, Testing and Monitoring Plan, and Injection Well Plugging Plan (as discussed in Sections 5.1.2, 5.1.6, and 5.1.7, respectively).

***Completeness Review***

An amendment to the PISC and Site Closure Plan will likely be a narrative document (supported by maps, cross sections, and well schematics) that is similar in format and content to the approved plan in the Class VI permit. Any changes relative to the approved plan that address newly acquired information should be highlighted and explained, either in the plan or in supporting documentation.

The owner or operator should also submit an updated QASP to address any new testing and monitoring procedures or parameters. A single QASP that covers injection and post-injection phase testing and monitoring may be acceptable. The UIC Program should verify that the QASP addresses all post-injection testing and monitoring. Section 4.1.9 provides additional information on reviewing the completeness of the PISC and Site Closure Plan.

***Evaluation***

The bolded text below outlines a suggested approach that a UIC Program might employ to evaluate the amended PISC and Site Closure Plan to: confirm that the owner or operator's submittal meets the requirements of the Class VI Rule; confirm that the permit conditions for post-injection site care are appropriate based on updated well and site-specific information; and facilitate authorization to inject.

**Verify that the predictions of post-injection phase plume and pressure front behavior are consistent with the most up-to-date computational modeling results.** If the results of pre-operational formation testing necessitate revisions to the AoR delineation modeling (see Section



BLF-000144

5.1.2), any associated changes to the estimates of the pre- and post-injection pressure differential, the predicted position of the carbon dioxide plume and pressure front at site closure, or other relevant parameters should be reflected in the amended PISC and Site Closure Plan. Changes to operating procedures or updated geologic information may also affect predictions of plume and pressure front behavior.

**Review the proposed post-injection testing and monitoring program.** In general, the testing and monitoring methods used in the post-injection phase will likely be an extension of the injection phase testing and monitoring methods. Thus, any changes to the strategies in the Testing and Monitoring Plan may need to be reflected in this part of the PISC and Site Closure Plan. Verifying that the strategy described in the amended PISC and Site Closure Plan is based on the most up-to-date understanding of the site is essential to ensuring that sufficient data will be generated to demonstrate compliance with the permit conditions and the Class VI Rule and to inform decision-making at project milestones. For example, consider the following in reviewing the amended PISC and Site Closure Plan:

- If new pathways for potential carbon dioxide movement (e.g., additional faults, fractures, or other pathways) have been identified, verify that post-injection monitoring will target these areas;
- If any new USDWs are identified during pre-operational testing, verify that the final plan includes monitoring to ensure that these USDWs are not endangered;
- If formation testing data indicate that mobilization of additional constituents is possible, confirm that the groundwater monitoring program in the PISC and Site Closure Plan includes monitoring for these constituents;
- If the most up-to-date computational modeling results indicate that the predicted speed, direction, or extent of plume and pressure migration have changed, verify that the spatial and temporal coverage of plume and pressure front tracking methods are appropriate considering the new information; and
- Verify that the locations/depths, spatial coverage, and frequencies of post-injection phase testing and monitoring are appropriate to the most up-to-date AoR delineation, predictions of plume and pressure front behavior, and any new information about endangerment to USDWs within the AoR.

If the plan includes provisions to decrease monitoring parameters or frequencies during the post-injection phase, confirm that any quantitative triggers specified to reduce monitoring (or the baselines against which they would be compared) remain accurate based on the current understanding of the site and model predictions.

If any new monitoring activities are included in the amended plan, confirm that they are addressed in an updated QASP.

**Review the alternative PISC timeframe demonstration in the context of new information (if applicable).** If new information about the site is relevant to any of the criteria for an alternative PISC timeframe demonstration at 40 CFR 146.93(c), revisit the basis of the demonstration. In particular, any changes to the geologic understanding of the site based on formation testing, predicted interactions between carbon dioxide and formation fluids (based on geochemical analyses), or any changes to planned operating procedures (or the physical and chemical


BLF-000145

characteristics of the carbon dioxide stream) may affect the trapping mechanisms and the overall behavior of the carbon dioxide plume and pressure front. When evaluating updates to the alternative PISC timeframe demonstration, also consider predictions about the rate or extent of carbon dioxide movement and/or the timeframe for pressure decline after injection ceases, changes to the understanding of the confining zone characteristics, the number/quality/location of conduits for fluid movement that could endanger a USDW in the final AoR, and the presence of any newly identified USDWs. Review this information and discuss it with the owner or operator as needed to confirm that the assumptions on which the predictions of the alternative timeframe are based remain accurate and the PISC timeframe is protective of USDWs. See Section 4.1.9 above for additional information.

**Review the non-endangerment demonstration criteria in light of newly available information.** If the PISC and Site Closure Plan included non-endangerment demonstration criteria, confirm that any changes to planned monitoring activities, computational modeling results, or information about potential conduits for fluid movement that could endanger USDWs are reflected in the non-endangerment demonstration criteria described in the amended plan. Also, confirm that a sufficient amount and types of baseline data to which future monitoring results will be compared were collected and documented during pre-operational testing. Coordinate with the reviewers of the Testing and Monitoring Plan and the AoR and Corrective Action Plan to ensure that sufficient information will be available at the end of the post-injection phase of the project to make a non-endangerment demonstration.

**Review plans for monitoring well plugging and site closure.** Any amendments made to the Injection Well Plugging Plan to address new information about the site (e.g., on subsurface geochemistry that could affect the compatibility of the injectate with well materials) should be considered for potential modifications to the monitoring well plugging procedures and materials. See Section 4.1.8. Verify that any other proposed site closure activities described in the plan are appropriate in light of newly collected information.

For additional information on evaluating amended PISC and Site Closure plans, see the *UIC Program Class VI Well Project Plan Development Guidance*. Section 3 of the *UIC Program Class VI Well Plugging, Post-Injection Site Care and Site Closure Guidance* provides additional information on PISC for Class VI projects.

***Outcomes***

Following review of the amended PISC and Site Closure Plan and related information, the UIC Program should revise information in the permit file as needed, including the following:

- Permit conditions for PISC and site closure (if necessary);
- The approved amended PISC and Site Closure Plan as an enforceable condition of the permit;
- A final, approved QASP that addresses all testing and monitoring activities in the amended PISC and Site Closure Plan (if necessary, and if the owner or operator develops separate QASPs for injection and post-injection testing and monitoring);
- Any applicable updates to the conditions that must be met to demonstrate that the site does not pose an endangerment to USDWs; and



BLF-000146

- Any revisions to the alternative PISC timeframe, including a report documenting the evaluation of the alternative PISC timeframe demonstration based on the results of newly available information.

The final PISC and Site Closure Plan and any associated supporting materials should be uploaded to the project's permit package area in the GSDT.

### *5.1.9 Emergency and Remedial Response*

Following pre-operational testing, owners or operators must amend the Emergency and Remedial Response Plan if necessary to address updated information [40 CFR 146.82(c)(9)].

The purpose of the UIC Program's review will be to ensure that the amended Emergency and Remedial Response Plan includes any revisions that are necessary to address newly available information, such as changes to site operations, additional resources in an expanded AoR, or the presence of previously unidentified USDWs.

#### *Completeness Review*

The amended Emergency and Remedial Response Plan will likely be a narrative document that is similar in format and content to the approved plan in the permit. The amended plan should include any changes that are needed to address newly available or updated information about the site. This may include changes to the size of the AoR or the presence of additional resources or risks for which response procedures are needed. See Section 4.1.10 for additional information on reviewing the completeness of Emergency and Remedial Response Plans.

#### *Evaluation*

The bolded text below outlines a suggested approach that a UIC Program might employ to evaluate an Emergency and Remedial Response Plan amendment to: confirm that the owner or operator's submittal meets the requirements of the Class VI Rule; verify that the permit conditions related to emergency response are protective; and facilitate authorization to inject.

**Review the amended Emergency and Remedial Response Plan to ensure that it addresses any newly identified risks or resources.** For example:

- If the size or shape of the delineated AoR changes based on newly acquired information, the Emergency and Remedial Response Plan should address risk to all resources and infrastructure throughout the final, approved AoR;
- If updated geologic information or modeling investigations suggest that there is a potential for induced seismicity, the Emergency and Remedial Response Plan should address induced seismicity;
- If pre-operational geochemical testing identifies additional USDWs within the AoR, the Emergency and Remedial Response Plan should address potential carbon dioxide or other fluid movement into these USDWs; and
- If updated information about the geologic characteristics of the site indicate the presence of additional pathways for fluid movement, the Emergency and Remedial Response Plan should describe any associated carbon dioxide leakage or groundwater contamination scenarios and identify responses.

Confirm that the amended Emergency and Remedial Response Plan meets the requirements at 40 CFR 146.94 and that planned responses will be adequate for mitigating any adverse events that could arise during injection and through the PISC phase. See the *UIC Program Class VI Well Project Plan Development Guidance* for additional information on evaluating amended Emergency and Remedial Response plans.

***Outcomes***

Following the review and approval of the amended Emergency and Remedial Response Plan, the UIC Program should develop the following information and upload it to the project's permit package area in the GSDT:

- Revised permit conditions for emergency and remedial response, if appropriate;
- The approved amended Emergency and Remedial Response Plan as an enforceable condition of the permit; and
- Follow-up reports about any aspects of the review that have changed since the permit application review, highlighting how any uncertainties or data limitations were addressed.

### *5.1.10 Injection Depth Waivers*

It is possible that additional geologic information collected during pre-operational testing may be relevant to the injection depth waiver determination or waiver-specific permit conditions. Additionally, such information could strengthen and support the demonstration of site-suitability and the appropriateness of an injection depth waiver. Thus, while there is no specific requirement to update the injection depth waiver application following construction of the well, it is anticipated that owners or operators may submit updated geologic information, required by 40 CFR 146.82(c)(2), that is relevant to the injection depth waiver, including the results of pre-operational formation testing below the injection zone.

Where an injection depth waiver is needed to allow injection into the identified injection zone, the UIC Program should review this in the context of newly acquired or updated geologic information collected during pre-operational testing, the reevaluated AoR, and the final construction of the well. The purpose of the UIC Program's evaluation is to confirm that all permit conditions are appropriate and that the Class VI project will be protective of USDWs. The EPA expects that this evaluation would be closely linked to the review of updated geologic information (see Section 5.1.1) and the AoR reevaluation (see Section 5.1.2).

***Completeness Review***

The EPA recommends encouraging the owner or operator to include in the updated geologic information any information relevant to the injection depth waiver—including information on the lower confining zone and USDWs below the injection zone—highlighting any newly acquired information. If necessary to ensure protection of USDWs above and below the injection zone, the UIC Program should consider requesting that the owner or operator submit this information, pursuant to 40 CFR 146.95(f)(5).

***Evaluation***

The bolded text below outlines a suggested approach that a UIC Program might employ to evaluate any updated information about the injection depth waiver to: confirm that the owner or operator's submittal meets the requirements of the Class VI Rule; confirm that the permit



BLF-000148

conditions remain protective of USDWs above and below the injection zone; and facilitate authorization to inject.

**Verify that updated geologic data confirm the information on which the injection depth waiver application and its approval were based,** particularly regarding USDWs and other formations below the injection zone. Consider operations under an injection depth waiver in the context of the current understanding of the site (e.g., the results of formation testing or updated computational modeling). Modify the Class VI permit conditions or project plans if necessary to address any remaining uncertainties. For example:

- Review the results of fluid sampling and analysis on all formations, including USDWs, below the injection zone and in the context of potential adverse reactions between the carbon dioxide stream and formation fluids or the well. If there is potential for mineralization or liberation of trace metals that may endanger USDWs, consider whether additional groundwater monitoring parameters should be specified in the Testing and Monitoring Plan and PISC and Site Closure Plan. If fluid analysis indicates the potential for adverse reactions between the carbon dioxide stream and well materials in formations below the injection zone, modify the corrosion monitoring or MIT conditions in the permit, as appropriate.
- Verify that the injection and confining zones are still suitable for receiving and confining the total volume of carbon dioxide to be injected based on the current understanding of the site and any newly acquired geologic, geomechanical, geochemical, or lithologic data about the injection and confining zones. For example, if the estimated total storage capacity of the injection zone has changed, consider whether it is necessary to modify the total permitted volume of carbon dioxide. If there is any change in information about the injectivity of the injection zone or the integrity of the confining zone, consider modifying the injection rate or pressure limits in the permit.
- Verify that the AoR reevaluation incorporates all available data about the lower confining zone and USDWs below it, and that no movement of the carbon dioxide plume or pressure front into unacceptable zones is predicted to occur. If necessary, request and review updates to the computational model and/or an amended AoR and Corrective Action Plan that incorporates consideration of the lower confining zone based on newly acquired information.
- Verify that the amended Emergency and Remedial Response Plan and the most up-to-date demonstration of financial responsibility address any newly identified risks to USDWs below the injection zone.
- If, based on other aspects of the pre-operation phase review, revisions to the injection and/or post-injection phase testing and monitoring strategies are necessary, determine whether permit conditions for monitoring below the injection zone are also needed. If so, verify that these have been incorporated into the amended Testing and Monitoring Plan and PISC and Site Closure Plan, as appropriate.

**Verify that the well was constructed properly** and confirm that it will allow injection operations that are protective of USDWs above and below the injection zone. Confirm that the casings were constructed to prevent movement of fluid into all unauthorized zones, including USDWs, above and below the injection zone. Review cement logs and the results of other pre-


BLF-000149

operational well tests to confirm the proper placement of cement. If the well was constructed differently than described in the original well construction plan, verify that the procedures and materials described in an amended Injection Well Plugging Plan are appropriate to protect USDWs below the lower confining zone. See Section 5.1.4 for additional information on evaluating the construction of the well.

If the owner or operator drilled test well bores to obtain logs and cores for geologic characterization below the injection zone, verify that they were plugged and sealed to prevent fluid movement.

**Coordinate with U.S. EPA Headquarters staff** as needed so that notice of the waiver can be posted on the EPA's Office of Water website, per 40 CFR 146.95(e). Provide information about the depth of the injection zone; the location of the well; the name and depth of all USDWs; a map of the AoR; the names of any public water supplies affected, reasonably likely to be affected, or served by USDWs in the AoR; and the date on which the waiver was issued.

***Outcomes***

Following the review of updated information related to the injection depth waiver, revise relevant information in the permit file as needed, including the following:

- Revised permit conditions to conduct direct and indirect testing and monitoring below the injection zone during the injection and post-injection phases or other accommodations to address operation under an injection depth waiver (e.g., related to injection pressure limits or well plugging conditions), if necessary;
- Follow-up to any reports that documented the initial evaluation of the injection depth waiver application, highlighting any changes or clarifications based on pre-operational formation testing results or updated geologic information;
- Documentation of any additional consultation with the applicable PWSS Director(s), e.g., in light of new information or to address questions or issues raised by the public;
- Copies of any public comments received on the waiver; and
- Information about the waiver that was posted on the EPA's website.

Any materials related to the injection depth waiver review should be uploaded to the project's permit package area in the GSDT.

## 5.2 Authorizing Injection

Issuing authorization to inject will likely involve similar activities to those performed to prepare the initial Class VI permit that allowed construction or conversion of the well (see Section 4.2). UIC Programs should implement the following steps:

**Revise the Class VI permit conditions as needed to address any changes in the understanding of the site.** As described throughout this section, it is likely that any needed changes to permit conditions will result from: an evaluation of pre-operational testing results and revised geologic characterization data and/or any updates to previously submitted information to reflect information that was not available at the time the permit application was submitted. Incorporate any changes that are needed based on the reviews described in Section 5.1 into the Class VI permit language.



BLF-000150

Modification of UIC permits is addressed at 40 CFR 144.39 and 144.41:

- 40 CFR 144.39 identifies the conditions under which permit modifications are needed. For Class VI permits, these include (but are not limited to): any permit changes that are necessary based on AoR reevaluations, amendments to any Class VI project plan, or any permit modification that is necessary based on a review of testing and/or monitoring results conducted in accordance with permit requirements. Permit modifications under 40 CFR 144.39 require additional public notification as described at 40 CFR 124. When a permit is modified, only the conditions subject to modification are reopened [40 CFR 144.39]. Note that, pursuant to 40 CFR 144.39, if the permit is revoked and reissued, the entire permit is reopened, subject to revision, and reissued for a new term.
- 40 CFR 144.41(h) presents examples of minor permit modifications for Class VI permits, which include revising any Class VI project plans where the modifications merely clarify or correct the plan. Minor permit modifications may be implemented without preparing a draft permit or soliciting public comment.

**Incorporate the amended project plans as enforceable conditions of the permit (if needed).** See Sections 5.1.6 through 5.1.9 for additional information on reviewing the amended project plans in the context of pre-operational testing results and other information the owner or operator submitted pursuant to 40 CFR 146.82(c).

**Conduct additional outreach per 40 CFR 124, if appropriate.** For example, if the AoR delineation changes and is determined to impact additional disadvantaged communities in areas that were not identified at the time of the initial permit development, communicate with representatives of these communities and provide outreach materials (see Section 3.3 for additional information on EJ considerations). If the final AoR delineation crosses boundaries with other states, territories, or tribes, notify appropriate officials (e.g., UIC Program or environmental protection officials). See 40 CFR 146.82(b) and the template of a letter that can help accomplish this notification, which is available in the resource library of the GSDT.

**Finalize the draft modified permit for notice and comment, if necessary.** Soliciting public comment is required if the updated information about the site necessitates more than minor modifications to the permit [40 CFR 144.39(a)]. For example, public notice and comment would be needed if the delineated AoR changes or calculations of fracture pressure necessitate a change in the approved injection pressure. See above for additional information on permit modifications. Develop a fact sheet and/or statement of basis and compile materials for the administrative record for the permitting decision (see Section 4.2 for additional information on using the GSDT to compile and organize permit files). Highlight how the permit has been modified, particularly how any changes address information acquired during pre-operational testing and updated geologic information. Publish a notice in a newspaper and post all relevant materials online, if possible [40 CFR 124.10(c)(2)(i)]. Provide an updated permit along with a summary of the revisions to the initial permit and why the permit conditions changed, i.e., based on site-specific data or the results of geologic testing. Hold a public hearing or hearings and document all input provided. Prepare responses to all public comments and develop a responsiveness summary document.

**Revise the Class VI permit conditions,** if needed based on the public process, and **issue authorization to inject for the Class VI well.** The permit should identify the date on which injection may commence. The authorization to inject may be a follow-up letter or other

communication to the permittee that the permit is effective on a specific date. Change the project status in the GSDT to show that the project is in the injection phase.

### 5.3 Planning for the Injection Phase Review

After injection is authorized, the owner or operator will begin to inject carbon dioxide and perform required testing and monitoring. The information the owner or operator will generate and submit to the UIC Program should demonstrate that the project is operating within permitted limits and that the well maintains mechanical integrity. Monitoring data should: demonstrate that the plume and pressure front are behaving as predicted; confirm that USDWs are not endangered; and validate modeled predictions or identify the need for appropriate responses. Consistent with the regulations at 40 CFR 146.84, 146.90, 146.92, 146.93, and 146.94, the owner or operator will periodically reevaluate the AoR and update the project plans as needed to ensure that the permit and plans are tailored to site-specific conditions and the behavior of the project.

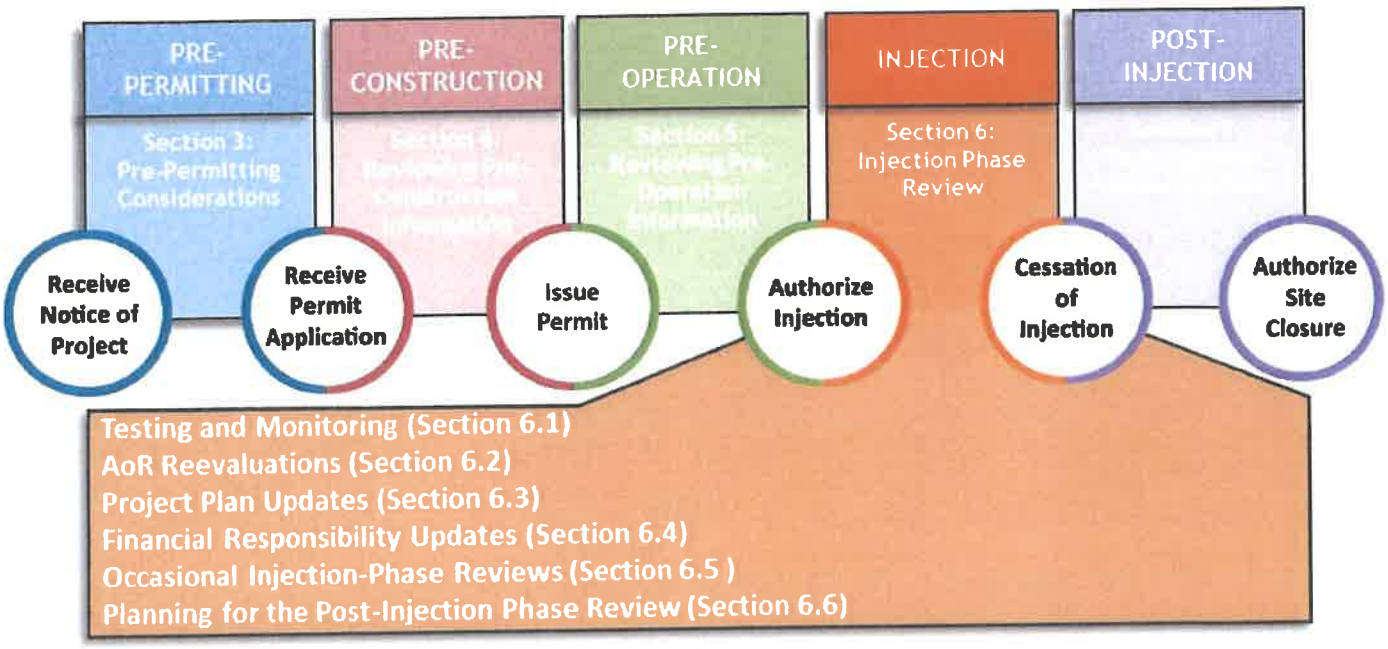
During the injection phase, the UIC Program should evaluate the testing and monitoring results, AoR reevaluations, and updated project plans submitted by the owner or operator to confirm that the project is performing as predicted or, if necessary, work with the owner or operator to implement appropriate actions to return the project to compliance and prevent or mitigate endangerment to USDWs.

Section 6 provides recommendations for how the UIC Program can evaluate the information submitted and coordinate with the owner or operator throughout the injection phase of a Class VI project. The EPA recommends that the UIC Program review Section 6 at the time injection is authorized and consult the section throughout injection operations.



BLF-000152

# Section 6: Injection Phase Review



*This page is intentionally blank.*

# 6 Injection Phase Review

During the injection phase, Class VI well owners or operators will conduct injection activities and perform testing and monitoring as described in the permit and project plans. The information generated and submitted by the owner or operator should demonstrate that the well is maintaining integrity and the carbon dioxide plume and pressure front are behaving as predicted. Reviewing data on project performance or the position of the plume and pressure front can validate modeled predictions or identify the need for appropriate responses. Data generated during injection phase activities will inform the need for AoR reevaluation and the demonstration of non-endangerment.

The goal of the UIC Program's review of information during this phase should be to confirm that the Class VI well and the Class VI project are operating as planned and in compliance with the permit, and that USDWs are not endangered. This information should be evaluated in consideration of the findings of the site characterization and permit application review, particularly with respect to any identified uncertainties about the site.

The UIC Program will likely receive and evaluate the following types of information during the injection phase:

- The results of testing and monitoring required at 40 CFR 146.90 (see Section 6.1);
- Information associated with AoR reevaluations, including updates to the AoR and Corrective Action Plan (see Section 6.2);
- Updates to the other project plans including, at a minimum, the Testing and Monitoring Plan and the Emergency and Remedial Response Plan. The owner or operator may also submit an updated Injection Well Plugging Plan or PISC and Site Closure Plan during this phase (see Section 6.3);
- Updated financial responsibility information (see Section 6.4); and
- Occasional notifications associated with workovers, emergency events, or adverse financial conditions, if necessary (see Section 6.5).

This section presents recommendations for how the UIC Program can evaluate the submitted information. Each subsection below describes the types of information owners or operators will submit, followed by considerations for reviewing the information to verify compliance or identify appropriate follow-up actions (e.g., discussions with the owner or operator or requests for additional or clarifying information). Because each project is unique and the specific information submitted by the owner or operator will vary, the appropriate activities will be specific to the project; thus, the activities described below outline a recommended course of action to accomplish the goal of evaluating injection phase information to ensure that USDWs are protected.

## 6.1 Testing and Monitoring

Throughout the injection phase, owners or operators must perform all testing and monitoring specified in the approved Testing and Monitoring Plan and submit the results to the EPA [40 CFR 146.90]. Owners or operators will also submit 30-day advance notifications of some testing and monitoring activities, as required by 40 CFR 146.91(d); see Section 6.5.1.



BLF-000155

While the specific considerations for each type of required testing and monitoring will vary (as explained in the subsections below), the recommended approach to evaluating the submitted information is the same (see Figure 6-1). The UIC Program should:

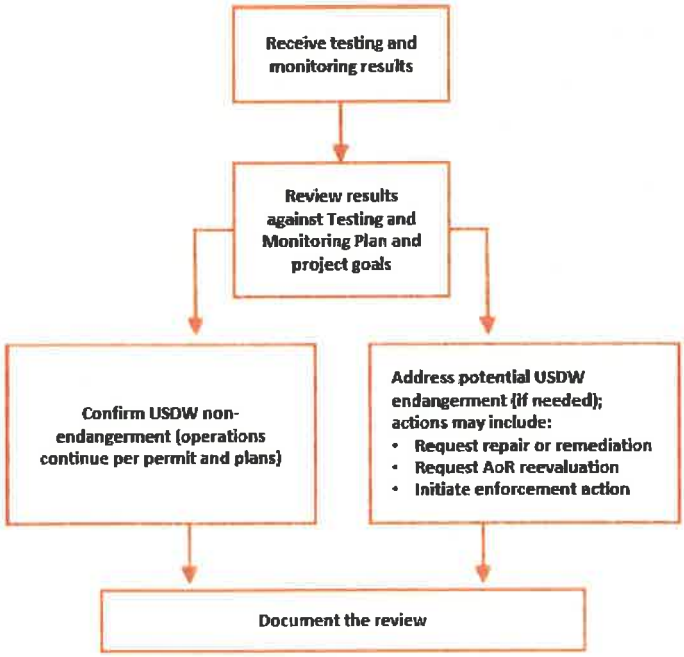



**Figure 6-1: Reviewing Testing and Monitoring Results**

- Confirm that the owner or operator has submitted all required information, i.e., as specified in the Testing and Monitoring Plan;
- Verify that the Class VI well is operating within the conditions of the permit and confirm that there is no evidence of USDW endangerment;
- Identify and discuss any exceedances or unexpected measurements that may provide evidence of endangerment or contamination and request appropriate responses, including well repairs or remediation, an AoR reevaluation, or additional monitoring;
- If there is any indication of noncompliance with the Class VI permit, determine whether a formal or informal enforcement action is appropriate (see Section 2.4); and
- Document the review.

Each subsection below describes, for each type of required testing or monitoring, the types of information that Class VI well owners or operators may submit and suggestions for UIC Programs to consider when reviewing the information to verify permit compliance and identify, where appropriate, any follow-up actions.

### *6.1.1 Characteristics of the Carbon Dioxide Stream*

Class VI well owners or operators must analyze the physical and chemical characteristics of the carbon dioxide stream [40 CFR 146.90(a)]. The purpose of the UIC Program's review of information about the carbon dioxide stream is to confirm that its composition remains consistent with the permit and the information on which predictions of no adverse interaction between the injectate and well materials or formation fluids were based. Changes to the carbon dioxide stream could have implications for well integrity or subsurface geochemical reactions (e.g., reactions that could cause mineralization or alter the corrosivity of the injectate).

Owners or operators may submit the following information about the carbon dioxide stream as part of their semi-annual reports:

- Tabulations and/or plots of analytical results for each sampling event during the reporting period for the suite of parameters specified in the Testing and Monitoring Plan;

- Any changes to the physical, chemical, and other relevant characteristics of the carbon dioxide stream from the proposed operating data, per 40 CFR 146.91(c)(1);
- Compilations of previous results to facilitate evaluation of temporal trends; and
- Descriptions of the sampling methodology and copies of original laboratory reports.

***Evaluation***

In reviewing information about the physical and chemical characteristics of the carbon dioxide stream, the EPA recommends that the UIC Program implement the following activities:

- Review the information submitted to verify that it reflects the requirements of the Testing and Monitoring Plan. For example, verify that appropriate analytical parameters and methods were used, that the testing was performed on schedule and at the specified frequency, and that all QA protocols were followed.
- Evaluate the results of the analyses of the carbon dioxide stream (i.e., composition and the concentrations of any impurities or water content) and compare the results to permitted values.
- Compare the results against any previously reported results to identify any significant changes in the physical and chemical characteristics of the carbon dioxide stream composition over time.

During this review, the UIC Program should consider the following to ensure compliance with the permit:

- If any impurities in the injectate render it a hazardous waste, discuss the implications related to the RCRA conditional exclusion for carbon dioxide in GS activities and assist the owner or operator in coordinating with the RCRA Program regarding the conditional exclusion under 40 CFR 261.4(h), if one has not been certified within the last year (see Section 3.4);
- If any changes in the physical or chemical characteristics of the carbon dioxide stream could potentially lead to unwanted interactions with well components (particularly where exceedances or inconsistencies are ongoing), consider requiring the owner or operator to perform an internal MIT to confirm that there were no adverse impacts on the well;
- If any changes in the physical and chemical characteristics of the carbon dioxide stream could potentially lead to unwanted interactions with formation solids/fluids, consider requiring the owner or operator to modify the water quality monitoring parameters in the Testing and Monitoring Plan; and
- If trends in testing results indicate that the injectate regularly contains impurities that are not listed in the permit or are present in excess of permitted amounts, this may constitute a violation of the permit (see Section 2.4).

### *6.1.2 Continuous Monitoring Data*

Owners or operators must demonstrate internal mechanical integrity by continuously monitoring injection pressure, injection rate, injected volume, pressure on the annulus between the tubing and long-string casing, and annulus fluid volume [40 CFR 146.89(b); 146.90(b)].

The purpose of the UIC Program's review of operating data is to ensure that the Class VI project is operating as planned and within permitted limits and that the well is maintaining internal mechanical integrity.

The owner or operator may submit the following results of continuous monitoring in a tabular and/or graphical form in a PDF file, spreadsheet, or database file, as part of the semi-annual report:

- Injection rate, volume, and pressure measurements;
- Monthly maximum, minimum, and average values for injection rate, carbon dioxide volume (mass), injection pressure, and annular pressure;
- Monthly annulus fluid volume added; and
- Total volume (mass) injected each month and cumulative carbon dioxide volume (mass) injected for the project.

The owner or operator should also note and explain any divergences from the testing protocols described in the approved Testing and Monitoring Plan or any exceedances of a permit limit.

***Evaluation***

In reviewing continuous monitoring data submitted by the owner or operator, the EPA recommends that the UIC Program implement the following activities:

- Confirm that measurements were taken using approved equipment (i.e., as specified in the approved well schematics/the Testing and Monitoring Plan) and recorded at the frequencies specified in the permit. Also verify that measuring instruments have been regularly calibrated according to the QASP. Compare the reported operating data to the limits set forth in the permit and to expected values presented in the Testing and Monitoring Plan to ensure compliance with the Class VI permit.
- Confirm that injection pressures did not exceed 90 percent of the fracture pressure of the injection zone (or a lower injection pressure set as a permit condition) and that they are consistent with values used as inputs in computational modeling. If pressure gauges are not located downhole, verify that proper corrections were made to determine bottom-hole pressure.
- Compare the volume (mass) of carbon dioxide injected to the permitted values and to the overall project volume goals, including estimates of the storage capacity of the injection zone. Examine any calculations of carbon dioxide volume based on the injection rate and verify that proper corrections for bottom-hole temperature and pressure were applied. Sections 3.2 and 3.3 of the *UIC Program Class VI Well Testing and Monitoring Guidance* contain additional information on pressure and flow rate monitoring.
- Evaluate the amount of fluid added to the annulus. If the amount added is excessive (i.e., a greater volume than can be attributed to pressure and temperature changes), consider requiring an MIT to verify well integrity (i.e., to confirm that the annulus is not compromised or leaking fluid).

The UIC Program should consider the following to ensure that USDWs are protected from endangerment:

- Discuss potential reasons for the variances with the owner or operator. If necessary, require follow-up testing to determine the cause of any variances from predicted values or permit conditions;
- If there is a significant divergence over permitted injection pressures (or a pattern of exceedances), consider whether testing to ensure that the injection or confining zone were not fractured or adjustments to the AoR delineation modeling to predict the impacts of higher injection pressures is needed;
- If the injection rate or pressure exceeded permit limits during the reporting period, verify that the owner or operator provided a description of the event(s), including the cause of the exceedance, the duration of the exceedance, and the owner or operator's response;
- If any permit conditions were exceeded, issue a notice of violation and begin discussions with the owner or operator about how to prevent future occurrences. If operating conditions that meet permitted limits cannot be restored, issue a notice to cease injection until the situation can be remedied; and
- If operating data indicate that the project is proceeding differently than the inputs on which computational modeling for delineating the AoR were based (particularly if significantly higher volumes of carbon dioxide are injected), this should trigger an AoR reevaluation (see Section 6.2).

### *6.1.3 Corrosion Monitoring Results*

Owners or operators must perform quarterly corrosion monitoring [40 CFR 146.90(c)] and, if required by the UIC Program Director, perform casing inspection logs (CILs).

The purpose of the UIC Program's review of corrosion monitoring information is to confirm that there are no indications of well material corrosion that could compromise the well's integrity. This is important for Class VI projects, given the potential corrosivity of wet carbon dioxide injectate or of carbon dioxide-water mixtures where an injectate mixes with fluids in the subsurface.

The owner or operator may submit the following information in the semi-annual report:

- Measurements of mass and thickness loss in any corrosion coupons or loops and any assessment of additional corrosion, including pitting, in corrosion coupons or loops (as tabular data or a PDF file, spreadsheet, or database files); and
- The results of any CILs performed, including information about:
    - The measured CILs and comparison to previous logs;
    - The thickness of the casing (referencing the original casing thickness); and
    - The locations of any detected anomalies such as pits, scratches, and splits.

***Evaluation***

In reviewing corrosion monitoring results, the EPA recommends that the UIC Program implement the following activities:



BLF-000159

- Confirm that corrosion monitoring was performed at least quarterly and that any required CILs were performed on schedule. Verify that the corrosion monitoring parameters and techniques used are consistent with those required by the Class VI Rule and described in the approved Testing and Monitoring Plan.
- If the owner or operator used corrosion coupons, verify that the coupon composition is appropriate for the well component(s) being tested (e.g., consisting of the same material as the casing and tubing). Confirm that the coupons were subjected to conditions representative of downhole conditions (e.g., placed downhole or within the injection line) for a duration that will yield relevant results. If the owner or operator used corrosion loops, verify that the temperature of the corrosion loop was controlled to simulate well conditions (otherwise, because corrosion rate increases with temperature, the results may be artificially low). Review the reported measurements of mass and thickness loss in any corrosion coupons or loops used, as well as any information on the nature of the corrosion that is taking place (e.g., localized or general attack, presence of pitting or cracking).
- If the owner or operator performed a CIL, verify that the test was performed properly, using tools and procedures described in the Testing and Monitoring Plan. Review the results of the CIL, such as reported thickness of the casing and the locations of anomalies such as pits, scratches, or splits. If the owner or operator used an alternative method to monitor corrosion, verify that the procedures used were consistent with those described in the approved Testing and Monitoring Plan.
- For all methods of corrosion monitoring, compare the results to any previously reported results that are available to identify any changes in the rate and/or nature of corrosion over time. Based on this information, assess whether the results indicate that that corrosion rates are within acceptable ranges.

During a review of the corrosion monitoring results, the UIC Program should consider the following to ensure that the well is in compliance:

- While target corrosion rates of 1 mil per year or less (or approximately 25 μm per year) are common in wells used in the oil industry, determining acceptable corrosion rates for wells at Class VI projects necessitate consideration of site-specific factors, such as subsurface conditions and well materials.
- The nature and location of corrosion is also important; a relatively higher rate of generalized metal loss may be less significant than a lower rate of localized corrosion, and certain well components may be more or less susceptible to different types of corrosion.
- If the information submitted suggests that unanticipated and/or unacceptable levels of corrosion may be occurring in any well components, initiate discussions with the owner or operator and request follow-up testing or repairs of the well, if necessary.

### *6.1.4 Groundwater Quality Monitoring*

Periodic monitoring of groundwater quality above the confining zone(s) is required at 40 CFR 146.90(d). Owners or operators of projects that are operating under an injection depth waiver must also monitor in the first USDWs above and below the confining zones, per 146.95(f)(3)(i).

Reviewing the results of groundwater monitoring can reveal geochemical changes that result from leaching or mobilization of heavy metals and organic compounds, or from fluid displacement.

The purpose of the UIC Program's review of groundwater quality data is to identify whether there is evidence of the migration of carbon dioxide and/or other fluids out of the injection zone that may endanger USDWs and identify appropriate responses or mitigation activities.

Owners or operators may submit the following types of information in the semi-annual reports:

- Tabulations of all analytical results for all chemical constituents analyzed, for each sampling event during the reporting period at each monitoring well;
- Previous results to facilitate evaluation of temporal trends;
- Maps and graphs in a geographic information system (GIS)-compatible format to support model validation; and
- Supporting information, including analytical data and interpretive analyses (e.g., using Piper or Stiff diagrams, time series graphs, or isopleth maps).

If the owner or operator supplemented their direct groundwater sampling with other above-confining-zone monitoring methods (such as well logging or geophysical techniques) they will also submit the results of these activities in their semi-annual reports.

***Evaluation***

In reviewing the results of groundwater quality monitoring, the EPA recommends that the UIC Program implement the following activities:

- Verify that samples were collected according to the schedule identified in the approved Testing and Monitoring Plan, taking into consideration any phased monitoring described in the plan (e.g., phased installation of monitoring wells), and that the parameters monitored are consistent with those identified in the plan.
- Verify that samples were collected and analyzed from all monitoring locations and intervals identified in the approved Testing and Monitoring Plan. Also verify that procedures such as well purging, instrument calibration, sample collection and handling, and quality assurance measures were carried out as described in the Testing and Monitoring Plan and the QASP. Confirm that samples were analyzed for all of the parameters specified in the Testing and Monitoring Plan using approved analytical methods. If applicable, verify that appropriate preservation of in situ conditions (e.g., pressure, temperature) was maintained to ensure that the results are representative of subsurface conditions. If additional above-confining-zone monitoring methods are used to supplement direct fluid sampling, review the results for consistency with the results of the groundwater analyses.
- Compare the analytical results with the baseline results collected during the site characterization process, as well as to any applicable predictions from the AoR delineation model or expectations stated in the Testing and Monitoring Plan. Also compare the results with previously reported data to identify trends that may indicate the movement of carbon dioxide and/or other fluids out of the injection zone. See the Interpretation subsection of Section 4.3 of the *UIC Program Class VI Well Testing and*

*Monitoring Guidance* for a description of trends that may indicate unintended fluid migration. However, keep in mind that these trends may have other causes and may not necessarily indicate leakage and/or migration.

During their review of the groundwater quality monitoring results, the UIC Program should consider the following to confirm non-endangerment of USDWs:

- If any excursions or trends indicate potential leakage or fluid migration out of the injection zone, initiate discussions with the owner or operator and request follow-up actions as needed. This may include additional testing or implementation of the Emergency and Remedial Response Plan.
- Review any analyses or documentation of trends provided by the owner or operator and, if necessary, discuss these or request that the owner or operator explain their cause.

### *6.1.5 External MITs*

Owners or operators must perform annual external MITs, per 40 CFR 146.89 and 146.90(e). The purpose of the UIC Program's review of MIT results is to verify that the well is maintaining mechanical integrity and the injection system is operating as intended, or to identify integrity issues that may indicate a possible loss of containment that could endanger USDWs.

Owners or operators must submit the results of external MITs within 30 days of each test [40 CFR 146.91(b)]. Depending on the type of test(s) performed, submissions may include the following information:

- Graphs (e.g., temperature vs. depth from temperature logs);
- Supporting data in spreadsheets or databases; and/or
- Log results (e.g., in LAS format) accompanied by narrative interpretations of the logs.

***Evaluation***

In reviewing MIT data, the EPA recommends that the UIC Program implement the following activities:

- Confirm that the owner or operator performed the MITs using the methods and procedures specified in the approved Testing and Monitoring Plan.
- Verify that necessary test conditions were met for a particular MIT (e.g., a sufficient shut-in period for temperature logs). Also review reported instrument calibration and other quality assurance-related procedures for consistency with the QASP. If the MIT results (especially from temperature and noise logs) are ambiguous or there are unresolved anomalies, discuss the potential need for the owner or operator to re-test the well using another method.

The UIC Program should consider the following to ensure that the well will not become a conduit for fluid movement:

- If proper testing procedures were not followed, request that the owner or operator re-test the well.
- If it is confirmed that the well lacks external mechanical integrity or is otherwise out of compliance with the Class VI permit, pursuant to 40 CFR 146.88(f), require the owner or



BLF-000162

operator to cease injection until the cause of the mechanical integrity loss has been determined and remedied. Ensure that the owner or operator completes follow-up activities (e.g., performing remedial action on the well) and, if necessary, implements procedures specified in the Emergency and Remedial Response Plan (see Section 6.3).

- If there is concern that carbon dioxide may have leaked from the well, discuss with the owner or operator whether additional above-confining-zone testing or monitoring may be appropriate.

### *6.1.6 Pressure Fall-Off Test Results*

Class VI well owners or operators must perform a pressure fall-off test at least once every five years [40 CFR 146.90(f)] unless more frequent testing is specified in the Testing and Monitoring Plan.

The purpose of the UIC Program's review of pressure fall-off data is to confirm that reservoir pressures are consistent with predicted pressures and modeling inputs. The evaluation should also confirm the geologic information on which the site characterization is based and verify that projects are operating properly and that pressures within the injection zone are responding as predicted.

Owners or operators will submit the results of pressure fall-off testing within 30 days of the test if required by the UIC Program Director [40 CFR 146.91(b)(3)]. (Otherwise, the results may be provided as part of the semi-annual reports.) These submissions may include the following information:

- Narrative summaries that describe any changes to formation characteristics of the near-well bore environment and any indication of fluid leakage during the test;
- Supporting information, including tabular data and/or the outputs from commercial software used to analyze the data;
- Trend data comparing new test results with previous results; and/or
- Other supporting information, including: measured injection rates and pressures from the test well and any offset wells; plots of observed pressure, time, and change in pressure as a function of time; any temperature anomalies and whether they correspond to pressure anomalies; and calculated formation characteristics (i.e., transmissivity, well skin factor).

***Evaluation***

In reviewing pressure fall-off testing results, the EPA recommends that the UIC Program implement the following activities:

- Confirm that the pressure fall-off testing was performed using the procedures specified in the approved Testing and Monitoring Plan, that the testing was performed on schedule, and the results were reported as specified in the plan.
- Verify that, during the test, a sufficient shut-in period elapsed and pressure stabilization was achieved. Confirm that the owner or operator measured the pressure prior to beginning the test and verified that it was not changing and that the injection was shut off for the duration of the test. At sites where multiple wells are injecting into the same zone, review the procedures related to offset wells (e.g., whether injection was halted or held

constant at the offset wells). Also review reported gauge calibration records and other quality assurance-related items against the QASP, and verify that the quantitative methods used to analyze the results were consistent with the Testing and Monitoring Plan.

- Compare the resolution of the pressure fall-off test results to the sensitivity of the gauges used. Evaluate the methods used to account for multiphase effects and the assumptions made by the owner or operator when interpreting the results. To assess whether there have been any changes in the near-well bore environment, compare the test results to the results of any previous pressure fall-off tests and to the formation characteristics (e.g., permeability, transmissivity) reported with the geologic data used in the AoR delineation model.

During their review of pressure fall-off data, the UIC Program should consider the following to confirm compliance with the permit:

- If proper testing procedures were not followed, discuss with the owner or operator the potential need to re-test the well and submit the new results;
- If any aspect of the test results (e.g., anomalous pressure drops) suggest the possibility of fluid migration, initiate discussion with the owner or operator and request further testing, if appropriate; and
- If changes in formation characteristics have been identified, discuss the potential need to reevaluate the AoR to reflect the new values with the owner or operator.

### *6.1.7 Plume and Pressure Front Tracking Information*

Owners or operators must track the carbon dioxide plume and pressure front using direct and indirect methods [40 CFR 146.90(g)]. The purpose of the UIC Program's review of plume and pressure front tracking information is to confirm that the carbon dioxide plume and pressure front are behaving as predicted (i.e., to validate the AoR delineation model) or identify any evidence of unintended carbon dioxide or formation fluid migration out of the injection zone and/or potential USDW endangerment.

Owners or operators will submit the results of both direct and indirect methods for tracking the pressure front within the injection zone and tracking the extent of the carbon dioxide plume unless indirect methods were not included in the Testing and Monitoring Plan based on a UIC Program Director decision pursuant to 40 CFR 146.90(g)(2). Owners or operators may submit the following types of information in the semi-annual report:

- A narrative summary that presents the results of all required tests/surveys, supported by maps, graphs, and monitoring data in tables;
- Monitoring data in a GIS-compatible format to allow data matching with the AoR delineation model;
- Comparisons of monitoring results to modeled predictions or to previous monitoring or survey results (to illustrate trends); and
- An assessment of whether any monitoring results indicate fluid movement into USDWs.

***Evaluation***

In reviewing the results of plume and pressure front tracking, the EPA recommends that the UIC Program implement the following activities:

- For each plume and pressure front monitoring activity, confirm that the measurement(s) or test(s) were conducted according to the schedule described in the approved Testing and Monitoring Plan. Also review the method(s) chosen (e.g., seismic, electrical, gravity) and specific procedures used for consistency with both the Testing and Monitoring Plan and the QASP. If the information submitted indicates that tests or measurements were not completed as described in the Testing and Monitoring Plan, initiate discussions with the owner or operator and, if necessary, request repeat or additional testing.
- For direct pressure monitoring, confirm that all pressure transducers have adequate sensitivity to measure the expected pressure increases caused by injection and that they were calibrated according to manufacturer's recommendations and/or industry standards. If pressure gauges are not placed downhole, review calculations to determine whether bottom-hole pressures have been properly calculated. Where fluid sampling from the injection zone is used to directly monitor the carbon dioxide plume, compare the results of this monitoring with baseline data, previously reported data, and predictions from the AoR delineation model to confirm that the plume and pressure front are behaving as predicted and/or identify any trends that may indicate that the rate and direction of plume movement are not as predicted.
- For indirect geophysical methods, verify that the instruments were properly placed and georeferenced. Verify that interpreted results are consistent with other monitoring data, such as directly measured data (e.g., pH, temperature, pressure, saturation).
- Compare the results of direct pressure front tracking against any threshold values for the pressure front established in the Testing and Monitoring Plan. Also compare the data to predictions of plume and pressure front locations based on AoR delineation modeling. If measurements have been collected from one or more zones above the confining zone, evaluate the results for possible indications of fluid migration (e.g., an increase in pressure above the confining zone).
- For indirect methods, compare the results against baseline surveys and other previous surveys, and any additional monitoring data that have been submitted since the last survey was conducted. In addition, review the assumptions made during data processing and other information used to constrain the interpretation of the results.

The UIC Program should consider the following about plume and pressure front behavior to ensure compliance with the permit:

- If the submitted information includes unexplained anomalies or ambiguous results, or indicates the possibility of fluid migration, initiate discussions with the owner or operator. As necessary, consider the need for follow-up testing or monitoring activities to ensure the protection of USDWs (pursuant to 40 CFR 146.90(i)).
- If the results suggest that the locations of the plume and/or pressure front do not agree with modeled predictions, this may trigger one of the criteria for an AoR reevaluation established in the AoR and Corrective Action Plan.

- If results indicate that fluid migration or pressure increases may be endangering USDWs, work with the owner or operator to initiate response procedures as described in the Emergency and Remedial Response Plan.

### *6.1.8 Surface Air and/or Soil Gas Monitoring*

If surface air and/or soil gas monitoring is required as part of the Testing and Monitoring Plan, pursuant to 40 CFR 146.90(h), the owner or operator will submit the results along with other testing and monitoring results.

The purpose of the UIC Program's review of surface air and/or soil gas monitoring is to confirm that there were no results that might indicate fluid migration out of the injection zone and/or USDW endangerment.

The owner or operator will submit the results of any required surface air and/or soil gas monitoring in their semi-annual reports. The owner or operator may submit the following information:

- A narrative description of the monitoring results;
- Descriptions of any significant changes in carbon dioxide levels compared to background levels or any detection of carbon dioxide migration that may impact a USDW; and
- Supporting images, maps, or spreadsheets or databases of all available surface air and soil gas monitoring data from each sampling location and depth, including any background data and QA/QC samples.

***Evaluation***

In reviewing surface air and/or soil gas monitoring data, the EPA recommends that the UIC Program implement the following activities:

- Verify that any required surface air and/or soil gas monitoring was performed according to the schedule in the approved Testing and Monitoring Plan. Review measurement procedures (e.g., instrument calibration, vacuum-volume purge tests, sample probe purging, sampling rates) and analytical procedures for consistency with the Testing and Monitoring Plan and the QASP.
- Compare the surface air and/or soil gas monitoring results to background/baseline data and other expectations as described in the Testing and Monitoring Plan. Also consider previous monitoring results from the sampling site(s) to identify trends that may indicate carbon dioxide leakage to the surface. However, keep in mind that carbon dioxide detection above background levels in surface air and/or soil gas does not necessarily indicate USDW endangerment; for example, it may reflect changes in near-surface carbon dioxide levels that are unrelated to the Class VI project.

The UIC Program should consider the following when reviewing the monitoring results to ensure compliance and USDW protection:

- If specified procedures were not followed or there are unexplained data gaps, initiate discussions with the owner or operator and evaluate the need for re-sampling/re-analysis and re-submission of the results; and

- If the results indicate elevated surface air and/or soil gas carbon dioxide levels, initiate discussions with the owner or operator and request additional follow-up work or remedial actions as necessary to ensure the protection of USDWs.

### *6.1.9 Other Required Monitoring*

A Class VI permit may include additional monitoring if, pursuant to 40 CFR 146.90(i), the UIC Program Director determined that such monitoring was necessary.

The purpose of the UIC Program's review of this monitoring data is to confirm that the results satisfy the intended purpose. For example, the UIC Program should evaluate the information submitted to determine compliance with the prohibition of fluid movement into USDWs per 40 CFR 144.12, and confirm that the monitoring/approach is appropriate to site-specific conditions. The UIC Program should also review the monitoring information to ensure that it confirms predictions of site behavior and/or supports updating or refinements to the AoR delineation modeling.

The specific information submitted and the timing of the submittal will depend on the testing and monitoring performed, but owners or operators may submit the following information:

- A narrative description of the monitoring results;
- A discussion of any changes or trends in the results;
- Maps, graphs, and monitoring data in tables (accompanied by historical data to illustrate trends) to support the monitoring data; and/or
- If passive seismic monitoring is required, information on the magnitude and location/depth of hypocenters of any microseismic activity or earthquakes, along with information about whether the event was felt (i.e., per USGS data).

***Evaluation***

While reviews of the results of additional testing and monitoring will be site-specific and depend on the nature of the activities performed, a general strategy may be followed. This section briefly explains several potential examples and activities that the EPA recommends that the UIC Program implement:

- Verify that the testing or monitoring was performed on the schedule set in the Testing and Monitoring Plan and that procedures (sampling, data collection, analytical methods, etc.) were consistent with the Testing and Monitoring Plan and the QASP. If specified testing/monitoring or quality assurance procedures were not followed, or if there are unexplained data gaps, initiate discussions with the owner or operator regarding re-sampling/testing, if necessary.
- Compare the results against any expected or threshold values included in the Testing and Monitoring Plan or predictions established by computational modeling, permit conditions, or other expectations.
- If the owner or operator performed passive seismic monitoring, review information about the magnitude and location/depth of seismic events, particularly any that were felt events, where applicable. Confirm that appropriate responses, e.g., applicable threshold-based

responses in the Emergency and Remedial Response Plan, were performed (see Section 4.1.10).

In evaluating the results of this monitoring, the UIC Program should consider the following, which may have implications for compliance:

- If any monitoring results indicate the possibility of a carbon dioxide leak or fluid migration out of the injection zone/through the confining zone, USDW endangerment, or any other unexplained anomalies, establish appropriate follow-up actions. These may include additional monitoring/testing (either with the same or a different method), revisions to the Testing and Monitoring Plan, an AoR reevaluation, or remedial action as described in the approved Emergency and Remedial Response Plan.
- If there is an indication that the frequency or intensity of seismic activity is increasing over time, consider modifying the operating parameters (e.g., injection rates or pressures) in the permit.

## 6.2 AoR Reevaluations

Class VI well owners or operators must reevaluate the AoR delineation throughout the duration of the project [40 CFR 146.84(e)] and, if necessary, update the AoR and Corrective Action Plan based on the results of the AoR reevaluation. Owners or operators must reevaluate the AoR at a frequency set in their approved AoR and Corrective Action Plan or when warranted based on certain conditions, such as following significant changes in site operations, monitoring results that deviate from computationally predicted behavior, or availability of new site-specific data that may impact modeling predictions. See Figure 6-2.

AoR reevaluations may result in two potential outcomes, with different submittals made by the owner or operator:

1. A technical demonstration that the existing AoR and Corrective Action Plan is adequate, supported by project monitoring data; or
2. An amended AoR and Corrective Action Plan with a modified AoR delineation and a revised corrective action strategy (or a demonstration that the existing corrective action strategy continues to ensure protection of USDWs).

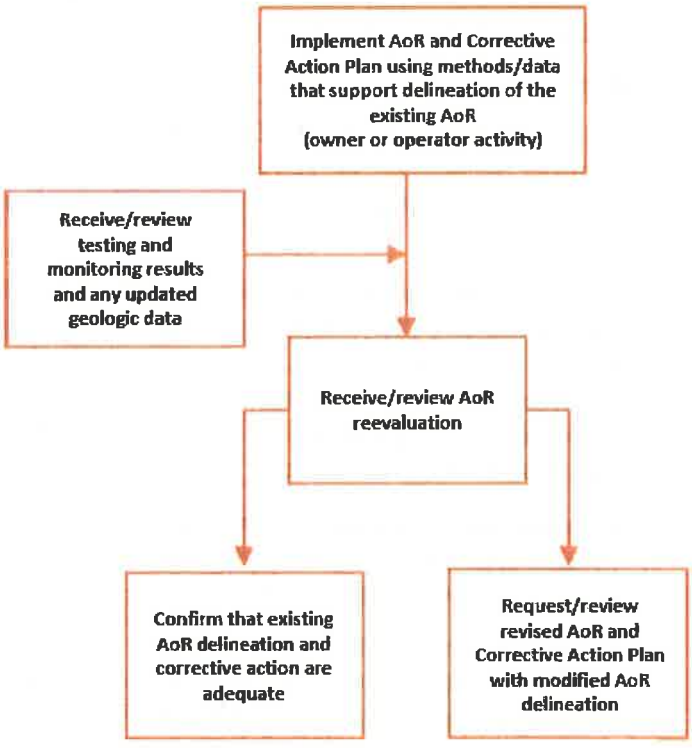



**Figure 6-2: AoR Reevaluations**

The purpose of the UIC Program's review of information associated with AoR reevaluations is to ensure that all new and relevant observed/measured

project data support the existing AoR or that, if necessary, a new AoR is delineated to more accurately represent the area where USDWs may be endangered. Reviewing this information is analogous to the pre-construction and pre-operation phase reviews of the AoR delineation, although it will focus on data collected during project operations.

The goal of evaluating these submittals is the same as that described in Section 4.1.2 for the initial AoR delineation: to assess (in light of any new data) whether the AoR appropriately represents the area in which USDWs may be endangered by the injection activity, and to ensure that all artificial penetrations that may allow fluid movement into USDWs in the AoR are identified and addressed by corrective action. For additional information on AoR reevaluations, see the *UIC Program Class VI Well Area of Review Evaluation and Corrective Action Guidance*.

***Completeness***

Depending on the progress of the project, owners or operators will either submit a demonstration that the existing AoR is adequate or a revised AoR and Corrective Action Plan.

Owners or operators may use a variety of approaches to demonstrate that the existing AoR is adequate. However, the EPA expects that such a demonstration will, at a minimum, involve comparison of the most up-to-date monitoring and operational data and other site-specific information to the computational predictions that supported the existing, approved AoR delineation. Owners or operators might also evaluate the agreement between the inputs used to delineate the existing AoR and the measured/observed project data or they might conduct additional computational modeling with updated, calibrated input parameters and show that this results in the same AoR.

The UIC Program should identify the approach taken by the owner or operator and examine the updated information to ensure that all necessary submissions/changes have been made to support the demonstration. The submission should account for all testing and monitoring, site characterization, and/or operational data used in the analysis and clearly reference the source of this information. If the owner or operator employed a new modeling approach and predictions used in the analysis have not been submitted previously, the permit writer should verify that the data associated with the predictions are also submitted to the GSDT along with a confirmation that they resulted from the same simulation (e.g., with the same initial conditions, simulation time, etc.) used for delineating the existing AoR.

If the owner or operator is submitting a revised AoR and Corrective Action Plan as a result of the reevaluation, the EPA expects that a detailed description of the reevaluation activities and the results that triggered a new delineation of the AoR will be submitted as part of this process. The UIC Program should confirm that:

- The submission sufficiently describes the inconsistencies found during the reevaluation;
- The necessary changes to the existing modeling data in the GSDT or the new data (e.g., associated with the calibration of the model) have been submitted and that they support the technical evaluation;
- An updated corrective action strategy has been provided, if needed; and
- A revised narrative plan, including all required components (as informed by 40 CFR 146.84), has been submitted.


BLF-000169

***Evaluation***

The specific aspects of the technical review of AoR reevaluations during the injection phase will depend on the types of information and materials submitted by the owner or operator. The bolded text below outlines a suggested approach for reviewing the injection phase AoR information. This approach will help to confirm that the owner or operator's submittal meets the requirements of the Class VI Rule and the permit; confirm that the AoR is appropriately protective; and ensure that the submitted reevaluation sufficiently addresses identified uncertainties associated with the existing AoR delineation to confirm USDW non-endangerment.

**Review the demonstration that the existing AoR is adequate** (if the owner or operator submits one). Identify the parameters used in the owner or operator's analysis to demonstrate conformity between the predicted and observed data (e.g., between the computationally predicted plume and pressure behavior and the plume and pressure front tracking results). Ensure that the data used in the analysis incorporates all the relevant data that have become available since the existing AoR delineation was approved (including the results of monitoring collected throughout the AoR). The demonstration should reflect the results from all relevant activities covered by the Testing and Monitoring Plan, as well as any newly available geologic data that the owner or operator may have collected (e.g., from new logs run at nearby wells). Pressure profiles at given locations (e.g., at injection or monitoring wells) over time are expected to be one of the key parameters of comparison between predicted and observed data. However, in addition to pressure data, it is important to ensure that the results of operational monitoring are also consistent with the operational input data used in the modeling effort, and to confirm that the observed plume migration agrees with predicted behavior. When conducting this evaluation, refer to the monitoring results submitted with the semi-annual reports (see Section 6.1) to ensure that the data used in the demonstration are accurate and complete.

**If the AoR does not Change during the Reevaluation**

In some cases, the revised plan may only need to include a new corrective action strategy or related information, with no changes made to the existing AoR. For instance, the AoR reevaluation may have been triggered by testing and monitoring results that indicate fluid migration out of the injection zone/into a formation above the confining zone formation through a newly identified abandoned well. While the reevaluation in this case confirms that the existing AoR is adequately delineated, a revised corrective action strategy should be incorporated into the AoR and Corrective Action Plan and evaluated by the UIC Program.

This demonstration should also include assessments of compliance with regulatory requirements and validation of AoR delineation modeling predictions, and compliance with the permit (e.g., pressure limits to ensure that injection does not initiate or propagate fractures in the confining zone). Assessments of agreement between the predicted and observed trapping values for different mechanisms are also important, particularly to ensure that the alternative PISC timeframe, if one has been approved, remains adequate. Furthermore, the demonstration should include an assessment of the adequacy of the existing corrective action plan by confirming that the previously identified corrective action needs are still accurate and were addressed.

The EPA expects that the conformity between predicted and measured project behavior will, at a minimum, be based on graphical examination of the data for the chosen parameters. For example, these graphical evaluations may include plots comparing observed and predicted pressure values at a certain location, or a comparison of the predicted plume extent at certain times to corresponding 3D seismic survey results and/or plume arrival data at specific

monitoring locations. In addition to comparing data directly, evaluations may also include comparisons of ranges and medians of integrated parameter values, or comparison of cumulative distribution functions. Confirm that the data used in these graphical examinations are correct and complete. This may be best achieved by developing plots of reported monitoring data (see Section 6.1) over time and comparing them to plots provided in the detailed discussion of the monitoring results. If the conformity is supported by a statistical analysis, in addition to confirming the accuracy and completeness of the data used, also evaluate the statistical methods to ensure they are suitable and correctly implemented.

If new/updated geologic data is available, assess whether it affects the AoR delineation (e.g., if it is relevant to the porosity, permeability, or relative permeability of key formations, the depth or extent of the confining zone, the pressure at the bottom of the lowermost USDW, etc.). If it does, evaluate whether it is consistent with the inputs used in the existing AoR delineation model. For example, it might be appropriate to develop plots of the data used in the model (e.g., a layer-by-layer distribution of mean parameter values and standard deviations) and compare those to the new information.

If the owner or operator conducted any additional computational modeling to demonstrate that the new information does not affect the existing AoR, identify the method used (e.g., whether the owner or operator used the original model or a new approach) and evaluate its accuracy by, for example, using the independent model developed to evaluate the existing AoR delineation. Any relevant testing and monitoring results and other new information should be integrated into the independent model, and/or the model parameters should be calibrated using the new data to support simulations assessing the impact on the AoR.

**Review the revised AoR and Corrective Action Plan** (if one was submitted). Ensure that the approach used to delineate the new AoR complies with the requirements under 40 CFR 146.84 and that it accounts for all new site characterization, operational, and testing and monitoring information. The EPA expects that a detailed description of the AoR reevaluation and its results warranting a new delineation of the AoR will be submitted as part of the revised plan, to achieve consistency and continuity in documenting project decisions. Conduct an evaluation of this submission, similar to the evaluation of the demonstration that the existing AoR is adequate, to confirm the need for a revised plan and/or a new AoR delineation.

If the owner or operator submitted an updated AoR and Corrective Action Plan, review the following:

- The reevaluation approach and the identified inconsistencies that warranted the delineation of the new AoR;
- The delineation of the new AoR (including the computational modeling and delineation method); and
- Any corrective action status/updates, including any updates to the phased corrective action schedule (or the owner or operator's demonstration that no update is needed).

Review and confirm that all proposed or performed corrective action relies on methods that are consistent with the testing and monitoring results (e.g., geochemical data). If phased corrective action is being implemented, evaluate the schedule in light of the new AoR delineation and computational modeling results.

If any unexpected carbon dioxide movement, fluid migration out of the injection zone, or emergency events have occurred since the last AoR reevaluation, discuss with the owner or operator the possible need to revise the reevaluation schedule or triggers for reevaluations.

**Review a new AoR delineation** (if one was submitted). Evaluate all of the updates/changes made to the modeling data and confirm that:

- They represent parameters for which inconsistencies have been identified. For example, if the reevaluation identified an inconsistency between newly available data for relative permeability in the injection zone and the values used in the existing AoR delineation, confirm that the AoR delineation reflects the most up-to-date data.
- The updates/changes reflect the adjustments, within reasonable limits (depending on the parameter used), determined via model calibration procedures to achieve an acceptable agreement between model predictions and the collected testing and monitoring data. Such model calibration procedures should focus on the parameters that have been identified as the most sensitive parameters during sensitivity analyses. If the same numerical model that supported the existing AoR delineation is being updated, a sensitivity analysis should already have been conducted during the delineation process identifying these parameters. Model calibration procedures should also include the model outputs that are most affected by these key parameters. At a minimum, it is expected that model calibration would involve an iterative optimization process resulting in an updated conceptual model and input parameters (e.g., inverse modeling). Additional information on model calibration can be found in the *UIC Program Class VI Well Area of Review Evaluation and Corrective Action Guidance*.

For these assessments, the EPA recommends using a combination of qualitative and quantitative procedures similar to the procedures described in Section 4.1.2. As part of the quantitative approach, conduct independent or semi-independent computational modeling that also accounts for the calibration of model parameters. Follow these general steps:

- Assess the conceptual/geologic model and model parameters to verify that they are consistent with all available data (i.e., including any newly acquired geologic information, testing and monitoring, and operational information), and that they provide an accurate representation of the geologic and operational systems.
- Assess the computational/numerical model to verify that it accounts for all applicable chemical and physical characteristics of the injected carbon dioxide and displaced fluids; that it is constructed to accurately represent the geologic and operational systems based on the measured data; and that its outputs are consistent with the measured/observed monitoring results.
- Evaluate the methodology used to delineate the modified AoR, based on the new modeling results, to ensure that the AoR accurately represents the area where USDWs may be endangered and parameter values used in the delineation are consistent with the most up-to-date field measurements.
- Determine if any additional artificial penetrations are present in the new AoR and verify that the owner or operator has taken actions to evaluate the conditions of these new wells and perform any needed corrective action. If phased corrective action was approved,



BLF-000172

verify that the phasing plan remains appropriate based on the most recent plume/pressure trajectory from the updated model or monitoring results.

- Confirm that the new AoR delineation process and the status of corrective action are documented in the narrative portion of the revised AoR and Corrective Action Plan. Determine if the frequency for future reevaluations included in the revised plan is sufficient, or whether more frequent reevaluations are necessary (e.g., due to some significant deviations identified during the current reevaluation process).
- Identify the other project plans that might need to be amended, such as the Testing and Monitoring Plan or PISC and Site Closure Plan (e.g., to include monitoring in new areas of the AoR or expanded geophysical monitoring that encompasses a wider area, or to identify more frequent monitoring) and the Emergency and Remedial Response Plan (e.g., to address additional resources in an expanded AoR). See Section 6.3 for more information on project plan updates and Section 5.2 for information on modifying the Class VI permit.

**Review information on any newly-performed corrective action** (i.e., under an approved phased corrective action schedule). Confirm that the owner or operator performed all phased corrective action on schedule and used appropriate/approved methods and carbon dioxide-resistant materials.

***Outcomes***

To ensure that the area where USDWs may be endangered due to the injection activity is accurately delineated and to support future site closure decisions, the UIC Program should develop the following:

- An updated AoR and Corrective Action Plan that is an enforceable condition of the Class VI permit;
- A modified permit that incorporates the amended plan; and
- A report documenting the technical evaluation process as described above to support a determination regarding whether revising the project plans (and potentially modifying the Class VI permit) are needed.

## 6.3 Project Plan Updates

Class VI well owners or operators must submit amended Testing and Monitoring and Emergency and Remedial Response Plans within one year of an AoR reevaluation or submit information to demonstrate that no amendments to the project plans are needed [40 CFR 146.90(j)(1); 146.94(d)(1)]. Project plan revisions may also be triggered by significant changes to the facility (e.g., addition of new injection wells) or as required by the UIC Program Director.

The purpose of the UIC Program's evaluation of the updated plans is to confirm that they address the entire AoR delineated as part of the most recent reevaluation and address any relevant risks to the site. In particular, the UIC Program should ensure that the amended plans are appropriate to operations, the well's construction, and the most up-to-date understanding of the behavior of the site, as informed by the most recent testing and monitoring and AoR delineation modeling results.

As described in Section 6.2 above, AoR reevaluations may also trigger revisions to the AoR and Corrective Action Plan [40 CFR 146.84(e)(4)]. In addition, revisions to the project plans may necessitate an update to the financial responsibility cost estimates and financial instruments. See Section 6.4 for additional information about reviewing these updates.

***Completeness***

Project plan updates will likely be narrative documents that are similar to the approved project plans that are enforceable conditions of the Class VI permit; they may be supported by supplemental information (e.g., GIS files or other materials). Changes should reflect the monitoring, operating, or modeling activities that need to be revised based on the findings of the AoR reevaluation or other event that triggered the plan revision. If applicable, owners or operators should also submit an updated QASP for all testing and monitoring procedures (e.g., as part of a revised Testing and Monitoring Plan or PISC and Site Closure Plan). See Section 4.1 for additional information on evaluating the completeness of Class VI project plans.

If any changes are needed and either a revised plan was not submitted or the appropriate changes were not included in the revised plan, the UIC Program should consider requesting that the owner or operator update the plan and submit a revised version. Alternatively, in some cases, the owner or operator may make a justification that no plan updates are needed; this should be a technical demonstration based on site-specific data.

***Evaluation***

If the owner or operator submits one or more updated project plans, reviewing the updated plans will entail a process similar to the review of the initial plans submitted with the permit application (see Section 4.1 for specific considerations). However, reviews during this phase will focus on operating data and monitoring data generated since the last review/update of the plans, the most recent AoR reevaluation, and any aspects of the project that have changed since the plans were last approved.

If the owner or operator submits a demonstration that no updates to one or more project plans are needed, the UIC Program should review geologic data and the most recent AoR reevaluation to confirm that there have been no changes at the facility (or divergences from predicted values) that would warrant revision of any of the plans. The demonstration should show how operating data (e.g., injection pressures, volumes, rates) and monitoring data (e.g., position of the carbon dioxide plume and pressure front and groundwater quality data) confirm there have been no significant changes at the site.

The bolded text below outlines a suggested approach for reviewing updated project plans that a UIC Program might employ. This approach will help to confirm that the owner or operator's submittal meets the requirements of the Class VI Rule and the permit, and that the amended plans are protective in light of the most recent site data and the approved AoR.

**Review the updated Testing and Monitoring Plan** or the owner or operator's demonstration that no update to the plan is needed. If revised modeling delineates a larger or differently shaped AoR, or monitoring indicates that the carbon dioxide plume is moving at a rate or in a direction other than was predicted, verify that the amended Testing and Monitoring Plan includes an expanded groundwater monitoring well/pressure monitoring network, more frequent/extensive geophysical surveys, or other appropriate methods to track the plume/pressure front to ensure that USDWs are not being endangered.



BLF-000174

If groundwater monitoring indicates leaching/mobilization of metals or organics, or impairment of a USDW has occurred, verify that the plan includes analysis of groundwater for additional parameters or analytes or more frequent analyses as needed to provide early indication of possible USDW endangerment. Likewise, if any of the physical or chemical characteristics of the carbon dioxide stream have changed, additional analytical parameters may be appropriate.

If MIT results or corrosion monitoring data identify changes to the injection well that could potentially endanger USDWs, confirm that any needed modifications to the well testing regime (e.g., to corrosion monitoring or MIT frequency or methods) are incorporated into the plan.

If new, more site-suitable testing and monitoring methods for use at the Class VI project become available, discuss with the owner or operator the merits of incorporating them into the Testing and Monitoring Plan.

**Review the updated Injection Well Plugging Plan** if any updates to the plan are submitted during the injection phase. Formal periodic reviews and amendments to the Injection Well Plugging Plan are not required during the injection phase. However, data on the chemistry of the carbon dioxide plume and formation fluids, well testing results, operational data, or significant changes to the facility may indicate that changes to the planned plugging techniques are necessary. If so, discuss with the owner or operator the need to eventually update the Injection Well Plugging Plan, including the merits of doing this during a current plan update cycle to ensure consistency across all the approved plans, or waiting until a future date. If a plan update is needed at a specific time, request an updated plan pursuant to 40 CFR 146.92(b).

If an updated Injection Well Plugging Plan is submitted during the injection phase, review the procedures and materials described in the plan to ensure that they are suitable to subsurface and carbon dioxide chemistry, operational data, and other aspects of the project based on recent testing and monitoring results. Cross-check the plan against information from monitoring and well logs, as appropriate. See Section 7.1 for additional information on reviewing the updated Injection Well Plugging Plan.

**Review the updated PISC and Site Closure Plan** if one is submitted. The Class VI Rule does not require formal periodic reviews and amendments to the PISC and Site Closure Plan during the injection phase; however, the owner or operator may choose to do so at any time [40 CFR 146.93(a)(4)]. If any changes in facility operations, monitoring results, or operational data warrant changes to other Class VI project plans, ask the owner or operator to consider updating the PISC and Site Closure Plan, particularly if the changes involve a permit modification.

Changes to the PISC and Site Closure Plan may be needed if monitoring indicates that the carbon dioxide plume is moving at a rate or in a direction other than was predicted, or pressures within the injection zone vary from modeled predictions. Additionally, changes may be appropriate if injection-phase AoR reevaluations indicate that predicted post-injection pressure differentials or the position of the carbon dioxide plume and pressure front will differ from those on which the plan was based. Additionally, if any changes to the injection-phase Testing and Monitoring Plan are needed (e.g., parameters or monitoring locations), the EPA recommends revising the post-injection monitoring strategy accordingly and concurrently with updates to the Testing and Monitoring Plan. If the owner or operator submits a revised plan that includes revisions to the PISC timeframe, evaluate the request in the context of available monitoring and operating data to determine whether a shorter (or longer) PISC timeframe is appropriate. Encourage the owner or operator to submit information that meets all of the criteria at 40 CFR 146.93(c) to demonstrate

that the alternative timeframe is protective of USDWs. See Section 7.2.1 for additional information on reviewing updated PISC and Site Closure plans and specific considerations for the review.

As part of the revisions to the PISC and Site Closure Plan, the owner or operator may submit changes to the non-endangerment demonstration criteria. The criteria should be based on monitoring and operational data that verify modeled predictions about the behavior of the carbon dioxide plume and pressure front and confirm USDW non-endangerment (see Section 4.1.9 for additional information on identifying criteria for non-endangerment demonstrations).

**Review the updated Emergency and Remedial Response Plan** or the owner or operator's demonstration that no update to the plan is needed. If revised modeling delineates a larger/differently shaped AoR that includes new resources/infrastructure or if recent (or planned) land use changes brought new resources or infrastructure near or into the AoR, consider requesting that the Emergency and Remedial Response Plan be revised to address such changes. If there has been a need to implement emergency procedures at the site, discuss the response with the owner or operator and consider asking them to incorporate any lessons learned into an amended Emergency and Remedial Response Plan.

Discuss with the owner or operator whether there have been any changes to available responding personnel (including updated contact information), training, or communications and notification procedures, or newly developed procedures that are not in the approved plan. If changes have occurred, verify that the Emergency and Remedial Response Plan includes this updated information.

***Outcomes***

Following review and approval of the amended plans, the UIC Program should develop the following information for inclusion in the permit file:

- Updated plans as enforceable conditions of the Class VI permit;
- A modified Class VI permit that incorporates the amended plans. See Section 5.2 for additional information on modifying Class VI permits;
- Documentation of the review to support the administrative record for a permit modification (if one is needed to incorporate the revised plans) or justify and explain to stakeholders and the public that testing and monitoring data and modeling indicate that the project is operating as planned and there is no evidence of endangerment to USDWs and, therefore, no changes to the plans are needed; and
- Periodic public updates on the status of the project. Consider providing status reports to reassure the public and stakeholders that the project is progressing as planned and that there is no endangerment to USDWs.

### 6.4 Financial Responsibility Updates

Per 40 CFR 146.85(c)(2),(3), the owner or operator must update the cost estimates for covered activities annually or within 60 days of revising the AoR and Corrective Action Plan, the Injection Well Plugging Plan, the PISC and Site Closure Plan, or the Emergency and Remedial Response Plan. Cost estimate updates may also trigger revisions to third-party financial instruments, pursuant to 40 CFR 146.85(c)(4).



BLF-000176

The purpose of the UIC Program's review of these updates is to confirm that sufficient resources remain available to ensure USDW protection without requiring the use of public funds to perform any of the covered activities.

***Completeness***

The owner or operator will submit cost estimates for any remaining corrective action and updates to the estimates for plugging the injection well, PISC and site closure, and emergency and remedial response. They may also need to submit updated financial instruments (e.g., renewed insurance policies or financial instruments with updated face values) or proposed language for any financial instrument(s) they plan to purchase.

Verify that the updated cost estimates reflect any changes to the covered activities and that the owner or operator plans to use one or more of the qualifying instruments at 40 CFR 146.85(a)(1) to cover the full amount of the cost estimates. Confirm that the updates were submitted on time; a delay in receiving updates to the financial instruments and cost estimates could serve as an indication that the owner or operator may no longer be able to meet the financial responsibility requirements.

**Reviewing Annual Submittals Associated with Self-Insurance**

Owners or operators who use self-insurance to demonstrate financial responsibility must submit a report of their bond rating and financial information annually [40 CFR 146.85(a)(6)(v)]. If the owner or operator fails to submit an updated report of their bond rating and financial information at the end of each fiscal year, then they may no longer qualify to use self-insurance as a financial instrument. The annual reports should be reviewed to confirm the owner or operator's continued eligibility for self-insurance. If self-insurance is no longer viable, the owner or operator will need to establish an alternative financial instrument within 60 days of the end of the fiscal year.

***Evaluation***

The text below outlines a suggested approach for reviewing updated financial responsibility information that a UIC Program might employ to confirm that the owner or operator's submittal meets the requirements of the Class VI Rule and the permit, and confirm that adequate financial resources are available to address the covered activities.

Verify that the cost estimates submitted by the owner or operator have been accurately adjusted for inflation relative to the prior year's cost estimates. If any changes to the Class VI project (e.g., related to changes to the size or shape of the AoR resulting from an AoR reevaluation) impact the covered activities, discuss with the owner or operator whether this may result in increases or decreases in the cost estimates and therefore necessitate changes to the value of the financial instrument(s). If so, request updated cost estimates and evaluate these. See Section 4.1.4 for additional information on the EPA's Financial Responsibility Cost Estimation Tool, which can support the evaluation of the cost estimates.

If the costs for any activity have increased, request that the owner or operator provide evidence that the value of the financial instrument has increased accordingly. If the cost estimate for any activity decreases, provide written approval to the owner or operator to reduce the face value of the financial instrument.

Release the owner or operator from financial instruments as activities are completed, e.g., as all corrective action is complete. Provide written authorization for the owner or operator to withdraw the financial instrument.

***Outcomes***

To ensure that adequate financial resources are in place to address all Class VI activities, develop or document the following:

- Permit conditions and/or a summary of the enforceable financial responsibility conditions that reflect any updates to the cost estimates or changes to the instruments;
- Copies of the financial instruments or documentation that any new or updated financial instruments are active or in force;
- Any documentation releasing the owner or operator from a financial instrument following completion of specific activities; and
- A report documenting the review, including the review of cost estimate updates and any adjustments for inflation; additional financial responsibility instruments obtained; or activities that have been completed.

## 6.5 Occasional Injection-Phase Reviews

In addition to the information that must be submitted by all owners or operators at a schedule defined in the permit, owners or operators may also need to submit certain information to respond to occasional or unanticipated events. These events include additional testing (beyond that described in the Testing and Monitoring Plan) or workovers, emergency events, or adverse financial conditions experienced by the owner or operator or the issuer(s) of the financial instruments.

The purpose of the UIC Program's evaluation of this information is to ensure that USDWs are protected, or identify appropriate actions to address endangerment and the implications for project operations or updates to the permit (including the Class VI project plans). The UIC Program is encouraged to discuss the activity or event with the owner or operator.

### *6.5.1 Workovers, Stimulation, or Other Well Tests*

During the injection phase, an owner or operator may submit notices related to workovers, stimulation, or other well tests. The bolded text below describes activities that the UIC Program may need to take to review the information submitted to ensure that all work is planned and executed in a manner that protects both the integrity of the well and USDWs.

**Review advance notices of planned workovers, stimulation, MITs, or non-routine testing.** Verify that proper procedures will be followed, including gradual well shutdown procedures according to the permit conditions (see Section 4.1.8).

- Review any descriptions of the work that the owner or operator submits with the notification to ensure that all work on the well will be performed such that fluids will be confined to the injection zone and that precautions are in place to avoid damage to the well or to mitigate the impacts of any damage.
- If the owner or operator provides notice of workovers or MITs less than 30 days in advance of the planned activity as required at 40 CFR 146.91(d), coordinate with the owner or operator to determine the feasibility of witnessing the tests. If witnessing is not feasible, confirm whether or not witnessing the test will impact the permitting authority's



BLF-000178

ability to review the planned work. If witnessing the test is essential, work to identify dates that work for both parties.

**If appropriate or necessary, arrange to witness the work or activity.** Select the personnel who will witness the work and coordinate with the owner or operator for those personnel to be present.

**Review the post-workover or testing reports,** which must be submitted within 30 days of the activity [40 CFR 146.91(b)]. Verify that the work was performed as planned and consider the following:

- If there is evidence or an indication of well damage or integrity issues, discuss the situation with the owner or operator and identify needed responses, such as additional MITs.
- If there is evidence of unacceptable fluid movement, discuss the situation and appropriate responses with the owner or operator. These may include additional rounds of monitoring to detect excursions of carbon dioxide or formation fluids. Update the project plans if needed.
- If a violation has occurred, take appropriate informal or formal enforcement actions (see Section 2.4).

### *6.5.2 Emergency Response*

While the goals of proper siting, construction, and operation of a Class VI project are to prevent the occurrence of an emergency or adverse event, quick and effective response is vital for mitigating the effects of such an event, if one should occur.

The Class VI Rule requires owners or operators to report, within 24 hours, any evidence of endangerment to a USDW [40 CFR 146.88(f)(3); 146.91(c); 146.94(b)(3)], including:

- Any evidence that the carbon dioxide plume or pressure front may endanger a USDW;
- Any noncompliance with a permit condition;
- Any malfunction of the injection system;
- Any triggering of a shut-off system or a loss of mechanical integrity; or
- A release of carbon dioxide to the atmosphere or biosphere.

Initial information about these events or evidence of endangerment to a USDW, as required at 40 CFR 146.91(c), may be:

- Reported via emergency "24-hour notices" from the owner or operator about an accident or adverse event;
- The subject of public inquiries or comments about the facility; or
- Based on inspections or reviews of monitoring data (e.g., that increased levels of carbon dioxide or mobilized metals were detected outside the injection zone or in a USDW).

The EPA anticipates that emergency notifications (e.g., immediate/24-hour) will be initiated by phone or email and followed up by formal electronic submittals via the GSDT to comply with 40 CFR 146.91(e).

The Class VI Rule does not specify the content of the notifications; however, given the need for timely reporting, the EPA anticipates that they will take the form of a brief letter to the UIC Program Director describing: what happened, the time and date of the event, any immediate actions the owner or operator may have taken, and initial information on any impacts to the well or the environment. Depending on the nature of the emergency, it may also be appropriate to notify (or ask the owner or operator to notify) local water systems, government agencies, etc.

The UIC Program should communicate with the owner or operator during the event to ensure that responses are taken to expeditiously mitigate risk(s) and return the project to compliance. The bolded text below describes activities that the UIC Program may need to take, based on the specific nature of the event, to support the owner or operator in returning the project to compliance and ensuring that USDWs are protected.

**Work with the owner or operator to identify and implement an appropriate response.** The response will be site- and situation-specific and depend on a variety of factors. These may include: whether there was damage to the injection well or any monitoring wells; whether there was any unacceptable movement of carbon dioxide or other fluids (and, if so, the extent of movement); the presence of USDWs or water supplies within the AoR and their proximity to an event; and what, if any, impacts could (or did) result from the event.

Responding to emergency events should be guided by and follow established permit conditions or the procedures in the approved Emergency and Remedial Response Plan. Work with the owner or operator to verify that the appropriate immediate actions were taken and to develop solutions. For example:

- Verify that the owner or operator has shut down the well, if necessary. The shutdown should be conducted as described in the permit, including the implementation of gradual shutdown procedures, if appropriate.
- Begin discussions with the owner or operator to determine the cause of the event, identify remedies to be taken (as outlined in the Emergency and Remedial Response Plan), and set a timeline for resolving the problem and returning the well to service.
- Where the response will take months or years to implement (e.g., groundwater remediation), develop a compliance schedule that describes required activities and a timeline for their completion, and provide this to the owner or operator. Verify that the owner or operator meets the milestones in the compliance schedule as the response proceeds.

Maintain open communication with the owner or operator throughout the response to confirm that all necessary steps are being taken to prevent or mitigate contamination. This might include requesting updates on the status of the project, the remedial effort, and any testing or monitoring performed (and documentation of the results).

**Initiate an enforcement action, if necessary.** If the event caused or was a result of a violation (e.g., failure to maintain integrity of the well or an excursion of injectate or formation fluids into a USDW), determine what enforcement actions are appropriate. (Failure to implement the Emergency and Remedial Response Plan would also constitute a violation of the permit.) Note that some events described in an Emergency and Remedial Response Plan (e.g., the triggering of an automatic shutdown device where the integrity of the well was not compromised) may not



BLF-000180

constitute a violation. See Section 2.4 for additional information on enforcement associated with Class VI permits.

**Require follow-up monitoring or testing** to confirm that remedial actions were successful and no USDWs were impacted. For example, if there was a loss of mechanical integrity, require internal and/or external MITs (i.e., pursuant to 40 CFR 146.88(f)(4)) or cement logs to verify that repairs to the well are complete. Arrange to witness MITs or other testing before the well is returned to service, if necessary. If there are indications that injectate or other fluids may have migrated out of the injection zone, consider the need for monitoring of USDWs or other formations. If a seismic event occurred, discuss the magnitude and location of the event with the owner or operator to determine whether additional monitoring stations may be needed. Check in with the owner or operator periodically to verify that milestones in a compliance schedule are being met.

**Authorize the owner or operator to resume injection.** After remediation is complete and the owner or operator demonstrates that the well has integrity and/or that USDWs are not endangered, inform the owner or operator that they may resume injection. UIC Program Directors also have discretion at 40 CFR 146.94(c) to allow injection to resume prior to remediation if the owner or operator demonstrates that the injection operation will not endanger USDWs. This determination will be site- and situation-specific, and should consider the extent of the contamination and proximity of USDWs or water supplies. For example, if movement of formation fluids or injectate was limited and no groundwater-based water systems or private water wells are near the migration pathway, it may be appropriate to allow injection to recommence, provided the owner or operator monitors water quality in the area.

**Request an AoR reevaluation, if appropriate.** If the event indicates that the carbon dioxide plume or pressure front are not moving as predicted, consider requesting an AoR reevaluation. Also request that the Class VI project plans be evaluated and updated, if needed (e.g., revising the Emergency and Remedial Response Plan to incorporate lessons learned during the event). See Section 6.3. The financial responsibility cost estimates may need to be updated accordingly.

**Consider communicating to stakeholders,** including customers of local water systems, nearby land owners, and the public about the event. If a water supply was endangered or contaminated as a result of the event, work with the water system operator or state drinking water authorities to ensure that appropriate actions are taken to protect public health. Alternatively, if the incident did not endanger USDWs or public health, communication is important to reassure stakeholders that UIC protective measures worked and that their water supply was protected. See Section 2.3 for additional information on communicating about Class VI projects.

**Document the event.** The EPA recommends documenting the event. This can provide a record that an appropriate response was taken or, if necessary, support the administrative record for future permitting actions (e.g., if any modifications to the permit or plans are needed based on the event or outcomes), or support an enforcement action (see Section 2.4). A summary report of the incident may address: what happened, including when it was discovered and the cause, if known; what responses or remedial action(s), including activities specified in the Emergency and Remedial Response Plan, were conducted; any impacts to USDWs; and the date that injection resumed.



BLF-000181

### *6.5.3 Notification of Adverse Financial Conditions*

The owner or operator must notify the UIC Program Director of adverse financial conditions that may affect their ability to carry out injection well plugging and post-injection site care and site closure. [40 CFR 146.85(d)] These may include bankruptcy of the owner or operator or a third-party provider, suspension or revocation of a trustee, or failure of the issuing institution to renew a letter of credit. If the owner or operator provides notification of any adverse financial conditions, the UIC Program should perform the following activities to ensure that adequate financial resources are available:

- Initiate discussions with the owner or operator and/or the financial institution to address the issue;
- If a new financial instrument is proposed and determined to be sufficient, provide written approval of the new financial instrument and release the owner or operator from the previous financial instrument; and
- Verify that the owner or operator establishes other financial assurance within 60 days after such an event.

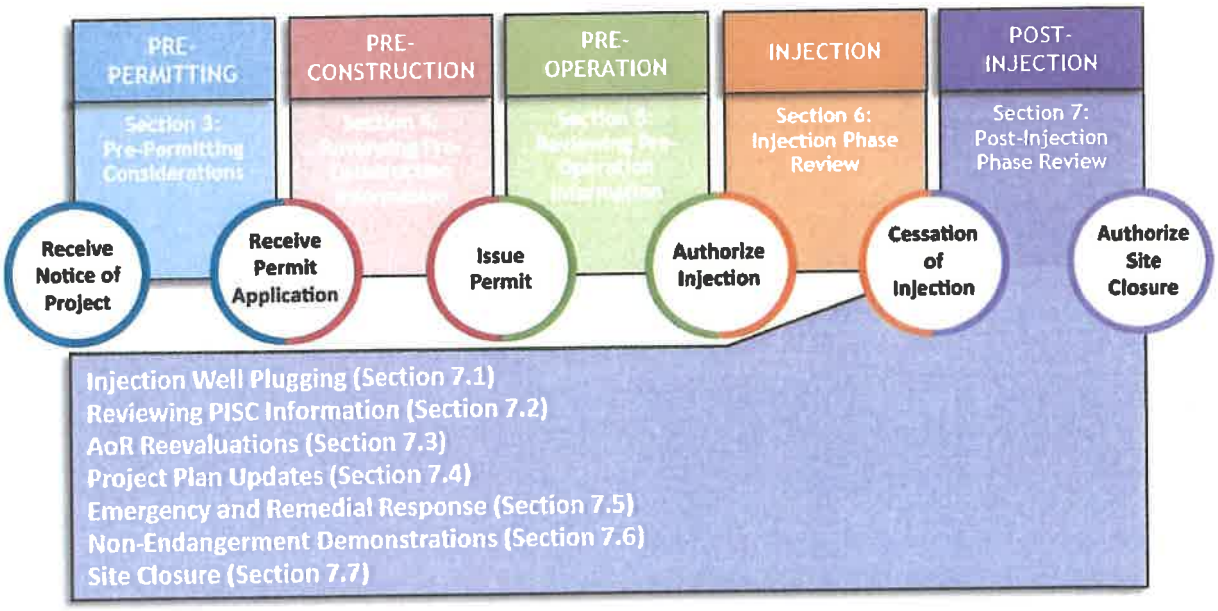
## 6.6 Planning for the Post-Injection Phase Review

The activities and reviews described in this section will continue for as long as the owner or operator injects carbon dioxide for the purpose of GS. Following cessation of injection, the owner or operator will continue to monitor the site to ensure that the project complies with permit conditions or that any unforeseen USDW endangerment is identified and mitigated. Information about groundwater quality, the performance of the carbon dioxide plume and pressure front, and the results of any other required monitoring will also support the non-endangerment demonstration that must be made before the owner or operator may be authorized to perform site closure activities per 40 CFR 146.93(b).

During the post-injection phase, the UIC Program will receive information related to plugging the injection well, post-injection monitoring results, a non-endangerment demonstration, and site closure-related information to confirm that the project continues to be protective of USDWs and that, following site closure, the site will not endanger USDWs.

Section 7 presents recommendations for how the UIC Program can confirm that all required post-injection activities are performed and review the information that is submitted to ensure that the Class VI project remains in compliance until site closure is complete.

# Section 7: Post-Injection Phase Review



*This page is intentionally blank.*

# 7 Post-Injection Phase Review

During the post-injection phase, after injection has ceased, Class VI well owners or operators will conduct monitoring to confirm project behavior over time. While the potential for endangerment of USDWs will likely decrease during this phase (i.e., as trapping mechanisms continue to immobilize the carbon dioxide and subsurface pressures decline), continued monitoring of the site, per 40 CFR 146.93(a),(b), is necessary to ensure continued project compliance with the permit, confirm USDW protection, and address any identified USDW endangerment. Generating, evaluating, and discussing site data can also ensure collection of the amounts and types of information necessary for demonstration of non-endangerment and authorization of site closure. Also during this phase, the owner or operator must plug the injection and monitoring wells to ensure they will not become conduits for fluid movement that could endanger USDWs [40 CFR 146.92(b); 146.93(e)], and restore the site to pre-operation conditions [40 CFR 146.93(e)].

The goal of the UIC Program's review of the information submitted during the post-injection phase is to verify that the project continues to be protective of USDWs and that, following site closure, the site will not endanger USDWs. Specifically, the UIC Program should confirm that all post-injection phase milestones are met, including proper plugging of the injection and monitoring wells, a demonstration of non-endangerment to USDWs, and closure of the site.

During this phase, the UIC Program will likely receive and evaluate the following types of information:

- Information related to plugging the injection well (see Section 7.1);
- Post-injection site care information, including amendments to the PISC and Site Closure Plan and the results of post-injection testing and monitoring (see Section 7.2);
- AoR reevaluations (see Section 7.3);
- Emergency and Remedial Response Plan amendments or financial responsibility updates (see Section 7.4);
- Information associated with emergency events and associated responses (see Section 7.5);
- A non-endangerment demonstration (see Section 7.6); and
- Site closure notifications and documentation, including information on plugging of the monitoring wells (see Section 7.7).

This section presents recommendations for how the UIC Program can confirm that all required information is generated and submitted, and evaluate this information to ensure that the project continues to be protective of USDWs. Many of the evaluations during this phase are analogous to injection-phase activities (e.g., reviewing testing and monitoring data, AoR reevaluations, and project plan updates), and this section focuses on what is likely to be unique to the post-injection phase. The reader is encouraged to review Section 6 as needed.

Each subsection below describes the types of information owners or operators are anticipated to submit and considerations for reviewing the information (e.g., discussing the information with the owner or operator or requesting clarifying information, if necessary) to verify permit compliance as well as identifying appropriate follow-on actions to ensure USDW protection.



BLF-000185

Because each project is unique and the specific information submitted by the owner or operator will vary, the appropriate activities will be specific to the project. Thus, the activities described below outline a recommended course of action to accomplish the goal of evaluating post-injection phase information to ensure that USDWs are protected.

## 7.1 Injection Well Plugging

Class VI well owners or operators must implement the approved Injection Well Plugging Plan, pursuant to 40 CFR 146.92(b) during the post-injection phase. The timing of well plugging will be site- and project-specific; however, the activities to be performed to plug the well will be the same. Proper plugging of injection wells is necessary to ensure that the wells do not serve as conduits for fluid movement into USDWs following cessation of injection and site closure. See Section 2 of the *UIC Program Class VI Well Plugging, Post-Injection Site Care, and Site Closure Guidance* for additional information on plugging Class VI injection wells.

### *Completeness*

UIC Program activities associated with injection well plugging should include reviewing the following information related to plugging the injection well:

- An amended Injection Well Plugging Plan if any changes have been made to the approved plan [40 CFR 146.92(b)]. The amended plan will likely be of a similar format to the approved plan that is included in the existing Class VI permit (see Section 4.1.8).
- A notice of intent to plug the well, which must be submitted at least 60 days prior to plugging unless a shorter timeframe is approved [40 CFR 146.92(c)].
- A well plugging report, which must be submitted within 60 days of plugging the well [40 CFR 146.92(d)] and that will likely consist of a narrative document, supported by schematics or other images.

### *Evaluation*

The bolded text below outlines a suggested approach for reviewing injection well plugging information. This approach will help to confirm that the owner or operator's submittal meets the requirements of the Class VI Rule and the permit, and confirm that the well was plugged in a manner that will prevent USDW endangerment.

**Review any amendments to the Injection Well Plugging Plan** that the owner or operator submits in advance of plugging activities to ensure that it includes all the required elements at 40 CFR 146.92(b) and addresses the current conditions of the well. The review should focus on any changes to the well or other aspects of the project since the plan was approved. For example, if the owner or operator has become aware of any debris or lost tools that need to be removed, ensure that provisions are included for their removal. Review the calculation of fluid weight proposed for well flushing to ensure that it is based on the most recent downhole data. Review the proposed plugging materials and buffer fluids to be sure they are compatible with the most recent analyses of formation fluids (i.e., based on any chemical changes that may have resulted from interactions between formation fluids and the injectate). Modify the Class VI permit to incorporate the revised Injection Well Plugging Plan. See Section 5.2 for additional information on modifying Class VI permits.



BLF-000186

**Review the notice of intent to plug the well.** Discuss the timing of well plugging with the owner or operator. If witnessing the plugging is necessary or appropriate, assign personnel to witness the plugging and schedule this with the owner or operator.

**Review the injection well plugging report,** which the owner or operator will submit following plugging activities, to confirm that all actions were completed as described in the approved Injection Well Plugging Plan and in a way that is compliant with the requirements at 40 CFR 146.92. Review records to confirm that tubing and all debris were removed from the well. Confirm that the fluid weight used for plugging operations was calculated using measured bottom-hole pressure. Verify that an MIT was performed and appropriate remedial action was taken to repair the well or cement across any zones where fluid movement did or could occur. Review information about the plugging materials that were used and confirm that they are compatible with downhole conditions and the location of plugs, and that they match the approved plan (or that any divergence from the plan is justified). Review cementing records and any tests performed to verify that appropriate cement strength was obtained.

Note any challenges the owner or operator encountered during plugging and confirm that adequate responses were taken. If it is not clear that the plugs were properly placed and are adequate to prevent fluid migration, additional information or testing may be needed. If testing indicates deficiencies in the plugs or the plugging procedures, confirm that the owner or operator performed remedial action to correct any deficiencies and retested the well.

**Converting Injection Wells to Post-Injection Monitoring Wells**

The EPA acknowledges that injection wells may be converted to monitoring wells during the PISC phase. If an owner or operator plans to convert the injection well to a monitoring well, the EPA encourages the UIC Program to discuss the conversion process with the owner or operator and consider the following:

- Tubing and debris should be removed and the well should be flushed before monitoring equipment is installed.
- Any remedial actions that may be necessary prior to installation of monitoring equipment, i.e., to address zones of weakness in the cement.
- Whether any packers will need to be replaced or if additional packers will be needed to isolate the zones to be monitored.
- The monitoring equipment to be installed should be capable of providing accurate measurements and collecting the data that are needed throughout the post-injection monitoring period.
- Proper procedures should be in place to confine fluids to the injection zone during the conversion process.

## 7.2 Reviewing Post-Injection Site Care Information

The primary activities occurring during the post-injection phase will be associated with testing and monitoring to track the carbon dioxide plume and pressure front and demonstrate that the project is in compliance with the permit and the Class VI Rule. During this phase, the UIC Program will likely receive the following information:

- An amended PISC and Site Closure Plan or a demonstration that no amendment to the plan is needed, per 40 CFR 146.93(a)(3); and
- The results of testing and monitoring performed pursuant to the approved PISC and Site Closure Plan and 40 CFR 146.93(a),(b).

Section 3 of the *UIC Program Class VI Well Plugging, Post-Injection Site Care, and Site Closure Guidance* provides detailed information on post-injection site care.

### *7.2.1 PISC and Site Closure Plan Amendments*

Class VI well owners or operators must amend the PISC and Site Closure Plan at the end of the injection phase or demonstrate that no amendment to the plan is needed [40 CFR 146.93(a)(3)]. The owner or operator may also amend the plan at any time during the post-injection phase, pursuant to 40 CFR 146.93(a)(4).

The purpose of the UIC Program's review of the amended PISC and Site Closure Plan is to verify, before post-injection site care begins, that the activities in the plan reflect the most up-to-date understanding of the site. In particular, the review should focus on the most recent AoR delineation modeling, carbon dioxide plume and pressure front behavior, and any additional information needed to support the non-endangerment demonstration (e.g., information on plume trapping). The UIC Program should also work with the owner or operator throughout the review to ensure that the planned post-injection monitoring will generate the data needed to inform a non-endangerment demonstration. See Section 4.1.9 for additional information on evaluating PISC and Site Closure plans.

***Completeness***

The amended PISC and Site Closure Plan will likely be a narrative document similar in format to the approved plan in the Class VI permit and must include all of the required elements described at 40 CFR 146.93(a). If any aspects of the testing and monitoring strategy have changed, the owner or operator may also submit an updated QASP.

If the owner or operator submits an alternative PISC timeframe demonstration as part of the plan amendment, the UIC Program should verify that the request includes sufficient information on which to base an evaluation, e.g., addressing all of the criteria at 40 CFR 146.93(c).

If any changes to the PISC and Site Closure Plan are needed and either an amended plan was not submitted or the changes were not adequately addressed in the amended plan, the UIC Program should consider requesting that the owner or operator update and resubmit the plan. A justification that no updates to the plan are needed should be a technical demonstration based on site-specific data.

***Evaluation***

An amended PISC and Site Closure Plan will likely include the same activities that were described in previously approved versions of the plan. As such, the evaluation of any amendments submitted after cessation of injection should focus on any changes necessary to address new information that arose during site operations.

The bolded text below outlines a suggested approach for reviewing PISC and Site Closure Plan amendments. This approach will help to confirm that the owner or operator's submittal meets the requirements of the Class VI Rule and the permit, and confirm that PISC activities will ensure that USDWs are protected from endangerment.

**Review the predicted post-injection pressure differentials and the position of the carbon dioxide plume and pressure front.** Confirm that these predictions, as described in the amended PISC and Site Closure Plan, reflect the most recently modeled predictions of carbon dioxide plume and pressure front behavior (i.e., based on the findings of the most recent AoR reevaluation).



BLF-000188

**Evaluate any changes to the post-injection monitoring strategy.** Verify that the proposed monitoring activities will allow for a comparison of results over time, ideally with monitoring continuing at the same locations/depths/extents and addressing the same analytes as during the injection phase. However, these monitoring activities should also be designed to capture the expected system behavior (as predicted by the AoR delineation modeling) and changes (e.g., monitoring of the carbon dioxide plume at points along its predicted trajectory or monitoring of trapping) during the post-injection phase. If groundwater monitoring during the injection phase identified leaching/mobilization of metals or organics, groundwater contamination, or plume excursions, determine whether analysis of groundwater for additional analytes is needed during post-injection monitoring. If new, more site-suitable testing and monitoring methods have become available, discuss with the owner or operator the merits of incorporating these into the PISC and Site Closure Plan. Any revisions to the fluid sampling/pressure monitoring network or the extent of geophysical surveys should encompass the entire extent of the current, approved AoR. Confirm that the owner or operator has updated the QASP, if necessary, to address new or additional testing and monitoring activities.

The owner or operator may propose reducing the scope or frequency of monitoring activities as the post-injection phase progresses. Any planned reductions should be informed by monitoring results, supported by AoR delineation modeling predictions, and linked to site-specific quantitative criteria. For example, the plan could include provisions for reducing the frequency of pressure monitoring at a location once pressures reach a specified level relative to baseline levels as demonstrated during pre-operational testing.

**Review plans to plug the monitoring well(s).** Confirm that the planned monitoring well plugging activities and materials remain appropriate based on any recent information about subsurface conditions, particularly the presence of potentially corrosive carbon dioxide-water mixtures.

**Evaluate an updated or new alternative PISC timeframe demonstration (if applicable).** If the owner or operator proposes an updated or new alternative PISC timeframe as part of the PISC and Site Closure Plan amendment, encourage them to submit information that meets all of the criteria at 40 CFR 146.93(c) to demonstrate that the alternative timeframe is appropriate and protective of USDWs. The evaluation of a proposed alternative PISC timeframe should focus on the results of the current AoR delineation modeling of pressure front and plume migration and immobilization of the plume due to site-specific trapping mechanisms and available monitoring data. Some specific considerations to support a decision that the project will no longer pose an endangerment to USDWs at the end of the post-injection phase include:

- The modeling results should demonstrate system-wide pressure levels and trends (e.g., decline) such that, at the end of the proposed alterative PISC timeframe, the project will no longer pose an endangerment to USDWs;
- The predicted results should demonstrate carbon dioxide plume immobilization by site-specific trapping mechanisms (e.g., structural trapping, capillary trapping, and mineralization) or a migration rate that is declining such that there is no potential for fluid movement into USDWs at the end of the proposed PISC timeframe; and
- All potential conduits within the AoR should be identified, characterized, and addressed and the proposal to revise the timeframe demonstrates that the conduits will not pose an endangerment to USDWs.

Consider meeting with the owner or operator to discuss the information that should be submitted and how best to conduct the analyses needed to demonstrate that an alternative PISC timeframe is appropriate. See Section 4.1.9 for additional information on evaluating proposed alternative PISC timeframes.

***Outcomes***

Following review and approval of the amended plan, the UIC Program should develop the following information for inclusion in the permit file:

- An updated PISC and Site Closure Plan as an enforceable part of the Class VI permit (if needed);
- A modified Class VI permit that incorporates the amended plan, if needed. See Section 5.2 for additional information on modifying Class VI permits; and
- Documentation of the review to support the permit's administrative record.

### *7.2.2 Post-Injection Monitoring*

After injection has ceased, the owner or operator must implement the PISC and Site Closure Plan, which includes performing monitoring to track the position of the carbon dioxide plume and pressure front and ensure that USDWs are not endangered [40 CFR 146.93(a),(b)]. As noted earlier, post-injection testing and monitoring will likely be an extension of the injection phase testing and monitoring; see Section 6.1 for additional information on reviewing testing and monitoring results.

The purpose of the UIC Program's review of this information is to confirm that the owner or operator is in compliance with the PISC and Site Closure Plan and other permit conditions, or to identify the need for follow-up actions to address any endangerment to USDWs. The UIC Program is encouraged to discuss the results of post-injection testing and monitoring with the owner or operator in the context of an eventual non-endangerment demonstration to confirm that appropriate types and amounts of data are being collected throughout the post-injection phase to support this demonstration.

More information about PISC monitoring requirements and recommendations for meeting those requirements can be found in the *UIC Program Class VI Well Plugging, Post-Injection Site Care, and Site Closure Guidance*.

***Completeness***

The specific information the owner or operator submits and the timing of reporting will depend on the testing and monitoring provisions of the approved PISC and Site Closure Plan. However, the UIC Program will likely receive the following types of information:

- The results of groundwater quality monitoring (and potentially other above-confining-zone monitoring), including analytical results for each sampling event during the reporting period at each monitoring well;
- Plume and pressure front tracking information, including the results of all required tests/surveys;
- The results of any required MITs or corrosion testing of monitoring wells; and/or



BLF-000190

- The results of any other required activities, e.g., surface air/soil gas monitoring and/or passive seismic monitoring.

The results should be accompanied by a synthesis that interprets the results. The report may describe any evidence of fluid migration out of the injection zone and/or into USDWs, compare results to modeled predictions, and identify trends in the context of previous results.

***Evaluation***

The bolded text below outlines a suggested approach for reviewing post-injection monitoring results. This approach will help to confirm that the owner or operator's submittals meet the requirements of the Class VI Rule and the permit, and confirm that USDWs are not endangered.

**Verify that all testing and monitoring was performed as planned,** i.e., on schedule using approved methods, equipment, and procedures; that samples were taken at all required locations and depths; and that proper QA protocols were applied. If the information submitted indicates that any tests or measurements were not completed as described in the approved PISC and Site Closure Plan and the QASP, a discussion with the owner or operator and/or a request for repeat or additional testing may be necessary.

**Review the testing and monitoring results**, including any submitted interpretations of the data. Confirm that:

- The plume and pressure front are tracked as permitted;
- Sufficient data are generated to inform future project decisions;
- The plume and pressure front location are consistent with the predicted behavior; and
- There have been no excursions of carbon dioxide or formation fluids out of the injection zone or any evidence of endangerment to USDWs.

Where applicable, this evaluation can be achieved by comparing the results to baseline data and/or to previous results from the injection and post-injection phases, along with the predictions of the system behavior.

Consider the overall trends in subsurface pressures. In most cases, sustained decreases in fluid pressures will be expected over time during the post-injection phase, unless there are other injection activities operating in the same formation. However, the rate of fluid pressure decline, which depends on the site-specific hydrogeologic properties of the injection zone and overlying formations, may not be steady within particular zones due to heterogeneity in the subsurface. Confirm that pressure measurements represent system-wide behavior and are consistent with the predicted pressure changes during this phase. Identify changes in any trends or deviations from predicted behavior and evaluate whether the results indicate the possibility of carbon dioxide or other fluid migration out of the injection zone, and whether reevaluation of the AoR is needed.

Also consider the trends in the behavior of both the separate-and dissolved-phase carbon dioxide plume. In general, most of the injected carbon dioxide is expected to remain as a separate-phase plume subject to both pressure- and/or buoyancy-driven migration. Confirm that plume monitoring results provide system-wide information (both spatially and temporally) that is consistent with, and complementary to, the AoR delineation modeling predictions. Review information on trapping mechanisms identified via monitoring data and their relevant/quantitative significance in the immobilization of the plume, and confirm that these

observations are consistent with the AoR delineation modeling predictions. Identify any deviations in the monitoring data from the predicted behavior and evaluate whether the results indicate the possibility of fluid migration out of the injection zone or USDW endangerment, and if a reevaluation of the AoR is necessary.

Review the results of other monitoring activities, such as monitoring above the confining zone, surface air/soil gas monitoring, and/or passive seismic monitoring, to confirm confinement of the injected carbon dioxide in the injection zone. Also review the results of periodic mechanical integrity and corrosion testing of the monitoring wells. For additional information on testing and monitoring for Class VI projects, see Section 6.1 and the *UIC Program Class VI Well Plugging, Post-Injection Site Care, and Site Closure Guidance*.

Note whether any anticipated milestones or benchmarks established in the PISC and Site Closure Plan have been reached, as these would support a demonstration of a decreased potential for endangerment to USDWs. Alternatively, if there is not a general trend of pressure decline or other results are not consistent with modeled predictions, discuss with the owner or operator whether additional monitoring or an amendment of the PISC timeframe may be needed. In addition, consider the testing and monitoring results in the context of the non-endangerment demonstration. For example, verify that data collection is tailored to meet any specific non-endangerment criteria established in the PISC and Site Closure Plan.

Based on the results of the review, consider whether the following activities may be appropriate to ensure compliance with the Class VI Rule and any related permit conditions:

- If warranted based on changes in site conditions, request that changes to monitoring frequency, methods, and/or locations or depths be incorporated into an amended PISC and Site Closure Plan.
- Request that the owner or operator reevaluate the AoR if any AoR reevaluation criteria were triggered or to incorporate new information to better predict the actual behavior of the carbon dioxide plume and pressure front.
- If monitoring results suggest the possibility of unintended movement of carbon dioxide or other fluids, or if there is concern that a monitoring well is experiencing degradation or a loss of mechanical integrity, initiate communication with the owner or operator and request additional testing to identify the source of the issue, followed by appropriate actions, such as remediation of monitoring wells or former injection wells.
- If the owner or operator is out of compliance with the Class VI permit, assess the situation, determine if a violation or USDW endangerment occurred, and if necessary, issue a violation (see Section 2.4). Work with the owner or operator to initiate response procedures as described in the Emergency and Remedial Response Plan if results indicate that fluid migration or pressure increases may be endangering USDWs (see Section 7.5).

***Outcomes***

The EPA recommends that the UIC Program document the review of testing and monitoring results and any follow-up actions taken. Materials that can support a robust permit record and promote consistency and continuity in project-related decision-making include:

- A report that documents the review of all monitoring data, including whether the monitoring was performed in a manner consistent with the approved PISC and Site



BLF-000192

Closure Plan, whether the results confirm predictions about the carbon dioxide plume and pressure front, or whether the results indicate any evidence of USDW endangerment; and

- Documentation of any identified deficiencies or concerns and how they were resolved, including whether a revision to the PISC and Site Closure Plan is needed, AoR reevaluation criteria were triggered, or any remedial responses were necessary (and how these were performed and the issue was resolved).

Note also that, following retention of PISC monitoring records (for 10 years following site closure, pursuant to 40 CFR 146.93(h)), the owner or operator must deliver these records to the UIC Program Director. The UIC Program Director must then designate a location for these records to be retained thereafter.

### 7.3 AoR Reevaluations

Reevaluations of the AoR and reviews of the AoR and Corrective Action Plan will continue throughout the post-injection phase. As in the injection phase, the purpose of the UIC Program's review of information associated with post-injection AoR reevaluations is to verify that predictions of plume and pressure front movement are accurate based on information collected via post-injection testing and monitoring. Reviewing this information is analogous to the injection phase review of AoR reevaluations, but focuses on post-injection phase monitoring results.

The bolded text below outlines a suggested approach for reviewing post-injection phase AoR reevaluations. This approach will help to confirm that the owner or operator's submittal meets the requirements of the Class VI Rule and the permit, and ensure that the AoR delineation is based on the most up-to-date information to prevent USDW endangerment.

**Review all new and relevant project data** generated from monitoring activities to ensure that the information is consistent with the modeling predictions and supports the existing AoR delineation. Reevaluations of the AoR must continue over the duration of the Class VI project, including the post-injection phase, to ensure that the area where USDWs may be endangered is delineated accurately [40 CFR 146.84(e)]. Post-injection phase AoR reevaluations will involve a comparison of newly collected data to the computational predictions that supported the existing, approved AoR delineation, similar to those conducted during the injection phase (as discussed in more detail in Section 6.2).

It is likely that, following cessation of injection, the area of increased pressure will reduce in size as pressures dissipate (unless there are other operations affecting the pressure in the formation); however, the separate-phase plume is expected to continue its migration until trapping mechanisms cause immobilization. The EPA anticipates that it is unlikely the area that may be endangered by the project will increase during the post-injection phase (if the existing AoR delineation was verified with monitoring data during the injection phase). However, in addition to plume movement and pressure changes, post-injection phase reviews of AoR reevaluations will also focus on verifying predicted trapping mechanisms (i.e., the type of trapping mechanism and their relative effects).

For projects where new information confirms and supports the existing AoR, the EPA expects that the owner or operator will submit a demonstration that the current AoR and predictions about plume/pressure front movement adequately represent the system behavior. If any monitoring data or other information about the project indicate a need to update the AoR

delineation and/or amend the AoR and Corrective Action Plan, consider discussing this with the owner or operator.

**Review an amended AoR and Corrective Action Plan (if one is submitted).** Similar to the corresponding injection phase activities, the focus of reviewing any amendments to the AoR and Corrective Action Plan will be to ensure that the new AoR delineation complies with 40 CFR 146.84 and accounts for all new, relevant project information. In addition to the amended plan, the EPA expects that the owner or operator will submit an analysis of the AoR reevaluation and whether its results warrant a new delineation and/or amendment of the plan. Review the amended plan to confirm that it accounts for the most recent testing and monitoring results or other site- or project-specific information. See Section 6.2 for additional information on AoR reevaluations and reviewing amendments to the AoR and Corrective Action Plan.

### 7.4 Project Plan Updates

In addition to the AoR and Corrective Action Plan, the owner or operator may update the Emergency and Remedial Response Plan and submit annual updates to the financial responsibility cost estimates and financial instruments in the post-injection phase. The owner or operator may also submit amendments to the Injection Well Plugging Plan or the PISC and Site Closure Plan during this phase; see Sections 7.1 and 7.2.1 for further information on evaluating amendments to these plans.

The UIC Program's evaluation of these amendments and updates should focus on information collected via post-injection testing and monitoring, with the goal of ensuring that USDWs are not endangered, that the project is in compliance with the permit, and that the project is progressing toward meeting the criteria for a non-endangerment demonstration.

The bolded text below outlines a suggested approach for reviewing post-injection phase plan updates. This approach will help to confirm that the owner or operator's submittals meet the requirements of the Class VI Rule and the permit, and confirm that planned activities will protect USDWs from endangerment.

**Review any proposed amendments to the Emergency and Remedial Response Plan** or the owner or operator's demonstration that no amendment to the plan is needed. This review should be similar in scope to reviews of injection-phase amendments to the plan (see Section 6.3), focusing on the presence of any new resources/infrastructure within the AoR or any updates to response personnel or procedures.

**Review any updates to the financial responsibility cost estimates and instruments** to ensure that they will cover all required activities, e.g., all remaining post-injection testing and monitoring (considering frequency, spatial coverage, etc.) and site closure. If the injection well has been plugged, release the owner or operator from financial responsibility for injection well plugging activities. Verify that the updated cost estimates reflect inflation or any changes to the project (e.g., related to changes to the size or shape of the AoR). Discuss with the owner or operator whether this may result in increases or decreases in the cost estimates and corresponding changes in the value of the financial responsibility instruments. Note that the requirements for updating or replacing financial responsibility instruments, as described in Section 6.4, continue to apply during this phase of the project.



BLF-000194

Following review and approval of the amended plans, **incorporate the amended plans into the Class VI permit** and modify the permit. See Section 5.2 for information on modifying the Class VI permit.

## 7.5 Emergency and Remedial Response

During the post-injection phase, events requiring an emergency or remedial response may involve excursions of the carbon dioxide plume and pressure front or other fluid movement. (Because the injection well will generally be plugged or converted for monitoring, mechanical integrity losses will be less likely.) The owner or operator must notify the UIC Program Director of any evidence of endangerment to a USDW within 24 hours [40 CFR 146.91(c), 146.94(b)(3)].

As with injection-phase events, the owner or operator's responses to emergency events should be guided by the approved Emergency and Remedial Response Plan and the permit. The UIC Program should discuss any events with the owner or operator to confirm that they have investigated the cause/impact of an event and initiated the appropriate response (if needed). On a project-specific basis, one of the following may be necessary: an AoR reevaluation and amendment to any of the Class VI project plans (see Sections 7.2.1 and 7.4); or an enforcement action if the event caused or was the result of a violation and impacted the integrity of the well and/or resulted in USDW endangerment (see Section 2.4).

The EPA encourages the UIC Program to communicate often with the owner or operator during these types of events to ensure that identified remedial actions are being taken and that they are successful in addressing the event. Additionally, communicating with/providing outreach to stakeholders and the public about the event and any impacts may be appropriate. For additional information, see Section 6.5.2.

## 7.6 Non-Endangerment Demonstrations

Before the owner or operator can be authorized to perform site closure activities, they must submit a demonstration, based on monitoring and other site-specific data, that the Class VI project does not pose an endangerment to USDWs [40 CFR 146.93(b)(3)]. Pursuant to 40 CFR 146.93(b)(2), the owner or operator may submit this demonstration before the end of the 50-year PISC timeframe or the end of an approved alternative PISC timeframe. Owners or operators may do this regardless of whether an alternative PISC timeframe is in place. Additional information on non-endangerment demonstrations is available in Section 3.4 of the *UIC Program Class VI Well Plugging, Post-Injection Site Care and Site Closure Guidance*.

The purpose of the UIC Program's review of the non-endangerment demonstration is to confirm, based on all available monitoring and other site-specific data, that no additional monitoring is needed to ensure that the project does not pose an endangerment to USDWs.

### *Completeness*

The non-endangerment demonstration should reference or summarize all relevant monitoring data—including trends and interpretations—on which the demonstration is based. It should also include a discussion of modeling results (e.g., following the last AoR reevaluation) and any other information necessary to assess, confirm, and validate the owner or operator's analysis. The demonstration should also present information to confirm that there are no conduits for fluid movement.

The UIC Program should verify that the data on which the non-endangerment demonstration was based reflect all relevant testing and monitoring results throughout the injection and post-injection phases to provide an accurate representation of current subsurface conditions and trends over time.

***Evaluation***

The bolded and italicized text below outlines a suggested approach for reviewing non-endangerment demonstrations. This approach will help to confirm that the owner or operator's submittal meets the requirements of the Class VI Rule and the permit, and confirm that there is no endangerment to USDWs from the carbon dioxide plume and pressure front.

**Review groundwater monitoring data** to verify that there is no USDW contamination that may be attributed to the Class VI project and that there is no evidence of fluid mobilization as a result of injection or interactions between the injectate and formation fluids. Verify that data from monitoring wells completed above the primary confining zone, within any USDWs that were monitored, or in the vicinity of any known leakage pathways demonstrate favorable trends in observed geochemical monitoring results. Compare recent data with baseline geochemical data and trends in monitoring data through the duration of the project, taking into account anything known about natural variability and surface influences.

**Verify that the carbon dioxide plume and pressure front are behaving as predicted** and that pressures within the subsurface are dissipating. Information about the movement of the carbon dioxide plume and dissipation of the pressure front should be based on a combination of in situ injection zone measurements, the results of geophysical surveys and/or other indirect monitoring techniques, and computational modeling results.

- Examine ***data from in situ pressure monitoring*** and/or any other indirect monitoring to determine whether pressures have declined to a level such that they no longer pose an endangerment to USDWs (e.g., to pre-operation conditions) and they are consistent (both spatially and temporally) with the approved AoR delineation modeling results. In cases where elevated pressures are sustained (e.g., if other operations are affecting pressures in the formation), review the pressure levels in light of their potential to drive fluids into unauthorized formations and the presence of potential conduits in the area affected by the injection (e.g., the AoR, if it is reevaluated and/or verified by the monitoring data).
- Evaluate ***plume monitoring results***, including direct measurements in the injection zone using monitoring wells combined with any geophysical survey results, to ensure that the separate-phase carbon dioxide is migrating as predicted (both laterally and vertically) and verify the trapping mechanisms (e.g., structural trapping, capillary trapping, and mineralization) and their effects (e.g., the estimated trapped fraction of the carbon dioxide). If the plume is predicted to continue migrating at a slow rate (i.e., it would take a significantly long period—on the order of thousands of years—for the plume to reach a potential receptor), confirm the predicted/estimated migration rate and verify that there are no other potential receptors along the plume trajectory.
- Review the results of the most recent ***AoR delineation modeling*** (e.g., AoR reevaluation). If any new computational modeling activities were conducted specifically for the non-endangerment demonstration, evaluate these efforts in a manner similar to that used to review AoR reevaluations during the injection phase (see Section 6.2).

While the owner or operator need not demonstrate that the plume has completely stopped moving, the non-endangerment demonstration should provide evidence, based on monitoring data, that the plume and pressure front are behaving as predicted and they will not pose any endangerment to USDWs and, therefore, no further monitoring is needed.

**Confirm that there are no potential conduits for fluid movement** in the vicinity of the project (e.g., active and abandoned wells, faults, or fractures). Verify that the analyses conducted to identify potential conduits (e.g., aeromagnetic surveys or records reviews) encompassed the maximum extent of the carbon dioxide plume and pressure front. Where conduits were identified, confirm that the owner or operator has demonstrated that none pose an endangerment to a USDW based on plugging records or MITs, assessments that faults or fractures are not transmissive to USDWs, or distance to USDWs.

**Discuss the results of the evaluation with the owner or operator.** Based on the review of the non-endangerment demonstration, three outcomes are possible (see Figure 7-1):

1. The non-endangerment demonstration supports a determination that the plume and pressure front no longer pose an endangerment to USDWs and additional monitoring is not needed. See Section 7.7 for more information on site closure.
2. Additional sampling data, more robust modeling, or additional analysis of results is needed to support a stronger demonstration of non-endangerment. If this outcome is indicated (and sufficient data exist at this point in the post-injection phase), work with the owner or operator to identify these needs and update the non-endangerment demonstration accordingly.

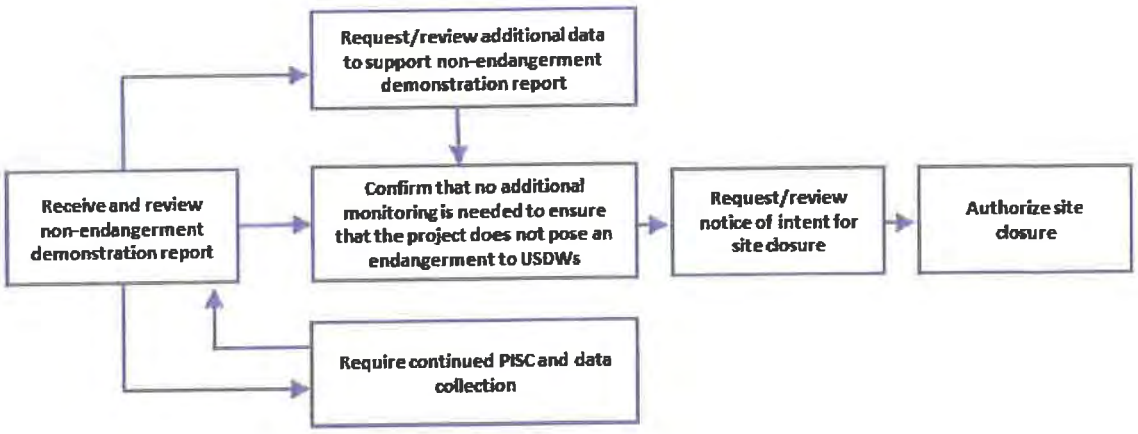



**Figure 7-1: Reviewing Non-Endangerment Demonstrations**

3. Monitoring or modeling data indicate that the carbon dioxide plume and pressure front continue to pose a potential endangerment to USDWs. If this outcome is indicated, request that the owner or operator continue to perform post-injection monitoring. If necessary to ensure protection, a UIC Program Director may require monitoring to continue beyond the previously established PISC timeframe [40 CFR 146.93(b)(4)]. If appropriate, consider asking the owner or operator to amend the PISC and Site Closure Plan, e.g., to modify the monitoring strategy, including increasing or decreasing the frequency at which monitoring is performed and results are submitted. Modify the Class VI permit if needed (see Section 5.2).

***Outcomes***

The EPA encourages the UIC Program to prepare the following materials to document the review of the non-endangerment demonstration and the outcome of the evaluation:

- A report that describes the information reviewed; and
- Documentation regarding whether:
    - The non-endangerment demonstration complies with the requirements under 40 CFR 146.93 and established permit conditions;
    - The UIC Program Director approves the non-endangerment demonstration;
    - Any additional actions, monitoring, or modeling are required of the owner or operator to protect USDWs from endangerment; and
    - The owner or operator may proceed to closing the site pursuant to 40 CFR 146.93(e).

## 7.7 Site Closure

After non-endangerment has been demonstrated and approved by the UIC Program Director, a final site closure process is initiated pursuant to 40 CFR 146.93(d) and (e). During this process, the owner or operator submits a notice of intent to close the site for review and approval by the UIC Program Director. Following approval, the owner or operator closes the site as described in the approved PISC and Site Closure Plan and submits a site closure report to the UIC Program Director (see Figure 7-1).

Proper site closure is necessary to ensure that all monitoring wells are plugged appropriately to prevent them from serving as conduits for fluid migration and to restore the Class VI project site for other uses. The documentation associated with site closure is needed to ensure that future land owners and planners will be made aware that carbon dioxide is stored in the subsurface and help authorities impose appropriate conditions on subsequent drilling activities that may penetrate the injection or confining zone(s).



BLF-000198

***Completeness***

During the post-injection phase, Class VI well owners or operators will submit a notice of intent for site closure and a site closure report to the UIC Program Director. Site closure notifications must be submitted at least 120 days prior to closure unless the UIC Program Director allows for a shorter notice period [40 CFR 146.93(d)]. The site closure notification will likely be a letter that includes information about the facility, contact information for site personnel, and the projected site closure date. At the time of the notification, the owner or operator must also provide an amended PISC and Site Closure Plan if any changes have been made to the approved plan [40 CFR 146.93(d)].

Owners or operators must submit a site closure report within 90 days of site closure [40 CFR 146.93(f)]. The report will describe the pre-plugging activities and the plugging procedures performed on all monitoring wells. It should also contain a copy of a survey plat that was submitted to the local zoning authority and document other required notifications to state, local, and tribal authorities.

***Evaluation***

The bolded text below outlines a suggested approach for reviewing information related to site closure. This approach will help to confirm that the owner or operator's submittals meet the requirements of the Class VI Rule and the permit, and confirm prevention of USDW endangerment.

**Review the notice of intent for site closure.** Consult with the owner or operator prior to the actual closure of the site so that a general understanding of the process is clear to everyone involved. Verify that all site closure activities will be completed by the closure date. If witnessing of monitoring well plugging or other closure activities is necessary, assign the appropriate personnel to witness the activities and schedule this with the owner or operator.

If the owner or operator submits amendments to the PISC and Site Closure Plan, review the information provided to ensure that the owner or operator plans to close the site in a manner that meets the requirements of 40 CFR 146.93. See Sections 4.1.9 and 7.2.1 for additional information on evaluating the PISC and Site Closure Plan.

If the injection well was converted to a monitoring well, ensure that the owner or operator will plug the well in the manner described in the approved Injection Well Plugging Plan [40 CFR 146.92].

**Authorize the owner or operator to proceed with site closure** after confirming that the notice of intent for site closure addresses any outstanding questions and that the owner or operator will proceed in a manner pursuant to 40 CFR 146.93(e) and the conditions of the Class VI permit.

**Review the site closure report** to verify that all activities were conducted according to the procedures described in the approved PISC and Site Closure Plan. Specifically:

- Verify that all monitoring wells were properly plugged as described in the approved plan.
- Review the results of any MITs performed on the monitoring wells prior to their plugging and confirm that appropriate remedial measures were taken to address any problems that were identified.

- Verify that tubing, other equipment, and debris were removed from the monitoring wells prior to plugging.
- Confirm that plugs are located as described in the PISC and Site Closure Plan and emplaced to prevent fluid migration between formations.
- Ensure that cement used for plugging is compatible with formation fluids and with carbon dioxide or carbon dioxide-water mixtures if the monitoring well penetrates the injection zone.
- Evaluate whether proper cement setting times were allowed and proper cement strength was obtained. If any monitoring wells were not properly plugged, request that the owner or operator perform remedial measures and/or retest the well.
- Confirm that the site was restored as described in the approved PISC and Site Closure Plan.
- Verify that all equipment slated for removal was removed and that any pits used for drilling have been properly filled.
- Confirm that vegetation has been replanted and any landscaping described in the plan has been accomplished.

**Verify that the owner or operator performed all site closure-related notifications required at 40 CFR 146.93(f) and (g).**

- Confirm that the required plat of the injection site was included in the site closure report and submitted to the appropriate land zoning authority.
- Verify that the location of the injection well is correctly indicated on the plat; the locations of the monitoring wells may also be helpful. Be sure that locations are documented with respect to permanently surveyed benchmarks.
- Verify that the owner or operator notified all appropriate state, local, tribal, and territorial agencies with authority over drilling activities, and that the notification included all of the information required at 40 CFR 146.93(f). This required information includes the location of the well, the nature of the injection activities, information about the carbon dioxide stream, and recent maps of the carbon dioxide plume position.
- Verify that the owner or operator recorded a notation on the deed to the facility property, and any other documents normally reviewed during a title search, that the site was used for injection of carbon dioxide. If any of the notifications required at 40 CFR 146.93(g) were not provided, request that the owner or operator complete and submit them to the appropriate parties and provide a copy to the Class VI permitting authority.

**Confirm that the owner or operator is aware of their recordkeeping responsibilities.** Many records must be retained for ten years following site closure [40 CFR 146.91(f)]. These include:

- Data collected to support the permit application;
- Data on the nature and composition of all injected fluids; and

- Well plugging reports, post-injection site care data (including, if appropriate, data and information used to develop the demonstration of the alternative PISC timeframe), and the site closure report.

If appropriate, require the owner or operator to deliver the records to the UIC Program Director at the conclusion of the retention period [40 CFR 146.91(f)(2)] or retain records for longer than 10 years after site closure [40 CFR 146.91(f)(5)].

**Release the owner or operator from remaining financial responsibility** after all site closure activities have been completed. Inform the owner or operator that, while they have been released from regulatory compliance and the Class VI permit, they are still responsible for any remedial actions necessary if USDWs should become endangered as a result of the injection activity. The owner or operator may also be liable to lawsuits and remedies under RCRA and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). See Section 4 of the *UIC Program Class VI Well Plugging, Post-Injection Site Care, and Site Closure Guidance* for additional information.

*This page is intentionally blank.*



BLF-000202

# Appendix A

# The Geologic Sequestration Data Tool



BLF-000203

*This page is intentionally blank.*

# The GSDT

## Storage and Access to Class VI Project Data

The GSDT supports the collection, preservation, and evaluation of project-related information and the development of an administrative record for each Class VI permit. The flow and use of information in the GSDT is outlined below:

- Permit applicants/owners or operators use topic-specific **reporting modules** to upload and submit information (see "Permit Applicant/Owner or Operator Reporting Modules" below). Reporting modules are launched from a centralized **operator landing page**.
- Information submitted by the applicant/owner or operator is saved in read-only format in the **administrative record area** of the GSDT. In compliance with the EPA's Cross-Media Electronic Reporting Regulation (CROMERR), users cannot modify these original, time-stamped files.
- Each time information related to a Class VI project is submitted, designated users receive an **automatic email alert**, which includes a PDF that summarizes the contents of the submittal and provides links to the location where the submitted information is stored. The PDF summary also highlights any information that has changed since the last submission.
- The permit writer and other members of the permitting authority team can access copies of the submitted files, save them to the **permit package area** of the GSDT, and collaboratively edit them as needed during the course of evaluating submittals (e.g., to annotate with questions, copy text to create reports, or add permit numbers to project plans). They can also launch the reporting modules directly to help them see the context of the original submittals.
- The permitting authority can request additional information, ask clarifying questions, or initiate other formal communications with the permittee via the **Information Request module**. The module facilitates the transmittal of information requests from the permitting authority to the permit applicant/owner or operator and the submission of responses. Because the communications take place within the GSDT, all requests and responses are automatically retained for inclusion in the permit's administrative record.
- The permitting authority can use the GSDT to organize the **administrative record** for the permit by saving files in the designated area. Any file associated with a project can be included, including original submittals, correspondence with the applicant/owner or operator, UIC Program Director-generated reports, and elements of the permit package.
- When a project milestone is reached (e.g., issuance of a permit), the permit writer can **change the project phase** (e.g., from the pre-construction phase to the pre-operation phase). The GSDT then generates a new area within the project's file structure to facilitate collection and review of information associated with the next project phase.
- The GSDT's **resource library** contains various tools, templates, guidance documents, and other materials that can be used to support the permitting authority's activities through the duration of a Class VI project.



BLF-000205

The GSDT allows for project-specific access control to ensure the integrity of information in the GSDT while allowing for information sharing among permitting authorities. By default, registered permitting authority users will have read-only access to all materials (across all projects) to facilitate transparency and information sharing. Users can be granted higher levels of access on a project-by-project basis, if they need to create or edit materials for those projects. In contrast, permit applicant/owner or operator users can only access materials that they have submitted and information requests sent to them by their permitting authority.

**GSDT Permitting Authority Capabilities**

Permitting authority users access the GSDT via a set of web-based dashboards, which provide users with flexibility to manage work on their assigned Class VI projects. These include user dashboards (which allow individual users to manage work and navigate the site) and project dashboards (to manage information related to each Class VI project).

Permitting authority users seeking access to the GSDT should send an email to GSDataTool@epa.gov or request an account at https://epa.velo.pnnl.gov/gs3/ to begin the registration process. Figure A-1 illustrates the GSDT capabilities and resources available to permitting authorities relative to those available to permit applicants/owners and operators.

***Permitting Authority Dashboards***

Upon logging onto the GSDT, permitting authority users arrive at their user dashboard, which serves as a personalized landing page. The dashboard helps users navigate throughout the GSDT and keep track of relevant information. It provides links to useful information and pages, including:

- The Class VI projects (and associated files) to which the user has been invited (e.g., as a permit writer/project manager or team member) and pending invitations to additional projects.
- Recently edited documents or other materials chosen as "favorites," for easy access to frequently viewed items.
- The overall file structure for the GSDT, with read-only access to all projects.
- User account settings (for changing a password, etc.).
- A resource library (for user documentation, templates, etc.).
- The owner or operator landing page, so that permitting authority users can launch the reporting modules.

Additional capabilities available to permitting authority users include task assignment/ management and support for computational evaluation tools.



BLF-000206

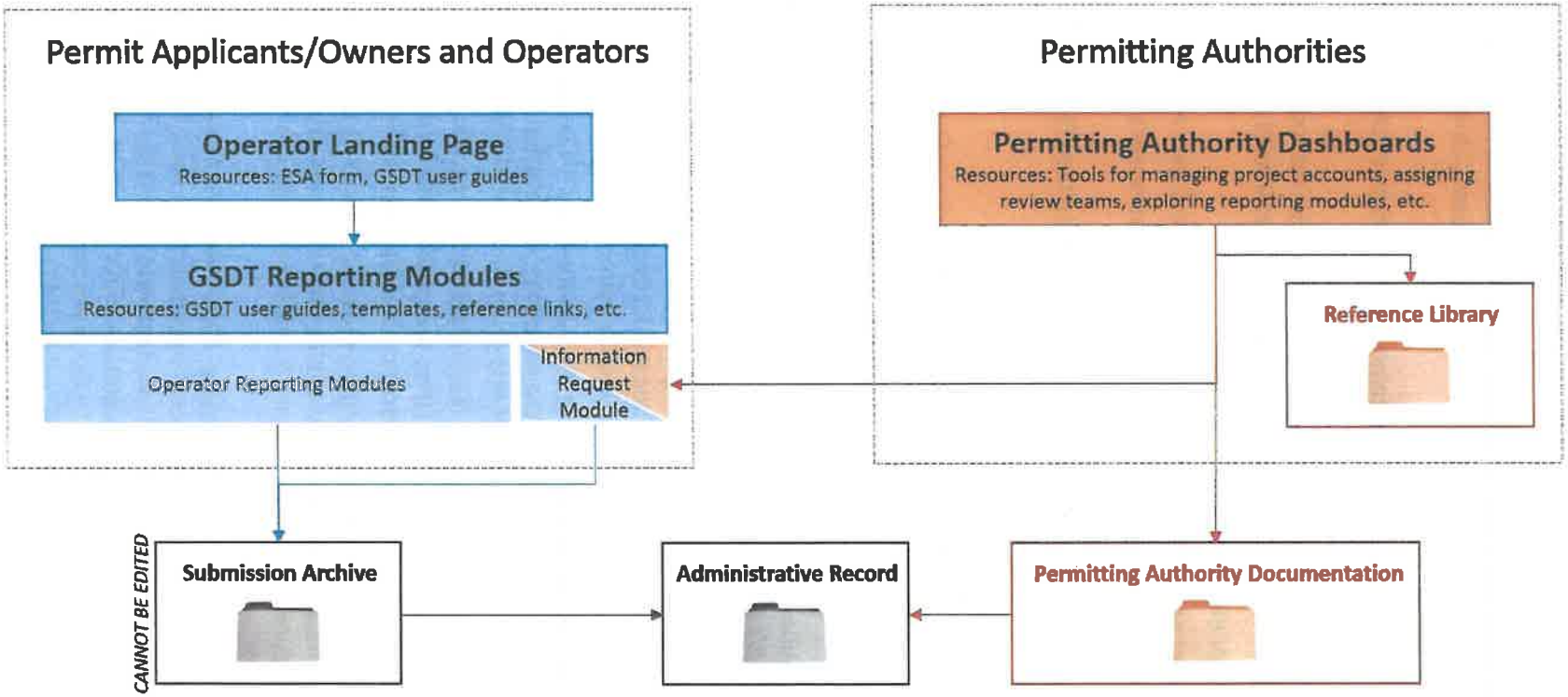



**Figure A-1: Schematic of GSDT Capabilities and Resources for Permit Applicants/Owners or Operators and Permitting Authorities**

### *Project Dashboards*

The GSDT is designed so that each Class VI project has its own dashboard. Project dashboards are created automatically in the GSDT when a new project is created. These dashboards serve as centralized landing pages for each project.

Project dashboards allow easy access to all information and activities related to the project, including:

- The project file structure, which includes both permit applicant/owner or operator submissions and files created or added by the permitting authority team.
- A list of project team members and their roles.
- A summary of recent project updates, such as new content, new users, etc.
- Special capabilities for project manager (permit writer) users, such as project milestone tracking.

For additional information on navigating the dashboards and using the GSDT, see the GSDT user guides for permitting authorities.

### Permit Applicant/Owner or Operator Reporting Modules

To facilitate the efficient submittal of required information, permit applicants/owners or operators interact with the GSDT via a set of reporting modules that reflect the Class VI Rule requirements. Permit applicants/owners or operators access the modules through a centralized operator landing page.

The GSDT provides the following capabilities to facilitate use of the modules and support compliance with the Class VI Rule:

- The reporting modules consist of structured electronic forms that reflect the Class VI Rule requirements. Within the modules, applicants/owners or operators provide information via a combination of selections (with check boxes, radio buttons, drop-down menus, etc.), direct entry into text fields, and file uploads.
- Some modules contain templates (e.g., for the various Class VI project plans) to help users ensure that they have included all the necessary information to fulfill the Class VI Rule requirements while providing flexibility to tailor submissions to their project.
- Each reporting module has a user guide that describes the specific technical procedures necessary to populate and submit data. These user guides can be downloaded from within the modules and be accessed from the operator landing page of the GSDT.
- Most modules are designed to be used during multiple Class VI project phases. This allows owners or operators to return to modules that they have already populated and provide updated information when necessary, while avoiding the need for duplicative submissions.

See the *UIC Program Class VI Well Recordkeeping, Reporting, and Data Management Guidance for Owners and Operators* for additional information on use of the GSDT by permit applicants and permittees. That guidance describes electronic reporting in the context of the Class VI Program, the key components and capabilities of the owner or operator modules of the GSDT, and how permit applicants can register to use and access the GSDT. Step-by-step instructions for using each module can be found in the GSDT user guides.



BLF-000208

# Appendix B

# Useful Websites

***This page is intentionally blank.***

## Useful Websites

The websites below provide tools and information that can support the UIC Program Director in reviewing permit applicant/owner or operator submittals or performing activities associated with developing a Class VI permit or supporting documents as part of a Class VI permit record. Some of the sites below are also referenced in the UIC Program guidance documents for owners or operators.

### *EPA UIC Program Websites*

The EPA's GS Guidance page includes all of the draft and final technical guidance documents for implementing the Class VI Rule. See https://www.epa.gov/uic/class-vi-guidance-documents.

The GSDT can be accessed at https://epa.velo.pnnl.gov/.

A list of Regional UIC contacts and links to state UIC contacts is available on the EPA's UIC page at https://www.epa.gov/uic.

Information on plugging monitoring wells is provided in the *UIC Program Class VI Well Plugging, Post-Injection Site Care, and Site Closure Guidance* and the EPA Region V's "Guidance on Plugging and Abandoning Injection Wells," which is available at https://www.epa.gov/sites/production/files/2015-09/documents/r5-deepwell-guidance4-plugging-abandoning-injection-wells-19941222.pdf.

The EPA's financial responsibility resources are available at http://www.epa.gov/uic/financial-responsibilities-underground-injection-well-owners-or-operators.

### *Other EPA Websites*

Information about water systems is available on the EPA's Safe Drinking Water Information System (SDWIS) at http://www.epa.gov/enviro/facts/sdwis/search.html.

Information on reporting under subpart RR of the Greenhouse Gas Reporting Program is available at https://www.epa.gov/ghgreporting.

Information and guidance related to EJ, including the EPA's environmental justice screening and mapping tool are available at https://www.epa.gov/environmentaljustice.

The EPA's Drinking Water Mapping Application to Protect Source Waters (DWMAPS), an online mapping tool to support updating of state source water assessments and protection plans, is available at https://www.epa.gov/sourcewaterprotection/dwmaps.

The EPA public involvement policy and public involvement web pages provide resources designed to assist in addressing community issues. See https://www.epa.gov/international-cooperation/public-participation-guide.

An index of EPA-approved laboratory methods can be found at https://www.epa.gov/dwanalyticalmethods.

A listing of state laboratory certification programs is available on the EPA's website at http://water.epa.gov/scitech/drinkingwater/labcert/statecertification.cfm.



BLF-000211

### *U.S. Department of Energy Websites*

DOE's Office of Fossil Energy provides news and information about research related to Carbon Capture and Storage (CCS) and best practices documents. Information is available at http://energy.gov/fe/science-innovation/carbon-capture-and-storage-research.

Information on the TOUGHREACT reactive transport model is available from the Lawrence Berkeley National Laboratory at http://esd.lbl.gov/TOUGHREACT/.

Information on STOMP is available from the Pacific Northwest National Laboratory at http://stomp.pnnl.gov/.

The National Risk Assessment Partnership (NRAP) develops risk assessment tools for geologic sequestration. Information about NRAP and its resources is available at https://www.netl.doe.gov/research/coal/crosscutting/national-risk-assessment-partnership.

### *U.S. Geological Survey Websites*

USGS maintains a variety of tools that can support reviews of geologic information in Class VI permit applications and injection depth waiver applications. Some examples include:

- The USGS Earthquake Hazards Program database, available at http://earthquake.usgs.gov/hazards/qfaults/.
- Groundwater information including groundwater use, aquifers, and water quality data, available at http://water.usgs.gov/ogw/data.html.
- USGS's Hydrologic Investigations Atlas Series, available at http://pubs.usgs.gov/ha/ha730.
- Data on water use by county is available at http://water.usgs.gov/watuse/.
- The Land Cover Institute databases of land use are available at http://landcover.usgs.gov/urban/intro.php.



BLF-000212

EPA
United States
Environmental Protection
Agency

# Geologic Sequestration of Carbon Dioxide

# Underground Injection Control (UIC) Program Class VI Well Site Characterization Guidance

INDUSTRIAL COMMISSION
STATE OF NORTH DAKOTA
DATE 6/12/24 CASE NO. 30869-880
Introduced By Bofto (HydroSolutions)
Exhibit LO-20
Identified By Bofto.

EXHIBIT
tabbies
LO-20
30869-30880

Office of Water (4605M)

EPA 816-R-13-004

May 2013
BLF-000001

# Disclaimer

The *Federal Requirements under the Underground Injection Control Program for Carbon Dioxide Geologic Sequestration Wells* (75 FR 77230, December 10, 2010), known as the Class VI Rule, establishes a new class of injection well (Class VI).

The Safe Drinking Water Act (SDWA) provisions and U.S. Environmental Protection Agency (EPA) regulations cited in this document contain legally-binding requirements. In several chapters this guidance document makes suggestions and offers alternatives that go beyond the minimum requirements indicated by the Class VI Rule. This is intended to provide information and suggestions that may be helpful for implementation efforts. Such suggestions are prefaced by "may" or "should" and are to be considered advisory. They are not required elements of the rule. Therefore, this document does not substitute for those provisions or regulations, nor is it a regulation itself, so it does not impose legally-binding requirements on EPA, states, or the regulated community. The recommendations herein may not be applicable to each and every situation.

EPA and state decision makers retain the discretion to adopt approaches on a case-by-case basis that differ from this guidance where appropriate. Any decisions regarding a particular facility will be made based on the applicable statutes and regulations. Mention of trade names or commercial products does not constitute endorsement or recommendation for use. EPA is taking an adaptive rulemaking approach to regulating Class VI injection wells, and the agency will continue to evaluate ongoing research and demonstration projects and gather other relevant information as needed to refine the rule. Consequently, this guidance may change in the future without a formal notice and comment period.

While EPA has made every effort to ensure the accuracy of the discussion in this document, the obligations of the regulated community are determined by statutes, regulations or other legally binding requirements. In the event of a conflict between the discussion in this document and any statute or regulation, this document would not be controlling.

Note that this document only addresses issues covered by EPA's authorities under the SDWA. Other EPA authorities, such as Clean Air Act requirements to report carbon dioxide injection activities under the Greenhouse Gas Mandatory Reporting Rule (GHG MRR), are not within the scope of this document.

# Executive Summary

EPA's *Federal Requirements Under the Underground Injection Control Program for Carbon Dioxide Geologic Sequestration Wells* are codified in the U.S. Code of Federal Regulations [40 CFR 146.81 *et seq.*] and are referred to as the Class VI Rule. The Class VI Rule establishes a new class of injection well (Class VI) and sets minimum federal technical criteria for Class VI injection wells for the purpose of protecting underground sources of drinking water (USDWs). This document is part of a series of technical guidance documents designed to support owners or operators of Class VI wells and the UIC Program permitting authorities.

Site characterization is critical to operating safe and effective geologic sequestration (GS) projects. The proper siting of a Class VI injection well is the foundation for successful GS operations. Site characterization identifies potential risks and eliminates unacceptable sites (e.g., sites with transmissive faults or fractures that would impair containment). Key aspects of an appropriate GS site, per 40 CFR 146.83, include geologic formations that provide adequate storage capacity to store the injected carbon dioxide and a competent confining zone that will contain the injected carbon dioxide. Class VI well owners or operators also must identify additional confining zones, if required by the UIC Program Director.

The Class VI Rule also requires owners or operators of Class VI wells to perform, among other activities, a detailed assessment of the geologic, hydrogeologic, geochemical, and geomechanical properties of the proposed GS site to ensure that wells are sited in suitable locations [40 CFR 146.82(a) and (c)]. As part of the site characterization required to be documented in a Class VI permit application, owners or operators of Class VI wells must submit maps and geologic cross sections describing subsurface geologic formations as well as the general vertical and lateral limits of all USDWs at the proposed GS site [40 CFR 146.82(a)]. Data and information collected during site characterization are used in the development of injection well construction and operating plans; provide inputs for the computational model that estimates the extent of the injected carbon dioxide plume and related pressure front; and establish baseline information to which geochemical, geophysical, and hydrogeologic site monitoring data collected over the life of the injection project can be compared.

This *UIC Program Class VI Well Site Characterization Guidance* describes those data and information that are typically used to characterize the geology of a site, including methods for measuring or estimating important geologic parameters. The introductory section of this guidance provides an overview of the Class VI Rule, specifically with regard to geologic siting requirements. The second section describes the site characterization data needed to obtain a permit for the construction of a Class VI well. The third section addresses certain aspects of site characterization activities that involve the synthesis of geologic, hydrogeologic, geochemical, and geomechanical data in order to demonstrate that the project site is suitable for injection (i.e., has an injection zone capable of receiving the anticipated volume of carbon dioxide and a confining zone(s) capable of containing the plume and pressure front). The fourth section addresses requirements applicable to drilling and completion of the injection well that must be met before operation may be authorized, pursuant to 40 CFR 146.82(c) and 146.87. In each section, the guidance describes options for meeting the Class VI Rule requirements and the types of information recommended to be submitted.

# Table of Contents


Disclaimer ..... i
Executive Summary ..... ii
Table of Contents ..... iv
List of Tables ..... vi
List of Figures ..... vii
Acronyms and Abbreviations ..... viii
Definitions ..... xi

1. Introduction ..... 1
   1.1. Overview of Class VI Rule Requirements ..... 2
   1.2. Overview and Purpose of this Guidance ..... 4
   1.3. Relationship to Other Class VI Activities ..... 6
   1.4. Organization of this Guidance ..... 8

2. Activities Performed Prior to Construction of a Class VI Well ..... 9
   2.1. Regional Geology, Hydrogeology, and Local Structural Geology ..... 9
   2.2. Map of Injection Well, Area of Review, Surface Water Bodies, Artificial Penetrations, and Faults ..... 11
   2.3. Detailed Geology and Hydrogeologic Site Characterization ..... 13
      2.3.1. Maps and Cross Sections of the Area of Review ..... 14
      2.3.2. Faults and Fractures in the Area of Review ..... 15
      2.3.3. Depth, Areal Extent, and Thickness of the Injection and Confining Zones ..... 17
      2.3.4. Petrology and Mineralogy of the Injection and Confining Zones ..... 18
      2.3.5. Porosity, Permeability, and Capillary Pressure of the Injection and Confining Zones ..... 20
         2.3.5.1. Porosity ..... 20
         2.3.5.2. Permeability ..... 22
         2.3.5.3. Capillary Pressure ..... 25
      2.3.6. Geomechanical Characterization ..... 26
      2.3.7. Seismic History ..... 28
      2.3.8. Hydrology and Hydrogeology of the Area of Review ..... 29
      2.3.9. Baseline Geochemical Characterization ..... 31
         2.3.9.1. Fluid Chemistry ..... 32
         2.3.9.2. Bulk Solid Phase Chemical Analysis ..... 34
         2.3.9.3. Geochemical Calculations and Modeling ..... 34
      2.3.10. Geophysical Characterization ..... 35
         2.3.10.1. Seismic Methods ..... 38
         2.3.10.2. Gravity Methods ..... 40
         2.3.10.3. Electrical/Electromagnetic Geophysical Methods ..... 40
         2.3.10.4. Magnetic Geophysical Methods ..... 41
      2.3.11. Surface Air and Soil Gas Monitoring ..... 42

3. Data Synthesis for Demonstration of Site Suitability ..... 45
   3.1. Facies Analysis for the Project Site ..... 46
   3.2. Structure of the Injection and Confining Zones ..... 47
   3.3. Compatibility of the Carbon Dioxide Stream with Subsurface and Well Materials ..... 49

3.3.1. Compatibility of the Carbon Dioxide Stream with Fluids and Minerals ..... 50
3.3.2. Compatibility with Well Materials ..... 53
3.4. Demonstration of Storage Capacity ..... 55
3.4.1. Methods for Estimating Carbon Dioxide Storage Capacity ..... 55
3.4.2. Static Models ..... 56
3.4.3. Dynamic Models ..... 56
3.4.4. Application of Methods for Estimating Carbon Dioxide Storage Capacity ..... 57
3.5. Demonstration of Confining Zone Integrity ..... 59
3.5.1. Movement through the Confining Zone ..... 59
3.5.2. Transmission of Carbon Dioxide through Faults ..... 60
3.5.3. Special Considerations for Characterizing Lower Confining Zones ..... 62
3.6. Considerations for Secondary Confinement ..... 63
3.7. Reporting Process ..... 64
4. Activities Performed Prior to Operation of a Class VI Well ..... 66
4.1. Well Logging ..... 66
4.2. Core Analyses ..... 68
4.3. Characterization of Injection Formation Fluid Chemical and Physical Properties and Downhole Conditions ..... 69
4.4. Fracture Pressure of the Injection and Confining Zones ..... 70
4.5. Hydrogeologic Testing ..... 71
4.5.1. Pressure Fall-Off Tests ..... 72
4.5.2. Injectivity and Pump Tests ..... 73
5. References ..... 75

Appendix: Available Technologies and Methods for Conducting Required Site Characterization Activities

# List of Tables

Table 1-1: Site Characterization Activities in the Class VI Rule ..... 4
Table 2-1: Applicability of Geophysical Techniques to Geological Features of Interest..... 37
Table 2-2: Stages in a Geologic Sequestration Project where Geophysical Techniques May Be Applicable..... 38

# List of Figures

Figure 1-1: Flow Chart Showing Relationships among Site Characterization, Modeling, and Monitoring for a GS Project ..... 7

# Acronyms and Abbreviations

| | |
|---|---|
| 2D | Two-dimensional |
| 3D | Three-dimensional |
| AAPG | American Association of Petroleum Geologists |
| ANN | Artificial neural networks |
| AoR | Area of review |
| API | American Petroleum Institute |
| BSE | Backscattered electron |
| CERCLIS | Comprehensive Environmental Response, Compensation, and Liability Information System |
| CERI | Center for Earthquake Research and Information |
| CFR | Code of Federal Regulations |
| CGS | Centimeter gram second system |
| $CO_2$ | Carbon dioxide |
| CR | Complex resistivity |
| CSAMT | Controlled source audio-frequency magnetotellurics |
| CT | Computerized tomography |
| DADN | Difference analysis with data normalization |
| DOE | United States Department of Energy |
| EGR | Enhanced gas recovery |
| EM | Electromagnetic |
| EOR | Enhanced oil recovery |
| EPA | United States Environmental Protection Agency |
| ERT | Electrical resistivity tomography (electroresistive tomography) |
| FBP | Formation breakdown pressure |
| FEMA | Federal Emergency Management Agency |
| FMI | Formation microresistivity image |
| FPP | Fracture pumping pressure |
| GEM | Global Earthquake Model |
| GHG MRR | Greenhouse Gas Mandatory Reporting Rule |
| GIS | Geographic information system |
| GPR | Ground penetrating radar |
| GS | Geologic sequestration |
| ICIS | Integrated Compliance Information System |
| ICP/AES | Inductively coupled plasma/atomic emission spectrometry |

| | |
|---|---|
| ICP/MS | Inductively coupled plasma/mass spectrometry |
| IFT | Interfacial tension |
| IGIP | Initial gas in place |
| IP | Induced polarization |
| LOP | Leak-off point |
| LOT | Leak-off test |
| LWD | Logging while drilling |
| M | Mobility ratio |
| Mt | Megatonne |
| NERSL | National Energy Research Seismic Library |
| NETL | National Energy Technology Laboratory |
| NML | Nuclear magnetism logging |
| NMR | Nuclear magnetic resonance |
| NOAA | National Oceanic and Atmospheric Administration |
| NWIS | National Water Information System |
| OGIP | Original gas in place |
| OOIP | Original oil in place |
| pAVAZ | P-wave amplitude variation with offset and azimuth, also referred to as pAVOA |
| Pe | Capillary entry pressure |
| PGIP | Producible gas in place |
| PIA | Petrographic image analysis |
| PISC | Post-injection site care |
| SC | Specific conductivity |
| SCAL | Special core analysis |
| SDWA | Safe Drinking Water Act |
| SEI | Secondary electron imaging |
| SEM | Scanning electron microscope (or microscopy) |
| SGR | Shale gouge ratio |
| SP | Self potential (when referring to geophysical techniques) |
| SP | Spontaneous potential (when referring to logging) |
| TDS | Total dissolved solids |
| TOC | Total organic carbon |
| UIC | Underground Injection Control |
| USBM | United States Bureau of Mines |
| USDW | Underground source of drinking water |
| USGS | United States Department of the Interior, United States Geological Survey |

| | |
|---|---|
| VSP | Vertical seismic profile |
| XLOT | Extended leak-off test |
| XRD | X-ray diffraction |
| XRF | X-ray fluorescence |

# Definitions

Key to definition sources:

1: 40 CFR 146.81(d).
2: EPA's UIC website (http://water.epa.gov/type/groundwater/uic/glossary.cfm).
3: Class VI Rule Preamble.
4: 40 CFR 144.6(f) and 144.80(f).
5: This definition was drafted for the purposes of this document.
6: 40 CFR 144.3.

**Area of Review (AoR)** means the region surrounding the geologic sequestration project where USDWs may be endangered by the injection activity. The AoR is delineated using computational modeling that accounts for the physical and chemical properties of all phases of the injected carbon dioxide stream and displaced fluids, and is based on available site characterization, monitoring, and operational data as set forth in 40 CFR 146.84.[1]

**Brine** means water that has a large quantity of salt, especially sodium chloride, dissolved in it. Large quantities of brine are often produced along with oil and gas. Water having high total dissolved solids (TDS) content.[2]

**Buoyancy** refers to the upward force on one phase (e.g., a fluid) produced by the surrounding fluid (e.g., a liquid or a gas) in which it is fully or partially immersed, caused by differences in pressure or density.[3]

**Capillary pressure** refers to the difference of pressures between two phases existing in a system of interconnecting pores or capillaries. The difference in pressure is due to the combination of surface tension and curvature in the capillaries.[5]

**Carbon dioxide plume** means the extent underground, in three dimensions, of an injected carbon dioxide stream.[1]

**Carbon dioxide stream** means carbon dioxide that has been captured from an emission source (e.g., a power plant), plus incidental associated substances derived from the source materials and the capture process, and any substances added to the stream to enable or improve the injection process. This subpart [Subpart H of 40 CFR part 146] does not apply to any carbon dioxide stream that meets the definition of a hazardous waste under 40 CFR part 261.[1]

**Class VI wells** means wells that are not experimental in nature that are used for GS of carbon dioxide beneath the lowermost formation containing a USDW; or, wells used for GS of carbon dioxide that have been granted a waiver of the injection depth requirements pursuant to requirements at 40 CFR 146.95; or, wells used for GS of carbon dioxide that have received an expansion to the areal extent of an existing Class II EOR/EGR aquifer exemption pursuant to 40 CFR 146.4 and 144.7(d).[4]

**Computational model** means a mathematical representation of the injection project and relevant features, including injection wells, site geology, and fluids present. For a GS project, site-specific geologic information is used as input to a computational code, creating a computational model that provides predictions of subsurface conditions, fluid flow, and carbon dioxide plume and pressure front movement at that site. The computational model comprises all model input and predictions (i.e., output).[5]

**Confining zone** means a geologic formation, group of formations, or part of a formation stratigraphically overlying the injection zone(s) that acts as barrier to fluid movement. For Class VI wells operating under an injection depth waiver, confining zone means a geologic formation, group of formations, or part of a formation stratigraphically overlying and underlying the injection zone(s).[1]

**Corrective action** means the use of Director-approved methods to ensure that wells within the AoR do not serve as conduits for the movement of fluids into USDWs.[1]

**Cratonic** means pertaining to the old, stable lithosphere in the interiors of continents.[5]

**Drilling mud** means a heavy suspension used in drilling an "injection well," introduced down the drill pipe and through the drill bit.[6]

**Dynamic models** refers to a method or methods for estimating carbon dioxide storage capacity after initiation of carbon dioxide injection, including decline curve analysis, material balance, and reservoir simulation.[5]

**Effective permeability** means the permeability of one fluid when more than one fluid phase is present.[5]

**Enhanced Oil or Gas Recovery (EOR/EGR)** typically means, the process of injecting a fluid (e.g., water, brine, or carbon dioxide) into an oil or gas bearing formation to recover residual oil or natural gas. The injected fluid thins (decreases the viscosity) and/or displaces extractable oil and gas, which is then available for recovery. This is also used for secondary or tertiary recovery.[3]

**Equation of state** refers to an equation that expresses the equilibrium phase relationship between pressure, volume and temperature for a particular chemical species.[5]

**Fluid** means any material or substance which flows or moves whether in a semisolid, liquid, sludge, gas or other form or state.[6]

**Formation or geological formation** means a layer of rock that is made up of a certain type of rock or a combination of types.[3]

**Geochemical characterization** means to study the chemistry of the formation fluids and solids (rock) and to identify potential chemical interactions among the injectate (carbon dioxide), formation fluids, and solids.[5]

**Geologic sequestration (GS)** means the long-term containment of a gaseous, liquid or supercritical carbon dioxide stream in subsurface geologic formations. This term does not apply to carbon dioxide capture or transport.[1]

**Geologic sequestration project** means an injection well or wells used to emplace a carbon dioxide stream beneath the lowermost formation containing a USDW; or, wells used for GS of carbon dioxide that have been granted a waiver of the injection depth requirements pursuant to requirements at 40 CFR 146.95; or, wells used for GS of carbon dioxide that have received an expansion to the areal extent of an existing Class II EOR/EGR aquifer exemption pursuant to 40 CFR 146.4 and 144.7(d). It includes the subsurface three-dimensional extent of the carbon dioxide plume, associated area of elevated pressure, and displaced fluids, as well as the surface area above that delineated region.[1]

**Geomechanical characterization** means to study the rock mechanical characteristics associated with carbon dioxide containment such as fault and reservoir rock stability and confining zone integrity.[5]

**Geophysical surveys** refers to the use of geophysical techniques (e.g., seismic, electrical, gravity, or electromagnetic (EM) surveys or well logging methods such as gamma ray and spontaneous potential) to characterize subsurface rock formations.[3]

**Heterogeneity** refers to the spatial variability in the geologic structure and/or physical properties of the site.[5]

**Hysteresis** means the phenomenon where the response of a system depends not only on the present stimulus, but also on the previous history of the medium. For example, in a GS project, relative permeability, capillary pressure, and residual trapping will depend upon the saturation history of the formation (i.e., injection vs. post-injection phase).[5]

**Injection zone** means a geologic formation, group of formations, or part of a formation that is of sufficient areal extent, thickness, porosity, and permeability to receive carbon dioxide through a well or wells associated with a GS project.[1]

**Injectivity** is the pressure differential over existing reservoir pressure required to inject a unit volume of fluid in a given unit of time. It is typically expressed as psi/bbl/day (psi per barrel per day) but can be expressed in any combination of pressure, volume, and time units. [5]

**In situ stresses** refers to the three principal stresses (vertical stress, maximum horizontal stress, and minimum horizontal stress) commonly used to characterize the geomechanical model.[5]

**Intracratonic** means located in an area above old, stable lithosphere, usually in the interiors of continents far away from plate boundaries.[5]

**Intrinsic permeability** refers to a parameter that describes properties of the subsurface that impact the rate of fluid flow. Larger intrinsic permeability values correspond to greater fluid flow rates. Intrinsic permeability has units of area (distance squared).[5]

**Irreducible water saturation** refers to the smallest amount of remaining water in a core sample after forced displacement by another fluid.[5]

**Lithology** means the description of rocks, based on color, mineral composition, and grain size.[3]

**Mineralogy, petrology, and solid-phase chemistry** refers to the composition of the solids in an aquifer, including the minerals, rock types and their origins, and bulk chemical composition.[5]

**Mud log** means data collected from drilling mud as it circulates. It produces a record of the different types of data collected when drilling a well, such as the rate of drilling, the rock types in the cuttings, and the presence of hydrocarbons.[5]

**Parameter** means a mathematical variable used in governing equations, equations of state, and constitutive relationships. Parameters describe properties of the fluids present, porous media, and fluid sources and sinks (e.g., injection well). Examples of model parameters include intrinsic permeability, fluid viscosity, and fluid injection rate.[5]

**Pore throat radius** means the radius of the opening to a pore in a rock.[5]

**Porosity** means the percentage of rock consisting of void space.[5]

**Post-injection site care** means appropriate monitoring and other actions (including corrective action) needed following cessation of injection to ensure that USDWs are not endangered, as required under 40 CFR 146.93.[1]

**Pressure front** means the zone of elevated pressure that is created by the injection of carbon dioxide into the subsurface. For [GS projects], the pressure front of a carbon dioxide plume refers to the zone where there is a pressure differential sufficient to cause the movement of injected fluids or formation fluids into a USDW.[1]

**Relative permeability** refers to a factor, between 0 and 1, that is multiplied by the intrinsic permeability of a formation to compute the effective permeability for a fluid in a particular pore space. When immiscible fluids (e.g., carbon dioxide, water) are present within the pore space of a formation, the ability for flow of those fluids is reduced, due to the blocking effect of the presence of the other fluid. This reduction is represented by relative permeability.[5]

**Reserve** means the estimated volume available for carbon dioxide storage in the injection zone, considering technological, economic, and regulatory constraints and limitations. Reserve estimates can be considered a subset of resource estimates.[5]

**Resource** means the estimated volume available for carbon dioxide storage in the injection zone.[5]

**Site closure** means the point/time, as determined by the UIC Program Director following the requirements under 40 CFR 146.93, at which the owner or operator of a GS site is released from post-injection site care responsibilities.[1]

**Skin factor or skin effect** refers to the restrictions to flow in the near-well bore region, typically associated with damage during drilling and well operations.[5]

**Static models** refers to the methods for estimating carbon dioxide storage capacity prior to startup of injection and includes volumetric and compressibility methods.[5]

**Storage capacity** means the pore volume within the injection zone available for carbon dioxide storage.[5]

**Stratigraphy** means the sequence of rock strata, or layers. This generally refers to layers of sedimentary or igneous rocks.[5]

**Supercritical fluid** means a fluid above its critical temperature (31.1°C for carbon dioxide) and critical pressure (73.8 bar for carbon dioxide).[5]

**Tensile strength** refers to the maximum force an element can take in tension before it breaks.[5]

**Total dissolved solids (TDS)** means the total dissolved (filterable) solids as determined by use of the method specified in 40 CFR part 136.[6]

**Transmissibility** means a coefficient associated with Darcy's law that characterizes flow through porous media. It is equal to the coefficient of permeability (hydraulic conductivity) multiplied by the thickness of the formation.[5]

**Transmissive fault or fracture** means a fault or fracture that has sufficient permeability and vertical extent to allow fluids to move between formations.[1]

**Underground Injection Control Program** refers to the program EPA, or an approved state, is authorized to implement under the Safe Drinking Water Act (SDWA) that is responsible for regulating the underground injection of fluids by injection wells. This includes setting the federal minimum requirements for construction, operation, permitting, and closure of underground injection wells.[5]

**Underground Injection Control Program (UIC Program) Director** refers to the chief administrative officer of any state or tribal agency or EPA Region that has been delegated to operate an approved UIC program.[2]

**Underground Source of Drinking Water (USDW)** means an aquifer or its portion which supplies any public water system; or which contains a sufficient quantity of ground water to supply a public water system; and currently supplies drinking water for human consumption; or contains fewer than 10,000 mg/l total dissolved solids; and which is not an exempted aquifer.[6]

**Well bore** refers to the hole that remains throughout a geologic (rock) formation after a well is drilled.[5]

**Wireline** refers to a wire or cable that is used to deploy tools and instruments downhole and that transmits data to the surface.[5]

**Workover** refers to any maintenance activity performed on a well that involves ceasing injection and removing the wellhead.[5]

# 1. Introduction

Site characterization is a long-standing requirement of the Underground Injection Control (UIC) Program to ensure safe deployment of injection operations and the protection of underground sources of drinking water (USDWs). The U.S. Environmental Protection Agency's (EPA's) *Federal Requirements Under the Underground Injection Control (UIC) Program for Carbon Dioxide Geologic Sequestration (GS) Wells*, found at 75 FR 77230, December 10, 2010, and codified in the U.S. Code of Federal Regulations [40 CFR 146.81 *et seq.*], are referred to as the Class VI Rule. The Class VI Rule requires owners or operators of wells used to inject carbon dioxide for GS to identify the presence of suitable geologic characteristics at a proposed site to ensure the protection of USDWs during and following injection activities.

Site characterization for Class VI permitting focuses on demonstrating that a proposed project site has a suitable injection zone to receive the carbon dioxide and a confining zone that will prevent fluid movement out of the injection zone as described under 40 CFR 146.83. Owners or operators must gather the data necessary to demonstrate site suitability and submit this with a Class VI permit application to be evaluated by the UIC Program Director prior to receiving authorization to construct the well [40 CFR 146.82(a)], and must update and gather more detailed site-specific information and submit this prior to receiving authorization for injection [40 CFR 146.82(c)].

The site characterization process typically includes a general characterization of regional and site geology, followed by detailed characterization of the injection zone and confining zones. The more general characterization includes data on the regional geology and hydrogeology, supported by maps, cross sections, and other available data. The more detailed information focuses on the proposed project site and involves submission of data on stratigraphy, structural geology, hydrogeology, geomechanical properties, and geochemistry. The initial stage includes compiling pre-existing and/or new information, maps, cross sections, geochemical and petrophysical data, and geophysical or remote sensing information as described under 40 CFR 146.82(a). Final site characterization data will be collected as the injection well is drilled, core samples are taken and analyzed, and logs and tests are performed, as described under 40 CFR 146.82(c).

In addition to being essential to USDW protection, thorough site characterization is a necessary element of selecting viable GS sites. EPA expects that selecting GS sites will be analogous to the process by which oil and gas recovery projects are sited—from a "big picture" regional evaluation of prospective resources that relies primarily on existing data, to more detailed evaluations of prospects that appear, based on preliminary data, to be promising sites. These detailed evaluations involve the use of the same logging, testing, and modeling techniques needed to perform site characterizations that can meet the requirements of the Class VI Rule (NETL, 2010).

## 1.1. Overview of Class VI Rule Requirements

The Class VI Rule, at 40 CFR 146.83, establishes minimum criteria for the siting of Class VI wells. Specifically, Class VI wells must be located in areas with a suitable geologic system, including: (1) the presence of an injection zone of sufficient areal extent, thickness, porosity, and permeability to receive the total anticipated volume of the carbon dioxide stream; and (2) the presence of confining zones that are free of transmissive faults or fractures and of sufficient areal extent and integrity to contain the carbon dioxide stream and displaced formation fluids and allow injection without initiating or propagating fractures [40 CFR 146.83(a)]. Additionally, at the UIC Program Director's discretion, owners or operators may be required to identify and characterize additional confining zones to ensure USDW protection, impede vertical fluid movement, allow for pressure dissipation, and provide additional opportunities for monitoring, mitigation, and remediation [40 CFR 146.83(b)].

Owners or operators must demonstrate that a proposed site is suitable for GS by performing detailed site characterization and submitting extensive geologic data to the UIC Program Director. These data, described at 40 CFR 146.82(a), are necessary to demonstrate that the well will be sited in an area with a suitable geologic system that will ensure USDW protection and meet the requirements of 40 CFR 146.83. The Class VI Rule specifies distinct requirements for information to be submitted with the permit application and before well construction is approved at 40 CFR 146.82(a), and information to be submitted before operation of the well is authorized at 40 CFR 146.82(c).

Site characterization is an iterative process. Site characterization data are submitted to the UIC Program Director to fulfill the requirements for a Class VI permit application [40 CFR 146.82(a)] before well construction is approved. Pursuant to the requirements at 40 CFR 146.82(c), the data must be updated and refined before operation of the well is authorized based on the results of the formation testing program required at 40 CFR 146.82(a)(8) and 146.87 that is executed during injection well drilling and completion.

The types of site characterization information specified by the Class VI Rule that must be provided with a Class VI well permit application include:

- Maps and cross sections of the area of review (AoR) [40 CFR 146.82(a)(3)(i) and 146.82(a)(2)];
- The location, orientation, and properties of known or suspected faults and fractures that may transect the confining zone(s) in the AoR, along with a determination that they will not interfere with containment [40 CFR 146.82(a)(3)(ii)];
- Data on the depth, areal extent, thickness, mineralogy, porosity, permeability, and capillary pressure of the injection and confining zone(s) and on lithology and facies changes [40 CFR 146.82(a)(3)(iii)];
- Geomechanical information on fractures, stress, ductility, rock strength, and in situ fluid pressures within the confining zone(s) [40 CFR 146.82(a)(3)(iv)];

- Information on the seismic history of the area, including the presence and depths of seismic sources, and a determination that the seismicity will not interfere with containment [40 CFR 146.82(a)(3)(v)];
- Geologic and topographic maps and cross sections illustrating regional geology, hydrogeology, and the geologic structure of the local area [40 CFR 146.82(a)(3)(vi)];
- Maps and stratigraphic cross sections indicating the general vertical and lateral limits of all USDWs, water wells, and springs within the AoR, their positions relative to the injection zone(s), and the direction of water movement (where known) [40 CFR 146.82(a)(5)]; and
- Baseline geochemical data on subsurface formations, including all USDWs in the AoR [40 CFR 146.82(a)(6)].

The types of site characterization information specified by the Class VI Rule that must be provided for the UIC Program Director to review and approve the operation of a Class VI well include:

- Any relevant updates to the information on the geologic structure and hydrogeologic properties of the proposed storage site and overlying formations, based on data obtained during logging and testing of the well [40 CFR 146.82(c)(2)];
- Information on the compatibility of the carbon dioxide stream with fluids in the injection zone(s) and minerals in both the injection and the confining zone(s) [40 CFR 146.82(c)(3)];
- The results of formation testing [40 CFR 146.82(c)(4)]; and
- All available logging and testing program data on the well required by 40 CFR 146.87 [40 CFR 146.82(c)(7)].

Owners or operators are expected to take full advantage of existing site characterization data to fulfill the requirements at 40 CFR 146.82. However, a stratigraphic well may need to be drilled in some cases (e.g., if adequate data are not already available). If owners or operators need to drill a stratigraphic well, they may consider ultimately using it for injection or monitoring.

Owners or operators should keep in mind that if the AoR delineation or any of the project plans require significant changes based on the final site characterization data, the Class VI permit would have to be modified to incorporate these changes before injection can be authorized [40 CFR 144.39]. Depending on the extent of the modifications, the UIC Program Director may need to re-initiate the public notice process. To avoid any potential delays associated with the permit modification process, EPA encourages owners or operators to collect as much site-specific data as possible before submitting the initial Class VI permit application. Additional information on the Class VI permitting process and how UIC Program Directors may evaluate the site characterization submittals is presented in the *UIC Program Class VI Implementation Manual for State Directors*.

## 1.2. Overview and Purpose of this Guidance

The purpose of this guidance is to describe the data needs, process, and procedures for conducting a geologic assessment that meets the requirements of the Class VI Rule at 40 CFR 146.82 and 146.83. This document provides guidance on the types of information to collect and submit with a Class VI injection well permit application as well as where and how such information might be obtained. Illustrative examples of some of the required information are in the Appendix to this document.

This guidance document is written to assist Class VI injection well owners or operators, parties that may conduct the geologic siting activities on behalf of owners or operators, and the UIC Program permitting authorities who will evaluate Class VI permit applications. This guidance can also help owners or operators who hire contractors to perform some or all of the required site characterization activities understand, as signers of the permit application, all of the information that is submitted. Likewise, owners or operators are encouraged to share this guidance document with contractors so that they understand the permitting authority's expectations for the data submitted.

It is important to note that not all sites will be suitable for GS. This guidance provides considerations for determining when issuing a Class VI permit is or might not be appropriate, or when more data may be needed to make a determination regarding the suitability of a site. EPA encourages owners or operators to review the considerations in this guidance and discuss the data being collected with the UIC Program Director throughout the site characterization process. Table 1-1 presents the activities owners or operators undertake as part of the site evaluation/characterization process (based on the requirements of 40 CFR 146.82), the corresponding Class VI Rule requirement, and the section of this guidance that describes how owners or operators can collect this information and submit it to demonstrate to the UIC Program Director that the site is appropriate for GS.

**Table 1-1: Site Characterization Activities in the Class VI Rule**

| Activity | Class VI Rule Requirement | Guidance Section |
|---|---|---|
| ***Regional evaluation*** | | |
| Characterize regional geology and hydrogeology and local structural geology | Maps and cross sections of the AoR [40 CFR 146.82(a)(3)(i)].<br><br>Geologic and topographic maps and cross sections illustrating regional geology, hydrogeology, and the geologic structure of the local area [40 CFR 146.82(a)(3)(vi)]. | 2.3.1<br><br>2.1 |
| Gather information on all wells, etc. | Map showing the injection well, the applicable AoR, and faults, if known or suspected [40 CFR 146.82(a)(2)]. | 2.2 |
| Study seismic history | Information on the seismic history of the area, including the presence and depths of seismic sources [40 CFR 146.82(a)(3)(v)]. | 2.3.7 |

| Activity | Class VI Rule Requirement | Guidance Section |
|---|---|---|
| ***Detailed analysis*** | | |
| Study faults and fractures in the AoR | The location, orientation, and properties of known or suspected faults and fractures that may transect the confining zone(s) in the AoR and a determination that they would not interfere with containment [40 CFR 146.82(a)(3)(ii)]. | 2.3.2 |
| Collect data on the depth, areal extent, and thickness of the injection and confining zones, and facies changes | Data on the depth, areal extent, thickness, mineralogy, porosity, permeability, and capillary pressure of the injection and confining zone(s); including geology/facies changes based on field data which may include geologic cores, outcrop data, seismic surveys, well logs, and names and lithologic descriptions [40 CFR 146.82(a)(3)(iii)]. | 2.3.3, 3.1 |
| Characterize mineralogy of the injection and confining zones | Data on the depth, areal extent, thickness, mineralogy, porosity, permeability, and capillary pressure of the injection and confining zone(s); including geology/facies changes based on field data which may include geologic cores, outcrop data, seismic surveys, well logs, and names and lithologic descriptions [40 CFR 146.82(a)(3)(iii)]. | 2.3.4 |
| Characterize porosity, permeability, and capillary pressure of the injection and confining zones | Data on the depth, areal extent, thickness, mineralogy, porosity, permeability, and capillary pressure of the injection and confining zone(s); including geology/facies changes based on field data which may include geologic cores, outcrop data, seismic surveys, well logs, and names and lithologic descriptions [40 CFR 146.82(a)(3)(iii)]. | 2.3.5 |
| Perform geomechanical characterization | Geomechanical information on fractures, stress, ductility, rock strength, and in situ fluid pressures within the confining zone(s) [40 CFR 146.82(a)(3)(iv)]. | 2.3.6 |
| Characterize hydrology and hydrogeology of the AoR | Maps and stratigraphic cross sections indicating all USDWs, water wells and springs within the AoR, their positions relative to the injection zone(s), and the direction of water movement, where known [40 CFR 146.82(a)(5)]. | 2.3.8 |
| Characterize geochemistry | Baseline geochemical data on subsurface formations [146.82(a)(6)]. | 2.3.9 |
| Perform geophysical characterization | Data on the depth, areal extent, thickness, mineralogy, porosity, permeability, and capillary pressure of the injection and confining zone(s); including geology/facies changes based on field data which may include geologic cores, outcrop data, seismic surveys, well logs, and names and lithologic descriptions [40 CFR 146.82(a)(3)(iii)]. | 2.3.10 |
| ***During/after well drilling*** | | |
| Update site characterization data based on pre-injection logs and tests | Any relevant updates, based on data obtained during logging and testing of the well and the formation, to the information on the geologic structure and hydrogeologic properties of the proposed storage site and overlying formations [40 CFR 146.82(c)(2)]. | 4 |
| Perform formation testing | The results of the formation testing program [40 CFR 146.82(c)(4)]. | 4.1 |

| Activity | Class VI Rule Requirement | Guidance Section |
|---|---|---|
| Analyze cores | Take whole cores or sidewall cores of the injection zone and confining system and formation fluid samples from the injection zone(s), and submit a detailed report prepared by a log analyst that includes: well log analyses (including well logs), core analyses, and formation fluid sample information [per 40 CFR 146.87(b), required at 146.82(c)(7)]. | 4.2 |
| Characterize injection zone fluids | Record the fluid temperature, pH, specific conductivity, reservoir pressure, and static fluid level of the injection zone(s) [per 40 CFR 146.87(c), required at 146.82(c)(7)]. | 4.3 |
| Calculate fracture pressures | Determine or calculate fracture pressure and other physical and chemical characteristics of the injection and confining zone(s) and physical and chemical characteristics of the formation fluids in the injection zone(s) [per 40 CFR 146.87(d), required at 146.82(c)(7)]. | 4.4 |
| Characterize injection zone hydrogeologic properties | Prior to operation, conduct a pressure fall-off test and a pump test or injectivity tests to verify hydrogeologic characteristics of the injection zone(s) [per 40 CFR 146.87(e), required at 146.82(c)(7)]. | 4.5 |
| Analyze carbon dioxide stream compatibility | Information on the compatibility of the carbon dioxide stream with fluids in the injection zone(s) and minerals in both the injection and the confining zone(s), based on the results of the formation testing program, and with the materials used to construct the well [40 CFR 146.82(c)(3)]. | 3.3 |

This guidance assumes that readers are familiar with many of the available techniques used in geologic site characterizations and their use. Thus, descriptions of these techniques in this document are minimal. The Appendix provides background information on a number of these technical topics, along with an extensive list of references.

## 1.3. Relationship to Other Class VI Activities

This guidance document focuses on collecting the geological, physical, and chemical data necessary to support Class VI permit determinations during the pre-injection phase of a GS project. Data obtained during the site characterization process will also support other permit application and site operation activities. For example:

- Data on rock and fluid properties can inform the design and calibration of AoR delineation models;
- Information on injection zone and/or confining zone mineralogy, fluids, and properties can inform proper well construction and pre-injection testing;
- Data on the confining zone fracture pressure and storage capacity can inform setting protective operating limits; and
- Water quality and geophysical profiling data can serve as a baseline for the testing and monitoring that will take place during the operational phase of the project.

These cross-linkages between guidance documents are noted in the text where appropriate.

This guidance document is part of a series of technical guidance documents developed to provide information and possible approaches for addressing various aspects of permitting and operating a Class VI injection well. A number of UIC Class VI Program companion guidance documents focus on other steps in the process. These documents include:

- The *UIC Program Class VI Well Area of Review Evaluation and Corrective Action Guidance* explains how site data will inform computational modeling of the AoR;
- The *UIC Program Class VI Well Construction Guidance* describes how to construct injection wells using materials that are compatible with the carbon dioxide and subsurface conditions;
- The *UIC Program Class VI Well Testing and Monitoring Guidance* describes how baseline geochemical and other site data will inform appropriate site monitoring;
- The *UIC Program Class VI Well Project Plan Development Guidance* explains how site data can inform development of the required project plans; and
- The *UIC Program Class VI Well Injection Depth Waivers Guidance* provides special considerations and additional requirements for evaluating sites where injection into non-USDWs above or between USDWs is planned.

These guidance documents are intended to complement each other and to assist owners or operators in preparing permit applications that satisfy the requirements of the Class VI Rule and are tailored to the characteristics of individual sites. The material that these guidance documents encompass reflects the linkages among the different steps and stages of a GS operation as shown in Figure 1-1.

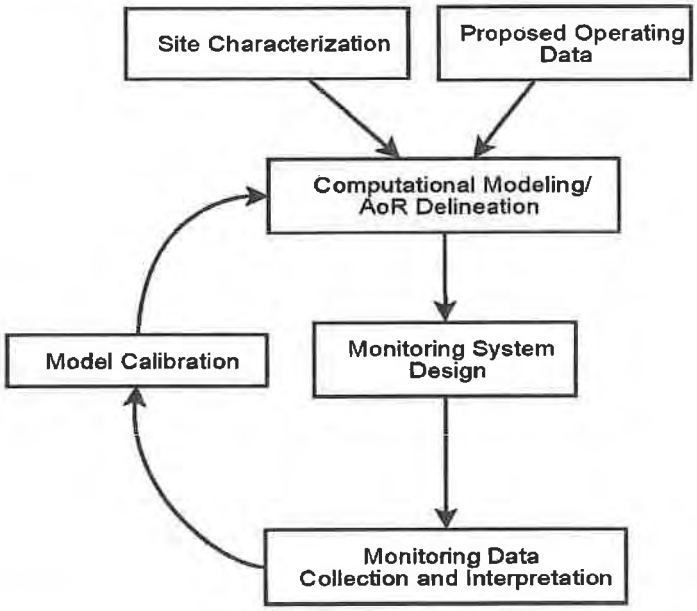



**Figure 1-1: Flow Chart Showing Relationships among Site Characterization, Modeling, and Monitoring for a GS Project**

## 1.4. Organization of this Guidance

Following the introduction (Section 1), this guidance document is organized as follows:

- Section 2, Activities Performed Prior to the Construction of a Class VI Well, presents the activities that owners or operators will perform before an injection well may be drilled (i.e., to apply for a Class VI permit). Information generated from these activities will meet the requirements of 40 CFR 146.82(a)(2), (3), (5), and (6).
- Section 3, Data Synthesis for Demonstration of Site Suitability, provides considerations and recommendations for how owners or operators can synthesize the information collected to demonstrate that the site meets the requirements of 40 CFR 146.83, is acceptable to the UIC Program Director, and is suitable for a Class VI permit. This section describes some of the "big picture" questions about a proposed site that will need to be answered through the site characterization process. Owners or operators should consider these as they plan to collect the site data that will inform their permit application.
- Section 4, Activities Performed Prior to the Operation of a Class VI Well, presents activities that owners or operators will perform before injection may be authorized. The information obtained from these activities will meet the site characterization-related requirements of 40 CFR 146.82(c)(2)–(4) and (7), and 146.87(b)–(e).

# 2. Activities Performed Prior to Construction of a Class VI Well

The Class VI Rule, at 40 CFR 146.82(a), requires Class VI permit applicants to submit to the UIC Program Director extensive information on the characterization of surface and subsurface features of the proposed storage site, in particular on the injection zone(s), confining zone(s), and USDWs. Applicants will submit geologic and hydrogeologic data on the injection and confining zones, including their lithologic properties; the seismic history of the site; the structural geology of the site, including the presence of faults and fractures; and other information. Required submissions also include geochemical data on subsurface formations, including USDWs, and geomechanical data on the confining zone(s).

This section provides information to assist owners or operators in conducting the site characterization activities necessary to gather information, prepare, and submit a Class VI permit application. Each subsection below describes the activities owners or operators will need to perform to submit the elements of a Class VI permit application required at 40 CFR 146.82(a). For each required piece of information, this guidance describes potential sources of information and provides recommendations for how this information can be submitted to the UIC Program Director to support a determination that the site is suitable for GS. Note that, for completeness in describing a thorough geologic characterization, some of the information described in this section may only be available before construction if the site has been previously characterized for another purpose, e.g., for hydrocarbon exploration. Where this is not the case, such information will need to be finalized after the well is constructed or based on information gathered via a stratigraphic test well.

Where appropriate, the subsections below also provide recommendations and special considerations for obtaining and interpreting data and note particular aspects of the site characterization process that might warrant discussions with the UIC Program Director.

## 2.1. Regional Geology, Hydrogeology, and Local Structural Geology

Owners or operators must submit geologic and topographic maps and cross sections illustrating the regional geology and hydrogeology and the geologic structure of the local area [40 CFR 146.82(a)(3)(vi)]. This characterization will describe the area surrounding the proposed project including the subsurface formations that are targeted for injection and identified as the confining unit(s). This information may help in eliminating unsuitable project sites or identify the need to characterize additional confining zone(s). If data obtained during site characterization suggest that a secondary confining zone is needed to protect USDWs, the owner or operator is encouraged to communicate with the UIC Program Director about the need to characterize additional zones [40 CFR 146.83(b)]. See Section 3.6 for considerations related to secondary confinement.

Providing maps and cross sections of the region and local area will enable the UIC Program Director to place the project site in a regional geologic context, including the types of large-scale structural features that may act to confine a carbon dioxide plume. This information will also illustrate the relationship between the injection formation and regional and local USDWs. When

considered along with detailed site-specific geologic information (see Section 2.3), this information will help in formulating the geologic conceptual model needed for modeling of the AoR.

**Data Collection and Analysis**

The geologic and topographic maps and cross sections to be submitted can be obtained through a number of sources such as the U.S. Geological Survey (USGS), state geological surveys, and other state and published literature and reports on general geology and water, mineral, and/or energy resources. For projects proposed in reservoirs undergoing enhanced oil recovery (EOR) or where significant exploration has taken place, owners or operators may have access to regional background information previously compiled.

**Information to Submit**

Owners or operators should demonstrate that an adequate screening-level analysis has taken place to determine if the project site is suitable. Maps, cross sections, and stratigraphic columns of the region and an accompanying narrative will constitute a key part of that demonstration. This information can provide the context for some of the specific information submitted to fulfill other requirements, e.g., descriptions of faults or geologic structure. It will also help in identifying the preliminary boundaries of the computational model used for delineating the AoR.

Features to describe in the narrative and in geologic and topographic maps and cross sections include:

- The names, lithologies, and depths of the injection formation(s) and confining zone(s);
- Depths, extent, and ground water flow patterns of regional USDWs;
- A brief synopsis of the geologic history of the project site;
- Regional faults, fault types, trends, and whether they transect the injection formation(s) and/or confining zone(s); and
- Structural geology of the local area:
    - Presence and trends of folds, and
    - Whether the proposed storage site will be bounded by faults or other structural features.

To support the UIC Program Director's evaluation of the submitted information, EPA recommends that, with the accompanying narrative, the owner or operator describe the regional setting and how the proposed project site fits into this regional setting. The owner or operator should ensure that the information submitted is complete, adequately describes the proposed project site and surrounding region, and is consistent with other available information about the region.

## 2.2. Map of Injection Well, Area of Review, Surface Water Bodies, Artificial Penetrations, and Faults

The Class VI Rule, at 40 CFR 146.82(a)(2), requires applicants for a Class VI permit to create a map to report the number or name and location of all wells in addition to a number of other surface features, water bodies, faults, and infrastructure. At 40 CFR 146.82(a)(4), the Class VI Rule also requires the tabulation of additional descriptive information regarding wells within the AoR that penetrate the injection or confining zone(s). Data compiled on wells within the AoR will help identify the need for corrective action. Furthermore, these data will help identify other activities (e.g., injection or production operations) that should be accounted for during AoR delineation and when developing the Testing and Monitoring Plan [40 CFR 146.90] and the Emergency and Remedial Response Plan [40 CFR 146.94].

At this stage of the site characterization process (particularly if the AoR delineation model has not been developed), estimates of the AoR may be preliminary, depending on the amount of pre-existing quality data, and refinements to the estimated AoR will be performed prior to operation once the formation testing program has been executed. Maps submitted at this initial stage should show at least the approximate AoR and the general direction of plume and pressure front migration. A detailed discussion of AoR delineation is provided in the *UIC Program Class VI Well Area of Review Evaluation and Corrective Action Guidance.*

The Class VI Rule, at 40 CFR 146.82(a)(2), requires the map to show:

- **Surface bodies of water and springs.** This includes seasonal bodies of water such as vernal pools, fens, carrs, and playas;
- **Mines (both surface and subsurface) and quarries**. For subsurface mines, the UIC Program Director may request additional information such as the extent of subsurface mining and the maximum depth at which mining has occurred or, in the case of an active mine, is predicted to occur;
- **Surface features, including structures intended for human occupancy.** These include, but are not limited to homes, schools, hospitals, prisons, and other buildings. Other pertinent surface features include transportation infrastructure such as roads, highways, airports, and railways;
- Political boundaries such as **state, tribal, and territorial boundaries**. This information is needed to ensure that permitting follows all applicable laws and regulations within these jurisdictions and will inform notification of other UIC Program Directors, per 40 CFR 146.82(b);
- The surface trace of all **known and suspected faults.** The faults can be presented using standard geologic symbols indicating the relative motion of the fault blocks. Suspected faults must also be presented (suspected faults should be differentiated from known faults on the map). At the direction of the UIC Program Director or at their own discretion, the owner or operator may indicate the extent of complex fault zones through shading or some other means;
- **The number or name, and location of all injection wells, producing wells, abandoned wells, plugged wells, dry holes, or deep stratigraphic holes.** This

information will help the UIC Program Director evaluate potential risks from artificial penetrations, especially any that penetrate the confining zone, to determine if risk is sufficient to render a site unsuitable, or to identify wells that are currently in use but might need to be plugged later; and

- **State- or EPA-approved subsurface cleanup sites.** Information should include any sites with the potential to impact USDWs.

The Class VI Rule, at 40 CFR 146.82(a)(4), requires tabulation of all wells within the AoR that penetrate the injection or confining zone(s). Such information must include:

- A description of each well's type, construction, date drilled, location, and depth;
- A record of plugging and/or completion; and
- Any additional information the UIC Program Director may require.

## Data Collection and Analysis

Cartographic information for map features is available from a variety of sources:

- State geographic information system (GIS) clearinghouses. Most states offer online clearinghouses for state GIS data. This may include layers for boundaries, roads, buildings, and other information;
- National agencies such as the USGS, or local cartographic or planning offices. The USGS can also provide geologic maps containing the surface traces of faults; and
- Tax assessors, who may be able to provide boundary, building, and other map data.

For state- or EPA-approved subsurface cleanup sites, owners or operators may indicate the nature of the contamination at the site and the nature and progress of remediation activities at the site. In addition to the sources listed above, information on cleanup sites can be obtained from:

- National databases compiled by the EPA such as the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) as part of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (Superfund) program;
- Various state departments (health, environment, natural resources, etc.) may also maintain their own databases of subsurface cleanup sites;
- Local universities and academic institutions; and
- Citizen watchdog groups.

The locations of wells in the proposed AoR and descriptive information on wells that intersect the injection or confining zone(s) can be obtained from:

- Federal agencies, such as EPA. The National UIC Data System and the Integrated Compliance Information System (ICIS) database may both provide well information;
- State agencies, such as state oil and gas commissions. These entities often maintain records of the location and construction parameters for all wells within the state;

- Geological surveys (both state and national). Maps may be available for either wells or magnetic anomalies, which may be used to infer the locations of wells;
- State GIS clearinghouses or city planning offices. These agencies may also provide layers or tables with well data;
- Water and other utilities. The UIC Program Director may request, and/or the owner or operator may provide, the yield of the water wells, the number of people supplied by the water wells, and the ownership status (public or private) of water wells; and
- Academic literature. This is especially applicable for stratigraphic boreholes.

Only existing information in the public record is required to be used when populating the map required at 40 CFR 146.82(a)(2). However, additional data requested at 40 CFR 146.82(a)(4) on well parameters for wells within the AoR may need to be generated by the owner or operator if it is not available or reliable. In cases where available records do not provide the necessary information required at 40 CFR 146.82(a)(4), or indicate that a well was plugged improperly or with materials inappropriate for contact with carbon dioxide, then site investigations are required to be performed to establish the condition of the well, as discussed at 40 CFR 146.84(c)(3).

**Information to Submit**

The owner or operator must submit a map that identifies all of the required information described above [40 CFR 146.82(a)(2)]. When data are not sufficiently complete to locate wells with certainty, and if appropriate or requested by the UIC Program Director, the owner or operator may mark regions of the map that are known or suspected of being well fields. For these areas, a description of typical well construction and operation (e.g., injection, production) may be included with the description of known wells within the AoR. This approach may be needed in areas with an extensive history of hydrocarbon production or areas suspected to have a number of private water wells.

Additional information that may be included or requested by the UIC Program Director includes gas storage fields, other injection operations, local, state, and national park or monument boundaries, locations of archeological or cultural heritage sites, military installations, habitat for threatened or endangered species, surface water impoundments, and floodplain or spillway boundaries. The applicant is encouraged to include on the map any additional information they deem appropriate.

The UIC Program Director may request additional information if full coverage of the AoR is not provided. The owner or operator should also provide sufficient information to support the UIC Program Director's review of existing features that may affect water quality in USDWs and that may affect baseline environmental conditions in the AoR.

## 2.3. Detailed Geology and Hydrogeologic Site Characterization

This section provides guidance on characterizing the specific geologic, hydrogeologic, geochemical, geophysical, and geomechanical properties of the proposed site. The site characterization activities described in the subsections below outline the information and data

that must be considered by the UIC Program Director in authorizing a Class VI well permit as identified in 40 CFR 146.82(a)(3)–(6).

### 2.3.1. Maps and Cross Sections of the Area of Review

Maps and cross sections of the AoR are required by the Class VI Rule at 40 CFR 146.82(a)(3)(i). The maps will likely include both topographic and geologic maps. Geologic maps in particular, and accompanying cross sections and stratigraphic columns, summarize key information on lithology, sequence of geologic units (including the proposed injection formations, confining units, and USDWs), approximate formation thicknesses, lateral extent of units, and correlation of units in the vicinity of the proposed project site and across the region. This information will help the UIC Program Director understand the spatial relationship between the proposed injection formation and other aspects of the site geology, including USDWs. The information will also help inform the geologic conceptual model on which the modeling for the AoR delineation is built. This information can also help identify zones for geochemical monitoring.

The narrative accompanying the maps and cross sections of the AoR should be similar in scope to the evaluation of regional geology, but provide more detail on the AoR. Among other features, the owner or operator should highlight the lateral extent of the proposed injection formation and show that it is continuous throughout the proposed site [40 CFR 146.82(a)(3)(iii) and 146.83(a)(1)]. The required evaluation of the areal extent of the confining zones is equally critical [40 CFR 146.82(a)(3)(iii) and 146.83(a)(2)]. If there are additional confining units farther up in the stratigraphic column, this strengthens the case for suitability of a proposed site. Areas where formations pinch out should be identified. An estimate of the approximate dimensions of the injection formation in the AoR also allows the owner or operator to estimate storage capacity.

**Data Collection and Analysis**

If a project site has been well characterized for hydrocarbon exploration and/or production, geologic maps and cross sections and topographic maps of the area may be available. Topographic and geologic maps may be obtained from the USGS, state geologic surveys, or through a commercial provider. Geologic maps and cross sections may also be produced by the owner or operator based on information from cores, well logs, field mapping, or seismic surveys. Maps and cross sections should be of an appropriate scale to illustrate features at the project site that would affect the suitability of the site for GS.

Geologic maps, cross sections, and stratigraphic columns may be improved with additional data. As site characterization progresses, it is recommended that the owner or operator be alert to potential alternative interpretations of the cross sections and other similar map information. Owners or operators should discuss any assumptions or uncertainties in the features illustrated in maps and cross sections. If an injection depth waiver is sought, the owner or operator should make sure that the cross sections include all relevant layers down to at least the first USDW below the lower confining zone.

**Information to Submit**

EPA recommends that owners or operators include a narrative with the maps and cross sections that describes, at a minimum:

- The formation names, lithologies, and depths of the injection formation(s), confining zone(s), and USDWs within the proposed AoR;
- A general description of stratigraphy, including the vertical distance and formations separating the injection formation from USDWs; and
- Structural geology of the project site, including whether the proposed storage site will be bounded or influenced by a structural trap (e.g., faults or a dome).

Identification and analysis of faults and their potential to affect containment is required at 40 CFR 146.82(a)(3)(ii) and is discussed in Section 2.3.2. Information on facies changes is required at 40 CFR 146.82(a)(3)(iii) and is discussed in Section 3.1.

### 2.3.2. Faults and Fractures in the Area of Review

The Class VI Rule, at 40 CFR 146.82(a)(3)(ii), requires owners or operators to submit information on the location, orientation, and properties of known or suspected faults and fractures that may transect the confining zone(s) in the AoR and a determination that they would not interfere with containment. This information is needed to demonstrate to the UIC Program Director that the site has a confining zone(s) free of transmissive faults or fractures and that will allow injection at proposed maximum pressures and volumes without initiating or propagating fractures in the confining zone(s), as required at 40 CFR 146.83(a)(2). Evaluation of fault stability and fault or fracture sealing capacity is needed to demonstrate that faults will not interfere with containment of the carbon dioxide. If an injection depth waiver is sought, the owner or operator must also demonstrate that the lower confining unit(s) is/are free of transmissive faults and fractures [40 CFR 146.95(a)(2)].

EPA recommends that owners or operators obtain information on faults in the injection formation as well. This information should also include whether a fault zone consists of one major plane or a series of faults that may collectively provide a conduit for fluid movement through the confining zone, especially if the faults intersect lenses of high permeability material. Faults crossing the confining zone will need to be evaluated for their stability (see below) and sealing capacity (see Section 3.5 and the Appendix).

**Data Collection and Analysis**

Materials available from the USGS include geologic and topographic maps (e.g., the National Geologic Map Database), aerial photographs, and reports. The USGS's Earthquake Hazards Program provides maps of faults for many regions in the United States. The Earthquake Hazards Program database (available at http://geohazards.cr.usgs.gov/cfusion/qfault/index.cfm) provides detailed information on faults. Maps and other data may also be available from state geologic surveys. Such maps (i.e., from the USGS and state geological surveys) are generally at the quadrangle scale, but maps can also be found at the county and state scale.

Geophysical survey data, including seismic, electrical, magnetic, and gravity surveys, can complement information from maps and other sources and can be used to delineate faults and fractures and to characterize their geometry. The project area and the size and location of the fault will determine whether two dimensional (2D) data will provide sufficient information or whether the higher resolution of three dimensional (3D) data is needed. See Section 2.3.10 and the Appendix for additional information on geophysical surveys.

***Fault Stability and Fault or Fracture Sealing Properties***

Assessment of fault stability requires knowledge of fault geometry, which can be obtained from the structural interpretation of seismic data, as well as in situ stresses (see Section 2.3.6). Several options are available to support a determination that faults will not interfere with containment through reactivation, including assessments of failure plots, 3D fault slip tendency, and critical pore fluid pressure increase (see the Appendix for additional details). EPA recommends that owners or operators use one of the above methods, based on information on downhole stresses and fault geometry, to determine fault stability and the maximum sustainable pressure that could be associated with injection. This information can be used to set safe injection pressure limits.

Faults and fractures can be assessed for the likelihood that they are sealing using one of several approaches described in Section 3.5.2. Faults may be assessed for the units they juxtapose, the presence of catalysis, the shale gouge ratio, or pressure compartmentalization. Both faults and fractures may be assessed for whether mineralization has rendered them non-transmissive. The choice of method will depend upon the availability of data and samples.

**Information to Submit**

In describing faults and fractures, EPA recommends that owners or operators submit the following information:

- Location and characteristics of the fault or fracture (e.g., geometry, depth, fault displacement, units juxtaposed by fault);
- Formations intersected or transected by the fault or fracture;
- Methods and results of fault stability analyses and comparison to preliminary anticipated (modeled) pressures during the injection phase of the project; and
- Information on faults and fractures in the lower confining zone (in cases where an injection depth waiver is sought).

To demonstrate that a fault is not transmissive, the owner or operator may submit:

- A description of the approach used to infer whether a fault or fracture is transmissive;
- A summary table of data used to formulate the estimate;
- Supporting data and information (e.g., analyses of core samples, results of geophysical surveys, pore pressure data, maps, and cross sections) and any relevant calculations (e.g., calculation of shale gouge ratio);

- A narrative that describes and integrates the relevant information, including a discussion of any spatial heterogeneity in sealing properties and whether a fault or fracture is likely to be transmissive in the project area; and
- A discussion of uncertainties in the data.

See Section 3.5.2 and the Appendix for examples of approaches that may be employed for this demonstration.

To support the UIC Program Director's evaluation of the data, the owner or operator should make sure that the data are complete and adequate for understanding the geometry of any major faults and the pressures that could lead to activation. All supporting data should be provided and/or referenced in the appropriate section of the permit application.

### 2.3.3. Depth, Areal Extent, and Thickness of the Injection and Confining Zones

The Class VI Rule requires the owner or operator to provide information to the UIC Program Director on the depth, areal extent, and thickness of the injection formation and confining zone(s) [40 CFR 146.82(a)(3)(iii)]. These features affect the ability of the injection formation to receive and store the injectate, as well as the ability of the confining zone(s) to contain the carbon dioxide and pressure front. In addition, the depth of the injection zone will govern the state (e.g., supercritical) of the injected carbon dioxide.

Information on the lithologies and thicknesses of both the injection and confining zones will support the estimation of storage capacity and development of a site-specific geologic conceptual model and the computational modeling required for AoR determinations at 40 CFR 146.84. (See the *UIC Program Class VI Well Area of Review Evaluation and Corrective Action Guidance* for more information on multiphase fluid modeling for AoR determinations). It will also support an analysis of facies changes, as required at 40 CFR 146.82(a)(3); see Section 3.1 for information on conducting facies analyses.

**Data Collection and Analysis**

Seismic techniques and other geophysical methods can provide valuable stratigraphic information on the injection and confining zones. Ideally, demonstration of the extent of these formations will be documented by adequate boreholes and grids of 2D or 3D seismic images in addition to maps and cross sections (Chadwick et al., 2008). More information on the details of geophysical techniques and a brief description of seismic stratigraphy can be found in Section 2.3.10 and in the Appendix. Seismic techniques are also discussed in the *UIC Program Class VI Well Testing and Monitoring Guidance*. If the owner or operator is applying for an injection depth waiver, information on depth, extent, and thickness of the lower confining zone(s) must be supplied as well, as required at 40 CFR 146.95 (see the *UIC Program Class VI Well Injection Depth Waivers Guidance* for further discussion).

**Information to Submit**

EPA recommends that owners or operators discuss the depth, areal extent, and thickness of the injection formation and confining zone(s) in a narrative discussion that accompanies the geologic maps and cross sections required at 40 CFR 146.82(a)(3)(i); see Section 2.3.1. The narrative should include a discussion of data quality and uncertainties in the information. If an injection depth waiver is sought, the owner or operator should provide similar types of information on the lower confining zone(s) as well.

Formation thickness may also be illustrated using:

- Isopach maps (contour maps showing equal values of true stratigraphic thickness); and
- Isochore maps (contour maps showing equal values of true vertical thickness) and supported by available well logs and cores (also see Sections 4.1 and 4.2).

Other supporting information may include:

- Seismic or other geophysical survey results, with relevant information highlighted (if geophysical data are used for this demonstration); and
- Well log data (when it is available), with injection and confining zones highlighted (if well logs are used for this demonstration).

Any variability in the thickness of the injection formation and confining zone(s) that could affect storage of the carbon dioxide should be discussed in the narrative report, and the owner or operator should demonstrate that this would not adversely affect confinement. The owner or operator should bear in mind that if the areal coverage of the confining zone does not cover the full extent of the AoR or appears to be discontinuous, the UIC Program Director may request information on a secondary confining zone.

### 2.3.4. Petrology and Mineralogy of the Injection and Confining Zones

The Class VI Rule requires the owner or operator of a proposed Class VI injection well to submit data on the mineralogy of the injection and confining zone(s) [40 CFR 146.82(a)(3)(iii)]. This information will support the identification of any geochemical reactions that may affect the storage and containment of injected carbon dioxide which could result from potential changes in the properties of the injection or confining zones (e.g., porosity, permeability, injectivity). It will also provide information on mobilization of trace elements from the formation matrix if minerals known to contain trace elements are identified, which informs decisions regarding parameters to analyze as part of a testing and monitoring program. Evaluation of the minerals and potential geochemical reactions is the basis of the required demonstration of compatibility of the carbon dioxide stream with fluids in the injection zone and minerals in the injection and confining zones required prior to commencement of injection at 40 CFR 146.82(c)(3); see Section 3.3. This information may also support the facies analysis required at 40 CFR 146.82(a)(3)(iii) (see Section 3.1).

If an evaluation of potential geochemical processes suggests that long-term storage and confinement of carbon dioxide may be affected by changes in the injection formation and confining zone(s), the AoR delineation may need to account for geochemical reactions through the use of reactive transport models. Any potential effects on storage and confinement due to mechanisms such as precipitation and dissolution may also affect the post-injection site care (PISC) time frame. [40 CFR 146.93(c)(1)(v)].

## Data Collection and Analysis

If the proposed site has undergone previous characterization (e.g., for oil and gas development), data on the mineralogy of the injection and confining zones may be available. Owners or operators should consult with the UIC Program Director regarding whether available data are of sufficient quality and completeness and whether they adequately represent the injection formation and confining zones in the AoR, or if additional information is needed. If the UIC Program Director determines that additional data are needed to satisfy the requirements at 40 CFR 146.82(a)(3)(iii), this may entail analysis of existing cores or, if needed, the collection of new cores.

Collection of new data will most likely be necessary in pristine saline formations under consideration for GS project sites; however, such new information may also be needed for depleted oil and gas reservoirs if the previous characterization was not sufficient to demonstrate that the site meets the requirements of the Class VI Rule. If the owner or operator is requesting an injection depth waiver, the lower confining zone must be represented in this analysis [40 CFR 146.95(a)(2)]; see the *UIC Program Class VI Well Injection Depth Waivers Guidance* for further discussion of injection depth waivers. EPA recommends that owners or operators discuss with the UIC Program Director any potential needs for stratigraphic/test wells to collect the necessary data and samples.

Basic lithologic information can be obtained from inspection of cuttings and cores retrieved during drilling of a stratigraphic well (or from existing samples from previous work at the project site). Such information may be reported as part of routine mud logging. Polarized light microscopy and scanning electron microscopy may be used on thin sections, and powdered samples may be subject to X-ray diffraction (XRD). Background information on these methods is provided in the Appendix.

## Information to Submit

EPA recommends that owners or operators submit a narrative report that includes, at a minimum, the following information:

- Methods used in examining samples;
- Locations (on maps) and depths of samples and the names of the formations sampled;
- Lithologies and descriptions (e.g., color, texture) from cores or hand samples;
- Mineralogic and petrologic descriptions obtained via microscopy (with approximate percentages of minerals);
- Cementation minerals and dissolution features; and

- A preliminary discussion of geochemical reactions that may affect the storage, confinement, and/or overall performance of the project (see Section 2.3.9 for additional information on baseline geochemistry).

Although the identification of mineralogy is required at 40 CFR 146.82(a)(3)(iii), and must be submitted before a permit is obtained to construct the injection well, additional data will also be obtained during the core analyses performed pursuant to 40 CFR 146.87(b), and the owner or operator must provide any updates to the UIC Program Director before injection is authorized, per 40 CFR 146.82(c)(2).

To support the UIC Program Director's evaluation of the application, the owner or operator should demonstrate that a sufficient number of samples have been analyzed to provide an indication of variability in mineralogy. The owner or operator should also highlight any information on the mineralogy and petrology of the injection and confining zones that is relevant to the required analysis of compatibility of the carbon dioxide to subsurface formations (see Section 3.3).

Lithologic and mineralogic information should be complete and consistent with other information sources such as maps and well logs. The UIC Program Director may ask for additional information if descriptions and analyses are incomplete.

### 2.3.5. Porosity, Permeability, and Capillary Pressure of the Injection and Confining Zones

Data on porosity, permeability, and capillary pressure of the injection and confining zones, required at 40 CFR 146.82(a)(3)(iii), are crucial for a number of aspects of site characterization including determination of storage capacity, injectivity, and integrity of the confining zone. They are also needed for the multiphase modeling to predict plume and pressure front behavior and delineate the AoR. Data may be obtained from well logs and laboratory analyses of core samples. If the owner or operator is seeking an injection depth waiver, information on the lower injection and confining zones is needed to evaluate their suitability.

Section 2.3.5.1 describes information sources and analyses and information to submit to the UIC Program Director related to porosity; Section 2.3.5.2 addresses permeability data; and Section 2.3.5.3 discusses data on capillary pressure.

#### 2.3.5.1. Porosity

Evaluation of porosity may entail collection and review of existing data, use of field methods, and use of laboratory methods, as described below.

## Data Collection and Analysis

### *Existing Data*

In evaluating existing data from prior activities in the project area, owners or operators should note the methods used, the locations where samples were taken, and the overall quality of the data. Sufficient representative data will be needed from within the AoR. If available data are inadequate to establish the suitability of the site, the owner or operator will need to collect new data or perform new analyses. Any questions about the suitability and representativeness of samples should be discussed with the UIC Program Director.

### *Field and Laboratory Methods*

If existing data are not available, are inadequate, or are of insufficient quality, new data will be needed. To satisfy the requirement under 40 CFR 146.82(a)(3)(iii), the owner or operator may use laboratory or field methods (e.g., well logging, seismic) to measure and/or estimate the porosity of the injection and confining formations. See Section 2.3.10 for additional information on seismic surveys. See the Appendix for additional information on the principles of well logging for porosity and brief descriptions of laboratory methods. When considering field data, owners or operators should be aware of the limitations and appropriate applications of different methods. Supporting data on lithology, corrections and/or interpretations applied to well logs or geophysical methods, and any statistical computations performed should be described and referenced.

In selecting samples for laboratory analysis, EPA recommends that owners or operators be aware of the quality of the sample because the method of sample collection can influence the measured porosity. Owners or operators should also note any possible issues with sample quality when reporting results.

### *Comparing Laboratory and Field Data*

Laboratory and field methods may or may not agree because laboratory methods provide point measurements, while field methods sample a volume of the subsurface. As a result, field-based data can incorporate small-scale heterogeneities that result from variability in lithologic characteristics and larger-scale fluid migration pathways such as vugs, fractures, and dissolution features (Cone and Kersey, 1992). Therefore, field measurements may yield higher or lower values for a particular formation than measurements collected in the laboratory. EPA suggests that owners or operators address any discrepancies between field and laboratory data if both types of data are submitted.

## Information to Submit

EPA recommends that owners or operators submit, at a minimum, the following information on porosity:

For laboratory-based data:

- Locations (on maps) and depths of cores and the formations from which those cores were taken;
- Coring method used and notes on the condition of the cores;
- Laboratory analysis method(s) used, justification for selection of method(s), associated assumptions, and a description of experimental conditions;
- Approximate grain sizes and shapes;
- Approximate pore sizes and shapes;
- Results in tabular and graphical form shown as laboratory results and porosity distributions within the injection and confining formations; and
- Photomicrographs if porosity was determined using thin sections.

For field-based data:

- Results of field measurements and estimations shown as porosity distributions within the injection and confining formations (also see Section 4.1), including:
    - Date and time of sampling/surveying,
    - Method used (e.g., logging, seismic),
    - Information on the location/area and intervals tested, and
- Calculations, corrections, or other steps in processing of field data.

For both field- and laboratory-based data:

- Summary statistics on data and any statistical representations (e.g., variograms); and
- A discussion of the results, including data quality and sources of uncertainty.

Because core samples represent point measurements, for reliable results, measurements are best made on a number of cores. The applicant should consider submitting a statistical representation of measurements such as a variogram (see the Appendix for additional information).

EPA recommends that the owner or operator demonstrate that the data are of sufficient quality. The owner or operator should ensure that a sufficient number of samples were analyzed and that they represent likely heterogeneities in the injection and confining zones. The owner or operator should demonstrate to the UIC Program Director that appropriate methods were used and that downhole conditions were simulated (or explain why they were not and whether this is expected to affect the usability of the measurements). Finally, EPA recommends that owners or operators provide a discussion comparing field and laboratory-based data, giving careful consideration to the reliability of the measurements and contributions to any discrepancies.

#### 2.3.5.2. Permeability

The permeability of the injection zone is one of the factors governing the rate at which carbon dioxide can be injected and is one of the parameters needed for the computational modeling involved in AoR determination. Permeability of the confining zone is one of the factors

considered in assessing the suitability of the confining zone. The subsections below provide considerations for the procurement and submission of permeability data. Because a GS project is a multiphase fluid system, effective and relative permeability data are also needed for AoR determination.

## Data Collection and Analysis

EPA encourages owners or operators to use data from field testing, well logging, and laboratory analyses of cores to estimate intrinsic (absolute) permeability. Laboratory analyses should also be performed to obtain a relative permeability-saturation function. When comparing field and laboratory measurements for intrinsic permeability, owners or operators should bear in mind that permeability measurements can differ by scale. Well tests measure a much greater area than core samples. As such, well testing tends to provide composite representations of localized variability. Permeability derived from well logs represents an intermediate scale between core logs and well tests.

### *Existing Data*

Where data are available from prior activities in the project area, owners or operators should take note of methods used, locations from where samples were taken, and overall quality of the data. These are described below, along with a discussion of spatial variability in permeability data.

### *Field Methods for Absolute Permeability*

Permeability can be estimated in situ using a variety of methods. Pressure changes during fall-off tests can be analyzed quantitatively. If multiple wells are available, variable flow test analysis can be used to determine permeability provided that the reservoir pressure, flowing bottomhole pressure, flow rates, and the total time of the test are known (Smolen, 1992; Matthews and Russell, 1967). Permeability can also be determined from well log data using an estimator of porosity such as a density log. A summary and comparison of the various empirical methods available to relate porosity, resistivity, and other parameters to permeability is given by Balan et al. (1995). Nelson and Batzle (2006) also provide a description of methods for permeability estimation from well logs. Owners or operators should be aware of the limitations associated with any method they select and be alert for uncertainties in the data and how these uncertainties might affect modeling efforts.

### *Laboratory Methods*

As with porosity measurements, owners or operators should be aware of any damage to cores that may have occurred during drilling and that might reduce permeability. Plug samples taken from the center of the core may be the best way to avoid such damage or infiltration of mud or other particles into the pore spaces. See the Appendix for additional discussion regarding coring and sample selection for permeability measurements.

EPA recommends that owners or operators consider conducting laboratory measurements of absolute permeability in an environment that simulates reservoir conditions or discuss

anticipated effects that pressure and temperature might have on results. When permeability is measured from a whole core, measurements should be reported in two directions: one parallel to the major fracture plane and the other at 90 degrees perpendicular to this direction (Almon, 1992).

A relative permeability-saturation function is needed for incorporation into the computational modeling for the AoR delineation. For GS projects, changes in relative permeability may result in improved or reduced injectivity into reservoir rocks and/or improved or reduced sealing capacity for confining formations. In measuring and reporting data on relative permeability, owners or operators should be aware of hysteresis effects and should consider the need for separate curves for drainage and imbibition. Additional discussion of permeability-saturation functions is provided in the *UIC Program Class VI Well Area of Review Evaluation and Corrective Action Guidance.*

EPA recommends that data be obtained from analysis of samples collected from as many cores, boreholes, or wells as practical and available to provide an understanding of spatial variability in permeability. Along each borehole, a number of core samples should be analyzed to capture heterogeneity. Owners or operators should be alert to variations that might indicate lenses of lower or higher permeability material that may affect storage capacity or carbon dioxide migration. Furthermore, permeability may be an anisotropic property that varies in the x, y, and z directions and typically shows the greatest variation in the direction perpendicular to layering. For the computational modeling performed for AoR determination, a realistic representation of the permeability distribution is needed, and EPA suggests that owners or operators consider a geostatistical approach. Further discussion regarding geostatistical approaches is provided in the Appendix and also discussed in the *UIC Program Class VI Well Area of Review Evaluation and Corrective Action Guidance.*

**Information to Submit**

EPA recommends that owners or operators submit the following data related to permeability of the injection and confining zones:

For laboratory-based data:

- Locations (on maps) and depths of cores and the formations from which cores were taken;
- Coring method used, and notes on the condition of the cores;
- Approximate grain sizes and shapes;
- Approximate pore sizes and shapes;
- Laboratory analysis method(s) used, justification for selection of method(s), associated assumptions, and a description of experimental conditions; and
- Results in tabular and graphical form shown as laboratory results and permeability distributions in the injection and confining formations.

For field-based data:

- Date, time, and method of logging/surveying;
- Information on the locations (on maps)/areas and intervals tested;
- Calculations, corrections, or other steps used in processing of field data;
- Methods used for permeability estimation (e.g., specific well logs, seismic) or whether new interpretations are being made using archived data; and
- Results of field measurements and estimations shown as permeability distributions within the injection and confining formations.

For both field- and laboratory-based data:

- Summary statistics on data and any statistical representations (e.g., variograms); and
- A discussion of the results, including data quality and sources of uncertainty.

To support the UIC Program Director's evaluation, the owner or operator should demonstrate that the data are complete and representative of the actual site. The discussion of permeability should also address variability in permeability and implications for the operational parameters for the project or for the storage capacity of the injection formation. See the Appendix regarding geostatistical methods.

#### 2.3.5.3. Capillary Pressure

Capillary pressure is one of the factors affecting the integrity of the confining zone and how readily carbon dioxide will penetrate into the confining zone.

**Data Collection and Analysis**

Several established methods are available for measurement of capillary pressure: mercury injection, centrifuge, porous plate, and restored state cell. See the Appendix for brief descriptions of these methods. In selecting a suitable method, owners or operators should consider methods that allow measurement at pressures and temperatures representative of the injection zone. Particular attention should be paid to the capillary pressure of the confining zone because a sufficiently high capillary pressure is one of the mechanisms by which the confining zone acts to inhibit migration of carbon dioxide. Owners or operators may compare their estimated capillary entry pressure (Pe) to the anticipated surface tension of the supercritical carbon dioxide (Chadwick et al., 2008), taking into account the anticipated buoyant pressure and potential height of the carbon dioxide column (Lindeberg, 1997).

**Information to Submit**

EPA recommends that owners or operators submit the following information on capillary pressures of the injection and confining zones:

- Locations (on maps), formations, and depths of samples used for analysis;

- Method used for analysis, fluid used, and laboratory conditions;
- Results in functional forms for the saturation-capillary pressure functions and/or tabular and graphical form;
- Summary statistics on data;
- A discussion of any limitations of the data or methods; and
- Any issues associated with extrapolation of results to a setting in which supercritical carbon dioxide is the non-wetting fluid.

To support the UIC Program Director's evaluation of the data, EPA recommends that the owner or operator demonstrate that the data are of sufficient quality and that the number and locations of samples are adequate to provide good characterization of the injection and confining zones.

### 2.3.6. Geomechanical Characterization

The Class VI Rule requires that geomechanical information be submitted on fractures, stress, ductility, rock strength, and in situ fluid pressures within the confining zone [40 CFR 146.82(a)(3)(iv)]. Geomechanical characterization is important for evaluating confining zone integrity as well as setting safe operational parameters. If an injection depth waiver is sought, the owner or operator must also characterize and provide information on the lower confining zone(s) as required at 40 CFR 146.95(a)(2); this would include geomechanical information to support a complete analysis.

**Data Collection and Analysis**

This section outlines options for performing and submitting the results of geomechanical studies of fractures, ductility, rock strength and stresses, and pore pressure measurement.

***Fractures*** may be detected in boreholes by several methods, including fracture finder (microseismogram) logs, caliper logs, or acoustic logs. Also, resistivity, gamma, and neutron logs can detect clay or fluids contained in fractures. Video logs can also show fractures. Fractures may be seen in cores, although unless the core was oriented, it will not be possible to determine the orientation of the fractures.

***Ductility*** is most commonly measured by performing a triaxial load test on a core sample. EPA recommends that such measurements be conducted in conjunction with other tests of core samples, such as strength, porosity, permeability, and capillary pressure.

***Rock strength*** can be measured in the laboratory using a triaxial compression test. ASTM International (ASTM) D7012-10, *Standard Test Method for Compressive Strength and Elastic Moduli of Intact Rock Core Specimens under Varying States of Stress and Temperatures* (ASTM, 2010), is suitable for simulating downhole stress conditions. Owners or operators should bear in mind that these measurements will not account for larger scale features that affect overall strength in situ, such as faults or joints; results should be interpreted accordingly.

***The in situ stress field*** is important in determining the natural stresses in the formation and, therefore, the reaction of the various geologic units to injection, including the potential for fault

reactivation (as discussed in Section 2.3.2). The in situ stress field consists of three components: vertical stress, maximum horizontal stress, and minimum horizontal stress:

- **Vertical stress** can be determined by integrating the density of the rock above the point of stress measurement (Chiaramonte et al., 2008; Herring, 1992; Streit et al., 2005). The density is determined using density logs (see the Appendix); and
- The magnitudes of the **minimum horizontal stress** ($S_{hmin}$) and **maximum horizontal stress** ($S_{hmax}$) can be determined with considerable accuracy through direct in situ formation stress tests (See Zoback et al., 2003). ASTM Method D 4645-08, *Standard Test Method for Determination of In-Situ Stress in Rock Using Hydraulic Fracturing Method* (ASTM, 2008) may be used. Additional descriptions of the determination of in situ stresses at a GS site are given by Chiaramonte et al. (2008), Streit et al. (2005), and Streit and Hillis (2004).

***Pore pressure*** can be measured in an open borehole by formation testers, either on wireline (Smolen, 1992) or during logging while drilling (LWD). If existing data are not available, this information will likely be acquired as part of logging and testing procedures after the well is constructed or by drilling a stratigraphic test well to obtain the necessary data to meet the requirements at 40 CFR 146.82(a).

**Information to Submit**

In submitting field- or laboratory-based information on geomechanical properties, the owner or operator should provide:

- The test(s) performed, dates, and locations (on maps);
- Sample collection procedures for cores;
- Test conditions (as appropriate);
- Results in tabular and/or graphical form;
- A narrative of results, including any anomalies or uncertainties in the data;
- Comparison of data from different tests if more than one type of test is used for a particular parameter; and
- Any issues with sample procurement, e.g., disintegration of poor quality rocks during transport or sample retrieval, the existence of discontinuities (fractures, fossils, etc.) in tested samples.

To support the UIC Program Director's evaluation of the geomechanical data submitted, EPA recommends that the owner or operator demonstrate that the data are complete, and that all data (e.g., from different surveys and logs) support consistent conclusions. The owner or operator should also demonstrate that in situ stress fields are consistent with and support the appropriateness of the proposed injection pressures and that fault stability analyses are consistent with in situ stress data (see Section 2.3.2 for additional information on fault stability analyses).

### 2.3.7. Seismic History

The Class VI Rule, at 40 CFR 146.82(a)(3)(v), requires Class VI permit applicants to report on the seismic history of the project site, including the presence and depth of all seismic sources. Additionally, the Rule requires a determination that seismic activity will not compromise subsurface containment of injected carbon dioxide. Records of prior seismic activity (both historical and geologic) should be used to make a determination of seismic risk. Information submitted for this requirement will also help to establish a site-specific monitoring program and inform the Emergency and Remedial Response Plan required at 40 CFR 146.94.

EPA anticipates that existing data will be sufficient for determining the presence and depths of all seismic sources. However, owners or operators may need to model or otherwise determine, using documented methods, that seismic activity from identified sources will not endanger USDWs.

**Data Collection and Analysis**

Seismic records and confirmed or inferred seismic sources are available from a variety of national and state sources, many of which are free and publicly available. State databases are generally more detailed, but sometimes contain partial or incomplete records. Nationally, the USGS Earthquake database provides source, date, time, latitude, longitude, magnitude, intensity, and seismic-related information for earthquakes greater than magnitude (M) 2.5. For earthquakes greater than M 0, the Advanced National Seismic System catalog, hosted by the Northern California Earthquake Data Center, is available. Other national databases include the Center for Earthquake Research and Information (CERI) and the National Oceanic and Atmospheric Administration (NOAA)'s National Geophysical Data Center. The USGS's Earthquake Hazards Program database (available at http://geohazards.cr.usgs.gov/cfusion/qfault/index.cfm) also provides information on recorded earthquakes.

Databases cataloging active faults are also available. These databases provide information on the hypocenters of seismic events, which can be mapped to provide a record of seismic sources for an area. Other databases of seismic sources include the USGS's Quaternary Fault and Fold Database of the United States, which tracks faults associated with seismic events greater than M6. Property insurers may also be able to provide seismic data for the region surrounding the proposed site.

Information on earthquake risk is available, most notably from the USGS's National Seismic Hazards Maps, which are available at numerous scales and for numerous risk thresholds. The data and software used to create the maps are also freely available, enabling the customization of maps and introduction of new data or modeling parameters. International and national humanitarian organizations, engineering organizations, and disaster preparedness agencies have also developed manuals, plans, and models of earthquake risk and, in addition, have attempted to quantify the potential impact of seismic events on infrastructure. For example, the Federal Emergency Management Agency (FEMA) has several manuals on seismic risk throughout the United States. The internationally-developed Global Earthquake Model (GEM) may also provide useful information for determining the seismic risk to infrastructure at various scales.

Although a seismic event would not necessarily lead to loss of containment, using seismic hazard maps to demonstrate the reasonable expectation that no seismic events would occur during the course of a GS project may fulfill the requirements at 40 CFR 146.82(a)(3)(v). However, if such maps indicate a substantial likelihood of seismic activity, other required geologic information, such as geomechanical data, depth to confining zones, and fault stability analysis may be needed to demonstrate that seismic activity will not compromise subsurface containment. Any demonstration that seismic activity will not interfere with containment should support a demonstration that the confining zone(s) will not be compromised by generation of new faults or reactivation of existing faults and that well bores will not be damaged in order for the site to meet the requirements at 40 CFR 146.83. The owner or operator should also consider the effect that seismic activity would have on site access and the ability of the owner or operator to verify containment under those circumstances as discussed in the Emergency and Remedial Response Plan.

**Information to Submit**

In reporting information on seismic risk, owners or operators should submit the following:

- A tabulation and/or map of seismic sources and their depths;
- A tabulation of seismic events, their hypocenters, and magnitudes for as far back as data are available;
- The sources of all seismic history data;
- Information on any seismic risk models used and the results; and
- A discussion of the degree of seismic risk in the region and information to support a determination that the confining system and wells at the project site are not vulnerable to damage from seismic activity.

The owner or operator should demonstrate to the UIC Program Director that the data provided to support an evaluation of seismic risk cover an appropriate time period and include sufficient information on the magnitudes and locations of the hypocenters of previous seismic events. If seismic risk models are used, the owner or operator should describe any limitations of those models.

### 2.3.8. Hydrology and Hydrogeology of the Area of Review

The owner or operator of a proposed Class VI injection well must submit maps and stratigraphic cross sections indicating the general vertical and lateral limits of all USDWs, water wells, and springs within the AoR, their positions relative to the injection zone(s) and confining zone(s), and the direction of water movement, where known [40 CFR 146.82(a)(5)]. This information can demonstrate the relationship between the proposed injection formation and any USDWs, and it will support an understanding of the water resources near the proposed well. The maps and cross sections developed to meet this requirement may be related to or overlain on the maps and cross sections illustrating regional geology and hydrogeology required at 40 CFR 146.82(a)(3)(vi); see Section 2.1. Potentiometric maps and isopach maps may also be submitted; additionally, the

cross sections submitted to satisfy the requirements at 40 CFR 146.82(a)(3)(i) should include information on the vertical limits of USDWs in the AoR.

This information can support development of the water quality monitoring procedures in the Testing and Monitoring Plan required at 40 CFR 146.90.

**Data Collection and Analysis**

In most cases, the information needed to satisfy this requirement will be available from existing data sources, as described below. However, the owner or operator should discuss the available information with the UIC Program Director to ensure that the level of detail and the areal scope over which the information is available will be adequate to demonstrate that all USDWs have been identified, accounted for, and characterized.

Information on **USDWs and springs in the AoR** can be obtained from the USGS as well as from state and local agencies (e.g., departments of environmental protection or municipalities). Published academic literature and reports from existing exploration or injection projects may also be used. In particular, the USGS maintains a website for ground water information that includes ground water use, aquifers, and water quality data (http://water.usgs.gov/ogw/data.html). Additionally, the USGS's Hydrologic Investigations Atlas Series contains maps with a large amount of water resources information including water availability, producing aquifers, depth to ground water, and other data. More than 700 of these atlases have been published and are available at http://pubs.usgs.gov/ha/ha730.

If the project involves an injection depth waiver, the owner or operator will need to provide information on USDWs *above and below* the injection zone. Information on all USDWs—above and below the injection zone—should be provided in the Class VI permit application *and* the injection depth waiver application required at 40 CFR 146.95(a) to support a review of all USDWs in the context of each evaluation. See the *UIC Program Class VI Well Injection Depth Waivers Guidance* for additional information on the injection depth waiver application.

Information on **water wells in the AoR** is available from the following sources:

- State water centers or water surveys, state departments of water resources, or state Water Resources Research Institutes;
- State health departments, which may have information on local and regional water supplies and private wells and state engineer's offices may have databases of well permits; and
- State well permitting records, which may provide locations of public and private supply wells. States that issue well permits typically keep permit information in a searchable database either online (e.g., on environmental protection websites), or in hardcopy at an office or agency library.

This information will complement the information submitted to satisfy the requirement for a tabulation of all wells within the AoR that penetrate the injection or confining zone(s) at 40 CFR 146.82(a)(4). Note that the requirement discussed in this section, at 40 CFR 146.82(a)(5), is to

show the location of all water wells, whereas 40 CFR 146.82(a)(4) is specific to wells that penetrate the injection and confining zones and must include additional information about the wells' construction, including the well type, date drilled, information on plugging, etc. See the *UIC Program Class VI Well Area of Review Evaluation and Corrective Action Guidance* for additional information on that requirement.

**Information to Submit**

EPA recommends that, to satisfy this requirement, Class VI injection well permit applicants provide the following information to the UIC Program Director:

- The numbers, thicknesses, and lithologies of USDWs (including interbedded low permeability zones);
- Information on all USDWs in the AoR and the region, and whether they are currently being used for drinking water; and
- The location of water wells and springs within the AoR.

In addition to tables and other files, the owner or operator may submit maps (e.g., showing the location of water wells on the maps of USDWs described above) and cross sections. If any water quality data or data on hydraulic conductivity, hydraulic gradient, or porosity are available from the sources examined, the owner or operator should reference this information or discuss it in the required analysis of baseline water quality, required at 40 CFR 146.82(a)(c) and described in Section 2.3.9. The owner or operator should ensure that the information submitted is complete and accurate; otherwise, the UIC Program Director may need to request additional information to thoroughly evaluate site hydrogeology and hydrology. For example, if state well databases have incomplete coverage of the area of the proposed well, owners or operators may need to fill in information gaps using on-the-ground surveys or hand searches of health or environmental department records. As noted above, most of the information needed to satisfy this requirement will likely come from existing data. If the data come from USGS or state data sources, it is likely that the UIC Program Director will be satisfied with the quality and accuracy of the data.

### 2.3.9. Baseline Geochemical Characterization

The Class VI Rule requires baseline geochemical information on subsurface formations including all USDWs in the AoR [40 CFR 146.82(a)(6)]. This encompasses both fluid and solid phase chemical analysis. Information on water chemistry indicates which formations in the stratigraphic column qualify as USDWs and confirms that the proposed injection formation is not a USDW. Geochemical information on both solids and fluids is also needed, in combination with the mineralogic data required at 40 CFR 146.82(a)(3)(iii), to determine whether the interaction of the formation fluids with the injectate and solids will cause changes in injectivity, changes in the properties of the confining zone, or the release of trace elements. This will inform an assessment of the compatibility of the carbon dioxide stream with injection zone fluids and minerals in the injection zone and confining zones, required at 40 CFR 146.82(c)(3) (see Section 3.3). Fluid chemistry also controls the amount of carbon dioxide that can dissolve in the fluid, affecting estimates of carbon dioxide trapping mechanisms and storage capacity. Furthermore, a baseline geochemical analysis will be important for comparison with future data collected via

required water quality monitoring above the confining zone [40 CFR 146.90(d)]. If an injection depth waiver is sought, the owner or operator should also provide data on or perform analyses of the geochemistry of USDWs that lie below the injection zone.

Owners or operators will need to review existing data and may need to collect samples and perform analyses for fluid characterization and bulk solid phase chemistry. Guidance for providing information about fluid chemistry and bulk chemical analysis is presented below.

#### 2.3.9.1. Fluid Chemistry

**Data Collection and Analysis**

***Pre-Existing Data***

Geochemical data for the site may be available if previous exploration and hydrocarbon production have taken place at the project site, or data may be obtained from other sources such as the USGS's National Water Information System (NWIS; http://waterdata.usgs.gov/nwis/qw) or Produced Waters Database (http://energy.cr.usgs.gov/prov/prodwat/). State geological surveys, water surveys, or water resources research institutes may also have information available.

Owners or operators should submit any available analyses of water or brine from all USDWs and other relevant formations within the AoR. If the owner or operator is requesting an injection depth waiver, data will be needed for the lower confining zone to serve as a baseline for geochemical monitoring. Where pre-existing geochemical data are available, owners or operators should be aware that data quality may vary among sources. Limitations or uncertainties regarding data quality should be noted, including the presence or absence of analyses of duplicate and quality assurance (QA) samples. In relatively homogeneous geological settings and in formations with slow flow rates, analyses taken from areas outside of the AoR may be generally representative of water quality within the AoR and may be used to help understand the geochemistry of the area. However, data will be needed from within the AoR as well. Owners or operators should also consider whether the existing analyses are complete and include a full suite of parameters (see below). Owners or operators may discuss the applicability of pre-existing water quality data sets with the UIC Program Director. Data with limited analyses may still be useful for providing some general characterization, but newer data may also be needed to provide full characterization of water quality within the AoR.

Owners or operators should note the time period over which the samples were taken and whether this information may be sufficient to capture any naturally occurring trends in water chemistry, especially in formations affected by recharge or surface activities. Having sufficient background information will allow owners or operators to distinguish possible effects of injection from naturally occurring variations over the life of the project.

### *Parameters to Analyze*

The specific parameters to be analyzed will depend on the characteristics of the site, each formation being analyzed, and the composition of the planned carbon dioxide stream. Parameters tested should help inform and be consistent with the testing and monitoring planned during the GS project operation and PISC period. Analyses should include basic parameters, such as pH; total dissolved solids (TDS); alkalinity; specific conductivity (SC); and major anions and cations (e.g., $Ca^{2+}$, $Mg^{2+}$, $K^{+}$, $Na^{+}$, $Cl^{-}$, $Br^{-}$, $SO_4^{2-}$, and $NO_3^{-}$). Other constituents may differ by formation and be determined based on the mineralogy of the injection and confining formations (as evaluated under 40 CFR 146.82(a)(3)(iii) and discussed in Section 2.3.4). These may include: $Sr^{2+}$, $Fe^{2+}$, $Fe^{3+}$, Al, $SiO_2$, total organic carbon (TOC), carbon dioxide (aq), and hydrogen sulfide (aq) (if the site is an oilfield) and trace metals (e.g., As, Hg, Cu, Zn, etc.). Additionally, baseline gaseous carbon dioxide should be measured in subsurface formations including all USDWs within the AoR. Samples from proposed injection zones that are depleted hydrocarbon reservoirs may need to be analyzed for hydrocarbons.

Constituents quantified by laboratory methods (e.g., major ions, trace elements, hydrocarbons, and TDS) should be analyzed using approved methods, including ASTM methods, Standard Methods (Greenberg et al., 2005), and EPA-approved methods. The *UIC Program Class VI Well Testing and Monitoring Guidance* can be consulted for more details, including a listing of specific methods that are generally used. An index of EPA methods can be found at http://www.epa.gov/region1/info/testmethods/pdfs/testmeth.pdf.

### *Sample Collection from Existing Monitoring Wells*

If there are monitoring wells in the AoR and they have not been recently sampled, owners or operators should consider taking fresh samples for water quality analysis. For wells in deep formations, including the injection formation, owners or operators may use a sampling apparatus that maintains downhole conditions if such a device is compatible with the construction of the well. If samples are retrieved at the surface, it is crucial that downhole estimates of pressure and temperature be obtained to support modeling of water chemistry speciation under conditions in the injection formation. For shallow wells, EPA guidelines are provided in USEPA (1991) and USEPA (1992). Additional information on sample retrieval and handling is provided in the *UIC Program Class VI Well Testing and Monitoring Guidance*. Following careful sampling procedures during site characterization will provide a reliable baseline for any future monitoring using the same monitoring wells. Owners or operators should also consider obtaining baseline samples over an adequate period of time to capture any natural temporal trends in water chemistry.

### *Sampling Fluids while Drilling a Stratigraphic Well*

If owners or operators drill a stratigraphic well to obtain information to fulfill the requirements at 40 CFR 146.82(a), EPA recommends that samples of formation fluids be taken at that time. Sampling can be conducted using wireline sampling devices. Commercial systems are available that can take fluid samples in addition to obtaining downhole measurements of parameters such as density, pH, and mud contamination. Such equipment has been developed for characterization

of hydrocarbon reservoirs and would be applicable to deep formations under consideration for GS. Additional discussion of fluid sampling is provided in Section 4.3. If the owner or operator obtains analyses of pore water in the confining zone(s), owners or operators should note if special methods were used (e.g., squeezing of shale core samples) and whether low volumes precluded analyses of any parameters.

#### 2.3.9.2. Bulk Solid Phase Chemical Analysis

In addition to mineral identification, an elemental analysis of the formation solids in the injection and confining zones and other relevant formations (e.g., the first permeable formation overlying the confining zone) may be needed to evaluate the potential for liberation of trace metals due to lowered pH from injection. Options include X-ray fluorescence (XRF) of whole rock samples, or sample digestion followed by analysis by inductively coupled plasma/mass spectrometry (ICP/MS).

#### 2.3.9.3. Geochemical Calculations and Modeling

With a complete chemical analysis of formation fluids and measurements of pH and temperature, equilibrium geochemical speciation of the constituents in the fluids and saturation indices for relevant mineral phases can be calculated to help identify the major reactions that may affect injection and containment. EPA recommends that this baseline information be compared against results from any future sampling. Two examples of suitable programs are PHREEQC, the current version of the USGS's PHREEQ program (Parkhurst et al., 1980) and the Geochemist's Workbench® (from Rockware, Inc.). Owners or operators should verify that the program selected for this purpose has the capability to perform calculations for waters with the ionic strength of the formation fluids (i.e., brines).

If the owner or operator plans to perform additional analyses beyond basic equilibrium calculations, both of the above-mentioned programs are examples of software that can model reactions of fluids with minerals (identified as required by 40 CFR 146.82(a)(3)(iii)) and gases and can incorporate reaction kinetics (rates) and transport of fluids. The advantage of such modeling is that it allows consideration, prior to injection, of the types of reactions (e.g., loss of carbonates, precipitation of carbonates, long-term dissolution of silicates) that can change permeability, release undesirable elements, alter injectivity, and affect ultimate storage capacity. The owner or operator may choose to conduct reactive transport modeling to account for any significant effects of geochemistry while delineating the AoR. Additionally, see Section 3.3 for discussion of geochemical modeling as part of a demonstration of compatibility between the injectate and formation fluids and formation solids.

**Data Collection and Analysis**

If pre-existing data on the geochemistry of solids or core samples from previous characterization work are available, the owner or operator should discuss their availability and quality with the UIC Program Director, along with whether new core samples are needed for the baseline characterization and if so, which formations should be tested.

Bulk chemical analysis of a powdered, solid sample may be obtained by XRF. Alternatively, samples may be digested and the extracts analyzed by inductively coupled plasma/atomic emission spectrometry (ICP/AES) or ICP/MS. Sample digestion can be done with EPA Method 3052 (Microwave Assisted Acid Digestion of Siliceous and Organically Based Materials). For the analysis stage, EPA Method 6020A (ICP/MS) or EPA Method 6010-C (ICP/AES) can be used.

**Information to Submit**

Owners or operators should submit the following information related to the baseline geochemistry of the site:

- The source of the data (if using existing analyses);
- Dates, locations (on maps), formations, and depths from which samples were taken;
- Sampling methods and sample preservation methods used;
- Analytical methods;
- QA data or QA samples (duplicates, blanks, matrix spikes); and
- A discussion of the results, including any anomalous data, and a discussion of the spatial representativeness of the data for a given formation.

Results should be presented in tabular and graphic form and plotted on a map of the AoR, if possible. The report on fluid chemistry should also include, temperature, SC, and pressure values taken at the time of sampling. In addition to submission of baseline fluid chemistry in tabular form, owners or operators may present their data in graphical form (e.g., using a Piper diagram (Piper, 1944) or a Stiff diagram (Stiff, 1951)).

To support the UIC Program Director's evaluation of the data, the owner or operator should demonstrate that the data are representative of the injection and confining zones, appropriate formation(s) above the confining zone, including USDWs, and, if needed, potential secondary confining zones, consistent with 40 CFR 146.82(a)(6) and 146.83(b). If geochemical data (e.g., analysis of the bulk chemistry of the solids) indicate high concentrations of trace elements, the owner or operator should evaluate injection and confining zone mineralogy and whether any trace elements are associated with minerals that are anticipated to be dissolved under the low pH conditions that may occur due to injection of carbon dioxide. In some circumstances, the owner or operator may also choose to analyze the presence of trace elements in the first permeable formation overlying the confining zone.

If vintage data are used, the owner or operator should demonstrate to the UIC Program Director that they are adequate to establish a reasonable baseline prior to injection. The owner or operator should also identify and discuss any spatial variability in water quality data.

### 2.3.10. Geophysical Characterization

To support the requirement at 40 CFR 146.82(a)(3)(iii) to submit data on the injection and confining zone(s), owners or operators can use a variety of field data, which may include seismic surveys or other geophysical methods. Although they are an indirect means of measurement and

subject to uncertainty and interpretation, geophysical methods provide a means of generating information about the subsurface in lieu of physically sampling the layers of interest. They can also provide information over a larger area than cores alone can reasonably provide. Depending upon the scale and resolution of the investigation, geophysical methods (e.g., seismic and other surface and cross-well geophysical techniques) can be used to estimate the stratigraphy, structure, extent, and thickness of subsurface units. Data collected for a baseline geophysical survey will also serve as the reference point for future monitoring as required at 40 CFR 146.90(g)(2) and as described in the *UIC Program Class VI Well Testing and Monitoring Guidance.*

There are four main types of geophysical methods: seismic, gravity, magnetic, and electrical/ electromagnetic (EM). These methods can image a large area of the subsurface without penetrations (i.e., wells or boreholes). EPA recommends that owners or operators deploy at least one of these methods during site characterization as they can provide good spatial coverage of a project area and may be especially useful in regions where subsurface geology is heterogeneous and/or wells are sparse. Owners or operators should demonstrate that their selected method will achieve adequate resolution at the depths needed.

In selecting the specific geophysical method(s) to use, owners or operators should consider the following:

- The goals of the survey and types of information desired;
- The desired resolution;
- Subsurface lithologies;
- Subsurface heterogeneity;
- Known or suspected faults and whether their geometries are likely to be imaged by the type of survey considered;
- Locations of existing wells to use for downhole methods;
- Whether an injection depth waiver is sought; and
- The availability of other information from cores, well logging, and other sources to aid in interpretation of the data.

Table 2-1 summarizes the status and utility of the various geophysical methods, and Table 2-2 outlines the phases of a GS project to which various geophysical techniques may be suited. The types of geophysical methods are described in Sections 2.3.10.1 through 2.3.10.4, followed by a discussion of what information should be submitted to the UIC Program Director. Additional detail on all four types of methods is provided in the Appendix.

**Table 2-1: Applicability of Geophysical Techniques to Geological Features of Interest**

| | SEISMIC | | | | | | GRAVITY | | ELECTROMAGNETIC/ ELECTRICAL | | | MAGNETIC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Investigation of* | *2D* | *3D* | *VSP** | *3D-VSP* | *Cross-well* | *Borehole Microseismic* | *Aerial & Surface Gravity* | *Borehole Gravity* | *Natural Source* | *Controlled Source* | *ERT** | *Aerial & Surface Magnetic* |
| *Near Borehole and Shallow Subsurface* | | | W | W | W | W | | W | | W | | |
| *Field-Wide Subsurface Studies* | W | W | | W | | P | W | | W | W | | W |
| *Stratigraphy* | W | W | W | W | W | | W[1] | W | P | P | W | P[2] |
| *Thickness* | W | W | W | W | W | | | W | | | W | |
| *Structure 0-100 m* | | | | P | | P | P | | P | P | P | P |
| *Structure 100 m – 1 km* | W | W | | W | W | W | P | P | P | P | W | P |
| *Structure >1 km* | W | W | | W | P | W | W[3] | P | W | W | P | W[3] |
| *Fault/Fracture* | W | W | | W | W | W[4] | P | | P[5] | W[5] | P[5] | W |
| *Porosity* | | | | | | | P | W | W[6] | W[6] | W[6] | |
| *Pore Pressure* | P | W | P | ? | P | | | | | | | |
| *Abandoned Wells*[7] | | | | | | | | | | | W | W[8] |

W = Well Suited (e.g., already in use for site characterization with good results);
P = Potential (e.g., could be used, but often not used because better alternatives are available or in use but results are not as resolved as desired).

[1] Valid for flows, sills, channel fills, or other discontinuous units with high density contrast
[2] Chiefly for iron-mineral bearing units (e.g., mafic intrusions, red-beds, etc.)
[3] Characterizes depth to basement
[4] Valid only if faults/fractures are actively undergoing deformation
[5] Valid only in non-porous formations
[6] Qualitative estimates compared to nearby formations
[7] For additional geophysical techniques on finding abandoned wells see the *UIC Program Class VI Well Area of Review Evaluation and Corrective Action Guidance*
[8] Valid only if wells are cased in the near surface with metal
*VSP = Vertical Seismic Profile; ERT = Electrical Resistance Tomography

**Table 2-2: Stages in a Geologic Sequestration Project where Geophysical Techniques May Be Applicable**

| APPLICABLE DURING | SEISMIC | | | | | | GRAVITY | | ELECTROMAGNETIC/ ELECTRICAL | | | MAGNETIC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | *2D* | *3D* | *VSP* | *3D VSP* | *Cross-well* | *Borehole Microseismic* | *Aerial & Surface Gravity* | *Borehole Gravity* | *Natural Source* | *Controlled Source* | *ERT* | *Aerial & Surface Magnetic* |
| *Preliminary Investigation* | X | | | | | | X | | X | X | | X |
| *Site Characterization* | X | X | X | X | X | | X | X | | X | | X |
| *Injection-Phase Monitoring* | X | X | X | X | X | X | | X | | X | X | |
| *Post-Injection Site Care* | X | X | X | X | X | X | | X | | X | X | X |

### 2.3.10.1. Seismic Methods

For site characterization, seismic methods are well suited for determining formation thickness, stratigraphy, structures, and the location and/or attributes of faults (Table 2-2). These methods work best for characterizing simple, homogenous geologic settings where supplementary sources of data such as well logs, outcrop data, and other geophysical surveys are available. More detailed information on seismic methods and processing is available from numerous sources, including introductory guides such as: *A Handbook for Seismic Data Acquisition* (Evans, 1997), *Environmental Geology – A Handbook* (Knödel et al., 2007), and *An Introduction to Geophysical Education* (Kearey et al., 2002). For additional discussion on the principles and deployment of seismic methods, see the Appendix.

**Data Collection and Analysis**

***Pre-Existing Data***

Because seismic methods are used by a variety of industries, pre-existing seismic surveys may be available for the area of interest, especially if the region has been the subject of hydrocarbon or other mineral exploration. Existing seismic data will most likely be 2D. Some seismic data may also be available for free from government agencies; for example, the USGS maintains the Seismic Data Processing and Interpretation Group, which houses the National Energy Research Seismic Library (NERSL) and has been acquiring seismic reflection data since the mid-1970s. Processing methods for seismic data have improved greatly in recent years, and reprocessing vintage raw data can lead to improved resolution or identification of features not identified in the original survey (Hyne, 2001). Owners or operators should recognize that the quality or resolution of publically available or free data may not be suitable for GS project site characterization.

### *Seismic Deployments*

Seismic deployment can be done on the surface (2D or 3D), in boreholes, or a combination of both. If owners or operators are conducting a new seismic survey for purposes of site characterization, EPA recommends that the decision regarding the type of deployment be based upon what is known about site geology and features that may need imaging. Furthermore, it should be kept in mind that seismic data acquired during site characterization will serve as the baseline for any geophysical monitoring activities conducted during the injection phase of the project. Because 2D surveys produce "slices" of the subsurface, they are not optimal in settings where significant lateral heterogeneity is expected or faults are known to be present. 3D surveys may be preferable to 2D surveys when characterizing sites with complex or variable subsurface geology, where subsurface geology is not well constrained, where improved resolution is necessary, or where high well costs require greater certainty in subsurface characterization. A vertical seismic profile (VSP) can help increase the resolution and accuracy of other seismic surveys, can help with pore pressure estimation, and can help to link geology derived from other borehole logs to seismic attributes (Kearey et al., 2002). When imaging thin beds, cross-well seismic methods may be useful; they offer good resolution and can fill the resolution gap between high-resolution well cores and 3D surface data or to help correlate structure between well bores. Cross-well imaging may be considered in areas with abundant subsurface penetrations in locations that will allow imaging of features of interest.

### *Additional Seismic Data Analysis*

#### *Pore Pressure Interpretation*

If seismic data are of adequate quality, owners or operators may consider using the data to remotely estimate subsurface pore pressure. Any seismic data that yield an accurate seismic velocity can be used to approximate effective stress and estimate pore pressure. However, not all seismic data meet this criterion because accurate velocity values are not needed to image the subsurface. Ensuring that seismic data can also be used for pore pressure prediction requires planning. Once accurate velocity data have been obtained, there are numerous methods available to convert velocity to pore pressure. These methods tend to work best in developed basins filled with shales and sands. The main disadvantage of this technique is that it requires extensive data processing and interpretation, which may introduce large errors and necessitate basin-specific correction factors during velocity processing.

#### *Seismic Stratigraphy*

Because seismic reflections follow large-scale bedding, the geometry of the reflections allows the delineation of features such as unconformities, depositional sequences, and unit thicknesses (e.g., Vail et al., 1977). EPA recommends the integration of seismic data with lithologic data from cores, well logs, and other data to assist in interpretation of depositional features and environments. If the owner or operator undertakes a detailed analysis, lithologies and other characteristics identified at wells and boreholes can be correlated to seismic attributes, which can then be used to predict subsurface properties at other locations through various methods, including regression or neural networks. Stratigraphic features identified in this manner may help

in identifying features (e.g., barriers, channels, fans) that might affect storage capacity and migration of carbon dioxide.

#### 2.3.10.2. Gravity Methods

Gravity methods are well established for determining stratigraphy and formation thickness and have possible usefulness for identifying structure, faults, and porosity (Table 2-2). Because detection of faults and structural features using gravity data depends upon contrasts in density, EPA recommends that owners or operators reserve the use of gravity methods for basins with varied lithologies. Salt domes and igneous intrusions are the easiest types of lithologic features to image because they generally have a high density contrast with surrounding formations. Faults may be detected with gravity data if units with contrasting density or regions with different sedimentary thicknesses are juxtaposed. EPA also recommends that owners or operators consider the types of faults that are likely to occur in the project area; small faults or faults with large displacement occurring in discrete steps are more difficult to detect with gravity data than large planar faults. Vertical faults are especially difficult to detect using surface gravity methods (Barbosa et al., 2007).

**Data Collection and Analysis**

Aerial and land-based gravity surveys are commonly performed by government agencies. They are widely available and are often free. However, data available from such sources may be undersampled for many site characterization purposes or may not have been targeted at shallow to moderate-depth sedimentary sequences. Gravity data may be more likely to exist than other types of geophysical data if investigations into deep saline formations have previously occurred at the site.

Where the owner or operator deploys a gravity survey for the purpose of site characterization, the choice of deployment (land-based, aerial, or subsurface (boreholes)) is usually based on factors such as desired resolution and site-specific geology. Broad land-based or aerial gravity surveys may suffice for detecting large-scale changes in the thickness of basin fill and other basin-wide features, while more detailed surveys will be needed to detect finer features such as the distribution and thickness of specific formations. Borehole surveys can be used to determine layer thickness and aid in determination of lithologic composition. In regions that are laterally variable, borehole gravity data may indicate features such as salt domes and reefs even if they do not intersect the borehole (LaFehr, 1992).

#### 2.3.10.3. Electrical/Electromagnetic Geophysical Methods

Electrical and EM methods have potential application in certain formation types for delineating structure, stratigraphy, faults, and porosity (see Table 2-2 for additional details). Resolution is low for most electrical/EM methods compared to seismic methods. However, the depth and breadth of electrical/EM surveys can provide valuable information on the regional geologic framework at low cost (Orange, 1992). Additional information on EM methods for GS site characterization is presented in the Appendix.

**Data Collection and Analysis**

Electrical survey data are not likely to be available for a proposed Class VI injection well site unless the region has previously been characterized for hydrocarbon or ground water resources.

Data can be collected aerially, from the surface, or from the subsurface. For a detailed site characterization, EPA recommends the use of subsurface deployments when possible; this is because subsurface techniques are generally of superior quality compared to most surface methods, and heterogeneous surface conditions tend to attenuate the signal (Wilt et al., 1995). See the Appendix for additional details on the various types of electrical and EM methods.

#### 2.3.10.4. Magnetic Geophysical Methods

Magnetic methods are suited for imaging faults and large-scale structures and may also be useful for smaller structures and stratigraphy (Table 2-2). Faults and other structural features in both basement rocks and overlying sedimentary formations can be imaged, but formation characteristics are difficult to determine using magnetic data (Ugalde, undated). Because magnetic data are non-unique and do not represent specific lithologies, additional data from other types of geophysical surveys or other sources (boreholes, outcrops, etc.) are needed to improve magnetic data interpretation (Jordan and Hare, 2002). The Appendix provides additional detail on magnetic geophysical methods.

Magnetic methods are sensitive to human infrastructure. As a result, they are not useful in populated or developed areas because buildings, pipes, and wires obscure the geologic signal. They are, however, well suited for locating abandoned, cased wells that may need corrective action. See the *UIC Program Class VI Well Area of Review Evaluation and Corrective Action Guidance* for additional information.

**Data Collection and Analysis**

Magnetic surveys have already been conducted over the majority of North America. However, the resolution of these surveys may not be high enough for site characterization purposes. High-resolution data are more likely to have been collected for hydrocarbon-producing basins and areas targeted for mineral exploration.

**Information to Submit**

In reporting the results of geophysical surveys, EPA recommends that owners or operators submit to the UIC Program Director the following information:

- The source of the data and whether they are vintage or newly collected;
- The type of survey and other details of the deployment (e.g., date, location/areal extent of the survey, vendor who performed the survey);
- If boreholes were used, the locations of the boreholes;
- Type of data processing, including any reprocessing of vintage data;

- Images, with locations of profiles indicated on a map and salient geologic features identified (including formations below the injection zone where an injection depth waiver is sought);
- Assumptions and limitations associated with the method, data, and their interpretation;
- A narrative discussing the results in the context of the site geologic conceptual model; and
- If the data suggest non-unique interpretations, the owner or operator should address alternative interpretations.

To support the UIC Program Director's evaluation of the data, the owner or operator should demonstrate that the geophysical survey results provide an image of the subsurface at a suitable resolution for evaluation of the injection and confining zones. The owner or operator should also demonstrate that the results of the survey are consistent with other data such as geologic maps and lithologic information from cores. If the owner or operator submits a new survey to serve as a baseline for future monitoring, EPA recommends that the survey be georeferenced for comparison against future surveys. If vintage data are submitted, the owner or operator should demonstrate to the UIC Program Director that the data provide adequate coverage of the AoR and are of sufficient quality.

### 2.3.11. Surface Air and Soil Gas Monitoring

At the discretion of the UIC Program Director, the owner or operator may be required to monitor surface air and/or soil gas for carbon dioxide leakage that may endanger a USDW [40 CFR 146.90(h)]. Carbon dioxide detection above background levels in soil gas or at the surface does not necessarily indicate USDWs have been endangered, but that a leakage pathway or conduit exists at some point in the operation.

Baseline surface air and soil gas data should be collected if the UIC Program Director requires surface air and soil gas monitoring as part of the Testing and Monitoring Plan. Baseline data on carbon dioxide concentrations and fluxes collected prior to operation will provide data for comparison to levels during and after the operational phase of the project in order to detect any potential leakage. The owner or operator or the UIC Program Director may opt to perform surface air and soil gas monitoring during the site characterization phase to provide a baseline if they plan to incorporate surface air and soil gas monitoring technologies at a later date.

The AoR should be characterized with respect to properties that may affect the baseline data, such as soil type, soil organic carbon content, vegetation type and density, topography, and surface water hydrology. Different approaches can be used to conceptualize the system, such as ecological modeling to identify the sources and sinks and/or flow and transport modeling to understand the flow paths and dispersion processes.

**Data Collection and Analysis**

Overall, the spatial distribution of soil carbon dioxide fluxes and concentrations should be determined on a site-specific basis. A more precise determination of baseline would require repeated measurements at several fixed sites to capture any seasonal or diurnal variations. In

particular, EPA recommends that the location of soil gas and/or surface air sampling points be based on the following considerations:

- Avoiding areas with highly fluctuating background concentrations, based on previously recorded data;
- Selecting potential point-sources, including wellheads, artificial penetrations, and fault or fracture zones. A transect-profiling approach may be used for linear features, such as faults (see ASTM, 2006); and
- If intended to monitor for non-point source leakage, monitoring throughout the AoR, using a grid methodology in areas of potential leakage. Grid cell spacing may range over several orders of magnitude, depending on site-specific factors. See ASTM (2006) for discussion of establishing a soil sampling grid.

During measurement of concentration and fluxes, EPA also recommends monitoring soil temperature and moisture. Some other important data, such as atmospheric temperature, pressure, and wind speed and direction can be obtained from a nearby weather station. The data collected should be analyzed using regression analysis to develop empirical relationships between correlated parameters for the entire area or the chosen sub-areas, which can then be used to predict background carbon dioxide fluxes expected under a given set of environmental conditions (Oldenburg et al., 2003).

EPA recommends that when surface air and/or soil gas monitoring is conducted in compliance with multiple regulatory programs, the owner or operator design a baseline determination and monitoring strategy that efficiently meets all objectives (e.g., to meet the requirements of the Class VI Rule and Subpart RR of the GHG MRR, promulgated under the authority of the Clean Air Act). In some cases, separate technologies (e.g., eddy covariance towers versus soil gas probes) may be used to meet specific objectives. However, it is likely that data collected from multiple techniques will be complementary and useful in data analysis and interpretation for all regulatory programs. Further information on technologies that can be used for soil gas and surface air monitoring can be found in the *UIC Program Class VI Well Testing and Monitoring Guidance* and the Subpart RR General Technical Support Document (USEPA, 2010).

**Information to Submit**

If baseline surface air or soil gas analyses are needed, EPA suggests that owners or operators submit the following:

- Site characteristics: soil type, soil organic carbon content, vegetation type and density, topography, surface water hydrology;
- Sampling locations (in map form) and dates;
- Soil temperature and moisture data and atmospheric conditions;
- Sampling and analytical methods, including detection limits;
- Results presented as concentrations and fluxes in tabular and graphic form, including QA samples and analyses;
- Methods and results of regression analyses; and

- Methods and results of any ecological modeling performed, including input data, outputs, and sensitivity analyses.

To support the UIC Program Director's evaluation of surface air and soil gas data, the owner or operator should demonstrate that the locations sampled represent a reasonable grid size and that potential point sources are represented and will serve as a good baseline to which future monitoring data can be compared. The owner or operator should also demonstrate that seasonal and diurnal variations in carbon dioxide levels have been captured and describe the variability in the data for future reference. If an inadequate time series of analyses was performed or if there are concerns regarding the quality of analytical data, the owner or operator may be asked to submit additional data.

# 3. Data Synthesis for Demonstration of Site Suitability

The information required at 40 CFR 146.82 and described in this guidance provide comprehensive data and descriptions for many properties of the proposed project site (e.g., porosity, geochemistry). These data do not individually provide a complete picture of the site to demonstrate that it can safely receive and confine the carbon dioxide. Together, however, this information can form a comprehensive picture of the site and demonstrate whether it is a good candidate for GS and meets the requirements at 40 CFR 146.83. This section describes how the owner or operator can synthesize the information collected during site characterization to demonstrate site suitability.

- Information on **facies changes**, required at 40 CFR 146.82(a)(3)(iii) supports the development of the site conceptual model and an understanding of how the carbon dioxide plume will move in the subsurface; it can also inform the AoR modeling. Section 3.1 briefly discusses how owners or operators may present geologic information (e.g., cores, outcrop data, seismic surveys, and well logs) to provide an illustration of facies changes within the subsurface;
- **Structural information on the injection and confining zones** is necessary to demonstrate how the carbon dioxide will be confined in the injection zone and that there are no potential leakage pathways. Section 3.2 describes how information collected, including maps, cross sections, and seismic data, support a description of the site structural geology;
- **Carbon dioxide stream compatibility** with the well and subsurface formations and fluids is important to the long-term viability of the injection operation. The owner or operator must provide information on the compatibility of the carbon dioxide stream with fluids in the injection zone(s) and minerals in both the injection and the confining zone(s) [40 CFR 146.82(c)(3)]. This information will show that the well will not be damaged by the injectate and that no geochemical reactions within the injection and/or confining formations will affect the storage and/or containment in a manner that is not accounted for in planning or reduce the storage capacity of the site. Section 3.3 describes how information on the injectate, fluids in the injection zone(s), minerals in the injection and confining zones, and well materials can be combined and evaluated together to demonstrate compatibility of the carbon dioxide stream;
- Information on the **storage capacity of the injection zone** is important to demonstrate that the site, based on site-specific information such as thickness, porosity, geochemistry, etc., has sufficient capacity to receive the amount of carbon dioxide anticipated to be injected as required at 40 CFR 146.83(a)(1). Section 3.4 briefly discusses approaches that may be considered to evaluate storage capacity;
- Information on **confining zone integrity** supports a demonstration that the confining zone will not allow migration of carbon dioxide outside the intended injection zone(s) and that the site meets the requirements at 40 CFR 146.83(a)(2). Section 3.5 describes how information collected, including lithologic and stratigraphic data, structural data, core analyses, and formation testing data can support a demonstration of confining zone integrity; and

- A demonstration of **secondary confinement** may be appropriate to ensure USDW protection, impede vertical fluid movement, allow for pressure dissipation, and provide additional opportunities for monitoring, mitigation and remediation. Section 3.6 describes the information that is needed to make this demonstration and how the owner or operator would present it to the UIC Program Director if it is required per 40 CFR 146.83(b).

Some aspects of this data synthesis involve combining geologic, geochemical, and geomechanical information and explaining how they demonstrate that the site meets the Class VI Rule requirements. Other aspects may require additional analysis, such as modeling. The sections below present recommended approaches for compiling, synthesizing, and presenting the necessary information.

Thinking of the proposed site in the context of this larger analysis can help guide the site characterization process by identifying the big questions about the site that need to be answered and tailoring the information collection to ensure that the data support a determination that the site is appropriate for GS. This synthesis also supports the AoR modeling, project plan development, and effective management of injection operations. It can also facilitate the UIC Program Director's review of the application and may improve public acceptance of the project by demonstrating to the public how the geologic data support a determination of site suitability.

## 3.1. Facies Analysis for the Project Site

The Class VI Rule, at 40 CFR 146.82(a)(3)(iii), requires owners or operators to provide information on facies changes in the injection and confining zones. Understanding facies changes at the injection site will help the owner or operator develop a geologic conceptual model that describes the depositional environments and the resulting distribution of lithologies. Because lithofacies exert control on porosity, permeability, and mineralogy, a good facies analysis will help in anticipating heterogeneity in these properties and the associated effects on the injection and storage capabilities of the site. Understanding of subsurface heterogeneity can also be used to select the placement and design of injection and monitoring wells as well as refine the parameterization of multiphase flow modeling for the site (see the *UIC Program Class VI Well Area of Review Evaluation and Corrective Action Guidance*). This section briefly discusses considerations and data needed for assessing facies changes.

### Data Collection and Analysis

An analysis of facies changes and identification of the spatial distribution of lithofacies within different layers/formations may require integration of several types of information gathered during site characterization. Lithofacies distribution for computational modeling can be estimated using geostatistical approaches (e.g., geometric object-based methods or cell-based methods).

The data needed for facies analysis can include geologic maps, isopach maps, stratigraphic columns, wireline logging data, descriptions and analyses of core samples, and seismic data. For example:

- Descriptions and analyses of core samples will provide information on a number of relevant characteristics including mineralogy, cross-bedding, grain sizes, sorting, fine-grained interbeds, and cementation;
- Seismic stratigraphic features can be used to identify stratigraphic sequences; and
- Wireline logging data can provide information on properties such as lithology and porosity and can be used to confirm the depths of formations.

Correlation of these various data sources can provide a three-dimensional representation of the subsurface stratigraphy. Owners or operators should bear in mind that there may be considerable uncertainty in facies models given the need to interpolate between what may be sparse data points and logistical challenges to obtaining representative data. A brief discussion of facies considerations for GS and some useful references are provided in the Appendix.

**Information to Submit**

Owners or operators should prepare a discussion of the inferred depositional environment(s) at the project site in the context of the site geologic conceptual model. The discussion should address, at a minimum:

- The implications for connectivity within the injection formation and the suitability of the confining zone;
- Lithofacies distributions mapped in the injection and confining formations, including the distributions of properties such as porosity and permeability for each lithofacies;
- The potential for preferential flow paths;
- Diagenetic processes that may affect present-day hydrogeologic properties; and
- Uncertainties associated with the data and with the resulting facies model.

The narrative should reference appropriate data, maps, geophysical images, cross sections, and stratigraphic columns.

To support the UIC Program Director's evaluation of the data, EPA recommends that the owner or operator demonstrate that correlation among data types is reasonable and that the available data support facies interpretations. The owner or operator should also assess possible preferential flowpaths or barriers and their implications for movement of carbon dioxide and for the quality of the confining zone. The report should also demonstrate how the facies interpretation informed the development of the site geologic conceptual model for the AoR delineation modeling.

## 3.2. Structure of the Injection and Confining Zones

The Class VI Rule, at 40 CFR 146.82(a)(3)(vi), requires that geologic and topographic maps and cross sections illustrate the geologic structure of the local area. An assessment of the structural geology of the project area is a crucial part of a demonstration that the well will be sited in an area that meets the requirements of 40 CFR 146.83(a), and owners or operators should provide a thorough discussion that integrates all relevant information compiled during site characterization. This may include use of:

- Geologic and structural maps and cross sections (see Section 2.3.1);
- Isopach maps (see Section 2.3.3);
- Results of geophysical surveys (see Section 2.3.10); and
- Data from well logs and core analyses (see Sections 4.1 and 4.2).

**Data Collection and Analysis**

EPA encourages the use of all available data in the AoR and the surrounding region in this analysis. However, owners or operators should be alert to the quality of vintage data, especially if samples or raw data are not available.

EPA strongly encourages the use of seismic data when evaluating structures at a GS site and emphasizes the usefulness of 3D seismic data or a grid of 2D seismic profiles. Lower or fair quality 2D data can be extremely useful for identifying larger faults, reservoir limits, and for general regional mapping. If geology is complex, especially around the point of injection, and greater detail is needed, 3D data are superior. If seismic profiling is not feasible at the project site, owners or operators should consider whether other geophysical methods will provide useful data.

In the evaluation of regional and local structural geology, EPA recommends that the owner or operator illustrate and discuss major structural features that will affect the migration of carbon dioxide in the subsurface, such as:

- Folds and their trend and plunge;
- The presence of domes;
- The strike and dip of unfolded beds;
- The locations, orientations, types of faulting (normal, reverse, strike-slip, thrust), and depths of faults; and
- Units juxtaposed by faults.

Owners or operators should discuss the role of structural traps in providing for secure storage (in a manner similar to the role of these structures in forming oil and gas traps). Such structures should limit the migration of carbon dioxide. The disadvantage of a closed structure, however, is that a confined column of carbon dioxide may form, putting stress on the confining zone from buoyant forces. In such settings, extra care may be needed in constraining the capillary pressure and geomechanical stability of the confining zone (Chadwick et al., 2008).

In unfolded, gently-dipping sequences, carbon dioxide may potentially migrate long distances and the AoR may be larger. In such settings, careful attention should be paid to the presence of higher-permeability preferred flowpaths. Also, more data may be needed to accurately constrain structural surfaces that have minimal topography because uncertainties in the data will have a greater impact on predictions of carbon dioxide movement.

Owners or operators should clearly indicate whether faulting is likely to enhance the project site by providing a trap, or potentially compromise the confining zone. Fault-bounded trapping through juxtaposition of the injection zone with a low-permeability layer may provide a favorable storage formation. Non-transmissive faults that transect the confining zone, however, may pose a leakage risk, and should be carefully evaluated for their stability and sealing capacity (see Section 2.3.2 for additional information on fault analyses and Section 3.5 for information on confining zone integrity).

**Information to Submit**

The owner or operator should prepare a narrative for the UIC Program Director that clearly describes how the local and regional geologic structure are conducive to GS and that an adequate confining system is present. This discussion should describe how the structure of the injection and confining zones fit into and support the development of the site conceptual model developed for delineation of the AoR. Owners or operators should identify which features support the capacity of the site to contain carbon dioxide, including the role of structural traps. Potential weaknesses should also be addressed (e.g., if faults are present, whether data indicate that they are sealing). The owner or operator should also discuss whether there are alternative interpretations to the data.

Because this evaluation is based on data collected to meet other requirements, the owner or operator should reference the relevant data and associated uncertainties and describe how the data were used to support the structural analysis. Owners or operators should address the representativeness of these data and their consistency with other site data as well as with region-wide data (e.g., maps and geophysical images) and explain limitations when using these data to develop a conceptual model of the subsurface in the entire project area. The owner or operator should demonstrate that sufficient data were used to evaluate the structural geology, keeping in mind that the amount of data needed will be site-specific to some degree. For example, fewer data may be needed in areas with simple structures than in complex areas.

## 3.3. Compatibility of the Carbon Dioxide Stream with Subsurface and Well Materials

The Class VI Rule requires owners or operators to report on the compatibility of the carbon dioxide stream with fluids in the injection zone(s) and minerals in both the injection and the confining zone(s), based on the results of the formation testing program, and with the materials used to construct the well [40 CFR 146.82(c)(3)]. This demonstration is needed to support an understanding of (1) whether subsurface interactions among the injectate, fluids, and solids will lead to precipitation or dissolution of minerals such that permeability, porosity, and injectivity may change; (2) if geochemical changes due to the introduction of large amounts of carbon dioxide into the subsurface might cause trace elements such as lead or arsenic to be liberated from subsurface solids; and (3) if interactions among the fluid, carbon dioxide, and cement might cause deterioration of the cement such that the cement sheath would become a conduit for fluid migration.

### 3.3.1. Compatibility of the Carbon Dioxide Stream with Fluids and Minerals

The compatibility demonstration will use information gathered during site characterization and during execution of the formation testing program, including:

- Chemical analyses of fluids in the injection zone and, if available, the confining zone (see Section 2.3.9);
- Mineralogy of the injection and confining zones (see Section 2.3.4);
- Bulk chemical analyses of solids in the injection and confining zones (see Section 2.3.9);
- Pressure, temperature, and pH in the injection zone and, if available, the confining zone (see Section 2.3.9); and
- The chemical characteristics of the injectate (see the *UIC Program Class VI Well Testing and Monitoring Guidance* for information on this analysis).

**Data Collection and Analysis**

To make a demonstration of compatibility, the owner or operator may take one or more of a few approaches, synthesizing information as appropriate: perform geochemical modeling, conduct bench-top laboratory experiments, and/or (in limited circumstances) provide an in-depth but qualitative discussion of potential geochemical reactions based on site data and GS literature. Guidance and recommendations for these approaches are presented below.

Owners or operators are strongly encouraged to perform **geochemical modeling** to assess potential impacts of injection on the subsurface. Equilibrium speciation modeling with programs such as PHREEQC or the Geochemist's Workbench® can be used to obtain saturation indices to predict the potential for mineral precipitation or dissolution, as described in Section 2.3.9. Such programs can also be used to model the reactions of fluids with minerals and gases and can incorporate reaction rates (kinetics). These geochemical models have also incorporated some capacity for 1D (PHREEQC) or 2D (Geochemists' Workbench®) reactive transport simulations. Other geochemical models that may be used in GS applications include SOLMINEQ.88 (Kharaka et al., 1989) and EQ3/EQ6 (Wolery, 1992). STOMP and TOUGHREACT are reactive transport models developed by Pacific Northwest National Laboratory and Lawrence Berkeley National Laboratory (http://esd.lbl.gov/TOUGHREACT/), respectively. They incorporate multiphase fluid and heat flow with geochemical reactions. TOUGHREACT has been used to model GS scenarios and anticipated mineral trapping (e.g., Xu et al., 2007; Xu et al., 2005). See the *UIC Program Class VI Well Area of Review Evaluation and Corrective Action Guidance* for additional information on multiphase reactive transport modeling.

In performing geochemical modeling, the owner or operator should be aware of and discuss limitations in modeling capabilities and resulting uncertainties. In particular, this includes limitations in available thermodynamic and kinetic data. Gaus (2010) presents a more in-depth discussion of geochemical interactions in a GS context. Owners or operators are encouraged to take advantage of literature and research on suitable models and available thermodynamic and kinetic data. For example, Krupka et al. (2010) published a literature review on thermodynamic data for modeling of carbonate reactions associated with GS. A 2007 book by Marini covers thermodynamics, kinetics, and reaction path modeling as applied to GS. Gaus et al. (2008) have

published a review article on geochemical and solute transport modeling for GS. Palandri and Kharaka (2004) have published a compilation of kinetic data.

Owners or operators may consider **bench-top laboratory experiments** to simulate reactions among subsurface solids, fluids, and the injectate. If an owner or operator plans to use an experimental approach, EPA recommends using core samples of the injection and confining zones (see Section 4.2). If a sufficient sample is not available, rock and mineral samples representative of the subsurface at the project site may be used with documentation that they are very similar to the mineralogy of the injection and confining zones. The fluid phase should be formulated to mimic the formation fluids in the injection zone, and the carbon dioxide phase should include anticipated impurities. Pressure and temperature conditions should be representative of conditions at depth during operation at the project site.

The duration of the experiment should allow for establishment of steady state conditions prior to introduction of carbon dioxide. After introduction of carbon dioxide, the experiment should be conducted for a sufficient time frame to result in measurable changes to the rock sample and for the fluid composition (pH, major ions) to achieve steady state; this may entail a run time of several weeks or a few months, depending upon the mineralogy of the sample and anticipated reaction rates among the fluid, minerals, and carbon dioxide. Fluid chemistry should be tracked during the experiment, and the solid materials should be analyzed after completion of the run. Rock/mineral samples should be evaluated for changes in porosity, permeability, and mineralogy by any of the methods described in Sections 2.3.4 and 2.3.5.

Alternatively (and with the UIC Program Director's agreement), the owner or operator may provide a detailed **discussion of the geochemical characteristics** of the injection and confining zone(s) and the injectate composition in the context of what is known in the literature about the reactivity of the minerals and anticipated reactions with the carbon dioxide and carbon dioxide-rich brine.

To make a convincing demonstration, this discussion should draw extensively on the geologic, mineralogic, geochemical, and GS literature and should tie this information closely to the known properties of the subsurface geochemistry and mineralogy at the project site, based on data collected during site characterization. Information from the literature such as mineral dissolution and precipitation rates should be considered in this evaluation, and the owner or operator should take note of limitations in available data (e.g., variations among studies, differences between field- and laboratory- derived data). Geochemical studies from GS pilot projects may be referenced if they have properties similar to the project site. Such a discussion will be qualitative in nature and is likely to be appropriate only in limited situations, such as where the geology is uncomplicated and homogeneous, the mineralogy is simple and relatively unreactive, and the injectate is known to be relatively free of impurities such as sulfur dioxide, which may give rise to very low pH values in the injection formation (Xu et al., 2007). If an owner or operator plans to use this approach, he or she should consult with the UIC Program Director. If this approach is supported by the UIC Program Director, the owner or operator should submit a thorough discussion that cites relevant literature and references mineralogic and geochemical data collected during site characterization.

**Information to Submit**

If geochemical modeling is performed, owners or operators should submit:

- The model used;
- Input data in tabular form;
- Modeling parameters and data used (e.g., activity coefficient model, identification of thermodynamic database, solid phases selected, reactions modeled, kinetic data, etc.);
- Results in tabular and graphical form;
- A thorough narrative interpreting the results and their applicability to the project; and
- A discussion of limitations and uncertainties associated with the modeling.

To support the UIC Program Director's evaluation of the data, EPA recommends that the owner or operator demonstrate that the information on which the model is based is complete and that the model is appropriate for the GS scenario. If significant mineral precipitation or dissolution is predicted, the owner or operator should discuss its impact on injectivity and whether precipitation or dissolution of minerals at the interface with the confining zone might either diminish or improve the sealing capabilities of the confining zone.

In reporting the results of experimental work, owners or operators should submit:

- A thorough description of the experimental method;
- A description of the composition and origin of solids used;
- The chemistry of the input solution and the carbon dioxide phase (i.e., impurities);
- Porosity and permeability of the rock sample prior to experimentation;
- Plots of solution chemistry with time during the experiment;
- Geochemical reactions (e.g., dissolution and precipitation of minerals) that have taken place;
- Methods of evaluating permeability and porosity at the end of the experiment and the resulting values; and
- A narrative discussing the results and their implication for long-term behavior of the site, including changes in injectivity, the degree of mineral trapping, and how this information relates to the AoR delineation.

To support the UIC Program Director's evaluation of the data, EPA recommends that the owner or operator demonstrate that the test conditions and input materials are representative of the injection formation and the downhole conditions, that the test was run for an adequate period of time, and that the fluid chemistry achieved steady state.

If data are available from more than one location within the AoR, the owner or operator should provide an analysis that encompasses any variability in fluid chemistry and discuss any impacts on the resultant modeling or experiments. Similarly, if core analyses indicate lithologic and mineralogic heterogeneity, this too should be discussed.

### 3.3.2. Compatibility with Well Materials

Owners or operators must provide information on the compatibility of the carbon dioxide stream with fluids in the injection zone(s) and minerals in both the injection and the confining zone(s) [40 CFR 146.82(c)(3)]. This will support a demonstration that reactions between the cement, formation fluids, and carbon dioxide will not lead to deterioration in the strength of the cement sheath or increases in the porosity and permeability that could result in the cement sheath becoming a conduit for carbon dioxide or carbon dioxide-rich fluids.

The chemical and mechanical properties of hydrated cement in contact with a carbon dioxide-rich environment should be considered. This is particularly relevant for Portland based cements. Owners or operators should demonstrate that the proposed cement sheath for their injection well will maintain integrity during the course of the project, including after injection ceases. This demonstration should take into account the following information gathered during site characterization and during well construction:

- Chemical analyses of fluids in the injection zone and, if available, the confining zone;
- Cement type and additives;
- Pressure, temperature, and pH in the injection zone and, if available, the confining zone;
- Chemical characteristics of the injectate, including impurities that may result in an especially low pH (e.g., sulfur dioxide); and
- Mineralogy of the injection and confining zones.

**Data Collection and Analysis**

To make a demonstration of compatibility, the owner or operator may conduct bench-top laboratory experiments and/or perform modeling or provide a detailed discussion of geochemistry based on available literature. Guidance and recommendations for these approaches are presented below.

**Modeling** may be performed to support the compatibility demonstration. Owners or operators should state assumptions used in modeling such as governing mechanisms (diffusion of carbon dioxide into cement, transport through microannuli), and assumption of local equilibrium vs. modeling of kinetics. Owners or operators should identify the aqueous and mineral components (e.g., carbonate minerals, jennite or tobermorite for calcium silicate hydrate) included in the modeling and identify the thermodynamic data set used. Modeling should also account for changing subsurface conditions as a result of injection over time. If the owner or operator chooses to pursue modeling as part of the demonstration, he or she may consider the approaches used in recent studies (e.g., Wigand et al., 2009; Huet et al., 2010).

Owners or operators may use **benchtop laboratory experiments** in a hydrothermal or flow-through apparatus to support their compatibility demonstration. Any such experiments should be conducted at downhole pressure and temperature conditions. Samples of cement used in experiments should be cured under conditions representative of downhole pressure and temperature conditions in order to replicate the mechanical properties of the cement sheath in the injection zone. Experimental fluids should be formulated to mimic formation fluid composition.

Experiments should be conducted over a sufficient time frame to permit measurement of the resulting mineralogical and mechanical properties. At the end of the experimental run, cement samples should be analyzed for mineralogy, texture, porosity, permeability, and strength; results should be compared with initial values. Examples of laboratory experiments performed for research purposes include Wigand et al. (2009) and Carroll et al. (2011).

Owners or operators may discuss with the UIC Program Director the acceptability of using a **literature-based discussion** for their demonstration. This approach may be viable for settings where the injectate will be free of impurities, such as sulfur dioxide that might cause extremely low pH, and if the proposed cement has additives known to reduce susceptibility to carbonic acid attack. Such a discussion should take into account both field and laboratory-based information and should also explain how the proposed cementing procedures will result in a high-quality sheath that will resist incursion of carbon dioxide-rich fluid along the well bore (i.e., no microannuli or channels in the cement).

## Information to Submit

In submitting the cement compatibility demonstration, the owner or operator should describe the method selected for the demonstration and why it was chosen. For a literature-based discussion, all relevant literature and relevant data from site characterization (e.g., formation fluid chemistry) should be referenced.

If owners or operators use an experimental approach, EPA recommends that they provide:

- A thorough description of the experimental methods;
- Why the particular experimental technique was chosen;
- Conditions under which the cement sample was cured;
- The chemistry of the input solution and the carbon dioxide phase (i.e., impurities);
- Porosity, permeability, and density of the cement sample prior to experimentation;
- Plots of solution chemistry with time during the experiment;
- Properties of the cement sample at the end of the experiment and at any intermediate stages at which samples are taken; and
- A discussion of the results and implications for the long-term integrity of the cement.

If owners or operators select a modeling approach, they should provide the following:

- The model used;
- Input data in tabular form;
- Modeling parameters and data used (activity coefficient model, thermodynamic database, solid phases selected, reactions modeled, kinetics data, etc.);
- Results in tabular and graphical form;
- A thorough narrative interpreting the results and their applicability to the project; and
- A discussion of limitations and uncertainties associated with the modeling.

To support the UIC Program Director's evaluation of the data, EPA recommends that the owner or operator demonstrate that the experimental conditions or modeling parameters are representative of the project, and that any reactions between the carbon dioxide and the cement or other well materials would not compromise the integrity of the well. See the *UIC Program Class VI Well Construction Guidance* for additional information on the compatibility of well materials and cements with carbon dioxide.

## 3.4. Demonstration of Storage Capacity

A demonstration of storage capacity can support predictions of the ability of the injection zone to receive and contain the anticipated total volume of carbon dioxide to be injected throughout the life of the GS project without endangering USDWs. It will support a demonstration that the site meets the requirements of 40 CFR 146.83(a)(1) that the injection zone or zones be of sufficient areal extent, thickness, porosity, and permeability to receive the total anticipated volume of the carbon dioxide stream. This information should be consistent with the proposed operating parameters, site-specific information, and AoR delineation under 40 CFR 146.84.

### 3.4.1. Methods for Estimating Carbon Dioxide Storage Capacity

Carbon dioxide storage capacity depends on a combination of factors including multiphase flow processes, formation geometry and types of boundaries (e.g., open or closed boundaries, fault sealing), geologic parameters (e.g., porosity, permeability, compressibility) and their heterogeneity, and subsurface geochemistry (Doughty et al., 2001). Therefore, each type of geologic system chosen for storage (e.g., oil and gas reservoirs, saline formations, unmineable coal seams, and shale and basalt formations) may have different characteristics to consider while estimating storage capacity. In addition, project-specific factors also affect the storage capacity estimations, such as total volume, and chemical and physical characteristics of carbon dioxide to be injected; injection well configuration (e.g., number of wells and locations) and well bore integrity; operational parameters (e.g., pressure, injection rate); and other injection and production activities. EPA recommends that estimates of storage capacity, therefore, be accompanied by a clear statement regarding factors considered and the limitations of the assessment method used.

Methods for estimating carbon dioxide storage capacity can be divided into static and dynamic models (USDOE, 2008; NETL, 2010). The application of static and dynamic models for estimating carbon dioxide storage capacity is based on methods routinely used in the UIC Program and by industry and others for estimating petroleum reserves, ground water resources, and underground natural gas storage. The selection of suitable methods for estimating storage capacity needs to consider various combinations of physical and chemical trapping mechanisms and their effectiveness over geological time frames and scales (Bachu et al., 2007; IPCC, 2005). Brief discussions regarding static and dynamic modeling methods for estimating carbon dioxide storage are provided in Sections 3.4.2 and 3.4.3, respectively. Section 3.4.4 describes considerations for the application of storage capacity estimation methods.

### 3.4.2. Static Models

Static models are simplified mathematical expressions that can be used to estimate the quantity of carbon dioxide stored in a reservoir and are typically used prior to injection, although they can also be used for estimating storage capacity after injection commences. Static models include volumetric and compressibility models (USDOE, 2008). Volumetric models are applied to open reservoirs when it is assumed that formation fluids are freely displaced from the reservoir. These models use porosity, area, and thickness in a Monte Carlo simulation approach with various efficiency terms included to account for the fraction of accessible pore volume that will be occupied by the injected fluid (USDOE, 2008). Compressibility-based models are used to estimate carbon dioxide storage in closed reservoirs, which are separated laterally by low-permeability zones where the injected carbon dioxide is constrained by the compressibility of the formation's native fluid and rock matrix. The compressibility approach is generally used for fluids with nearly constant total compressibility and assumes a single-phase system; typical applications include single-phase oil reservoirs and confined saline formations.

Static models, typically applied to basin- or regional-scale assessments, can be used to quantify carbon dioxide storage estimates for oil and gas reservoirs, saline formations, and unmineable coal seams (Bachu et al., 2007; NETL, 2010). Standardized methodologies for estimating carbon dioxide storage capacity using static models have been adopted by the Carbon Sequestration Leadership Forum, and use of static methods has been proposed by DOE's Regional Carbon Sequestration Partnership Program. A comparison of methods proposed by the two groups can be found in Bachu (2008). Owners or operators should be aware of the limitations of any static model selected, including the model's limited ability to address factors that affect carbon dioxide storage capacity such as geologic heterogeneity, fault-sealing, well bore integrity, injectivity, formation geochemistry, the various trapping mechanisms, and the injection well configuration. While these models are employed more generally for basin- or regional-scale assessments, they also do not address issues related to far-field pressure buildup or native formation fluid (e.g., brine) displacement (Birkholzer and Zhou, 2009). Additional information on storage capacity estimation using static models is available in the Appendix.

### 3.4.3. Dynamic Models

Dynamic methods include decline curve analysis, material balance, and reservoir simulation (USDOE, 2008). Of these, reservoir simulation is the most advanced and the most resource-intensive option and may not be easily applicable to basin- or regional-scale assessments where the necessary data are limited. However, this approach is suitable for local- or site-scale assessments, such as a Class VI project, where site characterization data are available and numerical modeling is already employed for AoR delineation. Using this approach will allow the development of more realistic, site-specific storage estimates that account for site-specific factors (e.g., boundaries, formation heterogeneity, near- and far-field pressure buildup, formation fluid displacement, etc.) as well as project-specific factors (e.g., operational parameters, injection well configurations, well bore integrity, etc.). This approach can also be used to reduce uncertainty and refine estimates of storage capacity by integrating new field data and well testing information during operation.

Decline curve analysis, for which a specific injection rate-time relationship (e.g., exponential function) is assumed, can be used for estimating storage capacity; however, it can only be used for active injection operations (USDOE, 2008). This method is generally applicable to individual wells or entire fields as long as the injection rate and time data exhibit a trend that fits the assumed function. Similarly, the material balance approach is also more suitable for injection operations already taking place since it includes the cumulative carbon dioxide injection and the corresponding pore pressure at various times.

### 3.4.4. Application of Methods for Estimating Carbon Dioxide Storage Capacity

Storage capacity estimates needed to support a demonstration that the site meets the requirements of 40 CFR 146.83(a)(1) will initially be submitted along with the permit application, which also includes the required AoR delineation information under 40 CFR 146.84. The numerical modeling employed for delineating the AoR must be based on site characterization data and account for chemical and physical properties of all phases of the carbon dioxide injected [40 CFR 146.84(a)]. Therefore, EPA recommends performing dynamic storage capacity estimates, complemented by static methods as described below, in concert with development of the numerical modeling used for the AoR delineation. If another method is chosen by the owner or operator, the application used should account for the planned and proposed operational parameters and the site characterization data collected, and be consistent with the AoR delineation process.

In formulating an initial storage capacity estimate for site selection or screening activities, owners or operators may use static models in conjunction with available data on the project site. Additionally, static models can provide alternative assessments of storage capacity to confirm numerical modeling results if a reservoir simulation is chosen to determine and/or demonstrate the suitability of a site for a proposed project.

In depleted reservoirs that have been used for EOR, reservoir simulations may have been previously performed to predict reservoir behavior based on the amounts of carbon dioxide injected. In these cases, estimating storage capacity can be facilitated by continued use of reservoir modeling. In coalbed methane settings, the storage mechanism is relatively straightforward and may be done in a manner similar to reserves estimation (Bachu et al., 2007). A static model may be suitable for such settings, keeping in mind limitations in calculation of the storage efficiency factor; owners or operators are encouraged to discuss the suitability of such estimates with the UIC Program Director.

Estimation of storage capacity in deep saline formations will be more challenging than for depleted reservoirs or coalbed methane enhanced recovery settings because saline formations will involve several trapping mechanisms; in addition, fewer data may be available and existing data may be at a lower spatial resolution. Bachu et al. (2007) note that the storage capacity estimate needs to include the contributions from the various trapping mechanisms (structural/stratigraphic, solubility, residual, and mineral), and provide examples of using static model calculations for different trapping mechanisms. Numerical simulations can be used to explore this level of complexity at the site scale and are the most rigorous approach. However, the usefulness of reservoir simulation will be limited by the amount and quality of data available

at the time the estimate is made. In some cases, static models may provide an adequate initial estimate; however, EPA recommends that they be refined using dynamic modeling when adequate data become available. Any uncertainties about which approach is suitable should be discussed with the UIC Program Director.

See the Appendix for additional discussion of data needs for storage capacity estimates. EPA also strongly encourages owners or operators to perform sensitivity analyses to estimate the effects of uncertainty in the input data for all storage capacity estimates.

After injection commences, the owner or operator should periodically update and refine the estimate of carbon dioxide storage capacity based on new field data and well testing information. EPA recommends the use of dynamic modeling for updating carbon dioxide storage capacity estimates. Periodic reevaluations of the storage capacity should be done in conjunction with reevaluations of the AoR. For example, estimates of carbon dioxide trapping mechanisms from reactive transport modeling will affect storage capacity estimates. Likewise, alterations in storage capacity estimates may lead to changes in operational parameters. Evaluations of storage capacity and operational parameters may especially need to be revisited in case of unexpectedly high pressure buildup within the injection formation or evidence of fluid displacement that may cause significant risk of endangerment to USDWs.

**Information to Submit**

In reporting storage capacity estimates, the owner or operator should submit:

- A description of the selected estimation method, including a discussion of its suitability for the type of formation;
- Tabulation of any input data used, along with estimates of uncertainty in those data;
- Results in tabular or graphic format;
- A discussion of the results, relating them to proposed operational parameters and the anticipated total volume of carbon dioxide to be injected and the duration of the project and any identified site-specific vulnerabilities (e.g., faults, fractures, etc.);
- A discussion of assumptions and limitations of the method used;
- A discussion of uncertainty based on the results of a sensitivity analysis; and
- A discussion of how the results are consistent with and/or supported by the AoR delineation modeling.

To support the UIC Program Director's evaluation of the data, EPA recommends that the owner or operator demonstrate that the storage capacity estimates support the anticipated injection rate and operational period, and that the anticipated total amount of injected carbon dioxide will not exceed storage capacity. The owner or operator should also demonstrate through sensitivity analyses that conservative estimates have been used for setting the proposed injection rate and volumes. An example evaluation of carbon dioxide storage capacity has been described by Asghari et al. (2006).

## 3.5. Demonstration of Confining Zone Integrity

The owner or operator must demonstrate the ability of the confining zone to contain the carbon dioxide [40 CFR 146.83(a)(2)] and not allow migration of carbon dioxide, either through interconnected pore spaces across the thickness of the seal or through the confining zone along faults or fractures. In particular, analyses may be needed to ensure that existing non-transmissive faults will not become transmissive under anticipated injection and storage pressures.

A number of approaches may be used to demonstrate competence of the confining zone. The Class VI Rule does not specify which methods should be used; rather, the choices of analyses and the data needed will depend on site geology. The methods described here are applicable to sites with single confining zones or multiple confining zones, if characterization of such additional zones is required by the UIC Program Director, per 40 CFR 146.83(b).

**Data Collection and Analysis**

An assessment of confining zone integrity will involve a synthesis of several types of information gathered through the site characterization process. In general, the following types of data may be used when demonstrating confining zone integrity:

- **Lithologic and stratigraphic data**, e.g., on the depth, thickness, and mineralogy of the confining zone (see Sections 2.3.3 and 2.3.4);
- **Structural data**, e.g., on faults and fractures, including fault geometry, depth of origin and termination, and the amount of displacement along the fault, including determinations of whether slip is consistent or variable along the fault and where such variations occur (see Sections 2.3.2 and 4.2);
- **Data from core analysis**, e.g., the capillary pressure, rock strength, permeability, and porosity (see Section 4.2);
- **Field formation testing data**, e.g., in situ fluid pressures, the magnitudes of principal stresses, and temperature (see Section 4); and
- **Geophysical survey data**, e.g., seismic, gravity, magnetic, or other geophysical methods (see Section 2.3.10).

Furthermore, while not a direct measure of integrity, the ability of the confining zone to contain natural oil and gas accumulations may serve as an additional line of evidence. Considerations for demonstration of confining zone integrity are presented in Section 3.5. Section 3.5.3 provides additional considerations for projects that will operate under injection depth waivers.

### 3.5.1. Movement through the Confining Zone

Continuous confining zones lacking faults or fractures may still allow the transmission of carbon dioxide through interconnected pore spaces throughout the thickness of the seal. Movement across intact seals in a GS setting will likely be controlled primarily by capillary pressure and permeability:

- **Capillary pressure.** As a general rule, good seals will have capillary entry pressures between approximately 6 and 40 MPa (Duncan, 2009). EPA recommends that owners or operators verify that the capillary entry pressure is in excess of pressure increases expected from the buoyancy-driven accumulation of carbon dioxide. Computational modeling developed for AoR delineation can assist in evaluating whether predicted pressures will remain below the capillary entry pressure, but owners or operators should bear in mind that such a demonstration is constrained by the fact that capillary pressure measurements will only be available from limited point locations. Capillary pressure and related measurement techniques are discussed in Section 2.3.5.3; and
- **Permeability.** Once the fluid pressure exceeds the capillary pressure, fluid may flow through the layer at a rate controlled by the permeability and the fluid pressure (Duncan, 2009). A layer can make an effective seal even if the capillary entry pressure is low or if capillary entry pressure is exceeded, as long as the permeability is also low. Owners or operators should provide relative permeability-saturation-capillary pressure relationships derived from core analyses. They should discuss permeability of the confining zone in the context of other characteristics such as capillary pressure and thickness, and they may consider the performance of similar lithologies in other GS projects. Owners or operators may also consider numerical modeling to assess the potential effectiveness of the seal in inhibiting migration of carbon dioxide. See the Appendix for additional information on measurement of intrinsic permeability and relative permeability.

### 3.5.2. Transmission of Carbon Dioxide through Faults

A confining zone may be compromised if faults or fractures allow carbon dioxide movement across it. Faults can provide leakage pathways and fractures can be generated when capillary entry pressure and pore pressure exceed the rock strength. At that point, the layer will fracture before carbon dioxide enters into the pore spaces.

***Characterizing the Sealing Potential of Existing Faults or Fractures***

Faulted or fractured formations may seal carbon dioxide (Meckel, 2007), but EPA recommends that applicants verify confining zone integrity by characterizing the sealing potential of the formation. Any faults or fractures that intersect, originate, or terminate in the confining zone should be thoroughly characterized (i.e., dimensions, geometry, sealing properties) regardless of their size (Knipe et al., 2001; Meckel, 2007). Thorough characterization of these features is important because properties can be heterogeneous across the fault or fracture plane, complicating interpretation (Freeman et al., 1998). A fault or fracture may be sealing (non-transmissive) in some regions while remaining transmissive in others.

Owners or operators should also keep in mind that leakage can occur in complex seals composed of numerous variably permeable layers. For example, small faults and fractures that do not extend completely through the unit can connect permeable regions of the unit to form pathways for carbon dioxide migration (Ingram et al., 1997). These types of leakage pathways are likely to be more difficult to characterize because of their smaller scale.

EPA suggests several possible approaches to evaluate the likelihood of leakage occurring across existing faults or fractures, as follows:

- **Juxtaposition of units.** Faults are likely to be sealed against lateral movement of carbon dioxide across the fault if the fault juxtaposes conductive and non-conductive units on either side. An Allan chart can be used to determine which units contact each other along a fault surface (Knipe et al., 1998);
- **Leakage along faults.** The risk of leakage along a fault will be lower if sediments with a high capillary pressure and low permeability are found along or incorporated into the fault zone. These sediments will prevent migration of carbon dioxide along the fault for the same reasons they can prevent migration upward when present as a seal. Such materials can occur along the faults as a result of catalysis, diagenetic sealing, or by entrainment during fault movement. Owners or operators may use information from outcrops or cores that intersect the fault to evaluate whether such sediments occur in the fault zone;
- **Catalysis.** Breakdown of materials along the fault due to physical abrasion during fault slip can produce fine material that tends to have smaller pore throats and, correspondingly, high capillary pressure. Catalysis can reduce the permeability of high-porosity sandstones up to four orders of magnitude with only a few centimeters of slip and lead to sealing behavior along the fault (Yielding et al., 1997). Owners or operators may evaluate the degree of catalysis by examining hand samples, cores, or thin sections of samples taken from the fault zone. After evaluation, hand samples may be subjected to capillary pressure tests or other laboratory tests to quantify the effect of catalysis on pore size;
- **Diagenetic sealing.** Determining the amount of diagenetic sealing of a fault or fracture due to authigenic calcite or silicates requires the direct examination of core samples from the fault or fracture zone in the laboratory. In some cases, samples taken from nearby faults or outcrops may be used to infer the amount of diagenetic sealing on buried faults or fractures, provided that the faults or fractures examined originated in the same time period and that evidence at various scales (e.g., thin section, hand sample, outcrop) indicate that diagenetic behavior is similar throughout the unit;
- **Calculation of shale gouge ratio (SGR).** Materials from hanging- and footwalls in shale and other clay-rich formations can be incorporated along a fault, producing shale gouge. This fine-grained material helps to retard the flow of fluids along the fault. The amount of shale entrained by the fault from the shale/siltstone units the fault intersects can be estimated using the SGR (Freeman et al., 1998). This method works best for shale/sandstone/siltstone sequences. See the Appendix for additional information on calculation and interpretation of the SGR. Calculation of the SGR and other shale-entrainment methods requires accurate knowledge of lithology (specifically clay/phyllosilicate content) and thickness in the area of the fault. This level of information may require new boreholes, seismic surveys, other geophysical surveys, and/or a refined analysis of fault geometry and extent. EPA encourages owners or operators to determine the SGR where it is feasible and appropriate; and
- **Pressure compartmentalization.** If a fault compartmentalizes regions of different subsurface pressure, it may be sealing (Huffman, 2002). This method requires both subsurface mapping of all faults within the area of interest and pore pressure

measurements. Pressure measurements can be taken directly from wells on both sides of the fault (Doughty and Karasaki, 2004), or indirect pore pressure data may be generated by transforming seismic velocity data into pore pressure (see Section 2.3.10 and the Appendix). An example figure is provided in the Appendix.

The owner or operator should be aware that use of seismic pore pressure estimates is still under development and can introduce errors, especially in subsurface environments that have not undergone significant subsurface exploration. Gathering sufficient subsurface pressure data by wells to use the pressure compartmentalization method may be labor intensive, and, although a pressure difference across a fault indicates sealing behavior, the lack of a pressure difference does not definitively indicate a transmissive fault.

### 3.5.3. Special Considerations for Characterizing Lower Confining Zones

An owner or operator applying for an injection depth waiver must demonstrate the integrity of both the upper and the lower confining zones [40 CFR 146.95(a)(2)]. The basic methods for evaluating seal integrity remain the same whether the confining zone is above or below the injection zone. Estimates of thickness, permeability, fracture pressure, capillary pressure, and other parameters are recommended, as well as an understanding of whether the zone contains interbedded units of higher permeability. The owner or operator will also need to demonstrate that the confining zones are free of transmissive faults and fractures [40 CFR 146.95(a)(2)].

One important difference to consider between confining zones above and below the injection zone is that the upper confining zone will likely contact free-phase carbon dioxide prior to its dissolution while the lower confining zone may or may not contact free-phase carbon dioxide. However, both the upper and lower confining zones will be in contact with brine and may eventually be in contact with carbon dioxide-saturated brine. While capillary entry pressure is not relevant in the case of brine contacting a confining zone already saturated with brine, the capillary entry pressure of free-phase carbon dioxide in the lower confining zone should be determined and considered. See the *UIC Program Class VI Well Injection Depth Waivers Guidance* for additional information on applying for injection depth waivers.

**Information to Submit**

EPA encourages owners or operators to submit a discussion of confining zone integrity. The owner or operator should reference all relevant information from the site characterization and should provide a narrative discussing all lines of evidence used to support the demonstration. Details should be shown for any calculations performed (e.g., SGR), and images that support the demonstration should be annotated to illustrate relevant features. Not all types of analyses presented above may be needed, but the information presented should collectively indicate that the confining unit meets the requirements at 40 CFR 146.83. Any limitations in the data or analysis should be noted.

Because the parameters used to assess confining zone integrity are calculated from existing data, the reliability of the final measurement depends upon the quality of the input data, and errors will be propagated through any calculations done in support of this analysis. The owner or operator

should discuss any potential errors and how they may affect the evaluation of confining zone integrity.

Because fault properties may vary spatially along the fault, resulting in variability of sealing capacity, the owner or operator should communicate any uncertainties in the data and be cognizant of the need for additional analyses to represent any spatial heterogeneity.

## 3.6. Considerations for Secondary Confinement

The Class VI Rule, at 40 CFR 146.83(b), provides the UIC Program Director with discretion to require the owner or operator to identify and characterize additional zones that will impede vertical fluid movement, are free of faults and fractures that may interfere with containment, allow for pressure dissipation, and provide additional opportunities for monitoring, mitigation, and remediation. This demonstration is needed to facilitate consideration of GS sites where the owner or operator or the UIC Program Director determines that an additional barrier to fluid movement is appropriate based on site-specific data.

These additional confining zones will not be needed in all circumstances, and the UIC Program Director would exercise their discretion to require characterization of secondary confinement if, for example, the first impermeable zone immediately above the injection zone can provide some confinement but may not demonstrate all of the properties needed to ensure that the carbon dioxide will not migrate. Characterization of a secondary confining zone may be needed if:

- The primary confining zone does not exhibit sufficient strength to allow injection at the proposed pressures;
- Known or suspected faults or fractures transect the primary confining zone and would interfere with containment of carbon dioxide;
- The primary confining zone is not sufficiently extensive to cover the entire maximum extent of the carbon dioxide plume and pressure front or it is not sufficiently thick and homogeneous over the entire area; or
- There is insufficient information or conflicting data about the primary confining zone.

**Data Collection and Analysis**

If the UIC Program Director requires information about a secondary confining zone, the owner or operator will need to demonstrate how the two layers would contain and prevent upward movement of the carbon dioxide. This demonstration should address how the two confining zones together meet all the requirements for confinement at 40 CFR 146.83(a)(2). Specifically, they should be free of faults that are transmissive throughout both confining zones, be of sufficient areal extent and integrity to contain the injected carbon dioxide stream and displaced formation fluids, and allow injection at proposed maximum pressures and volumes without initiating or propagating fractures. The owner or operator may also need to characterize the intervening zones between the primary and secondary confining zones to demonstrate that they allow for pressure dissipation and provide additional opportunities for monitoring or remediation.

Characterizing the secondary confining zone and any intermediate zones will involve the same methods that are used to characterize the primary confining zone. Some types of data, such as well logs or cross sections, will probably contain information about all subsurface formations, and the owner or operator would need to highlight information relevant to the additional confining zone and intervening layers.

If existing data or cores are used, the owner or operator should verify that they include coverage of the secondary confining layer and, ideally, any intervening units. If adequate data and/or samples are not available, additional sampling or analysis may be needed. If core samples are taken during drilling of a stratigraphic well, the owner or operator should ensure that the cores include representative samples from the primary and secondary confining zone, as well as any intervening layers. Owners or operators may need to obtain core analyses for samples from the secondary confining unit (e.g., porosity, permeability, capillary pressure, mineralogy, strength). Any relevant features on seismic or other geophysical images that help define the thickness and areal extent of the confining zone and characterize faults should be highlighted. In some cases, the owner or operator may need to establish the fracture pressure or fault sealing capabilities in the secondary confining unit.

Information on the potential for pressure dissipation within the intervening layers may come from AoR modeling that includes information about both confining zones and the intervening formations. If additional ground water quality monitoring or direct monitoring for carbon dioxide or pressure measurements in these zones is warranted, the owner or operator should demonstrate how such monitoring enhances the Testing and Monitoring Plan.

**Information to Submit**

The owner or operator is encouraged to discuss with the UIC Program Director specific needs related to characterizing additional confining zones, including how the primary confining zone is deficient. This will establish the level of data collection and analysis that may be needed to demonstrate that the system of subsurface formations is sufficient to confine the carbon dioxide and protect USDWs from endangerment.

Based on the discussions, additional data collected, and additional analysis of the secondary confining zone, the owner or operator should submit to the UIC Program Director a description of the primary and secondary confining zones and the intervening layers, and how they will impede vertical fluid movement, allow for pressure dissipation, and provide additional sites for monitoring, mitigation, and remediation.

## 3.7. Reporting Process

The Class VI Rule requires owners or operators to submit site characterization data collected pursuant to 40 CFR 146.82(a) and (c) with the permit application or prior to receiving authorization to begin injection, respectively (see the preceding sections of this document for specific recommendations on the types of information to submit). These data must be retained throughout the life of the GS project and for 10 years following site closure [40 CFR 146.91(f)(1)].

Under the Class VI Rule, regardless of whether a state has primary enforcement responsibility, owners or operators are required to submit site characterization data to EPA in an electronic format approved by EPA [40 CFR 146.91(e)]. The data and supporting documents may be submitted as PDF files, including charts, graphs, and tabular data. EPA also recommends that raw data be submitted, in separate files (e.g., LAS, Excel). Additionally, EPA recommends that maps be submitted in a GIS-compatible format, to further assist a more detailed and flexible review process by the UIC Program Director. For additional information on complying with the reporting requirements related to submitting site characterization data, please see the *UIC Program Class VI Well Recordkeeping, Reporting, and Data Management Guidance for Owners and Operators.*

# 4. Activities Performed Prior to Operation of a Class VI Well

Prior to commencing injection, owners or operators must provide extensive geologic and hydrogeologic data collected during the construction of a Class VI well to demonstrate to the UIC Program Director that the injection and confining zones are suitable for receiving and containing injected fluids [40 CFR 146.82(c)]. This section provides guidance on the formation and well testing and logging activities that the owner or operator must conduct to generate the information and data required to receive authorization to inject at a Class VI well.

The testing and logging activities described here provide the information and data that will be considered by the UIC Program Director in authorizing Class VI operation as identified in 40 CFR 146.82(c) and the formation testing requirements at 40 CFR 146.87. (The *UIC Program Class VI Well Construction Guidance* provides information on how owners or operators can meet the injection well testing requirements of 40 CFR 146.87.)

For new Class VI wells, these testing and logging activities are undertaken during and after drilling and construction of the new injection well. For Class VI wells to be transitioned from other classes of injection wells (or pre-existing monitoring, stratigraphic test, or production wells), the testing and logging information can be provided from previous and ongoing testing and monitoring of the formation and from well tests and logs conducted during the previous use of the well.

The activities described in this section include formation testing/logging, core sampling and analysis, and hydrogeologic testing to determine the physical and chemical characteristics of the injection and confining zones. Importantly, these post-well construction/pre-operational testing and logging data will provide updates to and can be synthesized with related injection and confining formation data obtained during the GS site characterization and submitted earlier as part of the Class VI permit application. Where appropriate, this section references related topics in Section 2 of this guidance.

Each section below describes the Class VI Rule requirements that relate to specific testing/logging activities and identifies the use or relevance of the information to be provided. Brief technical descriptions are provided in the Appendix for testing and logging methods and how required information and data can be generated or obtained. Where appropriate, subsections below also provide recommendations and special considerations for obtaining and interpreting data and note particular aspects of the formation and well characterization process that might warrant discussions with the UIC Program Director.

## 4.1. Well Logging

During the drilling and construction of a Class VI injection well, the owner or operator must run logs, conduct surveys, and perform tests when appropriate to determine or verify the depth, thickness, porosity, permeability, lithology, and salinity of any formation fluids in all relevant geologic formations [40 CFR 146.87].

These well logging activities supplement data on geologic and hydrogeologic properties of relevant subsurface formations collected during initial site characterization and are used to support building a conceptual understanding of the site, conducting the AoR determination, and designing the GS project. Performing a variety of logs provides complementary information on subsurface properties as well as taking advantage of the different levels of vertical resolution of the log types.

## Data Collection and Analysis

At a minimum, well logs must include resistivity, spontaneous potential, gamma ray, porosity, fracture finder logs, and any other logs the UIC Program Director requires based on the geology of the site [40 CFR 146.87(a)(2) and (3)]. These logs must be conducted before installation of the surface casing [40 CFR 146.87(a)(2)(i)] *and* before installation of the long-string casing [40 CFR 146.87(a)(3)(i)]. Any alternative methods that provide equivalent or better information must be approved by the UIC Program Director prior to implementation [40 CFR 146.87(a)(5)]. These types of logs are described in the Appendix; for further information on geophysical logging and analysis, see Asquith and Krygowski (2004), Telford et al. (1990), and NETL (2009).

## Information to Submit

The owner or operator must submit to the UIC Program Director a descriptive report prepared by a knowledgeable log analyst that includes an interpretation of the results of these logs [40 CFR 146.87(a)]. This report must be provided in an electronic format and should include:

- The date and time of each test, the date of well bore completion, and the date of installation of all casings and cements;
- Chart results of each log and any supplemental data;
- The name of the logging company and log analyst and information on their qualifications;
- Interpretation of the well logs by the log analyst, including any assumptions, determination of porosity, permeability, lithology, thickness, depth, and formation fluid salinity of relevant geologic formations; and
- Any changes in interpretation of site stratigraphy based on formation testing logs.

To support the UIC Program Director's evaluation of the logging results, EPA recommends that the owner or operator demonstrate that the collected information is consistent with other available site characterization data in the permit application and that the data support other assessments of stratigraphy and formation properties. The owner or operator should demonstrate that the logs were adequately performed and properly characterize all formations, and that logging tests were conducted by a knowledgeable log analyst. The UIC Program Director may compare the results of formation testing logs from different wells in the vicinity to interpret local stratigraphy and verify the depths and properties of the proposed injection and confining zones.

Where information gathered via the logs diverges from other data or supports different conclusions about the subsurface, the owner or operator should discuss in the report, and with the

UIC Program Director, the implications for any of the planned operational procedures, the AoR determination, or the GS project plans.

## 4.2. Core Analyses

The Class VI Rule [40 CFR 146.87(b)] requires the owner or operator to take whole cores or sidewall cores of the injection and confining zones and formation fluid samples from the injection zone(s) and to submit to the UIC Program Director a detailed report prepared by a log analyst.

Core samples provide information to support stratigraphic correlation, interpretation of depositional environments, and wireline log calibration. Information from cores will be used to refine site characterization data submitted pursuant to 40 CFR 146.82(a). Core samples may also have been taken prior to well construction if a stratigraphic well was drilled during initial site characterization.

**Data Collection and Analysis**

***Core Sampling***

Decisions about the type of coring to perform will ultimately depend upon logistics and the type of lithology to be cored. Detailed information on the various coring methods is available in Whitebay (1992). Proper drilling methods should be practiced to maintain zonal isolation when penetrating the confining zone or any over- or under-pressured zones.

Core samples must be taken from the injection and confining zones [40 CFR 146.87(b)]. Owners or operators may also consider analyzing samples from the first permeable formation overlying the confining zone or from other permeable formations and confining zones farther up in the stratigraphic column. The lower confining zone should be included if the owner or operator has been granted an injection depth waiver (see the *UIC Program Class VI Well Injection Depth Waivers Guidance* for additional information on the injection depth waiver application process).

The optimal number of samples to analyze will vary by site, but representative samples should be chosen from cores and core sections with different lithologies and characteristics (e.g., texture, grain size). Heterogeneous formations would warrant more closely spaced core samples than uniform formations. For heterogeneous formations with many fractures or solution features, it may be preferable to examine the complete length of full-diameter core in the interval being tested. Owners or operators may have also used a geostatistical approach to model the distribution of permeability and porosity in the injection and confining zone(s); selection of core samples during drilling and construction of the Class VI well should be planned to further refine such estimates.

***Core Logging and Analysis***

Core logs should include descriptions or indications of: lithology, thickness, grain size, sedimentary structures, diagenetic features, contacts, textural maturity, oil staining, fracturing,

and porosity. Laboratory analysis of cores should include petrology and mineralogy; petrophysical properties; and geomechanical properties (see Sections 2.3.4 through 2.3.6). Owners or operators may consider special core analysis (SCAL) to obtain an in-depth suite of tests for parameters relevant to GS, such as relative permeability, capillary pressure, fluid compatibility, wettability, and pore volume compressibility.

**Information to Submit**

Owners or operators must submit to the UIC Program Director a report prepared by a log analyst [40 CFR 146.87(b)]. Owners or operators should review the report prior to submission to ensure that it is complete and includes information on methods, notes on QA samples and calibration of instrumentation as appropriate, results in tabular and/or graphic form, and photographs as appropriate. Where information from the core analysis diverges from other data or supports different conclusions about the subsurface, the owner or operator should discuss in the report, and with the UIC Program Director, the implications for any of the planned operational procedures, the AoR determination, or the GS project plans.

## 4.3. Characterization of Injection Formation Fluid Chemical and Physical Properties and Downhole Conditions

The Class VI Rule requires the sampling and characterization of the chemical and physical properties of the formation fluids in the injection zone [40 CFR 146.82(a)(8) and 146.87(b)] as well as recording of the fluid temperature, pH, SC, reservoir pressure, and static fluid level [40 CFR 146.87(c)]. Fluid sampling and recording of downhole pressure, temperature, SC, and pH provides information to support a determination of the compatibility of the injectate with the formation fluids [40 CFR 146.82(c)(3)].

**Data Collection and Analysis**

Information on downhole pressure, temperature, pH, and SC can be obtained before completion using formation testing tools. Such tools may also record other parameters such as fluid density and fluid carbon dioxide. Alternatively, downhole conditions may be recorded after completion using wireline tools.

Fluid sampling can be done before well completion using wireline sampling devices, or after well completion. If sampling is performed before completion, the well bore should be cleaned of drilling mud as much as possible before the sample is taken (Nagarajan et al., 2007). After well completion, samples can be collected downhole using devices such as a flow-through device (see the *UIC Program Class VI Well Testing and Monitoring Guidance*), or at the surface by pumping the fluids for collection. Analyses generally include major anions and cations, pH, temperature, pressure, alkalinity, TOC, and total inorganic carbon (see Section 2.3.9).

**Information to Submit**

To meet the requirements of 40 CFR 146.82(a)(8) and 146.87(b), the owner or operator should submit the following information to the UIC Program Director:

- Type of sampling equipment used and field procedures (e.g., sample preservation);
- If the sample was pumped, flow rate, type of pump, and location of the pump, and geochemical modeling results indicating the likely geochemical makeup of the fluids at downhole conditions;
- Data for field measurements (pH, SC, temperature, pressure);
- Laboratory results, including QA samples (e.g., blanks, duplicates, matrix spikes); and
- Notes on any anomalous data.

To support the UIC Program Director's evaluation of the data, EPA recommends that the owner or operator demonstrate that they used proper field techniques to obtain samples. Where information gathered via formation testing diverges from other data or supports different conclusions about the injection and confining zones, the owner or operator should discuss with the UIC Program Director, and in the report, the implications for any of the planned operational procedures, the AoR determination, or the GS project plans.

## 4.4. Fracture Pressure of the Injection and Confining Zones

Owners or operators must determine or calculate the fracture pressure of the injection and confining zones [40 CFR 146.87(d)(1)]. This information, in conjunction with predictions of pore pressures within the injection zone, is used to support the determination of an appropriate injection pressure to ensure that injection will not initiate or propagate fractures in the confining zone [40 CFR 146.83(a)(2)]. In addition, this information can be used to confirm or refine the preliminary site characterization information described in Section 2. Where the owner or operator has received an injection depth waiver, they should provide information on the fracture pressure of the lower confining zone(s) to support the determination of injection pressures that do not compromise confinement below the injection zone.

In addition, owners or operators may be asked by the UIC Program Director to determine or calculate other physical and chemical characteristics of the injection and confining zone(s) [40 CFR 146.87(d)(2)]. Any such request will be site-specific and would likely involve gathering data to augment other information gathered during the site characterization process, address any data anomalies or inconsistencies, support the development of the AoR delineation model, or support setting of permit conditions (e.g., operational limits).

**Data Collection and Analysis**

The step rate test is a common method for determining the fracture pressure of a formation (see the Appendix and USEPA, 1999 for additional detail). EPA recommends the use of downhole pressure gauges during the test. If a surface gauge is used, the reading needs to be corrected to obtain the downhole pressure and the correction factor will need to account for friction. For wells with depths greater than 3,000 feet, the uncertainty in the friction correction may introduce too

much error to allow for an accurate reading (McAleese, 2000). EPA recommends using two pressure gauges to ensure that there is a backup if one gauge fails. Additionally, the flow meter should be calibrated prior to the test (USEPA, 1999).

**Information to Submit**

For the UIC Program Director to appropriately evaluate the fracture pressure calculation, as required at 40 CFR 146.87(d)(1), EPA recommends that the owner or operator submit the following information:

- Type and location of the pressure gauge;
- Type of flow meter and calibration records;
- Raw pressure and flow data;
- Plot of flow rate versus pressure data; and
- Discussion of any anomalous data.

To support the UIC Program Director's evaluation of the data, EPA recommends that the owner or operator demonstrate that proper test conditions were obtained and that the proposed operating pressure is appropriate based on the information gathered and the predicted (modeled) pore pressures throughout the injection zone. The owner or operator should also demonstrate that proper correction factors were used if the gauges were not deployed at the bottom of the well bore and that a constant injection rate was used at each step period.

The owner or operator should also discuss how the calculated fracture pressure compares with data from core tests or other wells in the area. Where this information is not consistent with existing data or supports different conclusions about the subsurface formations, the owner or operator should discuss in the report, and with the UIC Program Director, the implications for any of the planned operational procedures (e.g., injection pressure).

Data from the step rate test may also be helpful in designing well stimulation programs. Step rate tests can be carried out in conjunction with hydrogeologic testing described in Section 4.5 in order to determine other reservoir properties such as transmissibility.

## 4.5. Hydrogeologic Testing

The Class VI Rule requires hydrogeologic testing of the injection well before injection operations begin. A pressure fall-off test and either a pump test or injectivity test [40 CFR 146.87(e)(1)–(3)] must be performed. These tests are designed to verify information on the injectivity of the injection zone to support the setting of permit limits for carbon dioxide injection rates and volumes. Injectivity depends on parameters such as porosity, permeability, and connectivity. Many of these parameters will have been measured during the initial site characterization. Hydrogeologic testing can verify these parameters and can also help determine any local reduction in permeability near the well bore caused by the well construction process, often referred to as the skin factor. Hydrogeologic testing can also be used to determine if a stimulation program is necessary and aid in the design of such a program. Data from

hydrogeologic testing may also be useful in verifying the computational model for AoR determination.

### 4.5.1. Pressure Fall-Off Tests

Pressure fall-off tests are conducted on a well to verify several hydrogeologic parameters: the transmissibility of the injection zone, the static injection zone pressure, and the skin factor. Pressure fall-off tests can also indicate if there are faults and fractures near the well bore.

**Data Collection and Analysis**

EPA recommends the use of downhole gauges with surface displays for fall-off tests. The surface readout allows real time reading of the pressure and allows any anomalies to be noted and potentially corrected while the test is being conducted rather than during data analysis. Using two pressure gauges will provide a backup in case one fails and will provide two data sets which can be used to verify the accuracy of the test.

The appropriate injection and shut-in periods are determined based on site-specific parameters and the desired area for which data will be gathered. It is important that the flow rate during injection is constant and that the test is conducted over a sufficient period of time so that the pressure effects seen are not caused by the well bore but reflect the reservoir conditions. If the pressure fall-off test is to be used to examine reservoir features such as faults, non-homogenous areas, or other wells, the time should be long enough to allow the pressure effects from those areas to be seen. EPA Region 6 has published a guidance entitled "The Nuts and Bolts of Falloff Testing" (USEPA, 2003) that provides guidance on determining the appropriate injection and fall-off times, along with many other technical details.

**Information to Submit**

For the UIC Program Director to appropriately evaluate the fall-off test, EPA recommends that the owner or operator submit the following information:

- Raw pressure data;
- Flow data from the injection portion of the test;
- Test parameters (injection time, shut-in time, fluid viscosity, temperature, well bore diameter, pressure gauge type and location);
- Semi-log plots used for data analysis;
- Parameters calculated from the analysis; and
- Discussion of the results, including data quality and any anomalous values.

If the fall-off test data were used to verify computational model results, the owner or operator may also want to reference those results.

To support the UIC Program Director's evaluation of the data, EPA recommends that the owner or operator provide sufficient information to demonstrate the validity and results of the test. For

example, the owner or operator should demonstrate that pressure gauge data accurately capture the full range of test data and that the gauge was either properly placed to measure downhole pressure or appropriate corrections were made to calculate downhole pressure. The owner or operator should also demonstrate that a steady rate was held before the shut-in portion of the test was begun and that the time frame of the test was sufficiently long. The owner or operator should demonstrate that the semi-log plots were linear and explain any non-linearities against other data submitted for the site characterization.

EPA recommends that any interpretation of anomalies be corroborated with other data. For example, if an anomaly is proposed to have been caused by a fault, then the owner or operator should review and provide information from geologic maps and seismic data to determine if faults are documented in the area indicated by the pressure transient analysis.

Finally, the owner or operator should demonstrate that the results of the analysis are consistent with other site data. For example, transmissivity values calculated from the fall-off test may be compared to permeability values determined from cores. Where the information diverges from other data or supports different conclusions about the subsurface, the owner or operator should discuss the implications for any of the planned operational procedures, the AoR determination, or the GS project plans.

### 4.5.2. Injectivity and Pump Tests

Injectivity and pump tests are used in a manner similar to pressure fall-off tests to determine the transmissibility of the reservoir, the skin factor, and to identify nearby faults or fractures. The tests are subject to less interference from the well bore than pressure fall-off tests, but they are subject to more noise in the pressure data from the flowing fluid. Obtaining data from both a fall-off test and an injectivity or pump test allows verification of data, because, in some cases, more than one factor can yield similar pressure response curves.

**Data Collection and Analysis**

Injectivity testing involves pumping carbon dioxide into the well at a constant rate and recording the pressure response in the well. A pump test is similar to an injectivity test, but fluid is pumped from the well instead of injected. Either test can be used to fulfill the requirement at 40 CFR 146.87(e), and they should yield the same results. Injectivity tests are more commonly used in injection well applications. As with fall-off tests, placing the pressure gauge downhole reduces inaccuracies that are caused by friction loss in the well bore. Generally, with wells over 3,000 feet deep, downhole pressure gauges should be used (McAleese, 2000). Dual pressure gauges are also recommended to ensure that a backup gauge is available.

The rate of injection on an injectivity test should be low enough that the fracture pressure of the formation is not exceeded. The injection rate should be held constant long enough that radial flow is established and there are no near-well bore pressure effects. Variable flow rates or too short of an injection period may lead to poor test results.

Several variations on injectivity testing may be performed. A multi-rate injection test uses two or more injection rates to produce more data for a more complete analysis. Each injection rate is held long enough to obtain radial flow. In interference tests, fluid is injected into one well and the pressure is measured at another well. The interference test can yield information on the porosity and compressibility of the formation between the two wells. If planned properly, a pressure fall-off test can also be conducted following an injectivity test.

Pressure data from each of these tests are analyzed in the same way, using the same types of plots as those used for pressure fall-off tests. If the semi-log plots are not linear, this is likely due to errors in the assumptions underlying plot construction. Such errors could include non-constant injection rates, non-homogenous reservoir properties, interfering wells, or faults.

**Information to Submit**

Data submitted for injectivity or pump tests would be similar to data for a pressure fall-off test and should include:

- Raw pressure data;
- Flow data including rates and times;
- Test parameters (injection time, fluid viscosity, temperature, well bore diameter, pressure gauge type and location);
- Semi-log plots used for data analysis;
- Parameters calculated from the analysis; and
- A discussion of the results, including data quality and any anomalous values.

To support the UIC Program Director's evaluation of the data, EPA recommends that the owner or operator demonstrate that the test results are valid and verified, and that the data are consistent with other collected data. For example, the owner or operator should demonstrate that pressure gauge data accurately capture the entire range of injection pressures used. The owner or operator should also demonstrate that gauges were properly located to provide accurate bottomhole readings and/or that surface pressure readings were properly corrected to obtain bottomhole pressure.

The owner or operator should demonstrate that flow data and flow meters were calibrated and that a constant flow rate was maintained. The owner or operator should show that semi-log plots are linear and explain any anomalies, comparing data as necessary to other information collected during site characterization to aid in interpretation. Any deviations from linear behavior should be analyzed and a cause determined and documented. Because an anomaly may be caused by more than one type of phenomenon, any interpretations of anomalies should be verified using independent data. Where information from injectivity or pump tests diverges from other data or supports different conclusions about the subsurface, the owner or operator should discuss the implications for any of the planned operational procedures, the AoR determination, or the GS project plans. If the injectivity or pump test data were used to verify computational model results, the owner or operator may also want to reference those results.

# 5. References


Almon, W.R. 1992. Overview of Routine Core Analysis. In Morton-Thompson, D., and A.M. Woods (Eds.), AAPG Methods in Exploration Series, No. 10, Development Geology Reference Manual (pp. 201-203). American Association of Petroleum Geologists (AAPG): Tulsa, OK.

Asghari, K., A. Al-Dliwe, and N. Mihinpey. 2006. Effect of operational parameters on carbon dioxide storage capacity in a heterogeneous oil reservoir: A case study. Industrial & Engineering Chemistry Research 45: 2452-2456.

Asquith, G.B., and D. Krygowski. 2004. Basic Well Logging Analysis (2nd ed.). AAPG: Tulsa, OK.

ASTM International (ASTM). 2006. Standard Guide for Soil Gas Monitoring in the Vadose Zone. ASTM D5314 - 92(2006). DOI: 10.1520/D5314-92R06. http://www.astm.org.

ASTM. 2008. Standard Test Method for Determination of In-Situ Stress in Rock Using Hydraulic Fracturing Method. ASTM D4645 - 08. DOI: 10.1520/D4645-08. http://www.astm.org.

ASTM. 2010. Standard Test Method for Compressive Strength and Elastic Moduli of Intact Rock Core Specimens under Varying States of Stress and Temperatures. ASTM D7012 - 10. DOI: 10.1520/D7012-10. http://www.astm.org.

Bachu, S., D. Bonijoly, J. Bradshaw, R. Burruss, S. Holloway, N.P. Christensen, and O.M. Mathiassen. 2007. $CO_2$ storage capacity estimation: Methodology and gaps. International Journal of Greenhouse Gas Control 1: 430-443.

Bachu, S. 2008. Comparison between Methodologies Recommended for Estimation of $CO_2$ Storage Capacity in Geological Media – Phase II Report. The CSLF Task Force on $CO_2$ Storage Capacity Estimation and the USDOE Capacity and Fairways Subgroup of the Regional Carbon Sequestration Partnerships Program.

Balan, B., S. Mahaghegh, and S. Ameri. 1995. State-of-the-art in permeability determination from well log data: Part 1 – A comparative study, model development. SPE 30978.

Barbosa, V.C.F., P.T.L. Menezes, and J.B.C. Silva. 2007. Gravity as a tool for detecting faults: In depth enhancement of subtle Almada's basement faults, Brazil. Geophysics 73: B59-B68.

Birkholzer, J.T., and Q. Zhou. 2009. Basin-scale hydrogeologic impacts of CO2 storage: Capacity and regulatory implications. International Journal of Greenhouse Gas Control 3(6): 745-756.

Carroll, S., W. McNab, S. Torres, J. Singleton, and P. Zhao. 2011. Wellbore integrity in carbon sequestration environments: 1. Experimental study of cement – sandstone/shale – brine – $CO_2$. Energy Procedia 4: 5186-5194.

Chadwick, A., R. Arts, C. Bernstone, F. May, S. Thibeau, and P. Zweigel, P. 2008. Best practice for the Storage of $CO_2$ in Saline Aquifers. Keyworth, Nottingham: British Geological Survey Occasional Publication No. 14.

Chiaramonte, L., M.D. Zoback, J. Friedmann, and V. Stamp. 2008. Seal integrity and feasibility of $CO_2$ sequestration in the Teapot Dome EOR pilot: geomechanical site characterization. Environmental Geology 54: 1667-1675.

Cone, M.P., and D.G. Kersey. 1992. Porosity. In Morton-Thompson, D., and A.M. Woods (Eds.), AAPG Methods in Exploration Series, No. 10, Development Geology Reference Manual (pp. 204-209). AAPG: Tulsa, OK.

Doughty, C., K. Pruess, S.M. Benson, S.D. Hovorka, P.R. Knox, and C.T. Green. 2001. Capacity Investigation of Brine-Bearing Sands of the Frio Formation for Geologic Sequestration of $CO_2$. http://www.netl.doe.gov/publications/proceedings/01/carbon_seq/p32.pdf.

Doughty, C., and K. Karasaki. 2004. Modeling flow and transport in saturated fractured rock to evaluate site characterization needs. Journal of Hydraulic Engineering and Research 42 (extra issue): 33-44.

Duncan, I. 2009. $CO_2$ Seals: Why are they relevant to EOR Projects? Presented at the 2009 Society for Petroleum Engineers International Conference on $CO_2$ Capture, Storage, and Utilization. November 2-4, 2009; San Diego, California.

Evans, B.J. 1997. A handbook for seismic data acquisition in exploration. Society of Exploration Geophysicists: January 1, 1997.

Freeman, B., G. Yielding, D.T. Needham, and M.E. Badley. 1998. Fault seal prediction: The gouge ratio method. In Coward, M.P., T.S. Daltaban, and H. Johnson (Eds.), Structural Geology in Reservoir Characterization. London, England: Geological Society Special Publications 127: 19-25.

Gaus, I. 2010. Role and impact of $CO_2$-rock interactions during $CO_2$ storage in sedimentary rocks. International Journal of Greenhouse Gas Control 4: 73-89.

Gaus I., P. Audigane, L. Andre, J. Lions, N. Jacquemet, P. Dutst, I. Czernichowski-Lauriol, and M. Azaroual. 2008. Geochemical and Solute Transport Modelling for $CO_2$ Storage, What to Expect from It? International Journal of Greenhouse Gas Control Special Issue 2: 605-625.

Greenberg, A., et al. 2005. Standard Methods for Examination of Water and Wastewater (21st ed.). Washington, DC: American Public Health Association.

Herring, A.T. 1992. Borehole gravity. In Morton-Thompson, D., and A.M. Woods (Eds.), AAPG Methods in Exploration Series, No. 10, Development Geology Reference Manual (pp. 413-414). AAPG: Tulsa, OK.

Huet, B.M., J.H. Prevost, and G.W. Scherer. 2010. Quantitative reactive transport modeling of Portland cement in $CO_2$-saturated water. International Journal of Greenhouse Gas Control 4: 561-574.

Huffman, A.R. 2002. The future of pressure prediction using geophysical methods. In Huffman, A.R., and G.L. Bowers (Eds.), Pressure regimes in sedimentary basins and their prediction, AAPG Memoir 76: 217-233.

Hyne, N.J. 2001. Nontechnical guide to petroleum geology, exploration, drilling, and production. Penwell: Tulsa, OK.

Ingram, G.M., J.L. Urai, and M.A. Naylor. 1997. Sealing processes and top seal assessment. In Moller-Pedersen, P., and A.G. Koestler (Eds.), Hydrocarbon seals: Importance for exploration and production (pp. 165-174). Norwegian Petroleum Society Special Publication 7, Elsevier.

Intergovernmental Panel on Climate Change (IPCC). 2005. IPCC Special report on carbon dioxide capture and storage. Metz, B., O. Davidson, H. de Coninck, M. Loos, and L. Meyer (Eds.). New York, NY: Cambridge University Press.

Jordan, P.W., and J.L. Hare. 2002. Locating abandoned wells: A comprehensive manual of methods and resource. Solution Mining Research Institute Report No. 2002-1-SMRI.

Kearey, P., M. Brooks, and I. Hill. 2002. An introduction to geophysical exploration (3rd ed.). Blackwell Science LTD. Cambridge University Press.

Kharaka, Y.K., W.D. Gunter, P.K. Aggarwal, E. Perkins, and J.D. Debraal. 1989. SOLMINEQ.88: A computer program for geochemical modeling of water-rock reactions. USGS Water-Resources Investigations Report 88-4227.

Knipe, R.J., G. Jones, and Q.J. Fisher. 1998. Faulting, fault sealing, and fluid flow in hydrocarbon reservoirs: An introduction. London, England: Geological Society Special Publications 147: vii-xxi.

Knipe, R.J., Q.J. Fisher, G. Jones, E. McAllister, D.T. Needham, R. Davies, M. Kay, E. Edwards, A. Li, J.R. Porter, S.J. Harris, J. Ellis, and N. Odling. 2001. Faulting and fault seal: Progress with prediction. Rock the Foundation Convention, June 18-22, 2001. Canadian Society of Petroleum Geologists 137-1 to 137-2.

Knödel, K., G. Lange, and H.J. Voigt. 2007. Environmental geology: Handbook of field methods and case studies. New York, NY: Springer-Verlag.

Krupka, K.M., K.J. Cantrell, and B.P. McGrail. 2010. Thermodynamic Data for Geochemical Modeling of Carbonate Reactions Associated with $CO_2$ Sequestration – Literature Review. Pacific Northwest National Laboratory, PNNL-19766. http://www.pnl.gov/main/publications/external/technical_reports/PNNL-19766.pdf.

LaFehr, T.R. 1992. The Gravity Method. In Morton-Thompson, D., and A.M. Woods (Eds.). AAPG Methods in Exploration Series, No. 10, Development Geology Reference Manual (pp. 411-412). AAPG: Tulsa, OK.

Lindeberg, E. 1997. Escape of $CO_2$ from aquifers. Energy Conversion and Management 38 (supplement): S235–S240.

Marini, L. 2007. Geologic Sequetration of Carbon Dioxide: Thermodynamics, Kinetics, and Reaction Path Modeling. Developments in Geochemistry 11. Elsevier: Amsterdam, the Netherlands.

Matthews, C.S., and D.G. Russell. Pressure Buildup and Flow Tests in Wells. Dallas, TX: SPE of AIME.

McAleese, S. 2000. Operational Aspects of Oil and Gas Well Testing. New York, NY: Elsevier.

Meckel, T.A. 2007. Considering faults in CCS. Presented at the Outreach Working Group (OWG) for the Regional Carbon Sequestration Partnerships, Teleconference June 14, 2007. GCCC Digital Publication Series #07-04.

Nagarajan, N.R., M.M. Honarpour, and K. Sampath. 2007. Reservoir fluid sampling and characterization – key to efficient reservoir management. JPT, August 2007, 80-91.

National Energy Technology Laboratory (NETL). 2009. Southwest Regional Partnership for Carbon Sequestration - Validation Phase. Project 443. http://www.netl.doe.gov/publications/factsheets/project/Proj443.pdf.

NETL. 2010. Site Screening, Selection, and Initial Characterization for Storage of $CO_2$ in Deep Geologic Formations. DOE/NETL-401/090808. http://www.netl.doe.gov/technologies/carbon_seq/refshelf/project%20portfolio/2011/BP-Manuals/BPM-SiteScreening.pdf.

Nelson, P.H., and M.L. Batzle. 2006. Single Phase Permeability. In Fanchi, J.R. (Ed.), Petroleum Engineering Handbook, Vol. I: General Engineering. Society of Petroleum Engineers.

Oldenburg, C.M, J.L. Lewicki, and R.P. Hepple. 2003. Near-Surface Monitoring Strategies for Geologic Carbon Dioxide Storage Verification. http://www.osti.gov/bridge/servlets/purl/840984-dTw752/native/840984.pdf.

Orange, A.S. 1992. Electrical Methods. In Morton-Thompson, D., and A.M. Woods (Eds.), AAPG Methods in Exploration Series, No. 10, Development Geology Reference Manual (pp. 417-419). AAPG: Tulsa, OK.

Palandri, J.L., and Y.K. Kharaka. 2004. A compilation of rate parameters of water-mineral interaction kinetics for application to geochemical modeling. U.S. Geological Survey Open File Report 2004-1068.

Parkhurst, D.L., D.C. Thorstenson, and L.N. Plummer. 1980. PHREEQE—A computer program for geochemical calculations. U.S. Geological Survey. Water Resources Investigations Report, 80-96 (Revised and reprinted August 1990).

Piper, A.M. 1944. A graphic procedure in the geochemical interpretation of water-analyses. Transactions of the American Geophysical Union 25: 914–923.

Smolen, J.J. 1992. Production Logging. In Morton-Thompson, D., and A.M. Woods (Eds.), AAPG Methods in Exploration Series, No. 10, Development Geology Reference Manual (pp. 488-491). AAPG: Tulsa, OK.

Streit, J.E., and R.R. Hillis. 2004. Estimating fault stability and sustainable fluid pressures for underground storage of $CO_2$ in porous rock. Energy 29: 1445-1456.

Streit, J.E., A.F. Siggins, and B.J. Evans. 2005. Chapter 6: Predicting and monitoring geomechanical efects of $CO_2$ injection. In Thomas, D.C., and S.M. Benson (Eds.), Carbon Dioxide Capture for Storage in Deep Geologic Formations, Volume 2. Elsevier.

Stiff, H.A. Jr. 1951. The interpretation of chemical water analysis by means of patterns. Journal of Petroleum Technology 3: 15-17.

Telford, W.M., L.P. Geldart, and R.E. Sheriff. 1990. Applied Geophysics. New York, NY: Press Syndicate of University of Cambridge.

Ugalde, H.A. Undated. On the use of high-resolution airborne magnetics (HRAM) to map and characterize major faults. Accessed September 7, 2010 at http://www.gemsys.ca/Students/Ugalde_H_High_Resolution.pdf.

U.S. Department of Energy (USDOE). 2008. Methodology for Development of Geologic Storage Estimates for Carbon Dioxide. Prepared for U.S. Department of Energy National Energy Technology Laboratory Carbon Sequestration Program. Prepared by Capacity and Fairways Subgroup of the Geologic Working Group of the DOE Regional Carbon Sequestration Partnerships. August 2008.

U.S. Environmental Protection Agency (USEPA). 1991. Handbook: Ground Water. Vol. 2. EPA 625690016B, July 1991. 152 p.

USEPA. 1992. RCRA Ground-Water Monitoring: Draft Technical Guidance. Office of Solid Waste, EPA/530- R-93- 001, PB93-139 350, Washington, DC.

USEPA. 1999. Step-Rate Test Procedure. EPA Region 8, Denver, CO. http://www.epa.gov/region8/water/uic/INFO-StepRateTest.pdf.

USEPA. 2003. The Nuts and Bolts of Falloff Testing. Sponsored by EPA Region 6. http://www.epa.gov/safewater/dwa/pdfs/2%20uic%20modules/dwaUIC-2003falloffseminar.pdf.

USEPA. 2010. General Technical Support Document for Injection and Geologic Sequestration of Carbon Dioxide: Subparts RR and UU. Greenhouse Gas Reporting Program. November 2010. http://www.epa.gov/ghgreporting/documents/pdf/2010/Subpart-RR-UU_TSD.pdf.

Vail, P.R., R.G. Todd, and J.B. Sangree. 1977. Seismic Stratigraphy and Global Changes of Sea Level: Part 5. Chronostratigraphic Significance of Seismic Reflections: Section 2. Application of Seismic Reflection Configuration to Stratigraphic Interpretation Memoir, 26: 99-116.

Watney, W.L., W.J. Guy, and A.P. Byrnes. 2001. Characterization of the Mississippian chat in south-central Kansas. AAPG Bulletin 85: 85-113.

Whitebay, L. 1992. Conventional Coring. In Morton-Thompson, D., and A.M. Woods (Eds.), AAPG Methods in Exploration Series, No. 10, Development Geology Reference Manual (pp. 115-118). AAPG: Tulsa, OK.

Wigand, M., J.P. Kaszuba, J.W. Carey, and W.K. Hollis. 2009. Geochemical effects of $CO_2$ sequestration on fractured wellbore cement at the cement/caprock interface. Chemical Geology 265: 122-133.

Wilt, M.J., D.L. Alumbaugh, H.F. Morrison, A. Becker, K.H. Lee, and M. Deszcz-Pan. 1995. Crosswell electromagnetic tomography: System design considerations and field results. Geophysics 60: 871-885.

Wolery, T.J. 1992. EQ3/EQ6, a software package for geochemical modeling of aqueous systems, package overview and installation guide (version 7.0). Lawrence Livermore National Laboratory Report UCRL-MA-110662.

Xu, T., J.A. Apps, and K. Pruess, K. 2005. Mineral sequestration of carbon dioxide in a sandstone-shale system. Chemical Geology 217: 295-318.

Xu, T., J.A. Apps, K. Pruess, and H. Yamamoto. 2007. Numerical modeling of injection and mineral trapping of $CO_2$ with $H_2S$ and $SO_2$ in a sandstone formation. Chemical Geology 242: 319-246.

Yielding, G., B. Freeman, and D.T. Needham. 1997. Quantitative fault seal prediction. AAPG Bulletin 81: 897-917.

Zoback, M.D., C.A. Barton, M. Brudy, D.A. Castillo, T. Finkbeiner, B.R. Grollimund, D.B. Moos, P. Peska, C.D. Ward, and D.J. Wipurt. 2003. Determination of stress orientation and magnitude in deep wells. International Journal of Rock Mechanics and Mining Sciences 40: 1049-1076.

# Appendix: Available Technologies and Methods for Conducting Required Site Characterization Activities

# Table of Contents

Appendix: Table of Contents ..... A-i

Appendix: List of Figures ..... A-ii

Appendix: List of Tables ..... A-iv

Introduction to the Appendix ..... A-v

A1. Information to Support Development of Maps and Cross Sections of the Area of Review, Determination of Formation Thickness, Illustration of Structural Geology, and Facies Analysis ..... A-1

A2. Information to Support Petrologic and Mineralogic Analyses ..... A-6

A3. Information to Support Submittal of Data on Porosity, Permeability, and Capillary Pressure of the Injection and Confining Zones ..... A-10

A4. Information to Support Geomechanical Characterization of the Confining Zone ..... A-21

A5. Information to Support Fault Stability Analysis and Analysis of Confining Zone Integrity ..... A-28

A6. Information to Support Geophysical Characterization ..... A-35

A7. Information to Support Demonstration of Storage Capacity ..... A-50

A8. Information to Support Pre-Injection Logging and Testing ..... A-68

# List of Figures

Figure A-1: Interpreted Cross Section ..... A-2
Figure A-2: Structural Cross Section of the Soan Syncline, Kohat-Potwar Geologic Province, Upper Indus Basin, Pakistan ..... A-3
Figure A-3: Dip Model of a Tilted Plunging Anticline as it would Appear on an Arrow Plot of Dipmeter ..... A-4
Figure A-4: Sandstone Cemented with Calcium Carbonate, Viewed under Crossed Polarizers ..... A-7
Figure A-5: Limestone With Fossil Fragments, Viewed under Crossed Polarizers ..... A-7
Figure A-6: Grains of Sand in a Shale Matrix, Viewed under Crossed Polarizers ..... A-7
Figure A-7: Schematic Illustration of an Extended Leak-off Test and Associated Terms ..... A-23
Figure A-8: Schematic Cross Section through Borehole ..... A-24
Figure A-9: Image Logs of a Well with Well Bore Breakouts ..... A-25
Figure A-10: Example Plot of Data Used for Estimating Frictional Limits (Petrel Sub-Basin, Australia) ..... A-26
Figure A-11: Example of a Regional Stress Map based on the Orientation of Well Bore Breakouts in Paleozoic Rocks the Western Canada Sedimentary Basin near Calgary ..... A-27
Figure A-12: Example Failure Plot Indicating Scenarios where Fault Reactivation is Possible ..... A-28
Figure A-13: Example Fault Slip Tendency Image ..... A-29
Figure A-14: Example Mohr Diagram ..... A-30
Figure A-15: An Isometric View of a Fault Plane ..... A-31
Figure A-16: Simplified Shale Smearing Along a Fault ..... A-32
Figure A-17: Sealing Capacity from Seismic Pore Pressure Images ..... A-33
Figure A-18: A Gravity Map of an Area Ore Deposit and Mine ..... A-42
Figure A-19: A Subsurface Cross Section of Electromagnetic Resistivity Data ..... A-44
Figure A-20: Permanently Installed ERT Array at the CO2SINK Pilot Site at Ketzin ..... A-46
Figure A-21: An Aerial Gravity Map ..... A-48
Figure A-22: Variation in Size and Resolution of Various Storage Capacities ..... A-51
Figure A-23: Vertical Interference or Pulse Test ..... A-54
Figure A-24: A Diagram Demonstrating Wetting Angle ..... A-56
Figure A-25: Capillary Pressure (Drainage and Imbibitions) as a Function of Wetting Phase Saturation ..... A-56

Figure A-26: Density of Carbon Dioxide as a Function of Depth ..... A-58
Figure A-27: A Schematic of the Skin Effect ..... A-61
Figure A-28: Example of Geophysical Well Logs ..... A-69
Figure A-29: Example Porosity Log, Including Density (Red) and Neutron (Blue) Logs, for the Cincinnati Arch Validation Test Well ..... A-72
Figure A-30: Example of Borehole Video Imaging Log Showing Formation Fractures ..... A-74

# List of Tables

Table A-1: Typical Permeability for Various Lithologies ..... A-13

Table A-2: Parameters and Data Needed to Define the Stress Tensor and the Geomechanical Model ..... A-21

Table A-3: Parameters and Methods for Quantifying Storage Capacity ..... A-52

Table A-4: Interpreting Borehole Condition from Caliper Readings ..... A-70

# Introduction

This Appendix provides background information on some of the activities that will be performed as part of site characterization for a GS project that meets the requirements of 40 CFR 146.82 and 40 CFR 146.87. The *UIC Program Class VI Well Site Characterization Guidance* assumes that owners or operators are familiar with many of the available techniques used in assessing proposed GS sites, and it focuses on how these techniques should be applied to meeting the Class VI Rule requirements. This Appendix presents additional information, including examples of the application of various techniques in GS or other scenarios, on certain activities that reviewers of the draft guidance suggested was too detailed for the guidance document. It also refers the reader to additional sources of published information that are publically available.

This Appendix includes the following sections:

- A1, Information to Support Development of Maps and Cross Sections of the Area of Review, Determination of Formation Thickness, Illustration of Structural Geology, and Facies Analysis, which augments Sections 2.3.1 and 2.3.3 of the guidance;
- A2, Information to Support Petrologic and Mineralogic Analysis, which supports Section 2.3.4 of the guidance;
- A3, Information to Support Submittal of Data on Porosity, Permeability, and Capillary Pressure of the Injection and Confining Zones, which supplements the information in Section 2.3.5 of the guidance;
- A4, Information to Support Geomechanical Characterization of the Confining Zone, which supports Section 2.3.6 of the guidance;
- A5, Information to Support Fault Stability Analysis and Analysis of Confining Zone Integrity, which provides additional information related to Sections 2.3.2 and 3.5 of the guidance;
- A6, Information to Support Geophysical Characterization, which provides additional information related to Section 2.3.10 of the guidance;
- A7, Information to Support Demonstration of Storage Capacity, which supplements Section 3.4 of the guidance; and
- A8, Information to Support Pre-Injection Logging and Testing, which relates to the information in Section 4.1 of the guidance.

# A1. Information to Support Development of Maps and Cross Sections of the Area of Review, Determination of Formation Thickness, Illustration of Structural Geology, and Facies Analysis

To support owners or operators as they compile and/or prepare maps and cross sections of the AoR, as required by the Class VI Rule at 40 CFR 146.82(a)(3)(i), the sections below provide background information on stratigraphic cross sections, structural cross sections, and dipmeter logs. This information also supports determination of formation thickness [40 CFR 146.82(a)(3)(iii)] and local structural geology [40 CFR 146.82(a)(3)(vi)]. Information is also provided on facies analysis; a description of facies changes is required at 40 CFR 146.82(a)(3)(iii), and owners or operators may elect to do a more thorough facies analysis to help in developing the site conceptual model. For additional information and recommendations regarding this information, please see Sections 2.3.1 and 3.1 of the guidance.

## Stratigraphic Cross Sections

Stratigraphic cross sections show characteristics of correlatable stratigraphic units relative to a chosen geologic layer, or datum. Cross sections can rely on and incorporate data from a variety of sources, including logs, seismic data, cores, and cuttings. Figure A-1 shows an example of a schematic stratigraphic cross section that also displays log data.

The choice of a datum (the level or reference horizon) is a key part of developing a stratigraphic cross section. By displaying geologic units relative to the datum, the stratigraphic cross section may illustrate geologic relationships as they existed at a previous time (i.e., prior to deformation). In many cases, an unconformity (such as a buried erosion surface) is used as a datum because unconformities often represent relatively uniform time horizons (Boak, 1992).

Stratigraphic cross sections may be produced with various orientations relative to structural features. Sections oriented perpendicular to the depositional strike show facies changes toward or away from the basin margin, while sections oriented parallel to the depositional strike show lateral variations of particular units or sequences (Boak, 1992; Evenick, 2008). Another common orientation is perpendicular to a fold axis or major fault (Groshong, 2006). Furthermore, while cross sections are normally presented perpendicular to the ground surface, only cross sections oriented perpendicular to the dip of the units will show the true bedding thickness (Groshong, 2006).

Cross sections can be checked for accuracy by restoring deformed strata to an original, undeformed state, where there are no gaps or overlaps between sedimentary layers. This technique may not be possible for complexly deformed areas and requires simplifying assumptions (such as consistent thickness) about the original depositional characteristics of the layers. In addition, this technique is not applicable to non-homogenous strata such as salt domes and reefs (Evenick, 2008).

Cross sections can be anchored or projected (Evenick, 2008). Anchored cross sections have direct well control; they are either pinned (have at least one well directly on the surface trace of

the cross section) or tied (the trace follows a line from well to well). While tied cross sections have the advantage of direct data, they often enhance out-of-plane features and distort the thickness and other properties of subsurface layers (Evenick, 2008).

Projected cross sections have no direct well control. Projected cross sections may be bounded or synthetic. Bounded cross sections have data projected from nearby wells, and synthetic sections are not based on direct data. Projection of data onto the trace should be done carefully to avoid introducing error. Common methods include along dip, with structural contours, and within dip domains (groups of dips). See Groshong (2006) for more information on projected cross sections.

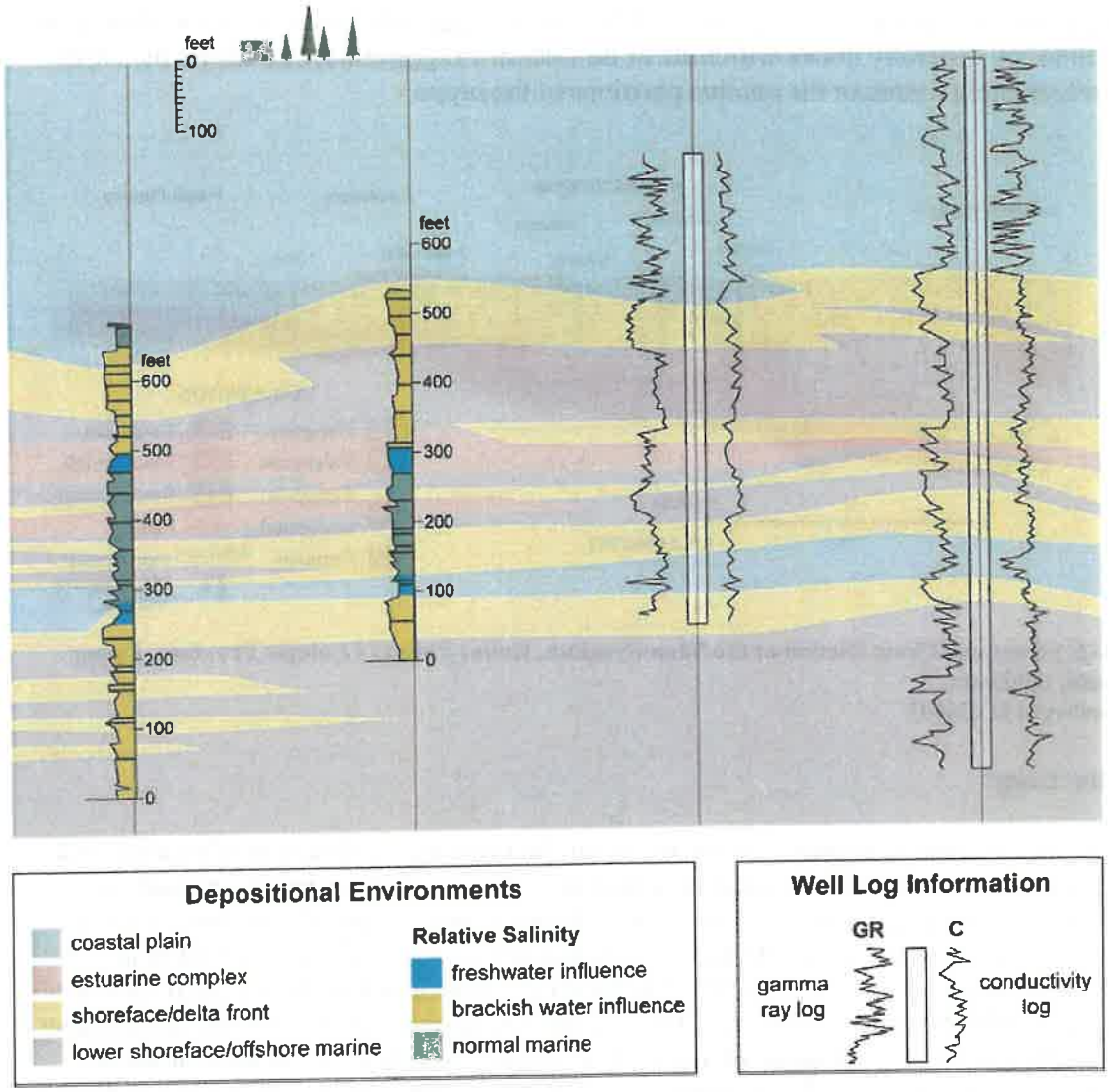



**Figure A-1: Interpreted Cross Section.**
Constructed from well log data. Distance scale is irregular to make the cross section more compact. Gamma ray logs are displayed to the left of the well, and conductivity is displayed to the right. From: Kirschbaum and Hettinger (2004).

## Structural Cross Sections

Structural cross sections illustrate the subsurface relationships and structural features of rock units. Cross sections are generally most useful when oriented perpendicular to major structural trends, although bends in the section can be used to show variable structural trends or other features (Boak, 1992). Additional smaller cross sections can be included to illustrate specific features such as faults. Structural cross sections may reference attached stratigraphic cross sections if correlations are difficult. Figure A-2 shows an example of a structural cross section.

Stratigraphic and structural cross sections are developed using similar methods. For a structural cross section, the datum is generally sea level, and units are drawn above or below that elevation according to their present positions (Boak, 1992). Unlike stratigraphic cross sections, structural cross sections are generally drawn with little or no vertical exaggeration; this allows the cross section to accurately represent the relative positions of the layers.

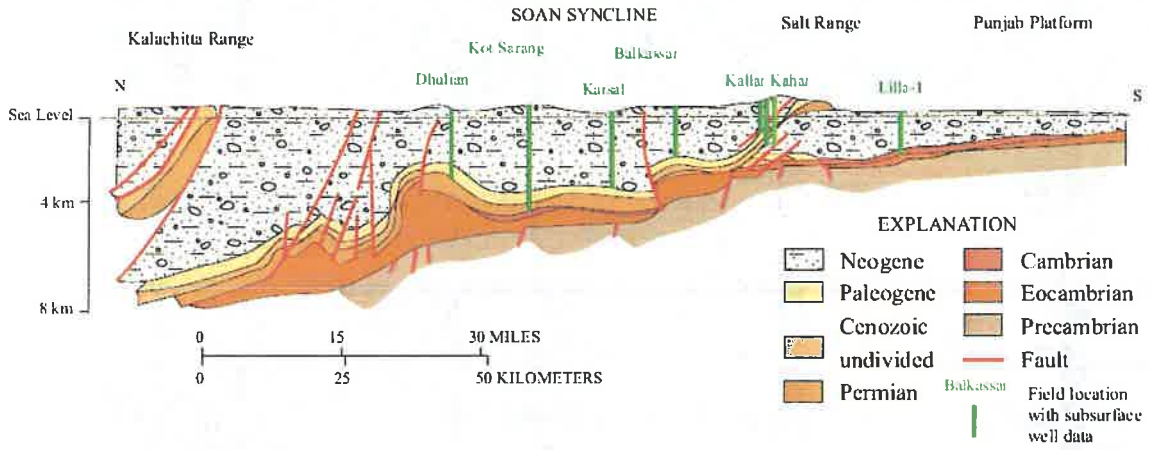



**Figure A-2: Structural Cross Section of the Soan Syncline, Kohat-Potwar Geologic Province, Upper Indus Basin, Pakistan.**
From: Wandrey et al. (2004).

## Dipmeter Logs

Dipmeters are designed to measure the dip of the stratum and the dip direction of layered rock surfaces that intersect the well. To generate a dipmeter reading, microresistivity sensors are mounted on a caliper logging tool. A minimum of three calipers is needed, but most modern dipmeters have six or more sensors to provide redundancy in case of failure, as well as to improve results (Johnson and Pile, 2006). The dip is calculated based on depth, the positions of the sensors, and the diameter of the well. If two or more sensors are present on the same caliper, small-scale features such as cross-bedding and directional sand transport can sometimes be identified (Johnson and Pile, 2006). Dipmeter logs can also be used to identify structural features such as faults and folds when compared to standard dip models such as the one shown in Figure A-3.

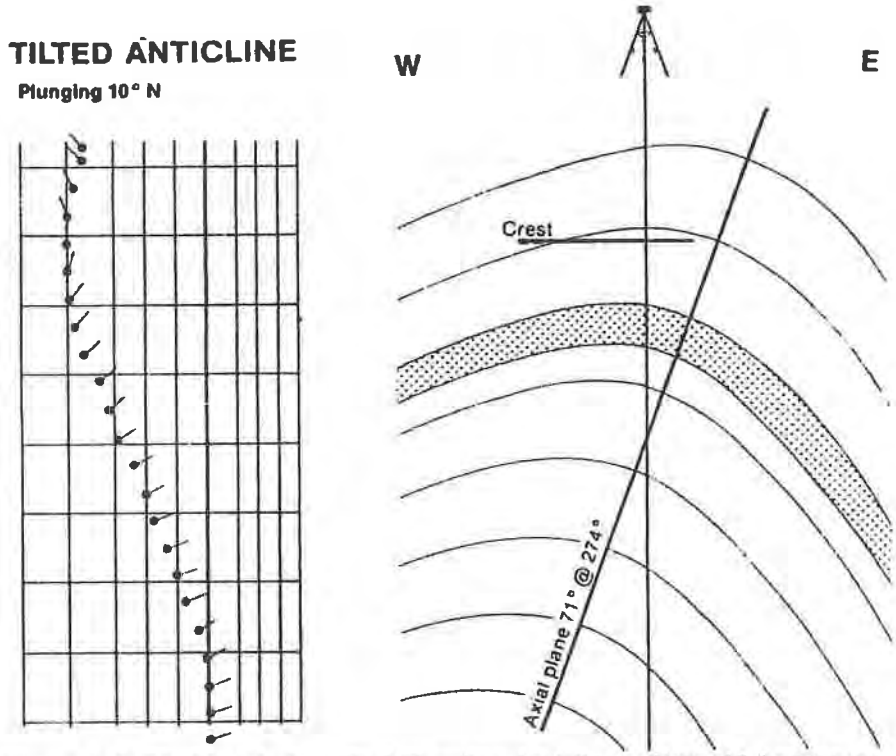



**Figure A-3: Dip Model of a Tilted Plunging Anticline as it would Appear on an Arrow Plot of Dipmeter.** From: Goetz, 1992; © American Association of Petroleum Geologists (AAPG) 1992, reprinted by permission of AAPG whose permission is required for further use.

## Facies Analysis

Facies analysis can inform conclusions about whether to expect good lateral connectivity within the formation and whether there are barriers to vertical connectivity. Ambrose et al. (2008) have discussed the importance of facies changes to GS projects. Beach and barrier island deposits, for example, tend to be homogeneous and continuous. Fluvial facies produce heterogeneity in the reservoir because the fluvial channels are associated with fine-grained floodplain deposits; this heterogeneity may produce more limited, poorly connected areas for carbon dioxide storage. In some settings (e.g., the GS project at Sleipner), mudstone layers serve as permeability barriers, forming baffles that limit the buildup of buoyant pressure in the injection formation (Chadwick et al., 2008).

Variable porosity/permeability distributions are related to grain sizes, facies changes, and variability in cementation (Norden et al., 2010), and a good facies model will be valuable for understanding these variations. However, some fine-grained deposits may also have high porosity and permeability. These grain size and facies variations cannot be used exclusively as an indicator of permeability. Furthermore, diagenetic (post-deposition) processes also govern the characteristics of formations, especially carbonates. Like descriptions of clastic systems, descriptions of carbonate facies are based on observations of rock fabrics and pore spaces from core and cutting samples. These descriptions are correlated with wireline log responses and other information to map porosity, saturation, and permeability (Lucia, 1992). Because the

characteristics of carbonates are often strongly (and sometimes completely) determined by the sediments' interactions with formation fluids, understanding current and past hydrogeology is also important in the analysis of carbonate facies.

A sequence stratigraphic approach focuses on surfaces (unconformities) that divide the sediments into chronostratigraphic units and allows strata to be correlated and then extrapolated to areas where data are lacking. Sequence stratigraphy is well established and is widely used in the oil and gas industry to characterize reservoirs and may be a useful approach for a GS project; it has already been used in the characterization of facies in some GS projects (e.g., Gibson-Poole et al., 2005). Additional information is available in the following sources: Lang et al. (2001); Van Wagoner et al. (1990); Posamentier and Allen (1999).

## A2. Information to Support Petrologic and Mineralogic Analyses

The Class VI Rule requires the owner or operator of a proposed Class VI injection well to submit data on the mineralogy of the injection and confining zone(s) [40 CFR 146.82(a)(3)(iii)]. This section provides background information on conducting petrologic and mineralogic analyses to support meeting this requirement, including analysis by polarized light microscopy, scanning electron microscopy, and XRD. For additional information and recommendations, see Section 2.3.4 of the guidance (Petrology and Mineralogy of the Injection and Confining Zones).

### Examples of Mineralogic and Petrologic Features Relevant to GS

The most common lithologic types in oil and gas reservoirs and deep saline formations are sandstone, limestone, and dolomite. The major minerals in sandstones include quartz and feldspar, with calcite (often as cement) and clay fines common as lesser components. Limestones and dolomites consist primarily of carbonate minerals (calcite, aragonite, dolomite). "Impure" limestones may have minor quartz grains, pyritic limestone contains pyrite, and argillaceous limestones contain clay components (Williams et al., 1982). Figures A-4 and A-5 show examples of thin sections of a sandstone and a fossiliferous limestone.

Shales and mudstones (clay-silt mixtures) will be common in the confining zones of GS projects. These lithologies consist of clay minerals and small particles of quartz, feldspar, and mica. Individual particles may be difficult to see by optical microscopy (Figure A-6), and, aside from general confirmation of the lithology and texture, limited information can be gained. If detailed information is desired, a scanning electron microscope (SEM) may be considered.

Some of the textural features that might be observed in thin sections and under SEM include cementation (secondary minerals providing cohesion to the rock), dissolution features (indicative of removal of minerals), pore size and shape, and the presence of fine clay minerals. For example, in Figure A-5, the carbonate cement can be seen infilling voids within the fossils and in between the fossil fragments. The extent of these features is integral to understanding porosity and permeability and for anticipating changes that may take place as a result of interactions between the injectate, native fluids, and formation solids.

The composition, grain size, grain shape, and sorting seen under a microscope can all be used to infer the depositional environment. This facies analysis can help in locating changes in physical parameters. For example, if grain size is seen to decrease upwards, a corresponding decrease in permeability may be seen. Such observations are considered a routine part of the determination of reservoir quality in the oil and gas field (e.g., Grier and Marschall, 1992) and would be valuable as part of storage formation characterization. A detailed discussion of the genesis, composition, and textures of rocks is also provided in Williams et al. (1982).

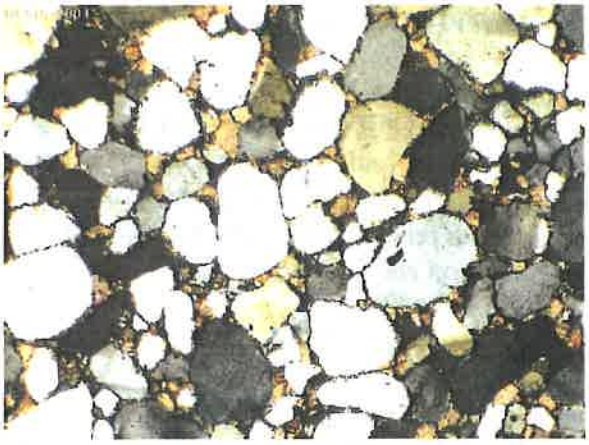


**Figure A-4: Sandstone Cemented with Calcium Carbonate, Viewed under Crossed Polarizers.**
Field of view is 3.5mm. The white and gray shapes are individual grains of sand, the tan in-between the sand grains is pore space filled with calcite cement. From: Univ. of Oxford (2010); © David Waters and the Department of Earth Sciences, University of Oxford, reproduced with permission.

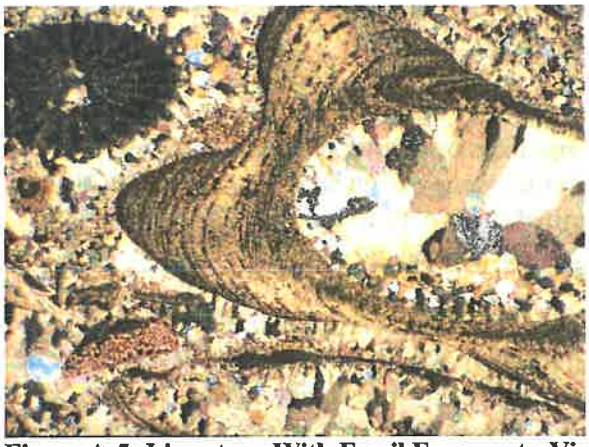


**Figure A-5: Limestone With Fossil Fragments, Viewed under Crossed Polarizers.**
Field of view is 3.5mm. The angular tan and blue shapes are calcite crystals filling in pore space. From: Univ. of Oxford (2010); © David Waters and the Department of Earth Sciences, University of Oxford, reproduced with permission.

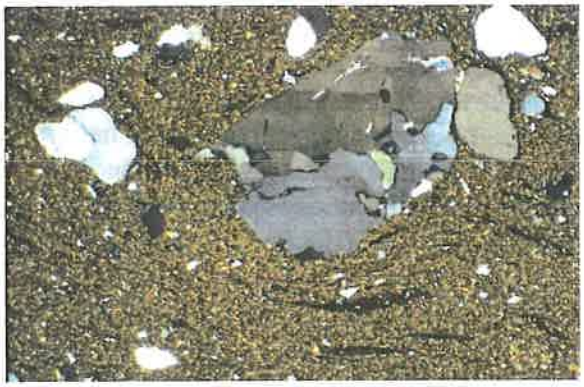


**Figure A-6: Grains of Sand in a Shale Matrix, Viewed under Crossed Polarizers.**
Field of view is 2mm tall. Quartz sand grains are gray and white. From: Schieber (2006); © Juergen Schieber, reproduced with permission.

## Analysis by Polarized Light Microscopy

The petrographic microscope is a fundamental tool for identifying and characterizing rock and mineral samples. Samples are prepared by mounting chips of the rock onto glass slides, cutting and grinding down to a thickness of 30 microns, and polishing. Poorly consolidated samples are often impregnated with epoxy prior to cutting them into chips.

A petrographic microscope is a transmitted light microscope designed for the examination of rock thin sections. It includes a rotating stage and polarizers both above and below the stage; the specimen is examined both with the upper polarizer in place ("crossed polarizers" or "crossed nicols") and with it removed ("plane polarized light"). When the upper polarizer is inserted, the vibration directions of the two polarizers are perpendicular. This arrangement takes advantage of the optical properties of minerals; those that are not isotropic have more than one index of refraction, and light passing through is split into separate rays with different velocities. Under crossed polarizers, the difference in the velocities produces interference colors, which helps with mineral identification when taken together with cleavage, shape, and other characteristics.

Petrographic microscopes have remained relatively unchanged in principle since their development in the late 1800s. Edwards (1916) and Kerr (1959) are examples of classic texts that are still available on the optical properties of minerals, descriptions of the petrographic microscope, and mineral identification using the microscope. Basic descriptions of petrographic microscopes are commonly available on the Internet.

Careful petrographic analysis can provide information about the minerals present, the relationships among them (e.g., overgrowths), textures, grain size, and weathering (e.g., rounded grains in a clastic sediment). Williams et al. (1982) provide details on the mineralogy and textures to be expected in different rock types and how they relate to rock formation.

## Scanning Electron Microscopy

SEM uses a beam of electrons instead of visible light, permitting much higher resolution and magnification than a petrographic microscope. The term "scanning" refers to the raster pattern used in moving the electron beam over the sample surface (similar to a television). The same thin sections prepared for light microscopy can be used in a scanning electron microscope. Also, unconsolidated samples can be prepared for analysis by mounting them onto a glass slide using adhesive.

The most common use of an SEM is for secondary electron imaging (SEI). In this mode, it produces a high resolution image of the sample surface with good depth of field. This function can image grain morphology and other features in loose samples affixed to a slide, but it is not appropriate for thin sections because they are polished flat. The oil and gas industry uses SEM in this capacity for assessment of reservoir quality (Grier and Marschall, 1992).

With thin sections, an SEM can be used in backscattered electron (BSE) mode. The signal from backscattered electrons depends on the atomic weight of the material being examined. Minerals are seen with different levels of brightness, with higher density minerals appearing brighter. This

can be helpful for distinguishing minerals that appear similar under light microscopy. The same types of textural relationships would be seen as with a petrographic microscope, but very fine grains such as clay minerals and other clay-sized particles can be identified, as can mineral coatings and cements. Also, an elemental analysis of the minerals can be obtained if the SEM is equipped for energy-dispersive X-ray spectroscopy or wavelength-dispersive X-ray spectroscopy. Such analyses are point measurements, allowing analysis of specific sections of a mineral grain or of cements and grain coatings. Energy-dispersive spectra can be quickly viewed during examination as a qualitative aid in mineral identification in addition to being used for quantitative analysis.

Images taken in BSE mode can be used in petrographic image analysis to calculate estimates of porosity, permeability, and capillary pressure based on 2D measurements (Welton, 2004).

### X-ray Diffraction

XRD may be useful for verification of mineralogy or identification of clay minerals. XRD helps to identify minerals based on structure rather than chemistry. The most common method for geologic samples is powder XRD, in which a slurry of the ground specimen is allowed to dry on a glass slide, which is then placed in the diffractometer. The sample is exposed to a beam of X-rays, which are diffracted by the various planes within the structure of the mineral. The angle of refraction for each plane is determined by Bragg's Law. During the analysis, a detector is moved through a range of angles relative to the sample and registers the angles at which X-rays are detected. The resulting pattern of X-ray peaks is used to identify the mineral. If multiple minerals are present, the patterns will be superimposed upon each other, and a qualitative estimate of the relative quantities of the minerals may be possible. XRD may be especially useful for identifying clay minerals, which are too fine to fully characterize by polarized light microscopy. Moore and Reynolds (1989) provide a thorough coverage of the theory and practice of XRD, with a focus on its application to clay minerals.

### Use of Mineralogic and Petrologic Information

Data on the characteristics of the solids in the injection and confining zone(s) can also support an evaluation of the potential for geochemical reactions between the carbon dioxide, brine, and minerals that may cause changes in geomechanical and operational parameters or result in mobilization of contaminants. Lowered pH in the near-well bore region would promote dissolution of any carbonate minerals and cements in the injection formation, and precipitation of carbonates may occur in the more distal regions where pH is higher. Such reactions may affect porosity, permeability, and injectivity (Cailly et al., 2005). The kinetics of the dissolution and precipitation of silicates in clastics are slower (Palandri and Kharaka, 2004); certain lithologies such as clean sandstones will be less reactive in a carbon dioxide-rich system. Certain reactive clays and mafic silicates, however, may provide cations for precipitation of authigenic carbonates. Relatively rapid formation of carbonates would be expected in basalts (McGrail et al., 2006). Sulfide minerals and iron oxides may be dissolved and can liberate metals. Thus, an accurate assessment of mineralogy is important for predictions of long-term effects of injection on the properties of the injection formation.

## A3. Information to Support Submittal of Data on Porosity, Permeability, and Capillary Pressure of the Injection and Confining Zones

Owners or operators must submit data on porosity, permeability, and capillary pressure of the injection and confining zones, per 40 CFR 146.82(a)(3)(iii). This section provides background information to support meeting this requirement. For recommendations on meeting this requirement, see Section 2.3.5 of the guidance on Porosity, Permeability, and Capillary Pressure of the Injection and Confining Zones. Additional information on capillary pressure is also provided in Section A8 of this Appendix.

### Porosity

#### Factors Affecting Measured Porosity

Porosity is controlled by many variables. In sedimentary rocks, porosity is a function of the packing, sorting, grain size, and grain shape of the individual particles as well as in situ stress (Cone and Kersey, 1992). Pore space can occur as space between grains, as micro-scale pores along grain surfaces or other boundaries (when spaces are less than 2 μm), or along fractures. It can also be controlled by dissolution features (typically in carbonates). In clastic rocks, intergranular pore space is generally the most significant, especially in loosely packed, medium to large grain well-sorted lithologies such as clean sandstones. Fractures are usually the most important contributors to porosity in non-sedimentary rocks although there are exceptions, e.g., vuggy basalts can have porosities up to 12% (Fetter, 1988). Clastic rocks on average have the highest porosity of any rock type, with sandstones having up to 40% pore space (Cone and Kersey, 1992). The porosity of carbonates varies widely but is usually between 5 and 25% (Cone and Kersey, 1992).

Shales, which generally are potential sealing formations, usually have higher porosity than sandstones upon deposition (up to 80%) but experience rapid decreases in porosity with burial compaction and additional diagenesis (Avseth et al., 2010). The mean porosity for over 100 samples of Devonian-age shale was 3.6–4.1%, with extremes of 1.2–7.6% when measured using helium gas resaturation (Davies et al., 1990). However, the study also noted difficulties in measuring shale porosity because low values may be near the resolving limit of some techniques and small pore size (averaging 0.05 μm in some shales (Soeder, 1988)) can complicate some techniques.

The method of sample collection can influence the measured porosity. For lithologies with greater than 30% porosity, samples collected with sidewall cores tend to yield porosity measurements that are below actual values by a few percentage points because of compaction during coring (Almon, 1992). Damage to samples collected with percussion methods can further distort results. For low porosity units, measured porosities can be over-represented because porosity is enhanced by damage that occurs during coring, while for high porosity formations, compaction and grain shattering can reduce measured porosity (Almon, 1992).

Igneous and metamorphic rocks usually have low porosities. However, some volcanic tuffs are very porous and pumice can have up to 87% absolute porosity (Fetter, 1988). Weathering can also greatly increase porosity of these lithologies; weathered ultramafic and plutonic rocks can have porosities up to 60% due to the breakdown of minerals such as mica (Fetter, 1988).

**Porosity Measurement**

***Field Methods***

In the field, neutron logs, density logs, and sonic logs are well-suited to help estimate porosity (Aguilera, 1992). Neutron logs can be used in cased or uncased wells. With this method, a neutron-emitting probe is lowered into a well, and neutrons are captured by the hydrogen atoms in trapped pore water, gas, and hydrocarbons and are re-emitted as gamma rays. The probe logs the total amount of gamma radiation and estimates the pore fluid volume. One downside to this method is that water bound to clays can over-represent porosity in shales, siltstones, and other clay-rich units. As a result, a neutron log is collected and processed with other logs such as density logs or gamma ray logs to ensure accuracy. Porosity values collected from neutron logs are also absolute porosity; space in isolated, disconnected vugs that is not available for fluid storage is captured in the measurement. Another potential problem is that the neutron log cannot be used to determine the type of pore fluid present, which may be an important consideration when determining total storage capacity and injectivity.

Density log data are collected using a sonde equipped with a source of gamma radiation and at least one gamma ray detector deployed in a well. As it enters the formation, the radiation is scattered according to bulk density. Porosity can be calculated from density log data if the lithology of the subsurface and the saturating fluid are known:

$$\textbf{Porosity} = \frac{(\rho_{matrix} - \rho_{bulk})}{(\rho_{matrix} - \rho_{fluid})} \qquad \text{Equation 1}$$

where $\rho_{matrix}$ is estimated based on the lithology (e.g. sandstone = 2.65 g/cm$^3$, limestone = 2.71 g/cm$^3$, and dolomite = 2.87 g/cm$^3$, etc.), $\rho_{bulk}$ is from the density log, and $\rho_{fluid}$ is estimated based on the salinity and hydrocarbon makeup of the saturating fluid (e.g. water = 1 g/cm$^3$, etc.) (Alberty, 1992a; Dewan, 1983).

Sonic logs measure the speed of sound in a formation. As a sonic probe is pulled up a well, it emits a sound wave and logs the time any reflected sonic waves arrive back at the receiver. If the lithology of the layer is known, the porosity can be deduced from deviation from the theoretical sonic travel time for a layer of the same lithology with zero porosity. The Wyllie time average method or the Raymer-Hunt-Gardner methods are two common methods used with sonic logs. Sonic logs work best when the pore fluid is water or brine. Additional descriptions of these logs are provided in Section A7.

### *Laboratory Methods*

Several laboratory methods are available to determine porosity. These methods provide values for effective porosity. However, there is no good laboratory method for determining absolute porosity. Because porosity is stress dependent, laboratory measurements should be taken at stress conditions similar to in situ conditions (Cone and Kersey, 1992). Furthermore, core samples represent point measurements. For reliable results, measurements are best made on a number of cores, and the applicant might consider submitting a statistical representation of measurements such as a variogram.

If an unaltered, fresh sample of the formation of interest is available, the summation method can be used. Gas, oil, water, and any other fluids are extracted from the rock using a vacuum or other method. The sum of extracted fluids is assumed to equal the sum of the pore space. This method is potentially problematic, however, because the sample is not cleaned and because core samples are often subject to damage (e.g., mud intrusion, etc.) during retrieval, which can displace pore fluids.

With a less pristine sample, a resaturation method can be used. First, the sample is cleaned and dried, which allows for the remediation of some damage incurred during drilling. Hydrocarbons are generally removed from samples using toluene. The sample is then heated until it maintains a constant weight. One potential problem with this method is that if brines are present, precipitation of salts can reduce the porosity (Cone and Kersey, 1992). If smectite, gypsum, or clay minerals are present, samples should be dried at 63° C and 45% humidity to prevent removal of structural water and damage to clay minerals (Cone and Kersey, 1992).

Once the sample remains at a constant weight, indicating that all fluids have been driven off, the sample is then saturated with either a liquid (usually water) or a gas. Helium is usually the gas of choice because it does not adhere to mineral surfaces and its small molecule size allows it to diffuse into micropores. If liquid resaturation is chosen, the sample is saturated with liquid and re-weighed. For rock samples with very small pore sizes, the choice of displacing and saturating fluid used during the porosity measurement may introduce variability into the final results because of the attraction between pore surfaces and displacing fluids. The amount of pore space is deduced from the density of the saturating liquid. In gas resaturation, the sample is placed in a confined volume and resaturated with gas from a referenced cell. The volume of pore space is determined from the change in the pressure in the reference cell through the ideal gas law ($pV = nRT$). Gas resaturation should not be used with vuggy or fractured samples.

Dry methods are also available. Thin sections of rocks made from core samples can be analyzed under a polarized light microscope or scanned and analyzed with specialized software (petrographic image analysis). Less commonly used laboratory methods to determine porosity include X-ray computerized tomography (CT scanning) and nuclear magnetic resonance imaging.

## Permeability

Permeability refers to the property of a porous medium to transmit fluids under a hydraulic gradient (USGS, 1989). Several physical factors can influence permeability. These include median pore size and connectivity of the pore space within the material (e.g., Bachu and Bennion, 2008). Grain size is also a significant factor; because all wetted grains have a boundary layer of fluid with a velocity of zero, more energy is expended in overcoming shear forces between the boundary layer and through fluids when the grain size is small (Schlumberger, 2006).

### Absolute (Intrinsic) Permeability

Absolute permeability, also known as intrinsic permeability, is the permeability of a material when only one fluid is present. It is dependent only on the properties of the material and not the fluid. Absolute permeability can be calculated from laboratory analyses of a core sample as:

$$\textbf{Absolute Permeability} = \frac{Q\mu L}{A_f \times (p_2 - p_1)} \qquad \text{Equation 2}$$

where $Q$ is the flow rate through the core, $\mu$ is the fluid viscosity, $L$ is the length of the core, $A_f$ is the cross sectional area of the core, and $(p_2\text{-}p_1)$ is the pressure difference on either side of the core. Permeability values of different lithologies can vary by orders of magnitude (Table A-1), with salts and shales typically exhibiting lower permeability values and sandstones having the highest values.

**Table A-1: Typical Permeability for Various Lithologies.**
From: Davis (1988).

| Lithology | Permeability (mD) |
|---|---|
| Shale (unfractured) | $4.7 \times 10^{-5}$ |
| Sandstone | 3.8-4,740 |
| Coal | 334 |
| Salt | $9.61 \times 10^{-5}$ |

Because geologic materials are inherently heterogeneous, absolute permeability will vary spatially. Furthermore, permeability is an anisotropic property that varies in the x, y, and z directions and typically shows the greatest variation in the direction perpendicular to layering. For the computational modeling performed for AoR delineation, a realistic representation of the permeability distribution is needed. Approaches for handling the distribution of permeability, including geostatistical approaches are discussed below and in Section 2 of the *UIC Program Class VI Well Area of Review Evaluation and Corrective Action Guidance*.

**Effective Permeability**

Effective permeability measures the permeability of a material to one fluid when more than one fluid phase is present (such as carbon dioxide in brine or oil). In addition to pore size distribution, effective permeability is affected by the relative saturation of fluids within a material and the interfacial tension (IFT) between the fluids (Bachu and Bennion, 2008). Because IFT is influenced by in situ conditions such as pressure and temperature, these variables can also influence effective permeability. Due to its dependence on the IFT and the relative saturation of fluids, effective permeability in a GS project is expected to vary spatially and temporally as the pressure and distribution of brine and carbon dioxide change.

**Relative Permeability**

Relative permeability is the dimensionless ratio of the effective permeability to absolute permeability. It varies from 0 to 1. Relative permeability is relevant to site characterization for GS because one phase or fluid can inhibit or facilitate the preferential flow of another phase or fluid. Because relative permeability varies with the relative saturations of the fluids, it may be expressed as a relative permeability-saturation function for incorporation into computational modeling. See the *UIC Program Class VI Well Area of Review Evaluation and Corrective Action Guidance* for more information. Relative permeability has been studied extensively due to its importance in hydrocarbon extraction (Schlumberger, 2006). For GS, changes in the relative permeability may result in improved or reduced injectivity into reservoir rocks and/or improved or reduced sealing capacity for confining formations.

Many mathematical methods for obtaining relative permeability are available. One of the simplest is the Pirson model, which uses the saturation of the wetting phase before and after drainage of a core sample to determine the relative permeability of the wetting phase:

$$K_{r(i)} = S_i^3 \left[\frac{(S_i - S_{ir})}{(1 - S_{ir})}\right]^{1.5} \qquad \text{Equation 3}$$

where $S_i$ and $S_{ir}$ are the initial saturation and residual saturation of the fluid.

Relative permeability measured in the laboratory is often found to depend on many factors, including pore size and IFT, which in turn depends on in situ pressure, temperature, overburden pressure, wettability, and salinity conditions (Bachu and Bennion, 2008; Hawkins, 1992). A lower IFT encourages the transport of the non-wetting phase through the pore space, leading to an increase in the relative permeability. Hysteresis effects may also influence relative permeability (Hawkins, 1992). This may be important for fields with previous water and carbon dioxide flooding histories or if injection of carbon dioxide is not done at a constant rate.

Permeability data for several different fluids/mixtures within the reservoir may be needed to fully characterize behavior of the injectate at carbon dioxide storage sites as injection progresses. These fluids/mixtures are:

- Brine, hydrocarbon, or other initial reservoir fluid;

- Carbon dioxide/reservoir fluid mixture; and
- Pure carbon dioxide.

Initially, the permeability depends only on the behavior of the reservoir fluid. Next, permeability becomes dependent on a mixture of two or more liquids as injectate is introduced into the reservoir. Bachu and Bennion (2008) found that the permeability of sandstone, carbonate, and shale core samples taken from a typical intracratonic sedimentary basin to carbon dioxide at irreducible water conditions was one-fifth that of brine at 100% brine conditions for lithologies with permeabilities greater than 1 mD.

As large volumes of carbon dioxide are injected, a new zone may form near the injection well as the carbon dioxide saturation increases and the reservoir fluid is completely displaced. Once again, the permeability is dependent on a single fluid: this time the injected carbon dioxide as opposed to the native reservoir fluid. This zone is called the "dry-out" zone. Salts will precipitate out of the migrating brines, potentially decreasing permeability (Burton et al., 2009). However, the presence of a dry-out zone may increase injectivity because the effective permeability (the product of intrinsic and relative permeability) of carbon dioxide in the dry-out zone exceeds the effective permeability of carbon dioxide in the two-phase region (Burton et al., 2009).

**Measuring Permeability**

Permeability can be quantified using in situ field measurement techniques (e.g., well tests, well logging) or laboratory methods (using cores). Unlike other parameters (e.g., viscosity, temperature, pressure), permeability is calculated indirectly from values derived from other measurements (e.g., capillary pressure, IFT). As a consequence, permeability can vary depending on the method used. Additional discussion is provided below.

It should be noted that permeability measurements can differ by scale. Well tests are representative of a much greater area (scale) than core samples, which represent a much smaller scale (sampling point) (Ellis and Singer, 2007). As such, well testing tends to provide composite representations of localized variability. Permeability derived from well logs represents an intermediate scale between core logs and well tests.

***Field Methods***

Permeability can be estimated in situ using a variety of methods. Pressure changes during drawdown tests can be analyzed quantitatively or, if multiple wells are available, variable flow test analysis can be used to determine permeability provided that the reservoir pressure, flowing bottomhole pressure, flow rates, and the total time of the test are known (Smolen, 1992; Matthews and Russell, 1967).

The absolute permeability can also be determined from the hydraulic conductivity (Lewis et al., 2006) using the relationship:

$$\textbf{Absolute Permeability} = \frac{K\mu}{\rho g} \qquad \text{Equation 4}$$

where $K$ is the hydraulic conductivity, $\mu$ is the dynamic viscosity of the liquid, $\rho$ is the density of the liquid, and $g$ is the acceleration due to gravity.

An important consideration in field measurements pertains to the effective permeability of the existing well bores. Gasda et al. (2008) present a method to determine the permeability of the near-well bore region, which may differ due to damage during drilling (skin effect), using the pressure in units above and below confining formations. The method can identify permeability along the well bore even when it is greater than reservoir permeability. Additional discussion of skin effects is provided later in this Appendix (Section A8).

Permeability can also be estimated from well log data. This is accomplished with an estimator of porosity such as a density log. Several empirical approaches have been developed to relate porosity, resistivity, and other parameters (e.g., irreducible water saturation) to permeability, with early work starting in the 1920s. Some empirical relationships are more suitable for certain rock types or textures; a summary and comparison of the various empirical methods are given by Balan et al. (1995). Nelson and Batzle (2006) also provide a description of methods for permeability estimation from well logs. These include multiple linear regression approaches using porosity and other variables and involve dividing the formation into zones with different lithologies, compositions, and flow histories.

### *Laboratory Methods*

#### *Absolute Permeability*

Permeability measurements in the laboratory can be conducted with water, brines, gases, or other fluids when core samples are available. However, determining permeability from downhole cores may be difficult if damage has occurred during drilling. Permeability in core material can be reduced by as much as 80% due to the infiltration of mud, fine material, or other particles into the pore spaces of the core. Plug samples taken from the center of the core may be the best way to avoid such damage and generate a representative measure of permeability. Sandblasting the outside of whole-core samples may remove some built-up fines and improve results, but it cannot remediate mud that may have worked into the pores (Almon, 1992). Permeability can also be measured from sidewall cores. However, sidewall permeability measurements are often erroneously high for hard, dense formations because of grain shattering and other damage during the coring and extraction of the side wall core. Conversely, permeability measurements taken from sidewall cores for loose, friable (crumbly) formations are often erroneously low due to grain shattering introducing fines into pore spaces (Almon, 1992).

Once an appropriate lithologic sample has been isolated, it can be analyzed. The most common laboratory methods involve isolating a sample of core in a non-permeable sleeve while injecting a fluid material into the core. Measurements taken using a single fluid yield information on absolute permeability. Lead sleeves are often used because traditional sleeve materials allow the diffusion of carbon dioxide across the sleeve. Also, lead sleeves transfer pressure radially throughout the core if experiments are conducted at in situ pressure conditions.

Gas (air) and brine are the most common fluids used for injection in conducting permeability tests. Gas permeability is the industry standard for hydrocarbon exploration because it is the easiest to produce. While gas and brine tests produce similar permeability results when permeability is high, gas permeability tends to be higher when the permeability is low because frequent collisions of gas molecules with the pore walls help propel the gas molecules forward. Gas methods are also corrected for gas slippage effects at low pressures and inertial effects at high pressures (Ohen and Kersey, 1992).

The pressure difference across the core after the flow has stabilized can be transformed into a permeability measurement using a modified version of Darcy's Law. A non-steady-state variant of this method measures the gas pressure decay across the core. Non-steady-state methods usually produce more accurate results. Experiments can be conducted in a temperature controlled environment to simulate reservoir conditions when measuring effective permeability.

When permeability is measured from a whole core, measurements are usually reported in two directions: one parallel to the major fracture planes and other at 90 degrees perpendicular to this direction (Almon, 1992). Measurements may also be needed along the core in order to gain a representative understanding of permeability within the unit.

*Relative Permeability*

Although both effective and relative permeability can be measured in the laboratory, relative permeability is more commonly measured and reported (Abaci et al., 1992; Ahmed, 2006). Several methods are available. One common method uses a setup similar to absolute permeability methods except that after initial saturation and pressure equilibration, a second fluid is introduced and driven though the sample until the saturation and pressure differential across the sample returns to a constant value. A faster alternative is the unsteady-state method, in which a stream of gas is injected into a sample to displace a liquid. However, mathematical calculations are more complex when using the unsteady-state method.

Several types of corrections have been applied to core data. The Klinkenberg correction, which is important for low-permeability rocks, relates permeability for liquids to gas permeability. The pore fluid chemistry, especially salinity, may also affect permeability. Another type of adjustment is a correction for the dependence of permeability on pressure. For example, unconsolidated rocks can collapse, reducing permeability. These corrections are described by Nelson and Batzle (2006).

**Petrographic Image Analysis**

Petrographic image analysis (PIA) is an established method employed in the oil and gas industry to derive 3D petrophysical properties (porosity, capillary pressure, permeability, relative permeability) from 2D measurements of pore size and geometry. It can be used for characterization of sandstones, carbonates, and conglomerates, and it is inexpensive and rapid (Gies, 1993).

To collect PIA data, standard petrographic thin sections are viewed under a petrographic microscope or SEM in backscatter mode (BSE), and the images are stored and analyzed using image analysis software. The sample will need to have been impregnated with epoxy to fill the pore spaces prior to making the thin section. If light microscopy is to be used, adding dye to the epoxy will make pore spaces easily visible and will facilitate the image analysis. In BSE images, the pore spaces will be darker grey than the mineral grains. During image measurement, a number of fields of view on the thin section will be examined to obtain a representative sampling of pore spaces. The number of images needed may vary according to the rock type and magnification (Solymar and Fabricius, 1999). The images allow quantification of the number, size, and structures of pores. Macroporosity can be determined, and, with the high magnification and excellent resolution achievable with SEM, microporosity can also be determined. Pore size distribution can be measured, as well as pore circumference and area. These properties can be used to estimate capillary pressure and permeability. Capillary pressure can be expressed as a function of porosity, pore perimeter, and pore surface (Cerepi et al., 2001). Permeability can be derived using the Carman-Kozeny model (Cerepi et al., 2001; Solymar and Fabricius, 1999), which relates permeability to the porosity, the pore area, and pore perimeter. Cerepi et al. (2001) have also evaluated an alternate model for permeability ("bundle of capillary tubes"), but achieved better results using the Carman-Kozeny model.

PIA has been found to produce porosity values that agree closely with data from other methods (core analysis, wireline logs data, petrographic methods) (Layman, 2004). With respect to permeability, Solymar and Fabricius (1999) found that PIA tends to yield higher values than measurements of liquid permeability. This method has become well established, and additional literature is available that further explores the basis of PIA methods and the relationship between PIA-derived parameters and those measured in the laboratory.

### Other Permeability Estimation Methods Based on Petrophysical Data

In addition to the Carman-Kozeny model noted above, there are several equations that make use of the results of petrophysical analysis, including information that can be gained from PIA. Krumbein and Monk's equation uses mean grain diameter and the standard deviation of grain diameter (an indication of sorting). Berg's model links grain size, shape, and sorting to permeability. Van Baaren's model is an empirical variation on the Carmen-Kozeny model and is similar to Berg's (Nelson and Batzle, 2006).

Some models are based on pore dimension and use capillary pressure and pore size. For example, Winland's equation relates permeability to porosity and capillary pressure. Katz and Thompson's equation addresses the influence of pore structure on flow properties. Details are provided by Nelson and Batzle (2006).

### Geostatistical Methods

Analyses of formation properties such as porosity and permeability from logs or core samples provide point measurements that cannot fully capture subsurface variability. However, representation of the distribution of porosity and permeability is valuable for the multiphase modeling required for AoR delineation under 40 CFR 146.84. Subsurface heterogeneity is

difficult to represent using conventional models, and if adequate data are available, owners or operators may consider use of geostatistical approaches such as semivariograms, kriging, and stochastic simulations to estimate porosity and permeability distributions at the project site:

- *Semivariograms* characterize spatial correlations and are developed from field measurements. A semivariogram model can then be fit to an empirical semivariogram. A number of semivariogram models exist including nugget, spherical, exponential, Gaussian, and power models. Individual models or combinations of models may be fit to the data;
- *Kriging* and stochastic (see next bullet point) methods may be used to estimate parameter values at unsampled locations once a semivariogram model has been developed. Kriging is an interpolation method that calculates a statistically unbiased, best-fit estimate at each point, accounting for the hard data values and the correlations between the data. Kriging results are artificially smooth because the variability between estimated locations is not considered (Khan, 2003); and
- *Stochastic simulation* is a probabilistic approach that generates multiple, equally probable realizations of a variable. The result from this method is not a single best answer, but a range of possible outcomes. Examples of stochastic simulations include Monte Carlo and Sequential Gaussian Simulation. Stochastic simulations can also be employed after kriging to correct for the artificially smooth output from kriging (Khan, 2003).

Though geostatistical methods may be helpful for approximating parameter values at unsampled locations, the results may not always accurately capture the complexities of the subsurface geologic heterogeneities such as faults, lenses, and varying lithologies. Geostatistical methods are optimal when the data are normally distributed and stationary (i.e., mean and variance do not vary significantly in space). To improve the results, a number of alternative methods have been proposed for use in combination with geostatistics, including the coupled Markov chain (Park et al., 2003) and the use of artificial neural networks (ANN) (Wang and Wong, 1999). Owners or operators may also consider using cross-validation to validate the modeling results (Malvic, 2005).

## Capillary Pressure

Several established methods are available for measurement of capillary pressure:

- *Mercury injection* - a dried core sample is injected with mercury in increasing pressure steps up to 60,000 psi. The pressure versus the mercury saturation is measured. This method is quicker than some of the other methods and can achieve much higher pressures. The disadvantages are that it uses mercury, and results need to be extrapolated to reservoir fluids. This method is effective for measuring pore throat size distributions, although not as effective for measuring capillary pressure in some formations such as tight sands;
- *Centrifuge* - core samples are centrifuged and the fluid forced out is measured. This test is relatively rapid, taking hours instead of days or longer. It can be performed at reservoir temperatures and pressures. The disadvantage is that this test has a maximum pressure

limit that is lower than mercury injection. Additionally, there may be cavitation if the capillary pressure is greater than atmospheric pressure. However, this test is well suited for poorly consolidated samples;.

- *Porous plate* - a porous membrane is used, and pressure is increased with a fluid. The pressure required to displace the pore fluid is measured. This method offers the advantage of using native fluids and does not require cleaning or drying of the cores. It can test a lower maximum pressure than mercury injection, and it is well suited for shales and clays. However, samples need to reach equilibrium, which can result in test lengths of days to weeks; and
- *Restored state cell* - the sample is initially saturated with brine. A non-wetting fluid is then introduced in small pressure steps. The pressure is increased until no more water is released. This method has the advantage that the electrical properties of the fluid can be measured as well. Furthermore, native fluids can be used. However, the disadvantage is that it takes longer than the centrifuge or mercury tests.

Newer techniques such as nuclear magnetic resonance and a vapor deposition technique may also be considered.

## A4. Information to Support Geomechanical Characterization of the Confining Zone

The Class VI Rule requires geomechanical information to be submitted on fractures, stress, ductility, rock strength, and in situ fluid pressures within the confining zone [40 CFR 146.82(a)(iv)]. This section provides background information for understanding in situ fluid pressure and downhole stresses; this information supplements Section 2.3.6 of the guidance on Geomechanical Characterization. Data on pore pressure and stress data may also be used for analysis of fault stability (see Section A5 below and Section 2.3.2 of the guidance). References and methods are summarized in Table A-2.

**Table A-2: Parameters and Data Needed to Define the Stress Tensor and the Geomechanical Model.** After Chiaramonte et al. (2008).

| Parameter | Data Collection Methods | Additional Information |
|---|---|---|
| Pore pressure | Measurement of downhole pressure by drill stem testing and production testing | Smolen (1992); Borah (1992); Lancaster (1992); Harrison & Chauvel (2007) |
| Vertical stress ($S_v$) | Integration of density logs over the desired depth | Zoback et al. (2003); Chiaramonte et al. (2008); Streit et al. (2005); Herring (1992) |
| Minimum horizontal stress ($S_{hmin}$) | Leak-off tests (LOT), Extended LOT (XLOT) | Chiaramonte et al. (2008); Zoback et al. (2003); Streit et al. (2005) |
| Maximum horizontal stress ($S_{Hmax}$) | Modeling well bore failure features such as drilling-induced tensile fractures (if $S_v$, $S_{hmin}$ and pore pressure values are known) or stress-induced well bore breakouts (if $S_v$, $S_{hmin}$, pore pressure, and the rock strength are known) | Moos & Zoback (1990); Goetz (1992); Streit & Hillis (2004); Zoback et al. (2003); Streit et al. (2005) |

### Pore Pressure

Pore pressure can be measured by formation testers or by performing drill stem tests. Formation testers are specialty wireline tools used for measuring the pressure of the formation in an open hole (Smolen, 1992). In drill stem testing, the formation pressure is measured by sealing the zone of interest with well bore packers (Borah, 1992). After completing the well, additional pressure testing can be conducted by production testing such as single-point, multi-point, and swab testing (Lancaster, 1992). Bottomhole pressure may also be measured by pressure transducers. Transducers convert a pressure change into a mechanical displacement or deformation, which is then converted into an electrical signal (Harrison and Chauvel, 2007). Additional information regarding types of pressure transducers is available in Harrison and Chauvel (2007) and from commercial manufacturers as well as in the *UIC Program Class VI Well Testing and Monitoring Guidance*.

## In Situ Stress Determination

The three principal stresses commonly assumed to characterize the geomechanical model of a site at depth are the vertical stress, $S_v$, the maximum horizontal stress, $S_{Hmax}$, and the minimum horizontal stress, $S_{hmin}$ (Zoback et al., 2003; Streit et al., 2005). Fault slip occurs in normal faulting regions (gravity-driven faulting) when the minimum stress reaches a low value relative to the vertical stress ($S_v \geq S_{Hmax} \geq S_{hmin}$); folding and reverse faulting can occur in compressive stress fields when both of the horizontal stresses exceed the vertical stress and the maximum horizontal stress is sufficiently large relative to the vertical stress ($S_{Hmax} \geq S_{hmin} \geq S_v$); and strike-slip faulting occurs when the difference between $S_{Hmax}$ and $S_{hmin}$ is sufficiently large ($S_{Hmax} \geq S_v \geq S_{hmin}$) (Zoback et al., 2003).

The magnitude and orientation of the vertical stress, the minimum horizontal stress, and the maximum horizontal stress can be determined from drilling data and well logs. Methods for quantifying the magnitude and orientation of these principal stresses are summarized below.

### Vertical Stress

Vertical (orientation) stress ($S_v$) can be obtained from density logs (Zoback et al., 2003). The magnitude of $S_v$ can be obtained by integrating data collected from density logs over depth. Density logs measure the bulk density of the rocks in the well bore walls through gamma ray emissions (Chiaramonte et al., 2008; Herring, 1992; Streit et al., 2005). Vertical stress at the depth of interest can be calculated by the following equation (Chiaramonte et al., 2008; Streit et al., 2005; Zoback et al., 2003):

$$S_v(z_0) = \int_0^{z_0} \rho g dz \qquad \text{Equation 5}$$

where $z_0$ is the depth of interest. In some cases (e.g., offshore wells), the analyst needs to account for the lower density of the water column and the transition to higher density with depth when evaluating the magnitude of vertical stress (Zoback et al., 2003). Additional editing and extrapolation of data may be necessary; for example, when borehole conditions are unfavorable and density data exhibit high levels of variability (Zoback et al., 2003).

### Minimum Horizontal Stress

The magnitude of the minimum horizontal stress ($S_{hmin}$) in normal and strike-slip faulting regions can be determined with considerable accuracy through direct in situ formation stress tests (see Zoback et al., 2003). For deep wells where conventional in situ formation stress tests are not available, information about $S_{hmin}$ can be collected by leak-off tests. A leak-off test is conducted by pumping into a well at a constant rate and recording the well bore pressure as a function of cumulative volume (or time if pumped at a constant rate). As described by Zoback et al. (2003), the pressure will increase linearly with volume (or time) until a distinct departure from a linear increase occurs (leak-off point or LOP) (Figure A-7). As pumping continues at constant rate, the maximum pressure reached is termed the formation breakdown pressure (FBP) and the pressure

then falls below the FBP to a relatively constant value called the fracture pumping pressure (FPP). The FPP value should be similar to the LOP.

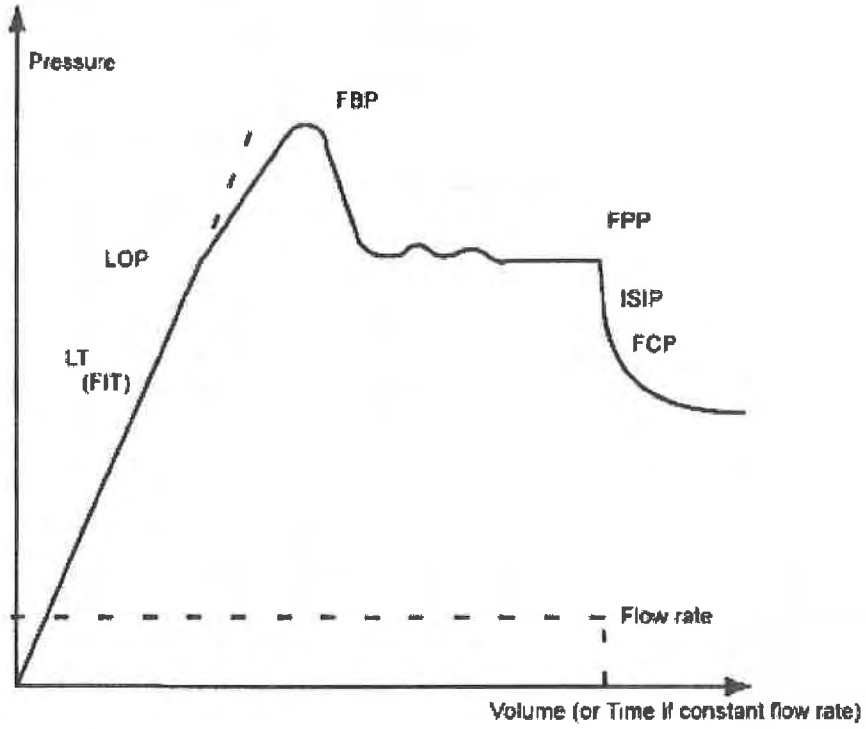



**Figure A-7: Schematic Illustration of an Extended Leak-off Test and Associated Terms.**
Where: LT= Limit Test; LOP= Leak-Off Point; FIT= Formation Integrity Test; FBP= Formation Break-down Pressure; FPP= Fracture Pumping Pressure; ISIP= Instantaneous Shut-in Pressure; FCP= Fracture Closure Pressure. From: Zoback et al. (2003); © Elsevier, reproduced with permission.

The extent that leak-off tests can be used to estimate $S_{hmin}$ can be assessed by evaluating the data collected. Zoback et al. (2003) noted that test data that show that the leak-off point was reached can be considered "an approximate measure" of $S_{hmin}$. Further, Zoback et al. (2003) noted that, if the test data shows that a stable FPP was achieved, the test can be considered "a good measure" of $S_{hmin}$. Chiaramonte et al. (2008) described the use of information from leak-off tests to determine the fracture pressure limit of the confining zone at the Teapot Dome oil field in Wyoming.

Another technique, which uses annular pressure measurements during drilling operations, is described by Zoback et al. (2003) as a potential method for estimating the magnitude of $S_{hmin}$.

### Maximum Horizontal Stress

In addition to the use of in situ stress testing, the magnitude of the maximum horizontal stress ($S_{Hmax}$) can be estimated based on knowledge of the vertical stress, $S_v$, and the minimum horizontal stress, $S_{hmin}$. The stress polygon method, as described by Zoback et al. (2003), can be used to estimate possible $S_{Hmax}$ values associated with normal-gravity, reverse faulting, and

strike-slip faulting environments, given the pore pressure at depth and available results of in situ formation stress tests or leak-off tests. Chiaramonte et al. (2008) applied the polygon method at the Teapot Dome oil field in Wyoming.

The orientation of $S_{Hmax}$ can be determined from the orientation of borehole breakouts and drilling-induced tensile fractures. Borehole breakouts and drilling-induced tensile fractures can form in the well bore during drilling operations. Zoback et al. (2003) provide a theoretical discussion of effective stresses acting in a vertical well bore. Streit et al. (2005) provide an illustration of the occurrence of well bore breakouts (formation loss in the area of minimum horizontal stress) and drilling-induced tensile fractures (along the axis of maximum horizontal stress) in a borehole relative to the orientation of maximum and minimum horizontal stresses.

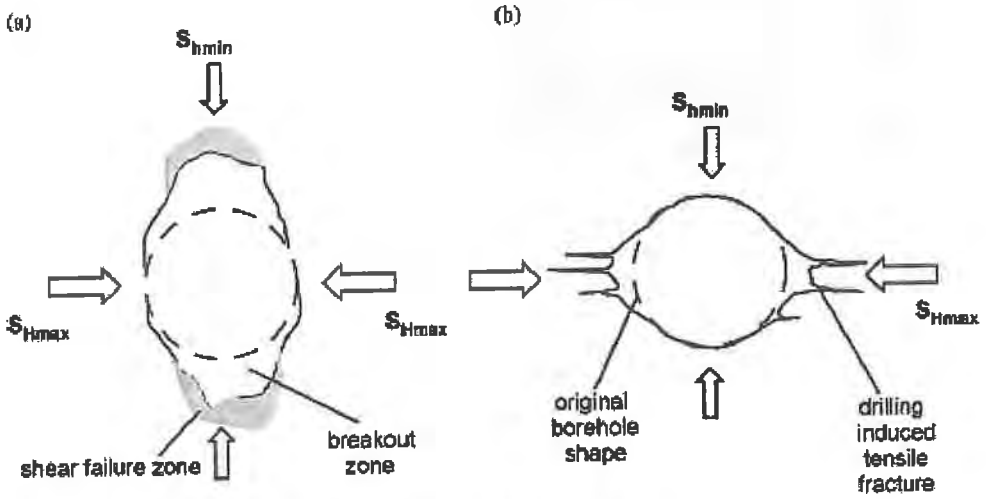



**Figure A-8: Schematic Cross Section through Borehole.**
(a) borehole breakout due to spalling of borehole wall indicating the Shmin direction. (b) drilling-induced tensile fractures indicating the $S_{Hmax}$ direction. From: Streit et al. (2005); © Elsevier, reproduced with permission.

Well bore breakouts and drilling-induced tensile fractures can be detected through the use of image logs (Zoback et al., 2003). Figure A-9(a) is a standard "unwrapped" well bore image from an ultrasonic borehole televiewer. Borehole breakouts can be seen as dark bands on opposite sides of the well in Figure A-8(a), and as out-of-focus zones on opposite sides of the well in the formation microresistivity image (FMI) in Figure A-9(b). The orientation and opening angles of the breakouts are shown in Figure A-9(c). Figure A-9(a) also shows fractures oriented 90° from the well bore breakouts, which indicates the occurrence of failures associated with both well bore breakouts and drilling-induced tensile fractures (Zoback et al., 2003).

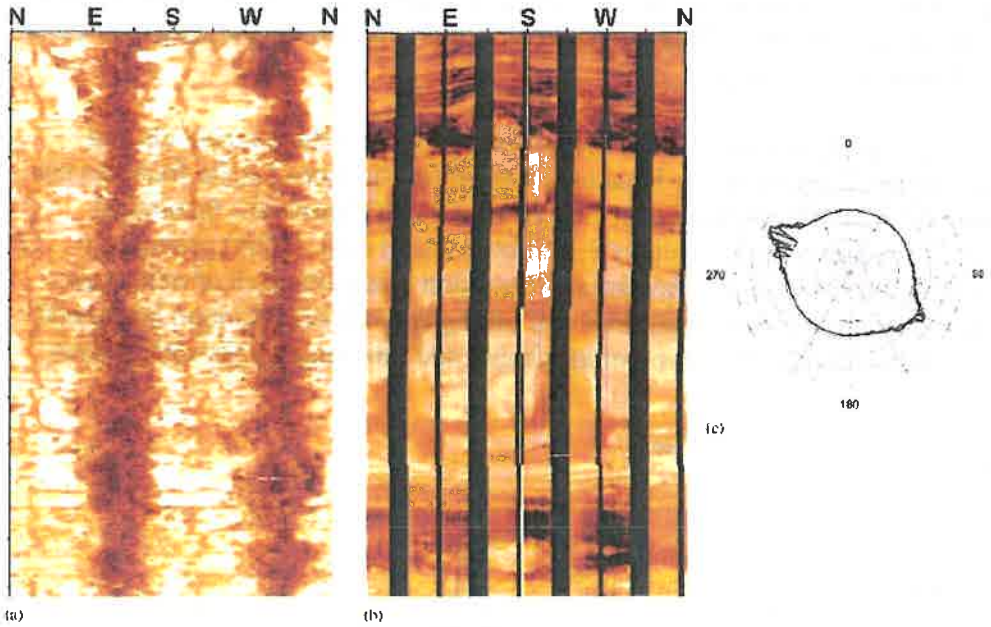



**Figure A-9: Image Logs of a Well with Well Bore Breakouts.**
(a) ultrasonic televiewer image logs (b) FMI log (c) cross sections of the well in (a). Breakouts are dark bands in part (a) and out-of-focus areas in part (b). From: Zoback et al. (2003); © Elsevier, reproduced with permission.

Another method that can be used to estimate $S_{Hmax}$ is referred to as a frictional limit calculation (Zoback et al., 2003; Streit et al. 2005; Streit and Hillis, 2004). The relation equates the ratio of the maximum-to-minimum principal stresses to frictional sliding on cohesionless, optimally oriented faults (Streit et al., 2005; Streit and Hillis, 2004):

$$\frac{\sigma_1 - P_p}{\sigma_3 - P_p} = \left[\left(\mu^2 + 1\right)^{1/2} + \mu\right]^2 \qquad \text{Equation 6}$$

where $\sigma_1$ and $\sigma_3$ are the maximum and minimum principal stresses, respectively, $P_p$ is the pore fluid pressure, and $\mu$ is the coefficient of static friction. The coefficient of static friction is generally considered between 0.6 and 1.0 for a range of rocks and faulting environments (Zoback et al., 2003).

The specific parameters used in Equation 6 for $\sigma_1$ and $\sigma_3$ are defined by the faulting environment (Zobak et al., 2003), as described previously. For example, a strike-slip faulting environment would be characterized $\sigma_1 = S_{Hmax}$ and $\sigma_3 = S_{hmin}$, while a normal faulting environment would be characterized by $\sigma_1 = S_v$ and $\sigma_3 = S_{hmin}$. An example plot of data used for estimating frictional limits is given in Figure A-10 (Streit et al., 2005). Example plots of stress magnitudes as a function of depth for various faulting environments are provided by Zoback et al. (2003). Techniques for stress determination in deviated wells (e.g., horizontal or wells drilled with complex trajectories) are described by Zoback et al. (2003).

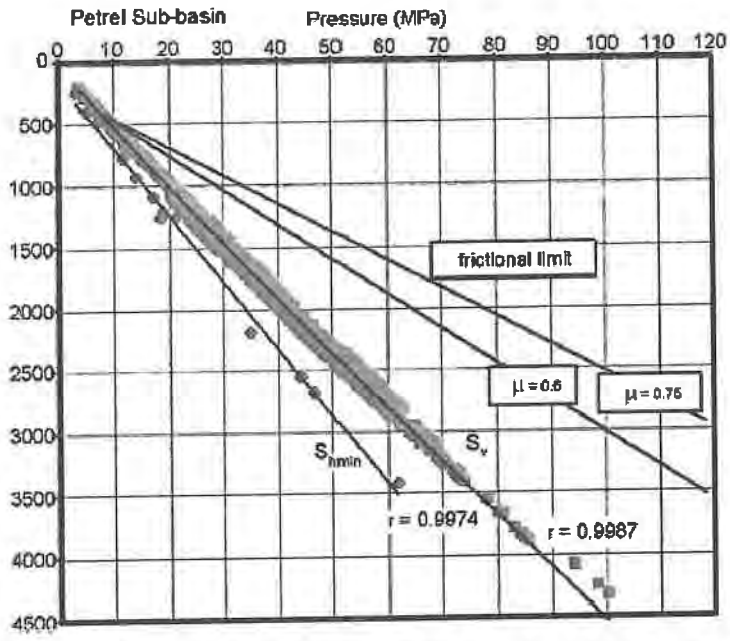



**Figure A-10: Example Plot of Data Used for Estimating Frictional Limits (Petrel Sub-Basin, Australia).** Shmin estimates are derived from pressure leak-off tests, and Sv estimates were obtained by examining density logs. R values are Pearson correlation coefficients. Vertical axis is meters. From: Streit et al. (2005); © Elsevier, reproduced with permission.

The orientation of borehole breakouts and tensile fractures (Figure A-11) can be determined from image logs and four-arm caliper logs. Six-arm caliper logs are also available, which may be able to provide more accurate and detailed data on borehole breakouts if four-arm caliper logs are not sufficient. FMI logs generate an electrical image of the borehole from microresistivity measurements, which penetrate about 30 inches from the well bore. FMI data are used to identify drilling-induced features and breakouts (Schlumberger, 2002). An application using FMI logs for the analysis of tensile fractures was described by Chiaramonte et al. (2008). Caliper logs (two-, three-, four-, or six-arm) can measure the enlargement of boreholes in the presence of natural fractures (Aguilera, 1992). Choosing a caliper log with a greater number of arms can increase the accuracy and level of detail in the resulting data. Breakout and tensile fracture data collected at depth from various wells can be used to develop stress maps such as those shown in Figure A-11.

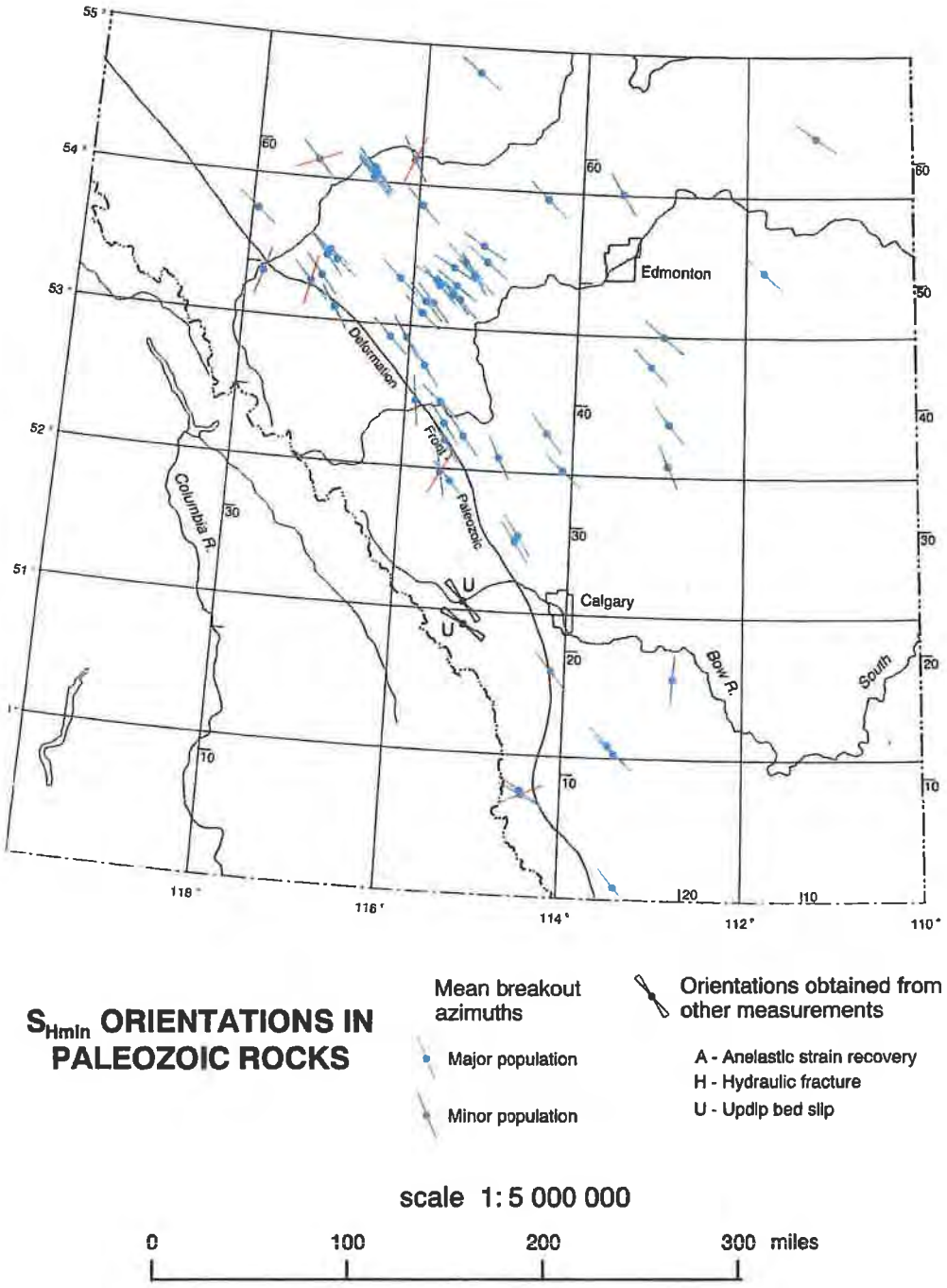



**Figure A-11: Example of a Regional Stress Map based on the Orientation of Well Bore Breakouts in Paleozoic Rocks the Western Canada Sedimentary Basin near Calgary.**
Modified after: Bell et al. (1994); © Alberta Geological Survey, reproduced with permission.

## A5. Information to Support Fault Stability Analysis and Analysis of Confining Zone Integrity

The Class VI Rule, at 40 CFR 146.82(a)(3)(ii), requires owners or operators to determine that any faults or fractures that may transect the confining zone(s) in the area of review will not interfere with containment. The Class VI Rule also, at 40 CFR 146.83(a)(2), requires the owner or operator to demonstrate the presence of a confining zone(s) free of transmissive faults or fractures and that has sufficient integrity to contain the injected carbon dioxide stream and formation fluids. These topics are addressed in Sections 2.3.2 and 3.5 of the guidance. Additional background information is presented here describing various methods that may prove useful to owners or operators. Examples of case studies are also presented.

### Fault Stability Analysis

Below are three examples of methods for analyzing fault stability and evaluating the pore pressure that should be maintained to minimize the chances of fault activation.

#### Failure Plots

Failure plots (Figure A-12) can be used to identify faults within a carbon dioxide storage reservoir that are relatively stable as a function of fault angle. Failure plots are developed by plotting differential stress (i.e., the difference between the maximum and minimum principal stresses, $\sigma_1 - \sigma_3$) versus fault angle, thus identifying conditions that permit fault reactivation (failure) versus formation of new fractures (or relatively stable fault conditions) (Streit et al., 2005). Streit (1999) described the method for constructing failure plots for various rock types and fault strengths. Although the failure plot method has been applied to study sites for carbon dioxide storage, 3D methods should also be used to estimate fault slip tendency (Streit et al., 2005).

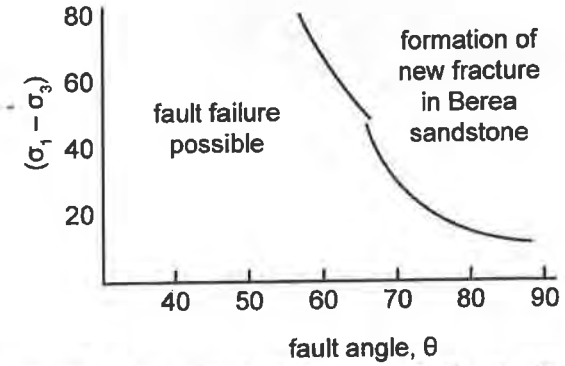



**Figure A-12: Example Failure Plot Indicating Scenarios where Fault Reactivation is Possible.**
Adapted from: Streit et al. (2005); © Elsevier, reproduced with permission.

### 3D Fault Slip Tendency

The parameter referred to as slip tendency ($T_s$) can be used to assess the potential for reactivating a fault associated with carbon dioxide injection (Streit and Hillis, 2004). The fault slip tendency depends upon the effective normal stress, shear stress, and pore fluid pressure. This method can also be used to calculate fault slip tendency along the grid orientation of a fault when 3D seismic surveys are available, and the fault slip tendency can be displayed in 3D graphical form using commercially available software (e.g., TrapTester, Badley Geoscience Ltd, UK, http://www.badleys.co.uk). Figure A-13 is an example fault slip tendency image in 3D form.

The fault slip tendency equation provided by Streit and Hillis (2004) can be used to predict the maximum sustainable pore pressure to avoid fault reactivation. This estimation may be compared to anticipated (simulated) pore pressure at the fault under the proposed operating conditions. The predicted pore pressure at the location of the fault should be less than the maximum sustainable pore pressure, with a margin of safety to account for uncertainties in both the fault slip tendency calculation and modeling results. The margin of safety will depend upon the precision of the data available and should be discussed in the submission materials.

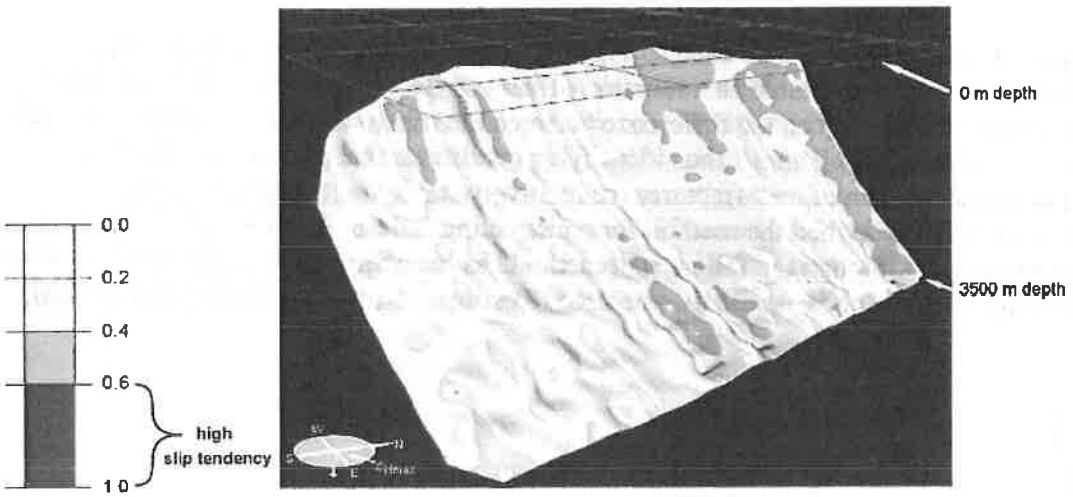



**Figure A-13: Example Fault Slip Tendency Image.**
From Streit et al. (2005); © Elsevier, reproduced with permission.

### Critical Pore Fluid Pressure Increase

The Mohr diagram (Figure A-14) can be used to evaluate the effects of increasing fluid pressure on fault stability (Streit et al., 2005; Streit and Hillis, 2004). The diameter of a semicircle represents the differential stress ($\sigma_1$-$\sigma_3$), and the curve to the left represents the rock failure envelope. A change in fluid pressure (as indicated by the arrow) can shift the Mohr envelope toward the failure envelope, which indicates a condition of fault failure. In the figure, the decrease in the effective normal stress (from increasing pore pressure or other causes) needed to reactivate an existing fault is indicated by *a*. The additional decrease in effective normal stress needed to create a new rupture is indicated by *b*.

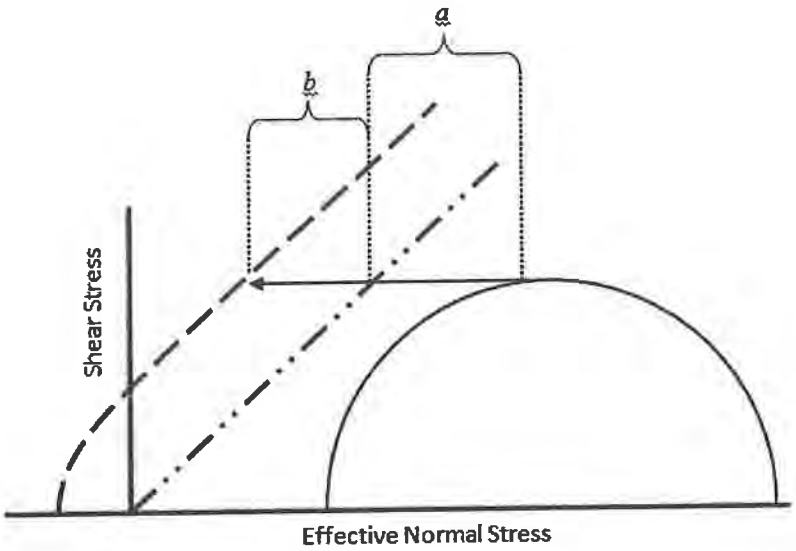



**Figure A-14: Example Mohr Diagram.**

The maximum injection pressure that can be considered safe and sustainable is site-specific and depends on the seismic history and current state (or pressure-depleted condition) of the site (Benson and Cook, 2005).

## Sealing Potential of Faults

Section 3.5.2 of the guidance presents several factors that may be evaluated in order to understand the sealing potential of existing faults; juxtaposition of units, capillary pressure of sediments in the fault zone, catalysis and diagenesis in the fault zone, the SGR, and pore pressure compartmentalization. Below is additional detail on use of Allan charts, calculation of the SGR, and pore pressure compartmentalization.

### Allan chart

An Allan chart can be developed from detailed fault geometry (available from maps, cross sections, and other interpretive aids) and a detailed stratigraphic column (developed from well bores, outcrops, and other data). The quality of an Allan chart is highly dependent on data quality, especially if layers are thin or when uncertainties in the amount of displacement along the fault may make it difficult to obtain a good understanding of juxtaposition. Leakage may still occur along the fault even when juxtaposition of permeable/impermeable units across the faults successfully limits the lateral migration of carbon dioxide.

Figure A-15 shows an example of heterogeneity across a fault plane. The area has layer-cake stratigraphy on either side of the fault. In the figure, the footwall and hanging wall boundaries are indicated by solid lines; the vertical exaggeration is a factor of five. The area that juxtaposes potentially conductive units is shaded, with the colored region showing the SGR (see below), which is one indication of sealing potential. Note that the SGR changes dramatically over the

surface of the fault. It is often more important to determine if the fault is sealing or non-sealing in the area or areas that have a critical impact on the integrity of the seal (e.g., above or below structural spill points) than for the entire surface of the fault.

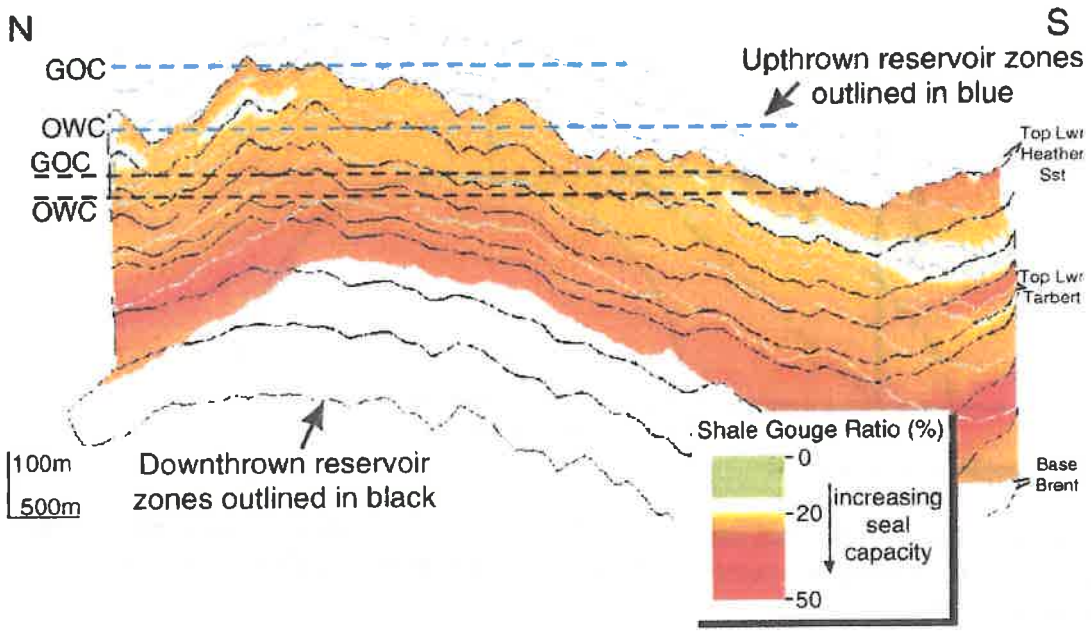



**Figure A-15: An Isometric View of a Fault Plane.**
GOC=Gas-Oil Contact, OWC=Oil Water Contact. From: Freeman et al. (1998); reproduced with permission from the Geological Society: London.

### Shale Gouge Ratio

In Figure A-16, the fault crosses shale (gray) and sandstone (white) layers. As displacement occurs along the fault (*a* and *b*), portions of the shale layers are incorporated into the fault zone. As the displacement increases (*c*), the amount of shale along the fault thins. The direction of fault slip is indicated by arrows, and the fault plane is idealized as a dotted line.

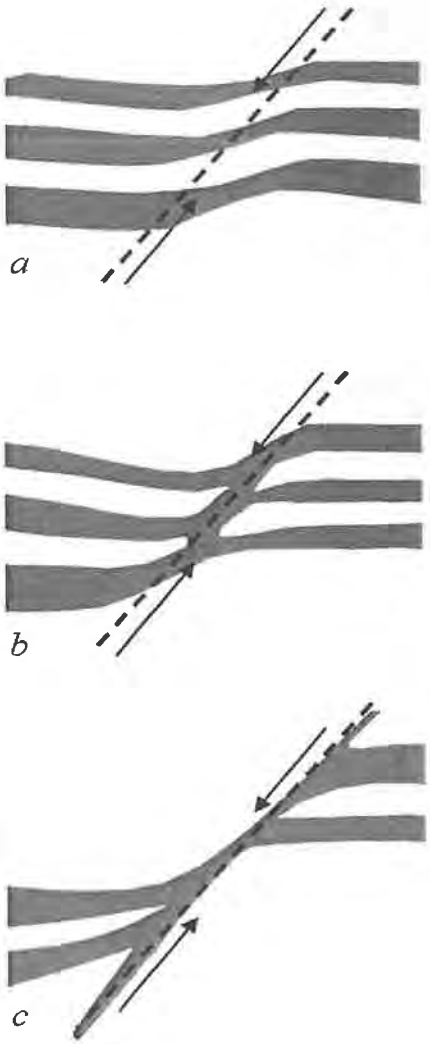



**Figure A-16: Simplified Shale Smearing Along a Fault.**
Modeled after Koledoye et al. (2003).

## Pore Pressure Compartmentalization

Using this method, it is also possible to evaluate if sealing behavior changes along the fault (Figure A-17). In the figure, faults are interpreted in the seismic image in (A), then mapped as lines onto the pore pressure determination (B). The color ramp is from low pressure (green) to high pressure (red). While the major fault (labeled with arrow Y and Z) at right compartmentalizes pressure, indicating that it may be sealing, the fault at left (labeled with arrow X), does not separate regions of different pressure, suggesting that it may not be sealing. The apparent non-compartmentalization of high pressure near the tip of the Z arrow may be due to poor resolution of the pressure data. Vertical red lines above X and Z are assumed to be wells.

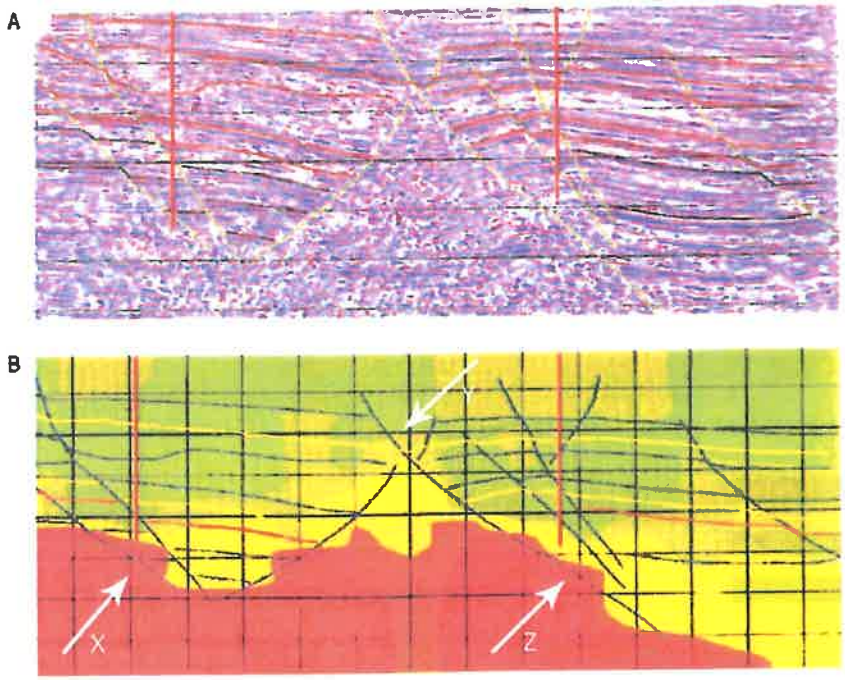



**Figure A-17: Sealing Capacity from Seismic Pore Pressure Images.**
From: Huffman (2002); © AAPG, 2002. Reprinted by permission of the AAPG, whose permission is required for further use.

## Case Studies and Applications

This section provides example applications of geomechanical characterization studies for helping to predict any potential impacts of carbon dioxide injection on fault stability and confining zone integrity as required by the Class VI Rule at 40 CFR 146.83(a)(2).

### *Fault Stability Case Studies*

Chiaramonte et al. (2008) evaluated the fault slip potential of the injection zone for the Teapot Dome oil field to determine the risk of leakage through the fault. The authors also conducted a critical pressure perturbation sensitivity analysis to understand possible impacts of horizontal stress estimates ($S_{Hmax}$ and $S_{hmin}$) and faulting environments on the probability of fault slip potential. Their study illustrates the potential for using geomechanical modeling to estimate the pore pressure required for a fault to slip during a GS project.

Gibson-Poole et al. (2008) summarized a geomechanical assessment of a basin-scale carbon dioxide geological storage system in southeast Australia. Using data and information regarding the site's rock strength, in situ stresses and fault orientation, Gibson-Poole et al. (2008) estimated the maximum sustainable pore pressure and risk of fault reactivation. Results showed large variability due to data uncertainties. The authors recommended additional work (e.g., laboratory testing of tensile and compressive core strength) to reduce uncertainties and constrain the geomechanical model.

Rutqvist et al. (2007) demonstrated the use of two numerical modeling approaches for analyzing geomechanical fault slip (i.e., continuum stress-strain analysis and discrete fault analysis) coupled with fluid flow to estimate the maximum sustainable injection pressure during geological sequestration of carbon dioxide. The results of these two numerical approaches were compared to conventional analytical fault-slip analysis. The authors concluded that the numerical methods provided a more accurate estimation of the maximum sustainable carbon dioxide injection pressure than the conventional analytical method because the numerical models can better account for the spatial evolution of both in situ stresses and fluid pressure.

### *Confining Zone Integrity Case Studies*

Haug et al. (2007) described a geomechanical characterization of a potential carbon dioxide injection site at an existing oil and gas field in Alberta, Canada, which included determination of the principal stresses ($S_v$, $S_{Hmax}$, $S_{hmin}$) and discussion of laboratory testing determinations of rock strength and deformation behavior. The study also included a sensitivity analysis regarding potential success for carbon dioxide containment based on data variability. The authors concluded that laboratory triaxial tests should be conducted to confirm the accuracy of the correlations.

Smith et al. (2009) described the program components of geomechanical testing and modeling of reservoir and confining zone integrity for a carbon dioxide sequestration project at an existing oil and gas field in Alberta, Canada. This work described the overall geomechanical workflow process and provided specific examples of log-derived rock strength and elastic properties, cores used for geomechanical testing, stress versus strain data measured on cores, linear Mohr-Coulomb failure envelopes, rock strength measurements, and uniaxial pore volume compressibility tests. In situ stresses, formation pressures and mechanical properties were input into a finite-differences-based geomechanical simulator to predict conditions leading to deformation of reservoir and confining zone, induced stresses, and to assess the propensity for fault reactivation and movements.

Orlic (2009) discussed the impacts of geomechanical changes in a reservoir associated with pressure depletion and rock compression during hydrocarbon production. Computational modeling examples were used to illustrate the mechanical impact of carbon dioxide injection on confining zone integrity, fault stability, and well integrity. This study illustrates the use of computational modeling for predicting effects of carbon dioxide injection on containment capacity of the reservoir, taking into account previous stresses from depletion.

Rutqvist and Tsang (2002) demonstrated the use of computational modeling to study the geomechanical effects of injecting carbon dioxide into a hypothetical sandstone formation. The authors provided discussion of the rock and fluid input parameters and simulation results assuming a homogeneous confining zone without intersecting fracture zone, and the effects of a vertical fracture zone in the confining zone. The analysis provided a better understanding of possible mechanisms affecting geomechanical changes associated with carbon dioxide injection processes.

## A6. Information to Support Geophysical Characterization

To support the requirement at 40 CFR 146.82(a)(3)(iii) to submit data on the injection and confining zone(s), this section provides background information on available geophysical methods that owner or operator may use, including seismic, gravity, magnetic, and electrical/EM methods. This section supplements the information provided in Section 2.3.10 of the guidance, which discusses geophysical characterization.

Geophysical methods gather information about subsurface features in lieu of physically sampling the region of interest. Depending on the scale and resolution of the investigation, geophysical methods may help to provide the required information on the stratigraphy, structure, extent, thickness, porosity, and permeability of subsurface units to be submitted to the UIC Program Director with a Class VI injection well permit application [40 CFR 146.82(a)(1)–(21)]. There are four main types of geophysical methods: seismic, gravity, magnetic, and electrical/EM. These methods can image a large volume of the subsurface without penetrations (i.e., wells or boreholes). These methods can provide good spatial coverage of a project area and may be especially useful in regions where subsurface geology is heterogeneous and/or wells are sparse. Geophysical methods are widely used for subsurface exploration and characterization in the hydrocarbon industry, archeology, engineering, and other fields.

Methods used to characterize sites for carbon dioxide storage will not differ substantially from methods used to characterize subsurface geology for other purposes. The choice of storage formation (e.g., depleted reservoir, coal seam, saline formation, etc.) will not likely strongly influence the suitability of geophysical techniques. Site-specific considerations such as depth, geologic complexity, and overlying lithologies are more likely to influence the choice of methodology. Two notable exceptions to this generalization are seismic methods, for which this technology may be hampered in depleted gas reservoirs, and gravity methods, which work especially well in most brine-filled formations.

The need to characterize features at depth is likely to be the most uniformly limiting factor in selecting an appropriate geophysical method for site characterization. Most carbon dioxide is likely to be stored at a depth of at least 800–1000 m, depending on site-specific conditions, and resolution at depth varies greatly among techniques and among different deployment techniques within the same method. Geophysical methods used primarily to image the shallow subsurface (e.g., ground penetrating radar (GPR), shallow seismic refraction, etc.) are not discussed in this section.

### Overview of Geophysical Techniques

Data gathered with geophysical techniques may aid in the creation of geologic maps and cross sections that illustrate the regional geology, hydrogeology, and geologic structure. Table 2-1 of the guidance summarizes the types of data produced by the various methods.

The different geophysical methods vary in quality, the surface and subsurface environments in which they can be used, and the types of data they produce. For example, unlike other

geophysical methods, seismic data may allow estimates of pore pressure in the injection formation, confining zone(s), and other zones.

Lithology and rock properties cannot be determined solely using geophysical data. Data gathered from geophysical surveys can indicate certain lithologies but are not conclusive. Information from stratigraphic wells, stratigraphic columns, or other sources is required to be submitted to the UIC Program Director with a Class VI injection well permit application. Such information can help to confidently assign rock types and properties to formations imaged using geophysical methods. Some of the required materials (e.g., maps and cross sections, available field data such as well logs) may help in interpreting geophysical data [40 CFR 146.82(a)].

Regardless of the geophysical method type, aerial, surface, and borehole deployments of each method are typically available. There are common advantages and disadvantages to each. Aerial surveys can cover large areas at low cost, they require no site preparation, but they often produce surveys of lower resolution than those produced by surface or borehole methods. Surface methods offer higher resolution in most situations and still offer coverage over a large areal extent. However, cost may be high, especially in areas with topographic relief, infrastructure, and/or environmentally sensitive cultural areas. Borehole methods often offer the highest resolution and can also often be acquired at a low cost. However, they do not image a large volume of the subsurface and they depend upon subsurface penetrations that cross the formations of interest. For all survey types, increasing the density of measurements, sources, or receivers will generally increase the quality of the survey but will also increase cost.

## Seismic Methods

A seismic survey uses seismic waves to produce 2D sections or 3D images of the subsurface. Both seismic reflection and seismic refraction techniques are available. Refraction techniques are generally used for imaging shallow features (less than 100 m) and are less useful than reflection techniques for interpreting complex geologic structures. The remainder of this section focuses on reflection techniques. More information on refraction techniques is available in *An Introduction to Geophysical Exploration* (Kearey et al., 2002).

Seismic reflection techniques measure the time it takes for seismic waves emitted from a source to bounce off a subsurface reflector and be detected at a geophone. This method is by far the most established, commonly deployed, varied, and advanced of the geophysical methods. More detailed information on seismic methods and processing is available from numerous sources, including introductory guides such as: *A Handbook for Seismic Data Acquisition* (Evans, 1997), *Environmental Geology – A Handbook* (Knödel et al., 2007), and *An Introduction to Geophysical Education* (Kearey et al., 2002).

Different source/receiver deployment configurations can be used to maximize data quality depending on terrain and other factors (see Short, 1992 for more details). Newer, fully portable (cableless) data acquisition systems are also available (Criss, 2007) and may be used in regions with surface infrastructure and/or rough terrain.

Seismic reflection systems are recognized as having the highest resolution of all geophysical imaging techniques in most situations (Benson and Myer, 2002). Seismic methods work best when characterizing simple, homogenous geologic settings where supplementary sources of data such as well logs, outcrop data, and other geophysical surveys are available. Increasing subsurface complexity may increase survey cost or decrease the resolution of survey results. Areas with accumulations of loose sediments such as thick sands or unconsolidated sandstones, conglomerates, well sorted gravels, or weathered horizons are challenging to image and may require more detailed consideration of seismic source and detector (see Short, 1992 or Knödel et al., 2007 for further information on selecting a proper seismic source). Seismic surveys are also complicated by noise contamination from roads, airports, railroads, mines, and other human activities that cause mechanical vibration.

Difficulty also increases when imaging through salts, basalts, coal seams, carbonates, and non-sedimentary units (Cooper, 2009; Hyne, 2001). Non-clastic rocks (i.e., metamorphic or igneous rocks) and coal seams cannot be imaged well. If such lithologies are present in the area of interest, seismic data may need to be supplemented with additional data. For example, if salt bodies are present, gravity data can be co-analyzed with seismic data to accurately determine their size and location (Nester and Padgett, 1992). Basalts pose a problem for seismic methods because traditional seismic approaches have resulted in severe energy scattering and wave interference. Some success has been reported in imaging basalts using multicomponent systems and wave component analysis (Sullivan et al., 2008). Carbonates often have minimal changes in seismic properties even when there are changes in texture, permeability, and porosity. High quality surveys, multicomponent methods, or other additional data collection steps may be needed to obtain sufficient accuracy and resolution in difficult environments.

Both surface and subsurface seismic methods can use additional wave types to improve data quality. Most seismic data acquisition systems collect only p-wave (compressional wave) data unless otherwise specified, usually in two vibrational directions (called components). Other seismic wave types and components may also be collected to improve survey results. Special sources, receivers, and recording capacity are usually the only changes required to modify a seismic survey for additional wave types. Geophones that measure additional seismic components (such as direction of vibration) may also be added. The main disadvantage of these methods is that they increase processing time and are not as well-developed as standard approaches.

Wave choice depends largely on subsurface geology. P-waves remain the best option for imaging bulk changes such as porosity. However, p-waves are distorted by gases in rock. In such cases, shear waves (s-waves), which are not distorted by subsurface gases, can be used (Thompson, 2005). This may be advantageous when characterizing some depleted gas reservoirs for carbon dioxide storage. S-waves are also appropriate for heavily faulted or fractured sites due to their greater sensitivity to continuous features such as fractures. Stoneley waves can help to identify fractures and changes in permeability (Cheng, 1992). Because s-waves provide information in the waveform as well as in the arrival time of the wave, a smaller number of geophones may be needed to gather the same amount of information.

S-waves can also help improve seismic pore-pressure prediction. S-wave data can aid in determining which seismic velocity variations are due to variations in fluid content and which are due to variations in fluid pressure (Sayers et al., 2000). In complex areas such as shallow, grossly undercompacted sediments, zones of severe unloading with minimal effective stress, and areas near gas chimneys and clouds, s-wave data may also help improve results (Huffman, 2002; Thompson, 2005).

**Seismic Deployments**

Seismic data can be collected with many different source/receiver configurations. Deployment can be done on the surface, in boreholes, or in a combination of both. 2D and 3D seismic profiling are the leading options available for surface-based seismic imaging. 2D surveys produce "slices" of the subsurface while 3D surveys produce subsurface models that can be rotated and viewed from different perspectives. 2D seismic surveys are less expensive than 3D surveys because they require less site preparation, shooting time, and post-collection data processing. The chief disadvantage of 2D imaging is that, because it is collected in a line on the surface, it is difficult to determine the location of out-of-plane features. Therefore, 2D surveys are not optimal in settings where significant lateral heterogeneity is expected (e.g., areas with salt domes, intrusions, or where sedimentary layers are expected to thin or thicken). Application of 2D seismic profiling may also be problematic in faulted regions, where the choice of line orientation is more critical to capture faults. 3D surveys are preferable to 2D surveys when characterizing sites with complex or variable subsurface geology, where subsurface geology is not well constrained, where improved resolution or greater certainty in subsurface characterization is needed.

Both 2D and 3D seismic methods have been used at GS sites. 2D seismic surveys were used for site characterization and baseline data at the Sleipner project in the North Sea (Hellevang et al., 2005). The Weyburn project in Saskatchewan, Canada also used 2D seismic lines for site characterization and as baseline measurements (Wilson and Monea, 2004). 3D seismic surveys were used for both site characterization and as baseline data at the carbon dioxide storage by injection into a natural saline aquifer project at Ketzin, Germany (CO2SINK) and for site characterization at the Kallirachi oil field in Greece, which is being considered for EOR/carbon dioxide storage (Koukouzas et al., 2009).

A larger number of downhole seismic techniques are available. VSPs are the most common borehole seismic method. A VSP is conducted with one component located on the surface (usually the source) and the remaining component placed downhole. A VSP can be conducted in a vertical or deviated well to a depth of at least 3,000 m (Balch et al., 1982). The source may be directly adjacent to the borehole or, for an offset VSP, located at a fixed distance away. A VSP can resolve features 3–4.5 m in size or smaller.

A VSP can also help increase the resolution and accuracy of other seismic surveys. First, a VSP can provide an accurate determination of the seismic velocity within the area of interest (seismic refraction techniques can also provide this information in simple geologic settings). This determination can help with seismic migration and pore pressure estimation. A VSP can also

help confirm the depth at which upgoing reflections are generated, which can be used to link geology derived from other bore logs to seismic attributes (Kearey et al., 2002).

Crosswell seismic methods deploy sources and receivers in different wells, producing a survey that images the plane between the wells. The Ketzin project used crosswell surveys and VSP surveys for site characterization and baseline monitoring data. Crosswell surveys between multiple wells can be used to produce a fence diagram. Equipment is generally deployed in monitoring wells located within 500 m of each other (Hoversten et al., 2002), although deployment down active injection wells is also possible (Daley et al., 2007).

Crosswell seismic surveys combine most of the advantages of VSP with additional lateral extent. Crosswell seismic profiling can achieve a maximum resolution of 3 m (Harris and Langan, 1997), which may provide data 10–100 times more detailed than surface seismic data (Martin et al., 2002). Crosswell seismic profiling may also be the best option available for imaging thin beds. The data can be used to fill the resolution gap between high-resolution well cores and 3D surface data (Washbourne and Bube, 1998) or to help correlate structures between well bores. However, because of the need for multiple wells, crosswell seismic profiling will not be suitable in areas that do not already have abundant subsurface penetrations. Furthermore, the distribution of wells will determine the potential planes for crosswell imaging. These orientations may not be optimal for imaging the relevant features. Crosswell imaging was used successfully for both site characterization and baseline monitoring at the Nagaoka pilot project in Japan, which injected and monitored 0.01 megatonne (Mt) of carbon dioxide.

The borehole microseismic method relies completely on subsurface deployment and uses passive seismic energy. A string of geophones is deployed down a monitoring well and used to sense seismic events, typically on the order of M -3 to -1. Microseismic events can be detected up to 1 km from the well on average (Downie et al., 2009). The period of data collection is variable and depends upon the frequency of seismic events, but typically lasts from several weeks to several months. This is disadvantageous compared to other seismic methods that collect data over a period of hours. Generally, the greater number of microseismic events, the more accurate the result.

After collection, the hypocenters of the seismic events are projected onto a subsurface map to image fracture networks, faults, and other regions actively undergoing strain or deformation. The quality of the geologic model used to transform the time data and locate each hypocenter largely controls the accuracy of the result (Warpinski et al., 2009).

**Processing of Seismic Data**

Post-collection processing techniques provide control over the final quality of the survey and its applicability to the project site characterization. In some cases, old data may even be re-processed with newer techniques to uncover additional information. Choice of processing techniques will largely depend on site-specific factors other than the type of carbon dioxide storage reservoir being investigated. For example, certain types of processing (such as pre-stack migration) are more appropriate in regions where steep faults or other features are anticipated (such as near salt domes). Seismic processing techniques are immensely varied; the following is

an overview. For more detailed information, a number of handbooks on seismic processing are available (e.g., Upadhyay, 2004).

If information about faults or other discontinuities in the subsurface is desired, special processing techniques can be used to mine the data for this information. Seismic crustal anisotropy processing can be used in areas where aligned fractures, joints, or fluid inclusions recur in the subsurface at a distance smaller than the wavelength of the seismic wave. As the wave passes through such a region, it is split into two waves with different polarization and velocities (Crampin and Lovell, 1991), in a manner similar to the effects of diffraction gratings on light waves. Studying the split waves can reveal information about the magnitude, consistency, and orientation of recurring subsurface features. Alternatively, p-wave data can be processed with a technique called p-wave amplitude variation with offset and azimuth (abbreviated pAVAZ or pAVOA) (Gray et al., 2002) to reveal information about fracture and pore orientations. However, these techniques are not fully developed. These techniques may have the potential to be adapted to image cleats and other discontinuities common in coal seams or columnar joint in basaltic flows if either type of formation is used as a potential carbon dioxide reservoir.

Coherence processing can be used to detect faults. This method suppresses continuous features and highlights discontinuities, such as faults, within seismic sections. Although discontinuities in high-quality seismic data are often indicative of faults and lithologic breaks, discontinuities in low-quality seismic data may be due to a range of data collection and processing errors. As a result, coherence is very sensitive to the quality of input seismic data and is not suitable for low-quality surveys.

Other advanced processing techniques, such as difference analysis with data normalization (DADN) (Onishi et al., 2009) are also available.

**Pore Pressure Interpretation**

Seismic data can be processed to remotely determine subsurface pore pressures. This is accomplished using the relationship between pore pressure and effective stress:

pore pressure = total stress (i.e., overburden stress) – effective stress

Any seismic data that yield an accurate velocity for the seismic wave in the subsurface can be used to approximate effective stress. However, not all seismic data meet this criterion because accurate velocity values are not needed to image the subsurface. Ensuring that seismic data can also be used for pore pressure prediction may not greatly increase the survey cost, but it does require planning.

Once accurate velocity data have been obtained, numerous methods are available to convert velocity to pore pressure. These methods tend to work best in developed basins filled with shales and sands. In regions with high sedimentation rates like the Gulf of Mexico, tectonically complex regions, or regions with abundant carbonates, the transforms to convert velocity to pressure may introduce significant error. (See Sayers et al., 2005; Young and Lepley, 2005; and Sayers et al., 2000 for more information.)

The overburden pressure in the area of interest is needed for accurate pore-pressure determination. The overburden pressure is closely related to the density of the overlying material and can be determined from well density logs. Gravity measurements can also be used to estimate the overburden pressure (Huffman, 2002). This is especially advantageous in areas with complex geology (e.g., regions with salt domes or other intrusive structures) where individual boreholes are likely to miss significant features.

Under optimal conditions, pore pressure analysis can resolve pressure data for strata 30–60 m thick at medium depth in clastic basins with relatively simple stratigraphy (Huffman, 2002). Pressure information can also be used to help determine the integrity of sealing layers and the sealing behavior of faults (Huffman, 2002; Sayers et al., 2002). Additionally, if pore pressure appears compartmentalized by a fault in a 3D subsurface pressure map, this may support the interpretation that the fault is sealing. Subsurface pressure data may also help to inform estimates of risks associated with induced seismicity and estimates of total storage capacity, both of which require estimates of subsurface pressure.

The main disadvantages to this technique are the extensive data processing and interpretation, which may introduce large errors, and the need for basin-specific correction factors during velocity processing. Saline formations and depleted reservoirs are the storage formations of interest where a potential Class VI injection well applicant would be most likely to utilize this technique.

**Additional Seismic Data Analysis - Seismic Stratigraphy**

Seismic stratigraphy identifies stratigraphic units based on their seismic characteristics. Because seismic reflections follow large-scale bedding, the geometry of the reflections allows the delineation of features such as unconformities, depositional sequences, and unit thicknesses. Seismic reflections will not indicate facies shifts, but can show fluid changes or diagenetic changes (Emery and Myers, 1996). The principles of seismic stratigraphy are presented in a classic paper by Vail et al. (1977).

Stratigraphic features identified in seismic surveys can be integrated with lithologic data from cores, well logs, and other data to allow interpretation of depositional environments. Lithologies and other characteristics identified at wells and boreholes can be correlated to seismic attributes, which can then be used to predict subsurface properties at other locations through the use of neural networks, regression, or other methods. Stratigraphic features identified in this manner may help in identifying features (e.g., barriers, channels, fans) that might affect storage capacity and migration of carbon dioxide.

There are different processing and display options that can be employed for stratigraphic interpretation, and the choice of method will depend upon acquisition parameters, seismic sources, and site geology (Emery and Myers, 1996).

## Gravity Methods

Gravity-based methods image differences in density among subsurface materials. Because density is related to gravity, changes in the distribution of fluids, cementation, and porosity of subsurface materials can be measured as changes in gravity. Gravity data can be collected from land-based stations, aerially, or directly from the subsurface using boreholes. Choice of deployment is usually controlled by factors such as desired resolution and site-specific geology and is not limited by choice of carbon dioxide storage formation type.

Gravity is measured with a gravimeter; information on how measurements are obtained can be found in Paterson and Reeves (1985). Figure A-18 is an example of a typical surface deployment pattern.

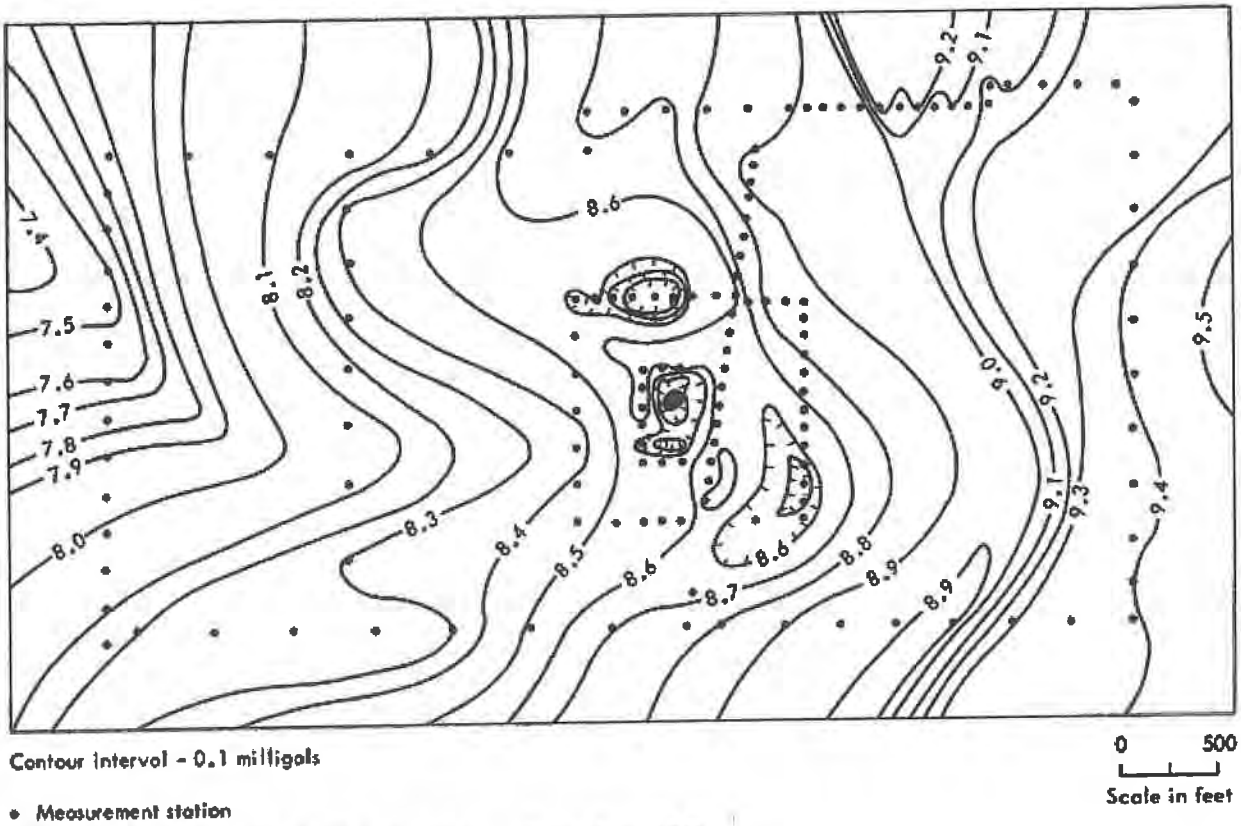



**Figure A-18: A Gravity Map of an Area Ore Deposit and Mine.**
From: Yarger and Jarjur (1972); Reproduced with permission from the Kansas Geological Survey.

Because detection of faults and structural features using gravity data depends upon contrasts in density, gravity methods work best in basins with varied lithologies. Salt domes and igneous intrusions are the easiest types of lithologic features to image because they usually have a high-density contrast with surrounding formations. Figure A-18 illustrates the gravity anomaly associated with an ore deposit and mine. Faults may be detected with gravity data if units with contrasting density or regions with different sedimentary thicknesses are juxtaposed. Small faults or faults with large displacement occurring in discrete steps are more difficult to detect with

gravity data than large planar faults. Vertical faults are especially difficult to detect using surface gravity methods (Barbosa et al., 2007).

Because gravity measurements are not unique to specific lithologies, additional data from other types of geophysical surveys or other sources (e.g., boreholes, outcrops) can greatly improve the interpretation of gravity data (Jordan and Hare, 2002). One advantage relative to seismic data is that, because processing of gravity data is much more straightforward, it generally introduces much less interpretive error.

### Aerial and Surface Gravity Methods

For aerial methods, data are typically collected along parallel lines in the area of interest. Closer spacing will generally increase resolution. For surface deployments, measurements are typically taken at discrete stations across the area of investigation. Broad gravity surveys may suffice for detecting large-scale changes in the thickness of basin fill and other basin-wide features, while more detailed surveys will be needed to detect finer features such as the distribution and thickness of specific formations.

### Borehole Gravity Methods

Borehole surveys can be used to determine layer thickness and aid in determination of lithologic composition. Borehole gravity methods collect information from a larger subsurface volume than other types of borehole logs. This is useful for characterizing porosity and other formation parameters in carbonate and fractured reservoirs (LaFehr, 1992; Chapin and Ander, 1999) or other situations where poor borehole conditions, problematic casings, cementing problems, and well bore washouts are likely to affect the quality of other borehole formation-testing tools (LaFehr, 1992).

Borehole gravity surveys are conducted in a manner similar to borehole seismic surveys. A gravimeter is lowered down the borehole and measurements are taken as the device is raised, usually at set intervals between 3 m and 15 m (Herring, 1990). Borehole surveys have been conducted in wells 2,000 m deep (Seigel et al., 2009) and inclined up to 60 degrees (Seigel et al., 2009). Resolution is usually high. Special techniques (i.e., gravity gradiometry) are needed to characterize non-horizontal strata.

In regions that are laterally variable geologically, borehole gravity data may indicate features such as salt domes and reefs even if they do not intersect the borehole (LaFehr, 1992). As a rule of thumb, borehole gravity surveys can detect anomalies as far away as one to two times the height of the body in question. For example, a sandstone lens 50 m high could be detected 100 m from the well bore under good conditions (Herring, 1992). When using a single well, however, it is only possible to know the radial distance from the well of a feature and not the direction.

## Electrical/Electromagnetic Geophysical Methods

Electrical and EM methods use the conductive properties of subsurface materials to infer fluid distribution, stratigraphy, and/or structural information. Data can be collected aerially,

surficially, or from the subsurface. Electrical/EM methods can use either natural electric fields or a controlled source (man-made). Deployment of survey equipment may either be temporary (for one survey) or permanent (e.g., installed during well construction).

Electrical methods transmit a pulse of electrical energy into the subsurface using electrodes or other means; changes in properties such as galvanic potential that are registered when the signal arrives at a receiver are used to infer subsurface resistivity, which is then mapped and interpreted. EM methods measure the induction effect (generation of current and electric fields) in the subsurface by another EM field or electric current (Jordan and Hare, 2002). Depending upon the method, results can be presented either as a surface map or cross section. Figure A-19 provides an example of the end result from an EM survey.

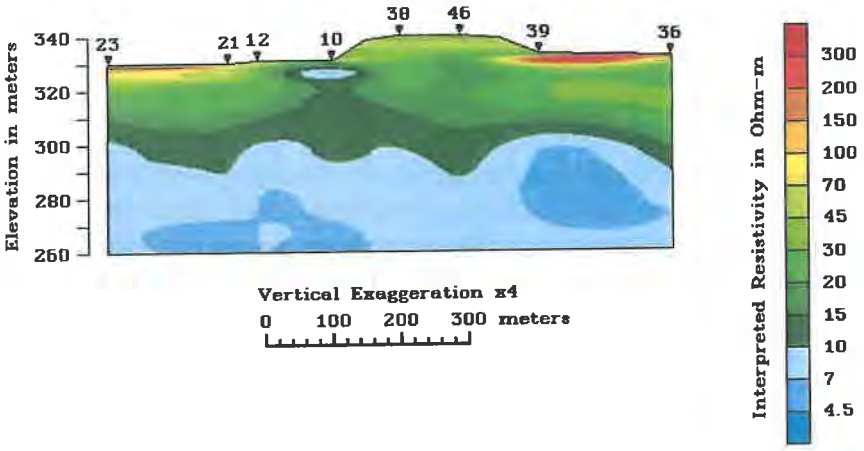



**Figure A-19: A Subsurface Cross Section of Electromagnetic Resistivity Data.**
From: Lucius and Bisdorf (1997).

Fluid saturation and composition are the two most important factors controlling the conductivity/resistivity in the subsurface and, accordingly, the response to electric and EM fields. Therefore, electrical and EM methods are most sensitive to fluid composition, distribution, and saturation and less responsive to lithologic or structural changes (Wynn, 2003). Detailed determination of subsurface lithologies or structural features is usually only possible when the flow and distribution of formation fluids are controlled by lithology and structure. For example, fractures and faults are generally considered significant for electric/EM studies in low permeability and low porosity formations, where they can act as the primary pathways for conductive fluids (Orange, 1992). Accordingly, electrical/EM data are more likely to be used to characterize saline formations and depleted reservoirs than other types of potential carbon dioxide storage formations. Interpretation of electrical data is primarily qualitative and generally attempts to explain the shape of an anomaly in terms of fluid flow direction and magnitude (Orange, 1992). Values such as flow volume and composition cannot typically be quantified.

Deployment method is more strongly influenced by the desired resolution than the type of carbon dioxide storage formation. Most surface methods for electrical data collection yield poor results compared to subsurface methods because surface conditions are highly heterogeneous and tend to attenuate the signal (Wilt et al., 1995). Near-surface changes in saturation (e.g., from

rainstorms) can also greatly affect survey results, although this is more problematic for time-lapse monitoring than site characterization.

For subsurface deployments, the survey depth is typically two to three times the length of the dipole used to generate the current (Jordan and Hare, 2002). Resolution is usually 5–20% of the electrode depth (Jordan and Hare, 2002). Resolution is low for most electrical/EM methods compared to seismic methods. However, the depth and breadth of electrical/EM surveys can provide valuable information on the regional geologic framework at low cost (Orange, 1992).

Highly conductive and magnetic rocks may introduce error into electric/EM methods (Jordan and Hare, 2002). Additional care should be taken if magnetite, iron-rich sands, graphite, or other conductive and/or magnetic constituents are present (at levels as low as 1%) within the area of interest. For further information, Jordan and Hare (2002) and the U.S. Army Corps of Engineers (1995) provide a detailed discussion of electrical and EM methods.

**Natural Source Electrical/Electromagnetic Methods**

The self-potential (SP) method is an electrical technique that detects the current (in millivolts) generated by electrochemical reactions (i.e., oxidation/reduction reactions) in the subsurface (Orange, 1992). Measurements should not be taken within 500 m of power plants, substations, pipelines, telephone lines, or power lines (Jordan and Hare, 2002). The result is a surface map of electric potential. (see U.S. Army Corps of Engineers, 1995, for further details on SP surveys.)

Magnetotellurics is an EM method that measures resistivity in the subsurface based on the strength and wave impedance of naturally propagating low-frequency EM fields in the Earth (Orange, 1992). Data are usually displayed as a cross section. Magnetotelluric surveys can image 10 km or more into the subsurface (Orange, 1992), allowing deep structures to be identified. Rock types can also be inferred when resolution is high and an existing knowledge of regional stratigraphy is available.

Methods that use naturally occurring electric fields avoid the expense and logistics of choosing and operating a source. However, naturally occurring fields are unpredictable, and the total energy level of the field cannot be controlled (Orange, 1992).

**Controlled Source Electrical/Electromagnetic Methods**

Controlled source methods use external sources to generate electrical energy and direct it into the subsurface or to induce EM fields in the subsurface. These methods can image the subsurface up to 1–2 km deep (Orange, 1992) with low resolution. Electrical controlled-source methods use a variety of sources channeled into the subsurface using source and receiver electrodes (U.S. Army Corps of Engineers, 1995). Induced polarization (IP) and complex resistivity (CR) are subtypes of this method and are most often used in known hydrocarbon reservoirs (Orange, 1992).

Electrical methods can also be used in a crosswell configuration. One such technique is electrical resistance tomography (ERT). Deployment is similar to crosswell seismic imaging with a source of electric current in one well and a receiver in another. Resistivity changes on the order of 30%

can generally be detected, although under optimal conditions resistivity changes as little as 10% can be measured (Newmark et al., 2001). Figure A-20 presents an example permanent downhole ERT array used to characterize and monitor carbon dioxide injection into a depleted reservoir.

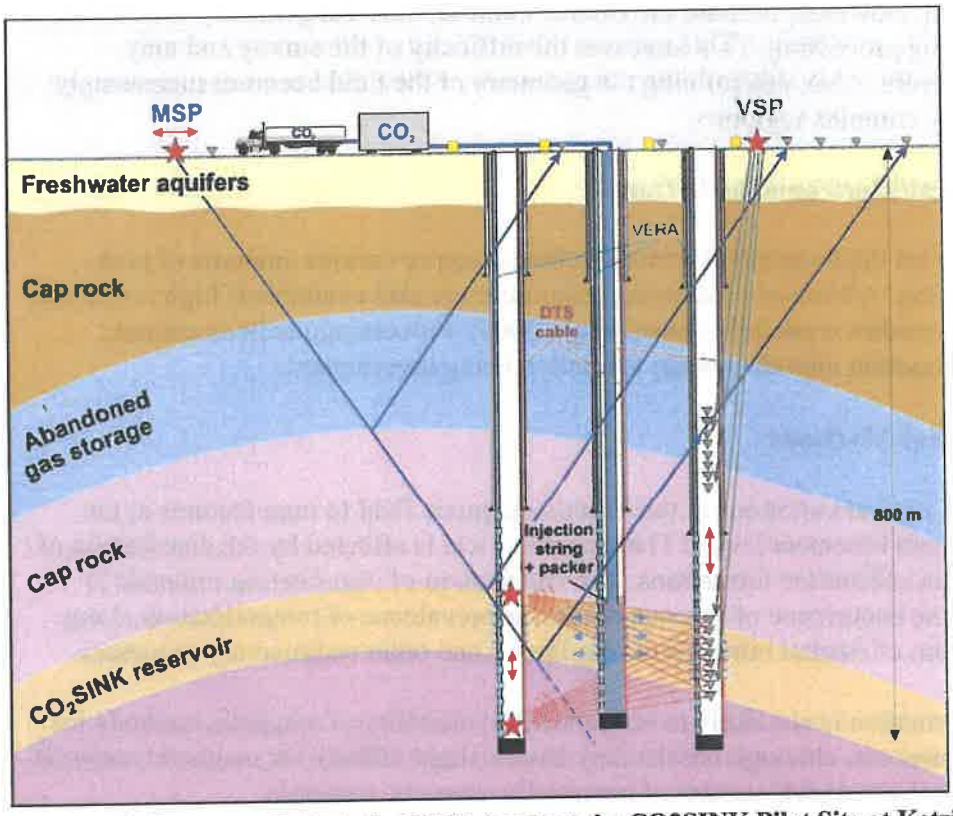



**Figure A-20: Permanently Installed ERT Array at the CO2SINK Pilot Site at Ketzin.**
The diagram uses blue boxes to represent geophones, while the red star is the source. VSP = Vertical Seismic Profile, DTS = Distributed Thermal Sensor, VERA = Vertical Electrical Resistance Array, MSP = Moving Source Profile. From: Forster et al. (2006); © AAPG 1992, reprinted by permission of the AAPG whose permission is required for further use.

Surface EM controlled-source methods use coils and/or grounded wires to generate an EM field on or above the surface. This field induces currents in the subsurface, which, in turn, generate their own EM fields. The induced subsurface EM fields are then quantified by the disturbance they create in other fields (frequency domain methods) or as they decay (time domain methods). Resistivity can be calculated through inversion and modeling of these measurements (Orange, 1992). EM methods can be used to detect changes down to 1 km or more (Orange, 1992; Jordan and Hare, 2002). Data can be collected aerially, although the maximum depth decreases to 100–200 m when using aerial data collection. Aerial data collection usually cannot resolve anomalies smaller than 50–100 $m^2$ (Jordan and Hare, 2002).

Controlled source audio-frequency magnetotellurics (CSAMT) is similar to the magnetotellurics method mentioned above, but the EM wave is generated and introduced into the ground by a dipole or pair of dipoles, usually 10-200 m in length (Jordan and Hare, 2002). A linear array of receivers located several kilometers away collects the signal from the subsurface. Data are

displayed as a cross section. CSAMT is less affected by infrastructure-related noise than other electrical/EM depth-profiling methods.

Using a controlled source allows the operator to control the source strength and, to some degree, the signal-to-noise ratio. However, because the field is induced, the field geometry is determined and accounted for during processing. This increases the difficulty of the survey and may introduce processing errors. Also, determining the geometry of the field becomes increasingly difficult in geologically complex regions.

### Processing of Electrical/Electromagnetic Data

Depending upon the exact deployment, electrical methods require various amounts of post-collection data processing. Advanced processing techniques are also available if high resolution in single or time-lapse studies is needed (Onishi et al., 2009). Processing methods are not affected by the type of carbon dioxide storage formation being investigated.

## Magnetic Geophysical Methods

Magnetic methods use natural variations in the Earth's magnetic field to map features at the shallow, sedimentary, and basement levels. The magnetic field is affected by the distribution of iron-bearing minerals in subsurface formations. The distribution of iron-bearing minerals is usually controlled by the occurrence of igneous rocks, the prevalence of mineralization along faults, and the separation of detrital minerals during fluvial and other sedimentary processes.

The type of storage formation is not likely to influence the suitability of magnetic methods for site characterization purposes, although basalts may have a slight affinity for magnetic methods since igneous rocks can have a high content of potentially magnetic minerals.

Magnetic intensity surveys are usually collected aerially using a magnetometer, although ground-based surveys can also be collected using a portable magnetometer. Figure A-21 presents an example of the type of data an aerial survey can provide. Paterson and Reeves (1985) provide a detailed discussion of magnetic methods.

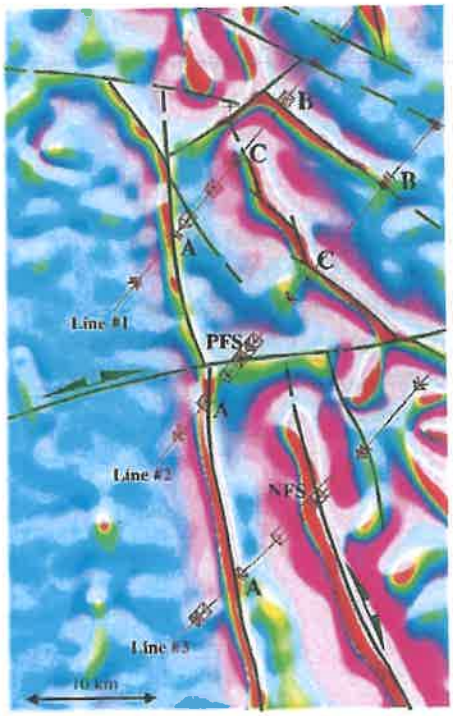



**Figure A-21: An Aerial Gravity Map.**
The data can then be interpreted for faults (the dashed and solid lines) and other structures. From: Goussev et al. (2004).

Faults and other structural features in both basement rocks and overlying sedimentary cover can be imaged, but formation characteristics are difficult to determine using magnetic data (Ugalde, undated). Faults can be identified either because displacement along the fault juxtaposes units with different magnetic signatures or, more commonly, because secondary mineralization of magnetite or demineralization along the fault plane alters the magnetic signal in the region of the fault. Information on the dip of faults can also be gathered in some cases. One common interpretive error in magnetic surveys is wrongly identifying paleochannels filled with detrital magnetite as faults. Therefore, extra care should be taken in interpreting regions with sandstones and other fluvial lithologies.

Because magnetic data are non-unique and do not represent specific lithologies, additional data from other types of geophysical surveys or other sources (boreholes, outcrops etc.) can improve magnetic data interpretation (Jordan and Hare, 2002). This approach was taken at the Weyburn Project in Saskatchewan. At the site, co-processing of low quality gravity and seismic data allowed positive identification of faults that were ambiguous using either data set alone (Goussev et al., 2004) during site characterization. This data interpretation approach may be a good solution for characterizing areas with vintage data sets such as oil and gas reservoirs.

Magnetic methods are sensitive to human infrastructure. As a result, they are not useful in populated or developed areas because buildings, pipes, and wires obscure the geologic signal. The one advantage to this sensitivity is that magnetic surveys may be used to find abandoned, cased wells. This can help in identifying abandoned wells that may need corrective action, as

required at 40 CFR 146.84(c). See the *UIC Program Class VI Well Area of Review Evaluation and Corrective Action Guidance* for further details on locating abandoned wells and performing the required corrective action activities.

**Processing of Magnetic Data**

After collection, magnetic intensity data undergo processing. Processing methods are not influenced by the type of carbon dioxide reservoir under investigation. High frequency anomalies can be attributed to near-surface and shallow subsurface effects, intermediate frequency anomalies can be attributed to the composition of the sedimentary basins, and low-frequency anomalies can be ascribed to changes in the basement rocks. Most surveys collected today are of sufficient resolution to detect anomalies in all three ranges.

## A7. Information to Support Demonstration of Storage Capacity

To support a demonstration that the site meets the requirement that the injection zone or zones are of sufficient areal extent, thickness, porosity, and permeability to receive the total anticipated volume of the carbon dioxide stream per 40 CFR 146.83(a)(1), this section provides background on the concept of storage capacity and some of the methods that have been used to estimate storage capacity for different formation types. This section includes definitions of terms, references for information on various parameters, methods for estimating carbon dioxide storage capacity, and case studies. For additional information and recommendations, see Section 3.4 of the guidance, Demonstration of Storage Capacity.

### Resources and Reserves

The concepts of resources and reserves are used to estimate the availability of mineral resources (e.g., in the oil and gas and mining fields). Similarly, the concepts of resources and reserves can be applied to carbon dioxide storage capacity. USDOE (2008a) makes a distinction between carbon dioxide resource estimates and carbon dioxide capacity estimates. A carbon dioxide resource estimate is defined as the volume of porous and permeable sedimentary rocks available for carbon dioxide storage and accessible to injected carbon dioxide via drilled and completed well bores. This assessment includes physical constraints, but it does not include economic or regulatory constraints. A carbon dioxide storage capacity estimate is an attempt to realistically include both the physical and economic constraints that determine the volume of rock available for storing carbon dioxide. The level of detail in storage capacity estimates depends on the scale and resolution of the assessment as illustrated in Figure A-22 (Bachu et al., 2007). Storage capacity estimates can be classified by degrees of certainty (Bachu et al., 2007; Bradshaw et al., 2007) as described below and illustrated in Figure A-22.

*Theoretical Storage Capacity* – This storage capacity estimate results in the least certainty. Bachu et al. (2007) describe it as representing the physical limit of what the geologic system can accept (e.g., entire pore space) or only the space from which the original fluids can be displaced (i.e., pore space minus the irreducible residual saturation of the initial fluid). The theoretical storage capacity typically represents a maximum upper limit to the capacity estimate; however, it is an unrealistic number as in practice there will always be physical, technical, and practical limitations that prevent full utilization of the theoretical storage capacity.

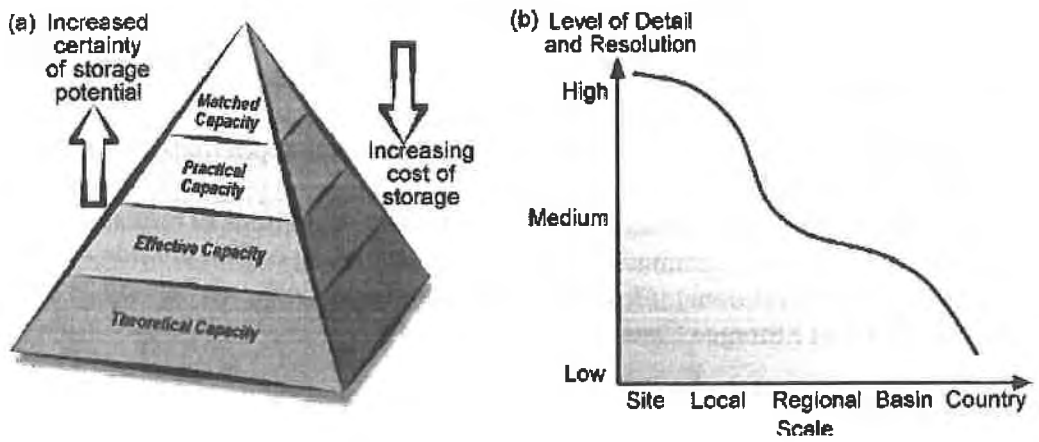



**Figure A-22: Variation in Size and Resolution of Various Storage Capacities.**
(a) resource pyramid and (b) data and assessment scales. From: Bachu et al. (2007); © Elsevier, reproduced with permission.

*Effective Storage Capacity* – This estimate is also known as "realistic capacity." Bachu et al. (2007) note that it is obtained by applying a range of technical (geological and engineering) cut-off limits to a storage capacity assessment, which usually changes with the acquisition of new data and/or knowledge.

*Practical Storage Capacity* – This estimate is also known as "viable capacity." Bachu et al. (2007) describe it as obtained by considering both technical and practical challenges to safe carbon dioxide geological storage. This estimate is prone to changes over the life of a GS project as technology, policy, regulations and/or economics change.

*Matched Storage Capacity* – This estimate yields the greatest certainty regarding carbon dioxide storage capacity. Bachu et al. (2007) describe it as a detailed matching of large stationary carbon dioxide sources with geological storage sites that are adequate in terms of capacity, injectivity and supply rate.

Additionally, USGS has released a report on risk-based capacity estimates, which differs from the above estimates in that it uses fully probabilistic methods to incorporate geologic uncertainty in calculations of storage potential (Brennan et al., 2010).

This section focuses on some methods that may be used to develop estimates of storage capacity for a GS project with the greatest certainty and highest level of detail.

## Parameters and Data Interpretation

This section provides brief information on parameters that may be needed to estimate the volume (or mass) of carbon dioxide storage capacity, depending upon the method selected. Table A-3 provides a summary of the types of methods available for quantifying parameters, such as laboratory methods and field testing, and estimating or predictive tools. Porosity, permeability, and injectivity (flow rate) are discussed in the guidance (Sections 2.3.5 and 4.5.2) and in Section

A3 of this Appendix. Some recommended data sources for determining injection zone thickness, area, and background hydraulic gradient are discussed in Sections 2.3.1 and 2.3.3 of the guidance and Section A1 of this Appendix. Several of these parameters, such as capillary pressure, temperature, compressibility, water saturation, intrinsic and relative permeability, and porosity are also needed for the multiphase fluid modeling required for proposed Class VI injection well AoR delineations [40 CFR 146.84]. For more information on the required AoR modeling for a proposed Class VI injection well, see the *UIC Program Class VI Well Area of Review Evaluation and Corrective Action Guidance.*

**Table A-3: Parameters and Methods for Quantifying Storage Capacity.**

| Parameter | Methods for Quantifying Parameters | | | Parameters for Estimating Storage Capacity | | |
|---|---|---|---|---|---|---|
| | Labora-tory | Field | Estimation or Prediction | Static Method | Material Balance | Reservoir Simulation |
| Pressure | X | X | X | | X | X |
| Fracture Pressure | | X | X | | | X |
| Temperature | | X | X | | | X |
| Compressibility | X | | X | | | X |
| Porosity* | X | X | | X | | X |
| Permeability* | X | X | X | | | X |
| Relative Permeability* | X | X | X | | | X |
| Transmissibility | X | X | X | | | X |
| Interfacial Tension | X | | X | | | X |
| Water Saturation | X | X | | X | | X |
| Wettability | X | | | | | X |
| Capillary Pressure | X | X | X | | | X |
| Viscosity | X | X | X | | | X |
| Density and Specific Gravity | X | X | X | | | X |
| Mobility and Mobility Ratio | | | X | X | | |
| Capillary and Gravitational Numbers | | | X | X | | |
| Injection Zone Thickness, Area and Background Hydraulic Gradient† | X | X | X | X | | X |
| Number of Wells | | X | X | | | X |
| Skin Factor | | X | X | | | X |
| Diffusion Coefficient and Dispersivity | | | X | | | X |
| Sweep Efficiency | | | X | X | | |

* Covered in Section A3 of the Appendix and in Section 2.3.5 of the guidance.
† Covered in Sections 2.3.3 and 2.3.8 of the guidance.

### Pressure

Formation pressure measurements are required by the Class VI Rule as part of the logging, sampling and testing required prior to injection well operation [40 CFR 146.87(c)]. Information on obtaining pore pressure measurements is provided in Section A4 of this Appendix. Additional information regarding types of pressure transducers is available in Harrison and Chauvel (2007) and from commercial manufacturers as well as in the *UIC Program Class VI Well Testing and Monitoring Guidance.*

### Fracture Pressure

Field methods such as step rate tests (see Section 4.4 of the guidance) can provide the required calculated information about the fracture pressure of both the injection and the confining zone(s) [40 CFR 146.87(d)(1)] that will support injection pressure limits in the Class VI permit. As noted by USDOE (2008a), all geological formations will begin propagating fractures upon reaching a threshold pressure; this site-specific threshold-pressure constraint is an important consideration in estimating carbon dioxide storage capacity.

A step rate test is performed by first shutting-in the well long enough for the bottom hole pressure to reach equilibrium with the formation pressure. This can be done by using a downhole pressure gauge with a surface readout and watching the gauge until the pressure stabilizes. Theoretical calculations of the time required to reach equilibrium are also available. A fluid is then injected at a constant rate while the downhole pressure is measured. The injection rate is held constant for a period of time that depends on the formation permeability. A typical injection step would be 1 hour for low permeability formations (less than 5 mD) and ½ hour for permeable formations (greater than 10 mD) (USEPA, 1999). After one injection step is completed, the injection rate is raised and another step is conducted. The pressure increments should be great enough to yield measurable pressure differences in the well and should cover the entire planned injection range. Injection rate is plotted versus pressure. The plot should initially be linear. Injection steps are continued until at least two data points are gathered past the point where the plot shows deviations from the linear trend; the intersection point of the two curves is the fracture pressure. After the last injection step, the well is shut-in again and the instantaneous pressure is recorded.

### Temperature

Temperature sensors include mechanical (obsolete), thermistors (semiconductor material and highly sensitive), and resistance temperature detectors (wide temperature range and excellent accuracy). Prensky (1992) has described the determination of formation temperature and temperature gradients by the two-point or multiple-point average temperature gradient, whereby a linear relationship is assumed between the ambient surface temperature and the bottomhole temperature. Regression techniques can be used to calculate geothermal gradients for large data sets (Speece et al., 1985). Information regarding local and regional thermal gradients can also be obtained from reports generated by academic institutions and government agencies such as Nuccio and Condon (1996). The reader is referred to Bachu and Haug (2005) and Harrison and Chauvel (2007) for additional discussion and examples.

### Compressibility

Rock compressibility data for a given reservoir can be obtained from laboratory measurements on core samples. In situations where laboratory analysis is not practical, rock compressibility values can be estimated from porosity overburden pressure as described by Craft and Hawkins (1959). Harrell and Cronquist (2007) provide a substitute correlation for estimating rock compressibility that depends on rock properties. Other values of rock compressibility have been reported as case studies in the literature (e.g., Law and Bachu, 1996; Ross et al., 2009).

For carbon dioxide, equation-of-state models have been developed to predict carbon dioxide compressibility in multi-component two-phase systems (Firoozabadi et al., 1988). The compressibility of carbon dioxide can also be affected by SOx and NOx impurities, potentially affecting the estimated volume of carbon dioxide for storage; the reader is referred to Benson and Cook (2005) and Sass et al. (2005).

### Transmissibility

In the field, vertical permeability (or transmissibility) can be estimated by transient tests generally classified as vertical interference testing or vertical pulse testing (Earlougher, 1977). For these types of tests, part of the well may be used for injection and part of the well may be used for pressure observation as illustrated in Figure A-23. Earlougher (1977) described several applications of vertical testing using type-curve matching methods. Additional discussion of pressure testing and analysis in gas injection wells is provided by Matthews and Russell (1967).

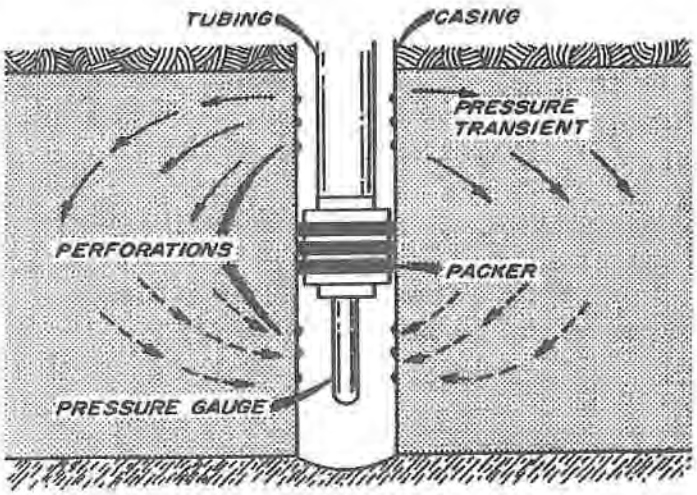



**Figure A-23: Vertical Interference or Pulse Test.**
From: Earlougher (1977); © SPE, 1977, reproduced with permission; further reproduction prohibited without permission.

### Interfacial Tension

Knowledge regarding the IFT between carbon dioxide and brine at in situ conditions is needed for precise measurements of capillary pressure, which in turn impacts relative permeability

(Bachu and Bennion, 2008). IFT is the surface tension at the interface of two immiscible fluids. Surface tension can be measured by a variety of laboratory methods such as the Du Noüy Ring method, the Wilhelmy Plate method, the spinning drop method, the pendant drop method, and other techniques. For additional information, see Bachu and Bennion (2008), del Rio and Neumann (1997), and Nobakht et al. (2007).

IFT can also be estimated mathematically by an empirical power function of pressure, whereby the values of the coefficient and exponent depend on temperature and water salinity (Bachu and Bennion, 2009). Bachu and Bennion (2009) provide parameters for a range of temperature and salinity conditions representative of in situ carbon dioxide-brine systems.

**Water Saturation**

Water saturation ($S_w$) describes the fraction of water in a given pore space. It depends on particle size and interparticle porosity (Lucia, 1992). Water saturation is most often determined from resistivity log measurements combined with knowledge of porosity, water resistivity, and shale volume (Alberty, 1992b). Water saturation values range from 0 (completely dry) to 1 (completely saturated). For additional information, see Alberty (1992b). Water saturation can also be determined from cores, for example from capillary pressure testing and other laboratory methods that involve expelling and measuring the formation water or other fluids (Ringen et al., 2001).

**Wettability**

In a solid, porous medium in contact with two or more fluid phases, wettability is the ability of one of the fluid phases (the wetting phase) to contact the solid preferentially over other phase(s) (Donaldson and Tiab, 2003) (Figure A-24). Wettability has important consequences for the relative permeability and Pe (see below) of pore fluids. These two parameters, in turn, affect the sealing and storage capacities of subsurface units (Chiquet et al., 2007; Li et al., 2005).

Wettability can be observed directly in the laboratory by measuring the contact angle between the solid portions of the formation and formation fluids (Chiquet et al., 2007) or can be inferred using either the Amott method or the USBM (United States Bureau of Mines) test (Donaldson and Tiab, 2003). There are no established techniques for downhole field measurement of wettability.

Salinity, temperature, and pressure can all affect wettability (Donaldson and Tiab, 2003), and wettability measurements will be most applicable if they are taken under conditions that approximate those found within the formation of interest. Additionally, micromodels are currently being developed that will be able to predict changes in wetting phase behavior as reservoir conditions change (PNNL, 2010). These may be useful if the reproduction of reservoir conditions is not possible in the laboratory.

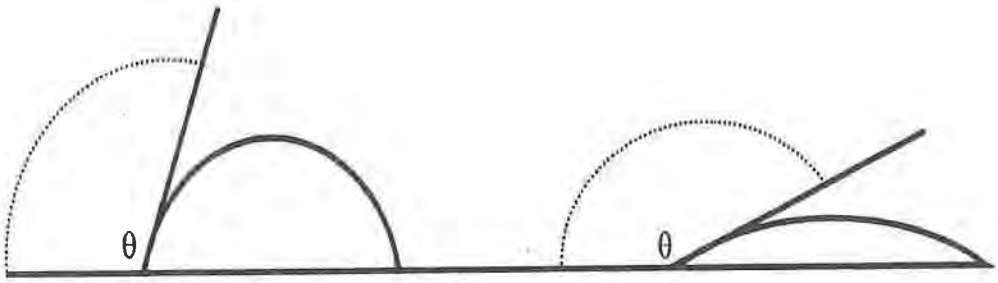



**Figure A-24: A Diagram Demonstrating Wetting Angle.**
The wetting angle is (180-θ).A fluid with a low wetting angle (at right) and a fluid with a moderate wetting angle (at left) on the same substrate. The fluid with the lower wetting angle would be the wetting phase if both fluids were present in the interconnected pore space of a solid made of the material upon which the wetting angle is being measured.

## Capillary Pressure

Capillary pressure is the minimum pressure required for an immiscible non-wetting fluid to overcome capillary and interfacial forces and enter pore space containing the wetting fluid. For carbon dioxide injection into a saline formation, the non-wetting fluid is carbon dioxide and the wetting fluid is the native brine. Capillary pressure has been shown to be affected by IFT and pore-size characteristics, as well as in situ pressure, temperature, and water salinity (Bachu and Bennion, 2008; Wollenweber et al, 2010). Capillary pressure relationships for porous media are typically reported as a function of the wetting phase saturation, and the capillary pressure curves generated by laboratory testing can be used to estimate the irreducible wetting phase saturation of the carbon dioxide/brine/rock system. Mathematical models have also been developed to predict capillary pressure relationships (e.g., Van Genuchten, 1980). Figure A-25 shows capillary pressure curves used in a simulation of carbon dioxide storage in saline formations (Ide et al., 2007).

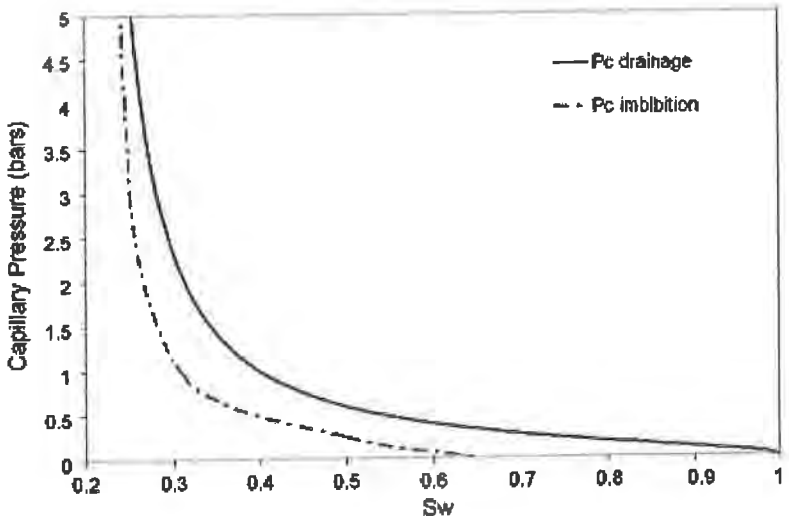



**Figure A-25: Capillary Pressure (Drainage and Imbibitions) as a Function of Wetting Phase Saturation.**
Generated using the Van Ganuchten Formulation. From: Ide et al. (2007); © Elsevier, reproduced with permission.

Reservoir capillary pressure relationships can be evaluated in the laboratory using the porous plate or centrifuge method (which uses actual or simulated fluids), or the mercury injection method (which simulates the wetting characteristics of the reservoir) (Vavra et al., 1992); descriptions are provided in Section A3.

Several techniques have been developed to measure capillary pressure in situ. Kuchuk et al. (2008) used a permanent downhole electrode array using time lapse resistivity in combination with pressure and flow readings to determine the capillary pressure and other properties of the formation downhole. Vinegar and Waxman (1984) mention the use of polarization logging measurements to determine pore size distribution. The capillary pressure is estimated from the pore size distribution. Others have used nuclear magnetism logging (NML) to estimate capillary pressure. NML has a very short effective range and returns a volume average of the capillary pressure. Freeman (1984) used wireline data consisting of pressure readings with water saturation and porosity data to estimate capillary pressure. Proett et al. (2003) proposed the use of data from a pump-out of drilling mud after drilling to determine capillary pressure. They measured pressure, flow, and fluid properties during the pump-out and used an algorithm to determine the capillary pressure.

Most of the available in situ methods determine the capillary pressure indirectly using data from downhole logs and algorithms based on certain assumptions. The accuracy of the methods likely depends on how closely the formation being tested resembles the assumptions made in developing the algorithm. These methods may not be as accurate as laboratory data, but generally can be done more quickly under in situ conditions.

**Viscosity**

Viscosity is a property of a fluid that measures resistance to shear stress. In the centimeter gram second (CGS) system, the unit of viscosity is the poise, which is 1 $g \cdot cm^{-1} \cdot s^{-1}$. The ratio of viscosity to density is called the kinematic viscosity, which has the units of stoke or $cm^2 s^{-1}$. Viscosity can be measured in the laboratory with various types of viscometers (e.g., u-tube, falling piston, oscillating, vibrational, rotational, bubble, and other types of viscometers). Close temperature control is essential for accurate measurements. ASTM International maintains standard methods for viscosity measurements (www.astm.org).

In situ, real-time direct measurements of viscosity can be collected at reservoir conditions using a wireline formation tester such as a tool described by O'Keefe et al. (2007). The tool measures the thermophysical properties of the fluid by the vibration of a mechanical resonator submersed in the flowline fluid, and the instrument measures viscosity in the range of 0.25 to 50 cP with a reported accuracy of ±10%.

**Density and Specific Gravity**

In the field, the in situ density of the formation fluid can be measured during open-hole sampling of reservoir fluids using a wireline formation tester (O'Keefe et al., 2007). The density of subsurface formations can be determined by formation density and combined neutron and density logs (Hancock, 1992; Section A7) and the borehole gravity meter (Herring, 1992).

Carbon dioxide density can be estimated by the Peng-Robison equation of state (Peng and Robinson, 1976) using available software such as the CMG Winprop module (Computer Modeling Group, Ltd., Canada) as described by Nobakht et al. (2007). Carbon dioxide density increases with depth (local pressure gradient) (Figure A-26) and decreases with increasing geothermal gradient (Kovscek, 2002). Brine density can be predicted at in situ temperature, salinity, and pressure conditions by several algorithms as discussed by Adams and Bachu (2002). Other algorithms for predicting density of carbon dioxide-brine mixtures are described by Hassanzadeh et al. (2008).

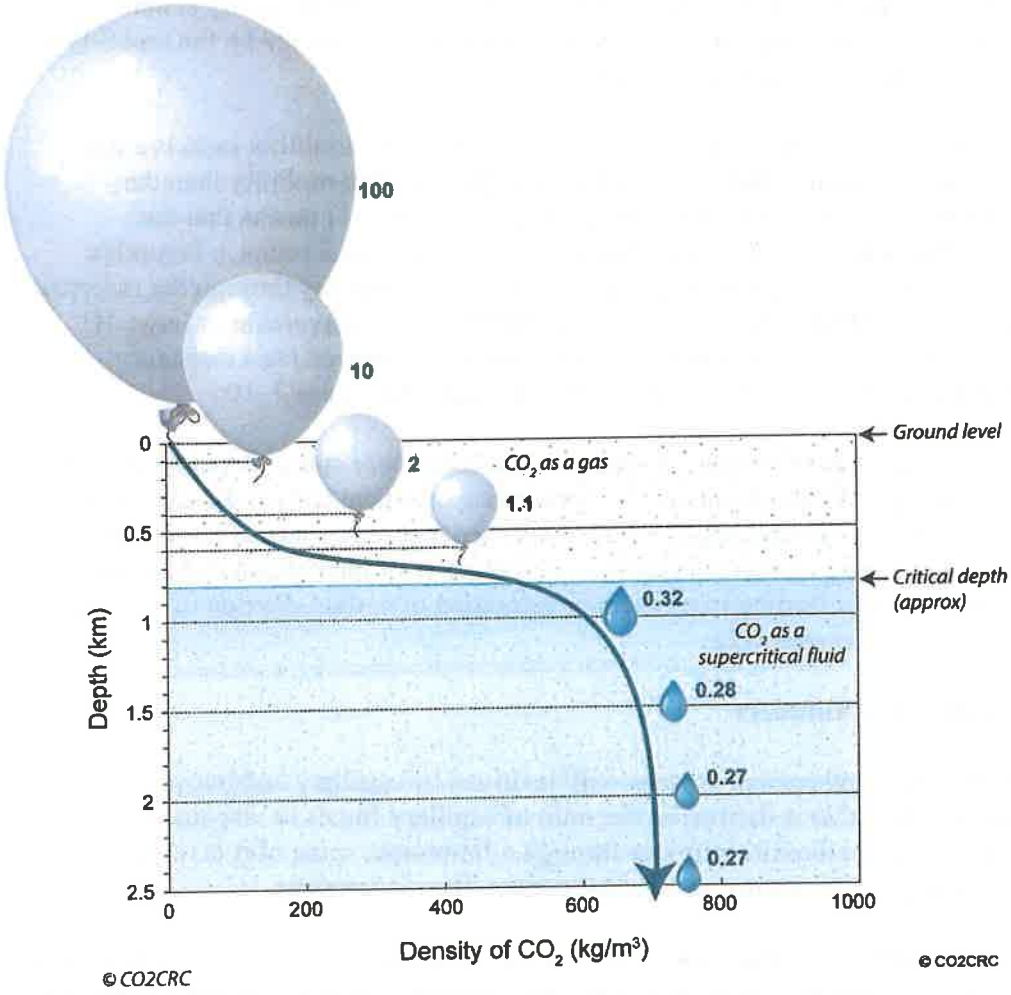



**Figure A-26: Density of Carbon Dioxide as a Function of Depth.**
© CO2CRC, 2010, reproduced with Permission.

## Mobility and Mobility Ratio

The mobility of a phase is defined as its relative permeability divided by its viscosity (Warner, 2007; Kopp et al., 2009a; 2009b; Craig, 1980). Mobility combines a rock property, relative permeability (dependent only on the saturation of the two fluid phases and the capillary pressure)

(Bachu and Bennion, 2008), with a fluid property, viscosity. Mathematically, mobility is expressed as:

$$\lambda_i = \frac{k_i}{\mu_i} \qquad \text{Equation 7}$$

where $\lambda_i$ is the mobility of fluid phase $i$, $k_i$ is the effective permeability of fluid phase $i$, and $\mu_i$ is the viscosity of fluid phase $i$. (Relative permeability is discussed in Section 2.3.5 of the guidance and in Section A3 of this Appendix.) Low-viscosity fluids generally have high mobility and high-viscosity fluids generally have low mobility. The mobility ratio (*M)* generally is defined as the mobility of the displacing phase (carbon dioxide for sequestration) divided by the mobility of the displaced phase (e.g., fluid in a saline formation).

*M* is considered to be either "favorable" or "unfavorable." A favorable mobility ratio is a low value ($M \leq 1$), which means that the displaced fluid (water) has a higher mobility than the displacing phase (carbon dioxide). An unfavorable mobility ratio ($M > 1$) means that the displacing fluid has a higher mobility than the displaced fluid. In practical terms, a favorable mobility ratio means that the displaced water phase can move more quickly through the reservoir rock than the displacing carbon dioxide phase. More importantly, an unfavorable or large *M* value tends to give rise to rapid migration of carbon dioxide along paths of least resistance. Typical values for *M* for reservoir conditions of interest in sequestration are 2–10.

Viscous fingering can cause carbon dioxide to bypass much of the pore space, depending on the heterogeneity and anisotropy of rock permeability, because supercritical carbon dioxide is much less viscous than water and oil. Benson and Cook (2005) noted that only some of the resident oil or water will be displaced during carbon dioxide injection because of the comparatively high mobility of carbon dioxide, thus leading to an average saturation of carbon dioxide in the range of 30–60% during storage in the reservoir.

**Capillary and Gravitational Numbers**

In addition to mobility, the displacement process will be driven by capillary and buoyancy forces. The capillary number (*Ca*) is defined as the ratio of capillary forces to viscous forces (Kopp et al., 2009a). As carbon dioxide migrates through a formation, some of it is retained in the pore space by capillary forces, known as residual carbon dioxide trapping.

The *Ca* is defined as the ratio of capillary forces to viscous forces and can be used to characterize the extent of carbon dioxide trapping in an injection zone. As carbon dioxide migrates through a formation, some of it is retained in the pore space by capillary forces, known as residual carbon dioxide trapping. Kopp et al. (2009a) examined the effect of *Ca* on storage capacity and concluded that a higher *Ca* is expected to be associated with a lower average carbon dioxide saturation. This expectation is based on the occurrence of stronger capillary forces associated with higher *Ca* values, thus leading to a smoother displacement front during the imbibition process, and resulting in a lower, non-wetting phase (carbon dioxide) saturation in the swept area behind the brine displacement front.

The Gravitational number (*Gr)* is defined as the ratio of the gravitational (buoyancy) forces to the viscous forces (Kopp et al., 2009a; Bryant and Lake, 2005, Chp 18). The type of fluid in the reservoir will influence the magnitude of the buoyancy forces that drive vertical flow of carbon dioxide in an injection zone (Benson and Cook, 2005). For example, the comparatively large density difference between carbon dioxide and formation water creates strong buoyancy forces that drive carbon dioxide upwards. In oil reservoirs, the density difference and buoyancy forces are less, particularly if oil and carbon dioxide are miscible. In gas reservoirs, carbon dioxide migrates downward because carbon dioxide is more dense than natural gas. *Gr* can therefore be used to predict the tendency of flow direction during the injection phase.

**Number of Wells**

Projects that employ multiple injection wells at a site can accelerate the volume of carbon dioxide injected into storage reservoirs. According to Michael et al. (2010), comparable carbon dioxide injection rates can be achieved in a low-permeability storage reservoir as in a high-permeability reservoir by increasing the number of injection wells. Bachu et al. (2007) and Gibson-Poole et al. (2005) also discussed the benefits of increasing the number of injection wells to improve injectivity in low-permeability rocks. However, if a storage reservoir already has a number of wells that penetrate the reservoir, then there may be a risk of leakage during carbon dioxide injection. For example, Gasda et al. (2004) studied clusters of wells that were previously drilled for hydrocarbon extraction in the Viking Formation, and they concluded that the number of wells that could potentially serve as leakage pathways during injection depends upon whether the injection well is located in an area with a high or low density of pre-existing wells.

**Skin Factor**

The skin effect or skin factor represents restricted entry into the formation associated with damaged formation near the well bore. In well bores where skin effects are a concern, injectivity can be enhanced by stimulating (e.g., by acid treatment) or by performing a workover (e.g., added perforations) of the injection well (Gidley, 1992; Osborne, 1992).

The concept of skin effect is illustrated in Figure A-27, which shows the pressure distribution from the well bore (bottomhole) flowing pressure, $p_{wf}$, to the reservoir pressure, $p_R$ for ideal and actual conditions (Golan, 1992). The difference between actual and ideal conditions in the damaged near-well bore region corresponds with the pressure drop associated with the skin effect. For additional information, including estimation of the skin factor, see Golan (1992), Lancaster (1992), Lee (1992), and Lee (2007).

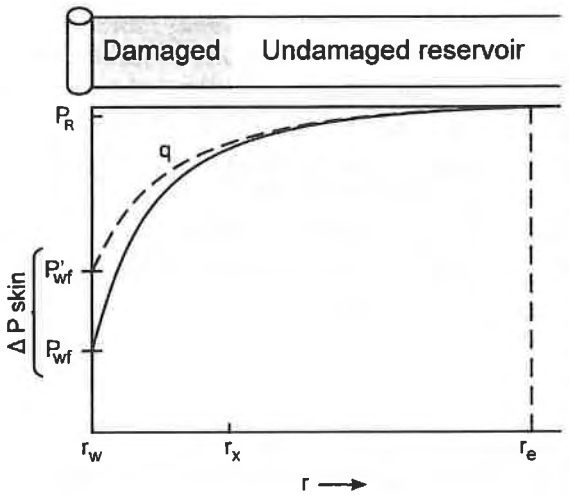



**Figure A-27: A Schematic of the Skin Effect.**
PR = Reservoir Pressure, Pwf = well bore (bottomhole) flowing pressure, P'wf = ideal well bore flowing pressure, ΔPskin = P'wf – Pwf, rw = well bore radius, ra = radius of skin zone, re = radius of drainage. q represents pressure profile under steady state conditions with no skin effect. From: Golan (1992); © AAPG 1992, by permission of the AAPG whose permission is required for further use.

### Diffusion Coefficient and Dispersivity

Molecular diffusion is defined as the net transport of a molecule in a liquid or gas medium as a result of intermolecular collisions and driven by a gradient through the medium such as temperature, pressure, or concentration (Tucker and Nelken, 1990). The diffusion coefficient or diffusivity is defined as the ratio of the net mass flux per unit gradient, and the rate of diffusion is a function of the properties of the compound as well as the medium through which the compound moves (Tucker and Nelken, 1990). Dispersion is controlled by the intensity of turbulent mixing rather than molecular diffusion. Methods for estimating values of diffusion coefficient and dispersivity are summarized by Tucker and Nelken (1990).

### Sweep Efficiency

Volumetric sweep efficiency $E_V$ is a term commonly used in the petroleum industry to represent the ratio of the volume of fluid contacted by a displacing agent to the volume of fluid originally in place. Values of $E_V$ range from 0 to 1 (or 0 to 100%) and are typically in the range of 40% to 60% for water flooding processes for hydrocarbon extraction from reservoirs (Lake, 1989). Volumetric sweep efficiency can be further defined as the product of areal sweep efficiency $E_A$ and vertical sweep efficiency $E_I$ whereby (Lake, 1989; Craig, 1980; Warner, 2007):

$$E_V = E_A E_I \qquad \text{Equation 8}$$

Areal sweep efficiency $E_A$ is generally used in the petroleum industry to represent the ratio of the area contacted by the displacing agent to the total area, and vertical sweep efficiency $E_I$ is used to characterize the ratio of the cross-sectional area contacted by the displacing agent to the total cross-sectional area (Lake, 1989; Craig, 1980; Warner 2007). Several correlations have been

developed and reported in the petroleum literature for estimating sweep efficiency through porous media for various well field injection patterns and simplifying assumptions (Craig, 1980).

## Methods for Storage Capacity Estimation

Methods for estimating carbon dioxide storage capacity can be divided into static and dynamic models (USDOE, 2008a). Static models are typically used for estimating carbon dioxide storage capacity prior to injection, although static models can also be used for estimating storage after injection commences. Dynamic models are typically employed after injection commences. The application of static and dynamic models for estimating carbon dioxide storage capacity is based on methods routinely used for estimating petroleum reserves, ground water resources, underground natural gas storage, and in the UIC Program. Parameters typically used to calculate storage capacity are listed in Table A-3. Additional discussion regarding static and dynamic modeling methods for estimating carbon dioxide storage is provided below.

### Static Models

Static models are typically used for estimating carbon dioxide storage capacity prior to the startup of injection. Static models, which include volumetric and compressibility methods, rely on parameters that are directly related to the geologic description of the area for injection such as porosity, area, thickness and compressibility (USDOE, 2008a and 2008b). Standardized methodologies for estimating carbon dioxide storage capacity in geological media (coal beds, oil and gas reservoirs, and deep saline formations) using static models have been adopted the Carbon Sequestration Leadership Forum (http://www.cslforum.org). These methodologies, as described by Bachu et al. (2007), are summarized below.

#### *Coal Beds*

The carbon dioxide storage capacity of a suitable coal bed can be estimated based on analogy with estimating the total gas in place (capacity) and reservoir deliverability (White et al., 2005). For a coal bed with gas already adsorbed by the coal, the initial gas in place (IGIP) can be calculated by the relation (Bachu et al., 2007; White et al., 2005):

$$\mathbf{IGIP} = \boldsymbol{A} \times \boldsymbol{h} \times \boldsymbol{n_C} \times \boldsymbol{G_C} \times (\mathbf{1} - \boldsymbol{f_a} - \boldsymbol{f_m}) \qquad \text{Equation 9}$$

where $A$ is the area and $h$ is the effective thickness of the coal zone, $n_C$ is the bulk coal density (generally assumed to be 1.4 t/m$^3$), $G_C$ is the coal gas content, and $f_a$ and $f_m$ are the ash and moisture weight content fractions of the coal, respectively. The coal gas adsorption capacity can be assumed to follow a pressure-dependent Langmuir isotherm in the form:

$$G_{CS} = V_L \frac{P}{P+P_L} \qquad \text{Equation 10}$$

where $G_{CS}$ is the gas content at saturation, $P$ is the pressure, and $V_L$ and $P_L$ are Langmuir volume and pressure, respectively. These relations are based on the assumptions that coal has a high affinity for carbon dioxide, 100% saturation is achieved, and all of the coal is accessed by the

injected carbon dioxide. To estimate the *effective* carbon dioxide storage capacity in coal beds, the analogy is drawn to the estimation of the producible gas in place (PGIP) from the IGIP with the relation:

$$\mathbf{PGIP} = R_f \times C \times \mathbf{IGIP} \qquad \text{Equation 11}$$

where $R_f$ is the recovery factor and $C$ is the completion factor (or effective contact area). The completion factor is an estimate of the coal thickness that will contribute to gas production or storage. It should be noted that there are limited field data for quantification of the recovery factor (Bachu et al., 2007).

***Oil and Gas Reservoirs***

Calculation of carbon dioxide storage capacity for depleted oil and gas reservoirs is based on the assumption that the same storage volume is available for injected carbon dioxide as was previously occupied by the extracted hydrocarbons (Bachu et al., 2007). This condition may be altered, for example, in the case of formation water invading a pressure-depleted reservoir. Another assumption is that carbon dioxide injection will continue until the pressure is restored to its original reservoir condition. As discussed previously, the re-pressurization of a depleted reservoir may be problematic with regard to the integrity of the reservoir and/or cap rock; thus, the maximum sustainable pore pressure may need to be lower than the original reservoir pressure.

An equation for calculating the carbon dioxide storage capacity in oil and gas reservoirs is based on the geometry of the reservoir (Bachu et al., 2007):

$$M_{CO_2t} = \rho_{CO_2r}\left[R_f A h \emptyset (1 - S_w) - V_{iw} + V_{pw}\right] \qquad \text{Equation 12}$$

where:

$M_{CO2t}$ = theoretical mass storage capacity for carbon dioxide in a reservoir at in situ conditions [M]
$\rho_{CO2r}$ = carbon dioxide density at reservoir conditions [$ML^{-3}$]
$R_f$ = recovery factor [dimensionless]
$A$ = reservoir area [$L^2$]
$h$ = thickness [L]
$\emptyset$ = porosity [dimensionless]
$S_w$ = water saturation [dimensionless]
$V_{iw}$ = volume of injected water [$L^3$]
$V_{pw}$ = volume of produced water [$L^3$]

Bachu et al. (2007) provide alternative relations that account for fluid compressibility in gas reservoirs:

$$M_{CO_2t} = \rho_{CO_2r} R_f (1 - F_{IG}) \times \mathbf{OGIP} \times \left[\frac{(P_s Z_r T_r)}{P_r Z_s T_s}\right] \qquad \text{Equation 13}$$

and for fluid compressibility in oil reservoirs:

$$M_{CO_2t} = \rho_{CO_2r} \times \left[\frac{R_f OOIP}{B_f} - V_{iw} + V_{pw}\right] \qquad \text{Equation 14}$$

where OGIP and OOIP represent the original gas and oil in place at surface conditions, $F_{IG}$ is the fraction of injected gas, $B_f$ is the formation volume factor that converts oil volume from standard conditions to in situ conditions, $V_{iw}$ and $V_{pw}$ are the volumes of injected and produced gas, $P$, $T$, and $Z$ are pressure, temperature, and gas compressibility, respectively, and the subscripts $r$ and $s$ represent reservoir and surface conditions.

The effective storage capacity can be influenced by the historical operation of the oil and gas reservoir (i.e., pressure depletion and formation water influx), thus reducing the total available capacity for carbon dioxide storage. The effective carbon dioxide storage capacity can also be influenced by carbon dioxide mobility, fluid density differences, reservoir heterogeneity, and residual water saturation. These influences can be combined to represent an efficiency factor for estimating an effective storage capacity (Bachu et al., 2007; Doughty and Pruess, 2004):

$$M_{CO_2e} = C_m C_b C_h C_w C_a M_{CO_2t} \equiv C_e M_{CO_2t} \qquad \text{Equation 15}$$

where $M_{CO2e}$ is the effective reservoir carbon dioxide storage capacity, $M_{CO2t}$ is the theoretical mass storage capacity of carbon dioxide in a reservoir at in situ conditions, and the coefficient $C_e$ is a single effective capacity coefficient that incorporates the cumulative effects of the other coefficients represented by subscripts $m$ for mobility, $b$ for buoyancy, $h$ for heterogeneity, $w$ for water saturation, and $a$ for formation strength. Currently, limited data are available for estimating values for $C_e$.

***Deep Saline Formations***

For deep saline formations, carbon dioxide storage capacity estimates can be developed for structural and stratigraphic traps, residual gas traps, solubility traps, mineral traps, and hydrodynamic traps (Bachu et al., 2007) as described below.

For *structural and stratigraphic traps*, the formation is initially saturated with water (instead of hydrocarbons), and the theoretical volume available for carbon dioxide storage, $V_{CO2t}$, can be calculated by the relation (Bachu et al., 2007):

$$V_{CO2t} = Ah\emptyset(1 - S_{wirr}) \qquad \text{Equation 16}$$

where $A$ is the reservoir area, $h$ is thickness, $\phi$ is porosity, and $S_{wirr}$ is the irreducible water saturation. Similar to oil and gas reservoirs, the effective carbon dioxide storage volume, $V_{CO2e}$, can be estimated by:

$$V_{CO2e} = C_c V_{CO2t} \qquad \text{Equation 17}$$

where $C_c$ is a capacity coefficient that represents the effects of heterogeneity, buoyancy, and sweep efficiency, and it can be determined through numerical simulation and/or field study.

Okwen et al. (2010) developed a method for estimating carbon dioxide storage efficiency applicable to structural and stratigraphic trapping that can be characterized by carbon dioxide mobility, buoyancy forces, and residual saturation. The mass of carbon dioxide that corresponds to the effective storage volume can be estimated by multiplying $V_{CO2e}$ by carbon dioxide density at storage temperature and pressure conditions.

*Residual gas traps* form within a saline formation when injected carbon dioxide migrates through the porous media and water moves back into the pore space. For example, during injection, carbon dioxide can migrate laterally and upward due to buoyancy forces. Once injection stops, carbon dioxide can continue to migrate, water enters the pore space, and residual, immobile carbon dioxide is left behind the plume (Juanes et al., 2006). Qi et al. (2009) proposed an injection strategy whereby carbon dioxide and brine are injected together and thus maximize storage efficiency in formations. The theoretical carbon dioxide storage volume of the residual gas traps can then be estimated by the relation (Bachu et al., 2007):

$$\boldsymbol{V_{CO2t} = \Delta V_{trap} \emptyset S_{CO2t}} \qquad \text{Equation 18}$$

where $\Delta V_{trap}$ represents the carbon dioxide-invaded rock volume and $S_{CO2t}$ is the trapped carbon dioxide saturation. $\Delta V_{trap}$ and $S_{CO2t}$ can be estimated through numerical simulations (e.g., Juanes et al., 2006). The mass of stored carbon dioxide can be estimated by multiplying the storage volume by carbon dioxide density at in situ conditions.

*Solubility trapping* of carbon dioxide is a relatively slow process and is assumed to become significant after cessation of injection (Bachu et al., 2007). Although dissolution of free-phase carbon dioxide occurs rapidly, and water in direct contact with injected carbon rapidly becomes saturated with carbon dioxide, the available contact area between free-phase carbon dioxide and unsaturated water is small, greatly limiting solubility trapping. When migration of carbon dioxide has stopped (thus reducing the influence of dispersion), then diffusion, which is very small, becomes the only mechanism enabling unsaturated water to contact carbon dioxide unless the water itself is moving. If a hydraulic gradient within the formation replaces the carbon dioxide-saturated water with unsaturated water, or the rock permeability and thickness are conducive to the development of convection within the pore system, then carbon dioxide will continue to dissolve into the unsaturated water that passes the contact area. The theoretical mass carbon dioxide storage capacity can be estimated using a simplified relation and average values for formation thickness, porosity, and carbon dioxide content in formation fluid as (Bachu et al., 2007):

$$\boldsymbol{M_{CO2t} = Ah\emptyset\left(\rho_S X_S^{CO2} - \rho_0 X_0^{CO2}\right)} \qquad \text{Equation 19}$$

where $\rho$ is the density of the formation water, $X^{CO2}$ is the mass fraction carbon dioxide content in formation water, and the subscripts *0* and *S* represent initial and saturated carbon dioxide content, respectively. Similar to the relations for coal beds and oil and gas reservoirs, the mass carbon

dioxide storage capacity can be estimated by multiplying the theoretical value by a coefficient that includes the effects of spreading and dissolution of carbon dioxide in the whole formation. However, for a site-specific application, the theoretical carbon dioxide storage capacity associated with solubility trapping should be assessed by numerical modeling (Bachu et al., 2007).

*Mineral trapping* of carbon dioxide depends on the chemical composition of the rock matrix and formation waters, in situ temperature and pressure conditions, the interface between the mineral grains and the formation water containing dissolved carbon dioxide, and the flow of fluids past the interface (Bachu et al., 2007). For site-specific applications, the amount and time frame of carbon dioxide storage associated with mineral trapping should be estimated by numerical modeling and supported, where possible, with laboratory testing and field data.

*Hydrodynamic trapping* of carbon dioxide is a combination of mechanisms (structural and stratigraphic trapping, dissolution, mineral precipitation, residual gas trapping) operating simultaneously, but at different rates, while an injected plume of carbon dioxide expands and migrates in a storage reservoir (Bachu et al., 2007). Carbon dioxide storage capacity associated with hydrodynamic trapping therefore needs to be evaluated at a specific point in time as the sum of the component mechanisms by numerical simulations.

## Dynamic Models

Dynamic models are generally considered applicable for estimating carbon dioxide storage capacity after initiation of carbon dioxide injection (USDOE, 2008a). They would therefore be useful after receiving a permit to operate a Class VI injection well, as a way to monitor storage capacity over time. Dynamic models include decline curve analysis, material balance, and reservoir simulation.

### *Decline Curve Analysis*

The decline curve analysis is a dynamic method for estimating subsurface storage volumes based on a simple exponential relation of injection rate and time (USDOE, 2008a):

$$q_{CO2} = q_{CO2i}e^{-Dt} \qquad \text{Equation 20}$$

where $q_{CO2}$ is the carbon dioxide injection rate and the subscript $i$ denotes the initial injection rate, $D$ is a decline coefficient that represents flow characteristics of the formation, and $t$ represents time. Carbon dioxide storage capacity, $G_{CO2}$, can be estimated by the relation:

$$G_{CO2} = \frac{(q_{CO2i} - q_{CO2})}{D} \qquad \text{Equation 21}$$

where the decline coefficient $D$ is determined from the exponential decline equation for a given injection rate history. This decline curve analysis is generally considered applicable to individual wells or entire fields, provided the exponential trend exists. Additional information regarding theory and application of decline curve analysis techniques is provided in Arps (1962), Campbell

and Campbell (1978), and Li and Horne (2003). This relation can be used to estimate carbon dioxide storage capacity likely to be attained with continued injection.

***Material Balance***

The material balance method for estimating carbon dioxide storage capacity is based on the relationship between cumulative carbon dioxide injection and the corresponding pore pressure as a function of time (USDOE, 2008a). The relation is analogous to the p/z plots used in gas reservoirs and underground gas storage reservoirs (e.g., Harrell and Cronquist, 2007), where z is the gas compressibility factor of carbon dioxide evaluated at pressure p. A straight line is expected on a plot of p/z versus cumulative carbon dioxide gas injection. The carbon dioxide storage capacity can be estimated from this plot by extrapolating the curve and determining the value of cumulative carbon dioxide gas injection that corresponds to the maximum p/z value at capacity pressure.

***Reservoir Simulation***

Reservoir simulation is considered the most advanced method for estimating carbon dioxide storage capacity, provided the input data adequately represent the injection formation and operating conditions (USDOE, 2008a). The purpose of simulation is to estimate field performance under one or more operational schemes (Batycky et al., 2007). For example, the simulation can be used to study actual field or pilot performance and thus improve estimates for carbon dioxide storage capacity. As discussed previously, reservoir simulation can be also used to develop estimates of specific carbon dioxide storage trapping mechanisms (e.g., hydrodynamic trapping). Reservoir simulation is the most resource-intensive method of estimating carbon dioxide storage. However, it requires the input of data at a scale and resolution appropriate for obtaining results at formation scale. Additional discussion regarding reservoir simulation is provided in the *UIC Program Class VI Well Area of Review Evaluation and Corrective Action Guidance*.

## A8. Information to Support Pre-Injection Logging and Testing

To support submittal of the well logs required at 40 CFR 146.87, this section describes various types of logs that can be used during formation testing. This information supplements Section 4.1 of the guidance.

**Gamma ray logs** measure the natural radioactivity emitted by radioactive isotopes (e.g., potassium, thorium, and uranium) in minerals. Gamma ray logs are the most common log run for stratigraphic correlation because they are relatively unambiguous and easy to interpret by a qualified analyst (Evenick, 2008) (Figure A-28). The intensity of radioactivity is measured by a scintillation counter in American Petroleum Institute (API) units (Evenick, 2008). Because clays tend to have higher concentrations of potassium and thorium than other minerals, gamma ray logs can provide information on the clay and mica content (or "shaliness") of the formation (Johnson and Pile, 2006). The log curve can also be compared to a section with 100% or 0% shale saturation to determine a "shale baseline" and calculate the percent of shale present in other regions of the log (Johnson and Pile, 2006).

The spectral gamma ray tool, an advanced version of the gamma ray tool, allows for the identification of gamma ray counts caused by specific elements. This allows for the removal of gamma ray counts caused by uranium, which is often deposited by formation fluids, although it is also found in some sandstones and carbonates (Johnson and Pile, 2006). Gamma ray logs are virtually unaffected by changes in porosity (Johnson and Pile, 2006).

**Spontaneous potential (SP) logs** show naturally occurring differences in electric potential (usually measured in millivolts, mV) due to salinity differences between the drilling mud and formation fluids, and between formation fluids in different units (Johnson and Pile, 2006). The SP response can be used to correlate formations between wells, determine permeability, and estimate formation fluid resistivity (Evenick, 2008; Alberty, 1992b; Hancock, 1992). Because SP logs reflect differences in electric potential, contrasts in permeability and salinity between formations are critical (see Figure A-28). Although not good for identifying general lithology, SP logs can help in differentiating shales from carbonates or sandstones, and they work best when shale layers separate more permeable formations (Evenick, 2008; Johnson and Pile, 2006). Hancock (1992) describes other conditions where SP logs are not applicable or difficult to interpret.

The SP response typically varies by lithology and can be used to correlate formations between wells, determine permeability, and estimate formation fluid resistivity (Alberty, 1992b; Hancock, 1992). Because SP logs reflect differences in electric potential, contrasts in permeability and salinity between formations are critical (see Figure A-28). SP logs are influenced by the presence of impermeable limestones and work best when shale layers separate more permeable formations (Johnson and Pile, 2006). Hancock (1992) describes other conditions where SP logs are not applicable or difficult to interpret.

SP logs can be challenging to correlate because they are not good indicators of lithologic boundaries (Evenick, 2008). With the advent of other more specialized and better resolved techniques, the role of SP logs has been gradually diminished (Blackbourn, 1990).

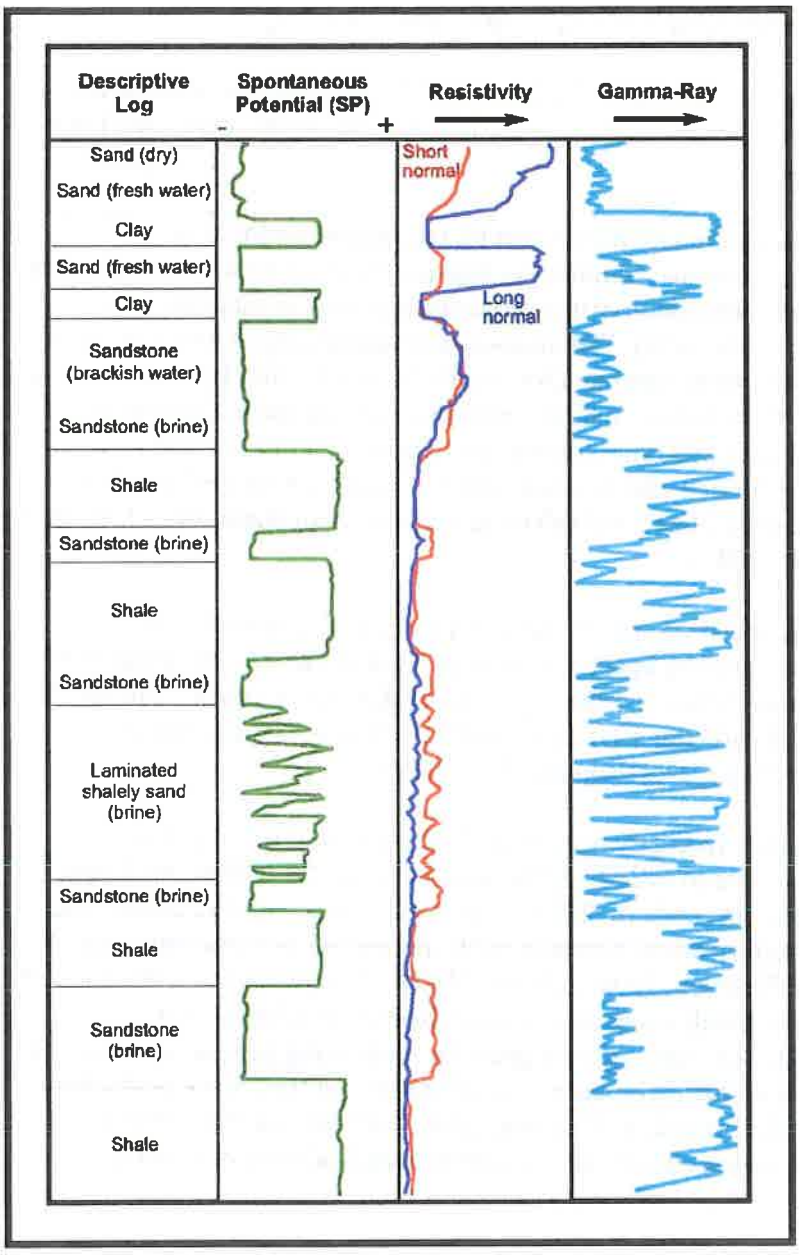



**Figure A-28: Example of Geophysical Well Logs.**

**Caliper logs** show the measured diameter of the borehole. A caliper log can be used as a crude lithologic indicator by comparing the caliper reading to the size of the drill bit, as shown in Table A-4. Different rock and sediment types show different responses on the caliper log, depending on properties such as permeability and level of consolidation. Hancock (1992) describes the various responses that indicate specific lithologies. In general, shales, coals, and bentonites tend to wash out with drilling (Evenick, 2008).

**Table A-4: Interpreting Borehole Condition from Caliper Readings.**

| | Well Bore Larger than Expected | Well Bore as Expected | Well Bore Smaller than Expected |
|---|---|---|---|
| Indicated by | Caliper > Bit size | Caliper = Bit size | Caliper < Bit size |
| Possible Rock Characteristics | Soft or Fractured | Hard / Unfractured | Permeable |
| Possible Cause | Wash Out | | Mud-cake Accumulation |

## Porosity Logs

Porosity logs are a class of geophysical logs that indirectly measure formation porosity, and include density, neutron, sonic, and magnetic resonance logs, which are individually described below. Typically, multiple logs are run simultaneously, and the results from the multiple logs can be interpreted to estimate porosity and formation lithology (AAPG, 2004). All of these logs would not necessarily need to be run to comply with the Class VI Rule porosity logging requirements. Rather, a suite of porosity logs may be run based on site conditions, owner or operator preferences, and as approved by the UIC Program Director.

- ***Sonic logs*** record the sound wave transit time between a source and receiver(s) through the rock formation. The transit time depends on the lithology and porosity of the formation, so it is necessary to determine or estimate lithology to measure porosity from a sonic log. Lithology may be known through core analysis, interpretation of other logs, or interpretation of sonic logs simultaneously with other porosity logs. For shale-free lithologies, the transit time is frequently related to porosity and mineral fractions. Estimates of porosity provided by sonic logs are categorized as primary porosities which excludes vugs and fractures that can be important in many carbonate sequences. Additionally, the presence of hydrocarbons in a formation will increase the interval transit time, and this effect is corrected for prior to estimating porosity (AAPG, 2004); owners or operators of GS projects in depleted reservoirs should bear this in mind when selecting porosity logs;
- ***Density logs*** measure the bulk density of the formation, including the densities of the rock and the pore fluid. The logs reflect changes in the rock composition, the porosity, and the contained fluids. The logging device consists of a gamma ray source and two detectors; this arrangement allows the results to be compensated for variable rugosity (roughness) and mud-cake thickness (Johnson and Pile, 2006). Porosity determination requires an average value for matrix density which may vary both between and within formations. Bulk densities from logs and laboratory-measured core porosities can be used to establish correlations between density and porosity for a particular interval. An example with density log included as a component of a porosity log is presented in Figure A-29;
- ***Neutron logs*** measure the hydrogen concentration in both pore fluids and in chemically bound water. In shale-free formations, hydrogen atoms are present primarily in the water phase, and neutron logs therefore measure aqueous fluid-filled porosity. Low measurement results from the neutron logger correspond to larger porosity values.

Similar to density logs and sonic logs, neutron log responses are dependent on formation lithology. Additionally, the presence of gas within the pores affects the neutron log response and also needs to be considered in selecting appropriate logs. The neutron log measure of porosity is overestimated in shales because hydrogen atoms are present within the clay structure in addition to pore water. An example neutron porosity log included as a component of a porosity log is presented in Figure A-29; and

- ***Nuclear magnetic resonance*** (NMR) logs measure the free precession of proton nuclear magnetic moments in the earth's magnetic field. Hydrogen protons in solids or bound to surfaces show differences in responses compared to bulk fluids in pore space. Therefore, these logs can be used to determine residual water saturation, the effective porosity, permeability, pore size distribution, and residual oil saturation. Compared to the other porosity logging techniques discussed below, NMR logging porosity estimates are insensitive to formation lithology type, and therefore the NMR log may be run alone as a porosity log.

As noted above, the response of sonic logs, density logs, and neutron logs depend not only on the porosity of the formation, but also the lithology. Common lithologies that may be encountered include sandstone, limestone, dolomite, anhydrite, and salt. Accurately calculating porosity from the measurement response requires that the lithology at each depth be known or estimated based on core analyses or other available information (see Sections 2.3.4 and 4.2). However, both lithology and porosity can be inferred if at least two of the above-mentioned logs are run and interpreted concurrently. This is possible using established relationships for the response from several logging tools. See AAPG (2004) for detailed information regarding porosity log measurement combinations and interpretation.

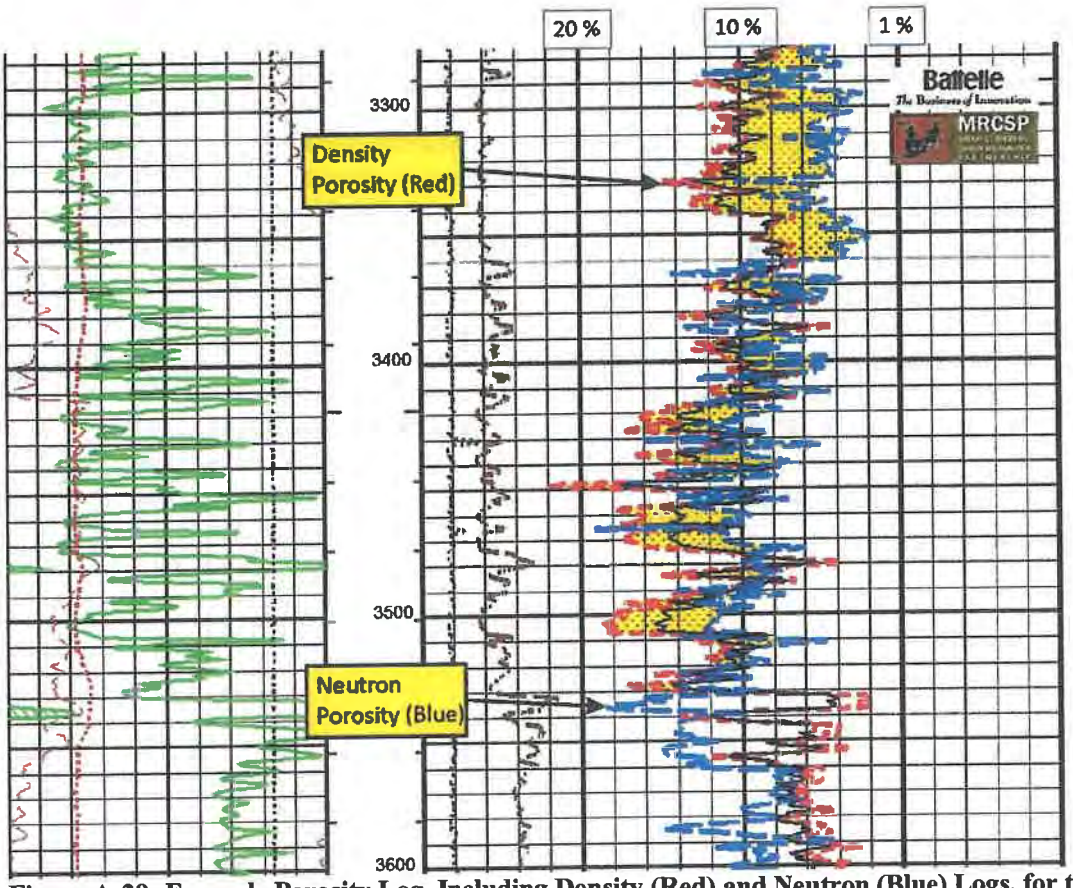



**Figure A-29: Example Porosity Log, Including Density (Red) and Neutron (Blue) Logs, for the Cincinnati Arch Validation Test Well.**
From: Battelle Memorial Institute.

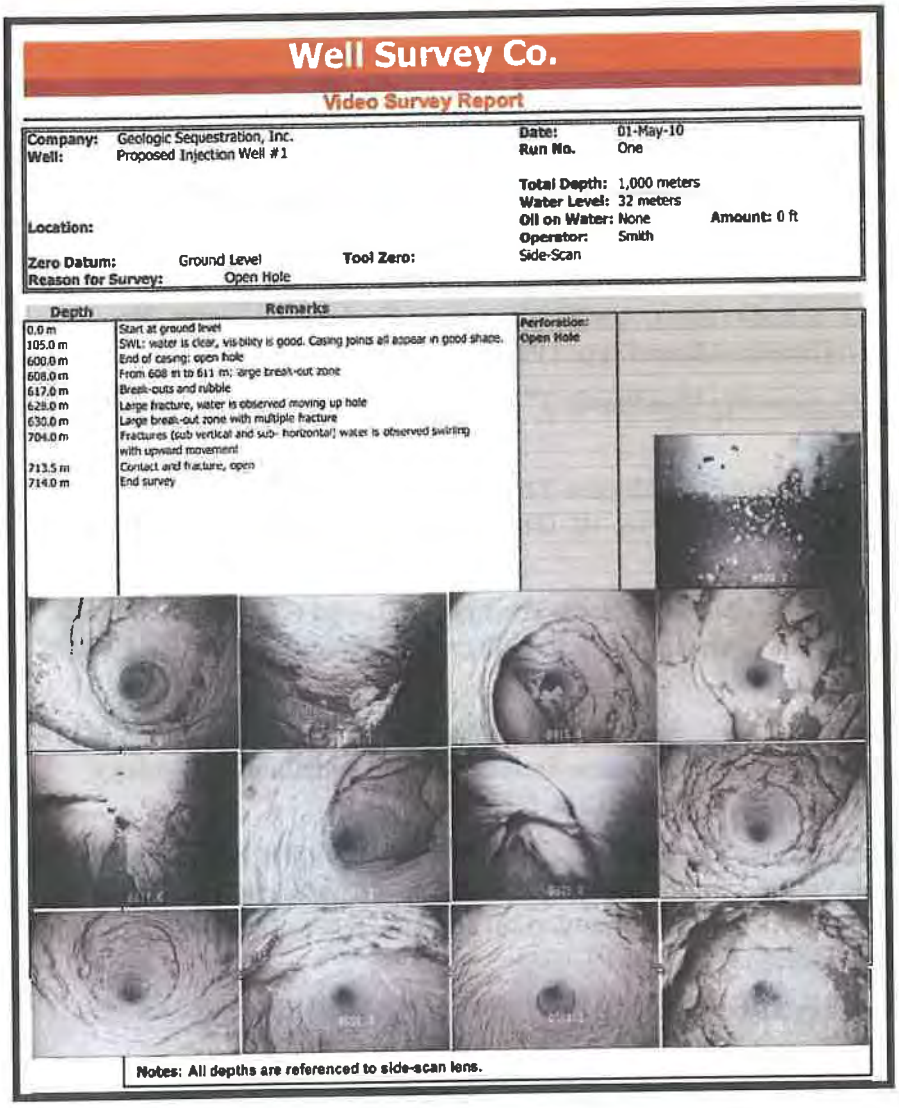
### Fracture Finder Logs

Several types of logs may be used for fracture detection, including sonic logs and a number of borehole imaging logs (Telford et al., 1990; AAPG, 1994). Not all logs discussed below must be run to comply with the Class VI Rule fracture finder logging requirements. Rather, a single type of fracture finder log may be run based on site conditions and operator preferences, and as approved by the UIC Program Director.

- ***Sonic logs,*** described above, can also be used for fracture detection. The logging tool provides a sonic signal, and the resulting log is a vertical graph of the amplitude and travel time of the reflected signal. A decrease in amplitude where sonic travel time is constant may indicate open fractures (Telford et al., 1990). As described above, sonic logs measure primary porosity, which excludes fractures. However, used with either neutron or density logs, both of which provide an estimate of the total porosity, sonic logs would yield an estimate of the proportion of vugs and fractures as secondary porosity;
- ***Borehole televiewers,*** also termed acoustic borehole images, make use of reflected sonic waves. The recorded sonic amplitude and travel time are assigned colors to create an image. The resulting logs are color-relief images of the borehole wall, based on acoustic

travel time and amplitude. Low-amplitude, high travel-time features, including fractures, are typically assigned dark colors. As with sonic fracture finder logs, shales and other features that result in a low sonic amplitude are considered during log interpretation;

- ***Electrical borehole imaging logs*** operate under a similar principle as acoustic imaging logs. Because this is an electrical log, the test is conducted in boreholes filled with a conductive drilling fluid. Measured resistivity values are assigned colors to develop an image. The resulting log is a color-relief image of the resistivity of the borehole wall. Low-resistivity features, including shales and fluid-filled fractures, are typically displayed as dark colors; and
- ***Borehole video imaging logs*** have become more common in recent years and may be used to detect fractures. A video log is conducted by lowering a video camera into the well. The video is seen in real time and recorded at the surface, allowing for detailed focus on features of interest. Video logs can be conducted in liquid-filled or open boreholes, as long as the borehole fluids are relatively clear. Fractures are evident on borehole video logs (Figure A-30).



Well Survey Co.

Video Survey Report

Company: Geologic Sequestration, Inc.
Well: Proposed Injection Well #1

Date: 01-May-10
Run No. One

Total Depth: 1,000 meters
Water Level: 32 meters
Oil on Water: None Amount: 0 ft
Operator: Smith
Side-Scan

Location:

Zero Datum: Ground Level Tool Zero:
Reason for Survey: Open Hole

| Depth | Remarks | Perforation: |
|---|---|---|
| 0.0 m | Start at ground level | Open Hole |
| 105.0 m | SWL: water is clear, visibility is good. Casing joints all appear in good shape. | |
| 600.0 m | End of casing: open hole | |
| 608.0 m | From 608 m to 611 m: large break-out zone | |
| 617.0 m | Break-outs and rubble | |
| 628.0 m | Large fracture, water is observed moving up hole | |
| 630.0 m | Large break-out zone with multiple fracture | |
| 704.0 m | Fractures (sub vertical and sub- horizontal) water is observed swirling with upward movement | |
| 713.5 m | Contact and fracture, open | |
| 714.0 m | End survey | |

Notes: All depths are referenced to side-scan lens.

**Figure A-30: Example of Borehole Video Imaging Log Showing Formation Fractures.**

## References


Abaci, S., J.S. Edwards, and B.N. Whittaker. 1992. Relative permeability measurements for two phase flow in unconsolidated sands. Mine Water and the Environment 11(2): 11-26.

Adams, J.J., and S. Bachu. 2002. Equations of state for basin geofluids: Algorithm review and intercomparison for brines. Geofluids 2: 257–271.

Aguilera, R. 1992. Formation Evaluation of Naturally Fractured Reservoirs. In Morton-Thompson, D., and A.M. Woods (Eds.), AAPG Methods in Exploration Series, No. 10, Development Geology Reference Manual (pp. 192-193). AAPG: Tulsa, OK.

Ahmed, T.H. 2006. Reservoir Engineering Handbook. 3rd edition. Gulf Professional Publishing (Elsevier): Burlington, MA.

Alberty, M. 1992a. Standard Interpretation. In Morton-Thompson, D., and A.M. Woods (Eds.), AAPG Methods in Exploration Series, No. 10, Development Geology Reference Manual (pp. 180-185). AAPG: Tulsa, OK.

Alberty, M. 1992b. Basic Open Hole Tools. In Morton-Thompson, D., and A.M. Woods (Eds.), AAPG Methods in Exploration Series, No. 10, Development Geology Reference Manual (pp. 144-149). AAPG: Tulsa, OK.

Almon, W.R. 1992. Overview of Routine Core Analysis. In Morton-Thompson, D., and A.M. Woods (Eds.), AAPG Methods in Exploration Series, No. 10, Development Geology Reference Manual (pp. 201-203). AAPG: Tulsa, OK.

Ambrose, W.A, S. Lakshminarasimhan, M.H. Holtz, V. Núñez-López, S.D. Hovorka, and I. Duncan. 2008. Geologic factors controlling $CO_2$ storage capacity and permanence: Case studies based on experience with heterogeneity in oil and gas reservoirs applied to $CO_2$ storage. Environmental Geology 54(8): 1619-1633.

American Association of Petroleum Geologists (AAPG), 2004. Basic Well Logging Analysis, 2nd Edition.

Arps, J.J. 1962. Estimation of primary oil and gas reserves. In Frick, T.C. (Ed.), Petroleum Production Handbook, Volume II Reservoir Engineering. Chapter 37. Society of Petroleum Engineers: Dallas, TX.

Avseth, P., T. Mukerji, and G. Mavko. 2010. Quantitative Seismic Interpretation: Applying Rock Physics Tools to Reduce Interpretation Risk. Cambridge University Press: Cambridge, United Kingdom.

Bachu, S., and B. Bennion. 2008. Effects of in-situ conditions on relative permeability characteristics of $CO_2$ brine systems. Environmental Geology 54: 1707-1722.

Bachu, S., and B. Bennion. 2009. Interfacial tension between $CO_2$, freshwater, and brine in the range of pressure from (2 to 27) MPa, temperature from (20 to 125) °C, and water salinity from (0 to 334 000) $mgL^{-1}$. Journal of Chemical and Engineering Data 54: 765–775.

Bachu, S. and K. Haug. 2005. In situ characteristics of acid-gas injection operations in the Alberta Basin, Western Canada: Demonstration of $CO_2$ geological storage. In Thomas,

D.C. and S.M. Benson, Eds. Carbon Dioxide Capture for Storage in Deep Geologic Formations, Volume 2. Elsevier: Oxford, United Kingdom.

Bachu, S., D. Bonijoly, J. Bradshaw, R. Burruss, S. Holloway, N.P. Christensen, and O.M. Mathiassen. 2007. $CO_2$ storage capacity estimation: Methodology and gaps. International Journal of Greenhouse Gas Control 1: 430-443.

Balan, B., S. Mahaghegh, and S. Ameri. 1995. State-of-the-art in permeability determination from well log data: Part 1 – A comparative study, model development. SPE 30978.

Balch, A.H., M.W. Lee, J.J. Miller, and R.T. Ryder. 1982. The use of vertical seismic profiles in seismic investigations of the earth. Geophysics 47: 906.

Barbosa, V.C.F., P.T.L. Menezes, and J.B.C. Silva. 2007. Gravity as a tool for detecting faults: In depth enhancement of subtle Almada's basement faults, Brazil. Geophysics 73(3): B59-B68.

Batycky, R.P., M.R. Thiele, K.H. Coats, A. Grindheim, D. Ponting, J.E. Killough, T. Settari, L.K. Thomas, J. Wallis, J.W. Watts, and C.H. Whitson. 2007. Chapter 17: Reservoir simulation. In Holstein, E.D., Ed. Reservoir Engineering and Petrophysics, Volume V(B). In Lake, L.W., and E.D. Holstein (Eds.), Petroleum Engineering Handbook. Society of Petroleum Engineers: Richardson, TX.

Bell, J.S., P.R. Price, and P.J. McLellan. 1994. In-site stress in the western Canada Sedimentary Basin. In: G.D. Mossop and I. Shetsen (Eds.), Canadian Society of Petroleum Geologists and Alberta Research Council, Special Report 4. http://www.ags.gov.ab.ca/publications/wcsb_atlas/atlas.html.

Benson, S., and P. Cook. 2005. Chapter 5: Underground geological storage. In IPCC Special Report on Carbon Dioxide Capture and Storage. Cambridge University Press: New York, NY.

Benson, S.M., and L. Myer. 2002. Monitoring to ensure safe and effective geologic sequestration of carbon dioxide. IPCC workshop on carbon dioxide capture and storage.

Blackbourn, G.A. 1990. Cores and Core Logging for Geologists. Whittles Publishing: Caithness, Scotland.

Boak, J.M., 1992. Part 6: Geological Cross Sections. In Morton-Thompson, D., and A.M. Woods (Eds.), AAPG Methods in Exploration Series, No. 10, Development Geology Reference Manual (pp. 300-304). AAPG: Tulsa, OK.

Borah, I. 1992. Drill Stem Testing. In Morton-Thompson, D., and A.M. Woods (Eds.), AAPG Methods in Exploration Series, No. 10, Development Geology Reference Manual (pp. 131-137). AAPG: Tulsa, OK.

Bradshaw, J., S. Bachu, D. Bonijoly, R. Burruss, S. Holloway, N.P. Christensen, and O.M. Mathiassen. 2007. $CO_2$ storage capacity estimation: issues and development of standards. International Journal of Greenhouse Gas Control 1: 62–68.

Brennan, S.T., R.C. Burruss, M.D. Merrill, P.A. Freeman, and L.F. Ruppert. 2010. A Probabilistic Assessment Methodology for the Evaluation of Geologic Carbon Dioxide

Storage. Open-File Report 2010–1127. http://pubs.usgs.gov/of/2010/1127/ofr2010-1127.pdf.

Bryant, S., and L.W. Lake. 2005. Chapter 18: Effect of Impurities on Subsurface $CO_2$ Storage Processes. In Benson, S.M., C. Oldenburg, M. Hoversten, and S. Imbus (Eds.), Carbon Dioxide Capture for Storage in Deep Geologic Formations - Results from the $CO_2$ Capture Project. Vol. 2: 983-998. Elsevier: Boston, MA.

Burton, M., N. Kumar, and S.L. Bryant. 2009. $CO_2$ injectivity into brine aquifers: Why relative permeability matters as much as absolute permeability. GHGT-9. Energy Procedia 1: 3091-3098.

Cailly, B., P. LeThiez, P. Egermann, A. Audibert, S. Vidal-Gilbert, and X. Longaygue. 2005. Geological storage of $CO_2$: A state-of-the-art of injection processes and technologies. Oil and Gas Science and Technology – Rev. IFP 60(3): 517-525.

Campbell, R.A., and J.M. Campbell. 1978. Mineral Property Economics, Volume 3: Petroleum Property Evaluation. Campbell Petroleum Series, Norman, OK.

Cerepi, A., L. Humbert, and R. Burlot, 2001. Petrophysical properties of porous medium from petrographic image analysis data. Colloids and Surfaces A: Physicochemical and Engineering Aspects 187-188: 233-256.

Chadwick, A., R. Arts, C. Bernstone, F. May, S. Thibeau, and P. Zweigel. 2008. Best practice for the Storage of $CO_2$ in Saline Aquifers. Keyworth Nottingham: British Geological Survey Occasional Publication No. 14.

Chapin, D., and M. Ander. 1999. New Life for Borehole Gravity? AAPG Geophysical Corner, February 1999. http://www.aapg.org/explorer/geophysical_corner/1999/gpc02.cfm.

Cheng, C.H. 1992. Full Waveform Acoustic Logging. In Morton-Thompson, D., and A.M. Woods (Eds.), AAPG Methods in Exploration Series, No. 10, Development Geology Reference Manual (pp. 409-410). AAPG: Tulsa, OK.

Chiaramonte, L., M.D. Zoback, J. Friedmann, and V. Stamp. 2008. Seal integrity and feasibility of $CO_2$ sequestration in the Teapot Dome EOR pilot: geomechanical site characterization. Environmental Geology 54: 1667-1675.

Chiquet, P., D. Broseta, and S. Thibeau. 2007. Wettability alteration of caprock minerals by carbon dioxide. Geofluids 7(2): 112-122.

CO2CRC. 2010. About CCS: Injection & storage, Injecting the $CO_2$. http://www.co2crc.com.au/aboutccs/stor_injecting.html.

Cone, M.P., and D.G. Kersey. 1992. Porosity. In Morton-Thompson, D., and A.M. Woods (Eds.), AAPG Methods in Exploration Series, No. 10, Development Geology Reference Manual (pp. 204-209). AAPG: Tulsa, OK.

Cooper, C. (Ed.). 2009. A Technical Basis for Carbon Dioxide Storage. $CO_2$ Capture Project. CPL Press.

Craft, B.C., and M.F. Hawkins. 1959. Applied Petroleum Reservoir Engineering, Prentice-Hall, Inc.: Englewood Cliffs, NJ.

Craig, F.F. 1980. The Reservoir Engineering Aspects of Waterflooding. Third Printing. Society of Petroleum Engineers: Dallas, TX.

Crampin, S., and J.H. Lovell. 1991. A decade of shear-wave splitting in the Earth's crust: what does it mean? What use can we make of it? And what should we do next? Geophysical Journal International 107: 387-407.

Criss, J. 2007. Another look at full-wave seismic imaging. First Break 25: 109-116.

Daley, T.M., R.D. Solbau, J.B. Ajo-Franklin, and S.M. Benson. 2007. Continuous Active-Source Seismic Monitoring of $CO_2$ injection in a brine aquifer. Geophysics 72(5): A57-A61.

Davies, D.K., W.R. Bryant, R.K. Vessell, and P.J. Burkett. 1990. Porosities, Permeabilities, and Microfabrics of Devonian Shales. In Bennett, R.H., W. R. Bryant, M. H. Hulbert, W.A. Chiou, R.W. Faas, J. Kasprowicz, H. Li, T. Lomenick, N.R. O'Brien, S. Pamukcu, P. Smart, C.E. Weaver, and T. Yamamoto (Eds.), Microstructure of Fine-Grained Sediments: From Mud to Shale (Frontiers in Sedimentary Geology). Springer.

Davis, S.N. 1988. Sandstones and shales. In Back, W., J.S. Rosenhein, and P.R. Seaber (Eds.), The Geology of North America, Volume O–2, Hydrogeology. Geological Society of America, 323–332. http://www.ces.clemson.edu/hydro/murdoch/Courses/Aquifer%20Systems/documents/Heath%20and%20Back%20books/Chapter%2037.pdf.

del Rio, O.I., and A.W. Neumann. 1997. Axisymmetric drop shape analysis: computational methods for the measurement of interfacial properties from the shape and dimensions of pendant and sessile drops. Journal of Colloid and Interface Science 196: 136–147.

Dewan, J.T. 1983. Essentials of Modern Open-Hole Log Interpretation. Pennwell Books: Tulsa, OK.

Donaldson, E.C., and D. Tiab. 2003. Petrophysics: Theory and practice of measuring reservoir rock and fluid. 2nd Edition. Gulf Professional Publishing.

Doughty, C., and K. Pruess. 2004. Modeling supercritical carbon dioxide injection in heterogeneous porous media. Vadose Zone Journal 3(3): 837-847.

Downie, R.C., J.H. Le Calvez, and K. Kerrihard. 2009. Real-time microseismic monitoring of simultaneous hydraulic fracturing treatments in adjacent horizontal wells in the Woodford shale. CSPG CSEG CWLS Convention: 484-492.

Earlougher, R.C. Jr. 1977. Advances in Well Test Analysis. Monograph Series, SPE, Richardson, Texas 5: 134.

Edwards, M.G. 1916. Optical mineralogy and petrography: The practical methods of identifying minerals in thin section with the microscope and the principles involved in the classification of rocks. Camp Press.

Ellis, D.V., and J.M. Singer. 2007. Well Logging for Earth Scientists, 2nd Edition. Springer.

Emery, D., and K.J. Myers. 1996. Sequence stratigraphy: Oxford, Blackwell Science, 297 p.

Evans, B.J. 1997. A handbook for seismic data acquisition in exploration. Society of Exploration Geophysicists: January 1, 1997.

Evenick, J. 2008. Introduction to Well Logs and Subsurface Maps. PennWell Corporation: Tulsa, OK.

Fetter, C.W. 1988. Applied Hydrogeology, 2nd Edition. MacMillan: New York, NY.

Firoozabadi, A., R. Nutakki, T.W. Wong, and K. Aziz. 1988. EOS Predictions of compressibility and phase behavior in systems containing water, hydrocarbons, and $CO_2$. SPE Reservoir Engineering 3(2): 673-684.

Forster, A., B. Norden, K. Zinck-Jorgensen, P. Frykman, J. Kulenkampff, E. Spangenberg, J. Erzinger, M. Zimmer, J. Kopp, G. Borm, C. Juhlin, C.-G. Cosma, and S. Hurger. 2006. Baseline characterization of the CO2SINK geological storage site at Ketzin, Germany. Environmental Geosciences 13(3): 145-161.

Freeman, B., G. Yielding, D.T. Needham, and M.E. Badley. 1998. Fault seal prediction: The gouge ratio method. In Coward, M.P., T.S. Daltaban, and H. Johnson, Eds. Structural Geology in Reservoir Characterization. Geological Society: London, Special Publications 127, 19-25.

Freeman, P.M. 1984. In-situ determination of capillary pressure, pore throat size and distribution, and permeability from wireline data. Presented at SPWLA 25th Annual Logging Symposium, 1984.

Gasda, S.E., S. Bachu, and M.A. Celia. 2004. Spatial characterization of the location of potentially leaky wells penetrating a deep saline aquifer in a mature sedimentary basin. Environmental Geology 46: 707-720.

Gasda, S.E., J.M. Norbotten, and M.A. Celia. 2008. Determining effective wellbore permeability from a field pressure test: A numerical analysis of detection limits. Environmental Geology 54: 1207-1215.Gibson-Poole, C.M., L. Svendsen, J. Underschultz, M.N. Watson, J. Ennis-King, P.J. Van Ruth E.J. Nelson, R.F. Daniel, and Y. Cinar. 2008. Site characterisation of a basin-scale $CO_2$ geological storage system: Gippsland Basin, Southeast Australia. Journal of Environmental Geology 54: 1583-1606.

Gibson-Poole, C.M., R.S. Root, S.C. Lang, J.E. Streit, A.L. Hennig, C.J. Otto, and J.R. Underschultz. 2005. Conducting comprehensive analyses of potential sites for geological $CO_2$ storage (pp. 673-681). In Rubin, E.S., D.W. Keith, and C.F. Gilboy (Eds.), Greenhouse Gas Control Technologies: Proceedings of the 7th International Conference on Greenhouse Gas Control Technologies, Volume I. Elsevier: Vancouver, British Columbia. 5–9 September 2005.

Gidley, J.L. 1992. Stimulation. In Morton-Thompson, D., and A.M. Woods (Eds.), AAPG Methods in Exploration Series, No. 10, Development Geology Reference Manual (pp. 469-473). AAPG: Tulsa, OK.

Gies, R.M. 1993. Petrographic image analysis: An effective technology for delineating reservoir quality. SPE Gas Technology Symposium, 28-30 June 1993, Calgary, Alberta. SPE paper 26147.

Goetz, J.F. 1992. Dipmeters. In Morton-Thompson, D., and A.M. Woods (Eds.), AAPG Methods in Exploration Series, No. 10, Development Geology Reference Manual (pp. 158-162). AAPG: Tulsa, OK.

Golan, M. 1992. Fundamentals of Fluid Flow. In Morton-Thompson, D., and A.M. Woods (Eds.), AAPG Methods in Exploration Series, No. 10, Development Geology Reference Manual (pp. 508-512). AAPG: Tulsa, OK.

Goussev, S.A., L.A. Griffith, J.W. Peirse, and A. Cordsen. 2004. Enhanced HRAM anomalies correlate faults between 2D seismic lines. Presented at the 2004 Canadian Society of Exploration Geophysicists National Convention, 11-13 May 2004.

Gray, D., M. Lahr, G. Roberts, K. Head. 2002. Examples of the determination of fracture parameters from P-Wave seismic data. CSEG Geophysics.

Grier, S.P., and D.M. Marschall. 1992. Reservoir quality In Morton-Thompson, D., and A.M. Woods (Eds.), AAPG Methods in Exploration Series, No. 10, Development Geology Reference Manual (pp. 275-277). AAPG: Tulsa, OK.

Groshong, R.H. Jr. 2006. 3-D structural geology: A practical guide to quantitative surface and subsurface map interpretation. 2nd Edition. Springer: The Netherlands.

Hancock, N.J. 1992. Quick-look lithology from logs. In Morton-Thompson, D., and A.M. Woods (Eds.), AAPG Methods in Exploration Series, No. 10, Development Geology Reference Manual (pp. 174-179). AAPG: Tulsa, OK.

Harrell, R., and C. Cronquist. 2007. Chapter 18: Estimation of primary reserves of crude oil, natural gas, and condensate. In Holstein, E.D. (Ed.), Reservoir Engineering and Petrophysics, Volume V(B). In Lake, L.W. and E.D. Holstein (Eds.), Petroleum Engineering Handbook. Society of Petroleum Engineers: Richardson, TX.

Harris, J.M., and R.T. Langan. 1997. Crosswell Seismic Fills the Gap. AAPG Explorer Geophysical Corner, January 1997.

Harrison, D., and Y. Chauvel. 2007. Chapter 7: Reservoir pressure and temperature. In Holstein, E.D. (Ed.), Reservoir Engineering and Petrophysics, Volume V(B). In Lake, L.W., and E.D. Holstein (Eds.), Petroleum Engineering Handbook. Society of Petroleum Engineers: Richardson, TX.

Hassanzadeh, H., M. Pooladi-Darvish, A.M. Elsharkawy, D.W. Keith, and Y. Leonenko. 2008. Predicting PVT data for $CO_2$–brine mixtures for black-oil simulation of $CO_2$ geological storage. International Journal of Greenhouse Gas Control 12: 65-77.

Haug, K., R. Nygaard, and D. Keith. 2007. Evaluation of stress and geomechanical characteristics of a potential site for $CO_2$ geological storage in Central Alberta, Canada. 60th Canadian Geotechnical Conference and 8th Joint CGS/IAH-CNC Groundwater Conference. Ottawa, Ontario. October 21-24, 2007.

Hawkins, J. T. 1992. Relative Permeability. In Morton-Thompson, D., and A.M. Woods (Eds.), AAPG Methods in Exploration Series, No. 10, Development Geology Reference Manual (pp. 226-228). AAPG: Tulsa, OK.

Hellevang, H., S.K. Khattri, G.E. Fladmark, B. Kvamme. 2005. $CO_2$ storage in the Utsira Formation – ATHENA 3D reactive transport simulations. Submitted to Basin Research.

Herring, A.T. 1990. Introduction to Borehole Gravity. http: //edcon-prj.com/introbhg.htm.

Herring, A.T. 1992. Borehole gravity. In Morton-Thompson, D., and A.M. Woods (Eds.), AAPG Methods in Exploration Series, No. 10, Development Geology Reference Manual (pp. 413-414). AAPG: Tulsa, OK.

Hoversten, G.M., R. Gritto, T.M. Daley, E.L. Majer, and L.R. Myer. 2002. Crosswell seismic and electromagnetic monitoring of $CO_2$ sequestration. Lawrency Berkely National Laboratory Paper# LBNL-51281. http: //repositories.cdlib.org/lbnl/LBNL-5128.

Huffman, A.R. 2002. The future of pressure prediction using geophysical methods. In Huffman, A.R., and G.L. Bowers (Eds.), Pressure regimes in sedimentary basins and their prediction. AAPG Memoir 76: 217-233.

Hyne, N.J. 2001. Nontechnical guide to petroleum geology, exploration, drilling, and production. Penwell: Tulsa, OK.

Ide, S.T., K. Jessen, and F.M. Orr. 2007. Storage of $CO_2$ in saline aquifers: effects of gravity, viscous, and capillary forces on amount and timing of trapping. International Journal of Greenhouse Gas Control 1: 481-491.

Johnson, D.E., and K.E. Pile. 2006. Well Logging in Non-Technical Language. 2nd Edition. PennWell Corporation: Tulsa, OK.

Jordan, P.W., J.L. Hare. 2002. Locating abandoned wells: A comprehensive manual of methods and resource. Solution Mining Research Institute Report No. 2002-1-SMRI.

Juanes R., E.J. Spiteri, F.M. Orr, and M.J. Blunt. 2006. Impact of relative permeability hysteresis on geological $CO_2$ storage. Water Resources Research 42: W12418.

Kearey, P., M. Brooks, and I. Hill. 2002. An introduction to geophysical exploration. 3rd Edition. Blackwell Science LTD. Cambridge University Press.

Kerr, Paul. 1959. Optical Mineralogy. McGraw-Hill. New York, NY.

Khan, D.K. 2003. Short note: Generating regional permeability maps for large-scale hydrogeological studies. Fifth Annual Report of the Centre for Computational Geostatistics. http://www.uofaweb.ualberta.ca/ccg/pdfs/2003%2089-hydrogeology.pdf.

Kirschbaum, M.A., and R. D. Hettinger. 2004. Facies Analysis and Sequence Stratigraphic Framework of Upper Campanian Strata (Neslen and Mount Garfield Formations, Bluecastle Tongue of the Castlegate Sandstone, and Mancos Shale), Eastern Book Cliffs, Colorado and Utah. U.S. Geological Survey Digital Data Series DDS–69–G. http://pubs.usgs.gov/dds/dds-069/dds-069-g/REPORT/Report.pdf (report); http://pubs.usgs.gov/dds/dds-069/dds-069-g/OPEN_FIRST/Plates.pdf (plates).

Knödel, K., G. Lange, H.-J. Voigt. 2007. Environmental geology: Handbook of field methods and case studies. Springer-Verlag: New York, NY.

Koledoye, B.A., A. Aydin, and E. May. 2003. A new process-based methodology for analysis of shale smear along normal faults in the Niger Delta. AAPG Bullentin 87(3): 445-463.

Kopp A., H. Class, and R. Helmig. 2009a. Investigations on $CO_2$ storage capacity in saline aquifers - Part 1. Dimensional analysis of flow processes and reservoir characteristics. International Journal of Greenhouse Gas Control 3: 263-276.

Kopp A., H. Class, and R. Helmig. 2009b. Investigations on $CO_2$ storage capacity in saline aquifers - Part 2. Estimation of storage capacity coefficients. International Journal of Greenhouse Gas Control 3: 277-287.

Koukouzas, N., F. Ziogou, and V. Gemeni. 2009. Preliminary assessment of $CO_2$ geological storage opportunities in Greece. International Journal of Greenhouse Gas Control 3: 502-513.

Kovscek, A.R. 2002. Screening criteria for $CO_2$ storage in oil reservoirs. Petroleum Science and Technology 20(7-8): 841-866.

Kuchuk, F., L. Zhan, S.M. Ma, A.M. Al-Shahri, S. Aramco, T.S. Ramakrishan, B. Altundas, M. Zeybet, R. de Loubens, and N. Chunjunov. 2008. Determination of In-situ two-phase flow properties through downhole fluid movement monitoring. Presented at SPE Annual Technical Conference and Exhibition, 21-24 September 2008. Denver, CO.

LaFehr, T.R. 1992. The Gravity Method. In Morton-Thompson, D., and A.M. Woods (Eds.), AAPG Methods in Exploration Series, No. 10, Development Geology Reference Manual (pp. 411-412). AAPG: Tulsa, OK.

Lake, L.W. 1989. Enhanced Oil Recovery. Prentice Hall: Englewood Cliffs, NJ.

Lancaster, D.E. 1992. Production Testing. In Morton-Thompson, D., and A.M. Woods (Eds.), AAPG Methods in Exploration Series, No. 10, Development Geology Reference Manual (pp. 474-476). AAPG: Tulsa, OK.

Lang, S.C., N. Ceglar, S. Forder, G. Spencer, and J. Kassan, 2001. The application of sequence stratigraphy to exploration and reservoir development in the Cooper-Eromanga-Bowen Surat Basin system. APPEA J 41: 223-250.

Law, D.H.-S., and S. Bachu. 1996. Hydrogeological and numerical analysis of $CO_2$ disposal in deep aquifers in the Alberta sedimentary basin. Energy Conversion and Management 37(6-8): 1167-1174.

Layman, J. 2004. Porosity Characterization Utilizing Petrographic Image Analysis: Implications for rapid identification and ranking of reservoir flow units, Happy Spraberry Field, Garza County, TX. AAPG International Conference, October 24-27, 2004, Cancun, Mexico.

Lee, J. 2007. Chapter 8: Fluid flow through permeable media. In Holstein, E.D., and L.W. Lake (Eds.), Reservoir Engineering and Petrophysics, Volume V(A). Society of Petroleum Engineers: Richardson, TX.

Lee, W.J. 1992. Pressure transient testing. In Morton-Thompson, D., and A.M. Woods (Eds.), AAPG Methods in Exploration Series, No. 10, Development Geology Reference Manual (pp. 477-481). AAPG: Tulsa, OK.

Lewis, M.A., C.S. Cheney, and B.E. ODochartaigh. British Geological Survey. 2006. Guide to permeability indices. Open Report CR/06/160N. Keyworth: Nottingham, United Kingdom. http://nora.nerc.ac.uk/7457/1/CR06160N.pdf.

Li, K., and R.N. Horne. 2003. A decline curve analysis model based on fluid flow mechanisms. Society of Petroleum Engineers, SPE 83470.

Li, S., M. Dong, Z. Li, S. Huang, H. Qing, and E. Nickel. 2005. Gas breakthrough pressure for hydrocarbon reservoir seal rocks: Implications for the security of long-term $CO_2$ storage in the Weyburn field. Geofluids 5: 326–334.

Lucia, F.J. 1992. Carbonate reservoir models: Facies, diagenesis, and flow characterization. In Morton-Thompson, D., and A.M. Woods (Eds.), AAPG Methods in Exploration Series, No. 10, Development Geology Reference Manual (pp. 269-274). AAPG: Tulsa, OK.

Lucius, J.E., and R.J. Bisdorf. 1997. EM induction and DC resistivity surveys near the Norman, Oklahoma Landfill. U.S. Geological Survey Open-File Report 97-679. http://ok.water.usgs.gov/projects/norlan/maps/dcresist.html#eminduct.

Malvic, T. 2005. Results of geostatistical porosity mapping in Western Drava Depression fields (Molve, Kalinovac, Stari Gradac). NAFTA 56(12): 465-476.

Martin, R.L., C.L. Welch, G.D. Hinterlong, J. Meyer, and R. Evans. 2002. Using crosswell seismic tomography to provide better resolution in the Woldcamp Formation in Lea County, New Mexico. In Hunt, T.J., and P.H. Lufholm (Eds.), The Permian Basin: Preserving Our Past - Securing Our Future. West Texas Geological Society Publication #02-111. Presented at the Fall Symposium 9-10 October 2002.

Matthews, C.S., and D.G. Russell. 1967. Pressure Buildup and Flow Tests in Wells. SPE of AIME: Dallas, TX.

McGrail, B.P., H.T. Schaef, A.M. Ho, Y.-J. Chien, J.J. Dooley, and C.L. Davidson. 2006. Potential for carbon dioxide sequestration in flood basalts. Journal of Geophysical Research 111: B12201.

Michael, K., A. Golab, V. Shulakova, J. Ennis-King, G. Allinson, S. Sharma, and T. Aiken. 2010. Geological storage of $CO_2$ in saline aquifers – A review of the experience from existing storage operations. International Journal of Greenhouse Gas Control 4(4): 659-667.

Moore, D.M., and R.C. Reynolds, Jr. 1989. X-ray diffraction and the identification and analysis of clay minerals. Oxford University Press.

Moos, D., and M.D. Zoback. 1990. Utilization of observations of well bore failure to constrain the orientation and magnitude of crustal stresses: Application to continental, deep sea drilling project, and ocean drilling program boreholes. Journal of Geophysical Research 95(B6): 9305-9325.

Nelson, P.H., and M.L. Batzle. 2006. Single Phase Permeability. In Fanchi, J.R. (Ed.), Petroleum Engineering Handbook, Vol. I: General Engineering. Society of Petroleum Engineers.

Nester, D.C., and M.J. Padgett. 1992. Seismic Data Acquistion on Land. In Morton-Thompson, D., and A.M. Woods (Eds.), AAPG Methods in Exploration Series, No. 10, Development Geology Reference Manual (pp. 379-380). AAPG: Tulsa, OK.

Newmark, R.L., A.L. Ramirez, and W.D. Daily. 2001. Monitoring carbon dioxide sequestration using electrical resistance tomography (ERT): Sensitivity studies. Lawrence Livermore National Laboratory. http://www.netl.doe.gov/publications/proceedings/01/carbon_seq/7a1.pdf.

Nobakht, M., S. Moghadam, and Y. Gu. 2007. Effects of viscous and capillary forces on $CO_2$ enhanced oil recovery under reservoir conditions. Energy and Fuels 21: 3469–3476.

Norden, B., A. Forster, D. Vu-Hoang, F. Marcelis, N. Springer, and I. Le Nir. 2010. Lithological and petrophysical core-log interpretation in CO2SINK, the European $CO_2$ onshore research storage and verification project. SPE Reservoir Evaluation and Engineering, April 2010, 179-192.

Nuccio, V.F., and S.M. Condon. 1996. Burial and thermal history of the Paradox Basin, Utah and Colorado, and petroleum potential of the Middle Pennsylvanian Paradox Formation. USGS Bulletin 2000-O. Denver, CO.

Ohen, H.A., and D.G. Kersey. 1992. Permeability. In Morton-Thompson, D., and A.M. Woods (Eds.), AAPG Methods in Exploration Series, No. 10, Development Geology Reference Manual (pp. 210-213). AAPG: Tulsa, OK.

O'Keefe, M., S. Godefroy, R. Vasques, A. Agenes, P. Weinheber, R. Jackson, M. Ardila, W. Wichers, S. Daungkaew, and I. De Santo. 2007. In-situ density and viscosity measured by wireline formation testers. Society of Petroleum Engineers, 110364-MS.

Okwen, R.T., M.T. Stewart, and J.A. Cunningham. 2010. Analytical solution for estimating storage efficiency of geologic sequestration of $CO_2$. International Journal of Greenhouse Gas Control 4: 102-107.

Onishi, K., T. Ueyama, T. Matsuoka, D. Nobuoka, H. Saito, H. Azuma, and Z. Xue. 2009. Application of crosswell seismic tomography using difference analysis with data normalization to monitor $CO_2$ flooding in an aquifer. International Journal of Greenhouse Gas Control 3: 311-321.

Orange, A.S. 1992. Electrical Methods. In Morton-Thompson, D., and A.M. Woods (Eds.), AAPG Methods in Exploration Series, No. 10, Development Geology Reference Manual (pp. 417-419). AAPG: Tulsa, OK.

Orlic, B. 2009. Some geomechanical aspects of geological $CO_2$ sequestration. KSCE Journal of Civil Engineering 13(4): 225-232.

Osborne, A.F. 1992. Workovers. In Morton-Thompson, D., and A.M. Woods (Eds.), AAPG Methods in Exploration Series, No. 10, Development Geology Reference Manual (pp. 496-499). AAPG: Tulsa, OK.

Pacific Northwest National Laboratory (PNNL). 2010. Geologic Sequestration Research at Pacific Northwest National Laboratory. Publication number PNNL-SA-69218. http://www.interpartnership.org/GS3_Brochure_v7.pdf.

Palandri, J.L., and Y.K. Kharaka. 2004. A compilation of rate parameters of water-mineral interaction kinetics for application to geochemical modeling. U.S. Geological Survey Open File Report 2004-1068.

Park, E., A.M.M. Elfeki, and F.M. Dekking. 2003. Characterization of subsurface heterogeneity: Integration of soft and hard information using multi-dimensional Coupled Markov chain approach. Developments in Water Science 52: 193-2002.

Paterson, N.R., and C.V. Reeves. 1985. Applications of gravity and magnetic surveys: The state-of-the-art in 1985. Geophysics 50(12): 2558-2594.

Peng, D.-Y., and D.B. Robinson. 1976. A new two-constant equation of state, Industrial Engineering and Chemistry Fundamentals 15(1): 59-64.

Posamentier, H.W., and G.P. Allen. 1999. (As cited in Gibson-Poole et al., 2008). Siliciclastic sequence stratigraphy – concepts and applications. SEPM, Concepts in Sedimentology and Paleontology.

Prensky, S. 1992. Temperature measurements in boreholes: An overview of engineering and scientific applications. The Log Analyst 33(3): 313-333. http://www.sprensky.com/publishd/temper2.html.

Proett, M.A., J. Wu, C. Torres-Verdfn, K. Shepehrnoori, and S.C. van Dolen. 2003. A new inversion technique determine in-situ relative permeabilities and capillary pressure parameters from pumpout wireline formation test data. Society of Petrophysicists and Well Log Analysts (SPWLA) 44th Ann. Logging Symposium 22-25 June, 2003. Galveston, TX.

Qi, R., T.C. LaForce, and M.J. Blunt. 2009. Design of carbon dioxide storage in aquifers. International Journal of Greenhouse Gas Control 3: 195-205.

Ringen, J.K., C. Halvorsen, K.A. Lehne, H. Rueslaatten, and H. Holand. 2001. Reservoir water saturation measured on cores: Case histories and recommendations. Proceedings of the 6th Nordic Symposium on Petrophysics, 15-16 May 2001, Trondheim, Norway. http://www.ipt.ntnu.no/nordic/Papers/6th_Nordic_Ringen.pdf.

Ross, H.E., P. Hagin, and M.D. Zoback. 2009. $CO_2$ storage and enhanced coalbed methane recovery: Reservoir characterization and fluid flow simulations of the Big George Coal, Powder River Basin, Wyoming, USA. International Journal of Greenhouse Gas Control 3: 773-786.

Rutqvist J., J. Birkholzer, F. Cappa, and C.-F. Tsang. 2007. Estimating maximum sustainable injection pressure during geological sequestration of $CO_2$ using coupled fluid flow and geomechanical fault-slip analysis. Energy Conversion and Management 48: 1798-1807.

Rutqvist, J. and Tsang, C.-F. 2002. A study of caprock hydromechanical changes associated with $CO_2$-injection into a brine formation. Environmental Geology 42: 296-305.

Sass, B., B. Monzyk, S. Ricci, A. Gupta, B. Hindin, and N. Gupta. 2005. Chapter 17: Impact of $SO_x$ and $NO_x$ in flue gas on $CO_2$ separation, compression, and pipeline transmission. In Thomas, D., and S.M. Benson (Eds.), Carbon Dioxide Capture for Storage in Deep Geologic Formations, Volume 2. Elsevier Ltd.: Oxford, United Kingdom.

Sayers, C.M., G.M. Johnson, and G. Denyer. 2000. Predrill pore pressure prediction using seismic data. Presented at the IADC/SPE Drilling Conference, New Orleans, LA. IADC/SPE 59122.

Sayers, C.M., L. den Boer, Z. Nagy, P. Hooyman, and V. Ward. 2005. Pore pressure in the Gulf of Mexico: Seeing ahead of the bit. World Oil December 2005: 55-58.

Sayers, C.M., M.J. Woodward, and R.C. Bartman. 2002. Seismic pore-pressure prediction using reflection tomography and 4-C seismic data. The Leading Edge February 2002: 188-192.

Schieber, J. 2006. Miscellaneous sedimentary features in shales. http://www.shale-mudstone-research-schieber.indiana.edu/misc-sed-struc.htm.

Schlumberger. 2002. FMI – Borehole geology, geomechanics and 3D reservoir modeling. www.connect.slb.com.

Schlumberger. 2006. Fundamentals of Formation Testing. 06-FE-014.

Seigel, H.O., C.J.M. Nind, A. Milanovic, and J. MacQueen. 2009. Results from the initial field trials of a borehole gravity meter for mining and geotechnical applications (pp. 92-96). Presented at the 11th SAGA Biennial Technical Meeting and Exhibition. Swaziland, 16-18 September 2009. http://www.sagaonline.co.za/2009Conference/CD%20Handout/SAGA%202009/PDFs/Abstracts_and_Papers/seigel_paper1.pdf.

Short, D.M. 1992. Seismic Data Acquisition on Land. In Morton-Thompson, D., and A.M. Woods (Eds.), AAPG Methods in Exploration Series, No. 10, Development Geology Reference Manual (pp. 358-360). AAPG: Tulsa, OK.

Smith, S.A., P. McLellan, C. Hawkes, E.N. Steadman, and J.A. Harju. 2009. Geomechanical testing and modeling of reservoir and cap rock integrity in an acid gas EOR/sequestration project, Zama, Alberta, Canada. Energy Procedia 1: 2169-2176.

Smolen, J.J. 1992. Production Logging. In Morton-Thompson, D., and A.M. Woods (Eds.), AAPG Methods in Exploration Series, No. 10, Development Geology Reference Manual (pp. 488-491). AAPG: Tulsa, OK.

Soeder, D.J. 1988. Porosity and permeability of Eastern Devonian gas shale. Society of Petroleum Engineers Formation Evaluation, Paper #15213.

Solymar, M., and I.L. Fabricius. 1999. Image analysis and estimation of porosity and permeability of Arnager Greensand, Upper Cretaceous, Denmark. Physics and Chemistry of the Earth (A), 24(7): 587-591.

Speece, M.A., T.D. Bowen, J.L. Folcik, and H.N. Pollack. 1985. Analysis of temperatures in sedimentary basins: the Michigan Basin. Geophysics 50(8): 1318-1334.

Streit, J.E. 1999. Conditions for earthquake surface rupture along the San Andreas fault system, California. Journal of Geophysical Research 104: 17929-17939.

Streit, J.E., and R.R. Hillis. 2004. Estimating fault stability and sustainable fluid pressures for underground storage of $CO_2$ in porous rock. Energy 29: 1445-1456.

Streit, J.E., A.F. Siggins, and B.J. Evans. 2005. Chapter 6: Predicting and monitoring geomechanical efects of $CO_2$ injection. In Thomas, D.C., and S.M. Benson (Eds.), Carbon Dioxide Capture for Storage in Deep Geologic Formations, Volume 2. Elsevier.

Sullivan, E.C., B.A. Hardage, S. Roche, and B.P. McGrail. 2008. Breakthroughs in seismic imaging of basalts for sequestration of man-made $CO_2$. Presented at the 2008 Joint Meeting of the Geological Society of America, Soil Science Society of America, American Society of Agronomy, Crop Science Society of America, Gulf Coast

Association of Geological Societies with the Gulf Coast Section of SEPM. Paper No. 204-1.

Telford, W. M., L.P. Geldart, and R.E. Sheriff. 1990. Applied Geophysics. Press Syndicate of University of Cambridge, NY.

Thompson, C. 2005. Multicomponent seismic: A pragmatist's primer. Search and Discovery Article #40155.

Tucker, W.A., and L.H. Nelken. 1990. Chapter 17: Diffusion coefficients in air and water. In Lyman, W.J., W.F. Reehl, and D.H. Rosenblatt (Eds.), Handbook of Chemical Property Estimation Methods. American Chemical Society: Washington, D.C.

Ugalde, H.A. Undated; Accessed September 7, 2010. On the use of high-resolution airborne magnetics (HRAM) to map and characterize major faults. http://www.gemsys.ca/Students/Ugalde_H_High_Resolution.pdf.

Upadhyay, S.K. 2004. Seismic Reflection Processing: With Special Reference to Anisotropy. Springer, 654 p.

U.S. Army Corps of Engineers. 1995. Geophysical Exploration for Engineering and Environmental Investigations. Engineering Manual: 1110-1-1802.

U.S. Department of Energy (USDOE). 2008a. Methodology for development of geologic storage estimates for carbon dioxide, prepared for Capacity and Fairways Subgroup of the Geologic Working Group of the DOE Regional Carbon Sequestration Partnership, U.S. Department of Energy, NETL Carbon Sequestration Program, August 2008. http://www.netl.doe.gov/technologies/carbon_seq/refshelf/methodology2008.pdf.

USDOE. 2008b. Carbon Sequestration Atlas of the United States and Canada. Second Edition. http://www.netl.doe.gov/technologies/carbon_seq/refshelf/atlas/.

U.S. Environmental Protection Agency (USEPA).1999. Step-Rate Test Procedure. EPA Region 8, Denver, CO.

U.S. Geological Survey (USGS). 1989. "Federal Glossary of Selected Terms: Subsurface-Water Flow and Solute Transport": Department of Interior, U.S. Geological Survey, Office of Water Data Coordination. August 1989. http://or.water.usgs.gov/projs_dir/willgw/glossary.html#P.

University of Oxford Department of Earth Sciences Home Page. 2010. http://www.earth.ox.ac.uk/.Vail, P.R., R.G. Todd, and J. B. Sangree. 1977. Seismic Stratigraphy and Global Changes of Sea Level: Part 5. Chronostratigraphic Significance of Seismic Reflections: Section 2. Application of Seismic Reflection Configuration to Stratigraphic Interpretation Memoir 26: 99 – 116.

Van Genuchten, M.Th. 1980. A closed-form equation for predicting the hydraulic conductivity of unsaturated soils. Soil Science Society of America Journal 44(5): 892–898.

Van Wagoner, J.C., R.M. Mitchum, K.M. Campion, and V.D. Rahmanian. 1990. Siliciclastic sequence stratigraphy in well logs, cores, and outcrops: concepts for high-resolution correlation of time facies. AAPG Methods in Exploration Series 7.

Vavra, C., J.G. Kaldi, and R.M. Sneider. 1992. Capillary pressure. In Morton-Thompson, D., and A.M. Woods (Eds.), AAPG Methods in Exploration Series, No. 10, Development Geology Reference Manual (pp. 221-225). AAPG: Tulsa, OK.

Vinegar, H.J., and M.H. Waxman. 1984. In-situ Method for Determining Pore Size Distribution, Capillary Pressure, and Permeability. U.S. Patent 4644283.

Wandrey, C.J., B.E. Law, and H.A. Shah. 2004. Patala-Nammal Composite Total Petroleum System, Kohat-Potwar Geologic Province, Pakistan. U.S. Geological Survey Bulletin 2208-B. U.S. Dept. of the Interior, U.S. Geological Survey, Denver, CO. http://pubs.usgs.gov/bul/b2208-b/b2208-b.pdf.

Wang, L., and P.M. Wong. 1999. Modeling porosity distribution in the A'nan Oilfield: Use of geological quantification, neural networks, and geostatistics. SPE Reservoir Eval. & Eng. 2(6): 527-532.

Warner, H.R. 2007. Chapter 11: Waterflooding. In Holstein, E.D. (Ed.), Reservoir Engineering and Petrophysics, Volume V(B). In Lake, L.W., and E.D. Holstein (Eds.), Petroleum Engineering Handbook. Society of Petroleum Engineers: Richardson, TX.

Warpinski, N.R., C.K. Waltman, J. Du., and Q. Ma. 2009. Anisotropy Effects in Microseismic Monitoring. Society of Petroleum Engineers Annual Technical conference and Exhibition, New Orleans, LA, SPE#124208.

Washbourne, J., and K. Bube. 1998. 3D High-Resolution Reservoir Monitoring From Crosswell Seismic Data. Society of Petroleum Engineers (SPE) Annual Technical Conference and Exhibition, New Orleans, LA. SPE 49176.

Welton, J. 2004. The SEM Petrology Atlas. American Association of Petroleum Geologists.

White, C.M., D.H. Smith, K.L. Jones, A.L. Goodman, S.A. Jikich, R.B. LaCount, S.B. DuBose, E. Ozdemir, B.I. Morsi, and K.T. Schroeder. 2005. Sequestration of carbon dioxide in coal with enhanced coalbed methane recovery - A review. Energy and Fuels 19(3): 559-724.

Williams, H., F.J. Turner, and C.M. Gilbert. 1982. Petrography: An introduction to the study of rocks in thin sections, 2nd Edition. W.H. Freeman and Company.

Wilson, M., and M. Monea (Eds.). 2004. The IEA GHG Weyburn $CO_2$ Monitoring and Storage Project Summary Report 2000-2004. The Petroleum Technology Research Centre: Regina, Saskatchewan.

Wilt, M.J., D.L. Alumbaugh, H.F. Morrison, A. Becker, K.H. Lee, and M. Deszcz-Pan. 1995. Crosswell electromagnetic tomography: System design considerations and field results. Geophysics 60(3): 871-885.

Wollenweber, J., S. Alles, A. Busch, B.M. Krooss, H. Stanjek, and R. Littke. 2010. Experimental investigation of the $CO_2$ sealing efficiency of caprocks. International Journal of Greenhouse Gas Control 4: 231-241.

Wynn, D. 2003. Geophysical monitoring of geologic sequestration in aquifers and depleted oil and gas fields. MS Project Report, Department of Geophysics, Stanford University.

Yarger, H.L., and S.Z. Jarjur. 1972. Gravity and Magnetic Survey of an Abandoned Lead and Zinc Mine in Linn County, Kansas. Kansas Geological Survey Bulletin 204, part 2. http://www.kgs.ku.edu/Publications/Bulletins/204_2/index.html.

Young, R.A., and T. Lepley. 2005. Five things your pore pressure analyst won't tell you. Presented at the American Association of Drilling Engineers (AADE) National Technical Conference and Exhibition. Houston, TX.

Zoback, M.D., C.A. Barton, M. Brudy, D.A. Castillo, T. Finkbeiner, B.R. Grollimund, D.B. Moos, P. Peska, C.D. Ward, and D.J. Wipurt. 2003. Determination of stress orientation and magnitude in deep wells. International Journal of Rock Mechanics and Mining Sciences 40: 1049-1076.

INDUSTRIAL COMMISSION
STATE OF NORTH DAKOTA
DATE 6/12/24 CASE NO. 30869-880
Introduced By Bofto (HydroSolutions)
Exhibit LO-21
Identified By Bofto

EPA United States Environmental Protection Agency

# Geologic Sequestration Data Tool (GSDT)

## Background

Under the Class VI Rule at 40 CFR 146.91(e), owners or operators of Class VI wells must submit geologic sequestration (GS) project information directly to EPA in an electronic format approved by EPA. **This requirement applies regardless of whether the project is located in a state with primary enforcement responsibility (primacy) for Class VI wells.**

EPA's Geologic Sequestration Data Tool (GSDT) is a centralized, web-based system that receives, stores, and manages Class VI data, to:

- Fulfill the requirement at 40 CFR 146.91(e);
- Facilitate data access, sharing, and technical evaluations of submitted materials;
- Develop and manage a comprehensive administrative record, consisting of all documents and communications supporting permitting decisions; and
- Ensure continuity over the potentially long lifespans of Class VI projects.

The GSDT provides a national, transparent, comprehensive, and cost-saving solution for Class VI data and records management.

## Class VI Users and Data

The GSDT is currently designed for two main groups of users; permit applicants/owners or operators and permitting authorities.

### *Owners or Operators*

The Class VI Rule requires owners or operators to submit certain types of information during each phase of a GS project:

- The **pre-construction phase**, prior to well construction or conversion;
- The **pre-injection phase**, prior to operation;
- The **injection phase**, during which $CO_2$ injection operations occur; and
- The **post-injection phase**, including post-injection site care (PISC) and site closure.

Beginning with the permit application and continuing through the life of the project, owners or operators must submit materials related to:

- **Site characterization** and pre-injection logging and testing;
- **Area of Review (AoR)** modeling and corrective action;
- **Well construction** and operation;
- **Financial responsibility** demonstrations;
- **Testing and monitoring** during the injection and post-injection phases;
- **Well plugging and site closure**, including non-endangerment demonstrations; and
- **Emergency and remedial response**.

*Class VI well schematic.*



EXHIBIT
tabbies
LO-21
30816A-30880

If applicable, owners or operators may also submit information related to alternative post-injection site care (PISC) timeframe demonstrations, injection depth waivers, and/or aquifer exemption expansion requests. Each of these categories of information must be evaluated both individually and in the context of the other types of submissions.

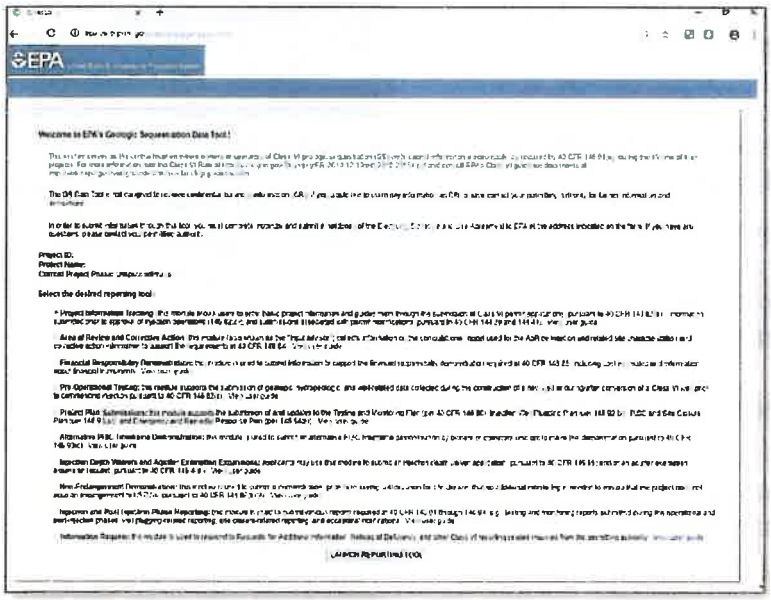
***Permitting Authorities***

Permitting authorities—primacy states and EPA regional offices—also generate information when permitting, managing, and overseeing Class VI projects. These materials may include:

- **Permitting documents**, including permit conditions and docket support materials;
- **Reports** generated during technical evaluation of materials submitted by permit applicants/owners or operators;
- **Communications** with owners or operators, such as responses to Notices of Deficiency (NODs) or Requests for Additional Information (RAIs);
- **Public participation/outreach materials**, including comment/response documents; and
- **Compliance-related materials**, including inspection and violation records.

## GSDT User Access

All users access the GSDT at https://gsdt.pnnl.gov/, where they are directed to separate areas for owners or operators and permitting authorities.



*Example project landing page.*

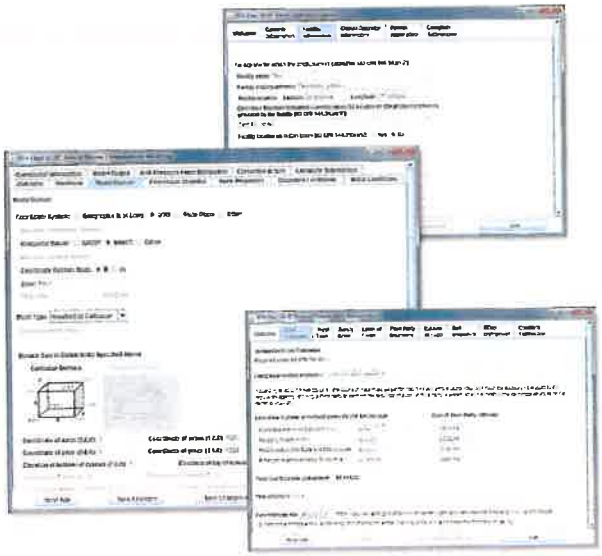
Owners or operators have access limited to their project site, which allows them to submit information. This group of users submits information via a series of topic-specific modules, accessed from a central landing page for their projects (see image at left).

Permitting authorities have full access, which allows them to access all the files and other information submitted via the modules. They can also use the tool to conduct technical evaluations, manage communications, and store all information related to a project. The GSDT allows permitting authorities to review and manipulate information while preserving the integrity of the original submitted data.

## GSDT Modules

All information submitted by permit applicant/owner or operator users is submitted via a series of modules that are designed to address certain components of Class VI data (AoR modeling, financial responsibility, etc.). Permit applicants/owners or operators can submit data using the following modules (see images on the following page):

- Project information tracking;
- AoR and corrective action;
- Financial responsibility demonstration;
- Pre-operational testing;
- Project plan submissions;
- Alternative PISC timeframe demonstration;
- Injection depth waivers and aquifer exemption expansions;
- Non-endangerment demonstration;
- Injection and post-injection phase reporting; and
- Information requests.



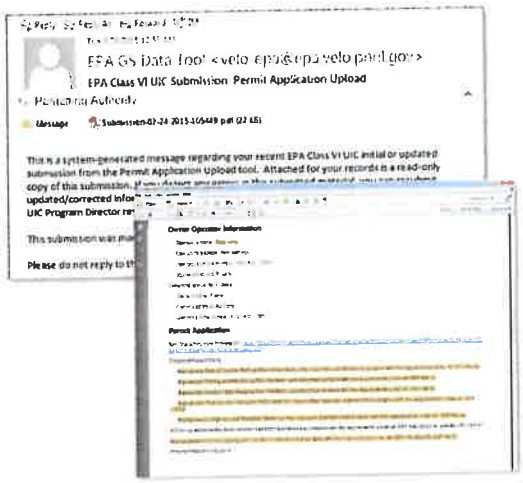
*Examples of GSDT modules.*

Depending on the topic and the type of data that must be submitted, some modules (such as the AoR and corrective action module) consist of fairly detailed proscriptive workflows to collect highly technical information. Others (such as the project plan submissions module) allow the user a great deal of flexibility in uploading required files and supplemental materials.

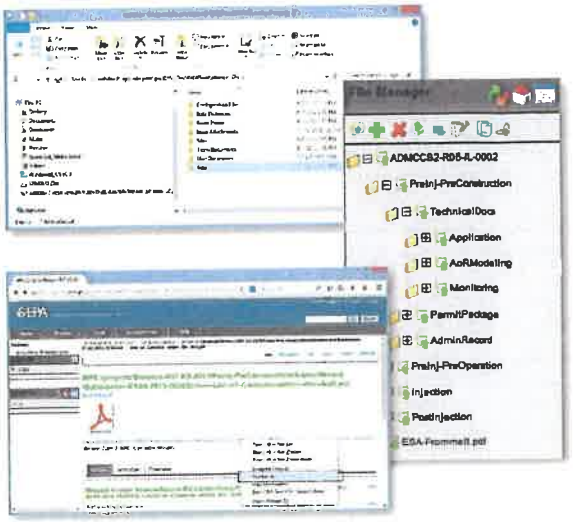
## Permitting Authority Capabilities

Permitting authority users have multiple options for viewing, downloading, and sharing files. When submissions are made, the designated permit writer(s) for a project will receive an email with a summary of the submission. The summary highlights any changes since the previous submission and includes links to uploaded files.

The version control features of the GSDT allow permitting authorities to more easily identify the most current version of a submitted file. Also, because all submissions are made through the tool, the tool supports the development of a comprehensive administrative record for a permitting decision.




*Automatic email notifications and versioning capabilities for permitting authorities.*




*Examples of options for accessing files.*

433811

INDEXED

# SALTWATER DISPOSAL LEASE AGREEMENT

FILM 567 PG 1382

STATE OF MONTANA, COUNTY OF SHERIDAN
RECORDED September 30 1991 at 9:00 AM
MILTON E. HOWLAND, COUNTY RECORDER
BY [signature] DEPUTY, FEE $ 2.00

THIS LEASE AGREEMENT is entered into this 30th day of August, 1991, by and between Brandon G. Smithson and Debra J. Smithson, husband and wife, HCR 276, Box 36, Westby, MT 59275 LESSOR, and Continental Resources, Inc., P.O. Box 10549, Enid, Oklahoma 73706, LESSEE.

1. In consideration of the sum of ten and more dollars ($10.00+) and other good and valuable consideration, the receipt of which is hereby acknowledged, LESSOR hereby grants, demises, leases and lets unto LESSEE a tract of land situated in Sheridan County, Montana, as described below, and the well bore known as the Allen #1-14 located thereon, to-wit:

Township 37 North, Range 56 East of the M.P.M.
Section 14: NE4

2. It is agreed that this lease shall commence on the date first written above and shall remain in force for so long as saltwater and other associated liquids (SALTWATER) are being disposed, or until terminated by LESSEE, according to the following terms.

3. LESSEE is hereby granted the right to use the Allen #1-14 well bore as situated on the above described tract, to maintain, equip, repair and operate the same, and to use the above described tract for the purpose of collecting and disposing below the surface SALTWATER. LESSEE may construct, maintain, replace and repair such facilities and equipment, including, but not limited to underground flowlines, power poles and lines, buildings, injection pump and tank and emergency pit, on such portions of the above described land as are reasonably necessary for or in connection with the gathering, storing and injection of SALTWATER into said disposal well.

4. It is agreed that payment to LESSOR for the disposal of SALTWATER shall be at the rate of $.05 (five cents) per barrel disposed. Payments for the disposal of SALTWATER will be made monthly. SALTWATER delivered to the premises shall be metered and reported monthly and LESSOR shall be entitled to meter reports on a periodic basis and shall be entitled to inspect the meters and the reports and the well operations at all reasonable times. Payment for the current month will be made to LESSOR at the address above set forth within thirty (30) days after the close of the current month, and payments will be made by check to LESSOR.

5. In consideration of the payment by LESSEE of the sum as hereinabove described, LESSOR hereby grants unto the LESSEE the right of ingress and egress to and from the leased tract and over any adjoining lands owned by LESSOR together with right-of-way over and across and the right from time to time to lay, maintain, replace, repair and remove pipelines over and across the leased tract and adjacent lands of LESSOR for the purpose of transporting SALTWATER to the disposal well. This right shall be exercisable by LESSEE so long as this LEASE AGREEMENT is in good standing.

6. The consideration paid as provided herein covers all surface damage to said tract due to the initial installation of buried flowlines and equipment thereon, payment for any subsequent damage shall be in the amount as negotiated between the parties hereto.

7. LESSEE shall, within a reasonable time after expiration of this lease, plug and abandon the said well bore and fill all existing pits located upon the above described tract and repair the lands as nearly practical to its original condition.

8. LESSEE further agrees to keep the site free of weeds and debris and to promptly clean up any and all spills.

9. LESSEE shall have a reasonable time, upon termination of this lease, to remove any and all structures, equipment and materials owned by the LESSEE from the lands herein described as leased lands or the rights-of-way herein granted.

Please record & return to: Continental Resources, Inc., P. O. Box 10549, Enid, OK 73706

EXHIBIT
tabbies
LO-32
30869-30880

INDUSTRIAL COMMISSION
STATE OF NORTH DAKOTA
DATE 6/13/24 CASE NO 30869-880
Introduced By Braaten
Exhibit LO-32
Identified By Stockness

EXHIBIT
084
1:18-cv-00181

Continental Resources, Inc.
DEPOSITION
EXHIBIT
084
06-07-2022

Attorney Eyes Only

10. This AGREEMENT shall bind all of LESSOR'S present interest in the subject lands, together with any subsequently acquired additional interests and shall be binding upon and inure to the benefit of the parties hereto, their heirs, successors and assigns.

11. This AGREEMENT contains the entire agreement of the parties and it is further agreed that there are no other oral or written promises or agreements.

IN WITNESS WHEREOF, The parties hereto have signed this AGREEMENT the day and year first above written.

LESSOR:

Debra J. Smithson

Brandon G. Smithson

LESSEE:

ATTEST:

CONTINENTAL RESOURCES, INC.

By: Gary H. Wright
Vice-President

STATE OF MONTANA )
) ss.
COUNTY OF SHERIDAN )

ACKNOWLEDGMENT, INDIVIDUAL

On this 30th day of August in the year 1991, before me, a Notary Public, personally appeared Brandon G. Smithson and Debra J. Smithson, husband and wife known to me to be the person who is described in, who executed the within and foregoing SALTWATER DISPOSAL LEASE AGREEMENT and acknowledged to me that he executed the same.

My commission expires:
3-12-94

Notary Public

STATE OF OKLAHOMA )
) ss.
COUNTY OF GARFIELD )

ACKNOWLEDGMENT, CORPORATE

On this 4th day of September 1991, before me appeared Gary H. Wright and Christine Roberts to me personally known, to be the Vice President and Secretary, respectively, who, being by me duly sworn, did say that they are the Vice President and Secretary, respectively, of CONTINENTAL RESOURCES, INC., and that the seal affixed to said instrument is the corporate seal affixed to said instrument and that said instrument was signed and sealed on behalf of said Vice President and Secretary acknowledged said instrument to be the free act and deed of said corporation.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed by seal the day and year last above written.

My commission expires:
4/26/93

Notary Public

INDUSTRIAL COMMISSION
STATE OF NORTH DAKOTA
DATE 6/12/24 CASE NO. 30869-880
Introduced By Braaten
Exhibit LO-33
Identified By Stockness

# SALTWATER DISPOSAL FACILITY LEASE AGREEMENT

THIS SALTWATER DISPOSAL FACILITY LEASE AGREEMENT (the "Agreement") is made and entered into this 26 day of June, 2019 by and between **Lyle H. Langseth, as Trustee of the Lyle H. Langseth Revocable Trust UDT August 10, 2010**, whose address is 405 13th Ave. W, Williston, ND 58801-4610, hereinafter called "Lessor" and **CONTINENTAL RESOURCES, INC.**, whose address is P. O. Box 269000, Oklahoma City, Oklahoma 73126, hereinafter called "Lessee."

**Witnesseth:**

WHEREAS, Lessor is the owner of the surface of the following described land located in Williams County, North Dakota, to-wit, (the "Leased Premises"):

Township 153 North, Range 99 West of the 5th P.M.
Section 2: SW¼

WHEREAS, Lessor is desirous of leasing a saltwater disposal well site upon the Leased Premises and the Lessee is desirous of leasing such property.

NOW, THEREFORE, for and in consideration of the sum of Ten Dollars ($10.00), the mutual promises contained herein, and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, it is agreed between the parties as follows:

1. **LEASED PREMISES**. The Lessor hereby leases, lets and rents unto the Lessee and the Lessee agrees to lease the following tract of land located on the Leased Premises described as follows:

a. **Tank Battery and Injection Well Site**: The Lessor hereby grants to Lessee the rights to the surface and subsurface of the Leased Premises located in the SW¼ of Section 2, Township 153 North, Range 99 West of the 5th P.M., Williams County, North Dakota, as depicted on the attached Exhibit "A", Lessor further grants to Lessee the rights to the surface and subsurface of the Leased Premises to equip, maintain, and operate the Saltwater Disposal Well for the purpose of disposing saltwater into the Saltwater Disposal Well. The Lessor also grants to Lessee the right to use the surface and subsurface of the Leased Premises for the purpose of equipping, operating and maintaining thereon all necessary facilities for a saltwater system, including, but not limited to, tanks, pumps and other structures and equipment necessary or convenient to save, take care of, treat, collect, store, transport, or dispose of saltwater from oil and gas wells on or off of the Leased Premises for disposal into the Saltwater Disposal Well, together with the right of ingress and egress across the Leased Premises from the county road.

b. **Easement Property**: The Lessor hereby grants to Lessee rights-of-way and easements for use of the surface and subsurface of the Leased Premises for the purpose of constructing, installing, operating, maintaining, replacing and removing pipelines, communication lines and poles, electric lines other utilities and for the purpose of transporting saltwater from oil and gas wells on or off of the Leased Premises to the Saltwater Disposal Well.

2. **PAYMENT.** Lessee agrees to pay the Lessor and the Lessor agrees to accept a one-time payment in the amount of Thirty Thousand Five Hundred and 00/100 Dollars ($30,500.00) (the "Initial Payment") for any and all damages, including, but not limited to, all damages relating to the construction, operation or use of the Saltwater Disposal Well site location and access road and all other damages related thereto, including, but not limited to, damages incurred in the operation, maintenance and development of the Saltwater Disposal Well and related facilities. In the event the acreage utilized by the Lessee exceeds the 6.1 acres, for the Saltwater Disposal Well site location, upon which this payment is based, the Lessee agrees to make a further payment to the Lessor for the extra acreage, based on the amount of $5,000.00 per acre. In addition, Lessee agrees to pay the Lessor and Lessor agrees to accept a payment of $0.06 cents per barrel for each barrel of saltwater disposed of in the Saltwater Disposal Well (the "Royalty Payment"). The Royalty Payment shall be paid by the 30th day of the following month for the life of the Saltwater Disposal Well (the "Monthly Payment"). In the event the Monthly Royalty Payment does not exceed $500.00, the minimum Monthly Payment shall be Five Hundred and 00/100 Dollars ($500.00) after the Saltwater Disposal Well is put into operation and for the life of the Saltwater Disposal Well. The parties agree the payments set forth in this paragraph are intended to cover all payments and damages arising from or related to surface and subsurface operations conducted by Lessee hereunder on the Leased Premises. Further, Lessor acknowledges and agrees the Initial Payment and Annual Payment paid under this Agreement are in full and complete settlement of any and all claims for loss, damage, or injury arising from or related to surface and subsurface operations conducted by Lessee hereunder on the Leased Premises. These payments will be paid proportionate to the interest the undersigned owns in the surface. Lessor and Lessee agree the payments hereunder shall be made upon receipt by Lessee of its executive management's approval to operate the Saltwater Disposal Well and upon commencement of construction activities on the Leased premises

EXHIBIT
tabbies
LO-33
30869 - 30880



EXHIBIT
085
1:18-cv-00181

Continental Resources, Inc.
DEPOSITION
EXHIBIT
085
06-07-2022

3. **TERM.** This Agreement shall remain in effect until Lessee permanently abandons the Saltwater Disposal Well and/or gathering system

4. **USE.** The Lessee shall have the right to use the Leased Premises for the storage of saltwater and other deleterious substances produced from oil and gas wells on or off of the Leased Premises; and for the disposal of saltwater and other deleterious substances produced from oil and gas wells on or off of the Leased Premises, and the easement for the transportation of saltwater and other deleterious substances produced from oil and gas wells on or off of the Leased Premises, including, but not limited to, the right of ingress and egress to said properties and premises, the right to lay, maintain and remove the pipeline or pipelines to and from said Saltwater Disposal Well site, the right to install, operate, maintain and remove pumping equipment, tankage and such other equipment as may be necessary or useful in the operation of the Saltwater Disposal Well facility.

5. **UTILITY EASEMENTS.** The Lessor agrees to execute all easements required by utility companies to affect the laying, maintaining and removing of utility lines, including, but not limited to, electric and telephone lines, for operating equipment necessary in Lessee's saltwater disposal operations.

6. **LIMITATION.** It is understood and agreed the disposal of saltwater and other deleterious substances will be made into a formation or formations which are not productive of fresh water, and which are approved for disposal purposes by the North Dakota Industrial Commission.

7. **FIXTURES OF LESSEE.** All pumping equipment, tankage and other equipment as may be necessary and useful in the operation of the Saltwater Disposal Well may be placed or attached on the Leased Premises by the Lessee and shall remain the property of the Lessee. Upon termination of this Agreement, or at any prior time, the Lessee may remove any and all of such equipment.

8. **DEFAULT.** The Lessee agrees upon its failure to comply with the provisions of this Agreement, the Lessor, at its option, may declare this Agreement at an end and void and terminate the same, and take possession of said premises. This Agreement shall not terminate until Lessor has given written notice of the alleged default(s) and of its intention to terminate the Agreement and Lessee has failed to cure the default(s) within sixty (60) days after receipt of the default notice. If Lessee cures the default within the sixty (60) days, the Agreement shall remain in full force and effect.

9. **ASSIGNMENT.** Lessee shall have the right to assign this Agreement without Lessor's consent. In the event of Lessee's assignment of its rights hereunder, Lessee shall have no further obligations under this Agreement. Lessor may assign, sell or transfer its rights in this Agreement and the property subject to the terms and conditions of this Agreement.

10. **NOTICE.** Any notice required to be given hereunder, must be given in writing and may be given personally or by certified or registered mail addressed to the parties as follows:

If to Lessor: Lyle H. Langseth, as Trustee of the Lyle H. Langseth
Revocable Trust UDT August 10, 2010
405 13th Ave. W
Williston, ND 58801-4610

If to Lessee: Continental Resources, Inc.
P.O. Box 269000
Oklahoma City, Oklahoma 73126
Attention: Contract Notices (Legal)

11. **INDEMNIFICATION, DAMAGES AND COVENANTS.** The Lessee, its successors or assigns, shall be solely responsible for damages arising from or related to Lessee's operation of the Saltwater Disposal Well and shall indemnify, defend and hold Lessor harmless from and against any liability, damages, claims, suits or causes of action, including but not limited to any reasonable attorney fees or expenses of Lessor, arising from any suit brought against Lessor related to Lessee's operation of the Saltwater Disposal Well. The Lessee will maintain the Saltwater Disposal Well and all appurtenances thereto in accordance with the rules and regulations of the North Dakota Industrial Commission, and comply with applicable environmental laws, rules or regulations that govern such operations.

12. **OWNERSHIP OF EQUIPMENT.** The Lessor agrees the Lessee has the right, at the termination of this Agreement, to remove any and all equipment and personal property that the Lessee places on the Leased Premises.

13. **TERMINATION.** When this Agreement terminates, Lessee shall remove all debris, machinery and equipment introduced by Lessee, and restore the Leased Premises as near to the condition, as reasonably practicable, it was in prior to Lessee's operations.



Attorney-Eyes-Only

14. **WARRANTIES.** Lessor warrants it owns all of the surface title to the Leased Premises and said property is not the homestead of the property.

15. **BINDING EFFECT.** This Agreement shall be binding upon the heirs, executors, administrators, successors and assigns of the parties hereto.

16. **EROSION CONTROL.** Lessee shall take reasonable measures to prevent erosion and disturbance of drainage areas, including but not limited to the installation of culverts, straw waddles, or other practicable applications. If an erosion problem develops, Lessor shall inform Lessee immediately, so the necessary corrective measures can be performed.

17. **WEED CONTROL.** Lessee agrees to make reasonable efforts to keep the well site and access road for the Saltwater Disposal Well free of noxious weeds, trash, and debris associated with Lessee's operations.

18. **DUST CONTROL.** During periods of heavy activity (e.g., drilling operations, hydraulic fracturing) and upon reasonable request by Lessor, Lessee shall make reasonable efforts to control dust on the access road leading to the Salt Water Disposal Well.

19. **ROAD MAINTENACE.** Lessee agrees to make reasonable efforts to maintain the Salt Water Disposal Well access road in good condition.

**IN WITNESS WHEREOF,** this Agreement is executed in counterparts, each, of which will constitute an original on the date and year first above written.

**LESSOR:**
**Lyle H. Langseth Revocable Trust**
**UDT August 10, 2010**

x Lyle H. Langseth
Lyle H. Langseth, Trustee

STATE OF North Dakota )
) ss. **INDIVIDUAL ACKNOWLEDGMENT**
COUNTY OF Williams )

I, the undersigned authority, a Notary Public in and for said County in said State, hereby certify that Lyle H. Langseth, as Trustee of the Lyle H. Langseth Revocable Trust UDT August 10, 2010, whose name is signed to the foregoing instrument, and who is known to me, acknowledged before me on this day that, being informed of the contents of the instrument, he executed the same voluntarily.

Given under my hand and official seal, this the 26 day of June, 2019.

Bradley Pederson
Notary Public

**BRADLEY PEDERSON**
Notary Public
State of North Dakota
My Commission Expires October 13, 2021



Attorney-Eyes-Only

**LESSEE:**
**CONTINENTAL RESOURCES, INC.**

X_____

By:_____

Its:_____

STATE OF _____ )
) ss. **CORPORATE ACKNOWLEDGMENT**
COUNTY OF _____ )

The foregoing document was acknowledged before me this_____ day of_____, 2019, by _____, as _____for Continental Resources, Inc., an Oklahoma corporation, on behalf of the corporation.

_____
Notary Public



Attorney-Eyes-Only

#208177 Bowman #1 SWD

NOV 3 1995

3

SURFACE AND ACCESS AGREEMENT

In that Wyoming Resources Corporation (WRC) desires continued access and use of the Bowman #1-D (SE/4 Sec. 10, T129N-R103W, Bowman County, North Dakota), Dr. Robert C. Thom grants access and use to this disposal site under the following terms and conditions:

1. Dr. Thom shall be paid a monthly access fee of $200.00 plus a $.05 fee for every barrel disposed during the month over and above 8,000 barrels. (i.e. 9,258 Bbls disposed, Dr. Thom to receive $200.00 plus (9,258 - 8,000) x .05 = $262.90).

2. Fee's shall be paid automatically by WRC within 45 days of the close of the month, and shall be based on barrels reported to the North Dakota Oil and Gas Commission.

3. This agreement is to commence the first month WRC has reportable disposed barrels, and Dr. Thom is to receive the agreed upon fees from this month onward.

4. WRC shall assume all responsibility for maintenance and up-keep of the site.

5. This agreement in no way compromises prior commitments by WRC for plugging, abandoning, and reclamation of the Bowman #1 site, once operations have ceased.

6. This agreement shall be in effect so long as WRC continues operations at the Bowman #1 site, is assignable by WRC to another party, and is binding should Dr. Thom dispose of the property covered by this agreement.

7. WRC shall notify Dr. Thom or his successor in writing as to succession of operations or sale of the property.

AGREED TO AND SIGNED BY:

WYOMING RESOURCES CORPORATION

Jay Brewster, Vice President

Jay Brewster

ATTEST: Diane C Calvert

DATE: October 31, 1995

DR. ROBERT C. THOM

R. C. Thom MD

ATTEST: Edward Hochhalter

DATE: 11-2-95

INDUSTRIAL COMMISSION
STATE OF NORTH DAKOTA
DATE 6/13/24 CASE NO 30869-880
Introduced By Braaten
Exhibit LO-34
Identified By Stockness

EXHIBIT
089
1:18-cv-00181

Continental Resources, Inc.
DEPOSITION
EXHIBIT
089
06-07-2022

EXHIBIT
tabbies
LO-34
30869-30880

Attorney-Eyes-Only

CLR-000562

Printed on:06/16/09 at 11:03 AM Requested by:SUPER
Rept VNM-01 Full Vendor Reference Listing by EntityCode Page 1

| Vendor | Name / Address | | Other | |
|---|---|---|---|---|
| 369640 | THOM, DR. ROBERT C. | Phone: | Min.Ck: | 0.00 |
| | | Fax : | | |
| | 11 8th AVENUE NW | Contact: | Take-Disc:Y | |
| | BOWMAN, ND 58623 | Fed. ID: [redacted] | Send-1099:Y Payment Type:1 | |
| | Email Addr: | | | |
| | Search Key:WRJ | Terms: 1N | Hold-Cks: N | |
| | | Comment: | | |

1 items listed.

AP# 757900



Attorney-Eyes-Only

INDUSTRIAL COMMISSION
STATE OF NORTH DAKOTA
DATE 6/13/24 CASE NO 30869-880
Introduced By Braaten
Exhibit LO-35
Identified By Stockness

B.J. KADRMAS INC.
"COMPLETE LAND SERVICE SINCE 1951"

161 FIRST AVENUE SOUTHEAST • P.O. BOX 1282
DICKINSON, NORTH DAKOTA 58602-1282

- 2nd new Rocket SWD.
  NW of recently drilled Dvirnak
- .06 $/bbl fee + $6,000/acre for
  6.43 acres for well + plant
- Standard agreement otherwise

June 8, 2018

**VIA FED EX**

Attn: Marcus Simpson
Continental Resources, Inc.
20 N. Broadway
Oklahoma City, OK 73126

RE: **Brandvik SWD**
Dunn County, North Dakota

Township 147 North, Range 96 West of the 5th P.M.
Section 25: W2SW4, SW4NW4

Reviewed both w/ HH on Wednesday. He was OK with both.
Brael 6/15/18

Greetings:

Please find enclosed the following:

1) Saltwater Disposal Facility Lease Agreement signed 6/5/2018 by Bruce G. Brandvik, as AIF for Mavis Brandvik

Please have a representative of Continental Resources, Inc. sign the enclosed document. Please mail back the executed document(s) to B.J. Kadrmas, Inc. Additionally, see enclosed another Agreement of the same kind, for the Jamestown SWD, in McKenzie County, for which a separate cover letter is attached.

Respectfully,

Matthew R. Kostelecky, RPL
B.J. Kadrmas, Inc.
President

EXHIBIT
tabbies
LO-35
30869-30880

EXHIBIT
091
1:18-cv-00181

Continental Resources, Inc.
DEPOSITION
EXHIBIT
091
06-07-2022

OFFICE: 1-800-730-0361 / 701-225-0361 • webmail@bjkadrmasinc.com • FAX: 701-227-0421

# SALTWATER DISPOSAL FACILITY LEASE AGREEMENT

**THIS SALTWATER DISPOSAL FACILITY LEASE AGREEMENT (the "Agreement")** is made and entered into this 5th day of June, 2018 by and between **Bruce G. Brandvik as AIF** for **Mavis Brandvik, a widow**, whose address is **10789 Highway 22 North, Killdeer, ND 58640**, hereinafter called **"Lessor"** and **CONTINENTAL RESOURCES, INC.**, whose address is **P. O. Box 268870, Oklahoma City, Oklahoma 73126**, hereinafter called **"Lessee."**

**Witnesseth:**

**WHEREAS**, Lessor is the owner of the surface of the following described land located in Dunn County, North Dakota, to-wit, (the "Leased Premises"):

Township 147 North, Range 96 West of the 5th P.M.
Section 25: W2SW4, SW4NW4

**WHEREAS**, Lessor is desirous of leasing a saltwater disposal well site upon the Leased Premises and the Lessee is desirous of leasing such property.

**NOW, THEREFORE**, for and in consideration of the sum of Ten Dollars ($10.00), the mutual promises contained herein, and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, it is agreed between the parties as follows:

1. **LEASED PREMISES**: The Lessor hereby leases, lets and rents unto the Lessee and the Lessee agrees to lease the following tract of land located on the Leased Premises described as follows:

    a. **Tank Battery and Injection Well Site**: The Lessor hereby grants to Lessee the rights to the surface and subsurface of the Leased Premises located in Section 25, W2SW4, SW4NW4, Township 147 North, Range 96 West, Dunn County, North Dakota, as depicted on the attached Exhibit "A". Lessor further grants to Lessee the rights to the surface and subsurface of the Leased Premises to equip, maintain, and operate the Saltwater Disposal Well for the purpose of disposing saltwater into the Saltwater Disposal Well. The Lessor also grants to Lessee the right to use the surface and subsurface of the Leased Premises for the purpose of equipping, operating and maintaining thereon all necessary facilities for a saltwater system, including, but not limited to, tanks, pumps and other structures and equipment necessary or convenient to save, take care of, treat, collect, store, transport, or dispose of saltwater from oil and gas wells on or off of the Leased Premises for disposal into the Saltwater Disposal Well, together with the right of ingress and egress across the Leased Premises from the county road.

    b. **Easement Property**: The Lessor hereby grants to Lessee rights-of-way and easements for use of the surface and subsurface of the Leased Premises for the purpose of constructing, installing, operating, maintaining, replacing and removing pipelines, communication lines and poles, electric lines other utilities and for the purpose of transporting saltwater from oil and gas wells on or off of the Leased Premises to the Saltwater Disposal Well.

2. **PAYMENT:** Lessee agrees to pay the Lessor and the Lessor agrees to accept compensation in the amount of $38,580.00 for the location ($6,000.00 per acre for 6.43 acres), and $529.50 for the access road (21.18 rods @ $25.00 per rod) for any and all damages, including, but not limited to, all damages relating to the Saltwater Disposal Well, roadway, tank battery, pipelines, utilities and all other damages related thereto, incurred in the conversion, operation, maintenance and development of the Saltwater Disposal Well. In addition, Lessee agree to pay the Lessor and the Lessor agrees to accept a $0.06 cent per barrel royalty on each barrel of salt water disposed of in the Salt Water Disposal Well. The $0.06 cent per barrel royalty for the previous year will become due and payable on January 31st of the upcoming year until the well is plugged and abandoned. Lessee agrees to pay the Lessor and the Lessor agrees to accept a payment of $200.00 per linear rod for pipelines located in Township 147 North, Range 96 West, Section 25 – W2, Dunn County, North Dakota. The parties agree this payment is intended to cover all damages arising from or related to surface and subsurface operations conducted by Lessee hereunder on the Leased Premises. Lessor and Lessee agree the payment hereunder shall be made upon receipt by Lessee of its executive management's approval to drill a Saltwater Disposal Well and upon commencement of construction activities on the Leased Premises.

from oil and gas wells on or off of the Leased Premises, including, but not limited to, the right of ingress and egress to said properties and premises, the right to lay, maintain and remove the pipeline or pipelines to and from said Saltwater Disposal Well site, the right to install, operate, maintain and remove pumping equipment, tankage and such other equipment as may be necessary or useful in the operation of the Saltwater Disposal Well facility.

5. **UTILITY EASEMENTS:** The Lessor agrees to execute all easements required by utility companies to affect the laying, maintaining and removing of utility lines, including, but not limited to, electric and telephone lines, for operating equipment necessary in Lessee's saltwater disposal operations.

6. **LIMITATION:** It is understood and agreed the disposal of saltwater and other deleterious substances will be made into a formation or formations which are not productive of fresh water, and which are approved for disposal purposes by the North Dakota Industrial Commission.

7. **FIXTURES OF LESSEE:** All pumping equipment, tankage and other equipment as may be necessary and useful in the operation of the Saltwater Disposal Well may be placed or attached on the Leased Premises by the Lessee and shall remain the property of the Lessee. Upon termination of this Agreement, or at any prior time, the Lessee may remove any and all of such equipment.

8. **DEFAULT:** The Lessee agrees upon its failure to comply with the provisions of this Agreement, the Lessor, at its option, may declare this Agreement at an end and void and terminate the same, and take possession of said premises. This Agreement shall not terminate until Lessor has given written notice of the alleged default(s) and of its intention to terminate the Agreement and Lessee has failed to cure the default(s) within sixty (60) days after receipt of the default notice. If Lessee cures the default within the sixty (60) days, the Agreement shall remain in full force and effect.

9. **ASSIGNMENT:** Lessee shall have the right to assign this Agreement without Lessor's consent. In the event of Lessee's assignment of its rights hereunder, Lessee shall have no further obligations under this Agreement. Lessor may assign, sell or transfer its rights in this Agreement and the property subject to the terms and conditions of this Agreement.

10. **NOTICE:** Any notice required to be given hereunder, must be given in writing and may be given personally or by certified or registered mail addressed to the parties as follows:

    If to Lessor: Mavis Brandvik
    10789 Highway 22 North
    Killdeer, ND 58640

    If to Lessee: Continental Resources, Inc.
    P.O. Box 268836
    Oklahoma City, Oklahoma 73126
    Attention: Contract Notices (Legal)

11. **INDEMNIFICATION, DAMAGES AND COVENANTS:** The Lessee, its successors or assigns, shall be solely responsible for damages arising from or related to Lessee's operation of the Saltwater Disposal Well and shall indemnify, defend and hold Lessor harmless from and against any liability, damages, claims, suits or causes of action, including but not limited to any reasonable attorney fees or expenses of Lessor, arising from any suit brought against Lessor related to Lessee's operation of the Saltwater Disposal Well. The Lessee will maintain the Saltwater Disposal Well and all appurtenances thereto in accordance with the rules and regulations of the North Dakota Industrial Commission, and comply with applicable environmental laws, rules or regulations that govern such operations.

12. **OWNERSHIP OF EQUIPMENT:** The Lessor agrees the Lessee has the right, at the termination of this Agreement, to remove any and all equipment and personal property that the Lessee places on the Leased Premises.

13. **TERMINATION:** When this Agreement terminates, Lessee shall remove all debris, machinery and equipment introduced by Lessee, and restore the Leased Premises as near to the condition, as reasonably practicable, it was in prior to Lessee's operations.

14. **WARRANTIES:** Lessor warrants it owns all of the surface title to the Leased Premises and said property

applications. If an erosion problem develops, Lessor shall inform Lessee immediately, so the necessary corrective measures can be performed.

17. **WEED CONTROL:** Lessee agrees to make reasonable efforts to keep the well site and access road for the Saltwater Disposal Well free of noxious weeds, trash, and debris associated with Lessee's operations.

18. **DUST CONTROL:** During periods of heavy activity (e.g., drilling operations, hydraulic fracturing) and upon reasonable request by Lessor, Lessee shall make reasonable efforts to control dust on the access road leading to the Salt Water Disposal Well.

19. **ROAD MAINTENACE:** Lessee agrees to make reasonable efforts to maintain the Salt Water Disposal Well access road in good condition.

**IN WITNESS WHEREOF,** this Agreement is executed in counterparts, each, of which will constitute an original on the date and year first above written.

**LESSOR:**

Bruce G. Brandvik as AIF for Mavis Brandvik

**LESSEE:**
CONTINENTAL RESOURCES, INC. DCR 6-12-18
An Oklahoma corporation MSS 6-12-18
6-13-18

By: Jack H Stark

Name: Jack H Stark

Title: President

STATE OF North Dakota )
) ss. **INDIVIDUAL ACKNOWLEDGMENT**
COUNTY OF Stark )

I, the undersigned authority, a Notary Public in and for said County in said State, hereby certify that Bruce G. Brandvik as AIF for Mavis Brandvik, whose names are signed to the foregoing instrument, and who is known to me, acknowledged before me on this day that, being informed of the contents of the instrument, he executed the same voluntarily.

Given under my hand and official seal, this the 5 day of June, 2018.

CHRISTINA M. WENKO
Notary Public
State of North Dakota
My Commission Expires October 19, 2018

Notary Public

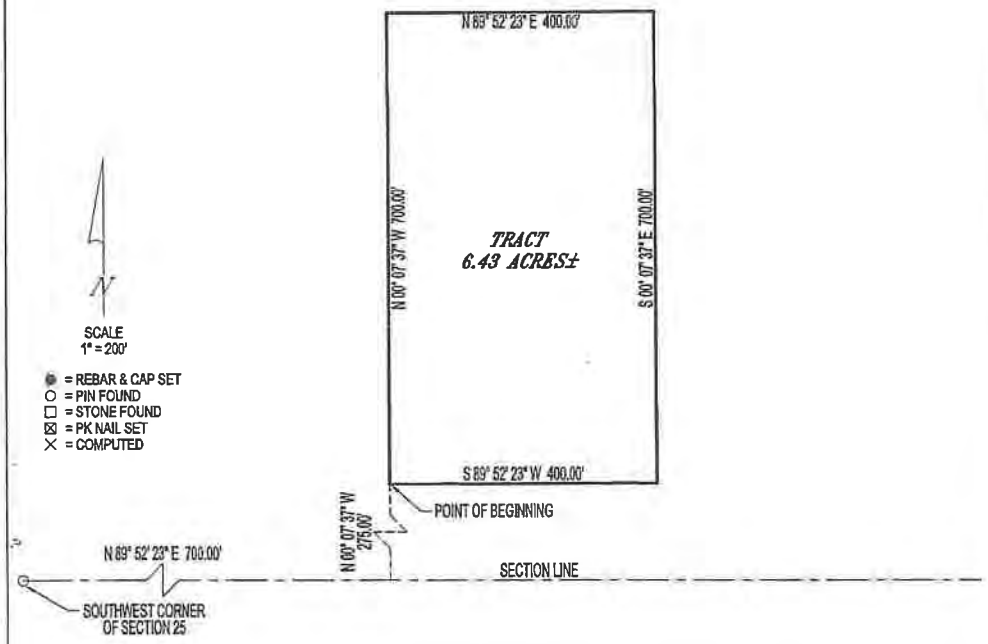
STATE OF Oklahoma )
) ss. **CORPORATE ACKNOWLEDGMENT**
COUNTY OF Oklahoma )

The foregoing document was acknowledged before me this 13 day of June, 2018, by Jack H Stark as President. for Continental Resources

EXHIBIT A

# *SURVEY PLAT*

BRANDVIK SWD
SW1/4SW1/4 OF SECTION 25
TOWNSHIP 147 NORTH - RANGE 96 WEST
DUNN COUNTY, NORTH DAKOTA




A TRACT OF LAND LOCATED IN THE SW1/4SW1/4 OF SECTION 25, T147N, R96W, DUNN COUNTY, NORTH DAKOTA.

COMMENCING AT THE SOUTHWEST CORNER OF SECTION 25; THENCE N 89° 52' 23" E, ALONG THE SOUTH LINE OF SAID SECTION, A DISTANCE OF 700.00 FEET; THENCE N 00° 07' 37" W, PERPENDICULAR TO SAID SOUTH LINE, A DISTANCE OF 275.00 FEET TO THE POINT OF BEGINNING; THENCE N 00° 07' 37" W, PERPENDICULAR TO SAID SOUTH LINE, A DISTANCE OF 700.00 FEET; THENCE N 89° 52' 23" E, PARALLEL TO SAID SOUTH LINE, A DISTANCE OF 400.00 FEET; THENCE S 00° 07' 37" E, PERPENDICULAR TO SAID SOUTH LINE, A DISTANCE OF 700.00 FEET; THENCE S 89° 52' 23" W, PARALLEL TO SAID SOUTH LINE, A DISTANCE OF 400.00 FEET TO THE POINT OF BEGINNING.

SAID TRACT CONTAINS 6.43 ACRES MORE OR LESS AND IS SUBJECT TO ANY EXISTING EASEMENTS AND RIGHT-OF-WAY.

I CERTIFY THAT THIS PLAT CORRECTLY REPRESENTS WORK PERFORMED BY ME OR UNDER MY RESPONSIBLE CHARGE, AND IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF

JOHN A. BROSZ L.S. 3366

LAND SURVEYOR L.S. 3366 NORTH DAKOTA

5-17-18

DATE STAKED: 11-1-17

PERSON AUTHORIZING SURVEY;
MARCUS SIMPSON

BASIS OF BEARING: TRUE NORTH

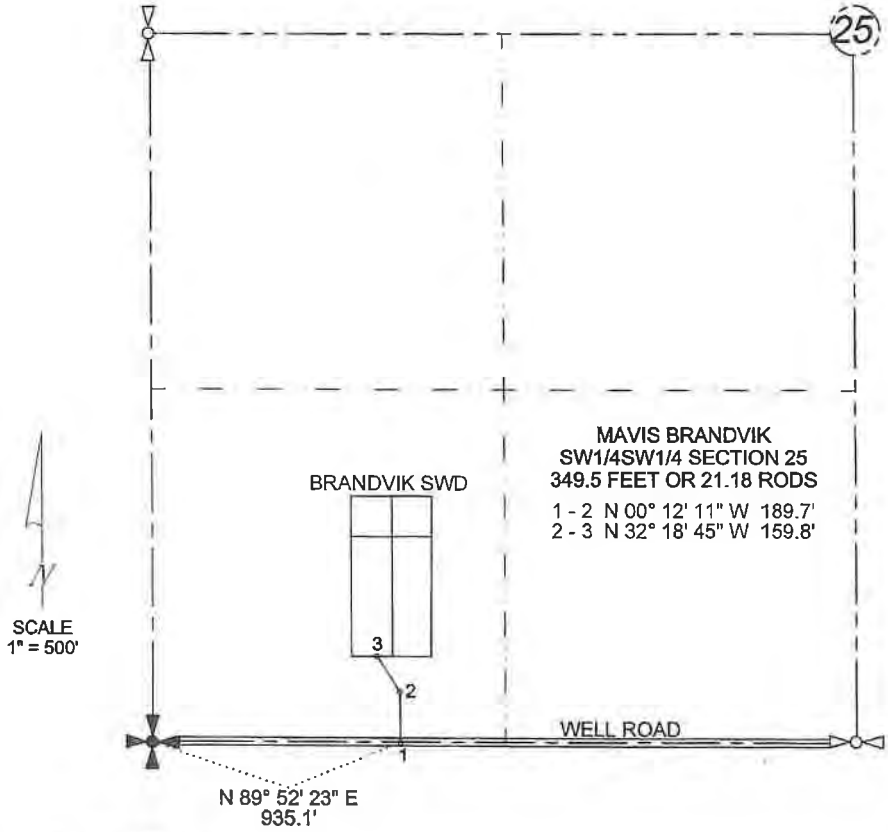

*BROSZ ENGINEERING INC.*
BOX 357
BOWMAN, N.D. 58623
PHONE: 701-523-3340
FAX: 701-523-5243

PROJECT NO. 17-10

EXHIBIT A

TOTAL ROAD LENGTH:
349.5 FEET OR 21.18 RODS

# ROAD LOCATION PLAT
## CONTINENTAL RESOURCES INC.
## BRANDVIK SWD
## SECTION 25, T147N, R96W
## DUNN COUNTY, NORTH DAKOTA




I CERTIFY THAT THIS PLAT CORRECTLY REPRESENTS WORK PERFORMED BY ME OR UNDER MY RESPONSIBLE CHARGE, AND IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF

JOHN PAUL [illegible] R.L.S. 3366

5-17-18

DATE STAKED: 11-1-17

PERSON AUTHORIZING SURVEY;
MARCUS SIMPSON

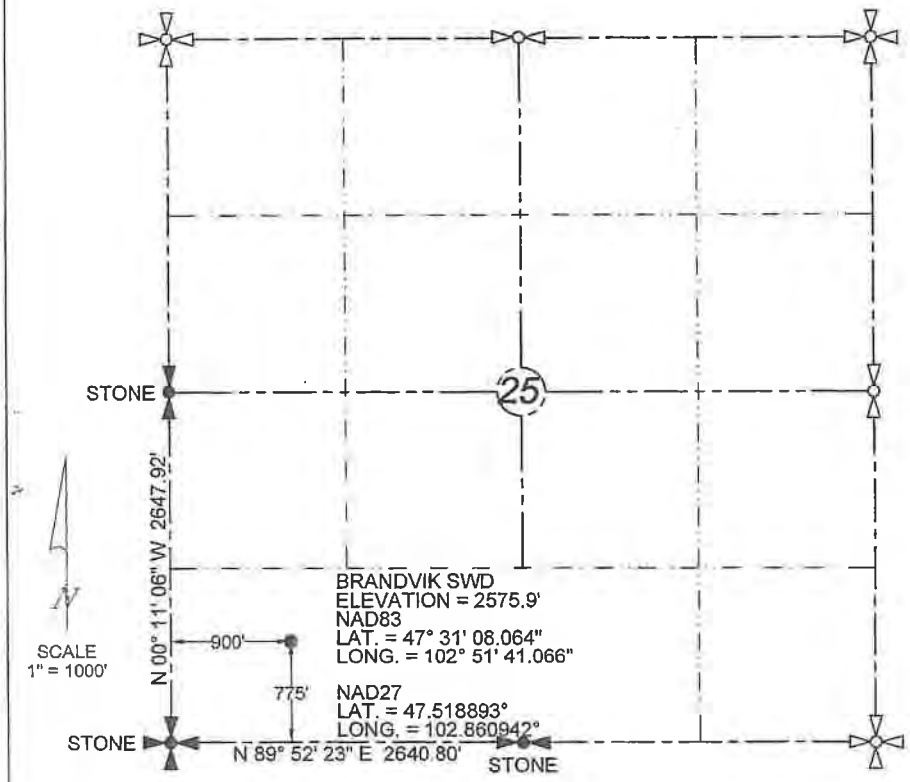
BASIS OF BEARING: TRUE NORTH


*BROSZ ENGINEERING INC.*
BOX 357
BOWMAN, N.D. 58623
PHONE: 701-523-3340
FAX: 701-523-5243

PROJECT NO. 18-10

EXHIBIT A

# WELL LOCATION PLAT
## CONTINENTAL RESOURCES INC.
## BRANDVIK SWD
## SECTION 25, T147N, R96W
## DUNN COUNTY, NORTH DAKOTA
## 775' FSL & 900' FWL




I CERTIFY THAT THIS PLAT CORRECTLY REPRESENTS WORK PERFORMED BY ME OR UNDER MY RESPONSIBLE CHARGE, AND IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF

John Paulson 5-17-18

JOHN PAULSON R.L.S. 3366

REGISTERED LAND SURVEYOR L.S. 3366 NORTH DAKOTA

DATE STAKED: 11-1-2017

BASIS OF VERTICAL DATUM: NAVD 1988 GEOID 12B

PERSON AUTHORIZING SURVEY; MARCUS SIMPSON

EXPLANATION AREA: NAD83(CONUS)

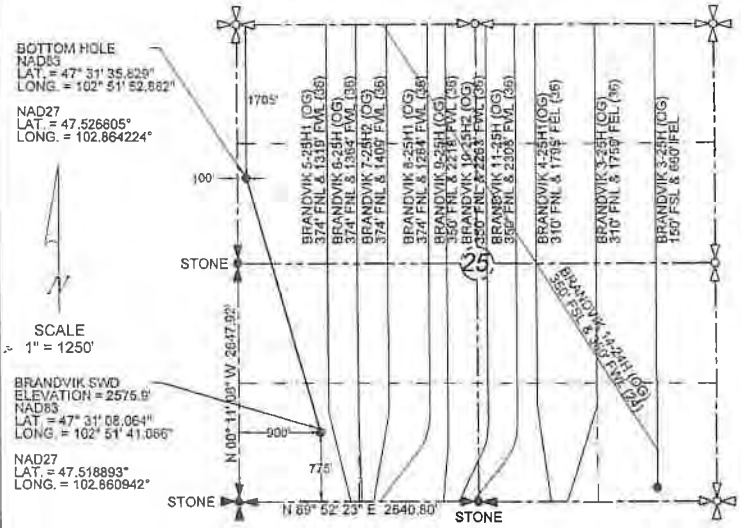
BASIS OF BEARING: TRUE NORTH


*BROSZ ENGINEERING INC.*
BOX 357
BOWMAN, N.D. 58623
PHONE: 701-523-3340
FAX: 701-523-5243


PROJECT NO. 18-10

EXHIBIT A

# BOTTOM HOLE LOCATION PLAT
## CONTINENTAL RESOURCES INC.
## BRANDVIK SWD
## SECTION 25, T147N, R96W
## DUNN COUNTY, NORTH DAKOTA
## 775' FSL & 900' FWL




I CERTIFY THAT THIS PLAT CORRECTLY REPRESENTS WORK PERFORMED BY ME OR UNDER MY RESPONSIBLE CHARGE, AND IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF

JOHN PAGE, REGISTERED LAND SURVEYOR L.S. 3366 NORTH DAKOTA

5-17-18

DATE STAKED: 11-1-2017

BASIS OF VERTICAL DATUM: NAVD 1988 GEOID 12B

PERSON AUTHORIZING SURVEY; MARCUS SIMPSON

EXPLANATION AREA: NAD83(CONUS)

BASIS OF BEARING: TRUE NORTH


*BROSZ ENGINEERING INC.*
BOX 357
BOWMAN, N.D. 58623
PHONE: 701-523-3340
FAX: 701-523-5243


PROJECT NO. 18-10

# SALTWATER DISPOSAL FACILITY LEASE AGREEMENT

THIS SALTWATER DISPOSAL FACILITY LEASE AGREEMENT (the "Agreement") is made and entered into this 15th day of Jan, 2019 by and between David Davidson, a/k/a David E. Davidson whose address is, P.O. Box 26, Tioga, ND 58852-0026, hereinafter called "Lessor" and CONTINENTAL RESOURCES, INC., whose address is P. O. Box 268870, Oklahoma City, Oklahoma 73126, hereinafter called "Lessee."

**Witnesseth:**

WHEREAS, Lessor is the owner of the surface of the following described land located in Williams County, North Dakota, to-wit, (the "Leased Premises"):

Township 156 North, Range 95 West of the 5th P.M.
Section 12: SE¼

WHEREAS, Lessor is desirous of leasing a saltwater disposal well site upon the Leased Premises and the Lessee is desirous of leasing such property.

NOW, THEREFORE, for and in consideration of the sum of Ten Dollars ($10.00), the mutual promises contained herein, and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, it is agreed between the parties as follows:

1. **LEASED PREMISES.** The Lessor hereby leases, lets and rents unto the Lessee and the Lessee agrees to lease the following tract of land located on the Leased Premises described as follows:

a. **Tank Battery and Injection Well Site**: The Lessor hereby grants to Lessee the rights to the surface and subsurface of the Leased Premises located in the SE¼ of Section 12, Township 156 North, Range 95 West, Williams County, North Dakota, as depicted on the attached Exhibit "A". Lessor further grants to Lessee the rights to the surface and subsurface of the Leased Premises to equip, maintain, and operate the Saltwater Disposal Well for the purpose of disposing saltwater and other deleterious substances produced from oil and gas wells on or off of the Leased Premises into the Saltwater Disposal Well. For purposes of this Agreement, the "Saltwater Disposal Well" is the David 1-12 SWD which is depicted on the attached Exhibit "A". The Lessor also grants to Lessee the right to use the surface and subsurface of the Leased Premises for the purpose of equipping, operating and maintaining thereon all necessary facilities for a saltwater system, including, but not limited to, tanks, pumps and other structures and equipment necessary or convenient to save, take care of, treat, collect, store, transport, or dispose of saltwater and other deleterious substances produced from oil and gas wells on or off of the Leased Premises for disposal into the Saltwater Disposal Well, together with the right of ingress and egress across the Leased Premises from the county road.

b. **Easement Property**: The Lessor hereby grants to Lessee rights-of-way and easements for use of the surface and subsurface of the Leased Premises for the purpose of constructing, installing, operating, maintaining, replacing and removing pipelines, communication lines and poles, electric lines, other utilities, and other necessary or convenient fixtures or operations for the purpose of transporting saltwater from oil and gas wells on or off of the Leased Premises to the Saltwater Disposal Well.

2. **PAYMENT.** Lessee agrees to pay the Lessor and the Lessor agrees to accept a one-time payment in the amount of One Hundred Thousand and 00/100 Dollars ($100,000.00) (the "Initial Payment") for any and all damages, including, but not limited to, all damages relating to the operation or use of the Saltwater Disposal Well site location and access road and all other damages related thereto, including, but not limited to, damages incurred in the operation, maintenance and development of the Saltwater Disposal Well and related facilities. In addition, Lessee agrees to pay the Lessor and Lessor agrees to accept a monthly payment of $0.055 cents per barrel for each barrel of saltwater disposed of in the Saltwater Disposal Well (the "Monthly Payment"). The Monthly Payment shall be paid by the 30th day of the following month after the filing of State injection reports. Upon request, Lessee shall furnish Lessor with copies of all reports of liquids received on site or injected as filed with the North Dakota Industrial Commission, Oil & Gas Division, for the previous month via email. The parties agree the payments set forth in this paragraph are intended to cover all payments and damages arising from or related to surface and subsurface operations conducted by Lessee hereunder on the Leased Premises. Further, Lessor acknowledges and agrees the Initial Payment and Annual Payment paid under this Agreement are in full and complete settlement of any and all claims for loss, damage, or injury arising from or related to surface and subsurface operations conducted by Lessee hereunder on the Leased Premises. Lessor and Lessee agree the payments hereunder shall be made upon receipt by Lessee of its executive management's approval to operate the Saltwater Disposal Well.

3. **TERM.** This Agreement shall remain in effect until Lessee permanently abandons the Saltwater Disposal Well and/or gathering system.

INDUSTRIAL COMMISSION
STATE OF NORTH DAKOTA
DATE 4/15/24 CASE NO 30869-30880
Introduced By Braaten
Exhibit LO-36
Identified By Stockness

EXHIBIT
tabbies
LO-36
30869-30880

EXHIBIT
093
1:18-cv-00181

Continental Resources, Inc.
DEPOSITION
EXHIBIT
093
06-07-2022

4. **USE.** The Lessee shall have the right to use the Leased Premises for the storage of saltwater and other deleterious substances produced from oil and gas wells on or off of the Leased Premises; and for the disposal of saltwater and other deleterious substances produced from oil and gas wells on or off of the Leased Premises, and the easement for the transportation of saltwater and other deleterious substances produced from oil and gas wells on or off of the Leased Premises, including, but not limited to, the right of ingress and egress to said properties and premises, the right to lay, maintain and remove the pipeline or pipelines to and from said Saltwater Disposal Well site, the right to install, operate, maintain and remove pumping equipment, tankage and such other equipment as may be necessary or useful in the operation of the Saltwater Disposal Well facility. Lessee shall transport and dispose of all produced water volumes from wells operated by Lessee, which are connected to the Saltwater Disposal Well via pipeline, provided the Saltwater Disposal Well is mechanically and/or volumetrically able to accept such produced water volumes, which shall be determined in Lessee's sole reasonable discretion. In the event, the Saltwater Disposal Well is not mechanically and/or volumetrically able to accept produced water from Lessee, then Lessee shall have the right to take such produced water to a third party for disposal until the mechanical and/or volumetric issue is resolved. Notwithstanding the anything in this paragraph to the contrary, Lessee shall not be required to connect any wells operated by Lessee to the Saltwater Disposal Well via pipeline if such connection is not economically feasible, which shall be determined in Lessee's sole reasonable discretion.

5. **UTILITY EASEMENTS.** The Lessor agrees to execute all easements requested by utility companies to affect the laying, maintaining and removing of utility lines, including, but not limited to, electric and telephone lines, for operating equipment necessary in Lessee's saltwater disposal operations.

6. **LIMITATION.** It is understood and agreed the disposal of saltwater and other deleterious substances by Lessee will be made into a formation or formations which are not productive of fresh water, and which are approved for disposal purposes by the North Dakota Industrial Commission.

7. **FIXTURES OF LESSEE.** All pumping equipment, tankage and other equipment as may be necessary and useful in the operation of the Saltwater Disposal Well may be placed or attached on the Leased Premises by the Lessee and shall remain the property of the Lessee. Upon termination of this Agreement, or at any prior time, the Lessee may remove any and all of such equipment.

8. **DEFAULT.** The Lessor agrees Lessee's failure to comply with the provisions of this Agreement shall not result in termination of this Agreement. If Lessor believes Lessee has failed to comply with the terms of this Agreement, prior to commencing any legal action to enforce the terms of this Agreement, Lessor shall give Lessee written notice of the alleged default(s) and allow Lessee sixty (60) days to being curing the alleged default(s).

9. **ASSIGNMENT.** Lessee shall have the right to assign this Agreement without Lessor's consent. In the event of Lessee's assignment of its rights hereunder, Lessee shall have no further obligations under this Agreement. Lessor may assign, sell or transfer its rights in this Agreement and the property subject to the terms and conditions of this Agreement.

10. **NOTICE.** Any notice required to be given hereunder, must be given in writing and may be given personally or by certified or registered mail addressed to the parties as follows:

If to Lessor: David E. Davidson
P.O. Box 26
Tioga, ND 58852-0026

If to Lessee: Continental Resources, Inc.
P.O. Box 268836
Oklahoma City, Oklahoma 73126
Attention: Contract Notices (Legal)

11. **INDEMNIFICATION, DAMAGES AND COVENANTS.** The Lessee, its successors or assigns, shall be solely responsible for actual damages arising from or related to Lessee's physical operation of the Saltwater Disposal Well from and after the date of this Agreement and shall indemnify, defend and hold Lessor harmless from and against any liability, damages, claims, suits or causes of action, including but not limited to any reasonable attorney fees or expenses of Lessor, arising from any suit brought against Lessor related to Lessee's physical operation of the Saltwater Disposal Well from and after the date of this Agreement. The Lessee will maintain the Saltwater Disposal Well and all appurtenances thereto in accordance with the rules and regulations of the North Dakota Industrial Commission, and comply with applicable environmental laws, rules or regulations that govern such operations.

12. **TERMINATION.** When this Agreement terminates, Lessee shall remove all debris, machinery and equipment introduced by Lessee, and restore the Leased Premises as near to the condition, as reasonably practicable, it was in prior to Lessee's operations.

13. **WARRANTIES.** Lessor warrants it owns all of the surface title to the Leased Premises and said property is not the homestead of the property.

14. **BINDING EFFECT.** This Agreement shall be binding upon the heirs, executors, administrators, successors and assigns of the parties hereto.

15. **EROSION CONTROL.** Lessee shall take reasonable measures to prevent erosion and disturbance of drainage areas, including but not limited to the installation of culverts, straw waddles, or other practicable applications. If an erosion problem develops as a result of Lessee's operations, Lessor shall inform Lessee immediately, so the necessary corrective measures can be performed.

16. **WEED CONTROL**. Lessee agrees to make reasonable efforts to keep the well site and access road for the Saltwater Disposal Well free of noxious weeds, trash, and debris associated with Lessee's operations.

17. **DUST CONTROL.** During periods of heavy activity by Lessee on the Leased Premises (e.g., drilling operations, hydraulic fracturing) and upon reasonable request by Lessor, Lessee shall make reasonable efforts to control dust on the access road leading to the Saltwater Disposal Well.

18. **ROAD MAINTENANCE.** Lessee agrees to make reasonable efforts to maintain the Saltwater Disposal Well access road in good condition.

19. **TAX LIABILITY.** Lessee shall retain ownership of all improvements, fixtures and equipment placed within the leased site and shall reimburse Lessor for all taxes levied and assessed against the site and the improvements thereon.

20. **CONFIDENTIALITY**. Lessor expressly acknowledges, warrants, and agrees the provisions of this Agreement, including, but not limited to, any and all provisions regarding payments to be made by Lessee to Lessor, shall remain strictly confidential.

21. **ENTIRE AGREEMENT.** This Agreement embodies the entire agreement between the parties hereto with respect to the matters involved herein. This Agreement was not executed in reliance upon any statement or representation by any of the parties other than those set forth above. The parties agree this Agreement supersedes and replaces all prior agreements and understandings with respect to the subject matter hereof, including, but not limited to, the Surface Use and Salt Water Disposal Agreement executed July 10, 2012, between Femco SWD, Inc. and David Davidson, and any amendments, documents, or agreements related thereto.

**IN WITNESS WHEREOF,** this Agreement is executed in counterparts, each, of which will constitute an original on the date and year first above written.

**LESSOR:**

X _____
David Davidson, a/k/a David E. Davidson

**LESSEE:**
**CONTINENTAL RESOURCES, INC.**
An Oklahoma corporation

By: _____

Name: Chad Newby, Attorney-in-Fact

Title: Operations Land Manager for Continental Resources, Inc.

STATE OF North Dakota )
) ss. **INDIVIDUAL ACKNOWLEDGMENT**
COUNTY OF Williams )

I, the undersigned authority, a Notary Public in and for said County in said State, hereby certify that David Davidson, a/k/a David E. Davidson, whose names are signed to the foregoing instrument, and who is known to me, acknowledged before me on this day that, being informed of the contents of the instrument, he executed the same voluntarily.

Given under my hand and official seal, this the 15 day of January, 2019.

**BRADLEY PEDERSON**
**Notary Public**
**State of North Dakota**
**My Commission Expires October 13, 2021**

Notary Public

STATE OF _____ )
) ss. **CORPORATE ACKNOWLEDGMENT**
COUNTY OF _____ )

The foregoing document was acknowledged before me this_____ day of _____, 2019, by _____, as Operations Land Manager for Continental Resources, Inc. an Oklahoma corporation, on behalf of the corporation.

_____
Notary Public

3961.0.759 David 1-12 SWD

# SALTWATER DISPOSAL FACILITY LEASE AGREEMENT

THIS SALTWATER DISPOSAL FACILITY LEASE AGREEMENT (the "Agreement") is made and entered into this 26 day of February, 2019 by and between Kyle R. Hawkinson, a single man, whose address is 11036 8th Street NW, Killdeer, ND 58640, hereinafter called "Lessor" and CONTINENTAL RESOURCES, INC., whose address is P. O. Box 268870, Oklahoma City, Oklahoma 73126, hereinafter called "Lessee."

INDUSTRIAL COMMISSION
STATE OF NORTH DAKOTA
DATE 6/13/24 CASE NO 30869-880
Introduced By Braaten
Exhibit LO-37
Identified By Stockmann

**Witnesseth:**

WHEREAS, Lessor is the owner of the surface of the following described land located in Dunn County, North Dakota, to-wit, (the "Leased Premises"):

Township 147 North, Range 96 West of the 5th P.M.
Section 22: SW4NW4 (top hole location)
Section 22: SW4NE4 (bottom hole location)

WHEREAS, Lessor is desirous of leasing a saltwater disposal well site upon the Leased Premises and the Lessee is desirous of leasing such property.

NOW, THEREFORE, for and in consideration of the sum of Ten Dollars ($10.00), the mutual promises contained herein, and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, it is agreed between the parties as follows:

1. **LEASED PREMISES**. The Lessor hereby leases, lets and rents unto the Lessee and the Lessee agrees to lease the following tract of land located on the Leased Premises described as follows:

a. **Tank Battery and Injection Well Site**: The Lessor hereby grants to Lessee the rights to the surface and subsurface of the Leased Premises located in Township 147, Range 96, Section 22 in Dunn County, North Dakota, as depicted on the attached Exhibit "A". Lessor further grants to Lessee the rights to the surface and subsurface of the Leased Premises to equip, maintain, and operate the Saltwater Disposal Well for the purpose of disposing saltwater into the Saltwater Disposal Well. The Lessor also grants to Lessee the right to use the surface and subsurface of the Leased Premises for the purpose of equipping, operating and maintaining thereon all necessary facilities for a saltwater system, including, but not limited to, tanks, pumps and other structures and equipment necessary or convenient to save, take care of, treat, collect, store, transport, or dispose of saltwater from oil and gas wells on or off of the Leased Premises for disposal into the Saltwater Disposal Well, together with the right of ingress and egress across the Leased Premises from the county road.

b. **Easement Property**: The Lessor hereby grants to Lessee rights-of-way and easements for use of the surface and subsurface of the Leased Premises for the purpose of constructing, installing, operating, maintaining, replacing and removing pipelines, communication lines and poles, electric lines other utilities and for the purpose of transporting saltwater from oil and gas wells on or off of the Leased Premises to the Saltwater Disposal Well.

2. **PAYMENT.** Lessee agrees to pay the Lessor and the Lessor agrees to accept compensation in the amount of $46,500.00, ($6,000.00 for 7.75 acres) for the location, and $513.00 for the access road (20.52 rods @ $25.00 per rod) for any and all damages, including, but not limited to, all damages relating to the Saltwater Disposal Well, roadway, tank battery, pipelines, utilities and all other damages related thereto, incurred in the conversion, operation, maintenance and development of the Saltwater Disposal Well. In addition, Lessee agree to pay the Lessor and the Lessor agrees to accept a $0.06 cent per barrel royalty on each barrel of salt water disposed of in the Salt Water Disposal Well. The $0.06 cent per barrel royalty for the previous year will be become due and payable on January 31st of the upcoming year until the well is plugged and abandoned. The parties agree this payment is intended to cover all damages arising from or related to surface and subsurface operations conducted by Lessee hereunder on the Leased Premises. Lessor and Lessee agree the payment hereunder shall be made upon receipt by Lessee of its executive management's approval to drill a Saltwater Disposal Well and upon commencement of construction activities on the Leased Premises.

EXHIBIT
tabbies
LO-37
30869-30880

3. **TERM.** This Agreement shall remain in effect until Lessee permanently abandons the Saltwater Disposal Well and/or gathering system

4. **USE.** The Lessee shall have the right to use the Leased Premises for the storage of saltwater and other deleterious substances produced from oil and gas wells on or off of the Leased Premises; and for the disposal of saltwater and other deleterious substances produced from oil and gas wells on or off of the Leased Premises, and the easement for the transportation of saltwater and other deleterious substances produced from oil and gas wells on or off of the Leased Premises, including, but not limited to, the right of ingress and egress to said properties and premises, the right to lay, maintain and remove the pipeline or pipelines to and from said Saltwater Disposal Well

EXHIBIT
097
1:18-cv-00181

Continental Resources, Inc.
DEPOSITION
EXHIBIT
097
06-07-2022

site, the right to install, operate, maintain and remove pumping equipment, tankage and such other equipment as may be necessary or useful in the operation of the Saltwater Disposal Well facility.

5. **UTILITY EASEMENTS.** The Lessor agrees to execute all easements required by utility companies to affect the laying, maintaining and removing of utility lines, including, but not limited to, electric and telephone lines, for operating equipment necessary in Lessee's saltwater disposal operations.

6. **LIMITATION.** It is understood and agreed the disposal of saltwater and other deleterious substances will be made into a formation or formations which are not productive of fresh water, and which are approved for disposal purposes by the North Dakota Industrial Commission.

7. **FIXTURES OF LESSEE.** All pumping equipment, tankage and other equipment as may be necessary and useful in the operation of the Saltwater Disposal Well may be placed or attached on the Leased Premises by the Lessee and shall remain the property of the Lessee. Upon termination of this Agreement, or at any prior time, the Lessee may remove any and all of such equipment.

8. **DEFAULT.** The Lessee agrees upon its failure to comply with the provisions of this Agreement, the Lessor, at its option, may declare this Agreement at an end and void and terminate the same, and take possession of said premises. This Agreement shall not terminate until Lessor has given written notice of the alleged default(s) and of its intention to terminate the Agreement and Lessee has failed to cure the default(s) within sixty (60) days after receipt of the default notice. If Lessee cures the default within the sixty (60) days, the Agreement shall remain in full force and effect.

9. **ASSIGNMENT.** Lessee shall have the right to assign this Agreement without Lessor's consent. In the event of Lessee's assignment of its rights hereunder, Lessee shall have no further obligations under this Agreement. Lessor may assign, sell or transfer its rights in this Agreement and the property subject to the terms and conditions of this Agreement.

10. **NOTICE.** Any notice required to be given hereunder, must be given in writing and may be given personally or by certified or registered mail addressed to the parties as follows:

If to Lessor: Kyle R. Hawkinson
11036 8th Street NW
Killdeer, ND 58640

If to Lessee: Continental Resources, Inc.
P.O. Box 268836
Oklahoma City, Oklahoma 73126
Attention: Contract Notices (Legal)

11. **INDEMNIFICATION, DAMAGES AND COVENANTS.** The Lessee, its successors or assigns, shall be solely responsible for damages arising from or related to Lessee's operation of the Saltwater Disposal Well and shall indemnify, defend and hold Lessor harmless from and against any liability, damages, claims, suits or causes of action, including but not limited to any reasonable attorney fees or expenses of Lessor, arising from any suit brought against Lessor related to Lessee's operation of the Saltwater Disposal Well. The Lessee will maintain the Saltwater Disposal Well and all appurtenances thereto in accordance with the rules and regulations of the North Dakota Industrial Commission, and comply with applicable environmental laws, rules or regulations that govern such operations.

12. **OWNERSHIP OF EQUIPMENT.** The Lessor agrees the Lessee has the right, at the termination of this Agreement, to remove any and all equipment and personal property that the Lessee places on the Leased Premises.

13. **TERMINATION.** When this Agreement terminates, Lessee shall remove all debris, machinery and equipment introduced by Lessee, and restore the Leased Premises as near to the condition, as reasonably practicable, it was in prior to Lessee's operations.

14. **WARRANTIES.** Lessor warrants it owns all of the surface title to the Leased Premises and said property is not the homestead of the property.

15. **BINDING EFFECT.** This Agreement shall be binding upon the heirs, executors, administrators, successors and assigns of the parties hereto.

16. **EROSION CONTROL.** Lessee shall take reasonable measures to prevent erosion and disturbance of drainage areas, including but not limited to the installation of culverts, straw waddles, or other practicable applications. If an erosion problem develops, Lessor shall inform Lessee immediately, so the necessary corrective measures can be performed.

17. **WEED CONTROL.** Lessee agrees to make reasonable efforts to keep the well site and access road for the Saltwater Disposal Well free of noxious weeds, trash, and debris associated with Lessee's operations.

18. **DUST CONTROL.** During periods of heavy activity (e.g., drilling operations, hydraulic fracturing) and upon reasonable request by Lessor, Lessee shall make reasonable efforts to control dust on the access road leading to the Salt Water Disposal Well.

19. **ROAD MAINTENACE.** Lessee agrees to make reasonable efforts to maintain the Salt Water Disposal Well access road in good condition.

**IN WITNESS WHEREOF,** this Agreement is executed in counterparts, each, of which will constitute an original on the date and year first above written.

**LESSOR:**

Kyle R. Hawkinson

**LESSEE:**
**CONTINENTAL RESOURCES, INC.**

By: _____

Name: Chad Newby
Title: Attorney-in-Fact

STATE OF N. Dakota )
) ss. **INDIVIDUAL ACKNOWLEDGMENT**
COUNTY OF Dunn )

I, the undersigned authority, a Notary Public in and for said County in said State, hereby certify that Kyle R. Hawkinson, a single man, whose name is signed to the foregoing instrument, and who is known to me, acknowledged before me on this day that, being informed of the contents of the instrument, he executed the same voluntarily.

Given under my hand and official seal, this the 26 day of February, 2019.

BRENDA S. BERG
Notary Public
State of North Dakota
My Commission Expires Feb 20, 2023

Notary Public

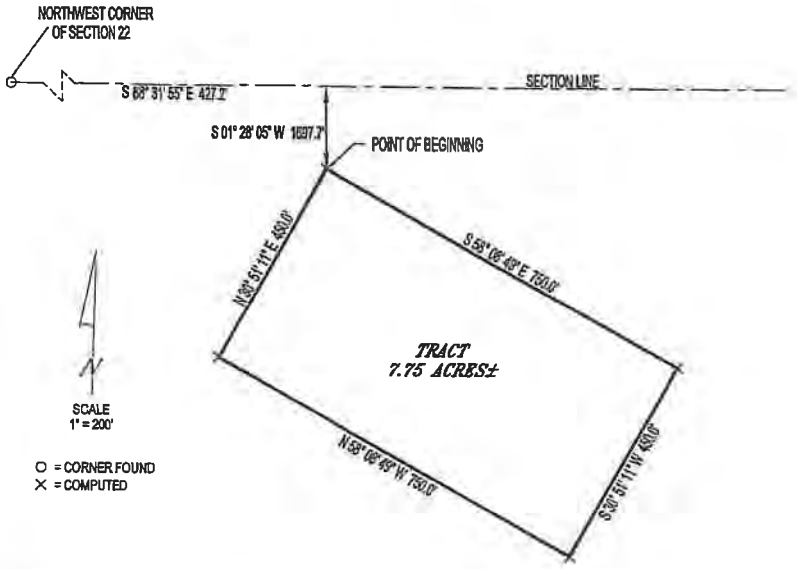
STATE OF _____ )
) ss. **CORPORATE ACKNOWLEDGMENT**
COUNTY OF _____ )

The foregoing document was acknowledged before me this_____ day of _____, 2019, by Chad Newby, as Attorney-in-Fact for Continental Resources, Inc. an Oklahoma corporation, on behalf of the corporation.

_____
Notary Public

# *SURVEY PLAT*

**INTERSTELLAR SWD**
**SW1/4NW1/4 OF SECTION 22**
**TOWNSHIP 147 NORTH - RANGE 96 WEST**
**DUNN COUNTY, NORTH DAKOTA**




A TRACT OF LAND LOCATED IN THE SW1/4NW1/4 OF SECTION 22, T147N, R96W, DUNN COUNTY, NORTH DAKOTA.

COMMENCING AT THE NORTHWEST CORNER OF SECTION 22; THENCE S 88° 31' 55" E, ALONG THE NORTH SIDE OF SAID SECTION, A DISTANCE OF 427.2 FEET; THENCE S 01° 28' 05" W, PERPENDICULAR TO SAID NORTH SIDE, A DISTANCE OF 1697.7 FEET TO THE POINT OF BEGINNING; THENCE S 58° 08' 49" E, A DISTANCE OF 750.0 FEET; THENCE S 30° 51' 11" W, A DISTANCE OF 450.0 FEET; THENCE N 58° 08' 49" W, A DISTANCE OF 750.0 FEET; THENCE N 30° 51' 11" E, A DISTANCE OF 450.0 FEET TO THE POINT OF BEGINNING.

SAID TRACT CONTAINS 7.75 ACRES MORE OR LESS AND IS SUBJECT TO ANY EXISTING EASEMENTS AND RIGHT-OF-WAY.

I CERTIFY THAT THIS PLAT CORRECTLY REPRESENTS WORK PERFORMED BY ME OR UNDER MY RESPONSIBLE CHARGE, AND IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF

1-31-19

JOHN PAULSON, R.L.S. 3366

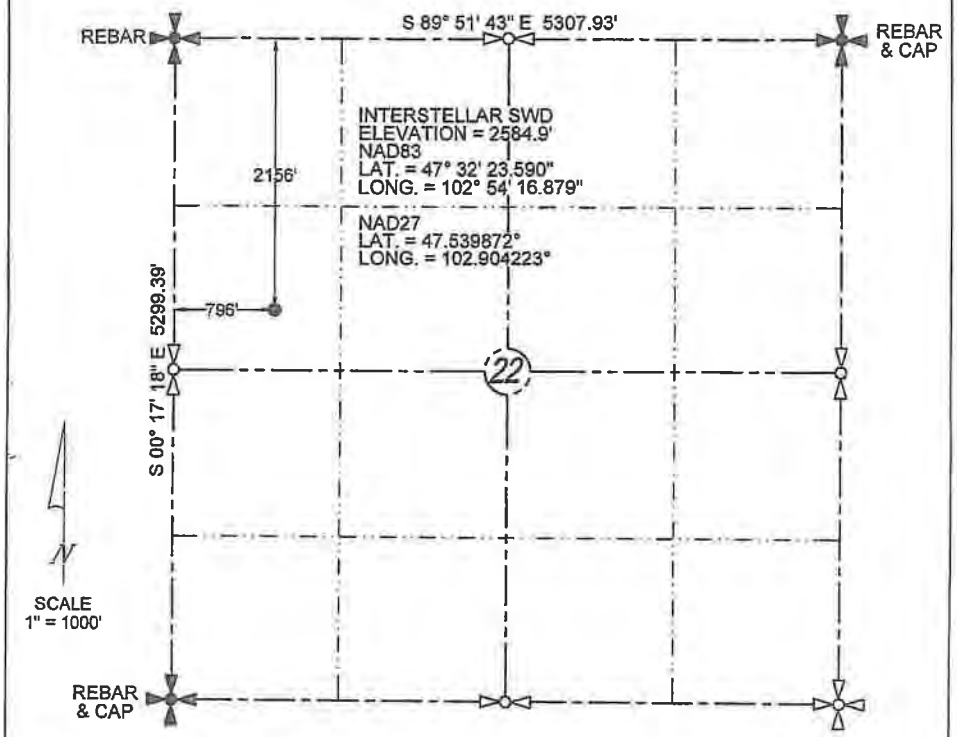
DATE STAKED: 1-25-19

PERSON AUTHORIZING SURVEY;
MARCUS SIMPSON

BASIS OF BEARING: STATE PLANE

*BROSZ ENGINEERING INC.*
BOX 357
BOWMAN, N.D. 58623
PHONE: 701-523-3340
FAX: 701-523-5243
PROJECT NO. 19-10

# WELL LOCATION PLAT
## CONTINENTAL RESOURCES INC.
## INTERSTELLAR SWD
## SECTION 22, T147N, R96W
## DUNN COUNTY, NORTH DAKOTA
## 2156' FNL & 796' FWL




I CERTIFY THAT THIS PLAT CORRECTLY REPRESENTS WORK PERFORMED BY ME OR UNDER MY RESPONSIBLE CHARGE AND IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF

1-31-19

JOHN PAULSON, LS 3366

PROFESSIONAL LAND SURVEYOR NORTH DAKOTA

DATE STAKED: 1-25-19

BASIS OF VERTICAL DATUM: NAVD 1988 GEOID 12B

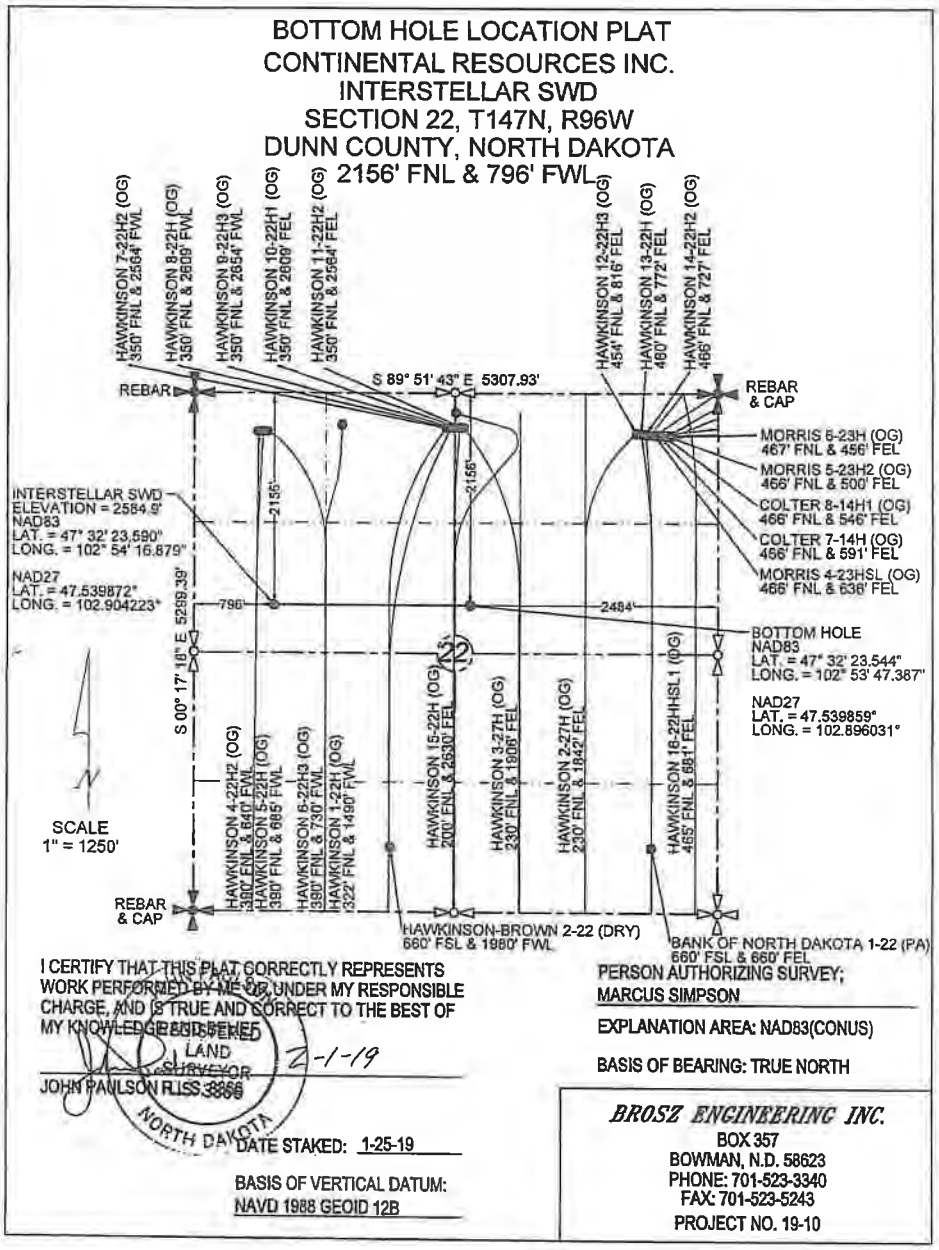
PERSON AUTHORIZING SURVEY; MARCUS SIMPSON

EXPLANATION AREA: NAD83(CONUS)

BASIS OF BEARING: TRUE NORTH

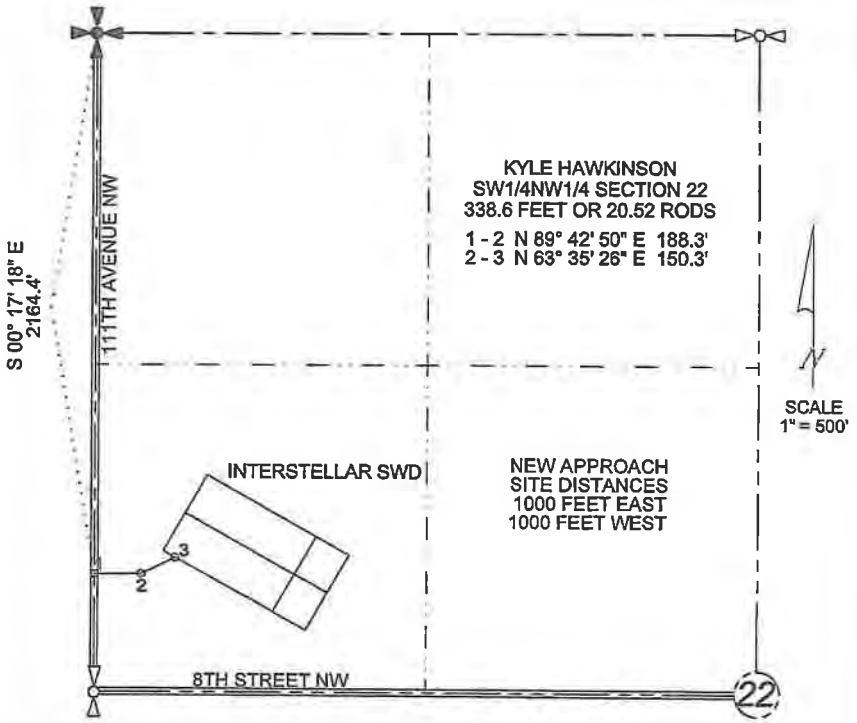
*BROSZ ENGINEERING INC.*
BOX 357
BOWMAN, N.D. 58623
PHONE: 701-523-3340
FAX: 701-523-5243

PROJECT NO. 19-10


BOTTOM HOLE LOCATION PLAT
CONTINENTAL RESOURCES INC.
INTERSTELLAR SWD
SECTION 22, T147N, R96W
DUNN COUNTY, NORTH DAKOTA
2156' FNL & 796' FWL
HAWKINSON 7-22H2 (OG) 350' FNL & 2564' FWL
HAWKINSON 8-22H (OG) 350' FNL & 2609' FWL
HAWKINSON 9-22H3 (OG) 350' FNL & 2654' FWL
HAWKINSON 10-22H1 (OG) 350' FNL & 2609' FEL
HAWKINSON 11-22H2 (OG) 350' FNL & 2564' FEL
HAWKINSON 12-22H3 (OG) 454' FNL & 816' FEL
HAWKINSON 13-22H (OG) 460' FNL & 772' FEL
HAWKINSON 14-22H2 (OG) 466' FNL & 727' FEL
REBAR
S 89° 51' 43" E 5307.93'
REBAR & CAP
MORRIS 6-23H (OG) 467' FNL & 456' FEL
MORRIS 5-23H2 (OG) 466' FNL & 500' FEL
COLTER 8-14H1 (OG) 466' FNL & 546' FEL
COLTER 7-14H (OG) 466' FNL & 591' FEL
MORRIS 4-23HSL (OG) 466' FNL & 636' FEL
INTERSTELLAR SWD
ELEVATION = 2584.9'
NAD83
LAT. = 47° 32' 23.590"
LONG. = 102° 54' 16.879"
NAD27
LAT. = 47.539872°
LONG. = 102.904223°
2156'
2156'
796'
2484'
S 00° 17' 18" E 5299.39'
BOTTOM HOLE
NAD83
LAT. = 47° 32' 23.544"
LONG. = 102° 53' 47.387"
NAD27
LAT. = 47.539859°
LONG. = 102.896031°
SCALE
1" = 1250'
HAWKINSON 4-22H2 (OG) 390' FNL & 840' FWL
HAWKINSON 5-22H (OG) 390' FNL & 885' FWL
HAWKINSON 6-22H3 (OG) 390' FNL & 730' FWL
HAWKINSON 1-22H (OG) 322' FNL & 1490' FWL
HAWKINSON 15-22H (OG) 200' FNL & 2530' FEL
HAWKINSON 3-27H (OG) 230' FNL & 1906' FEL
HAWKINSON 2-27H (OG) 230' FNL & 1842' FEL
HAWKINSON 16-22HHSL1 (DG) 465' FNL & 661' FEL
REBAR & CAP
HAWKINSON-BROWN 2-22 (DRY) 660' FSL & 1980' FWL
BANK OF NORTH DAKOTA 1-22 (PA) 660' FSL & 660' FEL
I CERTIFY THAT THIS PLAT CORRECTLY REPRESENTS WORK PERFORMED BY ME OR UNDER MY RESPONSIBLE CHARGE, AND IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF
JOHN PAULSON PLS 3880
LAND SURVEYOR
NORTH DAKOTA
2-1-19
DATE STAKED: 1-25-19
BASIS OF VERTICAL DATUM:
NAVD 1988 GEOID 12B
PERSON AUTHORIZING SURVEY:
MARCUS SIMPSON
EXPLANATION AREA: NAD83(CONUS)
BASIS OF BEARING: TRUE NORTH
BROSZ ENGINEERING INC.
BOX 357
BOWMAN, N.D. 58623
PHONE: 701-523-3340
FAX: 701-523-5243
PROJECT NO. 19-10

TOTAL ROAD LENGTH:
338.6 FEET OR 20.52 RODS

# ROAD LOCATION PLAT
## CONTINENTAL RESOURCES INC.
## INTERSTELLAR SWD
## SECTION 22, T147N, R96W
## DUNN COUNTY, NORTH DAKOTA




I CERTIFY THAT THIS PLAT CORRECTLY REPRESENTS WORK PERFORMED BY ME OR UNDER MY RESPONSIBLE CHARGE, AND IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF

REGISTERED LAND SURVEYOR 1-31-19
JOHN PAULSON, R.L.S. 6366
NORTH DAKOTA

DATE STAKED: 1-25-19

PERSON AUTHORIZING SURVEY;
RANCE LEMIEUX

BASIS OF BEARING: TRUE NORTH

*BROSZ ENGINEERING INC.*
BOX 357
BOWMAN, N.D. 58623
PHONE: 701-523-3340
FAX: 701-523-5243
PROJECT NO. 19-10

# SALTWATER DISPOSAL FACILITY LEASE AGREEMENT

**THIS SALTWATER DISPOSAL FACILITY LEASE AGREEMENT (the "Agreement")** is made and entered into this 17 day of March, 2017 by and between **Mary Ann Kjorstad and Diane Mary Kjorstad, as Joint Tenants**, whose address is **12906 42nd Street NW, Williston, North Dakota, 58801,** hereinafter called **"Lessor"** and **CONTINENTAL RESOURCES, INC.**, whose address is **P. O. Box 268870, Oklahoma City, Oklahoma 73126,** hereinafter called **"Lessee."**

INDUSTRIAL COMMISSION
STATE OF NORTH DAKOTA
DATE 6/12/24 CASE NO 30869-880
Introduced By Braaten
Exhibit LO-38
Identified By Stockness

**Witnesseth:**

**WHEREAS,** Lessor is the owner of the surface of the following described land located in Williams County, North Dakota, to-wit, (the "Leased Premises"):

Township 154 North, Range 100 West of the 5th P.M.
Section 35: W½SW¼

**WHEREAS,** Lessor is desirous of leasing a saltwater disposal well site upon the Leased Premises and the Lessee is desirous of leasing such property.

**NOW, THEREFORE,** for and in consideration of the sum of Ten Dollars ($10.00), the mutual promises contained herein, and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, it is agreed between the parties as follows:

1. **LEASED PREMISES.** The Lessor hereby leases, lets and rents unto the Lessee and the Lessee agrees to lease the following tract of land located on the Leased Premises described as follows:

   a. **Tank Battery and Injection Well Site:** The Lessor hereby grants to Lessee the rights to the surface and subsurface of the Leased Premises to drill, complete, equip, maintain, and operate a saltwater disposal well located in the W½SW¼ of Section 35, Township 154 North, Range 100 West, Williams County, North Dakota, as depicted on the attached Exhibit A (the "Saltwater Disposal Well" herein), for the purpose of disposing saltwater into the Saltwater Disposal Well. The Lessor also grants to Lessee the right to use the surface and subsurface of the Leased Premises for the purpose of equipping, operating and maintaining thereon all necessary facilities for a saltwater system, together with the right of ingress and egress across the Leased Premises from the county road.

   b. **Easement Property:** The Lessor hereby grants to Lessee a right of way and easement for use of the surface and subsurface of the Leased Premises for the purpose of building and maintaining a road, and for the transporting of saltwater, building and maintaining electric service, telephone service and other utilities and for the purpose of constructing, laying, maintaining, operating, relaying, replacing and removing a pipeline or pipelines for the purpose of transporting saltwater from oil and gas leases and wells in the area to the Saltwater Disposal Well site.

2. **PAYMENT:** Lessee agrees to pay the Lessor and the Lessor agrees to accept a one-time payment of Fifty Thousand and 00/100 Dollars ($50,000.00) for any and all damages, including, but not limited to, all damages relating to the construction of the well site, roadway, tank battery, pipelines, utilities and all other damages related thereto, incurred in the drilling, completion, operation, maintenance and development of the Saltwater Disposal Well. In addition, Lessee agrees to pay the Lessor and the Lessor agrees to accept a $0.06 cent per barrel royalty on each barrel of salt water disposed of in the Salt Water Disposal Well. The parties agree this payment is intended to cover all damages arising from or related to surface and subsurface operations conducted by Lessee hereunder on the Leased Premises. Lessor and Lessee agree the payment hereunder shall be made upon receipt by Lessee of its executive management's approval to drill the Saltwater Disposal Well and upon commencement of construction activities on the Leased Premises.

3. **TERM:** This Agreement shall remain in effect until Lessee permanently abandons the Saltwater Disposal Well and/or gathering system

4. **USE:** The Lessee shall have the right to use the Leased Premises for the storage of saltwater and other deleterious substances produced from oil and gas wells on or off of the Leased Premises; and for the disposal of saltwater and other deleterious substances produced from oil and gas wells on or off of the Leased Premises, and the easement for the transportation of saltwater and other deleterious substances produced from oil and gas wells on or off of the Leased Premises, including, but not limited to, the right of ingress and egress to said properties and premises, the

EXHIBIT
tabbies
LO-38
30869-30880

1597.0.759

EXHIBIT
101
1:18-cv-00181

Continental Resources, Inc.
DEPOSITION
EXHIBIT
101
05-07-2022

right to lay, maintain and remove the pipeline or pipelines to and from said Saltwater Disposal Well site, the right to install, operate, maintain and remove pumping equipment, tankage and such other equipment as may be necessary or useful in the operation of the Saltwater Disposal facility.

5. **UTILITY EASEMENTS:** The Lessor agrees to execute all easements required by utility companies to affect the laying, maintaining and removing of utility lines, including, but not limited to, electric and telephone lines, for operating equipment necessary in Lessee's saltwater disposal operations.

6. **LIMITATION:** It is understood and agreed the disposal of saltwater and other deleterious substances will be made into a formation or formations which are not productive of fresh water, and which are approved for disposal purposes by the North Dakota Industrial Commission.

7. **FIXTURES OF LESSEE:** All pumping equipment, tankage and other equipment as may be necessary and useful in the operation of a saltwater disposal well may be placed or attached on the Leased Premises by the Lessee and shall remain the property of the Lessee. Upon termination of this Agreement, or at any prior time, the Lessee may remove any and all of such equipment.

8. **DEFAULT:** The Lessee agrees upon its failure to comply with the provisions of this Agreement, the Lessor, at its option, may declare this Agreement at an end and void and terminate the same, and take possession of said premises. This Agreement shall not terminate until Lessor has given written notice of the alleged default(s) and of its intention to terminate the Agreement and Lessee has failed to cure the default(s) within sixty (60) days after receipt of the default notice. If Lessee cures the default within the sixty (60) days, the Agreement shall remain in full force and effect.

9. **ASSIGNMENT:** Lessee shall have the right to assign this Agreement without Lessor's consent. In the event of Lessee's assignment of its rights hereunder, Lessee shall have no further obligations under this Agreement. Lessor may assign, sell or transfer her rights in this Agreement and the property subject to the terms and conditions of this Agreement.

10. **NOTICE:** Any notice required to be given hereunder, must be given in writing and may be given personally or by certified or registered mail addressed to the parties as follows:

    If to Lessor: Mary Ann Kjorstad and Diane Mary Kjorstad
    12906 42nd Street NW
    Williston, North Dakota 58801

    If to Lessee: _____
    _____
    Continental Resources, Inc.
    P.O. Box 268870
    Oklahoma City, Oklahoma 73126

11. **INDEMNIFICATION, DAMAGES AND COVENANTS:** The Lessee, its successors or assigns, shall be solely responsible for damages arising from or related to Lessee's operation of the Saltwater Disposal Well and shall indemnify, defend and hold Lessor harmless from and against any liability, damages, claims, suits or causes of action, including but not limited to any reasonable attorney fees or expenses of Lessor, arising from any suit brought against Lessor related to Lessee's operation. The Lessee will maintain the Saltwater Disposal Well and all appurtenances thereto in accordance with the rules and regulations of the North Dakota Industrial Commission, and comply with applicable environmental laws, rules or regulations that govern such operations.

12. **OWNERSHIP OF EQUIPMENT:** The Lessor agrees the Lessee has the right, at the termination of this Agreement, to remove any and all equipment and personal property that the Lessee places on the Leased Premises.

13. **TERMINATION:** When this Agreement terminates, Lessee shall remove all debris, machinery and equipment introduced by Lessee, and restore the Leased Premises as near to the condition, as reasonably practicable, it was in immediately prior to Lessee's operations.

14. **WARRANTIES:** Lessor warrants it owns all of the surface title to the above described property and said property is not the homestead of the property.

15. **BINDING EFFECT:** This Agreement shall be binding upon the heirs, executors, administrators, successors and assigns of the parties hereto.

16. **EROSION CONTROL:** Lessee shall take measures to prevent erosion and disturbance of drainage areas, including but not limited to the installation of culverts, straw waddles, or other practicable applications. If an erosion problem develops, Lessor shall inform Lessee immediately so the necessary corrective measures can be performed.

17. **WEED CONTROL:** Lessee agrees to make reasonable efforts to keep the well site and access road free of noxious weeds, trash, and debris associated with Lessee's operations.

18. **DUST CONTROL:** During periods of heavy activity (e.g., drilling operations, hydraulic fracturing) and upon reasonable request by Lessor, Lessee shall make reasonable efforts to control dust on the well access road leading to the Salt Water Disposal Well.

19. **ROAD MAINTENACE:** Lessee agrees to make reasonable efforts to maintain the Salt Water Disposal Well access road.

**IN WITNESS WHEREOF,** this Agreement is executed in counterparts, each, of which will constitute an original on the date and year first above written.

**LESSOR:**

X Mary Ann K. Kjorstad
Mary Ann Kjorstad

X Diane Mary Kjorstad
Diane Mary Kjorstad

**LESSEE:**
CONTINENTAL RESOURCES, INC.
An Oklahoma corporation

By: _____

Name: _____

Title: _____

STATE OF North Dakota )
)
COUNTY OF Williams )

I, the undersigned authority, a Notary Public in and for said County in said State, hereby certify that Mary Ann Kjorstad, whose names is signed to the foregoing instrument, and who is known to me, acknowledged before me on this day that, being informed of the contents of the instrument, she executed the same voluntarily.

Given under my hand and official seal, this the 17 day of March, 2017.

Matthew R. Kostelecky
Notary Public

MATTHEW R. KOSTELECKY
Notary Public
State of North Dakota
My Commission Expires August 31, 2022

1597.0.759

STATE OF North Dakota )
)
COUNTY OF Williams )

I, the undersigned authority, a Notary Public in and for said County in said State, hereby certify that Diane Mary Kjorstad, whose names is signed to the foregoing instrument, and who is known to me, acknowledged before me on this day that, being informed of the contents of the instrument, she executed the same voluntarily.

Given under my hand and official seal, this the 17 day of March, 2017.

Matthew R. Kostelecky
Notary Public

MATTHEW R. KOSTELECKY
Notary Public
State of North Dakota
My Commission Expires August 31, 2022

STATE OF _____ )
)
COUNTY OF _____ )

The foregoing document was acknowledged before me this ____ day of _____, 2017, by _____, as _____ for Continental Resources, Inc. an Oklahoma corporation, on behalf of the corporation.

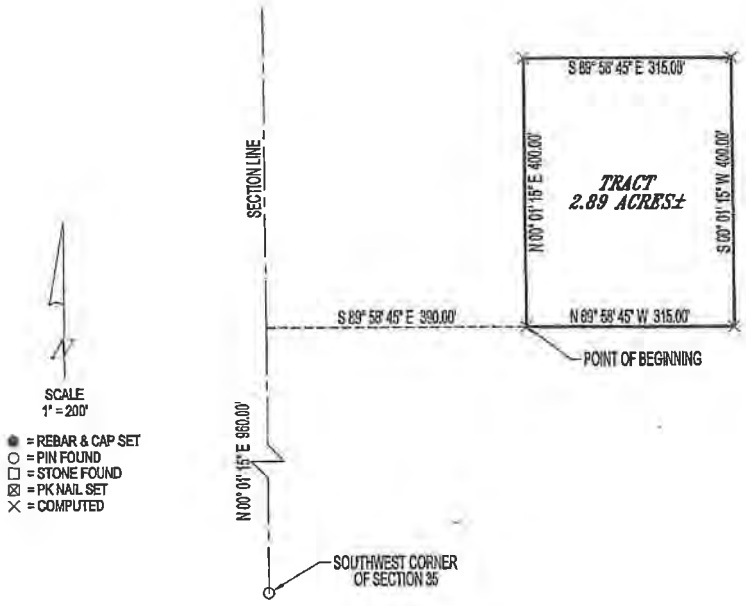
_____
Notary Public

1597.0.759

EXHIBIT A

# *SURVEY PLAT*

JACKSON SWD
W1/2SW1/4 OF SECTION 35
TOWNSHIP 154 NORTH - RANGE 100 WEST
WILLIAMS COUNTY, NORTH DAKOTA




A TRACT OF LAND LOCATED IN THE W1/2SW1/4 OF SECTION 35, T154N, R100W, WILLIAMS COUNTY, NORTH DAKOTA.

COMMENCING AT THE SOUTHWEST CORNER OF SECTION 35; THENCE N 00° 01' 15" E, ALONG THE WEST SIDE OF SAID SECTION 35, A DISTANCE OF 960.00 FEET; THENCE S 89° 58' 45" E, PERPENDICULAR TO SAID WEST SIDE, A DISTANCE OF 390.00 FEET TO THE POINT OF BEGINNING; THENCE N 00° 01' 15" E, PARALLEL TO SAID WEST SIDE, A DISTANCE OF 400.00 FEET; THENCE S 89° 58' 45" E, PERPENDICULAR TO SAID WEST SIDE, A DISTANCE OF 315.00 FEET; THENCE S 00° 01' 15" W, PARALLEL TO SAID WEST SIDE, A DISTANCE OF 400.00 FEET; THENCE N 89° 58' 45" W, PERPENDICULAR TO SAID WEST SIDE, A DISTANCE OF 315.00 FEET TO THE POINT OF BEGINNING.

SAID TRACT CONTAINS 2.89 ACRES MORE OR LESS AND IS SUBJECT TO ANY EXISTING EASEMENTS AND RIGHT-OF-WAY.

I CERTIFY THAT THIS PLAT CORRECTLY REPRESENTS WORK PERFORMED BY ME OR UNDER MY RESPONSIBLE CHARGE, AND IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF

JOHN HALVORSON

2-22-17

JOHN HALVORSON P.L.S. 3366

REGISTERED LAND SURVEYOR L.S. 3366 NORTH DAKOTA

DATE STAKED: 2-6-17

PERSON AUTHORIZING SURVEY;
MARCUS SIMPSON

BASIS OF BEARING: TRUE NORTH


*BROSZ ENGINEERING INC.*
*BOX 357*
*BOWMAN, N.D. 58623*
*PHONE: 701-523-3340*
*FAX: 701-523-5243*


*PROJECT NO. 17-10*

P.O. BOX 1282
DICKINSON, NORTH DAKOTA 58602-1282

July 27, 2020

**CERTIFIED MAIL:** 7019 0140 0001 1612 3505

Attn: Marcus Simpson
Continental Resources, Inc.
P.O. Box 269000
Oklahoma City, OK 73126

RE: **Kelly Draw PWD**
Dunn County, North Dakota

Township 147 North, Range 96 West of the 5th P.M.
Section 32: N2

Greetings:

Please find enclosed the following documents:

1) Produced Water Disposal Facility Lease Agreement signed 6/4/2020 by Jason J. Bang
2) Affidavit of Produced Water Disposal Facility Lease Agreement, to be signed by Sonia Thomas, Attorney-in-Fact for Continental Resources, Inc.

Please have a representative of Continental Resources, Inc. sign the enclosed documents in the presence of a Notary Public. Please mail back the executed document(s) to B.J. Kadrmas, Inc. Additionally, see enclosed other documents for the Carson Peak Morris MWP (11-14).

Respectfully,

Matthew R. Kostelecky

Matthew R. Kostelecky, RPL
B.J. Kadrmas, Inc.
President

OFFICE: 1-800-730-0361 / 701-225-0361 • webmail@bjkadrmasinc.com • FAX: 701-227-0421

EXHIBIT
LO-39
30869-30880

INDUSTRIAL COMMISSION
STATE OF NORTH DAKOTA
DATE 6/13/24 CASE NO. 30869-880
Introduced By Braaten
Exhibit LO-39
Identified By Stacknell

EXHIBIT
104
1:18-cv-00181

Continental Resources, Inc.
DEPOSITION
EXHIBIT
104
06-07-2022

# PRODUCED WATER DISPOSAL FACILITY LEASE AGREEMENT

THIS PRODUCED WATER DISPOSAL FACILITY LEASE AGREEMENT (the "Agreement") is made and entered into this 4th day of June, 2020 by and between Jason J. Bang, a single man, whose address is 11129 5th St NW, Killdeer, ND 58640, hereinafter called "Lessor" and CONTINENTAL RESOURCES, INC., whose address is P. O. Box 268870, Oklahoma City, Oklahoma 73126, hereinafter called "Lessee."

**Witnesseth:**

WHEREAS, Lessor is the owner of the surface estate of the following described land located in Dunn County, North Dakota, to-wit:

Township 147 North, Range 96 West of the 5th P.M.
Section 32: N2

(the "Subject Property").

WHEREAS, Lessor is desirous of leasing a disposal well site upon the Subject Property and the Lessee is desirous of leasing such property.

NOW, THEREFORE, for and in consideration of the sum of Ten Dollars ($10.00), the mutual promises contained herein, and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, it is agreed between the parties as follows:

1. **LEASED PREMISES**. The Lessor hereby leases, lets and rents unto the Lessee and the Lessee agrees to lease an 8.29 acre surface acre parcel of land as depicted on Exhibit "A" (the "Leased Premises") located on the Subject Property subject to the following terms and conditions:

a. **Tank Battery and Disposal Well Site**: Lessor hereby grants to Lessee the rights to the surface and subsurface of the Leased Premises to equip, maintain, and operate the disposal well ("Produced Water Disposal Well") for the purpose of disposing produced water into the Produced Water Disposal Well. The Lessor also grants to Lessee the right to use the surface and subsurface of the Leased Premises for the purpose of equipping, operating and maintaining thereon all necessary or convenient facilities for a disposal well, including, but not limited to, tanks, pumps and other structures and equipment necessary or convenient to save, take care of, treat, collect, store, transport, or dispose of produced water from oil and gas wells on or off of the Leased Premises for disposal into the Produced Water Disposal Well.

b. **Rights-of-Way and Easements**: The Lessor hereby grants to Lessee rights-of-way and easements for use of the surface and subsurface of the Subject Property for the purpose of constructing, installing, operating, maintaining, replacing and removing pipelines, communication lines and poles, electric lines, other utilities, and for the purpose of transporting produced water from oil and gas wells on or off of the Leased Premises to the Produced Water Disposal Well, together with the rights-of-way and easements necessary to use and maintain existing roads and/or to use, construct, and maintain new roads for ingress and egress to the Produced Water Disposal Well. Lessor also grants Lessee a subsurface easement under the Subject Property and lands outside of the Subject Property which is owned by Lessor which is necessary for Lessee to drill the Produced Water Disposal Well and dispose of produced water and other deleterious substances into the Produced Water Disposal Well.

2. **PAYMENT.** Lessee agrees to pay the Lessor and the Lessor agrees to accept compensation in the amount of $49,740.00 (8.29 acres @ $6,000.00 per acre) for the location, $2,594.50 for the access road (103.78 rods @ $25.00 per rod) for any and all damages to the Subject Property, including, but not limited to, all damages relating to the Produced Water Disposal Well, roads, tank battery, pipelines, utilities and all other damages related thereto, incurred in the conversion, operation, maintenance and development of the Produced Water Disposal Well. In the event the acreage utilized by the Lessee exceeds 8.29 acres for the Produced Water Disposal Well, upon which this payment is based, the Lessee agrees to make a further payment to Lessor for the extra acreage, based on the amount of $6,000.00 per acre. In addition, Lessee shall pay Lessor $0.06 per barrel for each barrel of produced water disposed into the Produced Water Disposal Well, which shall be paid by January 31st for any produced water disposed into the Produced Water Disposal Well for the previous year. The parties agree this payment is intended to cover all damages arising from or related to surface and subsurface operations conducted by Lessee hereunder. Lessor and Lessee agree the payment hereunder shall be made upon receipt by Lessee of its executive management's approval to drill a Produced Water Disposal Well and upon commencement of construction activities on the Leased Premises. This payment will be paid proportionate to the interest the undersigned owns in the surface.

3. **RELEASE.** Lessor acknowledges the receipt and sufficiency of all compensation paid by Lessee pursuant to this Agreement as full and complete settlement for, and as a release of, all claims for loss, damage, or injury to the surface and/or subsurface of the Subject Property arising out of Lessee's oil and gas operations, including those categories of loss, damage, or injury described in Chapter 38-11.1 of the North Dakota Century Code. Lessor

hereby releases, acquits, and forever discharges Lessee and its parent, subsidiary, and other affiliated companies, and their employees, contractors, subcontractors, agents, and representatives from any and all losses, liabilities, claims, damages, demands, and causes of action for injuries or damages to the surface and/or subsurface of the Subject Property and to the appurtenances, improvements, and vegetation on the Subject Property owned or possessed by the Lessor and/or tenants, arising directly or indirectly in connection with the Lessee's oil and gas operations on the Subject Property.

4. **TERM.** This Agreement shall remain in effect until Lessee permanently abandons the Produced Water Disposal Well.

5. **UTILITY EASEMENTS.** The Lessor agrees to execute all easements required by utility companies to affect the laying, maintaining and removing of utility lines, including, but not limited to, electric and telephone lines, for operating equipment necessary in Lessee's disposal operations.

6. **LIMITATION.** It is understood and agreed the disposal of produced water and other deleterious substances will be made into a formation or formations which are not productive of fresh water, and which are approved for disposal purposes by the North Dakota Industrial Commission.

7. **FIXTURES OF LESSEE.** All pumping equipment, tankage and other equipment as may be necessary, useful or convenient in the operation of the Produced Water Disposal Well may be placed or attached on the Leased Premises by the Lessee and shall remain the property of the Lessee. Upon termination of this Agreement, or at any prior time, the Lessee may remove any and all of such equipment.

8. **ASSIGNMENT.** Lessee shall have the right to assign this Agreement without Lessor's consent. In the event of Lessee's assignment of its rights hereunder, Lessee shall have no further obligations under this Agreement. Lessor may assign, sell or transfer its rights in this Agreement and the property subject to the terms and conditions of this Agreement.

9. **NOTICE.** Any notice required to be given hereunder, must be given in writing and may be given personally or by certified or registered mail addressed to the parties as follows:

If to Lessor: Jason J. Bang
11129 5th St NW
Killdeer, ND 58640

If to Lessee: Continental Resources, Inc.
P.O. Box 268836
Oklahoma City, Oklahoma 73126
Attention: Contract Notices (Legal)

10. **INDEMNIFICATION, DAMAGES AND COVENANTS.** The Lessee shall indemnify, defend and hold Lessor harmless from and against any liability, damages, claims, suits or causes of action, related to Lessee's operation of the Produced Water Disposal Well, except to the extent caused by the negligence or intentional misconduct of Lessor. The Lessee will maintain the Produced Water Disposal Well and all appurtenances thereto in accordance with the rules and regulations of the North Dakota Industrial Commission, and comply with applicable environmental laws, rules or regulations that govern such operations.

11. **TERMINATION.** When this Agreement terminates, Lessee shall remove all debris, machinery and equipment introduced by Lessee, and restore the Leased Premises to as near the condition it was in prior to Lessee's operations, as is reasonably practicable.

12. **GOVERNING LAW.** This Agreement shall be governed by, and construed in accordance with, the laws of the State of North Dakota, without giving effect to conflict of law principles. Any suit or proceeding hereunder shall be brought exclusively in and each party consents to the personal jurisdiction of the courts, state and federal, located therein. Each party agrees to waive any objection the state and federal courts are an inconvenient forum.

13. **WARRANTIES.** Lessor warrants it owns all of the surface title to the Leased Premises and said property is not the homestead of the property.

14. **SEVERABILITY.** The provisions of this Agreement shall be severable if any of the provisions hereof are held by a court of competent jurisdiction to be invalid, void, or otherwise unenforceable, and the remaining provisions shall remain enforceable to the fullest extent permitted by law.

15. **ENTIRE AGREEMENT.** This Agreement embodies the entire agreement of the Parties related to the subject matter hereof and supersedes all prior agreements, understandings, negotiations and discussions, whether oral or written, of the Parties related to the subject matter hereof.

16. **BINDING EFFECT.** This Agreement shall be binding upon the heirs, executors, administrators, successors and assigns of the parties hereto.

17. **COUNTERPARTS.** This Agreement may be executed in any number of counterparts, each of such counterparts shall for all purposes be deemed an original and all such counterparts shall together constitute but one and the same instrument. Signatures transmitted by facsimile or e-mail shall be acceptable to evidence acceptance of the terms and conditions herein.

**IN WITNESS WHEREOF,** Lessor and Lessee have executed this Agreement as of the date first referenced above.

**LESSOR:**

Jason J. Bang

**LESSEE:**
**CONTINENTAL RESOURCES, INC.**
An Oklahoma corporation

By: _____

Name: Sonia Thomas

Title: Attorney-in-Fact

STATE OF North Dakota )
) ss. **INDIVIDUAL ACKNOWLEDGMENT**
COUNTY OF Dunn )

I, the undersigned authority, a Notary Public in and for said County in said State, hereby certify that Jason J. Bang, a single man, whose name is signed to the foregoing instrument, and who is known to me, acknowledged before me on this day that, being informed of the contents of the instrument, he executed the same voluntarily.

Given under my hand and official seal, this the 4th day of June, 2020.

NANCY ANN THEESEN
Notary Public
State of North Dakota
My Commission Expires Jan 13, 2024

Nancy Ann Theesen
Notary Public

01/13/2024
My Commission Expires

STATE OF Oklahoma )
) ss. **CORPORATE ACKNOWLEDGMENT**
COUNTY OF Oklahoma )

The foregoing document was acknowledged before me this 7 day of August, 2020, by Sonia Thomas, as Attorney-in-Fact for Continental Resources, Inc. an Oklahoma corporation, on behalf of the corporation.

TERESA BRANSTETTER
NOTARY PUBLIC
# 13010795
EXP. 11-25-2021
STATE OF OKLAHOMA

KD SWD

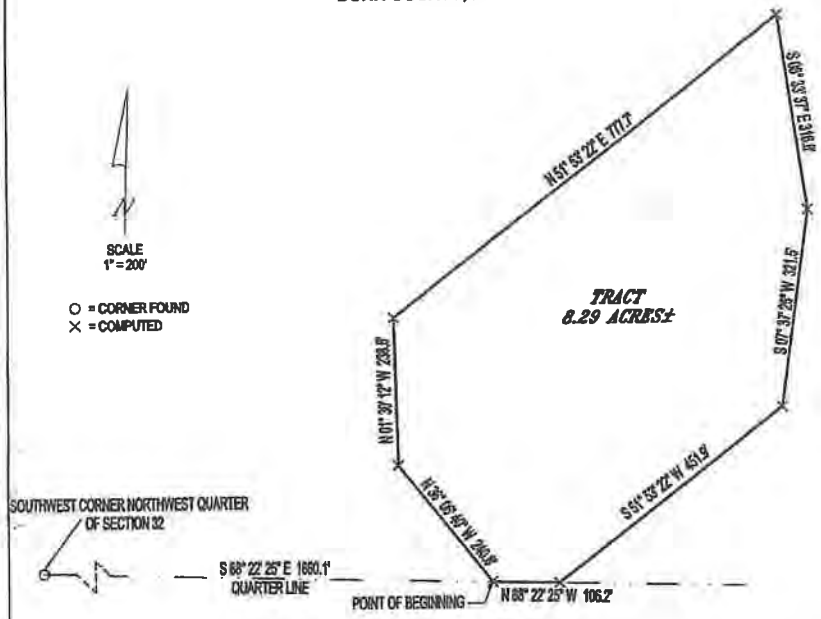
Teresa Branstetter
Notary Public

11-25-2021
My Commission Expires

Exhibit A

# SURVEY PLAT

KELLY DRAW SWD
S1/2NW1/4 OF SECTION 32
TOWNSHIP 147 NORTH - RANGE 96 WEST
DUNN COUNTY, NORTH DAKOTA




A TRACT OF LAND LOCATED IN THE S1/2NW1/4 OF SECTION 32, T147N, R96W, DUNN COUNTY, NORTH DAKOTA.

COMMENCING AT THE SOUTHWEST CORNER OF NORTHWEST QUARTER OF SECTION 32; THENCE S 88° 22' 25" E, ALONG THE SOUTH SIDE OF SAID QUARTER, A DISTANCE OF 1660.1 FEET; TO THE POINT OF BEGINNING: THENCE N 36° 06' 40" W, A DISTANCE OF 240.6 FEET; THENCE N 01° 30' 12" W, A DISTANCE OF 238.6 FEET; THENCE N 51° 53' 22" E, A DISTANCE OF 777.7 FEET; THENCE S 08° 33' 37" E, A DISTANCE OF 316.8; THENCE S 07° 37' 26" W, A DISTANCE OF 321.5 FEET; THENCE S 51° 53' 22" W, A DISTANCE OF 451.9 FEET TO THE SOUTH SIDE OF SAID QUARTER; THENCE N 88° 22' 25" W, ALONG THE SOUTH SIDE OF SAID QUARTER, A DISTANCE OF 106.2 FEET TO THE POINT OF BEGINNING.

SAID TRACT CONTAINS 8.29 ACRES MORE OR LESS AND IS SUBJECT TO ANY EXISTING EASEMENTS AND RIGHT-OF-WAY.

I CERTIFY THAT THIS PLAT CORRECTLY REPRESENTS WORK PERFORMED BY ME OR UNDER MY RESPONSIBLE CHARGE, AND IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF

5-20-20

JOHN PAUL [illegible] L.S. 3366

LAND SURVEYOR L.S. 3366 NORTH DAKOTA

DATE STAKED: 3-30-20

PERSON AUTHORIZING SURVEY;
RANCE LEMIEUX

BASIS OF BEARING: STATE PLANE


BROSZ ENGINEERING INC.
BOX 357
BOWMAN, N.D. 58623
PHONE: 701-523-3340
FAX: 701-523-5243

PROJECT NO. 20-10

KD SWD

AFFIDAVIT OF PRODUCED WATER DISPOSAL FACILITY LEASE AGREEMENT

STATE OF OKLAHOMA )
) SS
COUNTY OF BLAINE )

The undersigned, Sonia Thomas, being of lawful age, being first duly sworn upon oath states as follows:

1. I am Project Management Manager for Continental Resources, Inc. ("Continental"), with an office located at 20 North Broadway, Oklahoma City, Oklahoma 73102, and have knowledge of the information set forth herein.

2. That Continental, as "Lessee", and Jason J. Bang, a single man, as "Lessor" are parties to a certain Produced Water Disposal Facility Lease Agreement signed and executed on the 4th day of June, 2020 ("Produced Water Disposal Agreement"), which covers the following described property situated in Dunn County, North Dakota, to wit:

Township 147 North, Range 96 West of the 5th P.M.
Section 32: N2

(the "Subject Property").

3. That the Produced Water Disposal Agreement grants rights-of-way and easements to Continental for the use of the Subject Property to operate a facility on the Subject Property for the purpose of disposing of produced water from oil and gas wells.

4. That Continental possess a fully executed Produced Water Disposal Agreement at its office.

5. That the purpose of this Affidavit is to give notice of the Produced Water Disposal Agreement.

6. That the Produced Water Disposal Agreement is binding upon the heirs, executors, administrators, successors and assigns of the parties identified therein.

7. And, to make this public knowledge, this affidavit will be recorded in the Dunn County Clerk's Office, State of North Dakota.

Further Affiant sayeth not.

Sonia Thomas
Attorney-in-Fact



Attorney-Eyes-Only

**ACKNOWLEDGEMENTS**

**STATE OF OKLAHOMA** )
)
**COUNTY OF BLAINE** )

The foregoing document was acknowledged before me this 7th day of August, 2020, by Sonia Thomas, as Attorney-in-Fact for Continental Resources, Inc., an Oklahoma corporation, on behalf of the corporation.

TERESA BRANSTETTER NOTARY # 13010795 EXP. 11-25-2021 PUBLIC STATE OF OKLAHOMA

Notary Public: Teresa Branstetter

My Commission Expires: 11-25-2021



Attorney-Eyes-Only

# SALTWATER DISPOSAL FACILITY LEASE AGREEMENT

THIS SALTWATER DISPOSAL FACILITY LEASE AGREEMENT (the "Agreement") is made and entered into this 10 day of October, 2019 by and between **Marvin Keith Johnson**, whose address is 5893 120th Ave. NW, Ray, ND 58849, hereinafter called "Lessor" and **CONTINENTAL RESOURCES, INC.**, whose address is P. O. Box 269000, Oklahoma City, Oklahoma 73126, hereinafter called "Lessee."

**Witnesseth:**

WHEREAS, Lessor is the owner of the surface of the following described land located in Williams County, North Dakota, to-wit, (the "Leased Premises"):

Township 155 North, Range 97 West of the 5th P.M.
Section 20: E½SE¼

WHEREAS, Lessor is desirous of leasing a saltwater disposal well site upon the Leased Premises and the Lessee is desirous of leasing such property.

NOW, THEREFORE, for and in consideration of the sum of Ten Dollars ($10.00), the mutual promises contained herein, and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, it is agreed between the parties as follows:

1. **LEASED PREMISES**. The Lessor hereby leases, lets and rents unto the Lessee and the Lessee agrees to lease the following tract of land located on the Leased Premises described as follows:

a. **Tank Battery and Injection Well Site**: The Lessor hereby grants to Lessee the rights to the surface and subsurface of the Leased Premises located in the E½SE¼ of Section 20, Township 155 North, Range 97 West of the 5th P.M., Williams County, North Dakota, as depicted on the attached Exhibit "A". Lessor further grants to Lessee the rights to the surface and subsurface of the Leased Premises to equip, maintain, and operate the Saltwater Disposal Well for the purpose of disposing saltwater into the Saltwater Disposal Well. The Lessor also grants to Lessee the right to use the surface and subsurface of the Leased Premises for the purpose of equipping, operating and maintaining thereon all necessary facilities for a saltwater system, including, but not limited to, tanks, pumps and other structures and equipment necessary or convenient to save, take care of, treat, collect, store, transport, or dispose of saltwater from oil and gas wells on or off of the Leased Premises for disposal into the Saltwater Disposal Well, together with the right of ingress and egress across the Leased Premises from the county road.

b. **Easement Property**: The Lessor hereby grants to Lessee rights-of-way and easements for use of the surface and subsurface of the Leased Premises for the purpose of constructing, installing, operating, maintaining, replacing and removing pipelines, communication lines and poles, electric lines other utilities and for the purpose of transporting saltwater from oil and gas wells on or off of the Leased Premises to the Saltwater Disposal Well.

2. **PAYMENT.** Lessee agrees to pay the Lessor and the Lessor agrees to accept a one-time payment in the amount of Forty Thousand and 00/100 Dollars ($40,000.00) (the "Initial Payment") for any and all damages, including, but not limited to, all damages relating to the construction, operation or use of the Saltwater Disposal Well site location and access road and all other damages related thereto, including, but not limited to, damages incurred in the operation, maintenance and development of the Saltwater Disposal Well and related facilities. In the event the acreage utilized by the Lessee exceeds the 8.00 acres, for the Saltwater Disposal Well site location, upon which this payment is based, the Lessee agrees to make a further payment to the Lessor for the extra acreage, based on the amount of $5,000.00 per acre. In addition, Lessee agrees to pay the Lessor and Lessor agrees to accept a payment of $0.06 cents per barrel for each barrel of saltwater disposed of in the Saltwater Disposal Well (the "Royalty Payment"). The Royalty Payment shall be paid by the 30th day of the following month for the life of the Saltwater Disposal Well (the "Monthly Payment"). The parties agree the payments set forth in this paragraph are intended to cover all payments and damages arising from or related to surface and subsurface operations conducted by Lessee hereunder on the Leased Premises. Further, Lessor acknowledges and agrees the Initial Payment and Annual Payment paid under this Agreement are in full and complete settlement of any and all claims for loss, damage, or injury arising from or related to surface and subsurface operations conducted by Lessee hereunder on the Leased Premises. These payments will be paid proportionate to the interest the undersigned owns in the surface. Lessor and Lessee agree the payments hereunder shall be made upon receipt by Lessee of its executive management's approval to operate the Saltwater Disposal Well and upon commencement of construction activities on the Leased premises

INDUSTRIAL COMMISSION
STATE OF NORTH DAKOTA
DATE 6/13/24 CASE NO 30869-880
Introduced By Braaten
Exhibit LO-40
Identified By Stockwell

EXHIBIT
LO-40
30869-30880

EXHIBIT
108
1:18-cv-00181

Continental Resources, Inc.
DEPOSITION
EXHIBIT
108
06-07-2022

4422 0 759 Odin SWD

3. **TERM.** This Agreement shall remain in effect until Lessee permanently abandons the Saltwater Disposal Well and/or gathering system

4. **USE.** The Lessee shall have the right to use the Leased Premises for the storage of saltwater and other deleterious substances produced from oil and gas wells on or off of the Leased Premises; and for the disposal of saltwater and other deleterious substances produced from oil and gas wells on or off of the Leased Premises, and the easement for the transportation of saltwater and other deleterious substances produced from oil and gas wells on or off of the Leased Premises, including, but not limited to, the right of ingress and egress to said properties and premises, the right to lay, maintain and remove the pipeline or pipelines to and from said Saltwater Disposal Well site, the right to install, operate, maintain and remove pumping equipment, tankage and such other equipment as may be necessary or useful in the operation of the Saltwater Disposal Well facility.

5. **UTILITY EASEMENTS.** The Lessor agrees to execute all easements required by utility companies to affect the laying, maintaining and removing of utility lines, including, but not limited to, electric and telephone lines, for operating equipment necessary in Lessee's saltwater disposal operations.

6. **LIMITATION.** It is understood and agreed the disposal of saltwater and other deleterious substances will be made into a formation or formations which are not productive of fresh water, and which are approved for disposal purposes by the North Dakota Industrial Commission.

7. **FIXTURES OF LESSEE.** All pumping equipment, tankage and other equipment as may be necessary and useful in the operation of the Saltwater Disposal Well may be placed or attached on the Leased Premises by the Lessee and shall remain the property of the Lessee. Upon termination of this Agreement, or at any prior time, the Lessee may remove any and all of such equipment.

8. **DEFAULT.** The Lessee agrees upon its failure to comply with the provisions of this Agreement, the Lessor, at its option, may declare this Agreement at an end and void and terminate the same, and take possession of said premises. This Agreement shall not terminate until Lessor has given written notice of the alleged default(s) and of its intention to terminate the Agreement and Lessee has failed to cure the default(s) within sixty (60) days after receipt of the default notice. If Lessee cures the default within the sixty (60) days, the Agreement shall remain in full force and effect.

9. **ASSIGNMENT.** Lessee shall have the right to assign this Agreement without Lessor's consent. In the event of Lessee's assignment of its rights hereunder, Lessee shall have no further obligations under this Agreement. Lessor may assign, sell or transfer its rights in this Agreement and the property subject to the terms and conditions of this Agreement.

10. **NOTICE.** Any notice required to be given hereunder, must be given in writing and may be given personally or by certified or registered mail addressed to the parties as follows:

If to Lessor: Marvin Keith Johnson
5893 120th Ave. NW
Ray, ND 58849

If to Lessee: Continental Resources, Inc.
P.O. Box 269000
Oklahoma City, Oklahoma 73126
Attention: Contract Notices (Legal)

11. **INDEMNIFICATION, DAMAGES AND COVENANTS.** The Lessee, its successors or assigns, shall be solely responsible for damages arising from or related to Lessee's operation of the Saltwater Disposal Well and shall indemnify, defend and hold Lessor harmless from and against any liability, damages, claims, suits or causes of action, including but not limited to any reasonable attorney fees or expenses of Lessor, arising from any suit brought against Lessor related to Lessee's operation of the Saltwater Disposal Well. The Lessee will maintain the Saltwater Disposal Well and all appurtenances thereto in accordance with the rules and regulations of the North Dakota Industrial Commission, and comply with applicable environmental laws, rules or regulations that govern such operations.

12. **OWNERSHIP OF EQUIPMENT.** The Lessor agrees the Lessee has the right, at the termination of this Agreement, to remove any and all equipment and personal property that the Lessee places on the Leased Premises.



Attorney-Eyes-Only CLR-001346

13. **TERMINATION.** When this Agreement terminates, Lessee shall remove all debris, machinery and equipment introduced by Lessee, and restore the Leased Premises as near to the condition, as reasonably practicable, it was in prior to Lessee's operations.

14. **WARRANTIES.** Lessor warrants it owns all of the surface title to the Leased Premises and said property is not the homestead of the property.

15. **BINDING EFFECT.** This Agreement shall be binding upon the heirs, executors, administrators, successors and assigns of the parties hereto.

16. **EROSION CONTROL.** Lessee shall take reasonable measures to prevent erosion and disturbance of drainage areas, including but not limited to the installation of culverts, straw waddles, or other practicable applications. If an erosion problem develops, Lessor shall inform Lessee immediately, so the necessary corrective measures can be performed.

17. **WEED CONTROL.** Lessee agrees to make reasonable efforts to keep the well site and access road for the Saltwater Disposal Well free of noxious weeds, trash, and debris associated with Lessee's operations.

18. **DUST CONTROL.** During periods of heavy activity (e.g., drilling operations, hydraulic fracturing) and upon reasonable request by Lessor, Lessee shall make reasonable efforts to control dust on the access road leading to the Salt Water Disposal Well.

19. **ROAD MAINTENACE.** Lessee agrees to make reasonable efforts to maintain the Salt Water Disposal Well access road in good condition.

**IN WITNESS WHEREOF,** this Agreement is executed in counterparts, each, of which will constitute an original on the date and year first above written.

**LESSOR:**

X _____
**Marvin Keith Johnson**

STATE OF North Dakota )
) ss. **INDIVIDUAL ACKNOWLEDGMENT**
COUNTY OF Williams )

I, the undersigned authority, a Notary Public in and for said County in said State, hereby certify that **Marvin Keith Johnson**, whose name is signed to the foregoing instrument, and who is known to me, acknowledged before me on this day that, being informed of the contents of the instrument, he executed the same voluntarily.

Given under my hand and official seal, this the 10 day of July, 2019.

_____
Notary Public

**BRADLEY PEDERSON**
**Notary Public**
**State of North Dakota**
**My Commission Expires October 13, 2021**

4422.0.759 Odin SWD

**LESSEE:**
**CONTINENTAL RESOURCES, INC.**

MSS 7-23-19
DCR 7-23-19
BM 7-30-19
CMH 7-31-19

By: Harold Hamm

Its: Chairman & CEO

STATE OF Oklahoma )
) ss. **CORPORATE ACKNOWLEDGMENT**
COUNTY OF Oklahoma )

The foregoing document was acknowledged before me this 31st day of July, 2019, by Harold Hamm, as Chairman & CEO for **Continental Resources, Inc.**, an Oklahoma corporation, on behalf of the corporation.

KERRY BURCHAM
Notary Public
State of Oklahoma
Commission # 06004227 Expires 04/27/22

Notary Public

4422.0.759 Odin SWD

P.O. BOX 1282
DICKINSON, NORTH DAKOTA 58602-1282

February 16, 2021

**CERTIFIED MAIL:** 7019 0140 0001 1612 3376

Attn: Marcus Simpson
Continental Resources, Inc.
P.O. Box 269000
Oklahoma City, OK 73126

RE: **TREX SWD**
McKenzie County, North Dakota

Township 152 North, Range 102 West of the 5th P.M.
Section 1: Lots 3, 5, 6, 11

Greetings:

Please find enclosed the following documents:

1) Produced Water Disposal Facility Lease Agreement signed 11/24/2020 by Janice V. Joseph
2) Addendum to Produced Water Disposal Facility Lease Agreement signed 11/24/2020 by Janice V. Joseph
3) Affidavit of Produced Water Disposal Facility Lease Agreement, pertaining to a certain Produced Water Disposal Facility Lease Agreement signed and executed on 11/24/2020 by Janice V. Joseph

Please have Sonia Thomas, as Attorney-in-Fact for Continental Resources, Inc. sign the enclosed documents, including two (2) in the presence of a Notary Public. Please mail back the executed document(s) to B.J. Kadrmas, Inc. Additionally, see enclosed other documents for the LCU Foster Loop Road, Tracey 1-34H, Harms Federal MWP (17-18), and Harms Flowlines.

Respectfully,

Matthew R. Kostelecky, RPL
B.J. Kadrmas, Inc.
President

OFFICE: 1-800-730-0361 / 701-225-0361 • webmail@bjkadrmasinc.com • FAX: 701-227-0421

EXHIBIT
tabbies
LO-41
30869-30880

INDUSTRIAL COMMISSION
STATE OF NORTH DAKOTA
DATE 6/13/24 CASE NO. 30869-880
Introduced By Braaten
Exhibit LO-41
Identified By Stockness

EXHIBIT
112
1:18-cv-00181

Continental Resources, Inc.
DEPOSITION
EXHIBIT
112
06-07-2022

# PRODUCED WATER DISPOSAL FACILITY LEASE AGREEMENT

THIS PRODUCED WATER DISPOSAL FACILITY LEASE AGREEMENT (the "Agreement") is made and entered into this 24 day of November, 2020 by and between Janice V. Joseph, fka Janice V. Fredrickson, a single person, whose address is, 718 1st Avenue East, Williston, ND 58801-5408, hereinafter called "Lessor" and CONTINENTAL RESOURCES, INC., whose address is P. O. Box 268870, Oklahoma City, Oklahoma 73126, hereinafter called "Lessee."

**Witnesseth:**

WHEREAS, Lessor is the owner of the surface estate of the following described land located in McKenzie County, North Dakota, to-wit:

Township 152 North, Range 102 West of the 5th P.M.
Section 1: Lots 3, 5, 6, 11

(the "Subject Property").

WHEREAS, Lessor is desirous of leasing a disposal well site upon the Subject Property and the Lessee is desirous of leasing such property.

NOW, THEREFORE, for and in consideration of the sum of Ten Dollars ($10.00), the mutual promises contained herein, and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, it is agreed between the parties as follows:

1. **LEASED PREMISES**. The Lessor hereby leases, lets and rents unto the Lessee and the Lessee agrees to lease a 8.61 acre surface acre parcel of land as depicted on Exhibit "A" (the "Leased Premises") located on the Subject Property subject to the following terms and conditions:

a. **Tank Battery and Disposal Well Site**: Lessor hereby grants to Lessee the rights to the surface and subsurface of the Leased Premises to equip, maintain, and operate the disposal well ("Produced Water Disposal Well") for the purpose of disposing produced water into the Produced Water Disposal Well. The Lessor also grants to Lessee the right to use the surface and subsurface of the Leased Premises for the purpose of equipping, operating and maintaining thereon all necessary or convenient facilities for a disposal well, including, but not limited to, tanks, pumps and other structures and equipment necessary or convenient to save, take care of, treat, collect, store, transport, or dispose of produced water from oil and gas wells on or off of the Leased Premises for disposal into the Produced Water Disposal Well.

b. **Rights-of-Way and Easements**: The Lessor hereby grants to Lessee rights-of-way and easements for use of the surface and subsurface of the Subject Property for the purpose of constructing, installing, operating, maintaining, replacing and removing pipelines, communication lines and poles, electric lines other utilities and for the purpose of transporting produced water from oil and gas wells on or off of the Leased Premises to the Produced Water Disposal Well, together with the rights-of-way and easements necessary to use and maintain existing roads and/or to use, construct, and maintain new roads for ingress and egress to the Produced Water Disposal Well. Lessor also grants Lessee a subsurface easement under the Subject Property and lands outside of the Subject Property which is owned by Lessor which is necessary for Lessee to drill the Produced Water Disposal Well and dispose of produced water and other deleterious substances into the Produced Water Disposal Well.

2. **PAYMENT.** Lessee agrees to pay the Lessor and the Lessor agrees to accept compensation in the amount of $51,660.00 (8.61 acres @ $6,000.00 per acre) for the location, $4,760.35 for the access road (136.01 rods @ $35.00 per rod) for any and all damages to the Subject Property, including, but not limited to, all damages relating to the Produced Water Disposal Well, roads, tank battery, pipelines, utilities and all other damages related thereto, incurred in the conversion, operation, maintenance and development of the Produced Water Disposal Well. In the event the acreage utilized by the Lessee exceeds 8.61 acres for the Produced Water Disposal Well, upon which this payment is based, the Lessee agrees to make a further payment to Lessor for the extra acreage, based on the amount of $6,000.00 per acre. In addition, Lessee shall pay Lessor $0.06 per barrel for each barrel of produced water disposed into the Produced Water Disposal Well, which shall be paid by January 31st for any produced water disposed into the Produced Water Disposal Well for the previous year. The parties agree this payment is intended to cover all damages arising from or related to surface and subsurface operations conducted by Lessee hereunder. Lessor and Lessee agree the payment hereunder shall be made upon receipt by Lessee of its executive management's approval to drill a Produced Water Disposal Well and upon commencement of construction activities on the Leased Premises. This payment will be paid proportionate to the interest the undersigned owns in the surface.

3. **RELEASE.** Lessor acknowledge the receipt and sufficiency of all compensation paid by Lessee pursuant to this Agreement as full and complete settlement for, and as a release of, all claims for loss, damage, or injury to the surface and/or subsurface of the Subject Property arising out of Lessee's oil and gas operations, including those categories of loss, damage, or injury described in Chapter 38-11.1 of the North Dakota Century Code. Lessor



Attorney-Eyes-Only CLR-001634

hereby release, acquit, and forever discharge Lessee and its parent, subsidiary, and other affiliated companies, and their employees, contractors, subcontractors, agents, and representatives from any and all losses, liabilities, claims, damages, demands, and causes of action for injuries or damages to the surface and/or subsurface of the Subject Property and to the appurtenances, improvements, and vegetation on the Subject Property owned or possessed by the Lessor and/or tenants, arising directly or indirectly in connection with the Lessee's oil and gas operations on the Subject Property.

4. **TERM.** This Agreement shall remain in effect until Lessee permanently abandons the Produced Water Disposal Well.

5. **UTILITY EASEMENTS.** The Lessor agrees to execute all easements required by utility companies to affect the laying, maintaining and removing of utility lines, including, but not limited to, electric and telephone lines, for operating equipment necessary in Lessee's disposal operations.

6. **LIMITATION.** It is understood and agreed the disposal of produced water and other deleterious substances will be made into a formation or formations which are not productive of fresh water, and which are approved for disposal purposes by the North Dakota Industrial Commission.

7. **FIXTURES OF LESSEE.** All pumping equipment, tankage and other equipment as may be necessary, useful or convenient in the operation of the Produced Water Disposal Well may be placed or attached on the Leased Premises by the Lessee and shall remain the property of the Lessee. Upon termination of this Agreement, or at any prior time, the Lessee may remove any and all of such equipment.

8. **ASSIGNMENT.** Lessee shall have the right to assign this Agreement without Lessor's consent. In the event of Lessee's assignment of its rights hereunder, Lessee shall have no further obligations under this Agreement. Lessor may assign, sell or transfer its rights in this Agreement and the property subject to the terms and conditions of this Agreement.

9. **NOTICE.** Any notice required to be given hereunder, must be given in writing and may be given personally or by certified or registered mail addressed to the parties as follows:

If to Lessor: Janice V. Joseph
718 1st Avenue East
Williston, ND 58801-5408

If to Lessee: Continental Resources, Inc.
P.O. Box 268836
Oklahoma City, Oklahoma 73126
Attention: Contract Notices (Legal)

10. **INDEMNIFICATION, DAMAGES AND COVENANTS.** The Lessee shall indemnify, defend and hold Lessor harmless from and against any liability, damages, claims, suits or causes of action, related to Lessee's operation of the Produced Water Disposal Well, except to the extent caused by the negligence or intentional misconduct of Lessor. The Lessee will maintain the Produced Water Disposal Well and all appurtenances thereto in accordance with the rules and regulations of the North Dakota Industrial Commission, and comply with applicable environmental laws, rules or regulations that govern such operations.

11. **TERMINATION.** When this Agreement terminates, Lessee shall remove all debris, machinery and equipment introduced by Lessee, and restore the Leased Premises to as near the condition it was in prior to Lessee's operations, as is reasonably practicable.

12. **GOVERNING LAW.** This Agreement shall be governed by, and construed in accordance with, the laws of the State of North Dakota, without giving effect to conflict of law principles. Any suit or proceeding hereunder shall be brought exclusively in and each party consents to the personal jurisdiction of the courts, state and federal, located therein. Each party agrees to waive any objection the state and federal courts are of an inconvenient forum.

13. **WARRANTIES.** Lessor warrants it owns all of the surface title to the Leased Premises and said property is not the homestead of the property.

14. **SEVERABILITY.** The provisions of this Agreement shall be severable if any of the provisions hereof are held by a court of competent jurisdiction to be invalid, void, or otherwise unenforceable, and the remaining provisions shall remain enforceable to the fullest extent permitted by law.

15. **ENTIRE AGREEMENT.** This Agreement embodies the entire agreement of the Parties related to the subject matter hereof and supersedes all prior agreements, understandings, negotiations and discussions, whether oral or written, of the Parties related to the subject matter hereof.

16. **BINDING EFFECT.** This Agreement shall be binding upon the heirs, executors, administrators, successors and assigns of the parties hereto.

17. **COUNTERPARTS.** This Agreement may be executed in any number of counterparts, each of such counterparts shall for all purposes be deemed an original and all such counterparts shall together constitute but one and the same instrument. Signatures transmitted by facsimile or e-mail shall be acceptable to evidence acceptance of the terms and conditions herein.

See Addendum to Produced Water Disposal Facility Lease Agreement for additional provisions.

**IN WITNESS WHEREOF,** Lessor and Lessee have executed this Agreement as of the date first referenced above.

**LESSOR:**

Janice V. Joseph

**LESSEE:**
**CONTINENTAL RESOURCES, INC.**
An Oklahoma corporation

By: _____

Name: Sonia Thomas

Title: Attorney-in-Fact

STATE OF North Dakota )
) ss. **INDIVIDUAL ACKNOWLEDGMENT**
COUNTY OF Williams )

I, the undersigned authority, a Notary Public in and for said County in said State, hereby certify that Janice V. Joseph, fka Janice V. Fredrickson, a single person, whose name is signed to the foregoing instrument, and who is known to me, acknowledged before me on this day that, being informed of the contents of the instrument, she executed the same voluntarily.

Given under my hand and official seal, this the 24 day of November, 2020.

LORI K FOLDESI
Notary Public
State of North Dakota
My Commission Expires January 14, 2021

Notary Public

STATE OF Oklahoma )
) ss. **CORPORATE ACKNOWLEDGMENT**
COUNTY OF Oklahoma )

The foregoing document was acknowledged before me this 17 day of March, 2021, by Sonia Thomas, as Attorney-in-Fact for Continental Resources, Inc. an Oklahoma corporation, on behalf of the corporation.

TERESA BRANSTETTER NOTARY # 13010795 EXP. 11-25-2021 PUBLIC STATE OF OKLAHOMA

Notary Public

## ADDENDUM TO
## PRODUCED WATER DISPOSAL FACILITY LEASE AGREEMENT

This Addendum to Produced Water Disposal Facility Lease Agreement ("Addendum") is made and entered into this 24 day of November, 2020, between **JANICE V. JOSEPH, fka, Janice V. Fredrickson** (Lessor), whose address is 718 1st Avenue East, Williston, North Dakota 58801-5408, and **CONTINENTAL RESOURCES, INC.** (Lessee), whose address is PO Box 268870, Oklahoma City, Oklahoma 73126.

The provisions of this Addendum shall prevail wherever in conflict with the provisions of the Produced Water Disposal Facility Lease Agreement ("Agreement").

1. The consideration paid as stated in the Agreement is for normal damages to the surface and/or subsurface of the Subject Property, including the Leased Premises, associated with construction of the access road, installation of pipelines and electrical lines (including communication lines and/or other utilities), and for the disposal of produced water on the Leased Premises. Lessor acknowledges the receipt and sufficiency of the consideration paid by Lessee as full and complete settlement for, and as a release of, all claims related to normal damages to the surface and/or subsurface of the Subject Property, including those categories of loss, damage, or injury described in Chapter 38-11.1 of the North Dakota Century Code, associated with construction of the access road, installation of pipelines and electrical lines (including communication lines and/or other utilities), and for the disposal of produced water on the Leased Premises.

2. The Agreement allows for the construction of an access road and the Produced Water Disposal Well, which includes those things associated with the well site as stated in the Agreement and the installation of pipelines and electrical lines (including communication lines and/or other utilities). In the event Lessee's activities on the Subject Property result in any further damages to the Subject Property not related to the initial construction of the access road and Leased Premises, such damages shall not be covered by the Agreement and shall require further settlement. The consideration paid herein is only for the Subject Property directly affected by Leased Premises in Exhibit A.

3. Lessee will comply with all applicable Federal, State and local law, rules and regulations, which govern Lessee's oil and gas and salt water disposal operations on the Subject Property.

4. The access road is only for the Leased Premises and the access road shall be only used for purposes of access to the Leased Premises. Lessee agrees to place appropriate signs on the access road designating said road as a "private road" and to reasonably assist Lessor in the control of the use of the access road by any unauthorized personnel. Lessee shall give Lessor the opportunity to keep the access road placed on the Subject Property once Lessee discontinues disposal of produced water on the Leased Premises. Upon Lessee's discontinuance of disposal of produced water on the Leased Premises, unless Lessor elects to keep the road, Lessee shall restore and reclaim the access road to its original contour, replace topsoil, and reseed said access road.

5. Lessee agrees to indemnify and hold Lessor, its successors and assigns, harmless, including reimbursement of reasonable attorney fees and costs, from any claims, by any persons or entities, for damages to persons or property resulting from Lessee's activities or the activities of Lessee's parent, subsidiary and other affiliated companies, their employees, contractors, subcontractors agents and representatives on the Leased Premises except to the extent caused by Lessor's negligence of willful misconduct. This indemnification shall include Lessee indemnifying and holding Lessor harmless for any and all environmental damage caused by Lessee's activities hereunder, including but not limited to liability for water, soil, and air pollution, seepage, fire, spills and use of hazardous or toxic materials. Lessee assumes the liability for costs incurred by third parties required to contain or correct such damages (e.g. fire department), provided Lessee receives documentation supporting the costs incurred by such third parties.

6. Lessee shall make every reasonable effort to save all topsoil for the benefit of the land disturbed and stockpile topsoil on the land disturbed by building the access road and the Produced Water Disposal Well. All rocks 4 inches or larger unearthed by Lessee must be either removed by Lessee at its expense or buried.

7. Lessee shall not use any gravel or scoria belonging to Lessor for access roads or fill without prior express written consent by Lessor.

8. Lessee shall not use any fresh water, including but not limited to, groundwater or water from springs, dams or wells, from any property of Lessor or water from wells drilled on Lessor's property without the consent of Lessor. If operations by Lessee cause damages to any water well of the Lessor or restrict the supply of water to Lessor or its tenants for domestic livestock or any other agricultural purpose, or which would do injury to any potable ground water supply, Lessee shall pay for all damages, including the cost of one or more new water wells if deemed necessary.

9. Lessee shall maintain the access road and Leased Premises to ensure that it is free from noxious weeds. Lessee shall use Roundup or a similar product to control weeds and ensure that Lessor is in agreement with such usage.

10. No agent of the Lessee may be in possession of a firearm while on the Subject Property. No activities, including hunting, shall be allowed on the Subject Property that are not related to operation and maintenance of the Produced Water Disposal Well and access road as stated in the Agreement. Entry by Lessee's personnel is only granted while they are working in their official capacity.

11. Facilities and equipment not necessary for Lessee's operations on the Leased Premises are excessive facilities and such equipment and facilities shall be promptly removed from the location. All facilities (equipment and associated accessories) shall be functional and maintained or shall be promptly removed from the location. All trash on the Subject Property, which results from Lessee's operations will be hauled off site.

12. Lessee agrees to repair all existing fences damaged by its operations. Lessee agrees to fence all areas used for the Leased Premises Fencing (including repair) shall be completed without unreasonable delay taking into consideration the needs of Lessor

13. Lessee shall take all practicable steps to control and eliminate erosion and washouts caused by its operations upon Subject Property. If erosion or washouts occur, Lessee agrees to mitigate the affected area, within thirty (30) days of the occurrence.

14. Lessee shall minimize (and shall fully remediate, if it occurs) the release or discharge of any toxic or hazardous chemicals, water generated, drill grindings or other materials generated in connection with the creation or operation of the Produced Water Disposal Well, including any spills of oil, petroleum, or produced products, or other damage to or on the Leased Premises. In the event of any release or discharge outside the Leased Premises, Lessee shall compensate Lessor the actual damages suffered by Lessor to the Subject Property resulting from any such release or discharge, including, but not limited to, removing the contaminated material, reclaiming the contaminated area in accordance with applicable Federal, State and local statutes, rules and ordinances, and all other injuries to the Subject Property and other destruction to crops or damages to the ability of the Subject Property to produce crops going forward.

15. No pipelines and electrical facilities other than as needed for disposal operations as provided in the Agreement on the Subject Property are allowed.

16. All operations hereunder shall be conducted so as to cause the least inconvenience and interference with Lessor's existing surface use and the most practicable accommodation of Lessor's existing surface use.

17. Lessor reserves all rights to quiet enjoyment of the land and to use said land for any purpose that does not unreasonably interfere with Lessee's use of the land pursuant to this agreement.

18. Lessee further agrees to make a separate payment for crop loss on the Subject Property caused by Lessee during construction or operations. In the event Lessor's tenant suffers any damages to crops on the Subject Property due to Lessee's construction or operations, Lessee shall make a separate payment for such crop loss directly to Lessor's tenant.

19. Lessee shall pay the Lessor's attorney fees and any damages to defend a construction lien that is placed on the Subject Property due to work performed by Lessee, its parent, subsidiary and other affiliated companies, and their employees, contractors, subcontractors agents and representatives.

20. The rights granted in the Agreement shall be for only as long as Lessee uses the Subject Property for the purposes stated herein. Upon abandonment of the Produced Water Disposal Well, the Agreement shall terminate with the exception of Lessee's obligation to restore the Leased Premises to its original condition including re-contouring and re-seeding as well as any obligation to pay additional damages that may result from Lessee's activities. To the maximum extent possible, Lessee will coordinate its restoration efforts with Lessor. At Lessor's option, any access road, fence, gate or cattle guard constructed or installed by Lessee shall be left in place. All restoration and reclamation shall be completed within one (1) year of cessation of operational activities or six (6) months after the Produced Water Disposal Well is plugged and abandoned, weather permitting, whichever occurs later. The foregoing provisions are not intended to relieve Lessee from any more stringent restoration and reclamation requirements pursuant to applicable federal, state or local laws, rules or regulations.

21. Except for the release set forth in Paragraph 1 of this Addendum, nothing in the Agreement releases, acquits, and forever discharges Lessee and its parent, subsidiary and other affiliated companies, and hereby their employees, contractors, subcontractors agents and representatives from any and all losses, liabilities, claims, damages, demands, and causes of action for injuries or damages to the surface and/or subsurface of the Subject Property and to the appurtenances, improvements, and vegetation on the Subject Property owned or possessed by

the Lessor and/or tenants, arising directly or indirectly in connection with the Lessee's Produced Water Disposal Facility on the Leased Premises.

**LESSOR:**

Janice V. Joseph

**LESSEE:**
**CONTINENTAL RESOURCES, INC.**
An Oklahoma corporation

By: _____

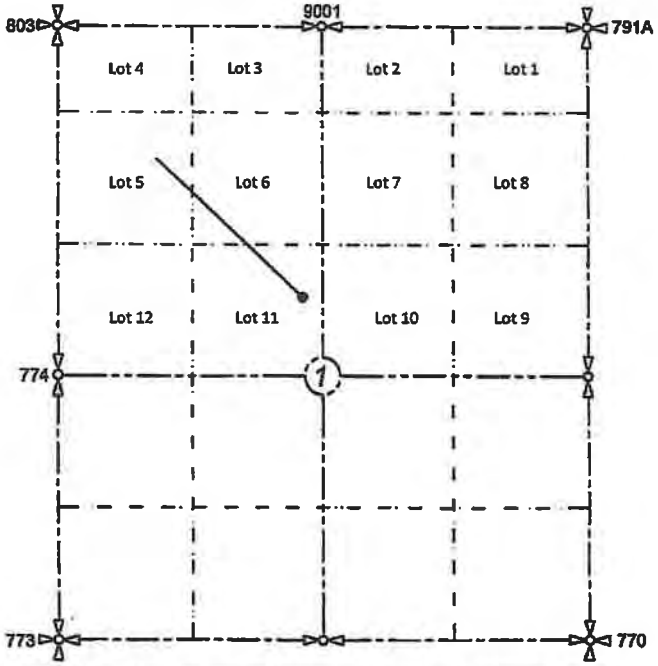
Name: Sonia Thomas



Attorney-Eyes-Only

EXHIBIT A – 1 of 3

**SECTION COORDINATE PLAT**
**CONTINENTAL RESOURCES INC.**
**TREX SWD**
**SECTION 1, T152N, R102W**
**MCKENZIE COUNTY, NORTH DAKOTA**




| ID | Northing | Easting | Elevation | Feature Code |
|---|---|---|---|---|
| 2 | 387025.356 | 1190352.66 | 2209.096 | TREXSWD |
| 3 | 388461.317 | 1188935.63 | 0.000 | TREX BH |
| 770 | 383488.463 | 1193055.84 | 2271.166 | NE12 RB/CAP |
| 773 | 383697.556 | 1187777.72 | 2162.490 | NW12 SPOT |
| 774 | 386333.487 | 1187884.66 | 2118.538 | W1/4 1 SPOT |
| 791A | 389625.830 | 1193307.19 | 2129.858 | SW34 CC BARCAP |
| 803 | 389846.329 | 1188005.02 | 2159.872 | SPOT |
| 9001 | 389736.623 | 1190667.22 | 2197.434 | N1\4 1 SPOT |

N

SCALE
1" = 1000'

NAD83 - ND NORTH - US SURVEY FEET


BROSE ENGINEERING INC.
BOX 357
BOWMAN, N.D. 58623
PHONE: 701-523-3340
FAX: 701-523-5243

PROJECT NO. 29-10

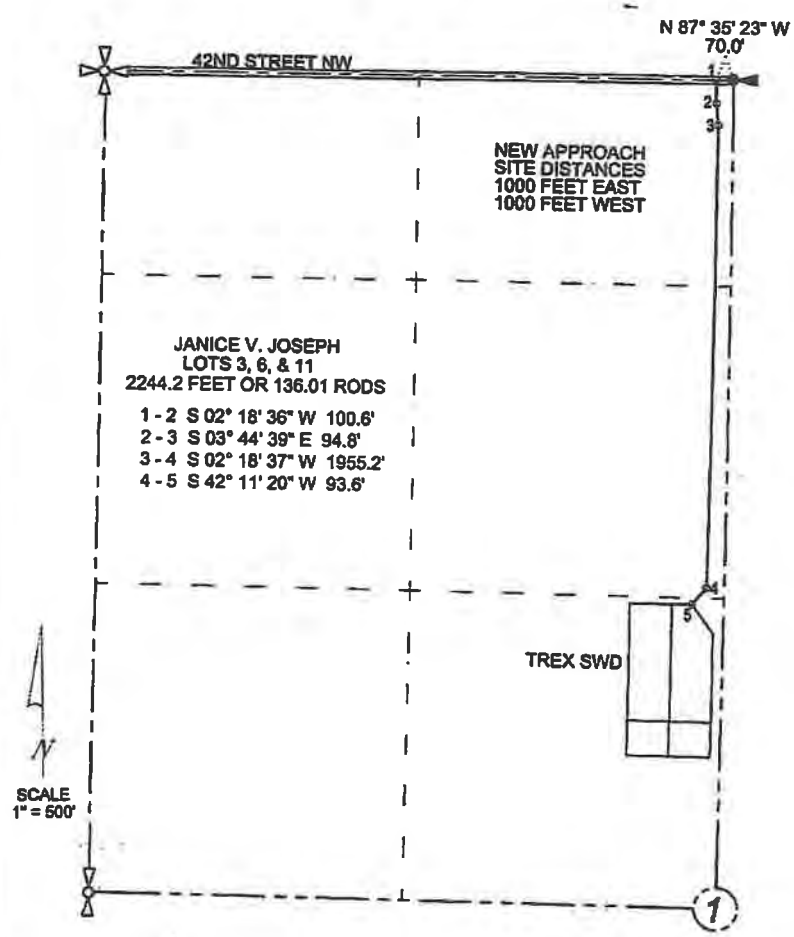


Attorney-Eyes-Only CLR-001640

EXHIBIT A – 2 OF 3

TOTAL ROAD LENGTH:
2244.2 FEET OR 136.01 RODS

# ROAD LOCATION PLAT
## CONTINENTAL RESOURCES INC.
## TREX SWD
## SECTION 1, T152N, R102W
## MCKENZIE COUNTY, NORTH DAKOTA




I CERTIFY THAT THIS PLAT CORRECTLY REPRESENTS WORK PERFORMED BY ME OR UNDER MY RESPONSIBLE CHARGE, AND IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF

7-16-20

JOHN PAULSON, R.L.S. 3366

REGISTERED LAND SURVEYOR L.S. 3366 NORTH DAKOTA

DATE STAKED: 3-24-20

BASIS OF VERTICAL DATUM:
NAVD 1988 GEOID 18

PERSON AUTHORIZING SURVEY;
MARCUS SIMPSON

EXPLANATION AREA: NAD83(CORS96)

BASIS OF BEARING: STATE PLANE

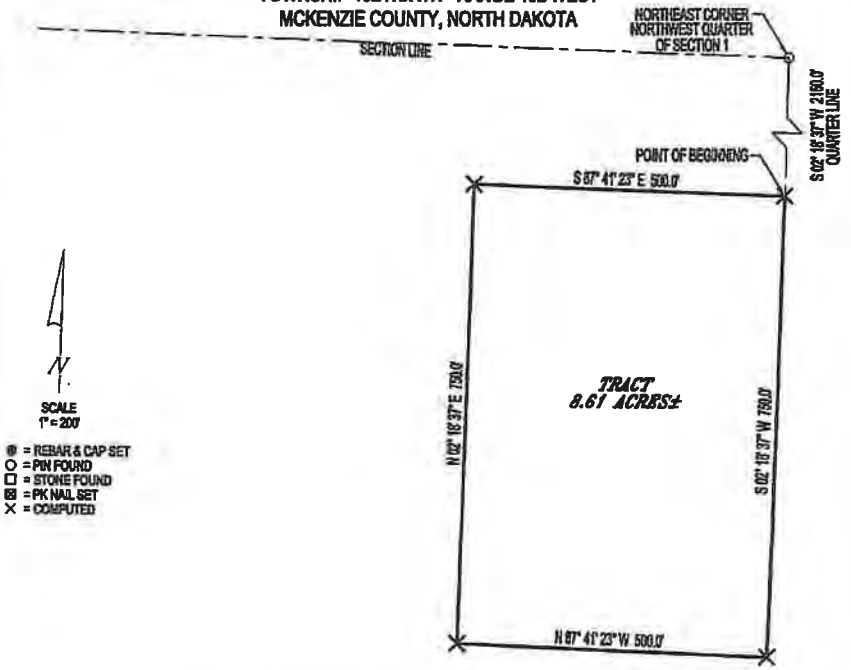

*BROSZ ENGINEERING INC.*
BOX 357
BOWMAN, N.D. 58623
PHONE: 701-523-3340
FAX: 701-523-5243


PROJECT NO. 20-10

EXHIBIT A – 3 OF 3

# *SURVEY PLAT*

**TREX SWD**
**LOT 11 OF SECTION 1**
**TOWNSHIP 152 NORTH - RANGE 102 WEST**
**MCKENZIE COUNTY, NORTH DAKOTA**




A TRACT OF LAND LOCATED IN LOT 11 OF SECTION 1, T152N, R102W, MCKENZIE COUNTY, NORTH DAKOTA.

COMMENCING AT THE NORTHEAST CORNER OF THE NORTHWEST QUARTER OF SECTION 1; THENCE S 02° 18' 37" W, ALONG THE EAST SIDE OF SAID QUARTER, A DISTANCE OF 2150.0 FEET TO THE POINT OF BEGINNING; THENCE S 02° 18' 37" W, ALONG SAID QUARTER LINE, A DISTANCE OF 750.0 FEET; THENCE N 87° 41' 23" W, PERPENDICULAR TO SAID QUARTER LINE, A DISTANCE OF 500.0 FEET; THENCE N 02° 18' 37" E, PARALLEL TO SAID QUARTER LINE A DISTANCE OF 750.0 FEET; THENCE S 87° 41' 23" E, PERPENDICULAR TO SAID QUARTER LINE, A DISTANCE OF 500.0 FEET TO THE POINT OF BEGINNING.

SAID TRACT CONTAINS 8.61 ACRES MORE OR LESS AND IS SUBJECT TO ANY EXISTING EASEMENTS AND RIGHT-OF-WAY.

I CERTIFY THAT THIS PLAT CORRECTLY REPRESENTS WORK PERFORMED BY ME OR UNDER MY RESPONSIBLE CHARGE AND IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF

REGISTERED JOHN PAULSON L.S. 3366 SURVEYOR L.S. 3366 NORTH DAKOTA

JOHN PAULSON R.L.S. 3366 4-14-20

DATE STAKED: 4-2020

PERSON AUTHORIZING SURVEY;
RANCE LEMIEUX

BASIS OF BEARING: STATE PLANE


*BROSZ ENGINEERING INC.*
BOX 357
BOWMAN, N.D. 58623
PHONE: 701-523-3340
FAX: 701-523-5243

PROJECT NO. 20-10



Attorney-Eyes-Only CLR-001642

AFFIDAVIT OF PRODUCED WATER DISPOSAL FACILITY LEASE AGREEMENT

STATE OF OKLAHOMA )
) SS
COUNTY OF BLAINE )

The undersigned, Sonia Thomas, being of lawful age, being first duly sworn upon oath states as follows:

1. I am Project Management Manager for Continental Resources, Inc. ("Continental"), with an office located at 20 North Broadway, Oklahoma City, Oklahoma 73102, and have knowledge of the information set forth herein.

2. That Continental, as "Lessee", and Janice V. Joseph, fka Janice V. Fredrickson, as "Lessor" are parties to a certain Produced Water Disposal Facility Lease Agreement signed and executed on the 24th day of November, 2020 ("Produced Water Disposal Agreement"), which covers the following described property situated in McKenzie County, North Dakota, to wit:

Township 152 North, Range 102 West of the 5th P.M.
Section 1: Lots 3, 5, 6, 11

(the "Subject Property").

3. That the Produced Water Disposal Agreement grants rights-of-way and easements to Continental for the use of the Subject Property to operate a facility on the Subject Property for the purpose of disposing of produced water from oil and gas wells.

4. That Continental possess a fully executed Produced Water Disposal Agreement at its office.

5. That the purpose of this Affidavit is to give notice of the Produced Water Disposal Agreement.

6. That the Produced Water Disposal Agreement is binding upon the heirs, executors, administrators, successors and assigns of the parties identified therein.

7. And, to make this public knowledge, this affidavit will be recorded in the McKenzie County Clerk's Office, State of North Dakota.

Further Affiant sayeth not.

Sonia Thomas
Attorney-in-Fact



Attorney-Eyes-Only

**ACKNOWLEDGEMENTS**

**STATE OF OKLAHOMA** )
)
**COUNTY OF BLAINE** )

The foregoing document was acknowledged before me this 17 day of March, 2021, by Sonia Thomas, as Attorney-in-Fact for Continental Resources, Inc., an Oklahoma corporation, on behalf of the corporation.

Notary Public: Dessa Branstetter

My Commission Expires: 11-25-2024

COPY

**STATE OF LOUISIANA**
**PARISH OF VERNON**

INDUSTRIAL COMMISSION
STATE OF NORTH DAKOTA
DATE 6/13/24 CASE NO. 30869-880
Introduced By Braaten
Exhibit LO-42
Identified By Stockner

## CARBON DIOXIDE SEQUESTRATION AGREEMENT

This Carbon Dioxide Sequestration Agreement (this "**Agreement**") is made and entered into effective as of _____, 20__ (the "**Effective Date**"), by and between _____, whose address is _____ (the foregoing, and sometimes collectively, referred to herein as "**Landowner**"), and **DENBURY CARBON SOLUTIONS, LLC**, a Delaware Limited Liability Company, whose address is 5851 Legacy Circle, Suite 1200, Plano, Texas 75024 (sometimes referred to herein as "**Denbury**"). Landowner and Denbury may be referred to in this Agreement, individually, as a "**Party**" and, together, as the "**Parties**".

Capitalized terms used but not otherwise defined herein, in Schedule 1 or in Schedule 2 shall have the meaning given to such terms in Schedule 3.

1. Grant. Landowner, in consideration of Ten Dollars, the mutual covenants and agreements contained herein and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, does hereby convey, grant, demise, and deliver exclusively unto Denbury a personal servitude in the nature of a right of use in and to the surface and subsurface of the Land (as defined below) unto Denbury as follows: (a) the right to, subject to the terms and provisions of this Agreement, use the surface and subsurface of the Land, including, without limitation, the Sequestration Formation, for the Purposes, together with (b) the right for ingress and egress to, from and across the Land, to access the Facilities, in each case, as may be reasonably necessary for permitting, installing, operating, maintaining, monitoring, and removing any Facilities and electric and other utility lines for the Purposes. Landowner further grants unto Denbury, insofar as the same are owned or controlled by Landowner, any and all rights reasonably necessary for the Purposes (it being understood that the rights and privileges granted herein are not sole and exclusive to Denbury to the extent unrelated to or not used for the Purposes).

TO HAVE AND TO HOLD the same unto Denbury, its successors and assigns, for the Term, and so long thereafter as Denbury is required by applicable law, regulation or order of a governmental entity to continue monitoring or other activities.

The lands covered by this Agreement include the surface and subsurface interests of Landowner in the following described lands located in Vernon Parish, Louisiana (the "**Land**") including the Sequestration Formation underlying the Land:

**SEE EXHIBIT "A"**
**ATTACHED HERETO**

This Agreement shall also extend and apply to any interest therein which Landowner may hereinafter acquire, and includes battures, accretions, alluvian, rights of reclamation, roads, highways, rights-of-way and all land, if any, contiguous or adjacent to, or adjoining the Land particularly described herein, including as acquired by acquisitive prescription, whether properly or specifically described or not. Landowner agrees to execute any supplemental instrument requested by Denbury for a more complete or accurate description of said Land.

2. Term. The initial term of this Agreement shall be the Pre-Injection Term. During the Pre-Injection Term, Denbury may terminate the Pre-Injection Term upon thirty (30) days' prior written notice to Landowner (upon which termination this Agreement shall immediately enter the Sequestration Term). This Agreement shall enter the Injection Term on the date that Denbury commences injection (as determined by Denbury in its reasonable discretion) of Carbon Dioxide. Denbury may terminate the Injection Term upon thirty (30) days prior written notice to Landowner and Denbury shall be under no further obligation to make any Annual Injection Payments (upon which termination this Agreement shall immediately enter the Sequestration Term); *provided* that, Denbury shall remain liable to Landowner for any Annual Injection Payments with respect to the period before the effective date of such termination. This Agreement shall enter the Sequestration Term on the date of the termination or expiration of the Pre-Injection Term or the Injection Term, as applicable.



Landowner:_____

EXHIBIT
tabbies
LO-42
30869-30880

3. Denbury's Operations. Denbury will conduct all operations in, on, above, or under the Land for the Purposes as a reasonably prudent operator, in a good and workmanlike manner, and in compliance with all Applicable Laws.

4. Establishment of Sequestration Unit(s). The Parties agree that Denbury may, in its sole discretion, and from time-to-time during the Term, pool or unitize this Agreement and the Land or the Sequestration Formation with others (whether or not such agreements contain similar provisions) or other lands (including where rights are acquired by eminent domain), whether owned by Landowner or by third parties, to form one or more sequestration units and, at the option (and in the sole discretion) of Denbury, to file a designation of any such unit in the official public records of Vernon Parish, Louisiana, or request the Louisiana Office of Conservation or other applicable governmental authority to form one or more sequestration units with other lands. Denbury's determination of the geographic boundaries of a sequestration unit shall be final and conclusive for all purposes under this Agreement, including for purposes of calculating Injection Payments in Schedule 1.

5. Payments To Landowner. In consideration of the rights granted hereunder, Denbury will pay Landowner the amounts set forth in Schedule 1 attached hereto. Schedule 1 will not be recorded without the specific prior written consent of both Landowner and Denbury, which consent may be granted or withheld in each Party's sole discretion.

6. Landowner's Retained Rights. In consideration of the rights granted hereunder, the Landowner retains the rights described in Schedule 2 attached hereto.

7. Liens and Title. Denbury, may, at its option, pay, discharge and/or redeem any mortgage, overdue tax, or other lien or encumbrance on the Land in the event of default in payment by Landowner, and shall be subrogated to the rights of the holder thereof or reimbursed by Landowner for any payments thereafter accruing hereunder. Denbury may acquire for its own benefit, deeds, agreements, or assignments covering any interest or claim in the Land which Denbury or any other party contends is outstanding and not covered hereby and even though such outstanding interest or claim be invalid or adverse to Landowner.

8. Termination. Denbury may fully terminate the Pre-Injection Term or the Injection Term at any time by giving Landowner thirty (30) days' written notice as described in Section 2 above. In addition, Denbury may partially terminate this Agreement at any time and from time to time execute and deliver to Landowner or file for recordation a release or releases of this Agreement as to any part or all of the Land or of any portion of the Sequestration Formation thereunder. In the event Denbury fully or partially terminates this Agreement, Denbury will remain responsible for any accrued obligations relative to such released acreage, the Parties' respective rights and obligations hereunder will remain in full force and effect as to any right, title and interest of Denbury not so terminated, and all Carbon Dioxide injected by or on behalf of Denbury into the Sequestration Formation will remain permanently sequestered in the subsurface of the Land.

9. Force Majeure. Denbury will not be liable for, and this Agreement will not terminate due to, delays in performance or for non-performance due to unforeseen circumstances or causes beyond the reasonable control of Denbury, including, without limitation, strikes, work stoppages, acts of war or terrorism, civil or military disturbances, fire, flood, earthquake, storm, hurricane, natural or nuclear catastrophes, acts of God, loss or malfunction of utilities, material travel restrictions or limitations, governmental actions, orders, or recommendations, health epidemics or pandemics, the lack of availability of any required equipment and/or personnel (such as the specific type of rig or specific type of casing or drill pipe), the orders of any court, regulatory body or Governmental Authority having jurisdiction, the delay in obtaining necessary orders or permits from any court, regulatory body or Governmental Authority having jurisdiction (including a UIC Class VI injection well permit necessary for any Well(s)), or any other cause, similar or dissimilar to the foregoing, which could not have been prevented by Denbury with reasonable care. In such event, this Agreement may be extended thereafter, at Denbury's sole option, as if such delay had not occurred.



Landowner:_____

10. Indemnity. Denbury will defend, protect and indemnify, hold harmless and release Landowner from and against each and every claim, demand, action, cause of action, or lawsuit, and any liability, cost, expense, damage or loss (including, without limitation, court costs, reasonable experts' fees and reasonable attorneys' fees), whether arising in equity, at common law, or by statute, or under the law of contracts, torts, or property, of every kind or character (including, without limitation, claims for personal injury or death, real and personal property damage, environmental contamination and other environmental liability) (collectively, "Losses") arising from or in any way related to (i) any operations, activities, use or enjoyment by Denbury or for the benefit of Denbury under this Agreement, (ii) any default or breach of this Agreement by Denbury, and (iii) any non-compliance by Denbury with any federal, state or other governmental or regulatory body's or agency's laws, rules and regulations, either now in effect or hereinafter enacted or promulgated, unless such claims or Losses result from (i) the activities or operations of any mineral lessee of Landowner or any owner of a mineral servitude created after the Effective Date, or (ii) the gross negligence or willful misconduct of Landowner. Denbury's indemnity obligations will survive termination of this Agreement.

11. Memorandum For Recording; Covenant Running With The Land. This Agreement shall not be recorded in the public records of any parish or in any public forum. The terms, conditions, rights and easements contained herein shall be real rights and obligations and covenants running with the Land. The Parties have executed a Memorandum of Carbon Dioxide Sequestration Agreement (the "Memorandum") giving public notice of this Agreement, which Memorandum shall be filed by Denbury in the official public records of Vernon Parish, Louisiana. The Memorandum shall be recorded against the Land, and the terms and conditions contained herein shall bind, inure to the benefit of, and be enforceable by, the Parties hereto and their respective successors and assigns. Landowner agrees to execute any amendments, supplements or additional Memorandum as may be necessary to make this Agreement binding upon third parties.

12. Assignments. The rights and interests of either Party hereto may be assigned from time to time in whole or in part and as to any portion of the Land or the Sequestration Formation. All of the covenants, obligations, and considerations of this Agreement will extend to and be binding upon the Parties hereto, their heirs, successors, assigns, and successive assigns; *provided, however*, that no change by Landowner in the ownership of the Land or assignment of payments due hereunder shall be binding upon Denbury until after Denbury has been furnished with (i) written notice thereof and (ii) either (x) the original recorded instrument of conveyance or (y) a duly certified copy thereof, in each case of (x) and (y), together with like proof of any and all intermediate transfers showing a complete chain of title back to Landowner of the full interest claimed. In the event Landowner sells, conveys or otherwise transfers the Land, any undivided interest therein or any portion thereof, Landowner agrees that any such sale, conveyance or transfer shall be made expressly subject to this Agreement and to require the purchaser, grantee or transferee to assume the obligations under this Agreement to the extent of the interest or portion of the Land acquired. No change or division in the ownership of said Land, or any part thereof, howsoever effected, will increase the obligations or diminish the rights of Denbury under this Agreement.

13. Notice and Cure Rights. In the event Landowner considers that Denbury has failed to perform any of the material covenants or obligations imposed on it pursuant to this Agreement, then Landowner may, at its option, cause a written notice to be served on Denbury, setting out specifically in what respects Denbury has failed to perform. Denbury shall have sixty (60) days after its receipt of such notice in which to cure the alleged failure or to commence corrective activities if the same cannot be completed within the sixty-day (60) period, and thereafter diligently pursue such cure to completion.

The service of said notice shall be precedent to the bringing of any action by Landowner for any cause, and no such action shall be brought until the lapse of sixty (60) days after service of such notice on Denbury. If following the lapse of sixty (60) days after service of such notice on Denbury, Denbury has still failed to cure the alleged failure, then Landowner may seek to impose liability or a remedy on Denbury under applicable law whether in equity or otherwise, but this Agreement shall not be subject to cancellation for any such cause. Neither the service of said notice nor the doing of any acts by Denbury aimed to meet all or any of the alleged failures shall be deemed an admission or presumption that Denbury has failed to perform all its obligations hereunder.



Landowner:_____

14. Further Cooperation. Landowner and Denbury will execute and deliver such further instruments, and will take such other actions as either Party may reasonably request, to accomplish the orderly transfer of the rights to Denbury in the manner contemplated by this Agreement, including, without limitation, approvals, permits and other documentation required by governmental entities which may have jurisdiction under Applicable Law.

15. Governing Law; Jurisdiction and Venue. This Agreement will be governed by and construed and enforced in accordance with the laws of the State of Louisiana, regardless of the conflict of laws, principles or the residence, location, domicile or place of business of any party or its constituent principals. The exclusive venue for any dispute arising out of or in connection with this Agreement including, without limitation, the validity, interpretation, and performance of this Agreement, will be the state and federal courts in Lafayette Parish, Louisiana and if necessary, the corresponding appellate courts.

[*Remainder of page intentionally blank; Signature pages follow*]



**Landowner:**_____

**IN WITNESS WHEREOF**, the Parties have executed this Agreement as of the date set forth in their respective acknowledgment blocks but effective as of the Effective Date.

**WITNESSES**:

_____
Name: _____

_____
Name: _____

**LANDOWNER**:

_____

By: _____
Name: _____
Title: _____

SUBSCRIBING WITNESS ACKNOWLEDGMENT

STATE OF _____
PARISH/COUNTY OF _____

Before me, the undersigned Notary Public, on this day personally appeared _____, who being by me duly sworn, stated under oath that he/she was one of the subscribing witnesses to the foregoing instrument and that the same was signed by _____ (Landowner, as above mentioned) in his/her presence and in the presence of the other subscribing witness(es).

_____
Printed Name: _____

SWORN TO AND SUBSCRIBED BEFORE ME this _____ day of _____, 2023.

_____
Notary Public, State of _____
Printed Name: _____
My Commission Expires: _____
Notary ID No. _____

ACKNOWLEDGMENT FOR INDIVIDUAL

STATE OF _____
PARISH/COUNTY OF _____

I, the undersigned Notary Public in and for said Parish/County, in said State, hereby certify that _____, whose name is signed to the foregoing instrument, and who is known to me, acknowledged before me on this day that, being informed of the contents of the instrument, he/she executed the same voluntarily on the day the same bears date.

Given under my hand and official seal, this _____ day of _____, 2023.

_____
Notary Public, State of _____
Printed Name: _____
My Commission Expires: _____
Notary ID No. _____

## ACKNOWLEDGMENT FOR CORPORATION

STATE OF _____
PARISH/COUNTY OF _____

I, the undersigned Notary Public in and for said Parish/County, in said State, hereby certify that _____, whose name as _____ of the _____, a corporation, is signed to the foregoing instrument and who is known to me, acknowledged before me on this day that, being informed of the contents of the instrument, she/he, as such officer and with full authority, executed the same voluntarily for and as the act of said corporation.

Given under my hand and official seal, this _____ day of _____, 2023.

_____
Notary Public, State of _____
Printed Name: _____
My Commission Expires: _____
Notary ID No. _____

## ACKNOWLEDGMENT FOR OFFICIAL OR OTHER PERSON IN REPRESENTATIVE CAPACITY

STATE OF _____
PARISH/COUNTY OF _____

I, the undersigned Notary Public in and for said Parish/County, in said State, hereby certify that _____, whose name as _____ is signed to the foregoing instrument and who is known to me, acknowledged before me on this day that, being informed of the contents of the instrument, she/he, in such capacity as such _____, executed the same voluntarily on the day the same bears date.

Given under my hand and official seal, this _____ day of _____, 2023.

_____
Notary Public, State of _____
Printed Name: _____
My Commission Expires: _____
Notary ID No. _____

## ACKNOWLEDGMENT FOR CORPORATION, IN REPRESENTATIVE CAPACITY

STATE OF _____
PARISH/COUNTY OF _____

I, _____, a Notary Public, in and for said Parish/County, in said State, hereby certify that _____ whose name as _____ of _____, a corporation, is signed to the foregoing instrument and who is known to me, acknowledged before me on this day, that being informed of the contents of said instrument, she/he, as such officer, and with full authority, executed the same voluntarily for and as the act of said corporation, acting in its capacity as _____ aforesaid.

Given under my hand and official seal, this _____ day of _____, 2023.

_____
Notary Public, State of _____
Printed Name: _____
My Commission Expires: _____
Notary ID No. _____

## ACKNOWLEDGMENT FOR LIMITED LIABILITY COMPANY

STATE OF _____
PARISH/COUNTY OF _____

I, the undersigned Notary Public in and for said Parish/County, in said State, hereby certify that _____, whose name as _____ of the _____, a limited liability company, is signed to the foregoing instrument and who is known to me, acknowledged before me on this day that, being informed of the contents of the instrument, she/he, as such _____ and with full authority, executed the same voluntarily for and as the act of said limited liability company.

Given under my hand and official seal, this _____ day of _____, 2023.

_____
Notary Public, State of _____
Printed Name: _____
My Commission Expires: _____
Notary ID No. _____



Landowner:_____

**WITNESSES**:

_____
Name: _____

_____
Name: _____

**DENBURY**:
**DENBURY CARBON SOLUTIONS, LLC**

By: _____
Name: _____
Title: _____

STATE OF TEXAS
COUNTY OF COLLINS

I, the undersigned Notary Public in and for said County, in said State, hereby certify that _____ of Denbury Carbon Solutions, LLC, a Delaware limited liability company, is signed to the foregoing instrument and who is known to me, acknowledged before me on this day, that being informed of the contents of the instrument, he/she, in such capacity as _____ and with full authority, executed the same voluntarily for and as the act of said limited liability company on the day the same bears date.

Given under my hand and official seal, this _____ day of _____, 2023.

_____
Notary Public, State of _____
Printed Name: _____
My Commission Expires: _____
Notary ID No. _____

Exhibit "A" – Land Description

Schedule 1 – Payments to Landowner

Schedule 2 – Landowner's Retained Rights in the Land

Schedule 3 – Definitions



Landowner:_____

**Exhibit "A"**
**To that certain Carbon Dioxide Sequestration Agreement**
**by and between Landowner, _____,**
**and DENBURY CARBON SOLUTIONS, LLC,**
**dated effective _____, 20__**

**LAND**

**[Insert description]**

**SEQUESTRATION FORMATION**

All formations between the base of the Frio Formation and the base of the Midway Group, defined herein as that stratigraphic interval or its correlative equivalent lying between 4,620 feet and 13,160 feet, as shown on the electric log from the Yuma Exploration & Production Crosby 14 No. 1 Well (API 17115202290000), located in Section 14, T2S-R7W in Vernon Parish, LA.

**Schedule 1**
**To that certain Carbon Dioxide Sequestration Agreement**
**by and between Landowner, _____,**
**and DENBURY CARBON SOLUTIONS, LLC,**
**dated effective _____, 20__**

## PAYMENTS TO LANDOWNER

1. BONUS PAYMENT. Denbury will pay Landowner the amount of $_____ as lump sum bonus consideration for this Agreement and all rights, and options hereunder. Accordingly, Landowner accepts the total amount of $_____ as lump sum bonus consideration for this Agreement and all rights, and options hereunder.

2. PAID-UP AGREEMENT. This is a paid-up agreement. In consideration of the bonus payment described in Paragraph 1 of this Schedule 1, Landowner agrees that Denbury will not be obligated, except as otherwise provided herein, to commence or continue any operations or activities related to the Purposes or make any payments to Landowner during the Initial Pre-Injection Term, other than any applicable Property Damage Payments.

3. OPTION TO EXTEND PRE-INJECTION TERM. Prior to the expiration of the Initial Pre-Injection Term of this Agreement, Denbury has the option to extend the Pre-Injection Term of this Agreement for the Extended Pre-Injection Term as to all or any part of the Land then covered hereby, by written notification of exercise of the option and by making payment to Landowner or to the credit of Landowner or such successor in interest in any depository bank named herein or in any amendatory instrument in the amount of **$300** for each acre as to which this Agreement is so extended. Subject to any termination or release, the Land shall be deemed to contain _____ **acres**, whether actually containing more or less. If this option is exercised by Denbury, this Agreement shall be extended for the Extended Pre-Injection Term. In consideration of the extension payment described in this Paragraph 3 of this Schedule 1, Landowner agrees that Denbury will not be obligated to make any payments to Landowner during the Extended Pre-Injection Term, other than any applicable Property Damage Payments.

4. INJECTION TERM PAYMENTS. On or before January 31st of each calendar year during the Injection Term and on January 31st of the calendar year following the termination or expiration of the Injection Term, Denbury will pay Landowner an annual payment (each an "**Annual Injection Payment**" and, collectively, the "**Annual Injection Payments**") equal to (i) the Injection Fee, *multiplied by* (ii) Landowner's pro rata share of Carbon Dioxide (in metric tons) injected during the immediately preceding calendar year. The Annual Injection Payment will be reduced proportionately as described in Paragraph 9 of this Schedule 1.

5. SEQUESTRATION TERM PAYMENTS. Landowner agrees that Denbury will not be obligated to make any payments to Landowner during the Sequestration Term, other than any applicable Property Damage Payments.

6. PROPERTY DAMAGE PAYMENTS. During the Term, Denbury will pay Landowner the following amounts (each a "**Property Damage Payment**" and, collectively, the "**Property Damage Payments**") as full and complete compensation for property damage resulting from Denbury's operations on the Land:

a. Right-of-Way for Pipelines:

One-time payment of $600 per rod and $2,500 per acre for lost timber acreage (if applicable).

b. Surface locations for the Facilities (including, without limitation, Well sites, meter stations and other associated well and/or pipeline equipment):

One-time payment of $2,500 per acre.

c. Well Site Access Roads (new roads constructed by Denbury on the Land):

One-time payment of $3.00 per linear foot and $2,500 per acre for lost timber acreage (if applicable).

7. PAYMENT/DEPOSITORY BANK. Each payment or tender made hereunder will be made to Landowner at Landowner's address or may be deposited to Landowner's credit in the N/A Bank at N/A, or its successors, which will continue as the depositories, regardless of changes in the ownership of the Land.

8. DAMAGE RELEASE. Denbury's delivery to Landowner of any Property Damage Payment under Paragraph 6 of this Schedule 1, will constitute full and complete compensation to Landowner of all use and damage claims related to any such right-of-way, well site, road or Facility for which such payment is delivered. Further, at Denbury's request, Landowner will execute and deliver a damage release, servitude and right of way Agreement in a form satisfactory to Denbury. Such settlement of damages will be binding upon all persons or entities currently having or in the future acquiring any right, title or interest in and to the surface of the Land by or through Landowner. Landowner will hold Denbury harmless from and against any and all claims of its tenant(s) for damages to the surface of the Land.

9. PROPORTIONATE REDUCTION.

a. In the event that Landowner owns less than full ownership in the Land (i.e., surface or fee ownership), the validity of this Agreement shall not be affected; rather, the payments provided herein (except for the bonus payment described in Paragraph 1 of this Schedule 1) shall be reduced or adjusted in proportion to Landowner's undivided interest in the Land.

b. In the event that all or any portion of the Land is pooled and/or unitized to form a sequestration unit, then the Injection Payments described in Paragraph 4 of this Schedule 1 shall (in addition to any proportionate reduction under Paragraph 9.a of this Schedule 1) be paid to Landowner only in the proportion to which the gross acreage covered by the Land bears to the total gross acreage covered by the whole sequestration unit; *provided* that in the event the Louisiana Office of Conservation or other applicable governmental authority forming a sequestration unit, allocates participation on a basis other than solely surface acreage, the proportionate reduction under this paragraph shall be based on the allocation for the Land included in the sequestration unit under the allocation method utilized versus the total unit allocation (i.e., 100%).

c. Denbury shall have the right, but not the obligation, to cause a current survey of the Land to be prepared at its own cost or conduct title research for the Land at its sole cost. In the event that it is determined that there are any inaccuracies in or changes required to the legal description of the Land, upon Denbury's request, Landowner and Denbury will amend the legal description of the Land and the acreage amount under Paragraph 3 of this Schedule 1 to reflect the accurate legal description. Thereafter, the amended legal description shall control as the definition of the Land for all purposes under this Agreement.

10. LANDOWNER SUBSEQUENT TRANSFERS. If the Land shall hereafter be owned in severalty or in separate tracts, the Land may nevertheless be developed and operated as an entirety, and the payments hereunder shall be paid to each separate owner in the proportion that the acreage owned by each such owner bears to all of the Land.

**Schedule 2**
**To that certain Carbon Dioxide Sequestration Agreement**
**by and between Landowner, _____,**
**and DENBURY CARBON SOLUTIONS, LLC,**
**dated effective _____, 20__**

## LANDOWNER'S RETAINED RIGHTS IN THE LAND

1. Retained Surface and Subsurface Rights. Subject to any limitations specifically set forth herein, all other rights not expressly granted by this Agreement are hereby reserved to Landowner. Except as otherwise provided in this Agreement and the attached Schedules, Landowner reserves the right to use and occupy the surface and subsurface of the Land for any purpose other than for the rights and privileges granted to Denbury herein; *provided, however*, Landowner's use of the surface and subsurface of the Land shall not interfere with Denbury's operations. Further, Landowner agrees it will not grant rights, engage in or otherwise permit activities, that could result in the breach, penetration or compromise of the Facilities or injected Carbon Dioxide or that would unreasonably interfere with Denbury's rights.

2. Exploration of Oil and Gas. Landowner retains the right to develop the oil, gas and other minerals and like hydrocarbons (excluding sequestered Carbon Dioxide) underlying the Land above or below (but not within) the Sequestration Formation, including the right to penetrate and drill through the Sequestration Formation, provided that the foregoing rights are to be exercised (i) in accordance with Applicable Laws, (ii) so as not to unreasonably interfere with, and with due regard for, the operations conducted by Denbury in accordance with this Agreement, and (iii) in compliance with all necessary well design requirements under any applicable permit of Denbury or its affiliates applicable to Denbury's operations under this Agreement, including any Class VI well permit. Further, Landowner and any future owner of a mineral servitude or mineral lease shall reasonably cooperate with Denbury on well design for any such wells proposed to be drilled above or below or through the Sequestration Formation and provide information reasonably requested by Denbury regarding such well design. In the event there is an existing mineral servitude and/or mineral lease on the Land, Denbury and Landowner agree to work cooperatively together to ensure that Landowner or mineral servitude owner can benefit from the exploitation of the minerals under the Land and to ensure that Denbury can undertake operations under this Agreement with reasonable certainty that the exploitation of the minerals will not interfere with Denbury's rights under this Agreement. Any new mineral servitude, lease, renewal and or extension of existing servitudes, leases, options to agree or any other agreement made by Landowner or a future mineral servitude owner with a third party regarding the Land (including any of the foregoing related to water, oil, gas or other minerals) shall contain language that states that such third party shall not disturb or interfere with Denbury's rights hereunder and will agree to comply with the provisions of this paragraph.

3. Ownership of Facilities, Improvements and Equipment. Notwithstanding anything to the contrary in this Agreement or this Schedule 2, Landowner shall have no ownership interest in Denbury's Facilities, Denbury's Improvements and Equipment installed in, on or under the Land, or any profits, credits (e.g. renewable, environmental or tax) derived therefrom, and Denbury may remove any or all such Facilities, Improvements and Equipment at any time.



Landowner:_____

**Schedule 3**
**To that certain Carbon Dioxide Sequestration Agreement**
**by and between Landowner, _____,**
**and DENBURY CARBON SOLUTIONS, LLC,**
**dated effective _____, 20__**

## DEFINITIONS

Each of the terms below are defined and incorporated into this Agreement and any attached Schedules:

"**Agreement**" is defined in the preamble of this Agreement.

"**Applicable Law(s)**" means any applicable, valid, final, and non-appealable federal or Louisiana statute, law, rule, regulation, or order, or any judicial decision, as may now be in effect or which may be enacted, adopted, or made effective at a future date.

"**Annual Injection Payment**" and "**Annual Injection Payments**" are defined in Schedule 1.

"**Carbon Dioxide**" means carbon dioxide (regardless of its source) including its derivatives, associated gases, substances and vapors, and all mixtures, combinations and phases, whether liquid or gaseous, stripped, segregated, or divided from any other streams thereof.

"**Denbury**" is defined in the preamble of this Agreement.

"**Effective Date**" is defined in the preamble of this Agreement.

"**Equipment**" is defined within the definition of the term Purposes.

"**Extended Pre-Injection Term**" means the extended initial term of this Agreement which, if exercised by Denbury in accordance with Paragraph 3 of Schedule 1, commences on the fifth anniversary of the Effective Date and continues until the earlier of (i) the seventh anniversary of the Effective Date, or (ii) the date that Denbury commences injection (as determined by Denbury in its reasonable discretion) of Carbon Dioxide.

"**Facilities**" is defined within the definition of the term Purposes.

"**Improvements and Equipment**" means all wells, pads, fixtures, trade fixtures, equipment, machinery, and tools, including all Pipelines, pipe, pipe casing, separators, condensers, evaporators, holding tanks, generators, monitoring, sampling, compression, pumping and testing facilities, devices or equipment, power lines, telephone lines, electrical lines and transmitters, towers, platforms, and any other surface or subsurface structures or downhole equipment, and all alterations, additions, constructions, buildings or other improvements, and all materials, parts and components thereof, made, placed, or installed in, on the surface of or underneath the Land by or on behalf of Denbury.

"**Initial Pre-Injection Term**" means the initial term of this Agreement which commences on the Effective Date and continues until the earlier of (i) the fifth anniversary of the Effective Date, or (ii) the date that Denbury commences injection (as determined by Denbury in its reasonable discretion) of Carbon Dioxide.

"**Injection Fee**" means the sum of $1.75 per metric ton.

"**Injection Term**" means that period of time from the date Denbury commences injection of Carbon Dioxide and continuing until Denbury terminates the Injection Term by ceasing operations related to the injection of Carbon Dioxide for the Purposes specified herein for a period of two (2) consecutive calendar years.

"**Land**" is defined in Section 1 of this Agreement.

"**Landowner**" is defined in the preamble of this Agreement.

"**Losses**" is defined in Section 10 of this Agreement.

"**Party**" and "**Parties**" are defined in the preamble of this Agreement.

"**Pipelines**" is defined within the definition of the term Purposes.

"**Pre-Injection Term**" means the Initial Pre-Injection Term and the Extended Pre-Injection Term (if exercised by Denbury in accordance with Paragraph 3 of Schedule 1), collectively.

"**Property Damage Payment**" and "**Property Damage Payments**" are defined in Schedule 1.

"**Purposes**" shall mean the purposes of (i) developing, maintaining, and operating a Carbon Dioxide injection, disposal, and sequestration project in the Sequestration Formation, including, without limitation, the drilling of wells located on the Land (or re-establishing, reopening, reconditioning, plugging, or replugging, any existing non-commercial wells located thereon) (collectively, the "**Wells**") and the construction and/or placement of facilities, roads, fixtures, structures, equipment and appurtenances related to the injection, pumping, sequestration, testing, monitoring, reporting and verifying the sequestration of Carbon Dioxide from any source, (ii) operating the Wells and the Facilities (as defined below), (iii) drilling, completing, and equipping the Wells as disposal wells or monitoring wells for the injection, disposal, and permanent sequestration of Carbon Dioxide in the Sequestration Formation or the monitoring thereof, (iv) transporting, injecting, disposing of, and permanently sequestering into the Wells, Carbon Dioxide that Denbury transports across the Land to the Wells (including, without limitation, from sources other than the Land), (v) laying and maintaining pipelines on or below the surface of the Land (collectively, the **Pipelines**), (vi) constructing, repairing, maintaining, altering, operating, and removing Carbon Dioxide injection stations, monitoring equipment, and other structures and equipment on the Land necessary or convenient in connection with the transportation, drilling, injection, disposal, and permanent sequestration of Carbon Dioxide in the Sequestration Formation (collectively, the "**Equipment**"; the Equipment, the Wells and the Pipelines, collectively, the "**Facilities**"), (vii) conducting geological and geophysical surveys to determine the suitability and performance of the area for the sequestration of Carbon Dioxide and to monitor operations in connection with the sequestration of Carbon Dioxide; (viii) performing tests, studies, and environmental assessments related to permitting, Carbon Dioxide sequestration and Carbon Dioxide sequestration operations; (ix) placing, constructing, using and maintaining roads, power lines, transmission lines, fiber optic, communication and other utility lines, together with all valves, valve boxes, connections, meter stations, appurtenances and/or Equipment to be attached to or installed in connection with or as a part of the Facilities; (x) drilling wells on the Land for the production or injection of water as necessary or useful for Carbon Dioxide sequestration operations; (xi) transporting through the Pipelines, Carbon Dioxide, water, and other fluids as necessary or useful for its operations; (xii) injecting water into, or removing, transporting or disposing of produced water from, the Sequestration Formation as necessary or useful for Carbon Dioxide sequestration operations; (xiii) re-entering and using plugged and abandoned (or simply abandoned) well bores, casing, tubing and other facilities on the Land; and (xiv) at Denbury's sole discretion, plugging abandoned well bores, casing or tubing that has the potential to cause releases from the Sequestration Formation.

"**Sequestration Formation**" means all formations between the base of the Frio Formation and the base of the Midway Group, defined herein as that stratigraphic interval or its correlative equivalent lying between 4,620 feet and 13,160 feet, as shown on the electric log from the Yuma Exploration & Production Crosby 14 No. 1 Well (API 17115202290000), located in Section 14, T2S-R7W in Vernon Parish, LA.

"**Sequestration Term**" means that period of time commencing on the termination or expiration of the Pre-Injection Term or the Injection Term, as applicable, and continuing for so long thereafter as is reasonably necessary for Denbury to monitor the Carbon Dioxide sequestered in the Land to the extent required by this Agreement and Applicable Law(s) and the establishment of monitoring equipment and protocols, and for taking any other action, all in compliance with Applicable Law(s), applicable regulations and industry standards to ensure the continued, safe sequestration of Carbon Dioxide in the Facilities and the Sequestration Formation.

"**Term**" means the Pre-Injection Term, the Injection Term and the Sequestration Term, collectively.

"**Wells**" is defined within the definition of the term Purposes.

COPY

**STATE OF LOUISIANA**
**PARISH OF VERNON**

**MEMORANDUM OF CARBON DIOXIDE SEQUESTRATION AGREEMENT**

THIS MEMORANDUM OF CARBON DIOXIDE SEQUESTRATION AGREEMENT (this "**Memorandum**") is executed on this ____ day of _____, 2023, to be effective as of _____, 2023 (the "**Effective Date**"), by and between _____, whose address is _____ (the foregoing, and sometimes collectively, referred to herein as "**Landowner**"), and **DENBURY CARBON SOLUTIONS, LLC**, a Delaware limited liability company (sometimes referred to herein as "**Denbury**"), whose address is 5851 Legacy Circle, Suite 1200, Plano, Texas 75024. Landowner and Denbury may be referred to in this Memorandum, individually, as a "**Party**" and, together, as the "**Parties**".

WHEREAS, the Parties entered into that certain Carbon Dioxide Sequestration Agreement dated effective as of the Effective Date (the "**Agreement**"); and

WHEREAS, the Parties now desire to record this Memorandum in the Conveyance Records of Vernon Parish, Louisiana, in order to memorialize certain material terms in the Agreement and to put third-parties on notice of the existence of the Agreement and of the material terms of the Agreement memorialized herein.

NOW THEREFORE, in consideration of Ten Dollars, the mutual covenants and agreements contained herein and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Parties agree as follows:

1. Capitalized terms used, but not defined, in this Memorandum have the meanings as defined in the Agreement.

2. Subject to the other provisions of the Agreement, Landowner by the Agreement did convey, grant, demise and deliver exclusively unto Denbury a personal servitude in the nature of a right of use in and to the surface and subsurface of the land located in Vernon Parish, Louisiana, more particularly described in **Exhibit "A"** attached hereto and made a part hereof by reference (the "**Land**") including the Sequestration Formation (as defined on **Exhibit "A"**) underlying the Land, as follows: (a) the right to, subject to the terms and provisions of the Agreement, use the surface and subsurface of the Land, including, without limitation, the Sequestration Formation, for the Purposes, together with (b) the right for ingress and egress to, from and across the Land, to access the Facilities, in each case, as may be reasonably necessary for permitting, installing, operating, maintaining, monitoring, and removing any Facilities and electric and other utility lines for the Purposes. Landowner further grants unto Denbury, insofar as the same are owned or controlled by Landowner, any and all rights reasonably necessary for the Purposes, (it being understood that the rights and privileges granted in the Agreement are not sole and exclusive to Denbury to the extent unrelated to or not used for the Purposes). The "**Purposes**" shall mean the purposes of (i) developing, maintaining, and operating a Carbon Dioxide injection, disposal, and sequestration project in the Sequestration Formation, including, without limitation, the drilling of wells located on the Land (or re-establishing, reopening, reconditioning, plugging, or replugging, any existing non-commercial wells located thereon) (collectively, the "**Wells**") and the construction and/or placement of facilities, roads, fixtures, structures, equipment and appurtenances related to the injection, pumping, sequestration, testing, monitoring, reporting and verifying the sequestration of Carbon Dioxide from any source, (ii) operating the Wells and the Facilities (as defined below), (iii) drilling, completing, and equipping the Wells as disposal wells or monitoring wells for the injection, disposal, and permanent sequestration of Carbon Dioxide in the Sequestration Formation or the monitoring thereof, (iv) transporting, injecting, disposing of, and permanently sequestering into the Wells, Carbon Dioxide that Denbury transports across the Land to the Wells (including, without



Landowner:_____

limitation, from sources other than the Land), (v) laying and maintaining pipelines on or below the surface of the Land (collectively, the "**Pipelines**"), (vi) constructing, repairing, maintaining, altering, operating, and removing Carbon Dioxide injection stations, monitoring equipment, and other structures and equipment on the Land necessary or convenient in connection with the transportation, drilling, injection, disposal, and permanent sequestration of Carbon Dioxide in the Sequestration Formation (collectively, the "**Equipment**"; the Equipment, the Wells and the Pipelines, collectively, the "**Facilities**"), (vii) conducting geological and geophysical surveys to determine the suitability and performance of the area for the sequestration of Carbon Dioxide and to monitor operations in connection with the sequestration of Carbon Dioxide; (viii) performing tests, studies, and environmental assessments related to permitting, Carbon Dioxide sequestration and Carbon Dioxide sequestration operations; (ix) placing, constructing, using and maintaining roads, power lines, transmission lines, fiber optic, communication and other utility lines, together with all valves, valve boxes, connections, meter stations, appurtenances and/or Equipment to be attached to or installed in connection with or as a part of the Facilities; (x) drilling wells on the Land for the production or injection of water as necessary or useful for Carbon Dioxide sequestration operations; (xi) transporting through the Pipelines, Carbon Dioxide, water, and other fluids as necessary or useful for its operations; (xii) injecting water into, or removing, transporting or disposing of produced water from, the Sequestration Formation as necessary or useful for Carbon Dioxide sequestration operations; (xiii) re-entering and using plugged and abandoned (or simply abandoned) well bores, casing, tubing and other facilities on the Land; and (xiv) at Denbury's sole discretion, plugging abandoned well bores, casing or tubing that has the potential to cause releases from the Sequestration Formation.

3. The initial term of the Agreement shall be the Pre-Injection Term. During the Pre-Injection Term, Denbury may terminate the Pre-Injection Term upon thirty (30) days' prior written notice to Landowner (upon which termination the Agreement shall immediately enter the Sequestration Term). The Agreement shall enter the Injection Term on the date that Denbury commences injection (as determined by Denbury in its reasonable discretion) of Carbon Dioxide. Denbury may terminate the Injection Term upon thirty (30) days prior written notice to Landowner (upon which termination the Agreement shall immediately enter the Sequestration Term). The Agreement shall enter the Sequestration Term on the date of the termination or expiration of the Pre-Injection Term or the Injection Term, as applicable.

4. The "**Pre-Injection Term**" means the Initial Pre-Injection Term and the Extended Pre-Injection Term, collectively. The "**Initial Pre-Injection Term**" means the initial term of the Agreement which commences on the Effective Date and continues until the earlier of (i) the fifth anniversary of the Effective Date, or (ii) the date that Denbury commences injection (as determined by Denbury in its reasonable discretion) of Carbon Dioxide. The "**Extended Pre-Injection Term**" means the extended initial term of the Agreement which, if exercised by Denbury, commences on the fifth anniversary of the Effective Date and continues until the earlier of (i) the seventh anniversary of the Effective Date, or (ii) the date that Denbury commences injection (as determined by Denbury in its reasonable discretion) of Carbon Dioxide.

5. The "**Injection Term**" means that period of time from the date Denbury commences injection of Carbon Dioxide and continuing until Denbury terminates the Injection Term by ceasing operations related to the injection of Carbon Dioxide for the Purposes specified in the Agreement for a period of two (2) consecutive calendar years.

6. The "**Sequestration Term**" means that period of time commencing on the termination or expiration of the Pre-Injection Term or the Injection Term, as applicable, and continuing for so long thereafter as is reasonably necessary for Denbury to monitor the Carbon Dioxide sequestered in the Land to the extent required by the Agreement and Applicable Law(s) and the establishment of monitoring equipment and protocols, and for taking any other action, all in compliance with Applicable Law(s), applicable regulations and industry standards to ensure the continued, safe sequestration of Carbon Dioxide in the Facilities and the Sequestration Formation.

7. Denbury may fully terminate the Pre-Injection Term or the Injection Term at any time by giving Landowner thirty (30) days' written notice. In addition, Denbury may partially terminate the Agreement at any time and from time to time execute and deliver to Landowner or



Landowner:_____

file for recordation a release or releases of the Agreement as to any part or all of the Land or of any portion of the Sequestration Formation thereunder.

8. Under the Agreement, Landowner retains the right to develop the oil, gas and other minerals and like hydrocarbons (excluding sequestered Carbon Dioxide) underlying the Land above or below (but not within) the Sequestration Formation, including the right to penetrate and drill through the Sequestration Formation, provided that the foregoing rights are exercised (i) in accordance with Applicable Laws, (ii) so as not to unreasonably interfere with, and with due regard for, the operations conducted by Denbury in accordance with the Agreement, and (iii) in compliance with all necessary well design requirements under any applicable permit of Denbury or its affiliates applicable to Denbury's operations under the Agreement, including any Class VI well permit. Further, Landowner and any future owner of a mineral servitude or mineral lease shall reasonably cooperate with Denbury on well design for any such wells proposed to be drilled above or below or through the Sequestration Formation and provide information reasonably requested by Denbury regarding such well design. In the event there is an existing mineral servitude and/or mineral lease agreement on the Land, Denbury and Landowner agree to work cooperatively together to ensure that Landowner or mineral servitude owner can benefit from the exploitation of the minerals under the Land and to ensure that Denbury can undertake operations under the Agreement with reasonable certainty that the exploitation of the minerals will not interfere with Denbury's rights under the Agreement. Any new mineral servitude, lease, renewal and or extension of existing servitudes, leases, options to agree or any other agreement made by Landowner or a future mineral servitude owner with a third party regarding the Land (including any of the foregoing related to water, oil, gas or other minerals) shall contain language that states that such third party shall not disturb or interfere with Denbury's rights and will agree to comply with the provisions of this paragraph.

9. The Parties agreed that Denbury may, in its sole discretion, and from time-to-time during the Term, pool or unitize the Agreement and the Land or the Sequestration Formation with others (whether or not such agreements contain similar provisions) or other lands (including where rights are acquired by eminent domain), whether owned by Landowner or by third parties, to form one or more sequestration units and, at the option (and in the sole discretion) of Denbury, to file a designation of any such unit in the official public records of Vernon Parish, Louisiana, or request the Louisiana Office of Conservation or other applicable governmental authority to form one or more sequestration units with other lands. Denbury's determination of the geographic boundaries of a sequestration unit shall be final and conclusive for all purposes under the Agreement, including for purposes of calculating Injection Payments.

10. The Agreement contains no option, right of first refusal, or other agreement of Landowner to transfer all or part of the Land.

11. This Memorandum is not a complete summary of the Agreement. The provisions of this Memorandum are subject in all respects to the provisions of the Agreement. Nothing in this Memorandum in any way amends or modifies any provisions of the Agreement. In the event of any conflict between the Agreement and this Memorandum, the provisions of the Agreement shall control. Landowner agrees to amend and supplement this Memorandum upon request in the future to the extent necessary to ensure that the Agreement is effective as to third parties.

12. This Memorandum may be executed in any number of counterparts, each of which shall be deemed an original. All counterparts, taken together, constitute one single agreement.

[*Remainder of page intentionally blank; Signature pages follow*]



Landowner: _____

**IN WITNESS WHEREOF**, this Memorandum is executed as of the date first above written.

**WITNESSES**:

_____
Name: _____

_____
Name: _____

**LANDOWNER**:

_____

By: _____
Name: _____
Title: _____

SUBSCRIBING WITNESS ACKNOWLEDGMENT

STATE OF _____
PARISH/COUNTY OF _____

Before me, the undersigned Notary Public, on this day personally appeared _____, who being by me duly sworn, stated under oath that he/she was one of the subscribing witnesses to the foregoing instrument and that the same was signed by _____ (Landowner, as above mentioned) in his/her presence and in the presence of the other subscribing witness(es).

_____
Printed Name: _____

SWORN TO AND SUBSCRIBED BEFORE ME this _____ day of _____, 2023.

_____
Notary Public, State of _____
Printed Name: _____
My Commission Expires: _____
Notary ID No. _____

ACKNOWLEDGMENT FOR INDIVIDUAL

STATE OF _____
PARISH/COUNTY OF _____

I, the undersigned Notary Public in and for said Parish/County, in said State, hereby certify that _____, whose name is signed to the foregoing instrument, and who is known to me, acknowledged before me on this day that, being informed of the contents of the instrument, he/she executed the same voluntarily on the day the same bears date.

Given under my hand and official seal, this _____ day of _____, 2023.

_____
Notary Public, State of _____
Printed Name: _____
My Commission Expires: _____
Notary ID No. _____

## ACKNOWLEDGMENT FOR CORPORATION

STATE OF _____
PARISH/COUNTY OF _____

I, the undersigned Notary Public in and for said Parish/County, in said State, hereby certify that _____, whose name as _____ of the _____, a corporation, is signed to the foregoing instrument and who is known to me, acknowledged before me on this day that, being informed of the contents of the instrument, she/he, as such officer and with full authority, executed the same voluntarily for and as the act of said corporation.

Given under my hand and official seal, this _____ day of _____, 2023.

_____
Notary Public, State of _____
Printed Name: _____
My Commission Expires: _____
Notary ID No. _____

## ACKNOWLEDGMENT FOR OFFICIAL OR OTHER PERSON IN REPRESENTATIVE CAPACITY

STATE OF _____
PARISH/COUNTY OF _____

I, the undersigned Notary Public in and for said Parish/County, in said State, hereby certify that _____, whose name as _____ is signed to the foregoing instrument and who is known to me, acknowledged before me on this day that, being informed of the contents of the instrument, she/he, in such capacity as such _____, executed the same voluntarily on the day the same bears date.

Given under my hand and official seal, this _____ day of _____, 2023.

_____
Notary Public, State of _____
Printed Name: _____
My Commission Expires: _____
Notary ID No. _____

## ACKNOWLEDGMENT FOR CORPORATION, IN REPRESENTATIVE CAPACITY

STATE OF _____
PARISH/COUNTY OF _____

I, _____, a Notary Public, in and for said Parish/County, in said State, hereby certify that _____ whose name as _____ of _____, a corporation, is signed to the foregoing instrument and who is known to me, acknowledged before me on this day, that being informed of the contents of said instrument, she/he, as such officer, and with full authority, executed the same voluntarily for and as the act of said corporation, acting in its capacity as _____ aforesaid.

Given under my hand and official seal, this _____ day of _____, 2023.

_____
Notary Public, State of _____
Printed Name: _____
My Commission Expires: _____
Notary ID No. _____



Landowner:_____

## ACKNOWLEDGMENT FOR LIMITED LIABILITY COMPANY

STATE OF _____
PARISH/COUNTY OF _____

I, the undersigned Notary Public in and for said Parish/County, in said State, hereby certify that _____, whose name as _____ of the _____, a limited liability company, is signed to the foregoing instrument and who is known to me, acknowledged before me on this day that, being informed of the contents of the instrument, she/he, as such _____ and with full authority, executed the same voluntarily for and as the act of said limited liability company.

Given under my hand and official seal, this _____ day of _____, 2023.

_____
Notary Public, State of _____
Printed Name: _____
My Commission Expires: _____
Notary ID No. _____



Landowner:_____

**WITNESSES**:

**DENBURY**:
**DENBURY CARBON SOLUTIONS, LLC**

_____
Name: _____

By: _____
Name: _____
Title: _____

_____
Name: _____

STATE OF TEXAS
COUNTY OF COLLINS

I, the undersigned Notary Public in and for said County, in said State, hereby certify that _____ of Denbury Carbon Solutions, LLC, a Delaware limited liability company, is signed to the foregoing instrument and who is known to me, acknowledged before me on this day, that being informed of the contents of the instrument, he/she, in such capacity as _____ and with full authority, executed the same voluntarily for and as the act of said limited liability company on the day the same bears date.

Given under my hand and official seal, this _____ day of _____, 2023.

_____
Notary Public, State of _____
Printed Name: _____
My Commission Expires: _____
Notary ID No. _____

**Exhibit "A"**
**To that certain Memorandum of Carbon Dioxide Sequestration Agreement**
**by and between Landowner, _____,**
**and DENBURY CARBON SOLUTIONS, LLC,**
**dated effective _____, 20__**

**LAND**

**[Insert description]**

**SEQUESTRATION FORMATION**

All formations between the base of the Frio Formation and the base of the Midway Group, defined herein as that stratigraphic interval or its correlative equivalent lying between 4,620 feet and 13,160 feet, as shown on the electric log from the Yuma Exploration & Production Crosby 14 No. 1 Well (API 17115202290000), located in Section 14, T2S-R7W in Vernon Parish, LA.



Landowner:_____

DocuSign Envelope ID: E8CA33E4-42EC-4325-BC92-14B3F66C6271

NOTICE OF CONFIDENTIALITY RIGHTS: IF YOU ARE A NATURAL PERSON, YOU MAY REMOVE OR STRIKE ANY OF THE FOLLOWING INFORMATION FROM THIS INSTRUMENT BEFORE IT IS FILED FOR RECORD IN THE PUBLIC RECORDS: YOUR SOCIAL SECURITY NUMBER OR YOUR DRIVER'S LICENSE NUMBER.

# MEMORANDUM OF LEASE

| | |
|---|---|
| State: | Texas |
| County: | Jefferson |
| Lessor: | State of Texas<br>General Land Office<br>1700 North Congress Avenue<br>Austin, TX 78701 |
| Lessee: | Bayou Bend CCS LLC |
| Effective Date: | April 1, 2022 |

1. This Memorandum of Lease (this "Memorandum") is entered into effective as of April 1, 2022 (the "Effective Date") by and between the State of Texas, acting by and through the Commissioner of the Texas General Land Office ("Lessor") and Bayou Bend CCS LLC ("Lessee"). Lessor and Lessee are hereinafter sometimes referred to singularly as a "Party" and collectively as the "Parties". Capitalized terms used in this Memorandum but not defined herein have the meaning ascribed to such terms in the Lease (defined below).

2. The Parties hereby acknowledge and give notice that Lessor and Lessee have entered into a Carbon Dioxide Transportation and Storage Lease dated April, 1 (the "Lease"), related to carbon dioxide sequestration operations by Lessee in, on, and under certain the Permanent School Fund lands in Jefferson County, Texas, which lands are more fully described in **Exhibit A** attached hereto (the "Leased Property"). In addition to the lease of the Leased Property to Lessee, Lessor hereby agrees that it will grant to Lessee the necessary easements, ingress and egress rights, rights-of-way, and surface locations over, across, and under certain tracts of land owned by the Permanent School Fund (the "Easement Tracts"), for the construction, installation, maintenance, and operation of pipelines, meters, and related equipment which are necessary for the transportation of CO2 from its source to the Leased Property and the measurement thereof. The Parties hereby agree to amend **Exhibit A** to this Memorandum to reflect any Easement Tracts conveyed by Lessor to Lessee. The Leased Property and the Easement Tracts are, collectively referred to herein and therein as, the "Property".

3. The Lease has been duly executed by Lessor and Lessee, but it has not been filed of record in the County Clerk's office of Jefferson County, Texas. Duplicate originals of the Lease are in possession of the Lessor and Lessee.

4. In the Lease, Lessor grants, leases and lets unto Lessee the exclusive right to geologically store anthropogenic carbon dioxide ("CO2") in a reservoir(s) and pore space in the



INDUSTRIAL COMMISSION
STATE OF NORTH DAKOTA
DATE 6/13/24 CASE NO 30869-880
Introduced By Braaten
Exhibit LO-43
Identified By Stockness/Svenson

EXHIBIT
tabbies
LO-43
30869-30880

Miocene Formation (as such term is defined under the most expansive definition required to ensure certification or classification of the CO2 sequestration as permanent under any protocols, standards, regulations or laws relevant to Lessee and its storage activities conducted pursuant to the Lease , the "Storage Unit"), together with the exclusive right to drill and to construct, maintain, and operate pipelines, flowlines, wells, fixtures, machinery, and any other equipment Lessee deems necessary for the purposes herein and in connection with such geologic storage (such Storage Unit, together with associated pipelines, wells, fixtures, machinery, and equipment, called the "Facility" herein, and the permitting, construction, and operation of the Facility, sometimes called the "Project" herein). It is the intent of Lessor and Lessee that all equipment, pipe, supports, facilities, meters, systems and ancillary items placed or maintained by Lessee on the Property shall be considered part of the Facility and shall be owned and controlled by Lessee except as provided for in the Lease.

5. The Term (as used herein) of the Lease begins on April 1, 2022, and shall consist, collectively, of each of the Development Term, Construction Term, and Operations Term, as well as the accompanying Development Term Extension Period and Construction Term Extension Period (as those terms are defined in the Lease), as well as the closure and monitoring period following the Operations Term.

6. The Lease contains certain payment terms and obligations, as well as specific termination rights exercisable by one or more of the Parties.

7. Section 1.05(a) of the Lease provides, in part, that during the Term, under no circumstance shall any well bore be drilled through the Storage Unit, nor shall the Storage Unit be exposed to communication with any well bore (each of which, a "Drill-Through Restriction"). PRIOR TO CONDUCTING ANY HYDROCARBON DRILLING OR EXTRACTION ACTIVITIES ON OR NEAR THE PROPERTY, A LESSEE OR OPERATOR OF A STATE LEASE OR OPERATING AGREEMENT MUST FORBEAR FROM ANY ACTIVITIES THAT VIOLATE OR POTENTIALLY VIOLATE THE DRILL-THROUGH RESTRICTIONS.

8. Section 1.05(b) of the Lease provides, in part, that as a condition of any future state lease on any part of the Property or the grant of any lease, easement or access rights to the Property, Lessor shall require the lessee or holder of such lease, easement or access rights to expressly indemnify and defend Lessee for all claims for damages or losses (including losses attributable to Carbon Credits previously realized by Lessee which are recaptured or otherwise disallowed) that Lessee may suffer or incur as a result of such party's activities, including such losses or damages, including legal fees, that result from any Leak Event. Such indemnity shall be (A) set forth in a separate written agreement between Lessee and the lessee or holder of such lease, easement or access right, and (B) be backed by adequate financial security (i.e. posting of bonds, letters-of-credit, or other financial assurance) in favor of Lessee and its designees, in each case of (A) and (B), in a form reasonably acceptable to Lessee. PRIOR TO CONDUCTING ANY HYDROCARBON DRILLING OR EXTRACTION ACTIVITIES ON OR NEAR THE PROPERTY, A LESSEE OR OPERATOR OF A STATE LEASE OR OPERATING AGREEMENT SHALL (1) DELIVER A SEPARATE WRITTEN INDEMNITY AGREEMENT TO LESSEE, AND (2) OBTAIN ADEQUATE FINANCIAL SECURITY IN FAVOR OF

DocuSign Envelope ID: E8CA33E4-42EC-4325-BC92-14B3F66C6271

LESSEE AND ITS DESIGNEES, IN EACH CASE OF (1) AND (2), IN SUBSTANCE AND FORM REASONABLY ACCEPTABLE TO LESSEE.

9. The interests of Lessor under the Lease may be freely assigned. The interests of Lessee under the Lease may be assigned on the prior written consent of Lessor (not to be unreasonably withheld, conditioned, delayed, or denied), but not otherwise; provided, however, the interests of Lessee may, upon written notice thereof provided to Lessor, be freely assigned without the prior consent of Lessor to any affiliate (as such term is defined in the Lease) of Lessee that agrees in writing to assume and be bound by the obligations of "Lessee" hereunder (with a copy of such assumption provided to Lessor). Nothing contained in the Lease will be construed as creating a partnership, joint venture, association, trust, mining partnership, or other entity, whether for state law or federal income tax purposes.

10. The Lease contains other terms and provisions not herein set forth but incorporated by reference herein for all purposes. This Memorandum is executed for the purposes of placing all parties dealing with the Property, or with the improvements constructed on said Property, on notice of the existence of the referenced Lease and, where appropriate, its contents. This Memorandum does not modify the Lease. In the event of any conflict between the terms of this Memorandum and the Lease, the Lease shall control.

[SIGNATURE PAGE FOLLOWS]

EXECUTED this ____ day of March, 2022.

Given under my hand and Seal of Office

**LESSOR**

**The State of Texas**

By: DocuSigned by: Mark Havens

Chief Clerk and Deputy Land Commissioner,
Texas General Land Office
On behalf of the Permanent School Fund

**APPROVED:**

Staff: DS

Dir.: DS

OGC: DS

Exec.:

**LESSEE**

**Bayou Bend CCS LLC**

By:
Name: Tim Duncan
Title: President and Chief Executive Office

DocuSign Envelope ID: E8CA33E4-42EC-4325-BC92-14B3F66C6271

STATE OF TEXAS §
§
COUNTY OF HARRIS §

This instrument was acknowledged before me on March 11, 2022, by Tim Duncan, President and Chief Executive Officer of Bayou Bend CCS LLC, a Delaware limited liability company, on behalf of said limited liability company.

JULIE PRATT
My Notary ID # 124482915
Expires December 27, 2024

Julie Pratt
Notary Public, State of Texas

DocuSign Envelope ID: E8CA33E4-42EC-4325-BC92-14B3F66C6271

**EXHIBIT A**
**PROPERTY**

All of Tract 5-S, Gulf of Mexico, Jefferson County, containing approximately 851.08 acres; and
All of Tract 6-S, Gulf of Mexico, Jefferson County, containing approximately 867.07 acres; and
All of Tract 7-S, Gulf of Mexico, Jefferson County, containing approximately 884.92 acres; and
All of Tract 8-S, Gulf of Mexico, Jefferson County, containing approximately 888.69 acres; and
All of Tract 22-S, Gulf of Mexico, Jefferson County, containing approximately 640.16 acres; and
All of Tract 23-S, Gulf of Mexico, Jefferson County, containing approximately 640.05 acres; and
All of Tract 24-S, Gulf of Mexico, Jefferson County, containing approximately 640.12 acres; and
All of Tract 25-S, Gulf of Mexico, Jefferson County, containing approximately 640.20 acres; and
All of Tract 34-S, Gulf of Mexico, Jefferson County, containing approximately 640.14 acres; and
All of Tract 35-S, Gulf of Mexico, Jefferson County, containing approximately 640.31 acres; and
All of Tract 36-S, Gulf of Mexico, Jefferson County, containing approximately 640.11 acres; and
All of Tract 37-S, Gulf of Mexico, Jefferson County, containing approximately 640.14 acres; and
All of Tract 38-S, Gulf of Mexico, Jefferson County, containing approximately 640.12 acres; and
All of Tract 39-S, Gulf of Mexico, Jefferson County, containing approximately 640.15 acres; and
W/2 of Tract 2-L, Gulf of Mexico, Jefferson County, containing approximately 2,881.33 acres; and
All of Tract 3-L, Gulf of Mexico, Jefferson County, containing approximately 5,761.42 acres; and
All of Tract 4-L, Gulf of Mexico, Jefferson County, containing approximately 5,761.59 acres; and
E/2 of Tract 5-L, Gulf of Mexico, Jefferson County, containing approximately 2,880.66 acres; and
E/2 of Tract 10-L, Gulf of Mexico, Jefferson County, containing approximately 2,880.45 acres; and
W/2 and N/2 NE/4 of Tract 11-L, Gulf of Mexico, Jefferson County, containing approximately 3,601.11 acres; and
N/2 NW/4 and NE/4 of Tract 12-L, Gulf of Mexico, Jefferson County, containing approximately 2,160.62 acres; and
W/2 of Tract 13-L, Gulf of Mexico, Jefferson County, containing approximately 2,880.74 acres; and
N/2 NE/4 and N/348.6 of S/2 of NE/4 of Tract 21-L, north of Three Marine League line, Gulf of Mexico, Jefferson County, containing approximately 1,068.92 acres; and
N/2 NW/4 and N/374.14 of S/2 of NW/4 of Tract 20-L, north of Three Marine League line, Gulf of Mexico, Jefferson County, containing approximately 1,094.24 acres.

DocuSign

## Certificate Of Completion

Envelope Id: E8CA33E442EC4325BC9214B3F66C6271
Subject: Memorandum of Lease- Talos_GLO.pdf
Source Envelope:
Document Pages: 6
Certificate Pages: 2
AutoNav: Enabled
EnvelopeId Stamping: Enabled
Time Zone: (UTC-06:00) Central Time (US & Canada)

Signatures: 1
Initials: 4

Status: Completed

Envelope Originator:
Caesare Peterson
1700 Congress Ave
Austin, TX 78701
Caesare.Peterson@glo.texas.gov
IP Address: 165.225.34.61

## Record Tracking

Status: Original
3/11/2022 12:26:08 PM

Holder: Caesare Peterson
Caesare.Peterson@glo.texas.gov

Location: DocuSign

## Signer Events

### Signature

### Timestamp

Colby Eaves
colby.eaves@glo.texas.gov
Water Resources Specialist
Texas General Land Office
Security Level: Email, Account Authentication (None)

Signature Adoption: Drawn on Device
Using IP Address: 165.225.34.81

Sent: 3/11/2022 1:30:15 PM
Viewed: 3/11/2022 1:37:18 PM
Signed: 3/11/2022 1:37:39 PM

**Electronic Record and Signature Disclosure:**
Not Offered via DocuSign

Robert Hatler
Robert.Hatler@GLO.TEXAS.GOV
Deputy Director
Texas General Land Office
Security Level: Email, Account Authentication (None)

Signature Adoption: Uploaded Signature Image
Using IP Address: 165.225.34.50

Sent: 3/11/2022 1:37:40 PM
Viewed: 3/11/2022 1:38:32 PM
Signed: 3/11/2022 1:41:04 PM

**Electronic Record and Signature Disclosure:**
Not Offered via DocuSign

Ken Mills
Ken.Mills@GLO.TEXAS.GOV
Texas General Land Office
Security Level: Email, Account Authentication (None)

Signature Adoption: Pre-selected Style
Using IP Address: 172.58.198.246
Signed using mobile

Sent: 3/11/2022 1:41:05 PM
Viewed: 3/11/2022 1:54:18 PM
Signed: 3/11/2022 1:54:39 PM

**Electronic Record and Signature Disclosure:**
Not Offered via DocuSign

Jeff Gordon
jeff.gordon@glo.texas.gov
General Counsel
Texas General Land Office
Security Level: Email, Account Authentication (None)

Signature Adoption: Pre-selected Style
Using IP Address: 165.225.34.81

Sent: 3/11/2022 1:54:40 PM
Viewed: 3/11/2022 1:55:09 PM
Signed: 3/11/2022 1:55:14 PM

**Electronic Record and Signature Disclosure:**
Not Offered via DocuSign

| Signer Events | Signature | Timestamp |
|---|---|---|
| Mark A. Havens<br>Mark.Havens@GLO.TEXAS.GOV<br>Chief Clerk and Deputy Land Commissioner<br>Texas General Land Office<br>Security Level: Email, Account Authentication (None) | DocuSigned by:<br> <br>-7C209F4374E7497... | Sent: 3/11/2022 1:55:15 PM<br>Viewed: 3/11/2022 4:34:39 PM<br>Signed: 3/11/2022 4:34:50 PM |
| | Signature Adoption: Drawn on Device<br>Using IP Address: 162.193.135.244 | |

**Electronic Record and Signature Disclosure:**
Not Offered via DocuSign

| In Person Signer Events | Signature | Timestamp |
|---|---|---|

| Editor Delivery Events | Status | Timestamp |
|---|---|---|

| Agent Delivery Events | Status | Timestamp |
|---|---|---|

| Intermediary Delivery Events | Status | Timestamp |
|---|---|---|

| Certified Delivery Events | Status | Timestamp |
|---|---|---|

| Carbon Copy Events | Status | Timestamp |
|---|---|---|
| David Villafranca<br>david.villafranca@glo.texas.gov<br>Texas General Land Office<br>Security Level: Email, Account Authentication (None) | COPIED | Sent: 3/11/2022 4:34:51 PM |

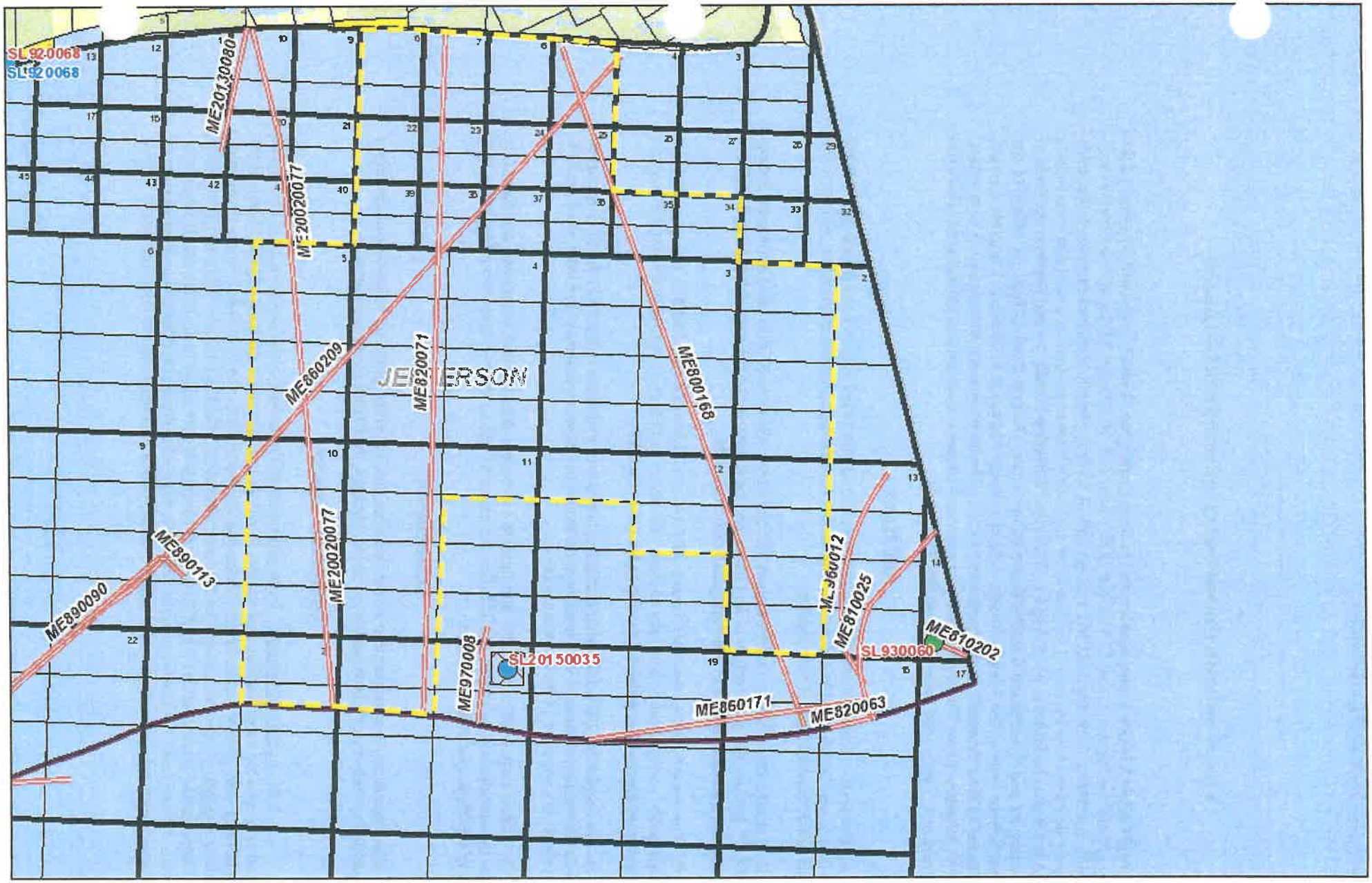
**Electronic Record and Signature Disclosure:**
Not Offered via DocuSign

| Witness Events | Signature | Timestamp |
|---|---|---|

| Notary Events | Signature | Timestamp |
|---|---|---|

| Envelope Summary Events | Status | Timestamps |
|---|---|---|
| Envelope Sent | Hashed/Encrypted | 3/11/2022 1:30:15 PM |
| Certified Delivered | Security Checked | 3/11/2022 4:34:39 PM |
| Signing Complete | Security Checked | 3/11/2022 4:34:50 PM |
| Completed | Security Checked | 3/11/2022 4:34:51 PM |

| Payment Events | Status | Timestamps |
|---|---|---|




# SL20220050

Please review all copyright and disclaimer information from our webpage here. https://www.glo.texas.gov/policy/index.html. The Texas General Land Office makes no representations or warranties regarding the accuracy or completeness of the information depicted on this map or the data from which it was produced. This map is not suitable for navigational purposes and does not purport to depict boundaries of private and public land.

mi
0 1 2 4

BLF-000009

Print Date: 3/8/2022

DocuSign Envelope ID: 79259559-F6E4-4E20-B8CE-8456B6E8CF46

# CARBON DIOXIDE TRANSPORTATION AND STORAGE LEASE

This Carbon Dioxide Transportation and Storage Lease (this "**Lease**") is granted by virtue of the authority granted in Chapters 33 and 51 Tex. Nat. Res. Code, 31 TAC Chapter 13 (Land Resources) et seq., Tex. Health and Safety Code Sec. 382.501 et seq., and all other applicable statutes and rules, as the same may be amended from time to time, is subject to all applicable State regulations promulgated from time to time, and is dated to be effective as of April 1, 2022 (the "**Effective Date**"), by and between the State of Texas, acting by and through the Commissioner of the Texas General Land Office, on behalf of the Permanent School Fund of the State of Texas, with its primary address at 1700 North Congress Avenue, Austin, Texas 78701 ("**Lessor**"), and Bayou Bend CCS LLC with its primary address at 333 Clay Street, Suite 3300, Houston, Texas 77002 ("**Lessee**"). Lessor and Lessee are sometimes individually referred to in this Lease as a "**Party**" and collectively as the "**Parties**."

## RECITALS

A. Pursuant to Texas Natural Resources Code, Ch. 33, the Texas School Land Board (the "**SLB**") is authorized to lease submerged land for any purpose that is in the best interests of the State, subject to the applicable notice requirements of that chapter.

B. Texas Health & Safety Code, Sections 382.501 et seq. allow the SLB to lease Permanent School Fund ("**PSF**") land for the construction of any necessary infrastructure for the transportation and offshore deep subsurface geologic storage of anthropogenic carbon dioxide.

C. On April 7, 2021, the SLB issued RFP No. 21-SLB-1-ST (the "**RFP**") and provided the appropriate public notice of the opportunity to lease PSF land for offshore storage of anthropogenic carbon dioxide in compliance with applicable law and as set out in the RFP.

D. On August 24, 2021, following receipt and review of responses to the RFP, the SLB approved a staff recommendation to proceed with lease negotiations with Lessee consistent with the terms of the RFP and with the SLB's approval of the recommendation.

E. Lessee responded to the RFP and applied to become the "Lessee" hereunder, and the SLB, finding at its meeting held on March 1, 2022, that the award of this Lease to Lessee would be in the best interests of the State, approved this Lease.

## AGREEMENT

**Now, therefore,** in consideration of the premises, and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Parties agree as follows:

## ARTICLE I. GRANT

**1.01** Lease of Property. In consideration of the mutual covenants contained herein and other good and valuable consideration, and subject to all of the terms and conditions of this Lease and for the term of this Lease, Lessor hereby grants, leases and lets unto Lessee the Permanent School Fund lands described in Exhibit A attached hereto (the "**Leased Property**") for the exclusive right to geologically store anthropogenic carbon dioxide ("**CO2**") in a reservoir(s) and pore space in the Miocene Formation (as such term is defined under the most expansive definition required to ensure certification or classification of the CO2 sequestration as permanent under any protocols, standards, regulations or laws relevant to Lessee

DocuSign Envelope ID: 79259559-F6E4-4E20-B8CE-8456B6E8CF46

and its storage activities conducted pursuant to this Lease, the "**Storage Unit**"), together with the exclusive right to drill and to construct, maintain, and operate pipelines, flowlines, wells, fixtures, machinery, and any other equipment Lessee deems necessary for the purposes herein and in connection with such geologic storage (such Storage Unit, together with associated pipelines, wells, fixtures, machinery, and equipment, called the "**Facility**" herein, and the permitting, construction, and operation of the Facility, sometimes called the "**Project**" herein). The intent of the Parties is that all equipment, pipe, supports, facilities, meters, systems and ancillary items placed or maintained by Lessee on the "Property" (defined below) shall be considered part of the Facility and shall be owned and controlled by Lessee except as provided for in Section 9.03 and Section 4.01 of this Lease. If Lessee proposes to construct or cause the construction of any infrastructure required to provide electricity or other power to an injection well or other component of the Facility (other than by running power lines to the Facility from an existing onshore connection to the power grid), Lessee will notify Lessor prior to such construction and include in such notification the timing, size, location, and pathways of power generation and distribution.

**1.02 Surface Access and Easements**. In addition to the lease of the Leased Property to Lessee, Lessor hereby agrees that it will grant to Lessee the necessary easements, ingress and egress rights, rights-of-way, and surface locations over, across, and under certain tracts of land owned by the Permanent School Fund (the "**Easement Tracts**"), for the construction, installation, maintenance, and operation of pipelines, meters, and related equipment for the transportation of CO2 from its source to the Leased Property and the measurement thereof. The Parties hereby agree to amend **Exhibit A** to this Lease and the Memorandum to reflect any Easement Tracts conveyed by Lessor to Lessee. The Leased Property and the Easement Tracts are, collectively, the "**Property**".

**1.03 Permits**. As more fully set forth in Section 2.02 (Development Term) below, Lessee may seek and obtain such federal, state, or local permits, rights, and approvals as are necessary for the Project and the Facility. Upon expiration or earlier termination of this Lease, to the extent permitted by law, Lessor and Lessee shall cooperate to transfer any such permit rights to Lessor. Lessee's obligation to transfer permits to Lessor shall survive the termination of this Lease. Lessee's obligations under this Section 1.03 shall not require Lessee to incur any unreasonable expenses or costs. Subject to the provisions of Sections 2.05 and 4.01(a), from and after the effective date of the transfer of such permits to Lessor, Lessor shall (i) assume responsibility for complying with said permits and all applicable regulatory requirements and (ii) release Lessee from all claims, losses, and other liabilities for actions or non-compliance arising under the permits that (a) are the result of acts or omissions of Lessee that are actually known to and expressly accepted by Lessor, (b) could have been known by Lessor in the exercise of reasonable due diligence, or (c) are the result of acts or omissions occurring after the date of such transfer and that relate to compliance or noncompliance with all federal, state, or local permits, rights and approvals as are necessary for the Project and the Facility.

**1.04 Carbon Credits**. Except as provided in Section 4.01(b) below, Lessor will not claim ownership of any Carbon Credits (defined below) attributable to CO2 captured and stored in the Storage Unit. Subject to the terms of this Lease regarding control and monetization of stored CO2 in the Storage Unit, Lessor and Lessee agree to use reasonable efforts to assist each other, at the cost of the requesting party, in efforts to obtain any such Carbon Credits (defined below) that are attributable to the Facility, including Carbon Credits earned or utilized by emitters, direct or indirect members of an emitter, Lessor or Lessee, tax equity investors or others.

**1.05 Reserved Rights**.

**(a)** Subject to Section 1.05(b), Lessor expressly reserves the following from the rights in the Property and in the Easement Tracts otherwise granted to Lessee in this Lease (the "**Reserved Rights**"):

(i) **Mineral Leases**. The right to retain existing leases or execute and enter into new leases for the exploration, development, production, treatment, marketing, sale and transportation of oil, gas, and other minerals to third persons, and to grant to such mineral lessees the right to use the surface and subsurface of the Property for ancillary purposes in a manner that does not materially or unreasonably interfere with the rights granted to Lessee in this Lease, with Lessee's operations hereunder, or Lessee's ability to obtain Carbon Credits attributable to the Facility. Lessee agrees and acknowledges that this Lease does not prohibit a lessee or operator of a state lease or operating agreement granted for the development and production of minerals, oil, or gas on the Property from conducting hydrocarbon drilling or extraction activities (1) above the ceiling of the Storage Unit, or (2) beneath the base of Storage Unit; provided, however, during the Term, under no circumstance shall any well bore be drilled through the Storage Unit, nor shall the Storage Unit be exposed to communication with any well bore (the "**Drill-Through Restriction**"). During the Operations Term, Lessor may request modifications to the Drill-Through Restrictions by providing no less than ten (10) business days' notice to Lessee. Promptly thereafter, Lessor and Lessee shall (A) meet in good faith to discuss such modifications and their potential impact on (1) the integrity of the Storage Unit, (2) the then-current location of the Plume, (3) the forecasted migration of the Plume in the Storage Unit, and (B) enter into a separate agreement as to the modifications to the Drill-Through Restrictions to the extent any such modifications are mutually agreeable to the Parties. In the event Lessee is unable to obtain, in the ordinary course and without undue delay, hardship, or expense, a Class VI Permit from the applicable governmental agency, and such agency indicates that the terms of this Lease are the reason for such denial, then the Parties shall amend, in good faith, the terms of this Lease objected to by the applicable governmental agency. Lessor (i) will not authorize any lessee or operator of a state oil and gas lease or operating agreement to conduct, and shall contractually prohibit and ensure that any such oil and gas leases or operating agreement prohibits, any activities that might reasonably be anticipated to cause the escape or migration of CO2 from the Storage Unit (any such occurrence, a "**Leak Event**"), and (ii) acknowledges that such prohibition is necessary given the applicable laws and regulations including the rules and regulations required for a Class VI Permit, as hereafter defined. If following the reasonable operation of the Storage Unit, Lessee discovers that the Plume has extended beyond the boundary of the Leased Property, Lessee shall notify Lessor of such occurrence and Lessor shall thereafter exercise its reserved rights hereunder in a way reasonably intended to avoid the occurrence of a Leak Event with respect to the area located outside of the boundary of the Leased Property. Lessor agrees and acknowledges that Lessee shall have the right to drill through, but not commercially produce any oil, gas, mineral, water, or any other substance from, any geologic formations, reservoirs, saline aquifers and/or pore spaces in the lands comprising the Property down to the base of the Storage Unit, subject to the rules for a Class VI well and other applicable regulatory requirements. Lessor acknowledges the importance of Carbon Credits to this Lease and will undertake reasonable steps to enforce the obligations of its mineral lessees under their respective State leases. Lessee shall immediately notify Lessor in writing if Lessee receives any notice from the IRS that an action or omission could lead, or has led, to Recaptured Amounts. Following all closure and monitoring requirements in accordance with Section 2.05 and Section 4.01(a), Lessor shall have the unrestricted right to drill through the Storage Unit.

(ii) **Other Uses of the Property.** Except with respect to mineral rights which are covered by Section 1.05(a)(i) above, the right to enter into, or to grant easements or other access rights to third parties to enter into, the Property and/or the Easement Tracts for any use, to conduct any activity, or to construct, maintain, and operate any facility or infrastructure, provided that such easements and access rights do not materially or unreasonably interfere with (A) the rights granted to Lessee in this Lease, (B) Lessee's operations hereunder, or (C) subject to Art. III, below, Lessee's ability to obtain Carbon Credits attributable to the Facility.

DocuSign Envelope ID: 79259559-F6E4-4E20-B8CE-8456B6E8CF46

(b) Lessor shall give advance written notice to Lessee prior to (i) entering into any lease on some or all of the Property for the exploration or production of oil, gas, and other minerals or (ii) granting easements or other access rights to third parties to enter into the Leased Property and/or the Easement Tracts for any use, to conduct any activity, or to construct, maintain, and operate any facility or infrastructure. Lessor shall not enter into any such lease or grant any such easement or access rights to third parties for any activity that might reasonably be anticipated to cause a Leak Event or would materially or unreasonably interfere with the rights granted to Lessee in this Lease, with Lessee's operations hereunder, or Lessee's ability to obtain Carbon Credits attributable to the Facility. Notwithstanding the foregoing, and for the avoidance of doubt and to provide additional clarity, the Parties agree that (1) hydrocarbon drilling or extraction by any lessee or operator of a state oil and gas lease or operating agreement granted for the development and production of minerals that exposes the Storage Unit to communication with the well bore, or which might reasonably be anticipated to cause a Leak Event is expressly prohibited, and (2) as a condition of any future state lease on any part of the Property or the grant of any lease, easement or access rights to the Property, Lessor shall require the lessee or holder of such lease, easement or access rights to expressly indemnify and defend Lessee for all claims for damages or losses (including losses attributable to Carbon Credits previously realized by Lessee which are recaptured or otherwise disallowed) that Lessee may suffer or incur as a result of such party's activities, including such losses or damages, including legal fees, that result from any Leak Event. Such indemnity shall be (A) set forth in a separate written agreement between Lessee and the lessee or holder of such lease, easement or access right, and (B) be backed by adequate financial security (i.e posting of bonds, letters of credit, or other financial assurance) in favor of Lessee and its designees, in each case of (A) and (B), in a form reasonably acceptable to Lessee.

## ARTICLE II. TERM

**2.01 Term.** Subject to all of the terms and conditions of this Lease, the "**Term**" (herein so called) of this Lease shall consist, collectively, of each of the Development Term, Construction Term, and Operations Term (as those terms are defined below), as well as the closure and monitoring period following the Operations Term, as and to the extent that each such portion of the Term is in effect pursuant to the terms of this Lease.

**2.02 Development Term.**

(a) **Due Diligence.** Subject to earlier expiration because of the commencement of the Construction Term, the first three (3) years following the Effective Date of this Lease shall be the "**Development Term**", as extended by the Development Term Extension Period pursuant to Section 2.02(f). During the Development Term, and at no cost or expense to Lessor, Lessee may conduct its due diligence and take any action that Lessee believes is reasonably necessary to determine whether the Property is suitable for the Project, including, without limitation, conducting engineering studies, economic studies, seismic or geological studies, applying for permits, marketing, and drilling test wells; provided, however, that, during the Development Term, (x) Lessee shall consult with Lessor regarding the location and spacing of test wells prior to drilling, and (y) except to the extent in connection with the drilling of a test well, Lessee may not make any material physical changes to the Property that would materially or unreasonably (i) interfere with Lessor's Reserved Rights, or (ii) damage the storage capacity of the Property, in each case, without the prior written approval of Lessor, which approval may be given or not in Lessor's sole discretion; and provided further that Lessee may not, without the prior written approval of Lessor, apply for a permit the issuance of which would preclude use of the Property by Lessor or its lessees for any purpose that is reserved to Lessor pursuant to Section 1.04 of this Lease.

DocuSign Envelope ID: 79259559-F6E4-4E20-B8CE-8456B6E8CF46

(b) **Permits**. Lessee shall be responsible for applying for, obtaining, and thereafter maintaining, any and all necessary permits for construction and operation of the Facility, including, without limitation and to the extent required by applicable law or regulation, a Class VI UIC well permit as defined in 75 Federal Register 77229 ("**Class VI Permit**"); provided, however, Lessor shall use reasonable efforts (but without the obligation to incur any out-of-pocket costs, expenses, or the obligation to undertake any liability or other obligations to or by Lessor) to assist Lessee to the extent necessary to obtain any and all necessary permits for the Project and the construction and operation of the Facility, including a Class VI Permit or other applicable underground injection control (UIC) permit. Likewise, until such time that ownership of the CO2 is transferred to Lessor pursuant to Section 4.01(a), Lessee shall be responsible for ongoing compliance with all federal, State, and local laws, ordinances, and regulations that are or become applicable to the Project and/or the Facility. Lessee must be able to demonstrate to Lessor, to Lessor's reasonable satisfaction, that all such permits have been obtained or have been applied for and are being diligently pursued for approval, and that Lessee is in material compliance with all such applicable laws, ordinances, and regulations at the time that Lessee proposes to begin the Construction Term under this Lease. With regard to its obligations under this paragraph, "Lessee" includes the named Lessee as well as its agents and contractors.

(c) **Termination by Lessee**. Lessee may terminate this Lease at any time during the Development Term upon thirty (30) days' prior written notice thereof delivered to Lessor. Lessor acknowledges and agrees that Lessee has provided to Lessor sufficient and independent consideration for such option to terminate. Upon such termination by Lessee, this Lease and the obligations of the Parties under it, shall terminate, except for any obligation of Lessor or Lessee that expressly survives termination hereof pursuant to the other terms and conditions of this Lease, including, without limitation, any such surviving obligations pertaining to indemnification of Lessor, removal of equipment, and remediation, and any accrued obligation to make payments provided hereunder shall survive the termination of this Lease. Following such termination, Lessee shall retain all necessary and incidental rights to access the Property and the Facility to undertake all obligations required under this Lease or applicable law.

(d) **No Warranties**. Lessor expressly makes no representations or warranties whatsoever that Lessee or Lessee's proposed providers of CO2 for storage will be able to satisfy any requirements of Sec. 45Q of the Internal Revenue Code. Regardless of the availability of any such tax credit, Lessee's payment obligations under Section 3.01 of this Lease shall continue hereunder until such time as such payment obligations are no longer due and payable hereunder pursuant to the other terms and conditions of this Lease.

(e) **Progress Report**. Beginning with the first such report due on the six-month anniversary of the Effective Date, and every six months thereafter during the Development Term, Lessee shall prepare and submit to Lessor a "**Development Term Progress Report**". Each Development Term Progress Report shall provide Lessee with a general update of how development activities are progressing, including with regard to permitting activities, possible sources of CO2 for storage, and the results of studies regarding engineering for and upcoming construction of the Facility; provided, however, Lessor shall maintain the Development Term Progress Reports strictly confidential, and shall not disclose all or any portion of the Development Term Progress Reports to any third party without the prior written consent of Lessee, which consent may be withheld in Lessee's sole discretion (provided that all of Lessor's foregoing obligations are subject to the Texas Open Records Act and to any relevant order of a court of competent jurisdiction). Notwithstanding the foregoing provision regarding the qualified confidentiality of the Development Term Progress Reports, Lessor may analyze those reports, draw conclusions from them, and develop General Land Office best practices standards and requirements that may be

DocuSign Envelope ID: 79259559-F6E4-4E20-B8CE-8456B6E8CF46

shared by Lessor with the general public, including future CO2 storage space lessees, even if those General Land Office-developed "best practices" standards and requirements are, ultimately, identical or substantially similar to Lessee's reported development activities. Subject to the notice and cure provisions of this Lease, Lessee's failure to provide Lessor with a Development Term Progress Report shall be a Default under this Lease.

(f) **Deadline to Apply for and Obtain Class VI Permit; Extension of Development Term**. Notwithstanding any other provision of this Lease to the contrary, if Lessee has not applied for a Class VI Permit or other applicable UIC permit within thirty-six (36) months after the Effective Date, , then Lessor may terminate this Lease upon thirty (30) days written notice thereof delivered to Lessee; provided, however, that if Lessee has not obtained the necessary UIC permit for the Facility by the expiration of the Development Term but, at that time, is diligently pursuing such permit and is otherwise not in Default of this Lease, then upon delivery of (A) written notice, and (B) extension consideration of four hundred and fifty thousand dollars ($450,000) to Lessor on or before the date that is thirty (30) days prior to such Development Term expiration, Lessee may elect to extend the Development Term for a period of twelve (12) months ( a "**Development Term Extension Period**"); provided, however, and subject to the foregoing notice requirements, the Development Term may only be extended once pursuant to this Section 2.02(f).

**2.03 Construction Term.**

(a) **Duration**. Subject to the other provisions of this Lease, the "**Construction Term**" shall (a) begin on the earlier of (i) the expiration of the Development Term (if Lessor or Lessee have not earlier terminated this Lease as provided above), or (ii) the date on which Lessee gives written notice to Lessor of Lessee's intent to proceed with construction of the Facility (regardless if Lessee has actually obtained the Class VI Permit at such time), and shall (b) end on the earlier of (1) the date that the Facility is complete and fully permitted such that Lessee may begin receiving and storing CO2 in the Storage Unit pursuant to its permits and this Lease (the "**Complete Date**"), or (2) the expiration of three (3) years after the commencement of the Construction Term (the "**Long Stop Date**"), as such Long Stop Date may be extended pursuant to Section 2.03(b). Notwithstanding any other provision of this Lease to the contrary, if Lessee has not obtained a Class VI Permit by the sixth anniversary of the Effective Date, then Lessor may terminate this Lease upon thirty (30) days written notice thereof delivered to Lessee; provided, however, that, Lessor agrees that it will weigh, among other factors, (i) Lessee's diligence in pursuing approval of a Class VI Permit or other applicable UIC permit, (ii) any delays in the approval process that were not reasonably foreseeable, and (iii) the exigencies of permitting an offshore sequestration site which is novel in the continental United States (the "**Offshore Exigencies**"), in making its decision whether or not to elect to terminate this Lease.

(b) **Termination by Lessor**. If the Complete Date has not occurred on or before the Long Stop Date, then Lessor may terminate this Lease upon thirty (30) days written notice thereof delivered to Lessee; provided, however, that if at the time of such Long Stop Date (or Construction Term Extension Period, as applicable) Lessee is diligently pursuing completion of the Facility and is otherwise not in Default of this Lease, then upon delivery of (A) written notice, and (B) extension consideration of four hundred and fifty thousand dollars ($450,000) per extension period to Lessor on or before the date that is thirty (30) days prior to such Construction Term (or Construction Term Extension Period, as applicable) expiration, Lessee may elect to extend the Construction Term (or Construction Term Extension Period, as applicable) for a period of twelve (12) months (each a "**Construction Term Extension Period**"); provided, further, however, and subject to the foregoing notice requirements, the Construction Term may only be extended pursuant to this Section 2.03(b),

DocuSign Envelope ID: 79259559-F6E4-4E20-B8CE-8456B6E8CF46

in the aggregate, for an additional twenty-four (24) months, (or two (2) Construction Term Extension Periods). If Lessee has not achieved the Complete Date prior to the expiration of the Construction Term Extension Period(s), then Lessor may elect to terminate this Lease upon thirty (30) days written notice thereof delivered to Lessee. Prior to electing to terminate this Lease in accordance with the prior sentence, Lessor agrees that it will (i) weigh, among other factors, Lessee's diligence in pursuing completion of the Facility and the Offshore Exigencies in making its decision whether or not to elect to terminate this Lease, and (ii) consider, in good faith, whether granting Lessee an additional Construction Term Extension Period in exchange for reasonable additional extension consideration is warranted. Following such termination, Lessee shall retain all necessary and incidental rights to access the Property and the Facility to undertake all obligations required under this Lease or applicable law.

(c) **Lessee Solely Responsible**. Lessee shall be solely responsible for designing, manufacturing, procuring, permitting, fabricating, constructing, erecting, installing, operating, maintaining and paying for the Facility.

(d) **Diligent Pursuit**. During the Construction Term, at no cost or expense to Lessor, Lessee shall construct and complete the Facility. If the Complete Date has not occurred on or before the Long Stop Date, as extended pursuant to Section 2.03(b), and if Lessor has not exercised its right to terminate this Lease pursuant to Section 2.03(b), Lessee shall, nevertheless, continue diligently working during the Operations Term (defined below) to construct the Facility, achieve the Complete Date, and begin operating the Project.

(e) **Construction Plans**. Lessee acknowledges that, as the owner of the Property, Lessor has a reasonable and legitimate interest in remaining informed about the location, design, construction, and operation of the Facility. Lessee shall (i) maintain and retain, and provide Lessor with reasonable access to, an online repository for the documents prepared and submitted for the approval and maintenance of the Class VI Permit or other applicable UIC permit for the Facility, as well as all plans and documents prepared for obtaining an approved Monitoring, Reporting, and Verification Plan ("**MRV**") from the relevant governmental authority, (ii) provide Lessor with copies of all relevant permits, plans, schematics, as-builts, and all other materials reasonably requested by Lessor that pertain to the design, construction, location, and operation of the Facility (collectively, the "**Plans**"); provided, however, Lessor shall maintain the Plans strictly confidential, and shall not disclose all or any portion of the Plans to any third party without the prior written consent of Lessee, which consent may be withheld in Lessee's sole discretion (provided that all of Lessor's foregoing obligations, including obtaining Lessee's prior written consent for disclosure, are subject to (A) the provisions of Section 10.16, and (B) the Texas Open Records Act and to any relevant order of a court of competent jurisdiction). Notwithstanding the foregoing, however, Lessee shall be solely responsible and liable for the permitting, design, and construction of the Facility, and the receipt by Lessor of the Plans and any commentary by Lessor to Lessee regarding the Plans shall not be construed in any way as the undertaking by Lessor of any professional or legal responsibility whatsoever for either the completeness or adequacy of the Plans or the Facility as it is actually constructed and operated by or on behalf of Lessee. Lessee shall be solely responsible for all performing and/or obtaining all testing, inspections, and approvals necessary for Lessee to achieve the Complete Date and to begin operating the Facility as intended by this Lease.

(f) **Minimum Construction Requirements**. All work done by or on behalf of Lessee with regard to the Project shall be (i) pursued diligently and timely, and performed in a good and workmanlike manner, and (ii) undertaken in material compliance with (A) at a minimum, the requirements of 40 CFR Sec. 146.86—93, if applicable, regarding construction, testing, operating, monitoring, reporting and closure (which shall also apply, as appropriate, to the Operations Term),

DocuSign Envelope ID: 79259559-F6E4-4E20-B8CE-8456B6E8CF46

and (B) all other applicable laws and regulations, and as a reasonably prudent operator, including as set out in the approved UIC permit and MRV.

**2.04 Operations Term**

**(a) Duration.** The **"Operations Term"** shall begin immediately upon the expiration of the Construction Term (the **"Operations Commencement Date"**), and shall end upon the earlier of (i) the date that is thirty (30) years after the Operations Commencement Date, (ii) the Maximum Capacity Date, or (iii) as otherwise terminated pursuant to the terms hereof.

**(b) Lessee's General Obligations.** During the Operations Term, Lessee shall (i) maintain all permits necessary under applicable law for the initial and continued operation of the Facility, including, without limitation, a Class VI Permit or other applicable UIC permit, (ii) obtain, operate, maintain, repair, and replace all pipelines, meters, equipment, and machinery as necessary for the safe and effective operation of the Facility, (iii) satisfy all requirements on Lessee under this Lease, including, without limitation, with regard to metering and reporting, (iv) pay all amounts owing to Lessor pursuant to the terms of this Lease, and (v) when it becomes appropriate, and with sufficient time prior to the expiration or earlier termination of this Lease, prepare for and, as applicable, perform all actions and install all equipment reasonably necessary for the post-injection period, including for closure of the Facility and post-closure monitoring, in each case, as required by applicable laws and regulations.

**(c) Limit of Facility.** At such time as the Storage Unit has reached the limit of its capacity to store injected CO2 (the **"Maximum Capacity Date"**), Lessee shall cease transporting CO2 to the Facility for injection, and shall otherwise cease injecting CO2 into the Storage Unit. With the cessation of injection of CO2 into the Storage Unit as the result of reaching the maximum technically accessible storage volume, the Operations Term shall terminate.

**(d) Removal of Property.** Subject to Lessor's remedies in the event of a Default hereunder by Lessee, Lessee shall have the right, at any time during the term of this Lease, to remove any personal property, improvements, equipment and fixtures placed by Lessee on the Property, provided, however, that no such removal may materially adversely affect the operation or safety of the Project.

**(e) Low Injection Period.** During the Operations Terms, if Lessee fails to inject at least the Standard Annual Volume into the Storage Unit for three (3) consecutive Lease Years (such time period to be extended, day-for-day, during the pendency of any Force Majeure event affecting Lessee) then either Party shall have the right to terminate the Operations Term by delivering written notice to the other Party no less than sixty (60) days following the commencement of the immediately subsequent Lease Year.

**2.05 Closure and Monitoring.** Following the expiration or earlier termination of the Operations Term, the Term of this Lease shall remain in effect, and Lessee shall remain responsible for closure of the Facility and the establishment of monitoring equipment and protocols, and for taking any other action, all in compliance with applicable regulations and generally accepted industry standards to ensure the continued, safe storage of CO2 in the Storage Unit as required by the terms of this Lease. To the extent that Lessee's compliance with its closure and monitoring obligations hereunder (including under applicable State and federal statutes and rules) requires the posting of bonds, letters of credit, or other financial assurance, Lessee shall remain responsible for satisfying such fiscal assurance requirements. Lessee's monitoring and financial assurance obligations under this Section 2.05 expressly survive the expiration or earlier termination of this Lease, provided however, notwithstanding the foregoing, such

obligations shall terminate in accordance with applicable laws and regulations related to monitoring and financial assurances requirements; provided, further, that such obligations shall terminate at such time that the ownership of the CO2 is transferred to Lessor pursuant to Section 4.01(a). Following the end of the Term, Lessee shall retain all necessary and incidental rights to access the Property and the Facility to undertake all obligations required under this Lease or applicable law.

**2.06 Authority of Lessor and No Warranty**. Pursuant to Texas Natural Resources Code, Ch. 33, the SLB has the authority to lease the Property for the purposes set forth in this Lease and Lessor, which provides the staff for the SLB, confirms that, other than as set forth on Schedule 2.06 to this Lease, the SLB has not granted any conflicting rights on the Property to any other party. Subject to the foregoing, Lessee expressly accepts and assumes all risk and liability for penalty, civil or criminal fines or charges, or any other consequence, whether in connection with environmental damage, misreporting to governmental entities, or any other context, arising in connection with operation of the Project, including its ultimate closure. The obligations of Lessee under this section expressly survive expiration or earlier termination of this Lease.

## ARTICLE III. Bonus Payments and Royalty

**3.01 Bonus Payments and Royalty**. During the Term of this Lease, Lessee shall pay consideration to Lessor as follows:

**(a) Initial Bonus Payment**. Within five (5) business days of the execution of this Lease, Lessee shall deliver, or cause to be delivered, to Lessor a wire transfer in the amount equal to $4,500,000.00 (the "**Initial Bonus Payment**").

**(b) Second Bonus Payment**. Within five (5) business days of the First Hurdle Date (defined below), Lessee shall deliver, or cause to be delivered, to Lessor a wire transfer in the amount equal to $4,500,000.00 (the "**Second Bonus Payment**").

**(c) Third Bonus Payment**. Within five (5) business days of the Second Hurdle Date (defined below), Lessee shall deliver, or cause to be delivered, to Lessor a wire transfer in the amount equal to $4,500,000.00 (the "**Third Bonus Payment**" and together with the Initial Bonus Payment and the Second Bonus Payment, the "Bonus Payments").

**(d) Royalty**. Lessee shall deliver, or cause to be delivered to Lessor, in each case as provided for in Section 3.03, (i) with respect to the Initial Injection Period, a monthly royalty equal to the product of the amount of Facility Proceeds for such month times three percent (3%), and (ii) with respect to the Subsequent Injection Period, a monthly royalty equal to the product of the amount of Facility Proceeds for such month times six percent (6%) (as applicable, the "**Royalty**" or "**Royalties**") (as Facility Proceeds, Initial Injection Period, and Subsequent Injection Period are defined below).

**(e) True-Up Payment**. Following the Second Hurdle Date, within thirty (30) business days following the end of each Lease Year, Lessee shall deliver, or cause to be delivered to Lessor, an annual payment (if any) equal to the following (as applicable, the "**True-Up Payment**"):

(i) with respect to each Lease Year during the Initial Injection Period, if the Standard Annual Volume exceeds the Annual Injected Volume for such Lease Year, the product of (A) the excess of the Standard Annual Volume over the Annual Injected Volume for such Lease Year, multiplied by (B) the Average Tonnage Price, multiplied by (C) three percent (3%), and

DocuSign Envelope ID: 79259559-F6E4-4E20-B8CE-8456B6E8CF46

(ii) with respect to each Lease Year during the Subsequent Injection Period, if the Standard Annual Volume exceeds the Annual Injected Volume for such Lease Year, the product of (A) the excess of the Standard Annual Volume over the Annual Injected Volume for such Lease Year, multiplied by (B) the Average Tonnage Price, multiplied by (C) six percent (6%).

(iii) Notwithstanding the above, the calculation of the True-Up Payment shall be adjusted proportionally, day for day, based upon the number of days in the period ending prior to, on or after the occurrence of any of the following in a particular Lease Year: (i) the Second Hurdle Date, (ii) commencement of the Subsequent Injection Period, and/or (iii) the expiration of the Operations Term.

3.02 Definitions.

(a) Annual Injected Volumes. "**Annual Injected Volumes**" means the actual volume of CO2 injected into the Storage Unit during a given Lease Year.

(b) Applicable Procedure. "**Applicable Procedure(s)**" means the valid, final, and non-appealable standards, public processes, procedures, and rules applicable to the regulation of the Facility or the Project, to the extent applicable, by the U.S. Environmental Protection Agency ("**EPA**"), the Railroad Commission of Texas ("**RRC**"), the Texas Commission on Environmental Quality ("**TCEQ**"), and the Internal Revenue Service ("**IRS**") as well as any other state or federal regulatory bodies having jurisdiction over all or a part of the Facility or the Project.

(c) Average Tonnage Price. "**Average Tonnage Price**" means the average Facility Proceeds paid or delivered to Lessee, on a per metric ton of injected CO2 basis, over the relevant Lease Year. (Unless expressly provided otherwise, references in this Lease to a "ton", a "tonne", or a "metric ton/tonne" are deemed to mean a metric unit of mass equivalent to 1,000 kg.)

(d) Carbon Credit. "**Carbon Credit**" means any rights, credits, revenues, offsets, (including, without limitation Section 45Q Credits or other federal, state or local tax credits) , greenhouse gas rights or similar rights related to the production, capture or sequestration of CO2 or the ownership or operation of the Facility or the Project, including such rights to sell or trade any of the aforementioned domestically or internationally, and including the right to count or claim any applicable reductions pursuant to the Department of Energy's Climate Challenge Program, to register all such reductions pursuant to §1605 of the Energy Policy Act of 1992, and any other program of a governmental authority designed to encourage or reward the reduction of greenhouse gas emissions, provided, however, that "Carbon Credit" shall not include any "Subsequent Carbon Offsets" as defined below.

(e) Facility Proceeds. "**Facility Proceeds**" means the aggregate gross cash, cash equivalent, or other consideration paid or delivered to Lessee, without duplication, under all Injection Contracts, including, without limitation, any portion of a Carbon Credit that is assigned or the value of which is otherwise conveyed to Lessee by a third party or an affiliate of Lessee in return for Lessee's services under an Injection Contract; provided, however, for the avoidance of doubt, "Facility Proceeds" shall not include proceeds received by Lessee in connection with authorized transfers of this Lease or the Facility. Lessee will make commercially reasonable efforts to enforce its Injection Contracts, including with regard to Lessee receiving all of the consideration due to it under an Injection Contract.

(1) Cash Section 45Q Credits. If Section 45Q Credits are paid by the U.S Treasury in cash under then-applicable law, then such cash Section 45Q Credit payments shall be treated like

DocuSign Envelope ID: 79259559-F6E4-4E20-B8CE-8456B6E8CF46

any other cash consideration, and shall be included in Facility Proceeds for Royalty calculation purposes by no later than the 12th month after such cash Section 45Q Credit is generated.

(2) Non-Cash Section 45Q Credits. With respect to any portion of the Facilities Proceeds in the form of non-cash Section 45Q Credits transferred to Lessee, (i) the value of such Section 45Q Credits shall be the federal cash tax savings recognized by the Lessee or its direct or indirect equity owners as a result of the utilization of the Section 45Q Credits, provided that if a cash contribution is received by Lessee in exchange for the future allocation of such Section 45Q Credits (e.g., a tax equity investment), the value of such Section 45Q Credits shall be the amount of cash received in exchange for such Section 45Q Credits, and (ii) the timing of the recognition of the value of the Section 45Q Credits shall be when such non-cash Section 45Q Credits have been utilized to offset cash tax liability or generated a contribution of cash to the Lessee in exchange for allocations of such Section 45Q Credits. If Lessor and Lessee fail to agree on the value of, or the timing of the recognition of, the reasonable non-cash Section 45Q Credits as defined in this Section 3.02(e) within 60 days after the last month of the Lease Year in which such Section 45Q Credits were transferred to the Lessee, the Parties shall refer such dispute to a mutually acceptable independent accounting firm (the "**Accounting Expert**"), and the Parties shall direct the Accounting Expert to make the determination of the value or timing of the non-cash Section 45Q Credits in dispute, and only such matter in dispute between the Parties, on a timely basis (and in any event within 60 days after its engagement) and to promptly notify the Parties in writing of its determination. The Parties shall provide the Accounting Expert all information reasonably necessary and available for the Accounting Expert to determine the value or timing of such non-cash Section 45Q Credits.

(3) Other Non-Cash Consideration. If any portion of the value to be paid to Lessee under an Injection Contract is in the form of an in-kind delivery (other than Section 45Q Credits), a non-arm's length cash payment from an affiliate of Lessee, or any other non-cash or cash equivalent consideration, then Lessor and Lessee will determine a cash value for such consideration based on the fair market value, arm's-length cash consideration to be paid to Lessee under its Injection Contract(s) during the applicable month (the "**Determined Cash Value**"). If Lessor and Lessee fail to agree on the Determined Cash Value within a reasonable amount of time after the last month of the Lease Year in which such amounts were includable in Facility Proceeds, the Parties shall refer such dispute to a mutually acceptable independent valuation expert (the "**Independent Expert**"), and the Parties shall direct the Independent Expert to make a determination as to the appropriate Determined Cash Value (and only such matter) on a timely basis (and in any event within 60 days after its engagement) and to promptly notify the Parties in writing of its determination. Thereafter, the Determined Cash Value shall be included in Facility Proceeds, as it is the intent of the Parties that the Royalty hereunder be applied in a timely manner against the full value received by Lessee for its service of transporting CO2 to, and sequestering CO2 in, the Storage Unit.

(4) Effect of Recaptured Amounts. Facility Proceeds for any month shall be reduced by any Recaptured Amounts for such month. If Facility Proceeds for any month is a negative dollar amount due to the reduction for any Recaptured Amounts in any month or otherwise, such negative dollar amount shall be carried forward and reduce the amount of Facility Proceeds in each subsequent month until such negative dollar amount is fully offset against future Facility Proceeds.

(f) **First Hurdle Date**. The "**First Hurdle Date**" means the date on which the aggregate volumes of CO2 contractually committed to the Facility, pursuant to an Injection Contract, or Injection Contracts, whether or not such volumes have actually been injected into the Storage Unit, exceeds 4 million metric tons per annum. Lessee shall notify Lessor as and when volumes have

DocuSign Envelope ID: 79259559-F6E4-4E20-B8CE-8456B6E8CF46

been committed, although only the volumes, and not the identity of the emitter(s), need to be disclosed in such notices.

**(g) Initial Injection Period**. The "**Initial Injection Period**" means the period beginning immediately upon the Second Hurdle Date, and ending upon the date Lessee has injected an aggregate amount of 50 million metric tons of CO2 in the Storage Unit.

**(h) Injection Contract**. An "**Injection Contract**" means a contract or agreement between Lessee and any third party for (i) the receipt, transportation, and/or injection of CO2 by Lessee into any portion of the Storage Unit, or (ii) the re-delivery of CO2 to Lessee. An Injection Contract may include a contract between Lessee and an affiliate of Lessee for the described service(s) so long as the proceeds payable to Lessee by an affiliate under such contract equal at least the proceeds payable to the affiliate by a third party under an arm's-length contract.

**(i) Lease Year**. A "**Lease Year**" means each successive twelve (12) month period commencing on the Effective Date.

**(j) Miocene Formation**. The "**Miocene Formation**" means all depths from the base of the Amphistegina B Shale, as found at 5,873 feet measured depth to the base of the Siphonina Davisi Sand as found at 8,765 feet measured depth, in each case, in the HI 4L Transco (Forest) #1 well (API No. 427083032500) located in Jefferson County, Texas State Waters (or the stratigraphic equivalent thereof, including each such stratigraphic equivalent shown on **Exhibit C**, recognizing that actual depths may vary across the Leased Property.

**(k) Plume**. The "**Plume**" means the physical and forecasted extent of the free-phase and dissolved CO2 stream, in three dimensions, that has been injected into the Storage Unit.

**(l) Recaptured Amounts**. The "**Recaptured Amounts**" means the dollar amounts, if any, attributed to any Carbon Credits, the value of which were previously included in the definition of Facility Proceeds for purposes of calculating the Royalty paid to Lessor and which are subsequently recaptured or otherwise disallowed for the relevant period due to the actions or omissions of Lessor, the SLB, the PSF and/or any third party lessee of Lessor.

**(m) Second Hurdle Date**. The "**Second Hurdle Date**" means the first date on which Lessee actually injects CO2 into the Storage Unit for permanent storage.

**(n) Section 45Q Credits**. The "**Section 45Q Credits**" means any tax credits under 26 U.S.C. § 45Q, as amended.

**(o) Standard Annual Volume**. The "**Standard Annual Volume**" means a volume of CO2 equal to 1,000,000 metric tons.

**(p) Subsequent Injection Period**. The "**Subsequent Injection Period**" means the period beginning immediately upon the date Lessee has injected an aggregate amount of 50 million tons of CO2 in the Storage Unit, and ending upon the termination of this Lease.

**3.03 Payments and Statements**. All Royalties that are required to be paid hereunder shall be due and payable sixty (60) days after the end of the month for each month during the Term (the "**Due Date**"), and shall be accompanied by a statement ("**Monthly Statement**") setting out the components of the Facility Proceeds and any Recaptured Amounts for the month for which Royalty is being paid. If Lessee and Lessor agree at any time that Royalties have been overpaid to Lessor (including as a result of any

Recaptured Amounts), Lessee shall recoup the overpaid Royalties by deducting the amount of the overpayment, without interest, from future Royalty payments; provided that if Royalty payments have concluded and Lessee has not recouped all Recaptured Amounts, Lessor shall be obligated to make a one-time payment to Lessee, without interest, for such Recaptured Amounts. Recoupment of overpaid Royalties shall be made as promptly as possible out of future Royalty payments. If the amount of agreed, overpaid Royalties and/or Recaptured Amounts to be recouped during any one month should exceed the amount of Royalties that otherwise would have been payable that month to Lessor, Lessee shall provide a written explanation to Lessor as to the nature and amount of the overpayment and the month during which it is reasonably expected that a resumption of Royalty payments to Lessor will occur. Lessor, at its option and in lieu of recoupment being made in the above manner, may promptly repay such overpayment in full or may request that the overpaid Royalties and/or Recaptured Amounts be recouped out of future Royalty payments on a mutually-agreeable schedule and in mutually-agreeable monthly amounts which will not create an undue hardship or burden on either Lessor or Lessee; provided that if Royalty payments have concluded and Lessee has not recouped all Recaptured Amounts, Lessor shall be obligated to make a one-time payment to Lessee, without interest, for such Recaptured Amounts. Lessor expressly reserves the right and Lessee expressly grants to Lessor the right to audit Facility Proceeds and the calculation and payment of Facility Proceeds upon Lessor giving Lessee notice of the exercise of this right. Within sixty (60) days after receipt of such notice, Lessee shall make available to Lessor during reasonable business hours all information requested by Lessor which in the commercially reasonable judgment of Lessor is reasonably necessary to audit such Facility Proceeds and the calculation and payment of Facility Proceeds in order that Lessor may fully and completely audit such Royalty. In the event the Parties reasonably dispute in good faith all or any portion of a Monthly Statement, then the undisputed portion, if any, shall be paid by the Due Date. Thereafter, the Parties shall cooperate with each other to resolve the dispute within sixty (60) days of the Due Date. In the event the Parties cannot reach agreement within 60 days of the Due Date (or earlier if by mutual written agreement), then the Parties will pursue resolution of the dispute pursuant to the terms of Section 10.11. The terms of this section shall survive expiration or earlier termination of this Lease.

**3.04 Interest and Penalty**. Any undisputed amount of Royalty that is not timely paid shall accrue simple interest at prime plus one percent (1%) per annum beginning on the date that the amount of unpaid Royalty is thirty (30) days overdue, and shall continue to accrue interest at that rate until paid (subject to the terms of this Lease, including Section 9.01(b)(ii), below, with regard to amounts determined to be due following an audit). For every month that a Monthly Statement or a monthly report described in Section 7.01, below, is not submitted when due as described in this Lease, each such non-filed report or Monthly Statement shall incur a penalty of $25 for every month (or part thereof) until filed. As used in this Section 3.04, "prime" means the prime interest rate, as published daily in the Wall Street Journal that is not a Saturday, Sunday, or legal holiday. For royalties due on a Saturday, "prime" shall refer to the prime interest rate published on the next business day that is not a legal holiday

## ARTICLE IV. OWNERSHIP OF CO2

**4.01 Ownership of Stored CO2**.

**(a) General**. Subject to the terms of Section 4.01(b), below, regarding the use of stored CO2 in connection with Subsequent Carbon Offsets (as defined below), the CO2 transported to and stored in the Storage Unit remains the property and responsibility of Lessee or the generator or emitter of the CO2 according to the agreements between them, until such time as the SLB may elect to accept ownership of the CO2 pursuant to Texas Health & Safety Code, Sec. 382.507, or otherwise. Lessor, Lessee and/or the generator or emitter, as the case may be, even while owning the CO2, may not withdraw or make any other use of the CO2 in storage, including, without limitation, for enhanced recovery purposes, as the Parties agree that CO2 storage in the Storage Unit as contemplated by this Lease is intended to be permanent; provided, however, Lessee may

DocuSign Envelope ID: 79259559-F6E4-4E20-B8CE-8456B6E8CF46

withdraw certain amounts of CO2 for the purpose of pressure maintenance or environmental or public safety concerns, in each case in accordance with Applicable Procedure and applicable law. Any Recaptured Amounts resulting from such a withdrawal will be borne entirely by Lessee. If the SLB has not previously elected to accept ownership of the CO2, once (i) CO2 has been delivered into storage into the Storage Unit, (ii) the Storage Unit has met all applicable state and federal requirements for closure of CO2 storage sites, and (iii) Lessee has received the relevant "closure certificate" from the applicable state or federal regulatory agency, the SLB shall acquire title to the CO2 stored in the Storage Unit and shall assume all obligations and liabilities with respect to such CO2, and Lessee shall be released thereafter from all liabilities related to the ownership of the CO2, provided that, notwithstanding the foregoing, delivery of CO2 into the Storage Unit or acceptance of ownership of the CO2 by the SLB on behalf of the PSF does not relieve Lessee of liability for any act or omission regarding the construction, operation, or closure, as applicable, of the Facility; except for such liabilities that (A) are the result of acts or omissions of Lessee that are actually known to and expressly accepted by Lessor, (B) could have been known by Lessor in the exercise of reasonable due diligence, or (C) are the result of acts or omissions occurring after the later of the date of receipt of such closure certificate or the date that the SLB acquires title to the stored CO2.

(b) **Subsequent Carbon Offsets**. Notwithstanding anything herein to the contrary, the Parties acknowledge and agree as follows: (i) the CO2 injected hereunder is to be permanently stored in the Storage Unit, (ii) all Carbon Credits associated with the capturing and permanent storage of CO2 under this Lease are solely for the benefit of Lessee (or its designee), (iii) **LESSOR SHALL NOT TAKE ANY ACTION THAT WOULD INTENTIONALLY OR REASONABLY FORESEEABLY (A) MATERIALLY ADVERSELY IMPACT ANY OF THE LESSEE'S, EMITTERS', DIRECT OR INDIRECT MEMBERS OF AN EMITTER, THE LESSOR OR THE LESSEE, TAX EQUITY INVESTORS OR OTHERS ABILITY TO CLAIM, MAINTAIN, MONETIZE OR OTHERWISE RECEIVE THE BENEFIT OF, ANY CARBON CREDIT EARNED BY LESSEE, (B) RESULT IN ANY CARBON CREDIT TO BE SUBSEQUENTLY RECAPTURED OR OTHERWISE DISALLOWED, OR (C) RESULT IN ANY ACTIVITY THAT COULD RESULT IN A REVERSAL OR RELEASE OF CO2 FROM THE STORAGE UNIT (PROVIDED THAT SUCH RESULTING "ACTIVITY" IN (C) DOES NOT INCLUDE ACTS OR OMISSIONS OF ANOTHER LESSEE OF LESSOR THAT CONSTITUTE NON-COMPLIANCE BY THAT LESSEE OF ITS LEASE OBLIGATIONS)**. Subject to the foregoing and following the transfer of title of the permanently sequestered CO2 from Lessee to Lessor, Lessor, at no expense to Lessee, shall have the sole and exclusive right to seek, market, receive, and retain in full any payment or other value that can be attributed to the permanently stored CO2, including, without limitation, in connection with a monetization of carbon offset credits, or any and all other monetization of such permanently stored CO2 (collectively herein, a "**Subsequent Carbon Offset**"), whether in connection with a recognized compliance system or otherwise; provided, that, such Subsequent Carbon Offsets do not adversely impact Lessee's ability to claim, maintain, monetize or otherwise receive the benefit of, any Carbon Credit. If Lessor does pursue a Subsequent Carbon Offset and such Subsequent Carbon Offset (x) adversely impacts any of Lessee's, emitters', direct or indirect members of an emitter, Lessor or Lessee, tax equity investors or others ability to claim, maintain, monetize or otherwise receive the benefit of, any Carbon Credit, (y) results in any Carbon Credit to be subsequently recaptured or otherwise disallowed, or (z) results in any activity that could result in a reversal or release of CO2 from the Storage Unit, Lessor and Lessee may choose to resolve such matter pursuant to the dispute resolutions procedures in Section 10.11 hereof. Following a determination of the then-current dollar amount of such adverse impact (if any) pursuant to Section 10.11, such amount will either be paid by Lessor to Lessee, applied as a credit toward subsequent Royalty due hereunder, or some combination of both, at Lessor's discretion.

DocuSign Envelope ID: 79259559-F6E4-4E20-B8CE-8456B6E8CF46

## ARTICLE V. METERING

**5.01 Mass Determination.** The mass of CO2 injected into the Storage Unit shall be determined in accordance with Class VI monitoring and verification requirements and in accordance with the MRV and best industry practices.

**5.02 Measuring Stations.**

**(a) Costs.** The costs and expenses of installing, operating, and maintaining measuring stations (including all equipment, whether a single instrument or multiple instruments, necessary to determine the mass of stored CO2) required by this Lease shall be borne solely by Lessee.

**(b) Location; Adequacy.** The type, size, and location of Lessee's proposed metering for the Project are subject to the prior written approval of Lessor, such approval not to be unreasonably delayed or withheld. Lessee shall maintain one or more measuring stations, at least one of which must be located at the wellhead where the CO2 is injected, in part for purposes of Lessor's audit of Royalty paid hereunder. Lessee shall provide Lessor with summaries of plans and drawings for Lessee's proposed transportation and storage system, including information regarding meter locations and specifications, so that Lessor has sufficient information to assess the adequacy of Lessee's proposed metering for purposes of this Lease; provided, however, Lessor shall maintain such summaries of plans, drawings and information strictly confidential, and shall not disclose all or any portion of such summaries to any third party without the prior written consent of Lessee, which consent may be withheld in Lessee's discretion, which discretion is subject to Lessor's obligations under Section 10.16, below, the Texas Open Records Act, and any relevant order of a court of competent jurisdiction. Lessee's measurement and monitoring program and equipment must be (i) adequate to measure or monitor the mass of CO2 being injected into the Storage Unit, and (ii) in compliance with the testing and monitoring plan required by the Class VI Permit, the MRV, and as set forth in 40 CFR Section 146.90. Notwithstanding the foregoing provision regarding the qualified confidentiality of the summaries of Lessee's plans, drawings, and information, Lessor may analyze those materials, draw conclusions from them, and develop General Land Office best practices standards and requirements that may be shared by Lessor with the general public, including future CO2 storage space lessees, even if those General Land Office-developed "best practices" standards and requirements are, ultimately, identical or substantially similar to the plans for Lessee's transportation and storage system for the Facility.

**(c) Standards.** Each measuring station for CO2 mass delivered pursuant to this Lease shall be equipped in accordance with at least the standards (i) set forth in all applicable chapters of the American Petroleum Institute Manual of Petroleum Measurement Standards and (ii) of the American Gas Association. Subject to the prior approval of Lessor, measurement equipment will be subject to change to allow the use of improved technology under such standards.

**5.03 Meter Calibration and Meter Tests.** Lessee shall ensure that the measurement equipment for the Project is accurate and in good repair, and that such periodic tests of that equipment as Lessee may deem necessary are made as often as needed, and in accordance with standard industry measurement practices, provided that no more often than once every twelve (12) months Lessor may require such an equipment test by written notice thereof delivered to Lessee.

## ARTICLE VI. MONITORING

**6.01 Monitoring and Verification.** Lessee shall adhere to all provisions of the approved MRV in addition to, and consistent with, all other applicable regulatory requirements and all other

DocuSign Envelope ID: 79259559-F6E4-4E20-B8CE-8456B6E8CF46

requirements of this Lease, including, but not limited to, the requirements of its Class VI Permit or other applicable UIC permit. The MRV plan shall be used to determine whether any CO2 is escaping from the Storage Unit and the amount of any such leakage. Lessee shall make all plans, models and reports required by the approved MRV, along with any associated supporting data, available to Lessor upon request. All reservoir models, well logs, well tests and other monitoring and verification studies performed on or for the Storage Unit shall be interpreted by a licensed professional engineer (or other qualified professional engineer or geoscientist who is approved by Lessor, such approval not to be unreasonably withheld), which may include Lessee personnel, and such interpretations shall be made available to Lessor upon written request; provided, however, Lessor shall maintain such models, well logs, well tests and other monitoring and verification studies and any interpretations with respect thereto strictly confidential, and shall not disclose all or any portion of such studies or interpretations to any third party, other than technical advisors or other consultants working with Lessor who have signed a reasonable non-disclosure agreement, without the prior written consent of Lessee, which consent may withheld in Lessee's sole discretion (provided that all of Lessor's foregoing obligations are subject to (A) the provisions of Section 10.16, and (B) the Texas Open Records Act and to any relevant order of a court of competent jurisdiction). Lessee shall permanently archive copies of all the aforementioned documents no later than the earliest of the closure date of the repository or the lease termination date. Notwithstanding the foregoing provision regarding the qualified confidentiality of the summaries of Lessee's studies and interpretations, Lessor may analyze those materials, draw conclusions from them, and develop General Land Office best practices standards and requirements, and such best practices and requirements may be shared by Lessor with the general public, including future CO2 storage space lessees provided that no such shared information contains any Lessee information or data.

**6.02 Seismicity.** Without limiting the foregoing, Lessee shall conduct an annual review of the seismicity relating to the Property and immediately adjacent land and report its findings to Lessor. If such findings indicate that seismicity is increasing in any particular location, Lessee will make commercially reasonable efforts to adjust its CO2 injection operations, using generally accepted engineering principles and industry practices, in order to reduce the possibility of the occurrence of damaging seismic activity.

## ARTICLE VII REPORTING

**7.01 Reports with Payments.** During the Operations Term, Lessee shall submit to Lessor, at the same time that Royalty is paid, a report identifying the source(s) and mass of CO2 that has been gathered and injected into the Storage Unit during the period for which Royalty is being paid. Lessee shall submit to Lessor a copy of all filings and reports, when filed, that Lessee must file with the relevant governmental authority in connection with maintaining its Class VI Permit(s) or other applicable UIC permit(s).

**7.02 Statutory Reporting.** Pursuant to requirements of Texas Health and Safety Code, Ch. 382, at least annually, Lessee must submit a report to Lessor regarding the Project, including information regarding the measurement, monitoring, and verification of the permanent storage status of the CO2 stored in the carbon dioxide repository. Such information must include (i) the total mass of CO2 stored; (ii) the total mass of CO2 received for storage during the year; and (iii) the mass of CO2 received from each producer of CO2.

**7.03 Leaks.** Lessee acknowledges that its operation of the Project could damage the quality and quantity of storage pore space in the Property and/or in submerged lands outside of the Property which is owned by Lessor ("**Outside Lands**"). In order that Lessor can be informed regarding the condition of the Property and such Outside Lands, Lessee shall provide copies of reports no less often than every twelve (12) months during the entire Term of this Lease pertaining to (i) leak rates, (ii) leak detection

DocuSign Envelope ID: 79259559-F6E4-4E20-B8CE-8456B6E8CF46

(whether by pressure transient well tests or otherwise), or (iii) whether any such leaks have resulted in a migration of CO2 outside of the Property. Damage to the pore space in the Property and/or the Outside Lands caused by Lessee's operations hereunder, which damage is material and could have been foreseen and avoided by a reasonably prudent operator, shall be a Default hereunder and shall be subject to the procedures and remedies in Section 9.01(b)(iv) and Section 9.02.

**7.04 Other Agency Reporting Requirements**. If, at any time during the Term of this Lease, the Texas Commission on Environmental Quality, the Texas Railroad Commission, the GLO, or any other relevant State agency promulgates rules for the reporting of CO2 storage, then Lessee must (i) comply with those rules to the extent applicable, and (ii) send to Lessor a true and complete copy of any report or information provided to such State agency in compliance with such rules.

## VIII LESSEE'S REPRESENTATIONS

**8.01 Lessee's Representations**. Lessee hereby represents and warrants to Lessor that (i) Lessee is authorized to do business in the State of Texas, (ii) entering into this Lease is an action duly authorized on behalf of Lessee by its management and in accordance with its organizational documents, and (iii) the person executing and delivering this Lease has the requisite authority to bind Lessee to Lessee's obligations hereunder.

## IX DEFAULT AND REMEDIES

**9.01 Default by Lessee; Notice and Cure; Removal and Restoration**.

**(a) Default**. Subject to the notice and cure provisions below, if Lessee is not in material compliance with the terms of this Lease, including, without limitation, the terms of this Lease that require payment of any Bonus Payment or Royalty, that require the maintenance of necessary permits, that require compliance with applicable laws and regulations, and that limit the use that may be made of the Property by or on behalf of Lessee, Lessee shall be in "Default" hereunder.

**(b) Notice and Cure**.

(i) If, based on the corresponding Monthly Statement, the Royalty paid in any given month (A) has been underpaid, then Lessee shall pay the underpayment to Lessor within thirty (30) days of Lessor's notice to Lessee of such underpayment, or (B) has been overpaid, then Lessee may credit such overpayment against its next Royalty payment, and shall also provide Lessor with an explanation of such overpayment and credit. If (1) Lessee does not timely pay such underpayment, and (2) there exists no good faith dispute between the Parties regarding such underpayment, Lessee shall be in Default hereunder. The Parties may agree to resolve any good faith dispute arising under this Section 9.01 pursuant to the dispute resolution procedures in Section 10.11 hereof.

(ii) If, following an audit pursuant to Section 10.05, below, Lessor determines that Royalty for any given period of time that was audited for the sixty (60) month period prior to the audit has been underpaid, Lessor will send to Lessee a final audit billing notice setting out the amount of Royalty, penalty (pursuant to Section 3.04, above), and interest due. The Parties will then proceed in accordance with the terms of Tex. Nat. Res. Code, Sec. 52.135(b) – (d) (pertaining to audits regarding payment of royalty for oil and gas production). If Lessee does not pay, within thirty (30) days of a final decision, the amounts, if any, that are determined to be due following that statutory process, then Lessee shall be in Default hereunder.

DocuSign Envelope ID: 79259559-F6E4-4E20-B8CE-8456B6E8CF46

(iii) If Lessee receives notice from any governmental entity that Lessee is in non-compliance with the terms of any permit that it has received from that governmental entity for the construction and/or operation of the Facility (a "**Notice of Non-Compliance**"), then Lessee will promptly provide to Lessor a copy of such Notice of Non-Compliance. If Lessee does not remedy the non-compliance in the manner and within the time set out in the Notice of Non-Compliance, then the provisions of Section 9.01(b)(iv) shall control.

(iv) If Lessor determines in its reasonable judgment that Lessee is operating the Facility in an unsafe manner and such operations could have been foreseen or avoided by a reasonably prudent operator (such as, e.g., but without limitation, by exceeding pressure limitations or damaging capacity potential), then Lessor shall notify Lessee in writing of the unsafe operation and Lessor may immediately seek a temporary injunction to prevent damage to Lessor's Property. Subject to the outcome of Lessor's temporary injunction request (if any), Lessee shall have thirty (30) days after receipt of such notice within which to (A) correct or cease such operations to the extent that Lessor has identified the operations to be unsafe (including damaging), or (B) explain to Lessor's reasonable satisfaction that Lessee's operation of the Facility is not unsafe. If Lessee has not corrected in all material respects or ceased its unsafe operations within thirty (30) days of Lessor's notice, as described in (A), or, if Lessor is not satisfied with Lessee's explanation within thirty (30) days after Lessor's receipt of Lessee's explanation, as described in subpart (B) above, then the Parties may seek to resolve such matters pursuant to Section 10.11 hereof.

(v) If Lessor determines in its reasonable judgment that Lessee is in Default of this Lease for any reason other than as described in the foregoing (i) – (iv), Lessor shall notify Lessee in writing of the alleged Default of this Lease and Lessee shall have thirty (30) days after receipt of such notice within which to correct, commence actions to correct or dispute all or any part of the alleged Default as to which Lessee has been notified and shall pursue the remedy of such alleged Default, if any, in good faith and with reasonable diligence until completion. If such Default is not corrected in all material respects within the 30-day period (or, in the case of a Default that is not susceptible to cure within 30 days, correction is not commenced within 30 days and then pursued diligently to completion), Lessee shall be in Default hereunder, provided, however, that if Lessee has disputed the Default within thirty (30) days after receipt of Lessor's notice, then the Parties will proceed to mediation with a mutually agreed-upon impartial third party as provided in Section 9.01(b)(iv) above.

**9.02 Lessor's Remedies**. Subject to the terms of Section 9.01(b), Lessor shall have, as a remedy for Lessee's Default hereunder, all remedies available to it in law or in equity except as any such remedy may be limited by the express terms of this Lease, including, at Lessor's sole discretion, the right to terminate this Lease and all rights inuring to Lessee hereunder by sending written notice of such termination to Lessee in accordance with this Lease. Upon sending of such written notice of termination, this Lease shall automatically terminate and all rights granted herein to Lessee shall revert to Lessor. Such termination shall not prejudice the rights of Lessor to collect any money due or to seek recovery on any claim arising hereunder, and nor shall any such termination relieve Lessee of its obligations hereunder that survive expiration or earlier termination of this Lease.

**9.03 Removal of Property; Restoration**. Upon expiration or earlier termination of this Lease, at Lessor's sole option, Lessee shall (1) convey all personal property and improvements of Lessee on the Property to Lessor, or (2) (A) restore the Property to its original topographical condition that existed as of the Effective Date, and (B) remove all personal property and any improvements placed or constructed on the Property by or on behalf of Lessee from the Property, except in each case to the extent such personal property or improvements are reasonably necessary for the closure of the Facility. The terms of this section shall survive expiration or earlier termination of this Lease. Lessor and Lessee agree that, in the event

Lessee fails to restore the Property or remove its personal property or improvements within the time specified in a notice provided pursuant to this Section 9.03, then Lessor may, at its sole option, remove and dispose of such property (with no obligation to sell or otherwise maintain such property in accordance with the Uniform Commercial Code), at Lessee's sole cost and expense, or Lessor may elect to own such property by written notice of such election provided. If Lessor makes an election under subpart (1) or (2) above and Lessee fails to comply with its obligations under this Section 9.03, then in such an event Lessor may restore the Property to its original topographical condition that existed as of the Effective Date, and remove all personal property and any improvements placed or constructed on the Property by or on behalf of Lessee from the Property, and Lessee shall be obligated to reimburse Lessor for the reasonable costs of such restoration, removal and disposal within ten (10) days of Lessor's demand for reimbursement. The terms of this section shall survive expiration or earlier termination of this Lease.

**9.04 Default by Lessor**. Notwithstanding any other provision of this Lease, if Lessor fails to perform any material obligation or breaches any covenant made to Lessee hereunder which, if capable of being cured, is not cured within thirty (30) days from the date that Lessee provides notice that corrective action is needed, Lessee may, in addition to all other remedies available to it, withhold or suspend payment of any amount due hereunder without prior notice to Lessor.

## X MISCELLANEOUS

**10.01 Taxes and Fees**.

**(a) Responsibility**. Lessor represents that it is exempt from taxation. Lessee shall timely pay all taxes imposed on Lessee that, if unpaid, would result in a lien or other encumbrance on the Property and that would adversely impact Lessor's interest in the Property, provided, however, that Lessee may, in good faith, and at its sole cost, contest any such taxes or assessments, and shall be obligated to pay the contested amount only if and when finally determined to be owed by the applicable governmental authority.

**(b) Proceedings**. Lessee may (but is not required to) prosecute any administrative or judicial proceedings relating to the Project and the rights conveyed herein including, but not limited to, contesting any taxes or fees assessed or levied upon the Project as a result of Lessee's equipment, leasehold or easement interest, or operations hereunder. With the express prior written consent of Lessor, Lessee may undertake any administrative or judicial proceeding in the name of Lessor.

**10.02 Force Majeure**. If, and while, operation of the Project is delayed or interrupted as a result of events beyond the reasonable control of Lessee, such as (but not limited to) hurricanes, floods, other acts of God, fire, war, pandemic, or action or inaction by any governmental authority other than Lessor, Lessee shall be excused from non-performance (including the payment of any True-Up Payment, if applicable) during the pendency of the direct interruptive effect of such events on operations at the Facility.

**10.03 As Is, Where Is. LESSEE HAS HAD THE OPPORTUNITY TO INSPECT THE PHYSICAL AND TOPOGRAPHIC CONDITION OF THE PROPERTY AND ACCEPTS SAME "AS IS" IN ITS EXISTING PHYSICAL AND TOPOGRAPHIC CONDITION. LESSEE IS NOT RELYING ON ANY REPRESENTATION OR WARRANTY OF THE LESSOR REGARDING ANY ASPECT OF THE PROPERTY, BUT IS RELYING ON LESSEE'S OWN INSPECTION OF THE PREMISES AND PROPERTY. LESSOR DISCLAIMS ANY AND ALL WARRANTIES OF HABITABILITY, MERCHANTABILITY, SUITABILITY, FITNESS FOR ANY PURPOSE, AND ANY OTHER WARRANTY WHATSOEVER NOT EXPRESSLY SET**

DocuSign Envelope ID: 79259559-F6E4-4E20-B8CE-8456B6E8CF46

**FORTH IN THIS LEASE. LESSEE WILL MAKES ITS OWN DETERMINATION OF THE USABILITY OF THE PROPERTY FOR THE PROJECT. LESSEE IS HEREBY PUT ON NOTICE THAT ANY PRIOR GRANTS OF RIGHTS AND/OR ENCUMBRANCES MAY BE OF RECORD AND LESSEE IS ADVISED TO EXAMINE ALL RECORDS OF THE STATE AND COUNTY IN WHICH THE PROPERTY IS LOCATED. THE USE OF THE TERMS "GRANT" AND/OR "CONVEY" EXPRESSLY DO NOT IMPLY OR CREATE ANY WARRANTIES OF TITLE. THE TERMS OF THIS SECTION SHALL SURVIVE EXPIRATION OR EARLIER TERMINATION OF THIS LEASE.**

**10.04 Notices.** All notices given pursuant to this Lease shall be in writing, and may be sent by (a) first class U.S. mail postage prepaid, certified, return receipt requested or (b) overnight mail, in each case addressed to the Party to be notified at the address listed for such Party above. The date that the certified letter is signed for or refused by the recipient, or, as applicable, the overnight mail is delivered to or refused by the recipient is the date that the notice is "received" under this Lease, including for purposes of Section 9.01(b), above. A copy of such notice shall also be provided by email, if to Lessor, to the Deputy Director of Energy Resources for the Texas General Land Office, or other express designee of Lessor, and if to Lessee, to the attention of the Executive Vice President and General Counsel. A Party may change its address for notice by giving notice to the other Party.

**10.05 Audits.** Lessor shall have the right, no more than once per Lease Year, personally or by representative, to inspect the proprietary books, accounts, contracts, records and data of Lessee solely as they pertain to the operation of the Project (including permit status), storage of CO2 in the Storage Unit, calculation of the Royalty (including all documents and information related to Facility Proceeds and Recaptured Amounts), and any other matter reasonably deemed subject to the terms of this Lease so long as such audit process is conducted during regular business hours at Lessee's principal place of business; provided however, Lessee shall not be required to provide any copies of Lessee's proprietary books, accounts, contracts, records and data for review by Lessor outside of Lessee's principal place of business.

**10.06 Memorandum of Lease.** Lessee shall, at its sole cost and expense, record a Memorandum of Lease in the form of **Exhibit B** attached hereto (the "**Memorandum**") in the Official Public Records of the county or counties in which the Property is located and provide a file marked copy of same to Lessor within sixty (60) days after this Lease is executed by all Parties.

**10.07 Counterparts.** This Lease may be executed in counterparts, each of which shall be considered an original for all purposes.

**10.08 Assignments.** The interests of Lessor under this Lease may be freely assigned. The interests of Lessee under this Lease may be assigned on the prior written consent of Lessor (not to be unreasonably withheld, conditioned, delayed, or denied), but not otherwise; provided, however, the interests of Lessee may, upon written notice thereof provided to Lessor, be freely assigned without the prior consent of Lessor to any affiliate of Lessee that agrees in writing to assume and be bound by the obligations of "Lessee" hereunder (with a copy of such assumption provided to Lessor). For purposes of the foregoing, an "affiliate" of Lessee is an entity that (i) owns more than 50% of, or otherwise has a controlling managerial interest in, Lessee, (ii) is more than 50% owned by, or is controlled by, Lessee, or (iii) is under common ownership and control with Lessee in a single "family" of entities ultimately owned and controlled by the same entity.

**10.09 Protection of Natural and Historical Resources. LESSEE IS EXPRESSLY PLACED ON NOTICE OF THE NATIONAL HISTORICAL PRESERVATION ACT OF 1966 (16 USC § 470, ET SEQ.) AND THE TEXAS ANTIQUITIES CODE (TEX. NAT. RES. CODE CH. 191), AS THE SAME MAY BE AMENDED FROM TIME TO TIME. IN THE EVENT THAT ANY SITE,**

DocuSign Envelope ID: 79259559-F6E4-4E20-B8CE-8456B6E8CF46

**OBJECT, LOCATION, ARTIFACT OR OTHER FEATURE OF ARCHEOLOGICAL, SCIENTIFIC, EDUCATIONAL, CULTURAL OR HISTORIC INTEREST IS ENCOUNTERED DURING ANY ACTIVITY ON ANY PORTION OF THE PROPERTY OWNED IN FEE BY LESSOR, LESSEE SHALL IMMEDIATELY CEASE SUCH ACTIVITIES AND SHALL IMMEDIATELY NOTIFY LESSOR AND THE TEXAS HISTORICAL COMMISSION, P.O. BOX 12276, AUSTIN, TEXAS 78711, SO THAT ADEQUATE MEASURES MAY BE UNDERTAKEN TO PROTECT OR RECOVER SUCH DISCOVERIES OR FINDINGS, AS APPROPRIATE. IN THE EVENT LESSEE IS REQUIRED TO CEASE ACTIVITIES UNDER THE LEASE AS TO ANY PORTION OF THE PROPERTY, THE TRUE-UP PAYMENT SET FORTH IN SECTION 3.01(E) SHALL NOT APPLY FOR ANY PERIOD FOR WHICH LESSEE IS REQUIRED TO CEASE ACTIVITIES.**

**10.10 Governing Law and Venue; Compliance with Laws.** This Lease shall be governed by the laws of the State of Texas. Exclusive venue for any dispute arising under or relating to this Lease shall be in any court of competent jurisdiction in Travis County, Texas. Lessor and Lessee agree that each of them will comply with all applicable federal, state and local laws and all applicable ordinances, rules, orders, and regulations of any authority having jurisdiction over the activities of Lessor or Lessee under this Lease.

**10.11 Non-Binding Mediation.** The Parties may agree at any time to mediate any dispute arising under Section 3.03, 4.01 or 9.01 of this Lease through an impartial third party. If both Parties agree to mediation, (i) the Parties will convene within a reasonable time with a professional mediator mutually agreed upon by the Parties, and (ii) representatives of each Party will make reasonable efforts to attend meetings and participate in telephone conferences or video conferences as reasonably requested by either Party. If (A) the dispute is not resolved within thirty (30) business days after the first convening with a mediator as described above, or (B) the Parties cannot agree to mediate, either Party may declare an impasse, which will conclude the mediation process. Thereafter, the Parties shall be entitled to seek all remedies available at law or in equity. Nothing in this Lease, including in this Section 10.11, shall be construed as a waiver by Lessor of its sovereign immunity from suit of from damages.

**10.12 Further Assurances.** The Parties shall take all further actions and shall execute and deliver to the other any document or instrument which is necessary to fully carry out the transactions contemplated by this Lease. The Parties shall cooperate with each other and act in good faith to accomplish the purposes of this Lease.

**10.13 Lessee Liability. LESSEE SHALL BE FULLY LIABLE AND RESPONSIBLE FOR ANY DAMAGE, OF ANY NATURE, ARISING OR RESULTING FROM ITS OWN ACTS OR OMISSIONS RELATED TO ITS EXERCISE OF THE RIGHTS GRANTED HEREIN. LESSEE AGREES TO AND SHALL INDEMNIFY AND HOLD LESSOR, LESSOR'S OFFICERS, AGENTS, AND EMPLOYEES, HARMLESS FROM AND AGAINST CLAIMS, SUIT, COSTS, LIABILITY OR DAMAGES OF ANY KIND, INCLUDING STRICT LIABILITY CLAIMS, WITHOUT LIMIT AND WITHOUT REGARD TO CAUSE OF THE DAMAGES OR THE NEGLIGENCE OF ANY PARTY, AND WHETHER FOR DAMAGES TO PROPERTY OR THE ENVIRONMENT OR INJURY OR DEATH OF ANY PERSON, OR ANY COMBINATION THEREOF, EXCEPT FOR THE CONSEQUENCES OF THE GROSSLY NEGLIGENT ACTS OR WILLFUL MISCONDUCT OF LESSOR, LESSOR'S OFFICERS, AGENTS, OR EMPLOYEES, ARISING DIRECTLY OR INDIRECTLY FROM LESSEE'S OPERATION OF THE PROJECT, INCLUDING ITS SOLE USE OF THE PROPERTY AND THE FACILITY (OR ANY ADJACENT OR CONTIGUOUS PSF LAND) OR FROM ANY BREACH BY LESSEE OF THE TERMS CONTAINED HEREIN. THE PROVISIONS OF THIS SECTION SHALL SURVIVE EXPIRATION OR EARLIER TERMINATION OF THIS LEASE.**

DocuSign Envelope ID: 79259559-F6E4-4E20-B8CE-8456B6E8CF46

**10.14 Lessee Insurance.** Lessee shall obtain and maintain at all times during the Term of this Lease all of the insurances, and in the amounts, as were required pursuant to the RFP.

**10.15 Oil, Gas, and Other Assets Disclaimer.** The only rights pertaining to any asset of Lessor granted to Lessee under this Lease are those expressly set out herein with regard to construction, operation, and closure of the Facility on the Leased Property. Without limitation, and notwithstanding anything in this Lease to the contrary, the Parties acknowledge and agree Lessee shall in no way be entitled to any oil and/or gas rights owned or otherwise held by Lessor, and that this Lease shall in no way be construed as an agreement between Lessor and Lessee with respect to such oil and gas rights or interests or the production, sale, transfer or treatment of oil, gas or other hydrocarbons. Further, as between Lessor and Lessee, and subject to Section 10.16, Lessor (or its lessees, pursuant to agreements between them) shall retain all responsibility and obligation related to existing, or future, oil, gas or other mineral development on the Property including producing, shut-in or non-producing wells, platforms, pipelines and related infrastructure and equipment of any kind.

**10.16 Lessee's Information.** The Parties acknowledge that this Lease and Lessee's documents provided in compliance with this Lease, including information that may be provided in compliance with provisions in Section 2.03, Section 5.02, and Section 6.01 ("**Lessee's Information**") may be subject to the Texas Public Information Act as set forth in Chapter 552 of the Texas Government Code. Lessee shall have the right, as a third party, to seek to withhold all or part of Lessee's Information, including as set forth in Section 7.1.6 of the RFP, and to seek a determination from the Texas Attorney General in accordance with the Texas Public Information Act prior to the release of any Lessee Information. Lessor agrees to timely notify, and to reasonably cooperate with, including as set forth in Section 7.1.6 of the RFP, Lessee of any request for the release of Lessor's Information. Such reasonable cooperation shall include withholding information provided by Lessee to Lessor in compliance with this Lease pending any such determination by the Attorney General. Additionally, if the Parties agree that a request for Lessee's Information may be the subject of a shared exception to the Public Information Act, including homeland security, geological, or other exception, Lessor agrees to separately pursue a determination of the confidentiality from the Attorney General of the requested information.

**10.17 Miscellaneous.** This Lease may not be amended except in a writing signed by Lessor and Lessee. Nothing in this Lease shall be construed as creating any form of partnership of joint venture relationship between the Parties. No third party shall be deemed a third party beneficiary of this Lease. This Lease (which specifically incorporates the non-conflicting terms of the RFP, as described above) constitutes the entire agreement between Lessor and Lessee and supersedes all oral statements and prior understandings relating to the subject matter contained in this Lease. Except as set forth in this Lease, no representations, warranties, or agreements have been made by either Party to the other Party with respect to this Lease. If any part of this Lease is illegal, invalid or unenforceable under present or future laws, then the remainder of this Lease shall not be affected and in lieu of such part there shall be added a clause or provision as similar in terms to such illegal, invalid, or unenforceable part as may be legal, valid, and enforceable, and any affected part shall be severed from this Lease if necessary to enforce the remainder of this Lease.

**10.18 Change-in-Law.** Notwithstanding anything to the contrary herein, the Parties agree to negotiate in good faith for the purposes of amending this Lease in the future in order to (a) ensure compliance with existing, amended, and/or future rules, regulations, and/or administrative guidance promulgated by the EPA, RRC, TCEQ, IRS, Lessor, or any other regulatory or administrative body having jurisdiction and/or authority over tax credits, economic incentives, or other revenue generating structures applicable to Lessee's business and operations, consistent with Lessee's desire to execute a successful carbon capture and sequestration project; (b) ensure compliance with the all applicable law(s) or Applicable Procedure(s); or (c) address operational, market or commercial matters related to carbon capture and

sequestration projects. Further, the Parties agree to cooperate in good faith in connection with Lessee obtaining regulatory approvals and additional amendments to this Lease to expand the Property covered by this Lease if the Plume migrates through a pathway unpredicted by the storage reservoirs modeling into adjacent state-owned land or water bottoms (to the extent such additional acreage is available).

**10.19 Lender Protections.** Notwithstanding anything to the contrary contained in this Lease, Lessee shall have the right to grant one or more liens against, or security interests in, (i) any improvements and/or equipment of Lessee, and/or (ii) Lessee's leasehold interest in the Property, in each case, as security for any indebtedness of Lessee or its affiliates. In this regard, Lessor hereby agrees to use commercially reasonable efforts (without the obligation to incur any out-of-pocket expenses) to cooperate with Lessee's efforts in obtaining and maintaining financing for (x) the construction of the Storage Unit and any related improvements and/or equipment, (y) Lessee's leasehold interest under this Lease, and/or (z) Lessee's operations to be conducted on the Property. Furthermore, Lessor shall execute and deliver to Lessee any documents reasonably required by a title insurance company, a financing party or a third party, including estoppel certificates, in form and substance reasonably acceptable to Lessee, within ten (10) business days after presentation of said documents by Lessee; provided, however, that in no event shall such documents materially increase any obligation or materially decrease any right of Lessor hereunder.

[SIGNATURE PAGE FOLLOWS]

DocuSign Envelope ID: 79259559-F6E4-4E20-B8CE-8456B6E8CF46

Given under my hand and Seal of Office

**LESSOR**

**The State of Texas**

By: DocuSigned by: 7C299F4374E7497...

Chief Clerk and Deputy Land Commissioner,
Texas General Land Office
On behalf of the Permanent School Fund

**APPROVED:**

Staff: DS

Dir.: DS

OGC: DS

Exec.: DS

**LESSEE**

**Bayou Bend CCS LLC**

By:
Name: Tim Duncan
Title: President and Chief Executive Officer

STATE OF TEXAS §
§
COUNTY OF HARRIS §

This instrument was acknowledged before me on March 11, 2022, by Tim Duncan, President and Chief Executive Officer of Bayou Bend CCS LLC, a Delaware limited liability company, on behalf of said limited liability company.

JULIE PRATT
My Notary ID # 124482915
Expires December 27, 2024

Notary Public in and for the State of Texas

DocuSign Envelope ID: 79259559-F6E4-4E20-B8CE-8456B6E8CF46

**EXHIBIT A**

**DESCRIPTION OF PROPERTY**

All of Tract 5-S, Gulf of Mexico, Jefferson County, containing approximately 851.08 acres; and
All of Tract 6-S, Gulf of Mexico, Jefferson County, containing approximately 867.07 acres; and
All of Tract 7-S, Gulf of Mexico, Jefferson County, containing approximately 884.92 acres; and
All of Tract 8-S, Gulf of Mexico, Jefferson County, containing approximately 888.69 acres; and
All of Tract 22-S, Gulf of Mexico, Jefferson County, containing approximately 640.16 acres; and
All of Tract 23-S, Gulf of Mexico, Jefferson County, containing approximately 640.05 acres; and
All of Tract 24-S, Gulf of Mexico, Jefferson County, containing approximately 640.12 acres; and
All of Tract 25-S, Gulf of Mexico, Jefferson County, containing approximately 640.20 acres; and
All of Tract 34-S, Gulf of Mexico, Jefferson County, containing approximately 640.14 acres; and
All of Tract 35-S, Gulf of Mexico, Jefferson County, containing approximately 640.31 acres; and
All of Tract 36-S, Gulf of Mexico, Jefferson County, containing approximately 640.11 acres; and
All of Tract 37-S, Gulf of Mexico, Jefferson County, containing approximately 640.14 acres; and
All of Tract 38-S, Gulf of Mexico, Jefferson County, containing approximately 640.12 acres; and
All of Tract 39-S, Gulf of Mexico, Jefferson County, containing approximately 640.15 acres; and
W/2 of Tract 2-L, Gulf of Mexico, Jefferson County, containing approximately 2,881.33 acres; and
All of Tract 3-L, Gulf of Mexico, Jefferson County, containing approximately 5,761.42 acres; and
All of Tract 4-L, Gulf of Mexico, Jefferson County, containing approximately 5,761.59 acres; and
E/2 of Tract 5-L, Gulf of Mexico, Jefferson County, containing approximately 2,880.66 acres; and
E/2 of Tract 10-L, Gulf of Mexico, Jefferson County, containing approximately 2,880.45 acres; and
W/2 and N/2 NE/4 of Tract 11-L, Gulf of Mexico, Jefferson County, containing approximately 3,601.11 acres; and
N/2 NW/4 and NE/4 of Tract 12-L, Gulf of Mexico, Jefferson County, containing approximately 2,160.62 acres; and
W/2 of Tract 13-L, Gulf of Mexico, Jefferson County, containing approximately 2,880.74 acres; and
N/2 NE/4 and N/348.6 of S/2 of NE/4 of Tract 21-L, north of Three Marine League line, Gulf of Mexico, Jefferson County, containing approximately 1,068.92 acres; and
N/2 NW/4 and N/374.14 of S/2 of NW/4 of Tract 20-L, north of Three Marine League line, Gulf of Mexico, Jefferson County, containing approximately 1,094.24 acres.

DocuSign Envelope ID: 79259559-F6E4-4E20-B8CE-8456B6E8CF46

**EXHIBIT B**

**Form of Memorandum**

See attached.

DocuSign Envelope ID: 79259559-F6E4-4E20-B8CE-8456B6E8CF46

**EXHIBIT B**
**FORM OF MEMORANDUM**

NOTICE OF CONFIDENTIALITY RIGHTS: IF YOU ARE A NATURAL PERSON, YOU MAY REMOVE OR STRIKE ANY OF THE FOLLOWING INFORMATION FROM THIS INSTRUMENT BEFORE IT IS FILED FOR RECORD IN THE PUBLIC RECORDS: YOUR SOCIAL SECURITY NUMBER OR YOUR DRIVER'S LICENSE NUMBER.

**MEMORANDUM OF LEASE**

| | |
|---|---|
| State: | Texas |
| County: | Jefferson |
| Lessor: | State of Texas<br>General Land Office<br>1700 North Congress Avenue<br>Austin, TX 78701 |
| Lessee: | Bayou Bend CCS LLC |
| Effective Date: | April 1, 2022 |

1. This Memorandum of Lease (this "Memorandum") is entered into effective as of April 1, 2022 (the "Effective Date") by and between the State of Texas, acting by and through the Commissioner of the Texas General Land Office ("Lessor") and Bayou Bend CCS LLC ("Lessee"). Lessor and Lessee are hereinafter sometimes referred to singularly as a "Party" and collectively as the "Parties". Capitalized terms used in this Memorandum but not defined herein have the meaning ascribed to such terms in the Lease (defined below).

2. The Parties hereby acknowledge and give notice that Lessor and Lessee have entered into a Carbon Dioxide Transportation and Storage Lease dated April, 1 (the "Lease"), related to carbon dioxide sequestration operations by Lessee in, on, and under certain the Permanent School Fund lands in Jefferson County, Texas, which lands are more fully described in **Exhibit A** attached hereto (the "Leased Property"). In addition to the lease of the Leased Property to Lessee, Lessor hereby agrees that it will grant to Lessee the necessary easements, ingress and egress rights, rights-of-way, and surface locations over, across, and under certain tracts of land owned by the Permanent School Fund (the "Easement Tracts"), for the construction, installation, maintenance, and operation of pipelines, meters, and related equipment which are necessary for the transportation of CO2 from its source to the Leased Property and the measurement thereof. The Parties hereby agree to amend **Exhibit A** to this Memorandum to reflect any Easement Tracts conveyed by Lessor to Lessee. The Leased Property and the Easement Tracts are, collectively referred to herein and therein as, the "Property".

3. The Lease has been duly executed by Lessor and Lessee, but it has not been filed of record in the County Clerk's office of Jefferson County, Texas. Duplicate originals of the Lease are in possession of the Lessor and Lessee.

4. In the Lease, Lessor grants, leases and lets unto Lessee the exclusive right to geologically store anthropogenic carbon dioxide ("CO2") in a reservoir(s) and pore space in the

DocuSign Envelope ID: 79259559-F6E4-4E20-B8CE-8456B6E8CF46

Miocene Formation (as such term is defined under the most expansive definition required to ensure certification or classification of the CO2 sequestration as permanent under any protocols, standards, regulations or laws relevant to Lessee and its storage activities conducted pursuant to the Lease , the "Storage Unit"), together with the exclusive right to drill and to construct, maintain, and operate pipelines, flowlines, wells, fixtures, machinery, and any other equipment Lessee deems necessary for the purposes herein and in connection with such geologic storage (such Storage Unit, together with associated pipelines, wells, fixtures, machinery, and equipment, called the "Facility" herein, and the permitting, construction, and operation of the Facility, sometimes called the "Project" herein). It is the intent of Lessor and Lessee that all equipment, pipe, supports, facilities, meters, systems and ancillary items placed or maintained by Lessee on the Property shall be considered part of the Facility and shall be owned and controlled by Lessee except as provided for in the Lease.

5. The Term (as used herein) of the Lease begins on April 1, 2022, and shall consist, collectively, of each of the Development Term, Construction Term, and Operations Term, as well as the accompanying Development Term Extension Period and Construction Term Extension Period (as those terms are defined in the Lease), as well as the closure and monitoring period following the Operations Term.

6. The Lease contains certain payment terms and obligations, as well as specific termination rights exercisable by one or more of the Parties.

7. Section 1.05(a) of the Lease provides, in part, that during the Term, under no circumstance shall any well bore be drilled through the Storage Unit, nor shall the Storage Unit be exposed to communication with any well bore (each of which, a "Drill-Through Restriction"). PRIOR TO CONDUCTING ANY HYDROCARBON DRILLING OR EXTRACTION ACTIVITIES ON OR NEAR THE PROPERTY, A LESSEE OR OPERATOR OF A STATE LEASE OR OPERATING AGREEMENT MUST FORBEAR FROM ANY ACTIVITIES THAT VIOLATE OR POTENTIALLY VIOLATE THE DRILL-THROUGH RESTRICTIONS.

8. Section 1.05(b) of the Lease provides, in part, that as a condition of any future state lease on any part of the Property or the grant of any lease, easement or access rights to the Property, Lessor shall require the lessee or holder of such lease, easement or access rights to expressly indemnify and defend Lessee for all claims for damages or losses (including losses attributable to Carbon Credits previously realized by Lessee which are recaptured or otherwise disallowed) that Lessee may suffer or incur as a result of such party's activities, including such losses or damages, including legal fees, that result from any Leak Event. Such indemnity shall be (A) set forth in a separate written agreement between Lessee and the lessee or holder of such lease, easement or access right, and (B) be backed by adequate financial security (i.e. posting of bonds, letters-of-credit, or other financial assurance) in favor of Lessee and its designees, in each case of (A) and (B), in a form reasonably acceptable to Lessee. PRIOR TO CONDUCTING ANY HYDROCARBON DRILLING OR EXTRACTION ACTIVITIES ON OR NEAR THE PROPERTY, A LESSEE OR OPERATOR OF A STATE LEASE OR OPERATING AGREEMENT SHALL (1) DELIVER A SEPARATE WRITTEN INDEMNITY AGREEMENT TO LESSEE, AND (2) OBTAIN ADEQUATE FINANCIAL SECURITY IN FAVOR OF

DocuSign Envelope ID: 79259559-F6E4-4E20-B8CE-8456B6E8CF46

LESSEE AND ITS DESIGNEES, IN EACH CASE OF (1) AND (2), IN SUBSTANCE AND FORM REASONABLY ACCEPTABLE TO LESSEE.

9. The interests of Lessor under the Lease may be freely assigned. The interests of Lessee under the Lease may be assigned on the prior written consent of Lessor (not to be unreasonably withheld, conditioned, delayed, or denied), but not otherwise; provided, however, the interests of Lessee may, upon written notice thereof provided to Lessor, be freely assigned without the prior consent of Lessor to any affiliate (as such term is defined in the Lease) of Lessee that agrees in writing to assume and be bound by the obligations of "Lessee" hereunder (with a copy of such assumption provided to Lessor). Nothing contained in the Lease will be construed as creating a partnership, joint venture, association, trust, mining partnership, or other entity, whether for state law or federal income tax purposes.

10. The Lease contains other terms and provisions not herein set forth but incorporated by reference herein for all purposes. This Memorandum is executed for the purposes of placing all parties dealing with the Property, or with the improvements constructed on said Property, on notice of the existence of the referenced Lease and, where appropriate, its contents. This Memorandum does not modify the Lease. In the event of any conflict between the terms of this Memorandum and the Lease, the Lease shall control.

[SIGNATURE PAGE FOLLOWS]

DocuSign Envelope ID: 79259559-F6E4-4E20-B8CE-8456B6E8CF46

EXECUTED this ____ day of March, 2022.

Given under my hand and Seal of Office

**LESSOR**

**The State of Texas**

By: _____
Mark Havens

Chief Clerk and Deputy Land Commissioner,
Texas General Land Office
On behalf of the Permanent School Fund

**LESSEE**

**Bayou Bend CCS LLC**

By: _____
Name: Tim Duncan
Title: President and Chief Executive Office

**APPROVED:**

Staff: _____

Dir.: _____

OGC: _____

Exec.: _____

DocuSign Envelope ID: 79259559-F6E4-4E20-B8CE-8456B6E8CF46

STATE OF TEXAS §
§
COUNTY OF HARRIS §

This instrument was acknowledged before me on March ___, 2022, by Tim Duncan, President and Chief Executive Officer of Bayou Bend CCS LLC, a Delaware limited liability company, on behalf of said limited liability company.

_____
Notary Public, State of Texas

DocuSign Envelope ID: 79259559-F6E4-4E20-B8CE-8456B6E8CF46

**EXHIBIT A**
**PROPERTY**

All of Tract 5-S, Gulf of Mexico, Jefferson County, containing approximately 851.08 acres; and
All of Tract 6-S, Gulf of Mexico, Jefferson County, containing approximately 867.07 acres; and
All of Tract 7-S, Gulf of Mexico, Jefferson County, containing approximately 884.92 acres; and
All of Tract 8-S, Gulf of Mexico, Jefferson County, containing approximately 888.69 acres; and
All of Tract 22-S, Gulf of Mexico, Jefferson County, containing approximately 640.16 acres; and
All of Tract 23-S, Gulf of Mexico, Jefferson County, containing approximately 640.05 acres; and
All of Tract 24-S, Gulf of Mexico, Jefferson County, containing approximately 640.12 acres; and
All of Tract 25-S, Gulf of Mexico, Jefferson County, containing approximately 640.20 acres; and
All of Tract 34-S, Gulf of Mexico, Jefferson County, containing approximately 640.14 acres; and
All of Tract 35-S, Gulf of Mexico, Jefferson County, containing approximately 640.31 acres; and
All of Tract 36-S, Gulf of Mexico, Jefferson County, containing approximately 640.11 acres; and
All of Tract 37-S, Gulf of Mexico, Jefferson County, containing approximately 640.14 acres; and
All of Tract 38-S, Gulf of Mexico, Jefferson County, containing approximately 640.12 acres; and
All of Tract 39-S, Gulf of Mexico, Jefferson County, containing approximately 640.15 acres; and
W/2 of Tract 2-L, Gulf of Mexico, Jefferson County, containing approximately 2,881.33 acres; and
All of Tract 3-L, Gulf of Mexico, Jefferson County, containing approximately 5,761.42 acres; and
All of Tract 4-L, Gulf of Mexico, Jefferson County, containing approximately 5,761.59 acres; and
E/2 of Tract 5-L, Gulf of Mexico, Jefferson County, containing approximately 2,880.66 acres; and
E/2 of Tract 10-L, Gulf of Mexico, Jefferson County, containing approximately 2,880.45 acres; and
W/2 and N/2 NE/4 of Tract 11-L, Gulf of Mexico, Jefferson County, containing approximately 3,601.11 acres; and
N/2 NW/4 and NE/4 of Tract 12-L, Gulf of Mexico, Jefferson County, containing approximately 2,160.62 acres; and
W/2 of Tract 13-L, Gulf of Mexico, Jefferson County, containing approximately 2,880.74 acres; and
N/2 NE/4 and N/348.6 of S/2 of NE/4 of Tract 21-L, north of Three Marine League line, Gulf of Mexico, Jefferson County, containing approximately 1,068.92 acres; and
N/2 NW/4 and N/374.14 of S/2 of NW/4 of Tract 20-L, north of Three Marine League line, Gulf of Mexico, Jefferson County, containing approximately 1,094.24 acres.

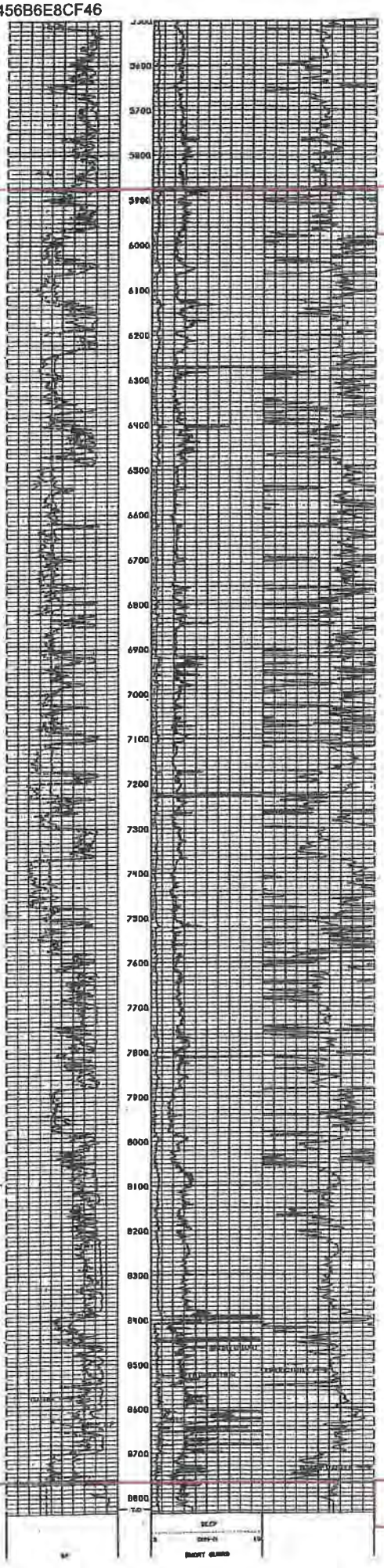
DocuSign Envelope ID: 79259559-F6E4-4E20-B8CE-8456B6E8CF46

# EXHIBIT C

## Miocene Formation

See attached.

DocuSign Envelope ID: 79259559-F6E4-4E20-B8CE-8456B6E8CF46




Base/*Amphistegina B* Shale

Miocene Formation

High Island 4L
Transco (Forest) #1
API 427083032500

Base/*Siphonina Davisi* Sand

DocuSign Envelope ID: 79259559-F6E4-4E20-B8CE-8456B6E8CF46

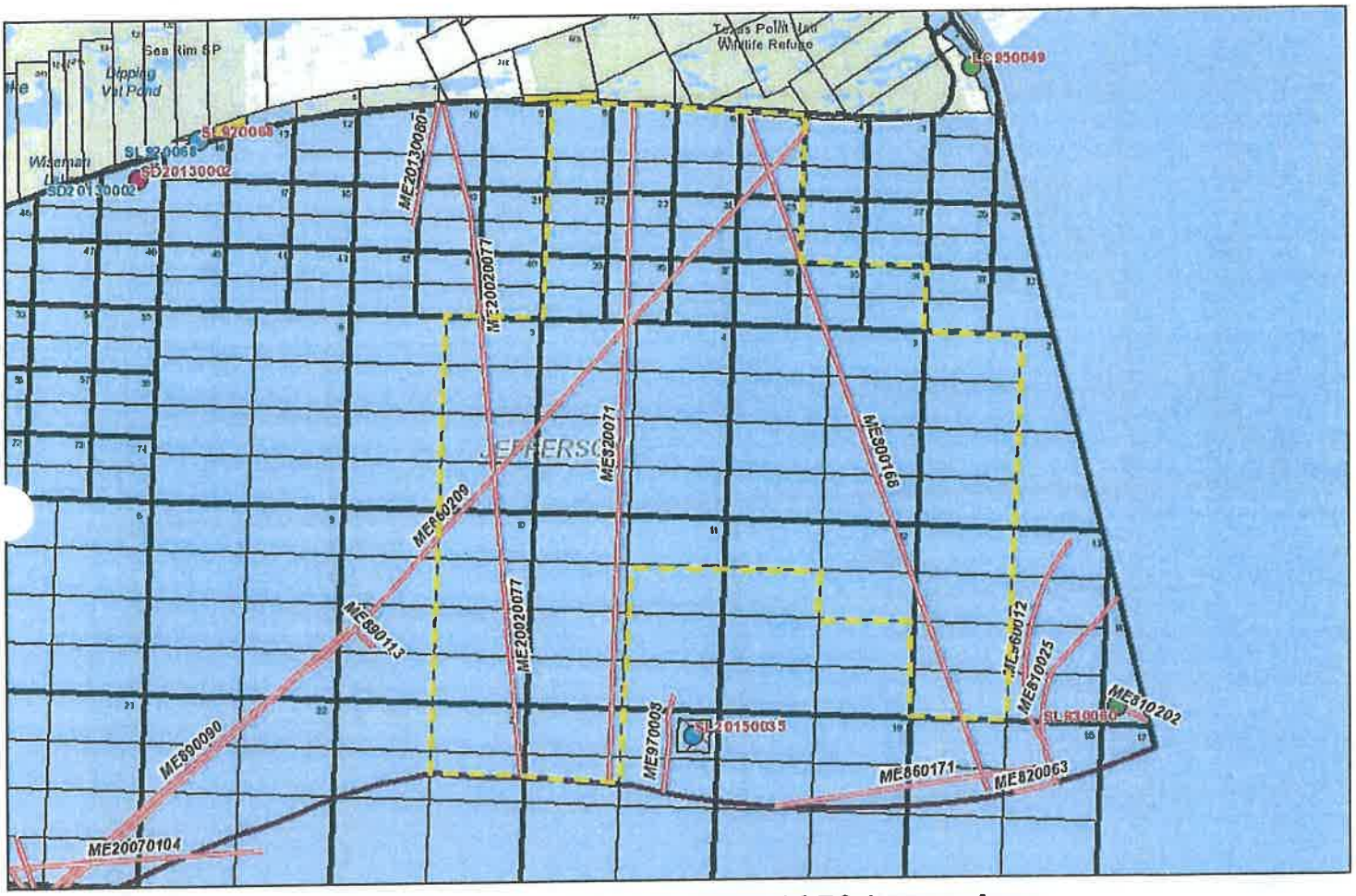
## Schedule 2.06

**Authority of Lessor**

| GLO Lease No. | Description* |
|---|---|
| ME20020077 | one (1) 24-inch O.D. pipeline for the purpose of transporting crude oil and other petroleum products |
| ME800168 | one (1) 8.625-inch O.D. pipeline for the purpose of transporting crude oil |
| ME820071 | one (1) 16-inch O.D. pipeline for the purpose of transporting natural gas |
| ME860209 | one (1) 24-inch O.D. pipeline for the purpose of transporting natural gas and condensate |

* more fully depicted in the attached graphics that follow

DocuSign Envelope ID: 79259559-F6E4-4E20-B8CE-8456B6E8CF46



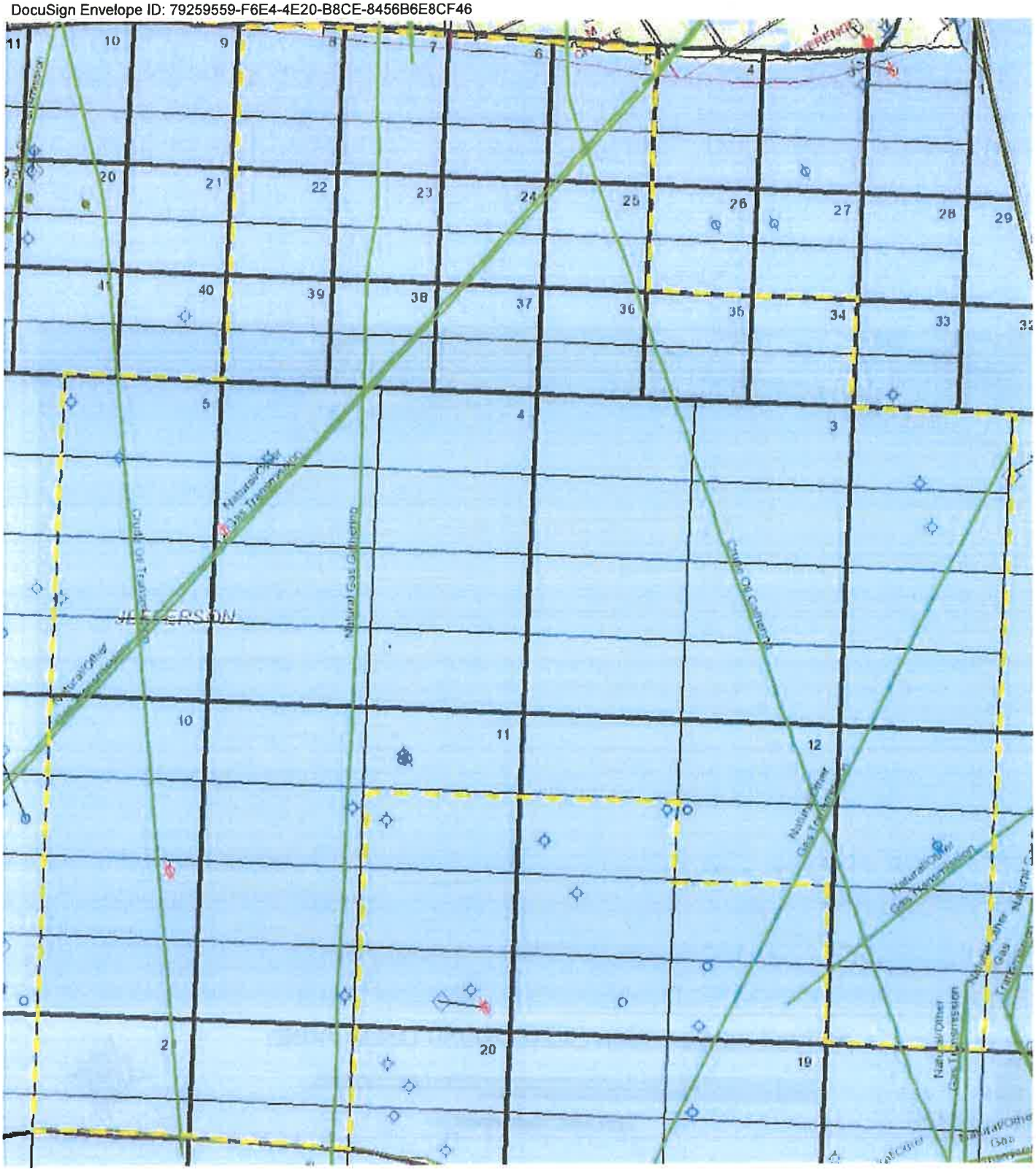

# Active Leases within SL20220050 Lease Area

Please review all copyright and disclaimer information from our webpage here, https://www.glo.texas.gov/policy/index.html. The Texas General Land Office makes no representations or warranties regarding the accuracy or completeness of the information depicted on this map or the data from which it was produced. This map is not suitable for navigational purposes and does not purport to depict boundaries of private and public land.

0 1 2 4 mi

Print Date: 3/9/2022

DocuSign Envelope ID: 79259559-F6E4-4E20-B8CE-8456B6E8CF46



| GLO Lease No. | Description |
|---|---|
| ME20020077 | one (1) 24-inch O.D. pipeline for the purpose of transporting crude oil and other petroleum products |
| ME800168 | one (1) 8.625-inch O.D. pipeline for the purpose of transporting crude oil |
| ME820071 | one (1) 16-inch O.D. pipeline for the purpose of transporting natural gas |
| ME860209 | one (1) 24-inch O.D. pipeline for the purpose of transporting natural gas and condensate |

**CARBON-DIOXIDE STORAGE AGREEMENT**

**La. R.S. 30:209(4)(e) Operating Agreement**

**STATE OF LOUISIANA**

**PARISH OF EAST BATON ROUGE**

THIS Operating Agreement (this "**Agreement**"), is entered into on the 13th day of October, 2021, to be effective on the Effective Date, by and between:

(1) The State of Louisiana, and as to only "Specific Area of Interest A" described herein, the Louisiana Department of Wildlife & Fisheries and the Louisiana Wildlife & Fisheries Commission ("**DWF**") (collectively referred to herein as "**State**") acting through its authorized agent, the Louisiana State Mineral and Energy Board ("**Board**"), represented and undersigned by Jamie S. Manuel duly authorized and whose mailing address is Post Office Box 2827, Baton Rouge, Louisiana 70821-2827; and

(2) Air Products Blue Energy LLC, a Delaware limited liability company ("**AP**" or "**Operator**"), represented herein by Seifollah Ghasemi duly authorized by a resolution of AP's Sole Member, a copy of which resolution is attached hereto and made a part hereof as Exhibit "A" and whose address is 1940 Air Products Blvd, Allentown, PA 18106-5500

In this Agreement, the State and AP may be referred to collectively as the "**Parties**" and individually as a "**Party**."

**WHEREAS**, the State is the owner of the Property located in the Parishes of Livingston, St. James, St. John the Baptist, Cameron, and Tangipahoa, State of Louisiana; and

**WHEREAS**, the properties that are the subject of this Agreement are approximately 122,455 acres in the parishes stated herein and are more particularly described below and depicted on Exhibits "B, C, and D", attached hereto and made a part hereof; and

**WHEREAS**, La. R.S. 56:1 delegates the Louisiana Wildlife & Fisheries Commission with the responsibility for protecting, conserving, and replenishing the natural resources of the State, subject to its supervision and control; and

INDUSTRIAL COMMISSION
STATE OF NORTH DAKOTA
DATE 6/13/24 CASE NO 30869-880
Introduced By Braaten
Exhibit LO-45
Identified By Stockness / Swenson.

EXHIBIT
tabbies
LO-45
30869-30880

**WHEREAS**, La. R.S. 56:6(19) requires that the Louisiana Wildlife & Fisheries Commission, through its Secretary, shall in every possible way develop to their fullest proportions the natural resources of the State that are under its jurisdiction; and

**WHEREAS**, La. R.S. 56:8(117) defines Secretary as the secretary of the Department of Wildlife and Fisheries; and

**WHEREAS**, the Louisiana Department of Wildlife & Fisheries is an agency of the State as defined by La. R.S. 30:151; and

**WHEREAS**, DWF and the Board have entered into an Inter-Agency Agreement ("**IAA**") which authorizes the Board to administer the properties owned by or under the jurisdiction of DWF for purposes of subsurface storage and pore space rights; and

**WHEREAS**, the IAA authorizes the Board to negotiate, award, administer and manage the existing and future oil and gas leases, operating agreements, subsurface storage agreements, and related activities/operations on DWF agency lands, and the Board, through the Office of Mineral Resources ("**OMR**"), has agreed to perform such services; and

**WHEREAS**, pursuant to La. R.S. 30:209, the State has the authority, upon a two-thirds vote of the members of the Board and after a public hearing conducted in the affected parish pursuant to La. R.S. 30:6, to enter into operating agreements whereby the State receives a share of revenues from the storage of Carbon Dioxide in whole or in part, as may be agreed upon by the Parties, in those situations where the Board determines it is in the best interest of the State either in equity or in the promotion of conservation to do so. The Board's authority expressly extends to, but is not limited to, establishing a contractual agreement on unleased acreage to promote utilization of the State's resources for Carbon Dioxide Storage. Further, pursuant to La. R.S. 30:209, the Board may do all other things that may appear to be necessary or desirable; and

**WHEREAS**, pursuant to La. R.S. 30:135, the Department of Natural Resources ("**DNR**"), through OMR, shall provide the necessary staff functions to assist the Board in its leasing, supervisory, and other activities; and

**WHEREAS**, this Agreement is entered into for the purpose of injecting Carbon Dioxide into certain geological strata or formations for permanent storage, in the general vicinity of the Properties more fully described below ("**Storage Reservoirs**"); and

**WHEREAS**, the Parties now enter into this Agreement to effect its terms and intent for the Injection, Storage, transportation, shipment, and Withdrawal of Carbon Dioxide Stream(s) and for all other purposes necessary or incidental thereto.

**NOW, THEREFORE**, the Parties, in consideration of the premises and the mutual benefits to be derived respectively by the State and AP, and the covenants and conditions set forth below, together with good and valuable consideration, the adequacy and sufficiency of which is hereby acknowledged and confessed by both Parties hereto, the State and AP do hereby agree and stipulate as follows:

The properties subject to this Agreement constitute approximately 122,455 acres and are situated in the Parishes of Livingston, St. James, St. John the Baptist, Cameron, and Tangipahoa, State of Louisiana, and are more particularly described as follows:

"**Specific Area of Interest A**" includes a tract comprised of 33,146 acres located in the Canal Bank area of the Maurepas Swamp Wildlife Management Area as more particularly described in Exhibit "B" to this Agreement;

"**Specific Area of Interest B**" includes the tract comprised of 57,100 acres consisting of Lake Maurepas as more particularly described in Exhibit "C" to this Agreement; and

**"Specific Area of Interest C"** includes the tract comprised of 32,209 acres consisting of Sabine Lake as more particularly described in Exhibit "D" to this Agreement.

Hereinafter, Specific Areas of Interest A, B, and C may be referred to collectively as "**Property**" or individually as a **"Specific Area of Interest"**.

**FURTHERMORE**, the Parties agree and acknowledge that this Agreement allows AP to inject and store Carbon Dioxide Stream(s) beneath the Property only in the Storage Reservoirs thereof and for all other purposes necessary or incidental thereto and to create a limited relationship between the Parties whereby the State (i) will receive a share of revenues from the Storage of Carbon Dioxide Stream(s), as reflected in this Agreement, and (ii) will assume a portion of the risk

of the cost of such activities and the operation of Facilities as reflected in this Agreement, as the Board has determined that it is in the best interest of the State in equity and in the promotion of conservation to do so.

## Article 1 - Definitions

1.1 "**Applicable Law(s)**" means any applicable, valid, final, and non-appealable federal or state statute, law, rule, regulation, or order, or any judicial decision, as may now be in effect or which may be enacted, adopted, or made effective at a future date. Applicable Laws include, without limitation, all statutes, laws, rules, regulations, orders, and judicial decisions that pertain to geologic or geophysical assessment of the Property, or construction, operation, monitoring, reporting, verification or closure of the Facilities, and any future amendments thereof, including, without limiting the generality of the foregoing, all such matters that pertain to protection of the environment, environmental matters, pollutants, minimum water quality standards, dredging, filling, local navigation, and/or health and safety matters.

1.2 "**Applicable Procedure(s)**" means the valid, final, and non-appealable standards, public processes, procedures, and rules applicable to the regulation of the Facilities, to the extent applicable, by the U.S. Environmental Protection Agency ("**EPA**"), Louisiana Office of Conservation ("**OC**"), DNR, and the Louisiana Department of Environmental Quality ("**DEQ**"), as well as any other State or federal regulatory bodies having jurisdiction over all or a part of any one or all of the Facilities.

1.3 "**Associated Substances**" means substances associated with, contained in, or incidental to the capture and/or Storage of Carbon Dioxide.

1.4 "**Carbon Dioxide**" means carbon dioxide including its derivatives and all mixtures, combinations, and phases, whether liquid or gaseous, stripped, segregated, or divided from any other stream, or produced from a chemical reaction.

1.5 "**Carbon Dioxide Stream(s)**" means a stream of Carbon Dioxide, plus Associated Substances and any substances added to the stream to enable or improve the Injection process. This subpart does not apply to any carbon dioxide stream, the Injection of which would be prohibited under Applicable Law(s).

1.6 **"Contract Year"** means the calendar year beginning on the Effective Date of this Agreement and ending on the first anniversary of the Effective Date and for every year thereafter from anniversary date to anniversary date.

1.7 **"Drill"** or **"Drilling"** means the act of boring a hole to reach a proposed location under the Property.

1.8 The term **"AP Group"** as used throughout this Agreement, means and includes AP and its directors, members, partners (general and limited), officers, agents, employees, contractors, subcontractors (of any tier), other representatives, and insurers, and each of its subsidiaries and affiliates, successors and assigns and their directors, members, partners (general and limited), officers, agents, employees, contractors, subcontractors, other representatives, and insurers, and each of them.

1.9 **"Facility/Facilities"** means the underground storage facility or facilities, including but not limited to, the Storage Reservoirs, and all related surface and subsurface Improvements and Equipment associated with underground Carbon Dioxide Storage in the Storage Reservoirs on or under the Property. When used in the singular it shall refer to one of the facilities located on or under the Property, and when used in the plural it shall refer to all of the facilities located on and under the Property.

1.10 **"Improvements and Equipment"** means all wells, pads, fixtures, equipment, machinery, and tools, including all pipelines, pipe, pipe casing, separators, condensers, evaporators, holding tanks, generators, compression equipment, measurement equipment, monitoring or testing devices or equipment, utility lines and facilities and any other surface or subsurface structures or equipment, and all alterations, additions, replacements, materials, parts, and components thereof, made, placed, installed or used, on, in or under the Property by AP.

1.11 **"Injection"** or **"Injected"** means the deposit of a Carbon Dioxide Stream into any of the Facilities.

1.12 **"Sequestration Protocols"** means any other protocols, standards, regulations or laws in addition to the obligations imposed by this Agreement, Applicable Law(s) and Applicable Procedure(s) relevant to AP and its Storage activities conducted pursuant to this

Agreement. To remove any doubt, the Sequestration Protocols shall not result in AP performing its obligations under this Agreement to a lesser standard than required under any Applicable Law(s), any Applicable Procedure(s) or this Agreement.

1.13 "**Storage**" means the activity of Injection or subsurface containment and/or Withdrawal of a Carbon Dioxide Stream into or from any of the Facilities, together with related Drilling, well completion, transportation, and all other operations conducted on or within any of the Facilities, and any other activities necessary or incidental thereto.

1.14 "**Storage Reservoir(s)**" means the geologic formation(s), reservoirs, saline aquifers, and pore space beneath the Property or Properties that have been or will be approved for Storage prior to Injection by the Louisiana Commissioner of Conservation in accordance with Applicable Law(s) and Applicable Procedure(s).

1.15 "**Withdrawal**" means the removal of any portion of a Carbon Dioxide Stream from any of the Facilities for the purpose of pressure or other maintenance or protection of the environment and public safety, all in accordance with and subject to Applicable Law(s), Applicable Procedure(s) and Sequestration Protocols. Withdrawal shall not include the withdrawal of any portion of a Carbon Dioxide Stream for the purpose of selling Carbon Dioxide, using Carbon Dioxide for other commercial purposes, or intentionally releasing the Carbon Dioxide Stream into the atmosphere, except as contemplated in this definition.

## Article 2 - Approval Process

2.1 Advertisement and Public Hearing. The Board, through OMR, shall cause this Agreement to be advertised in compliance with Applicable Law(s), and shall conduct a public hearing or hearings pursuant to and in accordance with La. R.S. 30:6, as required by La. R.S. 30:209 (the "**Public Hearing(s)**").

2.2 Approval or Disapproval. Following the Public Hearing(s), the Board shall render its determination regarding approval or disapproval of this Agreement at a Board meeting. If the Board approves this Agreement by a two-thirds vote of its members, as required by La. R.S. 30:209, this Agreement shall be effective as stated in Section 2.3.

2.3 Effective Date. The "**Effective Date**" of this Agreement shall be the first date on which both of the following have occurred:

a) This Agreement has been signed by the duly authorized representative of AP;

AND

b) This Agreement has been approved by the Board in accordance with Section 2.2.

## Article 3 - Term

3.1 With respect to the termination and maintenance provisions set forth in the remainder of Article 3, each Specific Area of Interest shall be treated as completely separate areas. Pursuant to the provisions below, an action taken with respect to one Specific Area of Interest shall not apply to or affect another Specific Area of Interest. Thus, pursuant to the remaining provisions of Article 3, this Agreement may be maintained with respect to one Specific Area of Interest, and this Agreement may terminate with respect to another Specific Area of Interest.

3.2 Subject to earlier expiration because of the commencement of the Permit/Construction Term, the first three (3) years following the Effective Date of this Agreement shall be the "**Initial Term**". This Agreement shall terminate at the end of the Initial Term with respect to a Specific Area of Interest on which AP has failed to apply for a permit to construct a Class VI injection well. However, upon a showing of good cause by AP (with such cause to be confirmed by the State), this Agreement may be extended for up to an additional two (2) years at the end of the Initial Term (**"Initial Discretionary Term"**) with respect to any Specific Area of Interest on which AP has failed to apply for a permit to construct a Class VI injection well. In order for AP to exercise this option, AP shall notify the State at least ninety (90) days prior to the expiration of the Initial Term that it wishes to exercise this option. If extended by an Initial Discretionary Term, then this Agreement shall terminate at the end of the Initial Discretionary Term with respect to any Specific Area of Interest on which AP has failed to apply for a permit to construct a Class VI injection well.

3.3 If prior to the end of the Initial Term or the Initial Discretionary Term (if applicable), AP has applied for a permit to construct a Class VI injection well on any Specific Area of Interest, then this Agreement shall be maintained only with respect to that individual Specific Area of Interest for an additional four (4) years from the end of the Contract Year in which the permit application is made (**"Permit/Construction Term"**). This Agreement shall terminate at the end of the Permit/Construction Term with respect to a Specific Area of Interest on which AP

has failed to begin Injection. However, at the end of the Permit/Construction Term, this Agreement may be extended, upon a showing of good cause by AP (with such cause to be confirmed by the State), for up to four (4) additional one-year periods ("**Permit/Construction Discretionary Term(s)**") with respect to any Specific Area of Interest on which AP has failed to begin Injection. In order for AP to exercise this option, AP shall notify the State at least ninety (90) days prior to the expiration of the Permit/Construction Term or the Permit/Construction Discretionary Term(s) (if applicable) that it wishes to exercise this option. This Agreement shall terminate at the end of the Permit/Construction Discretionary Term(s) with respect to any Specific Area of Interest on which AP has failed to begin Injection.

3.4 If prior to the end of the Permit/Construction Term or the Permit/Construction Discretionary Term(s) (if applicable), AP begins Injection at a Specific Area of Interest, then this Agreement shall be maintained with respect to that individual Specific Area of Interest for so long as Injection is occurring without a gap of more than one (1) year ("**Operational Term**"). Except for the rights described in the following subsection 3.5 and all other rights and provisions in this Agreement that expressly remain in effect and survive (or are intended to remain in effect and survive) following Injection, this Agreement shall terminate during the Operational Term with respect to a Specific Area of Interest on which there has been a gap of more than one (1) year without Injection. However, at the end of the Operational Term, this Agreement may be extended, one (1) or more times, by the State in the State's sole discretion ("**Operational Discretionary Term(s)**") with respect to any Specific Area of Interest on which there has been a gap of more than one (1) year without Injection. In order for AP to exercise this option, AP shall notify the State at least ninety (90) days prior to the expiration of the Operational Term or the Operational Discretionary Term(s) (if applicable) that it wishes to exercise this option. This Agreement, for purposes of Injection, shall terminate at the end of any Operational Discretionary Term with respect to a Specific Area of Interest on which there has been no Injection during the Operational Discretionary Term.

3.5 Following the expiration, termination or release (whichever occurs first) of this Agreement at any point in time on a Specific Area of Interest, AP shall remain responsible for, and this Agreement shall remain in effect as to, any and all restoration, closure, monitoring or other obligations and requirements imposed by this Agreement, Applicable Law(s) and Applicable Procedure(s), and AP shall have all necessary and incidental rights to access the Property and

utilize the Facilities to undertake such obligations and requirements. AP shall also retain all rights necessary or incidental to comply with any Sequestration Protocols related to restoration, closure, monitoring or other requirements established under such Sequestration Protocols. AP shall further retain all rights necessary or incidental to obtaining a Certificate of Completion of Injection Operations [as defined in the Sequestration Act (as hereinafter defined)] or other rights, credits, liability limitations, or releases afforded it under Applicable Law(s) or Applicable Procedure(s). For the avoidance of doubt, the right to permanently sequester the Carbon Dioxide Stream(s) shall survive the expiration, termination or release of this Agreement as to any point in time on a Specific Area of Interest.

## Article 4 - Payments

As adequate and total consideration for the rights granted to AP pursuant to this Agreement, AP shall make the following payments to the State:

4.1 AP agrees to pay OMR on the Effective Date of this Agreement, a lump sum payment of fifty dollars ($50) per each acre within each Specific Area of Interest which acreage is set forth on Exhibits "B," "C," and "D" attached hereto.

4.2 With respect to each Specific Area of Interest, for the period commencing on the Effective Date until its applicable Operational Term commences, AP shall pay OMR in arrears at the rate of fifty dollars ($50) per year per acre contained in each Specific Area of Interest, as calculated in this Article 4. Payments under this Section 4.2 may be adjusted if acreage of an applicable Specific Area of Interest is released by AP in accordance with this Agreement. Payments under this Section 4.2 shall cease with respect to an applicable Specific Area of Interest if that entire Specific Area of Interest is released by AP or this Agreement otherwise expires or terminates with respect to a Specific Area of Interest and payments under this Section 4.2 shall further cease if this Agreement is terminated in its entirety. Payments due under this Section 4.2 shall be payable within fifteen (15) business days after the end of each Contract Year. For the avoidance of doubt, payments under this Section 4.2 shall be pro-rated for the number of applicable days within the given Contract Year if the Operational Term commencement, or expiration, termination or release of this Agreement associated with such payment, occurs during the given Contract Year rather than co-incident with the end of the Contract Year.

4.3 With respect to each Specific Area of Interest, upon the commencement of its applicable Operational Term, (i) the payment obligation set forth in Section 4.2 above shall cease for the given Specific Area of Interest, and (ii) thereafter for the given Specific Area of Interest, AP shall pay OMR in arrears, due and payable fifteen (15) business days after the end of each Contract Year during its applicable Operational Term (and during any Operational Discretionary Term, if applicable), an amount equal to the greater of (a) the product of the "**Annual Injection Fee Per Ton**", as adjusted pursuant to Section 4.5, times the number of metric tons (**"ton" or "tons"**) of any Carbon Dioxide Stream Injected into a Facility in the given Specific Area of Interest under this Agreement during the given Contract Year of the Operational Term and/or Operational Discretionary Term, as applicable (such product being the **"Annual Injection Fee"**) in accordance and consistent with the annual Class VI permit monitoring and verification requirements, or (b) a minimum guaranteed annual payment (**"MGAP"**) calculated by multiplying the then current Annual Injection Fee Per Ton times the given applicable minimums stated below, determined as follows:

(a) For Specific Area of Interest A, the MGAP shall equal the product of the then current Annual Injection Fee Per Ton multiplied by one-half (0.5) million tons per year for each year of its Operational Term and/or Operational Discretionary Term, as applicable;

(b) For Specific Area of Interest B, the MGAP shall equal the product of the then current Annual Injection Fee Per Ton multiplied by (i) one (1) million tons per year for the first three (3) year period after commencement of its Operational Term, and (ii) two (2) million tons per year for each year of its Operational Term and/or Operational Discretionary Term, as applicable, thereafter; and

(c) For Specific Area of Interest C, the MGAP shall equal the product of the then current Annual Injection Fee Per Ton multiplied by one (1) million tons per year for each year of its Operational Term and/or Operational Discretionary Term, as applicable.

The "Annual Injection Fee Per Ton" shall initially be set at one dollar fifty cents ($1.50) per ton, and thereafter shall be subject to adjustment pursuant to Section 4.5.

Each MGAP for a Specified Area of Interest shall be in lieu of, and not in addition to, a Specified Area of Interest's Annual Injection Fee, and in no event shall both an Annual Injection Fee and MGAP be due by AP under this Section 4.3. No MGAP payment shall be due with respect

to a Specific Area of Interest that is released, expired or terminated from this Agreement. The payments under this Section 4.3 shall cease if and when an Operational Term (or Operational Discretionary Term, if applicable) terminates for an applicable Specific Area of Interest. For the avoidance of doubt, the MGAP payments under this Section 4.3 shall be pro-rated for the number of applicable days within the given Contract Year if the Operational Term (or Operational Discretionary Term, if applicable) commencement or termination, or the expiration, termination or release of this Agreement associated with such payment, occurs during the given Contract Year rather than co-incident with the end of the Contract Year.

4.4 If AP shall fail to perform any monetary payment obligation under this Agreement, then in such event the State shall cause a written notice to be served on AP, which notice shall declare it to be the intention of the State to terminate this Agreement if the default is not cured. AP shall have thirty (30) days after receipt of the aforesaid notice in which to remedy the nonpayment, and, if within such thirty (30) day period, AP does so remedy by paying the State the applicable monetary payment obligation required herein, then such termination notice shall be withdrawn and this Agreement shall continue in full force and effect. In the event that AP fails to remedy the nonpayment within such thirty (30) day period, this Agreement shall be terminated and of no further force or effect from and after the expiration of such thirty (30) day period with respect to the applicable Specific Area of Interest that is subject to the payment default. The State shall be entitled to any penalties and interest authorized by Applicable Laws.

4.5 AP agrees that the Annual Injection Fee Per Ton shall be adjusted in the event the 45Q tax credit received by AP increases above the base rate of fifty dollars per ton ($50/ton), as follows: at the close of each Contract Year during the Operational Term (or Operational Discretionary Term, if applicable), the Annual Injection Fee Per Ton shall be increased by an amount equal to nine percent (9 %) of any such increase above such base rate of fifty dollars per ton ($50/ton) during such Contract Year. For the avoidance of doubt, such adjustment shall mean that the applicable MGAP calculated for each Specific Area of Interest shall also be increased by a proportionate equivalent amount. In no event shall the adjusted Annual Injection Fee Per Ton decrease. When AP is no longer in receipt of 45Q tax credits, the Annual Injection Fee Per Ton for a given Specific Area of Interest shall be fixed for the balance of the term of this Agreement with respect to such a Specific Area of Interest at its then current value.

4.6 AP agrees and acknowledges that by reason of a Withdrawal pursuant to Section 5.4, AP shall not be entitled to a refund of the Annual Injection Fee paid to the State for the Carbon Dioxide Stream previously Injected and Withdrawn. However, the State agrees that AP shall not be required to pay an Annual Injection Fee for the Withdrawn Carbon Dioxide Stream reinjected into any Storage Reservoirs on the Property. Furthermore, AP agrees and acknowledges that it shall not be entitled, by reason of expiration or termination of this Agreement, or voluntary release of acreage by AP, to any refund of any bonus, rental or other payments previously paid, nor be released from the obligation required by Section 4.3 to pay the MGAP for each applicable Specified Area of Interest.

4.7 Except as otherwise approved by OMR in writing, AP shall make each payment owed to the State under this Agreement by electronic fund transfer using the Automated Clearing House (ACH) Network service pursuant to the institution transfer instructions. The electronic-fund transfer shall be from a banking institution in the United States in U.S. Dollars payable to the "Office of Mineral Resources" into the account identified by OMR, or to any other account as OMR may from time to time designate to AP. In the event AP is not able to transfer the fund via ACH, it may obtain approval from OMR to use a different method of payment.

4.8 Together with every Annual Injection Fee or MGAP made to the State, AP shall include information reasonably required by OMR and readily available to AP, detailing the amount of any Carbon Dioxide Stream Injected into each Facility that was used to calculate the Annual Injection Fee or MGAP. The information required herein shall be submitted to OMR in accordance with OMR's format specifications and consistent with the Class VI permit monitoring and verification requirements.

4.9 AP shall also pay to the State an amount consistent with the appropriate schedule (either the DWF or State Land Office schedule in effect as of the Effective Date) for pipeline right-of-ways for any pipelines installed on State or DWF owned land or water-bottoms, located inside the Property. Pipelines as that term is used in this Section shall not include flow-lines which are located on the Property and necessary for Storage under the Property (**"Storage Lines"**). Furthermore, AP agrees to consult DWF and/or the State Land Office for approval of the placement location of said pipelines (excluding Storage Lines) and AP agrees to install the pipelines (excluding Storage Lines) in accordance with the requirements of DWF and/or the State Land

Office. This Agreement does not provide for nor address pipeline right-of-ways located outside the Property.

## Article 5 - Rights

The State, pursuant to the authority of La. RS. 30:209 and other Applicable Law(s), does herein grant and retain certain rights, subject to the conditions herein set forth and immediately as of the Effective Date the following exclusive rights:

**State's Rights**

5.1 Exploration of Oil and Gas. The Parties acknowledge and agree that the State shall have the right to carry on, in and upon the Property, such operations necessary for and in connection with the discovery, extraction, preparation, utilization, removal and sale of any and all minerals above and below the Storage Reservoirs subject to any requirements or restrictions imposed by Applicable Law(s) and Applicable Procedure(s). However, the State's rights are to be exercised so as not to unreasonably interfere with, and with due regard for, the operations to be carried on by AP in accordance with this Agreement.

5.2 Drill-Through Rights. AP agrees and acknowledges that this Agreement does not prohibit a lessee or operator of a state lease or operating agreement granted for the development and production of minerals, oil, or gas on the Property from the right to drill and extract above the Storage Reservoirs or to drill and extract below the Storage Reservoirs, provided that the Storage Reservoirs are not penetrated by such drilling or extraction activities. The lessee or operator of a State lease or operating agreement must exercise its rights in accordance with the rules for a Class VI well or other rules and orders issued by the Commissioner of Conservation and this Section 5.2 in order to protect the applicable Facilities and/or the surrounding properties against pollution and/or against the escape or migration of any Carbon Dioxide Stream from the applicable Storage Reservoirs, and in accordance with the requirement of Section 5.5 below, and all Applicable Law(s) and Applicable Procedure(s). The State agrees and acknowledges that AP shall have the right to drill through any geologic formations, reservoirs, saline aquifers and/or pore spaces beneath the Property, subject to the rules for a Class VI well or other rules and orders issued by the Commissioner of Conservation, and all Applicable Law(s) and Applicable Procedure(s). Notwithstanding the foregoing, and for the avoidance of doubt and to provide additional clarity, the Parties agree that drilling or extraction that penetrates the Storage Reservoirs or its Carbon

Dioxide "storage complex" (as such term is defined under the most expansive definition required to ensure certification or classification of the Carbon Dioxide sequestration as permanent under any protocols, standards, regulations or laws relevant to AP and its Storage activities conducted pursuant to this Agreement) is prohibited (the "**Drill-Through and Extraction Restrictions**"). Further, notwithstanding any provision in this Agreement to the contrary, the Drill-Through and Extraction Restrictions set forth in this Section 5.2 of this Agreement shall ensure the "permanence" (as such term is defined under the most expansive definition required to ensure certification or classification of the Carbon Dioxide sequestration as permanent under any protocols, standards, regulations or laws relevant to AP and its Storage activities conducted pursuant to this Agreement) of the Sequestered Carbon Dioxide Stream which is currently for at least 100 years.

5.3 Property Access. (a) Pursuant to La. R.S. 30:127(G), AP shall maintain and preserve the public's access to public waterways throughout the Property covered by this Agreement; (b) Subject to the provisions of La. R.S. 30:127(G), AP is permitted to enclose (including by way of fencing) and protect the Injection well site portions of the Facilities or other portions of the surface Facilities as may be required by applicable Sequestration Protocols; (c) AP shall grant the State, or any other person or entity acting on behalf of the State, access at all reasonable times via any road or waterway to inspect the Property to ensure compliance with all requirements of this Agreement or to exercise any right reserved explicitly or impliedly in this Agreement; and (d) The State retains the right to sell, exchange, transfer, or otherwise dispose of all or any portion of the Property and all rights in the Property not expressly granted to AP or necessarily implied by this Agreement. Further, the State shall have the right to use any and all portions of the Property for any purpose or to issue rights-of-ways and servitudes upon the Property, provided doing so does not unreasonably interfere with the rights of AP. For the avoidance of doubt, DWF retains the right to access the Properties to carry out its statutory duties, authorities, and programs, subject to AP's rights under this Agreement.

**AP's Rights**

5.4 Permitted Purposes. AP is hereby granted, for itself and its affiliates, the right to use the Property for all purposes and rights granted in this Agreement, including, without limitation, the sole and exclusive right to use and occupy the Property for the purposes and rights

set forth in this Agreement, and the full control of all operations in connection with the construction, preparation, installation, maintenance, operation, expansion, enlargement, modification, replacement, repair, and disposition of the Facilities, Injecting any Carbon Dioxide Stream into the Storage Reservoirs, the installation, maintenance, repair, replacement and removal of Improvements and Equipment, the Injection, Storage, transportation, shipment, handling, transmission, Withdrawal, or other disposition of Carbon Dioxide Stream(s) Stored, or to be Stored from time to time, in each Facility, and monitoring each Facility and/or Storage Reservoirs (collectively, without limitation, the **"Permitted Purposes"**), subject to Applicable Law(s) and Applicable Procedure(s). As to Specific Area of Interest A, AP shall exercise its rights in accordance with the attached Schedule 1.

AP agrees that the Carbon Dioxide Stream(s) Injected for Storage in the Storage Reservoirs as contemplated by this Agreement is intended to be permanent. As such, any Withdrawal of Carbon Dioxide from any Storage Reservoirs shall, to the extent reasonably practicable, be reinjected into any of the Storage Reservoirs listed in this Agreement or any other Class VI injection well permitted by the State. For the avoidance of doubt, the de minimis incidental release of any portion of a Carbon Dioxide Stream from any of the Facilities (a) shall not constitute a Withdrawal requiring re-injection or (b) otherwise be prohibited by this Agreement.

5.5 Incidental Rights. Without limiting the foregoing, and for the avoidance of doubt, AP also shall have the sole and exclusive right to control, conduct, or perform all activities on the Property as may be necessary or incidental to the Permitted Purposes, including, but not limited to: (a) installing (including Drilling), maintaining, replacing, removing, monitoring, inspecting, testing, and/or operating the Improvements and Equipment necessary or incidental to constructing, maintaining, operating, monitoring or testing the Facilities or Storage Reservoirs; (b) performing mechanical integrity tests or other tests as may be desirable to determine Storage Reservoirs' capacity, limits, safety and/or integrity, or to comply with Applicable Law(s); (c) Injecting Carbon Dioxide Stream(s) for pressure maintenance in operations, mechanical integrity activities, or other lawful purposes; (d) transporting of Carbon Dioxide Stream(s); (e) performing any corrective action required pursuant to Applicable Law(s), Applicable Procedure(s) and Sequestration Protocols; (f) dredging in connection with constructing, maintaining, operating or monitoring the Facilities; (g) constructing, operating, and maintaining utility lines, fuel lines and pipelines and facilities related thereto to construct, operate maintain, or monitor the Facilities; (h) constructing,

operating, and maintaining pipelines for the transport of Carbon Dioxide Stream(s); (i) storing and using such quantities of fuel oil and other materials or substances as may be reasonable in connection with the Facilities; (j) accessing the entire Property as necessary to conduct any activities contemplated by this Agreement; and (k) viewing and performing testing, such as geological and geophysical surveys, seismic tests, and other testing and data relating to the Property and Storage Reservoirs to determine the capacity and suitability of the Storage Reservoirs and the Property for the Permitted Purposes. AP agrees it shall comply with the standard seismic regulations and requirements administered by DWF, for any geophysical or geological surveys and operations conducted within a wildlife-management area or wildlife refuge. These rights do not include the right to withdraw water from State owned water bottoms on the Property, except as may be necessary to support the activities of AP contemplated by this Agreement, and only to the extent allowed by, and in conformity with, Applicable Law(s) and Applicable Procedure(s).

5.6 In exercising its sole operational control and discretion, AP shall conduct all operations on or under the Property as a reasonably prudent operator, in a good and workmanlike manner, and in compliance with all Applicable Law(s) and Applicable Procedure(s).

5.7 Without limiting the foregoing, AP shall be responsible for obtaining all necessary permits and satisfying the insurance, bonding, fee and other obligations mandated by Applicable Law(s) and/or Applicable Procedure(s) regarding each Facility. Once obtained, such permits shall be deemed to be Applicable Law(s) with which AP will be responsible to comply.

5.8 Except subsequent to a transfer of ownership pursuant to La. R.S. 30:1109(A) or such successor statute thereto, wells, compressors pipelines, tank batteries, and Improvements and Equipment placed in or on the Property after the date hereof and used in connection with operations hereunder, shall be owned and controlled by the Operator and the State shall have no interest (ownership, controlling or otherwise) therein whatsoever. However, nothing herein stated shall deprive the State of the right to file a lien for unpaid cost or damages nor any other agency from levying any other costs or damages or enforcing any other rights commensurate with the authority granted by the State.

5.9 Except for any costs and expenses paid from the Carbon Dioxide Geologic Storage Trust Fund (established by La. R.S. 30:1110) in accordance with Applicable Law(s) and Applicable Procedure(s), all costs and expenses incurred in connection with Storage operations in,

on or under the Property or associated with the Facilities, including carrying out any Permitted Purposes or exercising any Incidental Rights, shall be borne solely by the Operator. The State shall be held free and harmless from liability or responsibility for any and all costs and expenses so incurred under the terms of this Agreement.

5.10 Nothing in this Section shall prohibit the State, acting in its capacity as a regulatory authority (through the OC, DEQ, or other regulatory authority), from enforcing all Applicable Law(s) and Applicable Procedure(s), specifically including any applicable environmental or underground injection/storage laws and regulations. For the avoidance of doubt, DWF retains the right to access the Properties to carry out its statutory duties, authorities, and programs, subject to AP's rights under this Agreement.

5.11 Correlative Rights. The Parties, their successors and assigns, agree to exercise their respective rights granted herein with reasonable regard for the rights of the other and shall use only so much of the Property, including its surface, as is reasonably necessary to conduct their operations. The exercise of the rights granted herein shall be subject to the provisions of Applicable Law(s) and Applicable Procedure(s), including, without limitation, Articles 11 and 22 of the Louisiana Mineral Code (La R.S. 31.1, *et seq.*).

## Article 6 - Insurance

6.1 Coverage Required. Within thirty (30) days of the Effective Date, AP shall pay all costs and/or premiums, for policies of insurance, providing coverage against third party claims relating to the Facilities, including the Property, with a carrier approved in the State of Louisiana and rated by AM Best or a similar agency not lower than "A-" with a surplus size of "VII or higher." The policies of insurance shall be maintained in full force until the termination or expiration of this Agreement and continuing until all obligations are fulfilled. Such commercial general liability policies shall name the State as an additional insured. Such policies of insurance shall be subject to the terms and conditions of the policies and shall have the following limits:

A. For bodily injury, One Million ($1,000,000) Dollars per occurrence, with a Two Million ($2,000,000) Dollars aggregate.

B. For property damage which is not considered to be environmental damage, One Million ($1,000,000) Dollars per occurrence, with a Two Million ($2,000,000) Dollars aggregate.

C. For environmental damage, Ten Million Dollars ($10,000,000) for each occurrence.

6.2 Proof of Insurance. AP shall provide the State with current certificates of insurance demonstrating compliance with the requirements of Sections 6.1 above (a) within forty five (45) days of the Effective Date; (b) within fifteen (15) days following annual policy renewals during the term of this Agreement; and (c) within fifteen (15) days of each reasonable request therefor by the State. Such certificates of insurance shall contain the requirements that (i) those insurance companies provide thirty (30) days' prior written notice of any cancellation or termination of those insurance policies as stated on a standard accord cancellation form or such similar form, and (ii) the insurance companies providing commercial general liability insurance waive any right of subrogation in favor of the State limited to the extent of obligations and liabilities assumed by AP under this Agreement.

6.3 Insurance Default Remedies, Notice and Cure Rights. In the event notice of cancellation of the insurance required by Section 6.2 is given and another certificate of insurance evidencing the issuance of another policy meeting all the terms and conditions of Section 6.2 is not furnished prior to cancellation [and except where such failure to furnish same is excused due to an Incident or any other provision of this Agreement or Applicable Law(s)], the Injection rights of AP under this Agreement shall automatically and without further notice to AP, be suspended (but not terminated), and AP shall immediately suspend Injection under this Agreement. For avoidance of doubt, rights necessary to maintain the viability of the Storage Reservoirs and the Facility or Facilities for the purposes hereof and as necessary for health, safety, and/or environmental concerns shall be permitted at all times. The reinstatement of the requisite insurance coverage as evidenced by the certificate showing same to the State shall immediately thereon lift the suspension and allow AP to resume Injection. Should AP fail to obtain coverage within one hundred twenty (120) days after receiving a written notice and request to obtain insurance from the State, this Agreement may terminate at the option of the State.

## Article 7 - Bankruptcy and Security

7.1 The Operator agrees to acknowledge and verify in any appropriate manner to any bankruptcy court or to any other authority, and hereby also acknowledges and verifies, that the Annual Injection Payments required in Article 4 are not a part of AP's estate, and that the estate

has no claim or interest therein. AP further acknowledges that all legal and equitable title to any portion of the payments owed to the State is vested in the State and that AP relinquishes all dominion, control, and title to the same. AP and the State agree that so long as this Agreement remains in effect, this Agreement is an executory contract and unexpired within the meaning of Section 365 of the United States Bankruptcy Code.

7.2 The Operator shall furnish any bond or other security, required by Applicable Law(s), to cover the Operator's obligations for closure and post-closure activity.

## Article 8 – Indemnification

8.1 The Operator unconditionally agrees that it will respond to, investigate, provide defense for, protect against, save, indemnify, and hold free and harmless the State, the Board, DNR OMR, DWF, the Board members, DNR's, OMR's and DWF's employees and other representatives of, from, and against any and all demands, claims, causes of action, damages, judgments, costs, fees, expenses and attorney's fees arising from any harm, loss, injury or death to any person, or any harm, loss, damage or destruction of any property, THAT MAY ARISE OUT OF, OR BY REASON OF, THE PERFORMANCE OF ALL SERVICES, ACTIVITIES, OBLIGATIONS, DUTIES AND OPERATIONS UNDER THIS AGREEMENT BY AP, THE OPERATOR, OR ANY OF ITS EMPLOYEES, AGENTS, CONTRACTORS, SUBCONTRACTORS, OR OTHER REPRESENTATIVES, OR ANY OTHER MEMBER OF THE AP GROUP, due to their negligence, commission or omission, and of and from any and all costs and expenses relating to the defense of any such claims, including reasonable attorney's fees incident thereto.

## Article 9 – Inspection, Records and Audit Rights

9.1 Subject to compliance with AP site rules and requirements, and provided that the State treats such information as strictly confidential to the extent allowed by Applicable Law(s) and Applicable Procedure(s), the State, or any person or entity acting as agent, representative or under the authority of the State shall have the right, at all reasonable times and upon reasonable notice, to examine, audit or inspect all books, records, accounts, statements, maps, plans, seismic or geologic data, diagrams and other such documents pertaining to Operator's Storage, Injection and calculation of payments required under Article 4 from the Effective Date of this Agreement. Except as provided in Section 9.2, AP shall only be required to maintain the foregoing items for

ten (10) years, but AP reserves the right to retain any and all such items for such longer period as AP deems necessary or desirable to ensure compliance with any Sequestration Protocols.

9.2 AP shall preserve all books and records used to calculate the payments required under Article 4 for as long as required by Applicable Law(s). AP shall reasonably cooperate with the State in any such audit and the State shall conduct said audit as not to unreasonably interfere with AP's operations.

9.3 AP shall provide access to accurate records concerning AP's payment obligations due under this Agreement with respect to each Facility required by Article 4, including but not limited to all accounts hereunder showing the amounts of Carbon Dioxide that have been Injected, are in Storage or have been Withdrawn from each Facility; provided that the State treats such records as strictly confidential, to the extent allowed by Applicable Law(s) and Applicable Procedure(s). The State may seek penalties in the event such accurate records are not timely provided in accordance with this Agreement and Applicable Law(s). The State and its agents shall, subject to all AP site safety rules and requirements, have the right, upon reasonable prior notice to AP and during normal business hours, to review such records created and maintained by AP concerning the design, construction, maintenance, modification, and physical operation of each Facility only in so far as such records are directly related to the calculation of payments required under Article 4 of this Agreement. Subject to all AP site safety rules and requirements, the State and any of its duly authorized representatives shall have access at all times to each Facility, the Property, and to any wells or Improvements and Equipment associated with the Facilities and to all records and reports directly related to Operator's Injection and to the calculation of payments required under Article 4 of this Agreement. AP shall reasonably cooperate with the State in any such review, and any such review shall be at the sole cost of the State and shall be done so as not to unreasonably interfere with AP's operations. To the extent that such information is received or acquired by the Operator from or in connection with operations hereunder subsequent to the date hereof, the Operator agrees, upon written request by the State, to furnish timely to the State any and all well data associated with the Facilities, provided that, to the extent allowed by Applicable Law(s) or Applicable Procedure(s), the State treats such records as strictly confidential.

9.4 For avoidance of doubt, all information obtained by the State pursuant to this Article 9 shall be treated as strictly confidential by the State to the fullest extent allowed by Applicable Law(s) and Applicable Procedure(s).

## Article 10 - Release of Acreage

Upon its own initiative, AP may release acreage by notifying the State in writing, at least thirty (30) days prior to the release, of its intent to do so and identifying the specific acreage to be released in the manner and format required by the State. Upon release of the acreage, AP shall lose any rights for Storage of Carbon Dioxide Stream(s), incidental rights, or undertaking any activities to carry out Permitted Purposes on the portion of the Property released, except for the rights described in Section 3.5 of this Agreement and this Article 10. Additionally, AP shall be required to undertake restoration, closure and post-closure activities in accordance with this Agreement for that acreage that has been released. Upon completion of any required restoration, closure, post-closure, and monitoring obligations in this Agreement for the portion of the Property being released, the amount required to be paid to the State by AP under its obligation to make payments for acreage included under this Agreement pursuant to Section 4.2 shall be reduced by the amount of acreage released from the date of such release going forward.

## Article 11 – Closure, Post-Closure and Monitoring Activities

11.1 Except for any activities undertaken by the State following issuance of a Certificate of Completion of injection operations (if sought by AP) pursuant to the Sequestration Act [or other Applicable Law(s)] at each Facility, upon the termination of this Agreement (for purposes of Injection) or upon release of specific acreage (and then only as to that released acreage), at its sole cost and expense, AP shall close the Facilities in conformity with any and all Applicable Law(s), Applicable Procedure(s) and this Agreement (including, without limitation, the Restoration Obligations) regarding closure and post-closure. AP has the continuing right to use the Property under this Agreement to perform its closure and post-closure activities (including any monitoring of the Storage Reservoirs) following termination of this Agreement for Injection Purposes or a release of acreage.

11.2 AP shall cause to remain in full force and effect the insurance coverage required by Article 6 and any bond required pursuant to Section 7.2 until such time as the action contemplated by Section 11.1 shall be completed.

11.3 Notwithstanding anything in this Article 11 to the contrary, AP retains the right to conduct its closure and post-closure obligations in conformance with Sequestration Protocols. As such, even if AP does seek and obtain a Certificate of Completion in conformance with the Sequestration Act [or other Applicable Law(s)], AP shall retain all rights necessary or incidental to enable it to conform to any Sequestration Protocols.

## Article 12 - Surface Use and Restoration

12.1 Surface Use.

(a) AP shall comply with and be subject to all Applicable Law(s) which govern: waste disposal, storage, treatment, transportation, or management; environmental quality (regardless of the environmental media involved); geologic Storage of Carbon Dioxide; navigation; archeological resources; cemeteries; coastal resource management; and wetlands protection and restoration.

(b) AP shall conduct operations as a prudent operator using standard industry practices and procedures and proper safeguards, including taking necessary preparations and precautions to prevent and remedy pollution, fire, explosion, and environmental damage to the Property. AP shall be responsible, unless otherwise limited by La. R.S. 30:1109 and La. R.S. 30:1111(as amended or any successor statutes thereto), for all damage to the Property caused by AP's or AP Group's operations including, but not limited to loss or damage to timber, crops, roads, buildings, fences, bridges, soil, surface and subsurface water, aquifers and vegetation and all environmental damage. Unless otherwise provided by La. R.S. 30:1109 and La. R.S. 30:1111, (as amended or any successor statutes thereto), this responsibility shall be irrespective of whether such damage is due to AP's or AP Group's negligence or to the inherent nature of AP's or AP Group's activities or operations. For the avoidance of doubt, this provision applies as to the Parties only and it is not intended to apply to or be for the benefit of any third persons.

(c) AP shall report all unpermitted and reportable discharges on the Property as required by Applicable Law(s).

(d) AP shall, at its sole cost and expense, keep and maintain all Improvements and Equipment on the Property utilized, owned, placed and/or caused to be placed by AP and all Facilities appurtenant to such Improvements and Equipment in good order and repair and in the appropriate condition for the safe conduct of any activities or enterprises conducted on the Property

pursuant to the rights granted hereunder, in each case as a prudent operator using standard industry practices and procedures and proper safeguards and in accordance with Applicable Law(s).

12.2 Restoration.

(a) Except as otherwise set forth in this Agreement [including this Section 12.2(a)], AP shall be obligated to plug and abandon all wells owned, utilized, placed or caused to be placed by AP on the Property no longer necessary for the Permitted Purposes; to remove from the Property all Improvements and Equipment owned, utilized, placed or caused to be placed by AP which are no longer utilized for the Permitted Purposes; and to the extent caused by AP's activities on the Property, restore the surface of the Property, as near as practicable, to the condition existing on the Effective Date of this Agreement (**"Restoration Obligations"**), all at AP's sole risk, cost and expense and subject to compliance with Applicable Law(s) and Applicable Procedure(s). Unless doing so would be in violation of Applicable Law(s), AP shall complete the Restoration Obligations within a reasonable time (but no later than eighteen (18) months, subject to extension for Force Majeure or any Suspending Events) following: (a) the date said wells, structures or facilities are no longer necessary for Permitted Purposes; or (b) the date this Agreement has expired, terminated or been released (whichever occurs first) as to all or a portion of the Property. Notwithstanding anything contained in this Agreement to the contrary, to the extent permitted by Applicable Law(s) and Applicable Procedure(s), AP shall be allowed to abandon in place Improvements and Equipment below the surface of the Property; however, to the extent any Improvements and Equipment (other than well bores) sought to be abandoned in place are located on a portion of the Property managed by DWF, then abandonment in place for such Improvements and Equipment shall be determined after consultation with DWF in accordance with the applicable provisions of Schedule 1. The failure of AP to timely complete the Restoration Obligations shall subject AP to and make AP liable for any and all costs or expenses of any kind incurred by the State for plugging said wells or removing said structures or facilities, but in no instance shall title to or ownership of said facilities automatically vest in or transfer to the State nor shall said wells, structures or facilities be deemed "improvements" to the Property for purposes of vesting title in same to the State. Notwithstanding anything in the foregoing to the contrary, AP retains the right to perform its Restoration Obligations and such related obligations in accordance with any other Sequestration Protocols.

(b) The State recognizes AP's right to draw and remove casing from wells and, further, to remove any structures and facilities no longer utilized for Permitted Purposes on the Property.

**Article 13 - Warranty of Title and Use**

13.1 Warranty of Title. Notwithstanding any provision herein to the contrary, this Agreement is granted and accepted without any warranty of title and without any recourse against the State whatsoever, either express or implied. As such, the Parties acknowledge and agree that the State shall not be required to return any payments received pursuant to this Agreement, even notwithstanding any subsequent litigation or judicial decrees, orders, or rulings regarding title to all or any part of the Property or otherwise be responsible to AP therefor. AP represents that it has investigated the title or is satisfied with such title as the State may have. The State hereby disclaims any covenant of quiet enjoyment or peaceful possession of the Property.

13.2 Warranty of Use. The State makes no warranties as to the condition of the Storage Reservoirs and AP accepts the Storage Reservoirs "AS IS". The State has no obligation to make any repairs, additions or improvements to the Storage Reservoirs, and the State does not warrant the suitability of the Storage Reservoirs for any purposes intended by AP or contemplated by this Agreement.

13.3 Termination for Lack of Title. Notwithstanding anything stated in this Agreement to the contrary, this Agreement shall terminate, as to the portion of the Property implicated, if it is determined by a court of competent jurisdiction (and any applicable appeal delays have run or have been exhausted) that the State does not have title to the Property.

**Article 14 - Force Majeure and Suspending Events**

(A)(1) If, at any time this Agreement is being maintained by Injection occurring on a Specific Area of Interest, and Operator is prevented from continuing Injection by the occurrence of a Force Majeure or Suspending Event as defined in this Article, ("**Incident**"), and Operator cannot maintain this Agreement under any other operative provision of this Agreement, then and only then shall the date for Operator to re-commence Injection in order to maintain this Agreement be postponed on a day-for-day basis for so long as the adverse effects of the Incident continue, providing that Operator provides OMR with notice in accordance with section (B) of this Article and that Operator is diligently, reasonably, and in good faith attempting to mitigate and eliminate the effects of the Incident to the extent such mitigation is within Operator's control. The occurrence

of an Incident shall not maintain this Agreement for more than twelve (12) months from the date of the Incident onset unless extended by the State.

(2) A determination as to whether Operator can utilize this Article and whether Operator has complied with the requirements thereof is at the sole, reasonable discretion of the State. If an Incident has occurred, the Operator is still required to make the MGAP and Annual Injection Fee payments required by Article 4 of this Agreement.

(B) Within ninety (90) days of the Incident onset, Operator shall submit a written notice containing the following: (1) the onset date, description and nature of the Incident; (2) the effects preventing continuation of Injection; (3) a description and evidence of Operator's diligent, reasonable and good faith efforts to mitigate and eliminate the effects of the Incident and to resume Injection; (4) an estimated time for resumption of Injection; and (5) any other information or documentation evidencing the existence of the Incident reasonably requested by the State. Notice given beyond ninety (90) days shall not be considered reasonable notice and the application may be denied by the State barring consequential extenuating circumstances.

(C) Every thirty (30) days following the notice required in section (B) of this Article, Operator shall be required to submit written, detailed reports on a monthly basis to OMR giving therein a description and evidence of Operator's diligent, reasonable, and good-faith efforts to mitigate and eliminate the effects of the Incident and to resume Injection. If the reports are not timely submitted or if Operator did not attempt in good faith to mitigate the effects of the Incident, the State, after notice and opportunity to be heard, may declare the Incident recognition to be ended and that Operator may not after such failure utilize this provision to excuse any failure to comply with any obligations of this Agreement relating to the particular Incident involved.

(D) A "**Force Majeure**" event is a fortuitous event that is beyond the Operator's control and is not ultimately determined to be caused by the Operator or due to the Operator's negligent or intentional commission or omission, or failure to take reasonable and timely foreseeable preventative measures that would have mitigated or negated the effects of the event. An example of a Force Majeure event may include, depending on the specific circumstances involved: (1) a major storm, major flood, or other similar natural disaster; or (2) a major accident such as a blowout, fire, or explosion, which prevents the occurrence of an act or event that would otherwise extend the effectiveness of this Agreement or prevent its termination.

(E) "**Suspending Event**" includes: (1) the lack of availability, after the Operator has diligently, timely and in good faith attempted to secure same, of any required equipment, materials and/or personnel, such as the specific type of rig or specific type of casing or drill pipe necessary for the occurrence of an act or event that would otherwise extend the effectiveness of this Agreement or prevent its termination; or (2) the unreasonable or unexpected delay by any government agency or political subdivision in granting, modifying, or reinstating permits necessary for the occurrence of an act or event that would otherwise extend the effectiveness of this Agreement or prevent its termination (e.g., delays relating to permits for the expected Carbon Dioxide source plant or facility); or (3) an order of any federal or state court of competent jurisdiction preventing or suspending the occurrence of an act or event that would otherwise extend the effectiveness of this Agreement or prevent its termination; or (4) the act of a third party, not under the control or at the instigation of the Operator, in shutting down and unreasonably refusing to reopen any pipeline, plant, or facility through which a Carbon Dioxide Stream for a Facility are necessarily emitted or passed through as part of the capture, transport or Injection of a Carbon Dioxide Stream (and provided there is no other reasonably economical method or alternative of carrying on Injection of a Carbon Dioxide Stream) so as to prevent the occurrence of an act or event that would otherwise extend the effectiveness of this Agreement or prevent its termination; or (5) any delays lasting one-hundred eighty (180) days or more due to shut downs, closures, repairs, maintenance or damage events to any pipeline, plant or facility through which a Carbon Dioxide Stream for a Facility is emitted or passed through as part of the capture, transport or Injection of a Carbon Dioxide Stream; or (6) other events not described herein that may be recognized by the State.

## Article 15 - Miscellaneous Provisions

15.1 It is understood and agreed that this Agreement shall not create the relationship of a partnership between the Parties hereto, and that no act done by any Party pursuant to the provisions hereof shall operate to create such relationship, nor shall the provisions of this Agreement be construed as creating such relationship.

15.2 It is expressly provided herein that neither this Agreement, nor anything herein contained, nor any of the data, maps, or exhibits considered in connection herewith, whether attached hereto or not, nor any course of conduct followed by any Party hereto pursuant to this Agreement, shall ever be considered to be or permitted to serve as a basis of estoppel against any

Party hereto in question of title, where title to Property or a portion of the Property is in dispute, anything herein contained to the contrary notwithstanding.

15.3 This Agreement shall extend to and be binding upon the successors, assigns, and successive assigns of the Parties; however, it is understood and agreed that no future assignments of the rights granted hereunder shall be effective unless and until such assignment or assignments are first approved by the State, through either DWF or the Board (depending on the Specified Area of Interest subject to the assignment), and same shall be subject to any reasonable conditions imposed by DWF or the Board (depending on the Specified Area of Interest subject to the assignment) in giving its approval, which approval shall not be unreasonably withheld, conditioned, delayed, or denied.

15.4 Payments, notices, reports, statements, and any and all written documents herein required to be given or furnished by any of the Parties hereto shall be in writing and mailed or delivered (via nationally recognized overnight courier or hand delivery), to the following addresses of the Parties hereto, to-wit:

If to the State:

Department of Natural Resources
Attn.: State Mineral and Energy Board
Post Office Box 2827
Baton Rouge, Louisiana 70821-2827

If to the Operator:

Air Products Blue Energy, LLC
Attention: Corporate Secretary
1940 Air Products Boulevard
Allentown, Pennsylvania 18106-5500
Telephone No.: 1-610-481-4880
Fax No.: 1-610 481-5765
Email: CorpSec@airproducts.com

15.5 This Agreement shall be recorded in the conveyance records of all Parishes where the Property is located in order to notify all interested third parties (including, without limitation, any lessees or other users or occupants of the Property) of the exclusive use of the Storage Reservoirs below the surface of the Property for permanent Carbon Dioxide sequestration and the restrictions pertaining thereto (including, without limitation, the Drill-Through and Extraction

Restrictions set forth in Section 5.2 of this Agreement). The Operator agrees that it shall execute and record, within ninety (90) days after the expiration or termination of this Agreement covering all or any portion of the Property, an appropriate and legally sufficient release evidencing such expiration or termination, and shall also supply the State with a copy or copies thereof with recordation information properly certified by the recorder of each Parish in which a Property is located. In the event the Operator fails to comply therewith after thirty (30) days of written notice from the State, it shall be liable for reasonable attorney's fees and court costs incurred in bringing suit for such cancellation and for all damages resulting therefrom. Notwithstanding the foregoing, a disclosure filing in mutually agreeable form shall also be recorded in the conveyance records of all Parishes where the Property is located to notify all interested third parties (including, without limitation, any lessees or other users or occupants of the Property) of the exclusive use of the Storage Reservoirs below the surface of the Property for permanent Carbon Dioxide sequestration and the restrictions pertaining thereto (including, without limitation, the Drill-through and Extraction Restrictions set forth in Section 5.2 of this Agreement).

15.6. This Agreement shall be interpreted and construed under the laws of the State of Louisiana. Should any provision, in whole or in part, of this Agreement be declared, found, or held invalid, illegal, or otherwise unenforceable, such declaration, finding, or holding shall not invalidate or render unenforceable the remaining provisions, which shall be construed and enforced as though the invalidated or unenforceable provision, or portion thereof, was not contained herein, provided that such remaining provisions fulfill the primary purpose of this Agreement.

15.7 The Parties hereby agree that this Agreement, and all terms, provisions, and conditions set forth herein are intended to be compatible with, and not limit or contradict any obligations or protections afforded under, the Louisiana Geologic Sequestration of Carbon Dioxide Act, La. R.S. 30:1101, *et seq.* (as amended from time to time in the future, the "**Sequestration Act**").

15.8 The venue for any suit, action, or proceeding instituted, arising out of, or relating to this Agreement, shall only be in the Nineteenth (19th) Judicial District Court, East Baton Rouge Parish, State of Louisiana. Each Party irrevocably submits to the exclusive jurisdiction of said courts, waives any objection which it may have now or hereafter to such venue, and waives any other venue to which it may be entitled by virtue of domicile or otherwise.

15.9 This Agreement has been read and understood by each Party. The Parties to this Agreement have freely and voluntarily executed this Agreement for the consideration recited herein. They have not relied on any representation or statement by any Party other than those statements contained herein. They have relied solely and completely upon their own respective judgment and the advice of their own attorneys.

15.10 This Agreement is the result of arms-length negotiations between the Parties and each has had the opportunity to review and revise it prior to execution. As a result, both Parties agree that the rule of construing the terms and provisions of an instrument against the drafting Party is not and shall not be applicable to this Agreement. This Agreement constitutes the entire agreement as between the Parties, and it shall not be modified or amended, nor shall any of its requirements be waived, except in a subsequent writing executed by all Parties.

15.11 Each Party represents and warrants to each and every other Party that the individuals executing this Agreement, and the agreements contemplated by this Agreement, have been duly authorized by their respective corporate principals and that this Agreement and the other documents contemplated by this Agreement, shall be binding on the Parties hereto in accordance with the provisions of such documents.

15.12 This Agreement may be executed in counterparts and each executed counterpart shall have the same force and effect as the original instrument. If counterparts are executed, the signatures of the Parties to each counterpart may be combined into and used as a single document.

15.13 The article and section headings in this Agreement are for convenience of reference only and shall not be deemed to alter or affect the meaning or interpretation of any provisions hereof.

15.14 The Parties agree to negotiate in good faith for the purposes of amending this Agreement in the future (subject to the State's approval and sole discretion) in order to (a) ensure compliance with existing, amended, and/or future rules, regulations, and/or administrative guidance promulgated by the EPA, OC, the Internal Revenue Service, or any other regulatory or

administrative body having jurisdiction and/or authority over tax credits, economic incentives, or other revenue generating structures applicable to Operator's business and operations, consistent with Operator's desire to execute a successful carbon capture and sequestration project; (b) ensure compliance with the Sequestration Act or other Applicable Law(s) or Applicable Procedure(s); or (c) address operational, market or commercial matters related to carbon capture and sequestration projects. Further, the Parties agree to cooperate in good faith in connection with Operator obtaining regulatory approvals and additional amendments to this Agreement to expand the Property covered by this Agreement if the Carbon Dioxide plume migrates through a pathway unpredicted by the Storage Reservoirs modeling into adjacent State-owned land or water bottoms (to the extent such additional acreage is available).

15.15 Safety Precautions and Other Protocols. Both Parties, and their respective contractors, subcontractors, invitees, and agents shall comply with Occupational Safety and Health Administration rules and regulations applicable to industrial sites when entering any area of the Property on which AP's surface facilities are located. The State understands and acknowledges that AP may, from time to time, be subject to Sequestration Protocols. Accordingly, and notwithstanding anything contained in this Agreement to the contrary, the State acknowledges and agrees that AP retains all rights necessary or incidental for AP to ensure conformance with any such Sequestration Protocols.

**This Part Left Intentionally Blank**

THUS DONE AND SIGNED on the date or dates herein below written, in the presence of the undersigned competent witnesses.

WITNESSES:

Cristina C. Vince

Print Name: Cristina O. Vince

Print Name: Greg Roberts

**State of Louisiana acting through the Louisiana State Mineral and Energy Board**

By:

Name: Jamie S. Manuel

Title: Secretary

Date: 10/22/21

WITNESSES:

Catherine E. McDonald

Print Name: Catherine E. McDonald

Print Name: Matt Hagen

**Air Products Blue Energy LLC**

By:

Name: Seifollah Ghasemi

Title: President of Air Products Blue Energy LLC and Chairman, President, and Chief Executive Officer of Air Products and Chemicals, Inc. (sole member of Air Products Blue Energy LLC)

Date: October 13, 2021

**WITNESS FORM OF**
**ACKNOWLEDGMENT FOR STATE MINERAL AND ENERGY BOARD**

STATE OF LOUISIANA
PARISH OF EAST BATON ROUGE

Before me, the undersigned authority, personally came and appeared: Greg E. Roberts, who by me first duly sworn, deposed and said:

That she/he is one of the witnesses to the execution of the foregoing instrument that he/she saw **Jamie S. Manuel** sign said instrument as **Secretary** of the State Mineral and Energy Board for and on behalf of the State of Louisiana, in the presence of appearer and Cristina O. Vince, the other subscribing witness.

Sworn to and subscribed before me, on this the
22nd day of October, 2021.

James B. Canfield
Notary #85001

Greg E. Roberts

James B. Canfield
Notary No. 85001
State of Louisiana
Commissioned for Life

EXHIBIT A

# AIR PRODUCTS BLUE ENERGY LLC

## WRITTEN CONSENT OF SOLE MEMBER

The undersigned, Air Products and Chemicals, Inc., being the sole member (the "Sole Member") of Air Products Blue Energy LLC, a Delaware limited liability company (the "Company"), and acting in accordance with the authority contained in Section 18-302(d) of the Delaware Limited Liability Company Act, does hereby consent in writing that the following resolutions shall have the same force and effect as if duly adopted at a meeting of the member of the Company, duly called and held in accordance with applicable law and the limited liability company operating agreement of the Company, and said resolutions to be and become effective as of the date hereof.

NOW, THEREFORE, BE IT RESOLVED, that the resignation of Melissa N. Schaeffer as President be and it is hereby accepted; and

FURTHER RESOLVED, that Seifollah Ghasemi be and he hereby is elected President of the Company, to serve at the pleasure of the Sole Member; and

FURTHER RESOLVED, that Melissa N. Schaeffer be and she hereby is elected Vice President of the Company, to serve at the pleasure of the Sole Member.

Dated as of the 13th day of October 2021.

SOLE MEMBER:
AIR PRODUCTS AND CHEMICALS, INC.

By: _____

Sean D. Major
Executive Vice President, General Counsel and Secretary

# EXHIBIT B

# SPECIFIC AREA OF INTEREST A – PROPERTY DESCRIPTION

"Specific Area of Interest A" includes a tract, title to which is in the State, through the Louisiana Department of Wildlife & Fisheries, and includes all of the lands of the Maurepas Swamp Wildlife Management Area situated in St. James Parish, Louisiana, within the following boundaries:

Beginning at a point being the Northeastermost point of St. James Parish, Louisiana, said point also being within the boundary of the Maurepas Swamp Wildlife Management Area; thence Southwesterly approximately 25,800 feet along the boundary of St. James Parish to the southern boundary of said Maurepas Swamp Wildlife Management Area; thence along said Maurepas Swamp Wildlife Management Area the following: Southwesterly, Southeasterly, Southwesterly, Northerly, and Southwesterly along irregular Section 43, Township 11 South, Range 5 East to a point of intersection with the Easternmost corner of Section 76, Township 11 South, Range 5 East; thence Southwesterly and Westerly along the Southern boundary of said Section 76 to its Southwest corner, said point also being the Northeast corner of Section 80, Township 11 South, Range 5 East; thence Southwesterly and Westerly along the boundary of said Section 80 to its Southwest corner, said point also being the Southeast corner of Section 79, Township 11 South, Range 5 East; thence continue along the South and West boundary of the Southeast Quarter and West along the Northwest Quarter of said Section 79 to a point being the Southeast corner of the Northeast Quarter of Section 76 Township 11 South, Range 4 East; thence Westerly along the Northeast Quarter, Southerly along the East Half of the Southwest Quarter, Northerly along the Southeast Quarter of the East Half of the Southwest Quarter, and Westerly along the Northwest Quarter of the Southwest Quarter of said Section 76, said point also being on the East boundary of Section 75, Township 11 South, Range 4 East; thence Southerly and Westerly along the boundary of said Section 75 to its Southwest corner, said point also being the Southeast corner of Section 74, Township 11 South, Range 4 East; thence continue along the South and West boundary of the Southeast Quarter of said Section 74 and West along the South boundary of the Northwest Quarter of said Section 74 to a point of intersection with the North boundary of Section 28, Township 11 South, Range 4 East; thence Southeasterly and Northwesterly along the North Half of said Section 28 to a point on the North Half of Section 29, Township 11 South, Range 4 East; thence Northwesterly along the North Half of said Section 29 to a point on the North Half of Section 30, Township 11 South, Range 4 East; thence Northwesterly and Northeasterly along the North Half of said Section 30 to a point of intersection with the East Half of Section 73, Township 11 South, Range 4 East; thence Northwesterly and Northerly along the Southern and Western boundary of the East Half of said Section 73 to a point of intersection with

the South line of Section 49, Township 11 South, Range 4 East; thence along the Southern and Western boundary of said Section 49 to a point being its Northwest corner, said point also being the Southeast corner of Section 45, Township 11 South, Range 4 East; thence along the Southern and Western boundary of said Section 45 to a point being the Northeast corner of Section 46 Township 11 South, Range 4 East; thence along the North boundary of the East half of said Section 46 to a point being the Northeast corner of the West half of said Section 46; thence Southerly, Westerly, and Northerly along the boundary of said Section 46 to a point being its Northwest corner, said point also being on the North line of St. James Parish; thence along the said boundary of St. James Parish to a point having a Coordinate of Y = 535,547.23; thence Easterly along the North boundary of said Maurepas Swamp Wildlife Management Area to the point being the Southwest corner of Section 30, Township 10 South, Range 5 East; thence Northerly along the West boundary of said Section 30 to a point of intersection with the said boundary of St. James Parish; thence along the said boundary of St. James Parish to the point of beginning, containing approximately 33,146 acres.

All as depicted on the map attached hereto.

Exact dimensions and final acreage of the area to be determined by survey.

# EXHIBIT C

# SPECIFIC AREA OF INTEREST B – PROPERTY DESCRIPTION

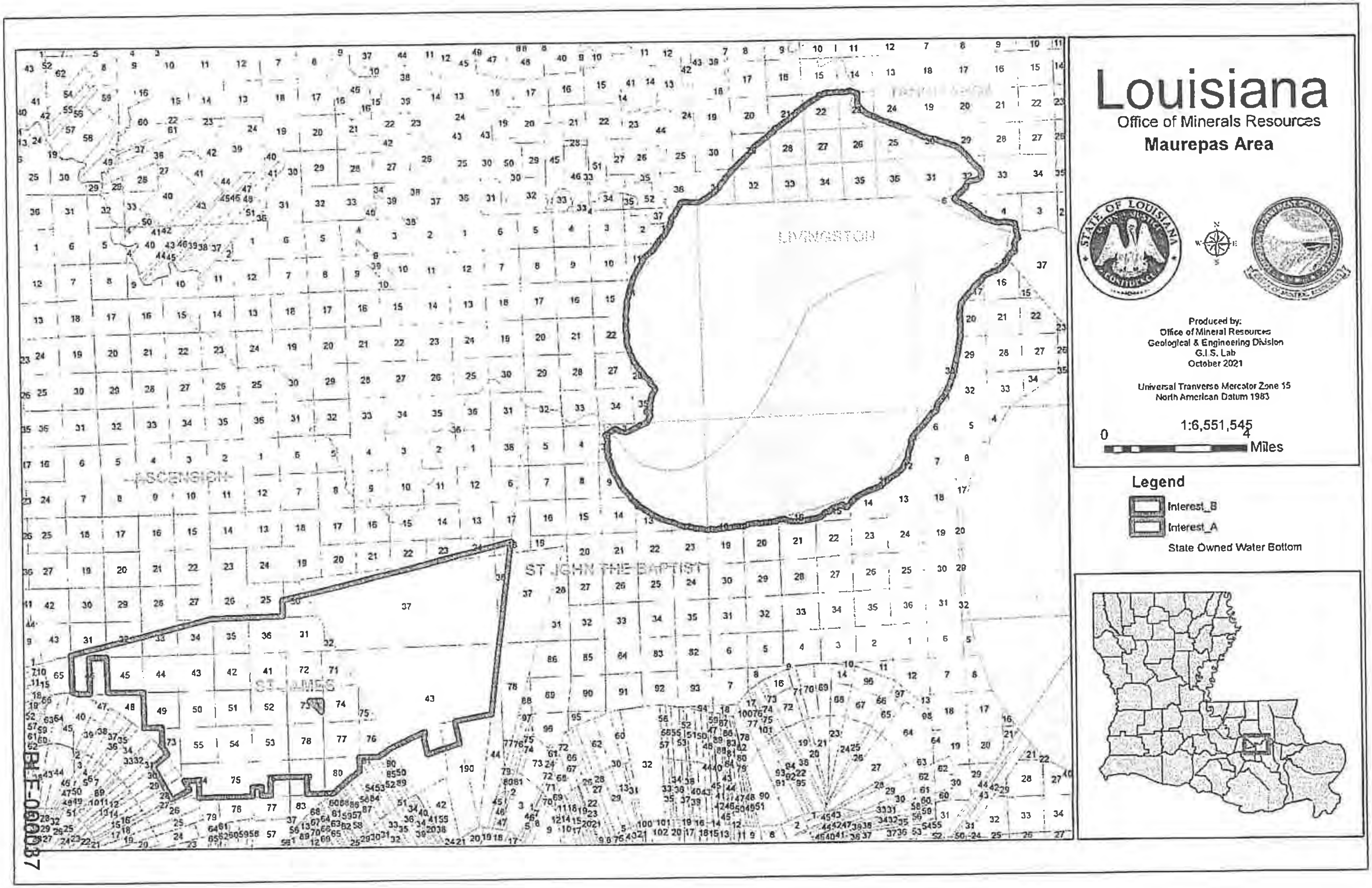
"Specific Area of Interest B" includes a tract, title to which is in the State in its public trust domain and includes all of the lands now or formerly constituting the beds and bottoms of all water bodies of every nature and description and all islands and other lands formed by accretion or reliction, except tax lands, and includes all lakebeds and waterbottoms of Lake Maurepas, owned by the State of Louisiana, situated in Tangipahoa, Livingston, and St. John the Baptist Parishes, Louisiana, within the following boundaries:

> Beginning at a point having Coordinates of X = 2,294,150.00 and Y = 589,950.00, said point being the approximate location of the common boundary of Tangipahoa Parish, Livingston Parish, and St. John the Baptist Parish, Louisiana; thence Southwesterly approximately 17,500 feet along the meanders of Lake Maurepas, to a point being the Northernmost point of the Maurepas Swamp Wildlife Management Area, said point also being the Northeast corner of Section 17, Township 9 South, Range 8 East; thence continue Southwesterly, Westerly, and Northwesterly along the meanders of Lake Maurepas approximately 150,000 feet to a point having Coordinates of X = 2,233,600.00 and Y = 561,900.00, said point being the common boundary of St. John the Baptist Parish, Louisiana and Livingston Parish, Louisiana; thence continue Northeasterly, Southeasterly, Northeasterly, Northwesterly, and Northeasterly approximately 137,500 feet along the said boundary of Lake Maurepas to a point having Coordinates of X = 2,270,900.00 and Y = 610,250.00, said point being the common boundary of Livingston Parish, Louisiana and Tangipahoa Parish, Louisiana; thence continue Southeasterly, Southwesterly, and Southeasterly approximately 72,000 feet along the said boundary of Lake Maurepas to the point of beginning.

Lake Maurepas contains approximately 24,000 acres in Livingston Parish, Louisiana, 8,900 acres in Tangipahoa Parish, Louisiana, and 24,200 acres in St. John the Baptist Parish, Louisiana for an aggregate of approximately 57,100 acres.

All as depicted on the map attached hereto.

Exact dimensions and final acreage of the area to be determined by survey.


Louisiana
Office of Minerals Resources
Maurepas Area
Produced by:
Office of Mineral Resources
Geological & Engineering Division
G.I.S. Lab
October 2021
Universal Tranverse Mercator Zone 15
North American Datum 1983
1:6,551,545
0
4
Miles
Legend
Interest_B
Interest_A
State Owned Water Bottom
ASCENSION
ST JOHN THE BAPTIST
ST JAMES
LIVINGSTON
BLF_000037

# EXHIBIT D

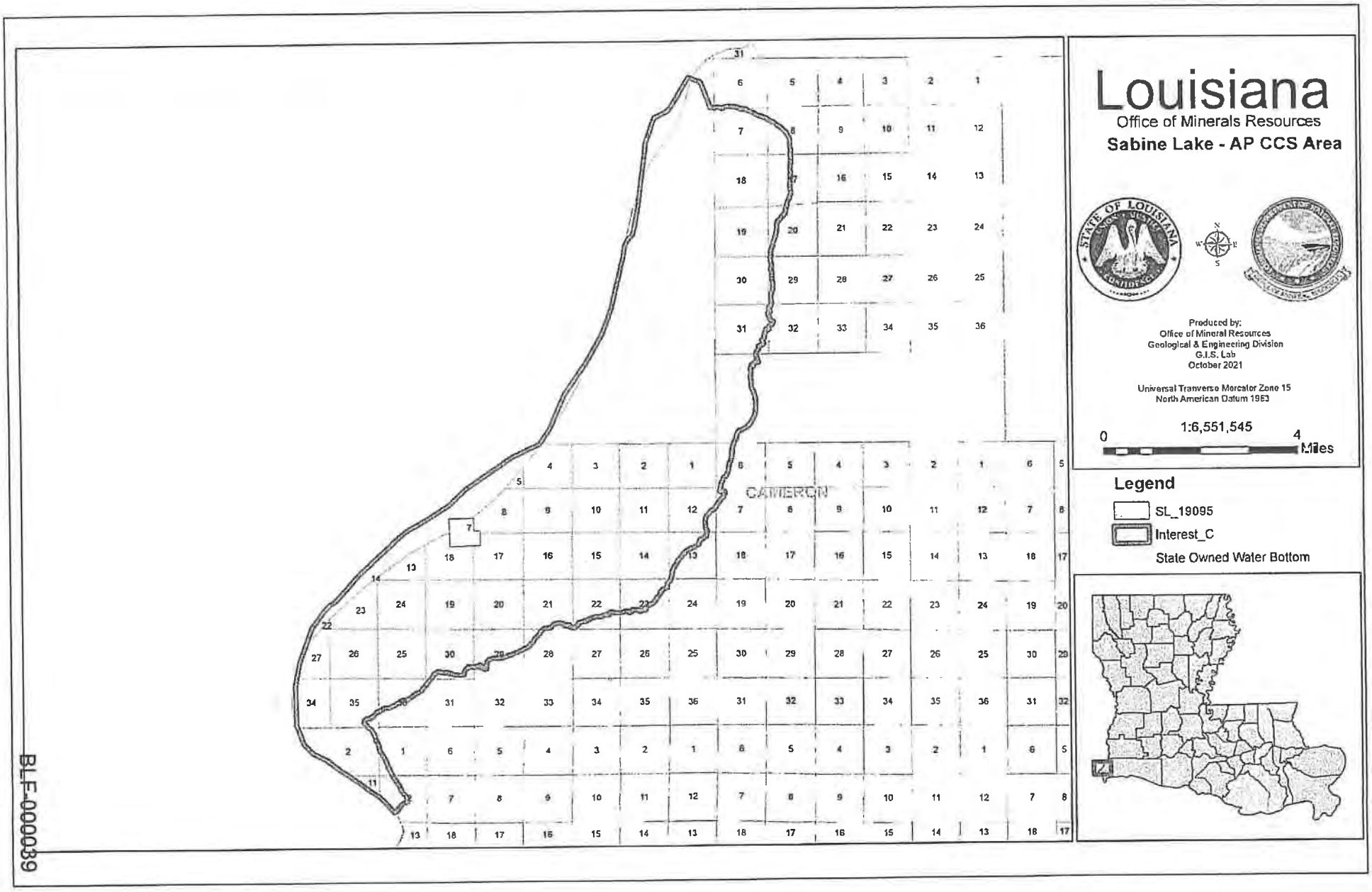
# SPECIFIC AREA OF INTEREST C – PROPERTY DESCRIPTION

"Specific Area of Interest C" includes a tract, title to which is in the State in its public trust domain and includes all of the lands now or formerly constituting the beds and bottoms of all water bodies of every nature and description and all islands and other lands formed by accretion or reliction, except tax lands, and includes all lakebeds and waterbottoms of Sabine Lake, owned by the State of Louisiana, situated in Cameron Parish, Louisiana, within the following boundaries:

> Beginning at a point being the Northernmost boundary of Sabine Lake situated at the Easternmost point of irregular Section 1, Township 13 South, Range 14 West and the Texas-Louisiana border; thence continue along the meanders of Sabine lake the following: Southeasterly approximately 8,200 feet, Easterly approximately 6,000 feet, Southeasterly approximately 13,500 feet, Southerly approximately 16,800 feet, Southwesterly approximately 94,600 feet, Continue Southwesterly approximately 65,000 feet, and Southeasterly approximately 20,700 feet to a point in irregular Section 12, Township 15 South, Range 16 West, also being the beginning of Sabine Pass; thence Southwesterly approximately 4,000 feet to said Texas-Louisiana border; thence along said Texas-Louisiana border the following: Northwesterly approximately 29,000 feet, Northerly approximately 14,000 feet, Northeasterly approximately 92,000 feet, Northerly approximately 52,500 feet, And Northeasterly approximately 11,300 feet to the point of beginning, containing approximately 32,209 acres.

All as depicted on the map attached hereto.

Exact dimensions and final acreage of the area to be determined by survey.


CAMERON
Louisiana
Office of Minerals Resources
Sabine Lake - AP CCS Area
Produced by:
Office of Mineral Resources
Geological & Engineering Division
G.I.S. Lab
October 2021
Universal Tranverse Mercator Zone 15
North American Datum 1983
1:6,551,545
0
4
Miles
Legend
SL_19095
Interest_C
State Owned Water Bottom

BLE-000039

# SCHEDULE 1

This Schedule 1 is meant to supplement that certain Carbon-Dioxide Storage Agreement, dated as of _____, 2021 (the "Agreement"), by and between the State of Louisiana and Air Products Blue Energy LLC, a Delaware limited liability company ("AP"). Capitalized terms not defined herein shall have the same meaning as set forth in the Agreement.

This Schedule 1 supplements the Agreement with respect to AP's activities and Improvements and Equipment located within the Maurepas Swamp Wildlife Management Area ("WMA") as referenced herein which relates to Specific Area of Interest A under the Agreement. The WMA is under the jurisdiction of DWF, which has promulgated rules and regulations for the protection of wildlife resources, including aquatic life, and their supporting habitat within the WMA. In addition to any specific applicable rules and regulations of DWF related to the WMA, the following provisions shall apply with respect to AP's activities and Improvements and Equipment located within the WMA:

**1. Cooperation and Consultation regarding Timing, Siting and Modifications**

AP agrees to consult with DWF in advance regarding timing of activities and locations of well sites, pipelines, roads, and utilities within the WMA to help minimize impacts to wildlife resources, including aquatic life, and their supporting habitat.

To the extent AP needs to conduct activities within the WMA during deer firearm (inclusive of primitive and modern) hunting season, AP shall notify DWF and seek authorization prior to commencing such activities. AP and DWF will work together cooperatively to facilitate AP's activities during deer firearm hunting season in a manner acceptable to DWF.

Modifications to plans for proposed project Improvements and Equipment, including, but not limited to, access routes, pipeline routes, well sites, flowlines and appurtenant structures may be required by DWF if less damaging project alternatives exist.

**2. Commencement of Activities**

AP shall notify DWF prior to commencement of activities within the WMA and seek written authorization from DWF to commence activities. DWF will work cooperatively with AP to facilitate timely authorization of such commencement of activities.

**3. Compensatory Mitigation; Property Exchange**

To the extent permanent impacts occur due to AP's activities (i.e. property within the WMA is cleared, or altered such that it is no longer in conservation use), AP shall purchase and donate to DWF property of equal or greater ecological value in exchange for such permanently impacted property in order to satisfy any applicable acts of sale or donation.

Compensatory mitigation will be required as part of AP's regulatory permitting process to offset unavoidable wetland or coastal resource impacts, as determined by the U.S. Army Corps of Engineers and/or the Louisiana Office of Coastal Management.

**4. Timber Damage**

Standard DWF compensation rates apply for any timber resource damages and are reproduced and incorporated here:

- DWF shall be paid at triple the stumpage rates posted for the region by Timber Mart-South as of date of damage or removal.

**5. Seismic Fees**

Standard DWF compensation rates apply for any seismic activity in accordance with Applicable Law(s).

**6. Road Servitudes and Utility Rights of Way**

As needed, AP will enter into or facilitate appropriate road servitudes and utility rights of way for AP's activities and Improvements and Equipment within the WMA at the standard DWF compensation rate as listed and incorporated below:

Road Servitude:

- $1 per foot, per year. Not to exceed 30 ft. (width)

Utility Right-of-Way (ROW):

- Small public utility ROW (telephone, waterline, gas, fiber optic communication system, etc.). $75 per rod. Not to exceed 15 ft. (width). 20-year minimum term.
- Greater than 15 ft. (width), same as pipeline compensation schedule.

Water Pipeline Right-of-Way (ROW):

- Not to exceed 10ft. (width), not less than $100 per rod, per year. (Note: Term of ROW could be greater than 1 year)

**7. Pipeline Schedule and Right-of-Way Agreements**

As stated in Section 4.9 of the Agreement, the DWF pipeline right-of-way schedule in effect as of the Effective Date shall control the price for DWF pipeline rights-of-way for any pipelines installed within the WMA by or for AP and is incorporated herein as follows:

- 1 to 50 ft. (width)
  - ≤4" diameter (single line or combined lines in 1 trench). $75 per rod.
  - >4" diameter (single line or combined lines in 1 trench). Not less than $100 per rod.
- 51 to 100 ft. (width). Not less than $200 per rod.
- Over 100 ft. (width). Special rate based on each individual request.

- 20-year minimum term. Renewable for an additional 20 years.
- A right-of-way agreement shall be for a single pipeline installation only.
- AP shall obtain pipeline right-of-way agreements from DWF prior to installation of pipelines.

**8. Abandonment of Flow-lines and Pipelines**

AP agrees to remove its flow-lines and all equipment, structures or appurtenances associated therewith in accordance with Section 12.2 of the Agreement. With respect to proposed pipeline(s), DWF desires to minimize immediate and long-term impacts to wildlife resources, including aquatic life, and their supporting habitat. DWF understands that AP's preference is to abandon in place proposed pipeline(s) or segments of proposed pipeline(s) and agrees to work cooperatively with AP in this regard consistent with Applicable Laws to determine whether such abandonment in place may be accomplished in a way that is protective of the wildlife resources, including aquatic life, and their supporting habitat. For all portions of the pipeline(s) abandoned in place, AP will enter into Pipeline Abandonment and ROW Release Agreement(s) with DWF. AP will also provide DWF with depth-of-cover surveys on all portions of the pipeline(s) that have been abandoned in place prior to execution of the Pipeline Abandonment and ROW Release Agreement(s). Allowance of Abandonment in place shall not alter other restoration obligations contained in Section 12.2 of the Agreement. AP will remove pipeline segments that become exposed or uncovered, or return them to their previous depth of cover and provide DWF a depth-of-cover survey. For any portions of the pipeline(s) as to which abandonment in place is prohibited by Applicable Law (at the time of abandonment), or as to which AP and DWF have consulted and DWF has determined that removal is required to protect the wildlife resources, including aquatic life, and their supporting habitat, AP agrees to remove such portions of the pipeline(s).

**9. Public Improvements Necessitating Pipeline Relocation**

AP and DWF recognize that it might hereafter become necessary or desirable to widen, deepen or make some other work of public improvement on land or on the streams or water bottoms over and through which a pipeline of AP is located within the WMA, and this grant is accepted under the express condition and with the distinct understanding that, if any such work by the United States, the State of Louisiana, or any agency, board, commission, department or political subdivision of either, makes it necessary to alter or relocate any such pipeline, the entire cost of such alteration or relocation shall be borne, at least initially, by AP, this responsibility on the part of AP being part of the consideration for which this grant is made. This provision, however, shall not prejudice AP's right to receive just compensation, indemnification and/or relocation costs from the United States, the State of Louisiana or any agency, board, commission, department or political subdivision of either to the extent allowed under Applicable Law.

# United States Department of the Interior

BUREAU OF LAND MANAGEMENT
Utah State Office
440 West 200 South, Suite 500
Salt Lake City, UT 84101
http://www.blm.gov/utah

IM 2017-82

43 CFR 3162.4-1

IM 2013-075

In Reply Refer To:
3160 (UT922)
UTU63058A

MAY 0 2 2017

Questar Pipeline Company
P.O. Box 45360
Salt Lake City, Utah 84145-0360
Attn: Mr. David A. Ingleby

Re: Clay Basin Storage Facility
Daggett County, Utah

Dear Mr. Ingleby:

We are writing to respond to your October 13, 2015, letter requesting a meeting with the appropriate parties to renegotiate the fees associated with the Clay Basin Gas Storage Agreement, and respond to your concerns addressed to Mr. Edwin Roberson, Utah State Director, on April 7, 2017.

Based on your concerns stated at the April 7, 2017, meeting, internal staff discussions, and coordination with our Washington Office, we are prepared to offer the following fee schedule for your consideration.

June 1, 2016 to May 31, 2021

Annual Storage Fee - $2.0280 per net Federal mineral acre or fraction thereof
Injection Fee - $0.0050 per MCF
Withdrawal Fee - $.0203 per MCF

If you have any questions please contact Mickey Coulthard of this office at (801) 539-4042.

Sincerely,

Roger L. Bankert
Chief, Branch of Minerals

INDUSTRIAL COMMISSION
STATE OF NORTH DAKOTA
DATE 6/13/24 CASE NO 30869-880
Introduced By Braaten
Exhibit LO-46
Identified By Stockness

EXHIBIT
tabbies
LO-46
30869-30880

cc:
Garrison, LaVonne J., State of Utah
School and Institutional Trust Lands Administration
675 East 500 South, Suite 500
Salt Lake City, Utah 84102

INDUSTRIAL COMMISSION
STATE OF NORTH DAKOTA
DATE 6/13/24 CASE NO 30869-880
Introduced By Braaten
Exhibit LO-47
Identified By Stocknell

# TEXAS GENERAL LAND OFFICE / SCHOOL LAND BOARD

## REQUEST FOR PROPOSALS
for
## Lease of Permanent School Fund Land for Storage of Carbon Dioxide

## REQUEST FOR PROPOSALS NO. 21-SLB-1-ST

**Class 926 / Item 25; Class 926 / Item 90; Class 926 / Item 91; Class 925 / Item 15; Class 925 / Item 43; Class 925 / Item 45; Class 925 / Item 46; Class 493 / Item 42**

**Release Date: April 7, 2021**
**Deadline for Submission: May 10, 2021 at 2:00 p.m. CDT**

**Solicitation Point of Contact: Susan Tipton-Hines, CTCM, CTCD**
Susan.Tipton-Hines@GLO.Texas.Gov

You are responsible for checking the Electronic State Business Daily (ESBD) website, http://www.txsmartbuy.com/esbd, for any addenda to this Solicitation. Please search under Agency Code 305 (General Land Office and Veterans Land Board). The Respondent's failure to periodically check the ESBD will in no way release that Respondent from addenda or additional information resulting in additional requirements of the Solicitation.

EXHIBIT
LO-47
30869-30880

## TABLE OF CONTENTS


**ARTICLE I. EXECUTIVE SUMMARY, DEFINITIONS, AND AUTHORITY ..... 1**

1.1 Executive Summary ..... 1

1.2 Definitions ..... 1

1.3 Authority ..... 2

**ARTICLE II. NATURE OF WORK ..... 3**

2.1 Project Background ..... 3

2.2 Lease and Term ..... 4

**ARTICLE III. ADMINISTRATIVE INFORMATION ..... 5**

3.1 Schedule of Events ..... 5

3.2 Inquiries ..... 6

3.2.1 Contact ..... 6

3.2.2 Clarifications ..... 6

3.2.3 Responses ..... 6

3.2.4 Prohibited Communications ..... 6

3.3 Solicitation Response Composition ..... 7

3.3.1 General Requirements ..... 7

3.3.2 Solicitation Response Format ..... 7

3.3.3 Page Limit and Supporting Documentation ..... 7

3.4 Solicitation Response Submission and Delivery ..... 8

3.4.1 Deadline ..... 8

3.4.2 Labeling ..... 8

3.4.3 Delivery ..... 8

3.4.4 Alterations, Modifications, and Withdrawals ..... 8

**ARTICLE IV. SOLICITATION RESPONSE EVALUATION & AWARD PROCESS ..... 9**

4.1 Evaluation Criteria ..... 9

4.1.1 Conformance with State Law ..... 9

4.1.2 Minimum Qualifications ..... 9

4.1.3 Selection Criteria ..... 9

4.2 Short List ..... 10

4.3 Demonstrations / Presentations ..... 10

4.4 Best and Final Offer (BAFO) ..... 10
4.5 Lease Award ..... 11
**ARTICLE V. REQUIRED RESPONDENT INFORMATION ..... 12**
5.1 Respondent Information ..... 12
5.1.1 Company Narrative ..... 12
5.1.2 Company Profile ..... 12
5.2 Technical Proposal ..... 13
5.3 References ..... 13
5.4 Litigation History ..... 13
5.5 Conflicts ..... 14
5.6 Annual Report ..... 14
**ARTICLE VI. RENT AND ROYALTY PROPOSAL ..... 16**
6.1 Rent and Royalty Proposal ..... 16
**ARTICLE VII. TERMS AND CONDITIONS ..... 17**
7.1 General Conditions ..... 17
7.1.1 Amendment ..... 17
7.1.2 Informalities ..... 17
7.1.3 Rejection ..... 17
7.1.4 Irregularities ..... 17
7.1.5 Negotiation Period ..... 17
7.1.6 Open Records ..... 17
7.1.7 Lease Responsibility ..... 18
7.1.8 Public Disclosure ..... 19
7.1.9 Remedies ..... 19
7.2 Insurance and Bonds ..... 19
7.2.1 Required Insurance Coverages ..... 19
7.2.2 Alternative Insurability ..... 20
7.2.3 Bonds ..... 20
7.3 Lease Terms and Solicitation Acceptance ..... 20
**ARTICLE VIII. SUBMISSION CHECKLIST ..... 21**
**EXHIBIT A. AFFIRMATIONS AND SOLICITATION ACCEPTANCE ..... A-1**

**EXHIBIT B. SAMPLE LEASE ..... B-1**

# ARTICLE I. EXECUTIVE SUMMARY, DEFINITIONS, AND AUTHORITY

## 1.1 EXECUTIVE SUMMARY

Pursuant to Texas Health and Safety Code, Sec. 382.501 et seq., the Texas General Land Office ("GLO"), on behalf of the School Land Board ("SLB"), is requesting proposals for the lease of Permanent School Fund ("PSF") land in Jefferson County, Texas for the establishment and operation of a geologic carbon dioxide storage repository under submerged land in a Miocene formation, including construction of necessary transportation and storage infrastructure (the "Project"). The Texas Land Commissioner sits as ex officio Chairman of the SLB, and the staff of the GLO acts as the staff of the SLB. The SLB seeks an experienced and adequately funded entity to undertake the Project in order to maximize the value of PSF land. Respondents must execute **Exhibit A**, *Affirmations and Solicitation Acceptance*, and complete other items listed on the submission checklist to be considered. Additional information on the GLO/SLB and its programs can be found at http://www.glo.texas.gov.

The GLO will review Solicitation Responses to this Solicitation and make recommendations to the SLB. The SLB may then award one or more leases to one or more Respondents for one or more Project facilities. The GLO anticipates that a period of negotiation with the successful Respondent(s), including with regard to rent proposals, storage proposals, metering, reporting, and other relevant matters, will be necessary to reach a lease agreement that is in the best interests of the PSF.

## 1.2 DEFINITIONS

"Addendum" means a written clarification or revision to the Request for Proposals issued by the GLO. Respondents must acknowledge receipt of any addenda in the submission of the Solicitation Response.

"Affiliate" means any individual or entity that, directly or indirectly, controls, is controlled by, or is under common control with, Respondent. "Control" means the ability to directly or indirectly direct the management and policies of an entity, whether through the ownership of voting securities or membership interests, by contract, or otherwise.

"BAFO" means Best and Final Offer.

"BEG" means the Bureau of Economic Geology at the University of Texas at Austin.

"$CO_2$" means carbon dioxide, both anthropogenic and non-anthropogenic.

"ESBD" means the Electronic State Business Daily, http://www.txsmartbuy.com/esbd.

"GLO" means the Texas General Land Office individually and on behalf of the School Land Board.

"Lessee" means, collectively, one or more Respondents that are chosen by the SLB after review of Solicitation Responses to undertake the Project, including by signing the lease with the State, the form of which is attached to this Solicitation as Exhibit B.

"PIA" means the Public Information Act, Chapter 552 of the Texas Government Code.

"PSF" means Permanent School Fund.

"Respondent" means the entity responding to this Solicitation.

"RFP" means Request for Proposals.

"SLB" means School Land Board.

"Solicitation" means this RFP.

"Solicitation Response" means the Respondent's entire response to this Solicitation, including all documents requested in Articles III and V.

"State" means, collectively, the State of Texas, the SLB, the GLO, or state agency identified in this Solicitation, including its officers, employees, or authorized agents.

"TAC" means the Texas Administrative Code.

## 1.3 AUTHORITY

The GLO/SLB is soliciting the proposals described herein under Texas Health and Safety Code, Ch. 382, Subchapter K.

**REMAINDER OF PAGE INTENTIONALLY LEFT BLANK**

## ARTICLE II. NATURE OF WORK

### 2.1 PROJECT BACKGROUND

The lease that a Lessee obtains through this Solicitation process will authorize Lessee to use the leased PSF tracts as necessary for transportation and safe, long-term geologic storage of $CO_2$ as described in this Solicitation. Lessee will be responsible for providing and maintaining, as necessary, all labor, materials, tools, equipment, technology, permits, supplies, superintendence, insurance, incidentals, and services necessary for the construction and operation of the contemplated $CO_2$ storage repository. The GLO anticipates that the work for the Project will include, and in some instances the lease that the Lessee signs will require, at least the following tasks:

1) Characterize the geologic and geophysical features of BEG-identified* and SLB-authorized storage formations.
2) Select a site based on geological suitability, long-term well integrity risk, and repository economic viability.
3) Transport $CO_2$ from its source(s) to the storage location(s).
4) Obtain and comply with necessary permitting requirements, including but not limited to successful acquisition of Class VI UIC permit(s) and compliance with all other applicable federal, state, and local laws and regulations (including but not limited to relevant rules of the GLO, the Texas Railroad Commission, the Texas Commission on Environmental Quality, the U.S. Occupational Safety and Health Administration, and the U.S. Environmental Protection Agency regarding Class VI wells, and carbon dioxide handling, transport, storage, and monitoring).
5) Construct and operate the contemplated $CO_2$ sequestration facility.
6) Develop an operational plan, including financial assurance, decommissioning of all topside structures and adequate well plugging and abandonment and contingency plans to address potential $CO_2$ leakage events and well integrity failures.
7) Compensate the PSF for use of the offshore repository and any associated easements, and storage of $CO_2$.
8) Identify environmental concerns and develop a plan to address those concerns.
9) Monitor $CO_2$ sequestration and report repository technical and economic performance to GLO.
10) Develop and adopt a repository closure contingency plan, including verification of necessary bond payment for well abandonment.

*(see BEG report entitled "Gulf of Mexico Miocene CO2 Site Characterization Mega Transect")

The selected Respondent(s), after selection, shall be bound to specific terms and conditions to be negotiated with the GLO within the framework of the lease form attached to this Solicitation as **Exhibit B**.

## 2.2 LEASE AND TERM

Any lease resulting from this Solicitation shall be effective as of the earlier of the date that it is signed by both parties or August 16, 2021 (the "Effective Date"), and shall initially remain in effect for, at most, a 3-year due diligence and permitting period, followed by construction and operation periods, with an overall maximum term of 30 years, subject to possible extension as agreed to by the parties, and subject to the conditions set forth herein and in the lease. The lease will have progress milestones for the development of the Project, which milestones are to be met by the selected Respondent. Failure to meet milestones may lead to termination of the lease, as set out in the lease. The parties may, upon mutual written agreement, renew the lease unless terminated early under the terms and conditions of the lease.

**REMAINDER OF PAGE INTENTIONALLY LEFT BLANK**

## ARTICLE III. ADMINISTRATIVE INFORMATION

### 3.1 SCHEDULE OF EVENTS

| EVENT | DATE/TIME |
|---|---|
| Issue Solicitation | April 7, 2021 |
| Deadline for Submitting Questions | April 21, 2021 at 5:00 p.m. CDT |
| Anticipated Release Date of Answers to Questions | April 28, 2021 |
| **Deadline for Submission of Solicitation Responses** | **May 10, 2021 at 2:00 p.m. CDT** |
| Evaluation Period | May 11, 2021 to June 10, 2021 |
| Short List Notification (if applicable) | June 14, 2021 |
| Demonstrations/Presentations (if needed) | June 21, 2021 to June 22, 2021 |
| SLB Meeting for Selection and Notice of Award | June 28, 2021 |
| Lease Formation, Negotiation, and Execution | June 29, 2021 to August 30, 2021 |
| Deadline for Bonds and Insurance | Upon Execution of Lease |

**NOTE: These dates represent a tentative schedule of events. The SLB reserves the right to modify these dates at any time prior to the deadline for submission of Solicitation Responses upon notice posted on the Electronic State Business Daily (ESBD) website at: http://www.txsmartbuy.com/esbd. Please search under Agency Code 305 (General Land Office and Veterans Land Board). Any modification of dates after the deadline for submission of Solicitation Responses will not be posted.**

## 3.2 INQUIRIES

### 3.2.1 Contact

All requests, questions, or other communications about this Solicitation must be made **in writing** to the GLO's Purchasing Department, addressed to the person listed below.

| | |
|---|---|
| Name | Susan Tipton-Hines, CTCM, CTCD |
| Address | 1700 N. Congress Ave., Austin, Texas 78701 |
| Phone | 800.998.4456 or 512.475.0226 |
| Email | Susan.Tipton-Hines@GLO.Texas.Gov |

### 3.2.2 Clarifications

The GLO will allow written requests for clarification of this Solicitation. Questions may be e-mailed to the point-of-contact listed in Section 3.2.1 above. Respondents' names shall be removed from questions in the responses released. Questions shall be submitted in the following format. Submissions that deviate from this format may not be accepted:

a) Identifying Solicitation number
b) Section number
c) Text of passage being questioned
d) Question

**NOTE: The deadline for submitting questions is noted in Section 3.1 above. Please provide company name, address, phone number, e-mail address, and name of contact person when submitting questions.**

### 3.2.3 Responses

All accepted questions will result in written responses with copies posted to the ESBD at: http://www.txsmartbuy.com/esbd. Responses shall be posted as an Addendum to the Solicitation. It is Respondent's responsibility to check the ESBD for updated responses.

### 3.2.4 Prohibited Communications

On issuance of this Solicitation, except for the written inquiries described in Section 3.2.1 above, the SLB and the GLO will not answer questions or otherwise discuss the contents of this Solicitation with any potential Respondent or their representative(s). Attempts to ask questions by phone or in person will not be allowed or recognized as valid. Failure to observe this restriction may disqualify the Respondent. Respondent shall rely only on written statements issued through or by the GLO's purchasing staff. This restriction does not preclude discussions

between affected parties for the purposes of conducting business unrelated to this Solicitation.

## 3.3 SOLICITATION RESPONSE COMPOSITION

### 3.3.1 General Requirements

Respondent shall complete and upload the documents listed below to the Box™ URL in Section 3.4.3:

a) One Proposal, including all documents requested in Part 1 of the *Submission Checklist*, submitted as one Portable Document Format (.pdf) file;

b) One Annual Report (see Section 5.6), submitted as one .pdf file; and

c) One Financial Statement Components Worksheet, submitted as a Microsoft Excel (.xlsx) file.

Respondent shall prepare a clear and concise Solicitation Response that focuses on the instructions and requirements of the Solicitation. Respondent is responsible for all costs related to the preparation of its Solicitation Response.

Any terms and conditions attached to a Solicitation Response that are intended to change the terms of the lease will not be considered and may result in disqualification.

### 3.3.2 Solicitation Response Format

For ease of evaluation, the Solicitation Response shall be presented in a format that corresponds to the order requested in Article VIII, *Submission Checklist*. Responses to each section and subsection shall be labeled clearly to indicate the item being addressed. Exceptions to this will be considered during the evaluation process.

### 3.3.3 Page Limit and Supporting Documentation

Proposals shall not exceed 40 pages in length. **Exhibit A,** signed acknowledgments of addenda, references, résumés, Annual Report (if relevant), and the Financial Statement Components Worksheet are considered supporting documentation and are not included in the page limit. The Solicitation Response should be formatted using 12-point or larger font, except for charts, graphs, or other graphical representations of data.

## 3.4 SOLICITATION RESPONSE SUBMISSION AND DELIVERY

### 3.4.1 Deadline

**Solicitation Responses must be received at the Box™ URL in Section 3.4.3 no later than as specified in Section 3.1.** Respondents may submit their Solicitation Responses any time prior to that deadline. Box™ shall time stamp all uploaded Solicitation Responses; any other documentation of timely submission in lieu of the Box™ time stamp WILL NOT be accepted.

### 3.4.2 Labeling

Each file uploaded to Box™ shall include Respondent's company name and the title of the document; for example: "Company X: Proposal."

### 3.4.3 Delivery

Respondents must upload Solicitation Responses to the following the Box™ URL:

https://txglo.app.box.com/f/835f08da04394c54924e2468851500f0

The GLO/SLB shall not accept Solicitation Responses submitted by any other means. Please contact the point-of-contact listed in section 3.2.1 above for assistance with the Box™.

### 3.4.4 Alterations, Modifications, and Withdrawals

Solicitation Responses may be modified, altered, or withdrawn by notifying the point-of-contact listed in Section 3.2.1 above, provided such notice is received prior to the deadline for submission of Solicitation Responses.

**REMAINDER OF PAGE INTENTIONALLY LEFT BLANK**

## ARTICLE IV. SOLICITATION RESPONSE EVALUATION & AWARD PROCESS

### 4.1 EVALUATION CRITERIA

4.1.1 Conformance with State Law

Solicitation Responses shall be evaluated in accordance with applicable State law. The GLO/SLB shall not be obligated to accept the highest royalty or rent proposal, but shall make an award to the Respondent that provides the "Best Value" to the State of Texas.

4.1.2 Minimum Qualifications

Respondents must meet the minimum qualifications listed below. Furthermore, Solicitation Responses that appear unrealistic in terms of technical commitment, that show a lack of technical competence, or that indicate a failure to comprehend the risk and complexity of the Project may be rejected.

Respondent shall submit a summary (not to exceed two pages) that provides specific support for meeting the minimum qualifications outlined in this Section. This support can specifically state how the Respondent meets each minimum qualification or can direct the evaluators to the appropriate section of the Solicitation Response that provides support for the Respondent satisfying each minimum qualification.

4.1.2.1 Respondent must have demonstrated experience undertaking and completing large-scale projects involving infrastructure construction and/or industrial-scale facility operation, preferably involving $CO_2$, gas storage, and/or hydrocarbon pipelines;

4.1.2.2 Respondent must have demonstrated experience obtaining and complying with Federal or State permits, preferably involving either or both of oil and gas regulations or environmental regulations; and

4.1.2.3 Respondent must be financially solvent and adequately capitalized.

4.1.3 Selection Criteria

Solicitation Responses shall be consistently evaluated and scored in accordance with the following best value criteria:

4.1.3.1 Demonstrated relevant experience, qualifications and past performance of Respondent and proposed staff (30%)

4.1.3.2 Proposed methodology for storage, and proposed schedule for completion of the Project (25%)

4.1.3.3 Proposed source(s) and quantities of $CO_2$ to be stored, and proposed schedule and rate of payments to be made to the GLO, for the benefit of the PSF, for lease of land and storage of $CO_2$ (25%)

4.1.3.4 Proposed plan for permitting and for compliance with all applicable Federal and State regulation (10%)

4.1.3.5 Overall responsiveness, clarity, and organization of Solicitation Response (10%)

**NOTE: To clarify any response, the Solicitation evaluation committee may contact references provided in response to this Solicitation, contact Respondent's clients, or solicit information from any available source concerning any aspect of the Solicitation deemed pertinent to the evaluation process.**

## 4.2 SHORT LIST

The GLO expects to make an initial evaluation of the Solicitation Responses to develop a short list of finalists. However, the GLO is not obligated to develop this list. If a list is developed, all Respondents will be notified in writing whether or not they are finalists.

## 4.3 DEMONSTRATIONS / PRESENTATIONS

The GLO may invite short listed finalists to provide demo presentations. All presentations will be conducted online via a virtual platform mutually agreed upon by the GLO and Respondent upon Respondent's acceptance of the invitation.

Respondents will be provided with notice of any such presentations and are responsible for their own presentation equipment and internet connection. Failure to participate in the requested presentation may eliminate a Respondent from further consideration. The GLO is not responsible for any costs incurred by the Respondent associated with the presentation.

## 4.4 BEST AND FINAL OFFER (BAFO)

Clarification discussions, at the GLO's sole option, may be conducted with Respondents who submit Solicitation Responses determined to be acceptable and competitive. Respondents shall be accorded fair and equal treatment with respect to any opportunity for discussion and/or written revisions of the Solicitation Responses. Such revisions may be permitted after submissions and prior to award solely for the purpose of obtaining BAFOs.

In conducting discussions, the GLO shall not disclose any information derived from the Solicitation Responses submitted by competing Respondents.

The GLO evaluation committee shall score BAFO responses in a manner consistent with the scoring of original solicitation responses. The criteria to be re-evaluated following a BAFO shall depend on the type of clarification requested by the GLO from Respondent. Scores for any of the applicable selection criteria included in the GLO's request for BAFO shall be replaced by the BAFO scores.

## 4.5 LEASE AWARD

The SLB may award a lease to one or more Respondents under this Solicitation. An award notice will be sent to the selected Respondent(s). Any award is contingent upon the successful negotiation of final lease terms with the GLO and upon approval of the SLB. Negotiations shall be confidential and not subject to disclosure to competing Respondents unless and until an agreement is reached. If lease negotiations cannot be concluded successfully, the GLO may negotiate a lease with fewer than all of the initially chosen Respondents, may negotiate a lease with the next highest scoring Respondent(s), or may withdraw this Solicitation.

**NOTE: Solicitation Responses are subject to the Texas Public Information Act, Chapter 552 of the Texas Government Code, and will be withheld from or released to the public only in accordance therewith.**

**REMAINDER OF PAGE INTENTIONALLY LEFT BLANK**

## ARTICLE V. REQUIRED RESPONDENT INFORMATION

### 5.1 RESPONDENT INFORMATION

Each Respondent must provide satisfactory evidence of its experience and operational and financial ability to undertake and complete the types of activities described in this Solicitation, including to complete and operate the Project.

5.1.1 Company Narrative

Provide a detailed narrative explaining why Respondent is qualified to undertake the Project, focusing on its key strengths and competitive advantages.

5.1.2 Company Profile

Provide a company profile to include:

a) The company ownership structure (e.g., corporation, partnership, LLC, sole proprietorship, etc.), including any wholly-owned subsidiaries, affiliated companies, or joint ventures. (*Please provide this information in a narrative or as a graphical representation*). If Respondent is an Affiliate of, or has a joint venture or strategic alliance with, another company, please identify the percentage of ownership and the percentage of the company's ownership. Finally, please provide your proposed operating structure for the Project and which entities (i.e. parent company, Affiliate, Joint Venture, subcontractor) will be performing Project tasks;

b) The year the company was founded and/or legally organized. If organized as a business entity other than a sole proprietorship (e.g., corporation, LLC, LP, etc.), please indicate the type of entity, the state under whose laws the company is organized, and the date of organization;

c) The location of Respondent's headquarters and any field office(s) that may provide services in connection with the Project;

d) The name, title, mailing address, e-mail address, and telephone number of Respondent's point of contact for any resulting lease under this Solicitation; and

e) Whether Respondent has ever been a party to a contract with any Texas state agency. If "Yes," specify when, for what duties, and with which agency.

**NOTE: A Respondent that is not organized under the laws of the state of Texas must register with the Texas Secretary of State before it may transact business**

**in Texas. Respondent must provide proof of registration before the SLB may award a lease under this Solicitation.**

## 5.2 TECHNICAL PROPOSAL

Respondent must describe clearly, specifically, and as completely as practicable, its proposed methodology and schedule for achieving the objectives of the Project, including with regard to transportation of $CO_2$ to and its long-term storage in the repository, as well as post-closure monitoring and security of stored $CO_2$. Respondent should describe tasks to be performed to be responsive to Article II, Nature of Work.

## 5.3 REFERENCES

Respondent shall provide a minimum of three **non-GLO** references for projects of similar general scope performed within the last three years. The GLO/SLB reserves the right to check references prior to award. Any negative responses received may be grounds for disqualification of the Solicitation Response.

Respondent must verify current contacts for its references. Information provided shall include:

a) Client name;
b) Project description;
c) Total dollar amount of project; and
d) Client project manager name, telephone number, and e-mail address.

**The GLO checks references by e-mail. Respondents who do not provide accurate e-mail addresses waive the right to have those references considered in the evaluation of their Solicitation Responses.**

## 5.4 LITIGATION HISTORY

Respondent must disclose any civil or criminal litigation or investigation pending at any time during the last three years that involves Respondent's work on or involvement with a construction, pipeline, industrial, or other type of project generally similar to the Project, as well as any in which Respondent has already been judged guilty or liable. For each instance of litigation or investigation, Respondent shall list: basic case information (e.g., cause number/case number, venue information, names of parties, name of investigating entity [if relevant]); a description of claims alleged by or against Respondent or its parent, subsidiary, or other Affiliate; for each resolved case, a description of the disposition of Respondent's involvement (e.g., settled, dismissed, judgment entered, etc.).

Failure to comply with the terms of this provision may disqualify any Respondent. Solicitation Responses may be rejected based upon Respondent's prior history with the

state of Texas or with any other party that demonstrates, without limitation, unsatisfactory performance, adversarial or contentious demeanor, or significant failure(s) to meet contractual obligations.

If Respondent has no litigation history, as described above, so indicate in the appropriate section of the Solicitation Response.

## 5.5 CONFLICTS

Respondent must disclose any potential conflict of interest it may have with the GLO or the SLB in undertaking the Project, including all existing or prior arrangements. Please include any activities of affiliated or parent organizations and individuals who may be assigned to manage this account. If Respondent has no conflicts, as described above, so indicate in the appropriate section of the Solicitation Response.

## 5.6 ANNUAL REPORT

If Respondent is an entity that is required to prepare audited financial statements, Respondent shall submit an annual report that includes:

a) Last two years of audited accrual-basis financial statements, including an income statement, cash flow statement, and balance sheet;
b) If applicable, last two years of consolidated statements for any holding companies or affiliates;
c) An audited or un-audited accrual-basis financial statement of the most recent quarter of operation; and
d) A full disclosure of any events, liabilities, or contingent liabilities that could materially affect Respondent's financial ability to undertake the Project.

If Respondent is a privately-owned entity or sole proprietorship for which audited financial statements are not required, Respondent shall submit a report that includes:

a) Last two years of un-audited accrual-basis financial statements, including an income statement, cash flow statement, and balance sheet;
b) An audited or un-audited accrual-basis financial statement of the most recent quarter of operation; and
c) A full disclosure of any events, liabilities, or contingent liabilities that could materially affect Respondent's financial ability to undertake the Project;

OR

a) Other financial information sufficient for the GLO, in its sole judgement, to determine if Respondent is financially solvent and adequately capitalized.

Respondent shall also complete and submit the Financial Statement Components Worksheet, posted to the ESBD as an Excel workbook (.xlsx format). Any respondent that fails to comply with this Section 5.6 or that is not financially solvent or adequately capitalized, as affirmed by the GLO Chief Financial Officer, shall be deemed not to have met the minimum qualification stated in Section 4.1.2.3 of this Solicitation.

**REMAINDER OF PAGE INTENTIONALLY LEFT BLANK**

## ARTICLE VI. RENT AND ROYALTY PROPOSAL

### 6.1 RENT AND ROYALTY PROPOSAL

Respondent must provide a proposal for paying to the GLO, for the benefit of the PSF, all or some of the following, as well as any other payments Respondent proposes to pay to the GLO, for the benefit of the PSF, in connection with the Project: (i) rent for the use of PSF land, whether surface or submerged, for transportation facilities associated with the Project; (ii) payment for the right to use PSF-owned submerged strata for $CO_2$ storage; (iii) rent or royalty payment for the mass of $CO_2$ initially placed into storage, without regard to loss or leakage; (iv) a portion of the value, however monetized, of $CO_2$ capture and/or storage tax credits earned by, or paid to, Respondent in connection with the Project; and (v) minimum rent during feasibility and construction periods for the submerged areas that may be used for storage pursuant to the Project as proposed by Respondent.

Per Section 4.1.3.3 of this Solicitation, Respondent's proposed source(s) and quantities of $CO_2$ to be stored, and the rent resulting from the proposed quantities, are a material element in the selection of the Respondent(s) who will enter into leases with the GLO/SLB. For that reason, the lease will include a baseline revenue target in the operations phase, based on a reasonable forecast of expected revenues based on rent structure and proposed stored quantities as set out in Respondent's Response. The lease will allow the GLO to terminate the lease if the baseline revenue target is not met over the course of an agreed period of time as stated in the lease.

**Respondents are hereby expressly put on notice that because of the open-ended nature of rent and royalty proposals that can be made, the ultimate rent and/or royalty provisions in the lease will be subject to further negotiation and documentation following the award(s) under this Solicitation.**

REMAINDER OF PAGE INTENTIONALLY LEFT BLANK

# ARTICLE VII. TERMS AND CONDITIONS

## 7.1 General Conditions

### 7.1.1 Amendment

The GLO, on behalf of the SLB, reserves the right to alter, amend, or modify any provision of this Solicitation, or to withdraw this Solicitation, at any time prior to the award, if it is in the best interest of the SLB and/or the PSF.

### 7.1.2 Informalities

The GLO reserves the right to waive minor informalities and irregularities in any Solicitation Response received.

### 7.1.3 Rejection

The GLO reserves the right to reject any or all Solicitation Responses received prior to lease award.

### 7.1.4 Irregularities

Any irregularities or lack of clarity in this Solicitation should be brought to the attention of the point-of-contact listed in Section 3.2.1 as soon as possible, so that corrective addenda may be furnished to prospective Respondents via the ESBD.

### 7.1.5 Negotiation Period

Solicitation Responses shall be binding for a period of 120 days after they are opened. Respondents may extend the time for which their Solicitation Response will be honored.

### 7.1.6 Open Records

The GLO and SLB are government agencies subject to the Texas Public Information Act (PIA), Chapter 552, Texas Government Code. The Solicitation Response and other information submitted to the GLO by the Respondent and any lease(s) awarded pursuant to this Solicitation are subject to release as public information. The Solicitation Response and other submitted information shall be presumed to be subject to disclosure unless a specific exception to disclosure under the PIA applies. If it is necessary for the Respondent to include proprietary or otherwise confidential information in its Solicitation Response or other submitted information, the Respondent must clearly label that proprietary or confidential information and identify the specific exception to disclosure of that information in the PIA. Merely making a blanket claim that the entire Solicitation Response is

protected from disclosure because it contains some proprietary information is not acceptable, and shall make the entire Solicitation Response subject to release under the PIA. In order to trigger the process of seeking an Attorney General opinion on the release of proprietary or confidential information, the specific provisions of the Solicitation Response the Respondent considers proprietary or confidential must be clearly labeled as described above. Any information which is not clearly identified as proprietary or confidential shall be deemed to be subject to disclosure pursuant to the PIA, except as provided by law.

Respondents are required to make any information created or exchanged with the GLO or SLB pursuant to this Solicitation and any lease that may result from this Solicitation, and not otherwise excepted from disclosure under the Texas Public Information Act, available in a format that is accessible by the public at no additional charge to the GLO.

Information related to the performance of any resulting lease may be subject to the PIA and will be withheld from public disclosure or released only in accordance therewith. Respondent shall make any information created or exchanged with the GLO or the SLB, and not otherwise excepted from disclosure under the PIA, available in a format that is accessible by the public at no additional charge to the GLO. Respondent shall make any information required under the PIA available to the GLO in Portable Document Format (PDF) or any other format agreed between the parties. The original copy of each Solicitation Response shall be retained in the official files of the GLO as a public record.

Solicitation Responses and all other documents associated with this Solicitation will be withheld or released upon written request only in accordance with the PIA. To the extent that a Respondent wishes to prevent the disclosure of portions of its Solicitation Response to the public, Respondent shall demonstrate the applicability of any exception to disclosure provided under the PIA in accordance with the procedures prescribed by the PIA. Respondent may clearly label individual documents "confidential" or "trade secret" to demonstrate that it believes certain information is excepted from disclosure and may legally be withheld from the public. Respondent thereby agrees to indemnify and defend the GLO for honoring such a designation. The failure of Respondent to clearly label such documents shall constitute a complete waiver of any and all claims for damages caused by the GLO's release of these records.

Pursuant to Texas Government Code Chapter 2261, any lease or contract that results from this Solicitation, including selected Respondent's Solicitation Response, shall be posted to the GLO's website.

7.1.7 Lease Responsibility

Respondent shall be solely responsible for the performance of all contractual obligations that may result from an award based on this Solicitation. Respondent

shall not be relieved of its obligations for any nonperformance by its subcontractors.

7.1.8 Public Disclosure

Respondent will not advertise that it is doing business with the GLO or SLB or use a lease resulting from this Solicitation as a marketing or sales tool without prior written consent of the GLO or SLB as applicable.

7.1.9 Remedies

All remedies available to the GLO for breach or anticipatory breach of any lease that results from this Solicitation are cumulative and may be exercised concurrently or separately, and the exercise of any one remedy shall not be deemed an election of such remedy to the exclusion of other remedies. Liquidated damages, actual damages, cost projections, and/or injunctive relief may also be invoked either separately or combined with any other remedy in accordance with applicable law.

## 7.2 INSURANCE AND BONDS

7.2.1 Required Insurance Coverages

For the duration of any lease resulting from this Solicitation, Lessee shall acquire insurance with financially sound and reputable independent insurers, in the type and at least the amount as follows:

7.2.1.1 Workers Compensation & Employers Liability

Lessee must maintain Workers' Compensation insurance coverage in accordance with statutory limits.

Workers Compensation: Statutory Limits
Employers Liability: Each Accident $1,000,000
Disease - Each Employee $1,000,000
Disease - Policy Limit $1,000,000

This website (coverage starts with 406 of the Labor code) addresses what Texas requires of Workers Compensation:
http://www.tdi.texas.gov/wc/act/index.html

7.2.1.2 Commercial General Liability (Occurrence based)

a) Bodily Injury and Property Damage:
   $1,000,000 each occurrence
   $2,000,000 aggregate limit
b) Medical Expense each person: $5,000
c) Personal Injury and Advertising Liability: $1,000,000

d) Products / Completed Operations Aggregate: $2,000,000
e) Damage to Premises Rented to You: $50,000

The required coverage is to be written with companies licensed in the State of Texas, with an "A-" rating from A.M. Best, and authorized to provide the corresponding coverage. Work on the Project shall not begin until after Lessee has submitted acceptable evidence of insurance. Failure to maintain insurance coverage or acceptable alternative methods of insurance shall be deemed a breach of contract.

7.2.2 Alternative Insurability

Notwithstanding the preceding, the GLO reserves the right to consider reasonable alternative methods of insuring the lease in lieu of the insurance policies customarily required. It will be Respondent's responsibility to recommend to the GLO alternative methods of insuring the contract. Any alternatives proposed by Respondent should be accompanied by a detailed explanation regarding Respondent's inability to obtain the required insurance and/or bonds. The GLO shall be the sole and final judge as to the adequacy of any substitute form of insurance coverage.

7.2.3 Bonds

Respondent's bond or other fiscal surety obligations will be as set out in the lease.

## 7.3 Lease Terms and Solicitation Acceptance

**Exhibit B**, *Sample Lease*, is the framework of the lease form that will be used by the SLB for the Project; please review the terms and conditions of the form. The SLB reserves the right to negotiate final lease terms with any selected Respondent. The terms and conditions in **Exhibit B** are subject to change prior to the execution of any lease that may result from this Solicitation.

Execution of **Exhibit A** of this Solicitation, *Affirmations and Solicitation Acceptance*, shall constitute an agreement to all terms and conditions specified in this Solicitation, including, but not limited to, **Exhibit B**, *Sample Lease*, and all terms and conditions therein.

**Remainder Of Page Intentionally Left Blank**

## ARTICLE VIII. SUBMISSION CHECKLIST

This checklist is provided for Respondent's convenience only and identifies documents that must be submitted with this Solicitation to be considered responsive. Any Solicitation Responses received without these requisite documents may be deemed nonresponsive and not considered for lease award.

## A COMPLETE SOLICITATION PACKAGE SHALL INCLUDE:

1. Part 1 – Proposal (one .pdf file)
2. Part 2 – Annual Report (or substitute permitted by this Solicitation) (one .pdf file)
3. Part 3 – Financial Statement Components Worksheet (one .xlsx file)

## PART 1 – PROPOSAL

**Please present documents in the following order:**

| | | |
|---|---|---|
| 1. **Exhibit A**, Affirmations and Solicitation Acceptance | | ___ |
| 2. Signed Acknowledgments of Addenda (if applicable) | | ___ |
| 3. Summary of Minimum Qualifications | (Section 4.1.2) | ___ |
| 4. Respondent Information | (Section 5.1) | ___ |
| 5. Technical Proposal | (Section 5.2) | ___ |
| 6. References | (Section 5.3) | ___ |
| 7. Major Subcontractor Information (if applicable) | (Section 5.4) | ___ |
| 8. Litigation History (if applicable) | (Section 5.4) | ___ |
| 9. Conflicts (if applicable) | (Section 5.5) | ___ |
| 10. Rent and Royalty Proposal | (Section 6.1) | ___ |

## PART 2 – ANNUAL REPORT

| | | |
|---|---|---|
| 1. Annual Report | (Section 5.6) | ___ |

## PART 3 – FINANCIAL STATEMENT COMPONENTS WORKSHEET

| | | |
|---|---|---|
| 1. Financial Statement Components Worksheet | (Section 5.6) | ___ |

# EXHIBIT A. AFFIRMATIONS AND SOLICITATION ACCEPTANCE

# GENERAL AFFIRMATIONS AND SOLICITATION ACCEPTANCE

Execution of this **Exhibit A**, constitutes an agreement to all terms and conditions in the Solicitation, including, without limitation, this **Exhibit A**. If Respondent fails to sign this **Exhibit A** or signs it with a false statement, Respondent's Solicitation Response and any resulting contract(s) shall be void. Respondent agrees without exception to the following general affirmations and acknowledges that any contract resulting from this Solicitation may be terminated and payment withheld if any of the following affirmations or certifications are inaccurate:

1. Respondent represents and warrants that all statements and information prepared and submitted in its Solicitation Response are current, complete, true, and accurate. Submitting a Solicitation Response with a false statement or making a material misrepresentation during the performance of a contract is a material breach of contract and may void the Solicitation Response and any resulting contract.

2. Pursuant to Section 2155.003 of the Texas Government Code, Respondent represents and warrants that it has not given, offered to give, nor intends to give at any time hereafter any economic opportunity, future employment, gift, loan, gratuity, special discount, trip, favor, or service to a public servant in connection with the submitted Solicitation Response.

3. Pursuant to Section 2155.004(a) of the Texas Government Code, Respondent certifies that neither Respondent nor any person or entity represented by Respondent has received compensation from the GLO to participate in the preparation of the specifications or solicitation on which its Solicitation Response is based. Under Section 2155.004(b) of the Texas Government Code, Respondent certifies that the individual or business entity named in its Solicitation Response is not ineligible to receive the specified contract and acknowledges that the contract may be terminated and payment withheld if this certification is inaccurate. This Section does not prohibit a Respondent from providing free technical assistance.

4. Under the Texas Family Code, Section 231.006, a child support obligor who is more than 30 days delinquent in paying child support and a business entity in which the obligor is a sole proprietor, partner, shareholder, or owner with an ownership interest of at least 25 percent is not eligible to receive payments from state funds under a contract to provide property, materials, or services. Under Section 231.006, Texas Family Code, the vendor or applicant [Respondent] certifies that the individual or business entity named in this contract, bid, or application [Solicitation Response] is not ineligible to receive the specified grant, loan, or payment. The Solicitation Response must include the name and social security number of any individual or sole proprietor and each partner, shareholder, or owner with an ownership interest of at least 25 percent of the business entity submitting the bid or application. This information must be provided prior to execution of any contract resulting from this Solicitation.

5. The GLO is federally mandated to adhere to the directions provided in the President's Executive Order (EO) 13224, blocking property and prohibiting transactions with persons who commit, threaten to commit, or support terrorism and any subsequent changes made to it. The GLO will cross-reference Respondents/vendors with the federal System for Award Management (https://www.sam.gov/), which includes the United States Treasury's Office of Foreign Assets Control (OFAC) Specially Designated National (SDN) list. Respondent certifies: 1) that Respondent and its principals are eligible to participate in this transaction and have not been subjected to suspension, debarment, proposed debarment, or similar ineligibility or exclusion by any federal, state, or local governmental entity; 2) that Respondent is in compliance with the State of Texas statutes and rules relating to procurement; and 3) that Respondent is not listed on the federal government's terrorism watch list as described in Executive Order 13224. Entities ineligible for federal procurement are listed at https://www.sam.gov/. This provision shall be included in its entirety in all subcontracts to contracts resulting from this Solicitation.

6. Respondent agrees that any payments due under any contract resulting from this Solicitation will be applied towards any debt or delinquency Respondent owes to the State of Texas including, but not limited to, delinquent taxes, delinquent student loan payments, and delinquent child support.

7. In accordance with Section 669.003 of the Texas Government Code, relating to contracting with the executive head of a state agency, Respondent certifies that it is not (1) the executive head of the GLO, (2) a person who at any time during the four years before the date of the contract was the executive head of the GLO, or (3) a person who employs a current or former executive head of a state agency.

8. If any contract resulting from this Solicitation is for services, Respondent shall comply with Section 2155.4441 of the Texas Government Code, requiring the purchase of products and materials produced in the State of Texas in performing service contracts.

9. Respondent shall retain in its records the Solicitation and its Solicitation Response and all documents related to this Solicitation or any contract resulting from this Solicitation. Unless a longer retention period is specified by applicable federal law or regulation, Respondent may destroy such records only after the seventh anniversary of the date: the contract is completed or expires; or all issues that arise from any litigation, claim, negotiation, audit, open records request, administrative review, or other action involving the Solicitation, Solicitation Response, contract, or related documents are resolved. Respondent acknowledges that the State has a right of access to information in Respondent's possession relating to State property and agrees to make such information reasonably available upon request of the GLO.

10. The state auditor may conduct an audit or investigation of any entity receiving funds from the state directly under a contract resulting from this Solicitation or indirectly through a subcontract under such contract. The acceptance of funds directly under such contract or indirectly through a subcontract under such contract acts as acceptance of the authority of the state auditor, under the direction of the legislative audit committee, to conduct an audit or investigation in connection with those funds. Under the direction of the legislative audit committee, an entity that is the subject of an audit or investigation by the state auditor must provide the state auditor with access to any information the state auditor considers relevant to the investigation or audit. Respondent shall ensure that this paragraph concerning the authority to audit funds received indirectly by subcontractors through a contract and the requirement to cooperate is included in any subcontract it awards. Any contract resulting from this Solicitation may be amended unilaterally by the GLO to comply with any rules and procedures of the state auditor in the implementation and enforcement of Section 2262.154 of the Texas Government Code.

11. In accordance with Section 2252.901 of the Texas Government Code, for the categories of contracts listed in that section, Respondent represents and warrants that none of its employees including, but not limited to, those authorized to provide services under the contract, were employees of the GLO during the twelve (12) month period immediately prior to the date of execution of the contract. Solely for professional services contracts as described by Chapter 2254 of the Texas Government Code, Respondent further represents and warrants that if a former employee of the GLO was employed by Respondent within one year of the employee's leaving the GLO, then such employee will not perform services on projects with Respondent that the employee worked on while employed by the GLO.

12. The Respondent shall not discriminate against any employee or applicant for employment because of race, disability, color, religion, sex, age, or national origin. The Respondent shall take affirmative action to ensure that applicants are employed and that employees are treated without regard to their race, disability, color, sex, religion, age, or national origin. Such action includes, but is not limited to: employment, promotion, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. Respondent shall post notices, setting forth the provisions of this non- discrimination article, in conspicuous places available to employees or applicants for employment. Respondent shall include the above provisions in all subcontracts to any contract resulting from this Solicitation.

13. Respondent represents and warrants that, in accordance with Section 2155.005 of the Texas Government Code, neither Respondent nor the firm, corporation, partnership, or institution represented by Respondent, or anyone acting for such a firm, corporation, partnership, or institution has (1) violated any provision of the Texas Free Enterprise and Antitrust Act of 1983, Chapter 15 of the Texas Business and Commerce Code, or the federal antitrust laws, or (2) communicated directly or indirectly the contents of its Solicitation Response to any competitor or any other person engaged in the same line of business as Respondent.

14. By signing this Solicitation Response, Respondent certifies that if a Texas address is shown as the address of the Respondent, Respondent qualifies as a "Texas Bidder" as defined in Section 2155.444(c) of the Texas Government Code.

15. Respondent understands that the GLO does not tolerate any type of fraud. The GLO's policy is to promote consistent, legal, and ethical organizational behavior by assigning responsibilities and providing guidelines to enforce controls. Any violations of law, GLO policies, or standards of ethical conduct will be investigated, and appropriate actions will be taken. Respondents are expected to report any possible fraudulent or dishonest acts, waste, or abuse to the GLO's Internal Audit Director at 512.463.6078 or Tracey.Hall@glo.texas.gov.

16. Respondent certifies that it will comply with the federal Immigration Reform and Control Act of 1986, the Immigration Act of 1990, and the Immigration Act of 1996 regarding employment, employment verification, and retention of verification forms of individuals who will prospectively perform work described in this proposal.

17. Sections 2155.006 and 2261.053 of the Texas Government Code, prohibit state agencies from accepting a Solicitation Response or awarding a contract that includes proposed financial participation by a person who, in the past five years, has been convicted of violating a federal law or assessed a penalty in connection with a contract involving relief for Hurricane Rita, Hurricane Katrina, or any other disaster, as defined by Section 418.004 of the Texas Government Code, occurring after September 24, 2005. Under Sections 2155.006 and 2261.053 of the Texas Government Code, Respondent certifies that the individual or business entity named in this Response is not ineligible to receive the specified contract and acknowledges that such contract may be terminated, and payment withheld if this certification is inaccurate.

18. Respondent represents and warrants that it shall comply with the applicable provisions of and rules and regulations related to the Drug-Free Workplace Act of 1988 (41 U.S.C. §§ 8101-8106).

19. The Respondent represents that payment to the Respondent and the Respondent's receipt of appropriated or other funds under any contract resulting from this Solicitation are not prohibited by Section 556.005 or Section 556.008 of the Texas Government Code.

20. If the Solicitation is for completion of a "project" (as defined by Texas Government Code §2252.201) in which iron or steel products will be used, Respondent agrees any iron or steel product produced through a "manufacturing process" (as defined by Texas Government Code §2252.201) and used in the project shall be produced in the United States.

21. If Texas Government Code Chapter 2270 prohibiting state contracts with companies boycotting Israel applies to Respondent and any contract awarded to Respondent pursuant to this Solicitation, then Respondent verifies it does not boycott Israel and will not boycott Israel during the term of any contract awarded to Respondent pursuant to this Solicitation.

22. If Respondent is submitting a Solicitation Response for the purchase or lease of computer equipment, then Respondent certifies it is in compliance with Subchapter Y, Chapter 361 of the Texas Health and Safety Code related to the Computer Equipment Recycling Program and the Texas Commission on Environmental Quality rules in Title 30 Texas Administrative Code, Chapter 328.

23. Upon the GLO's request, Respondent shall provide copies of its most recent business continuity and disaster recovery plans.

24. If the Solicitation is for consulting services, as defined in Texas Government Code Chapter 2254, in accordance with Section 2254.033 of the Texas Government Code, Respondent certifies it does not employ an individual who has been employed by the GLO or another agency at any time during the two years preceding the submission of the Solicitation Response or, in the alternative, Respondent has disclosed in its Solicitation Response the following: (i) the nature of the previous employment with the GLO or the other agency; (ii) the date the employment was terminated; and (iii) the annual rate of compensation for the employment at the time of its termination.

25. Respondent must use the dispute resolution process provided for in Chapter 2260 of the Texas Government Code to attempt to resolve any dispute arising under any contract resulting from this Solicitation.

26. Any contract resulting from this Solicitation is contingent upon the continued availability of lawful appropriations by the Texas Legislature. Respondent understands that all obligations of the GLO under a contract resulting from this Solicitation are subject to the availability of state funds. If such funds are not appropriated or become unavailable, the GLO may terminate such contract. Any contract resulting from this Solicitation shall not be construed as creating a debt on behalf of the GLO in violation of Article III, Section 49a of the Texas Constitution.

27. Respondent represents and warrants that it is not engaged in business with Iran, Sudan, or a foreign terrorist organization, as prohibited by Section 2252.152 of the Texas Government Code.

28. Any contract resulting from this Solicitation shall be governed by and construed in accordance with the laws of the State of Texas, without regard to the conflicts of law provisions. The venue of any suit arising under the contract is fixed in any court of competent jurisdiction of Travis County, Texas, unless the specific venue is otherwise identified in a statute which directly names or otherwise identifies its applicability to the GLO.

29. Respondent has disclosed in writing to the GLO all existing or potential conflicts of interest relative to the performance of any contract resulting from this Solicitation.

30. The GLO will comply with the Texas Public Information Act (Chapter 552 of the Texas Government Code) as interpreted by judicial rulings and opinions of the Attorney General of the State of Texas. Information, documentation, and other material associated with this Solicitation or any resulting contract may be subject to public disclosure pursuant to the Texas Public Information Act. In accordance with Section 2252.907 of the Texas Government Code, Respondent shall make any information created or exchanged with the State pursuant to the Solicitation and any resulting contract, and not otherwise excepted from disclosure under the Texas Public Information Act, available in a format that is accessible by the public at no additional charge to the State.

31. The person signing this Solicitation Response represents and warrants that he/she is duly authorized and legally empowered to submit this Solicitation Response, execute a contract on behalf of Respondent, and contractually bind the Respondent.

32. Respondent expressly acknowledges that state funds may not be expended in connection with the purchase of an automated information system unless that system meets certain statutory requirements relating to accessibility by persons with visual impairments. Accordingly, Respondent represents and warrants that any technology provided to the GLO for purchase under this Solicitation is capable, either by virtue of features included within the technology or because it is readily adaptable by use with other technology, of: providing equivalent access for effective use by both visual and non-visual means; presenting information, including prompts used for interactive communications, in formats intended for non-visual use; and being integrated into networks for obtaining, retrieving, and disseminating information used by individuals who are not blind or visually impaired. For purposes of this Section, the phrase "equivalent access" means a substantially similar ability to communicate with or make use of the technology, either directly by features incorporated within the technology or by other reasonable means such as assistive devices or services which would constitute reasonable accommodations under the Americans With Disabilities Act or similar state or federal laws. Examples of methods by which equivalent access may be provided include, but are not limited to, keyboard alternatives to mouse commands and other means of navigating graphical displays, and customizable display appearance.

33. If any contract resulting from this Solicitation is for the purchase or lease of covered television equipment as defined by Section 361.91(3) of the Texas Health and Safety Code, Respondent certifies its compliance with Subchapter Z, Chapter 361 of the Texas Health and Safety Code, related to the Television Equipment Recycling Program.

34. The requirements of Subchapter J, Chapter 552, Government Code, may apply to a contract awarded under this Solicitation and Respondent agrees that the contract can be terminated if Respondent knowingly or intentionally fails to comply with a requirement of that subchapter.

35. If Respondent, in its performance of a contract awarded under this Solicitation, has access to a state computer system or database, Respondent must complete a cybersecurity training program certified under Texas Government Code Section 2054.519, as selected by the GLO. Respondent must complete the cybersecurity training program during the initial term of the contract and during any renewal period. If awarded a contract, Respondent must verify in writing to the GLO its completion of the cybersecurity training program.

36. Under Section 2155.0061, Government Code, the Respondent certifies that the individual or business entity named in this bid (Solicitation Response) or contract is not ineligible to receive the specified contract and acknowledges that this contract may be terminated, and payment withheld if this certification is inaccurate.

Check below if preference claimed under Title 34 Texas Administrative Code § 20.306.

- ☐ Supplies, materials, equipment, or services produced in Texas/offered by Texas bidders or Texas bidder that is owned by a service-disabled veteran
- ☐ Agricultural products produced/grown in Texas
- ☐ Agricultural products and services offered by Texas bidders
- ☐ Texas vegetation native to the region for landscaping purposes
- ☐ USA produced supplies, materials, or equipment
- ☐ Products of persons with mental or physical disabilities
- ☐ Products made of recycled, remanufactured, or environmentally sensitive materials, including recycled steel
- ☐ Covered television equipment
- ☐ Energy efficient products

- ☐ Rubberized asphalt paving material
- ☐ Recycled motor oil and lubricants
- ☐ Products and services from economically depressed or blighted areas
- ☐ Products produced at facilities located on formerly contaminated property
- ☐ Vendors that meet or exceed air quality standards
- ☐ Paper containing recycled fibers
- ☐ Recycled Computer Equipment of other manufacturers
- ☐ Foods of Higher Nutritional Value
- ☐ Travel agents residing in Texas

I have read, understand, and agree to comply with the terms and conditions specified in this Solicitation Response. Checking "YES" indicates acceptance, while checking "NO" denotes non-acceptance.

YES_____ NO _____

**SIGNATURE PAGE FOLLOWS**

**RESPECTFULLY SUBMITTED:**

**Authorized Signature of the person authorized to bind Respondent to any contract that may result from this Solicitation**[1] _____

**Date** _____

**Printed Name and Title of Signatory** _____

**Full Legal Name of Respondent's company as registered with the Texas Secretary of State, and as it should appear on any Contract resulting from this Solicitation**[2] _____

**Respondent's Employer Identification Number (must match IRS Letter)**[3] _____

**Telephone** _____

**Email** _____

**Address** _____

**City/State/Zip** _____

[1] If Respondent is a Corporation or other legal entity, attach a corporate resolution or other appropriate official documentation, which states that the person signing this Solicitation Response is an authorized person that can legally bind the corporation or entity.

[2] Attach proof of registration with the Texas Secretary of State.

[3] Attach a copy of IRS Letter 147C, Verification of Employer Identification Number, or any IRS document listing both the EIN and Entity name on IRS letterhead.

# EXHIBIT B. SAMPLE LEASE

# CARBON DIOXIDE TRANSPORTATION AND STORAGE LEASE

This Carbon Dioxide Transportation and Storage Lease (this "**Lease**" or "**Agreement**") is granted by virtue of the authority granted in Chapters 33 and 51 Tex. Nat. Res. Code, 31 TAC Chapter 13 (Land Resources) et seq., Tex. Health and Safety Code Sec. 382.501 et seq., and all other applicable statutes and rules, as the same may be amended from time to time, is subject to all applicable State regulations promulgated from time to time, and is dated to be effective as of _____, 2021 (the "**Effective Date**"), by and between the State of Texas, acting by and through the Commissioner of the Texas General Land Office, on behalf of the Permanent School Fund of the State of Texas, with its primary address at 1700 North Congress Avenue, Austin, Texas 78701 ("**Lessor**"), and _____ _____ with its primary address at _____ _____ ("**Lessee**"). Lessor and Lessee are sometimes individually referred to in this Lease as a "**Party**" and collectively as the "**Parties**."

## RECITALS

A. Pursuant to Texas Natural Resources Code, Ch. 33, the Texas School Land Board (the "**SLB**") is authorized to lease submerged land for any purpose that is in the best interests of the State, subject to the applicable notice requirements of that chapter.

B. Texas Health & Safety Code, Sections 382.501 et seq. allow the SLB to lease Permanent School Fund ("**PSF**") land for the construction of any necessary infrastructure for the transportation and offshore deep subsurface geologic storage of anthropogenic carbon dioxide.

C. On _____, 20__, the SLB issued RFP No. _____ (the "**RFP**") and provided the appropriate public notice of the opportunity to lease PSF land for offshore storage of anthropogenic carbon dioxide in compliance with applicable law and as set out in the RFP.

D. Lessee responded to the RFP and applied to become the "Lessee" hereunder, and the SLB, finding at its meeting held on _____, 20__, that the award of this Lease to Lessee would be in the best interests of the State, approved this Lease.

## AGREEMENT

**Now, therefore**, in consideration of the premises, and for other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Parties agree as follows:

### ARTICLE I. GRANT

**1.01 Lease of Property**. In consideration of the mutual covenants contained herein and other good and valuable consideration, and subject to all of the terms and conditions of this Agreement and for the term of this Agreement, Lessor hereby grants, leases and lets unto Lessee the right to geologic storage of anthropogenic carbon dioxide ("**CO2**") in a reservoir(s) in the Miocene section beneath the surface of the Permanent School Fund land described in **Exhibit A**

attached hereto (the "**Leased Property**"), together with the right to construct, maintain, and operate pipelines, wells, fixtures, machinery, and equipment on the Leased Property in connection with such geologic storage (such geologic storage area, together with associated pipelines, wells, fixtures, machinery, and equipment, called the "**Facility**" herein, and the permitting, construction, and operation of the Facility, sometimes called the "**Project**" herein). The intent of the Parties is that all equipment, pipe, supports, facilities, meters, systems and ancillary items placed or maintained by Lessee on the "Property" (defined below) shall be considered part of the Facility.

**1.02 Surface Access and Easements**. In addition to the lease of the Leased Property to Lessee, Lessor hereby grants to Lessee a non-exclusive easement over, across, and under tracts of land owned by the Permanent School Fund for the construction, installation, maintenance, and operation of pipelines, meters, and related equipment for the transportation of CO2 from its source to the Leased Property and the measurement thereof (the "**Easement Tracts**"), as such Easement Tracts are generally shown on **Exhibit B** attached hereto. The Leased Property and the Easement Tracts are, collectively, the "**Property**".

**1.03 Permits**. As more fully set forth in Section 2.02 (Development Term) below, Lessee may seek and obtain such federal, state, or local permit rights as are necessary for the Project and the Facility. Upon expiration or earlier termination of this Agreement, at the sole discretion of Lessor, and to the extent permitted by law, Lessor and Lessee shall cooperate to transfer any such permit rights to Lessor. Lessee's obligation to transfer permits to Lessor shall survive the termination of this Agreement.

**1.04 Reserved Rights**. Lessor expressly reserves the following from the rights in the Property and in the Easement Tracts otherwise granted to Lessee in this Lease:

(i) **Mineral Leases**. The right to retain existing leases or execute and enter into new leases for the exploration, development, production, treatment, marketing, sale and transportation of oil, gas, and other minerals to third persons, and to grant to such mineral lessees the right to use the surface and subsurface of the Property for ancillary purposes in a manner that does not materially and unreasonably interfere with the rights granted to Lessee in this Agreement.

(ii) **Other Uses of the Property.** The right to enter into, or to grant easements or other access rights to third parties to enter into, the Property and/or the Easement Tracts for any use, to conduct any activity, or to construct, maintain, and operate any facility or infrastructure that does not materially and unreasonably interfere with the rights granted to Lessee in this Agreement.

**1.05 Incorporation of the RFP**. All of the terms and conditions of the RFP are hereby expressly incorporated into this Agreement as if fully set forth herein; provided, however, that if there is a direct conflict between a provision of this Agreement and a provision of the RFP, the provision of this Agreement shall control.

## ARTICLE II. TERM

**2.01 Term**. Subject to all of the terms and conditions of this Agreement, including, without limitation, Lessee's compliance with its obligation to pay Rent hereunder (as "Rent" is

defined below), the "**Term**" (herein so called) of this Agreement shall consist, collectively, of each of the Development Term, Construction Term, and Operations Term, as well as the closure and monitoring period following the Operations Term (as those terms are defined below), as and to the extent that each such portion of the Term is in effect pursuant to the terms of this Agreement.

**2.02 Development Term.**

**(a) Due Diligence**. Subject to earlier expiration because of the commencement of the Construction Term, the first _____ (__) months following the Effective Date of this Agreement shall be the "**Development Term**". During the Development Term, and at no cost or expense to Lessor, Lessee may conduct its due diligence and take any action that Lessee believes is reasonably necessary to determine whether the Property is suitable for the Project, including, without limitation, conducting engineering studies, economic studies, applying for permits, and marketing; provided, however, that Lessee may not make any material physical changes to the Property during the Development Term without the prior written approval of Lessor, which approval may be given or not in Lessor's sole discretion; and provided further that Lessee may not, without the prior written approval of Lessor, apply for a permit the issuance of which would preclude use of the Property by Lessor or its lessees for any purpose that is reserved to Lessor pursuant to Sec. 1.04 of this Agreement.

**(b) Permits**. Lessee shall be solely responsible for applying for and obtaining any and all necessary permits for construction and operation of the Facility, including, without limitation, a US Environmental Protection Agency Class VI UIC well permit (see 75 Federal Register 77229) ("**Class VI Permit**"). Likewise, Lessee shall be solely responsible for ongoing compliance with all federal, State, and local laws, ordinances, and regulations that are or become applicable to the Project and/or the Facility. Lessee must be able to demonstrate to Lessor, to Lessor's reasonable satisfaction, that all such permits have been obtained and that Lessee is in compliance with all such applicable laws, ordinances, and regulations at the time that Lessee proposes to begin the Construction Term under this Lease. With regard to its obligations under this paragraph, "Lessee" includes the named Lessee as well as its agents and contractors.

**(c) Termination by Lessee**. Provided that Lessee has paid all Rent (as defined below) through and including the effective date of such termination, and is otherwise in compliance with its obligations under this Agreement, Lessee may terminate this Agreement at any time during the Development Term upon thirty (30) days' prior written notice thereof delivered to Lessor. Lessor acknowledges and agrees that Lessee has provided to Lessor sufficient and independent consideration for such option to terminate. Upon such termination by Lessee, this Agreement and the obligations of the Parties under it, shall terminate, except for any obligation of Lessee that expressly survives termination hereof pursuant to the other terms and conditions of this Agreement, including, without limitation, any such surviving obligations pertaining to indemnification of Lessor, removal of equipment, and remediation.

**(d) No Warranties**. Lessee hereby acknowledges that applicable laws, including, without limitation, Sec. 45Q of the Internal Revenue Code, may require the commencement and/or completion of a CO2 storage facility or of CO2 capture facilities by a date certain in order for an entity to claim the benefit of any federal tax credits associated with the capture and/or storage of CO2. Lessor expressly makes no representations or warranties

whatsoever that Lessee or Lessee's proposed providers of CO2 for storage will be able to satisfy any such requirement. Regardless of the availability of any such tax credit, Lessee's obligation to pay Rent according to the terms of this Agreement shall continue hereunder until such time as Rent is no longer due and payable hereunder pursuant to the other terms and conditions of this Agreement.

**(e) Progress Report**. Beginning with the first such report due on the six-month anniversary of the Effective Date, and every six months thereafter during the Development Term, Lessee shall prepare and submit to Lessor a "**Development Term Progress Report**". Each Development Term Progress Report shall provide Lessee with an update of how development activities are progressing, including with regard to permitting activities, possible sources of CO2 for storage, and the results of studies regarding engineering for and upcoming construction of the Facility. Subject to the notice and cure provisions of this Lease, Lessee's failure to provide Lessor with a Development Term Progress Report shall be a default under this Lease.

**(f) Deadline to Apply for Class VI Permit**. Notwithstanding any other provision of this Agreement to the contrary, if Lessee has not applied for a Class VI Permit for the Facility within ____ (__) months after the Effective Date, or if Lessee has not obtained a Class VI Permit for the Facility within ____ (__) months after the Effective Date, Lessor may terminate this Agreement upon thirty (30) days written notice thereof delivered to Lessee.

**2.03 Construction Term**

**(a) Duration**. Subject to the other provisions of this Agreement, the "**Construction Term**" shall (a) begin on the earlier of (i) the expiration of the Development Term (if Lessor or Lessee have not earlier terminated this Agreement as provided above), or (ii) the date on which Lessee gives written notice to Lessor of Lessee's intent to proceed with construction of the Facility on the Property, and shall (b) end on the earlier of (i) the date that the Facility is complete and fully permitted such that Lessee may begin receiving and storing CO2 at the Facility pursuant to its permits and this Agreement (the "**Complete Date**"), or (b) the expiration of _____ (__) months after the commencement of the Construction Term.

**(b) Termination by Lessor**. If Lessee has not achieved the Complete Date by the expiration of the Construction Term, Lessor may terminate this Agreement upon thirty days written notice thereof delivered to Lessee no more than _____ days after the expiration of the Construction Term.

**(c) Lessee Solely Responsible**. Lessee shall be solely responsible for designing, manufacturing, procuring, permitting, fabricating, constructing, erecting, installing, operating, maintaining and paying for all equipment, pipelines, wells, supports, facilities, systems and ancillary equipment relating thereto, to be located on the Property, to:

(1) receive the CO2 into the most upstream point of the Facility;

(2) transfer, transport and pipe the CO2 to the inlet of the scrubber(s) or compressors (if any);

(3) compress, pump, and measure (and dehydrate or purify as necessary) the CO2; and

(4) deliver the CO2 downstream into permanent storage in the Facility.

**(d) Diligent Pursuit**. During the Construction Term, at no cost or expense to Lessor, Lessee shall construct and complete the Facility. If Lessee has not achieved the Complete Date by the end of the Construction Term, and if Lessor has not exercised its right to terminate the lease, Lessee shall, nevertheless, continue diligently working during the Operations Term (defined below) to construct the Facility, achieve the Complete Date, and begin operating the Project.

**(e) Construction Plans**. Lessee acknowledges that, as the owner of the Property, Lessor has a reasonable and legitimate interest in remaining informed about the location, design, construction, and operation of the Facility. Lessee shall (i) maintain and retain, and provide Lessor with access to, an online repository for the documents prepared and submitted for the approval and maintenance of the Class VI Permit for the Facility, as well as all plans and documents prepared for the ISO standard, and, (ii) as requested by Lessor, provide Lessor with copies of all relevant permits, plans, schematics, as-builts, and all other materials reasonably requested by Lessor that pertain to the design, construction, location, and operation of the Facility (collectively, the "**Plans**"). Notwithstanding the foregoing, however, Lessee shall be solely responsible and liable for the permitting, design, and construction of the Facility, and the receipt by Lessor of the Plans and any commentary by Lessor to Lessee regarding the Plans shall not be construed in any way as the undertaking by Lessor of any professional or legal responsibility whatsoever for either the completeness or adequacy of the Plans or the Facility as it is actually constructed and operated by or on behalf of Lessee. Lessee shall be solely responsible for all performing and/or obtaining all testing, inspections, and approvals necessary for Lessee to achieve the Complete Date and to begin operating the Facility as intended by this Agreement.

**(f) Minimum Construction Requirements**. Lessee shall design and construct the Facility, and operate the Project, so that there is a reasonable expectation that at least 99 percent of the CO2 sequestered in the Facility will remain sequestered for at least 1,000 years. All work done by or on behalf of Lessee with regard to the Project shall be (i) pursued diligently and timely, and performed in a good and workmanlike manner, and (ii) undertaken in full compliance with all applicable laws and regulations, as well as industry best practices, including as set out in ISO 27914 (and successor standards) (see definition of "ISO Standard", below).

**2.04 Operations Term**

**(a) Duration**. The "**Operations Term**" shall begin immediately upon the expiration of the Construction Term (the "**Operations Commencement Date**"), and shall end after the expiration of _____ years after the Operations Commencement Date or upon the earlier termination of this Agreement pursuant to the terms hereof.

**(b) Lessee's General Obligations**. During the Operations Term, Lessee shall (i) maintain all permits necessary under applicable law for the initial and continued operation of the Facility, including, without limitation, a Class VI Permit, (ii) seek and accept anthropogenic CO2 for transportation to and storage in the Facility, (iii) inject CO2 into the Facility, subject to

limits set out in this Agreement or in applicable regulations, (iv) obtain, operate, maintain, repair, and replace all pipelines, meters, equipment, and machinery as necessary for the safe and effective operation of the Facility, (v) satisfy all requirements on Lessee under this Agreement, including, without limitation, with regard to metering and reporting, (vi) pay all amounts owing to Lessor pursuant to the terms of this Agreement, and (vii) when it becomes appropriate, and with sufficient time prior to the expiration or earlier termination of this Agreement, prepare for and, as applicable, perform all actions and install all equipment reasonably necessary for the post-injection period, including for closure of the Facility and post-closure monitoring.

**(c) Continuous Operations**. If, following the Operations Commencement Date, Lessee injects less than ____ tons of CO2 (the "**Minimum Amount**") per month into the Facility in any four of six continuous months, then Lessor may terminate this Lease upon thirty (30) days written notice thereof delivered to Lessee. The foregoing requirement for continuous operations will not apply for a month during which the Minimum Amount is not injected into the Facility because of repairs to or replacement of pipeline, compression, or injection well equipment diligently pursued and completed, or because of the occurrence of a force majeure event, as described in Section 10.02 (Force Majeure) below.

**(d) Planned Stoppage**. Lessee shall notify Lessor in writing not less than 30 days prior to any scheduled cessations to injection operations due to planned stoppage for maintenance, monitoring, or verification activities. Lessee shall take all reasonable precautions to minimize the amount of time that injection ceases during the term of the lease. Lessee shall prepare a report of all planned or unplanned activities which occur during each period of time where injection operations cease, and shall make such reports available to Lessor upon request. The reports shall be sealed by a professional engineer or geoscientist licensed in the State of Texas and shall describe the justification for the outage and its actual (or expected) duration. Failure to comply with this provision shall be grounds for termination of the lease.

**(e) Limit of Facility**. At such time as the Facility has reached the limit of its capacity to store injected CO2, Lessee shall cease transporting CO2 to the Facility for injection, and shall otherwise cease injecting CO2 into the Facility. With the cessation of injection of CO2 into the Facility as the result of reaching the maximum technically accessible storage volume, the Operations Term shall terminate.

**(f) Removal of Property**. Subject to Lessor's remedies in the event of a default hereunder by Lessee, Lessee shall have the right, at any time during the term of this Lease, to remove any personal property, improvements, equipment and fixtures placed by Lessee on the Property, provided, however, that no such removal may materially adversely affect the operation or safety of the Project.

**2.05 Closure and Monitoring**. Following the expiration or earlier termination of the Operations Term, the Term of this Agreement shall remain in effect, and Lessee shall remain responsible for closure of the Facility and the establishment of monitoring equipment and protocols, and for taking any other action, all in compliance with applicable regulations and industry best standards to ensure the continued, safe storage of CO2 in the Facility as required by the terms of this Agreement. To the extent that Lessee's compliance with its closure and monitoring obligations hereunder (including under applicable State and federal statutes and rules)

requires the posting of bonds, letters of credit, or other financial assurance, Lessee shall remain responsible for satisfying such fiscal assurance requirements. Lessee's monitoring and financial assurance obligations under this Section 2.05 expressly survive the expiration or earlier termination of this Agreement.

**2.06 No Warranty**. Lessee expressly accepts and assumes all risk and liability for penalty, civil or criminal fines or charges, or any other consequence, whether in connection with environmental damage, misreporting to governmental entities, Section 45Q obligations, or any other context, arising in connection with operation of the Project, including its ultimate closure. The obligations of Lessee under this section expressly survive expiration or earlier termination of this Agreement.

## ARTICLE III. RENT

**3.01 Rent and Royalty**. During the Term of this Agreement, Lessee shall pay consideration to Lessor as follows:

[*This section will be based on Respondent's proposal in its response to the RFP.*

*Rent shall include a minimum rent paid during the Development Term and Construction Term, a rent paid during the Operations Term based on throughput, storage capacity, Sec. 45Q tax credit or other carbon credit values, Lessee's monetization of the value of the CO2 to be stored, and/or other factors, and consideration paid to support post-closure obligations, including monitoring, described in this Agreement.*

*A portion of rent may be required and designated to be passed along to a third party for purposes of independent measurement, monitoring, and verification activities with regard to the CO2 storage in the Facility.*]

**3.02 Definitions**.

**(a) Lease Year**. A "**Lease Year**" means each successive twelve (12) month period commencing on the Effective Date.

[*Alf and as necessary for the negotiated Rent terms, the following terms (b) and/or (c) will have these meanings*:] -

**(b)** "**Section 45Q Credits**" means any rights, credits, revenues, tax benefits or values, carbon-related tax credits or other quantifiable benefits generated by either Lessee or a customer of Less for CO2 stored in the Facility under this Agreement pursuant to 26 U.S.C. § 45Q (see IRS Notice 2009-83).

**(c) Carbon Credit** means any rights, credits, revenues, offsets, tax benefits or values, greenhouse gas rights or similar rights related to carbon credits (including, without limitation, IRS Sec. 45Q credits), rights to any greenhouse gas emission reductions, carbon-related tax credits or equivalent arising from emission reduction trading or any quantifiable benefits (including recognition, award or allocation of credits, allowances, permits or other tangible rights), whether created from or through a governmental authority, other person, or private contract, now

or in the future, associated with the production, capture and sequestration of CO2, operation of the Facility, or other operation of the Project, and including such rights to sell or trade any of the aforementioned domestically or internationally, and including the right to count or claim any applicable reductions pursuant to the Department of Energy's Climate Challenge Program, to register all such reductions pursuant to § 1605 of the Energy Policy Act of 1992, and any other program of a governmental authority designed to encourage or reward the reduction of greenhouse gas emissions.

[*if and as necessary, depending on Rent terms*] **3.03 Audit of Tax Information.** The Parties anticipate that either Lessee or a customer of Lessee will realize quantifiable value from a Carbon Credit. In order for Lessor to be able to audit Rent due under this Lease, Lessee will provide, for itself, or will require copies of, for contracts with third party customers, the tax return for the year in which the credit was claimed and for which tax credit value was realized; provided, that the portions of a tax return that are not germane to any such tax credit may be withheld or redacted.

**3.04 Payments and Statements.** Lessee will make the first Operations Term Rent payment within sixty (60) days after the date of Lessee's initial storage of CO2 in the Property. Thereafter, Lessee will pay Rent on a monthly basis with respect to the CO2 stored in the Property by Lessor as calculated [*per the negotiated rental provisions above*], with such payments being due no later than thirty (30) days after the last day of the relevant month. Each Rent payment shall include [*information from Lessor's metering/reporting sections below*].

## ARTICLE IV. OWNERSHIP OF CO2

**4.01 Ownership of Stored CO2.** The CO2 transported to and stored in the Facility remains the property of Lessee or the generator of the CO2 according to the agreements between them, until such time as the SLB may elect to accept ownership of the CO2 pursuant to this Section 4.01; provided, however, that Lessee and/or the generator, as the case may be, even while owning the CO2 may not withdraw or make any other use of the CO2 in storage, as the Parties agree that CO2 storage in the Facility as contemplated by this Agreement is intended to be permanent. Once CO2 has been delivered into storage into the Facility, and once the SLB has determined that permanent storage has been verified and that the storage has met all applicable State and federal requirements for closure of CO2 storage sites, the SLB shall acquire title to the CO2 stored in the Facility. However, delivery of CO2 into the Facility or acceptance of ownership of the CO2 by the SLB on behalf of the PSF does not relieve Lessee of liability for any act or omission regarding the construction, operation, or closure, as applicable, of the Project.

## ARTICLE V. METERING

**5.01 Mass Determination.** The mass of CO2 delivered into the Facility shall be determined as follows: [*to be negotiated*]

**5.02 Measuring Stations.**

**(a) Costs.** The costs and expenses of installing, operating, and maintaining measuring stations (including all equipment, whether a single instrument or multiple instruments,

necessary to determine the mass of stored CO2) required by this Agreement shall be borne solely by Lessee.

**(b) Location; Adequacy.** The type, size, and location of Lessee's proposed metering for the Project are subject to the prior written approval of Lessor, such approval not to be unreasonably delayed or withheld. Lessee shall maintain one or more measuring stations, at least one of which must be located at the wellhead where CO2 is injected, in part for purposes of Lessor's audit of Rent paid hereunder. Lessee shall provide Lessor with copies of plans and drawings for Lessee's proposed transportation and storage system, including information regarding meter locations and specifications, so that Lessor has sufficient information to assess the adequacy of Lessee's proposed metering for purposes of this Agreement. Lessee's metering should, among other things, be adequate to measure (i) the mass of CO2 being injected into the Facility, and (ii) the mass of CO2 retained within the Facility at any given time.

**(c) Standards.** Each measuring station for CO2 mass delivered pursuant to this Agreement shall be equipped in accordance with at least the standards (i) set forth in all applicable chapters of the American Petroleum Institute Manual of Petroleum Measurement Standards and (ii) of the American Gas Association. Subject to the prior approval of Lessor, measurement equipment will be subject to change to allow the use of improved technology under such standards.

**5.03 Meter Calibration and Meter Tests.** Lessee shall ensure that the measurement equipment for the Project is accurate and in good repair, and that such periodic tests of that equipment as Lessee may deem necessary are made as often as needed, but in no event less frequently than at least once every _____ months per meter; provided, Lessee agrees to perform additional calibrations at the request of Lessor, and at Lessor's expense, unless such requested calibration results in an adjustment greater than +/- ___.0%, in which case, Lessee will pay for the cost of the calibration. Lessee shall promptly deliver to Lessor (or maintain in the online repository of plans and documents referenced in Section 2.03(e) above) copies of the results of all calibrations. If, upon any such calibration, the measuring equipment is found to be (a) within ____.0% accurate, such equipment shall be considered correct in computing deliveries, and (b) inaccurate by any amount exceeding ____.0% error, repairs shall be made immediately at Lessee's cost, and any previous reading of such equipment shall be corrected to zero error for any period which is known definitely or agreed upon, but in case the period is not known definitely or agreed upon, then for one-half (1/2) of the period of time elapsed since the date of the last calibration.

## ARTICLE VI. MONITORING

**6.01 Monitoring and Verification – ISO Standard**. Lessee shall adhere to all provisions of International Standard ISO 27914, First Edition 2017-10, "Carbon dioxide capture, transportation and geological storage — Geological storage" (the "**ISO Standard**") in addition to, and consistent with, all other applicable regulatory requirements, including, but not limited to, all Class VI Permit requirements. Future published versions of the ISO Standard may later be adopted with the written consent of Lessor. Lessee shall make all plans, models and reports required by the ISO Standard, along with any associated supporting data, available to Lessor upon request. All reservoir models, well logs, well tests and other monitoring and verification studies performed on or for the Facility shall be interpreted by a professional engineer or geoscientist licensed in the State of Texas, and such interpretations shall be made available to Lessor upon request. Lessee

shall permanently archive copies of all the aforementioned documents no later than the earliest of the closure date of the repository or the lease termination date.

**6.02 Seismicity**. Without limiting the foregoing, Lessee shall conduct an annual review of the seismicity relating to the Property and immediately adjacent land and report its findings to Lessor. If such findings indicate that seismicity is increasing in any particular location, Lessee will make commercially reasonable efforts to adjust its CO2 injection operations, using generally accepted engineering principles and industry best practices, in order to reduce the possibility of damaging seismic activity.

## ARTICLE VII REPORTING

**7.01 Reports with Payments**. During the Operations Term, Lessee shall submit to Lessor, at the same time that Rent is paid, a report identifying the source(s) and mass of CO2 that has been gathered and injected into the Facility during the period for which Rent is being paid. Lessee shall submit to Lessor a copy of all filings and reports, when filed, that Lessee must file with the relevant governmental authority in connection with maintaining its Class VI Permit(s).

**7.02 Statutory Reporting**. Pursuant to requirements of Texas Health and Safety Code, Ch. 382, at least annually, Lessee must submit a report to Lessor regarding the Project, including information regarding the measurement, monitoring, and verification of the permanent storage status of the CO2 stored in the carbon dioxide repository. Such information must include (i) the total mass of CO2 stored; (ii) the total mass of CO2 received for storage during the year; and (iii) the mass of CO2 received from each producer of CO2.

**7.03 Damage to the Property**. Lessee acknowledges that its operation of the Project could damage the quality and quantity of storage pore space in the Property and/or in adjoining submerged land owned by Lessor. In order that Lessee can be informed regarding the condition of the Property, Lessee shall provide copies of reports no less often than every ____ months during the entire Term of this Agreement pertaining to (i) leak rates, (ii) leak detection (whether by pressure transient well tests or otherwise), or (iii) whether damage to the Property is reasonably likely to have caused the affected pore space to have become unsuitable for future storage. Damage to the pore space in the Facility caused by Lessee's operations hereunder, which damage could have been foreseen and avoided by a reasonably prudent operator, shall be a default hereunder and shall be subject to injunction by Lessor, the assessment of monetary damages by Lessor (based on the reduction in future usefulness of the Property as an asset for CO2 storage), or any other remedy available to Lessor at law or in equity.

**7.04 Other Agency Reporting Requirements**. If, at any time during the Term of this Agreement, the Texas Commission on Environmental Quality, the Texas Railroad Commission, the GLO, or any other relevant State agency promulgates rules for the reporting of CO2 storage, then Lessee must (i) comply with those rules, and (ii) send to Lessor a true and complete copy of any report or information provided to such State agency in compliance with such rules.

## VIII LESSEE'S REPRESENTATIONS

8.01 **Lessee's Representations**. Lessee hereby represents and warrants to Lessor that (i) Lessee is authorized to do business in the State of Texas, (ii) entering into this Lease is an action duly authorized on behalf of Lessee by its management and in accordance with its organic documents, (iii) the person executing and delivering this Lease has the requisite authority to bind Lessee to Lessee's obligations hereunder, and (iv) during the Term of this Lease, Lessee will maintain all necessary permits for operation of the Project, and will make commercially reasonable good faith efforts to remain in compliance with all statutes and regulations applicable to the Project.

## IX LESSEE'S DEFAULT AND LESSOR'S REMEDIES

**9.01 Default by Lessee; Notice and Cure; Removal and Restoration.**

**(a) Default**. Subject to the notice and cure provisions below, if Lessee is not in compliance with the terms of this Lease, including, without limitation, the terms of this Lease that require payment of Rent, that require the maintenance of necessary permits, that require compliance with applicable laws and regulations, and that limit the use that may be made of the Property by or on behalf of Lessee, Lessee shall be in default hereunder.

**(b) Notice and Cure**. Lessee's failure to comply with the terms of this Lease shall not constitute a default hereof unless, following thirty (30) days prior written notice from Lessor specifying a default or breach of this Lease, Lessee fails to pay any money due hereunder or continues in breach of any term or condition of this Lease, in each case as specified in such notice. Except in the event of a default in the obligation to pay Rent, which obligation the Parties hereby agree is susceptible to cure within the 30-day period, if an event of default or breach of this Lease is not reasonably susceptible to cure within the 30-day period, then, provided that Lessee is diligently working to cure such event of default or breach of this Lease within and beyond such 30-day period and diligently pursues such cure to completion, Lessor shall not have the right to terminate this Lease with respect to such event of default or breach, unless the default or breach is not cured within ninety (90) days of Lessor's initial notice of the default, or such other time as agreed to by Lessor.

**9.02 Lessor's Remedies**. Lessor shall have, as a remedy for Lessee's default hereunder, all remedies available to it in law or in equity except as any such remedy may be limited by the express terms of this Lease, including, at Lessor's sole discretion, the right to terminate this Lease and all rights inuring to Lessee hereunder by sending written notice of such termination to Lessee in accordance with this Lease. (Section 7.03 (Damage to the Property) above is not limited by the terms of this Article IX.) Upon sending of such written notice of termination, this Lease shall automatically terminate and all rights granted herein to Lessee shall revert to Lessor. Such termination shall not prejudice the rights of Lessor to collect any money due or to seek recovery on any claim arising hereunder, and nor shall any such termination relieve Lessee of its obligations hereunder that survive expiration or earlier termination of this Lease.

**9.03 Removal of Property; Restoration**. Upon expiration or earlier termination of this Lease, at Lessor's sole option, Lessee shall (1) convey all personal property and improvements of Lessee on the Property to Lessor, or (2) (A) restore the Property to its original topographical condition that existed as of the Effective Date, and (B) remove all personal property

and any improvements placed or constructed on the Premises by or on behalf of Lessee from the Premises. The terms of this section shall survive expiration or earlier termination of this Lease. Lessor and Lessee agree that, in the event Lessee fails to restore the Property or remove its personal property or improvements within the time specified in a notice provided pursuant to this Section 9.03, then Lessor may, at its sole option, remove and dispose of such property (with no obligation to sell or otherwise maintain such property in accordance with the Uniform Commercial Code), at Lessee's sole cost and expense, or Lessor may elect to own such property by written notice of such election provided. If Lessor elects to remove Lessee's property and dispose of it pursuant to this Section, then in such an event Lessee shall be obligated to reimburse Lessor for the reasonable costs of such removal and disposal within ten (10) days of Lessor's demand for reimbursement. The terms of this section shall survive expiration or earlier termination of this Lease.

## X MISCELLANEOUS

**10.01 Taxes and Fees.**

(a) **Responsibility**. Lessor represents that it is exempt from taxation. If any taxes or liens are levied on Lessee's interest under this Lease, or if any other taxes or assessments are appropriately levied against the Property, Lessee shall pay such taxes and assessments prior to the due date, or pay any late fees or charges if not paid in a timely manner, directly to the taxing authority. Lessee may in good faith and at its sole cost contest any such taxes or assessments, and shall be obligated to pay the contested amount only if and when finally determined to be owed. **LESSEE AGREES TO AND SHALL PROTECT AND HOLD THE LESSOR HARMLESS FROM LIABILITY FOR ANY AND ALL TAXES, CHARGES, AND ASSESSMENTS, TOGETHER WITH ANY PENALTIES AND INTEREST THEREON, AND FROM ANY SALE OR OTHER PROCEEDING TO ENFORCE PAYMENT THEREOF.**

(b) **Proceedings**. With the express prior written consent of Lessor, Lessee may (but is not required to) prosecute any administrative or judicial proceedings relating to the Property and the rights conveyed herein including, but not limited to, contesting any taxes or fees assessed or levied upon the Property as a result of Lessee's equipment, leasehold or easement interest, or operations hereunder. With the express prior written consent of Lessor, Lessee may undertake any administrative or judicial proceeding in the name of Lessor.

**10.02 Force Majeure**. If operation of the Project is delayed or interrupted by events beyond the reasonable control of Lessee, such as hurricane, flood, other Acts of God, fire, war, or action or inaction by any governmental authority other than Lessor, Lessee shall be excused from non-performance during the pendency of such event. Notwithstanding the foregoing, in the event of force majeure, Lessee must pay at least the Minimum Rent.

**10.03 As Is, Where Is. LESSEE HAS HAD THE OPPORTUNITY TO INSPECT THE PHYSICAL AND TOPOGRAPHIC CONDITION OF THE PROPERTY AND ACCEPTS SAME "AS IS" IN ITS EXISTING PHYSICAL AND TOPOGRAPHIC CONDITION. LESSEE IS NOT RELYING ON ANY REPRESENTATION OR WARRANTY OF THE LESSOR REGARDING ANY ASPECT OF THE PROPERTY, BUT IS RELYING ON LESSEE'S OWN INSPECTION OF THE PREMESIS AND PROPERTY. LESSOR DISCLAIMS ANY AND ALL WARRANTIES OF HABITABILITY,**

**MERCHANTABILITY, SUITABILITY, FITNESS FOR ANY PURPOSE, AND ANY OTHER WARRANTY WHATSOEVER NOT EXPRESSLY SET FORTH IN THIS LEASE. LESSEE WILL MAKES ITS OWN DETERMINATION OF THE USABILITY OF THE PROPERTY FOR THE PROJECT. LESSOR AND LESSEE HEREBY AGREE AND ACKNOWLEDGE THAT THE USE OF THE TERMS "GRANT" AND/OR "CONVEY" IN NO WAY IMPLIES THAT THIS LEASE OR THE PROPERTY ARE FREE OF LIENS, ENCUMBRANCES AND/OR PRIOR RIGHTS. LESSEE IS HEREBY PUT ON NOTICE THAT ANY PRIOR GRANT AND/OR ENCUMBRANCES MAY BE OF RECORD AND LESSEE IS ADVISED TO EXAMINE ALL RECORDS OF THE STATE AND COUNTY IN WHICH THE PROPERTY IS LOCATED. THE TERMS OF THIS SECTION SHALL SURVIVE EXPIRATION OR EARLIER TERMINATION OF THIS LEASE.**

**10.04 Notices**. All notices given pursuant to this Lease shall be in writing, and may be sent by (a) first class U.S. mail postage prepaid, certified, return receipt requested or (b) overnight mail, in each case addressed to the Party to be notified at the address listed for such Party above. A copy of such notice shall also be provided by email, if to Lessor, to the Deputy Director of Energy Resources for the Texas General Land Office, or other express designee of Lessor, and if to Lessee, to _____. A Party may change its address for notice by giving notice to the other Party.

**10.05 Audits; Availability of Tax Returns**. Lessor shall have the right, no more than once per Lease Year, during regular business hours, personally or by representative, to inspect the books, accounts, contracts, records and data of Lessee solely as they pertain to the operation of the Project, storage of the CO2, receipt and/or use of Section 45Q or other Carbon Credits (if applicable to the Rent hereunder), and any other matter reasonably deemed subject to the terms of this Lease. To the extent that the relevant information regarding Lessee's tax credits, including their effect on the Rent due to Lessor under this Lease, is part of Lessee's state and/or federal tax return(s), Lessee shall make available to Lessor any and all information, including tax returns, as is necessary for Lessor's audit purposes hereunder. Lessee hereby waives any objection to making such information available to Lessor for audit purposes, provided, however, that Lessee may hold back or redact information from such tax return(s) that is not relevant to Rent as long as the available and non-redacted information is sufficient for Lessor's audit purposes hereunder, as determined by Lessor in its sole discretion.

**10.06 Memorandum of Lease**. Lessee shall, at its sole cost and expense, record a Memorandum of Lease in the Official Public Records of the county or counties in which the Property is located and provide a file marked copy of same to Lessor within sixty (60) days after this Lease is executed by all Parties.

**10.07 Counterparts**. This Lease may be executed in counterparts, each of which shall be considered an original for all purposes.

**10.08 Assignments**. The interests of Lessor under this Lease may be freely assigned. The interests of Lessee under this Lease may be assigned on the prior written consent of Lessor (not to be unreasonably withheld, conditioned, or delayed), but not otherwise.

**10.09 Protection of Natural and Historical Resources. LESSEE IS EXPRESSLY PLACED ON NOTICE OF THE NATIONAL HISTORICAL PRESERVATION ACT OF 1966 (16 USC § 470, ET SEQ.) AND THE TEXAS ANTIQUITIES CODE (TEX. NAT. RES. CODE CH. 191), AS THE SAME MAY BE AMENDED FROM TIME TO TIME. IN THE EVENT THAT ANY SITE, OBJECT, LOCATION, ARTIFACT OR OTHER FEATURE OF ARCHEOLOGICAL, SCIENTIFIC, EDUCATIONAL, CULTURAL OR HISTORIC INTEREST IS ENCOUNTERED DURING ANY ACTIVITY ON ANY PORTION OF THE PROPERTY OWNED IN FEE BY LESSOR, LESSEE SHALL IMMEDIATELY CEASE SUCH ACTIVITIES AND SHALL IMMEDIATELY NOTIFY LESSOR AND THE TEXAS HISTORICAL COMMISSION, P.O. BOX 12276, AUSTIN, TEXAS 78711, SO THAT ADEQUATE MEASURES MAY BE UNDERTAKEN TO PROTECT OR RECOVER SUCH DISCOVERIES OR FINDINGS, AS APPROPRIATE. IN THE EVENT LESSEE IS REQUIRED TO CEASE ACTIVITIES UNDER THE LEASE AS TO ANY PORTION OF THE PROPERTY, THE MINIMUM ROYALTY SET FORTH IN SECTION 4(D) SHALL NOT APPLY FOR ANY PERIOD FOR WHICH LESSEE IS REQUIRED TO CEASE ACTIVITIES.**

**10.10 Governing Law and Venue; Compliance with Laws.** This Lease shall be governed by the laws of the State of Texas. Exclusive venue for any dispute arising under or relating to this Lease shall be in any court of competent jurisdiction in Travis County, Texas. Lessor and Lessee agree that each of them will comply with all applicable federal, state and local laws and all applicable ordinances, rules, orders, and regulations of any authority having jurisdiction over the activities of Lessor or Lessee under this Lease.

**10.11 Further Assurances.** The Parties shall take all further actions and shall execute and deliver to the other any document or instrument which is necessary to fully carry out the transactions contemplated by this Lease. The Parties shall cooperate with each other and act in good faith to accomplish the purposes of this Lease.

**10.12 Lessee Liability. LESSEE SHALL BE FULLY LIABLE AND RESPONSIBLE FOR ANY DAMAGE, OF ANY NATURE, ARISING OR RESULTING FROM ITS OWN ACTS OR OMISSIONS RELATED TO ITS EXERCISE OF THE RIGHTS GRANTED HEREIN. LESSEE AGREES TO AND SHALL INDEMNIFY AND HOLD LESSOR, LESSOR'S OFFICERS, AGENTS, AND EMPLOYEES, HARMLESS FROM AND AGAINST CLAIMS, SUIT, COSTS, LIABILITY OR DAMAGES OF ANY KIND, INCLUDING STRICT LIABILITY CLAIMS, WITHOUT LIMIT AND WITHOUT REGARD TO CAUSE OF THE DAMAGES OR THE NEGLIGENCE OF ANY PARTY, AND WHETHER FOR DAMAGES TO PROPERTY OR THE ENVIRONMENT OR INJURY OR DEATH OF ANY PERSON, OR ANY COMBINATION THEREOF, EXCEPT FOR THE CONSEQUENCES OF THE GROSSLY NEGLIGENT ACTS OR WILLFUL MISCONDUCT OF LESSOR, LESSOR'S OFFICERS, AGENTS, OR EMPLOYEES, ARISING DIRECTLY OR INDIRECTLY FROM LESSEE'S OPERATION OF THE PROJECT, INCLUDING ITS USE OF THE PROPERTY AND THE FACILITY (OR ANY ADJACENT OR CONTIGUOUS PSF LAND) OR FROM ANY BREACH BY LESSEE OF THE TERMS CONTAINED HEREIN. THE PROVISIONS OF THIS SECTION SHALL SURVIVE EXPIRATION OR EARLIER TERMINATION OF THIS LEASE.**

**10.13 Lessee Insurance**. Lessee shall obtain and maintain at all times during the Term of this Lease all of the insurances, and in the amounts, as were required pursuant to the RFP.

**10.14 Miscellaneous**. This Lease may not be amended except in a writing signed by Lessor and Lessee. Nothing in this Lease shall be construed as creating any form of partnership of joint venture relationship between the Parties. No third party shall be deemed a third-party beneficiary of this Lease. This Lease (which specifically incorporates the non-conflicting terms of the RFP, as described above) constitutes the entire agreement between Lessor and Lessee and supersedes all oral statements and prior understandings relating to the subject matter contained in this Lease. Except as set forth in this Lease, no representations, warranties, or agreements have been made by either Party to the other Party with respect to this Lease. If any part of this Lease is illegal, invalid or unenforceable under present or future laws, then the remainder of this Lease shall not be affected and in lieu of such part there shall be added a clause or provision as similar in terms to such illegal, invalid, or unenforceable part as may be legal, valid, and enforceable, and any affected part shall be severed from this Lease if necessary to enforce the remainder of this Lease.

**[10.15** ***Lessor and Lessee may negotiate a standard, limited Lender Protection provision, if needed.***]

[SIGNATURE PAGE FOLLOWS]

Given under my hand and Seal of Office

**LESSOR**

**The State of Texas**

By: _____
George P. Bush

Commissioner, Texas General Land Office
On behalf of the Permanent School Fund

**LESSEE**

_____

By: _____
_____

**APPROVED:**

Staff: _____

Dir.: _____

OGC: _____

Exec.: _____

STATE OF _____ §
§
COUNTY OF _____ §

This instrument was acknowledged before me on _____ __, 20__, by _____ _____, _____ of _____, a _____ _____, on behalf of said _____.

_____
Notary Public in and for the State of _____

**EXHIBIT A**

**DESCRIPTION OF PROPERTY**

INDUSTRIAL COMMISSION
STATE OF NORTH DAKOTA
DATE 6/13/24 CASE NO 30869-880
Introduced By Braaten
Exhibit LO-48
Identified By Stockness

Tract Numbers:
IL-CC-CS-_____; and
-_____

**LEASE AGREEMENT**

THIS LEASE AGREEMENT (hereinafter the "Lease") is dated and effective as of _____, 2022 (the "Effective Date") and is made by and between _____ (the "Landlord") and **HG CARBON STORAGE LLC**, a Delaware limited liability company (the "Tenant")

Recitals:

**WHEREAS,** Landlord is the fee owner of that real property located in Christian County, Illinois, and more particularly described in **Exhibit A** attached hereto and incorporated herein by reference (the "Property"). The premises leased to Tenant includes, without limitation, that portion of the subsurface lying between the top of the St Peter formation and the top of the Precambrian Basement underlying the approximately _____ acres of surface Property located in Christian County, Illinois, described in Exhibit A attached hereto (collectively, the "Premises"). The volume of subsurface Premises described above which is subject to the terms of this Lease is hereinafter sometimes referred to as the "Premises" or "Deep Subsurface" and the portion of the above described Property which is retained by Landlord is hereinafter sometimes referred to as the "Landlord's Property;" and

**WHEREAS,** Tenant desires to lease the Premises and hereby leases all rights for the development and operation of an underground carbon capture and storage facility, among other purposes.

**NOW, THEREFORE,** in consideration of the mutual covenants and obligations of the parties herein contained, and for other good and valuable consideration, the sufficiency of which is hereby acknowledged, the Landlord and Tenant (collectively, the "Parties") hereby agree as follows:

**ARTICLE 1: TERMS OF THE LEASE**

1.1 Lease. Landlord hereby leases the Premises to Tenant, and Tenant hereby leases the Premises from Landlord, on the terms and conditions contained in this Lease.

1.2 Use of Premises. Tenant shall have the exclusive right to use the Premises, including, without limitation, using the Premises for permanently storing, sequestering and monitoring carbon dioxide and incidental associated substances derived from the source materials and capture process and any substances added or used to enable or facilitate transport, injection, monitoring, and storage (such injected material being referred to herein as "Carbon Dioxide"). The operation of the carbon capture and storage facility described above is herein sometimes referred to, collectively, as the "CCS Facilities," or individually as a "CCS Facility." Nothing in this Lease shall be construed as requiring Tenant to install and/or operate any CCS Facilities or any other business or use on the Premises or the Property, and Tenant shall not be required to operate the Premises for the storage of Carbon Dioxide or for any other purpose.

1.3 Part of a Larger Project. Landlord acknowledges that Tenant may elect to install CCS Facilities on other property as part of a larger project (collectively, the "Project"), all of which are specifically designed to be interrelated and integrated in operation and use for the full life of such CCS Facilities. Tenant may designate, from time to time, the CCS Facilities with which the Premises is included in the Project. The properties designated by Tenant as included in the Project with the Premises shall herein sometimes be referred to as the "Project Properties."

1.4 Commencement and Expiration Dates. This Lease shall be effective and the term of this Lease (the "Term") shall commence on the Effective Date which is specified above in the introductory paragraph of this Lease. The



EXHIBIT
tabbies
LO-48
30869-30880

Term shall end on that date (the "Expiration Date") which is the date Ninety-Nine (99) years following the Effective Date, unless the Term is sooner terminated in accordance with the express terms of this Lease.

1.5 Tenant's Right to Terminate. Tenant shall have the right to terminate this Lease, and the Term of this Lease, as to all or any part of the Premises, at any time and from time to time during the Term, upon Tenant giving written notice of termination to Landlord. Upon any termination of this Lease by Tenant, Tenant shall surrender the Premises, or the portion thereof that has been terminated, to Landlord, and the parties shall be bound to comply with the terms of Section 9.1 below.

## ARTICLE 2: ADDITIONAL USE OF PREMISES AND LANDLORD'S PROPERTY

2.1 Inspections and Due Diligence. Landlord grants permission to Tenant to enter upon the surface of Landlord's Property, to conduct various surveys, and may use, without limitation, vibroseis trucks, thumper trucks, monitoring and vibration sensors and other equipment, appurtenances and facilities Tenant deems necessary and appropriate for use in conducting geophysical and other surveys. Prior to any entry upon the surface of Landlord's Property for the purpose of exercising of the right to conduct geophysical surveys, Tenant shall provide to Landlord at least ten (10) days written notice. Surface access shall be utilized by Tenant, to the extent practical, at times which minimize damage to crops or to the land.

2.2 Pooling. Tenant is granted the right and agrees to pool or unitize all or a portion of the Premises with adjoining and nearby subsurface area which Tenant owns or controls by filing of record a declaration of pooling designating the area covered by the unit ("Storage Unit"). The size, shape and location of the Storage Unit will be determined on the basis of the permit acquired for injection of Carbon Dioxide from the United States Environmental Protection Agency (or the Illinois Environmental Protection Agency, if applicable) in connection with the storage and sequestering of Carbon Dioxide, or if such permit is unnecessary or does not provide such guidance, by such reasonable means as Tenant determines. Tenant agrees to declare and record the location of the Storage Unit prior to injection of the initial metric ton of Carbon Dioxide. The portion of the Premises included in the Storage Unit, if any, shall be based on the aforesaid determination. Tenant may expand, contract or reshape the Storage Unit at any time or times based upon the best available science and information at the time of such change, including, without limitation, an increase or decrease in the planned amount of Carbon Dioxide to be injected, a change in the number or location of injection wells, receipt of additional information regarding the area impacted by injected Carbon Dioxide or improved analytic techniques regarding the appropriate size and shape of a Storage Unit.

## ARTICLE 3: RENT

3.1 Development Rent. (a) Tenant shall pay Landlord a one-time payment in an amount equal to the greater of (i) One Hundred and No/100 Dollars ($100.00) per acre of surface Property described above, and (ii) Two Thousand Five Hundred and No/100 Dollars (2,500.00) (the "Development Rent"). The Development Rent payment will be made by Tenant to Landlord within forty-five (45) days after the Effective Date.

(b) Notwithstanding the initial payment of Development Rent described above in Section 3.1(a), Tenant shall pay Landlord, an additional bonus amount equal to Twenty-Five and no/100 Dollars ($25.00) per acre of surface Property described above if (1) this Lease and the Memorandum described in Section 11.4 below are fully executed and delivered to Tenant on or before March 31, 2022 (the "Bonus Deadline"), and (2) the Memorandum is publicly recorded in the official real estate records of Christian County, Illinois, on or before the Bonus Deadline.

(c) In addition to the payments described above in this Section 3.1, if the Commercial Operation Date (as hereinafter defined) has not occurred as of the date four (4) years after the date of the Effective Date (the "Fourth Anniversary"), and this Lease has not be terminated by Tenant or Landlord, then Tenant shall pay Landlord an additional one-time payment in an amount equal to the greater of (i) One Hundred and No/100 Dollars ($100.00) per acre of surface Property described above, and (ii) Two Thousand Five Hundred and No/100 Dollars (2,500.00) (the "Additional Development Rent"). The Additional Development Rent payment will be made by Tenant to Landlord within forty-five (45) days after the Third Anniversary.

3.2 Commercial Operation Rent. Tenant shall pay to Landlord the following amounts as the "Commercial Operation Rent":

(a) Initial One-Time Payment of Commercial Operation Rent. On or before the date forty-five (45) days following the Commercial Operation Date (as hereinafter defined) Tenant shall pay Landlord an amount equal to the greater of (i) Four Hundred and No/100 Dollars ($400.00) per acre of surface Property above the Premises included in the Premises as of the Commercial Operation Date, and (ii) Two Thousand Five Hundred and No/100 Dollars (2,500.00)("Initial Operating Rent Payment"); and

(b) Termination of Lease. If the Commercial Operation Date has not occurred on or before the seventh ($7^{th}$) anniversary of the Effective Date, then this Lease shall automatically terminate without any further action being required by Landlord or Tenant.

(c) Commercial Operations Rent: From and after the first calendar day of the first calendar month following the Commercial Operation Date, Tenant shall pay to Landlord commercial operations rent ("Operations Rent") which shall be such portion of the Total Storage Unit Royalty (defined below) as the amount of Landlord's Deep Subsurface acreage leased hereby bears to the total acreage within the Storage Unit.

(d) Royalty Amount. The "Total Storage Unit Royalty" is Twenty-Five Cents ($0.25) per metric ton of Carbon Dioxide injected into the Storage Unit.

(e) Payment Terms. Payment of the Operations Rent shall be made in two installments:

(1) on or before August 31 for the volume of Carbon Dioxide injected into the Storage Unit during the immediately preceding January 1 through June 30, as estimated by Tenant; and

(2) on or before February 28 for the volume of Carbon Dioxide injected into the Storage Unit during the immediately preceding July 1 through December 31, as estimated by Tenant.

Within thirty (30) days after the annual publication of Carbon Dioxide injection volumes into the Storage Unit with the United States Environmental Protection Agency ("EPA") the Operations Rent payments shall be trued up to reflect the actual volume reported to the EPA, with a payment adjustment (plus or minus) made in the next Operations Rent payment made in accordance with this Section 3.2(e) to reflect the true-up to actual reported volumes; provided that the final true-up after injection ceases shall be made as a stand-alone payment following completion of injection and shall only be made if it results in a positive amount being paid to Landlord (i.e. Landlord shall not be required to refund any overpayment for the final true-up).

For all purposes under this Lease, the term "Commercial Operation Date" shall mean the date that, following the completion of all testing of the injection wells, and the receipt by Tenant of

the written approval of all governmental authorities required for the injection of Carbon Dioxide into the Storage Unit that includes the Premises, the first metric ton of Carbon Dioxide is injected into the Storage Unit that includes the Premises.

(f) Proration for Lesser Interests. If Landlord owns an interest in the Premises less than the entire fee simple estate, then the Operating Rent to be paid to Landlord shall be reduced proportionately. No change in ownership of the Operating Rent shall bind Tenant until sixty (60) days after Tenant receives documentation of such change. If the right to Operating Rent is disputed or unknown as a result of such change in ownership or the amount of Operating Rent due is disputed, Tenant may suspend the portion of payments which are in dispute until the dispute is resolved by agreement or final court order. Failure to pay Operating Rent shall not affect this Lease, but shall only create a cause of action for amounts due; however, if Landlord initiates an action in court after sixty (60) days' notice to Tenant of failure to pay an amount due under a documented and undisputed claim, and Landlord is thereafter successful in obtaining judgment for Landlord's full claim, then Tenant shall pay Landlord's reasonable attorneys' fees and costs.

(g) CPI Adjustment. The Operating Rent due shall be adjusted over time in accordance with this provision. Effective as of the first July 1 date that occurs following the date 24 months after initial injection of Carbon Dioxide in the Storage Unit that includes the Premises (the "Initial Adjustment Date"), and on each July 1 thereafter (each July 1 date thereafter being herein sometimes referred to as an "Adjustment Date"), the amount of the Operating Rent owed shall be adjusted by multiplying the then currently applicable Operating Rent by the lesser of:

i) the greater of (a) 1.0100 and (b) the Consumer Price Index for All Urban Consumers (reference base 1982-84=100), unadjusted index, all items, as first published by the United States Department of Labor, Bureau of Labor Statistics ("CIP-U") CPI-U for July of the year in which the adjustment is being made, divided by the CPI-U for July of the immediately prior calendar year; and

ii) 1.0300,

and the adjusted Operations Rent due shall be effective on all Carbon Dioxide injected in the Storage Unit during the period of time from the July 1 Adjustment Date for that calendar year through June 30 of the following year.

In the event of any dispute regarding the calculation of the adjustment to the Operating Rent as provided above, Tenant shall continue to pay the Operating Rent at the previous rate, and after the dispute is finally resolved, refunds to Tenant, or additional Operating Rent to Landlord, as the case may be, shall be promptly paid, with interest at the rate of six percent (6%), compounded monthly. In the event the reference base of the CPI-U is rebased, the CPI-U shall continue to be used by the parties as rebased. If during any January when the Operating Rent is being adjusted the CPI-U is no longer published or issued by a governmental authority, then Landlord and Tenant shall use such other index as is then generally recognized and utilized for similar determinations of purchasing power. If there is a failure to agree on the replacement index, then a court sitting in equity will select the replacement index, and the provisions of this paragraph regarding payment pending resolution of a dispute shall apply.

(h) If the amount of Carbon Dioxide stored or sequestered into the Storage Unit is not made publicly available by the EPA or other similar reporting agency prior to the annual true-up described in Section 3.2(e) above being made by Tenant, then Landlord shall on or before the date one hundred and twenty (120) days following the date of such annual true-up, upon written notice and request given by Landlord to Tenant, have the right to access the books and records of Tenant, during normal business hours, as reasonably necessary to verify the amount of Operating Rent payable to Landlord for the one (1) year period prior to such annual true-up. If any investigation determines an underpayment of more than five percent (5%) during such one (1) year period, then Tenant shall also pay Landlord for all reasonable costs incurred by Landlord in conducting the investigation.

(i) The rights granted to Tenant under this Lease may be exercised for the benefit of the Premises and other subsurface now or hereafter controlled by Tenant for Carbon Dioxide storage and sequestration.

**ARTICLE 4:** Damages.

4.1 Tenant shall be liable to Landlord for any and all damages incurred by Landlord, including, but not limited to, those relating to the land, crops, groundwater, subsidence, improvements, livestock, timber, buildings, fences, drainage systems, equipment or personal injury occasioned by any present and future use of the Premises or the Landlord's Property, including, but not limited to, the injection, presence, maintenance, operation, inspection, migration or release of the sequestered and stored Carbon Dioxide in the Premises.

4.2 To the extent practical, Tenant shall use existing roadways or paths and minimize disturbance of the surface of Landlord's Property when exercising the rights granted herein, but in any event Tenant shall compensate Landlord for all damages to Landlord's Property caused by exercise of Tenant's rights, including, without limitation, damages to growing crops, pasture, timber, fences, soil (ruts, compaction and otherwise), waterways, drainage tile and ditches, ponds, well, water quality, soil subsidence, and other farm facilities.

4.3 In the event of crop or certain land damages, the following calculations shall apply:

(1) In the event of damaged or destroyed crops or areas which Landlord was unable to plant, the crop damages shall be computed as follows:

(A) the size of the damaged area is determined;

(B) the determined area is multiplied by the average yield that year on Landlord's adjoining land; and

(C) the calculated yield loss is multiplied by the average cash price at ADM in Decatur, IL, during the following January.

(2) In the event there is any soil disturbance (such as ruts or compaction), the amount owed for this disturbance shall be computed as follows:

(A) the area of disturbed land is computed by measuring all that area located within the outermost boundaries where the disturbance occurred;

(B) a calculation is made to determine the amount which would be paid (under the above formula) for this amount of area as if there was 100% crop loss; and

(C) the calculated crop loss amount is multiplied by two (2).

(3) Tenant shall pay Landlord for such crop damages and land damages on or before February 28th following the calendar year of damage.

4.4 Tenant shall indemnify and hold Landlord harmless from any and all liability, liens, demands, judgments, suits, attorneys' fees, costs and claims of any kind or character arising out of, or in connection with the presence, migration, or release of Carbon Dioxide stored or sequestered in the Premises, or relating in any other way to Tenant's operations in the Premises or to Tenant's use of the rights granted herein, including, but not limited to, claims for damage, loss or destruction of any property, real or personal, and claims for injury, under any theory of

tort, contract, statutory or strict liability. Tenant shall defend at Tenant's cost, all such claims and suits brought against Landlord. The terms of the forgoing indemnities contained in Section 4.1 above and this Section 4.4 shall apply to any claims arising or accruing during the Term or at any time thereafter. The terms of Section 4.1 above and this Section 4.4 of the Lease shall survive any expiration or earlier termination of this Lease.

4.5 Except for access to the surface of Landlord's Property as set forth in this Lease, Tenant shall not have any other actual or implied rights or easements to utilize the surface or other rights in Landlord's Property for any purpose, including, but not limited to, any right to install injection or monitoring wells on the surface of Landlord's Property. Any such additional rights or easements shall be by express written agreement.

4.6 Landlord shall have no right, express or implied, to enter into the Premises for any reason. Any access to property rights below the Premises must be made laterally without penetration of the Premises.

4.7 Tenant shall hereafter pay all taxes, assessments, fees, and other charges levied by any governmental authority against Tenant's leasehold interest in the Premises.

4.8 If any suit or action is filed by either party against the other to enforce any of the provisions of this Lease, the prevailing party shall be entitled to recover reasonable costs and attorneys' fees incurred in the investigation of related matters and in preparation for and prosecution of such action as fixed by the court, and if any appeal or other form of review is taken from the decision of any court, reasonable costs and attorneys' fees as fixed by the court.

## ARTICLE 5: TENANT'S REPRESENTATIONS, WARRANTIES AND COVENANTS

5.1 Taxes. Tenant shall pay any increase in the real property taxes levied against the Premises directly attributable to the injection and storage of Carbon Dioxide in the Premises, to the extent that such increase is not separately assessed to Tenant and paid directly by Tenant to the taxing authorities. Tenant shall not be liable for taxes attributable to any improvements to the Landlord's Property installed by Landlord or others on the Landlord's Property or to the underlying value of the Landlord's Property itself. It is a condition to Landlord's right to payment or reimbursement of any such increased taxes hereunder that Landlord submit the real property tax bill to Tenant within ten (10) days after Landlord received the bill from the taxing authority. Tenant shall have the right to pay its portion of the real property taxes directly to the taxing authority. Landlord shall pay its portion of the real property taxes, and if Landlord fails to do so, Tenant shall be entitled, but not obligated, to make payment in fulfillment of Landlord's obligations to the taxing authority and may offset the amount of such payments from any amounts due from Tenant to Landlord under this Agreement. Tenant shall, at Tenant's option, have the right to cause the Christian County Tax Assessor's office to issue a separate Accessor's Tax Parcel number for the Premises, and to have it assessed separately from the Landlord's Property. Landlord agrees to cooperate with Tenant to executed any consents or other documents needed to obtain that separate Accessor's Tax Parcel number for the Premises.

5.2 Insurance and Indemnity. Tenant shall maintain commercial general liability insurance insuring Tenant against loss caused by Tenant's use of the Premises under this Lease, in an amount not less than One Million Dollars ($1,000,000.00) of combined single-limit coverage, and shall provide certificates of this insurance coverage to Landlord upon Landlord's written request. Actual limits of said policy shall be reasonable and proportional considering industry norms, project size, project scope and project development or operational status. At Landlord's request, Tenant, its successors or assigns, shall add Landlord as an additional named insured under the general liability policy, provided that Landlord pay any additional underwriting and other fees required by the insurance company to effectuate the change.

5.3 Requirements of Governmental Agencies. Tenant shall comply in all material respects with all valid laws applicable to CCS Facilities located on or under the Landlord's Property, but shall have the right, in its sole discretion and at its sole expense, in its name or in Landlord's name, to contest the validity or applicability of any law, ordinance, order,

rule or regulation of any governmental agency or entity. Tenant shall control any such contest and Landlord shall cooperate with Tenant in every reasonable way in such contest, at no out-of-pocket expense to Landlord.

5.4 Mechanics' Liens. Tenant shall not permit any mechanics' liens to be filed against the Premises as a result of Tenant's use of the Premises pursuant to this Lease. Tenant may reasonably contest any such lien by written notice to the liening party with copy to the Landlord. Tenant may also provide a bond, guarantee, or other form of security, or provide a title insurance commitment to insure over the lien, or remove such lien from the Premises pursuant to applicable law. Any lien filed against the Premises that is reasonably contested by Tenant, or for which Tenant has provided reasonable security, title insurance, or removal, within 120 days of receiving written notice of such lien shall not be considered a breach under this Lease.

5.5 Hazardous Materials. As used in this Lease, the term "Hazardous Materials" means petroleum, asbestos, polychlorinated biphenyls, radioactive materials, radon gas or any chemical, material or substance defined as or included in the definition of "hazardous substances," "hazardous wastes," "hazardous materials," "extremely hazardous waste," "restricted hazardous waste" or "toxic substances," or words of similar import, under any applicable laws, including, but not limited to, all Environmental Laws. For all purposes under this Lease, the term "Hazardous Materials" specifically excludes Carbon Dioxide, as defined in this Lease. As used in this Lease, the term "Environmental Laws" means all statutes, ordinances, orders, rules and regulations of all federal, state or local governmental agencies relating to the use, generation, manufacture, installation, handling, release, discharge, storage or disposal of Hazardous Materials, including, but not limited to, the Federal Water Pollution Act, as amended (33 U.S.C. § 1251 et seq.), the Resource Conservation and Recovery Act, as amended (42 U.S.C. § 6901 et seq.), the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended (42 U.S.C. § 9601 et seq.), and the Hazardous Materials Transportation Act, as amended (49 U.S.C. § 1801 et seq.). If Tenant places, disposes or releases any Hazardous Material onto the surface of Landlord's Property and such placement, disposal or release results in the contamination of the surface of Landlord's Property, then Tenant shall remediate such Hazardous Materials to the extent ordered to do so by a governmental authority with jurisdiction.

5.6 Tile Lines / Other Fixtures. Tenant shall not damage or destroy ground tile or other fixtures on the Landlord's Property unless necessary to exercise its rights under this Lease. If during the Term of this Lease ground tile or other fixtures are damaged or destroyed by Tenant's ingress and egress to and from the Landlord's Property under the terms of this Lease then Tenant shall repair or replace such tile lines or other fixtures, or pay to Landlord fair compensation for such losses or damage. Fair compensation shall mean actual cost for third party contractor to repair at the point of damage and to return the tile or fixture to its pre-damage condition.

## ARTICLE 6: LANDLORD'S REPRESENTATIONS, WARRANTIES AND COVENANTS

6.1 Landlord's Authority. Landlord is the sole owner of fee simple title to the Premises and has the unrestricted right and authority to sign this Lease and to grant Tenant the rights granted in this Lease. When signed by Landlord, this Lease constitutes a valid and binding agreement enforceable against Landlord in accordance with its terms. All persons having any ownership interest in the Premises and/or Landlord's Property (including spouses) are signing this Lease as Landlord.

6.2 No Interference. Landlord agrees that Tenant shall have the exclusive right to access and use the Premises, including, without limitation, the exclusive right to store Carbon Dioxide in the Premises. Landlord shall not interfere with, and shall not allow any other party to interfere with, disturb or hinder Tenant's use of the Premises for the purposes set forth in this Lease, during the Term or at all times thereafter. Landlord shall not conduct any activity, nor grant any rights to any third party, whether on the Premises, Landlord's Property or elsewhere, that would interfere in any way with Tenant's use of the Premises or the rights granted to Tenant under this Lease, during the Term or at all times thereafter. Landlord shall not grant or provide any easement, license, lease or other right for access across any portion of the Premises or Landlord's Property to any third party if the granting of such right by Landlord could result in interference with Tenant's use of the Premises during the Term or at any time thereafter. NOTHING HEREIN SHALL IN ANYWAY PROHIBIT LANDLORD, ITSELF OR THEMSELVES, FROM USING THE SURFACE OF THE

LANDLORD'S PROPERTY FOR ORDINARY AND CUSTOMARY CROP AND LIVESTOCK FARMING OR LEASING OR GRANTING RIGHTS TO THIRD PARTIES TO USE THE SURFACE FOR SUCH CROP AND LIVESTOCK FARMING PURPOSES. Following the Commencement of Construction (as hereinafter defined) the covenants and agreements contained in this Section 6.2 shall survive the expiration and any earlier termination of the Lease, and the covenants and agreements contained in this Section 6.2 shall touch, concern and run with the title to the Premises, and be binding upon Landlord and its heirs, executors, administrators, personal representatives, successors, successors-in-title and assigns.

6.3 Liens. Landlord shall cooperate with Tenant to obtain a nondisturbance agreement from each lienholder (recorded or unrecorded) which provides that the lienholder shall not hinder, disturb or interfere with Tenant's use, possession or enjoyment of the Premises, Landlord's Property, or Tenant's other rights, under this Lease , or terminate this Lease so long as Landlord is not entitled to terminate this Lease under its terms.

6.4 Requirements of Governmental Agencies; Rights-of-way. At no out-of-pocket cost to Landlord, Landlord shall assist and fully cooperate with Tenant (including signing in Landlord's name, if necessary) in applying for, complying with or obtaining any land use permits and approvals, building permits, environmental reviews or any other approvals required for the financing, construction, installation, replacement, relocation, maintenance, operation or removal of the CCS Facilities and using the Premises for the permanent storage of Carbon Dioxide.

6.5 Hazardous Materials. Landlord hereby represents and warrants to Tenant that: (i) there are no Hazardous Materials, abandoned wells, other than disclosed to Tenant in writing at the time of signing the Lease, solid waste disposal sites or underground storage tanks located on the Landlord's Property; (ii) the Landlord's Property and the Premises are not in violation of any Environmental Law; and (iii) the Landlord's Property and Premises are not subject to, and Landlord has no notice of, any judicial or administrative action, investigation or order under any Environmental Law. Landlord warrants that it has done nothing to contaminate the Landlord's Property or Premises with Hazardous Materials. Landlord agrees not to use, dispose of or release on the Landlord's Property or Premises, or cause or permit to exist or be used, stored, disposed of or released on the Landlord's Property or Premises, as a result of Landlord's operations, any Hazardous Materials. If Landlord breaches its warranty or representation, or if a release of a Hazardous Material is caused or permitted by Landlord or its agents, employees or contractors and results in contamination of the Landlord's Property or Premises, then Landlord shall indemnify, defend, protect and hold Tenant, and Tenant's employees, agents, partners, members, officers and directors, harmless from and against any and all claims, actions, suits, proceedings, losses, costs, damages, liabilities (including without limitation sums paid in settlement of claims), deficiencies, fines, penalties or expenses (including, without limitation, reasonable attorneys' fees and consultants' fees, investigation and laboratory fees, court costs and litigation expenses) which arise during or after the Term as a result of such breach or contamination. This indemnity shall include, without limitation, and Landlord shall pay all costs and expenses relating to: (i) any claim, action, suit or proceeding for personal injury (including sickness, disease or death), property damage, nuisance, pollution, contamination, spill or other effect on the environment; (ii) any investigation, monitoring, repair, clean-up, treatment or detoxification of the Landlord's Property and Premises; and (iii) the preparation and implementation of any closure plan, remediation plan or other required action in connection with the Landlord's Property and Premises.

6.6 Exclusivity. Tenant shall have the sole and exclusive rights to use, install and operate any improvements or facilities related to the Premises, including, without limitation, the CCS Facilities. In no event during the Term shall Landlord construct, build or locate, or allow others to construct, build or locate, any improvements or facilities on the Landlord's Property during the Term, or at any time thereafter, that could affect the Premises or Tenant's use of the Premises for the permanent sequestration of Carbon Dioxide, including, without limitation, any CCS Facilities, Carbon Dioxide injection wells, Carbon Dioxide monitoring wells, or any other wells on the Landlord's Property. Following the Commencement of Construction, the covenants and agreements contained in this Section 6.6 shall survive the expiration and any earlier termination of the Lease, and the covenants and agreements contained in this Section 6.6 shall touch, concern and run

with the title to the Premises, and be binding upon Landlord and its heirs, executors, administrators, personal representatives, successors, successors-in-title and assigns.

6.7 Operation of the CCS Facilities. Landlord covenants and agrees that Tenant's use of the Premises for the storage of Carbon Dioxide and the operation of the CCS Facilities, on the Premises or elsewhere, shall not constitute a nuisance.

**ARTICLE 7:** ASSIGNMENT AND SUBLETTING; EASEMENTS AND LICENSES; NEW, REVISED OR MODIFIED LEASE OR LEASES

7.1 Assignment and Subletting, Easements and Licenses. Tenant may assign all or any portion of this Lease or its rights under this Lease or sublet all or any part of the Premises or the CCS Facilities without obtaining the consent of Landlord. Without limiting the generality of the foregoing, a foreclosure and sale by a Leasehold Mortgagee pursuant to Section 8 shall be a permitted assignment. In the event of an assignment of Tenant's entire interest in this Lease, Tenant shall be released of all further liability under this Lease. If Tenant shall have subleased or assigned all or a portion of the Premises or the CCS Facilities, no such sublease or assignment shall be affected by a cancellation or termination of this Lease, and Landlord shall recognize the rights of the subtenant or assignee thereunder, provided only that such subtenant or assignee attorn to Landlord upon its request. Landlord shall enter into a nondisturbance and attornment agreement, in form and substance reasonably acceptable to Tenant, upon the request of the subtenant or assignee under any sublease or assignment. Tenant also shall have the right to grant sub-easements, sub-licenses or similar rights (however denominated) to one or more persons or entities, without obtaining the consent of Landlord. If Tenant shall have subleased or assigned all or a portion of the Premises or the CCS Facilities, such assignee or subtenant shall have the right, but not the obligation, to cure any and all defaults of Tenant under this Lease during the longer of Tenant's cure periods under Section 9.3 or Leasehold Mortgagee's cure periods under Section 8.2, and if such assignee or subtenant cures or causes to be cured any default, such cure shall be as effective as if done by Tenant.

**ARTICLE 8:** LEASEHOLD FINANCING

8.1 Mortgage By Tenant. Tenant, subtenant or assignee may, from time to time, without the consent of Landlord, hypothecate, mortgage, pledge or alienate the CCS Facilities and/or Tenant's, subtenant's or assignee's leasehold estate and rights under this Lease. Each holder of any such lien is hereinafter referred to as a "Leasehold Mortgagee." For purposes of this Section 8 and Section 9, the term Tenant shall include a subtenant or assignee under Section 7. A Leasehold Mortgagee or its assigns may enforce such lien and acquire title to the leasehold estate in any lawful way and, pending foreclosure of such lien, the Leasehold Mortgagee may take possession of and use and operate the Premises, CCS Facilities and Tenant's Leasehold interest in the Premises, performing all obligations performable by Tenant that are capable of performance by the Leasehold Mortgagee. Upon foreclosure of such lien by power of sale, judicial foreclosure or acquisition of the leasehold estate by deed in lieu of foreclosure, the Leasehold Mortgagee may, upon notice to Landlord, sell and assign the leasehold estate to any transferee. Notwithstanding anything herein contained to the contrary, the Leasehold Mortgagee and/or any person or entity acquiring the leasehold estate shall be liable to perform the obligations imposed on Tenant by this Lease only to the extent arising during the period during which such person or entity holds title to the leasehold estate of Tenant or is making use of the Premises for the continuing storage of Carbon Dioxin in the Premises following such foreclosure or transfer in lieu of foreclosure.

8.2 Rights of Leasehold Mortgagees.

(a) The right of a Leasehold Mortgagee to receive notices and to cure Tenant's defaults pursuant to the provisions of this Section 8.2 shall be available only to those Leasehold Mortgagees which shall have notified Landlord in writing of their name and address, or whose lien is recorded in the official records of the County in which the Premises are located, regardless of whether the specific provision in question expressly so states. Tenant shall undertake reasonable efforts to

notify Landlord of the identity and notice address for any Leasehold Mortgagee, but failure to do so shall not be considered a default hereunder. When giving notice to Tenant of Tenant's default under this Lease, Landlord shall also serve a copy of such notice upon each Leasehold Mortgagee. No such notice shall be effective against a Leasehold Mortgagee unless and until served on such Leasehold Mortgagee. If Tenant shall default in the performance of any of its obligations under this Lease, then Landlord shall give each Leasehold Mortgagee a second written notice of such default and each Leasehold Mortgagee shall have the right, within thirty (30) days after the expiration of the cure period which this Lease provides to Tenant for curing such default, to cure such default and Landlord shall accept such performance as though the same had been done or performed by Tenant. Leasehold Mortgagee shall have no duty to exercise any cure rights granted hereunder or to foreclose on Tenant's interest in the Lease. In no event shall Leasehold Mortgagee be liable to Landlord for any action taken by it or on its behalf in good faith during the cure period notwithstanding that such action may prove in whole or in part to be inadequate or invalid. In the event a Leasehold Mortgagee shall elect to exercise its rights hereunder, such Leasehold Mortgagee shall have no personal liability to the Landlord and the sole recourse of the Landlord in seeking enforcement of its obligations under this Lease or any new lease entered pursuant to Section 8.2 (d) shall be to such Leasehold Mortgagee's interest in the Lease and Premises.

(b) In the case of a default by Tenant in the payment of money, Landlord shall take no action to terminate this Lease unless such default shall have continued beyond the cure period which this Lease provides to Tenant for curing such default, and then only after Landlord shall have given each Leasehold Mortgagee a second written notice of such default and an additional thirty (30) days, in addition to and after the expiration of Tenant's cure period, within which to cure such default.

(c) In the case of a non-monetary default by Tenant, Landlord shall take no action to terminate this Lease unless such default shall have continued beyond the cure period which this Lease provides to Tenant for curing such default, and then only after Landlord shall have given each Leasehold Mortgagee a second written notice of such default and an additional thirty (30) days, in addition to and after the expiration of Tenant's cure period, within which to elect:

(i) to commence and diligently proceed to cure such default, if such default can be cured by the Leasehold Mortgagee without obtaining possession of the Premises; or

(ii) to commence and diligently proceed to obtain possession of the Premises (including possession by a receiver) in order to cure such default, in the case of a default which can be cured only after the Leasehold Mortgagee has obtained possession of the Premises; or

(iii) to institute and diligently pursue foreclosure proceedings or otherwise proceed to acquire Tenant's interest under this Lease. A Leasehold Mortgagee shall not be required to continue such possession or continue such foreclosure proceedings if the default which prompted the service of such notice shall have been cured. A Leasehold Mortgagee shall have no obligation to cure any default in the payment of money which has occurred more than sixty (60) days before its receipt of notice of such default, in order to preserve its interest under its mortgage or to exercise any of the rights granted to it under this Lease. A Leasehold Mortgagee shall have no obligation to cure any default which is not reasonably susceptible of being cured by the Leasehold Mortgagee.

(d) If this Lease is terminated by Landlord on account of any default, or terminates for any other reason, including without limitation a rejection of the Lease by a trustee or debtor-in-possession in any bankruptcy or insolvency proceeding, then Landlord shall give prompt written notice thereof to each Leasehold Mortgagee. Each Leasehold Mortgagee, within sixty (60) days after receipt of written notice from Landlord, shall have the right to elect to enter into a new lease of the Premises as described below. Within thirty (30) days after receiving a Leasehold Mortgagee's written request therefore, Landlord shall execute and deliver a new lease of the Premises to such Leasehold Mortgagee or its nominee or to the purchaser, assignee or transferee, as the case may be, for the remainder of the Term of this Lease, containing the same covenants, agreements, terms, provisions and limitations as are contained in this Lease, except that

such new lease shall reflect any prepaid rent paid by Tenant, and the Leasehold Mortgagee shall not have to pay again any such prepaid rent, all of which shall be deemed to have been paid by the Leasehold Mortgagee. After execution of the new lease, the Leasehold Mortgagee shall commence and diligently proceed to cure all defaults which reasonably can be cured by the Leasehold Mortgagee.

(e) As long as there is a Leasehold Mortgage, neither the bankruptcy nor the insolvency of Tenant shall operate to terminate, nor permit Landlord to terminate, this Lease as long as all charges payable by Tenant continue to be paid in accordance with the terms of this Lease. As long as there is a Leasehold Mortgagee, Landlord and Tenant shall not modify or cancel this Lease without the consent of the Leasehold Mortgagee, which consent shall not unreasonably be withheld.

(f) The time available to a Leasehold Mortgagee to initiate foreclosure proceedings as aforesaid shall be extended by the number of days of delay occasioned by judicial restriction against such initiation or occasioned by other circumstances beyond such Leasehold Mortgagee's reasonable control.

(g) During the period that a Leasehold Mortgagee shall be in possession of the Premises and/or during the pendency of any foreclosure proceedings instituted by a Leasehold Mortgagee, the Leasehold Mortgagee shall pay or cause to be paid all charges payable by Tenant which have accrued during said period and are unpaid. Following the acquisition of Tenant's leasehold estate by the Leasehold Mortgagee or its designee, either as a result of foreclosure or acceptance of an assignment in lieu of foreclosure, the Leasehold Mortgagee or party acquiring title to Tenant's leasehold estate shall commence performing all of Tenant's obligations under this Lease thereafter arising, whereon Landlord's right to terminate this Lease based upon the default in question shall be deemed waived. Any default not susceptible of being cured by the Leasehold Mortgagee or party acquiring title to Tenant's leasehold estate shall be deemed to have been, waived by Landlord upon completion of the foreclosure proceedings or acquisition of Tenant's interest in this Lease by any purchaser (who may, but need not be, the Leasehold Mortgagee) at the foreclosure sale, or who otherwise acquires Tenant's interest from the Leasehold Mortgagee or by virtue of a Leasehold Mortgagee's exercise of its remedies. No such purchaser, or successor to such purchaser, shall be liable to perform the obligations imposed on Tenant by this Lease incurred or accruing after such purchaser or successor no longer holds a leasehold interest, estate or possession of the Premises.

(h) If two or more Leasehold Mortgagees exercise their rights hereunder and there is a conflict which renders it impossible to comply with all such requests, then the Leasehold Mortgagee whose Leasehold Mortgage would be senior in priority if there were a foreclosure shall prevail. If any Leasehold Mortgagee pays any sums due hereunder which relate to periods other than during its actual ownership of the leasehold estate, such Leasehold Mortgagee shall be subrogated to any and all rights which may be asserted against Landlord with respect to such period of time.

(i) Upon the notice and request to Landlord from any Leasehold Mortgagee, Landlord and Tenant shall amend this Lease to include any provision reasonable requested by such Leasehold Mortgagee to implement the protective provisions contained in this Lease for the benefit of such Leasehold Mortgagee or to allow such Leasehold Mortgagee reasonable means to protect or preserve the lien of its Leasehold Mortgage on the occurrence of a default under this Lease; provided, however, that Landlord shall not be required to amend this Lease in any way which would adversely affect the Term or monetary charges to be paid by Tenant to Landlord hereunder or otherwise in any material respect adversely affect any rights or remedies of Landlord under this Lease.

## ARTICLE 9: DEFAULT AND TERMINATION

9.1 Surrender and Post Termination Monitoring. Upon the expiration of the Term or proper termination of the Lease pursuant to the express terms of this Lease, whichever occurs first, Tenant shall surrender the Premises to Landlord in its then current condition, and Landlord and Tenant shall mutually execute and publicly record a Termination of Memorandum Agreement, that shall (i) confirm in the public records the termination of the Lease, (ii) memorialize in the public records Tenant's right to perform the Post Termination Monitoring (as defined below), (iii) include a notice

of the Premises being used for the permanent storage of Carbon Dioxide contained in the Premises, and (iv) include a notice to all future owners, tenants, subtenants and other users or parties acquiring any right, title or interest in the Premises and the surface above the Premises that any and all drilling or extraction that will or could penetrate into the Premises is prohibited, to ensure the permanence of the stored Carbon Dioxide at all times following the Term. In each case, upon any expiration or earlier termination of this Lease, Tenant shall have no obligation to remove any Carbon Dioxide from the Premises, and Landlord hereby agrees to accept the surrender of the Premises subject to any existing Carbon Dioxide located on or in the Premises. Additionally, Landlord covenants and agrees on behalf of itself and its heirs, executors, administrators, personal representatives, successors, successors-in-title and assigns, to not take, or permit others to take, any actions or omissions that could cause the release of any Carbon Dioxide permanently sequestered in the Premises or the Storage Unit that includes the Premises. Landlord agrees that Tenant and its agents, employees, contractors and subcontractors shall have the right, following the expiration or earlier termination of the Term of the Lease, to go upon the surface of the Landlord's Property to perform all work to monitor the Carbon Dioxide sequestered in the Premises and the Storage Unit that includes the Premises, for a period of fifty (50) years following the expiration or earlier termination of the Term of this Lease, or any longer period as required by any governmental authority, agency, industry practice or as required by applicable law (collectively the "Post Termination Monitoring"). Following the Commencement of Construction, the covenants and agreements contained in this Section 9.1 shall survive the expiration and any earlier termination of the Lease, and the covenants and agreements contained in this Section 9.1, shall touch, concern and run with the title to the Premises, and be binding upon Landlord and its heirs, executors, administrators, personal representatives, successors, successors-in-title and assigns.

9.2 Remedies Upon Landlord's Default. If Landlord shall at any time be in default of any of its covenants under this Lease and such default shall continue for a period of thirty (30) days after written notice to Landlord (or if any non-monetary default is not reasonably capable of being cured within thirty (30) days, if Landlord has not commenced to cure the same within said 30-day period and has not diligently prosecuted the same to completion within a reasonable period of time), then Tenant shall be entitled to exercise concurrently or successively any one or more of the following rights and remedies, in addition to all other remedies provided in this Lease or available at law or in equity: (i) to bring suit for the collection of any amounts for which Landlord may be in default, or for the specific performance of any other covenant or agreement of Landlord, without terminating this Lease; (ii) exercise Tenant's right to self-help and remedy the default itself, all at the cost and expense of the Landlord, and/or (iii) to terminate this Lease upon thirty (30) days' written notice to Landlord, without waiving Tenant's rights to damages for Landlord's failure to perform its obligations hereunder. If Tenant elects to terminate this Lease, then Landlord shall pay to Tenant any and all rent and other charges that Tenant shall have prepaid, to the extent relating to the period after the effective date of such termination.

9.3 Remedies Upon Tenant's Default. Tenant shall be in default under this Lease only if: (i) Tenant shall have failed to pay any monetary charges required to be paid by Tenant and such failure shall have continued for a period of thirty (30) days after written notice from Landlord; or (ii) Tenant shall have failed to perform any of Tenant's covenants under this Lease (other than the payment of monetary charges) and such failure shall have continued for a period of sixty (60) days after written notice from Landlord (or if such failure is not reasonably capable of being cured within sixty (60) days, if Tenant shall not have commenced to cure the same within said 60-day period and/or shall not have diligently prosecuted the same to completion within a reasonable period of time). If Tenant shall be in default after the expiration of the cure period set forth above, then Landlord shall be entitled, at its election, to terminate this Lease, (subject, however, to the rights of sublessees pursuant to Section 7 and Leasehold Mortgagees pursuant to Section 8) or, so long as Landlord does not terminate Tenant's right to possession of the Premises, keep this Lease in full force and effect and collect all charges from Tenant as and when due under this Lease, with Landlord having the obligation to mitigate damages. If Landlord terminates this lease in accordance with this Section 9.3, then all rights and obligations of the parties shall terminate, except that i) Landlord shall have the right to collect all amounts with respect to which Tenant shall then be in default, and all damages to Landlord by reason of such default, Landlord having the obligation to mitigate damages, and ii) Tenant shall surrender the Premises to Landlord as provided in, and subject to the terms of, Section 9.1 above.

9.4 Damages. NOTWITHSTANDING ANYTHING TO THE CONTRARY IN THIS LEASE, NEITHER PARTY SHALL BE ENTITLED TO, AND EACH OF LANDLORD AND TENANT HEREBY WAIVES ANY AND ALL RIGHTS TO RECOVER, CONSEQUENTIAL, INCIDENTAL, AND PUNITIVE OR EXEMPLARY DAMAGES, HOWEVER ARISING, WHETHER IN CONTRACT, IN TORT, OR OTHERWISE, UNDER OR WITH RESPECT TO ANY ACTION TAKEN IN CONNECTION WITH THIS LEASE.

9.5 Waiver of Jury Trial. EACH OF THE PARTIES KNOWINGLY, VOLUNTARILY AND INTENTIONALLY WAIVES THE RIGHT TO A TRIAL BY JURY IN RESPECT OF ANY LITIGATION BASED ON THIS LEASE, OR ARISING OUT OF, UNDER OR IN CONNECTION WITH THIS LEASE AND ANY AGREEMENT CONTEMPLATED TO BE EXECUTED IN CONJUNCTION HEREWITH, OR ANY COURSE OF CONDUCT, COURSE OF DEALING, STATEMENTS (WHETHER VERBAL OR WRITTEN) OR ACTIONS OF ANY PARTY HERETO IN CONNECTION WITH OR ARISING OUT OF THIS LEASE OR SUCH AGREEMENTS. EACH OF THE PARTIES TO THIS LEASE WAIVES ANY RIGHT TO CONSOLIDATE ANY ACTION IN WHICH A JURY TRIAL HAS BEEN WAIVED WITH ANY OTHER ACTION IN WHICH A JURY TRIAL CANNOT OR HAS NOT BEEN WAIVED. THIS PROVISION IS A MATERIAL INDUCEMENT TO EACH OF THE PARTIES FOR ENTERING INTO THIS LEASE.

**ARTICLE 10:** CONDEMNATION

10.1 Effect of Condemnation. If eminent domain proceedings are commenced against all or any portion of the Premises, and the taking would, as determined by Tenant in its sole discretion, prevent or adversely affect Tenant's installation or operation of the CCS Facilities or the Project making use of the Premises for storage of Carbon Dioxide, then, at Tenant's option, the parties shall either amend this Lease to reflect any necessary reductions in the size and scope of the Premises which will preserve the value and benefit of the Lease to Tenant, together with any corresponding reductions and equitable adjustments in payments, or, at Tenant's election, this Lease shall terminate in which event neither party shall have any further duties, obligation or liabilities under this Lease following the effective date of such termination, whereupon Tenant shall surrender the Premises to Landlord subject to the terms of Section 9.1 above.

10.2 Condemnation Proceeds. All payments made by a condemning authority on account of a taking by eminent domain of all or any part of the Premises shall be the property of the Tenant. Tenant shall have the right to participate in any condemnation proceedings.

**ARTICLE 11:** MISCELLANEOUS

11.1 Force Majeure. If performance of this Lease or of any obligation hereunder is prevented or substantially restricted or interfered with by reason of an event of "Force Majeure" (as defined below), the affected party, upon giving notice to the other party, shall be excused from such performance to the extent of and for the duration of such prevention, restriction or interference. The affected party shall use its reasonable efforts to avoid or remove such causes of nonperformance and shall continue performance as soon as such causes are removed. "Force Majeure" means: fire, earthquake, flood, tornado, pandemic (including, without limitation, Covid 19 or any variant thereof) or other acts of God and natural disasters; strikes or labor disputes; war, civil strife or other violence; any law, order, proclamation, regulation, ordinance, action, demand or requirement of any government agency or utility; or any other act or condition beyond the reasonable control of a party.

11.2 Confidentiality. Landlord shall maintain in the strictest confidence all information pertaining to the terms and conditions of this Lease, including, without limitation, the financial terms of this Lease, Tenant's engineering, methods of construction, operation and use of the Premises, Tenant's CCS Facility and/or the Project. Landlord shall not use such information for its own benefit, publish or otherwise disclose it to others, or permit its use by others. Notwithstanding the foregoing, Landlord may disclose such information to Landlord's lenders, attorneys, accountants and other personal financial advisors solely for use in connection with their representation of Landlord regarding this Lease; any

prospective purchaser of the Landlord's Property and Premises who has a made a written offer to purchase or otherwise acquire the Landlord's Property and Premises that Landlord desires to accept; or pursuant to lawful process, subpoena or court order requiring such disclosure, provided Landlord in making such disclosure advises the party receiving the information of the confidentiality of the information and obtains the written agreement of said party not to disclose the information, which agreement shall run to the benefit of and be enforceable by Tenant and any assignee or transferee of Tenant, as a third party beneficiary of such agreement. The provisions of this Section 11.2 shall survive the termination or expiration of this Lease.

11.3 Terms and Conditions of Lease Run with the Land; Binding Effect. All of the terms, agreements, covenants and conditions stated in this Lease and any Leases hereto (i) attach to, burden, encumber and run with the title to the Premises and Landlord's Property, (ii) inure to the benefit of Landlord and Tenant, and their respective heirs, executors, administrators, personal representatives, successors, successors-in-title, assigns, permittees, licensees, lessees, sublessees, agents and employees, and (iii) shall be enforceable by Landlord and Tenant, and their respective heirs, executors, administrators and personal representatives, successors, successors-in-title, assigns, permittees, licensees, lessees, sublessees, agents and employees. Such parties may institute or prosecute any proceedings at law or in equity against any person or entity who violates or threatens to violate the provisions of this Lease, and if successful, to be entitled to recovery of costs and reasonable attorneys' fees. The failure of any party to enforce any right under the provisions of this Lease shall not be deemed a waiver of the right to do so thereafter or to enforce any other provision of this Lease.

11.4 Memorandum of Lease. Landlord and Tenant shall execute in recordable form, and Tenant shall record in the official records or land records of the County in which the Premises are located, a memorandum of this Lease satisfactory in form and substance to Tenant. Landlord consents to the recordation of the interest of Tenant, and any Leasehold Mortgagee or assignee of Tenant's interest in this Lease.

11.5 Notices. All notices pursuant to this Lease shall be in writing and shall be sent only by the following methods: personal delivery; United States Mail (first-class, certified, return-receipt requested, postage prepaid); or delivery by a national, overnight courier service which keeps records of deliveries (such as, by way of example but not limitation, Federal Express and United Parcel Service). For purposes of giving notice hereunder, the respective addresses of the parties are, until changed as hereinafter provided, the following:

| Landlord: | Tenant: |
|---|---|
| | |
| | Plus a copy to: |

Any party may change its address at any time by giving written notice of such change to the other party in the manner provided herein. All notices shall be deemed given on the date of personal delivery or, if mailed by certified mail, on the delivery date or attempted delivery date shown on the return-receipt.

11.6 Entire Agreement/Amendments. This Lease and the attached Addenda and Leases constitute the entire agreement between Landlord and Tenant respecting its subject matter, and replace and supersede any prior agreements, letters of intent, term sheets or other agreements, written or verbal. This Lease shall not be modified or amended except in a writing signed by both parties or their lawful successors in interest.

11.7 Construction and Interpretation. The headings of the Articles and Sections of this Lease are not a part of this Lease and shall have no effect upon the construction or interpretation of any part thereof. Unless the context requires otherwise, references in this Lease to Articles, Sections, subsections or Leases refer to the Articles, Sections, subsections and Leases of this Lease. Unless the context requires otherwise, references to a "party" or "parties" refer to Landlord or Tenant, or both, as the context may require. The word "including" shall be construed in its inclusive sense, and not in limitation, whether or not language of non-limitation (such as "without limitation") is used with reference thereto. References to a "month" or "months" refer to whole or partial calendar months during the Term. All provisions of this Lease have been negotiated by Landlord and Tenant at arms' length and neither party shall be deemed the scrivener of this Lease. This Lease shall not be construed for or against either party by reason of the authorship or alleged authorship of any provision hereof or by reason of the status of the respective parties as Landlord or Tenant.

11.8 Tax and Environmental Credits. Tenant shall be exclusively entitled to apply for, collect, receive, and obtain the benefit of all credits, set-offs, payments or other consideration arising out of the nature of Tenant's use of the Premises, from any the use of the CCS Facilities or the transportation and storage of Carbon Dioxide, including, without limitation, (i) federal, state and local carbon tax credits, production incentive payments and other renewable energy credits, (ii) green pricing programs, green tags, renewable energy credit trading programs, and (iii) environmental credits of any kind or nature, environmental set-offs and similar benefits. Landlord shall reasonably assist Tenant in applying for and receiving such credits and benefits, and Landlord agrees to amend this Lease or replace with a different instrument at the request of Tenant if such action would assist Tenant in applying for and receiving such credits or benefits, provided that such action would not reduce the rent.

11.9 Personal Property. Landlord acknowledges that the CCS Facilities and Carbon Dioxide shall be owned by Tenant (or Tenant's subtenant or assignee, as the case may be) and acknowledges and agrees that Landlord shall have no lien or claims of any nature now or hereafter in or to any of the CCS Facilities or the Carbon Dioxide. Landlord acknowledges that the CCS Facilities and Carbon Dioxide shall remain personal property (and not fixtures) owned by Tenants, notwithstanding the manner or mode of injection or attachment to the property where located, and that, notwithstanding the occurrence of an event of default under the Lease beyond all applicable notice and cure periods (including those granted to any Leasehold Mortgagee), Leasehold Mortgagee (or its designee) or Tenant may remove the CCS Facilities.

11.10 Estoppel Certificates. From time to time, each party, within fifteen (15) days after written request from the other party, shall execute and deliver an estoppel certificate certifying as to the status of this Lease and each party's performance thereunder.

11.12 Quiet Enjoyment. Landlord covenants and warrants that Landlord is the true and lawful sole owner of fee simple title to the Premises and has full right and power to lease the Premises. Landlord agrees that Tenant shall quietly and peaceably hold, possess and enjoy the Premises for the Term of this Lease, and any extension thereof, without any hindrance or molestation. Landlord shall defend title to the Premises and the use and occupancy of the same against the claims of all persons, except those claiming by or through Tenant. Landlord shall not enter into or modify any documents, including any declarations, easements, restrictions or other similar instruments, that are or may be recorded against the Premises, or otherwise affect the Premises, or the rights or obligations of Tenant, without first obtaining the prior written consent of Tenant, which consent may be withheld in Tenant's sole and absolute discretion.

11.13 No Partnership. Nothing contained in this Lease (including the method of computation of any rental payments) shall be deemed or construed by the parties or by any third person to create the relationship of principal and agent, partnership, joint venture or any other association between Landlord and Tenant, other than the relationship of landlord and tenant.

11.14 Governing Law. This Lease shall be construed and enforced in accordance with the laws of the State of Illinois.

11.15 Non-Waiver. No delay or failure by Landlord or Tenant to enforce or exercise any of their respective rights or remedies hereunder shall constitute a waiver of such right or remedy, nor shall any single or partial exercise of a right or remedy preclude any other or further exercise of rights or remedies.

11.16 Severance. If any provision of this Lease, except the Lease Term stated in Article 1, shall be determined by any court of competent jurisdiction to be invalid, void or unenforceable to any extent, the remainder of this Lease or the application of such provision to such person or circumstances, other than those as to which it is so determined invalid, void or unenforceable, shall not be affected thereby, and each provision hereof shall be valid and shall be enforced to the fullest extent permitted by law.

If the Lease term stated in Article 1 is determined to be invalid, void or otherwise unenforceable by a court of competent jurisdiction, due to conflict or inconsistency with any statutory limitation or prohibition, the lease term shall be revised and reformed to the maximum length consistent with the statutory period and commence from the original Effective Date of this lease. Landlord and Tenant understand and agree that project development, from commencement to commercial operation, is a complex, expensive and time-consuming process. If the Lease Term is revised or reformed pursuant to this paragraph to a term length that is less than the length of Term that Tenant determines is required to complete project development and commercial operation, Landlord and Tenant agree to execute a new lease and Memorandum thereof (acknowledged in the presence of a Notary Public), upon written request by Tenant containing a revised Term acceptable to Tenant prior to the expiration of the revised or reformed Lease Term. The new lease shall include a Lease Term sufficient, in Tenant's judgement, to complete development and operation of the CCS Facilities sufficient for Tenant's use and the financial success of the Project.

11.17 Grant of Easement Rights for Use of Premises. If at any time during the Term severance of the strata identified herein as the "Premises" is prohibited by statue or other applicable law, then in consideration for Tenant's agreement to continue pay the Operating Rent to Landlord, the Landlord shall execute and deliver to Tenant a perpetual, exclusive and irrevocable easement granting to Tenant the right to store and sequester Carbon Dioxide in the Premises, and granting to Tenant all of the other rights and remedies with respect to the Premises contained in this Lease.

11.18 Further Assurances. From time to time at and after the execution of this Lease, each party, at its expense and without further consideration, shall execute, acknowledge and deliver to the other party such instruments and documents, and take such other actions, in addition to the instruments, documents and actions specifically provided for herein, as such other party may reasonably request in order to effectuate the provisions of this Lease, consummate the transactions contemplated herein, or confirm or perfect any right, restriction or interest to be created or transferred hereunder or pursuant to these transactions.

11.19 Definitions. For all purposes under this Lease, the following terms shall have the following meanings:

(a) The term "storage," "storage facility," "Storage Unit," and terms of similar import, shall mean and refer to the permanent and perpetual sequestration of Carbon Dioxide in the subsurface Premises, and (i) Tenant shall have no duty or obligation to ever remove any Carbon Dioxide injected into the Premises or any Storage Unit that includes the Premises,

and (ii) Landlord, and anyone claiming title to or use of the Premises shall not take any actions or omit to take any actions, during the Term of this Lease and at any time after the expiration or any earlier termination of this Lease, that could cause the release or removal of any Carbon Dioxide injected into the Premises or any Storage Unit that includes the Premises.

(b) The term "Premises," "premises," and terms of similar import shall mean the deep subsurface strata underlying the surface of the Property identified and described in Exhibit A attached hereto and made a part hereof. The Premises does not include the surface of the Property; provided, however, that Tenant shall have the right to go on and use the surface of the Property for the limited uses and purposes expressly set forth in this Lease.

(c ) The term "Commencement of Construction" and terms of similar import shall mean that the commencement of the construction of any CCS Facilities (including, but not limited to, the commencement of the construction of any of the injection wells, monitoring wells, or any portion of the pipeline for purposes of transmitting Carbon Dioxide to any of said injection wells), whether or not those CCS Facilities are located on the Property.

11.20 Special Considerations. A list of Special Considerations is attached to this Lease as **Exhibit B** and made a part hereof (the items listed in Exhibit B are herein sometimes collectively referred to as the "Special Considerations"). The Special Considerations amend the terms of this Lease and any Leases to this Lease affected by the Special Considerations. In the event of a conflict between the terms of the form of this Lease or the Leases attached hereto, on the one hand, and the terms of the Special Considerations, on the other hand, the terms of the Special Considerations shall control.

11.21 Counterparts and Execution and Delivery by Facsimile or Electronic Transmission. This Lease may be executed in multiple counterparts, each of which shall be deemed an original, but all of which, together, shall constitute one and the same instrument. Furthermore, this Lease may be executed and delivered by facsimile or electronic transmission. The parties intend that faxed or electronic (e.g. pdf. format) signatures constitute originals signatures and that a faxed or electronic copy or counterparts of this Lease containing signatures (original, faxed or electronic) of a party is binding upon that party. Each signature page to any counterpart of this Lease may be detached from such counterpart without impairing the legal effect of the signatures thereon and thereafter attached to another counterpart of this Lease identical thereto except having attached to it additional signature pages.

11.22 Authority and Execution. Each person executing this Lease on behalf of a party represents and warrants that such person is duly and validly authorized to do so on behalf of the entity it purports to bind and that such entity has the full right and authority to enter into this Lease and perform all of its obligations hereunder.

**IN WITNESS WHEREOF,** the parties hereto have executed this Lease on the day and year as set forth above

**LANDLORD:**

_____ _____

**TENANT:**

**HG CARBON STORAGE LLC**

By: _____

Print Name: _____

Its: _____

**Exhibit A**

**Description of Premises**

**Exhibit B**

**Special Considerations**

HEARTLAND GREENWAY

Dear

**RE: *Heartland Greenway Carbon Capture Project Revised Offer***

Heartland Greenway has revised its offer to landowners to purchase Deep Storage rights. We are now offering the following to all landowners within the project footprint:

1) Initial Option Payment has been increased to $100 per acre to sign a four-year option agreement.

2) We are offering an additional $25 per acre for those who sign by April 30, 2022.

3) Exercise of Option Payment has been raised to $400 per acre.

As requested by the Landowners, please find enclosed the new Lease Agreement. Should you have any questions or concerns, please contact me on my mobile phone (310) 944-5366 or email me at dtpadegimas@tenaska.com.

Sincerely,

Daria

Daria T. Padegimas
Senior Land Agent

Project Office:
913 W. Spresser St.
Taylorville, IL 62568
(217) 777-1870

TENASKA

## Heartland Greenway Deep Storage Offers

**Land Owner:** [redacted] **Parcel Number:** [redacted]

| | ACRES |
|---|---|
| **Tract 1** | 35 |
| **Tract 2** | 40 |
| **Tract 3** | 40 |
| **Tract 4** | 80 |
| **Tract 5** | |
| **Tract 6** | |
| **Tract 7** | |
| **Total ACRES:** | 195.00 |

Agent: Daria Padegimas

### OPTION PAYMENT FOR SIGNING DEEP STORAGE AGREEMENT

| OFFERS | Acres | Payment per acre | | | | Totals | |
|---|---|---|---|---|---|---|---|
| Initial Option | 195.00 | $100.00 | | | | $19,500.00 | Option Payment |
| Signing Bonus | 195.00 | $25.00 | | | | $4,875.00 | Bonus for March |
| | | | | | | $24,375.00 | Grand Total Due 45 Days after signing storage agreement |

### 2nd OPTION PAYMENT FOR DEEP STORAGE AGREEMENT

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| SECOND OPTION PAYMENT | 195.00 | $100.00 | | | | $19,500.00 | Second Option Payment |

### EXERCISE OF OPTION PAYMENT FOR DEEP STORAGE AGREEMENT

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| EXERCISE OF OPTION DEEP STORAGE | 195.00 | $400.00 | | | | $78,000.00 | Grand Total Due Upon the exercise of the option agreement |

**Approximate Total Royalty Payment**
**$348,207.40**

PLEASE SEE ROYALTY PAYMENT SCHEDULE ON FOLLOWING PAGE

## SURFACE USE AND PORE SPACE LEASE

THIS SURFACE USE AND PORE SPACE LEASE **("Lease")** is made, entered into, and effective as of the ___ day of _____, 2023 **("Effective Date")** by and between _____, whose address is _____ (whether one or more, **"Lessor"**), and _____, a Florida limited liability company, whose address is 3437 iris Ct, Boulder, CO 80304 (whether one or more, **"Lessee"**). Lessor and Lessee are sometimes referred to in this Lease individually as a **"Party"** and collectively as the **"Parties."**

1. **DEFINITIONS.** The following terms shall have the following meanings in this Lease:

**"Carbon Dioxide"** means carbon dioxide in gaseous, liquid, or supercritical fluid state together with incidental associated substances derived from the source materials, capture process and any substances added or used to enable or improve the injection process.

**"Commencement of Operations"** means the date on which Carbon Dioxide is first injected into a Reservoir for commercial operations under this Lease, provided that the performance of test injections and related activities shall not be deemed Commencement of Operations.

**"Commission"** means the North Dakota Industrial Commission.

**"Completion Notice"** means a certificate of project completion issued to Lessee by the Commission pursuant to Chapter 38-22 of the North Dakota Century Code.

**"Environmental Attributes"** means any and all credits, benefits, emissions reductions, offsets, and allowances, howsoever entitled, attributable to the Operations, including any avoided emissions and the reporting rights related to these avoided emissions, such as 26 U.S.C. §45Q Tax Credits.

**"Environmental Incentives"** means any and all credits, rebates, subsidies, payments or other incentives that relate to the use of technology incorporated into the Operations, environmental benefits of Operations, or other similar programs available from any regulated entity or any Governmental Authority.

**"Facilities"** means all facilities, structures, improvements, fixtures, equipment, and any other personal property at any time acquired or constructed by or for Lessee that are necessary or desirable in connection with any use of Reservoirs and their Formations or Operations, including without limitation wells, pipelines, roads, utilities, metering or monitoring equipment, and buildings.

**"Financing Parties"** means person or persons providing construction or permanent financing to Lessee in connection with construction, ownership, operation and maintenance of Facilities or Operations, including financial institutions, leasing companies, institutions, tax equity partners, joint venture partners and/or private lenders.

**"Formation"** means the geological formation of which any Reservoir is a part.

**"Hazardous Substance"** means any chemical, waste or other substances, expressly excluding Carbon Dioxide and Non-Native Carbon Dioxide, (a) which now or hereafter becomes defined as or included in the definition of "hazardous substances," "hazardous wastes," "hazardous materials," "extremely hazardous wastes," "restricted hazardous wastes," "toxic substances," "toxic pollutants," "pollutions," "pollutants," "regulated substances," or words of similar import under any law

INDUSTRIAL COMMISSION
STATE OF NORTH DAKOTA
DATE 6/13/24 CASE NO. 30869-880
Introduced By Braaten
Exhibit LO-49
Identified By Stocknell

EXHIBIT
tabbies LO-49
30869 - 30880

pertaining to environment, health, safety or welfare, (b) which is declared to be hazardous, toxic or polluting by any Governmental Authority, (c) exposure to which now or hereafter prohibited, limited or regulated by any Governmental Authority, (d) the storage, use, handling, disposal or release of which is restricted or regulated by any Governmental Authority, or (e) for which remediation or cleanup is required by any Governmental Authority.

**"Leased Premises"** means the Pore Space, surface and subsurface of the land, excluding mineral rights, described in **Exhibit A** of this Lease.

**"Native Oil and Gas"** means all oil, natural gas, and other hydrocarbons present in and under the Leased Premises and not injected by Lessor, Lessee or any third party.

**"Non-Native Carbon Dioxide"** means Carbon Dioxide that is not naturally occurring in the Reservoir together with incidental associated substances, fluids, minerals, oil, and gas, excluding that which, independent of Operations, originates from an accumulation meeting the definition of a Pool. All Non-Native Carbon Dioxide will be considered personal property of the Lessee and its successor and assigns under this Agreement.

**"Operating Year"** means the calendar year or portion of the calendar year following Commencement of Operations during which Operations occur.

**"Operations"** means the transportation and injection of Carbon Dioxide into a Reservoir after Commencement of Operations, and any withdrawal of this Carbon Dioxide, as well as the withdrawal of Non-Native Carbon Dioxide, for sale, sequestration or disposal in accordance with applicable law.

**"Pool"** means an underground Reservoir containing a common accumulation of Native Oil and Gas that is economically recoverable. A zone of a structure that is completely separated from any other zone in the same structure is a Pool.

**"Pore Space"** means a cavity or void, whether natural or artificially created, in a Reservoir.

**"Property"** means the real property commonly known as _____, which includes the Leased Premises.

**"Related Person"** means any member, partner, principal, officer, director, shareholder, predecessor-in-interest, successor-in-interest, employee, agent, heir, representative, contractor, lessee, sublessee, licensee, invitee, permittee of a Party, Financing Parties or any other person or entity that has obtained or in future obtains rights or interests from, under or through a Patty (excluding the other Party itself).

**"Reservoir"** means any subsurface stratum, sand, formation, aquifer, cavity or void, whether natural or artificially created, wholly or partially within the Leased Premises, suitable for the storage or sequestration of carbon dioxide or other gaseous substances.

**"Storage Fee"** means Lessor's proportionate share of sixteen cents ($0.50) per metric ton of Carbon Dioxide ("Storage Rate") as determined by the Lessee's last meter before injection as part of Operations. The Storage Fee shall be: (i) calculated separately for each amalgamated area as created and established by the Commission that includes any portion of the Leased Premises; (ii) limited to the Carbon Dioxide injected in said amalgamated area in the immediately preceding Operating Year; and (iii) based on the Lessor's proportionate per net acre share of said unit. For avoidance of doubt, the Lessor shall receive a separate Storage Fee for each amalgamated area created and established by the Commission that includes any portion of the Leased Premises on a net acre basis within the Lessor's interest being the numerator and the acres in the amalgamated area being the denominator.

**"Tax Credits"** means any and all (a) investment tax credits, (b) production tax credits, (c)

credits under 26 U.S.C. §45Q credits, and (d) similar tax credits or grants under federal, state or local law relating to construction, ownership or Operations

2. **LEASE RIGHTS.** In consideration of the compensation, covenants, agreements, and conditions set forth in this Lease, Lessor grants, demises, leases and lets to Lessee the exclusive right to use the Leased Premises for the capture, injection, storage, sequestration, sale, withdrawal or disposal of Carbon Dioxide, Non-Native Carbon Dioxide and incidental associated substances, fluids, and minerals; together with the following exclusive rights:

(a) to use the Leased Premises for developing, constructing, installing, improving, maintaining, replacing, repowering, relocating, removing, abandoning in place, expanding, and operating Facilities;

(b) to lay, maintain, replace, repair, and remove roads on the Leased Premises to allow Lessee, in its sole discretion, to exercise its rights under this Lease; and

(c) to enter upon and use the Leased Premises for the purposes of conducting:

(i) any investigations, studies, surveys, and tests, including without limitation drilling and installing test wells and monitoring wells, seismic testing, and other activities as Lessee deems necessary or desirable to determine the suitability of the Leased Premises for Operations,

(ii) any inspections and monitoring of Reservoirs and Carbon Dioxide as Lessee or any governmental authority deems necessary or desirable during the term of this Lease, and

(iii) any maintenance to the Facilities that Lessee or any governmental authority deems necessary or as required by applicable law.

Lessor also hereby grants and conveys unto Lessee all other and further easements across, over, under and above the Property as reasonably necessary to provide access to and services reasonably required for Lessee's performance under the Lease. The easements granted hereunder shall run with and burden the Leased Premises for the term of this Lease.

Lessee may exercise its rights under this Lease in conjunction with related operations on other properties near the Leased Premises. Lessee shall have no obligation, express or implied, to begin, prosecute or continue storage operations in, upon or under the Leased Premises, or to store and/or sell or use all or any portion of the gaseous substances stored thereon. The timing, nature, manner and extent of Lessee's operations, if any, under this Lease shall be at the sole discretion of Lessee. All obligations of Lessee are expressed herein, and there shall be no covenants implied under this Lease, it being agreed that all amounts paid hereunder constitute full and adequate consideration for this Lease.

3. **INITIAL TERM.** This Lease shall commence on the Effective Date and shall continue for an initial term of twenty (20) years ("Initial Term") unless sooner terminated in accordance with the terms of this Lease. Lessee may, but is not obligated to, extend the Initial Term for up to four successive five-year periods by providing notice to Lessor on or prior to the last day of the Initial Term or expiring five-year extension period. The Initial Term together with any extensions are referred to as the "Primary Term."

4. **OPERATIONAL TERM.** Upon Commencement of Operations at any time during the Primary Term, this Lease shall continue for so long as any portion of the Leased Premises or

Lessee's Facilities are subject to a permit issued by the Commission or under the ownership or control of the State of North Dakota ("Operational Term"); *provided, however,* that all of Lessee's obligations under this Lease shall terminate upon issuance of a Completion Notice, except for payment of the Final Royalty Payment (as applicable), and Final Occupancy Fee (as applicable). If Commencement of Operations does not occur during the Primary Term, this Lease shall terminate, and Lessee shall execute a document evidencing termination of this Lease in recordable form and shall record it in the official records of the county in which the Leased Premises is located.

**5. COMPENSATION.**

(a) **Primary Term Payment.** Lessee shall pay to Lessor five hundred dollars ($500.00) per net acre in the Leased Premises ("Primary Term Payment"), which shall escalate at two- and one-half percent (2.5%) per year, the receipt and sufficiency of which are hereby acknowledged.

(b) **Royalty.** During the Operational Term, Lessee shall annually on or before May 31 pay to Lessor a royalty equal to the greater of a flat $100.00 payment or the Storage Fee(s) for the immediately preceding Operating Year. For the Operating Year in which Lessee provides Lessor with a Completion Notice, Lessee shall pay a pro rata share of the Storage Fee(s) ("Final Royalty Payment"), as applicable, and said payment shall be made within sixty days after the date the Completion Notice was issued.

Lessor and Lessee agree that the Lease shall continue as specified herein even in the absence of Operations and the payment of royalties.

**6. AMALGAMATION.** (a) Lessee, in its sole discretion, shall have the right and power, at any time (including both before and after Commencement of Operations), to pool, unitize, or amalgamate any Reservoir or portion of a Reservoir with any other lands or interests into which that Reservoir extends and document such unit in accordance with applicable law or agency order. Amalgamated units shall be of such shape and dimensions as Lessee may elect and as are approved by the Commission. Amalgamated areas may include, but are not required to include, land upon which injection or extraction wells have been completed or upon which the injection and/or withdrawal of Carbon Dioxide and Non-Native Carbon Dioxide has commenced prior to the effective date of amalgamation. In exercising its amalgamation rights under this Lease and if required by law, Lessee shall record or cause to be recorded a copy of the Commission's amalgamation order or other notice thereof in the county in which the amalgamated unit. Amalgamating in one or more instances shall, if approved by the Commission, not exhaust the rights of Lessee to amalgamate Reservoirs or portions of Reservoirs into other amalgamation areas, and Lessee shall have the recurring right to revise any amalgamated area formed under this Lease by expansion or contraction or both. Lessee may dissolve any amalgamated area at any time and document such dissolution by recording an instrument in accordance with applicable law or agency order. Lessee shall have the right to negotiate, on behalf of and as agent for Lessor, any unit agreements and operating agreements with respect to the operation of any amalgamated areas formed under this Lease.

(b) The injection and/or withdrawal of Carbon Dioxide and Non-Native Carbon Dioxide into a Reservoir from any property within a amalgamated area that includes the Leased Premises shall be treated as if Operations were occurring on the Leased Premises, except that the royalty payable to Lessor under Section 5(b) of this Lease shall be Lessor's per net acre proportionate share of the total Storage Fee for the preceding Operating year's injection of Carbon Dioxide into the amalgamated area.

7. **ENVIRONMENTAL INCENTIVES.** Unless otherwise specified, Lessee is the owner of all

Environmental Attributes and Environmental Incentives and is entitled to the benefit of all Tax Credits or any other attributes of ownership of the Facilities and Operations. Lessor shall (i) cooperate with Lessee in obtaining, securing and transferring all Environmental Attributes and Environmental Incentives and the benefit of all Tax Credits and (ii) allow Lessee to take any actions necessary to install additional equipment or other facilities to comply with all monitoring and reporting obligations, and allow Lessee's personnel to enter the premises and collect any data Lessee requires to satisfy its obligations required in connection with obtaining Environmental Attributes, Tax Credits and Environmental Incentives. Lessor shall not be obligated to incur any out-of-pocket costs or expenses in connection with such actions unless reimbursed by Lessee. If any Environmental Incentives are paid directly to Lessor, Lessor shall immediately pay such amounts over to Lessee.

**8. SURRENDER OF LEASED PREMISES.** Lessee shall have the unilateral right at any time and from time to time to execute and deliver to Lessor a written notice of surrender and/or release covering all or any part of the Leased Premises for which the subsurface pore space is not being utilized for storage as set forth herein, and upon delivery of such surrender and/or release to Lessor this Lease shall terminate as to such lands, and Lessee shall be released from all further obligations and duties as to the lands so surrendered and/or released, including, without limitation, any obligation to make payments provided for herein, except obligations accrued as of the date of the surrender and/or release.

**9. FACILITIES.**

(a) Lessee shall notify Lessor regarding the location of the Facilities, which selection shall be within the discretion of the Lessee. Notwithstanding the foregoing, in no event shall Facilities be located within 500 feet of any currently occupied dwelling existing on the Leased Premises or the Property as of the Effective Date without Lessor's express consent. Lessee may erect fences around all or part of any aboveground Facilities (excluding roads) to separate Facilities from adjacent Lessor-controlled lands. Lessee shall maintain and repair at its expense any roads it constructs on the Leased Premises in reasonably safe and usable condition.

(b) Lessor and Lessee agree that all Facilities and property of whatever kind and nature constructed, placed or affixed on the rights-of-way, easements, patented or leased lands as part of Lessee's Operations, as against all parties and persons whomsoever (including without limitation any party acquiring interest in the rights-of-way, easements, patented or leased lands or any interest in or lien, claim or encumbrance against any of such Facilities), shall be deemed to be and remain the property of the Lessee, and shall not be considered to be fixtures or a part of the Leased Premises. Lessor waives, to the fullest extent permitted by applicable law, any and all rights it may have under the laws of the State of North Dakota, arising under this Lease, by statute or otherwise to any lien upon, or any right to distress or attachment upon, or any other interest in, any item constituting the Facilities or any other equipment or improvements constructed or acquired by or for Lessee and located on the leased Premises or within any easement area. Each Lessor and Lessee agree that the Lessee (or the designated assignee of Lessee or Financing Parties) is the tax owner of any such Facilities, structures, improvements, equipment and property of whatever kind and nature and all tax filings and reports will be filed in a manner consistent with this Lease. Facilities shall at all times retain the legal status of personal property as defined under Article 9 of the Uniform Commercial Code. If there is any mortgage or fixture filing against the Leased Premises which could reasonably be construed as prospectively attaching to the Facilities as a fixture of the Property, Lessor shall provide a disclaimer or release from such lienholder. Lessor, as fee owner, consents to the filing of a disclaimer of the Facilities as a fixture of the Property in the _____ County Recorder's Office, or where real estate records of _____ County are customarily filed.

**10. SURFACE DAMAGE COMPENSATION ACT.** The compensation contemplated and paid to Lessor hereunder is compensation for, among other things, damages sustained by Lessor for the lost use of and access to Lessor's land, pore space (to the extent required under North Dakota law), and any other damages which are contemplated under Ch. 38-11.1 of the North Dakota Century Code (to the extent applicable).

**11. MINERALS, OIL AND GAS.** This Lease is not intended to grant or convey, nor does it grant or convey, any right to or obligation for Lessee to explore for or produce minerals, including Native Oil and Gas that may exist on the Leased Premises. Lessee shall not engage in any activity or permit its Related Persons to engage in any activity that unreasonably interferes with the Lessor's or third party's (or parties') rights to the granted, leased, or reserved mineral interests.

**12. FORCE MAJEURE.** Should Lessee be prevented from complying with any express or implied covenant of this Lease, from utilizing the Leased Premises for underground storage purposes by reason of scarcity of or an inability to obtain or to use equipment or material failure or breakdown of equipment, or by operation of force majeure (including, but not limited to, riot, insurrection, war (declared or not), mobilization, explosion, labor dispute, fire, flood, earthquake, storm, lightning, tsunami, backwater caused by flood, vandalism, act of the public enemy, terrorism, epidemic, pandemic (including COVID-19), civil disturbances, strike, labor disturbances, work slowdown or stoppage, blockades, sabotage, labor or material shortage, national emergency, and the amendment, adoption or repeal of or other change in, or the interpretation or application of, any applicable laws, orders, rules or regulations of governmental authority), then while so prevented, Lessee's obligation to comply with such covenant shall be suspended and this Lease shall be extended while and so long as Lessee is prevented by any such cause from utilizing the property for underground storage purposes and the time while Lessee is so prevented shall not be counted against Lessee, anything in this Lease to the contrary notwithstanding.

**13. DEFAULT/TERMINATION.** Lessor may not terminate the Lease for any reason whatsoever unless a Default Event has occurred and is continuing consistent with the terms of this Section 13. Any Party that fails to perform its responsibilities as listed below shall be deemed to be the "Defaulting Party," the other Party shall be deemed to be the "Non-Defaulting Party," and each event of default shall be a "Default Event." A Default Event is: (a) failure of a Party to pay any amount due and payable under this Lease, other than an amount that is subject to a good faith dispute, within thirty (30) days following receipt of written notice from Non-Defaulting Party of such failure to pay; or (b) a material violation or default of any terms of this Lease by a Party, provided the Non-Defaulting Party provides written notice of violation or default and Defaulting Party fails to substantially cure the violation or default within ninety (90) days after receipt of said notice to cure such violations or defaults. Notwithstanding the foregoing, in the event a violation or default of the Defaulting Party cannot be cured within such ninety (90) day period, then, so long as the Defaulting Party is working in good faith to cure, the timeline to cure the violation or default shall be extended until such time as necessary, but in no event shall such timeline extend more than one hundred eighty (180) days. Parties acknowledge that in connection with any construction or long-term financing or other credit support provided to Lessee or its affiliates by Financing Parties, that such Financing Parties may act to cure a continuing Default Event and Lessor agrees to accept performance from any such Financing Parties so long as such Financing Parties perform in accordance with the terms of this Lease. If Lessee, its affiliates or Financing Parties, fail to substantially cure such Default Event within the applicable cure period, Lessor may terminate the Lease. Lessee may terminate the lease with thirty (30) days written notice to Lessor. Upon termination of this Lease, Lessee shall have one hundred eighty (180) days to remove, plug, and/or abandon in place all Facilities of Lessee located on the Leased Premises in accordance with applicable permit requirements or other applicable statutes, rules or regulations.

**14. ASSIGNMENT.** (a) Lessee has the right to sell, assign, mortgage, pledge, transfer, use as collateral, or otherwise collaterally assign or convey all or any of its rights under this Lease, including, without limitation, an assignment by Lessee to Financing Parties. (b) In the event Lessee assigns its rights under this Lease, Lessee shall be relieved of all obligations with respect to the assigned portion arising after the date of assignment so long as notice of such assignment is provided to Lessor, and provided that Lessee shall not be relieved from any obligation in respect of any payment or other

obligations that have not been satisfied or performed prior to such date of assignment. (c) This Lease shall be binding on and inure to the benefit of the successors and assignees. The assigning Party shall provide written notice of any assignment within sixty (60) days after such assignment has become effective; provided, however, that an assigning Party's failure to deliver written notice of assignment within such 60-day period shall not be deemed a breach of this Lease unless such failure is willful and intentional. Further, no change or division in Lessor's ownership of or interest in the Leased Premises or royalties shall enlarge the obligations or diminish the rights of Lessee.

**15. FINANCING.** (a) Lessor acknowledges that Lessee may obtain tax equity, construction, long-term financing and other credit support from one or more Financing Parties and that Lessee intends to enter into various agreements and execute various documents relating to such financing, which documents may, among other things, assign this Lease and any related easements to a Financing Party, grant a sublease in the Leased Premises and a lease of the Facilities from such Financing Party to Lessee, grant the Financing Parties a sublease or other real property interest in Lessee's interests in and to the Leased Premises, grant a first priority security interest in Lessee's interest in the Facilities and/or this Lease and Lessee's other interests in and to the Leased Premises, including, but not limited to, any easements, rights of way or similar interests (such documents, "Financing Documents"). Lessor acknowledges notice of the foregoing and consents to the foregoing actions and Financing Documents described above.

(b) Lessor agrees, to execute, and agrees to cause any and all of Lessor's lenders to execute, such commercially reasonable subordination agreements, non-disturbance agreements, forbearance agreements, consents, estoppels, modifications of this Lease and other acknowledgements of the foregoing as Lessee or the Financing Parties may reasonably request (collectively, "Lessor Financing Consent Instruments"). Lessor acknowledges and agrees that (i) Lessee's ability to obtain financing for the construction and operation of the Facilities is dependent upon the prompt cooperation of Lessor and its lenders as contemplated by this Section 15; (ii) if Lessee is unable to close on the financing for the Facilities, the construction of the Facilities and the Commencement of Operations will not likely occur; and (iii) it is in the best interest of both Lessee and Lessor for Lessee to obtain financing from the Financing Parties as contemplated by this Section 15. Therefore, Lessor agrees to act promptly, reasonably and in good faith in connection with any request for approval and execution of all Lessor Financing Consent Instruments. The Lessor shall also reasonably cooperate with the Lessee or the Financing Party in the making of any filings required by such requesting party for regulatory compliance or in accordance with applicable laws and in the operation and maintenance of the Facilities, all solely at the expense of the Lessee.

(c) As a precondition to exercising any rights or remedies as a result of any default or alleged default by Lessee under this Lease, Lessor shall deliver a duplicate copy of the applicable notice of default to each Financing Parties concurrently with delivery of such notice to Lessee, specifying in detail the alleged default and the required remedy, provided Lessor was given notice of such Financing Parties and if no such notice of default is required to be delivered to Lessee under this Lease, Lessor may not terminate this Lease unless Lessor has delivered a notice of default to each Financing Party specifying in detail the alleged default or breach and permitting each Financing Party the opportunity to cure as provided in this Section 15(c). Each Financing Party shall have the same period after receipt of a notice of default to remedy default, or cause the same to be remedied, as is given to Lessee after Lessee's receipt of a notice

of default under this Lease, plus, in each instance, the following additional time periods: (i) ten (10) Business Days in the event of any monetary default; and (ii) sixty (60) days in the event of any non-monetary default; provided, however, that (A) such sixty (60)-day period shall be extended for an additional sixty 60 days to enable such Financing Party to complete such cure, including the time required for such Financing Party to obtain possession of the Facilities (including possession by a receiver), institute foreclosure proceedings or otherwise perfect its right to effect such cure and (8) such Financing Party shall not be required to cure those defaults which are not reasonably susceptible of being cured or performed. Lessor shall accept such performance by or at the instance of a Financing Party as if the performance had been made by Lessee.

(d) If any Lessee Default Event cannot be cured without obtaining possession of all or part of the Facilities and/or the leasehold interest created by the Lease (the "Leasehold Estate"), then any such Lessee Default Event shall nonetheless be deemed remedied if: (i) within sixty (60) days after receiving the notice of default, a Financing Party acquires possession thereof, or commences appropriate judicial or non-judicial proceedings to obtain the same; (ii) such Financing Party is prosecuting any such proceedings to completion with commercially reasonable diligence; and (iii) after gaining possession thereof, such Financing Party performs all other obligations as and when the same are due in accordance with the terms of the Lease. If a Financing Party is prohibited by any process or injunction issued by any court or by reason of any action of any court having jurisdiction over any bankruptcy or insolvency proceeding involving Lessee from commencing or prosecuting the proceedings described above, then the sixty (60)-day period specified above for commencing such proceedings shall be extended for the period of such prohibition.

(e) Financing Parties shall have no obligation or liability to the Lessor for performance of the Lessee's obligations under the Lease prior to the time the Financing Party acquires title to the Leasehold Estate. A Financing Party shall be required to perform the obligations of the Lessee under this Lease only for and during the period the Financing Party directly holds such Leasehold Estate. Any assignment pursuant to this Section 15 shall release the assignor from obligations accruing under this Lease after the date the liability is assumed by the assignee.

(f) Each Financing Party shall have the absolute right to do one, some or all of the following things: (i) assign the rights, mortgage or pledge held by Financing Party (the "Financing Party's Lien"); (ii) enforce the Financing Party's Lien; (iii) acquire title (whether by foreclosure, assignment in lieu of foreclosure or other means) to the Leasehold Estate; (iv) take possession of and operate the Facilities or any portion thereof and perform any obligations to be performed by Lessee under the Lease, or cause a receiver to be appointed to do so; (v) assign or transfer the Leasehold Estate to a third party; or (vi) exercise any rights of Lessee under this Lease. Lessor's consent shall not be required for any of the foregoing; and, upon acquisition of the Leasehold Estate by a Financing Party or any other third party who acquires the same from or on behalf of the Financing Party or any purchaser who purchases at a foreclosure sale, Lessor shall recognize the Financing Party or such other party (as the case may be) as Lessee's proper successor, and this Lease shall remain in full force and effect.

(g) If this Lease is terminated for any reason whatsoever, including a termination by Lessor on account of a Lessee Default Event, or if this Lease is rejected by a trustee of Lessee in a bankruptcy or reorganization proceeding or by Lessee as a debtor-in-possession (whether or not such rejection shall be deemed to terminate this Lease), if requested by Financing Party, Lessor shall execute a new lease (the "New Lease") for the Leased Premises with the Financing Parties (or their designee(s), if applicable) as Lessee, within thirty (30) days following the date of such request. The New Lease shall be on substantially the same terms and conditions as are in this Lease (except for any requirements or conditions satisfied by Lessee prior to the termination or rejection). Upon execution of the New Lease by Lessor, Financing Parties (or their designee, if applicable) shall pay to Lessor any and all sums owing by Lessee under this Lease that are unpaid and that would, at the time of the execution of the New Lease, be due and payable under this Lease if this Lease had not been terminated or rejected. The provisions of this Section 15(g) shall survive any termination of this Lease prior to the expiration of the Term, and any rejection of this Lease in any bankruptcy or reorganization proceeding.

(h) Lessor consents to each Financing Party's security interest, if any, in the Facilities and waives all right of levy for rent and all claims and demands of every kind against the Facilities, such waiver to continue so long as any sum remains owing from Lessee to any Financing Parties. Lessor agrees that the Facilities shall not be subject to distraint or execution by, or to any claim of, Lessor.

**16. INDEMNIFICATION; WAIVER.** (a) Each Party shall indemnify, defend, and hold harmless the other Party and its Related Persons from and against any and all third-party suits, claims, or damages suffered or incurred by the indemnified Party and its Related Persons arising out of physical damage to property and physical injuries to any person, including death, caused by the gross negligence or willful misconduct of the indemnifying Party or its Related Persons except to the extent such claims arise out of the negligence or willful misconduct of the indemnified Party or its Related Persons. (b) Each Party shall indemnify, defend and hold harmless the other Party and its Related Persons from and against all suits, claims, or damages suffered or incurred by the indemnified Party and its Related Persons arising out of or relating to the existence at, on, above, below or near the Leased Premises of any Hazardous Substance, except to the extent deposited, spilled or otherwise caused by the indemnified Party or any of its contractors or agents, provided that Lessee shall not be obligated to indemnify Lessor with respect to any Hazardous Substance on the Leased Premises prior to the Effective Date.

**17. INSURANCE.** Lessee shall, at its sole cost and expense, keep and maintain in force commercial general liability insurance including broad form property damage liability, personal injury liability, and contractual liability coverage, on an "occurrence" basis, with a combined single limit, which may be effected by primary and excess coverage, of not less than Four Million Dollars ($4,000,000.00) during the Primary Term, except that such limit in the Primary Term shall be instead not less than One Million Dollars ($1,000,000.00) until such time as Lessee commences physical testing of any injection wells or other similar commercial activities, with such commercially reasonable deductibles as Lessee, in its discretion, may deem appropriate. Lessor shall be named as an additional insured in such policy but only to the extent of the liabilities specifically assumed by the Lessee under this Lease. The policy shall contain provisions by which the insurer waives any right of subrogation it may have against Lessor and shall be endorsed to provide that the insurer shall give Lessor thirty days written notice before any material modification or termination of coverage. Upon Lessor's request, Lessee shall promptly deliver certificates of such insurance to Lessor.

**18. MISCELLANEOUS.**

(a) **Confidentiality.** Lessor shall maintain in the strictest confidence, and shall require each of Lessor's Related Persons to hold and maintain in the strictest confidence, for the benefit of Lessee, all information pertaining to the compensation paid under this Lease, any information regarding Lessee and its business, operations on the Leased Premises or on any other lands, the capacity and suitability of the Reservoir, and any other information that is deemed proprietary or that Lessee requests or identifies to be held confidential, in each such case whether disclosed by Lessee or discovered by Lessor.

(b) **Liens.** (i) Lessee shall protect the Leased Premises from liens of every character arising from its activities on the Leased Premises, provided that Lessee may, at any time and without the consent of Lessor, encumber, hypothecate, mortgage, pledge, or collaterally assign (including by mortgage, deed of trust or personal property security instrument) all or any pollution of Lessee's right, title or interest under this Lease (but not Lessor's right, title or interest in the Leased Premises), as security for the repayment of any indebtedness and/or the performance of any obligation. (ii) Lessor shall not directly or indirectly cause, create, incur, assume or allow to exist any mortgage, pledge, lien, charge, security interest, encumbrance or other claim of any nature on or with respect to the Facilities, Operations or any interest therein. Lessor shall immediately notify Lessee in writing of the existence of any such mortgage, pledge, lien, charge, security interest, encumbrance or other claim, shall promptly cause the same to be discharged and released of record without cost to Lessee, and shall indemnify the Lessee against all costs and expenses (including reasonable attorneys' fees) incurred in discharging and releasing any such

mortgage, pledge, lien, charge, security interest, encumbrance or other claim.

(c) **Warranty of Title.** Lessor represents and warrants to Lessee that Lessor is the owner in fee of the surface and subsurface pore space of the Leased Premises. Lessor hereby warrants and agrees to defend title to the Leased Premises and Lessor hereby agrees that Lessee, at its option, shall have the right to discharge any tax, mortgage, or other lien upon the Leased Premises, and in the event Lessee does so, Lessee shall be subrogated to such lien with the right to enforce the same and apply annual rental payments or any other such payments due to Lessor toward satisfying the same. At any time on or after the Effective Date, Lessee may obtain for itself and/or any Financing Party, at Lessee's expense, a policy of title insurance in a form and with exceptions acceptable to Lessee and/or such Financing Party in its sole discretion (the "Title Policies"). Lessor agrees to cooperate fully and promptly with Lessee in its efforts to obtain the Title Policies, and Lessor shall take such actions as Lessee, or any Financing Party may reasonably request in connection therewith.

(d) **Conduct of Operations.** Each Party shall, at its expense, use best efforts to comply (and cause its Related Persons to comply) in all material respects with all laws applicable to its (or their) activities on the Leased Premises, provided that each Party shall have the right, in its sole discretion, to contest, by appropriate legal proceedings, the validity or applicability of any law, and the other Party shall cooperate in every reasonable way in such contest, at no out-of-pocket expense to the cooperating Party. During the Primary Term, Lessee, its agents, affiliates, servants, employees, nominees and licensees shall be entitled to: (i) apply for and obtain any necessary permits, approvals and other governmental authorizations (collectively called "Governmental Authorizations") required for the development, construction, operation and maintenance of the Project and Lessor agrees to co-operate, execute, obtain or join with Lessee in any applications or proceedings relating to the Governmental Authorizations upon Lessee's written request and at Lessee's direction, cost and expense; and (ii) apply for any approvals and permits and any zoning amendment of any area of the Leased Premises required in connection with the Project, and Lessor agrees to promptly cooperate, execute, obtain or join with Lessee in any applications or proceedings relating to such approvals, permits and zoning amendments upon Lessee's written request and at Lessee's direction, cost and expense.

(e) **Title to Carbon Dioxide.** As between Lessor and Lessee, all right, title, interest and ownership to all Carbon Dioxide injected into any Reservoir shall belong to Lessee, as measured by corresponding Storage Fee payment to Lessor.

(f) **Hazardous Substances.** Lessee shall have no liability for any regulated hazardous substances located on the Leased Premises prior to the Effective Date or placed in, on or within the Leased Premises by Lessor or any of its Related Persons on or after the Effective Date, and nothing in this Lease shall be construed to impose upon Lessee any obligation for the removal of such regulated hazardous substances.

(g) **Interference.** Lessee shall peaceably and quietly have, hold, and enjoy the Leased Premises against any person claiming by, through or under the Lessor and without disturbance by the Lessor, unless Lessee is found in default of the terms of this Lease and such default is continuing. Lessor shall not unreasonably interfere with Lessee's access to or maintenance of the Facilities or associated use of Leased Premises under this Lease; endanger the safety of Lessor, Lessee, the general public, private or personal property, or the Facilities; or install or maintain or permit to be installed or maintained vegetation, undergrowth, trees (including overhanging limbs and foliage and any trees standing which are substantially likely to fall), buildings, structures, installations, and any other obstructions which unreasonably interfere to Lessee access or use of the Facilities or Lessee's use of the Leased Premises under this Lease. Lessor shall not engage in any activity or permit its Related Persons to engage in any activity that might damage or undermine the physical integrity of any Formation or interfere with Lessee's use of the Leased Premises under this Lease, provided however that it is understood by Lessee that Lessor has no right to prohibit the exercise of any mineral rights not owned by Lessor at the time of entering into the Option to Lease between Lessor and Lessee with respect to the Leased Premises.

(h) **Reservations.** Lessor reserves the right to sell, lease, or otherwise dispose of any interest in the Leased Premises subject to the rights granted in this Lease and agrees that sales, leases, or other dispositions

of any interest or estate in the Leased Premises shall be expressly made subject to the terms of this Lease and shall not unreasonably interfere with Lessee's rights under this Lease.

(i) **Taxes.** Lessor shall pay for all real estate taxes and other assessments levied upon the Leased Premises. Lessee shall pay any taxes, assessments, fines, fees, and other charges levied by any governmental authority against its Facilities on the Leased Premises. The Parties agree to cooperate fully to obtain any available tax refunds or abatements with respect to the Leased Premises. Lessee shall have the right to pay all taxes, assessments and other fees on behalf of Lessor and to deduct the amount so paid from other payments due to Lessor hereunder.

j) **Amendments.** Lessee reserves the right to revise this Lease to remedy any mistakes, including correcting the names of the Parties, the legal description of the Leased Premises, or otherwise. Any amendments must be in writing and signed by both parties.

(k) **Remedies.** Notwithstanding anything to the contrary in this Lease, neither Party shall be liable to the other for any indirect, special, punitive, incidental or exemplary damages, whether foreseeable or not and whether arising out of or in connection with this Lease, by statute, in contract, tort, including negligence, strict liability or otherwise, and all such damages are expressly disclaimed. This provision does not limit Lessee's obligation to indemnify Lessor for third-party suits, claims, or damages under Section 16 of this Lease.

(I) **Financial Responsibility.** Lessee will comply with all applicable law regarding financial responsibility for Carbon Dioxide storage and will post bonds or other financial guarantees as required by the government entities.

(m) **Attorneys' Fees.** If any suit or action is filed or arbitration commenced by either Party against the other Party to enforce this Lease or otherwise with respect to the subject matter of this Lease, the prevailing party shall be entitled to recover reasonable costs and attorneys' fees incurred in investigation of related matters and in preparation for and prosecution of such suit, action, or arbitration as fixed by the arbitrator or court, and if any appeal or other form overview is taken from the decision of the arbitrator or any court, reasonable costs and attorneys' fees as fixed by the court.

(n) **Representations and Warranties.** Lessor represents and warrants to Lessee the following as of the Effective Date and covenants that throughout the Term: (i) Lessor has the full right, power and authority to grant rights, interests and license as contained in this Lease. Such grant of the right, interests and license does not violate any law, ordinance, rule or other governmental restriction applicable to the Lessor or the Leased Premises and is not inconsistent with and will not result in a breach or default under any agreement by which the Lessor is bound or that affects the Leased Premises. (ii) Neither the execution and delivery of this Lease by Lessor nor the performance by Lessor of any of its obligations under this Lease conflicts with or will result in a breach or default under any agreement or obligation to which Lessor is a party or by which Lessor or the Leased Premises is bound. (iii) All information provided by Lessor to Lessee, as it pertains to the Leased Premises' physical condition, along with Lessor's rights, interests and use of the Leased Premises, is accurate in all material respects. (iv) Lessor has no actual or constructive notice or knowledge of Hazardous Substances at, on, above, below or near the Leased Premises. (v) Each of the undersigned represents and warrants that they have the authority to execute this Lease on behalf of the Party for which they are signing.

(o) **Severability.** Should any provision of this Lease be held, in a final and unappealable decision by a court of competent jurisdiction, to be either invalid, void or unenforceable, the remaining provisions

of this Lease shall remain in full force and effect, unimpaired by the holding. If the easements or other rights under this Lease are found to be in excess of the longest duration permitted by applicable law, the term of such easements or other rights shall instead expire on the latest date permitted by applicable law.

(p) **Memorandum of Lease.** This Lease shall not be recorded in the real property records. Lessee shall furnish to Lessor a reasonable memorandum of this Lease and Lessor shall promptly execute. Lessee shall cause a memorandum of this Lease to be recorded in the real property records of the county in which the Leased Premises is situated.

(q) **Notices.** All notices required to be given under this Lease shall be in writing, and shall be deemed to have been given upon (a) personal delivery, (b) one (I) Business Day after being deposited with FedEx or another reliable overnight courier service, with receipt acknowledgment requested, or (c) upon receipt or refused delivery deposited in the United States mail, registered or certified mail, postage prepaid, return receipt required, and addressed to the respective Party at the addresses set forth at the beginning of this Lease, or to such other address as either Party shall from time to time designate in writing to the other Patty.

(r) **No Waiver.** The failure of either Party to insist in any one or more instances upon strict performance of any of the provisions of this Lease or to take advantage of any of its rights hereunder shall not be construed as a waiver of any such provision or the relinquishment of any such rights, but the same shall continue and remain in full force and effect.

(s) **Estoppels.** Either party hereto (the "Receiving Party"), without charge, at any time and from time to time, within ten ( I 0) Business Days after receipt of a written request by the other party hereto (the "Requesting Party"), shall deliver a written statement, duly executed, certifying to such Requesting Party, or any other person, or entity specified by such Requesting Party: (i) that this Lease is unmodified and in full force and effect, or if there has been any modification, that the same is in full force and effect as so modified and identifying the particulars of such modification; (ii) whether or not, to the knowledge of the Receiving Party, there are then existing any offsets or defenses in favor of such Receiving Patty against enforcement of any of the terms, covenants and conditions of this Lease and, if so, specifying the particulars of same and also whether or not, to the knowledge of such Receiving Party, the Requesting Patty has observed and performed all of the terms, covenants and conditions on its part to be observed and performed, and if not, specifying the particulars of same; and (iii) such other information as may be reasonably requested by the Requesting Party. Any written instrument given hereunder may be relied upon by the recipient.

(t) **Counterparts.** This Lease may be executed in any number of counterparts, each of which, when executed and delivered, shall be an original, but all of which shall collectively constitute one and the same instrument.

(u) **Governing Law.** This Lease shall be governed, interpreted, and enforced in accordance with the laws of the state of North Dakota.

(v) **Further Action.** Each Party will execute and deliver all documents, provide all information, and take or forbear from all actions as may be necessary or appropriate to achieve the purposes of this Lease, including without limitation executing a memorandum of easement and all documents required to obtain any necessary government approvals.

(w) **Entire Agreement.** This Lease, into which the attached **Exhibit A** is incorporated by reference, contains the entire agreement of the Parties. There are no other conditions, agreements, representations, warranties, or understandings, express or implied.

*[Remainder of page intentionally left blank. Signature page follows.]*

IN WITNESS OF THE ABOVE, Lessor and Lessee have caused this Lease to be executed and delivered by their duly authorized representatives as of the Effective Date.

**LESSOR:**

By:_____
Print:_____

By:_____
Print:_____

**LESSEE:**

_____

By:_____
Print:_____
Its:_____

**Exhibit A**

**LEGAL DESCRIPTION OF THE LEASED PREMISES**

The Leased Premises consists of the lands located in [] County, North Dakota that are owned by the Lessor and generally described as follows:

For purposes of calculating the royalty payable under Section 5(b) of this Lease, the Parties stipulate that the Leased Premises consists of _____ acres.

# OPTION AGREEMENT

This option agreement ("Agreement") is executed effective this ____day of _____ 2023, ("Effective Date"), by and between having a mailing address of ("Owner") and Retract LLC, a Florida limited liability company, having a mailing address of 3437 Iris Ct, Boulder, CO 80304 ("Optionee"). Owner and Optionee are sometimes individually referred to as a "Party" and collectively, as the "Parties".

## PREMISES

A. Owner is the owner of a certain tract of real property located in Morton County, North Dakota and more particularly described on Exhibit A attached hereto and made a part hereof ("Property"); and

B. Owner desires to grant and convey to Optionee an option to acquire an exclusive lease for the surface estate and pore estate for the erection, installation, and maintenance of certain facilities for the capture and sequestration of carbon on the Property.

IN CONSIDERATION of the foregoing and other good and valuable consideration, the receipt and adequacy of which are hereby acknowledged, the Parties hereto agree as follows:

1. **Option**. Owner grants to Optionee an exclusive option to lease the Property referenced in Section 2 ("Option") in accordance with the following terms and conditions.

1.1 **Option Term**. The period during which Optionee may exercise the Option shall be for a term of thirty-six (36) months, commencing on the Effective Date and expiring on the date immediately preceding the third (3rd) anniversary of the Effective Date ("Option Term").

1.2 **Use**. During the Option Term, Optionee and its employees, agents and contractors shall have a right of entry upon the Property and the right of ingress and egress over and across the Property for the purposes of (i) surveying the Property; and (ii) performing such other tests and studies as Optionee may desire in connection with the Option, including, without limitation, environmental, and cultural resource assessments, geotechnical, foundation and soil tests.

1.3 **Right to Grant Option**. Owner warrants and represents to Optionee that (i) Owner is the holder of fee simple title to all of the Property; (ii) Owner has the authority to grant this Option and Lease to Optionee without the consent or approval of any other party; and (iii) there are no other existing options, rights of first refusal, contracts to purchase, leases or mortgages that encumber the Property or would prevent Optionee from exercising its right with respect to the Option except as disclosed in writing to Optionee.

INDUSTRIAL COMMISSION
STATE OF NORTH DAKOTA
DATE 6/13/24 CASE NO 30869-880
Introduced By Braaten
Exhibit LO-51
Identified By Stockness

EXHIBIT
tabbies
LO-51
30869-30880

1.4 **Exercise of Option**. Optionee may exercise the Option at any time up to the end of the Option Term by delivering written notice of Optionee's intention to lease the Property either (a) in person, or (b) by certified mail, return receipt requested (or other nationally recognized overnight mail service), effective upon receipt, to Owner at the above referenced address. Along with delivering written notice, Optionee shall deliver a lease substantially in the form attached to Exhibit A of the Letter Agreement between the Parties. Upon Optionee's exercise of the Option, the Option Term shall be automatically extended until Optionee and Owner enter into a Lease for the Property. Optionee and Owner shall negotiate in good faith and shall use diligent and commercially reasonable efforts to finalize such negotiations within thirty (30) days of Optionee's exercise of the Option.

2. **Lease**. Upon the lease commencement date, Owner does hereby grant, bargain, and convey unto Optionee, an exclusive lease in, under, on, and along the Property and within the subsurface pore space ("Lease") for the purposes of erecting, constructing, replacing, relocating, improving, enlarging, removing, maintaining, and utilizing, from time to time, a facility capable of capturing and sequestering, carbon therewith (collectively, the "Facilities").

2.1 **Rent Commencement Date**. Rent commencement will be upon the commercial operation date ("COD") of the Facility. If the COD is after the conclusion of the Option Term, Optionee shall make additional Option payments to Owner until the COD. Notwithstanding the foregoing, in all events, for the purpose of rent commencement for the Lease, the COD shall be on or before two (2) years after the effective date of the Lease.

2.2 **Terms and Termination**. Provided Owner timely exercises the Option, (time being of the essence), the lease terms shall be as follows:

(a) **Real Estate Taxes**. Optionee shall pay all real estate taxes applicable to the lease area. The payment of real estate taxes are in addition to Lease rent payments.

(b) **Term**. The lease will be for a period of twenty (20) years, with four (4) five-year (5-year) options to extend at Optionee's sole discretion. Notification of intent to extend the lease will be given to Owner, in writing, within thirty (30) days of the lease expiration and/or extension dates.

3. **Livestock**. Optionee shall take reasonable precautions to avoid contact with livestock on the Property. If agreed by Owner and Optionee, Optionee shall install temporary fencing around Optionee's production sites for purposes of deterring livestock.

4. **Interference**. During the Option Term, Owner expressly reserves the right to use the Property for all other purposes not granted to Optionee under this Agreement; provided, however, Owner covenants and agrees that neither Owner nor its agents, lessees, invitees, guests, licensees, successors or assigns will (i) interfere with, impair or prohibit the free and complete use and enjoyment by Optionee of its rights granted by this Agreement; (ii) take any action which will in any way interfere with or impair the Optionee's access over and across the Property and to the Property for the purposes

specified in this Agreement. Owner shall not be permitted to drill or excavate for minerals on the surface of the Property. Optionee shall also have the right and privilege to trim, cut down, or control the growth of trees or any other vegetation on the Property, as in the sole judgement of Optionee may interfere with maintenance or operation of the Facilities. Owner will cooperate with Operator to avoid pasturing animals on or near the Facilities during periods of construction, maintenance or removal activity by Operator.

5. **Assignability**. Optionee may assign this Agreement to any affiliate of Optionee for the same purpose and on the same terms and conditions set forth herein.

6. **Broker**. The Parties represent to one another that they have not dealt with any broker or finder, unless set forth in another writing, signed by both Parties hereto, with respect to this Agreement. Each Party shall indemnify, defend and hold harmless the other Party from and against any breach of the foregoing representation.

7. **Due Diligence**. Optionee may, during the term of this Agreement, conduct due diligence with respect to the Property. Such review may include, but is not limited to, soil samples, environmental review and engineering feasibility. Owner will cooperate in due diligence and provide all relevant documentation in Owner's possession. Owner acknowledges that Optionee may contact government authorities regarding the Property. Owner agrees to promptly execute all reasonable documents requested by Optionee for permitting the Facility. Owner shall provide access to the Property upon reasonable notice, not to exceed forty-eight (48) hours, from Optionee.

8. **Parties**. This Agreement shall be binding upon and inure to the benefit of the Parties hereto and their respective heirs, successors, legal representatives and assigns, it being specifically understood that unless Optionee declines to exercise the Option, Owner may not lease, sell, transfer or convey during the Option Term any interest in the Property and easement areas to any third party whatsoever. Further, during the Option Term, Owner shall refrain from negotiating, discussing or dealing with any other persons concerning the lease or sale of the Property.

9. **Entire Agreement**. This Agreement contains the entire agreement between the Parties with respect to the subject matter thereof. This Agreement may not be amended or modified, nor may any provision be waived, unless in writing signed by the Party against whom enforcement is sought. This Agreement may be executed in any number of counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument. For purposes of this Agreement, any signature transmitted by facsimile or electronically via e-mail shall be considered to have the same legal and binding effect as any original signature.

10. **Easements**. Owner shall grant Optionee all easements necessary for construction and operation of the Facility, including, but not limited to, access, electrical and utility easement agreements. Additionally, Owner shall execute an electrical, utility and access easement with the relevant utility company.

11. **Governing Law**. This Agreement shall be governed by and construed under North Dakota law.

12. **Consent Form**. Conterminous with the execution hereof, Owner shall execute the utility Property Owner Consent Form.

13. **Force Majeure**. Notwithstanding anything to the contrary contained herein, neither party shall be liable for any delays or failures in performance resulting from acts beyond its reasonable control including, without limitation, acts of God, acts of war or terrorism, shortage of supply, pandemics, breakdowns or malfunctions, interruptions or malfunction of computer facilities, or loss of data due to power failures or mechanical difficulties with information storage or retrieval systems, labor difficulties or civil unrest. In the event there is a delay or failure pursuant to the preceding sentence, all timelines herein shall be extended on a day of day basis until such time as the reason for delay or failure expires. Notwithstanding the foregoing, in the event of such an occurrence, each party agrees to make a good faith effort to perform its obligations hereunder.

14. **Confidentiality**. Parties agree that the terms of this Agreement are confidential and constitute proprietary information of the Parties hereto. Each of the Parties hereto agree that itself, and its respective partners, officers, directors, employees, agents, brokers and attorneys, shall not disclose the terms and conditions of this Agreement to any other person without the prior written consent of the other Party hereto except pursuant to an order of a court of competent jurisdiction. Provided, however, that either party may disclose the terms hereof to its respective independent accountants, to any lender or prospective lender to such party, to any governmental entity, agency or person to whom disclosure is required by applicable law, regulation or duty of diligent inquiry and in connection with any action brought to enforce the terms of this Agreement, on account of the breach or alleged breach hereof or to seek a judicial determination of the rights and obligations of the Parties hereunder.

*[REMAINDER OF PAGE INTENTIONALLY LEFT BLANK. SIGNATURES CAN BE FOUND ON THE FOLLOWING PAGE.]*

IN WITNESS WHEREOF, the Parties have executed this Agreement and made it effective the date and year first above written.

**Owner(s)**

_____

_____

**Optionee**

Retract LLC

By: _____
Name:
Its:

Notary Blocks

STATE OF _____}

COUNTY OF _____}

On this _____ day of _____, in the year 2023, before me personally appeared XXXXXXXXXXXX , known to me (or proved to me on the oath) to be the persons who described in and who executed the within and foregoing instrument, and acknowledged to me that she executed the same.

X_____

Notary Public in and for the State of _____

Printed Name:_____

Commission Expires:_____

STATE OF _____}

COUNTY OF _____}

On this _____ day of _____, in the year 2023, before me personally appeared XXXXXXXXXX, known to me (or proved to me on the oath) to be the persons who described in and who executed the within and foregoing instrument, and acknowledged to me that she executed the same.

X_____

Notary Public in and for the State of _____

Printed Name:_____

Commission Expires:_____

Exhibit A

**Property**

Approximately acres of land, within the Property as outlined below in this Exhibit A. The Property, which will be included in the lease agreement between the Parties, shall be more particularly defined via a boundary survey.

INDUSTRIAL COMMISSION
STATE OF NORTH DAKOTA
DATE 6/13/24 CASE NO. 30869-880
Introduced By Braaten
Exhibit LO-52
Identified By Stockness

39680
29237

UG-0023

# NEW MEXICO STATE LAND OFFICE

Agreement for Natural Gas Storage in the Grama Ridge-Morrow Formation

## RIGHT-OF-WAY EASEMENT NO. RW-30222

This Agreement for Natural Gas Storage in the Grama Ridge-Morrow Formation (this "***Agreement***"), made this 20th day of September, 2006, is by and between the **STATE OF NEW MEXICO**, acting by and through Patrick H. Lyons, its Commissioner of Public Lands, hereinafter called the "***Grantor***", and **ENSTOR GRAMA RIDGE STORAGE AND TRANSPORTATION, LLC (fka GRAMA RIDGE STORAGE AND TRANSPORTATION, LLC)**, a limited liability company duly organized and existing under the laws of the State of Oregon, and duly authorized to transact business in the State of New Mexico, hereinafter called "***Grantee***."

WHEREAS, Grantor has previously granted oil and gas leases covering lands within the Unit Area (as herein after defined);

WHEREAS, Raptor Natural Pipeline LLC (successor by merger and name change to Llano, Inc.) acquired such oil and gas leases and desired to develop the Storage Interval (as herein after defined) for the underground storage of natural gas;

NM OCD
STATE LAND OFFICE
SANTA FE, N.M.
2006 SEP 8 PM 2 24

WHEREAS, Grantor, pursuant to N.M.S.A. § 70-6-3, has the authority to grant rights for underground storage of natural gas in lands subject to its control;

WHEREAS, in order to grant such storage rights within the Storage Interval, a unit was formed for the purposes of secondary recovery and gas storage pursuant to that certain Unit Agreement for the Operation of the Grama Ridge-Morrow Unit Area, Lea County, New Mexico entered into on April 25, 1973 (as subsequently amended on September 1, 1976, and May 23, 2001, the "***Unit Agreement***");

WHEREAS, the "***Unit Area***" under the Unit Agreement covers Sections 33 and 34, Township 21 South, Range 34 East, N.M.P.M.; Section 3, Township 22 South, Range 34 East, N.M.P.M.; and Lot 1, Lot 2 and S½NE¼ of Section 4, Township 22 South, Range 34 East, N.M.P.M.;

WHEREAS, the unitized formation under the Unit Agreement is defined as the zone encountered at a log depth of 12,722 feet to 13,208 feet in the Shell Oil Company State GRA Well No. 1 (API No. 30-025-21336) as shown on the Schlumberger Sonic Log B Gamma Ray Log of such well dated July 5, 1965, which well is located 1,980 feet from the North line and 660 feet from the West line (Unit E) of Section 3, Township 22 South, Range 34 East (the "***Storage Interval***");

WHEREAS, OCD Order R-4473 (January 29, 1973) and OCD Order 4491 (March 16, 1973) provided the initial authorization for storage in the Storage Interval and OCD Order R-11611 (July 3, 2001) established "Special Project Rules and Operating Procedures for the Grama Ridge Morrow Gas Storage Unit";

WHEREAS, Grantee, as successor in interest to Raptor Natural Pipeline LLC (successor by merger and name change to Llano, Inc.), holds certain rights, including the right to store natural gas in the Storage Interval, in and to the Unit Area pursuant to the Unit Agreement and the "***Original Non-BLM Agreements***" (as such term is more particularly described in Exhibit B);

WHEREAS, Grantee, as successor in interest to Raptor Natural Pipeline LLC (successor by merger and name change to Llano, Inc.), holds certain rights from the United States of America to store natural gas in Sections 4 and 10, Township 22 South, Range 34 East (Lea County, New Mexico) pursuant to that certain Agreement for the

Subsurface Storage of Gas, Morrow Formation, Grama Ridge Area, dated effective November 1, 1975, Serial No. NM-70953X, formerly Contract No. 14-08-0001-14277 (such agreement, as amended, the "***BLM Gas Storage Agreement***");

WHEREAS, Grantee conducts gas storage operations in the Storage Interval underlying both the Unit Area and the lands committed to the BLM Gas Storage Agreement;

WHEREAS, Grantee, by assignment, is the holder of that certain Business Lease No. BL-1652, dated April 20, 2004, granted by Grantor in favor of ConocoPhillips Company (as amended, the "***Business Lease 1652***") covering certain lands in Section 3, Township 22 South, Range 34 East, Lea County, New Mexico, which business lease is an integral part of Grantee's storage operations on, and includes lands comprising, the "***State Committed Lands***" (as such term is defined below);

WHEREAS, Grantee, by assignment, is the holder of that certain Business Lease No. BL-1662, dated October 4, 2004, granted by Grantor in favor of ConocoPhillips (as amended, the "***Radio Tower Site Lease***") covering certain lands in Section 3, Township 22 South, Range 34 East, Lea County, New Mexico, which lease is also an integral part of Grantee's storage operations on, and includes lands comprising, the State Committed Land (the Business Lease 1652 and Radio Tower Site Lease, collectively, the "***State Business Leases***");

2004 DEC 3 PM 8 24 STATE LAND OFFICE SANTA FE, N.M.

WHEREAS, Grantee, by partial assignment, is the holder of that certain Right-Of-Way and Easement RW 16644, dated May 4, 2005, granted by Grantor in favor of Raptor Gas Transmission LLC for a pipeline in Section 34, Township 21 South, Range 34 East, NMPM, Lea County, New Mexico, which easement is an integral part of

Grantee's storage operations on, and includes lands comprising, the State Committed Lands;

WHEREAS, Grantee, by partial assignment, is the holder of that certain Right-Of-Way and Easement RW 16406, dated May 4, 2005, granted by Grantor in favor of Raptor Gas Transmission LLC for a pipeline in Section 34, Township 21 South, Range 34 East and Section 3, Township 22 South, Range 34 East, NMPM, Lea County, New Mexico, which easement is an integral part of Grantee's storage operations on, and includes lands comprising, the State Committed Land (RW-16644 and RW-16406 collectively, the "***State Easements***");

WHEREAS, Grantor and Grantee desire to reaffirm the rights of Grantee to conduct gas storage operations generally upon, and in the Storage Interval underlying, the State Committed Lands;

WHEREAS, the Second Amendment to the Unit Agreement states that the Unit Agreement is unique and that this right is in the nature of an easement that exists independently of the oil and gas leases that were initially unitized under the Unit Agreement;

WHEREAS, Grantor and Grantee desire to amend and restate, in their entirety, the terms and conditions contained in the Unit Agreement in respect of, and only in respect of, gas storage operations in the Storage Interval underlying the State Committed Lands with the terms and conditions contained herein, including those in the Stipulations For Underground Storage of Gas attached hereto as Exhibit A (the "***Stipulations***") and made a part hereof;

2007 DEC 3 AM 8 STATE OF NEW MEXICO SAN A FILED

WHEREAS, Grantor and Grantee desire to provide herein for the uses of the lands covered by State Business Leases and State Easements, which uses are appurtenant to Grantee's storage operations; and

WHEREAS, Grantor desire to replace and supersede the conditions of the State Business Leases and State Easements in their entirety;

NOW, THEREFORE, Grantor, for and in consideration of the Fees (as defined in the Stipulations) to be paid by the Grantee, receipt whereof is hereby acknowledged, has granted and by these presents does grant to the Grantee, its successors and assigns, the exclusive right to use the following lands in Lea County, New Mexico, for the Permitted Uses (as such term is defined in the Stipulations):

**Township 21 South, Range 34 East, NMPM**
Section 33: NW/4NE/4 (mineral interest only), W/2SE/4 (mineral interest only) E/2E/2, W/2
Section 34: S/2S/2 (mineral interest only), N/2S/2, N/2

**Township 22 South, Range 34 East, NMPM**
Section 3: Lots 1 through 4, S/2N/2, S/2 (All)
Section 4: Lots 1 & 2 and S/2NE/4 (NE/4) (surface only)

all of which lands are hereby committed to this Agreement and are referred to as "***State Committed Lands***" and contain a total of 1,769.81 surface acres and 1887.16 mineral acres, in both cases, more or less.

RECEIVED
2007 DEC 3 AM 8 24
STATE LAND OFFICE
SANTA FE, N.M.

TO HAVE AND TO HOLD the said State Committed Lands for the Permitted Uses and purposes unto Grantee, its lawful successors and assigns, subject to the terms and conditions contained herein.

The State Committed Lands shall be developed and operated as an entirety. The Permitted Uses on any part of the State Committed Lands shall be deemed to be use of

all the State Committed Lands. The grant herein is made upon the further condition that should the State Committed Lands hereby granted cease to be used by the Grantee or its lawful successors or assigns for any of the Permitted Uses for the consecutive period of one (1) year, the rights herein granted shall terminate, free and clear from any claim, interest or demand of the said Grantee or its successors or assigns; provided further, in any event, the Grantee shall be given notice of any such claimed cessation and a reasonable opportunity thereafter within which to remedy any default before a final determination is made to terminate the Grantee's rights under this Agreement.

If Grantee's use entails the crossing of any right-of-way for a highway, or the right-of-way of any other road, telephone, telegraph or transmission line, Grantee will exercise due care so as not to interfere with said rights-of-way and will comply with all laws, rules and regulations in connection with the making of such crossings.

Grantee, its successors and assigns hereby agree carefully to avoid destruction or injury to any improvements or livestock lawfully upon the State Committed Lands; carefully to close all gates immediately upon passing through such gates; and pay the reasonable and just damages for injury or destruction, if any, arising from Grantee's construction or operation activities on the State Committed Lands.

The Grantee shall have the right to assign this Agreement, subject to the approval of the Grantor.

Grantee, including its assigns, agents, and contractors shall at its own expense fully comply with all applicable laws, regulations, rules, ordinances, and requirements of the city, county, state, federal authorities and agencies, in all matters and things affecting the State Committed Lands and operations thereon. Such government entities

2007 OCT 3 AM 8 24
STATE LAND OFFICE
SANTA FE, N.M.

are not to be deemed third party beneficiaries hereunder; however, this clause is enforceable by the Grantor as herein provided or as otherwise provided by law.

This Agreement is executed subject to all valid existing rights; provided, however, that Grantee's rights deriving from Grantor in respect of it gas storage operations created under the Unit Agreement and/or the Original Non-BLM Agreements shall continue in full force and effect and relate back to the dates of the Unit Agreement and/or the Original Non-BLM Agreements, as applicable, subject only to the terms and conditions contained herein. This Agreement, together with its attachments, is intended to modernize, amend and restate, in their entirety, the terms and conditions of the Unit Agreement in respect of gas storage on the State Committed Lands within the Storage Interval, which Unit Agreement through length of time and amendments is in need of clarification and updating. Furthermore, Grantor grants to Grantee reasonable use of the surface of the State Committed Lands as is necessary to operate and maintain gas storage operations within the Storage Interval, including, without limitation, such use of the surface as is set forth in the Permitted Uses section of the Stipulations; and in this regard Grantor and Grantee agree to replace and supersede the State Business Leases and State Easements. Grantor agrees to exclude other parties from certain uses that would interfere with Grantee's storage operations as more fully described in Paragraph 6 of the Stipulations.

2007 DEC 3 AM 8 24
STATE LAND OFFICE
SANTA FE, N.M.

IN WITNESS WHEREOF, the State of New Mexico has caused this instrument to be executed by its Commissioner of Public Lands thereunto duly authorized, with the seal of office affixed, the day and year above written.

**GRANTOR:**

STATE OF NEW MEXICO

BY _____
COMMISSIONER OF PUBLIC LANDS

**GRANTEE:**

Enstor Grama Ridge Storage and Transportation, LLC

By: Enstor Operating Company, LLC,
its manager

By: _____
Matt Morrow, President

2007 DEC 3 AM 8 24
STATE LAND OFFICE
SANTA FE, N.M.

## ACKNOWLEDGEMENTS

STATE OF NEW MEXICO)
) ss.
COUNTY OF _____)

The foregoing instrument was subscribed and sworn to before me this ____ day of ____, 2006, by _____, as _____ of the New Mexico State Land Office.

Witness my hand and official seal.

My commission expires:

_____

STATE OF Texas )
) ss.
COUNTY OF Harris )

The foregoing instrument was subscribed and sworn to before me this 21st day of September 2006 by Matt Morrow, as President of Enstor Operating Company LLC, the manager of Enstor Grama Ridge Storage and Transportation, LLC.

Witness my hand and official seal.

My commission expires:

LORI B. VANCE
NOTARY PUBLIC, STATE OF TEXAS
MY COMMISSION EXPIRES
JUNE 21, 2008

Lori B. Vance

2007 DEC 3 AM 8 24
STATE LAND OFFICE
SANTA FE, N.M.

COUNTY CLERK SEAL LEA COUNTY

STATE OF NEW MEXICO
COUNTY OF LEA
FILED
OCT 10 2006
at 9:47 o'clock A M
and recorded in Book 1473
Page 678
Melinda Hughes, Lea County Clerk
By _____ Deputy

29237

BOOK 1473 PAGE 626

BOOK 1516 PAGE 251

**EXHIBIT A**
attached to and made a part of that
certain Agreement for Natural Gas Storage in the
Grama Ridge-Morrow Formation

**STIPULATIONS FOR UNDERGROUND STORAGE OF GAS**

1. PARTIES: The parties hereto are the State of New Mexico acting by and through its Commissioner of Public Lands ("***Grantor***") and Enstor Grama Ridge Storage and Transportation, LLC (fka Grama Ridge Storage and Transportation, LLC) ("***Grantee***") (each of Grantor and Grantee, a "***Party***", and collectively, the "***Parties***").

2. TERMS: Any capitalized term contained herein, not otherwise defined herein, will have the meaning ascribed to such term in the Agreement for Natural Gas Storage in the Grama Ridge-Morrow Formation (the "***Agreement***") to which this Exhibit A is attached.

3. PURPOSE: In order to prevent waste and conserve natural resources, Grantee proposes to continue the use of certain lands in Lea County, New Mexico, specifically, Sections 33 and 34, Township 21 South, Range 34 East, N.M.P.M. and Sections 3, 4 and 10, Township 22 South, Range 34 East, N.M.P.M. (the "***Storage Area***"), and the underlying Storage Interval, more particularly described in OCD Order No R-11611 (July 3, 2001), for the development and operation of an underground gas storage facility (the "***Storage Facility***") as described in detail in Section 5 herein. Due to the fact that a portion of the Storage Area is comprised of lands owned by the State of New Mexico, specifically the State Committed Lands, Grantor has granted

2007 DEC 3 AM 8 24
STATE LAND OFFICE
SANTA FE, N.M.

exclusively unto Grantee the use of the Storage Interval underlying the State Committed Lands for the purpose of injecting, storing and removing natural gas and other gases or gaseous substances and vapors (hereinafter collectively referred to as "***Gas***"), from the Storage Interval (collectively, the "***Gas Storage Operating Rights***").

Furthermore, in connection with the development and operation of the Storage Facility, Grantor has granted to Grantee reasonable use of the surface of the State Committed Lands as is necessary to develop, operate and maintain the Storage Facility, including, without limitation, such use of the surface as is specifically set forth herein.

The Agreement, together with its attachments, is intended to a) modernize, amend and restate, in their entirety, the terms and conditions of the Unit Agreement in respect of gas storage on the State Committed Lands within the Storage Interval; and b) replace and supersede the State Business Leases and State Easements.

Accordingly, Grantor and Grantee have agreed and stipulated as herein provided:

4. LANDS: The following described lands are hereby designated and recognized as constituting the Storage Area:

2007 DEC 3 AM 8 24
STATE LAND OFFICE
SANTA FE, N.M.

Township 21 South, Range 34 East, NMPM
Section 33: All
Section 34: All

Township 22 South, Range 34 East, NMPM
Section 3: All
Section 4: All

Section 10: All

Total acres . . . . . 3211.92, more or less (the "***Storage Area Acreage***")

Lands owned by the State of New Mexico within the Storage Area are described as follows:

**Township 21 South, Range 34 East, NMPM**
Section 33: NW/4NE/4 (mineral interest only), W/2SE/4 (mineral interest only) E/2E/2, W/2
Section 34: S/2S/2 (mineral interest only), N/2S/2, N/2

**Township 22 South, Range 34 East, NMPM**
Section 3: Lots 1 through 4, S/2N/2, S/2 (All)
Section 4: Lots 1 & 2 and S/2NE/4 (NE/4) (surface only)

all of which lands are hereby committed to this Agreement and are referred to as "***State Committed Lands***" and contain a total of 2,090 acres, more or less, of which the Grantor owns 1,769.81 surface acres, more or less (the "***State Surface Acreage***") and 1,887.16 mineral acres, more or less (the "***State Mineral Acreage***").

5. FORMATION: The Storage Interval (sometimes referred to as the "Morrow Formation") is that certain subsurface zone underlying the Storage Area encountered at a log depth of 12,722 feet to 13,208 feet in the Shell Oil Company State GRA Well No. 1 (API No. 30-025-21336) as shown on the Schlumberger Sonic Log B Gamma Ray Log of such well dated July 5, 1965, which well is located 1,980 feet from the North line and 660 feet from the West line (Unit E) of Section 3, Township 22 South, Range 34 East.

6. OPERATIONS: Subject to the other terms and provisions of this Agreement, Grantee shall have, and Grantor has granted to Grantee, the exclusive right, privilege, and authority to utilize the Storage Interval underlying

2007 DEC 3 AM 8 24
STATE LAND OFFICE
SANTA FE, N.M.

the State Committed Lands for Gas Storage Operating Rights and the right, privilege, and authority to utilize the State Committed Lands as is necessary or desirable to use and enjoy the Gas Storage Operating Rights. Pursuant to NMAC 19.2.10.22. Grantor expressly excludes other parties from Gas storage use within the State Committed Lands and expressly excludes surface use by other parties that do not currently hold valid existing rights (including, now or hereafter, valid renewals and extensions of those rights) in those certain portions of the SW/4NW/4 of Section 3, Township 22 South, Range 34 East, NMPM, Lea County, New Mexico, as more particularly described in Exhibit C and Exhibit D to this Agreement. Grantor further expressly excludes all other surface activities within the State Committed Lands that would interfere with, or would otherwise limit the enjoyment of, Grantee's storage operations and the Gas Storage Operating Rights. In no way limiting the foregoing, such rights of Grantee will include, but not be limited to, the following activities (collectively, and together with the Gas Storage Operating Rights, the "***Permitted Uses***"):

a. The exclusive right to drill, complete, equip, connect to pipelines, maintain, and operate injection and/or withdrawal wells completed in the Storage Interval;

b. The exclusive right to re-establish, re-open, repair, recondition, plug or re-plug any non-commercial existing wells heretofore drilled on the State Committed Lands, whether or not abandoned, for the purpose of injecting and/or withdrawing Gas in and from the Storage Interval;

DEC 3 AM 8 12
STATE LAND OFFICE
SANTA FE, N.M.

c. Drill, construct, install, operate, maintain, remove, and abandon, at locations selected by Grantee upon the State Committed Lands, such wells, piping, electric lines, communication facilities, and other fixtures, structures, equipment and appurtenances as Grantee, in its sole discretion, may deem necessary or desirable for the purpose of receiving, injecting, storing, treating, processing, and removing Gas in, from, and under the Storage Area;

d. Conduct geological and geophysical surveys to determine the suitability and performance of the Storage Area for the Storage Facility;

e. The exclusive right to transport Gas, whether produced from the State Committed Lands or elsewhere, into or out of the Storage Interval underlying the Storage Area through any well now or hereafter located or drilled on the Storage Area. Grantee shall have the right, in its sole discretion, to inject such Gas into the Storage Interval, store such Gas therein and in its sole discretion remove the Gas therefrom, with the Gas so injected, stored and removed to be and remain the personal property of Grantee, or Grantee's customers;

OIL CONSERVATION DIV. STATE OF NEW MEXICO SANTA FE, N.M. FILED 2 PM R 24

f. The exclusive right to remove from Gas withdrawn from the Storage Interval any water vapors or liquid hydrocarbon absorbed therein;

g. The rights of ingress and egress in, on and across the State Committed Lands, including, without limitation, the right to use any existing roads and to establish and utilize new roads as are reasonably necessary for

the operation of the Storage Facility and for the enjoyment by Grantee of the rights and privileges granted unto Grantee in this Agreement.

h. It is expressly understood and agreed that Grantee is under no obligation to drill or utilize any existing well or wells on the State Committed Land for primary production, secondary recovery and/or storage purposes. In the event that no surface operations for the underground storage of Gas is actually undertaken on the State Committed Lands, but such operations are conducted by Grantee in the Storage Area, Grantee shall have the right to inject Gas into the Storage Interval underlying the surface of the State Committed Land, store the Gas therein, and remove Gas (together with any native hydrocarbons) utilizing in such process of injection and removal of Gas any well or wells located within the Storage Area.

i. Grantee, as approved and authorized by any agency having regulatory authority, shall be the sole and exclusive judge as to whether Gas is being stored in a portion of the Storage Interval underlying the State Committed Land, subject to reasonable proof, if requested by the Grantor, of a nature generally accepted in the gas storage industry.

2007 DEC 3 AM 8 24
STATE LAND OFFICE
SANTA FE, N.M.

j. Grantee shall be, and shall have the rights of, the Operator in respect to the Gas Storage Operating Rights.

k. Use, hold, and occupy the Storage Area, including the State Committed Land, together with necessary rights of ingress and egress, for all such foregoing purposes.

7. OBLIGATIONS OF GRANTEE:

a. Within one (1) year after the later of the expiration of this Agreement and removal by Grantee of last recoverable Gas from the Storage Interval, Grantee shall fill all pits and ponds, remove all structures and equipment, plug and abandon all wells drilled or used by Grantee in accordance with applicable rules, regulations, and orders of the State of New Mexico, and restore the surface of the State Committed Land as nearly as practicable to its original condition, natural wear and tear and damage from the elements excepted.

b. Grantee shall maintain any well site, storage tank location, or any other surface area used on the State Committed Lands in compliance with all applicable rules and regulations

2007 DEC 3 AM 8 24
STATE LAND OFFICE
SANTA FE, N.M.

8. EFFECTIVE DATE AND TERM: This Agreement shall become effective June 1, 2006, upon approval by Grantor, and shall remain in effect for a term of thirty-five (35) years, provided however that Grantee's rights hereunder shall terminate one (1) year after Grantee has ceased to use the State Committed Lands for gas storage purposes. The Agreement and the grant contained herein may be renewed for additional periods upon application to Grantor. Any such renewals are subject to such terms and conditions as the Grantor may reasonably require, and payment of reasonable compensation.

9. PAYMENTS: The following payments from Grantee to Grantor will compensate Grantor for all uses and rights granted herein and are sometimes referred to collectively as the "***Fees***":

a. Grantee shall pay an annual storage fee (the "***Annual Storage Fee***") of one dollar ($1.00) per acre, based upon the State Surface Acreage, which fee will be paid to Grantor regardless of the amount of Gas injected or withdrawn.

b. Grantee shall pay an injection and withdrawal fee of $0.02379 per MCF on the quantity of Gas injected and withdrawn by Grantee from the Storage Interval, prorated based upon a fraction, the numerator of which is the State Mineral Acreage and the denominator of which is the Storage Area Acreage (the "***Injection and Withdrawal Fee***"). The Injection and Withdrawal Fee will be paid on a quarterly basis and each such payment remitted by Grantee shall provide a statement indicating the volume of Gas injected and withdrawn and the rate referenced in this section supporting the amount of payment. The time period for corrections to each Injection and Withdrawal Fee payment data shall be six (6) months from the date of the initial payment with a three (3) month rebuttal period. This limitation does not apply in the case of deliberate omission or misrepresentation or mutual mistake of fact, nor shall this limitation diminish the Parties' other statutory or contractual rights. If there is a deliberate omission or misrepresentation of fact, there will be no time limit on correction of the payment.

2007 DEC 3 AM 8 24
STATE LAND OFFICE
SANTA FE, N.M.

c. Grantee shall pay the Annual Storage Fee on or before September 30 of each calendar year during the term of this Agreement (Grantee has

previously made the September 2005 payment, so payments under this Agreement shall beginning September 30, 2006). Grantee shall pay the Injection and Withdrawal Fee within 30 days following the end of the calendar year quarter to which such payment relates. Unless otherwise directed by Grantor in writing, Grantee shall make all payments of the Fees to the order of the New Mexico State Land Office.

d. Effective July 1, 2006, and every July 1st thereafter, the Injection and Withdrawal Fee will be adjusted in accordance with the COPAS accounting procedure wage index adjustments based on the Bureau of Labor Statistics for Crude, Petroleum and Gas Field Workers ("COPAS Wage Index"). Upon any future renewal, the Grantor reserves the right to negotiate for a different indexing adjustment depending on matters such as, but not limited to, the industry practice and the need to harmonize this Agreement with other storage agreements entered into by Grantor so that such agreements share major common features.

2007 DEC 3 AM 8 24
STATE LAND OFFICE
SANTA FE, N.M.

10. MEASUREMENT: All Gas stored by Grantee shall be measured when injected into and withdrawn from the Storage Interval, and a record thereof shall be kept. Grantee agrees to render to Grantor within 30 days following the end of each calendar year quarter a statement certified by Grantee showing the total amount of Gas injected into and withdrawn from the Storage Interval by Grantee during that preceding calendar year quarter. The quantity of Gas reported as

injected and withdrawn each calendar year quarter (and used to calculate the Injection and Withdrawal Fee) shall be computed at a standard pressure of 14.73 pounds per square inch absolute and a standard temperature of 60 degrees Fahrenheit, regardless of the pressure and temperature at which the Gas was actually measured.

11. ROYALTIES ON NATIVE HYDROCARBONS: It is acknowledged, agreed and stipulated by the Parties that Grantor has previously been compensated for all native Gas contained within the Storage Interval that may be produced and saved by Grantee. As such, Grantor shall not be owed any additional payments in respect of any Gas produced and saved by Grantee from the Storage Interval (other than the Fees as set forth herein).

In respect to oil produced and saved and all liquid hydrocarbons removed and saved by Grantee from Gas withdrawn from the Storage Interval, Grantee shall pay to Grantor as royalty 12.5% of the net proceeds received by Grantor for such oil and/or liquid hydrocarbons; provided, however, that such royalty paid to Grantor shall be proportionally reduced to Grantor's mineral ownership, on an acreage bases, within the Storage Area. For purposes of this section, Grantor's mineral ownership, on an acreage basis, shall be deemed to be a fraction, the numerator of which is the State Mineral Acreage and the denominator of which is the Storage Area Acreage. Grantee shall make payment of such royalty within 30 days from receipt by Grantee of the proceeds received from the sale of any such liquid hydrocarbons. Grantor and Grantee agree that oil and gas leases covering lands within the State Committed Lands are hereby modified to

2007 DEC 3 AM 8 24
STATE LAND OFFICE
SANTA FE, N.M.

incorporate the above-described royalty payment provisions in respect of the Storage Interval, to the extent of Grantee's interest in such leases.

12. OIL AND GAS RIGHTS:

a. Certain lands within the State Committed Lands are presently covered by existing oil and gas leases, which leases are subject to Grantee's rights under the Unit Agreement and, in some instances, to provisions contained in assignments out of Grantee's predecessors in interest.

b. Grantor agrees that any new, amended or replacement oil, gas and/or mineral lease or leases issued by Grantor covering any portion of the State Committed Lands, whether on lands presently unleased or on lands presently leased that may be surrendered, expire, or otherwise terminate, will be issued subject to the following provisions: (1) that the lessee thereunder, his successors and assigns, will conduct operations in such a manner as not to interfere with or in any way compromise the integrity of Grantee's gas storage operations under this Agreement, which Agreement will be expressly recited in any such leases; (2) that any drilling, testing, work-over, or any other construction, operations or maintenance activities by such lessee, his successors and assigns, will be conducted in such a manner as to protect the Storage Interval from damage and loss of gas; (3) that such lessee, his successors and assigns, will own no interest in any hydrocarbons, whether native or stored, produced from the Storage Interval nor will it own any interest in the proceeds received by

Grantee from any sale of such hydrocarbons; and (4) that such leases, and such lessee, its successors and assigns, are expressly subject to the Special Project Rules and Operating Procedures adopted in OCD Order R-11611, which order will be expressly referred to therein. Grantor further agrees to expressly exclude from any oil and gas leases surface use on all of the SW/4 of Section 34 and SE/4 of Section 33, both in Township 21 South, Range 34 East, NMPM and the NW/4 of Section 3, Township 22 South, Range 34 East, NMPM.

c. Grantor agrees that the State of New Mexico is not entitled to a royalty payment on Gas withdrawn from the Storage Interval by Grantee and that all future oil and gas leases covering any portion of the State Committed Lands issued by Grantor will expressly incorporate a provision stating such agreement.

13. CHANGES TO STORAGE AREA: In the event Grantee determines, from time to time, that a portion of the State Committed Lands is no longer necessary for the Storage Facility, Grantee may eliminate said portion from the Storage Area and from the provisions hereof. Should there be, from time to time, a change in the Storage Area as a result of elimination or addition of acreage or a change in the amount of State Committed Lands, (a) Grantee shall notify Grantor in writing and (b) after such notice is given, the percentage factor for payments hereunder, including, without limitation, payment of the Injection and Withdrawal Fee and the Annual Storage Fee, payable to Grantor

will be adjusted accordingly and the resulting percentage factor will be applicable to all subsequent payments under this Agreement.

14. CONSERVATION: Operations under the Storage Facility shall be conducted to provide for the most economical and efficient recovery and storage of gas without waste as defined by or pursuant to the laws or regulations of the State of New Mexico.

15. COVENANTS: It is covenanted and agreed that each obligation hereunder shall constitute covenants running with the land and shall extend to and shall be binding upon and every benefit hereof shall inure to the successors or assigns of Grantor and Grantee. If any provision hereof should be found to be inconsistent with applicable laws, rules or regulations, this Agreement shall be conformed to any such laws, rules or regulations and shall continue in full force and effect.

16. NOTICES: All notices required under the terms and stipulations of this Agreement shall be deemed effective when received at the following addresses:

For Grantee:

Enstor Grama Ridge Storage and Transportation, LLC
c/o Enstor Operating Company, LLC
20333 State Hwy. 249, Suite 400
Houston, Texas 77070
Attn: Land Department

For Grantor:

Director, Surface Resources Management Division
New Mexico State Land Office
P.O. Box 1148
Santa Fe, NM 87504-1148

Any adjustments to the above listed notice addresses shall be made in writing and shall not be effective until written confirmation of the acceptance of the adjustment is received by the requesting party from the receiving party.

Each provision of this Agreement shall be binding upon the parties hereto and their respective voluntary or involuntary successors in interest.

17. HOLD HARMLESS CLAUSE: Notwithstanding any of the provisions contained in these Stipulations, as between Grantor and Grantee, Grantee shall save, hold and protect the Commissioner of Public Lands and the State of New Mexico harmless from all claims and liabilities resulting from damages or injuries solely caused by Grantee in its operation of the Storage Facility.

2007 DEC 3 AM 8 24
STATE LAND OFFICE
SANTA FE, N.M.

## EXHIBIT B

HISTORICAL DOCUMENTS RELATING TO
THE GRAMA RIDGE STORAGE FACILITY

1. **STATE LAND OFFICE AGREEMENTS**: The Storage Area contains 1769.81 acres, more or less, of State of New Mexico surface lands and 1,887.16 acres, more or less, of State of New Mexico mineral lands. The following agreements with the New Mexico State Land Office concern the right to store gas as well as appurtenant rights necessary to operate the Storage Facility. The issuance of the Agreement is intended to amend and restate the following agreements and all gas storage operations rights in the Storage Interval underlying the State Committed Lands granted therein are expressly made part of the Agreement (the following, collectively, the "***Non-BLM Agreements***"):

a) Unit Agreement for the Operation of the Grama Ridge Morrow Unit Area, Lea County, New Mexico, April 25, 1973;

b) Consent and Ratification of Grama Ridge Morrow Unit Agreement and Amendment thereto, Lea County, New Mexico, November 2, 1976;

c) Amendment to the Unit Agreement for the Operation of the Grama Ridge Morrow Unit Area, Lea County, New Mexico, September 1, 1976;

d) Second Amendment to the Unit Agreement for the Operation of the Grama Ridge Unit Area, Lea County, New Mexico, May 23, 2001;

e) Memorandum of Agreement Pursuant to the Unit Operating Agreement for the Operation of the Grama Ridge Unit Area, Lea County, New Mexico.

f) Lease No. BL-1652, dated April 20, 2004 and Amendment No. 1 to BL-1652 dated November 17, 2004 [and Amendment No. 2 dated effective January 25, 2006] covering a tract of land in Section 3, Township 22 South, Range 34 East,

NMPM, Lea County, New Mexico, as assigned to Grama Ridge Storage and Transportation, LLC on May 4, 2005.

g) Lease No. BL-1662, dated October 4, 2004, covering a tract of land in Section 3, Township 22 South, Range 34 East, NMPM, Lea County, New Mexico, as assigned to Grama Ridge Storage and Transportation, LLC on May 4, 2005.

h) RW-16644, dated November 15, 1966, for a pipeline in Section 34 as assigned to Grama Ridge Storage and Transportation, LLC on May 4, 2005.

i) RW-16406, dated January 24, 1966, for a pipeline in Section 34 and Section 3 as assigned to Grama Ridge Storage and Transportation, LLC on May 4, 2005.

2. **BLM AGREEMENTS**: The Storage Area contains 1280 acres, more or less, of federal lands. The following agreements with the Bureau of Land Management concern the right to store gas in a certain portion of the Storage Area:

a) Agreement for Subsurface Storage of Natural Gas, Morrow Formation, Grama Ridge Area, Lea County, New Mexico, 14-08-0001-14277, November 1, 1975;

b) First Amendment to Agreement for Subsurface Storage of Natural Gas, Morrow Formation, Grama Ridge Area, Lea County, New Mexico, 14-08-0001-14277, April 1, 1981.

OCD
STATE LAND OFFICE
SANTA FE, N.M.
3 AM 8 24

3. **OCD ORDERS**: The following New Mexico Oil Conservation Division Orders concern gas storage operations in the Storage Area:

a) Order R-4473/4491 (Case Nos. 4895 & 4896)
b) Order R-5995 (Case No. 6496)
c) Order R-5996 (Case No. 6497)
d) Order R-7569 (Case No. 8189)
e) Order R-7582 ((Case No. 8088)
f) Order R-11611 (Case No. 12588)
g) Order R-11768-B (Case Nos. 12622 &12908)

## EXHIBIT C

Being a 6.132 acre tract of land located in Section 3, Township 22 South, Range 34 East, N.M.P.M., Lea County, New Mexico and being more particularly described as follows:

Beginning at a point for an exterior corner of this tract, from which a USGLO Brass Cap found for the NW corner of said Section 3 bears S 89°40'14" W, a distance of 456.97 feet and N 00°19'46"W, a distance of 1857.27 feet; THENCE N 04°50'40"W, a distance of 35.63 feet to a ½" iron rod set for an interior corner of this tract; THENCE N 39°30'20"W, a distance of 18.01 feet to a ½" iron rod set for an exterior corner of this tract; THENCE N 61°15'43"E, a distance of 107.27 feet to a ½" iron rod set for an exterior corner of this tract; THENCE N 88°51'30"E, a distance of 661.35 feet to a ½" iron rod set for the NE corner of this tract; THENCE S 01°08'24"E, a distance of 574.08 feet to a ½" iron rod set for the SE corner of this tract; THENCE S 88°51'36"W, a distance of 823.30 feet to a point for the SW corner of this tract; THENCE N 10°29'51"E, a distance of 98.76 feet to a point for an exterior corner of this tract; THENCE S 88°51'04"E, a distance of 528.02 feet to a point for an interior corner of this tract; THENCE N 01°08'56"E, a distance of 200.00 feet to a point for an interior corner of this tract; THENCE N 88°51'04"W, a distance of 150.00 feet to a point for an exterior corner of this tract; THENCE N 01°08'56"E, a distance of 53.80 feet to a point for an exterior corner of this tract; THENCE N 85°285'53"E, a distance of 69.80 feet to a point for an interior corner of this tract; THENCE N 02°54'15"W, a distance of 134.80 feet to a ½" iron rod with cap found near a fence corner post for an interior corner of this tract; THENCE S88°56'55"W, a distance of 392.93 feet to the place of beginning, containing 6.132 acres more or less.

2007 DEC 3 AM 8 24
STATE LAND OFFICE
SANTA FE, N.M.

BLF-000026

## EXHIBIT D

A tract of land located in part of the SW4NW4 in Section 3, Township 22 South, Range 34 East, N.M.P.M., Lea County, New Mexico and being more particularly described as follows: Beginning at a point which lies S.00°10'29"W., 1828.2 feet and S.89°49'31"E., 534.6 feet from the NW corner of said Section 3; thence N.87°15'48"E., 30.00 feet; thence S.02°44'12"E., 30.00 feet; thence S.87°15'48"W., 30.00 feet; thence N.02°44'12"W., 30.00 feet to the point of beginning. Said tract of land containing 0.0207 acres, more or less.

39680

STATE OF NEW MEXICO
COUNTY OF LEA
FILED

JUN 0 4 2007

at 8:27 o'clock A M
and recorded in Book 1516
Page 263
Melinda Hughes, Lea County Clerk
By RD Deputy

COUNTY CLERK SEAL LEA COUNTY, NEW MEXICO

BLF-000027

INDUSTRIAL COMMISSION
STATE OF NORTH DAKOTA
DATE 6/13/24 CASE NO 30869-880
Introduced By Braaten
Exhibit LO-53
Identified By Stockness/Swenson

**Parcel No. 281-45Q-80**

# PORE SPACE LEASE

THIS PORE SPACE LEASE (this "Lease") is made effective as of the Effective Date (as defined below), by and between **Irma M. Bitner**, whose address is 2200 80th St NE, Bismarck ND 58501, (whether one or more, "Lessor"), and **Dakota Gasification Company**, a North Dakota corporation, whose address is 1717 East Interstate Avenue, Bismarck, North Dakota 58503 (whether one or more, "Lessee"). Lessor and Lessee may be individually referred to herein as a "Party" and collectively as the "Parties".

1. Leased Premises. Lessor, for good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, does hereby grant, demise, lease and let unto Lessee for Lessee's geologic storage operations and other purposes set forth herein, the following-described lands situated in Mercer County, North Dakota:

Township 145 North, Range 88 West
Section 23: W2NE, NW

containing 240.00 acres, more or less (the "Leased Premises"), subject to the terms and conditions set forth herein. The entire project area includes 15,979.19 acres, more or less (the "Project Area").

2. Term.

(a) Primary Term. This Lease shall commence on the date Lessee executes this Lease ("Effective Date") and continue for an initial term of Fifteen (15) years ("Primary Term") unless sooner terminated in accordance with the terms of this Lease. On the Effective Date of this Lease and thereafter on or before each annual anniversary date of this Lease, Lessee shall pay to Lessor the sum of Twenty Five Dollar ($25.00) per surface acre covered by this Lease. After the Primary Term, Lessee retains the right to extend this lease up to three (3) additional five (5) year terms by providing Lessor with at least a 60-day notice, as long as Lessee continues to pay to Lessor through any extension period, the annual lease rate provided for above and any royalty rates as set forth in Section 3 of this Lease.

(b) Operational Term. This Lease shall continue beyond the Initial Term for so long as any portion of the Leased Premises or Lessee's storage facilities located in, on or under the Leased Premises (including without limitation, any Reservoirs) are subject to a permit issued by the North Dakota Industrial Commission (the "Commission") (a "Permit") or under the ownership or control of the State of North Dakota; *provided, however*, that all of Lessee's obligations under this Lease shall terminate upon issuance of a certificate of project completion pursuant to Chapter 38-22 of the North Dakota Century Code (the "Operational Term"). If the Primary Term expires and no portion of the Leased Premises or Lessee's storage facilities located in, on or under the Leased Premises is subject to a Permit, this Lease shall terminate, and Lessee shall execute a document evidencing termination of this Lease in recordable form and shall record it in the official records of the county or counties in which any portion of the Leased Premises is located.

3. Royalty. Lessee shall pay to Lessor its proportionate share of One Dollar and Seventy Cents ($1.70) per metric ton of carbon dioxide ($CO_2$) injected into the reservoirs and subsurface pore spaces (as used herein, such terms shall have the meanings set forth in Chapter 38-22 and Chapter



EXHIBIT
tabbies LO-53
30869 - 30880

47-31 of the North Dakota Century Code), stratum or strata underlying the Leased Premises (collectively, "Reservoirs"), or reservoirs and subsurface pore spaces, stratum or strata unitized or amalgamated therewith (the "Amalgamated Reservoirs"). Lessor's "proportionate share" shall be determined on a net acre basis and the Parties hereby stipulate that the acreage set forth in Section 1 shall be used to calculate Lessor's proportionate share of the Project Area. The quantity of carbon dioxide injected into the Reservoirs or any Amalgamated Reservoirs shall be determined through the use of metering equipment installed and operated by Lessee at the injection site. All royalties due hereunder for carbon dioxide injected into the Reservoirs or any Amalgamated Reservoirs during any calendar year shall be paid to Lessor within sixty (60) days of the end of said year. Lessor and Lessee agree that this Lease shall continue as specified herein even in the absence of injection operations and the payment of royalties.

4. Right to Pore Space/Storage of Carbon Dioxide. Lessor grants to Lessee the exclusive right to inject and store carbon dioxide and other incidental gaseous substances into and in the Reservoirs, together with the right of reasonable use of the surface of the Leased Premises as set forth in Section 5. Lessor shall not grant to any other person the right to inject or store carbon dioxide or any other gases, liquids, solids or semi-solids into the Reservoirs underlying the Leased Premises.

5. Surface Access. Lessor grants Lessee the right of reasonable use of the surface of the Leased Premises, including without limitation, the rights of ingress and egress over the Leased Premises, for purposes of any surveys and/or ongoing testing activities related to this Lease provided, however, that Lessee shall compensate Lessor, or its tenants, for any physical damages to growing crops, livestock and improvements located on the Leased Premises, if such damages are caused by Lessee's use of the Leased Premises.

6. Amalgamation. Lessee, in its sole discretion, shall have the right and power, at any time and from time to time during the term of this Lease to pool, unitize, or amalgamate any reservoirs or subsurface pore spaces, stratum or strata underlying the Leased Premises with any other lands or interests into which such reservoirs or subsurface pore spaces extend and document such unit in accordance with applicable law or agency order. Amalgamated units shall be of such shape and dimensions as Lessee may elect and as are approved by the Commission. Amalgamated areas may include, but are not required to include, land upon which injection or extraction wells have been completed or upon which the injection and/or withdrawal of carbon dioxide and/or related gaseous substances has commenced prior to the effective date of amalgamation. In exercising its amalgamation rights under this Lease and if required by law, Lessee shall record or cause to be recorded a copy of the Commission's amalgamation order or other notice thereof in the county or counties in which any portion of the amalgamated unit is located. Amalgamating in one or more instances shall, if approved by the Commission, not exhaust the rights of Lessee to amalgamate Reservoirs or portions of Reservoirs into other amalgamation areas, and Lessee shall have the recurring right to revise any amalgamated area formed under this Lease by expansion or contraction or both. Lessee may dissolve any amalgamated area at any time and document such dissolution by recording an instrument in accordance with applicable law or agency order. Lessee shall have the right to negotiate, on behalf of and as agent for Lessor, any unit, amalgamation, storage or operating agreements with respect to amalgamation of reservoir or pore space interests underlying the Leased Premises or the operation of any amalgamated areas formed under such agreements and Lessor shall ratify any such agreements upon Lessee's request. To the extent any of the terms of such agreements conflict with the terms of this Lease, the terms of such agreements

shall control and the provisions of this Lease shall be deemed modified to conform to the terms, conditions, and provisions of any such agreements which are approved by the Commission.

7. Lessee Obligations. Lessee shall have no obligation, express or implied, to begin, prosecute or continue storage operations in, upon or under the Leased Premises, or store and/or sell or use all or any portion of the gaseous substances stored thereon. The timing, nature, manner and extent of Lessee's operations, if any, under this Lease shall be at the sole discretion of Lessee. All obligations of Lessee are expressed herein, and there shall be no covenants implied under this Lease, it being agreed that all amounts paid hereunder constitute full and adequate consideration for this Lease.

8. Ownership. Lessee shall at all times be the owner of (i) the carbon dioxide and other gaseous substances stored in the Reservoirs or any Amalgamated Reservoirs, and (ii) all Facilities constructed or installed by Lessee on the Leased Premises. Lessee shall have the right, but not the obligation, at any time during this Lease to remove all or any portion of the property or fixtures placed by Lessee on the Lease Premises. Notwithstanding the foregoing, title to the storage facility and to the stored carbon dioxide or other gaseous substances shall be transferred to the State of North Dakota upon issuance of a certificate of project completion by the Commission in accordance with Chapter 38-22 of the North Dakota Century Code.

9. Minerals, Oil and Gas. This lease is not intended to grant or convey, nor does it grant or convey, any right to or obligation for lessee to explore for or produce minerals, including oil and gas, that may exist on or under the leased premises.

10. Surrender of Leased Premises. Lessee shall have the right, but not the obligation, at any time from time to time to execute and deliver to Lessor a surrender and/or release covering all or any part of the Leased Premises for which the Reservoirs are not being utilized for storage as set forth herein, and upon delivery of such surrender and/or release to Lessor this Lease shall terminate as to such lands, and Lessee shall be released from all further obligations and duties as to the lands so surrendered and/or released, including, without limitation, any obligation to make payments provided for herein, except obligations accrued as of the date of the surrender and/or release. Lessee shall be able to surrender any and or all of the Leased Premises if not utilizing the Reservoirs located thereunder.

11. Hold Harmless and Indemnification. The Lessee agrees to defend, indemnify, and hold harmless Lessor from any claims by any person that are a direct result of the Lessee's use of the Leased Premises or Reservoirs. Notwithstanding the foregoing, such indemnity/hold harmless obligation excludes (i) any claim or cause of action, or alleged or threatened claim or cause of action, damage, judgment, interest, penalty or other loss arising or resulting from the negligence or intentional acts of Lessor or Lessor's agents, invitees, or licensees; or third parties, and (ii) any claim for exemplary, punitive, special or consequential damages claimed by Lessor. Lessee further accepts liability and indemnifies Lessor for reasonable costs, expenses and attorneys' fees incurred in establishing and litigating the indemnification coverage provided above. The legal defense provided by Lessee to the Lessor under this paragraph must be free of any conflicts of interest even if this requires Lessee to retain separate legal counsel for Lessor.

12. Hazardous Substances. Lessee shall have no liability for any regulated hazardous substances located on the Leased Premises prior to the Effective Date or placed in, on or about the Leased

Premises by Lessor or any third-party on or after the Effective Date, and nothing in this Lease shall be construed to impose upon Lessee any obligation for the removal of such regulated hazardous substances. As used herein, "hazardous substances" shall have the meaning set forth in the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) and any amendments thereto, or any other local, state or federal statutes.

13. Termination. A material violation or default of any terms of this Lease by Lessee shall be grounds for termination of the Lease. Lessor shall provide Lessee written notice of violation or default and Lessee shall have sixty (60) days after receipt of said notice to substantially cure such violations or defaults. If Lessee fails to substantially cure such violations or defaults within the 60-day cure period, Lessor may terminate the Lease; *provided that*, if it is not reasonably possible to cure such violations or defaults within the 60-day cure period, Lessee shall have additional time as is reasonably necessary to cure such violations or defaults provided Lessee has commenced its efforts to cure within the initial sixty (60) day period and thereafter diligently pursues such cure. Lessee may terminate the lease with thirty (30) days written notice to Lessor. Upon termination of this Lease, Lessee shall have one hundred eighty (180) days to remove all facilities and property (except for carbon dioxide or other incidental gaseous substances which have been injected into the Reservoirs) of Lessee located on the Leased Premises.

14. Taxes. Lessee shall pay all taxes, if any, levied against its personal property or on its improvements to the Leased Premises. Lessor shall pay for all real estate taxes and other assessments levied upon the Leased Premises. Lessee shall have the right to pay all taxes, assessments and other fees on behalf of Lessor and to deduct the amount so paid from other payments due to Lessor hereunder.

15. Conduct of Operations. In conducting its operations hereunder, Lessee shall use its best efforts to comply with all applicable laws, rules and regulations and ordinances pertaining thereto. Lessee reserves and shall have the right to challenge and/or appeal any law, ruling, regulation, order or other determination and to carry on its operations in accordance with Lessee's interpretation of the same, pending final determination.

16. Force Majeure. Should Lessee be prevented from complying with any express covenant of this Lease, from utilizing the Lease Premises for underground storage purposes by reason of scarcity of or an inability to obtain or to use equipment or material or failure or breakdown of equipment, or by operation of force majeure, any federal or state law or any order, rule or regulation of governmental authority, then while so prevented, Lessee's obligation to comply with such covenant shall be suspended and this Lease shall be extended while and so long as Lessee is prevented by any such cause from utilizing the property for underground storage purposes and the time while Lessee is so prevented shall not be counted against Lessee, anything in this Lease to the contrary notwithstanding.

17. Warranty of Title. Lessor represents and warrants to Lessee that Lessor is the owner of the surface of the Leased Premises and the pore space located thereunder. Lessor hereby warrants and agrees to defend title to the Leased Premises and the pore space located thereunder and Lessor hereby agrees that Lessee, at its option, shall have the right to discharge any tax, mortgage, or other lien upon the Leased Premises, and in the event Lessee does so, Lessee shall be subrogated to such lien with the right to enforce the same and apply royalty payments or any other payments due to Lessor toward satisfying the same.

18. Quiet Enjoyment. Lessor shall have the quiet use and enjoyment of the Leased Premises in accordance with the terms of this Lease. Lessor's activities and any grant of rights Lessor makes to any person or entity, whether located on the Leased Premises or elsewhere, shall not interfere with the rights granted to Lessee hereunder.

19. Environmental Incentives and Tax Credits. Lessee shall be the owner of (i) any and all credits, benefits, emissions reductions, offsets, and allowances, howsoever entitled, attributable to Lessee's geologic storage operations, including any avoided emissions and the reporting rights related to these avoided emissions, such as 26 U.S.C. §45Q Tax Credits, and any other attributes of Lessee's ownership of the Facilities and Lessee's geologic storage operations ("Environmental Attributes"), and (ii) any and all credits, rebates, subsidies, payments or other incentives that relate to the use of technology incorporated into Lessee's geologic storage operations, environmental benefits of such operations, or other similar programs available from any regulated entity or any governmental authority ("Environmental Incentives"). Lessee is further entitled to the benefit of any and all (a) investment tax credits, (b) production tax credits, (c) credits under 26 U.S.C. §45Q credits, and (d) similar tax credits or grants under federal, state or local law relating to Lessee's geologic storage operations ("Tax Credits"). Lessor shall (i) cooperate with Lessee in obtaining, securing and transferring all Environmental Attributes and Environmental Incentives and the benefit of all Tax Credits, and (ii) shall allow Lessee to take any actions necessary to install additional equipment on the Facilities to comply with all monitoring and reporting obligations, and allow Lessee's personnel to enter the premises and collect any data Lessee requires to satisfy its obligations required in connection with obtaining Tax Credits and Environmental Attributes. Lessor shall not be obligated to incur any out-of-pocket costs or expenses in connection with such actions unless reimbursed by Lessee. If any Environmental Incentives are paid directly to Lessor, Lessor shall immediately pay such amounts over to Lessee.

20. Financing. Lessor acknowledges and agrees that Lessee may, at Lessee's own expense, seek equity or debt financing or refinancing in connection with Lessee's geologic storage operations, including any construction financing, whether on a project basis or a portfolio basis ("Financing"). In order to facilitate the Financing, Lessor agrees, at Lessee's expense, to cooperate and to execute all documents including, if applicable, any title policy affidavits reasonably necessary to obtain the Financing, provided that the foregoing shall not require Lessor to execute any documents that (a) result in Lessor incurring liabilities or obligations not contemplated in this Lease, or (b) encumber Lessor's fee interest in the Leased Premises, except to the extent any such interest is covered by this Lease. Lessor agrees that Lessor shall execute and deliver to Lessee any documents reasonably required by a financing party within five (5) business days after presentation of said documents by Lessee. Lessee shall have the absolute right in its sole and exclusive discretion, without obtaining the consent of Lessor, to mortgage, encumber, hypothecate, pledge, transfer, assign, or collateral assign, to one or more financing parties any or all of the rights granted to Lessee hereunder and/or any or all right or interest of Lessee in the Leased Premises or in any or all of the Facilities.

21. Assignment. The rights of either Party hereto may be assigned in whole or part. The assigning party shall provide written notice of any assignment within sixty (60) days after such assignment has become effective; *provided, however,* that an assigning party's failure to deliver written notice of assignment within such 60-day period shall not be deemed a breach of this Lease unless such

failure is willful and intentional. The Lessor's consent shall not be required for an assignment by the Lessee of this Lease, whether by way of a collateral assignment to its financiers or otherwise.

22. Change of Ownership. Lessee understands that this Lease runs with the land and transfers to any new owner of the surface acres. No change of ownership in the Leased Premises or assignment of Lessor's rights hereunder shall be binding on the Lessee for purpose of making payments to Lessor hereunder until the date Lessor, or Lessor's successors or assigns, furnishes Lessee the recorded original or a certified copy of the instrument evidencing the change in ownership or assignment.

23. Notices. All notices required to be given under this Lease shall be in writing and addressed to the respective Party at the addresses set forth at the beginning of this Lease unless otherwise directed by either Party.

24. No Waiver. The failure of either Party to insist in any one or more instances upon strict performance of any of the provisions of this Lease or to take advantage of any of its rights hereunder shall not be construed as a waiver of any such provision or the relinquishment of any such rights, but the same shall continue and remain in full force and effect.

25. Notice of Lease. This Lease shall not be recorded in the real property records. Lessee shall cause a memorandum of this Lease to be recorded in the real property records of the county or counties in which any portion of the Leased Premises are situated. A recorded copy of said memorandum shall be furnished to Lessor within thirty (30) days of recording.

26. Confidentiality. Lessor shall maintain in the strictest confidence, for the benefit of Lessee, all information pertaining to the compensation paid under this Lease, any information regarding Lessee and its business or operations on the Leased Premises or on any other lands, the capacity and suitability of any Reservoir or Amalgamated Reservoir, and any other information that is deemed proprietary or that Lessee requests or identifies to be held confidential, in each such case whether disclosed by Lessee or discovered by Lessor.

27. Counterparts. This Lease may be executed in any number of counterparts, each of which, when executed and delivered, shall be an original, but all of which shall collectively constitute one and the same instrument.

28. Severability. If any provision of this Lease is found to be invalid, illegal or unenforceable in any respect, such provision shall be deemed to be severed from this Agreement, and the validity, legality and enforceability of the remaining provisions contained herein shall not in any way be affected or impaired thereby.

29. Governing Law. This Lease shall be governed by, construed and enforced in accordance with the laws of the State of North Dakota and the Parties hereby submit to the jurisdiction of the state or federal courts located in the State of North Dakota.

30. Further Assurances. Each Party will execute and deliver all documents, provide all information, and take or forbear from all actions as may be necessary or appropriate to achieve the purposes of this Lease, including without limitation executing a memorandum of this Lease and all documents required to obtain any necessary government approvals.

31. Entire Agreement. This Lease constitutes the entire agreement between the Parties and supersedes all prior negotiations, undertakings, notices, memoranda and agreement between the Parties, whether oral or written, with respect to the subject matter hereof. This Lease may only be amended or modified by a written agreement duly executed by Lessor and Lessee.

32. Electronic Signatures. This Lease, and any amendments hereto, to the extent signed and delivered by means of electronic transmission in portable document format (pdf) or by DocuSign or similar electronic signature process, shall be treated in all manner and respects as an original contract and shall be considered to have the same binding legal effect as if it were the original signed version thereof delivered in person.

IN WITNESS WHEREOF, the Parties have executed this Lease effective for all purposes as of the Effective Date.

**LESSOR: Irma M. Bitner**

By: _____

**Effective Date:**_____

**LESSEE:**

**Dakota Gasification Company**

By: _____
**Dale Johnson, VP & Plant Manager**

NORTH DAKOTA

OIL AND GAS DIVISION

| | | |
|---|---|---|
| In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND. | : | Case No(s). 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880 |
| In re application of Summit Carbon Storage #1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, and 35, Township 141 | : | |

INDUSTRIAL COMMISSION
STATE OF NORTH DAKOTA
DATE 6/13/24 CASE NO. 30869-880
Introduced By Braaten
Exhibit LO-54
Identified By Stockness

EXHIBIT
tabbies
LO-54
30869-30880

BLF-000001

North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re application of Summit Carbon Storage #1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township:

140 North, Range 88 West and :
Sections 4, 5, 6, and 7, Township :
140 North, Range 87 West, Mercer, :
Morton, and Oliver Counties, ND, :
subject to the application of :
Summit Carbon Storage #1, LLC for :
the geologic storage of carbon :
dioxide in the Broom Creek :
Formation. :

In re application of Summit :
Carbon Storage #2, LLC requesting :
consideration for the geologic :
storage of carbon dioxide in the :
Broom Creek Formation from the :
Midwest Carbon Express Pipeline :
in the storage facility located in:
Sections 27, 28, 29, 32, 33, 34, :
and 35, Township 143 North, Range :
88 West, Sections 1, 2, 3, 4, 5, :
6, 7, 8, 9, 10, 11, 12, 13, 14, :
15, 16, 17, 18, 19, 20, 21, 22, :
23, 24, 25, 26, 27, 28, 29, 30, :
32, 33, 34, 35, and 36, Township :
142 North, Range 88 West, Sections:
5, 6, 7, 8, 17, 18, 19, 20, 29, :
30, and 31, Township 142 North, :
Range 87 West, and Sections 1, 2, :
and 3, Township 141 North, Range :
88 West, Mercer and Oliver :
Counties, ND. :

In re application of Summit :
Carbon Storage #2, LLC to :
consider the amalgamation of the :
storage reservoir pore space, in :
which the Commission may require :
that the pore space owned by :
nonconsenting owners be included :
in the geologic storage, as :
required to operate the Summit :
Carbon Storage #2, LLC storage :
facility located in Sections 27, :
28, 29, 32, 33, 34, and 35, :
Township 143 North, Range 88 West,:
Sections 1, 2, 3, 4, 5, 6, 7, 8, :
9, 10, 11, 12, 13, 14, 15, 16, 17,:
18, 19, 20, 21, 22, 23, 24, 25, :

26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.

In re application of Summit Carbon Storage #2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.

In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29,

30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.

In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the

Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.

In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.

In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

TRANSCRIPT OF PROCEEDINGS

Taken At
100 North Fourth Street
Bismarck, North Dakota
June 6, 2024

(APPEARANCES AS NOTED HEREIN)

A P P E A R A N C E S

MR. DERRICK BRAATEN
MS. DESIRAE ZASTE, Paralegal and Videographer
Braaten Law Firm
Attorneys at Law
Suite 100
109 North Fourth Street
Bismarck, North Dakota 58501

FOR THE INTERVENORS, THE SWENSON LIVING TRUST, BAUMAN, GERVING, HAUPT, JOCHIM, KRAFT, LIEBELT, MAIZE, METZ, RUST, AND SMITH.

---

# C O N T E N T S


CERTIFICATE OF COURT REPORTER..... 18

---

DEPOSITION EXHIBITS:

| No. | Description | First Referenced |
|---|---|---|
| 1 | Landowners Notice of 30(b)(6) Deposition of Summit Carbon Solutions..... | 11 |
| 2 | Intervenor Landowners' Amended Notice of 30(b)(6) Deposition of Summit Carbon Solutions..... | 12 |
| 3 | June 4, 2024, Letter..... | 12 |
| 4 | Intervenor Landowners' Second Amended Notice of 30(b)(6) Deposition of Summit Carbon Storage #1, LLC..... | 13 |
| 5 | Intervenor Landowners' Second Amended Notice of 30(b)(6) Deposition of Summit Carbon Storage #2, LLC..... | 13 |
| 6 | Intervenor Landowners' Second Amended Notice of 30(b)(6) Deposition of Summit Carbon Storage #3, LLC..... | 13 |
| 7 | June 5, 2024, Letter..... | 14 |
| 8 | June 5 and 6, 2024, Email String... | 14 |
| 9 | May 2, 2024, Letter..... | 15 |
| 10 | May 9, 2024, Email String..... | 16 |


---

10

(Pursuant to Notice to Take 30(b)(6) Deposition of **SUMMIT CARBON STORAGE #1, LLC, SUMMIT CARBON STORAGE #2, LLC, and SUMMIT CARBON STORAGE #3, LLC**, in the above-entitled cause, the following proceeding came on for taking before Stephanie A. Smith, a Registered Professional Reporter and a Notary Public in and for the State of North Dakota, at the Braaten Law Firm, 109 North Fourth Street, Suite 100, in the City of Bismarck, County of Burleigh, State of North Dakota, on the 6th day of June, 2024, commencing at 9:02 a.m., counsel appearing on behalf of the respective parties as hereinbefore indicated:)

---

(The following proceedings were had and made of record:)

THE VIDEOGRAPHER: This is the audiovisual 30(b)(6) deposition of Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC, being taken on behalf of intervenor landowners in the matter of the applications of Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC, Case Numbers 30869, 30870, 30871, 30872, 30873, 30874, 30875, 30876, 30877, 30878,

11

30879 and 30880 before the Oil and Gas Division of the North Dakota Industrial Commission.

This is being taken on behalf of the intervenor landowners represented by Braaten Law Firm. This deposition is being held on June 6, 2024, at the offices of Braaten Law Firm in Bismarck, North Dakota, commencing at 9:02 a.m.

My name is Desirae Zaste of Braaten Law Firm, and I am recording the deposition supplementally. The officer, court reporter and notary public is Stephanie Smith of Emineth & Associates.

Will counsel please state their appearances.

MR. BRAATEN: Derrick Braaten with Braaten Law Firm on behalf of the intervenors, including the Swenson Living Trust and other intervenors granted intervenor status in the proceeding by the Industrial Commission.

I am going to put a few documents down on record to document the fact that the deponent is not going to appear for the deposition today.

Okay. We have marked as Deposition Exhibit No. 1 Landowners Notice of 30(b)(6) Deposition. This is the original deposition notice

12

with topics dated May 9, 2024, and was served on Lawrence Bender of Fredrikson & Byron.

We have now marked Deposition Exhibit 2 electronically for the record. Deposition Exhibit 2 is Intervenor Landowners' Amended Notice of 30(b)(6) Deposition, which was dated May 31, 2024, and served once intervention was granted to Intervenors Swenson Living Trust, Bauman, Gerving, Haupt, Jochim, Kraft, Liebelt, Maize, Metz, Rust and Smith, given an objection from Summit's counsel that intervenors could not serve a deposition notice until officially granted party status. Therefore, immediately upon being granted party status, the notice was re-served with the topics not changing at all.

We have now electronically marked Exhibit No. 3 to the deposition, which is a letter dated June 4, 2024, from Lawrence Bender to Derrick Braaten. In that letter Mr. Bender indicates that the notice was served upon Summit Carbon Solutions, LLC, and he indicates that that entity is not a party to the proceeding and the three subsidiary entities, Summit Carbon Storage #1, #2 and #3, LLC, are the actual parties and, therefore, Summit Carbon Solutions, LLC, would require a subpoena.

13

We -- the intervenors disagree given that the application was submitted for those three subsidiary entities by Summit Carbon Solutions, LLC, in care of Summit Carbon Solutions, LLC.

We will now mark three exhibits, Exhibit Nos. 4, 5 and 6. Beginning with 4, these are three amended notices of deposition, one each directed at Summit Carbon Storage #1, LLC; an amended notice directed at Summit -- Summit Carbon Storage #2, LLC, which is now marked as Exhibit 5 to the deposition; and an amended notice directed to Summit Carbon Storage #3, LLC, which is now electronically marked as Exhibit No. 6 to the deposition.

These three notices were served within a couple hours of receiving Mr. Bender's letter indicating that he believed the Summit Carbon Solutions entity would require a subpoena. We believe that it is clear to who these notices were directed.

Throughout all of these amended deposition notices there was not a single change to any of the topics that had been listed for this 30(b)(6) deposition.

Following service of the [illegible]

14

deposition notices to Summit Carbon Storage #1, #2 and #3, we received a letter that has now been marked electronically as Exhibit No. 7. That letter is dated June 5 from Lawrence Bender to Derrick Braaten. That letter then sets out a number of additional objections that Mr. Bender and his client raised to the deposition notice. This letter was sent yesterday after close of business, and also advised -- in the last paragraph Mr. Bender states, "Ultimately, this letter is intended to inform you that because of the Intervenor Landowners' failure to comply with Rule 30, my clients do not intend to appear for the depositions tomorrow, June 6, 2024, as set forth in the Deposition Notices."

In response to that letter from Mr. Bender, I sent an email back to Mr. Bender that has now been electronically marked as Exhibit No. 8. That email responded to Mr. Bender's objections and let him know that I disagreed with all of those objections and particularly with the use of such objections to avoid a deposition.

Given that Mr. Bender and his clients have not filed any motions for protective order or otherwise taken any other actions to comply with

15

the notice in the Rules of Civil Procedure, we intend to seek to compel the deposition and to seek sanctions for the failure to appear.

In my email marked as Exhibit 8, I let Mr. Bender know that we intended to move forward with the deposition this morning, which is what we are doing right now, and I let him know that if there is no witness, I will put that on record and continue the deposition, which is what we intend to do.

To that email, I also attached two different attachments, one being a prior email as well as a prior letter that I sent to Mr. Bender offering to confer on these depositions in order to address any concerns he might have. We have electronically marked as Exhibit 9 one of those attachments, which is a letter dated May 2, 2024, from Derrick Braaten to Lawrence Bender, telling him that I would like to conduct a 30(b)(6) deposition of his client and that I am currently working on a topic list. I indicate that I intend to serve a couple rounds of written discovery and would like to take a 30(b)(6) deposition and asked Mr. Bender to sit down and confer and discuss coordination.

16

We also electronically marked as Exhibit No. 10 an email from Derrick Braaten to Lawrence Bender dated May 9, which was responding to the service of the 30(b)(6) deposition notice upon Mr. Bender. I indicated to Mr. Bender in that email that I scheduled the deposition to get a date down, and that I did try to look at Mr. Bender's schedule and his PSC hearings and other matters to find a date that I did not think he would have a conflict. I told him I am nonetheless open to rescheduling the deposition if there is another mutually agreeable date.

Other than the communications I've put on record in these exhibits from Mr. Bender, I have not received other communications from him in response to my numerous attempts over the course of the last month to provide notice, meet with and confer with Mr. Bender to conduct this deposition.

We will leave the record open for this deposition and continue the deposition while we file a motion to compel and seek sanctions for the failure to appear.

And with that we can go off the record.

THE VIDEOGRAPHER: This is the end of the audiovisual 30(b)(6) deposition of Summit Carbon

17

Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC, taken at the offices of Braaten Law Firm in Bismarck, North Dakota, on June 6, 2024.

We are off the video and off the record at 9:16 p.m. [sic], Central time.

MR. BRAATEN: And just to remain on record for one moment, I should have noted this, but we are going to leave the record open for the continuance of the deposition.

(Recessed at 9:17 a.m., Thursday, the 6th day of June, 2024.)

---

BLF-000011

CERTIFICATE OF COURT REPORTER

I, Stephanie A. Smith, a Registered Professional Reporter,

DO HEREBY CERTIFY that I recorded in shorthand the foregoing proceedings had and made of record at the time and place hereinbefore indicated.

I DO HEREBY FURTHER CERTIFY that the foregoing typewritten pages contain an accurate transcript of my shorthand notes then and there taken.

Dated at Bismarck, North Dakota, this 6th day of June, 2024.

_____

Stephanie A. Smith
Registered Professional Reporter

## 1

**1** [40] - 1:4, 1:8, 1:12, 1:15, 1:19, 1:21, 2:1, 2:5, 2:10, 2:14, 2:20, 2:24, 3:3, 3:10, 3:14, 3:23, 4:5, 4:13, 4:18, 4:23, 5:3, 5:15, 5:16, 5:18, 6:6, 6:7, 6:18, 6:20, 7:4, 7:5, 9:7, 9:13, 10:2, 10:18, 10:22, 11:24, 12:23, 13:8, 14:1, 17:1
**10** [15] - 1:10, 1:23, 2:12, 2:22, 3:11, 3:24, 4:14, 4:23, 5:17, 5:18, 6:7, 6:20, 7:6, 9:22, 16:2
**100** [3] - 7:19, 8:5, 10:9
**109** [2] - 8:6, 10:8
**11** [22] - 1:8, 1:10, 1:21, 1:23, 2:10, 2:12, 2:20, 2:22, 3:11, 3:24, 4:14, 4:23, 5:15, 5:17, 5:18, 6:6, 6:7, 6:19, 6:20, 7:4, 7:6, 9:8
**12** [23] - 1:8, 1:12, 1:21, 2:1, 2:10, 2:14, 2:20, 2:24, 3:11, 3:24, 4:14, 4:23, 5:16, 5:17, 5:19, 6:6, 6:8, 6:19, 6:20, 7:5, 7:6, 9:10, 9:11
**13** [20] - 1:8, 1:21, 2:10, 2:20, 3:11, 3:24, 4:14, 4:23, 5:16, 5:17, 5:19, 6:6, 6:8, 6:19, 6:20, 7:5, 7:6, 9:13, 9:16, 9:18
**14** [23] - 1:8, 1:10, 1:21, 1:23, 2:10, 2:12, 2:20, 2:22, 3:11, 3:24, 4:14, 4:24, 5:16, 5:17, 5:19, 6:6, 6:8, 6:19, 6:20, 7:5, 7:6, 9:19, 9:20
**140** [8] - 1:12, 1:13, 2:1, 2:2, 2:14, 2:15, 3:1, 3:2
**141** [12] - 1:9, 1:11, 1:22, 1:24, 2:11, 2:13, 2:21, 2:24, 3:15, 4:5, 4:18, 5:3
**142** [26] - 1:7, 1:20, 2:9, 2:20, 3:13, 3:14, 4:1, 4:3, 4:4, 4:16, 4:17, 5:1, 5:2, 5:16, 5:17, 5:20, 5:21, 6:6, 6:9, 6:10, 6:19, 6:22, 6:23, 7:5, 7:8, 7:9
**143** [13] - 3:10, 3:23, 4:13, 4:22, 5:12, 5:13, 5:15, 6:4, 6:5, 6:17, 6:18, 7:2, 7:4
**15** [17] - 1:8, 1:10, 1:21, 1:23, 2:10, 2:12, 2:20, 2:22, 3:11, 3:24, 4:14, 4:24, 5:19, 6:8, 6:20, 7:6, 9:21
**16** [13] - 1:10, 1:23, 2:12, 2:22, 3:11, 3:24, 4:14, 4:24, 5:19, 6:8, 6:20, 7:6, 9:22
**17** [21] - 1:10, 1:23, 2:12, 2:22, 3:11, 3:13, 3:24, 4:2, 4:3, 4:14, 4:16, 4:24, 5:2, 5:19, 5:21, 6:8, 6:10, 6:20, 6:22, 7:6, 7:8
**18** [22] - 1:10, 1:23, 2:12, 2:22, 3:11, 3:13, 3:24, 4:2, 4:3, 4:14, 4:16, 4:24, 5:2, 5:19, 5:21, 6:8, 6:10, 6:21, 6:23, 7:6, 7:8, 9:3
**19** [26] - 1:10, 1:23, 2:12, 2:22, 3:11, 3:13, 3:24, 4:2, 4:3, 4:14, 4:17, 4:24, 5:2, 5:12, 5:14, 5:19, 5:21, 6:4, 6:8, 6:10, 6:17, 6:21, 6:23, 7:3, 7:6, 7:8

## 2

**2** [44] - 1:9, 1:12, 1:22, 2:1, 2:11, 2:14, 2:22, 2:24, 3:6, 3:10, 3:14, 3:17, 3:21, 3:23, 4:5, 4:8, 4:9, 4:14, 4:18, 4:23, 5:3, 5:5, 5:15, 5:17, 5:18, 6:6, 6:7, 6:19, 6:20, 7:4, 7:6, 9:9, 9:16, 9:21, 10:3, 10:19, 10:23, 12:3, 12:5, 12:23, 13:9, 14:1, 15:17, 17:1
**20** [26] - 1:10, 1:23, 2:12, 2:23, 3:11, 3:13, 3:24, 4:2, 4:4, 4:15, 4:17, 4:24, 5:2, 5:12, 5:14, 5:19, 5:21, 6:4, 6:8, 6:10, 6:17, 6:21, 6:23, 7:3, 7:7, 7:9
**2024** [16] - 7:20, 9:11, 9:19, 9:20, 9:21, 9:22, 10:11, 11:6, 12:1, 12:7, 12:18, 14:14, 15:17, 17:4, 17:12, 18:14
**21** [17] - 1:10, 1:23, 2:12, 2:23, 3:11, 3:24, 4:15, 4:24, 5:13, 5:14, 5:19, 6:5, 6:8, 6:17, 6:21, 7:3, 7:7
**22** [16] - 1:8, 1:10, 1:21, 1:23, 2:10, 2:12, 2:21, 2:23, 3:11, 3:24, 4:15, 4:24, 5:19, 6:8, 6:21, 7:7
**23** [16] - 1:8, 1:10, 1:21, 1:24, 2:10, 2:12, 2:21, 2:23, 3:12, 3:24, 4:15, 4:24, 5:19, 6:8, 6:21, 7:7
**24** [16] - 1:8, 1:21, 2:10, 2:21, 3:12, 3:24, 4:15, 4:24, 5:16, 5:17, 6:6, 6:8, 6:19, 6:21, 7:5, 7:7
**25** [16] - 1:8, 1:10, 1:22, 1:24, 2:10, 2:12, 2:21, 2:23, 3:12, 3:24, 4:15, 4:24, 5:19, 6:8, 6:21, 7:7
**26** [17] - 1:8, 1:10, 1:22, 1:24, 2:10, 2:12, 2:21, 2:23, 3:12, 4:1, 4:15, 4:24, 5:19, 6:8, 6:21, 7:7
**27** [16] - 1:10, 1:24, 2:13, 2:23, 3:9, 3:12, 3:22, 4:1, 4:12, 4:15, 4:22, 4:24, 5:19, 6:8, 6:21, 7:7
**28** [21] - 1:10, 1:24, 2:13, 2:23, 3:9, 3:12, 3:22, 4:1, 4:12, 4:15, 4:22, 4:24, 5:13, 5:14, 5:20, 6:5, 6:9, 6:17, 6:21, 7:3, 7:7
**29** [26] - 1:11, 1:24, 2:13, 2:23, 3:9, 3:12, 3:13, 3:22, 4:1, 4:2, 4:4, 4:12, 4:15, 4:17, 4:22, 4:24, 5:2, 5:13, 5:14, 5:20, 6:5, 6:9, 6:17, 6:21, 7:3, 7:7

## 3

**3** [36] - 1:9, 1:12, 1:23, 2:1, 2:11, 2:14, 2:22, 2:24, 3:10, 3:15, 3:23, 4:5, 4:14, 4:18, 4:23, 5:3, 5:9, 5:17, 5:18, 5:23, 6:3, 6:7, 6:13, 6:20, 7:6, 7:10, 9:11, 9:18, 10:4, 10:20, 10:24, 12:17, 12:23, 13:12, 14:2, 17:2
**30** [23] - 1:11, 1:24, 2:13, 2:23, 3:12, 3:14, 4:1, 4:2, 4:4, 4:15, 4:17, 5:1, 5:2, 5:13, 5:14, 5:20, 6:5, 6:9, 6:17, 6:21, 7:3, 7:7, 14:13
**30(b)(6** [14] - 9:7, 9:9, 9:12, 9:15, 9:17, 10:1, 10:18, 11:24, 12:6, 13:23, 15:19, 15:23, 16:4, 16:25
**30869** [2] - 1:3, 10:24
**30870** [2] - 1:4, 10:24
**30871** [2] - 1:4, 10:24
**30872** [2] - 1:5, 10:25
**30873** [2] - 1:5, 10:25
**30874** [2] - 1:6, 10:25
**30875** [2] - 1:6, 10:25
**30876** [2] - 1:7, 10:25
**30877** [2] - 1:7, 10:25
**30878** [2] - 1:8, 10:25
**30879** [2] - 1:8, 11:1
**30880** [2] - 1:9, 11:1
**31** [19] - 1:7, 1:11, 1:20, 1:24, 2:9, 2:13, 2:19, 2:23, 3:14, 4:2, 4:4, 4:17, 5:2, 5:13, 5:14, 6:5, 6:17, 7:3, 12:6
**32** [25] - 1:7, 1:11, 1:20, 1:24, 2:9, 2:13, 2:19, 2:23, 3:9, 3:12, 3:22, 4:1, 4:13, 4:15, 4:22, 5:1, 5:13, 5:14, 5:20, 6:5, 6:9, 6:17, 6:21, 7:3, 7:7
**33** [25] - 1:7, 1:11, 1:20, 1:24, 2:9, 2:13, 2:19, 2:23, 3:9, 3:12, 3:22, 4:1, 4:13, 4:15, 4:22, 5:1, 5:13, 5:14, 5:20, 6:5, 6:9, 6:18, 6:21, 7:3, 7:7
**34** [25] - 1:7, 1:11, 1:20, 1:24, 2:9, 2:13, 2:19, 2:23, 3:9, 3:12, 3:22, 4:1, 4:13, 4:15, 4:22, 5:1, 5:13, 5:14, 5:20, 6:5, 6:9, 6:18, 6:21, 7:3, 7:7
**35** [25] - 1:8, 1:11, 1:22, 1:24, 2:10, 2:13, 2:21, 2:23, 3:10, 3:12, 3:22, 4:1, 4:13, 4:15, 4:22, 5:1, 5:13, 5:15, 5:20, 6:5, 6:9, 6:18, 6:22, 7:4, 7:7
**36** [17] - 1:8, 1:22, 2:11, 2:21, 3:12, 4:1, 4:16, 5:1, 5:12, 5:13, 5:15, 6:4, 6:5, 6:16, 6:18, 7:2, 7:4

## 4

**4** [22] - 1:9, 1:13, 1:23, 2:2, 2:11, 2:15, 2:22, 3:1, 3:10, 3:23, 4:14, 4:23, 5:17, 5:18, 6:7, 6:20, 7:6, 9:11, 9:12, 12:18, 13:6

## 5

**5** [28] - 1:9, 1:13, 1:23, 2:2, 2:11, 2:15, 2:22, 3:1, 3:10, 3:13, 3:23, 4:2, 4:3, 4:14, 4:16, 4:23, 5:2, 5:17, 5:18, 6:7, 6:20, 7:6, 9:14, 9:19, 9:20, 13:6, 13:10, 14:4
**58501** [1] - 8:6

## 6

**6** [34] - 1:9, 1:13, 1:23, 2:2, 2:11, 2:15, 2:22, 3:1, 3:11, 3:13, 3:23, 4:2, 4:3, 4:14, 4:16, 4:23, 5:2, 5:17, 5:18, 5:21, 6:7, 6:10, 6:20, 6:22, 7:6, 7:8, 7:20, 9:17, 9:20, 11:5, 13:6, 13:13, 14:14, 17:4
**6th** [3] - 10:10, 17:11, 18:13

## 7

**7** [28] - 1:9, 1:13, 1:23, 2:2, 2:12, 2:15, 2:22, 3:1, 3:11, 3:13, 3:23, 4:2, 4:3, 4:14, 4:16, 4:23, 5:2, 5:17, 5:18, 5:21, 6:7, 6:10, 6:20, 6:22, 7:6, 7:8, 9:19, 14:3

## 8

**8** [21] - 1:9, 1:23, 2:12, 2:22, 3:11, 3:13, 3:23, 4:2, 4:3, 4:14, 4:16, 4:23, 5:2, 5:17, 5:18, 6:7, 6:20, 7:6, 9:20, 14:19, 15:4
**85** [4] - 5:22, 6:10, 6:23, 7:9
**86** [8] - 5:15, 5:20, 6:6, 6:9, 6:18, 6:22, 7:4, 7:8
**87** [26] - 1:7, 1:11, 1:13, 1:21, 2:1, 2:3, 2:10, 2:14, 2:15, 2:20, 2:24, 3:2, 3:14, 4:4, 4:17, 5:3, 5:12, 5:14, 5:16, 5:18, 6:4, 6:7, 6:17, 6:19, 7:3, 7:5
**88** [21] - 1:9, 1:12, 1:22, 2:2, 2:11, 2:14, 2:21, 3:1, 3:10, 3:13, 3:15, 3:23, 4:2, 4:3, 4:5, 4:13, 4:16, 4:18, 4:23, 5:1, 5:4

## 9

**9** [18] - 1:9, 1:23, 2:12, 2:22, 3:11, 3:24, 4:14, 4:23, 5:17, 5:18, 6:7, 6:20, 7:6, 9:21, 9:22, 12:1, 15:16, 16:3
**9:02** [2] - 10:11, 11:7
**9:16** [1] - 17:6
**9:17** [1] - 17:11

## A

**a.m** [3] - 10:11, 11:7, 17:11
**above-entitled** [1] - 10:4
**accurate** [1] - 18:10
**actions** [1] - 14:25
**actual** [1] - 12:24
**additional** [1] - 14:6
**address** [1] - 15:15
**advised** [1] - 14:9
**agreeable** [1] - 16:12
**amalgamation** [3] - 1:16, 3:18, 5:24
**Amended** [5] - 9:9, 9:12, 9:15, 9:17, 12:5
**amended** [5] - 13:7, 13:8, 13:11, 13:21, 13:25
**amount** [3] - 2:6, 4:10, 6:14
**AND** [2] - 1:2, 8:10
**appear** [4] - 11:22, 14:13, 15:3, 16:22
**appearances** [1] - 11:14
**APPEARANCES** [1] - 7:23
**appearing** [1] - 10:12
**application** [14] - 1:3, 1:15, 2:5, 3:3, 3:6, 3:17, 4:7, 4:8, 5:5, 5:8, 5:23, 6:12, 7:10, 13:2
**applications** [1] - 10:22
**AS** [1] - 7:23
**Associates** [1] - 11:12
**attached** [1] - 15:11
**attachments** [2] - 15:12, 15:17
**attempts** [1] - 16:16
**Attorneys** [1] - 8:5
**audiovisual** [2] - 10:17, 16:25
**avoid** [1] - 14:22

## B

**Bauman** [1] - 12:8
**BAUMAN** [1] - 8:8
**beginning** [1] - 13:6
**behalf** [4] - 10:12, 10:20, 11:3, 11:16
**Bender** [18] - 12:2, 12:18, 12:19, 14:4, 14:6, 14:10, 14:17, 14:23, 15:5, 15:13, 15:18, 15:24, 16:3, 16:5, 16:14, 16:18
**Bender's** [3] - 13:16, 14:19, 16:7
**Bismarck** [6] - 7:19, 8:6, 10:9, 11:7, 17:3, 18:13
**BRAATEN** [3] - 8:3, 11:15, 17:7
**Braaten** [12] - 8:4, 10:8, 11:4, 11:6, 11:8, 11:15, 12:19, 14:5, 15:18, 16:2, 17:3
**Broom** [12] - 1:5, 2:4, 2:16, 3:4, 3:8, 4:6, 4:19, 5:6, 5:10, 6:11, 6:24, 7:11
**Burleigh** [1] - 10:10
**business** [1] - 14:8
**Byron** [1] - 12:2

## C

**Carbon** [46] - 1:4, 1:6, 1:15, 1:19, 2:5, 2:8, 3:3, 3:6, 3:8, 3:17, 3:21, 4:8, 4:9, 4:11, 5:5, 5:9, 5:11, 5:23, 6:3, 6:13, 6:15, 7:10, 9:7, 9:10, 9:13, 9:15, 9:18, 10:18, 10:19, 10:20, 10:22, 10:23, 12:20, 12:23, 12:25, 13:3, 13:4, 13:8, 13:9, 13:12, 13:17, 14:1, 16:25, 17:1, 17:2
**CARBON** [3] - 10:2, 10:3
**carbon** [9] - 1:5, 2:7, 3:4, 3:7, 4:11, 5:6, 5:10, 6:15, 7:11
**care** [1] - 13:4
**Case** [2] - 1:3, 10:24
**Central** [1] - 17:6
**CERTIFICATE** [2] - 9:3, 18:1
**CERTIFY** [2] - 18:5, 18:9
**change** [1] - 13:22
**changing** [1] - 12:15
**City** [1] - 10:9
**Civil** [1] - 15:1
**clear** [1] - 13:19
**client** [2] - 14:7, 15:20
**clients** [2] - 14:13, 14:23
**close** [1] - 14:8
**commencing** [2] - 10:11, 11:7
**Commission** [10] - 1:17, 2:6, 3:19, 4:9, 4:20, 6:1, 6:13, 7:1, 11:2, 11:19
**communications** [2] - 16:13, 16:15
**compel** [2] - 15:2, 16:21
**comply** [2] - 14:12, 14:25
**concerns** [1] - 15:15
**conduct** [2] - 15:19, 16:18
**confer** [3] - 15:14, 15:24, 16:18
**conflict** [1] - 16:10
**consider** [7] - 1:16, 2:18, 3:18, 4:8, 4:21, 5:23, 7:1
**consideration** [3] - 1:4, 3:7, 5:9
**contain** [1] - 18:10
**continuance** [1] - 17:10
**continue** [2] - 15:9, 16:20
**coordination** [1] - 15:25
**counsel** [3] - 10:11, 11:13, 12:10
**Counties** [8] - 1:14, 2:3, 2:16, 3:2, 3:16, 4:6, 4:19, 5:4
**County** [4] - 5:22, 6:11, 6:24, 10:9
**county** [1] - 7:9
**couple** [2] - 13:16, 15:22
**course** [1] - 16:16
**COURT** [2] - 9:3, 18:1
**court** [1] - 11:10
**Creek** [12] - 1:5, 2:4, 2:16, 3:4, 3:8, 4:6, 4:19, 5:6, 5:10, 6:11, 6:24, 7:11

## D

**Dakota** [8] - 7:19, 8:6, 10:7, 10:10, 11:2, 11:7, 17:3, 18:13
**DAKOTA** [1] - 1:1
**date** [3] - 16:6, 16:9, 16:12
**dated** [6] - 12:1, 12:6, 12:17, 14:4, 15:17, 16:3
**Dated** [1] - 18:13
**deponent** [1] - 11:21
**DEPOSITION** [1] - 9:5
**deposition** [28] - 10:18, 11:5, 11:9, 11:22, 11:25, 12:11, 12:17, 13:7, 13:11, 13:14, 13:21, 13:24, 14:1, 14:7, 14:22, 15:2, 15:6, 15:9, 15:20, 15:23, 16:4, 16:6, 16:11, 16:18, 16:20, 16:25, 17:10
**Deposition** [12] - 9:7, 9:9, 9:13, 9:15, 9:18, 10:2, 11:23, 11:25, 12:3, 12:4, 12:6, 14:15
**depositions** [2] - 14:14, 15:14
**DERRICK** [1] - 8:3
**Derrick** [5] - 11:15, 12:18, 14:5, 15:18, 16:2
**Description** [1] - 9:6
**Desirae** [1] - 11:8
**DESIRAE** [1] - 8:3
**determining** [3] - 2:6, 4:10, 6:14
**different** [1] - 15:12
**dioxide** [9] - 1:5, 2:7, 3:4, 3:7, 4:11, 5:6, 5:10, 6:15, 7:11
**directed** [4] - 13:7, 13:9, 13:11, 13:20
**disagree** [1] - 13:1
**disagreed** [1] - 14:20
**discovery** [1] - 15:22
**discuss** [1] - 15:24
**DIVISION** [1] - 1:2
**Division** [1] - 11:1
**DO** [2] - 18:5, 18:9
**document** [1] - 11:21
**documents** [1] - 11:20
**down** [3] - 11:20, 15:24, 16:7

## E

**electronically** [7] - 12:4, 12:16, 13:13, 14:3, 14:18, 15:16, 16:1


BLF-000014

**email** [7] - 14:17, 14:19, 15:4, 15:11, 15:12, 16:2, 16:6
**Email** [2] - 9:20, 9:22
**Emineth** [1] - 11:11
**enact** [2] - 5:6, 7:12
**end** [1] - 16:24
**entities** [2] - 12:23, 13:3
**entitled** [1] - 10:4
**entity** [2] - 12:21, 13:18
**establishing** [3] - 2:18, 4:21, 7:1
**Exhibit** [12] - 11:24, 12:3, 12:5, 12:16, 13:5, 13:10, 13:13, 14:3, 14:18, 15:4, 15:16, 16:1
**EXHIBITS** [1] - 9:5
**exhibits** [2] - 13:5, 16:14
**Express** [6] - 1:6, 2:8, 3:8, 4:11, 5:11, 6:15

F

**facility** [9] - 1:6, 1:20, 2:8, 3:9, 3:22, 4:12, 5:11, 6:3, 6:16
**fact** [1] - 11:21
**failure** [3] - 14:12, 15:3, 16:22
**few** [1] - 11:20
**field** [5] - 2:18, 4:21, 5:7, 7:1, 7:12
**file** [1] - 16:21
**filed** [1] - 14:24
**financial** [3] - 2:7, 4:10, 6:14
**Firm** [7] - 8:4, 10:8, 11:5, 11:6, 11:9, 11:16, 17:3
**First** [1] - 9:5
**following** [3] - 10:4, 10:15, 13:25
**FOR** [1] - 8:7
**foregoing** [2] - 18:6, 18:10
**Formation** [12] - 1:5, 2:4, 2:17, 3:5, 3:8, 4:6, 4:19, 5:6, 5:10, 6:11, 6:24, 7:11
**forth** [1] - 14:14
**forward** [1] - 15:5
**Fourth** [3] - 7:19, 8:6, 10:8
**Fredrikson** [1] - 12:2
**FURTHER** [1] - 18:9

G

**Gas** [1] - 11:1
**GAS** [1] - 1:2
**geologic** [12] - 1:4, 1:18, 2:7, 3:4, 3:7, 3:20, 4:11, 5:5, 5:9, 6:2, 6:15, 7:11
**GERVING** [1] - 8:8
**Gerving** [1] - 12:8
**given** [3] - 12:10, 13:1, 14:23
**granted** [4] - 11:18, 12:7, 12:12, 12:13

H

**HAUPT** [1] - 8:9
**Haupt** [1] - 12:9
**hearings** [1] - 16:8
**held** [1] - 11:5
**HEREBY** [2] - 18:5, 18:9
**HEREIN** [1] - 7:23
**hereinbefore** [2] - 10:13, 18:7
**hours** [1] - 13:16

I

**immediately** [1] - 12:13
**included** [3] - 1:18, 3:20, 6:2
**including** [1] - 11:16
**indicate** [1] - 15:21
**indicated** [3] - 10:13, 16:5, 18:8
**indicates** [2] - 12:19, 12:21
**indicating** [1] - 13:17
**Industrial** [2] - 11:2, 11:19
**inform** [1] - 14:11
**intend** [4] - 14:13, 15:2, 15:9, 15:21
**intended** [2] - 14:11, 15:5
**Intervenor** [6] - 9:9, 9:12, 9:14, 9:17, 12:5, 14:12
**intervenor** [3] - 10:21, 11:4, 11:18
**intervenors** [4] - 11:16, 11:17, 12:11, 13:1
**INTERVENORS** [1] - 8:7
**Intervenors** [1] - 12:8
**intervention** [1] - 12:7

J

**JOCHIM** [1] - 8:9
**Jochim** [1] - 12:9
**June** [12] - 7:20, 9:11, 9:19, 9:20, 10:11, 11:5, 12:18, 14:4, 14:14, 17:4, 17:12, 18:14

K

**Kraft** [1] - 12:9
**KRAFT** [1] - 8:9

L

**landowners** [2] - 10:21, 11:4
**Landowners** [2] - 9:7, 11:24
**Landowners'** [6] - 9:9, 9:12, 9:14, 9:17, 12:5, 14:12
**lands** [3] - 2:19, 4:21, 7:2
**last** [2] - 14:9, 16:17
**Law** [8] - 8:4, 8:5, 10:8, 11:4, 11:6, 11:8, 11:16, 17:3
**Lawrence** [5] - 12:2, 12:18, 14:4, 15:18, 16:2
**leave** [2] - 16:19, 17:9
**letter** [11] - 12:17, 12:19, 13:16, 14:2, 14:4, 14:5, 14:8, 14:10, 14:16, 15:13, 15:17
**Letter.....** [2] - 9:11, 9:19
**Letter.....** [1] - 9:21
**LIEBELT** [1] - 8:9
**Liebelt** [1] - 12:9
**limits** [3] - 2:19, 4:21, 7:2
**list** [1] - 15:21
**listed** [1] - 13:23
**Living** [2] - 11:17, 12:8
**LIVING** [1] - 8:8
**LLC** [36] - 1:4, 1:15, 1:19, 2:5, 3:3, 3:6, 3:17, 3:21, 4:8, 4:9, 5:5, 5:9, 5:23, 6:3, 6:13, 7:10, 10:2, 10:3, 10:4, 10:19, 10:20, 10:22, 10:23, 10:24, 12:21, 12:23, 12:25, 13:4, 13:8, 13:10, 13:12, 17:1, 17:2
**LLC.....** [3] - 9:13, 9:16, 9:18
**located** [12] - 1:6, 1:20, 2:9, 2:19, 3:9, 3:22, 4:12, 4:21, 5:11, 6:3, 6:16, 7:2
**look** [1] - 16:7

M

**Maize** [1] - 12:9
**MAIZE** [1] - 8:9
**mark** [1] - 13:5
**marked** [10] - 11:23, 12:3, 12:16, 13:10, 13:13, 14:3, 14:18, 15:4, 15:16, 16:1
**matter** [1] - 10:21
**matters** [1] - 16:8
**meet** [1] - 16:17
**Mercer** [8] - 1:13, 2:3, 2:16, 3:2, 3:15, 4:5, 4:18, 5:4
**Metz** [1] - 12:9
**METZ** [1] - 8:9
**Midwest** [6] - 1:6, 2:8, 3:8, 4:11, 5:11, 6:15
**might** [1] - 15:15
**moment** [1] - 17:8
**month** [1] - 16:17
**morning** [1] - 15:6
**Morton** [4] - 1:14, 2:3, 2:16, 3:2
**motion** [4] - 2:18, 4:20, 7:1, 16:21
**motions** [1] - 14:24
**move** [1] - 15:5
**MR** [3] - 8:3, 11:15, 17:7
**MS** [1] - 8:3
**mutually** [1] - 16:12

N

**name** [1] - 11:8
**ND** [12] - 1:14, 2:3, 2:16, 3:2, 3:16, 4:6, 4:19, 5:4, 5:22, 6:11, 6:24, 7:9
**necessary** [2] - 5:7, 7:12
**No(s)** [1] - 1:3
**nonconsenting** [3] - 1:18, 3:20, 6:1
**nonetheless** [1] - 16:10
**NORTH** [1] - 1:1
**North** [70] - 1:7, 1:9, 1:11, 1:12, 1:13, 1:21, 1:22, 2:1, 2:1, 2:2, 2:9, 2:11, 2:13, 2:14, 2:15, 2:20, 2:21, 2:24, 3:1, 3:2, 3:10, 3:13, 3:14, 3:15, 3:23, 4:1, 4:3, 4:4, 4:5, 4:13, 4:16, 4:17, 4:18, 4:22, 5:1, 5:3, 5:3, 5:12, 5:13, 5:15, 5:16, 5:18, 5:20, 5:21, 6:4, 6:5, 6:7, 6:9, 6:10, 6:17, 6:18, 6:19, 6:22, 6:23, 7:2, 7:4, 7:5, 7:8, 7:9, 7:19, 7:19, 8:6, 8:6, 10:7, 10:8, 10:10, 11:2, 11:7, 17:3, 18:13
**Nos** [1] - 13:6
**Notary** [1] - 10:7
**notary** [1] - 11:11
**NOTED** [1] - 7:23
**noted** [1] - 17:8
**notes** [1] - 18:11
**notice** [10] - 11:25, 12:12, 12:14, 12:20, 13:8, 13:11, 14:7, 15:1, 16:4, 16:17
**Notice** [8] - 9:7, 9:9, 9:12, 9:15, 9:17, 10:1, 11:24, 12:5
**notices** [5] - 13:7, 13:15, 13:19, 13:22, 14:1
**Notices** [1] - 14:15
**number** [1] - 14:6
**Numbers** [1] - 10:24

BLF-000015

**numerous** [1] - 16:16

## O

**objection** [1] - 12:10
**objections** [4] - 14:6, 14:20, 14:21, 14:22
**OF** [3] - 7:15, 9:3, 18:1
**offering** [1] - 15:14
**officer** [1] - 11:10
**offices** [2] - 11:6, 17:2
**officially** [1] - 12:12
**OIL** [1] - 1:2
**Oil** [1] - 11:1
**Oliver** [12] - 1:14, 2:3, 2:16, 3:2, 3:15, 4:5, 4:19, 5:4, 5:22, 6:11, 6:23, 7:9
**once** [1] - 12:7
**one** [4] - 13:7, 15:12, 15:16, 17:8
**open** [3] - 16:10, 16:19, 17:9
**operate** [3] - 1:19, 3:21, 6:2
**order** [5] - 2:6, 4:9, 6:13, 14:24, 15:14
**original** [1] - 11:25
**otherwise** [1] - 14:25
**owned** [3] - 1:17, 3:19, 6:1
**owners** [3] - 1:18, 3:20, 6:2

## P

**p.m** [1] - 17:6
**pages** [1] - 18:10
**paragraph** [1] - 14:9
**Paralegal** [1] - 8:3
**particularly** [1] - 14:21
**parties** [2] - 10:12, 12:24
**party** [3] - 12:12, 12:13, 12:22
**Pipeline** [6] - 1:6, 2:8, 3:8, 4:12, 5:11, 6:16
**place** [1] - 18:7
**pool** [3] - 2:18, 4:21, 7:2
**pore** [5] - 1:16, 1:17, 3:18, 3:19, 6:1
**Procedure** [1] - 15:1
**proceeding** [3] - 10:5, 11:18, 12:22
**PROCEEDINGS** [1] - 7:15
**proceedings** [2] - 10:15, 18:6
**Professional** [3] - 10:6, 18:4, 18:18
**protective** [1] - 14:24
**provide** [1] - 16:17
**PSC** [1] - 16:8
**Public** [1] - 10:7
**public** [1] - 11:11
**Pursuant** [1] - 10:1
**put** [3] - 11:20, 15:8, 16:13

## R

**raised** [1] - 14:7
**Range** [59] - 1:7, 1:9, 1:11, 1:12, 1:13, 1:21, 1:22, 2:1, 2:2, 2:3, 2:9, 2:11, 2:13, 2:14, 2:15, 2:20, 2:21, 2:24, 3:1, 3:2, 3:10, 3:13, 3:14, 3:15, 3:23, 4:2, 4:3, 4:4, 4:5, 4:13, 4:16, 4:17, 4:18, 4:23, 5:1, 5:3, 5:4, 5:12, 5:14, 5:15, 5:16, 5:18, 5:20, 5:21, 6:4, 6:6, 6:7, 6:9, 6:10, 6:17, 6:18, 6:19, 6:22, 6:23, 7:3, 7:4, 7:5, 7:8, 7:9
**re** [13] - 1:3, 1:15, 2:5, 2:18, 3:6, 3:17, 4:7, 4:20, 5:8, 5:23, 6:12, 7:1, 12:14
**re-served** [1] - 12:14
**received** [2] - 14:2, 16:15
**receiving** [1] - 13:16
**Recessed** [1] - 17:11
**record** [11] - 10:16, 11:21, 12:4, 15:8, 16:14, 16:19, 16:23, 17:5, 17:7, 17:9, 18:7
**recorded** [1] - 18:5
**recording** [1] - 11:9
**Referenced** [1] - 9:6
**Registered** [3] - 10:6, 18:3, 18:18
**remain** [1] - 17:7
**Reporter** [3] - 10:6, 18:4, 18:18
**REPORTER** [1] - 18:1
**reporter** [1] - 11:10
**REPORTER.....** [1] - 9:3
**represented** [1] - 11:4
**requesting** [3] - 1:4, 3:6, 5:9
**require** [5] - 1:17, 3:19, 6:1, 12:25, 13:18
**required** [3] - 1:19, 3:21, 6:2
**rescheduling** [1] - 16:11
**reservoir** [3] - 1:16, 3:18, 5:24
**respective** [1] - 10:12
**responded** [1] - 14:19
**responding** [1] - 16:3
**response** [2] - 14:16, 16:16
**responsibility** [3] - 2:7, 4:10, 6:14
**rounds** [1] - 15:22
**Rule** [1] - 14:13
**rules** [2] - 5:7, 7:12
**Rules** [1] - 15:1
**RUST** [1] - 8:10
**Rust** [1] - 12:9

## S

**sanctions** [2] - 15:3, 16:21
**schedule** [1] - 16:8
**scheduled** [1] - 16:6
**Second** [3] - 9:12, 9:14, 9:17
**Section** [4] - 5:12, 6:4, 6:16, 7:2
**Sections** [55] - 1:7, 1:8, 1:9, 1:12, 1:13, 1:20, 1:21, 1:22, 2:1, 2:2, 2:9, 2:10, 2:11, 2:14, 2:15, 2:19, 2:20, 2:22, 2:24, 3:1, 3:9, 3:10, 3:13, 3:14, 3:22, 3:23, 4:2, 4:3, 4:4, 4:12, 4:13, 4:16, 4:18, 4:22, 4:23, 5:2, 5:3, 5:12, 5:14, 5:15, 5:16, 5:18, 5:21, 6:4, 6:6, 6:7, 6:10, 6:17, 6:18, 6:20, 6:22, 7:3, 7:4, 7:5, 7:8
**seek** [3] - 15:2, 16:21
**sent** [3] - 14:8, 14:17, 15:13
**serve** [2] - 12:11, 15:22
**served** [5] - 12:1, 12:7, 12:14, 12:20, 13:15
**service** [2] - 13:25, 16:4
**set** [1] - 14:14
**sets** [1] - 14:5
**shorthand** [2] - 18:6, 18:11
**sic** [1] - 17:6
**single** [1] - 13:22
**sit** [1] - 15:24
**Smith** [5] - 10:6, 11:11, 12:10, 18:3, 18:17
**SMITH** [1] - 8:10
**Solutions** [5] - 12:20, 12:25, 13:3, 13:4, 13:18
**Solutions.....** [1] - 9:10
**Solutions.....** [1] - 9:8
**space** [6] - 1:16, 1:17, 3:18, 3:19, 5:24, 6:1
**special** [2] - 5:7, 7:12
**State** [2] - 10:7, 10:10
**state** [1] - 11:13
**states** [1] - 14:10
**status** [3] - 11:18, 12:12, 12:14
**Stephanie** [4] - 10:5, 11:11, 18:3, 18:17
**Storage** [33] - 1:4, 1:15, 1:19, 2:5, 3:3, 3:6, 3:17, 3:21, 4:8, 4:9, 5:5, 5:9, 5:23, 6:3, 6:13, 7:10, 9:13, 9:16, 9:18, 10:18, 10:19, 10:20, 10:22, 10:23, 10:24, 12:23, 13:8, 13:9, 13:12, 14:1, 17:1, 17:2
**STORAGE** [3] - 10:2, 10:3
**storage** [24] - 1:5, 1:6, 1:16, 1:18, 1:19, 2:7, 2:8, 3:4, 3:7, 3:9, 3:18, 3:20, 3:21, 4:11, 4:12, 5:6, 5:10, 5:11, 5:24, 6:2, 6:3, 6:15, 6:16, 7:11
**Street** [3] - 7:19, 8:6, 10:8
**String..** [1] - 9:20
**String.....** [1] - 9:22
**subject** [3] - 3:3, 5:4, 7:9
**submitted** [1] - 13:2
**subpoena** [2] - 12:25, 13:18
**subsidiary** [2] - 12:22, 13:3
**Suite** [2] - 8:5, 10:9
**SUMMIT** [3] - 10:2, 10:3
**Summit** [41] - 1:3, 1:15, 1:19, 2:5, 3:3, 3:6, 3:17, 3:21, 4:7, 4:8, 5:5, 5:8, 5:23, 6:3, 6:12, 7:10, 9:7, 9:10, 9:13, 9:15, 9:18, 10:18, 10:19, 10:22, 10:23, 12:20, 12:23, 12:24, 13:3, 13:4, 13:8, 13:9, 13:12, 13:17, 14:1, 16:25, 17:1, 17:2
**Summit's** [1] - 12:10
**supplementally** [1] - 11:10
**SWENSON** [1] - 8:8
**Swenson** [2] - 11:17, 12:8

## T

**THE** [4] - 8:7, 8:8, 10:17, 16:24
**therefore** [2] - 12:13, 12:24
**three** [5] - 12:22, 13:2, 13:5, 13:6, 13:15
**throughout** [1] - 13:21
**Thursday** [1] - 17:11
**today** [1] - 11:22
**tomorrow** [1] - 14:14
**topic** [1] - 15:21
**topics** [3] - 12:1, 12:14, 13:23
**Township** [59] - 1:7, 1:9, 1:11, 1:12, 1:13, 1:20, 1:22, 1:24, 2:1, 2:2, 2:9, 2:11, 2:13, 2:14, 2:15, 2:20, 2:21, 2:24, 2:24, 3:1, 3:10, 3:12, 3:14, 3:15, 3:23, 4:1, 4:3, 4:4, 4:5, 4:13, 4:16, 4:17, 4:18, 4:22, 5:1, 5:2, 5:3, 5:12, 5:13, 5:15, 5:16, 5:17, 5:20, 5:21, 6:4, 6:5, 6:6,

6:9, 6:10, 6:16, 6:18, 6:19, 6:22, 6:23, 7:2, 7:4, 7:5, 7:8, 7:9
**TRANSCRIPT** [1] - 7:15
**transcript** [1] - 18:11
**Trust** [2] - 11:17, 12:8
**TRUST** [1] - 8:8
**try** [1] - 16:7
**two** [1] - 15:11
**typewritten** [1] - 18:10

## U

**Ultimately** [1] - 14:10

## V

**video** [1] - 17:5
**VIDEOGRAPHER** [2] - 10:17, 16:24
**Videographer** [1] - 8:4

## W

**West** [59] - 1:7, 1:9, 1:11, 1:12, 1:13, 1:21, 1:22, 2:1, 2:2, 2:3, 2:10, 2:11, 2:14, 2:14, 2:15, 2:20, 2:21, 2:24, 3:1, 3:2, 3:10, 3:13, 3:14, 3:15, 3:23, 4:2, 4:3, 4:4, 4:5, 4:13, 4:16, 4:17, 4:18, 4:23, 5:1, 5:3, 5:4, 5:12, 5:14, 5:15, 5:16, 5:18, 5:20, 5:22, 6:4, 6:6, 6:7, 6:9, 6:11, 6:17, 6:18, 6:19, 6:22, 6:23, 7:3, 7:4, 7:5, 7:8, 7:9
**witness** [1] - 15:8
**written** [1] - 15:22

## Y

**yesterday** [1] - 14:8

## Z

**Zaste** [1] - 11:8
**ZASTE** [1] - 8:3

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

**In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**Case No(s). 30869**
**30870**
**30871**
**30872**
**30873**
**30874**
**30875**
**30876**
**30877**
**30878**
**30879**
**30880**

BLF-0000018

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**LANDOWNERS NOTICE OF 30(b)(6) DEPOSITION OF SUMMIT CARBON SOLUTIONS**

**TO:** Summit Carbon Solutions, by and through its attorney, Lawrence Bender, Fredrickson & Byron, P.A., 1133 College Drive, Suite 1000, Bismarck, North Dakota, 58501:

[¶1] PLEASE TAKE NOTICE that, pursuant to N.D.C.C. § 28-32-33 and Rule 30(b)(6) of the North Dakota Rules of Civil Procedure, Intervenor The Swenson Living Trust ("Landowners" or "Swenson Trust") will take the deposition upon oral examination of Summit Carbon Solutions ("SCS" or "$CO_2$ injector") through one or more of its officers, directors, managing agents, or other representatives who shall be designated to testify on the $CO_2$ injector's behalf regarding all information known or reasonably available to the $CO_2$ injector with respect to the subject matters identified in Exhibit A.

[¶2] The deposition shall commence on June 6, 2024 at 9:00 a.m. (Central Time), and continue thereafter until complete, at the offices of Braaten Law Firm, 100 N. 4th St., Ste. 100, Bismarck, North Dakota 58501. The deposition shall be conducted before a court reporter, or other officer authorized by law to administer oaths, and shall be recorded by stenographic means and supplementally recorded by video. The deposition will be taken for the purposes of discovery, for use at hearings, or for other purposes as permitted under the North Dakota Rules of Civil Procedure and N.D.C.C. ch. 28-32.

Dated this 9th day of May, 2024.

**BRAATEN LAW FIRM**

*/s/ Derrick Braaten*

Derrick Braaten (ND #06394)
109 North 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
derrick@braatenlawfirm.com

*Attorneys for Intervenor*
*The Swenson Living Trust*

**EXHIBIT A TO NOTICE OF DEPOSITION OF SUMMIT CARBON SOLUTIONS**

**DEFINITIONS**

As used in this Notice, the following terms shall have the meanings and definitions as indicated:

1. "SCS" or "Summit" means the applicants in NDIC Case Nos. 30869, 30870, 30871, 30872 (for "Summit Carbon Storage #1, LLC,"); 30873, 30874, 30875, 30876 (for "Summit Carbon Storage #2,") and 30877, 30878, 30879, 30880 (for "Summit Carbon Storage #3, LLC,"). and each of those entities' authorized agents.

2. "Landowner" means The Swenson Living Trust.

3. "Storage Reservoir" means the reservoir and formation into which Summit intends to inject CO2 and the confining zones within the Areas of Review, as defined and depicted by Summit's applications herein (*see e.g.* Figure 1-1, NDIC Case No. 30869) including but not limited to the Storage Reservoir as defined by Section 1.15 of the Storage Agreement included with Summit's applications in NDIC Case No. 30869, and includes the confining layers/zones, to wit:

> the Pore Space and confining subsurface strata underlying the Facility Area described as the Opeche/Spearfish (Upper Confining Zone), Broom Creek (Injection Zone), and Amsden (Lower Confining Zone) Formation(s) and which are defined as identified by the well logging suite performed at one stratigraphic well, the Milton Flemmer 1 well (NDIC File No. 38594) located in the NW¼ of the NE¼, Section 35, Township 141 North, Range 88 West, Mercer County, North Dakota. The Storage Reservoir is defined as the stratigraphic interval from below the top of the Opeche/Spearfish Formation found at a depth of 5,587 feet below the Kelly Bushing, to above the base of the Amsden Formation, found at a depth of 6,421 feet below the Kelly Bushing, as identified by the Array Induction Gamma log run in the Milton Flemmer 1 well. The logging suite included triple combo (gamma ray [GR], density porosity, and resistivity), caliper, spectral GR, combinable magnetic resonance (CMR), elemental capture spectroscopy (ESC), dipole sonic including four-arm caliper and inclinometer, and an image log. Further, the acquired logs were used to pick formation top depths and interpret lithology, petrophysical properties, and time-to-depth shifting of seismic data obtained from three 3D seismic surveys and one 5-mile long 2D seismic line covering an area totaling 208 miles in and around the Milton Flemmer 1 stratigraphic well. Formation top depths

were picked from the top of the Pierre Formation to the base of the Amsden Formation. The average depth of the top of the Opeche/Spearfish Formation (Upper Confining Zone) across the storage facility area is 5,464 total vertical depth (TVD). The average depth of the base of the Amsden Formation (Lower Confining Summit Carbon Storage #1, LLC – Broom Creek 5 Zone) across the storage facility area is 6,270 feet TVD. The average thickness of the Storage Reservoir across the storage facility area is 806 feet.

4. "Communication" means any oral or written utterance, notation, or statement of any nature, by and to whomever, including, but not limited to, correspondence, text messages, chat messages, emails, letters, and any other oral or written conversations, dialogues, discussions, interviews, or consultations, between or among two or more persons.

5. "Document" means all documents or electronically stored information discoverable under N.D.R.Civ.P. 34 - including writings, drawings, graphs, charts, photographs, sound recordings, images, and other data or data compilations - stored in any medium from which information can be obtained either directly or, if necessary, after translation by you into a reasonably usable form. Documents and electronically stored information encompasses and includes all file formats in which electronically stored information is or can be stored or saved, and always includes the native file format if one exists.

6. "ESI" or "electronically stored information" means all electronically stored information discoverable under N.D.R.Civ.P. 34 - including writings, databases, shapefiles, electronic or computer files, graphs, charts, photographs, sound recordings, images, and other data or data compilations - stored in any medium from which information can be obtained either directly or, if necessary, after translation by you into a reasonably usable form. ESI encompasses and includes all file formats in which electronically stored information is or can be stored or saved, and always includes the native file format if one exists.

7. "Identification," "identify," or "identity," when used in reference to (a) a natural person, requires you to state his or her full name and residential and business addresses; (b) a corporation, requires you to state its full corporate name and any names under which it does business, its state of incorporation, the address of its principal place of business, and the addresses of all of its offices in the State of North Dakota; (c) a business, requires you to state the full name or style under which the business is conducted, its business address or addresses, the types of businesses in which it is engaged, the geographic area in which it conducts those businesses, and the identity of the person or persons who own, operate, and control the business; (d) a document, requires you to state the number of pages and the nature of the document (e.g., letter or memorandum), and if not apparent on the face of the document or ESI, its title, its date, the name or names of its authors and recipients, and its present location and custodian; (e) a communication, requires you, if any part of the communication was written, to identify the document or documents which refer to or evidence the communication, and, to the extent that the communication was non-written, to identify the persons participating in the communication and to state the date, manner, place, and substance of the communication.

8. "Person" means any individual acting in any capacity as well as any entity or organization, including divisions, departments, and other units of the organization, and shall include such organizations as public or private corporations, partnerships, joint ventures, voluntary or unincorporated associations, sole proprietorships, trusts, estates, governmental agencies, commissions, bureaus, or departments.

9. "Representative" means any agent, employee, servant, officer, director, attorney, or other person acting or purporting to act on behalf of the person in question.

10. "You," "your," or "yourself" refer to "SCS" or "Summit", and each of its authorized agents.

## TOPICS FOR EXAMINATION

In accordance with N.D.R.Civ.P. 30(b)(6), The Swenson Living Trust designates the following topics and matters for examination.

I. Summit's applications and the information contained in and created or submitted in support of the applications and conclusions drawn therefrom in NDIC Case Nos. 30869, 30870, 30871, 30872 (for "Summit Carbon Storage #1, LLC,"); 30873, 30874, 30875, 30876 (for "Summit Carbon Storage #2,") and 30877, 30878, 30879, 30880 (for "Summit Carbon Storage #3, LLC,") (all applications hereafter referred to collectively as "Summit's applications").

a. Summit's applications include all documents submitted to the North Dakota Industrial Commission including its Department of Mineral Resources and its Oil and Gas Division (collectively "NDIC") as part of or in support of or in relation to Summit's applications, and all correspondence between Summit and NDIC whether in writing and whether electronic or physical, and whether written or oral. This topic and the scope of Summit's applications as used herein includes all data files, spreadsheets, databases, and models (including loading files necessary to make data files useable with any model) and all of the information, data, documents, calculations, and non-attorney work product that was created in support of Summit's applications or which was necessary to create or is materially supportive of Summit's applications.

i. Without limiting the generality of the foregoing, this topic includes the following models and associated data:

1. The data and interpretations and inputs for the geologic model created with SLB's Petrel software (Schlumberger, 2020).
2. The data and inputs and model referred to in Section 3.1 of the applications as follows:

a. "The geologic model and properties served as inputs for numerical simulations of CO2 injection using Computer Modelling Group Ltd.'s (CMG's) GEM software (Computer Modelling Group Ltd., 2021). Numerical simulations of CO2 injection were conducted to assess potential CO2 injection rate, disposition of injected CO2, wellhead pressure (WHP), bottomhole pressure (BHP), and pressure changes in the storage reservoir throughout the expected injection time frame and postinjection period. Results of the numerical simulations were then used to determine the

project's area of review (AOR) pursuant to North Dakota's geologic CO2 storage regulations."

3. United States Geological Survey's PHREEQC geochemical model and both the data files and data inputs used to run this model and bases for using the chosen inputs.
4. The data and load files and data decks for the SLB Petrel model that was run for Summit's applications.
5. Computer Modelling Group Ltd.'s GEM model and both the data files and data inputs used to run this model and bases for using the chosen inputs.
6. 3D numerical reservoir simulation model data decks, output files and graphing files of the Storage Reservoir in original electronic format. Without limiting the foregoing, such files may commonly be stored in Schlumberger SEclipse format, CMG (Canadian Modeling Group) Imex format, or other similar format.
7. Input files, field and analytical data, and the model geochemical database (and the sources of the foregoing) used to run any modelling or analysis of critical threshold pressures or areal extent of review or impact and pressure buildup, or which was used to do any kind of analysis related to EPA Method 1 or EPA Method 2 or Analytical Solution for Leakage in Multilayered Aquifers – ASLMA, or any risk-based area-of-review analysis.

ii. These models also include the conclusions drawn from the models and the data inputs used, particularly as those conclusions were used to support Summit's applications as referenced in these topics.

iii. The identity of the person most familiar with the workflows described in Section 3.2.3 of Summit's application in NDIC Case No. 30869 and how it was performed for purposes of Summit's applications and the identity of the person who wrote this passage.

iv. The meaning and context and details of how the various processes and functions described in Section 3.2.3 of Summit's applications and how they were actually performed and the models and calculations used to support them.

b. The factual documentation and information that might support or that Summit will use to support a finding "[t]hat the storage operator has obtained the consent of persons who own at least sixty percent of the storage reservoir's pore space" as required by N.D.C.C. § 38-22-08(5).

c. The factual documentation and information that might support or that Summit will use to support any finding in this proceeding "[t]hat the proposed storage facility will not adversely affect surface waters or formations containing fresh water" as is stated at N.D.C.C. § 38-22-08(7).

d. The factual documentation and information that might support or that Summit will use to support any finding in this proceeding that "[t]hat the storage facility will not

endanger human health nor unduly endanger the environment" as is stated at N.D.C.C. § 38-22-08(10).

e. The factual documentation and information that might support or that Summit will use to support any finding in this proceeding "[t]hat the horizontal and vertical boundaries of the storage reservoir are defined [and] include buffer areas to ensure that the storage facility is operated safely and as contemplated" as is stated at N.D.C.C. § 38-22-08(12).

f. The factual documentation and information related to or that might support or that Summit will use to support any finding in this proceeding that "all nonconsenting pore space owners are or will be equitably compensated" as that phrase is used in N.D.C.C. § 38-22-08(14) and any documentation, information, data sets, comparable sales, comparable transactions, appraisals, market reports, financial reports, or other documents related to or referencing compensation paid to nonconsenting pore space owners.

    i. This subtopic I.b. includes all amounts paid by Summit to any individual or entity for use of or damages to pore space or property rights associated with or related to its storage facility that is the subject of Summit's application and the Storage Reservoir, and all agreements for such use or damages or payments.

    ii. This subtopic I.b. includes all reports and agreements in Summit's possession indicating any amount of compensation paid for any kind of use of or damage to pore space or property for CO2 sequestration. If Summit has in its possession any agreement with any property owner for use of property or damage to property arising from use of pore space or property for storage or sequestration of CO2 it is included in this topic.

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

**In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**Case No(s). 30869**
**30870**
**30871**
**30872**
**30873**
**30874**
**30875**
**30876**
**30877**
**30878**
**30879**
**30880**

BLF-000032

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**INTERVENOR LANDOWNERS' AMENDED NOTICE OF 30(b)(6) DEPOSITION OF SUMMIT CARBON SOLUTIONS**

**TO:** Summit Carbon Solutions, by and through its attorney, Lawrence Bender, Fredrickson & Byron, P.A., 1133 College Drive, Suite 1000, Bismarck, North Dakota, 58501:

[¶1] PLEASE TAKE NOTICE that, pursuant to N.D.C.C. § 28-32-33 and Rule 30(b)(6) of the North Dakota Rules of Civil Procedure, Intervenors Landowners the Swenson Living Trust, Michael Bauman, Glenn and Lisa Gerving, Michael and Bonnie Haupt, John Jochim, Kevin and Kimberly Kraft, Charmayne Liebelt, Kirk and Linda Maize and Allen Maize, Paul and Christy Metz, JoLene M. Rust, and Gary and Cassie Smith ("Landowners") will take the deposition upon oral examination of Summit Carbon Solutions ("SCS" or "$CO_2$ injector") through one or more of its officers, directors, managing agents, or other representatives who shall be designated to testify on the $CO_2$ injector's behalf regarding all information known or reasonably available to the $CO_2$ injector with respect to the subject matters identified in Exhibit A.

[¶2] The deposition shall commence on June 6, 2024 at 9:00 a.m. (Central Time), and continue thereafter until complete, at the offices of Braaten Law Firm, 100 N. 4th St., Ste. 100, Bismarck, North Dakota 58501. The deposition shall be conducted before a court reporter, or other officer authorized by law to administer oaths, and shall be recorded by stenographic means and supplementally recorded by video. The deposition will be taken for the purposes of discovery, for use at hearings, or for other purposes as permitted under the North Dakota Rules of Civil Procedure and N.D.C.C. ch. 28-32.

Dated this 31st day of May, 2024.

**BRAATEN LAW FIRM**

*/s/ Derrick Braaten*

Derrick Braaten (ND #06394)
109 North 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
derrick@braatenlawfirm.com

*Attorneys for Intervenors the Swenson Living Trust, Bauman, Gerving, Haupt, Jochim, Kraft, Liebelt, Maize, Metz, Rust, and Smith*

**EXHIBIT A TO NOTICE OF DEPOSITION OF SUMMIT CARBON SOLUTIONS**

**DEFINITIONS**

As used in this Notice, the following terms shall have the meanings and definitions as indicated:

1. "SCS" or "Summit" means the applicants in NDIC Case Nos. 30869, 30870, 30871, 30872 (for "Summit Carbon Storage #1, LLC,"); 30873, 30874, 30875, 30876 (for "Summit Carbon Storage #2,") and 30877, 30878, 30879, 30880 (for "Summit Carbon Storage #3, LLC,"). and each of those entities' authorized agents.

2. "Landowners" means The Swenson Living Trust, Michael Bauman, Glenn and Lisa Gerving, Michael and Bonnie Haupt, John Jochim, Kevin and Kimberly Kraft, Charmayne Liebelt, Kirk and Linda Maize and Allen Maize, Paul and Christy Metz, JoLene M. Rust, and Gary and Cassie Smith.

3. "Storage Reservoir" means the reservoir and formation into which Summit intends to inject CO2 and the confining zones within the Areas of Review, as defined and depicted by Summit's applications herein (*see e.g.* Figure 1-1, NDIC Case No. 30869) including but not limited to the Storage Reservoir as defined by Section 1.15 of the Storage Agreement included with Summit's applications in NDIC Case No. 30869, and includes the confining layers/zones, to wit:

> the Pore Space and confining subsurface strata underlying the Facility Area described as the Opeche/Spearfish (Upper Confining Zone), Broom Creek (Injection Zone), and Amsden (Lower Confining Zone) Formation(s) and which are defined as identified by the well logging suite performed at one stratigraphic well, the Milton Flemmer 1 well (NDIC File No. 38594) located in the NW¼ of the NE¼, Section 35, Township 141 North, Range 88 West, Mercer County, North Dakota. The Storage Reservoir is defined as the stratigraphic interval from below the top of the Opeche/Spearfish Formation found at a depth of 5,587 feet below the Kelly Bushing, to above the base of the Amsden Formation, found at a depth of 6,421 feet below the Kelly Bushing, as identified by the Array Induction Gamma log run in the Milton Flemmer 1 well. The logging suite included triple combo (gamma ray [GR], density porosity, and resistivity), caliper, spectral GR, combinable magnetic

resonance (CMR), elemental capture spectroscopy (ESC), dipole sonic including four-arm caliper and inclinometer, and an image log. Further, the acquired logs were used to pick formation top depths and interpret lithology, petrophysical properties, and time-to-depth shifting of seismic data obtained from three 3D seismic surveys and one 5-mile long 2D seismic line covering an area totaling 208 miles in and around the Milton Flemmer 1 stratigraphic well. Formation top depths were picked from the top of the Pierre Formation to the base of the Amsden Formation. The average depth of the top of the Opeche/Spearfish Formation (Upper Confining Zone) across the storage facility area is 5,464 total vertical depth (TVD). The average depth of the base of the Amsden Formation (Lower Confining Summit Carbon Storage #1, LLC – Broom Creek 5 Zone) across the storage facility area is 6,270 feet TVD. The average thickness of the Storage Reservoir across the storage facility area is 806 feet.

4. "Communication" means any oral or written utterance, notation, or statement of any nature, by and to whomever, including, but not limited to, correspondence, text messages, chat messages, emails, letters, and any other oral or written conversations, dialogues, discussions, interviews, or consultations, between or among two or more persons.

5. "Document" means all documents or electronically stored information discoverable under N.D.R.Civ.P. 34 - including writings, drawings, graphs, charts, photographs, sound recordings, images, and other data or data compilations - stored in any medium from which information can be obtained either directly or, if necessary, after translation by you into a reasonably usable form. Documents and electronically stored information encompasses and includes all file formats in which electronically stored information is or can be stored or saved, and always includes the native file format if one exists.

6. "ESI" or "electronically stored information" means all electronically stored information discoverable under N.D.R.Civ.P. 34 - including writings, databases, shapefiles, electronic or computer files, graphs, charts, photographs, sound recordings, images, and other data or data compilations - stored in any medium from which information can be obtained either directly or, if necessary, after translation by you into a reasonably usable form. ESI encompasses and

includes all file formats in which electronically stored information is or can be stored or saved, and always includes the native file format if one exists.

7. "Identification," "identify," or "identity," when used in reference to (a) a natural person, requires you to state his or her full name and residential and business addresses; (b) a corporation, requires you to state its full corporate name and any names under which it does business, its state of incorporation, the address of its principal place of business, and the addresses of all of its offices in the State of North Dakota; (c) a business, requires you to state the full name or style under which the business is conducted, its business address or addresses, the types of businesses in which it is engaged, the geographic area in which it conducts those businesses, and the identity of the person or persons who own, operate, and control the business; (d) a document, requires you to state the number of pages and the nature of the document (e.g., letter or memorandum), and if not apparent on the face of the document or ESI, its title, its date, the name or names of its authors and recipients, and its present location and custodian; (e) a communication, requires you, if any part of the communication was written, to identify the document or documents which refer to or evidence the communication, and, to the extent that the communication was non-written, to identify the persons participating in the communication and to state the date, manner, place, and substance of the communication.

8. "Person" means any individual acting in any capacity as well as any entity or organization, including divisions, departments, and other units of the organization, and shall include such organizations as public or private corporations, partnerships, joint ventures, voluntary or unincorporated associations, sole proprietorships, trusts, estates, governmental agencies, commissions, bureaus, or departments.

9. "Representative" means any agent, employee, servant, officer, director, attorney, or other person acting or purporting to act on behalf of the person in question.

10. "You," "your," or "yourself" refer to "SCS" or "Summit", and each of its authorized agents.

## TOPICS FOR EXAMINATION

In accordance with N.D.R.Civ.P. 30(b)(6), Landowners designate the following topics and matters for examination.

I. Summit's applications and the information contained in and created or submitted in support of the applications and conclusions drawn therefrom in NDIC Case Nos. 30869, 30870, 30871, 30872 (for "Summit Carbon Storage #1, LLC,"); 30873, 30874, 30875, 30876 (for "Summit Carbon Storage #2,") and 30877, 30878, 30879, 30880 (for "Summit Carbon Storage #3, LLC,") (all applications hereafter referred to collectively as "Summit's applications").

a. Summit's applications include all documents submitted to the North Dakota Industrial Commission including its Department of Mineral Resources and its Oil and Gas Division (collectively "NDIC") as part of or in support of or in relation to Summit's applications, and all correspondence between Summit and NDIC whether in writing and whether electronic or physical, and whether written or oral. This topic and the scope of Summit's applications as used herein includes all data files, spreadsheets, databases, and models (including loading files necessary to make data files useable with any model) and all of the information, data, documents, calculations, and non-attorney work product that was created in support of Summit's applications or which was necessary to create or is materially supportive of Summit's applications.

i. Without limiting the generality of the foregoing, this topic includes the following models and associated data:

1. The data and interpretations and inputs for the geologic model created with SLB's Petrel software (Schlumberger, 2020).
2. The data and inputs and model referred to in Section 3.1 of the applications as follows:

a. "The geologic model and properties served as inputs for numerical simulations of CO2 injection using Computer Modelling Group Ltd.'s (CMG's) GEM software (Computer Modelling Group Ltd., 2021). Numerical simulations of CO2 injection were conducted to assess potential CO2 injection rate, disposition of injected CO2, wellhead pressure (WHP), bottomhole pressure (BHP), and pressure

changes in the storage reservoir throughout the expected injection time frame and postinjection period. Results of the numerical simulations were then used to determine the project's area of review (AOR) pursuant to North Dakota's geologic CO2 storage regulations."

3. United States Geological Survey's PHREEQC geochemical model and both the data files and data inputs used to run this model and bases for using the chosen inputs.
4. The data and load files and data decks for the SLB Petrel model that was run for Summit's applications.
5. Computer Modelling Group Ltd.'s GEM model and both the data files and data inputs used to run this model and bases for using the chosen inputs.
6. 3D numerical reservoir simulation model data decks, output files and graphing files of the Storage Reservoir in original electronic format. Without limiting the foregoing, such files may commonly be stored in Schlumberger SEclipse format, CMG (Canadian Modeling Group) Imex format, or other similar format.
7. Input files, field and analytical data, and the model geochemical database (and the sources of the foregoing) used to run any modelling or analysis of critical threshold pressures or areal extent of review or impact and pressure buildup, or which was used to do any kind of analysis related to EPA Method 1 or EPA Method 2 or Analytical Solution for Leakage in Multilayered Aquifers – ASLMA, or any risk-based area-of-review analysis.

ii. These models also include the conclusions drawn from the models and the data inputs used, particularly as those conclusions were used to support Summit's applications as referenced in these topics.

iii. The identity of the person most familiar with the workflows described in Section 3.2.3 of Summit's application in NDIC Case No. 30869 and how it was performed for purposes of Summit's applications and the identity of the person who wrote this passage.

iv. The meaning and context and details of how the various processes and functions described in Section 3.2.3 of Summit's applications and how they were actually performed and the models and calculations used to support them.

b. The factual documentation and information that might support or that Summit will use to support a finding "[t]hat the storage operator has obtained the consent of persons who own at least sixty percent of the storage reservoir's pore space" as required by N.D.C.C. § 38-22-08(5).

c. The factual documentation and information that might support or that Summit will use to support any finding in this proceeding "[t]hat the proposed storage facility

will not adversely affect surface waters or formations containing fresh water" as is stated at N.D.C.C. § 38-22-08(7).

d. The factual documentation and information that might support or that Summit will use to support any finding in this proceeding that "[t]hat the storage facility will not endanger human health nor unduly endanger the environment" as is stated at N.D.C.C. § 38-22-08(10).
e. The factual documentation and information that might support or that Summit will use to support any finding in this proceeding "[t]hat the horizontal and vertical boundaries of the storage reservoir are defined [and] include buffer areas to ensure that the storage facility is operated safely and as contemplated" as is stated at N.D.C.C. § 38-22-08(12).
f. The factual documentation and information related to or that might support or that Summit will use to support any finding in this proceeding that "all nonconsenting pore space owners are or will be equitably compensated" as that phrase is used in N.D.C.C. § 38-22-08(14) and any documentation, information, data sets, comparable sales, comparable transactions, appraisals, market reports, financial reports, or other documents related to or referencing compensation paid to nonconsenting pore space owners.
    i. This subtopic I.b. includes all amounts paid by Summit to any individual or entity for use of or damages to pore space or property rights associated with or related to its storage facility that is the subject of Summit's application and the Storage Reservoir, and all agreements for such use or damages or payments.
    ii. This subtopic I.b. includes all reports and agreements in Summit's possession indicating any amount of compensation paid for any kind of use of or damage to pore space or property for CO2 sequestration. If Summit has in its possession any agreement with any property owner for use of property or damage to property arising from use of pore space or property for storage or sequestration of CO2 it is included in this topic.

Fredrikson

**Fredrikson & Byron, P.A.**
Attorneys and Advisors

304 East Front Avenue, Suite 400
Bismarck, ND 58504-5639
Main: 701.221.8700
fredlaw.com

June 4, 2024

***VIA E-MAIL***

Derrick L. Braaten
Braaten Law Firm
109 N. Fourth St., Ste. 100
Bismarck, ND 58501-4003

derrick@braatenlawfirm.com

**RE: NDIC Case Nos. 30869–30880**

Dear Derrick:

This letter concerns the Intervenor Landowners' Amended Notice of 30(b)(6) Deposition of Summit Carbon Solutions in NDIC Case Nos. 30869- 30880, which I received via e-mail last Friday afternoon, May 31, 2024.

Summit Carbon Solutions, LLC is not a party to NDIC Case Nos. 30869–30880. "A non-party deponent's attendance may be compelled by subpoena under Rule 45." N.D.R.Civ.P. 30(a)(1). As a result, a notice of deposition alone is not sufficient to compel the attendance of Summit Carbon Solutions, LLC at a deposition. *See, e.g.*, N.D.R.Civ.P. 30(g)(2).

The notice we received is directed to "Summit Carbon Solutions" and gives no indication that a subpoena has been or will be served on Summit Carbon Solutions, LLC. Instead, the Intervenor Landowners' Amended Notice of 30(b)(6) Deposition of Summit Carbon Solutions appears to assume that Summit Carbon Solutions, LLC is a party to NDIC Case Nos. 30869- 30880 and that a subpoena is unnecessary. If that is the case, please be advised the notice is ineffective.

Thank you for your attention to this matter. Should you have any questions, please advise.

Sincerely,

LAWRENCE BENDER

LB/sdp
#8268740501

cc: Summit Carbon Solutions, LLC

30(b)(6) Deposition of Summit Carbon Storage #1, #2, #3, LLC06-06-2024
EXHIBIT
003
30869-30880

BLF-000046

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

**In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**Case No(s). 30869**
**30870**
**30871**
**30872**
**30873**
**30874**
**30875**
**30876**
**30877**
**30878**
**30879**
**30880**

BLF-000047

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## INTERVENOR LANDOWNERS' SECOND AMENDED NOTICE OF 30(b)(6) DEPOSITION OF SUMMIT CARBON STORAGE #1, LLC

**TO:** Summit Carbon Storage #1, LLC, by and through its attorney, Lawrence Bender, Fredrickson & Byron, P.A., 304 East Front Avenue, Suite 400, Bismarck, North Dakota, 58504:

[¶1] PLEASE TAKE NOTICE that, pursuant to N.D.C.C. § 28-32-33 and Rule 30(b)(6) of the North Dakota Rules of Civil Procedure, Intervenors Landowners the Swenson Living Trust, Michael Bauman, Glenn and Lisa Gerving, Michael and Bonnie Haupt, John Jochim, Kevin and Kimberly Kraft, Charmayne Liebelt, Kirk and Linda Maize and Allen Maize, Paul and Christy Metz, JoLene M. Rust, and Gary and Cassie Smith ("Landowners") will take the deposition upon oral examination of Summit Carbon Storage #1, LLC ("SCS" or "$CO_2$ injector") through one or more of its officers, directors, managing agents, or other representatives who shall be designated to testify on the $CO_2$ injector's behalf regarding all information known or reasonably available to the $CO_2$ injector with respect to the subject matters identified in Exhibit A.

[¶2] The deposition shall commence on June 6, 2024 at 9:00 a.m. (Central Time), and continue thereafter until complete, at the offices of Braaten Law Firm, 100 N. 4th St., Ste. 100, Bismarck, North Dakota 58501. The deposition shall be conducted before a court reporter, or other officer authorized by law to administer oaths, and shall be recorded by stenographic means and supplementally recorded by video. The deposition will be taken for the purposes of discovery, for use at hearings, or for other purposes as permitted under the North Dakota Rules of Civil Procedure and N.D.C.C. ch. 28-32.

Dated this 4th day of June, 2024.

**BRAATEN LAW FIRM**

*/s/ Derrick Braaten*

Derrick Braaten (ND #06394)
109 North 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
derrick@braatenlawfirm.com

*Attorneys for Intervenors the Swenson Living Trust, Bauman, Gerving, Haupt, Jochim, Kraft, Liebelt, Maize, Metz, Rust, and Smith*

**EXHIBIT A TO NOTICE OF DEPOSITION OF SUMMIT CARBON STORAGE #1, LLC**

**DEFINITIONS**

As used in this Notice, the following terms shall have the meanings and definitions as indicated:

1. "SCS" or "Summit" means the applicants in NDIC Case Nos. 30869, 30870, 30871, 30872 (for "Summit Carbon Storage #1, LLC,"); 30873, 30874, 30875, 30876 (for "Summit Carbon Storage #2,") and 30877, 30878, 30879, 30880 (for "Summit Carbon Storage #3, LLC,"). and each of those entities' authorized agents.

2. "Landowners" means The Swenson Living Trust, Michael Bauman, Glenn and Lisa Gerving, Michael and Bonnie Haupt, John Jochim, Kevin and Kimberly Kraft, Charmayne Liebelt, Kirk and Linda Maize and Allen Maize, Paul and Christy Metz, JoLene M. Rust, and Gary and Cassie Smith.

3. "Storage Reservoir" means the reservoir and formation into which Summit intends to inject CO2 and the confining zones within the Areas of Review, as defined and depicted by Summit's applications herein (*see e.g.* Figure 1-1, NDIC Case No. 30869) including but not limited to the Storage Reservoir as defined by Section 1.15 of the Storage Agreement included with Summit's applications in NDIC Case No. 30869, and includes the confining layers/zones, to wit:

> the Pore Space and confining subsurface strata underlying the Facility Area described as the Opeche/Spearfish (Upper Confining Zone), Broom Creek (Injection Zone), and Amsden (Lower Confining Zone) Formation(s) and which are defined as identified by the well logging suite performed at one stratigraphic well, the Milton Flemmer 1 well (NDIC File No. 38594) located in the NW¼ of the NE¼, Section 35, Township 141 North, Range 88 West, Mercer County, North Dakota. The Storage Reservoir is defined as the stratigraphic interval from below the top of the Opeche/Spearfish Formation found at a depth of 5,587 feet below the Kelly Bushing, to above the base of the Amsden Formation, found at a depth of 6,421 feet below the Kelly Bushing, as identified by the Array Induction Gamma log run in the Milton Flemmer 1 well. The logging suite included triple combo (gamma ray [GR], density porosity, and resistivity), caliper, spectral GR, combinable magnetic

resonance (CMR), elemental capture spectroscopy (ESC), dipole sonic including four-arm caliper and inclinometer, and an image log. Further, the acquired logs were used to pick formation top depths and interpret lithology, petrophysical properties, and time-to-depth shifting of seismic data obtained from three 3D seismic surveys and one 5-mile long 2D seismic line covering an area totaling 208 miles in and around the Milton Flemmer 1 stratigraphic well. Formation top depths were picked from the top of the Pierre Formation to the base of the Amsden Formation. The average depth of the top of the Opeche/Spearfish Formation (Upper Confining Zone) across the storage facility area is 5,464 total vertical depth (TVD). The average depth of the base of the Amsden Formation (Lower Confining Summit Carbon Storage #1, LLC – Broom Creek 5 Zone) across the storage facility area is 6,270 feet TVD. The average thickness of the Storage Reservoir across the storage facility area is 806 feet.

4. "Communication" means any oral or written utterance, notation, or statement of any nature, by and to whomever, including, but not limited to, correspondence, text messages, chat messages, emails, letters, and any other oral or written conversations, dialogues, discussions, interviews, or consultations, between or among two or more persons.

5. "Document" means all documents or electronically stored information discoverable under N.D.R.Civ.P. 34 - including writings, drawings, graphs, charts, photographs, sound recordings, images, and other data or data compilations - stored in any medium from which information can be obtained either directly or, if necessary, after translation by you into a reasonably usable form. Documents and electronically stored information encompasses and includes all file formats in which electronically stored information is or can be stored or saved, and always includes the native file format if one exists.

6. "ESI" or "electronically stored information" means all electronically stored information discoverable under N.D.R.Civ.P. 34 - including writings, databases, shapefiles, electronic or computer files, graphs, charts, photographs, sound recordings, images, and other data or data compilations - stored in any medium from which information can be obtained either directly or, if necessary, after translation by you into a reasonably usable form. ESI encompasses and

includes all file formats in which electronically stored information is or can be stored or saved, and always includes the native file format if one exists.

7. "Identification," "identify," or "identity," when used in reference to (a) a natural person, requires you to state his or her full name and residential and business addresses; (b) a corporation, requires you to state its full corporate name and any names under which it does business, its state of incorporation, the address of its principal place of business, and the addresses of all of its offices in the State of North Dakota; (c) a business, requires you to state the full name or style under which the business is conducted, its business address or addresses, the types of businesses in which it is engaged, the geographic area in which it conducts those businesses, and the identity of the person or persons who own, operate, and control the business; (d) a document, requires you to state the number of pages and the nature of the document (e.g., letter or memorandum), and if not apparent on the face of the document or ESI, its title, its date, the name or names of its authors and recipients, and its present location and custodian; (e) a communication, requires you, if any part of the communication was written, to identify the document or documents which refer to or evidence the communication, and, to the extent that the communication was non-written, to identify the persons participating in the communication and to state the date, manner, place, and substance of the communication.

8. "Person" means any individual acting in any capacity as well as any entity or organization, including divisions, departments, and other units of the organization, and shall include such organizations as public or private corporations, partnerships, joint ventures, voluntary or unincorporated associations, sole proprietorships, trusts, estates, governmental agencies, commissions, bureaus, or departments.

9. "Representative" means any agent, employee, servant, officer, director, attorney, or other person acting or purporting to act on behalf of the person in question.

10. "You," "your," or "yourself" refer to "SCS" or "Summit", and each of its authorized agents.

## TOPICS FOR EXAMINATION

In accordance with N.D.R.Civ.P. 30(b)(6), Landowners designate the following topics and matters for examination.

I. Summit's applications and the information contained in and created or submitted in support of the applications and conclusions drawn therefrom in NDIC Case Nos. 30869, 30870, 30871, 30872 (for "Summit Carbon Storage #1, LLC,"); 30873, 30874, 30875, 30876 (for "Summit Carbon Storage #2,") and 30877, 30878, 30879, 30880 (for "Summit Carbon Storage #3, LLC,") (all applications hereafter referred to collectively as "Summit's applications").
   a. Summit's applications include all documents submitted to the North Dakota Industrial Commission including its Department of Mineral Resources and its Oil and Gas Division (collectively "NDIC") as part of or in support of or in relation to Summit's applications, and all correspondence between Summit and NDIC whether in writing and whether electronic or physical, and whether written or oral. This topic and the scope of Summit's applications as used herein includes all data files, spreadsheets, databases, and models (including loading files necessary to make data files useable with any model) and all of the information, data, documents, calculations, and non-attorney work product that was created in support of Summit's applications or which was necessary to create or is materially supportive of Summit's applications.
      i. Without limiting the generality of the foregoing, this topic includes the following models and associated data:
         1. The data and interpretations and inputs for the geologic model created with SLB's Petrel software (Schlumberger, 2020).
         2. The data and inputs and model referred to in Section 3.1 of the applications as follows:
            a. "The geologic model and properties served as inputs for numerical simulations of CO2 injection using Computer Modelling Group Ltd.'s (CMG's) GEM software (Computer Modelling Group Ltd., 2021). Numerical simulations of CO2 injection were conducted to assess potential CO2 injection rate, disposition of injected CO2, wellhead pressure (WHP), bottomhole pressure (BHP), and pressure

changes in the storage reservoir throughout the expected injection time frame and postinjection period. Results of the numerical simulations were then used to determine the project's area of review (AOR) pursuant to North Dakota's geologic CO2 storage regulations."

3. United States Geological Survey's PHREEQC geochemical model and both the data files and data inputs used to run this model and bases for using the chosen inputs.
4. The data and load files and data decks for the SLB Petrel model that was run for Summit's applications.
5. Computer Modelling Group Ltd.'s GEM model and both the data files and data inputs used to run this model and bases for using the chosen inputs.
6. 3D numerical reservoir simulation model data decks, output files and graphing files of the Storage Reservoir in original electronic format. Without limiting the foregoing, such files may commonly be stored in Schlumberger SEclipse format, CMG (Canadian Modeling Group) Imex format, or other similar format.
7. Input files, field and analytical data, and the model geochemical database (and the sources of the foregoing) used to run any modelling or analysis of critical threshold pressures or areal extent of review or impact and pressure buildup, or which was used to do any kind of analysis related to EPA Method 1 or EPA Method 2 or Analytical Solution for Leakage in Multilayered Aquifers – ASLMA, or any risk-based area-of-review analysis.

ii. These models also include the conclusions drawn from the models and the data inputs used, particularly as those conclusions were used to support Summit's applications as referenced in these topics.

iii. The identity of the person most familiar with the workflows described in Section 3.2.3 of Summit's application in NDIC Case No. 30869 and how it was performed for purposes of Summit's applications and the identity of the person who wrote this passage.

iv. The meaning and context and details of how the various processes and functions described in Section 3.2.3 of Summit's applications and how they were actually performed and the models and calculations used to support them.

b. The factual documentation and information that might support or that Summit will use to support a finding "[t]hat the storage operator has obtained the consent of persons who own at least sixty percent of the storage reservoir's pore space" as required by N.D.C.C. § 38-22-08(5).

c. The factual documentation and information that might support or that Summit will use to support any finding in this proceeding "[t]hat the proposed storage facility

will not adversely affect surface waters or formations containing fresh water" as is stated at N.D.C.C. § 38-22-08(7).

d. The factual documentation and information that might support or that Summit will use to support any finding in this proceeding that "[t]hat the storage facility will not endanger human health nor unduly endanger the environment" as is stated at N.D.C.C. § 38-22-08(10).
e. The factual documentation and information that might support or that Summit will use to support any finding in this proceeding "[t]hat the horizontal and vertical boundaries of the storage reservoir are defined [and] include buffer areas to ensure that the storage facility is operated safely and as contemplated" as is stated at N.D.C.C. § 38-22-08(12).
f. The factual documentation and information related to or that might support or that Summit will use to support any finding in this proceeding that "all nonconsenting pore space owners are or will be equitably compensated" as that phrase is used in N.D.C.C. § 38-22-08(14) and any documentation, information, data sets, comparable sales, comparable transactions, appraisals, market reports, financial reports, or other documents related to or referencing compensation paid to nonconsenting pore space owners.
    i. This subtopic I.b. includes all amounts paid by Summit to any individual or entity for use of or damages to pore space or property rights associated with or related to its storage facility that is the subject of Summit's application and the Storage Reservoir, and all agreements for such use or damages or payments.
    ii. This subtopic I.b. includes all reports and agreements in Summit's possession indicating any amount of compensation paid for any kind of use of or damage to pore space or property for CO2 sequestration. If Summit has in its possession any agreement with any property owner for use of property or damage to property arising from use of pore space or property for storage or sequestration of CO2 it is included in this topic.

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

**In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**Case No(s). 30869**
**30870**
**30871**
**30872**
**30873**
**30874**
**30875**
**30876**
**30877**
**30878**
**30879**
**30880**

BLF-0000081

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## INTERVENOR LANDOWNERS' SECOND AMENDED NOTICE OF 30(b)(6) DEPOSITION OF SUMMIT CARBON STORAGE #2, LLC

**TO:** Summit Carbon Storage #2, by and through its attorney, Lawrence Bender, Fredrickson & Byron, P.A., 304 East Front Avenue, Suite 400, Bismarck, North Dakota, 58504:

[¶1] PLEASE TAKE NOTICE that, pursuant to N.D.C.C. § 28-32-33 and Rule 30(b)(6) of the North Dakota Rules of Civil Procedure, Intervenors Landowners the Swenson Living Trust, Michael Bauman, Glenn and Lisa Gerving, Michael and Bonnie Haupt, John Jochim, Kevin and Kimberly Kraft, Charmayne Liebelt, Kirk and Linda Maize and Allen Maize, Paul and Christy Metz, JoLene M. Rust, and Gary and Cassie Smith ("Landowners") will take the deposition upon oral examination of Summit Carbon Storage #2, LLC ("SCS" or "$CO_2$ injector") through one or more of its officers, directors, managing agents, or other representatives who shall be designated to testify on the $CO_2$ injector's behalf regarding all information known or reasonably available to the $CO_2$ injector with respect to the subject matters identified in Exhibit A.

[¶2] The deposition shall commence on June 6, 2024 at 9:00 a.m. (Central Time), and continue thereafter until complete, at the offices of Braaten Law Firm, 100 N. 4th St., Ste. 100, Bismarck, North Dakota 58501. The deposition shall be conducted before a court reporter, or other officer authorized by law to administer oaths, and shall be recorded by stenographic means and supplementally recorded by video. The deposition will be taken for the purposes of discovery, for use at hearings, or for other purposes as permitted under the North Dakota Rules of Civil Procedure and N.D.C.C. ch. 28-32.

Dated this 4th day of June, 2024.

**BRAATEN LAW FIRM**

*/s/ Derrick Braaten*

Derrick Braaten (ND #06394)
109 North 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
derrick@braatenlawfirm.com

*Attorneys for Intervenors the Swenson Living Trust, Bauman, Gerving, Haupt, Jochim, Kraft, Liebelt, Maize, Metz, Rust, and Smith*

**EXHIBIT A TO NOTICE OF DEPOSITION OF SUMMIT CARBON STORAGE #2, LLC**

**DEFINITIONS**

As used in this Notice, the following terms shall have the meanings and definitions as indicated:

1. "SCS" or "Summit" means the applicants in NDIC Case Nos. 30869, 30870, 30871, 30872 (for "Summit Carbon Storage #1, LLC,"); 30873, 30874, 30875, 30876 (for "Summit Carbon Storage #2,") and 30877, 30878, 30879, 30880 (for "Summit Carbon Storage #3, LLC,"). and each of those entities' authorized agents.

2. "Landowners" means The Swenson Living Trust, Michael Bauman, Glenn and Lisa Gerving, Michael and Bonnie Haupt, John Jochim, Kevin and Kimberly Kraft, Charmayne Liebelt, Kirk and Linda Maize and Allen Maize, Paul and Christy Metz, JoLene M. Rust, and Gary and Cassie Smith.

3. "Storage Reservoir" means the reservoir and formation into which Summit intends to inject CO2 and the confining zones within the Areas of Review, as defined and depicted by Summit's applications herein (*see e.g.* Figure 1-1, NDIC Case No. 30869) including but not limited to the Storage Reservoir as defined by Section 1.15 of the Storage Agreement included with Summit's applications in NDIC Case No. 30869, and includes the confining layers/zones, to wit:

> the Pore Space and confining subsurface strata underlying the Facility Area described as the Opeche/Spearfish (Upper Confining Zone), Broom Creek (Injection Zone), and Amsden (Lower Confining Zone) Formation(s) and which are defined as identified by the well logging suite performed at one stratigraphic well, the Milton Flemmer 1 well (NDIC File No. 38594) located in the NW¼ of the NE¼, Section 35, Township 141 North, Range 88 West, Mercer County, North Dakota. The Storage Reservoir is defined as the stratigraphic interval from below the top of the Opeche/Spearfish Formation found at a depth of 5,587 feet below the Kelly Bushing, to above the base of the Amsden Formation, found at a depth of 6,421 feet below the Kelly Bushing, as identified by the Array Induction Gamma log run in the Milton Flemmer 1 well. The logging suite included triple combo (gamma ray [GR], density porosity, and resistivity), caliper, spectral GR, combinable magnetic

resonance (CMR), elemental capture spectroscopy (ESC), dipole sonic including four-arm caliper and inclinometer, and an image log. Further, the acquired logs were used to pick formation top depths and interpret lithology, petrophysical properties, and time-to-depth shifting of seismic data obtained from three 3D seismic surveys and one 5-mile long 2D seismic line covering an area totaling 208 miles in and around the Milton Flemmer 1 stratigraphic well. Formation top depths were picked from the top of the Pierre Formation to the base of the Amsden Formation. The average depth of the top of the Opeche/Spearfish Formation (Upper Confining Zone) across the storage facility area is 5,464 total vertical depth (TVD). The average depth of the base of the Amsden Formation (Lower Confining Summit Carbon Storage #1, LLC – Broom Creek 5 Zone) across the storage facility area is 6,270 feet TVD. The average thickness of the Storage Reservoir across the storage facility area is 806 feet.

4. "Communication" means any oral or written utterance, notation, or statement of any nature, by and to whomever, including, but not limited to, correspondence, text messages, chat messages, emails, letters, and any other oral or written conversations, dialogues, discussions, interviews, or consultations, between or among two or more persons.

5. "Document" means all documents or electronically stored information discoverable under N.D.R.Civ.P. 34 - including writings, drawings, graphs, charts, photographs, sound recordings, images, and other data or data compilations - stored in any medium from which information can be obtained either directly or, if necessary, after translation by you into a reasonably usable form. Documents and electronically stored information encompasses and includes all file formats in which electronically stored information is or can be stored or saved, and always includes the native file format if one exists.

6. "ESI" or "electronically stored information" means all electronically stored information discoverable under N.D.R.Civ.P. 34 - including writings, databases, shapefiles, electronic or computer files, graphs, charts, photographs, sound recordings, images, and other data or data compilations - stored in any medium from which information can be obtained either directly or, if necessary, after translation by you into a reasonably usable form. ESI encompasses and

includes all file formats in which electronically stored information is or can be stored or saved, and always includes the native file format if one exists.

7. "Identification," "identify," or "identity," when used in reference to (a) a natural person, requires you to state his or her full name and residential and business addresses; (b) a corporation, requires you to state its full corporate name and any names under which it does business, its state of incorporation, the address of its principal place of business, and the addresses of all of its offices in the State of North Dakota; (c) a business, requires you to state the full name or style under which the business is conducted, its business address or addresses, the types of businesses in which it is engaged, the geographic area in which it conducts those businesses, and the identity of the person or persons who own, operate, and control the business; (d) a document, requires you to state the number of pages and the nature of the document (e.g., letter or memorandum), and if not apparent on the face of the document or ESI, its title, its date, the name or names of its authors and recipients, and its present location and custodian; (e) a communication, requires you, if any part of the communication was written, to identify the document or documents which refer to or evidence the communication, and, to the extent that the communication was non-written, to identify the persons participating in the communication and to state the date, manner, place, and substance of the communication.

8. "Person" means any individual acting in any capacity as well as any entity or organization, including divisions, departments, and other units of the organization, and shall include such organizations as public or private corporations, partnerships, joint ventures, voluntary or unincorporated associations, sole proprietorships, trusts, estates, governmental agencies, commissions, bureaus, or departments.

9. "Representative" means any agent, employee, servant, officer, director, attorney, or other person acting or purporting to act on behalf of the person in question.

10. "You," "your," or "yourself" refer to "SCS" or "Summit", and each of its authorized agents.

## TOPICS FOR EXAMINATION

In accordance with N.D.R.Civ.P. 30(b)(6), Landowners designate the following topics and matters for examination.

I. Summit's applications and the information contained in and created or submitted in support of the applications and conclusions drawn therefrom in NDIC Case Nos. 30869, 30870, 30871, 30872 (for "Summit Carbon Storage #1, LLC,"); 30873, 30874, 30875, 30876 (for "Summit Carbon Storage #2,") and 30877, 30878, 30879, 30880 (for "Summit Carbon Storage #3, LLC,") (all applications hereafter referred to collectively as "Summit's applications").

   a. Summit's applications include all documents submitted to the North Dakota Industrial Commission including its Department of Mineral Resources and its Oil and Gas Division (collectively "NDIC") as part of or in support of or in relation to Summit's applications, and all correspondence between Summit and NDIC whether in writing and whether electronic or physical, and whether written or oral. This topic and the scope of Summit's applications as used herein includes all data files, spreadsheets, databases, and models (including loading files necessary to make data files useable with any model) and all of the information, data, documents, calculations, and non-attorney work product that was created in support of Summit's applications or which was necessary to create or is materially supportive of Summit's applications.

      i. Without limiting the generality of the foregoing, this topic includes the following models and associated data:

         1. The data and interpretations and inputs for the geologic model created with SLB's Petrel software (Schlumberger, 2020).
         2. The data and inputs and model referred to in Section 3.1 of the applications as follows:

            a. "The geologic model and properties served as inputs for numerical simulations of CO2 injection using Computer Modelling Group Ltd.'s (CMG's) GEM software (Computer Modelling Group Ltd., 2021). Numerical simulations of CO2 injection were conducted to assess potential CO2 injection rate, disposition of injected CO2, wellhead pressure (WHP), bottomhole pressure (BHP), and pressure

changes in the storage reservoir throughout the expected injection time frame and postinjection period. Results of the numerical simulations were then used to determine the project's area of review (AOR) pursuant to North Dakota's geologic CO2 storage regulations."

3. United States Geological Survey's PHREEQC geochemical model and both the data files and data inputs used to run this model and bases for using the chosen inputs.
4. The data and load files and data decks for the SLB Petrel model that was run for Summit's applications.
5. Computer Modelling Group Ltd.'s GEM model and both the data files and data inputs used to run this model and bases for using the chosen inputs.
6. 3D numerical reservoir simulation model data decks, output files and graphing files of the Storage Reservoir in original electronic format. Without limiting the foregoing, such files may commonly be stored in Schlumberger SEclipse format, CMG (Canadian Modeling Group) Imex format, or other similar format.
7. Input files, field and analytical data, and the model geochemical database (and the sources of the foregoing) used to run any modelling or analysis of critical threshold pressures or areal extent of review or impact and pressure buildup, or which was used to do any kind of analysis related to EPA Method 1 or EPA Method 2 or Analytical Solution for Leakage in Multilayered Aquifers – ASLMA, or any risk-based area-of-review analysis.

ii. These models also include the conclusions drawn from the models and the data inputs used, particularly as those conclusions were used to support Summit's applications as referenced in these topics.

iii. The identity of the person most familiar with the workflows described in Section 3.2.3 of Summit's application in NDIC Case No. 30869 and how it was performed for purposes of Summit's applications and the identity of the person who wrote this passage.

iv. The meaning and context and details of how the various processes and functions described in Section 3.2.3 of Summit's applications and how they were actually performed and the models and calculations used to support them.

b. The factual documentation and information that might support or that Summit will use to support a finding "[t]hat the storage operator has obtained the consent of persons who own at least sixty percent of the storage reservoir's pore space" as required by N.D.C.C. § 38-22-08(5).

c. The factual documentation and information that might support or that Summit will use to support any finding in this proceeding "[t]hat the proposed storage facility

will not adversely affect surface waters or formations containing fresh water" as is stated at N.D.C.C. § 38-22-08(7).

d. The factual documentation and information that might support or that Summit will use to support any finding in this proceeding that "[t]hat the storage facility will not endanger human health nor unduly endanger the environment" as is stated at N.D.C.C. § 38-22-08(10).
e. The factual documentation and information that might support or that Summit will use to support any finding in this proceeding "[t]hat the horizontal and vertical boundaries of the storage reservoir are defined [and] include buffer areas to ensure that the storage facility is operated safely and as contemplated" as is stated at N.D.C.C. § 38-22-08(12).
f. The factual documentation and information related to or that might support or that Summit will use to support any finding in this proceeding that "all nonconsenting pore space owners are or will be equitably compensated" as that phrase is used in N.D.C.C. § 38-22-08(14) and any documentation, information, data sets, comparable sales, comparable transactions, appraisals, market reports, financial reports, or other documents related to or referencing compensation paid to nonconsenting pore space owners.
    i. This subtopic I.b. includes all amounts paid by Summit to any individual or entity for use of or damages to pore space or property rights associated with or related to its storage facility that is the subject of Summit's application and the Storage Reservoir, and all agreements for such use or damages or payments.
    ii. This subtopic I.b. includes all reports and agreements in Summit's possession indicating any amount of compensation paid for any kind of use of or damage to pore space or property for CO2 sequestration. If Summit has in its possession any agreement with any property owner for use of property or damage to property arising from use of pore space or property for storage or sequestration of CO2 it is included in this topic.

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

**In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**Case No(s). 30869**
**30870**
**30871**
**30872**
**30873**
**30874**
**30875**
**30876**
**30877**
**30878**
**30879**
**30880**

BLF-000075

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**INTERVENOR LANDOWNERS' SECOND AMENDED NOTICE OF 30(b)(6) DEPOSITION OF SUMMIT CARBON STORAGE #3, LLC**

**TO:** Summit Carbon Storage #3, LLC, by and through its attorney, Lawrence Bender, Fredrickson & Byron, P.A., 304 East Front Avenue, Suite 400, Bismarck, North Dakota, 58504:

[¶1] PLEASE TAKE NOTICE that, pursuant to N.D.C.C. § 28-32-33 and Rule 30(b)(6) of the North Dakota Rules of Civil Procedure, Intervenors Landowners the Swenson Living Trust, Michael Bauman, Glenn and Lisa Gerving, Michael and Bonnie Haupt, John Jochim, Kevin and Kimberly Kraft, Charmayne Liebelt, Kirk and Linda Maize and Allen Maize, Paul and Christy Metz, JoLene M. Rust, and Gary and Cassie Smith ("Landowners") will take the deposition upon oral examination of Summit Carbon Storage #3, LLC ("SCS" or "$CO_2$ injector") through one or more of its officers, directors, managing agents, or other representatives who shall be designated to testify on the $CO_2$ injector's behalf regarding all information known or reasonably available to the $CO_2$ injector with respect to the subject matters identified in Exhibit A.

[¶2] The deposition shall commence on June 6, 2024 at 9:00 a.m. (Central Time), and continue thereafter until complete, at the offices of Braaten Law Firm, 100 N. 4th St., Ste. 100, Bismarck, North Dakota 58501. The deposition shall be conducted before a court reporter, or other officer authorized by law to administer oaths, and shall be recorded by stenographic means and supplementally recorded by video. The deposition will be taken for the purposes of discovery, for use at hearings, or for other purposes as permitted under the North Dakota Rules of Civil Procedure and N.D.C.C. ch. 28-32.

Dated this 4th day of June, 2024.

**BRAATEN LAW FIRM**

*/s/ Derrick Braaten*

Derrick Braaten (ND #06394)
109 North 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
derrick@braatenlawfirm.com

*Attorneys for Intervenors the Swenson Living Trust, Bauman, Gerving, Haupt, Jochim, Kraft, Liebelt, Maize, Metz, Rust, and Smith*

**EXHIBIT A TO NOTICE OF DEPOSITION OF SUMMIT CARBON STORAGE #3, LLC**

## DEFINITIONS

As used in this Notice, the following terms shall have the meanings and definitions as indicated:

1. "SCS" or "Summit" means the applicants in NDIC Case Nos. 30869, 30870, 30871, 30872 (for "Summit Carbon Storage #1, LLC,"); 30873, 30874, 30875, 30876 (for "Summit Carbon Storage #2,") and 30877, 30878, 30879, 30880 (for "Summit Carbon Storage #3, LLC,"). and each of those entities' authorized agents.

2. "Landowners" means The Swenson Living Trust, Michael Bauman, Glenn and Lisa Gerving, Michael and Bonnie Haupt, John Jochim, Kevin and Kimberly Kraft, Charmayne Liebelt, Kirk and Linda Maize and Allen Maize, Paul and Christy Metz, JoLene M. Rust, and Gary and Cassie Smith.

3. "Storage Reservoir" means the reservoir and formation into which Summit intends to inject CO2 and the confining zones within the Areas of Review, as defined and depicted by Summit's applications herein (*see e.g.* Figure 1-1, NDIC Case No. 30869) including but not limited to the Storage Reservoir as defined by Section 1.15 of the Storage Agreement included with Summit's applications in NDIC Case No. 30869, and includes the confining layers/zones, to wit:

> the Pore Space and confining subsurface strata underlying the Facility Area described as the Opeche/Spearfish (Upper Confining Zone), Broom Creek (Injection Zone), and Amsden (Lower Confining Zone) Formation(s) and which are defined as identified by the well logging suite performed at one stratigraphic well, the Milton Flemmer 1 well (NDIC File No. 38594) located in the NW¼ of the NE¼, Section 35, Township 141 North, Range 88 West, Mercer County, North Dakota. The Storage Reservoir is defined as the stratigraphic interval from below the top of the Opeche/Spearfish Formation found at a depth of 5,587 feet below the Kelly Bushing, to above the base of the Amsden Formation, found at a depth of 6,421 feet below the Kelly Bushing, as identified by the Array Induction Gamma log run in the Milton Flemmer 1 well. The logging suite included triple combo (gamma ray [GR], density porosity, and resistivity), caliper, spectral GR, combinable magnetic

resonance (CMR), elemental capture spectroscopy (ESC), dipole sonic including four-arm caliper and inclinometer, and an image log. Further, the acquired logs were used to pick formation top depths and interpret lithology, petrophysical properties, and time-to-depth shifting of seismic data obtained from three 3D seismic surveys and one 5-mile long 2D seismic line covering an area totaling 208 miles in and around the Milton Flemmer 1 stratigraphic well. Formation top depths were picked from the top of the Pierre Formation to the base of the Amsden Formation. The average depth of the top of the Opeche/Spearfish Formation (Upper Confining Zone) across the storage facility area is 5,464 total vertical depth (TVD). The average depth of the base of the Amsden Formation (Lower Confining Summit Carbon Storage #1, LLC – Broom Creek 5 Zone) across the storage facility area is 6,270 feet TVD. The average thickness of the Storage Reservoir across the storage facility area is 806 feet.

4. "Communication" means any oral or written utterance, notation, or statement of any nature, by and to whomever, including, but not limited to, correspondence, text messages, chat messages, emails, letters, and any other oral or written conversations, dialogues, discussions, interviews, or consultations, between or among two or more persons.

5. "Document" means all documents or electronically stored information discoverable under N.D.R.Civ.P. 34 - including writings, drawings, graphs, charts, photographs, sound recordings, images, and other data or data compilations - stored in any medium from which information can be obtained either directly or, if necessary, after translation by you into a reasonably usable form. Documents and electronically stored information encompasses and includes all file formats in which electronically stored information is or can be stored or saved, and always includes the native file format if one exists.

6. "ESI" or "electronically stored information" means all electronically stored information discoverable under N.D.R.Civ.P. 34 - including writings, databases, shapefiles, electronic or computer files, graphs, charts, photographs, sound recordings, images, and other data or data compilations - stored in any medium from which information can be obtained either directly or, if necessary, after translation by you into a reasonably usable form. ESI encompasses and

includes all file formats in which electronically stored information is or can be stored or saved, and always includes the native file format if one exists.

7. "Identification," "identify," or "identity," when used in reference to (a) a natural person, requires you to state his or her full name and residential and business addresses; (b) a corporation, requires you to state its full corporate name and any names under which it does business, its state of incorporation, the address of its principal place of business, and the addresses of all of its offices in the State of North Dakota; (c) a business, requires you to state the full name or style under which the business is conducted, its business address or addresses, the types of businesses in which it is engaged, the geographic area in which it conducts those businesses, and the identity of the person or persons who own, operate, and control the business; (d) a document, requires you to state the number of pages and the nature of the document (e.g., letter or memorandum), and if not apparent on the face of the document or ESI, its title, its date, the name or names of its authors and recipients, and its present location and custodian; (e) a communication, requires you, if any part of the communication was written, to identify the document or documents which refer to or evidence the communication, and, to the extent that the communication was non-written, to identify the persons participating in the communication and to state the date, manner, place, and substance of the communication.

8. "Person" means any individual acting in any capacity as well as any entity or organization, including divisions, departments, and other units of the organization, and shall include such organizations as public or private corporations, partnerships, joint ventures, voluntary or unincorporated associations, sole proprietorships, trusts, estates, governmental agencies, commissions, bureaus, or departments.

9. "Representative" means any agent, employee, servant, officer, director, attorney, or other person acting or purporting to act on behalf of the person in question.

10. "You," "your," or "yourself" refer to "SCS" or "Summit", and each of its authorized agents.

## TOPICS FOR EXAMINATION

In accordance with N.D.R.Civ.P. 30(b)(6), Landowners designate the following topics and matters for examination.

I. Summit's applications and the information contained in and created or submitted in support of the applications and conclusions drawn therefrom in NDIC Case Nos. 30869, 30870, 30871, 30872 (for "Summit Carbon Storage #1, LLC,"); 30873, 30874, 30875, 30876 (for "Summit Carbon Storage #2,") and 30877, 30878, 30879, 30880 (for "Summit Carbon Storage #3, LLC,") (all applications hereafter referred to collectively as "Summit's applications").

a. Summit's applications include all documents submitted to the North Dakota Industrial Commission including its Department of Mineral Resources and its Oil and Gas Division (collectively "NDIC") as part of or in support of or in relation to Summit's applications, and all correspondence between Summit and NDIC whether in writing and whether electronic or physical, and whether written or oral. This topic and the scope of Summit's applications as used herein includes all data files, spreadsheets, databases, and models (including loading files necessary to make data files useable with any model) and all of the information, data, documents, calculations, and non-attorney work product that was created in support of Summit's applications or which was necessary to create or is materially supportive of Summit's applications.

i. Without limiting the generality of the foregoing, this topic includes the following models and associated data:

1. The data and interpretations and inputs for the geologic model created with SLB's Petrel software (Schlumberger, 2020).
2. The data and inputs and model referred to in Section 3.1 of the applications as follows:

a. "The geologic model and properties served as inputs for numerical simulations of CO2 injection using Computer Modelling Group Ltd.'s (CMG's) GEM software (Computer Modelling Group Ltd., 2021). Numerical simulations of CO2 injection were conducted to assess potential CO2 injection rate, disposition of injected CO2, wellhead pressure (WHP), bottomhole pressure (BHP), and pressure

changes in the storage reservoir throughout the expected injection time frame and postinjection period. Results of the numerical simulations were then used to determine the project's area of review (AOR) pursuant to North Dakota's geologic CO2 storage regulations."

3. United States Geological Survey's PHREEQC geochemical model and both the data files and data inputs used to run this model and bases for using the chosen inputs.
4. The data and load files and data decks for the SLB Petrel model that was run for Summit's applications.
5. Computer Modelling Group Ltd.'s GEM model and both the data files and data inputs used to run this model and bases for using the chosen inputs.
6. 3D numerical reservoir simulation model data decks, output files and graphing files of the Storage Reservoir in original electronic format. Without limiting the foregoing, such files may commonly be stored in Schlumberger SEclipse format, CMG (Canadian Modeling Group) Imex format, or other similar format.
7. Input files, field and analytical data, and the model geochemical database (and the sources of the foregoing) used to run any modelling or analysis of critical threshold pressures or areal extent of review or impact and pressure buildup, or which was used to do any kind of analysis related to EPA Method 1 or EPA Method 2 or Analytical Solution for Leakage in Multilayered Aquifers – ASLMA, or any risk-based area-of-review analysis.

ii. These models also include the conclusions drawn from the models and the data inputs used, particularly as those conclusions were used to support Summit's applications as referenced in these topics.

iii. The identity of the person most familiar with the workflows described in Section 3.2.3 of Summit's application in NDIC Case No. 30869 and how it was performed for purposes of Summit's applications and the identity of the person who wrote this passage.

iv. The meaning and context and details of how the various processes and functions described in Section 3.2.3 of Summit's applications and how they were actually performed and the models and calculations used to support them.

b. The factual documentation and information that might support or that Summit will use to support a finding "[t]hat the storage operator has obtained the consent of persons who own at least sixty percent of the storage reservoir's pore space" as required by N.D.C.C. § 38-22-08(5).

c. The factual documentation and information that might support or that Summit will use to support any finding in this proceeding "[t]hat the proposed storage facility

will not adversely affect surface waters or formations containing fresh water" as is stated at N.D.C.C. § 38-22-08(7).

d. The factual documentation and information that might support or that Summit will use to support any finding in this proceeding that "[t]hat the storage facility will not endanger human health nor unduly endanger the environment" as is stated at N.D.C.C. § 38-22-08(10).
e. The factual documentation and information that might support or that Summit will use to support any finding in this proceeding "[t]hat the horizontal and vertical boundaries of the storage reservoir are defined [and] include buffer areas to ensure that the storage facility is operated safely and as contemplated" as is stated at N.D.C.C. § 38-22-08(12).
f. The factual documentation and information related to or that might support or that Summit will use to support any finding in this proceeding that "all nonconsenting pore space owners are or will be equitably compensated" as that phrase is used in N.D.C.C. § 38-22-08(14) and any documentation, information, data sets, comparable sales, comparable transactions, appraisals, market reports, financial reports, or other documents related to or referencing compensation paid to nonconsenting pore space owners.
    i. This subtopic I.b. includes all amounts paid by Summit to any individual or entity for use of or damages to pore space or property rights associated with or related to its storage facility that is the subject of Summit's application and the Storage Reservoir, and all agreements for such use or damages or payments.
    ii. This subtopic I.b. includes all reports and agreements in Summit's possession indicating any amount of compensation paid for any kind of use of or damage to pore space or property for CO2 sequestration. If Summit has in its possession any agreement with any property owner for use of property or damage to property arising from use of pore space or property for storage or sequestration of CO2 it is included in this topic.

Fredrikson

**Fredrikson & Byron, P.A.**
Attorneys and Advisors

304 East Front Avenue, Suite 400
Bismarck, ND 58504-5639
Main: 701.221.8700
fredlaw.com

June 5, 2024

***VIA E-MAIL***

*derrick@braatenlawfirm.com*
Derrick L. Braaten
Braaten Law Firm
109 N. Fourth St., Ste. 100
Bismarck, ND 58501-4003

**RE: NDIC Case Nos. 30869–30880**

Dear Derrick:

This letter concerns the following documents you served in the above-referenced cases: Intervenor Landowners' Second Amended Notice of 30(b)(6) Deposition of Summit Carbon Storage #1, LLC; Intervenor Landowners' Second Amended Notice of 30(b)(6) Deposition of Summit Carbon Storage #2, LLC; Intervenor Landowners' Second Amended Notice of 30(b)(6) Deposition of Summit Carbon Storage #3, LLC (collectively, the "Deposition Notices"). I received copies of these documents by e-mail yesterday, June 4, 2024.

Rule 30(b)(1) provides that a party who wants to depose a person by oral questions must give reasonable written notice "to every other party." The North Dakota Industrial Commission ("Commission") issued an order on Monday, June 3, 2024, granting the petition to intervene in NDIC Case Nos. 30869–30880 filed by Minnkota Power Cooperative, Inc. ("Minnkota"). The declaration of service accompanying the Deposition Notices does not indicate that Minnkota has been served with copies thereof. As a result, the Intervenor Landowners have not complied with Rule 30 and the Deposition Notices are ineffective. *Cf. Rolin Mfg., Inc. v. Mosbrucker*, 544 N.W.2d 132, 139 (N.D. 1996) (Noting that issuance of subpoena without written notice to other parties was "not consistent with" the Rules of Civil Procedure and affirming district court order quashing subpoena and imposing sanctions on issuing party).

If Minnkota has been given notice of the proposed depositions of my clients, there remain issues with the Deposition Notices that I believe are ultimately fatal. As noted above, Rule 30(b)(1) requires that a party seeking to depose another person must give "reasonable written notice" thereof. The Deposition Notices were served on June 4, 2024, for a deposition to take place on June 6, 2024. I am not aware of any court that has held less than two days' notice to be "reasonable" under Rule 30. For this reason, the Deposition Notices do not comply with Rule 30.

Fredrikson

Rule 30(b)(6) requires that "[b]efore or promptly after the notice . . . is served, the serving party and the organization must confer in good faith about the matters for examination." Intervenor Landowners have not attempted to confer in good faith with my clients regarding the matters for examination, nor does a June 6, 2024 deposition date allow for such conferral. As such, the Intervenor Landowners have not complied with Rule 30(b)(6) and the Deposition Notices are for that additional reason ineffective.

The Intervenor Landowners failure to confer in good faith regarding matters for examination is exacerbated by the fact that the Deposition Notices do not comply with Rule 30(b)(6)'s requirement they "describe with reasonable particularity the matters for examination." As I read the Deposition Notices, I understand the topic for examination to be "Summit's applications and the information contained in and created or submitted in support of the applications and conclusions drawn therefrom in NDIC Case Nos. [30869–30880]." This is analogous to listing "all allegations contained in the complaint" as a matter for examination, which courts routinely reject for failure to comply with the reasonable particularity requirement. *See, e.g.*, *Washington-St. Tammany Elec. Coop., Inc. v. Louisiana Generating, L.L.C.*, No. CV 17-405-JWD-RLB, 2019 WL 1804849, at *12 (M.D. La. Apr. 24, 2019) (concluding that 30(b)(6) deposition topic "which generally refers to allegations in the Complaint" is overly broad and fails to describe the topic with reasonable particularity); *Waste Mgmt. of Louisiana, LLC v. River Birch, Inc.*, No. CV 11-2405, 2017 WL 2831700, at *3 (E.D. La. June 30, 2017) (finding that "The factual basis for the allegations contained in [the Plaintiff's] RICO Statement" and "The factual basis for the allegations contained in [the Plaintiff's] Third Amended Complaint" to be overly broad as written); *Carriage Hills Condo., Inc. v. Roofing*, 109 So.3d 329, 336 (Fla. App. 2013) (finding that "all allegations contained in the complaint" fails to meet reasonable particularity requirement); *E3 Biofuels, LLC v. Biothane, LLC*, No. 8:11CV44, 2013 WL 4400506, at *2 (D. Neb. Aug. 15, 2013) (stating the most obvious example of a failure to particularize the areas of inquiry is a request for testimony regarding "[Plaintiff's] claims as set forth in its Amended Complaint"). Because the Deposition Notices fail to comply with Rule 30(b)(6)'s "reasonable particularity" requirement, they are improper and ineffective.

Ultimately, this letter is intended to inform you that because of the Intervenor Landowners' failure to comply with Rule 30, my clients do not intend to appear for the depositions tomorrow, June 6, 2024, as set forth in the Deposition Notices. Should you have any questions, please advise.

Sincerely,

*/s/ Lawrence Bender*

LAWRENCE BENDER

LB/sdp

cc: Summit Carbon Solutions, LLC

#82707960v1

**From:** "Derrick Braaten" <derrick@braatenlawfirm.com>
**Sent:** Thursday, June 6, 2024 12:39 AM
**To:** "Etter, Mary" <MEtter@fredlaw.com>
**Cc:** "Bender, Lawrence" <LBender@fredlaw.com>; "Ptacek, Spencer" <SPtacek@fredlaw.com>; "Desirae Zaste" <desirae@braatenlawfirm.com>
**Subject:** RE: NDIC Case Nos. 30869-30880
**Attachments:** RE: Summit Carbon Solutions – NDIC Case Nos. 30869-30880, 240502 Bender ltr from DB re discovery and deposition.pdf

Lawrence,

I appreciate your sending this notice and letting me know in advance this evening.

I disagree that there is not an obligation for your client to produce a witness. I'll respond specifically to your points below.

I did provide notice to Minnkota. I was in a hearing all day today with Josh Swanson and explained it to him and he was aware of the deposition and apparently not intending to participate. But he did get notice. We also served him formally with the notice of deposition.

I offered to confer before I even served the notice, and that letter is attached. I then served you with the notice that included the topics for examination on May 9, and they have not changed since then. That was more than sufficient to provide you with reasonable notice as well. You were provided with the topics a month ago and they've not changed, and you were well aware of the date and time. My opening email also offered to confer and adjust the date or work with you on this depo, and you never took me up on that.

As to the particularity of the topics speak for themselves, and I clearly did not simply state "the applications." For example, I narrowed in from the broader category to very specifically request a witness prepared to discuss: "The data and inputs and model referred to in Section 3.1 of the applications as follows: [the] geologic model and properties served as inputs for numerical simulations of CO2 injection using Computer Modelling Group Ltd.'s (CMG's) GEM software (Computer Modelling Group Ltd., 2021). Numerical simulations of CO2 injection were conducted to assess potential CO2 injection rate, disposition of injected CO2, wellhead pressure (WHP), bottomhole pressure (BHP), and pressure changes in the storage reservoir throughout the expected injection time frame and postinjection period. Results of the numerical simulations were then used to determine the project's area of review (AOR) pursuant to North Dakota's geologic CO2 storage regulations." I also specified: "United States Geological Survey's PHREEQC geochemical model and both the data files and data inputs used to run this model and bases for using the chosen inputs."

I intend to move forward with the deposition tomorrow morning. If there is no witness I will put that on record and continue the deposition.

Thank you,
Derrick

**Derrick Braaten**

**BRAATEN LAW FIRM**
109 N. 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
Fax: 701-221-5842
www.braatenlawfirm.com

**PRIVILEGED COMMUNICATION**
**This e-mail message is intended only for the named recipient(s) above and is covered by the Electronic Communications Privacy Act, 18 U.S.C. Sections 2510-2521. This e-mail is confidential and may contain information that is privileged, attorney work product or exempt from disclosure under applicable law. Recipients should not file copies of this e-mail with publicly accessible records. If you have received this message in error, please immediately notify the sender by return e-mail and delete this e-mail message from your computer. Thank you for your cooperation.**

**From:** Etter, Mary <METter@fredlaw.com>
**Sent:** Wednesday, June 5, 2024 5:55 PM
**To:** Derrick Braaten <derrick@braatenlawfirm.com>
**Cc:** Bender, Lawrence <LBender@fredlaw.com>
**Subject:** NDIC Case Nos. 30869-30880

[Warning: External Sender]
Good evening, Derrick,

Please see the attached letter from Mr. Bender. If you have any questions, please contact Lawrence.

Thank you,
Mary

***Mary Etter***
*Legal Administrative Assistant to Jason R.S. Cassady,*
*Justin G. Hughes, and Spencer D. Ptacek*
Fredrikson & Byron, P.A.
304 East Front Ave, Suite 400 | Bismarck, ND 58504-5639
Direct: 701.221.8642 | Main: 701.221.8700| metter@fredlaw.com
www.fredlaw.com

Fredrikson

*Fredrikson's Bismarck office has moved, please note our new address.*

***This is a transmission from the law firm of Fredrikson & Byron, P.A. and may contain information which is privileged, confidential, and protected by the attorney-client or attorney work product privileges. If you are not the addressee, note that any disclosure, copying, distribution, or use of the contents of this message is prohibited. If you have received this transmission in error, please destroy it and notify us immediately at our telephone number (701) 221-8700.***

BRAATEN
Law Firm

May 2, 2024

**Via Email Only**

Lawrence Bender
304 East Front Avenue, Suite 400
Bismarck, ND 58504-5639
lbender@fredlaw.com

**Re: Summit Carbon Solutions – NDIC Case Nos. 30869-30880**

Lawrence:

I am writing to discuss discovery in this administrative proceeding. I would like to conduct a 30(b)(6) deposition of your client and am currently working on a topic list and will be providing that to you in the next few days. I understand you will need to see the topics in order to determine who at Summit will be testifying, but I would like to put aside some days in late May/early June for the deposition that work for our two schedules at least given how busy we both are and are likely to become. Please let me know what days you have available for a deposition. I also will be serving your client with a couple rounds of written discovery, and I want to give you a heads up that I intend to request that the NDIC expedite the discovery process.

I also would like to know if you would have any objection to my asking the commission for electronic data and files that were provided to the commission on behalf of your client, such as shape files, engineering files for the reservoir modeling and geological data. If I am able to get all data and electronic files the Commission has, that may be sufficient for my experts and their technical review if it contains all of the pertinent data. I'm also happy to sit down with you and anyone from Summit or the NDIC to discuss a way to efficiently exchange data and information prior to the hearing.

Sincerely,

Derrick Braaten

DB/dnz

cc: Clients

30(b)(6) Deposition of Summit Carbon Storage #1, #2, #3, LLC06-06-2024
EXHIBIT
009
30869-30880

**From:** "Derrick Braaten" <derrick@braatenlawfirm.com>
**Sent:** Thursday, May 9, 2024 8:08 PM
**To:** "Desirae Zaste" <desirae@braatenlawfirm.com>; "Bender, Lawrence" <LBender@fredlaw.com>
**Subject:** RE: Summit Carbon Solutions – NDIC Case Nos. 30869-30880

Lawrence,

I scheduled this to get a date down and I did try to look at what I know of your schedule between PSC hearings, etc. I am open to rescheduling this if we can find a mutually agreeable date though, so just wanted to let you know that right away. I realize we may also still get in a fight about whether you're going to show up or respond to anything I am doing until the NDIC responds to the petition, but assuming I move ahead with it just let me know on the date.

Thanks,
Derrick

**Derrick Braaten**

BRAATEN LAW FIRM
109 N. 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
Fax: 701-221-5842
www.braatenlawfirm.com

**PRIVILEGED COMMUNICATION**
**This e-mail message is intended only for the named recipient(s) above and is covered by the Electronic Communications Privacy Act, 18 U.S.C. Sections 2510-2521. This e-mail is confidential and may contain information that is privileged, attorney work product or exempt from disclosure under applicable law. Recipients should not file copies of this e-mail with publicly accessible records. If you have received this message in error, please immediately notify the sender by return e-mail and delete this e-mail message from your computer. Thank you for your cooperation.**

**From:** Desirae Zaste <desirae@braatenlawfirm.com>
**Sent:** Thursday, May 9, 2024 3:04 PM
**To:** Bender, Lawrence <LBender@fredlaw.com>
**Cc:** Derrick Braaten <derrick@braatenlawfirm.com>
**Subject:** Summit Carbon Solutions – NDIC Case Nos. 30869-30880

Mr. Bender,

Attached for service are the following documents:

- **Landowners Notice of 30(b)(6) Deposition of Summit Carbon Solutions; and**
- **Declaration of Service.**

A copy will also be sent via US Mail.

**DESIRAE ZASTE** | Certified Paralegal

30(b)(6) Deposition of Summit Carbon Storage #1, #2, #3, LLC06-06-2024
EXHIBIT
010
30869-30880

desirae@braatenlawfirm.com

**BRAATEN LAW FIRM**
109 N. 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
Fax: 701-221-5842
www.braatenlawfirm.com

**PRIVILEGED COMMUNICATION**
**This e-mail message is intended only for the named recipient(s) above and is covered by the Electronic Communications Privacy Act, 18 U.S.C. Sections 2510-2521. This e-mail is confidential and may contain information that is privileged, attorney work product or exempt from disclosure under applicable law. Recipients should not file copies of this e-mail with publicly accessible records. If you have received this message in error, please immediately notify the sender by return e-mail and delete this e-mail message from your computer. Thank you for your cooperation.**

## CHRISTOPHER J. STOCKNESS

Chris is managing director of the real estate division at Shenehon Company. An experienced appraiser, he has valued a wide range of commercial and industrial properties, complex investment portfolios, and ground leases. Over the last few years, Chris has expanded his service area, preparing appraisals for individuals, government agencies, and national lending institutions across the United States and internationally. Clients rely on Chris to appraise residential developments, determine project feasibility, and provide analyses of real estate investment opportunities. Chris has appraised a wide variety of conservation easements and is a nationally-recognized expert in the area. Chris also offers expert testimony, appraisal review, and consulting services. He is currently pursuing the MAI designation through the Appraisal Institute.

### EDUCATION

- University of St. Thomas, Bachelor of Science, Real Estate

### LICENSE

- Minnesota License No. 20458763
- North Dakota License No. CG-220130

### AFFILIATIONS

- National Association of Industrial and Office Properties
- Urban Land Institute
- Associate Member Appraisal Institute

### ARTICLES AND PRESENTATIONS

- "Storm Clouds Ahead: Navigating Real Estate through the Southwest Light Rail Line," *Valuation Viewpoint,* Fall 2018
- Panelist, "Critical Capital Markets Update & Office Investment Sales Update," The Office Summit, *Minnesota Real Estate Journal,* December 2, 2016
- Panelist, "Capital Markets Update," The Office Summit, *Minnesota Real Estate Journal,* December 4, 2015
- Presenter, "Valuing and Managing Your Assets," Succession Planning Summit: Real Estate and Private Business, *Minnesota Real Estate Journal*, December 12, 2014
- Presenter, "Critical Capital Market to Investment Strategies," The Office Summit, *Minnesota Real Estate Journal*, December 5, 2014
- "Office Rents in Downtown Minneapolis and Other Major Markets," Shenehon Company *Hot Topic* post, November 2013

INDUSTRIAL COMMISSION
STATE OF NORTH DAKOTA
DATE 6/13/24 CASE NO. 30869-880
Introduced By Braaten
Exhibit LO-55
Identified By Stockness

EXHIBIT
tabbies
LO-55
30869-30880

**PRESENTATIONS & PUBLICATIONS – CHRISTOPHER J. STOCKNESS**

- "Storm Clouds Ahead: Navigating the Southwest Light Rail Line," *Valuation Viewpoint* newsletter, Fall 2018
- Panelist, "Real Estate Capital Markets," *Minnesota Real Estate Journal,* April 18, 2018
- Presenter, "Applying the Development Cost Approach – An Appraiser's Perspective", Hennepin County Bar Association – Eminent Domain, April 26, 2017
- Panelist, "Capital Markets Update," The Office Summit, *Minnesota Real Estate Journal,* December 1, 2017
- Panelist, "Real Estate Capital Markets," *Minnesota Real Estate Journal,* April 20, 2017
- Panelist, "Critical Capital Markets Update & Office Investment Sales Update," The Office Summit, *Minnesota Real Estate Journal,* December 2, 2016
- Panelist, "Capital Markets Update," The Office Summit, *Minnesota Real Estate Journal,* December 4, 2015
- Presenter, "Valuing and Managing Your Assets," Succession Planning Summit: Real Estate and Private Business, *Minnesota ~~Real~~ Estate Journal*, December 12, 2014
- Presenter, "Critical Capital Market to Investment Strategies," The Office Summit, *Minnesota Real Estate Journal*, December 5, 2014
- "Office Rents in Downtown Minneapolis and Other Major Markets," Shenehon Company *Hot Topic* post, November 2013
- "Employ the Development Cost Approach to Value an Atypical Taking," *Valuation Viewpoint* newsletter, Fall 2009
- "Summary of State of Minnesota vs. Union Pacific Railroad, et al," Shenehon Company *Hot Topic* post, May 2009
- "Appraising Development Projects in Challenging Economic Times," co-author with Thomas Gump and Robert J. Strachota, *Minnesota Real Estate Journal*, August 2008

## EXPERT TESTIMONIES – CHRISTOPHER J. STOCKNESS

| Date | Subject and Court Docket Number | Attorney/Client | Conclusion |
|---|---|---|---|
| May 22, 2012 | Deadwood Canyon Ranch v. Fidelity Exploration & Production US Dist Court ND 4:10-CV-81 | Dave Peterson Larson Latham Huettl | Deposition |
| August 30, 2012 | Madden Dissolution | Judith Oakes, J. Oakes Family Law | Deposition |
| October 15, 2013 | Larson Matter | Judith Oakes, J. Oakes Family Law | Trial Hearing – Testified |
| May 5, 2015 | Abramovitz Dissolution | James Vedder. Attorney | Family Law Court- Testified |
| November 7, 2015 | Florine Dissolution | Denis E. Grande DeWitt Mackall Crounse & Moore S.C. | Family Court – Testified |
| June 8, 2016 | Nelson v. American Family Insurance Company | Bert Black, Schaefer Halleen, LLC | Deposition |
| July 18, 2016 | CapEx Easement - Bauer Farms | Donald J. Fluegel, Attorney | Commissioner Hearing - Testified |
| July 18, 2016 | CapEx Easement - Endres Farms | Donald J. Fluegel, Attorney | Commissioner Hearing - Testified |
| August 30, 2016 | Metropolitan State Condemnation of 393 Bates | Steve Melchionne, Minnesota Attorney General's Office | Commissioner Hearing – Testified |
| December 9, 2016 | Schmitz Condemnation | Dan Biersdorf Biersdorf & Associates | Deposition |
| December 22, 2016 | Metropolitan Airports Commission v. O'Neil 27-CV-14-1374 | Monte Mills Greene Espel | Commissioners Hearing - Testified |

| | | | |
|---|---|---|---|
| December 14, 2017 | Graco Condemnation | Thomas Boyd Winthrop & Weinstine | Commission Hearing - Testified |

Shane A. Bofto Senior Chemical/Environmental Engineer

HydroSolutions

Email: shaneb@hydrosi.com

Tel:406.655.9555 x107

## Professional Profile - Expert

Shane Bofto is a Senior Chemical/Environmental Engineer for HydroSolutions, with over 32 years of experience in environmental work related to oil and gas production and refining, hardrock, coal, and aggregate mining, and resource development focusing primarily on air and water quality. Projects have involved mining, energy, oil and gas (upstream, midstream, and downstream), underground coal gasification (UCG), and chemical production encompassing water management, modelling, permitting, compliance, EIS, environmental due diligence, water chemistry, treatment and remediation. Locations have included United States, Canada, and internationally.

## Academic Credentials

| | | |
|---|---|---|
| MBA | Management, University of Mary | 2009 |
| B.S. | Chemical Engineering, Montana State University | 1986 |
| | Biology/Chemistry, Eastern Montana College | 1980-82 |

## Professional Affiliations

Member, American Institute of Chemical Engineers, AIChE
Member, Society of Petroleum Engineers

INDUSTRIAL COMMISSION
STATE OF NORTH DAKOTA
DATE 6/12/24 CASE NO 30869-30880
Introduced By Bofto (HydroSolutions)
Exhibit LO-56
Identified By Bofto

## Certifications

| | |
|---|---|
| OSHA (29 CFR 1910) | Hazardous Materials Training |
| Montana UST Removers License | #R-0594-459 - Expired |

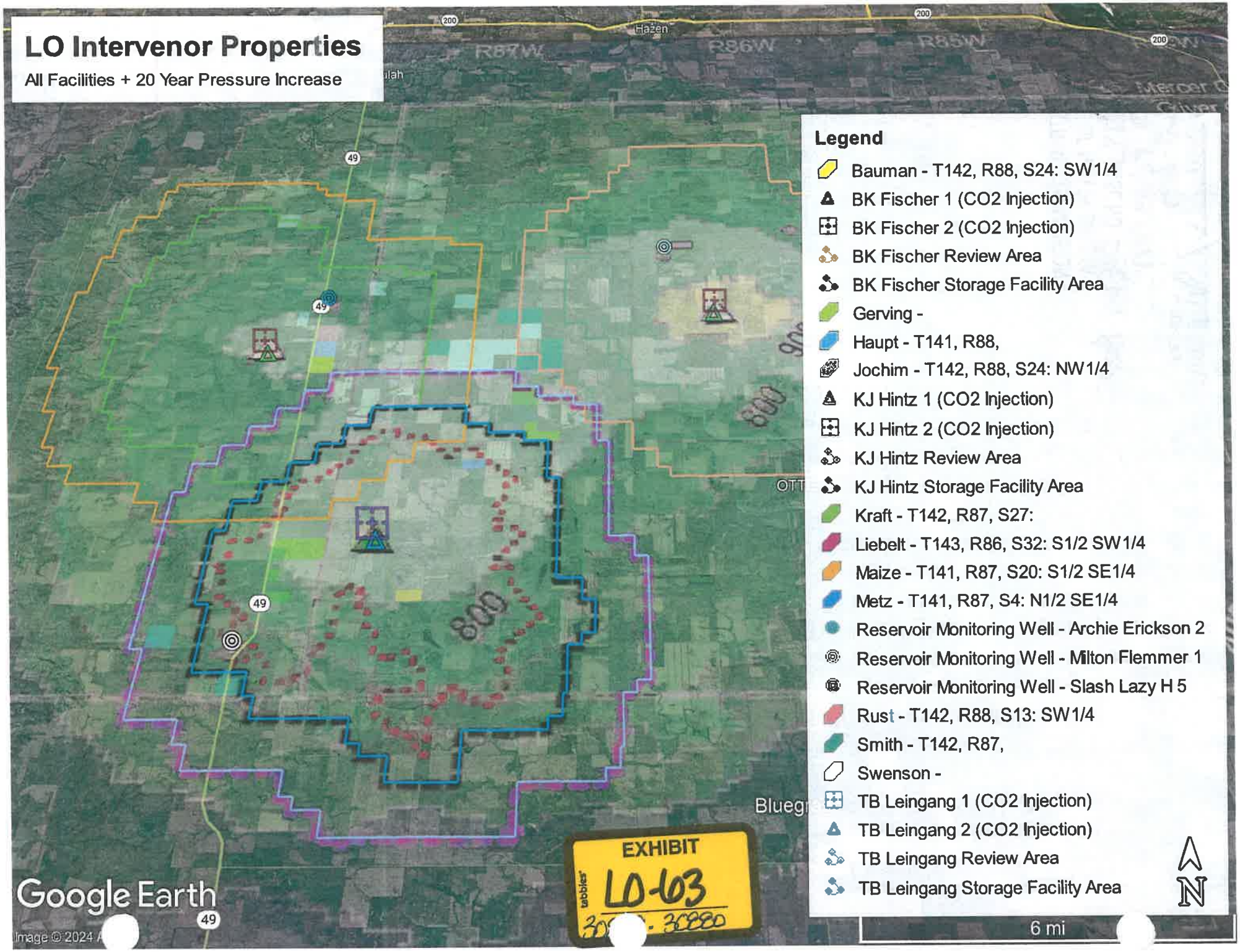
## Selected Project Experience

### EXPERT TESTIMONY

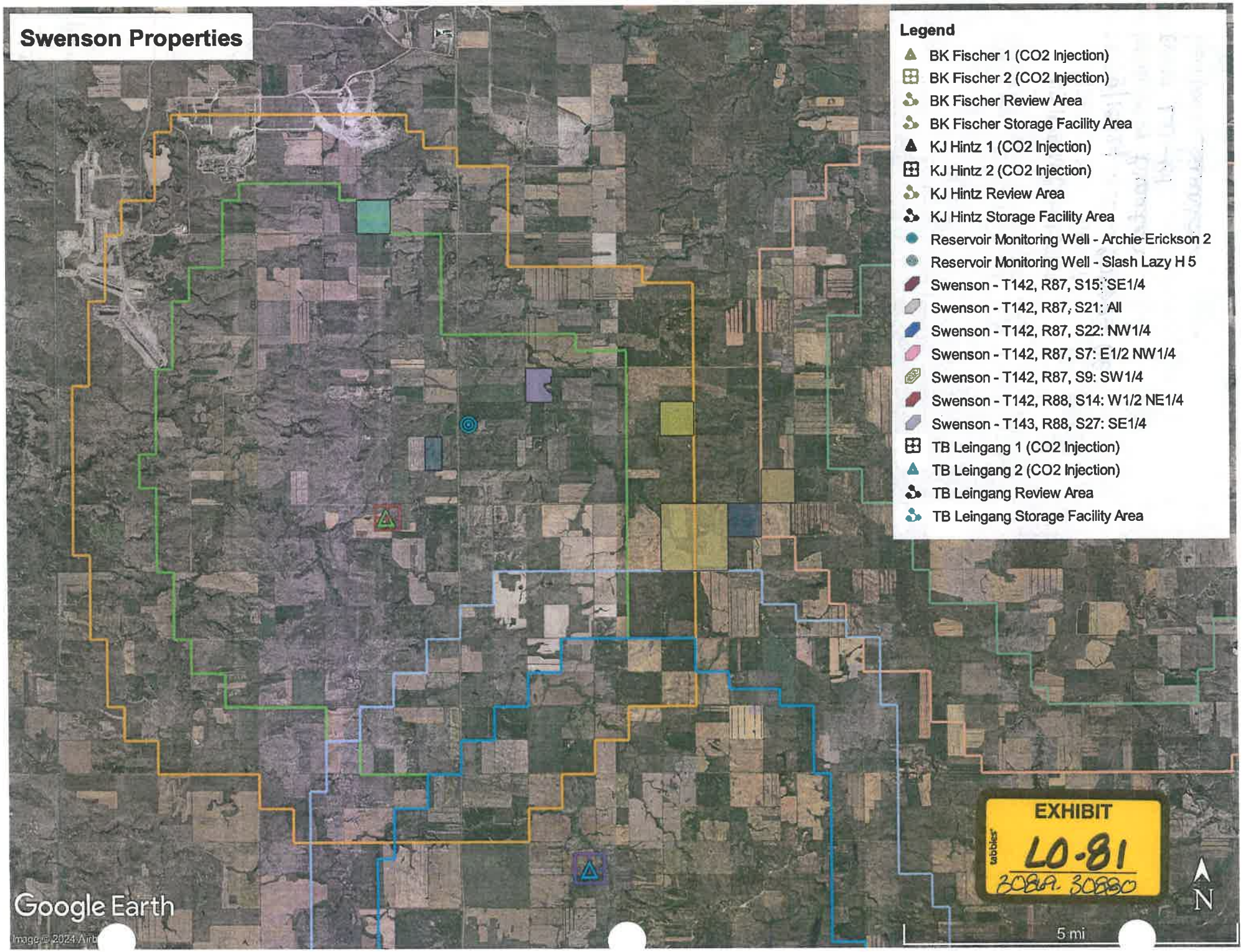
**ARCO (Anaconda, Montana)** - Developed permits for construction and discharge of 7 outfalls for a drain tile system to control high groundwater. Activities included a water quality evaluation, contaminant source mitigation, legal depositions, and permitting for MPDES, 310 and 404 Permits. Provided expert testimony in support of ARCO as part of the civil case.

**Braaten Law Partners, Peterson v. Petro Harvester Operating Company (Bottineau County, North Dakota)** – Provided a field assessment for numerous produced water spills from a salt water disposal facility and oil and gas production. Parameters of concern included a soils impact assessment of total dissolved solids, sodium adsorption ratio, chlorides, radium and extractable petroleum hydrocarbons and review of defendant's remediation report to an agricultural field. The expert report integrated multiple disciplines to include hydrogeology, regulatory compliance (NDIC, NDDoH, EPA), soil chemistry, and hydrogeology.

EXHIBIT
tabbies
LO-56
30869-30880


LO Intervenor Properties
All Facilities + 20 Year Pressure Increase
Legend
Bauman - T142, R88, S24: SW1/4
BK Fischer 1 (CO2 Injection)
BK Fischer 2 (CO2 Injection)
BK Fischer Review Area
BK Fischer Storage Facility Area
Gerving -
Haupt - T141, R88,
Jochim - T142, R88, S24: NW1/4
KJ Hintz 1 (CO2 Injection)
KJ Hintz 2 (CO2 Injection)
KJ Hintz Review Area
KJ Hintz Storage Facility Area
Kraft - T142, R87, S27:
Liebelt - T143, R86, S32: S1/2 SW1/4
Maize - T141, R87, S20: S1/2 SE1/4
Metz - T141, R87, S4: N1/2 SE1/4
Reservoir Monitoring Well - Archie Erickson 2
Reservoir Monitoring Well - Milton Flemmer 1
Reservoir Monitoring Well - Slash Lazy H 5
Rust - T142, R88, S13: SW1/4
Smith - T142, R87,
Swenson -
TB Leingang 1 (CO2 Injection)
TB Leingang 2 (CO2 Injection)
TB Leingang Review Area
TB Leingang Storage Facility Area
Hazen
R87W
R86W
R85W
Google Earth
6 mi
N
EXHIBIT
LO-03

INDUSTRIAL COMMISSION
STATE OF NORTH DAKOTA
DATE 6/12/24 CASE NO 30869-880
Introduced By Braaten
Exhibit LO-63
Identified By Douglas / Swenson. 6/13/24


Swenson Properties
Legend
BK Fischer 1 (CO2 Injection)
BK Fischer 2 (CO2 Injection)
BK Fischer Review Area
BK Fischer Storage Facility Area
KJ Hintz 1 (CO2 Injection)
KJ Hintz 2 (CO2 Injection)
KJ Hintz Review Area
KJ Hintz Storage Facility Area
Reservoir Monitoring Well - Archie-Erickson 2
Reservoir Monitoring Well - Slash Lazy H 5
Swenson - T142, R87, S15: SE1/4
Swenson - T142, R87, S21: All
Swenson - T142, R87, S22: NW1/4
Swenson - T142, R87, S7: E1/2 NW1/4
Swenson - T142, R87, S9: SW1/4
Swenson - T142, R88, S14: W1/2 NE1/4
Swenson - T143, R88, S27: SE1/4
TB Leingang 1 (CO2 Injection)
TB Leingang 2 (CO2 Injection)
TB Leingang Review Area
TB Leingang Storage Facility Area
EXHIBIT
LO-81
30869, 30890
N
5 mi
Google Earth

INDUSTRIAL COMMISSION
STATE OF NORTH DAKOTA
DATE 6/13/24 CASE NO. 30869-880
Introduced By Braaten
Exhibit LO-81
Identified By Swenson

**Braaten Law Partners, (Belle Creek, Montana)** – Provided a field assessment for oil and gas production spill and clean-up. Field assessment included sampling soils for EPH, common cations/anions, and observations in support of surface owner documentation of clean-up.

**Crist Law Firm, McEwen v. MCR, LLC (Shelby, Montana)** – Provided expert services regarding an oil and gas produced water permitted outfall for a surface pond used as a stock water source for sheep. Evaluations included decommissioning the pond through land application of the water, and surface reclamation of the pond bed.

**Crowley Fleck, PLLP, Skari v. True Oil (Liberty County, Montana)** – Provided expert services regarding clean-up of produced water impacted alkaline soils. Subsequent work included the preparation of a soils remediation plan to address soil EC and SAR.

**D'Alton Law Firm, Morgan Farms v. Interstate Explorations, LLC (Billings, Montana)** – Provided expert services regarding clean up and disposal of petroleum contaminated soils, storm water permitting issues, and spill prevention, control and countermeasure plans for a former drill site on private surface.

**Doney Crowley, P.C., Yellowstone Disposal Landfill Environmental Assessment (Sidney, Montana)** – Provided expert services regarding public comment of the DEQ prepared Environmental Assessment for the permit application to construct and operate a special waste landfill southeast of Sidney, Montana on behalf of a citizen's group and their legal representation. Evaluation included ground and surface water, air quality, landfill operations, and waste acceptance criteria including NORM and TENORM.

**Moulton Bellingham, PC, Ralston v. City of Hardin (Hardin, Montana)** – Completed a site reconnaissance and expert witness opinion regarding plaintiff's expert disclosure regarding storm water and sanitary sewer impacts to properties as a result of significant rainfall events.

**Montana Board of Oil and Gas, (Montana)** – Project Manager and Lead Engineer to prepare draft an application to EPA for Underground Injection Control (UIC) Program Class VI Primacy Application for Carbon Sequestration. Reviewed all EPA guidance documentation regarding project planning, site characterization, well construction, testing and monitoring, AOR corrective action guidance, financial responsibility, and public participation considerations. Used the guidance to complete the draft of six core element, MIT, P&A, Groundwater Investigations, Environmental Monitoring, Emergency Response, and Enforcement and Compliance Procedures of the primacy application.

**Sweely Oil Company, (Sidney, Montana)** – Conducted a remedial investigation and provided expert testimony in support of challenges to land use of a former Standard Oil services station.

**NEPA/ MEPA- EIS/EA**

**Montana DEQ, Butte Highlands Mine EIS (Montana)** -Project Engineer for Montana DEQ under the Hard Rock Mining Bureau and USFS. Evaluated primary, secondary impacts from air quality and hazardous materials for compliance with MEPA/NEPA, MMRA, and CWA.

**Montana DEQ, Garnet Hill Mine EIS (Montana)** - Project Engineer for Montana DEQ under the Hard Rock Mining Bureau. Project Engineer for Montana DEQ under the Hard Rock Mining Bureau. Evaluated primary, secondary impacts from air quality and hazardous materials for compliance with MEPA, MMRA, and CWA.

**Montana DEQ, Cloud Peak Energy, Spring Creek Mine (Montana)** – Project Engineer Reviewed the expansion EA for the proposed Spring Creek Mine Transportation Corridor and evaluated primary, secondary impacts for compliance for air and water quality with MEPA, MSUMRA, and CWA. Final EIS pending DEQ approval.

**Montana DEQ, Golden Sunlight Mine, (Whitehall, Montana)** - Reviewed the expansion EA for the East Area Pit Expansion Amendment for MDEQ. Review included an evaluation of potential water quality and quantity to

the Primary Pit Flowpath for Montana DEQ under the Hard Rock Mining Bureau, and evaluated primary, secondary impacts for compliance with MEPA, MMRA, and CWA.

**Montana DEQ, Montana Resources (Montana) -** Project Engineer on the Montana Resources EIS and was responsible for air quality and geochemistry. He also served as technical editor for water quality, water treatment and mining operations for Montana DEQ under the Hard Rock Mining Bureau, and evaluated primary, secondary impacts from air quality and water quality of tailings water for compliance with MEPA/NEPA, MMRA, RCRA. CAA, and CWA. Completed a technical memorandum on air quality at the project site. Draft EIS has been published for comment.

**Montana DEQ, Outstanding Resource Water EIS, Gallatin River (Big Sky, Montana) -** Through MDEQ's consultant, Garcia and Associates, a measurable change impact evaluation on water quality of the Gallatin River was completed. Projected impacts by developments along the Gallatin River through nutrients (nitrogen and phosphorous) were made in support of baseline and impacts analysis for the EIS. This was based on modelling impacts based on single family entities waste water flows and nutrient loading in hydrologically connected aquifers to the stream. Footprint analysis was developed to determine areas conjunctive interaction between stream and groundwater for the over 30 mile stretch.

**Rosetta Resources Operating, LP Programmatic Environmental Assessment, Oil and Gas Exploration and Development (Shelby, West Shelby, Calk Butte Prospect Area (Cut Bank, Montana) -** This was an extensive EA with multiple cooperating agencies covering 270,000 acres within the Blackfeet Indian Reservation. As project engineer, an evaluation was completed of environmental conditions with respect to air quality and GHG of an existing, historical oil field with respect to proposed development of horizontal and fractured wells within the resource area. The EAs evolved over the years to include greenhouse gas (GHG) emission evaluation and air quality concerns for development and long term production. Preparation of the EA documents involved a team of specialists and scientists from the BIA regional office, BIA Blackfeet Agency, Blackfeet Tribe, BLM, and the operator. The Draft EA was finalized in October 2011.

**USFS Blacktail Road Restoration and Stabilization Project, Environmental Assessment (Flathead National Forest, Montana)** – Completed an air quality and GHG impacts analysis based on current and existing Forest Service data, ensuring that the EA was consistent with recent land management EIS documents, responding to all public comments, compiling the project record, and revising the final EA and Record of Decision. The Draft EA was issued in July 2016, and the Final EA and Record of Decision were issued in December 2016.

**USFS Butte Highlands Mine Haul Road Project, Environmental Assessment (Montana) -** Served as lead consultant for the Forest Service's comment analysis and final Environmental Assessment with regards to GHG and air quality concerns. The Draft EA was issued in March 2014, and the Final EA was issued in March 2015. HydroSolutions also assisted the Forest Service to address issues during the objection process.

**USFS Fern Hardy Resource Area, Supplemental Environmental Assessment, (Flathead National Forest, Idaho)** – Performed a GHG/Air Quality impacts analysis for resource development within the Flathead National Forest. The Draft S EA was issued in December 2016. The Final S EA is in process.

**MINING and OTHER PERMITS**

**Cloud Peak Energy, Spring Creek Mine (Decker, Montana) -** Completed a geochemical evaluation of arsenic fate using USGS PHREEQC model to assess arsenic sources, speciation, and fate as a supplement to the mine's probable hydrologic consequences document.

**Echo Bay Minerals-Borealis Mine (Nevada) -** Reviewed and compiled data for effluent parameters from heap leach decommissioning rinse effluent for anticipated rinse water quality from spent leach pads. Water quality data was used in preparation of a heap leach closure permit.

**Golden Sunlight Mine (White Hall, Montana)** - Conducted this analysis to evaluate whether the East Area Pit would alter long-term predictions of groundwater quality and quantity along the Primary Pit Flowpath, or whether impacts would remain as disclosed in the April 1998 Final EIS (1998 FEIS) for Amendment 008 to Operating Permit No. 00065 and the July 2007 Supplemental EIS (2007 SEIS) for the Golden Sunlight Mine Pit Reclamation.

**Marc Rich Mining-Salsigne Mine et (Carcassonne, France)** - Investigated alternative forms of iron oxidation in mine water in order to precipitate the trace metals with organic flocculent. Investigated alternatives for the reduction of calcium sulfate scale by reagent selection and modification of operating parameters.

**Montana Department of State Lands, Abandon Mine Reclamation Bureau, Hazardous Mine Opening (Butte, Montana)** - Characterized waste rock dumps and profiled shaft water to evaluate potential environmental impacts prior to backfilling of historic hazardous mine openings. Parameters included assessment of acid generating materials, dissolved metals impact to groundwater, and beneficial use survey.

**Montana Department of State Lands, Abandon Mine Reclamation Bureau, Pony Hill Mine Tailings Decommissioning (Pony, Montana)** - Designed and installed a cyanide evaporation system to remediate weak acid dissociable cyanide from 27,000 yards of tailings located in a lined impoundment. Up to 6 million gallons of tailings surface and pore water were treated to drinking water standards during the fast track schedule.

**Landusky Mine Site, Swift Gulch Water Quality Evaluation (Landusky, Montana)** - Through Spectrum Engineering, site operator for MDEQ, a water quality evaluation of Swift Gulch was performed due to acid rock drainage seepage impacts. Water quality projections were completed along with the development of treatability options using lime addition.

**RTZ-Rössing Uranium Limited (Windhoek, Namibia, Africa)** - Evaluation and study of corrosion from high TDS process water in a uranium mine in NAMIBIA (Southwest Africa) due to high recycle rates within the milling circuit. High recycle rate of process water was due to the limited availability of water at the mine site.

## HAZARDOUS MATERIALS

**Marathon Oil Corporation (Wyoming)** - Prepared a hazardous waste handling document for hazardous materials handling including listed, characteristic and universal wastes for Marathon operations.

**Wyoming Land Quality Division (Wyoming)** - Reviewed adequacy of current Wyoming non-coal statutes, rules and regulations, guidelines, and standard operating procedure documents for the protection of the environment with regards to hazardous and Bevill exempted materials and implications of rare earth development. Specific attention was placed on rare earth elements and perpetual water treatment.

## AIR QUALITY

**Augustus Energy Partners, LLC (Wray, Colorado)** - Completed annual air quality and greenhouse gas (GHG) estimation and reporting for onshore natural gas EPA submittal. Ongoing work includes compliance with Federal (OOOO) and State of Colorado air quality regulations 3, 6 and 7, and minor source permitting of O&G production, compressor, and disposal/injection facilities.

**Genesis Energy, LP - Pronghorn Rail Facility (Douglas, Wyoming)** -Through the site consultant, Project Consulting Services, an air quality permit application was completed for a 40,000 barrel per day truck offloading facility with 6-2,000 barrel storage tanks. The facility also included 4-110,000 floating roof, above ground crude oil storage tanks, rail facility for loading upwards of 80,000 barrels per day of crude, 1-flare, with the facility powered by 4 natural gas fired RICE engines. Permit analysis included dispersion modelling for NOx using AERMOD.

**Intermountain Asphalt Supply (Fernly, Nevada)** - Estimated emissions for a proposed 100,000 ton per year asphalt storage and transfer facility and the associated 350 hp natural gas fired boiler and two 16 MM btu/hr natural gas fired heaters using AP-42 estimating procedures. Performed an MSDS, TSCA and HAPS review of on-site chemicals.

**Intermountain Asphalt Supply (Ogden, Utah)** - Estimated emissions for a proposed 150,000 ton per year asphalt storage and transfer facility and the associated 11.2 MM btu/hr natural gas fired boiler and two 11.2 MM btu/hr natural gas fired heaters using AP-42 estimating procedures. Performed an MSDS and TSCA review of on-site chemicals. Completed air quality permit applications.

**Marathon Oil Corporation (Wyoming)** -Completed five minor source air quality permits for grandfathered unitized facilities with over 100 wells per facility in basins with near 100 years of production.

**Marathon Oil Corporation (Wyoming)** - Completed evaluation of six facilities for hydrogen sulfide emission and dispersion. Evaluations included geochemical modelling of hydrogen sulfide in produced water using USGS PHREEQC model. Emissions were estimated using EPA's WATER9 model and dispersion evaluated using EPA's AERMOD.

**Marathon Oil Corporation (Wyoming)** - Completed a minor source emission inventory for all Marathon Wyoming oil and gas facilities for WyDEQ biannual reporting.

**Riverside Contracting (Pablo, Montana)** - Estimated emissions for a proposed 15,000 ton per year asphalt storage and transfer facility and the associated 200 hp boiler using AP-42 estimating procedures. Performed an MSDS and TSCA review of on-site chemicals.

**Rosetta Resources – Alberta Basin (Cut Bank, Montana)** - Completed an air quality and greenhouse gas impact analysis for a programmatic environmental assessment for oil and gas development within a region of historical oil and gas production.

**Saint Mary's Exploration (SME) formerly Nance Petroleum, Inc. (Eastern Montana/Western North Dakota)** - Completed over 140 minor source air quality permits/registration for oil and gas facilities with a three month completion date. Completed an air dispersion evaluation using SCREEN3 dispersion modelling software for hydrogen sulfide and VOC impacts to the area for BLM review.

**United States Exploration (DJ Basin, Colorado)** - Completed 15 minor source registrations for condensate and natural gas wells within the DJ basin.

## ENVIRONMENTAL ENGINEERING

**Big Horn County Museum (Hardin, Montana)** -Performed a preliminary domestic wastewater treatment wetland design incorporating subsurface and surface flow wetland treatment cells for the treatment of approximately 0.5 million gallons per year of domestic wastewater. Parameters of concern included nitrates, BOD, fecal coliform and TSS.

**CENEX Petroleum, Inc. (Billings, Montana)** -Designed and constructed a soil vapor extraction system for in-situ petroleum contaminated soil remediation and a dual completion sparge system to address the remediation of dissolved organic constituents in groundwater.

**Chaffin, Inc. (Billings, Montana)** - Designed and constructed a soil vapor extraction/sparge system for remediation of in-situ petroleum contaminated soil and dissolved organic constituents in groundwater.

**Hudstad Property (Helena, Montana)** – Designed an SVE system installed beneath a monolithic slab for remediation of PCE using horizontal boring techniques to install the vapor wells. Designed and implemented a granular activated carbon air treatment system to recover PCE.

**Montana Resources (Butte, Montana)** - Tasks included project management, sampling process outfall and approximately 40 wells ranging from 20 to 500 feet in depth. Sampling included measurement of numerous field parameters and evaluation of laboratory reports. Also performed hydraulic conductivity testing and evaluation of aquifers placed in both waste rock piles and tailing impoundments.

**Fidelity Exploration and Production Company, Wyoming** - Completed an injection feasibility study and for injection into the Eagle Formation-Shannon Sandstone in the Powder River Basin. Prepared dual UIC application of Class V and II w/ associated aquifer exemption rationale to EPA Region VIII.

**Golden Sunlight Mine, Barrick Minerals, (Whitehall, Montana)** - Reviewed expansion EA for the East Area Pit Expansion Amendment for MDEQ. Review included an evaluation of potential water quality and quantity to the Primary Pit Flowpath.

**Merit Energy Company (Formerly Marathon Oil Corporation), Wyoming** - Ongoing waste reduction evaluations for oil and grease and sulfide/sulfate reduction in produced water discharges and numerous facilities in the Rocky Mountain Operations at total flows exceeding 250,000 barrels of produced water per day. Evaluations have included degradation models, geochemical modelling, dynamic system modelling and treatment options.

**Miller Paint Company (Eugene, Oregon)** - Developed workplan and cost estimate for voluntary clean-up of chromic acid contaminated soils beneath a building and concrete slab. Established clean-up criteria and coordinated off-site disposal of both hazardous and non-hazardous waste.

**Montana Department of Environmental Quality (Big Sky, Montana)** - Performed field sampling and stream gauging and evaluated water quality data for the Big Sky Environmental Resource Assessment. Parameters of concern included nutrients and TSS associated with both natural and manmade sources.

**Montana Department of Environmental Quality, Helena Solvent Site (Helena, Montana)** – Completed a remediation evaluation, and designed/installed at 150 cubic feet per minute horizontal soil vapor extraction system to remove PCE from the vadose beneath a dry cleaner facility. Project included the design and implementation of a GAC system to remove vapors from the SVE exhaust stream

**Nance Petroleum, Inc. (SME) (Montana)** - Prepared a Class II and V UIC permit for injection of CBNG produced water into the Fox Hills in the Power River Basin. Application included support for proposed aquifer exemption through EPA Region VIII for the Class II disposal well.

**Tristates Mint (Rapid City, South Dakota)** - Compiled data for USEPA administrative hearing. Data included calculation of various cyanide/metal concentrations and degradation rates in plating solutions. Researched literature related to industrial hygiene concerns of constituents emanating from gold and silver plating solutions.

## WATER QUALITY PERMITTING

**ARCO (Anaconda, Montana)** - Developed permits for construction and discharge of 7 outfalls for a drain tile system to control high groundwater. Activities included a water quality evaluation, contaminant source mitigation, legal depositions, and permitting for MPDES, 310 and 404 Permits. Provided expert testimony in support of ARCO as part of the civil case.

**Black Hills Power and Light-Kirk Power Plant (Rapid City, South Dakota)** - Developed regulatory contacts for permitting and approval prior to effluent pipe diffuser installation and coordinated all governmental permit applications. (Army Corp of Engineers, USEPA Region 8, South Dakota Department of Water and Natural Resources).

**Brewer Gold-Westmont Mining (Jefferson, South Carolina)** - Developed site specific criteria for NPDES permit for selected parameters in Little Fork Creek. Implemented a flow measurement apparatus and

engineered pipe modification for flow measurement of sediment pond discharge into Little Fork Creek for NPDES permit compliance.

**Confidential Client (Canada)** - Assisted in developing site specific criteria for ammonia in mine effluent water for the protection of salmonids in the receiving stream. Performed calculations for free ammonia criteria development based upon pH and temperature.

**Confidential Client (United States)** - Examined waste load allocation sensitivity to dilution and hardness related values for the development of effluent limitations for NPDES permit development. Developed site specific effluent criteria for silver and cyanide.

**Cyprus Minerals (Thompson Creek, Idaho)** - Compiled water quality data. Examined dilution and hardness measuring their effect on effluent limitations developed through waste load allocation computations. Performed a sensitivity analysis to optimize effluent discharge on the receiving stream currently being utilized as a trout fishery.

**FMC-Beartrack Mining (Salmon, Idaho)** - Assisted in the development of revised site specific criteria for the NPDES permit. Tasks included validation of USEPA criteria for waste load allocations and statistical evaluation. Assisted in developing discharge strategies using controlled hydrograph release to enhance dilution due to seasonal fluctuations in receiving stream volume.

**Homestake Mining (Lead, South Dakota)** - Examined sensitivity of hardness related parameters and dilution requirements for NPDES renewal permit for an existing outfall.

**Kraken Oil, O&G Facility, Richland County (Montana)** - Completed a Notice of Intent for coverage under an MPDES construction storm water general permit for construction disturbance for a highway turnout and well facility pad, and completed a Storm Water Pollution Prevention Plan.

**Linc Energy, Underground Coal Gasification Demonstration Project (Campbell County, Wyoming)** - Evaluated water quality baseline data and development of UCLs, permitting assistance, restoration of water quality evaluation and treatability options, and aquifer exemption.

**Phoenix Production – Breitburn Energy, O&G Facilities, North Sunshine Field (Wyoming)** - Completed a construction WYDPES storm water permit application for construction disturbance for a lease road and well facility pad, and completed a Storm Water Pollution Prevention Plan.

**Rosetta Resources – Tribal Big Rock Facility (Cut Bank, Montana)** - Completed an erosion control plan for lease road upgrades and well pad facility for a new O&G development on Tribal Lands through the BLM.

**Times Limited (Bozeman, Montana)** - Compiled water quality and bioassessment data to evaluate impacts from historic and active mine operations in Whitewood Creek drainage area near Lead, South Dakota.

**United Parcel Service (Alaska and Montana)** - Developed EPA Class V Underground Injection Control permits for discharges emanating from UPS facilities in EPA Regions 8 and 10.

**United Parcel Service (Billings, Montana)** - Developed pretreatment permit application for POTW discharge from a truck wash facility. Selected oil/water separator to meet effluent standards.

**PROCESS ENGINEERING - (ACID MINE DRAINAGE, METALS, AND CYANIDE TREATMENT)**

**Atlantic Richfield Company, ARCO (Butte, Montana)** - Assisted in engineering projects and installed instrumentation, piezometers and discrete interval samplers in constructed wetlands for treatment of metals and sulfide impacted mine waste runoff.

**Boliden Resources (Bald Mountain, Maine)** - Developed a process design and cost estimate for a 1.2 MGD wastewater treatment facility for the treatment of high selenium, chromium and acid mine drainage wastewater to meet primary drinking water standards. The treatment facility used pH adjustment, sulphide precipitation, water softening and multimedia sand filtration with either ion exchange or reverse osmosis for tertiary treatment of specific metals to reach effluent limitations. Anticipated wastewater characteristics were modelled over a 10 year life of mine.

**Brewer Gold (Jefferson, South Carolina)** - Performed an economic analysis and feasibility study for an AVR process for the recovery of cyanide from mine tailings. Conducted batch pilot plant study using AVR and the effect on acid mine drainage and precipitation of gypsum in tailings impoundments.

**Brewer Gold (Jefferson, South Carolina)** - Investigated alternative methods of acid mine drainage control via iron precipitation through trisodium phosphate addition. Performed an extensive investigation for previous acid rock drainage control through chemical application to include the use of apatite and surfactants. Specific types of chemicals containing phosphate were researched to evaluate availability, price, and phosphate content. Field trials were performed at the mine site and proved successful.

**Confidential Client (United States)** - Performed a process design and cost estimation for a 7.2 MGD acidification/volatilization/reneutralization (AVR) process to recover cyanide from mine tailings. This process was later patented as the Cyanasorb Process. Also, performed an economic and feasibility study of the process to predict cyanide recovery payback period.

**Cyprus Minerals (Thompson Creek, Idaho)** - Provided a process design and cost estimate for a 1.5 MGD treatment facility for acid mine drainage and metals removal for a potential mine outfall discharging to the Salmon River in Idaho.

**Minnova (Canada)** - Provided a process design and cost estimate for a 0.4 MGD treatment facility for acid mine drainage and metals removal for a mine outfall discharging to Sturgeon Lake in Ontario, Canada.

**Marathon Oil Company (Oregon Basin, Wyoming)** – Over the course of 10 years, performed ongoing water management, process engineering, and permitting services on facilities discharging up to 250,000 barrels of water per day.

**SME formerly Nance Petroleum (Billings, Montana)** – Provided ongoing water management services for coal bed methane development to include treatment, dynamic system modelling, and cost estimates to manage waste streams over 5 years of development.

**Nerco Minerals-Delamar Silver Mine (Jordan Valley, Oregon)** - Modified and operated a pilot plant and performed laboratory studies for the recovery of cyanide tailings slurry using the AVR process. Acid consumption and metals attenuation were studied on the reneutralized tailings. The data was used in the design of a 2.0 MGD facility. This plant was the first one of its kind in the United States. Reviewed existing technologies for the treatment of selenium and wad cyanide in tailings for economically feasible treatment methods.

## ENVIRONMENTAL SITE ASSESSMENTS- DUE DILIGENCE

**Augustus Energy Partners, (Colorado)** - Performed an Environmental Compliance Evaluation of approximately 700 gas and oil wells with associated compression, pipeline and salt water disposal wells. The project included site equipment inventories, regulatory compliance evaluation, Storm Water Permit, and UIC permit review.

**Breitburn Energy (Wyoming)** - Through their consultant, Golden Globe Engineering, a Phase I ESA was performed on O&G properties at Black Mountain, Gebo, Half Moon, Hidden Dome, North Sunshine, Rolff Lake, Sheldon Dome, West Oregon Basin fields, Wind River and Circle Ridge Pipelines. Properties included BLM, Tribal, Fee, and State surface and minerals.

**Department of Energy, RMOTC-NPR No. 3 (Casper, Wyoming)** - Performed a Phase I ESA on approximately 700 oil and gas properties to include industrial landfills, composting areas, a gas plant and crude, gas and salt water disposal (SWD) pipelines. Assessment included verification of UIC permits, MIT expiration, pit permits and reclamation requirements, and site equipment inventories.

**Double D Energy (Nevada)** - Performed a Phase I ESA on approximately 12 oil and gas properties to include a salt water disposal (SWD) pipeline. The project included site equipment inventories.

**MCR, LLC, Montana** - Performed a Phase I ESA on approximately 600 oil and gas properties to include a gas plant and crude, gas and salt water disposal (SWD) pipelines. Assessment included verification of UIC permits, MIT expiration, pit permits and reclamation requirements, and site equipment inventories.

**Montana Power Company (Billings, Montana)** - Performed a Phase I Environmental Site Assessment using ASTM Standard E-1527-93 on a 90 mile 6-inch crude/product Shoshone Pipeline prior to acquisition.

**Nance Petroleum, Inc. (Montana, Wyoming, Colorado, Nevada)** - Performed a Phase I ESA on approximately 500 oil and gas properties to include a gas plant and crude, gas and salt water disposal (SWD) pipelines. Assessment included verification of UIC permits, MIT expiration, pit permits and reclamation requirements, and site equipment inventories.

INDUSTRIAL COMMISSION
STATE OF NORTH DAKOTA
DATE 6/12/24 CASE NO 30869-880
Introduced By Button
Exhibit LO-57
Identified By Button

Paul Button
1119 S Ophir St
Butte, Mt 59701
(406) 860-5752 (cell)
paul@terrastor.com

# Paul Button

## SUMMARY OF QUALIFICATIONS

**Petroleum Engineer** with diversified experience in reservoir and production engineering. Responsibilities include reservoir modeling, geologic engineering, rate transient analysis, property valuation, well completion optimization, detailed reservoir characterization, waterflood management, and EOR management.

## EMPLOYMENT HISTORY

**TerraStor Energy Corporation** **2021-Present**

**Chief Technology Officer** **Butte, MT**

Perform geologic search for Compressed Air Energy Storage (CAES) sites. Determine electricity grid connectivity around geologic sites to determine if interconnection is possible. Liaison with consulting engineers and OEM providers on compression, turbo expansion, heat exchange and cavern design.

**Poplar Resources** **2019-Present**

**Sr Vice President Resource Development** **Billings, MT**

Supervise technical and operational staff on the implementation and monitoring of gas oil gravity drainage project at Poplar Dome.

Develop EOR development plan, schedule implementation operations, budget and monitoring of results.

**Button Petroleum Management** **2016-2022**

**Consulting Reservoir Engineer** **Billings, MT**

Consulting Reservoir Engineer that has performed field valuations and recovery forecasts on conventional and un-conventional fields at client's request.

- Constructed development plan for multiple water flood fields including economic model. Work with geology and land to determine unitization area and criteria.
- Conducted optimal spacing study for unconventional Bakken & Three Forks development. Reviewed multiple spacing tests and well performance to determine most economic development scenario for each reservoir in the client's subject land position.
- EOR review and valuation of field for acquisition. Included full reserve review and CO2 requirement review.
- Reservoir Simulation and EOR recovery project design and planning.
- Expert Witness and Advise on cases for Braaten Law Firm

**SM Energy** **2005 - 2016**

***Senior Reservoir Engineer*** ***Billings, MT***

Multi-disciplined team leader for Wyoming asset team, developing conventional, unconventional, and EOR reserves. Responsibilities include development planning, exploration evaluation, EOR project screening, and A&D evaluation.

- Multi discipline team lead responsible for the acquisition of 160,000 acres of stacked pay un-conventional resources in the Powder River Basin. Primary reservoir evaluator for over $300 MM in acquisitions and

EXHIBIT
tabbies
LO-57
30869-30880

over $200 MM in appraisal drilling in the Frontier and Niobrara. Responsible for identifying key play drivers, developing optimal depletion plan, and maximizing net asset value. Key evaluation engineer on basin wide exploration effort focus on Muddy and Mowry.

- Lead reservoir engineer on team that developed the Niobrara and Codell resource plays in Laramie Co, Wyoming. Worked intricately with asset team to design innovative completion design to maximize recovery from Niobrara. Team drilled first long lateral (+9,000' lateral) which was key to economic exploitation of the Codell and Niobrara.
- Lead role in EOR evaluation of Wind River and Bighorn Basin Tensleep fields. Developed screening criteria and determined recovery potential on several legacy assets. Determined technical feasibility of miscible CO2 but determined resource size was economically unfeasible.
- Primary reservoir engineer Nance Petroleum's early development of Elm Coulee Field Richland Co, MT. Instrumental in asset team's effort to improve recovery through spacing optimization, wellbore design and completion design.

**Kinder Morgan** **2003 - 2005**

***Reservoir Engineer*** ***Midland, TX***

Multi-disciplined team member in Yates field, a highly fractured carbonate reservoir with 400 million barrels reaming reserves. Responsibilities include improving reservoir understanding, optimizing contact movement to improve reserve development, and providing analysis on EOR projects.

- Selected 40 horizontal well locations for drilling in early 2004. Prepared economic justification for each well, selected target interval within reservoir, developed detailed well plan, and provided production and reserve forecast for the program.
- Prepared detailed review of Surfactant and Thermal EOR projects that included review of production response, economic performance, and Texas EOR Severance Tax fillings.

**MARATHON OIL COMPANY** **1998 - 2003**

***Reservoir Engineer*** ***Midland, TX***

Multi-disciplined team member in Yates field, a highly fractured carbonate reservoir with 400 million barrels reaming reserves. Responsibilities include improving reservoir understanding, optimizing contact movement to improve reserve development from double displacement gas injection, and providing analysis on EOR projects.

- Improve reservoir understanding for diversified team by proving simulation support that led to the optimization of the Double Displacement Process. Built and ran a variety of simulation models that led to increased understanding of oil drainage and mobilization. Recommendations resulted in improved oil rate and increased asset value.
- Recommended termination of 60 MMCFD of nitrogen injection to control reservoir pressure growth and moderate contact movement to maximize oil mobilization. Project included simulation, material balance, and economic analysis as well as contract negotiation. Resulted in a $25 million improvement in asset net present value.
- Performed reserve evaluation of an immiscible $CO_2$ project. Determined that a potential 25 million barrels of reserves are probable. Analysis involved compositional modeling, equation of state tuning, coordinating PVT lab work, and economic analysis.

- Coordinated $80 million dollar capital and expense budget for three years. Responsible for presenting to senior management, tracking expenditures, and making recommendations on projects for local management's approval.

- Project engineer responsible for testing and developing innovative, low cost completion methods in Yates field. Successfully modeled completion performance of both vertical and horizontal completions and recommended changes in our completion practices that improved the well production efficiency. Published an SPE paper on the modeling work and presented it at a convention in Villahermosa, Mexico.

## EDUCATION

***Bachelor of Science in Petroleum Engineering (B.S.P.E.)*** **December 1997**

Montana Tech of the University of Montana, Butte, Montana

## SPECIAL SKILLS

Reservoir Simulation… Rate Transient Analysis… Aries… PHDWin…Spotfire… Excel… Word… Power Point…

INDUSTRIAL COMMISSION
STATE OF NORTH DAKOTA
DATE 6/12/24 CASE NO 30869-880
Introduced By Doughty
Exhibit LO-58
Identified By Doughty

**P. Ted Doughty, Ph.D., P.Geol., CPG.**
1427 Avenue F, Billings, MT 59102
509-638-3729 cell
teddoughty@prisemgeoconsulting.com
www.prisemgeoconsulting.com

## *EMPLOYMENT*

### Founder: PRISEM Geoscience Consulting LLC, 2005-present

*Projects*

- Unconventional prospect evaluation and generation throughout the Rockies
- Well site geology for exploration wells in Montana and North Dakota. Includes cuttings description, gas analysis, core point selection, core processing, log evaluation.
- Drilling supervisor for a three well coring program for Hess. Cut over 1,000' feet of core with 99% recovery, 2015
- Consulting structural geologist, central Utah thrust belt, PetroTerra Energy, 2015.
- US Exploration Manager for Amarok Energy Inc in WY-MT thrust belt 2010-2014
- Exploration for structural prospects in the Rockies and Ouachita thrust belts
- Regional structural studies and balanced cross-section construction for exploration and detailed well planning in the WY and MT thrust belt
- Multiple prospect evaluations and reserve estimates for clients in Montana and Wyoming
- Core description and evaluation for unconventional prospect analysis (Bakken and Heath)
- Leader of exclusive PRISEM Bakken field trips in west-central Montana (10 years and counting)
- Leading and organizing industry-tailored field trips to examine the hydrocarbon systems of the WY-UT-MT thrust belt

*Clients*

- Rosetta Resources, Petrobakken, Crescent Point. Wolverine Gas and Oil, Primary Petroleum, Talisman Energy, Manitok Energy, Ballard Petroleum, Memphis Enterprises, British Gas, Husky Energy, Hess Corporation, Petroshale Energy, Amarok Energy, PetroTerra.

### Talisman Energy, Contract Geologist, 2005-2010

- US-based member of US Rockies Exploration Team. Technical work and coordination of US activities. Drilled two wells in Wyoming/Utah Overthrust.
- Member of New Ventures Exploration Team (2010). Unconventional play generation and exploration in the Rockies and East Texas/Louisiana, includes Haynesville, Utica, Niobrara, Woodford, Heath, Bakken, and others

### Eastern Washington University, Cheney, 2000-2008

- Tenured Associate Professor, structural geology, tectonics, petroleum geology

### Pason Systems Corp, 2005

- Well-site geologist, log analyst

### Geologist: Exxon Exploration Company, 1998-1999

- Seismic interpretation: Nigeria
- 2-D and 3-D trap fill-and-spill evaluation and column prediction (west Texas, North Sea)
- Top seal failure analysis
- Reservoir pressure evaluation and integration with fault seal prediction
- 3-D seismic structure mapping



EXHIBIT
tabbies
LO-58
30869-30880

## Geologist: Exxon Production Research Company, 1996-1998

- Fault-trap analysis for prospect evaluation and risking (Scotian Shelf, GOM)
- Balanced cross-section construction in complex fold and thrust belts (Nigeria, Mauritania)
- Regional structural studies for basin evolution, structure integrity, and trap evaluation
- Evaluation of anomalous fault seal processes (clay smear, cataclasis, cementation)
- Fault zone mapping and description in California, Utah, and Colorado
- Description of fault linkage geometry (relay ramps, breached relays)
- Project leader for using ground-penetrating radar to map fault zone materials

## Exploration Geologist: Amoco Production Company, 1990-1991

- Interpreted well logs, drill core, and 2-D seismic data
- Constructed structure maps, isopach maps, and stratigraphic correlations using well logs
- Thrust-belt exploration in the Arkoma basin of southeastern Oklahoma
- Stratigraphic trap exploration in the Green River Basin and eastern Colorado
- Operations geologist responsible for an 8-rig drilling program in Moxa Arch

## *BASIN EXPERIENCE*

Williston Basin
Arkoma Basin/Fayetteville shale
Gulf of Mexico onshore salt basins
MT-WY-UT thrust belt
Wyoming: Green River/Hanna Basin/Big Horn/Powder River
Colorado: North Park Basin
West-Northwest Africa (Nigeria)
Willamette-Puget Sound Basin
North Sea (onshore Netherlands)
Scotia Shelf
Termit Graben (Niger)
North Louisiana/East Texas salt basins
West Texas/New Mexico basins

## *EDUCATION*

- Ph.D., Structural Geology, Queen's University, Kingston, Ontario, 1995
- M.S., Geophysics, University of Montana, Missoula, Montana, 1990
- B.A., Geology, Washington University in St. Louis, St. Louis, Missouri, 1986

## *RELEVANT ARTICLES/REPORTS**

**Doughty, P. T., Grader, G.W., Guthrie, J., Hohman, J. and Wells, K, 2014,** Developing an outcrop reservoir analog for the Williston Basin Bakken Formation with the Sappington Formation of south-central Montana, Unconventional Resources Technology Conference, Symposium Paper 1922201.

**Doughty, P. T., Chamberlain, K.R. and Pope, M.C.,** 2013, Using Detrital Zircon Geochronology to Solve Complex Structural Problems: An Application with Pitfalls in the Helena Salient of the Montana Disturbed Belt, West Central Montana, AAPG Studies in Geology Volume 65, Application of Structural Methods to Rocky Mountain Hydrocarbon Exploration and Development, pp.71-101.

**Grader, G.W., and Doughty, P.T.,** Synsedimentary Deformation and Erosion of the Bakken/Sappington Formation in West-central Montana: Evidence for a Brief Basin Polarity Switch and Development of Paleohighs along the Western Bakken Fairway, AAPG Annual Meeting, Long Beach California

**Doughty, P. T.,** 2008, Geology of the North Park Basin, Colorado and the recent EOG discovery: Talisman Energy Report.

**Doughty, P. T.,** 2007, Evaluation of unconventional plays in the Talisman fairway: Talisman Energy Report.

**Doughty, P. T.,** 2007, Prospect proposal for 3 prospects in MT and Wyoming: Talisman Energy Report.

**Doughty, P. T.,** 2005, Prospectivity of unconventional gas from the Fayetteville shale in eastern Arkansas: report for Memphis Enterprises.

**Doughty, P. T.,** 2003, Clay smear seals and fault sealing potential of an exhumed growth fault, Rio Grande Rift, New Mexico: American Association of Petroleum Geologists Bulletin v. 87 pp. 427-444.

**Doughty, P. T.,** 1998, Structural features of the Mauritania passive margin: Exxon Proprietary Research Report.

**Doughty, P. T.,** 1997, Sequential Geosec restorations of seismic line 2648: implications for the structural evolution of the Niger delta: Exxon Proprietary Research Report.

* *complete publication list available on request*

## EXCLUSIVE OPTION TO LEASE PORE SPACE

THIS EXCLUSIVE OPTION TO LEASE PORE SPACE (this "Agreement") is made and entered into this ____ day _____ 2021 ("Effective Date"), by and between _____ whose _____ address is _____ (whether one or more, "Lessor") and Summit Carbon Solutions, LLC, an Iowa limited liability company, whose address is 1805 Collaboration Place, Suite 1200 Annes, Ames, IA 50010 ("Lessee"). Lessor and Lessee may be individually referred to herein as a "Party" and collectively as the "Parties".

### RECITALS

A. Lessor is the owner of the surface estate of the lands described and incorporated herein by reference in Exhibit C attached (the "Property").

B. Lessee desires to purchase an exclusive option to lease the Property for Carbon Dioxide geologic storage operations.

C. Lessor is willing to grant an exclusive option to Lessee to lease the Property for such purposes, subject to the terms and conditions of this Agreement.

### DEFINITION

Carbon Dioxide for the purposes of this Agreement and subsequent Pore Space Lease and any Easements is defined 99% or higher concentration of carbon dioxide molecules. Carbon Dioxide may contain incidental impurities from the ethanol production process.

### AGREEMENT

NOW THEREFORE, in consideration of the mutual covenants and terms set forth in this Agreement and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the Parties agree as follows:

1. Grant of Option. Lessor, in consideration of ~~TWENTY-FIVE~~ONE HUNDRED and NO/100 DOLLARS ($~~25~~100.00) per acre (the "Option Fee") and other good and valuable consideration paid by Lessee to Lessor, receipt of which is hereby acknowledged by Lessor, grants to Lessee the exclusive right and option to lease the Property for Carbon Dioxide geologic storage operations ("Option"). The Option Fee shall be paid to Lessor by Lessee within 5 business days of the Effective Date and prior to Access to Property as described in Section 6. Contemporaneously with the execution of this Agreement, Lessor shall sign the pore space lease attached hereto as Exhibit A and made part hereof (the "Pore Space Lease"); *provided, however*, that the Pore Space lease shall not become effective unless and until Lessee exercises the Option in accordance with Section 3. Lessee shall retain the original copy of the Pore Space Lease executed by Lessor and provide Lessor with a copy. In the event Lessee exercises the Option prior to the expiration of the Option Period, Lessee shall



Formatted: Header

Style Definition: Heading 1: Font: 12 pt, Bold, No underline, Underline color: Auto, Indent: Left: 0.08", First line: 0", Space Before: 3.05 pt
Style Definition: List Paragraph: Indent: Left: 0.08", First line: 0", Right: 0.08"
Style Definition: Table Paragraph: Indent: Left: 0"
Formatted: Font color: Auto, Character scale: 100%
Formatted: Heading 1, Indent: Left: 1.52", Space Before: 0 pt
Formatted: Font: Bold
Formatted ... [1]
Formatted ... [2]
Formatted ... [3]
Formatted: Normal, Indent: Left: 0.08", First line: 0", Right: 0.08", Line spacing: Multiple 0.99 li, Tab stops: Not at 3.11"
Formatted: Font: 10.5 pt
Formatted: Space Before: 0.05 pt
Formatted: Font color: Auto
Formatted: Heading 1, Indent: Left: 2.21", Right: 2.21", Space Before: 0.05 pt
Formatted: Font color: Auto
Formatted ... [4]
Formatted: Right: 0", Space Before: 11.6 pt, Line spacing: Multiple 1.03 li, Numbered + Level: 1 + Numbering Style: A, B, C, ... + Start at: 1 + Alignment: Left + Aligned at: 0.08" + Indent at: 0.58", Tab stops: 0.58", Left + Not at 0.62"
Formatted: Font color: Auto
Formatted ... [5]
Formatted: Font color: Auto, Character scale: 100%
Formatted: Heading 1, Indent: Left: 2.21", Right: 2.21", Space Before: 11.45 pt
Formatted: Font: Bold
Formatted: Space Before: 0.35 pt
Formatted: Font color: Auto
Formatted: Indent: Left: 0.08", Right: 0.08"
Formatted
Formatted ... [7]
Formatted ... [6]

INDUSTRIAL COMMISSION
STATE OF NORTH DAKOTA
DATE 6/13/24 CASE NO 30869-880
Introduced By Braaten
Exhibit LO-87
Identified By Swenson

EXHIBIT
tabbies
LO87
30869-30880

sign and date the Pore Space Lease effective as of the date Lessee exercised the Option and provide a copy of the fully executed Pore Space Lease to Lessor. Lessee shall cause a memorandum of the Pore Space Lease to be recorded in the real property records. In the event Lessee does not exercise the Option prior to expiration of the Option Period, the Pore Space lease shall be cancelled and void.

2. Option Period. The term of this Option shall commence on the Effective Date and shall continue until 11:59 p.m. central time on the date that is five (5) years from the Effective Date (the "Option Period").

3. ~~3~~ Exercise of Option. Lessee may exercise this Option by signing the "Exercise of Option" attached as Exhibit B to this Agreement and delivering a copy to Lessor prior to the expiration of the Option Period at the address of Lessor stated above. If the Option is exercised, the Parties shall there forth be bound by the terms and conditions of the Pore Space Lease.

4. Application of Option Fee. In the event Lessee does not exercise this Option prior to the expiration of the Option Period, Lessor shall retain the Option Fee as consideration for this Option.

5. Representations and Warranties and Covenants. Lessor represents, to the best of its knowledge and belief, ~~and warrants~~ that there are no unrecorded leases, options, or other agreements affecting the Property that have not been provided or otherwise disclosed to Lessee. Lessor shall not enter into any new agreements that affect the pore space without Lessee's written consent. ~~Lessor represents, to the best of its knowledge and belief, and warrants to Lessee that (i) the Property has not been used for generating, transporting, storing, treating or disposing of "hazardous substances" (as that term is defined under applicable federal, state and local laws), (ii) the Property has not been used for disposal of waste or hazardous substances including agricultural chemicals such as fertilizers, herbicides or pesticides, and (iii) no underground storage tanks are presently or have been located on the Property. Lessor shall be responsible for removing any such waste or hazardous substances (including any such agricultural chemicals) at its own cost upon Lessee's exercise of the Option.~~ Lessor further represents and warrants to Lessee that there exists no judgment, suit, action or legal, administrative, arbitration or other proceeding affecting the Property or that would prevent or limit Lessor from performing his obligations under this Agreement or the Pore Space Lease. During the Option Period, Lessor agrees to cooperate in good faith in connection with Lessee's Due Diligence Activities (as defined below) or inspection of the Property. During the Option Period, Lessor shall, subject to casualty and force majeure, maintain the existing condition of the Property and not take any action or fail to take any action that results in damage to the Property.

6. Access to Property. Upon execution of this Agreement, Lessor agrees to provide Lessee, its agents and representatives, access to the Property, as may be reasonably requested, with a minimum of 7 days advance notice to Lessor by Lessee for the purposes of doing those things reasonably ~~convenient or~~ necessary to study, survey, test and plan for the development of its Carbon Dioxide geologic storage operations, including but not limited to: ~~drilling and installing test wells and monitoring wells;~~ performing seismic testing and other similar activities; establishing ground and aerial survey control points and section corners;



Formatted: Header

Formatted ... [8]

Formatted

Formatted ... [9]

Formatted: Right: 0.08", Space Before: 0 pt, Line spacing: Multiple 1.01 li, Numbered + Level: 2 + Numbering Style: 1, 2, 3, … + Start at: 1 + Alignment: Left + Aligned at: 0.08" + Indent at: 0.58", Tab stops: 0.58", Left + Not at 0.62"

Formatted ... [10]

Formatted: Font: 12 pt

Formatted ... [11]

Formatted: Right: 0.08", Space Before: 0 pt, Line spacing: Multiple 1.01 li, Numbered + Level: 2 + Numbering Style: 1, 2, 3, … + Start at: 1 + Alignment: Left + Aligned at: 0.08" + Indent at: 0.58", Tab stops: 0.58", Left + Not at 0.63"

Formatted: Font: 12 pt

Formatted ... [12]

Formatted: Right: 0.08", Space Before: 0 pt, Line spacing: single, Numbered + Level: 2 + Numbering Style: 1, 2, 3, … + Start at: 1 + Alignment: Left + Aligned at: 0.08" + Indent at: 0.58", Tab stops: 0.58", Left + Not at 0.62"

Formatted: Font: 12 pt

Formatted ... [13]

Formatted: Right: 0", Space Before: 0 pt, Line spacing: single, Numbered + Level: 2 + Numbering Style: 1, 2, 3, … + Start at: 1 + Alignment: Left + Aligned at: 0.08" + Indent at: 0.58", Tab stops: 0.58", Left + Not at

conducting a feasibility study, which may cover subjects such as soil conditions, geological tests, engineering reports, topographic studies, flood protection, and environmental impact reports, ~~zoning and planning regulations and any other tests and studies the Lessee may elect to perform on the Property~~ (collectively, "Due Diligence Activities") all at the sole discretion and expense of the Lessee. Due Diligence Activities shall only be performed between the hours of 7 AM and 7 PM. Any vehicle traffic will be limited to existing roads and two tracks. Off-road access is to be performed only by foot or light UTV access. In the event ~~Lessee constructs and installs any Facilities (as such term is defined in Section 5 of the Pore Space Lease) on the Property~~ that vibroseis trucks access the Property or adjacent properties, Lessee agrees to ~~compensate Lessor for the installation of any such Facilities in the same manner set forth in Section 5 of the Pore Space Lease attached hereto as Exhibit B. Lessee shall defend, indemnify and hold Lessor harmless from any costs or~~;

Formatted: Header

Formatted: Font: 12 pt, Font color: Auto

Formatted: Font: 12 pt, Font color: Auto

Formatted: Font: 12 pt, Font color: Auto

Formatted: Font: 12 pt, Font color: Auto

Formatted: Font: 12 pt, Font color: Auto, Not Expanded by / Condensed by

Formatted: Font: 12 pt, Font color: Auto

Formatted: Font: 12 pt, Font color: Auto, Not Expanded by / Condensed by

Formatted: Font: 12 pt, Font color: Auto

Formatted: Font: 12 pt, Font color: Auto, Not Expanded by / Condensed by

Formatted: Font: 12 pt, Font color: Auto

Formatted: Font: 12 pt

~~expenses incurred in connection with Lessee's access to the Property and its Due Diligence Activities and shall restore the Property to its condition immediately preceding such access.~~

- Pay for and coordinate competent 3rd party water flow and quality testing of all water sources identified by Lessor before and after vibroseis operations occur. Any degradation in water flow and quality up to two years from vibroseis activities shall be remedied by Lessee.
- Adhere to 3 times the minimum setbacks as required in North Dakota statutes or regulations.
-

7. INDEMNIFICATION. Lessee agrees to defend, indemnify and hold harmless Lessor, its family members, members, shareholders, directors, managers, partners, officers, employees, agents and contractors (the Indemnified Parties) from and against, and shall promptly reimburse each Indemnified Party with respect to any claim, demand or cause of action, including any actual loss, cost, expense, liability, fine or damage incurred or suffered by the Indemnified Party (including reasonable fees and expenses of attorneys, technical experts and expert witnesses, court costs and other out-of-pocket expenses) related to any bodily injury, death or property damage resulting from Lessor's breach of this Agreement, Lessee's violation of any law, rule or regulation or Lessee's negligence or willful misconduct, or any act of Lessee. Neither the coverage nor the limits of insurance required by this Agreement shall in any way restrict the foregoing indemnity obligation.

8. PROPERTY RESTORATION. Lessee shall restore the Property to its condition immediately preceding Access to Property as specified in Section 6 to the satisfaction of Lessor. Restoration of Property includes, but is not limited to, driveway and farm road maintenance, removing all compaction, depressions, imprints and tracks from overland travel and vibroseis truck plates, re-establishment of same type vegetation on pasture and hay lands, and weed control for as long as it takes to complete restoration activities.

9. PERFORMANCE AND PAYMENT BONDS. Lessee shall furnish to Lessor security covering the faithful performance of Property Restoration and Lessor's payment and other obligations arising under this Agreement in the form of separate performance and payment bonds, each with a penal sum equal to TWO HUNDRED and NO/100 DOLLARS ($200.00) per acre covered by this Agreement (Performance and Payment Bonds). The Performance and Payment Bonds must be obtained from a guaranty or surety company authorized to conduct business in North Dakota. Lessor shall deliver the security required by this Section 9 within 5 business days of the Effective Date and shall maintain the security in full force and effect until the end of the Option Period.

10. INSURANCE REQUIREMENTS

- Prior to access on the Property, Lessee shall secure and maintain all insurance required as evidenced by Section 10 of this Agreement.
- Lessee shall maintain in effect at all times during the Option Period, insurance in accordance with the applicable laws relating to workers' compensation and employers' liability insurance, regardless of whether such coverage or insurance is mandatory or merely elective under the law.
- The failure to secure and provide proof of insurance as required in this Lease shall constitute a material breach of this Lease entitling Lessor to terminate this Agreemeent immediatley.
- Required insurance coverage is to be purchased at Lessees' expense.



Formatted: Header

Formatted: No bullets or numbering, Tab stops: Not at 0.58"

Formatted: No bullets or numbering, Tab stops: Not at 0.58"

- Lessee shall notify Lessor of any erosion of aggregate limits under any of the insurance policies, and if requested, purchase additional limits of coverage as may be deemed by the Lessor to satisfy Lessees' coverage obligations.
- All insurance policies must include a waiver of the insurer's right of subrogation against Lessor. Lessee also hereby waives all rights of subrogation against Lessor.
- All insurance policies will not be canceled, or their limits or coverage reduced or restricted without endeavoring to provide at least 30 days prior written notice to Lessor.
- Lessor will look to Lessees' insurer for coverage for claims arising from the negligent acts or omissions of Lessee and its Agents or Subcontractors.
- Insurance coverages, with the exception of workers' compensation and employers' liability shall be endorsed to name Lessor as an additional insured with respect to any liabilities assumed under this Agreement; and apply severally and not collectively to each insured against whom claim is made or suit is brought.
- Upon execution of this Agreement and prior to January 1st of each year, Lessee shall instruct and require its insurance agent/broker to complete and return an insurance certificate, in an ACORD form, as evidence that insurance policies providing the required coverage, limits and additional insured provisions as outlined in this Section 10 are in full force and effect. Lessee shall be fully responsible for all deductibles and self-insured retentions related to insurance provided herein. The insurance certificate shall be provided to Lessee prior to Access to Property as defined in Section 6.
- Minimum General Requirements.
  - $5,000,000 General Liability
  - $1,000,000 Automobile Liability
  - Statutory Workers' Compensation
  - Employers' Liability - $1,000,000 each accident; $1,000,000 disease – policy limit; and $1,000,000 disease – each employee.
  - $10,000,000 Excess Liability
  - $5,000,000 Pollution Liability

~~7.~~11. Permits. Applications and Studies. During the Option Period, Lessee, its agents, affiliates, servants, employees, nominees and licensees shall be entitled to: (A) apply for and obtain any necessary permits, approvals and other governmental authorizations (collectively called "Governmental Authorizations") required for the development, construction, operation and maintenance of the Lessee's Carbon Dioxide geologic storage operations and Lessor agrees to co-operate, execute, obtain or join with Lessee in any applications or proceedings relating to the Governmental Authorizations upon Lessee's written request and at Lessee's direction, cost and expense; and (B) apply for any approvals and permits ~~and any zoning amendment of any area of the Property~~ required in connection with the Lessee's Carbon Dioxide geologic storage operations, and Lessor agrees to co-operate, execute, obtain or join with Lessee in any applications or proceedings relating to such approvals. ~~permits and zoning~~

Formatted

Formatted ... [14]

Formatted: Right: 0", Space Before: 0 pt, Numbered + Level: 2 + Numbering Style: 1, 2, 3, ... + Start at: 1 + Alignment: Left + Aligned at: 0.08" + Indent at: 0.58", Tab stops: 0.58", Left + Not at 0.63"

~~amendments~~ upon Lessee's written request and at Lessee's direction, cost and expense.

~~8.~~12. Entire Agreement. This Agreement, and its exhibits, constitute the entire agreement between the Parties and supersedes any and all previous agreements or understandings between the Parties concerning the subject matter hereof, and all prior agreements are deemed merged herein. No Party makes any representation or warranties to the other Party, unless expressly set forth in this Agreement.

~~9.~~13. Time of Essence. Time is of the essence to each and every aspect of this Agreement.

~~10.~~14. Successors and Assigns. All of the terms and conditions of this Agreement are hereby made binding on the successors and permitted assigns of the respective Parties.

~~11.~~ Headings. The captions used in connection with the articles and sections of this Agreement are for convenience only and shall not be deemed to construe or limit the meaning of the language of this Agreement.

~~12.~~ 15.

16 Governing Law and Venue. This Agreement shall be governed by and construed in accordance with the laws of the State of North Dakota without giving effect to principles of conflicts of laws. An action to enforce the terms of this Agreement shall be brought in a court of competent jurisdiction located in the state of North Dakota.

~~13.~~

17 Attorneys' Fees. ~~The Parties~~Lessee shall ~~be responsible~~pay for ~~their own attorneys' fees incurred~~Lessors' attorney's expense in ~~negotiating~~connection with review and ~~drafting~~negotiation of this Agreement ~~and any ancillary documents~~ within 5 business days of the Effective Date. In the event that legal action is required to enforce the terms of this Agreement, the prevailing Party shall be entitled to collect its costs of court, including reasonable attorneys' fees, from the non- prevailing Party.

~~14.~~18. Interpretation. The Parties acknowledge that each Party and its counsel have reviewed this Agreement with their respective counsel and agree that this Agreement has been fairly negotiated at arm's length. This Agreement shall not be construed against either Party and the principle of contract construction to the effect that any ambiguities are to be resolved against the drafting party shall not apply in construing or interpreting this Agreement.

**Formatted:** Header

**Formatted:** Font color: Auto

**Formatted:** Space Before: 0.5 pt

**Formatted**

**Formatted** ... [15]

**Formatted:** Right: 0.08", Space Before: 0 pt, Numbered + Level: 2 + Numbering Style: 1, 2, 3, ... + Start at: 1 + Alignment: Left + Aligned at: 0.08" + Indent at: 0.58", Tab stops: 0.58", Left + Not at 0.63"

**Formatted:** Font color: Auto

**Formatted** ... [16]

**Formatted:** Space Before: 0 pt, Numbered + Level: 2 + Numbering Style: 1, 2, 3, ... + Start at: 1 + Alignment: Left + Aligned at: 0.08" + Indent at: 0.58", Tab stops: 0.58", Left + 0.58", Left + Not at 0.63" + 0.63"

**Formatted**

**Formatted** ... [17]

**Formatted:** Right: 0", Space Before: 0 pt, Numbered + Level: 2 + Numbering Style: 1, 2, 3, ... + Start at: 1 + Alignment: Left + Aligned at: 0.08" + Indent at: 0.58", Tab stops: 0.58", Left + Not at 0.63"

**Formatted** ... [18]

**Formatted:** Font: 12 pt

**Formatted** ... [19]

**Formatted:** List Paragraph, Left, Right: 0", Space Before: 11.45 pt, Numbered + Level: 2 + Numbering Style: 1, 2, 3, ... + Start at: 1 + Alignment: Left + Aligned at: 0.08" + Indent at: 0.58", Tab stops: 0.58", Left

**Formatted:** Font: 12 pt

**Formatted** ... [20]

**Formatted:** List Paragraph, Left, Right: 0", Space Before: 11.45 pt, Numbered + Level: 2 + Numbering Style: 1, 2, 3, ... + Start at: 1 + Alignment: Left + Aligned at: 0.08" + Indent at: 0.58", Tab stops: 0.58", Left

**Formatted:** Font: 10.5 pt

**Formatted:** Space Before: 0.05 pt

**Formatted**

**Formatted** ... [21]

**Formatted:** Right: 0", Space Before: 0 pt, Numbered + Level: 2 + Numbering Style: 1, 2, 3, ... + Start at: 1 + Alignment: Left + Aligned at: 0.08" + Indent at: 0.58", Tab stops: 0.58", Left + Not at 0.62"

~~15.~~19. ~~Severability~~ Severability. If any provision(s) of this Agreement are held to be illegal, invalid or unenforceable under present or future laws, such provision(s) shall be fully severable, and this Agreement shall be construed and enforced as if such illegal, invalid or unenforceable provision(s) had never comprised a part of this Agreement, and the remaining provisions of this Agreement shall remain in full force and effect and not be affected by the illegal, invalid or unenforceable provision or by its severance from this Agreement, provided that both Parties may still effectively realize the complete benefit of the transaction contemplated hereby.

~~16.~~20. Amendments. No modification or amendment of this Agreement shall be effective unless made in writing and executed by both Lessor and Lessee. In the event any approval or consent is required pursuant to any provision of this Agreement, such approval or consent shall be deemed given only if it is in writing, executed by the party whose approval or consent is required.

~~17.~~21. Authority. Lessor and Lessee each have the right, power, legal capacity, and authority to enter into and no approvals or consents of any other person(s) other than Lessor or Lessee are required in connection with this Agreement. The execution of this Agreement and consummation of the transactions contemplated hereby will not result in, or constitute any default or event that with notice or lapse of time, or both, would be, a default, breach or violation of any lease, license, promissory note, conditional sales contract, commitment, indenture, mortgage, deed of trust or other agreement, instrument or arrangement to which Lessor or Lessee is a party or by which Lessor or Lessee is bound.

~~18. Further Assurances. The Parties hereto agree to execute any and all additional documents or instruments which may be necessary to fully carry out or perform the intended purpose of this Agreement.~~

~~19.~~22. Notice of Option. This Option shall not be recorded in the real property records. Lessor authorizes Lessee to record a Notice of Option to Lease in the real property records that reflects the basic terms of this Agreement and the Option.

~~20. Confidentiality. Lessor shall maintain in the strictest confidence, for the benefit of Lessee, all information pertaining to the compensation paid under this Agreement, any information regarding Lessee, its business or operations on the Property or on any other lands, and any other information that is deemed proprietary or that Lessee requests or identifies to be held confidential, in each such case whether disclosed by Lessee or discovered by Lessor.~~

~~21.~~23. Counterparts. This Agreement may be executed in any number of counterparts and when so executed, all such counterparts together shall constitute a single instrument binding upon all parties hereto.

~~22.~~24. Binding Agreement. This Agreement and, if the Option is exercised by Lessee, the attached Pore Space Lease, shall be binding upon and shall inure to the benefit of the Parties and their respective heirs, successors, or assigns.

~~23.~~25. Electronic Signatures. This Lease, and any amendments hereto, to the extent signed and delivered by means of electronic transmission in portable document format (pdf) or by



Formatted: Header

Formatted: Left: 0.92", Right: 0.92", Top: 0.94", Bottom: 0.88", Footer distance from edge: 0.74"

Formatted ... [22]

Formatted: List Paragraph, Right: 0", Space Before: 3.8 pt, Line spacing: single, Numbered + Level: 2 + Numbering Style: 1, 2, 3, … + Start at: 1 + Alignment: Left + Aligned at: 0.08" + Indent at: 0.58", Tab stops: 0.58", Left + Not at 0.63"

Formatted: Font: 12 pt, Font color: Auto

Formatted ... [23]

Formatted: Right: 0.08", Space Before: 0.05 pt, Line spacing: single, Numbered + Level: 2 + Numbering Style: 1, 2, 3, … + Start at: 1 + Alignment: Left + Aligned at: 0.08" + Indent at: 0.58", Tab stops: 0.58", Left + Not at 0.63"

Formatted: Font: 12 pt

Formatted ... [24]

Formatted: Right: 0.08", Space Before: 0 pt, Line spacing: single, Numbered + Level: 2 + Numbering Style: 1, 2, 3, … + Start at: 1 + Alignment: Left + Aligned at: 0.08" + Indent at: 0.58", Tab stops: 0.58", Left + Not at 0.63"

Formatted: Font: 10 pt, Font color: Auto

Formatted ... [25]

Formatted: Font: 10.5 pt

Formatted ... [26]

Formatted ... [27]

Formatted: Font: 12 pt

Formatted ... [28]

Formatted: Right: 0.08", Space Before: 0 pt, Line spacing: Multiple 0.99 li, Numbered + Level: 2 + Numbering Style: 1, 2, 3, … + Start at: 1 + Alignment: Left + Aligned at: 0.08" + Indent at: 0.58", Tab stops: 0.58", Left + Not at 0.62"

Formatted: Font: 10 pt

Formatted: Body Text, Line spacing: Multiple 0.06 li

DocuSign or similar electronic signature process, shall be treated in all manner and respects as an original contract and shall be considered to have the same binding legal effect as if it were the original signed version thereof delivered in person.

IN WITNESS WHEREOF, the Parties have executed this Agreement to be effective as of the Effective Date.

**LESSOR:**

~~TBD~~

By: _____

Print: _____

_____

By: _____

Print: _____



**Formatted:** Header

**Formatted:** Font: 12 pt, No underline, Font color: Auto, Character scale: 100%

**Formatted:** Left: 0.92", Right: 0.92", Top: 0.94", Bottom: 0.88", Footer distance from edge: 0.74"

**Formatted** ... [29]

**Formatted:** Body Text, Indent: Left: 0.58", First line: 0", Right: 0.08", Space Before: 3.8 pt, Line spacing: Multiple 1.01 li

**Formatted:** Font: 13 pt

**Formatted:** Space Before: 0 pt

**Formatted:** Font: 12 pt, No underline, Font color: Auto, Character scale: 100%

**Formatted** ... [30]

**Formatted:** Body Text, Indent: Left: 0.08", First line: 0.5", Space Before: 7.5 pt, Line spacing: Multiple 1.01 li

**Formatted:** Font: 10 pt

**Formatted:** Space Before: 0.45 pt

**Formatted:** Font: 12 pt, Font color: Auto

**Formatted:** Font: 12 pt

**Formatted:** Heading 1, Left, Indent: Left: 0", Right: 0", Space Before: 0.05 pt

**Formatted:** Font: 15.5 pt, Bold

**Formatted:** Space Before: 0.05 pt

**Formatted:** Font: Times New Roman, 15.5 pt, Bold

**Formatted:** Body Text, Indent: Left: 0", Space Before: 0.05 pt

**Formatted:** Space Before: 0.05 pt

**Formatted:** Font color: Auto

**Formatted** ... [31]

**Formatted:** Body Text, Indent: Left: 0.08", Right: 3.58", Line spacing: Multiple 1.88 li, Tab stops: 0.58", Left + 3.08", Left + Not at 3.64" + 6.17"

**Formatted:** Font: 15.5 pt, Bold

**Formatted:** Space Before: 0.3 pt

**Formatted:** Font color: Auto

**Formatted** ... [32]

**Formatted:** Body Text, Indent: Left: 0.08", Right: 3.58", Line spacing: Multiple 1.86 li, Tab stops: 0.58", Left + 3.08", Left + Not at 6.18"

**Formatted:** Font: 10 pt

**Formatted:** Body Text, Line spacing: Multiple 0.06 li

**LESSEE:**

SUMMIT CARBON SOLUTIONS, LLC

By: _____

Print: _____

Its: ~~Executive Vice President~~



Formatted: Header

Formatted: Font color: Auto, Character scale: 100%

Formatted: Left: 0.92", Right: 0.92", Top: 0.96", Bottom: 0.88", Footer distance from edge: 0.74"

Formatted: Heading 1, Indent: Left: 0", Space Before: 0 pt

Formatted: Font: Bold

Formatted: Space Before: 0.05 pt

Formatted: Font color: Auto

Formatted: Indent: Left: 0.08"

Formatted: Font: 16.5 pt

Formatted: Space Before: 0.05 pt

Formatted: No underline, Font color: Auto

Formatted: Font color: Auto

Formatted: Body Text, Indent: Left: 0.08", First line: 0", Right: 3.58", Line spacing: Multiple 1.86 li, Tab stops: 3.08", Left + Not at 3.07" + 3.17"

Formatted: No underline, Font color: Auto

Formatted: Font: 12 pt, No underline, Font color: Auto

Formatted: Font: 12 pt, Font color: Auto

Formatted: Font: 12 pt, No underline, Font color: Auto

Formatted: Font: 12 pt

Formatted: Font: 12 pt

Formatted: Font: 10 pt

Formatted: Body Text, Line spacing: Multiple 0.06 li

**EXHIBIT A**

**PORE SPACE**

**LEASE**

**ATTACHED**

**Formatted:** Header

**Formatted:** Underline color: Auto, Font color: Auto, Character scale: 100%

**Formatted:** Left: 0.92", Right: 0.92", Top: 0.94"

**Formatted:** Font: Bold, Font color: Auto, Character scale: 100%

**Formatted:** Font: 12 pt, Bold, Font color: Auto, Character scale: 100%

**Formatted:** Font: Bold

**Formatted:** Normal, Indent: Left: 2.22", Right: 2.21", Space Before: 4.5 pt, Line spacing: Double

**PORE SPACE LEASE**

THIS PORE SPACE LEASE (this "Lease") is made effective as of the Effective Date (as defined below) by and between _____, whose address is _____ (whether one or more, "Lessor"), and Summit Carbon Solutions, LLC, an Iowa limited liability company, whose address is 1805 COLLABORATION PLACE SUITE 1200, AMES, IA 50010 (whether one or more, "Lessee"). Lessor and Lessee may be individually referred to herein as a "Party" and collectively as the "Parties"

1. Leased Premises. Lessor, for good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, does hereby grant, demise, lease and let unto Lessee for Lessee's Carbon Dioxide geologic storage operations and other purposes set forth herein, the lands described and incorporated herein by reference in Exhibit C attached (the "Leased Premises"). This Lease in no way conveys the right to Lessee for storage or facility developments for any other purpose than Carbon Dioxide sequestration. No facilities constructed as part of this Lease or associated agreements may be converted for any other purpose than Carbon Dioxide sequestration.

2. Term.

(a) Initial and Primary Term. This Lease shall commence on the date Lessee executes this Lease ("Effective Date") and continue for an initial term of twenty (20) years ("Initial Term") unless sooner terminated in accordance with the terms of this Lease. As consideration for the Initial Term, Lessee shall pay to Lessor ~~TWENTY-FIVE~~TWO HUNDRED and NO/100 DOLLARS ($~~25~~200.00) per acre as a single one-time bonus payment within 5 business days of the Effective Date, and an annual rental of ~~Two~~Ten and No/100 Dollars ($~~*~~10.00) per acre on or before January 1 of each year of the Initial Term. The annual rental shall increase by TWO percent (2.0%) commencing on January 1, 2026 and on January 1 each year thereafter. ~~The first year's rental has been paid in full, the receipt and sufficiency of which is hereby acknowledged by Lessor.~~ Lessee may, at any time prior to the expiration of the Initial Term, elect to extend the Initial Term for up to an additional twenty (20) years by providing written notice to Lessor (the Initial Term, together with all extensions shall be referred to herein as the "Primary Term"). Upon Notice by Lessee to Lessor of the extension of Lease Term, Lessee shall pay Lessor an additional bonus payment within 5 days of said notice in an amount to be negotiated at the time of extension based on current market rates for such purposes, but in no case shall be less than TWO HUNDRED and NO/100 DOLLARS ($200.00) per acre. For the avoidance of doubt, Lessor's consent to any such extension will not be required. Lessee shall pay to Lessor the annual rentals when due throughout the Primary Term; ~~*provided, however*, Lessee shall not be liable to Lessor for annual rentals with respect to any portion of the Leased Premises which are or become subject to Permit as set forth in Section 2(b), below.~~

~~(a)~~

(b) Operational Term. This Lease shall continue beyond the Primary Term for so long as any portion of the Leased Premises or Lessee's storage facilities located in, on or under the Leased Premises (including without limitation, any Reservoirs) are subject to a permit issued by the North Dakota Industrial Commission (the "Commission") (a "Permit") or under the ownership or control of the State of North Dakota; *provided, however*, that all of Lessee's obligations under this Lease shall terminate upon issuance of a certificate of project completion pursuant to Chapter 38-22 of the North Dakota Century Code (the "Operational Term"). If the Primary Term expires and no portion of the Leased Premises or Lessee's storage facilities located in, on or under the Leased Premises is subject to a Permit, this Lease shall terminate, and Lessee shall execute a document evidencing

Formatted: Header

Formatted: Font: 12 pt, Bold, Font color: Auto, Character scale: 100%

Formatted: Font: Bold

Formatted: Normal, Indent: Left: 2 51", Space Before: 3.05 pt

Formatted ... [33]

Formatted: Normal, Indent: Left: 0.08", First line: 0.5", Right: 0 08", Space Before: 0 pt, Line spacing: Multiple 0.99 li

Formatted ... [34]

Formatted: Font: 10.5 pt

Formatted: Space Before: 0.15 pt

Formatted: Font color: Auto

Formatted ... [35]

Formatted: Indent: Left: 0.08", Hanging: 0.21", Numbered + Level: 1 + Numbering Style: 1, 2, 3, ... + Start at: 1 + Alignment: Left + Aligned at: -0.14" + Indent at: 0.08", Tab stops: 0.29", Left + Not at 0.34"

Formatted ... [36]

Formatted: Font: 10 5 pt

Formatted: Body Text, Right: 0", Space Before: 0.05 pt, Line spacing: single, No bullets or numbering, Tab stops: Not at 1 14"

Formatted ... [37]

termination of this Lease in recordable form and shall record it in the official records of the county in which the Leased Premises is located. As consideration for the Operational Term, Lessee shall pay to Lessor the royalty set forth in Section 3, below.

3. Royalty. ~~Lessee shall pay to Lessor its proportionate share of TWENTY-FIVE cents ($0.25) per metric ton of carbon dioxide (COC) injected into the reservoirs and subsurface pore spaces (as~~

Formatted: Header

Formatted: Font color: Auto
Formatted: Font color: Auto, Condensed by 0.5 pt
Formatted: Font color: Auto, Condensed by 0.15 pt
Formatted: Font color: Auto, Condensed by 0.4 pt
Formatted: Font color: Auto
Formatted: Font color: Auto, Condensed by 0.55 pt
Formatted: Font color: Auto
Formatted: Font color: Auto, Condensed by 0.55 pt
Formatted: Font color: Auto
Formatted: Font color: Auto, Condensed by 0.5 pt
Formatted: Font color: Auto
Formatted: Font color: Auto, Condensed by 0.45 pt
Formatted: Font color: Auto
Formatted: Font color: Auto, Condensed by 0.7 pt
Formatted: Font color: Auto
Formatted: Font color: Auto, Condensed by 0.45 pt
Formatted: Font color: Auto
Formatted: Font color: Auto, Condensed by 0.45 pt
Formatted: Font color: Auto
Formatted: Font color: Auto, Condensed by 0.7 pt
Formatted: Font color: Auto
Formatted: Font color: Auto, Condensed by 0.7 pt
Formatted: Font color: Auto
Formatted: Font color: Auto, Condensed by 0.5 pt
Formatted: Font color: Auto
Formatted: Font color: Auto, Condensed by 0.15 pt
Formatted: Font color: Auto
Formatted
Formatted: Condensed by 0.15 pt
Formatted: No underline, Condensed by 0.15 pt
Formatted: Expanded by 0.15 pt
Formatted: Font color: Auto
Formatted: Font color: Auto
Formatted: No underline, Font color: Auto
Formatted: Font color: Auto

3. ~~used herein, such terms shall have the meanings set forth in Chapter 38-22 and Chapter 47-31 of the North Dakota Century Code), stratum or strata underlying the Leased Premises (collectively, "Reservoirs"), or reservoirs and subsurface pore spaces, stratum or strata unitized or amalgamated therewith. The royalty shall increase TEN percent (10.0%) on January 1, 2026 and an additional TEN percent (10.0%) every five years thereafter, as outlined on attached Exhibit D. The quantity of CO2 so injected shall be measured by meters installed by Lessee.~~ Lessee shall pay to Lessor its proportionate share of three-sixteenths (3/16 ths) of the Lessees' Gross Profits and any Credits realized by Lessee for use of the subsurface pore space. For the avoidance of doubt, Gross Profit, as defined by GAAP, shall be the difference between revenues plus the value of any credits, less the cost of capturing, processing, compressing, transporting and sequestering Carbon Dioxide. The Gross Profits derived from the withdrawl of Carbon Dioxide shall be included as in the Royalty calculation. Gross Profit shall not include Lessees' overhead and corporate operations. Credits shall include, but are not limited to 45Q federal tax credits, benefits, rebates, subsidies, payments, emissions reductions, offsets, investment tax credits, production tax credits, allowances or other incentives Lessee obtains through sequestration of Carbon Dioxide on the Leased Premises. Subject to Lessor's Right to Audit as defined in Section 35, Lessor's "proportionate share" shall be determined on a net acre basis, and the Parties hereby stipulate that the acreage set forth in Section 11 shall be used to calculate Lessor's proportionate share. The quantity of ~~carbon dioxide~~Carbon Dioxide injected into the Reservoirs or any reservoirs or subsurface pore spaces, stratum or strata unitized or amalgamated therewith shall be determined through the use of metering equipment installed and operated by Lessee at the injection site. All royalties due hereunder for ~~carbon dioxide~~Carbon Dioxide injected into the Reservoirs or any reservoirs or subsurface pore spaces, stratum or strata unitized or amalgamated therewith during any calendar month shall be paid to Lessor ~~annually. Lessor and Lessee agree that this Lease shall continue as specified herein even in the absence of injection operations and the payment of royalties~~ quarterly. Tax Credits will transfer to Lessor on an annual basis

4. Right to Pore Space/Storage of Carbon Dioxide. Lessor grants to Lessee the exclusive right to inject and store ~~carbon dioxide (CO2) and other incidental gaseous substances~~Carbon Dioxide into the Reservoirs, together with the right to and subject to appropriate Easements construct, replace, inspect, repair, monitor, maintain, relocate, change the size of such surface or subsurface facilities on the Leased Premises that Lessee determines necessary or desirable for Lessee's storage operations, including, but not limited to fences, pipelines, tanks, reservoirs, electric and communication lines, roadways, underground facilities and equipment, surface facilities and equipment, buildings, structures and other such facilities and appurtenances. Lessor shall not grant any other person the right to inject or store ~~CO2 or any other incidental substances~~ Carbon Dioxide.

~~Facility Right of Ways~~

5. Easements/Compensation. Subject to mutual execution of an appropriate Easement as shown in Exhibits D and/or E and payment of Consideration per schedule in Exhibit F, Lessor grants Lessee the right of reasonable use of the surface of the Leased Premises, ~~including without limitation,~~ subject to the terms of the Easement(s), the rights of ingress and egress over the Leased Premises together with the right of way over, under and across the Leased Premises and the right from time to time to construct, replace, inspect, repair, monitor, maintain, relocate, change the size of such surface or subsurface facilities on the Leased Premises that Lessee determines necessary or desirable for Lessee's storage operations, including, but not limited to fences, pipelines, tanks, reservoirs, electric and communication lines, roadways, underground facilities and equipment, surface facilities and equipment, buildings, structures and other such facilities and appurtenances, (each a "Facility" and collectively the "Facilities"); ~~*provided, however,* that Lessee shall provide~~

Formatted: Header

Formatted ... [38]

Formatted: Font: 10 pt

Formatted: Body Text, Indent: Left: 0", First line: 0", Right: 0", Space Before: 0.3 pt, Line spacing: single

Formatted ... [39]

Formatted: Right: 0", No bullets or numbering, Tab stops: Not at 0.29"

Formatted ... [40]

~~Lessor with notice of operations and an offer of damage, disruption and loss of production payments, as each may be applicable, prior to the installation of any such Facilities on the Leased Premises. Lessee shall be entitled to proceed with the installation of the Facilities while the amount of damage, disruption or loss is being agreed or determined.~~"). Lessee shall have the further right to fence the perimeter of any Facility on the Leased Premises and sufficiently illuminate the site for the safety and security of operations subject to restrictions below. All facilities must be designed and located so noise and light does not impact Lessor's quiet use and enjoyment of Property.

- The location and extent of all surface and subsurface facilities shall be at the sole discretion of Lessor and be in concert with current and future land uses and maintain a minimum setback of ½ mile from any occupied residence unless approved in writing by Lessor.
- All external lighting for facilities shall be shielded, designed to reduce glare and not allow direct light to trespass.
- Lessee, at Lessees' expense, shall conduct noise testing while facilities are completed and in operation. The maximum noise at the boundary of any operating surface faciltity must be less than 62 dBA while in operation. If the noise level exceeds this level, Lessee shall promptly take any and all actions, including discontinuing use of the facilities to achieve the stated noise level.
- While conducting any construction activities for the Carbon Dioxide geologic storage facilities that cause traffic to utilize county gravel roads, Lessee shall incorporate a commercial dust control product into the gravel surface 1,000 feet each side of any occupied residences driveways and adjacent to any pastures and feedlots, whether or not the construction activity is within the Leased Premises.

Lessee agrees to fully remove and remediate the Leased Premises where facilities have been installed to the condition immediately preceding their installation within 1 year of the end of the Operational Term or 3 years after Carbon Dioxide is no longer being injected in to the pore space in the unit, unless Lessor agrees in writing to allow Lessee to abandon the Facilities in place. No structures, pipe, or other facility infrastructure may be abandoned in place unless Lessor agrees in writing to allow such abandonment with an approved procedure. Lessee shall furnish to Lessor security covering the faithful performance of facility removal and remediation and Lessees' payment and other obligations arising under this Agreement in the form of separate Performance and Payment Bonds, each with a penal sum equal to an amount as determined by the associated right of way agreement or surface use agreement for the estimated cost of facility removal and remediation. The Performance and Payment Bonds must remain in place until the facilities are removed and land is remediated. The Performance and Payment Bonds must be obtained from a guaranty or surety company authorized to conduct business in North Dakota.

Formatted: Header

Formatted: Font: 12 pt, Font color: Auto

Formatted: Font: 12 pt, Font color: Auto, Not Expanded by / Condensed by

Formatted: Font: 12 pt, Font color: Auto

Formatted: Font: 12 pt, Font color: Auto, Not Expanded by / Condensed by

Formatted: Font: 12 pt, Font color: Auto

Formatted: Font: 12 pt, Font color: Auto, Not Expanded by / Condensed by

Formatted: Font: 12 pt, Font color: Auto

Formatted ... [41]

Formatted: Font: 12 pt, Font color: Auto

Formatted ... [42]

Formatted: Font: 12 pt, Font color: Auto

Formatted ... [43]

Formatted: Font: 12 pt, Font color: Auto

Formatted ... [44]

Formatted: Font: 12 pt, Font color: Auto

Formatted ... [45]

Formatted: Font: 12 pt, Font color: Auto

Formatted ... [46]

Formatted: Font: 12 pt, Font color: Auto

Formatted ... [47]

Formatted: Font: 12 pt, Font color: Auto

Formatted ... [48]

Formatted: Font: 12 pt, Font color: Auto

Formatted ... [49]

Formatted: Font: 12 pt, Font color: Auto

Formatted ... [50]

Formatted: Font: 12 pt, Font color: Auto

Formatted ... [51]

Formatted: Font: 12 pt, Font color: Auto

Formatted ... [52]

Formatted: Font: 12 pt, Font color: Auto

Formatted ... [53]

Formatted: Font: 12 pt, Font color: Auto

Formatted ... [54]

Formatted: Font: 12 pt, Font color: Auto

Formatted: Header

~~5.~~

Formatted: Font: 10 pt, Font color: Auto

Formatted: Body Text, Right: 0", Space Before: 0.4 pt, Line spacing: single, No bullets or numbering, Tab stops: Not at 0.37"

~~6.~~ Amalgamation. Lessee, in its sole discretion, shall have the right and power, at any time and from time to time during the term of this Lease to pool, unitize, or amalgamate any reservoirs or subsurface pore spaces, stratum or strata underlying the Leased Premises with any other lands or interests into which such reservoirs or subsurface pore spaces extend and document such unit in accordance with applicable law or agency order- and only if such Amalgamation does not deprive Lessor of any financial benefit that was originally to be derived from this Lease. Amalgamated units shall be of such shape and

Formatted ... [55]

6. dimensions as Lessee may elect and as are approved by the Commission. Amalgamated areas may include, but are not required to include, land upon which injection ~~or extraction~~ wells have been completed or upon which the injection ~~and/or withdrawal~~ of ~~carbon dioxide and/or related gaseous substances~~Carbon Dioxide has commenced prior to the effective date of amalgamation. In exercising its amalgamation rights under this Lease and if required by law, Lessee shall record or cause to be recorded a copy of the Commission's amalgamation order or other notice thereof in the county in which the amalgamated unit is located. Amalgamating in one or more instances shall, if approved by the Commission, not exhaust the rights of Lessee to amalgamate Reservoirs or portions of Reservoirs into other amalgamation areas, and Lessee shall have the recurring right to revise any amalgamated area formed under this Lease by expansion or contraction or both. ~~Lessee may dissolve any amalgamated area at any time and document such dissolution by recording an instrument in accordance with applicable law or agency order. Lessee shall have the right to negotiate on behalf of and as agent for Lessor, any unit, amalgamation, storage or operating agreements with respect to amalgamation of reservoir or pore space interests underlying the Leased Premises or the operation of any amalgamated areas formed under such agreements. To the extent any of the terms of such agreements conflict with the terms of this Lease, the terms of such agreements shall control, and the provisions of this Lease shall be deemed modified to conform to the terms, conditions, and provisions of any such agreements which are approved by the Commission.~~

7. Lessee Obligations. Lessee shall have no obligation other paying Lessor the minimum annual rental fee as described in Section 1, express or implied, to begin, prosecute or continue storage operations in, upon or under the Leased Premises. ~~or store and/or sell or use all or any portion of the gaseous substances stored thereon.~~ The timing, nature, manner, and extent of Lessee's operations, if any, under this Lease shall be at the sole discretion of Lessee. All obligations of Lessee are expressed herein, and there shall be no covenants implied under this Lease, it being agreed that all amounts paid hereunder constitute full and adequate consideration for this Lease.

8. Ownership. Lessee shall at all times be the owner of (i) the ~~carbon dioxide and other gaseous substances~~Carbon Dioxide stored in the Reservoirs or any reservoirs or subsurface pore spaces, stratum or strata unitized or amalgamated therewith, and (ii) all equipment, buildings, structures, facilities and other property constructed or installed by Lessee on the Leased Premises. Lessee shall have the right, ~~but not the obligation~~, at any time during this Lease to remove all or any portion of the property or fixtures placed by Lessee on the Lease Premises. Notwithstanding the foregoing, title to the storage facility and to the stored ~~carbon dioxide or other gaseous substances~~Carbon Dioxide shall be transferred to the State of North Dakota upon issuance of a certificate of project completion by the Commission in accordance with Chapter 38-22 of the North Dakota Century Code.

9. Minerals. Coal, Oil and Gas. This Lease is not intended to grant or convey, nor does it grant or convey, any right to or obligation for Lessee to explore for or produce minerals, including coal, oil and gas, that may exist on or under the Leased Premises.

10. Water, Gravel and Scoria. This Lease is not intended to grant or convey, nor does it grant or convey, any right to Lessee for use or title to any source of water, gravel or scoria.

11. Surrender of Leased Premises. Lessee shall have the right, ~~but not the obligation~~, at any time



Formatted: Header

Formatted ... [56]

Formatted: List Paragraph, Left, Indent: First line: 0", Right: 0", Space Before: 0.05 pt, Line spacing: single, Numbered + Level: 1 + Numbering Style: 1, 2, 3, … + Start at: 1 + Alignment: Left + Aligned at: -0.14" + Indent at: 0.08", Tab stops: 0.29", Left

Formatted: No bullets or numbering

Formatted: Font: 12 pt

Formatted ... [57]

Formatted: Indent: First line: 0", Right: 0", Space Before: 0.05 pt, Line spacing: single, Numbered + Level: 1 + Numbering Style: 1, 2, 3, … + Start at: 1 + Alignment: Left + Aligned at: -0.14" + Indent at: 0.08", Tab stops: 0.29", Left + Not at 0.34"

Formatted: Font: 12 pt

Formatted ... [58]

Formatted: Indent: First line: 0", Right: 0.08", Space Before: 0.05 pt, Line spacing: single, Numbered + Level: 1 + Numbering Style: 1, 2, 3, … + Start at: 1 + Alignment: Left + Aligned at: -0.14" + Indent at: 0.08", Tab stops: 0.3", Left + Not at 0.34"

Formatted: Font: 12 pt

Formatted ... [59]

Formatted: Indent: First line: 0", Space Before: 0 pt, Line spacing: Multiple 1.01 li, Numbered + Level: 1 + Numbering Style: 1, 2, 3, … + Start at: 1 + Alignment: Left + Aligned at: -0.14" + Indent at: 0.08", Tab stops: 0.33", Left + Not at 0.37"

Formatted: Line spacing: single, No bullets or numbering, Tab stops: Not at 0.33"

Formatted ... [60]

Formatted: Header

from time to time to execute and deliver to Lessor a surrender and/or release covering all or any part of the Leased Premises for which the Reservoirs are not being utilized for storage as set forth

Formatted ... [61]

Formatted: Header

~~10.~~ herein, and upon delivery of such surrender and/or release to Lessor this Lease shall terminate as to such lands, and subject to completion of any reclamation, remediation, facility removal obligations in this Lease or any Easements, Lessee shall be released from all further obligations and duties as to the lands

Formatted ... [62]

so surrendered and/or released, including, without limitation, any obligation to make payments provided for herein, except obligations accrued as of the date of the surrender and/or release. Lessee shall be able to surrender the any and or all of the Leased Premises if not utilizing the Reservoirs located thereunder. If Lessee has not started to or discontinues injection of Carbon Dioxide into the storage unit for a period of 2 years, Lessor may chose to terminate this Agreement or continue to receive the annual rental at its' sole discretion.

~~11.~~12. Hold Harmless and Indemnification. The Lessee agrees to defend, indemnify, and hold harmless Lessor from any claims by any person that are a direct result of the Lessee's use of the Leased Premises or Reservoirs. Notwithstanding the foregoing, such indemnity/hold harmless obligation excludes (i) any claim or cause of action, or alleged or threatened claim or cause of action, damage, judgment, interest, penalty or other loss arising or resulting from the negligence or, intentional acts of Lessor or Lessor's agents, invitees, or licensees; or third parties, and (ii) any claim for exemplary, punitive, special or consequential damages claimed by Lessor. ~~Lessee further accepts liability and indemnifies Lessor for reasonable costs, expenses and attorneys' fees incurred in establishing and litigating the indemnification coverage provided above. The legal defense provided by Lessee to the Lessor under this paragraph must be free of any conflicts of interest even if this requires Lessee to retain separate legal counsel for Lessor~~ Lessee agrees to defend, indemnify and hold harmless Lessor, its family members, members, shareholders, directors, managers, partners, officers, employees, agents and contractors (the Indemnified Parties) from and against, and shall promptly reimburse each Indemnified Party with respect to any claim, demand or cause of action, including any actual loss, cost, expense, liability, fine or damage incurred or suffered by the Indemnified Party (including reasonable fees and expenses of attorneys, technical experts and expert witnesses, court costs and other out-of-pocket expenses) related to any bodily injury, death or property damage resulting from Lessees' breach of this Agreement, Lessees' violation of any law, rule or regulation or Lessor's negligence or willful misconduct, or any act of Lessee. Neither the coverage nor the limits of insurance required by this Agreement shall in any way restrict the foregoing indemnity obligation.

13. Hazardous Substances. Lessee shall have no liability for any regulated hazardous substances located on the Leased Premises prior to the Effective Date or placed in, on or about the Leased Premises by Lessor or any third-party on or after the Effective Date, and nothing in this Lease shall be construed to impose upon Lessee any obligation for the removal of such regulated hazardous substances. As used herein, "hazardous substances" shall have the meaning set forth in the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) and any amendments thereto, or any other local, state or federal statutes. Lessee is responsible for any and all pollution caused by Lessee, its operations, agents, invitees or third parties. Any spill, leak or release of any Hazardous substance shall immediately be cleaned up and the Leased Premises restored to the condition immediately preceding the event. For avoidance of doubt, this includes any damages caused by a release or leak of Carbon Dioxide, whether from transportation, compression or storage operations.

~~12.~~

~~13.~~14. Termination. A material violation or default of any terms of this Lease by Lessee shall be grounds for termination of the Lease. Lessor shall give Lessee written notice of violation or default and Lessee shall have sixty (60) days after receipt of said notice to substantially cure such violations or defaults. If Lessee fails to substantially cure such violations or defaults within the 60-day cure period, Lessor may terminate the Lease; provided that if it is not possible to cure such violations or defaults within the 60-day cure period, Lessee shall have a reasonable longer period of time to cure



**Formatted:** Header

**Formatted:** Font color: Auto

**Formatted:** Indent: Left: 0.08", First line: 0", Right: 0.08", Space Before: 3.8 pt

**Formatted:** Font color: Auto

**Formatted** ... [63]

**Formatted:** Indent: First line: 0", Right: 0", Space Before: 0.05 pt, Numbered + Level: 1 + Numbering Style: 1, 2, 3, … + Start at: 1 + Alignment: Left + Aligned at: -0.14" + Indent at: 0.08", Tab stops: 0.43", Left + Not at 0.47"

**Formatted:** Font: 10 pt

**Formatted:** Space Before: 0.35 pt

**Formatted** ... [64]

**Formatted:** Font: 10.5 pt, Font color: Auto

**Formatted:** Body Text, Right: 0", Space Before: 0.05 pt, Line spacing: single, No bullets or numbering, Tab stops: Not at 0.43"

**Formatted** ... [65]

such violations or defaults provided it commences cure within the initial 60-day cure period and thereafter diligently pursues such cure, Lessee may terminate the lease with thirty (30) days written notice to Lessor. Upon termination of this Lease, Lessee shall have one hundred eighty (180) days to remove all facilities and property of Lessee located on the Leased Premises. For the avoidance of doubt, Lessee shall not be required to remove any ~~CO2 or other incidental gaseous substances~~Carbon Dioxide injected into the Reservoirs.

~~14~~15. Taxes. Lessee shall pay all taxes, if any, levied against its personal property or on its improvements to the Leased Premises. Lessor shall pay for all real estate taxes and other assessments levied upon the Leased Premises. Lessee shall have the right to pay all taxes, assessments and other fees on behalf of Lessor and to deduct the amount so paid from other payments due to Lessor hereunder.

16. Insurance Requirements.

- Prior to access on the Leased Premises, Lessee shall secure and maintain all insurance required as evidenced by Section 16 of this Agreement.
- The failure to secure and provide proof of insurance as required in this Lease shall constitute a material breach of this Lease entitling Lessor to terminate this Agreement immediately.
- Lessee shall maintain in effect at all times during the Option Period, insurance in accordance with the applicable laws relating to workers' compensation and employers' liability insurance, regardless of whether such coverage or insurance is mandatory or merely elective under the law.
- Required insurance coverage is to be purchased at Lessees' expense.
- Lessee shall notify Lessor of any erosion of aggregate limits under any of the insurance policies, and if requested, purchase additional limits of coverage as may be deemed by the Lessor to satisfy Lessees' coverage obligations.
- All insurance policies must include a waiver of the insurer's right of subrogation against Lessor. Lessee also hereby waives all rights of subrogation against Lessor.
- All insurance policies will not be canceled, or their limits or coverage reduced or restricted without providing 30 days prior written notice to Lessor.
- Lessor will look to Lessees' insurer for coverage for claims arising from the acts or omissions of Lessee and its Agents or Subcontractors.
- Insurance coverages, with the exception of workers' compensation and employers' liability shall be endorsed to name Lessor as an additional insured with respect to any liabilities assumed under this Agreement; and apply severally and not collectively to each insured against whom claim is made or suit is brought.
- Upon execution of this Lease and prior to January 1st of each year, Lessee shall instruct and require its insurance agent/broker to complete and return an insurance certificate to Lessor, in an ACORD form, as evidence that insurance policies providing the required coverage, limits and additional insured provisions as outlined in this Section 16 are in full force and effect. Lessee shall be fully responsible for all deductibles and self-insured retentions related to insurance provided herein.
- Minimum General Requirements.
  - $5,000,000 General Liability



Formatted: Header

Formatted ... [66]

Formatted ... [67]

Formatted: Space Before: 0.5 pt

Formatted: Font color: Auto

Formatted ... [68]

Formatted: Indent: First line: 0", Right: 0.08", Line spacing: single, Numbered + Level: 1 + Numbering Style: 1, 2, 3, ... + Start at: 1 + Alignment: Left + Aligned at: -0.14" + Indent at: 0.08", Tab stops: 0.44", Left + Not at 0.48"

- $1,000,000 Automobile Liability
- Statutory Workers' Compensation
- Employers' Liability - $1,000,000 each accident; $1,000,000 disease – policy limit; and $1,000,000 disease – each employee.
- $10,000,000 Excess Liability
- $20,000,000 Pollution Liability

15. Conduct of Operations. In conducting its operations hereunder, Lessee shall ~~use its best efforts to~~ comply with all applicable laws, rules and regulations and ordinances pertaining thereto. Lessee reserves and shall have the right to challenge and/or appeal any law, ruling, regulation, order, or

Formatted ... [69]

17. other determination and to carry on its operations in accordance with Lessee's interpretation of the same, pending final determination.

~~16.~~18. Force Majeure. Should Lessee be prevented from complying with any express or implied covenant of this Lease or from utilizing the Lease Premises for underground storage purposes by reason of scarcity of or an inability to obtain or to use equipment or material or failure or breakdown of equipment, or by operation of force majeure, any federal or state law or any order, rule or regulation of governmental authority, then while so prevented, ~~Lessee's~~Lessee's obligation to comply with such covenant shall be suspended ~~and the primary term of this Lease~~. In no event shall ~~be extended while and so long as Lessee is prevented by any such cause from utilizing~~this Section 18 be construed to be precedent to Lessors' right to terminate the Lease under Section 11. For the ~~property for underground storage purposes and~~avoidance of doubt, the ~~time while Lessee is so prevented~~Lessees' obligation to pay the annual rent as described in section 2(a) shall not be ~~counted against Lessee, anything in~~ impacted by this Section 18 and the Term of this Lease ~~to the contrary notwithstanding~~ shall not be extended due to this Section 18.

19. Surface Damage Compensation ~~Act~~. The bonus and royalty amounts contemplated and paid to Lessor hereunder is compensation for~~, among other things,~~ damages sustained by Lessor for the lost use of and access to Lessor's ~~land,~~ pore space ~~(to the extent required under North Dakota law), and any other damages which are contemplated under Chapter 38-11.1 of the North Dakota Century Code (if any and to the extent applicable). Subject to Lessee's obligation to compensate Lessor for the installation of any Facilities on the Leased Premises pursuant to Section 5 of this Agreement, Lessor agrees that such compensation is just and adequate for any and all damages contemplated under said Chapter 38-11.1 (if any and to the extent applicable), and all other damages which Lessor may sustain as a result of Lessee's use of the property for its storage operations.~~

~~17.~~

~~18.~~20. Warranty of Title and Quiet Enjoyment. Lessor represents and warrants to Lessee that Lessor is the owner of the surface of the Leased Premises and the pore space located thereunder. Lessor hereby warrants and agrees to defend title to the Leased Premises and the pore space located thereunder and Lessor hereby agrees that Lessee, at its option, shall have the right to discharge any tax, mortgage, or other lien upon the Leased Premises, and in the event Lessee does so, Lessee shall be subrogated to such lien with the right to enforce the same ~~and apply royalty payments or any other payments due to Lessor toward satisfying the same~~.

Lessor warrants that, except as disclosed to Lessee in writing, there are no liens, encumbrances, leases, mortgages, deeds of trust, options, or other exceptions to Lessor's fee title ownership of the Leased Premises (collectively, "Liens") which are not recorded in the public records of the County in which the Leased Premises is located. Lienholders (including tenants), whether or not their Liens are recorded, shall be Lessor's responsibility, and Lessor shall cooperate with Lessee to obtain a non-disturbance agreement from each party that holds a Lien (recorded or unrecorded) that might interfere with Lessee's rights under this Lease. A non-disturbance agreement is an agreement between Lessee and a lienholder which provides that the lienholder shall not disturb Lessee's possession or rights under the Lease or terminate this Lease so long as Lessor is not entitled to terminate this Lease under the provisions hereof.

Lessor shall have the quiet use and enjoyment of the Leased Premises in accordance with the terms of this Lease. Lessor's activities and any grant of rights Lessor makes to any person or entity, whether located on the Leased Premises or elsewhere, shall not, ~~currently or prospectively~~, materially interfere with activities permitted hereunder. If Lessor has any right to select, determine,



**Formatted:** Header

**Formatted** ... [70]

**Formatted:** List Paragraph, Left, Indent: First line: 0", Right: 0.08", Line spacing: single, Numbered + Level: 1 + Numbering Style: 1, 2, 3, ... + Start at: 1 + Alignment: Left + Aligned at: -0.14" + Indent at: 0.08", Tab stops: 0.36", Left

**Formatted:** Space Before: 0.4 pt

**Formatted**

**Formatted** ... [71]

**Formatted:** Indent: First line: 0", Right: 0", Line spacing: single, Numbered + Level: 1 + Numbering Style: 1, 2, 3, ... + Start at: 1 + Alignment: Left + Aligned at: -0.14" + Indent at: 0.08", Tab stops: 0.41", Left + Not at 0.45"

**Formatted** ... [72]

**Formatted:** Font: 10 pt, Font color: Auto

**Formatted:** Body Text, Right: 0", Space Before: 0.5 pt, Line spacing: single, No bullets or numbering, Tab stops: Not at 0.43"

**Formatted** ... [73]

**Formatted:** Font color: Auto

**Formatted:** Indent: Left: 0.08", Right: 0.08", Space Before: 0 pt

**Formatted** ... [74]

**Formatted** ... [75]

prohibit or control the location of sites for drilling, exploitation, production and/or exploration of minerals, hydrocarbons, water, gravel, or any other similar resource in, to or under the Lease Premises, then Lessor shall exercise such right so as to minimize interference with any of the foregoing.

~~19.~~21. Environmental Incentives and Tax Credits. Except as determined by Section 3 Royalty and Lessors' proportionate share. Lessee shall be the owner of (i) any and all credits, benefits, emissions reductions, offsets, and allowances, howsoever entitled, attributable to Lessee's Carbon Dioxide geologic storage operations, including any avoided emissions and the reporting rights related to these avoided emissions, such as 26 U.S.C. §45Q Tax Credits, and any other attributes of Lessee's ownership of the Facilities and Lessee's Carbon Dioxide geologic storage operations ("Environmental Attributes"), and (ii) any, and all credits, rebates, subsidies, payments or other incentives that relate to the use of technology incorporated into Lessee's Carbon Dioxide geologic storage operations, environmental benefits of such operations, or other similar programs available from any regulated entity or any governmental authority ("Environmental Incentives"). Lessee is further entitled to the benefit of any and all (a) investment tax credits, (b) production tax credits, (c) credits under 26 U.S.C. §45Q credits, and (d) similar tax credits or grants under federal, state or local law relating to Lessee's Carbon Dioxide geologic storage operations ("Tax Credits"). Lessor shall (i) cooperate with Lessee in obtaining, securing and transferring all Environmental Attributes and Environmental Incentives and the benefit of all Tax Credits, and (ii) shall allow Lessee to take any actions necessary to install additional equipment on the Facilities subject to Easements as defined in Section 5, to comply with all monitoring and reporting obligations, and allow Lessee's personnel to enter the premises and collect any data Lessee requires to satisfy its obligations required in connection with obtaining Tax Credits and Environmental Attributes. Lessor shall not be obligated to incur any out-of-pocket costs or expenses in connection with such actions unless reimbursed by Lessee. If any Environmental Incentives are paid directly to Lessor, Lessor shall immediately pay such amounts over to Lessee, less s Lessors' appropriate share as determined by Section 3, Royalty.

22. Assignment. The rights and obligations of either Party hereto may be assigned in whole or part. The assigning party shall provide written notice of any assignment within sixty (60) days after such assignment has become effective; *provided, however*, that an assigning party's failure to deliver written notice of assignment within such 60-day period shall not be deemed a breach of this Lease unless such failure is willful and intentional. The Lessor's consent shall ~~not~~ be required for an assignment by the Lessee of this Lease, whether by way of a collateral assignment to its financiers, or otherwise. For the avoidance of doubt, any assignment of these rights and obligations by Lessee shall not change the terms and conditions of this Lease or expand the use of the pore space, Surface Use Agreement or Right of Way Agreement for substances other than Carbon Dioxide.

~~20.~~

~~21.~~23. Change of Ownership. No change of ownership in the Leased Premises shall be binding on the Lessee for purpose of making payments to Lessor hereunder until the date Lessor, or Lessor's successors or assigns, furnishes Lessee the recorded original or a certified copy of the instrument evidencing the change in ownership. The Lessor's consent shall not be required for a change in the direct or indirect control of the Lessee.

~~22.~~24. Notices. All notices required to be given under this Lease shall be in writing and addressed to the respective Party at the addresses set forth at the beginning of this Lease unless otherwise directed by either Party.



**Formatted:** Header

**Formatted** ... [76]

**Formatted:** Indent: Left: 0.08", First line: 0", Right: 0.08", Space Before: 3.8 pt

**Formatted:** Font color: Auto

**Formatted** ... [77]

**Formatted:** Indent: First line: 0", Right: 0.08", Space Before: 0.05 pt, Numbered + Level: 1 + Numbering Style: 1, 2, 3, ... + Start at: 1 + Alignment: Left + Aligned at: -0.14" + Indent at: 0.08", Tab stops: 0.58", Left + Not at 0.62"

**Formatted:** Font: 10 pt

**Formatted:** Space Before: 0.5 pt

**Formatted** ... [78]

**Formatted:** Font: 10 pt, Font color: Auto

**Formatted:** Body Text, Right: 0", Space Before: 0.5 pt, Line spacing: single, No bullets or numbering, Tab stops: Not at 0.4"

**Formatted** ... [79]

**Formatted:** Font: 10 pt

**Formatted:** Space Before: 0.4 pt

**Formatted:** Font color: Auto

**Formatted** ... [80]

**Formatted:** Indent: First line: 0", Right: 0.08", Line spacing: Multiple 1.01 li, Numbered + Level: 1 + Numbering Style: 1, 2, 3, ... + Start at: 1 + Alignment: Left + Aligned at: -0.14" + Indent at: 0.08", Tab stops: 0.39", Left + Not at 0.42"

25. Costs of Future Documentation. Lessee or any Mortgagee or Assignee requesting or receiving from Lessor additional, new or revised documents under the terms of this Lease shall pay Lessors' reasonable legal fees and other out of pocket expenses related to preparation, review, execution and delivery of the documents requested or received.

~~23.~~26. No Waiver. The failure of either Party to insist in any one or more instances upon strict performance of any of the provisions of this Lease or to take advantage of any of its rights hereunder shall not be construed as a waiver of any such provision or the relinquishment of any such rights, but the same shall continue and remain in full force and effect.

Formatted: Header

Formatted: Font: 12 pt

Formatted: List Paragraph, Space Before: 0 pt

Formatted

Formatted: No underline

Formatted: Font color: Auto

Formatted: Indent: First line: 0", Right: 0.08", Space Before: 3.8 pt, Numbered + Level: 1 + Numbering Style: 1, 2, 3, … + Start at: 1 + Alignment: Left + Aligned at: -0.14" + Indent at: 0.08", Tab stops: 0.42", Left + Not at 0.45"

Formatted: Font color: Auto, Condensed by 0.15 pt

Formatted: Font color: Auto

Formatted: Font color: Auto, Condensed by 0.15 pt

Formatted: Font color: Auto

Formatted: Font color: Auto, Condensed by 0.15 pt

Formatted: Font color: Auto

Formatted: Font color: Auto, Condensed by 0.15 pt

Formatted: Font color: Auto

Formatted: Font color: Auto, Condensed by 0.1 pt

Formatted: Font color: Auto

~~24.~~27. Notice of Lease. This Lease shall not be recorded in the real property records. Lessee shall cause a memorandum of this Lease to be recorded in the real property records of the county in which the Leased Premises are situated.

25. ~~Confidentiality. Lessor shall maintain in the strictest confidence, for the benefit of Lessee, all information pertaining to the compensation paid under this Lease, any information regarding Lessee and its business or operations on the Leased Premises or on any other lands, the capacity and suitability of any Reservoir or reservoirs and subsurface pore spaces, stratum or strata unitized or amalgamated therewith, and any other information that is deemed proprietary or that Lessee requests or identifies to be held confidential, in each such case whether disclosed by Lessee or discovered by Lessor.~~

~~26.~~28. Counterparts. This Lease may be executed in any number of counterparts, each of which, when executed and delivered, shall be an original, but all of which shall collectively constitute one and the same instrument.

~~27.~~29. Severability. If any provision of this Lease is found to be invalid, illegal or unenforceable in any respect, such provision shall be deemed to be severed from this Agreement, and the validity, legality, and enforceability of the remaining provisions contained herein shall not, in any way, be affected or impaired thereby.

~~28.~~30. Governing Law. This Lease shall be governed by, construed, and enforced in accordance with the laws of the State of North Dakota and the Parties hereby submit to the jurisdiction of the state or federal courts located in the State of North Dakota.

~~29.~~31. Further Assurances. Each Party will execute and deliver all documents, provide all information, and take or forbear from all actions as may be necessary or appropriate to achieve the purposes of this Lease, including without limitation executing a memorandum of this Lease and all documents required to obtain any necessary government approvals.

~~30.~~32. Entire Agreement. This Lease constitutes the entire agreement between the Parties and supersedes all prior negotiations, undertakings, notices, memoranda and agreement between the Parties, whether oral or written, with respect to the subject matter hereof. This Lease may only be amended or modified by a written agreement duly executed by Lessor and Lessee.

~~31.~~33. Cooperation with Financiers. The Lessor hereby acknowledges and consents that Lessee may grant a collateral assignment or leasehold mortgage of Lessee's rights under this Lease to Lessee's debt financiers, it being understood that such collateral assignment or leasehold mortgage would only encumber the leasehold interest created hereunder.

34. Favored Nations. If, at any time ~~within the twelve (12) month period following the Effective Date,~~ Lessee enters into a pore space lease agreement with a third party landowner covering any part of Lessee's storage facility ("Third-Party Lease"), and if any of the payments, terms or conditions specified in the

Formatted: Header

Formatted: Font: 12 pt, Font color: Auto

Formatted ... [81]

Formatted: List Paragraph, Indent: First line: 0", Right: 0.08", Space Before: 0.05 pt, Line spacing: Multiple 1.01 li, Numbered + Level: 1 + Numbering Style: 1, 2, 3, ... + Start at: 1 + Alignment: Left + Aligned at: -0.14" + Indent at: 0.08", Tab stops: 0.39", Left + Not at 0.41"

Formatted: Font: 10.5 pt, Font color: Auto

Formatted ... [82]

Formatted ... [83]

Formatted ... [84]

Formatted: Font: 12 pt

Formatted ... [85]

Formatted: Indent: First line: 0", Right: 0.08", Space Before: 0.05 pt, Line spacing: single, Numbered + Level: 1 + Numbering Style: 1, 2, 3, . . + Start at: 1 + Alignment: Left + Aligned at: -0.14" + Indent at: 0.08", Tab stops: 0.47", Left + Not at 0.49"

Formatted: Font: 12 pt

Formatted ... [86]

Formatted: Indent: First line: 0", Right: 0.08", Space Before: 0 pt, Line spacing: single, Numbered + Level: 1 + Numbering Style: 1, 2, 3, .. + Start at: 1 + Alignment: Left + Aligned at: -0.14" + Indent at: 0.08", Tab stops: 0.43", Left + Not at 0.45"

Formatted: Font: 12 pt, Character scale: 100%

Formatted ... [87]

Formatted: Indent: First line: 0", Right: 0.08", Space Before: 0 pt, Line spacing: single, Numbered + Level: 1 + Numbering Style: 1, 2, 3, . + Start at: 1 + Alignment: Left + Aligned at: -0.14" + Indent at: 0.08", Tab stops: 0.38", Left + Not at 0.4"

Formatted ... [88]

Formatted: Header

~~32.~~ Third-Party Lease would have been more favorable to Lessor had Lessor executed a lease agreement similar to the Third-Party Lease, then Lessor and Lessee will amend this Lease so that it reflects compensation or other terms similar to the Third-Party Lease, and Lessee will pay to Lessor the additional compensation, if any, that Lessor would have been paid had Lessor signed a lease agreement similar to the Third-Party Lease. For the purposes of this Section ~~32~~ 33, "Lessee's storage

Formatted ... [89]

facility" shall mean any storage facility (as such term in defined in ch. 38-22 of the North Dakota Century Code) operated by Lessee within a ~~ten (10~~twenty (20) mile radius of the Leased Premises which is subject to a permit is issued by the Commission pursuant to ch. 38-22 of the North Dakota Century Code.

35. Right to Audit. Lessor has the right to audit any and all records of the Lessee that are associated with this Lease or the storage facility as defined in Section 3. Audits will be conducted by a 3rd party firm, at Lessors' expense. If the results of the audit find any deficiency that should have been to the benefit of the Lessor, then Lessee will pay for the full cost of the audit and remedy the deficiency immediately.

~~33~~36. Electronic Signatures. This Lease, and any amendments hereto, to the extent signed and delivered by means of electronic transmission in portable document format (pdf) or by DocuSign or similar electronic signature process, shall be treated in all manner and respects as an original contract and shall be considered to have the same binding legal effect as if it were the original signed version thereof delivered in person.

IN WITNESS WHEREOF, the Parties have executed this Lease effective for all purposes as of the Effective Date.

**LESSOR:**

~~TBD~~

By: _____

Print: _____

By: _____

Print: _____

Formatted: Header

Formatted: Left: 0.92", Right: 0.92", Top: 0.94", Bottom: 0.88", Footer distance from edge: 0.74"

Formatted ... [90]

Formatted: Indent: Left: 0.08", First line: 0", Right: 0.08", Space Before: 3.8 pt

Formatted: Space Before: 0.4 pt

Formatted

Formatted ... [91]

Formatted: Indent: First line: 0", Right: 0", Line spacing: single, Numbered + Level: 1 + Numbering Style: 1, 2, 3, … + Start at: 1 + Alignment: Left + Aligned at: -0.14" + Indent at: 0.08", Tab stops: 0.42", Left + Not at 0.47"

Formatted: Font color: Auto

Formatted: Indent: Left: 0.08", First line: 0.5", Right: 0", Space Before: 7.9 pt, Line spacing: Multiple 1.03 li

Formatted: Font: Times New Roman, Font color: Auto

Formatted: Font: Times New Roman

Formatted: Heading 1, Centered, Indent: Left: 2.24", Right: 2.03", Space Before: 10.15 pt

Formatted: Font: Times New Roman, 12 pt, Bold

Formatted: Space Before: 0 pt

Formatted: Font: Times New Roman, 12 pt, Bold

Formatted: Font color: Auto

Formatted: Font color: Auto

Formatted ... [92]

Formatted: Indent: Left: 3.08", First line: 0", Right: 0", Space Before: 4.5 pt, Line spacing: single, Tab stops: 6.08", Left + Not at 3.64" + 6.19"

Formatted: Font: 10 pt

Formatted: Space Before: 0 pt

Formatted: Font color: Auto

Formatted: Font color: Auto

Formatted: Indent: Left: 3.08", First line: 0", Right: 0", Space Before: 4.5 pt, Line spacing: single, Tab stops: 6.08", Left + Not at 3.64" + 6.19"

IN WITNESS WHEREOF, the Parties have executed this Lease effective for all purposes as of the Effective Date.

**Effective Date:** _____ **LESSEE:**

SUMMIT CARBON SOLUTIONS, LLC

By: _____

Print: _____

_____

Its: Executive Vice President





**Formatted:** Header

**Formatted:** Font: Not Bold, Font color: Auto, Character scale: 100%

**Formatted:** Body Text, Indent: Left: 0.08", First line: 0.5", Right: 0", Space Before: 3.95 pt, Line spacing: Multiple 0.99 li

**Formatted:** Font: Not Bold, Font color: Auto

**Formatted:** Font: Not Bold, Font color: Auto, Not Expanded by / Condensed by

**Formatted:** Font: Not Bold, Font color: Auto

**Formatted:** Font: 8 pt

**Formatted:** Space Before: 0.15 pt

**Formatted:** Font color: Auto

**Formatted:** Font color: Auto, Not Expanded by / Condensed by

**Formatted:** Font color: Auto

**Formatted:** Underline, Underline color: Auto, Font color: Auto

**Formatted:** Font: Times New Roman, 12 pt, Font color: Auto

**Formatted:** Font: Times New Roman, 12 pt

**Formatted:** Font color: Auto

**Formatted:** Indent: Left: 0.58", Space Before: 0 pt

**Formatted:** Font: 11 pt

**Formatted:** Space Before: 0.1 pt

**Formatted:** Font color: Auto

**Formatted:** Font color: Auto

**Formatted:** Indent: Left: 0.58", Space Before: 0.05 pt, Tab stops: 1.08", Left + 3.58", Left + Not at 3.61" + 6.15"

**Formatted:** Left: 0.92", Right: 0.92", Top: 0.96", Bottom: 0.19", Section start: Continuous, Header distance from edge: 0.5", Footer distance from edge: 0.5"

**Formatted:** Font: 8 pt

**Formatted:** Space Before: 0.1 pt

**Formatted:** Font: Not Bold, Font color: Auto

**Formatted:** Font: Not Bold, Underline, Font color: Auto, Character scale: 100%

**Formatted:** Font: Not Bold, Underline, Font color: Auto

**Formatted:** Body Text, Indent: Left: 3.08", Space Before: 4.5 pt, Tab stops: 3.58", Left + 6.08", Left + Not at 3.6" + 6.05"

~~EXBIBIT~~EXHIBIT B

EXERCISE OF OPTION

By signing below and delivering a copy of such to Lessor as specified above, Lessee hereby exercises the above Option.

SUMMIT CARBON SOLUTIONS, LLC

~~SUMGATCARBONSOLUTIONSLLC~~





**Formatted:** Header

**Formatted:** Font: Times New Roman, Underline color: Auto, Font color: Auto

**Formatted:** Font: Times New Roman

**Formatted:** Heading 1, Indent: Left: 2.21", Right: 2.21", Space Before: 3.8 pt

**Formatted:** Font: Times New Roman, 8 pt, Bold

**Formatted:** Font color: Auto

**Formatted:** Left, Indent: Left: 2.48", Right: 0", Space Before: 4.5 pt

**Formatted:** Font: Not Bold, Font color: Auto, Character scale: 100%

**Formatted:** Body Text, Indent: Left: 0.08", First line: 0.5", Space Before: 10.9 pt, Line spacing: Multiple 1.01 li

**Formatted:** Font: Not Bold, Font color: Auto

**Formatted:** Font: Not Bold, Font color: Auto, Expanded by 0.05 pt

**Formatted:** Font: Not Bold, Font color: Auto

**Formatted:** Font: 6 pt

**Formatted:** Space Before: 0.3 pt

**Formatted:** Font color: Auto, Character scale: 100%

**Formatted:** Heading 1, Indent: Left: 3.08", Space Before: 4.5 pt

**Formatted:** Font: Bold

Dated: _____

By: _____

_____

Print: _____

Print: _____

Its: Executive Vice President



BLF-000031

Formatted: Header

Formatted: Font color: Auto

Formatted: Font color: Auto

Formatted: Font: 8 pt

Formatted: Space Before: 0.1 pt

Formatted: Font color: Auto

Formatted: Font color: Auto, Character scale: 100%

Formatted: Font color: Auto, Character scale: 100%, Condensed by 0.2 pt

Formatted: Font color: Auto, Character scale: 100%

Formatted: Font color: Auto

Formatted: Body Text, Indent: Left: 3.08", Space Before: 4.5 pt, Tab stops: 3.46", Left + 6.58", Left + Not at 0.48" + 3.55"

Formatted: Font: 10 pt

Formatted: Body Text, Line spacing: Multiple 0.06 li

**Formatted:** Header

**EXHIBIT C**

REAL PROPERTY INTEREST

This Lease Agreement is subject to the following real property located in Oliver County, North Dakota more particularly described as:

Containing acres, more or less.

**Formatted:** Font: 12 pt, Underline color: Auto, Font color: Auto

**Formatted:** Font: 12 pt

**Formatted:** Heading 1, Indent: Left: 2.21", Right: 2.21", Space Before: 0 pt

**Formatted:** Font color: Auto

**Formatted:** Indent: Left: 2.21", Right: 2.21", Space Before: 0 pt

**Formatted:** Space Before: 0.35 pt

~~Exhibit D – Royalty Escalation 1~~

**ROW (#)**

**EXHIBIT D**

~~Royalty Escalation Provision~~

**EASEMENT: CARBON DIOXIDE SURFACE FACILITIES**

_____ whose address is _____ (GRANTOR), in consideration as defined in Section 1, which initial payment has been received, conveys to **Summit Carbon Solutions, LLC, an Iowa limited liability company, whose address is 1805 Collaboration Place, Suite 1200, Ames, IA 50010**, (GRANTEE), an easement to construct, operate, maintain, and remove (Non-linear facilities such as compressor or pumping station, well site, storage or office building site, tower site,etc. (Surface Facilities), with the right of ingress and egress, over certain land hereafter referred to as the "easement area", which is described by the following metes and bounds survey:

**(qtr) of Section (#), T(#)N, R(#)W, (County) County**

A Survey Plat and Written Narrative, titled Exhibit "A" shall be prepared by a Registered Land Surveyor and shall depict and describe the accurate as-built location of the facility(s). The boundary of the facility must be described using a mete and bounds (for non-linear or point facilities) or centerline survey (for linear or point facilities). The survey plat must be accompanied by a written narrative describing the boundary or centerline description, the number of acres and/or rods within the easement and the survey plat must depict, and the written narrative must include, the points of beginning and ending of the survey with said points tied to known and monumented government section or quarter corners of the property on which they occur. The completed survey plat and written narrative must be attached to the GRANTOR' signed Easement as Exhibit "A" and filed with the fully executed easement at the County Recorder's Office by Grantee or their representative immediately upon execution and easement consideration payment to GRANTOR.

The centerline is **(ft)** feet or **(rods)** rods long, and the easement area contains **(acres)** acres, more or less. The easement area is further described and illustrated in **Exhibit "(Ltr)"** which is attached to and is a part of this easement.

1. In Consideration for the rights conveyed to GRANTEE under this easement, GRANTEE agrees to pay GRANTOR an annual payment for the Surface Facilities of **(Dollars spelled out)**, and **(# or No)**/100 Dollars (**$($)**) on or before January 1st of each year with the first payment due upon execution of this Easement, and continuing each year thereafter until the Surface Facilities are removed and the site is reclaimed.

2. The only use to which this easement may be put is for Carbon Dioxide geologic storage purposes as defined in the Pore Space Lease, and therefore, it may not be used for any other purpose, such as for injection of any other substances than Carbon Dioxide as defined in the Pore Space Lease, a water source, or for stacking or storing equipment.

3. This easement will remain in effect for so long as Carbon Dioxide geologic storage injection operations continue at the Surface Facilities, but in no event after Termination of the Pore Space Lease Agreement ~~is~~. The kind of injection operations required to keep this easement in force is commercial injection during at least 20 days each month.



Formatted: Font: 12 pt

Formatted: Font: Times New Roman, 10.5 pt, Bold, Underline, Underline color: Auto, Font color: Auto

Formatted: Font: Times New Roman, 10.5 pt, Bold, Underline

Formatted: Normal, Indent: Left: 0", Right: 0", Space Before: 0 pt, Tab stops: 3.63", Left

Commented [MH1]:

Commented [MH2R1]:

Formatted: Font: 10.5 pt, Font color: Auto

Formatted: Font: 10.5 pt, Font color: Auto

**ROW (#)**

4. Violation or default of any terms of this easement by GRANTEE shall be grounds for termination of this easement. GRANTOR shall give GRANTEE written notice of violation or default at the address written above and GRANTEE shall have 30 days after receipt of said notice to rectify such violations or defaults. In the event GRANTEE fails to comply, GRANTOR may terminate this easement and file notice of termination with the County Recorders Office.

5. If construction of the Surface Facilities is not completed within one year after GRANTOR signs this easement, this easement automatically terminates.

6. GRANTEE, or its agent, shall have a legible copy of this easement with them on site for reference during construction, operation, maintenance or reclamation and shall present the copy upon GRANTOR's request.

7. In addition to the consideration paid to the GRANTOR, GRANTEE shall make a satisfactory settlement with the surface tenant for damage to seeded annual crops, fences or other improvements owned by the tenant, caused by construction, operation, maintenance or removal of the well site and shall notify the surface tenant of the construction schedule at least one week before construction.

8. GRANTEE shall maintain the natural water flow and drainage.

9. If, prior to or during construction, archeological or paleontological items are discovered or such items are disturbed, GRANTEE shall cease construction activities immediately. GRANTEE shall then promptly notify GRANTOR and must not resume construction until written approval is given by GRANTOR.

10. Any fixtures, structures, installations or facilities constructed or installed by GRANTEE, are the property of GRANTEE and may be removed by GRANTEE at any time during the Term of this Easement.

11. Prior to the end of the Term, GRANTEE shall remove all improvements, both above ground and underground, from the easement area when the easement is abandoned or in any other way terminated, unless authorized to do otherwise in writing by GRANTOR.

12. GRANTEE shall, prior to construction, maintenance or removal, reserve the top 12 inches of soil from areas subject to a ~~Royalty Escalation. The royalty shall increase TEN percent (~~topsoil and subsoil mixing as depicted on Exhibit "B". The reserved soil must be stockpiled to minimize wind and water erosion. Upon completion of construction, and maintenance or removal, GRANTEE shall promptly reclaim the disturbed area. It must be recontoured to conform to the adjacent natural topography, rocks exposed by excavation must be hauled off or reburied on the property, the reserved soil must be evenly respread over the disturbed area, and the entire disturbed area must be revegetated with a mixture of native perennial grasses as shown in **Exhibit C"**. Reclamation is not complete until rocks are removed from the surface, erosion is controlled and the surface is revegetated with a mixture of native perennial grasses.

Formatted: Font: 10.5 pt, Font color: Auto

13. After construction is complete, topsoil shall be evenly respread on all areas from which it was removed, except those areas covered by construction aggregate or any other surfacing material. The topsoil from those areas covered by construction aggregate or other surfacing material shall remain stockpiled for use during the reclamation of the well site. All exposed soil surfaces not covered by construction aggregate or other surfacing materials shall be revegetated with a mixture of native perennial grasses approved by Grantor prior to revegetation sufficient to prevent accelerated erosion and restore, as closely as possible, the original long-term productivity.

14. GRANTEE shall take necessary precautions to prevent fires. In the event of a fire caused by the GRANTEE or its agent, GRANTEE shall compensate the GRANTOR's surface lessee(s) for their losses including forage, crop and any other losses, and shall compensate GRANTOR for any loss it suffers due to the fire.

15. GRANTEE shall conduct all activities associated with the Surface Facilities in a manner that avoids the degradation of the area's air, land, water quality, audible and visual resources.

16. Prior to the end of the Term, GRANTEE shall dispose of all surface contaminated soil, remove debris, recontour the disturbed surface to conform with the original terrain, bury all rocks and evenly respread the reserved soil and reseed with a mixture of

native grasses as specified in **Exhibit "C"**. After seeding, the entire disturbed area shall be fenced to exclude livestock. Reclamation shall not be deemed completed until erosion is controlled, the surface is revegetated with a mixture of native grasses or a mixture approved by GRANTOR, and written approval is received from the GRANTOR. Upon approval of reclamation by the GRANTOR, this easement shall automatically terminate and a Release or Termination of Easement document may be filed by GRANTOR at the County Recorder's Office.

17. GRANTEE shall implement reasonable measures to prevent accelerated erosion. If an erosion problem develops, GRANTEE shall promptly take the necessary actions to correct it and shall repair any erosion damage.

18. Through this easement, GRANTEE is not acquiring any subsurface interest. Subsurface interests include, but are not limited to oil, gas, coal, cement materials, water, sodium sulfate, sand and gravel, scoria, road material, building stone, chemical substances, metallic ores, uranium ores, or colloidal or other clays.

19. GRANTEE agrees to defend, indemnify and hold harmless GRANTOR from any claims by any person that are in any way related to GRANTEE's use of the easement area, including all costs, expenses, and attorney fees that in any manner result from or arise out of this agreement. It is GRANTEE's exclusive right and responsibility to construct, maintain, and remove the Surface Facilities. GRANTEE further accepts liability and indemnifies GRANTOR, and its family, officers and employees, from all costs, expenses and attorneys fees incurred in establishing and litigating the indemnification coverage provided above. The legal defense provided by GRANTEE to the GRANTOR under this paragraph must be free of any conflicts of interest, even if this requires GRANTEE to retain separate legal counsel for GRANTOR. The obligations of this paragraph shall continue after this agreement terminates.

20. GRANTEE shall not discharge any hazardous liquids or toxic substances onto the easement area or land adjacent to the easement area. All discharges of hazardous liquids or toxic substances shall be stopped as soon as possible after discovery and acted upon immediately to halt movement of such discharges. Any such discharges shall be reported immediately to the GRANTOR. The GRANTEE shall then restore the affected area as closely as possible to its original condition.

21. GRANTEE shall secure and keep in force during the Term of this Easement all Insurance Requirements as defined in the Pore Space Lease.

22. GRANTEE shall control all noxious weeds in the easement area.

23. GRANTOR neither warrants nor agrees to defend title to the easement area.

24. GRANTOR reserves the right to use the easement area and to allow others to use the easement area for purposes compatible with GRANTEE's use. If someone other than GRANTOR uses the easement area in a manner inconsistent with GRANTEE's use, GRANTOR is not liable or responsible.

25. GRANTEE shall not assign or in any way transfer, in whole or in part, this Easement or rights under it unless GRANTOR gives written consent. Any assignment or other transfer without GRANTOR's written consent is void and, at the GRANTOR's option, shall terminate this Easement.

26. This Easement is subject to all existing easements and nothing in this easement supersedes any rights previously granted.

27. This easement is also subject to the conditions in Exhibits "A" Survey Plat and Written Narrative, "B" Soil Reservation and Reclamation Requirements & "C" Native Grass Seeding Specifications which are attached and made a part of this easement.

**ROW (#)**

Dated this _____ day of _____, 20____, at Bismarck, North Dakota.

_____
GRANTOR

_____

_____

_____

STATE OF NORTH DAKOTA )
_____ ) ss.
COUNTY OF BURLEIGH )

On this _____ day of _____, 20____, before me personally appeared _____, known to me to be the person who executed this instrument and acknowledged to me that he executed the same.

_____
(SEAL) Notary Public

_____
GRANTEE

_____
**(COMPANY NAME - All CAPS)**

_____
(signature) On Behalf of **(Company name)**

STATE OF _____ )
_____ ss.
COUNTY OF _____ )

On this _____ day of _____, 20____, before me personally appeared _____, _____ (title), acting on behalf of **Summit Carbon Solutions, LLC**, known to me to be the person who executed this instrument and acknowledged to me that he executed the same.

_____
(SEAL) Notary Public

~~Exhibit D – Royalty Escalation 1~~

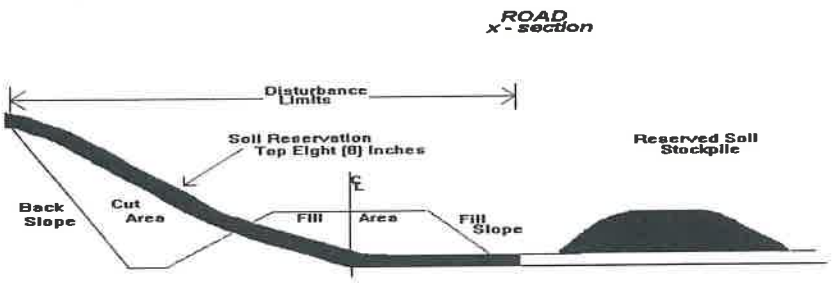
**ROW #()**

**EASEMENT: Surface Facilities Exhibit "B"**

**SOIL RESERVATION AND RECLAMATION SPECIFICATIONS**

**Required Method for Surface Facilities**

Field Code Changed




Prior to construction or maintenance of the herein authorized easement area the top twelve (12) inches of soil shall be reserved and stockpiled from all areas to be disturbed, including the facility location site, fillslope and backslope areas, as shown above, and all other areas subject to topsoil and subsoil mixing. The reserved soil shall be stockpiled such that wind and water erosion are minimized. Following soil reservation, cut and fill operations can proceed. If the facility site will be permanent, then all or a portion of the reserved soil shall be respread as needed to stabilize facility cut and fill slopes. Structures (i.e., culverts, finger dikes, etc.) must be added to assure proper drainage and to stabilize erosion. All disturbed areas must be seeded to a native grass seed mixture found on **Exhibit "C"** attached.

~~Exhibit D – Royalty Escalation 1~~

**ROW #()**

**EASEMENT: Surface Facilities Exhibit "C"**

**Native Grass Seeding Specifications**

| Species | lbs PLS*/acre |
|---|---|
| Western wheatgrass | 8 |
| Slender wheatgrass | 5 |
| Green needlegrass | 4 |
| Side-oats grama | 2 |
| | 19 |

*PLS - Pure Live Seed (based on 50 PLS/sq. feet)

1. The seed bed should be firmly packed (footprints left in the soil should be less than 1/2 inch deep).
2. An early spring seeding (before May 24th) is preferred. A dormant fall seeding (after October 20th) is acceptable.
3. A cover crop of oats at ~~10 0%~~ lbs. PLS/acre must be seeded on ~~January~~the disturbed area.
4. A drill designed specifically for native grass seeding will give the best seeding results. The seed should be planted at a depth of ~~1, 2026~~ /2 to 1 inch. Precaution must be taken not to plant the seed too deeply in the soil or poor germination will result.
5. On areas where equipment cannot be used, broadcast seed and rake or drag to cover seed. Where seed is broadcast, double the seeding rate.
6. Use only North Dakota certified seed.

**CAUTION:** Be sure to clean out the drill before seeding to avoid any contamination with smooth brome grass or crested wheatgrass that may remain in the drill from previous use on private land. These are invasive grasses in native prairie and are not allowed on school trust lands. Contamination with or use of crested wheatgrass or smooth brome will result in the applicant being required to spray out the grass and reseed with the above native grass seed mixture. Sweet clover and alfalfa are also not allowed – only the above native grass seed mixture may be used for revegetation.

**Formatted:** Font: 10.5 pt, Font color: Auto

**Formatted:** Font: 10.5 pt, Font color: Auto

**Formatted:** Font: 10.5 pt, Font color: Auto

**Formatted:** Font: 10.5 pt, Font color: Auto

~~Exhibit D – Royalty Escalation 1~~

**ROW #()**

## EXHIBIT E
## EASEMENT: CARBON DIOXIDE LINEAR

whose address is _____
(GRANTOR), in consideration as defined in Section 1, which initial payment has been received , conveys to Summit Carbon Solutions, LLC, an Iowa limited liability company, whose address is 1805 Collaboration Place, Suite 1200, Ames, IA 50010, (GRANTEE), an easement to construct, operate, maintain, and remove, **(LINEAR infrastructure: number, type of structure, diameter, voltage, overhead, underground, etc.)** with the right of ingress and egress, over certain land hereafter referred to as the "easement area", which is a strip of land **(Width)** feet wide, **(Feet)** feet on each side of the following described centerline:

**(qtr) of Section (#), T(#)N, R(#)W, (County)County**

A Survey Plat and Written Narrative, titled Exhibit "A" shall be prepared by a Registered Land Surveyor and shall depict and describe the accurate as-built location of the facility(s). The boundary of the facility must be described using a mete and bounds (for non-linear or point facilities) or centerline survey (for linear or point facilities). The survey plat must be accompanied by a written narrative describing the boundary or centerline description, the number of acres and/or rods within the easement and the survey plat must depict, and the written narrative must include, the points of beginning and ending of the survey with said points tied to known and monumented government section or quarter corners of the property on which they occur. The survey must also depict and describe those segments subject to no surface disturbance which require horizontal boring (paragraph #2). The completed survey plat and written narrative must be attached to the GRANTOR' signed Easement as Exhibit "A" and filed with the fully executed easement at the County Recorder's Office by Grantee or their representative immediately upon execution and easement consideration payment to GRANTOR.

1. The **(Type of Structure)** shall be built only on the centerline(s) as described above. GRANTEE may also temporarily use **an additional** ~~TEN percent (10.0%) every five years thereafter.~~ **(TemporaryFeet)** feet of temporary right of way on the working side of the **(Type of Structure)** as a construction right of way. This construction right of way shall be subject to the topsoil reservation and reclamation provisions of this easement and must be abandoned upon the completion of construction and reclamation.

2. **(OPTIONAL)**GRANTEE agrees that there will be no surface disturbance or surface occupancy of the **(number of segment(s))** segment(s) of the easement area that are designated for **(Type of Structure)** installation by horizontal boring as specifically shown on Exhibit "**(exhibit letter)**" without written permission from GRANTOR.

3. **(OPTIONAL)**The top of the **(Type of Structure)** must be buried at least 60 inches below the ground's surface.

4. GRANTEE may install the following described appurtenance(s) upon or below the surface: ( (Pig Launcher/Receiver, Aboveground Valve Station, Cathodic Protection Anode Beds), For ~~the avoidance of doubt, the royalty to be paid is calculated below:~~this/these additional appurtenance(s), GRANTEE has paid **(N/A or dollar amount of additional compensation)** as further consideration. GRANTEE shall, when necessary, protect all above ground appurtenances with a fence adequate to prevent livestock access and shall paint all above ground structures; except wire fences, anchors, guy wires, steel towers, and wood poles; with earth tone colors.

5. If construction of the **(Type of Structure)** is not completed within one year after GRANTOR signs this easement, this easement automatically terminates.

6. In addition to consideration payment to GRANTOR, GRANTEE shall make a satisfactory settlement with the surface tenant for damage to seeded annual crops, fences or other improvements owned by the tenant, caused by construction, operation, maintenance or removal of the **(Type of Structure)** and shall notify the surface tenant of the construction schedule at least one week before construction.

~~Exhibit D – Royalty Escalation 1~~

**Formatted:** Font: Helvetica, 10.5 pt, Underline, Font color: Auto

**Formatted:** Font: Helvetica, 10.5 pt, Underline, Font color: Auto

**ROW #()**

7. GRANTEE, or its agent, shall have a legible copy of this easement with them on site for reference during construction, operation, maintenance or reclamation and shall present the copy upon GRANTOR's request.

8. This easement is subject to all of the GRANTOR's existing rights and privileges.

9. If, prior to or during construction, archeological or paleontological items are discovered or such items are disturbed, GRANTEE shall cease construction activities immediately. GRANTEE shall then promptly notify GRANTOR and must not resume construction until written approval is given by GRANTOR.

10. GRANTEE shall, prior to construction, maintenance or removal, reserve the top 12 inches of soil from areas subject to topsoil and subsoil mixing. The reserved soil must be stockpiled to minimize wind and water erosion. Upon completion of construction, and maintenance or removal, GRANTEE shall promptly reclaim the disturbed area. It must be recontoured to conform to the adjacent natural topography, rocks exposed by excavation must be hauled off or reburied on the property, the reserved soil must be evenly respread over the disturbed area, and the entire disturbed area must be revegetated with a mixture of native perennial grasses as shown in Exhibit "B". Reclamation is not complete until rocks are removed from the surface, erosion is controlled and the surface is revegetated with a mixture of native perennial grasses.

11. In areas where temporary fencing is necessary to keep livestock out of the easement areas (i.e. non-cultivated pasture land), GRANTEE shall install temporary fencing around the total easement areas (temporary, additional, and permanent) before commencement of construction, which fences shall remain until the entire easement area has been reclaimed. At the conclusion of reclamation activities, temporary fencing shall become the property of the GRANTOR. Before construction of any fence by GRANTEE, GRANTEE will consult with GRANTOR as to the location of the fence and any gates along the easement areas. If GRANTOR Chooses, GRANTOR may notify GRANTEE in writing that GRANTOR will install this fencing, and provide and estimate for one of the types of fences described below. GRANTEE will reimburse GRANTOR for the cost of the estimate, unless GRANTEE believes the estimate is unreasonable, in which case GRANTEE will obtain a reasonable estimate and reimburse that amount to GRANTOR.

    a. Unless otherwise agreed to in writing by GRANTOR and as long as GRANTOR supplies power to the fence, any fence installed by GRANTEE under this section will be reasonably similar to the two-wire power fence described in the NRCS spec sheet, which requires use of smooth, single-strand, 12.5 gauge hig-tensile strength (170,000 psi, minimum), type III galvanized or better wire and a top wire (hot wire) at least 26 inches above ground line and the bottom wire (ground wire) 8 to 12 inches below the top wire. The bottom (ground) wire will be connected either directly to the negative side of the energizer or to the same grounding rod(s) as the energizer. In situations where the earth provides adequate ground to complete the circuit, both wires may be energized. Tension on each wire shall be sufficient to maintain proper wire swpacing between line posts. In-line strainers will be installed on each wire to maintain correcttension on each wire between all brace corners and gate assemblies. Tension springs may be used on each wire to maintain proper tension. In the absence of power, GRANTEE shall install a basic four strand barbed-wire fence, utilizing Red Brand 2 point barbed wire with studded t posts weighing a minimum of 1.25 pounds/foot. Such barbed wire fence shall meet the installation specifications in the NRCS spec sheet.

12. GRANTEE shall implement reasonable measures to prevent accelerated erosion. If an erosion problem develops, GRANTEE shall promptly take the necessary actions to correct it and shall repair any erosion damage.

13. GRANTEE shall not discharge any hazardous liquids or toxic substances onto the easement area or land adjacent to the easement area. All discharges of hazardous liquids or toxic substances shall be stopped as soon as possible after discovery and acted upon immediately to halt movement of such discharges. Any such discharges shall be reported immediately to the GRANTOR. The GRANTEE shall then restore the affected area as closely as possible to its original condition.

14. GRANTEE shall secure and keep in force during the Term of this Easement all Insurance Requirements as defined in the Pore Space Lease.

**ROW #0**

15. GRANTEE shall control all noxious weeds in the easement area.

16. GRANTEE may cut or trim trees and shrubs, but only to the extent they interfere with or endanger the operation or maintenance of the **(Type of Structure)**.

17. GRANTEE shall maintain the natural water flow and drainage.

18. GRANTEE shall take necessary precautions to prevent fires. In the event of a fire caused by the GRANTEE or its agent, GRANTEE shall compensate the GRANTOR's surface lessee(s) for their losses including forage, crop and any other losses; and shall compensate GRANTOR for any loss it suffers due to the fire.

19. GRANTEE shall conduct all activities associated with the **(Type of Structure)** in a manner that avoids the degradation of air, land, and water quality and that protects the area's visual resources.

20. GRANTOR reserves the right to use the easement area and to allow others to use the easement area for purposes compatible with GRANTEE's use. If someone other than GRANTOR uses the easement area in a manner inconsistent with GRANTEE's use, GRANTOR is not liable or responsible.

21. Through this easement GRANTEE is not acquiring any subsurface interest. Subsurface interests include, but are not limited to oil, gas, coal, water, cement materials, sodium sulfate, sand and gravel, scoria, road material, building stone, chemical substances, metallic ores, uranium ores, or colloidal clays or other clays. If any subsurface interest is or will likely be excluded from mining or development because of the presence of this easement or the **(Type of Structure)** allowed by this easement, or if the location of the easement and **(Type of Structure)** interferes or will likely interfere with the mining or development of subsurface interests outside of the easement area, GRANTOR will give GRANTEE at least sixty (60) days written notice of the conflict between this easement and GRANTOR's right to mine and develop subsurface interests. At the end of the sixty day period GRANTEE must either pay GRANTOR the amount of lost royalties as determined by GRANTOR for the damages suffered because of GRANTOR's inability to mine or develop subsurface interests, or to benefit from their mining or development, or GRANTEE must agree to relocate the easement and the **(Type of Structure)** to another location within the tract, provided GRANTOR determines that a suitable substitute location exists on the tract. If GRANTEE selects relocation and if GRANTOR agrees that a suitable substitute location exists, this easement will be revised to describe the easement's new location and GRANTEE will move all structures and other physical features of the easement to the new location. Relocation does not entitle GRANTOR to additional compensation but GRANTEE must bear all relocation costs. GRANTEE must promptly complete relocation.

22. GRANTEE agrees to defend, indemnify and hold harmless GRANTOR from any claims by any person that are in any way related to GRANTEE's use of the easement area, including all costs, expenses, and attorney fees that in any manner result from or arise out of this agreement. **It is GRANTEE's exclusive right and responsibility to construct, maintain, and remove the (Type of Structure).** GRANTEE further accepts liability and indemnifies GRANTOR, and its family, officers and employees, from all costs, expenses and attorneys fees incurred in establishing and litigating the indemnification coverage provided above. The legal defense provided by GRANTEE to the GRANTOR under this paragraph must be free of any conflicts of interest, even if this requires GRANTEE to retain separate legal counsel for GRANTOR. The obligations of this paragraph shall continue after this agreement terminates.

23. Any fixtures, structures, installations or facilities constructed or installed by GRANTEE, are the property of GRANTEE and may be removed by GRANTEE at any time.

    GRANTEE shall remove all improvements, both above ground and underground, from the easement area when the easement is abandoned or in any other way terminated, unless authorized to do otherwise in writing by GRANTOR. If a pipeline is to be abandoned in place, the following minimum requirements will apply: The pipeline must be disconnected and physically isolated from any operating facility or other pipeline(s), any pipeline

segments coming to the surface must be cut off no lower than 48 inches below the surface, purge the pipeline with fresh water, air, or inert gas in a manner that effectively removes all fluids, remove cathodic protection from the pipeline, permanently plug or cap all open ends by mechanical or welded means and document the abandonment procedure with written notes containing methods, dates, persons, companies and pictures.

24. This easement shall be a covenant running with the land and shall be binding on the heirs, successors, and assigns of the parties hereto.

25. This easement is subject to all existing easements and nothing in this easement supersedes any rights previously granted.

26. GRANTOR neither warrants nor agrees to defend title to the easement area.

27. This easement is also subject to the conditions in Exhibits "A" Survey Plat and Written Narrative, "B" Soil Reservation and Reclamation Requirements & "C" Native Grass Seeding Specifications which are attached and made a part of this easement.

**ROW #0**

Dated this _____ day of _____, 20____, at Bismarck, North Dakota.

_____ GRANTOR:

_____

_____

_____

_____

STATE OF NORTH DAKOTA )
_____ )ss.
COUNTY OF BURLEIGH )

On this _____ day of _____, 20____, before me personally appeared _____, known to me to be the person who executed this instrument and acknowledged to me that he executed the same.

_____
(SEAL) Notary Public

_____ GRANTEE:

_____ **(NAME OF GRANTEE(All in Caps))**

_____
(signature) On Behalf of **(Name of Grantee)**

STATE OF _____ )
_____ ss.
COUNTY OF _____ )

On this _____ day of _____, 20____, before me personally appeared _____ (title), acting on behalf of **Summit Carbon Solutions, LLC**, known to me to be the person who executed this instrument and acknowledged to me that he executed the same.

_____
(SEAL) Notary Public

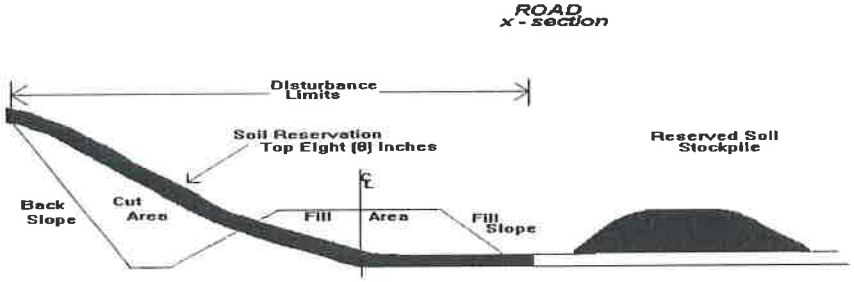
~~Exhibit D – Royalty Escalation 1~~

**ROW #0**

## EASEMENT: LINEAR EXHIBIT "B"

### SOIL RESERVATION AND RECLAMATION SPECIFICATIONS

**Required Method for Surface Facilities**




Prior to construction or maintenance of the herein authorized easement area the top twelve (12) inches of soil shall be reserved and stockpiled from all areas to be disturbed, including the facility location site, fillslope and backslope areas, as shown above, and all other areas subject to topsoil and subsoil mixing. The reserved soil shall be stockpiled such that wind and water erosion are minimized. Following soil reservation, cut and fill operations can proceed. If the facility site will be permanent, then all or a portion of the reserved soil shall be respread as needed to stabilize facility cut and fill slopes. Structures (i.e., culverts, finger dikes, etc.) must be added to assure proper drainage and to stabilize erosion. All disturbed areas must be seeded to a native grass seed mixture found on **Exhibit** "C" attached.

Field Code Changed

Formatted: Font: 10 pt

Formatted: Body Text, Line spacing: Multiple 0.06 li

**ROW #0**

## EASEMENT: LINEAR EXHIBIT "C"

### Native Grass Seeding Specifications

| Species | lbs. PLS*/acre |
|---|---|
| Western wheatgrass | 8 |
| Slender wheatgrass | 5 |
| Green needlegrass | 4 |
| Side-oats grama | 2 |
| | 19 |

*PLS - Pure Live Seed (based on 50 PLS/sq. feet)

1. The seed bed should be firmly packed (footprints left in the soil should be less than 1/2 inch deep).
2. An early spring seeding (before May 24th) is preferred. A dormant fall seeding (after October 20th) is acceptable.
3. A cover crop of oats at 10 lbs. PLS/acre must be seeded on the disturbed area.
4. A drill designed specifically for native grass seeding will give the best seeding results. The seed should be planted at a depth of 1/2 to 1 inch. Precaution must be taken not to plant the seed too deeply in the soil or poor germination will result.
5. On areas where equipment cannot be used, broadcast seed and rake or drag to cover seed. Where seed is broadcast, double the seeding rate.
6. Use only North Dakota certified seed.

**Caution:** Be sure to clean out the drill before seeding to avoid any contamination with smooth brome grass or crested wheatgrass that may remain in the drill from previous use on private land. These are invasive grasses in native prairie and are not allowed on school trust lands. Contamination with or use of crested wheatgrass or smooth brome will result in the applicant being required to spray out the grass and reseed with the above native grass seed mixture. Sweet clover and alfalfa are also not allowed – only the above native grass seed mixture may be used for revegetation on school trust land.



Formatted: Font: 10 pt

Formatted: Body Text, Line spacing: Multiple 0.06 li

ROW #0

## EXHIBIT "F"

### Consideration Schedule for Easements

| ~~Date:~~Easement Type | ~~Royalty Rate:~~Structure | Size | Consideration | Per |
|---|---|---|---|---|
| ~~Beginning January 1, 2026~~Linear | ~~$0.275~~Pipeline | 8" and Below | $350.00 | Rod (16.5') |
| ~~Beginning January 1, 2031~~Linear | ~~$0.303~~Pipeline | Above 8", Below 20" | $400.00 | Rod (16.5') |
| ~~Beginning January 1, 2036~~Linear | ~~$0.333~~Pipeline | Above 20" | $450.00 | Rod (16.5') |
| ~~Beginning January 1, 2041~~Linear | ~~$0.366~~Below Grade Electric / Communications Line | NA | $100.00 | Rod (16.5') |
| ~~Beginning January 1, 2046~~Linear | ~~$0.403~~Above Grade Electric / Communications Line | NA | $500.00 | Rod(16.5') |
| ~~Beginning January 1, 2051~~Surface Facility | ~~$0.443~~Valve Station, Anode Bed, Pig Launcher/Receiver, Compressor/Pumping Station, CommunicationsTower | Per Easement | $5,000.00 | Acre |

~~Beginning January 1, 2056~~ ~~$0.487~~
~~Beginning January 1, 2061~~ ~~$0.536~~
~~Beginning January 1, 2066~~ ~~$0.589~~
~~Beginning January 1, 2071~~ ~~$0.648~~
~~Beginning January 1, 2076~~ ~~$0.713~~

~~SUMMIT CARBON SOLUTIONS, LLC~~



Formatted ... [95]
Formatted ... [96]
Formatted ... [97]
Formatted ... [102]
Formatted ... [98]
Formatted ... [101]
Formatted Table ... [99]
Inserted Cells ... [103]
Inserted Cells ... [105]
Inserted Cells ... [106]
Formatted ... [104]
Formatted ... [100]
Formatted ... [110]
Formatted ... [107]
Formatted ... [109]
Formatted ... [108]
Formatted ... [111]
Formatted ... [113]
Formatted ... [114]
Formatted ... [112]
Formatted ... [118]
Formatted ... [115]
Formatted ... [117]
Formatted ... [116]
Formatted ... [119]
Formatted ... [120]
Formatted ... [122]
Formatted ... [121]
Formatted ... [123]
Formatted ... [125]
Formatted ... [124]
Formatted ... [126]
Formatted ... [127]
Formatted ... [128]
Formatted ... [129]
Formatted ... [130]
Formatted ... [131]
Formatted ... [132]
Formatted ... [133]
Formatted ... [134]
Formatted ... [135]
Formatted ... [93]
Formatted ... [94]

**ROW #0**

~~Dated:~~ _____

**ROW #0**

~~By:~~_____

~~Print:~~_____

~~Its: Executive Vice President~~_____

**Formatted:** Left, Indent: Left: 3.08", First line: 0", Right: 0", Line spacing: single, Tab stops: 3.46", Left + 6.58", Left + Not at 3.59" + 3.67"

BRAATEN
Law Firm

May 15, 2024

**Via Email Only**

North Dakota Industrial Commission
Department of Mineral Resources
Oil & Gas Division
600 E. Blvd. Ave. Dept. 405
Bismarck, ND 58505-0840
oilandgasinfo@nd.gov

**Re: Records Request**

I am writing to request a copy of records from your office, pursuant to N.D.C.C. § 44-04-18. Please provide the following data electronic files and/or load files submitted to the Oil and Gas Division by applicants Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC:

- All the input files, field and analytical data, and the model geochemical database used to evaluate the CO2 effects on the upper and lower confining layers, including but not limited to all inputs and data files used to run the United States Geological Survey's USGS's PHREEQC model.
- All the input files, field and analytical data , and the model geochemical database used to run Computer Modelling Group Ltd.'s GEM model and software or any similar model or software used for the same purposes.
- Geophysical Logs that penetrate injection and confining zones, seismic survey data and core sample measurements, all measurements and data for acoustic impedance, total porosity, effective porosity, permeability, and facies.
- All the input files, field and analytical data, and the model, including but not limited to all inputs and data files used to run SLB's Petrel model in any manner related to Summit's applications.
- All 3D numerical reservoir simulation model data decks, output files and graphing files of the Storage Reservoir in original electronic format. Without limiting the foregoing, such files may commonly be stored in Slumberger Eclipse or Petrel format, CMG (Canadian Modeling Group) Imex format, or other similar format.

To the maximum extent possible, I request that you provide all records to me in electronic format by emailing them to my paralegal Desirae Zaste at desirae@braatenlawfirm.com. If it is necessary to mail responsive records, they may be sent to me at the address below.

You have my pre-authorization to bill up to $300.00 to fulfill this records request. If you have any questions about anything in this letter, do not hesitate to contact me. Thank you for your assistance.

Sincerely,

Derrick Braaten

DB/dnz

INDUSTRIAL COMMISSION
STATE OF NORTH DAKOTA
DATE 6/12/24 CASE NO. 30869-880
Introduced By Braaten
Exhibit LO-83
Identified By

EPA
United States
Environmental Protection
Agency

# Geologic Sequestration of Carbon Dioxide

## Underground Injection Control (UIC) Program Class VI Well Recordkeeping, Reporting, and Data Management Guidance for Owners and Operators

INDUSTRIAL COMMISSION
STATE OF NORTH DAKOTA
DATE 6/12/24 CASE NO. 30869-880
Introduced By Bafto (Hydro Solutions)
Exhibit LO-82
Identified By Bafto

EXHIBIT
tabbies
LO-82
30869-30880

Office of Water (4606M)
EPA 816-R-16-005
September 2016

BLF-000002

# Disclaimer

The Class VI injection well classification was established by the *Federal Requirements Under the Underground Injection Control (UIC) Program for Carbon Dioxide ($CO_2$) Geologic Sequestration (GS) Wells* (75 FR 77230, December 10, 2010), referred to as the Class VI Rule, which establishes a new class of injection well (Class VI).

The Safe Drinking Water Act (SDWA) provisions and the United States Environmental Protection Agency (EPA) regulations cited in this document contain legally-binding requirements. In several sections, this guidance document makes suggestions and offers alternatives that go beyond the minimum requirements indicated by the Class VI Rule. This is intended to provide information and suggestions that may be helpful for implementation efforts. Such suggestions are prefaced by "may" or "should" and are to be considered advisory. They are not required elements of the Rule. Therefore, this document does not substitute for those provisions or regulations, nor is it a regulation itself, so it does not impose legally-binding requirements on the EPA, states, or the regulated community. The recommendations herein may not be applicable to each and every situation.

EPA and state decision makers retain the discretion to adopt approaches on a case-by-case basis that differ from this guidance where appropriate. Any decisions regarding a particular facility will be made based on the applicable statutes and regulations. Mention of trade names or commercial products does not constitute endorsement or recommendation for use. This guidance may change in the future without a formal notice and comment period.

While the EPA has made every effort to ensure the accuracy of the discussion in this document, the obligations of the regulated community are determined by statutes, regulations, or other legally binding requirements. In the event of a conflict between the discussion in this document and any statute or regulation, this document would not be controlling.

Note that this document only addresses issues covered by the EPA's authorities under SDWA. Other EPA authorities, such as Clean Air Act (CAA) requirements to report carbon dioxide injection activities under the Greenhouse Gas Reporting Program, are not within the scope of this document.

# Executive Summary

The EPA's *Federal Requirements Under the Underground Injection Control (UIC) Program for Carbon Dioxide ($CO_2$) Geologic Sequestration (GS) Wells,* codified in the U.S. Code of Federal Regulations (CFR) [40 CFR 146.81 *et seq.*], known as the Class VI Rule, establishes a class of injection well, Class VI, and sets minimum technical criteria for Class VI injection wells for the purposes of protecting underground sources of drinking water (USDWs). This document is one of a group of guidance documents developed to support owners or operators of Class VI wells and the UIC Program permitting authorities.

Under the Class VI Rule, owners or operators of Class VI wells are required to site, construct, and operate their wells according to the specific technical criteria that address specific GS activities: site characterization; area of review (AoR) delineation and corrective action; well construction and operation; financial responsibility; testing and monitoring; reporting and recordkeeping; post-injection site care (PISC) and site closure; and emergency and remedial response. Recordkeeping, reporting, and data management are important components of the UIC Program, helping to ensure that the activities and operations regulated under the program are conducted as planned, are compliant with the regulations and permit conditions, and, ultimately, are sufficiently protective of USDWs.

This guidance is intended to describe specific information that owners or operators of Class VI wells are required or recommended to submit during each GS activity under the Class VI Rule. It closely references other UIC Program Class VI guidance documents for technical details and its content complements the information in the *UIC Program Class VI Implementation Manual for Permitting Authorities*. This document will help owners or operators understand the type and format of information the EPA is seeking in order to make risk-based permitting decisions.

Additionally, the Class VI Rule, at 40 CFR 146.91(e), requires owners or operators of Class VI wells to submit all required reports, submittals, and notifications to the EPA in an approved electronic format. Therefore, this guidance document also provides recommendations for the use of the EPA's centralized, integrated electronic reporting and data management system, the Geologic Sequestration Data Tool (GSDT). The Introduction describes the purpose and organization of the document and provides background information on the GSDT. The GSDT provides a framework in which owners and operators should electronically submit information. Section 2 provides overarching information on the GSDT. Sections 3 through 6 describe reporting, recordkeeping, and data management activities that take place in the different phases of a Class VI project's life cycle.

# Table of Contents

**Disclaimer** ..... i
**Executive Summary** ..... ii
**Table of Contents** ..... iii
**List of Tables** ..... v
**List of Figures** ..... v
**Acronyms and Abbreviations** ..... vi
**Definitions** ..... vii
**1 Introduction** ..... 1
1.1 Purpose of Guidance ..... 1
1.2 Class VI Project Phases and Reporting Requirements ..... 3
**2 Electronic Reporting and the GSDT** ..... 7
2.1 Electronic Reporting under the Class VI Rule ..... 7
2.2 Introduction to the GSDT ..... 8
2.3 GSDT Registration and Access ..... 9
2.4 Project Communications and the Administrative Record ..... 10
2.5 Recordkeeping Requirements ..... 12
**3 Pre-Construction Phase Reporting and Recordkeeping** ..... 13
3.1 Class VI Permit Applications ..... 14
3.1.1 Site Characterization ..... 16
3.1.2 AoR and Corrective Action ..... 17
3.1.3 Financial Responsibility Demonstration ..... 20
3.1.4 Well Construction and Operation ..... 22
3.1.5 Pre-Operational Testing Program ..... 23
3.1.6 Testing and Monitoring ..... 24
3.1.7 Injection Well Plugging ..... 26
3.1.8 PISC and Site Closure ..... 26
3.1.9 Emergency and Remedial Response ..... 28
3.2 Injection Depth Waivers ..... 29
3.3 Aquifer Exemption Expansions ..... 31
**4 Pre-Operation Phase Reporting and Recordkeeping** ..... 33
4.1 Site Characterization ..... 35
4.2 AoR and Corrective Action ..... 37
4.3 Injection Well Construction ..... 39
4.4 Pre-Operational Testing ..... 40
4.5 Other Project Plans ..... 41
4.6 Financial Responsibility ..... 42

**5 Injection Phase Reporting and Recordkeeping ..... 44**

5.1 Semi-Annual Reports of Testing and Monitoring Results ..... 46
5.1.1 Carbon Dioxide Stream Monitoring Results ..... 47
5.1.2 Operational Monitoring Results ..... 48
5.1.3 Description of Exceedances or Shut-Offs ..... 49
5.1.4 Other Testing and Monitoring Results ..... 50
5.2 Well Testing Notifications and Results ..... 54
5.3 Project Plan Amendments and Other Periodic Reporting ..... 55
5.3.1 AoR Reevaluations and Corrective Action ..... 56
5.3.2 Other Project Plan Amendments ..... 57
5.3.3 Financial Responsibility Updates ..... 59
5.4 Emergency and Remedial Response and Other Occasional Reporting ..... 59
5.4.1 Emergency and Remedial Response ..... 60
5.4.2 Notifications of Adverse Financial Conditions ..... 61

**6 Post-Injection Phase Reporting and Recordkeeping ..... 62**

6.1 Injection Well Plugging ..... 64
6.1.1 Pre-Plugging Submissions ..... 64
6.1.2 Well Plugging Report ..... 66
6.2 PISC Reporting ..... 66
6.2.1 PISC and Site Closure Plan ..... 67
6.2.2 PISC Monitoring Results ..... 67
6.2.3 Non-Endangerment Demonstration ..... 68
6.3 Site Closure Reporting ..... 69
6.3.1 Pre-Site Closure Submissions ..... 69
6.3.2 Site Closure Report ..... 71

# List of Tables

Table 3-1. Summary of submittals to be made during the pre-construction phase..... 13

Table 4-1. Summary of submittals to be made during the pre-operation phase, to support the determination to authorize injection. ..... 33

Table 5-1. Summary of submittals to be made during the injection phase..... 44

Table 6-1. Summary of submittals to be made during the post-injection phase..... 62

# List of Figures

Figure 1-1. Sections of this guidance document and other supporting documentation that apply to each of the Class VI project phases. ..... 4

Figure 2-1. The GS Data Tool registration and ESA process..... 9

Figure 2-2. The GSDT reporting modules, mapped to project phases and Class VI Rule requirements..... 11

# Acronyms and Abbreviations

| | |
|---|---|
| AoR | Area of Review |
| CAA | Clean Air Act |
| CBI | Confidential business information |
| CFR | Code of Federal Regulations |
| CROMERR | Cross-Media Electronic Reporting Regulation |
| $CO_2$ | Carbon dioxide |
| EPA | Environmental Protection Agency |
| ESA | Electronic Signature Agreement |
| FR | Federal Register |
| GIS | Geographic information system |
| GS | Geologic Sequestration |
| $GS^3$ | Geologic Sequestration Software Suite |
| GSDT | Geologic Sequestration Data Tool |
| JRP | Joint Requirements Planning |
| LAS | Log ASCII Standard |
| MIT | Mechanical integrity test |
| PDF | Portable document format |
| PISC | Post-injection site care |
| PNNL | Pacific Northwest National Laboratory |
| PWSS | Public Water System Supervision |
| QA/QC | Quality assurance/quality control |
| QASP | Quality Assurance and Surveillance Plan |
| SDWA | Safe Drinking Water Act |
| TDS | Total dissolved solids |
| UIC | Underground Injection Control |
| USDW | Underground source of drinking water |

# Definitions

Key to definition sources:
1: Class VI Rule Preamble.
2: 40 CFR 144.3.
3: 40 CFR 146.81(d).
4: This definition was developed for the purposes of this document.
5: 40 CFR 144.6(f) and 144.80(f).

**Annulus** means the space between the well casing and the wall of the borehole; the space between concentric strings of casing; or, the space between casing and tubing.[1]

**Aquifer exemption** means a process by which an aquifer or portion of an aquifer is removed from SDWA protection to allow injection that would otherwise be prohibited, where certain requirements [40 CFR 146.4] are met. [4]

**Area of review (AoR)** means the region surrounding the GS project where USDWs may be endangered by the injection activity. The AoR is delineated using computational modeling that accounts for the physical and chemical properties of all phases of the injected carbon dioxide stream and displaced fluids, and is based on available site characterization, monitoring, and operational data as set forth in 40 CFR 146.84.[3]

**Carbon dioxide plume** means the extent underground, in three dimensions, of an injected carbon dioxide stream.[3]

**Carbon dioxide stream** means carbon dioxide that has been captured from an emission source (e.g., a power plant), plus incidental associated substances derived from the source materials and the capture process, and any substances added to the stream to enable or improve the injection process. This subpart [subpart H of 40 CFR 146] does not apply to any carbon dioxide stream that meets the definition of a hazardous waste under 40 CFR Part 261.[3]

**Casing** means pipe material placed inside a drilled hole to prevent the hole from collapsing. The two types of casing in most injection wells are (1) surface casing, the outer-most casing that extends from the surface to the base of the lowermost USDW and (2) long-string casing, which extends from the surface to or through the injection zone.[1]

**Cement** means material used to support and seal the well casing to the rock formations exposed in the borehole. Cement also protects the casing from corrosion and prevents movement of injectate up the borehole. The composition of the cement may vary based on the well type and purpose; cement may contain latex, mineral blends, or epoxy.[1]

**Class I well** means a well that injects hazardous waste, other industrial and municipal waste, and radioactive wastes beneath the lowermost formation containing, within one quarter mile of the well bore, an underground source of drinking water.[4]

**Class II well** means a well that injects fluids (1) brought to the surface in connection with natural gas storage operations or conventional oil or natural gas production, (2) for enhanced recovery of oil or natural gas, and (3) for storage of hydrocarbons which are liquid at standard temperature and pressure.[4]

**Class V well** means a well designed and constructed for injection, but not included in the definitions of Class I, II, III, IV, or VI wells. Class V wells inject non-hazardous fluids into or above a USDW and are typically shallow, on-site disposal systems; however, this class also includes some deeper injection operations. There are approximately 20 subtypes of Class V wells.[4]

**Class VI wells** means wells that are not experimental in nature that are used for GS of carbon dioxide beneath the lowermost formation containing a USDW; or, wells used for GS of carbon dioxide that have been granted a waiver of the injection depth requirements pursuant to requirements at 40 CFR 146.95; or, wells used for GS of carbon dioxide that have received an expansion to the areal extent of an existing Class II enhanced oil recovery or enhanced gas recovery aquifer exemption pursuant to 40 CFR 146.4 and 144.7(d).[5]

**Computational code** refers to a series of interrelated mathematical equations solved by computer to represent the behavior of a complex system. For the purposes of GS, computational models represent, at a minimum, the flow and transport of multiple fluids and components in varying phases through porous media. Computational codes offer the ability to predict fluid flow in the subsurface using scientifically accepted mathematical approximations and theory. The use of computational codes is necessary because the mathematical formulations describing fluid flow are complicated and in many cases, non-linear. Several codes have been specifically developed or tailored for injection activities similar to GS, and can be used for this purpose.[4]

**Computational model** means a mathematical representation of the injection project and relevant features, including injection wells, site geology, and fluids present. For a GS project, site specific geologic information is used as input to a computational code, creating a computational model that provides predictions of subsurface conditions, fluid flow, and carbon dioxide plume and pressure front movement at that site. The computational model comprises all model input and predictions (i.e., output).[4]

**Confining zone** means a geologic formation, group of formations, or part of a formation stratigraphically overlying the injection zone(s) that acts as barrier to fluid movement. For Class VI wells operating under an injection depth waiver, confining zone means a geologic formation, group of formations, or part of a formation stratigraphically overlying and underlying the injection zone(s).[3]

**Corrective action** means the use of UIC Program Director-approved methods to ensure that wells within the AoR do not serve as conduits for the movement of fluids into USDWs.[3]

**Enhanced gas recovery** means the process of injecting a gas (i.e., carbon dioxide) into a gas-bearing formation to displace available gas to allow it to be produced.[4]

**Enhanced oil recovery** means the process of injecting carbon dioxide into an oil reservoir to thin (decrease the viscosity of) extractable oil, which is then available for recovery.[4]

**Enhanced recovery** means either enhanced oil recovery or enhanced gas recovery.[4]

**Fluid** means any material or substance which flows or moves, whether in a semisolid, liquid, sludge, gas, or other form or state. [2]

**Formation or geological formation** means a layer of rock that is made up of a certain type of rock or a combination of types.[1]

**Geologic sequestration (GS)** means the long-term containment of a gaseous, liquid, or supercritical carbon dioxide stream in subsurface geologic formations. This term does not apply to carbon dioxide capture or transport.[3]

**Geologic Sequestration Data Tool (GSDT)** means the EPA's centralized, integrated electronic reporting and data management system for Class VI projects.[4]

**GS project** means an injection well or wells used to emplace a carbon dioxide stream beneath the lowermost formation containing a USDW; or, wells used for GS of carbon dioxide that have been granted a waiver of the injection depth requirements pursuant to requirements at 40 CFR 146.95; or, wells used for GS of carbon dioxide that have received an expansion to the areal extent of an existing Class II enhanced oil recovery or enhanced gas recovery aquifer exemption pursuant to 40 CFR 146.4 and 144.7(d). It includes the subsurface three-dimensional extent of the carbon dioxide plume, associated area of elevated pressure, and displaced fluids, as well as the surface area above that delineated region.[3]

**Injectate** means the fluids injected. For the purposes of the Class VI Rule, this is also known as the carbon dioxide stream.[1]

**Injection depth waiver** refers to a waiver of the Class VI injection depth requirements by the UIC Program Director and the EPA Regional Administrator pursuant to provisions at 40 CFR 146.95.[4]

**Injection zone** means a geologic formation, group of formations, or part of a formation that is of sufficient areal extent, thickness, porosity, and permeability to receive carbon dioxide through a well or wells associated with a GS project.[3]

**Mechanical integrity** means the absence of significant leakage within the injection tubing, casing, or packer (known as internal mechanical integrity), or outside of the casing (known as external mechanical integrity).[1]

**Mechanical integrity test (MIT)** refers to a test performed on a well to confirm that a well maintains internal and external mechanical integrity. MITs are a means of measuring the adequacy of the construction of an injection well and a way to detect problems within the well system.[1]

**Model** means a representation or simulation of a phenomenon or process that is difficult to observe directly or that occurs over long time frames. Models that support GS can predict the flow of carbon dioxide within the subsurface, accounting for the properties and fluid content of the subsurface formations and the effects of injection parameters.[1]

**Owner or operator** means the owner or operator of any facility or activity subject to regulation under the UIC program.[2]

**Packer** means a mechanical device that seals the outside of the tubing to the inside of the long-string casing, isolating an annular space.[1]

**Phased corrective action** refers to a provision of the Class VI Rule [40 CFR 146.84(b)(2)(iv)] afforded to Class VI injection well owners or operators to defer some identified corrective action needed within the AoR, but farther away from the injection well, until after injection has commenced, but prior to carbon dioxide plume and pressure front movement into that particular area.[4]

**Post-injection site care (PISC)** means appropriate monitoring and other actions (including corrective action) needed following cessation of injection to ensure that USDWs are not endangered, as required under 40 CFR 146.93.[3]

**Pressure front** means the zone of elevated pressure that is created by the injection of carbon dioxide into the subsurface. For GS projects, the pressure front of a carbon dioxide plume refers to the zone where there is a pressure differential sufficient to cause the movement of injected fluids or formation fluids into a USDW.[3]

**Primacy (primary enforcement responsibility)** means the authority to implement the UIC Program. To receive primacy, a state, territory, or tribe must demonstrate to the EPA that its UIC program is at least as stringent as the federal standards; the state, territory, or tribal UIC requirements may be more stringent than the federal requirements. The EPA may grant primacy for all or part of the UIC program, e.g., for certain classes of injection wells.[4]

**Site closure** means the point/time, as determined by the UIC Program Director following the requirements under 40 CFR 146.93, at which the owner or operator of a GS site is released from PISC responsibilities.[3]

**Total dissolved solids (TDS)** refers to the measurement, usually in mg/L, for the amount of all inorganic and organic substances suspended in liquid as molecules, ions, or granules. For injection operations, TDS typically refers to the saline (i.e., salt) content of water-saturated underground formations.[1]

**Tubing** refers to a small-diameter pipe installed inside the casing of a well. Tubing conducts injected fluids from the wellhead at the surface to the injection zone and protects the long-string casing of a well from corrosion or damage by the injected fluids.[4]

**Underground Injection Control (UIC) Program** refers to the program that the EPA, or an approved state, is authorized to implement under SDWA that is responsible for regulating the

underground injection of fluids by well injection. This includes setting the federal minimum requirements for construction, operation, permitting, and closure of underground injection wells.[4]

**Underground Injection Control (UIC) Program Director** refers to the chief administrative officer of any state or tribal agency or the EPA Region that has been delegated to operate an approved UIC program.[4]

**Underground source of drinking water (USDW)** means an aquifer or its portion which supplies any public water system; or which contains a sufficient quantity of ground water to supply a public water system; and currently supplies drinking water for human consumption; or contains fewer than 10,000 mg/L TDS; and which is not an exempted aquifer.[2]

**Well bore** refers to the hole that remains throughout a geologic (rock) formation after a well is drilled.[4]

**Workover** refers to any maintenance activity performed on a well that involves ceasing injection or production and removing the wellhead.[4]

# 1 Introduction

To ensure the protection of underground sources of drinking water (USDWs), the United States Environmental Protection Agency (EPA) established minimum federal requirements for the proper management of carbon dioxide injection and storage under the authority of Part C of the Safe Drinking Water Act (SDWA) on December 10, 2010. The *Federal Requirements Under the Underground Injection Control (UIC) Program for Carbon Dioxide ($CO_2$) Geologic Sequestration (GS) Wells*, found at 75 FR 77230 and hereafter referred to as the Class VI Rule, establishes a new class of injection wells, Class VI, for the injection of carbon dioxide for GS.

The Class VI Rule defines technical criteria for the safe deployment of Class VI projects, including site characterization; area of review (AoR) delineation and corrective action; well construction and operation; financial responsibility; testing and monitoring; reporting and recordkeeping; well plugging, post-injection site care (PISC) and site closure; and emergency and remedial response. It requires well owners or operators to collect, generate, and report specific information needed to inform permitting and compliance decisions related to siting, constructing, operating, monitoring, and closing a Class VI well [40 CFR 146.81 *et seq.*].

Pursuant to Section 1445 of SDWA, owners or operators subject to requirements under SDWA must establish and maintain records, conduct monitoring, and provide any information that the Administrator or a representative, such as a UIC Program Director, may require by regulation to comply with the Act. Therefore, reporting and recordkeeping are important components of the UIC Program to ensure that activities and operations regulated under the program are conducted as planned, are compliant with the regulations and permit conditions, and, ultimately, are sufficiently protective of USDWs.

## 1.1 Purpose of Guidance

This guidance is one of a group of guidance documents that describe Class VI well operations that are protective of USDWs and in compliance with the Class VI Rule. This document is designed to provide guidance to Class VI injection well owners or operators and their representatives regarding recordkeeping, reporting, and management of data associated with Class VI projects.

Specifically, the purpose of this guidance document is to provide:

- A comprehensive description of the reporting and recordkeeping requirements of the Class VI Rule, for each phase of a Class VI project (see Section 1.2 for a discussion of the Class VI project phases).
- A description of the reporting process, as guided by the EPA's Geologic Sequestration Data Tool (GSDT). The GSDT is an electronic reporting tool for Class VI owners, operators, and permitting authorities, developed by the EPA to facilitate compliance with 40 CFR 146.91(e).

- Information on how the reporting, recordkeeping, and data management activities will ensure USDW protection and support compliance determinations. The GSDT supports the creation and maintenance of a comprehensive administrative record for each project, which supports the EPA's permitting and compliance decisions.

The EPA recommends that this guidance document be used by owners or operators for support in navigating the reporting and recordkeeping requirements of the Class VI Rule. The tables and text boxes provided throughout the document give an overview of associated reporting processes/GSDT workflows, identify resources that owners or operators can use when developing their submissions, and can serve as a check to ensure that regulatory requirements have been met. In addition to these quick reference items, the document provides the basis for the reporting requirements of each project phase (as described in the text of this document), which is critical to ensuring efficiency in permitting and operations throughout the life of an injection project. The EPA's experience with issuing Class VI permits has informed the suggestions that are made throughout this document, and every effort has been made to maximize efficiency while adhering to the Class VI Rule and ensuring USDW protection.

**Class VI Guidance Documents for Owners or Operators**

- *UIC Program Class VI Well Site Characterization Guidance*
- *UIC Program Class VI Well Area of Review Evaluation and Corrective Action Guidance*
- *UIC Program Class VI Financial Responsibility Guidance*
- *UIC Program Class VI Well Construction Guidance*
- *UIC Program Class VI Well Testing and Monitoring Guidance*
- *UIC Program Class VI Well Plugging, Post-Injection Site Care, and Site Closure Guidance*
- *UIC Program Class VI Well Project Plan Development Guidance*
- *UIC Program Class VI Well Injection Depth Waivers Guidance*
- *UIC Program Guidance on Transitioning Class II Wells to Class VI Wells*

As noted above, this document is one of a complementary suite of technical guidance documents that address various aspects of permitting and operating a Class VI injection well. This document focuses specifically on the reporting process for Class VI projects: *what* information to submit, *when* and *how* to submit it, and in *what format* the EPA recommends that it be submitted. Other Class VI guidance documents (see the box at right) provide recommendations for conducting the activities necessary to generate this information, and references to these other documents are noted in the text where appropriate. As they are finalized, all of the Class VI guidance documents will be made available on the EPA's website at http://www.epa.gov/uic/class-vi-guidance-documents and https://www.epa.gov/uic/guidance-documents-underground-injection-control-financial-responsibilities.

The EPA has also developed the *UIC Program Class VI Implementation Manual for Permitting Authorities*, which describes requirements and provides recommendations specific to the activities of UIC Program Directors. This Implementation Manual may also be useful to owners or operators, helping them to understand the review and oversight process that will follow their submissions, and anticipate what the permitting authority will need to inform its review.

## 1.2 Class VI Project Phases and Reporting Requirements

The Class VI Rule requires owners or operators to submit information throughout the lifetime of a Class VI project to demonstrate protection of USDWs and maintain regulatory compliance. A Class VI project consists of four main phases: (1) the pre-operational phase prior to construction (also referred to as the pre-construction phase), (2) the pre-operational phase prior to operation (also referred to as the pre-operation phase), (3) the injection phase, and (4) the post-injection phase. Figure 1-1 (on the following page) illustrates these project phases, the milestones that separate them, and the sections of this guidance document that provide reporting recommendations for each. As shown in the figure, the GSDT user guides and related resources apply throughout all four phases of a Class VI project's life cycle. The paragraphs below summarize the key activities that take place during each project phase, along with the associated requirements for reporting, recordkeeping, and data management.

The **pre-construction phase** begins with the submission of a Class VI permit application. The Class VI Rule, at 40 CFR 146.82(a), requires prospective owners or operators to submit a permit application prior to the issuance of a permit for the construction of a new Class VI well or the conversion of an existing well to a Class VI well. The permit application (see Section 3.1) is a comprehensive collection of proposed project information, including a characterization of the site, an AoR delineation supported by computational modeling, proposed well construction and operation details, a demonstration of financial responsibility, and five project-specific plans (the AoR and Corrective Action Plan, the Testing and Monitoring Plan, the Injection Well Plugging Plan, the PISC and Site Closure Plan, and the Emergency and Remedial Response Plan). Owners or operators seeking to convert existing Class I, Class II, or Class V experimental technology wells to Class VI must demonstrate that the wells were engineered and constructed to meet the requirements at 40 CFR 146.86(a) and to ensure protection of USDWs, in lieu of requirements at 40 CFR 146.86(b) and 146.87(a).[1] Permit applicants seeking a waiver of the requirement to inject below the lowermost USDW must also submit a supplemental report as required at 40 CFR 146.95(a). This injection depth waiver application report (see Section 3.2) must be submitted concurrent with the permit application, pursuant to 40 CFR 146.82(d). In addition, owners or operators seeking to expand the areal extent of an existing aquifer exemption will need to apply to the UIC Program Director pursuant to the requirements at 40 CFR 144.7(d)(1). Recommendations for submittals associated with aquifer exemption expansions are presented in Section 3.3.

**Pre-Construction Phase Reporting**

- Class VI permit application
  *40 CFR 146.82(a)*
- Injection depth waiver application report, if applicable
  *40 CFR 146.95*
- Aquifer exemption expansion request, if applicable
  *40 CFR 144.7(d) and 146.4(d)*

[1] While the Class VI Rule, at 40 CFR 146.81(c) and 146.82(a), specifically lists Class I, Class II, and Class V experimental technology wells as examples of wells that can transition to Class VI, EPA may also consider other types of wells (e.g., monitoring or stratigraphic test wells) for conversion to Class VI provided they meet all of the applicable regulatory requirements. When EPA considers other types of wells for conversion to Class VI, those wells are subject to the same regulatory requirements as those well types listed as examples in 40 CFR 146.81(c) and 146.82(a).

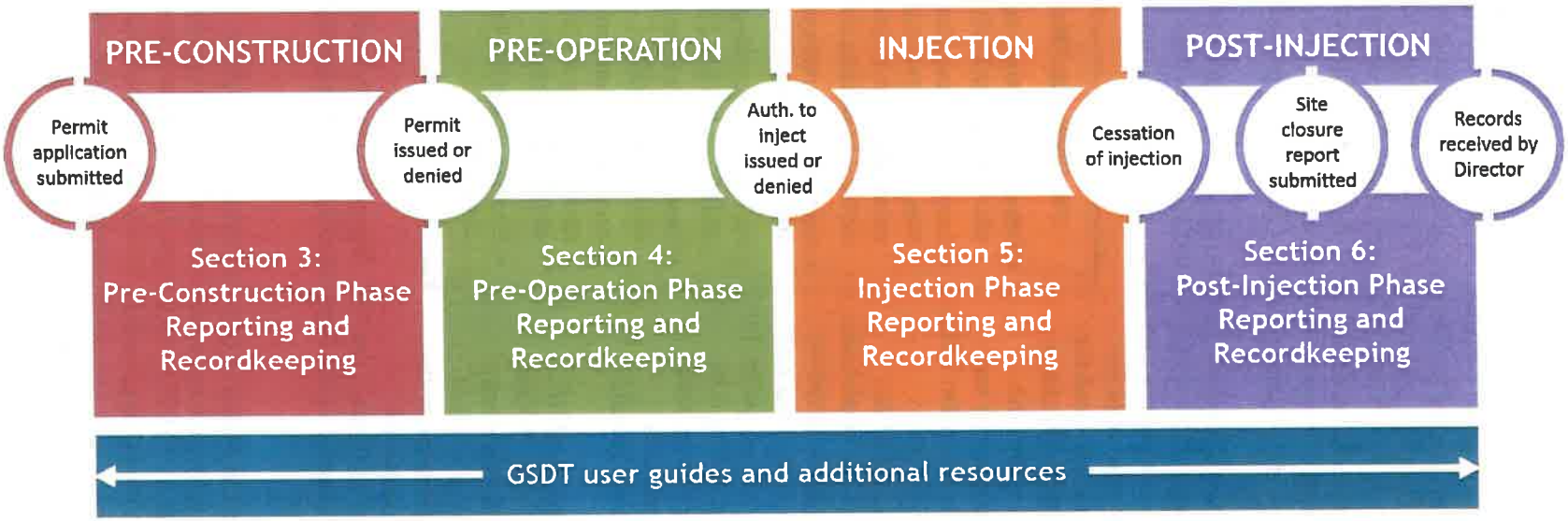



**Figure 1-1. Sections of this guidance document and other supporting documentation that apply to each of the Class VI project phases.**

The pre-construction phase includes an iterative evaluation process, during which permit applicants may be required to make subsequent submissions in response to requests for additional information from the UIC Program Director. These requests would be made to achieve compliance with the rule requirements and/or to provide clarification to the permitting authority; the Class VI Rule, at 40 CFR 146.82(a)(21), provides the Director discretion to request additional information to inform his or her evaluation. When all of the information identified at 40 CFR 146.82(a) has been submitted and evaluated, the UIC Program Director will evaluate it and determine whether to issue a Class VI permit that authorizes the owner or operator to construct a Class VI well (or to convert an existing well to Class VI, if applicable).

The **pre-operation phase** is the period during which the owner or operator and UIC Program Director comply with the requirements under 40 CFR 146.82(c) and previously established permit conditions. Before an owner or operator may inject carbon dioxide, the UIC Program Director must consider information generated in conjunction with drilling and construction, and the EPA expects that owners or operators will submit all of the information necessary to support the Director's review when that information has not otherwise been made available to the Director. This information, specified at 40 CFR 146.82(c), includes the results of logs, surveys, and tests conducted pursuant to 40 CFR 146.87; a final AoR delineation; site characterization updates based on data gathered during drilling and testing; final well construction information; and final project plans. In addition, updates to financial responsibility cost estimates and/or financial instruments may take place during this phase. Section 4 presents recommendations for pre-operation submittals.

**Pre-Operation Phase Reporting**

- Site characterization updates
  *40 CFR 146.82(c)(2)-(3)*
- Amended AoR and Corrective Action Plan, including final AoR delineation and corrective action status
  *40 CFR 146.82(c)(1), (6), (9)*
- Injection well construction updates
  *40 CFR 146.82(c)(3), (5)*
- Pre-operational testing results
  *40 CFR 146.82(c)(4), (7), (8)*
- Amendments to other project plans
  *40 CFR 146.82(c)(9)*
- Any other information requested by the UIC Program Director
  *40 CFR 146.82(c)(10)*
- Financial responsibility updates
  *40 CFR 146.85*

Similar to the pre-construction phase, the UIC Program Director's evaluation of Class VI Rule compliance during the pre-operation phase may require an iterative process with submission of additional information and/or clarification by the owner or operator. When all of the required information has been submitted and evaluated, the UIC Program Director will determine whether to authorize injection operations. Issuance of the final decision to authorize injection marks the end of this phase.

During the **injection phase**—when the actual injection operation takes place—owners or operators are required to submit information at certain intervals to demonstrate compliance with the Class VI requirements. Pursuant to 40 CFR 146.91(a)-(d), owners or operators must submit semi-annual reports of testing and monitoring results; 30-day advance notifications of well tests; well test results within 30 days of each test; and notifications of emergency situations within 24 hours of their occurrence.

**Injection Phase Reporting**

- Semi-annual reports of testing and monitoring results
  *40 CFR 146.91(a)*
- Well test notifications and results
  *40 CFR 146.91(b), (d)*
- Project plan amendments and other periodic reporting
  *40 CFR 146.84(e)(4); 146.85; 146.90(j); 146.93(a)(4); 146.94(d)*
- Emergency and remedial response and other occasional reporting
  *40 CFR 146.85(d); 40 CFR 146.88(f)(4)-(5), 146.91(c), 146.94(b)-(c)*

Periodically throughout the injection phase, owners or operators must reevaluate the project's AoR and, if necessary, amend one or more of their project plans [40 CFR 146.84(e), 146.90(j), and 146.94(d)]. Owners or operators must also update financial responsibility information annually and under certain other conditions [40 CFR 146.85(a)(5)(ii)]. See Section 5 of this document for recommendations related to injection phase submittals.

The **post-injection phase** begins with the cessation of injection activities. During this phase, owners or operators must plug the injection well, perform post-injection monitoring activities, demonstrate that no additional monitoring is needed to ensure that the site does not pose an endangerment to USDWs, and close the site, pursuant to 40 CFR 146.92 and 146.93. Because injection wells may be converted to monitoring wells after injection has ceased, injection well plugging is not required to take place at the beginning of the post-injection phase. However, pursuant to 40 CFR 146.93(f)(1), the site closure report must include documentation of appropriate injection well and monitoring well plugging as specified in 40 CFR 146.92 and 146.93(e) regardless of when the injection well plugging took place.

**Post-Injection Phase Reporting**

- Injection well plugging submissions
  *40 CFR 146.92(c)-(d)*
- PISC submissions, including the non-endangerment demonstration
  *40 CFR 146.93(a)-(b)*
- Site closure submissions
  *40 CFR 146.93(d), (f)*

As necessary during the post-injection phase, the owner or operator will also perform AoR reevaluations and potentially amend the associated project plans, provide updates on financial responsibility, and conduct emergency and remedial response activities. Reporting associated with this phase of the Class VI project is described in Section 6 and includes: submitting a notice of intent to plug the well; submitting an injection well plugging report; submitting an amended PISC and Site Closure Plan; reporting the results of PISC monitoring; performing a non-endangerment demonstration; and submitting a site closure report. The post-injection phase ends when the site is closed and the UIC Program Director receives the site closure report; owners or operators must also deliver post-injection records to the UIC Program Director following a 10-year retention period, as required by 40 CFR 146.93(h).

# 2 Electronic Reporting and the GSDT

Under the Class VI Rule at 40 CFR 146.91(e), owners or operators are required to submit data generated and collected during the lifetime of a Class VI project directly to the EPA in an approved electronic format. The EPA developed the GSDT to facilitate compliance with this electronic reporting requirement. The requirement applies regardless of whether the project is located in a jurisdiction with primary enforcement responsibility (primacy) for Class VI wells, and UIC Program Directors of primacy states, tribes, and territories are encouraged to use the GSDT to eliminate duplicative reporting for owners and operators. The following subsections provide more information about electronic reporting in the context of the Class VI program, the key components and capabilities of the GSDT, and the recordkeeping requirements of the Class VI Rule.

## 2.1 Electronic Reporting under the Class VI Rule

Given the complex nature of Class VI well operations and the more comprehensive requirements of the Class VI Rule compared to those for other UIC well classes, a centralized and integrated reporting system that is managed by the EPA is essential for effective oversight of Class VI projects and management of GS data.

Centralized electronic reporting and data management offers several advantages, including:

- Reducing the burden on permit applicants/owners or operators for data submittal while also assisting with recordkeeping.
- Creating an instantaneous submission process, which is essential for the time-sensitive reporting required under the Class VI Rule, such as 24-hour emergency notifications.
- Facilitating collaboration among owner or operator project team members and between owners or operators and permitting authorities.
- Supporting consistency and continuity for projects with long lifetimes.
- Developing a complete, accurate, and reproducible administrative record for project permitting and compliance decisions.
- Reducing the burden on permitting authorities that receive and manage data.

In addition, centralized electronic reporting and recordkeeping facilitates transparency and supports the EPA's ability to respond to information requests from Congress, the public, and other interested parties. This characteristic is consistent with the recommendations of the *Report of the Interagency Task Force on Carbon Capture and Storage*: "State UIC primacy agencies' efforts could be aided by a national data system that would promote regulatory certainty, efficiency, and accountability, while allowing transparency of all geologic sequestration related information."[2]

[2] Interagency Task Force on Carbon Capture and Storage. 2010. *Report of the Interagency Task Force on Carbon Capture and Storage*, p. C-8. Available on the Internet at: http://www.epa.gov/climatechange/Downloads/ccs/CCS-Task-Force-Report-2010.pdf.

To determine the optimal way to address these electronic reporting needs, the EPA conducted a Joint Requirements Planning (JRP) process in 2011. During a JRP process, stakeholders and content experts participate in structured meetings to collaboratively identify, define, create, and refine user requirements. The EPA held JRP stakeholder meetings with participants from two groups: potential EPA users (particularly those from the EPA regional offices) and potential state and owner or operator users. The EPA then developed an Alternatives Analysis and conducted a cost-benefit evaluation of data system alternatives based on the information received from these stakeholders. Ultimately, the EPA determined that the most cost-effective alternative with the greatest operational value was a tool that relied on an existing system called the Geologic Sequestration Software Suite ($GS^3$), which was developed by the Pacific Northwest National Laboratory (PNNL). The GSDT was developed using $GS^3$ as a starting point.

## 2.2 Introduction to the GSDT

The Class VI Rule is organized according to key UIC Program elements, such as AoR and corrective action, financial responsibility, testing and monitoring, etc. Owners or operators of Class VI wells will submit information for these various topic areas throughout the life of their projects, as described in Section 1.2. To facilitate the efficient submittal of Class VI information, the GSDT utilizes a modular structure for reporting that corresponds to topic areas within the Class VI Rule (see the box below). The GSDT modules are structured to reflect the Class VI Rule requirements (as shown in Figure 2-2 in Section 2.4), and Sections 3 through 6 of this guidance document refer to the GSDT modules to describe information requirements and associated recommendations for information type and format.

**GSDT Reporting Modules for Owners or Operators**

- Project Information Tracking *(for submitting/organizing general project data and permit applications)*
- AoR and Corrective Action
- Financial Responsibility Demonstration
- Pre-Operational Testing
- Project Plan Submissions
- Alternative PISC Timeframe Demonstration
- Injection Depth Waivers and Aquifer Exemption Expansions
- Non-Endangerment Demonstration
- Injection and Post-Injection Phase Reporting
- Information Request *(for responding to permitting authority requests for additional information)*

Class VI permit applicants, owners, and operators all access the GSDT through a centralized landing page, from which they can launch each of the reporting modules. The modules themselves consist of structured electronic forms that reflect the Class VI Rule requirements. Within the GSDT reporting modules, owners or operators provide information in three main ways: selections via check boxes, radio buttons, or drop-down menus; direct entry into text fields; and file uploads.

In some modules, the GSDT also provides templates that users can download, populate, upload, and submit. This helps users ensure that they have included all the necessary information to fulfill the applicable Class VI Rule requirements, while providing them the flexibility to tailor submissions to their particular projects.

Each reporting module has a user guide that describes the specific technical procedures necessary to populate and submit data using that module. These user guides can be downloaded

from within the modules and accessed from the operator landing page of the GSDT. Permitting authorities can also provide copies of the user guides to permit applicants/owners or operators. Because the GSDT modules may be updated over time (e.g., in response to user feedback), this guidance document focuses on the *content* and *timing* of submittals, with more specific technical recommendations described in the GSDT user guides and other resources. For the most up-to-date information on particular fields/actions within the GSDT, owners or operators should refer to the user guides or contact their permitting authority.

In light of the nearly universal use of computerized systems (particularly for wells as technically complex as Class VI wells), the EPA anticipates that most owners or operators will be able to submit data electronically using the GSDT. However, the EPA recognizes that there may be some circumstances where it will be necessary to submit data non-electronically or via an alternative electronic method. For example, the GSDT is not designed to receive confidential business information (CBI). Owners or operators who would like to claim information as CBI or otherwise discuss the possibility of submitting data outside of the GSDT should contact their permitting authority for further information and instructions. If any owners or operators cannot submit the required data using the GSDT, they should work with their UIC Program Director to identify an appropriate alternate reporting format or procedure to ensure regulatory compliance.

## 2.3 GSDT Registration and Access

The GSDT is for authorized users only and requires registration in compliance with the EPA's Cross-Media Electronic Reporting Regulation (CROMERR) and 40 CFR 144.32(a), under which UIC permit applications or other submittals by corporations must be signed by a responsible corporate officer or other authorized personnel. For permit applicants/owners or operators, there is a three-step process for establishing access to the GSDT (see Figure 2-1). This process includes establishing an Electronic Signature Agreement (ESA) to designate the authorized personnel who will submit information via the GSDT over the life of a Class VI well.

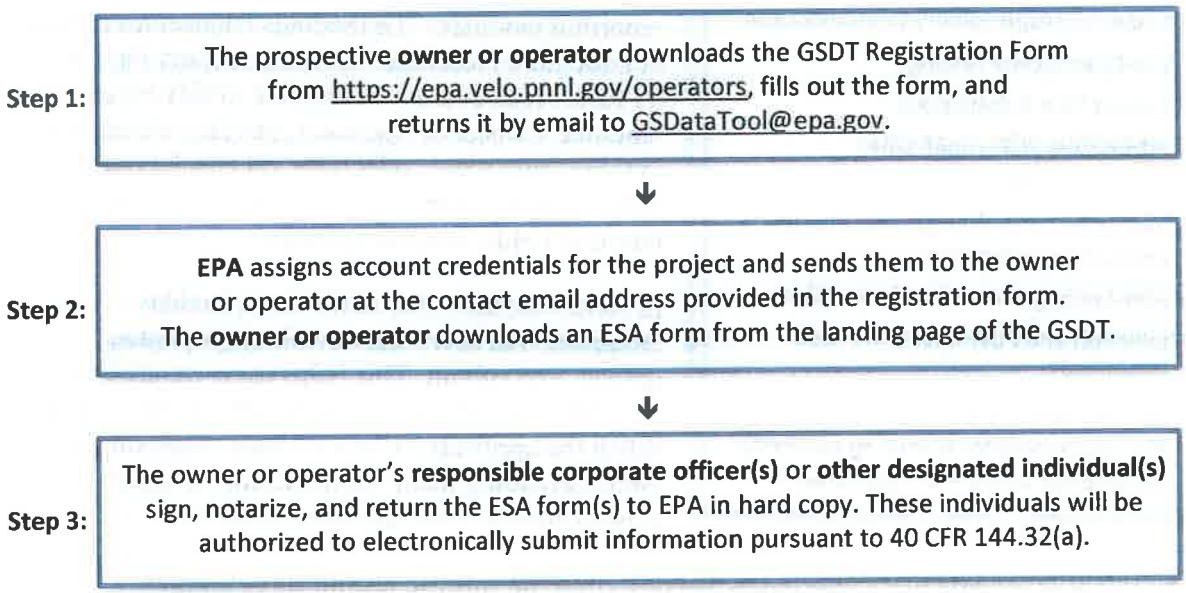



**Figure 2-1. The GS Data Tool registration and ESA process.**

GSDT accounts are issued on a per-project basis, meaning that there is one set of credentials for each project. This also means that data associated with a project is managed collectively regardless of the number of injection wells proposed for the project. (However, pursuant to 40 CFR 144.33, each injection well must be permitted separately with distinct Class VI permit numbers, and each well will be issued a unique UIC permit.) The project-level approach within the GSDT allows permit applicants/owners or operators to efficiently submit combined information that applies to all wells within a project (e.g., computational modeling results for AoR delineation).

Because only one set of credentials will be issued to an organization for a particular project, it is the owner or operator's responsibility to make sure that only appropriate individuals have access to the credentials. All users authorized by the owner or operator organization will need to establish an ESA with the EPA before they can make submissions using the GSDT.

## 2.4 Project Communications and the Administrative Record

An administrative record is a collection of documents that forms the basis for an EPA decision, including the provisions of a draft or final permit where the EPA is the permitting authority (see 40 CFR 124.9 and 124.18). The administrative record for a Class VI permit decision will include all components of the permit application—including any supporting documentation or responses to requests for additional information—once the permit is issued. By capturing and preserving all submissions, the GSDT supports the development of this record in an efficient and transparent manner. The EPA continues to build the record throughout the life of a Class VI project to document all of the materials that support compliance and oversight decisions.

The EPA encourages permit applicants/owners or operators to communicate with their permitting authorities throughout the lifetime of a Class VI project and acknowledges that different modes of communication (such as email, conference calls, etc.) may be appropriate in different situations. Note that any information supporting the permitting decision (e.g., files sent in response to questions or requests for additional information from the permitting authority) is considered to be part of the administrative record by the EPA. For this reason, the EPA recommends using the GSDT for all submissions of permitting- and compliance-related materials. The Information Request module of the GSDT was designed specifically to facilitate this type of information sharing in a way that preserves a clear and complete record while tracking the submission of additional information by owners or operators.

Most modules within the GSDT are designed to be used during multiple Class VI project phases (see Figure 2-2). This allows owners or operators to come back to modules that they have already populated and provide updated information when necessary. For example, an owner or operator who needs to submit annual financial responsibility updates will only need to update those fields in the Financial Responsibility Demonstration module that have changed since the last submission. All submissions are time-stamped and preserved by the system so that the GSDT contains a comprehensive log for the administrative record.

## Class VI Project Phases and Associated Reporting Activities

| GS Data Tool Reporting Module | Pre-Construction | Pre-Operation | Injection | Post-Injection |
|---|---|---|---|---|
| **Project Information Tracking** | Permit application<br>*40 CFR 146.82(a)* | Permit application updates and other pre-operation information<br>*40 CFR 146.82(c)* | Updates to basic project information<br>*N/A* | Updates to basic project information<br>*N/A* |
| **AoR and Corrective Action** | Proposed AoR and Corrective Action Plan, including AoR delineation and corrective action information<br>*40 CFR 146.82(a)(4); 146.84(c)* | Amended AoR and Corrective Action Plan, including final AoR delineation and corrective action status<br>*40 CFR 146.82(c)(1),(6),(9)* | AoR reevaluations and associated AoR and Corrective Action Plan amendments<br>*40 CFR 146.84(e)* | AoR reevaluations and associated AoR and Corrective Action Plan amendments<br>*40 CFR 146.84(e)* |
| **Financial Responsibility Demonstration** | Financial responsibility demonstration, including cost estimate and financial instruments<br>*40 CFR 146.82(a)(14); 146.85(a)(5)(i)* | Financial responsibility cost estimate and instrument updates<br>*40 CFR 146.85(a)(5)(ii), (c)(2)-(4), (e)*<br>Notice of adverse financial conditions<br>*40 CFR 146.82(c)(9)* | Financial responsibility cost estimate and instrument updates<br>*40 CFR 146.85(a)(5)(ii), (c)(2)-(4), (e)*<br>Notice of adverse financial conditions<br>*40 CFR 146.85(d)* | Financial responsibility cost estimate and instrument updates<br>*40 CFR 146.85(a)(5)(ii), (c)(2)-(4), (e)*<br>Notice of adverse financial conditions<br>*40 CFR 146.85(d)* |
| **Project Plan Submissions** | Other proposed project plans<br>*40 CFR 146.82(a)(15)-(17), (19); 146.84(b); 146.90; 146.92(b); 146.93(a)* | Other project plan amendments<br>*40 CFR 146.82(c)(9)* | Other project plan amendments<br>*40 CFR 146.90(j); 146.93(a)(4); 146.94(d)* | Other project plan amendments<br>*40 CFR 146.92(c); 146.93(a)(3)-(4), (d); 146.94(d)* |
| **Alternative PISC Timeframe Demonstration** | Alternative PISC timeframe demonstration, as part of a proposed PISC and Site Closure Plan<br>*40 CFR 146.82(a)(18); 146.93(c)* | Updated alternative PISC timeframe demonstration, as part of an amended PISC and Site Closure Plan<br>*40 CFR 146.82(c)(9)* | Updated alternative PISC timeframe demonstration, as part of an amended PISC and Site Closure Plan<br>*40 CFR 146.93(a)(4)* | Updated alternative PISC timeframe demonstration, as part of an amended PISC and Site Closure Plan<br>*40 CFR 146.93(a)(4)* |
| **Pre-Operational Testing** | Proposed pre-operational logging and testing program<br>*40 CFR 146.82(a)(8)* | Schedule of pre-operational logging and testing activities<br>*40 CFR 146.87(f)*<br>Pre-operational logging and testing results<br>*40 CFR 146.82(c)(4), (7)-(8); 146.87(a)-(f)* | | |
| **Injection and Post-Injection Phase Reporting** | | | Semi-annual reports of testing and monitoring results<br>*40 CFR 146.91(a)*<br>Well test notification and results<br>*40 CFR 146.91(b),(d)*<br>Emergency and remedial response reporting<br>*40 CFR 146.88(f)(4)-(5); 146.91(c); 146.94(b)-(c)* | PISC monitoring results<br>*40 CFR 146.93(b)*<br>Well plugging/site closure notifications and reports<br>*40 CFR 146.92(c)-(d); 146.93(d),(f)*<br>Emergency and remedial response reporting<br>*40 CFR 146.88(f)(4)-(5); 146.91(c); 146.94(b)-(c)* |
| **Non-Endangerment Demonstration** | | | | Non-endangerment demonstration<br>*40 CFR 146.93(b)(2)-(3)* |
| **Injection Depth Waivers and Aquifer Exemption Expansions** | Injection depth waiver application<br>*40 CFR 146.82(d); 146.95(a)*<br>Aquifer exemption expansion request<br>*40 CFR 144.77(d); 146.4(d)* | | | |

$CO_2$

**Figure 2-2. The GSDT reporting modules, mapped to project phases and Class VI Rule requirements.**

## 2.5 Recordkeeping Requirements

Under the requirements outlined at 40 CFR 146.91(f), owners or operators of Class VI injection wells must retain records as follows:[3]

- All data collected under 40 CFR 146.82 for a Class VI permit application must be retained throughout the life of the Class VI project and for 10 years following site closure.
- Data on the nature and composition of all injected fluids collected under 40 CFR 146.90(a) must be retained until 10 years after site closure. The UIC Program Director may require the owner or operator to deliver the records at the conclusion of the retention period.
- All other monitoring data collected under 40 CFR 146.90(b) through (i) must be retained for 10 years after it is collected.
- Well plugging reports, post-injection data (including, if applicable, data and information used to develop the alternative PISC timeframe demonstration), and site closure reports, must be retained for 10 years following site closure.

The UIC Program Director also has the authority, pursuant to 40 CFR 146.91(f)(5), to require the owner or operator to retain records for longer than 10 years after site closure.

In compliance with CROMERR, materials submitted to the GSDT are time-stamped and preserved in a read-only format. These processes allow the EPA to build a comprehensive administrative record for each Class VI project (see Section 2.4) and support recordkeeping for both the owner or operator and the permitting authority. However, note that owners or operators must still comply with the recordkeeping requirements of the Class VI Rule, i.e., they must retain copies of all submittals as required by 40 CFR 146.91(f).

While the GSDT maintains a record of all previous submittals, allowing the permitting authority to build a comprehensive administrative record, the reporting modules available to owners or operators only display the current version of each submittal. In other words, owners or operators will only be able to access their most recently submitted information via the GSDT modules, and they cannot go back to review older submissions within the GSDT. Independent recordkeeping by owners or operators will ensure that they have access to the content of all previous submissions that may have been superseded by newer information.

[3] For the purposes of the recordkeeping requirements discussed throughout this section, "data collected" is inclusive of both submitted data and data that support a permit applicant's decision-making process.

# 3 Pre-Construction Phase Reporting and Recordkeeping

Prospective owners or operators (i.e., permit applicants) must submit certain information before receiving a permit to begin construction of a new Class VI well or the conversion of an existing Class I, Class II, or Class V experimental technology well to a Class VI well [40 CFR 146.82(a)]. This submittal, which makes up the Class VI permit application, includes information related to site characterization, AoR delineation, corrective action, injection well construction, operating information, and other topic areas. In addition to the permit application, owners or operators seeking a waiver of the injection depth requirement must also concurrently submit a waiver application report [40 CFR 146.95(a)]. Owners or operators of existing Class II wells that have made the business decision to transition to Class VI and that are operating under an aquifer exemption may also need to submit information requesting the expansion of the areal extent of that aquifer exemption [40 CFR 144.7(d)].

The submittals to be made during this project phase are summarized in Table 3-1 and described in more detail in the subsections below. Note that, pursuant to 40 CFR 146.91(f)(1), all data collected for Class VI permit applications must be retained throughout the life of the Class VI project and for 10 years following site closure. While not required, the EPA recommends that owners or operators retain associated information related to injection depth waivers for the same timeframe. Additionally, where an owner or operator received a Class VI aquifer exemption expansion, the EPA recommends that the owner or operator retain aquifer exemption-related documents[4] indefinitely, particularly where the exempted aquifer may be used for injection in the future.

The EPA recommends that all prospective owners or operators contact their permitting authority before preparing a Class VI permit application, both to establish access to the GSDT (including its templates and other resources) and to discuss any project-specific considerations that may affect the preparation or review of the permit application.

**Table 3-1. Summary of submittals to be made during the pre-construction phase.**

| Reporting Requirement | Relevant GSDT Modules | Recommended Format | Timing and Frequency |
|---|---|---|---|
| Class VI permit application [40 CFR 146.82(a)] | Project Information Tracking module (which contains a checklist of other modules to use for more detailed submissions; see subsections below) | Basic project information - directly entered into the module<br><br>Permit application narrative - uploaded file, with supplemental uploaded items as necessary (see below)<br><br>Detailed data submissions - other GSDT modules (see below) | Prior to well construction or conversion, per 40 CFR 146.82(a) |

[4] The regulatory authority is an additional resource for aquifer-exemption records, retaining them indefinitely.

| Reporting Requirement | Relevant GSDT Modules | Recommended Format | Timing and Frequency |
|---|---|---|---|
| Class VI permit application [40 CFR 146.82(a)], *continued* | Project Information Tracking module (which contains a checklist of other modules to use for more detailed submissions; see subsections below) | Additional information requested by the UIC Program Director - uploaded file(s) | Prior to well construction or conversion, per 40 CFR 146.82(a) |
| Injection depth waiver application [40 CFR 146.82(d)] | Injection Depth Waivers and Aquifer Exemption Expansions module | A combination of uploaded files and references to previously submitted materials | Concurrent with the permit application, per 40 CFR 146.95(a) |
| Application to expand the areal extent of an aquifer exemption [40 CFR 144.7(d) and 146.4(d)] | Injection Depth Waivers and Aquifer Exemption Expansions module | A combination of uploaded files and references to previously submitted materials | Concurrent with the permit application (recommended) |

## 3.1 Class VI Permit Applications

Permit application requirements for Class VI wells are specified at 40 CFR 146.82(a) and are summarized in the box below. To fulfill these requirements, a Class VI permit application must include multiple types of information with varying levels of technical complexity. Ideally, when considered together, the components of a Class VI permit application will present an integrated, site-specific strategy for demonstrating site suitability and USDW protection. Recommendations for submitting each of these components are provided in the following subsections.

The Project Information Tracking module of the GSDT helps prospective owners or operators to successfully navigate the Class VI permit application process. To reduce the potential for redundancy and to organize permit application components in a manner that facilitates efficient review by the permitting authority, the EPA recommends that Class VI permit applicants submit both:

1. A narrative describing characterization of the proposed site and project, overall strategies for project operations, and other general project information (compiled into a single file and submitted using the Project Information Tracking module of the GSDT).
2. Specific, detailed information required by certain Class VI Rule provisions (submitted using other GSDT modules, which are tailored to the applicable Class VI Rule requirements).

The Project Information Tracking module provides a narrative template that permit applicants can download, complete, and upload back to the module. The EPA strongly recommends that permit applicants use the template, which includes specific instructions and examples for each section of the narrative. The Project Information Tracking module also provides a checklist of other GSDT modules to be populated during the permit application process. Information submitted with these other modules does not need to be repeated in the narrative, and the

narrative template includes placeholders indicating where certain rule requirements can be fulfilled directly in the GSDT. Because of this, the EPA recommends that permit applicants review the relevant GSDT modules and/or user guides described below before developing the narrative, to avoid duplicating efforts or information.

While the GSDT modules associated with the permit application can be submitted in any order, the EPA recommends the following process. First, permit applicants should complete the general project information sections of the Project Information Tracking module (including the project name, contact information, list of existing permits, etc.). Second, they should populate and submit the modules used to provide detailed information. This includes both the modules associated with the required permit application components, such as the AoR and Corrective Action module, and (if applicable) any optional modules, such as the Alternative PISC Timeframe Demonstration module. Third, they should finish populating the 40 CFR 146.82(a) section of the Project Information Tracking module (by uploading the narrative and filling out the checklist) and submit it.

**Permit Application Requirements**

- Basic project information
  *40 CFR 146.82(a)(1), (20)*
- Site characterization information
  *40 CFR 146.82(a)(2)-(3), (5)-(6)*
- Proposed AoR and Corrective Action Plan and associated modeling data
  *40 CFR 146.82(a)(4), (13)*
- Financial responsibility demonstration
  *40 CFR 146.82(a)(14)*
- Injection well construction data
  *40 CFR 146.82(a)(9), (11), (12)*
- Proposed pre-operational testing program
  *40 CFR 146.82(a)(8)*
- Proposed operating data
  *40 CFR 146.82(a)(7), (10)*
- Proposed Testing and Monitoring Plan
  *40 CFR 146.82(a)(15)*
- Proposed Injection Well Plugging Plan
  *40 CFR 146.82(a)(16)*
- Proposed PISC and Site Closure Plan
  *40 CFR 146.82(a)(17), (18)*
- Proposed Emergency and Remedial Response Plan
  *40 CFR 146.82(a)(19)*
- Any other information requested by the UIC Program Director
  *40 CFR 146.82(a)(21)*

For ease of submission and to facilitate the permitting authority's evaluation, the EPA recommends that the 40 CFR 146.82(a) narrative be provided as a single portable document format (PDF) file. Supplemental materials that accompany the narrative but are not compatible with this format, such as tabular data, high-resolution images, or geographic information system (GIS) files like shapefiles, may be provided separately, using the module field designated for "any other information requested by the UIC Program Director."

Pursuant to 40 CFR 146.82, owners or operators of Class I, Class II, or Class V experimental technology wells that are converting to Class VI may incorporate pre-existing information into their permit applications by reference. However, to be compliant with this regulatory requirement and the requirement to electronically report information pursuant to 40 CFR 146.91(e), this referenced information must be current, readily available to the UIC Program Director, sufficiently identified to allow retrieval, and available in an electronic format. For example, certain maps and cross-sections included with a well's original permit application may already be on file; if they meet the requirements at 40 CFR 146.82 and 146.91(e), these materials could be referenced in the Class VI permit application

instead of being re-submitted. The EPA encourages applicants interested in referencing information from previous permits to consult with their permitting authority and to consider the benefits of ensuring a complete record of the project within the GSDT for the duration of a Class VI project.

The EPA considers a permit application to be submitted when all associated components have been received in a way that complies with 40 CFR 146.91(e). Because of the technical complexity of a Class VI permit application, the EPA expects that the permitting process will be an iterative one. Permitting authorities may need to ask clarifying questions, request additional information, or discuss the content of the application with prospective owners or operators. (As described in Section 2.4, the GSDT's Information Request module will facilitate written communications between permit applicants and permitting authorities during this process.) Permit applicants should contact their permitting authority with any specific questions about the Class VI permit application review process.

### 3.1.1 Site Characterization

Site characterization information required under 40 CFR 146.82(a) includes information on the geologic, geomechanical, and hydrogeologic characteristics of the proposed storage site (including the proposed injection zone and overlying formations), as well as baseline geochemical data and other information on USDWs in the AoR. This information is used to demonstrate that the site meets the minimum criteria for suitability specified at 40 CFR 146.83, and it also serves as the foundation, informing plans for site operation, computational modeling, testing and monitoring, and other aspects of the project.

**Site Characterization Submissions**

Class VI Rule requirements:
- 40 CFR 146.82(a)(2)-(3), (5)-(6)
- 40 CFR 146.83

Relevant GSDT modules:
- Project Information Tracking module
- AoR and Corrective Action module

Reference documents:
- *UIC Program Class VI Well Site Characterization Guidance*

Electronic resources:
- 40 CFR 146.82(a) narrative template
- GSDT user guides

Preparing the site characterization component of a Class VI permit application generally involves both desktop analysis of secondary information and the collection of primary data in the field, such as ground water sampling or geophysical surveying. Some of these analyses may be supported with literature reviews and summaries of existing information about the site. The *UIC Program Class VI Well Site Characterization Guidance* presents recommendations for gathering necessary data and demonstrating the suitability of a proposed GS site.

The site characterization material can be incorporated into the 40 CFR 146.82(a) narrative template, available in the Project Information Tracking module of the GSDT. The narrative should integrate the information specified under 40 CFR 146.82(a)(2)-(3) and (5)-(6) to demonstrate a clear and data-driven understanding of the site and show how the site meets the criteria at 40 CFR 146.83. When the narrative is complete, it should be submitted using the Project Information Tracking module as part of the permit application. Note that certain site-related information will also be provided as part of the AoR delineation submission in the AoR and Corrective Action module (see Section 3.1.2).

As stated above, the EPA recommends that the 40 CFR 146.82(a) narrative be provided as a single PDF file, with supplemental materials provided separately using the module field designated for "any other information requested by the UIC Program Director." Supplemental materials, such as legacy data, historical maps, or similar materials should be legible and clear (e.g., contour lines are unambiguous, legends are visible, acronyms are defined, images have an appropriate scale, etc.). If secondary data are used, sources should be clearly cited to support an evaluation of this information. For primary data, relevant reference information—such as the date/time, location/depth, method name, test conditions, assumptions, limitations, quality assurance (QA) protocols, etc.—associated with a sampling event should be included. This reference information is particularly important for baseline data, such as that required by 40 CFR 146.82(a)(6), because it will be used as a point of comparison for future monitoring results. If calculations or experimental results are provided in the permit application, the permitting authority will likely ask for documentation of assumptions and methods used to interpret the results.

The Class VI Rule recognizes that project sites will have varying levels of pre-existing information and that some data submitted with a permit application will be preliminary. As part of the site characterization narrative, the EPA recommends discussing data gaps and uncertainties that will be addressed through the formation testing program and other activities conducted after well construction/conversion, but before receiving authorization to inject (see Section 3.1.5 and Section 4). The ultimate goal of the site characterization information is to demonstrate that the site is suitable, pursuant to 40 CFR 146.83; the EPA encourages permit applicants to include any additional information they deem necessary to support this demonstration even if it is not explicitly identified in the rule.

Because many of the Class VI Rule requirements are designed to be site-specific, site characterization information forms the foundation for several other components of the permit application. Therefore, site characterization materials should be consistent with related permit application components. For example, site parameters entered into the AoR and Corrective Action module for the critical pressure calculation should not conflict with the content of the narrative. More broadly, the site characterization submission should support the other site-specific aspects of the permit application, such as the proposed well construction procedures, the injection and post-injection phase testing and monitoring strategies, the Emergency and Remedial Response Plan, etc.

Permit applicants should contact their permitting authority if questions arise about whether a certain type of information is necessary or if the recommended level of detail is unclear. The EPA recommends discussion of how certain Class VI Rule requirements apply to an individual project (e.g., whether a secondary confining zone is necessary) before permit application submittal.

### 3.1.2 AoR and Corrective Action

The Class VI Rule, at 40 CFR 146.84(a), requires that the well's AoR be delineated using computational modeling that accounts for the physical and chemical properties of all phases of the injected carbon dioxide stream, based on available site characterization, monitoring, and operational data. The purpose of this effort is to delineate a project area where USDWs may be

endangered due to the injection activity. AoR delineation also supports other components of the permit application and the project as a whole, such as defining the area where corrective action may be needed, determining financial responsibility cost estimates, developing project-specific testing and monitoring strategies for the injection and post-injection phases, and supporting alternative PISC timeframe demonstrations.

**AoR and Corrective Action Submissions**

Class VI Rule requirements:
- 40 CFR 146.82(a)(4), (13)
- 40 CFR 146.84

Relevant GSDT modules:
- Project Information Tracking module
- AoR and Corrective Action module

Reference documents:
- *UIC Program Class VI Well Area of Review Evaluation and Corrective Action Guidance*
- *UIC Program Class VI Well Project Plan Development Guidance*

Electronic resources:
- AoR and Corrective Action Plan template
- GSDT user guides

In the pre-construction phase, delineation of the AoR relies on existing site data and proposed project information. As new information becomes available throughout the lifetime of the project, the AoR will need to be reevaluated pursuant to 40 CFR 146.84(e). Therefore, permit applicants must submit an AoR and Corrective Action Plan that proposes site-specific procedures for delineating the AoR and periodically reevaluating this delineation, as well as for performing any necessary corrective action [40 CFR 146.84(b)]. In addition, 40 CFR 146.82(a)(4) specifically requires permit applicants to provide a tabulation of wells in the AoR to support the corrective action evaluation.

The computational modeling effort is the primary focus of the AoR and corrective action components of the permit application. However, in addition to the modeling information, well data (e.g., from state oil and gas databases) and proposed procedures for conducting AoR reevaluations and performing corrective action must also be submitted to fulfill Class VI Rule requirements under 40 CFR 146.84. Detailed information on model development and AoR delineation can be found in the *UIC Program Class VI Well Area of Review Evaluation and Corrective Action Guidance* and recommendations for developing project plans is presented in the *UIC Program Class VI Well Project Plan Development Guidance*.

The AoR and Corrective Action Plan and the detailed information that supports it (e.g., computational modeling data such as simulator information and model input, assumptions, output, etc., and the tabulation of wells in the AoR) can all be submitted using the AoR and Corrective Action module. This module contains a plan template that can be downloaded, populated, and uploaded back to the module. Recommendations for compiling and providing each component of the AoR and corrective action submittal are provided in the subsections below.

It may be helpful for permit applicants to discuss any questions related to data files and formats with their permitting authority prior to entering the information into the AoR and Corrective Action module. The EPA recommends that applicants work with their permitting authority to identify the best approach for submitting project-specific modeling information; this will also help the permitting authority determine the most efficient and effective process to evaluate this information. Following successful submission of information in the AoR and Corrective Action

module, the relevant boxes in the Project Information Tracking module can be checked. Note that the permitting authority's evaluation depends on the submission of complete, accurate, and consistent information and cannot be completed before the full set of information is submitted.

### *AoR and Corrective Action Plan*

The detailed computational modeling and corrective action data submitted via the AoR and Corrective Action module represent essential supporting information for the AoR and Corrective Action Plan. However, it is the plan itself that will be incorporated into the Class VI permit and will become directly enforceable per 40 CFR 146.84(b). In the plan, permit applicants should explain how they will demonstrate compliance with the Class VI requirements relevant to AoR delineation, corrective action, AoR reevaluation, and the plan itself. The EPA recommends that the plan consist of a narrative that describes procedures for delineating the AoR using computational modeling, addressing all deficient artificial penetrations within the AoR, and reevaluating the AoR periodically throughout the life of the project.

The EPA recommends that the AoR and Corrective Action Plan be provided as a single PDF file, uploaded to the AoR and Corrective Action module. As noted above, a template is available in the module to guide development of this document. The template was designed to help ensure that the plan meets all the Class VI Rule requirements while allowing for project-specific flexibility. Within the standardized format of the template, applicants are encouraged to tailor their plans to the needs of their particular projects. Information submitted elsewhere in the AoR and Corrective Action module may be referenced in the narrative (e.g., in the context of describing how the information is used in the delineation process, how it supports the proposed strategies for the corrective action or AoR reevaluation, etc.). Cross-references to other GSDT submittals are also encouraged wherever appropriate.

Pursuant to 40 CFR 146.84(b), the requirement to maintain and implement the AoR and Corrective Action Plan is directly enforceable regardless of whether that requirement is a condition of the Class VI permit. Supplemental or supporting material that informs evaluation of the plan but is not intended to become an enforceable requirement for the project (e.g., reference documents, descriptions of alternative methods considered for AoR delineation, etc.) should not be incorporated into the plan file but should be submitted elsewhere in the module.

### *Detailed Computational Modeling and Corrective Action Data*

The EPA recommends that permit applicants submit all information that the UIC Program Director would need for an independent evaluation of the AoR delineation and the associated corrective action strategy. The AoR and Corrective Action module of the GSDT provides a structured approach to submitting (and, later, updating) the detailed data that support the narrative portion of the modeling information. This information serves to benchmark the AoR delineation at this phase, to provide continuity in decision making and support AoR reevaluations and the non-endangerment demonstration in later phases of the project.

The AoR and Corrective Action module facilitates submission of the following categories of information: model domain, processes modeled, rock properties, boundary conditions, initial conditions, operational information, model output, AoR pressure front delineation, and corrective

action. The module prompts users to provide information in several formats, including image files, tabular data, and short written descriptions. The EPA recommends following the instructions in the module itself and in the associated user guide to ensure that the appropriate type of information is submitted. Explanations for all data files, either in the file itself or in the description/comment fields of the module, should be submitted so that the data can be understood and evaluated appropriately. Explanations should include a description of what is included in each file, how the data are formatted, and any necessary identifying information (e.g., model domain coordinates, simulation duration, etc.). Because an important component of the permitting authority's review is evaluating the degree to which the model simulates actual conditions, all site-related information should be clearly presented and consistent with the site characterization narrative.

The EPA recognizes that some Class VI permit applications may rely on proprietary models, software, or inputs. Users should submit only non-proprietary information with the GSDT. The AoR and Corrective Action module does not necessitate user submittal of actual models or code—only the parameters, assumptions, results, and other supporting information that will allow the permitting authority to fully evaluate the AoR delineation are required. Also, remember that the GSDT is not designed to accept CBI. If permit applicants would like to claim information as CBI or otherwise discuss the possibility of submitting data outside of the GSDT, they should contact their permitting authority for further information and instructions.

In addition to the actual modeling data, the module includes a section for corrective action data. Users are encouraged to submit the population of wells in the AoR either in a tabular format (e.g., .CSV) or as a GIS file (e.g., shapefile). The well construction/plugging information required by 40 CFR 146.82(a)(4)—well type, construction, date drilled, depth, record of plugging and/or completion—can also be included directly in this file (e.g., as metadata associated with a shapefile).

Permit applicants should contact their permitting authority if they have questions about how to submit modeling information, e.g., to determine if certain file types are acceptable or for clarification on how to format output data. It may also be helpful to discuss how to most efficiently submit related information, such as modeling information associated with an alternative PISC timeframe demonstration. While the AoR and Corrective Action module provides flexibility in choosing the file formats for submission, the EPA recommends that permit applicants discuss which file formats to use, as well as any other questions they may have, with their permitting authority. This communication can help determine the best approach(es) for submitting this information and will facilitate the technical evaluation conducted by the permitting authority.

### 3.1.3 Financial Responsibility Demonstration

The Class VI Rule, at 40 CFR 146.85, requires owners or operators of Class VI wells to demonstrate and maintain financial responsibility for performing corrective action, injection well plugging, PISC, site closure, and emergency and remedial response. The purpose of the financial responsibility demonstration submitted with the permit application, required by 40 CFR 146.82(a)(14), is to ensure that sufficient resources exist to carry out activities related to closing and (if necessary) remediating GS sites so that they do not endanger USDWs.

The financial responsibility demonstration in the permit application has two main components: cost estimates for the applicable project activities and financial instruments sufficient to cover those costs. Pursuant to 40 CFR 146.85(c), the cost estimate must reflect costs of hiring a third party to perform the required activities; as a result, the EPA expects that the cost estimate provided as part of the permit application will be an independent estimate generated by an organization that is not within the corporate structure of the owner or operator. Most financial instruments will be generated by a financial institution, but this depends on the instrument type. More detailed information on developing the financial responsibility demonstration is given in the *UIC Program Class VI Financial Responsibility Guidance*. Additional EPA resources that may be helpful for permit applicants are available at http://www.epa.gov/uic/financial-responsibilities-underground-injection-well-owners-or-operators.

**Financial Responsibility Submissions**

Class VI Rule requirements:
- 40 CFR 146.82(a)(14)
- 40 CFR 146.85

Relevant GSDT modules:
- Project Information Tracking module
- Financial Responsibility Demonstration module

Reference documents:
- *UIC Program Class VI Financial Responsibility Guidance*

Electronic resources:
- Online materials at http://www.epa.gov/uic/financial-responsibilities-underground-injection-well-owners-or-operators
- GSDT user guides

Both the cost estimate and the financial instruments are submitted using the Financial Responsibility Demonstration module. For the cost estimate, permit applicants should enter the costs for each covered activity and upload the independent cost estimate. Applicants may also include supplemental materials, such as engineering reports, that support the estimate.

Similarly, for the financial instruments, owners or operators should make the selections on the appropriate tab(s) and upload copies of the instrument(s) and/or documents that prove the third-party instrument or self-insurance is in place and sufficient to cover the estimated costs. Because banks, insurers, or other financial institutions may not provide the specific instruments until the applicant is prepared to purchase them, the initial permit application may only contain information about the types of financial instruments to be used rather than the instruments themselves. For insurance policies, the EPA recommends that a copy of the policy be included in addition to the certificate of insurance, when it is available. Some instruments have special requirements; for example, the owner or operator must document the financial strength of the provider pursuant to 40 CFR 146.85(a)(6)(ii) for third-party instruments. The instructions within the Financial Responsibility Demonstration module guide the submission of information to fulfill these requirements.

Permit applicants should contact their permitting authority if they have questions about what information is necessary to include in the financial responsibility demonstration. It may be appropriate to request a preliminary, informal review of one or more aspects of the cost estimate before finalizing decisions about which financial instrument(s) to obtain. The Financial Responsibility Demonstration module is designed to accommodate this review by allowing cost estimate and financial instrument submissions to be made at different times. However, note that the permit application (as a whole) will not be considered complete until all components

(including either copies of financial instruments or descriptions of the instruments to be secured) are successfully submitted.

### 3.1.4 Well Construction and Operation

As part of the permit application, prospective owners or operators must submit proposed construction and operating data for the Class VI project, including:

- Proposed operational parameters and injectate characteristics [40 CFR 146.82(a)(7)].
- Proposed stimulation program, if applicable [40 CFR 146.82(a)(9)].
- Proposed operating procedures, outlining the steps necessary to conduct injection operation [40 CFR 146.82(a)(10)].
- Schematics or other appropriate drawings of injection well construction [40 CFR 146.82(a)(11)].
- Proposed injection well construction procedures [40 CFR 146.82(a)(12)].

These materials must meet the requirements at 40 CFR 146.86 (to demonstrate that the planned well construction is adequate to prevent movement of fluids into USDWs or other unauthorized zones) and at 40 CFR 146.88 (to demonstrate that the proposed operational procedures will be protective of USDWs). Refer to the *UIC Program Class VI Well Construction Guidance* for information on designing and constructing an injection well that meets the Class VI Rule requirements.

**Well Construction and Operation Submissions**

Class VI Rule requirements:
- 40 CFR 146.81(c)
- 40 CFR 146.82(a)(7), (9)-(12)
- 40 CFR 146.86
- 40 CFR 146.88

Relevant GSDT modules:
- Project Information Tracking module

Reference documents:
- *UIC Program Class VI Well Construction Guidance*

Electronic resources:
- 40 CFR 146.82(a) narrative template
- GSDT user guides

Permit application components associated with these requirements will likely be a combination of narrative description (including tables, charts, etc.) and figures/illustrations (such as from computer-aided design programs). This material can be incorporated into the 40 CFR 146.82(a) narrative, using the template provided in the Project Information Tracking module. As noted above, the EPA recommends that the 40 CFR 146.82(a) narrative be provided as a single PDF file. Supplemental materials that accompany the narrative but are not compatible with this format (such as high-resolution images) may be provided separately, using the module field designated for "any other information requested by the UIC Program Director." Regardless of whether schematics and other images are incorporated into the narrative or provided separately, they should be legible and clear (e.g., legends and scales included, labels visible, etc.).

Specifically, the EPA recommends that the well schematics/drawings include the following elements: the wellhead; the surface casing, long-string casing, and any intermediate casings;

cement placement; the tubing and packer; the type and location of the safety valve(s) and any landing nipples, if used; and proposed completion details, including perforated zones and construction materials to be used. Examples of other documentation that may be submitted to demonstrate compliance with the construction requirements include: copies of construction specifications, references to any standards or best management practices to be followed during construction, and manufacturer specifications on materials used for well construction (e.g., corrosion and temperature resistance ratings or material strengths).

Pursuant to 40 CFR 146.81(c), owners or operators of Class I, Class II, or Class V experimental technology wells transitioning to Class VI do not need to meet the specific construction requirements at 40 CFR 146.86(b). Instead, they must demonstrate that their wells were engineered and constructed to meet the requirements at 40 CFR 146.86(a) and to ensure protection of USDWs. For example, an owner or operator might demonstrate adequate materials strength by providing computations showing calculated down-hole stresses on the casing, tubing, cement, and packer. Because this demonstration will be specific to each individual well, the EPA recommends that affected owners or operators communicate with their permitting authorities before submitting a Class VI permit application, to determine what information will be necessary to make the demonstration.

The EPA also recommends pre-construction discussions between permit applicants and permitting authorities if site- or project-specific considerations may require alternative construction procedures. For example, if cement cannot be recirculated to the surface, the UIC Program Director may approve an alternative method of cementing; if this is the case, owners or operators must submit logs to demonstrate that the cement does not allow fluid migration behind the well bore, pursuant to 40 CFR 146.86(b)(4). Appropriate communication with the permitting authority in the pre-construction stage will help ensure a more efficient permitting process. Additionally, this communication can help streamline the pre-operational testing process (see Section 4) because it provides an opportunity for permitting authorities and owners or operators to discuss whether any additional or alternative methods may be necessary to meet the requirements at 40 CFR 146.87.

### 3.1.5 Pre-Operational Testing Program

With the permit application, the prospective owner or operator must submit a proposed pre-operational well and formation testing program to verify proper construction of the well and obtain an analysis of the chemical and physical characteristics of the injection zone(s) and confining zone(s) [40 CFR 146.82(a)(8)]. This proposed program must meet the requirements at 40 CFR 146.87, which include elements related to both site characterization (to reduce uncertainties associated with site characterization and the AoR delineation) and well integrity (to demonstrate that the well itself will not create a pathway for fluid migration into USDWs). The resulting data from these logs and tests will form the foundation of the pre-operation submissions under 40 CFR 146.82(c), as described in Section 4.

The Class VI Rule, at 40 CFR 146.87, specifies certain minimum requirements or options for the pre-operational testing program. Beyond that, owners or operators have the flexibility to design a program that will collect sufficient information about the well's integrity and the geology of the site to inform a determination that USDWs will be protected. Both the *UIC Program Class VI*

*Well Site Characterization Guidance* and the *UIC Program Class VI Well Construction Guidance* provide recommendations for this process.

The EPA recommends that the description of the proposed pre-operational testing program be submitted as a single PDF containing the necessary narrative description, tables/charts, maps, etc. While this submission is part of the permit application, it is uploaded separately in the Pre-Operational Testing module. This module will be used during the pre-operation phase to provide the results of the logging and testing (see Section 4); using the same module for the proposed activities and their results helps to ensure that all necessary materials are easily accessible for review (both by the owner or operator, when submitting the logging and testing results, and by the permitting authority, during evaluation of this material). The box indicating the submission of the pre-operational testing program in the Project Information Tracking module should be checked when finalizing the permit application submission.

Permit applicants should contact their permitting authority with questions about what materials to include in the pre-operational testing program submission. The Class VI Rule, at 40 CFR 147.87(a)(5), allows permit applicants to use alternative logging and testing methods that provide equivalent or better information, provided that they are approved by the UIC Program Director. The UIC Program Director may also require the use of alternative methods. The EPA recommends discussing the potential use of alternative methods with the permitting authority prior to submitting a permit application.

**Pre-Operational Testing Program Submissions**

Class VI Rule requirements:
- 40 CFR 146.82(a)(8)
- 40 CFR 146.87

Relevant GSDT modules:
- Project Information Tracking module
- Pre-Operational Testing module

Reference documents:
- *UIC Program Class VI Well Site Characterization Guidance*
- *UIC Program Class VI Well Construction Guidance*

Electronic resources:
- GSDT user guides

Owners or operators of existing wells transitioning to Class VI must demonstrate that the wells were engineered and constructed to meet the requirements at 40 CFR 146.86(a) and to ensure protection of USDWs, in lieu of conducting the logs/tests specified at 40 CFR 146.87(a). As with the construction requirements, the EPA recommends that owners or operators discuss the content of this demonstration with their permitting authorities to determine what, if any, information may be needed, e.g., results of previous mechanical integrity tests (MITs) or data that may have been collected during the construction of the well. Note that owners or operators of transitioning wells are responsible for meeting all other requirements at 40 CFR 146.87.

### 3.1.6 Testing and Monitoring

The Class VI Rule, at 40 CFR 146.82(a)(15) requires permit applicants to submit a Testing and Monitoring Plan describing how they will meet the requirements at 40 CFR 146.90. The Testing and Monitoring Plan describes the permit applicant's strategies for identifying potential endangerment of USDWs, demonstrating that the well is maintaining mechanical integrity, that

the project is operating as planned, and that the carbon dioxide plume and pressure front are behaving as predicted.

Testing and monitoring results are the primary method of assessing the performance of the project and provide points of comparison for modeled predictions. As a result, the Testing and Monitoring Plan should present data collection methods sufficient to support AoR reevaluations, demonstrations of whether project plan amendments or financial responsibility cost estimate updates are needed, and the non-endangerment demonstration that will be made before site closure. The *UIC Program Class VI Well Testing and Monitoring Guidance* and the *UIC Program Class VI Well Project Plan Development Guidance* provide recommendations for developing a plan that will meet the rule requirements and lead to the collection of the necessary data.

A template for the Testing and Monitoring Plan is available in the Project Plan Submissions module. Like the templates for the other Class VI project plans, this template was designed to help ensure that the plan meets all the Class VI Rule requirements while allowing for project-specific flexibility; within the standardized format of the template, applicants are encouraged to tailor their plans to the needs of their particular projects. The EPA recommends that the plan be provided as a single PDF that includes the Quality Assurance and Surveillance Plan (QASP) required by 40 CFR 146.90(k). Upload the completed plan to the Project Plan Submissions module. The box indicating the submission of the Testing and Monitoring Plan in the Project Information Tracking module should be checked when finalizing the permit application submission.

**Testing and Monitoring Submissions**

Class VI Rule requirements:
- 40 CFR 146.82(a)(15)
- 40 CFR 146.90

Relevant GSDT modules:
- Project Information Tracking module
- Project Plan Submissions module

Reference documents:
- *UIC Program Class VI Well Testing and Monitoring Guidance*
- *UIC Program Class VI Well Project Plan Development Guidance*

Electronic resources:
- Testing and Monitoring Plan template
- GSDT user guides

Pursuant to 40 CFR 146.90, the requirement to maintain and implement the Testing and Monitoring Plan is directly enforceable regardless of whether that requirement is a condition of the Class VI permit. There may be supplemental or supporting material that would inform evaluation of the submission but does not need to be in the enforceable plan (e.g., reference documents or example specifications from equipment vendors). These materials can instead be uploaded through the designated field in the module.

Permit applicants should contact their permitting authority if they have questions about what to include in the Testing and Monitoring Plan or QASP (including which information to include in the QASP rather than in the body of the plan). It may also be appropriate to discuss whether alternative/additional monitoring activities (e.g., surface air and/or soil gas monitoring, seismicity monitoring, alternative MITs, etc.) may be necessary for a given project.

### 3.1.7 Injection Well Plugging

Class VI permit applicants must submit an Injection Well Plugging Plan that describes how the owner or operator will meet the requirements at 40 CFR 146.92 [40 CFR 146.82(a)(16)]. As described at 40 CFR 146.92(b), the plan includes information such as planned tests or measures to determine bottom-hole reservoir pressure and ensure external mechanical integrity; the type and number of plugs to be used; the planned placement of each plug; the type, grade, and quantity of material to be used in plugging; and the proposed method for plug placement.

**Injection Well Plugging Submissions**

Class VI Rule requirements:
- 40 CFR 146.82(a)(16)
- 40 CFR 146.92

Relevant GSDT modules:
- Project Information Tracking module
- Project Plan Submissions module

Reference documents:
- *UIC Program Class VI Well Plugging, Post-Injection Site Care, and Site Closure Guidance*
- *UIC Program Class VI Well Project Plan Development Guidance*

Electronic resources:
- Injection Well Plugging Plan template
- GSDT user guides

Similar to the injection well construction component of the permit application, the EPA recommends that the Injection Well Plugging Plan consist of narrative description and schematics or other illustrations. As with the other Class VI project plans, a recommended template is provided in the Project Plan Submissions module of the GSDT. The template can be tailored as appropriate to reflect project-specific considerations and uploaded after completion to the Project Plan Submissions module. Any supplemental or supporting material should be submitted in the designated field, and the associated box in the Project Information Tracking module should be checked.

Permit applicants should contact their permitting authority if they have questions about what to include in the Injection Well Plugging Plan or if they wish to discuss whether alternative/additional activities (e.g., alternative MITs) may be appropriate for a given project.

### 3.1.8 PISC and Site Closure

The Class VI Rule, at 40 CFR 146.82(a)(17), requires permit applicants to submit a PISC and Site Closure Plan that proposes post-injection monitoring strategies, describes how non-endangerment of USDWs will be ensured throughout the post-injection phase, and provides procedures for site closure in compliance with 40 CFR 146.93. Proper post-injection monitoring and site closure procedures ensure that neither the injectate nor any mobilized fluids/increased pressures endanger USDWs. The applicant may also submit a request for a PISC timeframe other than the 50-year default, pursuant to 40 CFR 146.82(a)(18).

Both the PISC and Site Closure Plan and the alternative PISC timeframe demonstration (if applicable) rely on predictions from the AoR modeling effort to support decisions about post-injection activities. As a result, narrative descriptions in these submissions should be accompanied by charts, graphs, tables, maps, and/or other materials showing the relevant results from the AoR delineation modeling process. Refer to the *UIC Program Class VI Well Plugging, Post-Injection Site Care, and Site Closure Guidance* and the *UIC Program Class VI Well Project*

*Plan Development Guidance* for recommendations on preparing the PISC and Site Closure Plan and proposing an appropriate alternative PISC timeframe.

Like the other Class VI project plans, the PISC and Site Closure Plan can be completed using a template available in the Project Plan Submissions module. Pursuant to 40 CFR 146.93(a)(2)(v), the plan must state the duration of the PISC timeframe and demonstrate that this timeframe provides for an adequate duration of post-injection monitoring to ensure that the carbon dioxide plume and pressure front will not endanger USDWs. However, because of the specificity and technical complexity of the requirements for this demonstration, the EPA has designed a separate GSDT module to guide permit applicants through submitting the detailed data required to support an alternative PISC timeframe request. Permit applicants may refer to material submitted using this Alternative PISC Timeframe Demonstration module in their plans to meet the requirements at 40 CFR 146.93(a)(2)(v). Considerations for submitting both of these items are provided below.

**PISC and Site Closure Submissions**

Class VI Rule requirements:
- 40 CFR 146.82(a)(17)-(18)
- 40 CFR 146.93

Relevant GSDT modules:
- Project Information Tracking module
- Project Plan Submissions module
- Alternative PISC Timeframe Demonstration module

Reference documents:
- *UIC Program Class VI Well Plugging, Post-Injection Site Care, and Site Closure Guidance*
- *UIC Program Class VI Well Project Plan Development Guidance*

Electronic resources:
- PISC and Site Closure Plan template
- GSDT user guides

When finalizing the permit application submission in the Project Information Tracking module, the box indicating submittal of a PISC and Site Closure Plan and (if applicable) an alternative PISC timeframe demonstration should be checked.

### *PISC and Site Closure Plan*

While the PISC and Site Closure Plan must include the components specified by 40 CFR 146.93(a), the Class VI Rule allows for substantial flexibility regarding the post-injection testing and monitoring program. The PISC and Site Closure Plan template available for download in the Project Plan Submissions module provides a general structure for the plan, but it should be tailored to the needs of a particular project. In addition to the items specified in the Class VI Rule, the EPA encourages permit applicants to include criteria for the non-endangerment demonstration so that expectations for this demonstration are established from the beginning of the project.

As with other Class VI project plans, the EPA recommends that the PISC and Site Closure Plan be provided as a single PDF, with supplemental or supporting material not intended to be part of the enforceable plan uploaded separately in the designated GSDT module field. Any schematics or other images (e.g., for modeling results or monitoring well plugging) should be legible and clear. The EPA also recommends that permit applicants either include a copy of the QASP from the Testing and Monitoring Plan in the PISC and Site Closure Plan, or incorporate it into the PISC and Site Closure Plan by reference.

Permit applicants should contact their permitting authority if they have questions about what to include in the PISC and Site Closure Plan (e.g., how best to incorporate AoR modeling results or how to refer to information submitted with the Alternative PISC Timeframe Demonstration module) or if they wish to discuss the development of appropriate non-endangerment demonstration criteria.

***Alternative PISC Timeframe***

As stated above, the GSDT includes a separate module for the detailed data that support an alternative PISC timeframe demonstration. It can be used as a guide to ensure that all necessary information is provided to inform the permitting authority's decision-making process. Several of the requirements at 40 CFR 146.93(c) are related to other components of the permit application, such as site characterization and AoR delineation modeling. The Alternative PISC Timeframe Demonstration module allows users to submit a combination of new information and cross-references to materials submitted using other GSDT modules. Provided that the references are sufficiently specific and that the referenced material fulfills the specified requirement, no duplicate information needs to be submitted as part of the alternative PISC timeframe demonstration.

Some projects may not have sufficient data available in the pre-construction (or pre-operation) phase to demonstrate that an alternative PISC timeframe will be protective of USDWs. However, pursuant to 40 CFR 146.93(b)(2), an owner or operator may make a non-endangerment demonstration before the end of the timeframe specified in the PISC and Site Closure Plan, regardless of whether an alternative timeframe has been approved during permitting. The EPA recommends that, where possible, permit applicants and permitting authorities discuss this possibility at the outset of a project (for this reason, the EPA encourages owners or operators to identify criteria for the non-endangerment demonstration at the time of the permit application). Also, permit applicants should contact their permitting authority if they wish to discuss any project-specific considerations related to the alternative PISC timeframe, such as whether additional site-specific factors will need to be included in the demonstration per 40 CFR 146.93(c)(xi).

**Emergency and Remedial Response Submissions**

Class VI Rule requirements:
- 40 CFR 146.82(a)(19)
- 40 CFR 146.94

Relevant GSDT modules:
- Project Information Tracking module
- Project Plan Submissions module

Reference documents:
- *UIC Program Class VI Well Project Plan Development Guidance*

Electronic resources:
- Emergency and Remedial Response Plan template
- GSDT user guides

### 3.1.9 Emergency and Remedial Response

The Emergency and Remedial Response Plan is required by 40 CFR 146.82(a)(19). Emergency and remedial response planning pursuant to 40 CFR 146.94 helps ensure an expeditious and appropriate response to protect USDWs from endangerment in the event of an emergency during the lifetime of a Class VI project.

The Class VI Rule, at 40 CFR 146.94(a), does not specify the content of the Emergency and Remedial Response Plan; instead, the permit applicant must

provide appropriate site-specific information. The EPA anticipates that the Emergency and Remedial Response Plan will be a narrative report that may be supported by data sets and maps or other images (e.g., of potentially affected environmental resources or infrastructure such as public water system drinking water supply wells). The *UIC Program Class VI Well Project Plan Development Guidance* provides further recommendations for developing the plan.

The EPA recommends that permit applicants download the plan template from the Project Plan Submissions module, populate it with project-specific information, and submit it through the same module as a single PDF. As with the other Class VI project plans, applicants are encouraged to tailor their submissions to the needs of their particular projects; this is particularly important given the flexibility in the Class VI Rule requirements for emergency and remedial response. Any supplemental or supporting material not intended to be part of the enforceable plan can be uploaded separately in the designated GSDT module field.

Permit applicants should contact their permitting authority to discuss any questions related to the content of the Emergency and Remedial Response Plan or how proposed emergency and remedial response procedures may affect other aspects of the permit application.

### 3.2 Injection Depth Waivers

The Class VI Rule, at 40 CFR 146.95(a), requires owners or operators seeking a waiver of the Class VI injection depth requirements to submit additional information for a comprehensive assessment of site suitability to inject into a non-USDW above or between USDWs. Owners or operators must submit a waiver application report concurrent with the Class VI permit application [40 CFR 146.82(d) and 146.95(a)].[5] The waiver application report is a separate submittal which complements the Class VI permit application.

**Injection Depth Waiver Requirements**

- Suitability of the injection and confining zones
  *40 CFR 146.95(a)(1)-(2)*
- Computational modeling information
  *40 CFR 146.95(a)(3)*
- Injection well construction information
  *40 CFR 146.95(a)(4)*
- Testing and monitoring information
  *40 CFR 146.95(a)(5)*
- Water resource information
  *40 CFR 146.95(a)(6)*
- Any other information requested by the UIC Program Director to support the EPA Regional Administrator's evaluation
  *40 CFR 146.95(a)(7)*

The EPA expects that the waiver application report will contain some information that is similar to (or references) information submitted in the permit application. However, the submittal must be tailored to demonstrate that all USDWs—above and below the injection zone—will be protected. There are also additional requirements that apply only to owners or operators requesting injection depth waivers. For more information, see the *UIC Program Class VI Well Injection Depth Waivers Guidance*.

The EPA recommends that injection depth waiver applications contain the same information

[5] Should a USDW be identified below the injection zone after a Class VI project is permitted or operational, the requirements at 40 CFR 146.95 would apply and this section would remain applicable to such submittals.

types/data formats as Class VI permit applications, including narrative descriptions, tabular data, maps (in flat images and/or GIS files such as shapefiles), charts/graphs, construction schematics, and other types of visual information. As with all Class VI submissions, the files should be legible and clear (e.g., contour lines unambiguous, legends visible, acronyms defined, images have an appropriate scale, etc.). Sources of secondary data should be clearly cited. Primary data should include relevant reference information such as the date/time, location/depth, method name, test conditions, assumptions, limitations, QA protocols, etc., associated with a sampling event.

Injection depth wavier application reports are submitted using the Injection Depth Waiver and Aquifer Exemption Expansion module of the GSDT. In recognition that some aspects of the waiver application report may be the same as components of the permit application, the module allows users to submit a combination of new information and cross-references to materials submitted using other GSDT modules. Cross-references should point specifically to the relevant parts of the permit application (e.g., references to particular pages or subsections, rather than to an entire project plan) to facilitate the review. Also, referenced material should be sufficient to meet the applicable requirements for both the permit application and the injection depth waiver application report. When finalizing the permit application in the Project Information Tracking module, the owner or operator should check the box indicating application for an injection depth waiver.

**Injection Depth Waiver Submissions**

Class VI Rule requirements:
- 40 CFR 146.82(d)
- 40 CFR 146.95

Relevant GSDT modules:
- Project Information Tracking module
- Injection Depth Waivers and Aquifer Exemption Expansions module

Reference documents:
- *UIC Program Class VI Well Injection Depth Waivers Guidance*

Electronic resources:
- GSDT user guides

Pursuant to 40 CFR 146.95(b)-(d), the determination to grant an injection depth waiver for a given Class VI project is the responsibility of the EPA Regional Administrator (even in states with primacy for implementing the Class VI program). This determination is based not only on information provided by the permit applicant but also on consultation with the Public Water System Supervision (PWSS) Director(s) of the state(s) and/or tribe(s) in the AoR. Therefore, submitting a complete injection depth waiver application report via the GSDT is not a guarantee that a waiver will be granted.

The EPA recommends that owners or operators contact their permitting authorities before submitting an injection depth waiver application report to discuss any site-specific factors that may affect the development of the report. For example, the Class VI Rule, at 40 CFR 146.95(a)(7), gives the UIC Program Director the discretion to request any other information needed to inform the EPA Regional Administrator's decision to issue a waiver. This may include a subset of the information listed at 40 CFR 146.95(b). Discussing what additional information may be necessary to submit at the beginning of the process will help support efficiency and reduce the need for additional information requests after the report is submitted.

## 3.3 Aquifer Exemption Expansions

No new aquifer exemptions will be granted for Class VI wells [40 CFR 144.7(a)]. However, if an owner or operator of a Class II enhanced recovery well injecting into an exempted aquifer makes the business decision to transition to Class VI, the owner or operator may request an expansion of the areal extent of the previously approved aquifer exemption [40 CFR 144.7(d)], provided they demonstrate that the area to be exempted meets all of the requirements at 40 CFR 146.4(d).

**Aquifer Exemption Expansion Requirements**

The area to be exempted:

- Does not currently serve as a source of drinking water
  *40 CFR 146.4(d)(1)*
- Has a TDS content more than 3,000 mg/L and less than 10,000 mg/L
  *40 CFR 146.4(d)(2)*
- Is not reasonably expected to supply a public water system
  *40 CFR 146.4(d)(3)*

The Class VI Rule, at 40 CFR 144.7(d)(1), requires aquifer exemption expansion requests to define (by narrative description, illustrations, maps, or other means) and describe, in clear and definite geographic and/or geometric terms (such as vertical/lateral limits and gradient), all aquifers or parts thereof that fall under the request. The *UIC Program Guidance on Transitioning Class II Wells to Class VI Wells* contains additional information about aquifer exemption expansions, including recommendations for the content to be submitted.

Owners or operators may submit various types of information to support this demonstration, such as tabular data, maps (in flat images and/or GIS files), charts/graphs, reports developed by public water systems, etc. As with all Class VI submissions, files should be legible and clear (e.g., contour lines unambiguous, legends visible, acronyms defined, images have an appropriate scale). Sources of secondary data should be clearly cited. Primary data should include relevant reference information such as the date/time, location/depth, method name, test conditions, assumptions, limitations, QA protocols, etc., associated with each sampling event, particularly for total dissolved solids (TDS) measurements.

**Aquifer Exemption Expansion Submissions**

Class VI Rule requirements:
- 40 CFR 144.7(d); 146.4(d)

Relevant GSDT modules:
- Project Information Tracking module
- Injection Depth Waivers and Aquifer Exemption Expansions module

Reference documents:
- *UIC Program Guidance on Transitioning Class II Wells to Class VI Wells*

Electronic resources:
- GSDT user guides

Aquifer exemption expansion requests are submitted using the Injection Depth Waiver and Aquifer Exemption Expansion module of the GSDT. The Class VI Rule does not specify when a request must be submitted, but the EPA recommends that it be submitted at the same time as the Class VI permit application to allow sufficient time for review. Pursuant to 40 CFR 144.7(d), such requests must be treated as a revision to the applicable federal UIC Program under 40 CFR 147 or as a substantial revision to a state/tribal program under 40 CFR 145.32, and will not be final until approved by the EPA (even in states with primacy for implementing the Class VI program). Therefore, submitting a

complete aquifer exemption expansion request via the GSDT is not a guarantee that the request will be granted.

Like injection depth waiver submissions, some aspects of the request may be the same as components of the permit application, and the Injection Depth Waivers and Aquifer Exemption Expansions module allows users to submit a combination of new information and cross-references to materials submitted using other GSDT modules. Cross-references should point specifically to the relevant parts of the permit application (e.g., references to particular pages or subsections, rather than to an entire project plan) and the referenced material should be sufficient to meet all of the applicable requirements. When finalizing the permit application in the Project Information Tracking module, the owner or operator should check the box indicating a request for an aquifer exemption expansion.

The EPA encourages owners or operators to communicate with their permitting authorities prior to submitting an aquifer exemption expansion request. In particular, demonstrating that the aquifer is not reasonably expected to supply a public water system [40 CFR 146.4(d)(3)] requires a tailored, site-specific response, and the EPA recommends discussing this requirement with the permitting authority.

# 4 Pre-Operation Phase Reporting and Recordkeeping

Before receiving approval for the operation of a Class VI well, owners or operators must conduct certain pre-operational activities (as specified by 40 CFR 146.87) and submit the results to the EPA. The Class VI Rule, at 40 CFR 146.82(c), also requires the UIC Program Director to consider certain types of information before authorizing injection, and the EPA expects that owners or operators will submit all of the information necessary to support the Director's review when that information has not otherwise been made available to the Director.

Much of this pre-operation phase information serves to update or supplement the components of the permit application submitted pursuant to 40 CFR 146.82(a), though some is new and specific to the current phase. Overall, the purpose of the information specified by 40 CFR 146.82(c) is to demonstrate that the injection project will not endanger USDWs. The new data considered by the UIC Program Director address uncertainties identified in the permit application process and ensure that all of the planned project activities appropriately reflect the necessary site-specific considerations.

Like the components of a Class VI permit application, the pre-operation information includes data related to site characterization, AoR delineation, corrective action, injection well construction, operating information, and other topic areas. While the Class VI Rule does not specify any pre-operation phase submittals related to injection depth waivers or aquifer exemption expansions, owners or operators may also need to submit information related to these items if requested by the UIC Program Director. See Sections 3.2 and 3.3 for recommendations related to submitting injection depth waiver and aquifer exemption expansion materials.

The information relevant to the pre-operation phase is summarized in Table 4-1, and it is described in more detail in the subsections below. Submitting complete, accurate, and consistent information that clearly demonstrates compliance with the Class VI Rule requirements will support timely authorization to inject, provide information to inform the public and address any concerns about the project, support continuity in decision-making for the project, and facilitate the development of an administrative record documenting permitting authority decisions. As with information collected for a Class VI permit application, 40 CFR 146.91(f)(1) requires that information collected to support 40 CFR 146.82(c) be retained throughout the life of the Class VI project and for 10 years following site closure.

**Table 4-1. Summary of submittals to be made during the pre-operation phase, to support the determination to authorize injection.**

| Reporting Requirement | Relevant GSDT Modules | Recommended Format | Timing and Frequency |
|---|---|---|---|
| Information for the UIC Program Director to consider before granting authorization to inject [40 CFR 146.82(c) and 146.85] | Project Information Tracking module (which contains a checklist of other modules to use for more detailed submissions; see subsections below) | Basic project information - directly entered into the module | Information for the UIC Program Director to consider before granting authorization to inject [40 CFR 146.82(c) and 146.85] |

| Reporting Requirement | Relevant GSDT Modules | Recommended Format | Timing and Frequency |
|---|---|---|---|
| Information for the UIC Program Director to consider before granting authorization to inject [40 CFR 146.82(c)] *continued* | Project Information Tracking module (which contains a checklist of other modules to use for more detailed submissions; see subsections below) | Detailed data submissions - other GSDT modules (see below)<br><br>Additional information requested by the UIC Program Director - uploaded file(s) | Information for the UIC Program Director to consider before granting authorization to inject [40 CFR 146.82(c) and 146.85] |

The information specified by 40 CFR 146.82(c), which is summarized in the box below, is similar to that required under 40 CFR 146.82(a) with respect to the topic areas covered and the type/format of the information. The reporting process is also similar; like the permit application, the EPA recommends that owners or operators submit both:

1. A narrative summarizing the changes to site characterization, strategies for site operation, etc., as a result of pre-operational testing results (compiled into a single file and submitted using the Project Information Tracking module of the GSDT).

2. Specific, detailed information required by certain Class VI Rule provisions (submitted using other GSDT modules, which are tailored to the applicable rule requirements).

As with the 40 CFR 146.82(a) narrative, owners or operators should use the Project Information Tracking module to download a 40 CFR 146.82(c) narrative template, then upload the completed file to the module along with any supplemental materials. For ease of submission and to facilitate the permitting authority's evaluation, the EPA recommends that the 40 CFR 146.82(c) narrative be provided as a single PDF file. Supplemental materials that accompany the narrative but are not compatible with this format (such as tabular data, high-resolution images, or GIS shapefiles) may be provided separately, using the module field designated for "any other information requested by the UIC Program Director."

When owners or operators submit detailed information using the other GSDT modules, they will generally be updating previous submissions made during the pre-construction phase, either by entering new information directly into the module or by uploading updated files. This process is intended to streamline the reporting process as well as facilitate the permitting authority's review. One exception is the Pre-Operational Testing module, which is used to submit the results of the logging and testing activities required by 40 CFR

**Pre-Operation Phase Requirements**

- Site characterization updates
  *40 CFR 146.82(c)(2), (3)*
- Amended AoR and Corrective Action Plan, including final AoR delineation and corrective action status
  *40 CFR 146.82(c)(1), (6), (9)*
- Injection well construction updates
  *40 CFR 146.82(c)(3), (5)*
- Pre-operational testing results
  *40 CFR 146.82(c)(4), (7), (8)*
- Amendments to other project plans
  *40 CFR 146.82(c)(9)*
- Any other information requested by the UIC Program Director
  *40 CFR 146.82(c)(10)*
- Financial responsibility updates
  *40 CFR 146.85*

146.87; before the pre-operation phase of the project, owners or operators will have only used this module to submit their proposed pre-operational testing program files.

While the GSDT modules used during the pre-operation phase can be populated and submitted in any order, the EPA recommends the following process. First, owners or operators should review the general project information sections of the Project Information Tracking module (including the project name, contact information, etc.) to confirm that the information is accurate and up to date. Second, owners or operators should populate and submit the modules used to provide detailed information (e.g., the Pre-Operational Testing module). Third, they should finish populating the 40 CFR 146.82(c) section of the Project Information Tracking module (by uploading the completed narrative template and filling out the checklist) and submit it. The EPA recommends that, throughout this process, owners or operators delete or replace any obsolete information/files in the GSDT modules to ensure that the GSDT contains the most up-to-date information for the project. Note that deleting a file does not alter or hinder the reporting and recordkeeping requirements described in Section 2.5. The GSDT maintains a full record of all previously submitted materials; if an owner or operator deletes/removes a file, this simply means that the file will not be included in an owner or operator's next submission.

Also, similar to the permit application review process, the permitting authority's evaluation of the pre-operation information will likely be an iterative one. Permitting authorities may need to ask clarifying questions, request additional information, or discuss the content of a submittal with owners or operators. As described in Section 2.4, the GSDT's Information Request module will facilitate written communication between owners or operators and permitting authorities during this process (and throughout the life of a Class VI project). In addition to the specific information listed at 40 CFR 146.82(c)(1)–(9), the UIC Program Director may request any additional information necessary to inform his or her decision to authorize injection [40 CFR 146.82(c)(10)]. The EPA recommends that owners or operators contact their permitting authority with any questions about additional required information or the evaluation process.

Depending on a project's permit conditions and the timeframe of the permitting authority's evaluation, an owner or operator may also need to begin certain periodic reporting activities, such as providing financial responsibility updates using the Financial Responsibility Demonstration module (see Section 4.6). The EPA recommends that owners or operators discuss the need for such submittals with their permitting authority.

## 4.1 Site Characterization

The Class VI Rule, at 40 CFR 146.82(c)(2), describes updates that must be made to the project's site characterization information during the pre-operation phase. To support the UIC Program Director's evaluation, the EPA anticipates that the owner or operator will update the site characterization information from the permit application based on the results of the pre-operational testing required at 40 CFR 146.87 (see Section 4.4). As with the original site characterization information, these updates serve to demonstrate that the project meets the minimum criteria for site suitability specified at 40 CFR 146.83. They inform the final AoR delineation, as well as updated plans for site operation, testing and monitoring, and other aspects of the project.

**Site Characterization Submissions**

Class VI Rule requirements:
- 40 CFR 146.82(c)(2), (3)
- 40 CFR 146.83

Relevant GSDT modules:
- Project Information Tracking module
- AoR and Corrective Action module

Reference documents:
- *UIC Program Class VI Well Site Characterization Guidance*

Electronic resources:
- 40 CFR 146.82(c) narrative template
- GSDT user guides

The data used to develop the site characterization updates will be generated during the logging and testing activities conducted pursuant to 40 CFR 146.87. Recommendations for gathering the data are provided in the *UIC Program Class VI Well Site Characterization Guidance*. In some cases, such as those in which additional relevant scientific publications or state well records become available during the pre-operation phase, the updates could also be supported by secondary data.

The site characterization updates can be incorporated into the 40 CFR 146.82(c) narrative, using the template available in the GSDT's Project Information Tracking module. In this narrative, the EPA recommends that owners or operators integrate the formation testing results into the existing site description, highlighting any changes in the understanding of the site since submittal of the permit application. Ideally, the updates will address any key uncertainties identified in the permit application and provide additional evidence to demonstrate that the site meets the suitability criteria at 40 CFR 146.83. The narrative should also include new or updated information on the compatibility of the carbon dioxide stream with the properties of the injection and confining zones, based on the results of formation testing at 40 CFR 146.87(c)-(d) [40 CFR 146.82(c)(3)], as well as any other relevant information that can support an evaluation of the site's geology.

When complete, the compiled 40 CFR 146.82(c) narrative should be submitted using the Project Information Tracking module. As stated above, the EPA recommends that the 40 CFR 146.82(c) narrative be provided as a single PDF file, with supplemental materials provided separately using the module field designated for "any other information requested by the UIC Program Director." These may include updated maps, figures, or other summary items providing a synthesis of the logging and testing results. While the site characterization component of the 146.82(c) narrative relies on the results of pre-operational testing, the actual logging and testing results (e.g., log analyst reports) should be submitted separately, using the Pre-Operational Testing module (see Section 4.4). The EPA recommends that owners or operators cross-reference their pre-operational testing submittals in the 40 CFR 146.82(c) narrative file.

In addition to submitting the 146.82(c) narrative with the Project Information Tracking module, owners or operators may also need to update certain site-related information in the AoR and Corrective Action module, as part of the AoR and corrective action submission (see Section 4.2).

As with the site characterization components of the permit application, the pre-operation phase site characterization information forms the foundation on which other UIC Program Director decisions are based, pursuant to 40 CFR 146.82(c). Therefore, the EPA recommends that owners or operators review the site characterization materials for consistency with related items, such as the final AoR delineation, the Testing and Monitoring Plan, and (if applicable) the alternative PISC timeframe demonstration. Owners or operators should contact their permitting authority if

questions arise about site-specific considerations or about the level of detail necessary to fulfill the Class VI Rule requirements.

## 4.2 AoR and Corrective Action

The Class VI Rule, at 40 CFR 146.82(c)(1), (6), and (9), requires updates to the AoR and corrective action materials submitted with the permit application, including the delineation of the final AoR (based on data obtained during logging and testing of the well and the formation), an update on the corrective action status of wells in the AoR, and an amended AoR and Corrective Action Plan that reflects the pre-operation phase activities. To support the permitting authority's evaluation, the EPA recommends that owners or operators submit the following, using the AoR and Corrective Action module:

- An amended AoR and Corrective Action Plan. This plan should present the final AoR delineation, describe how the delineation is supported by the newly collected data, and contain any necessary updates to the procedures for corrective action (including phased corrective action, if proposed) and AoR reevaluation.
- Updates to the detailed modeling data or any other information supporting the final AoR delineation.
- Documentation of any corrective action that has been completed.

Specific recommendations for submitting each of these items are provided in the subsections below. The content and format of the submissions will likely be similar to those provided as part of the permit application: detailed modeling information such as input and output data, narrative descriptions, tabular well data, etc. (see Section 3.1.2). Recommendations for preparing these materials are provided in the *UIC Program Class VI Well Area of Review Evaluation and Corrective Action Guidance* and the *UIC Program Class VI Well Project Plan Development Guidance*.

**AoR and Corrective Action Submissions**

Class VI Rule requirements:
- 40 CFR 146.82(c)(1), (6), (9)
- 40 CFR 146.84

Relevant GSDT modules:
- Project Information Tracking module
- AoR and Corrective Action module

Reference documents:
- *UIC Program Class VI Well Area of Review Evaluation and Corrective Action Guidance*
- *UIC Program Class VI Well Project Plan Development Guidance*

Electronic resources:
- AoR and Corrective Action Plan template
- GSDT user guides

The EPA recommends that owners or operators hold a discussion with their permitting authority prior to submitting any new modeling information, to address any questions related to data files/formats or the overall approach for submitting modeling data. Once these questions have been addressed, owners or operators should upload the amended AoR and Corrective Action Plan to the AoR and Corrective Action module and enter any updates to the detailed computational modeling/corrective action information. Following successful submission of information in this module, owners or operators can check the relevant boxes in the Project

Information Tracking module to confirm that they have completed this component of pre-operation phase reporting.

### *AoR and Corrective Action Plan*

To fulfill the requirements at 40 CFR 146.82(c)(1), (6), and (9), the EPA recommends that owners or operators review the material in the approved AoR and Corrective Action Plan (i.e., as it was incorporated into the Class VI permit) and amend it to:

- Reflect the final AoR and the procedures used to delineate it.
- Provide a status update on corrective action activities, including both completed and remaining (planned) activities, in light of the final AoR delineation.
- Include any necessary changes to the procedures for AoR reevaluation.

The AoR and Corrective Action Plan will serve as a benchmark for future activities. The requirement to maintain and implement the approved plan is directly enforceable, pursuant to 40 CFR 146.84(b). Accordingly, the plan submitted during the pre-operation phase should reflect the most up-to-date site characterization information and computational modeling procedures, to most efficiently support these future activities.

At this stage of a Class VI project, the AoR and Corrective Action module should contain the last version of the plan submitted before the Class VI permit was issued. The EPA recommends that owners or operators delete this file and replace it with the up-to-date file.[6] As with the initial plan submittal, supplemental materials that are not part of the plan itself should be uploaded elsewhere in the module and not incorporated into the plan file. In addition to the examples of supplemental materials listed in Section 3.1.2, the EPA encourages owners or operators to submit an explanation of the changes that have been made to the plan, especially if substantial changes have been necessary.

In certain cases (e.g., for some well-characterized project sites with substantial existing data available in the pre-construction phase), only minimal updates to the computational model may be needed, and the final AoR delineation might be the same as the one included in the Class VI permit. If this is the case, the EPA recommends that owners or operators amend the AoR and Corrective Action Plan to include a technical description of how the newly obtained data support the final delineation.

### *Detailed Computational Modeling Data*

The computational modeling data supporting the final AoR delineation should be submitted using the AoR and Corrective Action module, using the same procedures as the submittals made during the pre-construction phase (see Section 3.1.2). The EPA recommends that owners or operators review each component of the existing submission (as it appears in the module) and

[6] If the permitting authority made any changes to the plan before incorporating it into the permit, the file in the reporting module may not be exactly the same as the approved plan. When revising the plan file, EPA recommends that owners or operators ensure that they are using the final, approved plan as a starting point.

edit or replace information as necessary. Regardless of the extent to which the AoR delineation may change, the EPA recommends that owners or operators ensure that all fields in the module reflect the most up-to-date information so that the permitting authority can confirm that the modeling effort appropriately incorporates the results of the pre-operation phase activities.

Documentation supporting the corrective action status update described above can also be submitted in the AoR and Corrective Action module. This documentation may include tables of well information and/or plugging reports from any wells that have received corrective action.

### 4.3 Injection Well Construction

To support the review of final construction procedures required by 40 CFR 146.82(c)(5), the EPA recommends that owners or operators submit final as-built drawings/schematics of the injection well and a description of any deviations from the construction procedures included in the Class VI permit. The *UIC Program Class VI Well Construction Guidance* contains information on designing and constructing an injection well that meets the Class VI Rule requirements, including considerations related to the pre-operation phase.

EPA recommends that the final construction information be incorporated into the 40 CFR 146.82(c) narrative. This component of the narrative can also be used to provide information on the compatibility of the carbon dioxide stream with the materials used to construct the well [40 CFR 146.82(c)(3)]. As noted above, the EPA recommends that the 40 CFR 146.82(c) narrative be provided as a single PDF file. Supplemental materials that are not compatible with this format (such as high-resolution images) may be provided separately using the module field designated for "any other information requested by the UIC Program Director." Regardless of whether as-built drawings and other images are incorporated into the narrative or provided separately, they should be legible, clear, and include all relevant legends, scales, labels, etc.

**Injection Well Construction Submissions**

Class VI Rule requirements:
- 40 CFR 146.82(c)(3), (5)
- 40 CFR 146.86

Relevant GSDT modules:
- Project Information Tracking module

Reference documents:
- *UIC Program Class VI Well Construction Guidance*

Electronic resources:
- 40 CFR 146.82(c) narrative template
- GSDT user guides

The EPA recommends that owners or operators hold a discussion with their permitting authority if the actual well construction procedures varied significantly from the approved procedures incorporated in the Class VI permit. (Ideally, owners or operators will notify the permitting authority as soon as possible after identifying the need for such a change—e.g., if relevant information about subsurface formations arises during drilling—to ensure that the well, as built, meets the Class VI requirements.) The EPA also recommends that owners or operators and permitting authorities discuss the ramifications of any changes on other aspects of the project, including operations, well plugging, and associated financial responsibility costs.

## 4.4 Pre-Operational Testing

The Class VI Rule requires owners or operators to conduct certain activities to verify proper construction of the well and obtain data on the chemical and physical characteristics of the injection and confining zones [40 CFR 146.87]. These activities should be performed pursuant to the approved pre-operational testing program in the Class VI permit (see Section 3.1.5) and the results submitted during the pre-operation phase to inform the UIC Program Director's evaluation pursuant to 40 CFR 146.82(c)(4), (7), and (8).

Before conducting the logs and tests required by 40 CFR 146.87, owners or operators must notify their permitting authority and provide them with an opportunity to witness the logging and testing. An owner or operator must provide a testing schedule to the permitting authority at least 30 days before the first test takes place, and any changes to the schedule must be submitted at least 30 days before the next scheduled test [40 CFR 146.87(f)]. These notifications can be submitted using the Pre-Operational Testing module.

**Pre-Operational Testing Submissions**

Class VI Rule requirements:
- 40 CFR 146.82(c)(4), (7), (8)
- 40 CFR 146.87

Relevant GSDT modules:
- Project Information Tracking module
- Pre-Operational Testing module

Reference documents:
- *UIC Program Class VI Well Site Characterization Guidance*
- *UIC Program Class VI Well Construction Guidance*
- *UIC Program Class VI Well Testing and Monitoring Guidance*

Electronic resources:
- GSDT user guides

The EPA anticipates that the pre-operational testing results will include a combination of narrative information (including third-party materials, such as log analyst reports), graphs/figures, and tabular data. Log results may be submitted in Log ASCII Standard (LAS) format, if desired. Both the *UIC Program Class VI Well Site Characterization Guidance* and the *UIC Program Class VI Well Construction Guidance* provide recommendations for conducting the required logs and tests. In addition, the *UIC Program Class VI Well Testing and Monitoring Guidance* includes recommendations related to MITs.

The Pre-Operational Testing module was designed to facilitate submission of the logging and testing results. Unlike most other GSDT modules used during the pre-construction and pre-operation phases, owners or operators will not yet have used the applicable components of the Pre-Operational Testing module. Therefore, the EPA recommends that owners or operators contact their permitting authority before populating the module to discuss any questions about how to use the module or about the specific types of information to submit. Following successful submission of the module, owners or operators can check the corresponding box in the Project Information Tracking module to confirm that they have completed this component of pre-operation phase reporting.

During this phase of a Class VI project, the pre-operational testing results are likely to be the primary source of site-specific information informing the final AoR delineation, Testing and Monitoring Plan, and other project components. Therefore, the EPA recommends that interpretive materials submitted with the pre-operational testing results include a discussion of data limitations and remaining uncertainties at the site. The EPA also recommends that owners

or operators provide information to document compliance with quality assurance/quality control (QA/QC) procedures for the logs and tests, such as equipment calibration information and QA/QC sample data (e.g., blanks, duplicates, or matrix spikes used during laboratory analyses).

The Pre-Operational Testing module provides a great deal of flexibility to owners or operators, reflecting the flexibility of the associated Class VI Rule requirements. The EPA encourages owners or operators to contact their permitting authority to discuss the best approach for submitting a particular project's pre-operational testing results.

## 4.5 Other Project Plans

The Class VI Rule, at 40 CFR 146.82(c)(9), requires the UIC Program Director to consider any amendments to the proposed Testing and Monitoring Plan, Injection Well Plugging Plan, PISC and Site Closure Plan, and Emergency and Remedial Response Plan that are necessary to address new information collected during logging and testing of the well and the formation. (See Section 4.2 for a discussion of the AoR and Corrective Action Plan.) This requirement also includes consideration of any necessary updates to the alternative PISC timeframe demonstration, if one has been proposed. The EPA expects that owners or operators will submit amended project plan files to support this evaluation.

**Other Project Plan Submissions**

Class VI Rule requirements:
- 40 CFR 146.82(c)(9)
- 40 CFR 146.90
- 40 CFR 146.92(b)
- 40 CFR 146.93(a), (c)
- 40 CFR 146.94(a)

Relevant GSDT modules:
- Project Information Tracking module
- Project Plan Submissions module
- Alternative PISC Timeframe Demonstration module

Reference documents:
- *UIC Program Class VI Well Project Plan Development Guidance*
- *UIC Program Class VI Well Testing and Monitoring Guidance*
- *UIC Program Class VI Well Plugging, Post-Injection Site Care, and Site Closure Guidance*

Electronic resources:
- Project plan templates
- GSDT user guides

The EPA anticipates that the amended project plans will have a similar content and format as the original approved plans (e.g., PDF files developed using the templates provided in the Project Plan Submissions module). See the *UIC Program Class VI Well Project Plan Development Guidance* for more information on the project plans, and refer to the *UIC Program Class VI Well Testing and Monitoring Guidance* and the *UIC Program Class VI Well Plugging, Post-Injection Site Care, and Site Closure Guidance* for recommendations on the information to be included in these submittals.

At this stage of a Class VI project, the Project Plan Submissions module should contain the last versions of the project plans that were submitted before the Class VI permit was issued. The EPA recommends that owners or operators delete these files and replace them with the most up-to-date files.[7] Supplemental materials that are not part of the plans can be uploaded in the designated fields in the Project Plan Submissions module. In addition to the examples of

[7] If the permitting authority made any changes to the plan before incorporating it into the permit, the file in the Project Plan Submissions module may not be exactly the same as the approved plan. When updating the plan, EPA recommends that owners or operators ensure that they are using the final, approved plan as a starting point.

supplemental materials provided for the original proposed plans (see Sections 3.1.6, 3.1.7, 3.1.8 and 3.1.9), the EPA recommends that owners or operators consider submitting an explanation of the changes that have been made to each plan, particularly if substantial changes were necessary.

Any revisions to the alternative PISC timeframe demonstration materials can be made directly in the Alternative PISC Timeframe Demonstration module. The EPA recommends that owners or operators delete any obsolete information from that module and replace it with information that reflects the most up-to-date understanding of the site. Because this demonstration relies heavily on computational modeling results, owners or operators are encouraged to reference the detailed modeling submission as appropriate in their submission.

Following successful submission in the Project Plan Submissions module and (if applicable) the Alternative PISC Timeframe Demonstration module, owners or operators can check the relevant boxes in the Project Information Tracking module to confirm that they have completed the corresponding components of pre-operation phase reporting.

In certain cases, it may not be necessary to amend one or more of the project plans. For example, if sufficient project-specific data were available during the pre-construction phase and the AoR delineation has not changed substantially, the existing strategy outlined in the Emergency and Remedial Response Plan may still be appropriate. If owners or operators believe this may be the case for their project, the EPA recommends that they discuss this possibility with the permitting authority before making the relevant pre-operation phase submittals. In lieu of an amended plan, the UIC Program Director may request a technical justification of why no amendment is needed. This justification can be submitted using the supplemental materials field of the Project Plan Submissions module.

### 4.6 Financial Responsibility

If amendments to the AoR and Corrective Action Plan, Injection Well Plugging Plan, PISC and Site Closure Plan, or Emergency and Remedial Response Plan lead to increased costs for the covered activities, the owner or operator must update the cost estimate supporting the financial responsibility demonstration within 60 days [40 CFR 146.85(c)(3)]. Also, owners or operators must update their cost estimates annually [40 CFR 146.85(c)(2)]. Given the likelihood that one or more project plans will change and the time needed to construct the well and perform all required pre-operational testing, it is likely that an updated cost estimate will be needed during the pre-operation phase.

**Financial Responsibility Submissions**

Class VI Rule requirements:
- 40 CFR 146.85(c)(2), (4), and (e)
- 40 CFR 146.85(a)(5)(ii), (c)(4), and (d)(3)

Relevant GSDT modules:
- Project Information Tracking module
- Financial Responsibility Demonstration module

Reference documents:
- *UIC Program Class VI Financial Responsibility Guidance*

Electronic resources:
- GSDT user guides

Updated cost estimates should be submitted using the Financial Responsibility Demonstration module, with the same procedures used to submit the initial cost estimate materials during the pre-construction phase (see Section 3.1.3). The EPA recommends that owners or operators delete any obsolete information

from the module and replace it with an up-to-date version. If final copies of financial instruments were not provided during the pre-construction phase, they should be provided whenever they become available. See Section 3.1.3 for more information about submitting materials related to financial instruments. Once the updated financial responsibility information is submitted, the owner or operator can check the corresponding box in the Project Information Tracking module.

Owners or operators are encouraged to contact their permitting authority to discuss the need for (or the timing of) cost estimate updates or any other questions related to submitting financial responsibility information.

# 5 Injection Phase Reporting and Recordkeeping

During the injection phase, owners or operators must submit information at certain intervals as specified by the project's permit and the Class VI Rule. The goal of injection phase information collection and reporting is to demonstrate that the project is in compliance with the Class VI permit, to identify any endangerment of USDWs, and to generate a body of data to support project milestones (such as AoR reevaluations and the demonstration of non-endangerment made at the end of the project). Specifically, owners or operators must submit periodic reports of testing and monitoring results; notifications and results of well tests; and documentation related to AoR reevaluations, financial responsibility updates, and project plan amendments, as well as notifications and other information associated with emergency and remedial response activities or adverse financial conditions. Table 5-1 summarizes these requirements and the associated Class VI Rule citations, and further details are provided in the subsections below.

The Class VI Rule also specifies certain recordkeeping requirements for injection phase information. Pursuant to 40 CFR 146.91(f)(2), data on the nature and composition of injected fluids must be retained for 10 years after site closure, and the UIC Program Director may require the owner or operator to deliver these records to him or her at the end of this retention period. In addition, 40 CFR 146.91(f)(3) requires monitoring data collected pursuant to 40 CFR 146.90(b)-(i) to be retained for 10 years after it is collected, and 40 CFR 146.84(g) requires that modeling data and inputs used to support AoR reevaluations be retained for 10 years as well.

**Table 5-1. Summary of submittals to be made during the injection phase.**

| Reporting Requirement | Relevant GSDT Modules | Recommended Format | Timing and Frequency |
|---|---|---|---|
| Semi-annual reports of testing and monitoring results [40 CFR 146.91(a)] | Injection and Post-Injection Phase Reporting module | A single uploaded PDF containing the narrative component of each semi-annual report, with supporting data and other supplemental materials uploaded separately as necessary | Semi-annually, on the schedule set in the plan or permit |
| Notifications of well tests and stimulation activities [40 CFR 146.91(d)] | Injection and Post-Injection Phase Reporting module | An uploaded PDF letter | At least 30 days before the event |
| Results of MITs, workovers, and other tests of the injection well, if required by UIC Program Director [40 CFR 146.91(b)] | Injection and Post-Injection Phase Reporting module | An uploaded PDF, with supporting data and other supplemental materials uploaded separately as necessary | Within 30 days of the event<br><br>With the next semi-annual report, for certain types of activities per 40 CFR 146.91(a)(7) |

| Reporting Requirement | Relevant GSDT Modules | Recommended Format | Timing and Frequency |
|---|---|---|---|
| Submissions associated with an AoR reevaluation, including AoR and Corrective Action Plan amendments, or justification that no amendment is needed [40 CFR 146.84(e)] | AoR and Corrective Action module | A combination of uploaded PDF files (including a single uploaded PDF containing the narrative component of the plan) and data files in other formats, as well as information entered directly into the module | According to the schedule (or triggering criteria) set in the permit or the approved AoR and Corrective Action Plan |
| Testing and Monitoring Plan amendments, or justification that no amendment is needed [40 CFR 146.90(j)] | Project Plan Submissions module | A single uploaded PDF, with supporting data and other supplemental materials uploaded separately as necessary | Within 1 year of an AoR reevaluation, following significant changes to the facility, or when required by the UIC Program Director (as specified in the permit or the approved Testing and Monitoring Plan) |
| Emergency and Remedial Response Plan amendments, or justification that no amendment is needed [40 CFR 146.94(d)] | Project Plan Submissions module | A single uploaded PDF, with supporting data and other supplemental materials uploaded separately as necessary | Within 1 year of an AoR reevaluation, following significant changes to the facility, or when required by the UIC Program Director (as specified in the permit or the approved Emergency and Remedial Response Plan) |
| Financial responsibility cost estimate updates [40 CFR 146.85(c)(2), (c)(4), and (e)] | Financial Responsibility Demonstration module | A combination of uploaded PDF files and information entered directly into the module | Annually, 60 days before instrument anniversary<br><br>Within 60 days of project plan amendment or notification by UIC Program Director |
| Financial responsibility instrument updates [40 CFR 146.85(a)(5)(ii), (c)(4), and (d)(3)] | Financial Responsibility Demonstration module | A combination of uploaded PDF files and information entered directly into the module | Annually<br><br>Within 60 days of cost estimate increase to greater than value of current instrument<br><br>Within 60 days of notification of third-party adverse financial conditions |

| Reporting Requirement | Relevant GSDT Modules | Recommended Format | Timing and Frequency |
|---|---|---|---|
| Emergency notifications [40 CFR 146.88(f)(3), 146.91(c), 146.94(b)(3)] | Injection and Post-Injection Phase Reporting module | An uploaded PDF letter, with other supplemental materials uploaded separately as necessary | Within 24 hours<br><br>Included in the semi-annual report, for certain types of events per 40 CFR 146.91(a)(3)-(4) |
| Follow-up submissions after an emergency shutdown or loss of mechanical integrity [40 CFR 146.88(f)(4)-(5), 146.94(c)] | Injection and Post-Injection Phase Reporting module | One or more uploaded file(s) | Before resuming injection or as required by the UIC Program Director |
| Notifications of adverse financial conditions [40 CFR 146.85(d)] | Financial Responsibility Demonstration module | An uploaded PDF letter (submission by certified mail also required) | Within 10 days of the start of bankruptcy proceedings |

## 5.1 Semi-Annual Reports of Testing and Monitoring Results

The Class VI Rule, at 40 CFR 146.91(a), requires owners or operators to submit semi-annual reports of testing and monitoring results. These reports must contain the results of monitoring conducted pursuant to 40 CFR 146.90, as specified in the approved Testing and Monitoring Plan, as well as certain summary statistics of operational parameters and descriptions of permit exceedances and emergency shut-offs. Recommendations for submitting each of these components are provided in the subsections below.

**Semi-Annual Report Requirements**

- Changes to the characteristics of the carbon dioxide stream compared to the proposed operating data
  *40 CFR 146.91(a)(1)*
- Operational monitoring results, including monthly and cumulative summary statistics
  *40 CFR 146.91(a)(2), (5)-(6)*
- Description of permit exceedances or events that triggered shut-off devices
  *40 CFR 146.91(a)(3)-(4)*
- Results of monitoring prescribed under 40 CFR 146.90, including corrosion monitoring, ground water monitoring, external MITs, pressure fall-off tests, plume and pressure front monitoring, surface air and/or soil gas monitoring (if required), and any other activities included in the approved Testing and Monitoring Plan
  *40 CFR 146.91(a)(7)*

The Injection and Post-Injection Phase Monitoring module of the GSDT facilitates submission of the semi-annual reports and any supplemental information supporting those reports. The module provides a semi-annual report template that can be downloaded, populated, and uploaded back to the module. The EPA recommends that owners or operators use the template, which includes specific instructions and examples for each required component.

For ease of submission and to facilitate the permitting authority's evaluation, the EPA recommends that each semi-annual report be provided as a single PDF file. This file should include a summary of the activities conducted and

an interpretation (supported by graphics/charts) that synthesizes the results of these activities and their relevance to the permit conditions and Class VI Rule requirements. Supplemental materials or appendices that accompany the report but are not compatible with this format (such as tabular data, high-resolution images, and GIS files) may be provided separately in the designated module field.

Because injection phase testing and monitoring activities are conducted according to the project-specific Testing and Monitoring Plan, the specific content of the semi-annual report will vary among projects, and, potentially, among different reporting periods for a single project. However, in general, EPA recommends that owners or operators submit the following types of information for each testing and monitoring activity, if applicable:

- The purpose, date, time, and location of sampling event, test, or survey.
- A list or brief description of methods used.
- Interpretation of results with respect to permit conditions/regulatory requirements and past results.
- Any identified data gaps.
- The QA/QC procedures employed.
- The names of any contractors or laboratories involved in sampling and analysis (and their certifications, if applicable).
- Any identified amendments to the Testing and Monitoring Plan that may be necessary to continue protection of USDWs.

Additional recommendations for reporting the results of specific types of monitoring are provided in the subsections below. Again, these general recommendations may not apply to all projects or to all components of an individual project's semi-annual report. The EPA recommends that owners or operators contact their permitting authority before submitting their first semi-annual report, to discuss any questions about how to submit particular types of information. Background information on conducting all required testing and monitoring for Class VI projects can be found in the *UIC Program Class VI Well Testing and Monitoring Guidance*.

### 5.1.1 Carbon Dioxide Stream Monitoring Results

The Class VI Rule, at 40 CFR 146.91(a)(1), requires the semi-annual report to include any changes to the physical, chemical, and other relevant characteristics of the carbon dioxide stream compared to the proposed operating data. Carbon dioxide stream monitoring is also a required component of the Testing and Monitoring Plan, pursuant to 40 CFR 146.90. As a result, the requirement at 40 CFR 146.91(a)(7) to include the results of 40 CFR 146.90 monitoring activities in the semi-annual report applies to this information. This means that the overall results of carbon dioxide stream monitoring must also be included in the semi-annual report, not just changes compared to what was proposed.

Changes in the carbon dioxide stream may lead to changes in the potential for interactions with the injection formation, subsurface fluids, and/or injection well construction materials. Additionally, monitoring the chemical and physical characteristics of the carbon dioxide stream may help distinguish the injectate from the native fluids in case of fluid migration out of the injection zone. An individual project's Class VI permit may also specify certain carbon dioxide stream characteristics (e.g., water content, concentrations of certain impurities) that must be maintained to remain in compliance with the permit.

**Carbon Dioxide Stream Submissions**

Class VI Rule requirements:
- 40 CFR 146.90(a)
- 40 CFR 146.91(a)(1), (7)

Relevant GSDT modules:
- Injection and Post-Injection Phase Reporting module

Reference documents:
- *UIC Program Class VI Well Testing and Monitoring Guidance*

Electronic resources:
- Semi-annual report template
- GSDT user guides

Data on the carbon dioxide stream's characteristics will be generated during periodic injectate monitoring, which is required to be included in the Testing and Monitoring Plan by 40 CFR 146.90. The monitoring frequency, parameters, procedures, etc., will be specified in the approved plan. Owners or operators can consult Section 3.1 of the *UIC Program Class VI Well Testing and Monitoring Guidance* for further information on conducting carbon dioxide stream monitoring.

Carbon dioxide stream monitoring results can be incorporated into the semi-annual report template available in the GSDT. The EPA recommends that owners or operators include a list of chemicals analyzed (including carbon dioxide and any other constituents specified in the approved Testing and Monitoring Plan), a description of the sampling methodology, a tabulation of the analytical results, including results from any QA/QC samples, and a synthesis of the results interpreting any changes in the characteristics of the injected carbon dioxide stream. The EPA also recommends that owners or operators submit the results of previous analyses to facilitate evaluation of temporal trends. In general, owners or operators should provide any information necessary to demonstrate compliance with the Class VI permit and the approved Testing and Monitoring Plan, including the approved QASP.

When complete, the compiled semi-annual report file should be submitted using the Injection and Post-Injection Phase Reporting module. As stated above, the EPA recommends that the semi-annual report be provided as a single PDF file, with supplemental materials (e.g., copies of laboratory reports or tabular monitoring data) uploaded separately using the designated field in the module.

### 5.1.2 Operational Monitoring Results

The Class VI Rule requires that the following types of operational monitoring information be included in the semi-annual report:

- Monthly average, maximum, and minimum values for injection pressure, flow rate, and volume and annular pressure [40 CFR 146.91(a)(2)].

- The monthly volume and/or mass of the carbon dioxide stream injected over the reporting period and the volume injected cumulatively over the life of the project [40 CFR 146.91(a)(5)].
- The monthly annulus fluid volume added [40 CFR 146.91(a)(6)].

Continuous monitoring of each of these parameters is a required component of the Testing and Monitoring Plan pursuant to 40 CFR 146.90(b), and 40 CFR 146.91(a)(7) requires that results of these activities are included in the semi-annual report. Operational monitoring results are used to demonstrate compliance with permit conditions and identify any deviations from permitted conditions that may result in USDW endangerment.

**Operational Monitoring Submissions**

Class VI Rule requirements:
- 40 CFR 146.90(b)
- 40 CFR 146.91(a)(2), (5)-(7)

Relevant GSDT modules:
- Injection and Post-Injection Phase Reporting module

Reference documents:
- *UIC Program Class VI Well Testing and Monitoring Guidance*

Electronic resources:
- Semi-annual report template
- GSDT user guides

Data to support this reporting requirement will be generated by continuous recording devices required by 40 CFR 146.88(e)(1) and 146.90(b), as specified in the approved Testing and Monitoring Plan. Sections 3.2 and 3.3 of the *UIC Program Class VI Well Testing and Monitoring Guidance* provide information on conducting continuous monitoring during injection.

Continuous monitoring results can be incorporated into the semi-annual report template available in the GSDT. The EPA recommends that the monthly and cumulative data required by 40 CFR 146.91(a)(2), (5), and (6) be presented in one or more tables within the semi-annual report file. EPA also recommends that, to ensure compliance with 40 CFR 146.91(a)(7), owners or operators submit all available results for these parameters; the EPA recommends a summary tabular and/or graphical format for these data (i.e., owners or operators should not only submit the monthly/cumulative values). The data can either be incorporated directly into the semi-annual report file or uploaded separately using the field for supplemental information.

### 5.1.3 Description of Exceedances or Shut-Offs

The semi-annual report must include a description of any event that exceeded or otherwise diverged from permitted levels for annulus pressure or injection pressure, pursuant to 40 CFR 146.91(a)(3). In addition, the semi-annual report must include a description of any event that triggered a shut-off device, as well as a description of the activities conducted in response to such an event. Importantly, permit exceedances and automatic shut-offs may also require 24-hour reporting pursuant to 40 CFR 146.91(c), as described in Section 5.4.1; this section only describes the requirements applicable to the semi-annual report. The purpose of including this information in the semi-annual report is to allow the permitting authority to evaluate it in the context of other monitoring results, with the ultimate goal of ensuring USDW protection.

The underlying data for this component of the semi-annual report will be generated during the continuous monitoring required by 40 CFR 146.90(b), with supplemental information potentially coming from the project's operational records (e.g., internal incident reports) or emergency reporting submissions (see Section 5.4.1). The continuous monitoring information in Sections 3.2 and 3.3 of the *UIC Program Class VI Well Testing and Monitoring Guidance* may be useful to owners or operators when preparing this component of their semi-annual report.

**Exceedance and Shut-off Submissions**

Class VI Rule requirements:
- 40 CFR 146.91(a)(3)-(4)

Relevant GSDT modules:
- Injection and Post-Injection Phase Reporting module

Reference documents:
- *UIC Program Class VI Well Testing and Monitoring Guidance*

Electronic resources:
- Semi-annual report template
- GSDT user guides

The EPA recommends that owners or operators incorporate these event descriptions directly into the semi-annual report file, using the template available in the GSDT. The EPA recommends that the descriptions consist of brief narrative explanations, supported by tables, charts, graphs, or images as appropriate. Appendices (e.g., a record of 24-hour emergency notifications), attachments, etc., can also be incorporated into the semi-annual report PDF or be uploaded separately in the designated GSDT module field.

In general, the EPA recommends that the event descriptions include a brief overview of what occurred, any identified causes, the duration of the exceedance, and a description of the owner or operator's response. If any emergency reporting was conducted pursuant to 40 CFR 146.91(c), owners or operators are encouraged to include cross-references to those previous submissions.

### 5.1.4 Other Testing and Monitoring Results

In addition to the specific components listed at 40 CFR 146.91(a)(1)-(6), the Class VI Rule requires that the semi-annual report include the results of monitoring prescribed under 40 CFR 146.90 [40 CFR 146.91(a)(7)]. This means that the semi-annual report must include the results of monitoring conducted to comply with the approved Testing and Monitoring Plan. Because testing and monitoring strategies (and, therefore, the associated results) will vary from project to project, the following recommendations may not apply to all projects in all situations. The EPA recommends that owners or operators consult with their permitting authorities to determine how best to present results from their individual projects, especially if a project's approved Testing and Monitoring Plan includes monitoring methods not specified under 40 CFR 146.90.

#### *Corrosion Monitoring*

The Class VI Rule, at 40 CFR 146.90(c), requires quarterly corrosion monitoring of well materials, by analyzing coupons of well material, routing the carbon dioxide stream through a loop of well material, or an alternate method approved by the UIC Program Director. Furthermore, the UIC Program Director may require casing inspection logs to be run [40 CFR 146.89(d)]. Section 3.4 of the *UIC Program Class VI Well Testing and Monitoring Guidance* provides information related to corrosion monitoring.

The EPA recommends that corrosion monitoring results be incorporated directly into the semi-annual report file, using the template provided in the GSDT. The EPA recommends that owners or operators provide a brief narrative describing the method of sampling/measurement (e.g., the method for retrieval of coupons, the material from which coupons or loops are made, etc.) and an interpretation of the measured or observed results. This should be accompanied by the actual measurements of mass and thickness loss in any corrosion coupons or loops used (e.g., in a tabular or graphical format), presented in the context of all previous results. If casing inspection logs were run, the owner or operator may submit information about the measured casing inspection logs and comparison to previous logs; information about the thickness of the casing (referencing the original casing thickness); and the locations of any detected anomalies such as pits, scratches, and splits. Supplemental items such as photographs can be incorporated into the semi-annual report file or uploaded separately in the designated field.

**Other Testing and Monitoring Submissions**

Class VI Rule requirements:
- 40 CFR 146.90(c)-(i)
- 40 CFR 146.91(a)(7)

Relevant GSDT modules:
- Injection and Post-Injection Phase Reporting module

Reference documents:
- *UIC Program Class VI Well Testing and Monitoring Guidance*

Electronic resources:
- Semi-annual report template
- GSDT user guides

### *External MITs*

The Class VI Rule, at 40 CFR 146.89(c) and 40 CFR 146.90(e), requires annual external MITs. This testing may take the form of a tracer survey (e.g., oxygen activation log), a temperature log, a noise log, or another test required or allowed by the UIC Program Director, as specified in the approved Testing and Monitoring Plan. External MITs are described in Section 2.3 of the *UIC Program Class VI Well Testing and Monitoring Guidance*.

MITs are subject to special reporting requirements under 40 CFR 146.91(b) and (d), as described in Section 5.2. Because MIT results must be submitted within 30 days of the test, owners or operators may have already submitted these results by the time they prepare their semi-annual report in a given reporting period. To avoid duplicative reporting, the EPA recommends that owners or operators include a short statement in the semi-annual report indicating the date of the test, the outcome, and a cross-reference to the previous submission that includes the complete results.

### *Pressure Fall-Off Testing*

Pressure fall-off testing is required by the Class VI Rule at least once every five years, unless more frequent testing is required by the UIC Program Director, pursuant to 40 CFR 146.90(f). The schedule for pressure fall-off testing and the associated reporting will be specified in a project's approved Testing and Monitoring Plan. Section 3.5 of the *UIC Program Class VI Well Testing and Monitoring Guidance* provides more detailed information about pressure fall-off testing.

Results of pressure fall-off testing must be reported within 30 days of the test, if required by the UIC Program Director [40 CFR 146.91(b)(3)] (see Section 5.2). If pressure fall-off test results

were submitted within the 6 months covered by the semi-annual report, the EPA recommends that owners or operators include a short statement in the semi-annual report indicating the date of the test, any notable results, and a cross-reference to a previous submission that includes the previous results. (If the UIC Program Director/the project's Testing and Monitoring Plan does not require 30-day reporting of pressure fall-off results, owners or operators should include the full set of results in their semi-annual report.)

### *Ground Water Quality Monitoring Above the Confining Zone*

Periodic monitoring of ground water quality above the confining zone(s) is required by the Class VI Rule [40 CFR 146.90(d)]. Owners or operators of wells operating under injection depth waivers must also sample ground water below the lower confining zone [40 CFR 146.95(f)(3)(i)]. The parameters, methods, schedule, and other specifics of this monitoring activity will be established in the project's approved Testing and Monitoring Plan. Recommendations for conducting ground water monitoring are covered in Section 4 of the *UIC Program Class VI Well Testing and Monitoring Guidance*.

Ground water monitoring results can be incorporated directly into the semi-annual report template available in the GSDT. The EPA recommends that owners or operators include a list of parameters analyzed (as specified in the approved Testing and Monitoring Plan), a description of the sampling locations and methodology, a tabulation of the analytical results (including results for any QA/QC samples), and a synthesis of the results in the context of permit/regulatory compliance (e.g., an interpretative narrative that discusses any changing trends, any evidence of fluid leakage/fluid migration above the confining zone, and any implications for project operations or USDW protection, supported by maps and graphs as appropriate). To facilitate identification and evaluation of temporal trends, the EPA recommends that owners or operators submit the results of previous analyses, including baseline data. Any supplemental materials that owners or operators wish to provide (e.g., copies of laboratory reports) can be provided separately using the designated field in the module.

### *Carbon Dioxide Plume and Pressure-Front Tracking*

The Class VI Rule, at 40 CFR 146.90(g), requires the owner or operator to perform direct and indirect monitoring to track the carbon dioxide plume and pressure front. As described in Section 5 of the *UIC Program Class VI Well Testing and Monitoring Guidance*, owners or operators may incorporate a variety of methods/techniques into their Testing and Monitoring Plans to fulfill this requirement. Accordingly, the specific types of information submitted related to plume and pressure-front tracking will vary from project to project.

In general, the EPA recommends that owners or operators incorporate the following items into their semi-annual report files (as applicable):

- One or more maps showing the locations/spatial extents (including, if applicable, depths/elevations), dates, and types of monitoring activities.
- Time-series graphs/charts showing monitoring results over time (including the current reporting period, previous reporting periods, and baseline data). For example, pressure or

saturation profiles at a given location or profiles of carbon dioxide trapping indictors could be submitted in this manner.

- Snapshot figures showing distributions of parameters over a given spatial extent at a particular time, such as one or more images showing the interpreted location of the carbon dioxide plume and pressure front in cross-sectional and plan/map view.
- A description of data processing methods used for geophysical surveys, as well as the major assumptions employed when analyzing monitoring results.
- Instrument calibration data, method sensitivity information, QA sample results, or other information to demonstrate compliance with the approved QASP.

In addition to the actual monitoring results, the EPA recommends that owners or operators include an interpretative narrative that synthesizes the results from the various monitoring methods, compares the results to the predictions generated during AoR delineation modeling, identifies any anomalies, and discusses any implications for project operations or USDW protection. Owners or operators should keep in mind that plume and pressure-front monitoring results are a key component of AoR reevaluations (see Section 5.3.1), as well as the project's ultimate non-endangerment demonstration (see Section 6.2.3). Submitting clear, organized, relevant, and complete results in the semi-annual reports will support efficient evaluations of these other Class VI project components.

To supplement the information included in the semi-annual report file, owners or operators may submit contractor's reports, GIS files, well log results, or other types of information that would not be practical to incorporate directly into the report PDF. These supplemental materials can be uploaded separately in the designated field in the GSDT.

***Surface Air and/or Soil Gas Monitoring***

The Class VI Rule allows the UIC Program Director, at his or her discretion, to require surface air and/or soil gas monitoring [40 CFR 146.90(h)]. If such activities are determined to be necessary, they will be incorporated into the approved Testing and Monitoring Plan. See Section 6 of the *UIC Program Class VI Well Testing and Monitoring Guidance* for more information.

Similar to the other types of testing and monitoring results, the EPA recommends that surface air and/or soil gas monitoring results be incorporated directly into the semi-annual report template. The EPA recommends that owners or operators include a list of parameters analyzed (as specified in the approved Testing and Monitoring Plan), a description of the sampling locations and methodology, and a tabulation of the analytical results, including results from any QA/QC samples. To facilitate identification and evaluation of temporal trends, the EPA recommends that owners or operators submit the results of previous analyses, including baseline data. In addition to the analytical testing results, the EPA recommends that owners or operators include an interpretative narrative that discusses any changing trends, any evidence of carbon dioxide reaching the surface, and any implications for project operations or USDW protection. This narrative may be supported by maps and graphs, as appropriate. In general, owners or operators should provide any information necessary to demonstrate compliance with the Class VI permit and the approved Testing and Monitoring Plan, including the approved QASP. Any supplemental

materials that owners or operators wish to provide (e.g., copies of laboratory reports, GIS files) can be provided separately using the designated field in the module. If any emergency reporting was conducted pursuant to 40 CFR 146.91(c)(5), as described in Section 5.4, the EPA recommends that owners or operators include a cross-reference to the associated submittals.

## 5.2 Well Testing Notifications and Results

**Well Testing Notifications and Results Requirements**

- Notifications of planned workovers, stimulations, and well tests
  *40 CFR 146.91(d)*
- Results of MITs, workovers, and other well tests (if required by the UIC Program Director)
  *40 CFR 146.91(b)*

The Class VI Rule contains special reporting requirements for well tests and related activities, including MITs, stimulation activities, and workovers. First, owners or operators must notify the UIC Program Director in writing 30 days before any planned workovers, stimulation activities (other than those conducted for formation testing under 40 CFR 146.82), and other planned tests of the injection well [40 CFR 146.91(d)]. Second, owners or operators must submit the results of MITs, workovers, and other tests of the injection well (if required by the UIC Program Director) within 30 days of the activity [40 CFR 146.91(b)]. The EPA expects that any project-specific requirements, such as which well tests require 30-day reporting under 40 CFR 146.91(b)(3), will be incorporated into the project's permit conditions and/or the approved Testing and Monitoring Plan.

Both types of submissions described above can be made using the GSDT's Injection and Post-Injection Phase Reporting module. Background information on well testing and the associated Class VI Rule requirements can be found in the *UIC Program Class VI Well Testing and Monitoring Guidance*.

For notifications made pursuant to 40 CFR 146.91(d), the EPA recommends that owners or operators upload a PDF letter stating the date/time/location of the planned activity and providing a brief description of what will be done. Owners or operators may also want to state the purpose of the activity or the applicable permit condition/Class VI Rule requirement that it will fulfill. The EPA does not anticipate that owners or operators will need to submit any supplemental materials to accompany this notification letter, but the Injection and Post-Injection Phase Reporting module does provide the option to do so.

**Well Testing Notifications and Results Submissions**

Class VI Rule requirements:
- 40 CFR 146.91(d)
- 40 CFR 146.91(b)

Relevant GSDT modules:
- Injection and Post-Injection Phase Reporting module

Reference documents:
- *UIC Program Class VI Well Testing and Monitoring Guidance*

Electronic resources:
- GSDT user guides

When submitting the results of well tests and other activities pursuant to 40 CFR 146.91(b), the EPA recommends that owners or operators upload a brief narrative report (in PDF) summarizing the procedures used and any key interpretations/ outcomes. Owners or operators may use the field for supplemental materials to upload items such as log

files or log analyst reports; alternatively, these items may be incorporated directly into the owner or operator's narrative file.

While the specific information to be submitted will vary depending on the type and purpose of the test or other activity, owners or operators are encouraged to submit details such as the following (as applicable):

- Operating conditions during testing, including injection rate, pressure, and temperature, or the conditions and timing associated with shutting-in the well.
- The numbers and locations of measurement stations (e.g., for oxygen activation logs).
- The name of the logging company and log analyst(s) responsible for preparing or interpreting the results.
- Plots of results (e.g., for pressure fall-off tests, a plot of change in pressure as a function of time) and information on any data processing methods used.
- Details on instrumentation, including relevant information related to calibration or QA/QC.
- A description of any anomalous results, including records of any corrective action or other activities undertaken in response to the test results.
- A comparison of the current results to previous results and any implications for project plans, predictions, or operations.

The EPA encourages owners or operators to contact their permitting authority to discuss any questions related to submitting well test results. Note that any failure to maintain mechanical integrity must be reported within 24 hours, pursuant to 40 CFR 146.91(c); see Section 5.4.1 for more information on the associated submissions.

## 5.3 Project Plan Amendments and Other Periodic Reporting

In addition to the specific reporting requirements at 40 CFR 146.91, owners or operators must also submit information related to AoR reevaluations, project plan amendments, and financial responsibility during the injection phase. Like other planned reporting during the injection phase, the purpose of these submissions is to demonstrate compliance with permit and Class VI Rule requirements and to demonstrate that the project is operating in a way that is protective of USDWs.

While the Class VI Rule includes minimum timing requirements for these periodic reporting activities, the actual reporting schedule for an individual project (including criteria that would trigger

**Project Plan Amendments and Other Periodic Reporting Requirements**

- AoR reevaluations, including an amended AoR and Corrective Action Plan or a demonstration that no amendment is needed
  *40 CFR 146.84(e)(4)*
- Other amended project plans, or (if applicable) justifications that no amendments are needed
  *40 CFR 146.90(j), 146.93(a)(4), 146.94(d)*
- Financial responsibility cost estimate and instrument updates
  *40 CFR 146.85(a)(5)(ii), (c)(2), (c)(4), (d)(3), (e)*

unscheduled AoR reevaluations or plan reviews) will be specified in that project's permit and approved project plans. Depending on the item to be submitted, owners or operators will use the AoR and Corrective Action module, the Project Plan Submissions module, and/or the Financial Responsibility Demonstration module to make these submissions. The subsections below provide recommendations for each action.

### 5.3.1 AoR Reevaluations and Corrective Action

Owners or operators of Class VI injection wells are required to reevaluate the AoR delineation at a fixed frequency not to exceed five years, as specified in the AoR and Corrective Action Plan, or when warranted by monitoring and operational conditions [40 CFR 146.84(e)]. The purpose of the reevaluation is to ensure that the AoR delineation continues to represent the area where USDWs may be endangered by the injection activities, as required by 40 CFR 146.84(a).

Procedures and processes associated with AoR reevaluations are described in Section 4 of the *UIC Program Class VI Well Area of Review Evaluation and Corrective Action Guidance*. In general, the EPA anticipates that owners or operators will compare testing and monitoring results and other newly acquired project data to the modeled predictions generated during AoR delineation. Depending on the project and the approach that the owner or operator chooses to take, this may or may not involve additional computational modeling. Regardless of the approach used, the owner or operator will ultimately need to submit one of two items:

1. A technical demonstration, supported by project data, that the existing AoR delineation (and the AoR and Corrective Action Plan) remains appropriate; or
2. An amended AoR and Corrective Action Plan with a modified AoR delineation based on computational modeling (and, potentially, an updated corrective action strategy).

**AoR Reevaluation and Corrective Action Submissions**

Class VI Rule requirements:
- 40 CFR 146.84(e)

Relevant GSDT modules:
- AoR and Corrective Action module

Reference documents:
- *UIC Program Class VI Well Area of Review Evaluation and Corrective Action Guidance*
- *UIC Program Class VI Well Project Plan Development Guidance*

Electronic resources:
- AoR and Corrective Action Plan template
- GSDT user guides

Owners or operators can submit all reevaluation information using the AoR and Corrective Action module of the GSDT. For a demonstration that the existing AoR remains appropriate, the EPA recommends that owners or operators submit a narrative PDF document that compares all available, relevant project data (e.g., from site characterization, operations, and testing and monitoring) to the computational predictions and/or the inputs that supported the existing AoR delineation. The EPA recommends that data presentation formats such as maps, diagrams, and charts/graphs be incorporated into the narrative; the actual data supporting this synthesis can be submitted separately as a supplement to the narrative PDF. Owners or operators are also encouraged to cross-reference semi-annual reports or other testing and monitoring submissions. If any computational modeling was conducted to support the demonstration, the owner or

operator may also need to update some of the other tabs in the module to reflect the changes to the associated parameters, results, etc. When considered together, this submission will serve as the demonstration that no plan amendment is needed, pursuant to 40 CFR 146.84(e)(4).

If the owner or operator is submitting an amended AoR and Corrective Action Plan as a result of the reevaluation, the EPA expects that an analysis of the reevaluation and its outcome (similar to that described above) will also be submitted. The owner or operator should use the AoR and Corrective Action module to submit a description of inconsistencies found during the reevaluation and all necessary changes to the modeling data (e.g., associated with the calibration of the model) used for the delineation of the new AoR. The amended AoR and Corrective Action Plan should benchmark any changes to the AoR delineation process and provide an updated corrective action strategy (or a demonstration that one is not needed). Note that, if the permitting authority made any changes to the submitted plan before incorporating it into the permit, the existing file in the module may not be exactly the same as the approved plan. When amending the plan, the EPA recommends that owners or operators ensure that they are using the current, approved plan as a starting point.

Because of the flexibility that the Class VI Rule allows for AoR reevaluations and associated reporting, the EPA encourages owners or operators to contact their permitting authority prior to submitting their first AoR reevaluation documentation to discuss any questions related to the reevaluation approach or what information should be submitted.

If a revised AoR has been delineated, owners or operators must also identify all wells in the reevaluated AoR that require corrective action [40 CFR 146.84(e)(2)]. For any newly identified wells (i.e., wells that were not within the previously delineated AoR), the owner or operator must submit a description of each well's type, construction, date drilled, location, depth, and record of plugging and/or completion, as well as any additional information required by the UIC Program Director [40 CFR 146.84(c)(2)] and, if necessary, perform corrective action on these wells [40 CFR 146.84(e)(3)]. The EPA recommends that owners or operators communicate with their permitting authorities before conducting corrective action on wells that were not previously identified in the AoR and Corrective Action Plan. As described above, the AoR and Corrective Action module is designed to facilitate submission of all corrective action materials, including any documentation of corrective action that has been performed, such as plugging reports, records of any remedial cementing, etc.

The AoR and Corrective Action module can also be used to submit documentation of corrective action conducted on a phased schedule during the injection phase (i.e., pre-scheduled corrective action that is not associated with an AoR reevaluation), if such activities are included in the approved AoR and Corrective Action Plan. For these phased corrective action submissions, owners or operators may update just the corrective action section of the reporting module; no modeling or project plan submissions are necessary.

### 5.3.2 Other Project Plan Amendments

Owners or operators must periodically review their Testing and Monitoring Plan and Emergency and Remedial Response Plan, and either make amendments or demonstrate that no amendments are needed [40 CFR 146.90(j) and 146. 94(d)]. These reviews will occur after AoR reevaluations

and/or significant changes to the facility; like AoR reevaluations, the actual reporting schedule for an individual project (including criteria that would trigger unscheduled plan reviews) will be specified in that project's permit and approved project plans. The Class VI Rule does not require formal periodic reviews and amendments of the Injection Well Plugging Plan or the PISC and Site Closure Plan during the injection phase; however, 40 CFR 146.93(a)(4) states that owners or operators may submit a modified PISC and Site Closure Plan at any time during the life of the project.

Depending on the results of the most recent AoR reevaluation (see Section 5.3.1), the extent of any recent changes to the project, and other factors, owners or operators may submit either an amended project plan or a demonstration that no amendment is needed. More information on completing and documenting project plan amendments can be found in the *UIC Program Class VI Well Testing and Monitoring Guidance*, the *UIC Program Class VI Well Plugging, Post-Injection Site Care, and Site Closure Guidance*, and the *UIC Program Class VI Well Project Plan Development Guidance*.

**Other Project Plan Submissions**

Class VI Rule requirements:
- 40 CFR 146.90(j)
- 40 CFR 146.93(a)(4)
- 40 CFR 146.94(d)

Relevant GSDT modules:
- Project Plan Submissions module

Reference documents:
- *UIC Program Class VI Well Testing and Monitoring Guidance*
- *UIC Program Class VI Well Plugging, Post-Injection Site Care, and Site Closure Guidance*
- *UIC Program Class VI Well Project Plan Development Guidance*

Electronic resources:
- Project plan templates
- GSDT user guides

Both the amended project plans and the justifications that no plan amendments are needed can be submitted using the Project Plan Submissions module. If owners or operators determine that no plan amendment is necessary, the EPA recommends that, to meet the requirements for this demonstration, owners or operators submit a narrative document describing the approach used to evaluate the plan (which should be consistent with the approach outlined in the existing approved plan) and the outcome of this evaluation. Owners or operators should support this discussion with project data presented in the form of maps, graphs/charts, tables, diagrams, or other formats as appropriate. The EPA recommends that the demonstration document be provided as a single PDF; supplemental items that are not compatible with this format, like GIS files, can be uploaded separately in the field designated for appendices and supporting materials.

The EPA expects that amended project plans will have a similar content and format as the original approved plans: PDF files developed using the templates provided in the Project Plan Submissions module, with any materials that cannot or are not intended to be incorporated into the plan uploaded separately. Owners or operators can use the same procedures to submit amended plans as in previous project phases (see Section 4.5). Note that, if the permitting authority made any changes to a plan before incorporating it into the permit, the existing file in the Project Plan Submissions module may not be exactly the same as the approved plan. When amending a project plan, the EPA recommends that owners or operators ensure that they are using the current, approved plan as a starting point.

### 5.3.3 Financial Responsibility Updates

The Class VI Rule requires that owners or operators update their financial responsibility cost estimates on an annual basis to adjust for inflation [40 CFR 146.85(c)(2)]. The cost estimate must also be updated if the AoR and Corrective Action Plan, the Injection Well Plugging Plan, the PISC and Site Closure Plan, or the Emergency and Remedial Response Plan are amended [40 CFR 146.85(c)(2)], or if the UIC Program Director determines during the annual adjustment that the estimate is no longer adequate [40 CFR 146.85(e)]. In addition, the Class VI Rule requires that the financial responsibility instruments be updated (or additional instruments secured) if the cost estimate increases to an amount greater than the face amount of the financial instrument(s) currently in use [40 CFR 146.85(c)(4)].

**Financial Responsibility Submissions**

Class VI Rule requirements:
- 40 CFR 146.85(a)(5)(ii), (c)(2) and (4), and (e)

Relevant GSDT modules:
- Financial Responsibility Demonstration module

Reference documents:
- *UIC Program Class VI Financial Responsibility Guidance*

Electronic resources:
- Online materials at http://www.epa.gov/uic/financial-responsibilities-underground-injection-well-owners-or-operators
- GSDT user guides

Recommendations for generating these materials (including developing cost estimates) is provided in the *UIC Program Class VI Financial Responsibility Guidance*. The EPA anticipates that the content and format of the updated documentation will be similar to that of the items submitted during the permit application process or the previous financial responsibility update (see Sections 3.1.3 and 4.6).

Both cost estimate and financial instrument updates can be submitted using the GSDT's Financial Responsibility Demonstration module, using the tabs associated with the applicable activity or instrument. When preparing these submissions, the EPA recommends that owners or operators delete any obsolete information from the module (including both directly entered data and uploaded files) and replace it with an up-to-date version. The EPA encourages owners or operators to contact their permitting authority to discuss the timing of cost estimate or financial instrument updates or any other questions related to submitting financial responsibility information.

## 5.4 Emergency and Remedial Response and Other Occasional Reporting

In certain situations, owners or operators must submit notifications and other documentation associated with unexpected events. The Class VI Rule includes specific requirements for reporting associated with emergency and remedial response, as well as for adverse financial conditions (such as bankruptcy) experienced by either the owner or operator or a third-party provider of a financial responsibility instrument. While the EPA

**Emergency and Remedial Response and Other Occasional Reporting Requirements**

- Emergency notifications and follow-up submissions
  *40 CFR 146.88(f)(3)-(5), 146.91(c) and (e), 146.94(b)-(c)*
- Notifications of adverse financial conditions
  *40 CFR 146.85(d)*

anticipates that emergency situations will likely require direct (non-GSDT) communication between the owner or operator and the permitting authority, all notifications, reports, and other required submissions must still be submitted electronically in compliance with 40 CFR 146.91(e).

The GSDT's Injection and Post-Injection Phase Reporting module and Financial Responsibility Demonstration modules facilitate the submission of emergency and remedial response materials and notifications of adverse financial conditions, respectively. The subsections below provide recommendations specific to both of these types of submissions. The Injection and Post-Injection Phase Reporting module can also be used to submit other types of materials that may be required by a Class VI permit and are not otherwise accommodated by the GSDT. Owners or operators can use the Other Submissions tab of the module for this purpose and enter a brief description of the item they are submitting in the designated text-entry field.

### 5.4.1 Emergency and Remedial Response

The Class VI Rule lists several situations or events that require owners or operators to submit emergency notifications. Specifically, the owner or operator must report any of the following within 24 hours:

- Any evidence that the injected carbon dioxide stream or associated pressure front may cause endangerment of a USDW [40 CFR 146.91(c)(1), 146.94(b)(3)].
- Any noncompliance with permit conditions or equipment malfunctions that may cause fluid movement into a USDW [40 CFR 146.91(c)(2)].
- Any triggering of the automatic shut-off system [40 CFR 146.88(f)(3), 146.91(c)(3)].
- Any failure to maintain mechanical integrity [40 CFR 146.91(c)(4)].
- Any release of carbon dioxide to the atmosphere or biosphere, for projects with surface air and/or soil gas monitoring [40 CFR 146.91(c)(5)].

**Emergency and Remedial Response Submissions**

Class VI Rule requirements:
- 40 CFR 146.88(f)(3)-(5), 146.91(c) and (e), 146.94(b)-(c)

Relevant GSDT modules:
- Injection and Post-Injection Phase Reporting module

Reference documents:
- *UIC Program Class VI Project Plan Development Guidance*

Electronic resources:
- GSDT user guides

The EPA anticipates that the initial emergency notification will likely take the form of a phone call or other immediate mode outlined in the Emergency and Remedial Response Plan. However, the formal notification must still be submitted electronically in compliance with 40 CFR 146.91(e). In addition, after an emergency event has occurred, an owner or operator may need to submit follow-up information, such as a demonstration that USDWs will not be endangered by resuming injection [40 CFR 146.94(c)], a demonstration that mechanical integrity has been restored [40 CFR 146.88(f)(4)], or documentation that remedial actions or other procedures have been carried out according to the Emergency and Remedial Response Plan or as requested by the UIC Program Director. Any project-

specific requirements associated with these notifications and follow-up submissions will be established in the project's approved Emergency and Remedial Response Plan. See the *UIC Program Class VI Well Project Plan Development Guidance* for further information.

Both notifications and follow-up submissions can be submitted using the Emergency and Remedial Response tab of the Injection and Post-Injection Phase Reporting module. The EPA recommends that notifications consist of a PDF letter containing the date/time/location of the event and a brief description of what occurred. Follow-up documentation may take various formats, such as narrative descriptions of remedial activities, results of MITs, monitoring data, or additional notifications (e.g., notifications that injection will resume, per 40 CFR 146.88(f)(5)). Because of the wide variety of potential follow-up submissions, the EPA recommends that owners or operators review their Emergency and Remedial Response Plan and consult with their permitting authority to determine the appropriate materials to submit.

### 5.4.2 Notifications of Adverse Financial Conditions

The Class VI Rule requires owners or operators to notify their UIC Program Director of any adverse financial conditions that may affect their ability to cover the costs of any of the required activities guaranteed by the financial responsibility instruments [40 CFR 146.85(d)]. These events could include bankruptcy or other adverse financial conditions experienced by the owner or operator, a third-party provider of a financial instrument, or a corporate guarantor.

**Adverse Financial Conditions Submissions**

Class VI Rule requirements:
- 40 CFR 146.85(d) and 146.91(e)

Relevant GSDT modules:
- Financial Responsibility Demonstration module

Reference documents:
- *UIC Program Class VI Financial Responsibility Guidance*

Electronic resources:
- GSDT user guides

The EPA anticipates that specific conditions associated with these notifications will be stated in the financial instruments themselves. The *UIC Program Class VI Financial Responsibility Guidance* provides further information on this. Unless otherwise specified in the permit or financial instruments, the EPA recommends that the notification consist of a PDF letter describing the situation and the owner or operator's plans to establish other means of financial assurance.

Note that, in the case of bankruptcy proceedings, the Class VI Rule requires that a notification be sent by certified mail within 10 days of commencement of the proceedings [40 CFR 146.85(d)(1)]. The EPA recommends that owners or operators submit the notification first using the GSDT and follow it with the certified mail letter. Submitting the notification via the GSDT allows owners or operators to rapidly alert their permitting authority, as well as to comply with the Class VI Rule's electronic reporting requirement under 40 CFR 146.91(e).

# 6 Post-Injection Phase Reporting and Recordkeeping

Following cessation of injection, a Class VI project enters the post-injection phase. During this phase, owners or operators will plug the injection well, perform PISC testing and monitoring, demonstrate that the site no longer poses an endangerment to USDWs, and close the site, pursuant to 40 CFR 146.92 and 146.93. These activities (and their associated reporting requirements) are intended to demonstrate that the site is managed and monitored properly following the cessation of injection, to maintain protection of USDWs through the end of the project's lifespan. Because injection wells may be converted to monitoring wells after injection has ceased, injection well plugging is not required to take place at the beginning of the post-injection phase. However, pursuant to 40 CFR 146.93(f)(1), the site closure report must include documentation of appropriate injection well and monitoring well plugging as specified in 40 CFR 146.92 and 146.93(e), regardless of when the injection well plugging took place.

Information that owners or operators will submit during this phase of a Class VI project is summarized below in Table 6-1. The Class VI Rule, at 40 CFR 146.91(f)(4), states that well plugging reports, PISC data (including information used to develop the alternative PISC timeframe), and site closure reports must be retained for 10 years following site closure. Pursuant to 40 CFR 146.93(h), the owner or operator must deliver the records to the UIC Program Director at the conclusion of this retention period. Owners or operators should discuss plans for this transfer with their permitting authority. Note that the Class VI Rule, at 40 CFR 146.91(f)(5), also grants the UIC Program Director the authority to require owners or operators to retain records from any project phase for more than 10 years after site closure.

**Table 6-1. Summary of submittals to be made during the post-injection phase.**

| Reporting Requirement | Relevant GSDT Modules | Recommended Format | Timing and Frequency |
|---|---|---|---|
| Injection Well Plugging Plan amendments, if necessary [40 CFR 146.92(c)] | Project Plan Submissions module | A single uploaded PDF, with supporting data and other supplemental materials uploaded separately as necessary | Upon cessation of injection |
| Notice of intent to plug the injection well [40 CFR 145.92(c)] | Injection and Post-Injection Phase Reporting module | Uploaded PDF letter | At least 60 days before scheduled well plugging |
| Well plugging report [40 CFR 146.92(d)] | Injection and Post-Injection Phase Reporting module | A single uploaded PDF, with supporting data and other supplemental materials uploaded separately as necessary | Within 60 days of well plugging |
| PISC and Site Closure Plan Amendments or justification that no amendment is needed [40 CFR 146.93(a)(3)] | Project Plan Submissions module | A single uploaded PDF, with supporting data and other supplemental materials uploaded separately as necessary | Upon cessation of injection |

| Reporting Requirement | Relevant GSDT Modules | Recommended Format | Timing and Frequency |
|---|---|---|---|
| PISC monitoring results [40 CFR 146.93(b)] | Injection and Post-Injection Phase Reporting module | A single uploaded PDF containing the narrative component of each report, with supporting data and other supplemental materials uploaded separately as necessary | As specified in the approved PISC and Site Closure Plan |
| Non-endangerment demonstration [40 CFR 146.93(b)(3)] | Non-Endangerment Demonstration module | Uploaded files in PDF and other formats and references to previously submitted materials | At end of 50 years or the approved alternative PISC timeframe, or based on site-specific data |
| Notice of intent for site closure [40 CFR 146.93(d)] | Injection and Post-Injection Phase Reporting module | Uploaded PDF letter | At least 120 days before site closure |
| Notice of intent to plug monitoring wells [N/A*] | Injection and Post-Injection Phase Reporting module | Uploaded PDF letter | N/A |
| Site closure report [40 CFR 146.93(f)] | Injection and Post-Injection Phase Reporting module | A single uploaded PDF, with supporting data and other supplemental materials uploaded separately as necessary | Within 90 days of site closure |

*This item is not specifically required by the Class VI Rule; however, the EPA recommends that owners or operators provide notification before plugging monitoring wells. The requirement to plug monitoring wells appears in the Class VI Rule at 40 CFR 146.93(e).

In addition to the reporting requirements that are specific to the post-injection phase, some injection phase reporting requirements continue to apply after injection has ceased. (Other injection phase reporting requirements, such as those associated with operational monitoring, do not.) To avoid redundancy, the injection phase reporting activities that continue through the post-injection phase activities are not discussed in the subsections below; refer to Section 5 for recommendations on submitting the associated materials. Injection phase reporting requirements that continue to apply through the post-injection phase are as follows:

- AoR reevaluations and corrective action updates, including amendments to the AoR and Corrective Action Plan, if necessary (see Section 5.3.1).
- Other project plan reviews and amendments (see Section 5.3.2). While the Testing and Monitoring Plan will no longer be in effect after the cessation of injection, the Emergency and Remedial Response Plan may need to be amended following AoR reevaluations or other project-specific criteria. Note that there are also post-injection phase requirements related to the Injection Well Plugging Plan and the PISC and Site Closure Plan, which are discussed in Sections 6.1.1, 6.2.1, and 6.3.1 below.

- Financial responsibility cost estimate and financial instrument updates (see Section 5.3.3). Note that, pursuant to 40 CFR 146.85(b)(2), an owner or operator may be released from a financial instrument by the UIC Program Director if the associated project phase has been completed and the owner or operator has fulfilled all necessary financial obligations.
- Emergency and remedial response reporting, if necessary (see Section 5.4.1).
- Notifications of adverse financial conditions, if necessary (see Section 5.4.2).

The post-injection phase reporting schedule for each of these items will likely vary among projects and will be specified in each project's permit conditions and/or the applicable approved project plans. The EPA encourages owners or operators to contact their permitting authorities to discuss any questions or concerns related to post-injection phase reporting of these activities.

## 6.1 Injection Well Plugging

Requirements for injection well plugging are provided in the Class VI Rule at 40 CFR 146.92. Before plugging the injection well, owners or operators must notify the UIC Program Director and (if necessary) submit an amended Injection Well Plugging Plan [40 CFR 146.92(c)]. After the plugging activities are complete, the owner or operator must submit an injection well plugging report [40 CFR 146.92(d)]. The Injection and Post Injection Phase Reporting module and the Project Plan Submissions module of the GSDT were designed to facilitate submission of these items.

**Injection Well Plugging Requirements**

- Notice of intent to plug
  *40 CFR 146.92(c)*
- Amended Injection Well Plugging Plan, if necessary
  *40 CFR 146.92(c)*
- Well plugging report
  *40 CFR 146.92(d)*

As noted above, injection wells may be converted to monitoring wells after injection has ceased, so injection well plugging is not required to take place at the beginning of the post-injection phase. The only timing requirement specified in the Class VI Rule is that plugging take place before site closure, so that the necessary plugging records can be incorporated into the site closure report per 40 CFR 146.93(f)(1). The EPA recommends that owners or operators notify their permitting authorities before and after converting the injection well to a monitoring well, including a general description of what activities (e.g., removal of well equipment) will take place/have taken place.

### 6.1.1 Pre-Plugging Submissions

The owner or operator must notify the UIC Program Director at least 60 days before plugging the injection well (though a shorter notice period may be allowed by the Director), pursuant to 40 CFR 146.92(c). As noted above, the Class VI Rule allows injection well plugging to occur at any time during the post-injection phase. However, if injection well plugging does take place at the beginning of the post-injection phase, it may be necessary to submit the notice of intent to plug *before* injection ends, in order to meet the 60-day requirement. In addition, if any changes have been made to the original, approved Injection Well Plugging Plan, the owner or operator must also provide the amended plan at this time. More details about the injection well plugging

requirements can be found in the *UIC Program Class VI Well Plugging, Post-Injection Site Care, and Site Closure Guidance*, and recommendations related to the Injection Well Plugging Plan are provided in the *UIC Program Class VI Well Project Plan Development Guidance*.

The notice of intent to plug can be submitted using the Injection and Post-Injection Phase module of the GSDT, on the Other Submissions tab. The EPA recommends that owners or operators upload a PDF letter stating the time and date of the planned activity and providing a brief description of what will be done. A template to guide the development of this letter is available for download from the GSDT. The EPA does not anticipate that owners or operators will need to submit any supplemental materials to accompany this notification letter, but the Injection and Post-Injection Phase Reporting module provides the option to do so.

**Pre-Plugging Submissions**

Class VI Rule requirements:
- 40 CFR 146.92(c)

Relevant GSDT modules:
- Injection and Post-Injection Reporting Phase module
- Project Plan Submissions module

Reference documents:
- *UIC Program Class VI Well Plugging, Post-Injection Site Care, and Site Closure Guidance*
- *UIC Program Class VI Well Project Plan Development Guidance*

Electronic resources:
- Injection Well Plugging Plan template
- Notice of intent to plug template
- GSDT user guides

Owners or operators can use the Project Plan Submissions module to submit the amended Injection Well Plugging Plan, if necessary. The EPA expects that the plan will have a similar content and format as the original approved plan: a PDF file developed using the template provided in the Project Plan Submissions module, with any materials that cannot or are not intended to be incorporated into the plan itself uploaded separately. Owners or operators can use the same procedures to submit amended plans as in previous project phases (see Section 4.5). Note that, if the permitting authority made any changes to the plan before incorporating it into the permit, the existing file in the Project Plan Submissions module may not be exactly the same as the approved plan. When revising the plan file, the EPA recommends that owners or operators ensure that they are using the current, approved plan as a starting point.

The Class VI Rule does not require that owners or operators submit a justification that no amendment to the Injection Well Plugging Plan is needed. However, the EPA recommends that owners or operators submit a statement to this effect in the Project Plan Submissions module (e.g., in the form of a brief letter in PDF), so that the GSDT contains a full record of documentation for the project. The EPA recommends that owners or operators contact their permitting authority if there is uncertainty about whether an amended plan is needed.

In addition to the notice of intent to plug and the amended Injection Well Plugging Plan, owners or operators may also need to conduct reporting related to the preparatory activities specified at 40 CFR 146.92(a). For example, the external MIT required before plugging the injection well is subject to the notification and reporting requirements under 40 CFR 146.91(b) and (d). See Section 5.2 for more information on these reporting requirements.

### 6.1.2 Well Plugging Report

Following plugging of the injection well, owners or operators must submit a report detailing how the well was plugged, pursuant to 40 CFR 146.92(d). The Class VI Rule specifies that this report must be certified as accurate by the owner or operator and by the person who performed the plugging operation (if other than the owner or operator). The plugging report serves to demonstrate that plugging was carried out in compliance with the Class VI Rule and the approved Injection Well Plugging Plan, so that the well does not pose an endangerment to USDWs.

**Well Plugging Report Submissions**

Class VI Rule requirements:
- 40 CFR 146.92(d)

Relevant GSDT modules:
- Injection and Post-Injection Reporting Phase module

Reference documents:
- *UIC Program Class VI Well Plugging, Post-Injection Site Care, and Site Closure Guidance*

Electronic resources:
- Well plugging report template
- GSDT user guides

The Class VI Rule does not specify the contents of the plugging report, but recommendations are provided in the *UIC Program Class VI Well Plugging, Post-Injection Site Care, and Site Closure Guidance*, and a template is available for download from the GSDT. In general, the EPA recommends that the well plugging report include a description of both the pre-plugging activities conducted pursuant to 40 CFR 146.92(a), including the results of the final external MIT, and the procedures/outcomes of the actual plugging operation (including any schematic/drawings). The EPA recommends that the well plugging report be compiled into a single PDF and uploaded to the Other Submissions tab of the Injection and Post-Injection Phase Reporting module. Supplemental materials not compatible with this format can be uploaded separately in the designated field.

## 6.2 PISC Reporting

The Class VI Rule, at 40 CFR 146.93(a)-(b), provides a set of requirements for PISC activities. Upon cessation of injection, the owner or operator must submit an amended PISC and Site Closure Plan or a demonstration that no amendment is needed [40 CFR 146.93(a)(3)]. During the post-injection phase, owners or operators must conduct monitoring and submit the results as specified in the approved PISC and Site Closure Plan, until they can demonstrate that no additional monitoring is needed to ensure that the project does not pose an endangerment to USDWs [40 CFR 146.93(b)]. In the GSDT, owners or operators can use designated sections of the Project Plan Submissions module, the Injection and Post-Injection Phase Reporting module, and the Non-Endangerment Demonstration module to submit the required materials.

**PISC Reporting Requirements**

- Amended PISC and Site Closure Plan, if necessary
  *40 CFR 146.93(a)(3)*
- PISC testing and monitoring results
  *40 CFR 146.93(a)(2)(iv), (b)*
- Non-endangerment demonstration
  *40 CFR 146.93(b)(3)*

### 6.2.1 PISC and Site Closure Plan

Upon cessation of injection, the Class VI Rule requires that owners or operators either submit an amended PISC and Site Closure Plan or demonstrate to the UIC Program Director through monitoring data and modeling results that no amendment to the plan is needed [40 CFR 146.93(a)(3)]. More information on completing and documenting this plan amendment can be found in the *UIC Program Class VI Well Plugging, Post-Injection Site Care, and Site Closure Guidance* and the *UIC Program Class VI Well Project Plan Development Guidance.*

Both the amended project plan and the justification that no plan amendment is needed (whichever is appropriate for the individual project) can be submitted using the Project Plan Submissions module. If owners or operators determine that no plan amendment is necessary, the EPA recommends that they submit a narrative document describing the approach used to evaluate the plan and the outcome of this evaluation. The EPA recommends that the narrative address all of the elements in the approved plan and be based on both monitoring data related to ground water quality and plume and pressure front tracking collected during injection and recent revisions of the site computational model, to ensure compliance with 40 CFR 146.93(a)(3). Owners or operators should support this discussion with project data presented in the form of maps, graphs/charts, tables, diagrams, or other formats as appropriate. If an owner or operator proposes an alternative PISC timeframe as part of the Post-Injection Site Care Plan amendment, the EPA recommends that they thoroughly justify the alternative timeframe using the criteria at 40 CFR 146.93(c). The EPA recommends that the demonstration document be provided as a single PDF; supplemental items that are not compatible with this format, like GIS files, can be uploaded separately in the field designated for appendices and supporting materials.

The EPA anticipates that the amended PISC and Site Closure Plan, if one is needed, will have a similar content and format as the existing approved plan (e.g., a PDF file developed using the template provided in the Project Plan Submissions module, with any supplemental materials uploaded separately in the designated field). The EPA recommends that owners or operators discuss the need for plan amendments with their permitting authority, keeping in mind the need to collect a sufficient amount of data to inform the non-endangerment demonstration and the UIC Program Director's assessment that site closure is appropriate (see Sections 6.2.3 and 6.3).

### 6.2.2 PISC Monitoring Results

During the post-injection period, the owner or operator must implement the approved PISC and Site Closure Plan and report the results of PISC monitoring as specified in the plan. Post-injection monitoring must be performed for the duration of the PISC timeframe (either the default 50-year period or an approved alternative timeframe) or until the owner or operator can demonstrate non-endangerment to USDWs [40 CFR 146.93(b)(1)].

Similar to monitoring results submitted during the injection phase, post-injection monitoring submissions serve to demonstrate that the project is in compliance with the Class VI permit, to identify any endangerment of USDWs, and to generate data to support AoR reevaluations and the demonstration of non-endangerment.

The Class VI Rule does not specify the content, format, or timing of PISC monitoring submissions; the EPA expects that these will be determined on a project-specific basis in each project's PISC and Site Closure Plan. However, in general, the EPA anticipates that these submissions will have a similar format to the semi-annual reports of testing and monitoring results submitted during the injection phase: a PDF document containing a compilation of monitoring results (e.g., of MITs, ground water analysis, and plume and pressure front tracking) and associated interpretation, accompanied by attachments or other supplemental materials as necessary. The GSDT provides a template that owners or operators can download and use to guide the development of this document.

**PISC Monitoring Results Submissions**

Class VI Rule requirements:
- 40 CFR 146.93(a)(2)(iv), (b)

Relevant GSDT modules:
- Injection and Post-Injection Phase Reporting module

Reference documents:
- *UIC Program Class VI Well Plugging, Post-Injection Site Care, and Site Closure Guidance*
- *UIC Program Class VI Well Testing and Monitoring Guidance*

Electronic resources:
- PISC monitoring report template
- GSDT user guides

Owners or operators can use the Other Submissions tab of the Injection and Post-Injection Phase Reporting module to submit their PISC monitoring results. The *UIC Program Class VI Well Plugging, Post-Injection Site Care, and Site Closure Guidance* and the *UIC Program Class VI Well Testing and Monitoring Guidance* provide recommendations for conducting PISC monitoring activities and submitting the results.

### 6.2.3 Non-Endangerment Demonstration

Prior to receiving authorization for site closure, the owner or operator must submit a demonstration, based on monitoring results and other site-specific information, that no additional monitoring is needed to ensure that the Class VI project does not pose an endangerment to USDWs [40 CFR 146.93(b)(3)]. Pursuant to 40 CFR 146.93(b)(2), owners or operators may submit this non-endangerment demonstration at any time during the post-injection phase, even before the end of the designated PISC timeframe. This means that, if non-endangerment is demonstrated to the satisfaction of the UIC Program Director, an owner or operator could potentially receive authorization for site closure before the end of the PISC timeframe.

**Non-Endangerment Demonstration Submissions**

Class VI Rule requirements:
- 40 CFR 146.93(b)(3)

Relevant GSDT modules:
- Non-Endangerment Demonstration module

Reference documents:
- *UIC Program Class VI Well Plugging, Post-Injection Site Care, and Site Closure Guidance*

Electronic resources:
- Non-endangerment demonstration template
- GSDT user guides

The data supporting the non-endangerment demonstration will be generated throughout the life of the Class VI project, during injection- and post-injection-phase monitoring and modeling. While the content of the demonstration will necessarily be site specific, the EPA recommends that it address ground water monitoring data, information on the

behavior of the carbon dioxide plume and pressure front, and the monitoring results' agreement with any AoR modeling predictions that are being used to support the demonstration, as well as an evaluation of potential conduits for fluid movement. The *UIC Program Class VI Well Plugging, Post-Injection Site Care, and Site Closure Guidance* provides some additional recommendations for making the non-endangerment demonstration.

The GSDT includes a specific reporting module for non-endangerment demonstrations. The Non-Endangerment Demonstration module provides substantial flexibility to owners or operators, while helping ensure that all the necessary information is submitted. The EPA anticipates that the non-endangerment demonstration will be composed of one or more uploaded files, supplemented by references to previously submitted information (e.g., modeling results submitted using the AoR and Corrective Action module following the last AoR reevaluation). The module provides a template that owners or operators can download and use to guide the development of their submission.

The EPA recommends that owners or operators contact their permitting authorities to discuss any questions related to the non-endangerment demonstration submission, especially if the content of the demonstration is not specified in the approved PISC and Site Closure Plan.

## 6.3 Site Closure Reporting

Site closure is the final stage of a Class VI project, during which owners or operators submit a notice of intent to close the site, plug all monitoring wells, submit a site closure report, and record a notation on the deed to the facility property or other documents that the land has been used to sequester carbon dioxide [40 CFR 146.93(d)-(g)]. The purpose of site closure reporting is to demonstrate compliance with the Class VI Rule and the permit, to demonstrate that monitoring wells are plugged appropriately in a way that is protective of USDWs, and to ensure that future land owners are made aware of the injection history of the site.

**Site Closure Requirements**

- Notice of intent for site closure
  *40 CFR 146.93(d)*
- Amended PISC and Site Closure Plan, if necessary
  *40 CFR 146.93(d)*
- Site closure report
  *40 CFR 146.93(f)*

The Injection and Post-Injection Phase Reporting module of the GSDT is designed to facilitate the submission of site closure-related materials.

### 6.3.1 Pre-Site Closure Submissions

Owners or operators must notify the UIC Program Director of their intent to close a Class VI project site at least 120 days in advance of the intended site closure date, or on a schedule with a shorter notice period if allowed by the Director [40 CFR 146.93(d)]. At this time, if any changes have been made to the original PISC and Site Closure Plan, the owner or operator must also provide the amended plan. More details about the site closure process and templates for the submittals can be found in the *UIC Program Class VI Well Plugging, Post-Injection Site Care, and Site Closure Guidance*, and recommendations related to the PISC and Site Closure Plan are provided in the *UIC Program Class VI Well Project Plan Development Guidance*.

The notice of intent for site closure can be submitted using the Injection and Post-Injection Phase module of the GSDT, on the Other Submissions tab. The EPA recommends that owners or operators upload a PDF letter stating the date/time/location of the planned activities (e.g., monitoring well plugging, site restoration tasks) and providing a brief description of what will be done. The GSDT provides a template that owners or operators can download and use to guide the development of this letter. The EPA does not anticipate that owners or operators will need to submit any supplemental materials to accompany this notification letter, but the Injection and Post-Injection Phase Reporting module does provide the option to do so.

**Pre-Site Closure Submissions**

Class VI Rule requirements:
- 40 CFR 146.93(d)

Relevant GSDT modules:
- Injection and Post-Injection Reporting Phase module
- Project Plan Submissions module

Reference documents:
- *UIC Program Guidance on Class VI Well Plugging, Post-Injection Site Care, and Site Closure*
- *UIC Program Class VI Well Project Plan Development Guidance*

Electronic resources:
- PISC and Site Closure Plan template
- Notice of intent for site closure template
- GSDT user guides

Owners or operators can use the Project Plan Submissions module to submit the amended PISC and Site Closure Plan, if one is needed. The EPA expects that the plan will have a similar content and format as the existing, approved plan: a PDF file developed using the template provided in the Project Plan Submissions module, with any materials that cannot or are not intended to be incorporated into the plan itself uploaded separately. Owners or operators can use the same procedures to submit amended plans as in previous project phases (see Section 4.5). Note that, if the permitting authority made any changes to the plan before incorporating it into the permit, the existing file in the Project Plan Submissions module may not be exactly the same as the approved plan. When revising the plan file, the EPA recommends that owners or operators ensure that they are using the current, approved plan as a starting point.

The Class VI Rule does not require that owners or operators submit a justification that no plan amendment is needed prior to site closure. However, the EPA recommends that owners or operators submit a statement to this effect in the Project Plan Submissions module (e.g., in the form of a brief letter in PDF), so that the GSDT contains a full record of documentation for the project. The EPA recommends that owners or operators contact their permitting authority if there is uncertainty regarding whether an amended plan is needed.

The Class VI Rule, at 40 CFR 146.93(e) requires owners or operators to plug all monitoring wells after the UIC Program Director has authorized site closure. (If the injection well was repurposed for use as a monitoring well, it must be plugged in accordance with the Injection Well Plugging Plan, per 40 CFR 146.92(b); see Section 6.1.) While the Class VI Rule does not specifically require advance notification of monitoring well plugging, the EPA recommends that owners or operators notify the UIC Program Director before carrying out these activities (if the specifics are not included in the initial notification of intent for site closure). The EPA recommends that owners or operators use a letter similar to the one submitted in advance of

injection well plugging and upload it to the Other Submissions tab of the Injection and Post-Injection Phase Reporting module.

### 6.3.2 Site Closure Report

The Class VI Rule requires owners or operators to submit a report within 90 days of site closure [40 CFR 146.93(f)]. The Class VI Rule, at 40 CFR 146.93(f)(1)-(3) specifies that the site closure report must include documentation of appropriate injection and monitoring well plugging; a copy of a survey plat that has been submitted to the local zoning authority, showing the location of the injection well; documentation of appropriate notification to applicable state, local, and tribal entities; and records reflecting the nature, composition, and volume of the carbon dioxide stream. Recommendations for notifying the relevant authorities and preparing the site closure report are provided in the *UIC Program Class VI Well Plugging, Post-Injection Site Care, and Site Closure Guidance*.

**Site Closure Report Submissions**

Class VI Rule requirements:
- 40 CFR 146.93(f)

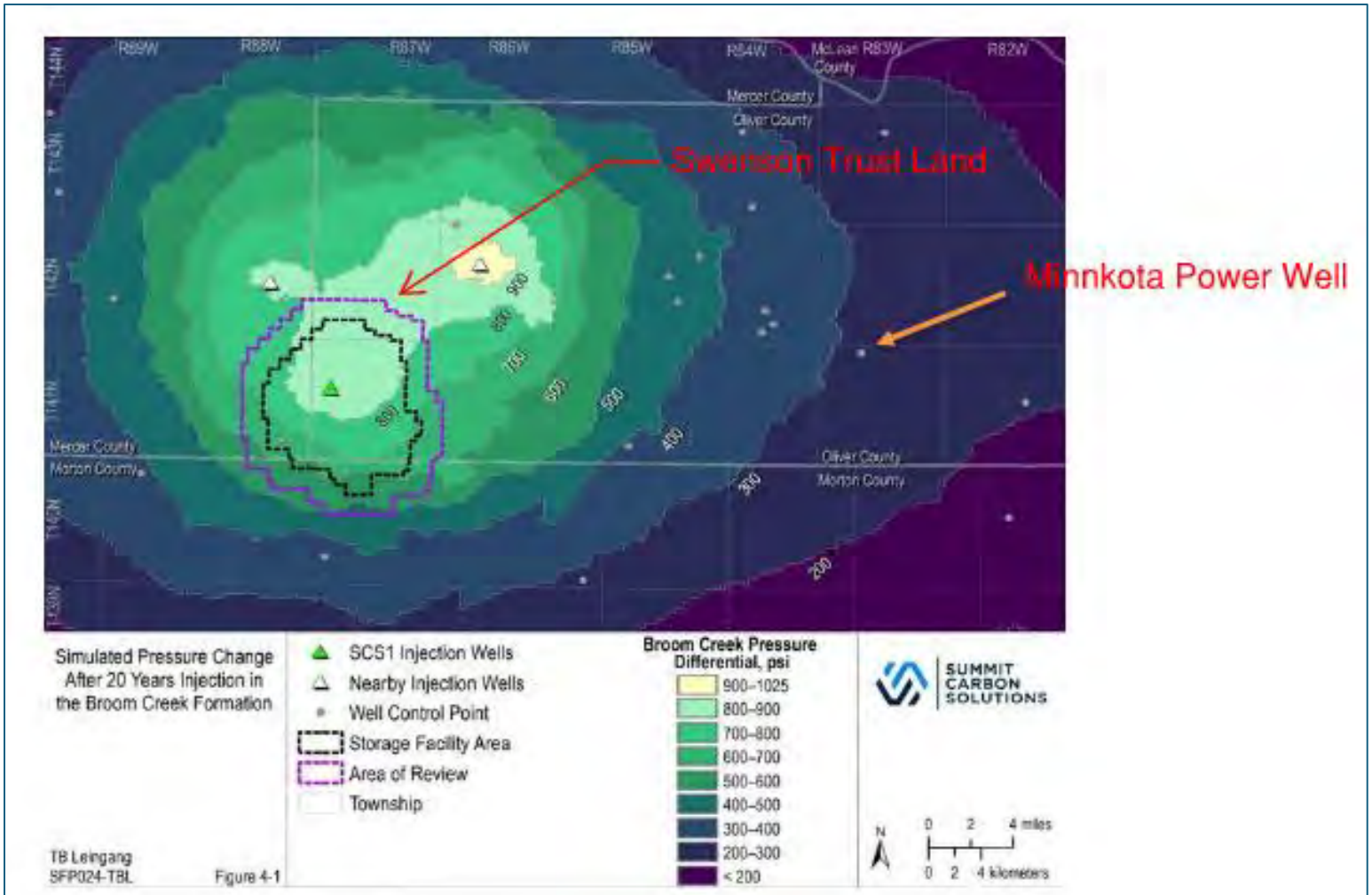
Relevant GSDT modules:
- Injection and Post-Injection Reporting Phase module

Reference documents:
- *UIC Program Class VI Well Plugging, Post-Injection Site Care, and Site Closure Guidance*

Electronic resources:
- Site closure report template
- GSDT user guides

The EPA recommends that the site closure report be submitted as a single PDF file. The GSDT provides a template that owners or operators can download and use to guide the development of this document. Supplemental materials that are not compatible with this format (e.g., GIS files) can be uploaded separately in the designated field in the reporting module.

The owner or operator must also record a notation on the deed to the facility property or any other document that is normally examined during a title search [40 CFR 146.93(g)]. Pursuant to 40 CFR 146.93(g)(1)-(3), the notation must state that the land has been used for GS; the name of the government agency with which the survey plat was filed and the address of the EPA regional office to which it was submitted; and the volume of carbon dioxide injected, the injection zone(s), and the period over which the injection occurred. While the Class VI Rule does not require any formal submissions associated with the deed notation, the EPA recommends that the owner or operator provide evidence of this notation to the EPA, for example by attaching copies of it to the site closure report or uploading the documents separately within the Injection and Post-Injection Reporting module.


Swenson Trust Land
Minnkota Power Well
R89W
R88W
R87W
R86W
R85W
R84W
R83W
R82W
T144N
T143N
T142N
T141N
T140N
T139N
Mercer County
Oliver County
Morton County
900
800
700
600
500
400
300
200
Simulated Pressure Change After 20 Years Injection in the Broom Creek Formation
SCS1 Injection Wells
Nearby Injection Wells
Well Control Point
Storage Facility Area
Area of Review
Township
Broom Creek Pressure Differential, psi
900–1025
800–900
700–800
600–700
500–600
400–500
300–400
200–300
< 200
SUMMIT CARBON SOLUTIONS
N
0 2 4 miles
0 2 4 kilometers
TB Leingang
SFP024-TBL
Figure 4-1

INDUSTRIAL COMMISSION
STATE OF NORTH DAKOTA
DATE 6/13/24 CASE NO. 30869-880
Introduced By Braaten
Exhibit LO-88
Identified By Swenson

Michael L. Haupt
5631 Apple Creek Drive
Bismarck ND, 58504

February 9, 2023

Ms. Jessica Petrick
Public Information Officer II
ND Oil and Gas Division
600 E Boulevard Ave Dept 405
Bismarck ND 58503

Dear Ms. Petrick:

Under the North Dakota Open Records Statute, N.D.C.C. §44-04-18 et seq., I am requesting an opportunity to inspect or obtain copies of public records, including spreadsheets, analysis, correspondence by letter, email or phone records that would be used to determine how "non-consenting pore space owners are or will be equitably compensated" for the Minnkota Power Project Tundra and Red Trail Energy carbon sequestration projects under 38-22-08.14.

Also, I request the information, be it from the same sources as mentioned above, that Mr. Lynn Helms used to formulate/support his statements on January 13th, 2023 to the joint Senate and House Energy and Natural Resource Committee members that landowners are receiving a "significant share of that 14% return on investment that's going to the landowners" and "it's in the neighborhood of 10 or 15% of that return on investment". How were these figures arrived at?

If there are any fees for searching or copying these records, please inform me if the cost will exceed $50. I would request a prompt response to this request. If you expect a significant delay in responding to or in fulfilling this request, please contact me with information about when I might expect copies or the ability to inspect the requested records.

If you deny any or all of this request, please cite each specific exemption you feel justifies the refusal to release the information and notify me of the appeal procedures available to me under the law.

Thank you for considering my request.

Sincerely,

Michael L. Haupt

701-426-7526

EXHIBIT
tabbies
LO-88
30869-30880

**Petrick, Jessica K.**

---

**From:** Petrick, Jessica K.
**Sent:** Friday, February 10, 2023 2:13 PM
**To:** -Grp-DMR All
**Subject:** Open Records Request - Haupt
**Attachments:** FOIRnonconsenting.pdf; Guide_Open-Records.pdf

Please see the below Open Records Request.

If there are questions, please let me know.

Requestor: Michael Haupt

Records Requested:
All records used to determine how "non-consenting pore space owners are or will be equitably compensated" for the Minnkota Power Project Tundra and Red Trail Energy Carbon Sequestration projects. See attached letter request.

*"Record" means recorded information of any kind, regardless of physical form or characteristic by which the information is stored. Record does not include unrecorded thought processes or mental impressions but does include preliminary drafts and working papers.*

Action Requested:

If less than one hour of time, please place documents here: **M:\Open Records-FOIA-AG Opinions\Haupt FOIA**
If MORE than one of time, please let me know an estimate by the end of Monday, February 13th.

Jessica Petrick
Public Information Officer II
**ND Department of Mineral Resources**
jkpetrick@nd.gov 701.328.8036 www.DMR.nd.gov

NORTH Dakota | Mineral Resources
Be Legendary.™

NORTH Dakota | Mineral Resources
Be Legendary.

TO: Mr. Michael Haupt

FROM: Jessica Petrick
Public Information Officer II
ND Department of Mineral Resources

Re: Your request for records

DATE 2/14/2023

**Records Request:**
See attached request.

- [x] The records you requested cannot be provided because no such records exist, OR the requested records are not records of this agency. All negotiations for compensation were private conversations with pore space owners.
- [ ] Attached are the records as defined by N.D.C.C. § 44-04-17.1(16) and pursuant to N.D.C.C. § 44-04-18(4).
- [ ] Some information is redacted because it is exempt and/or confidential pursuant to: _____
- [ ] To the extent the requested/other records may exist, the records are/would be confidential or exempt in entirety, under N.D.C.C. §§44-04-19.1(3),(7), 44-04-18.7; 44-04-18(10)
- [ ] The records you requested can be provided however the estimated cost for the requested records is calculated as follows:

_____ pages @ 25¢ per page $____
_____ custom queries resulting in _____ rows of data in Excel @ $1 per 1,000 rows $____
_____ custom queries resulting in _____ rows of data in Excel @ $50 per 1 GB of Data $____
_____ other copies @ $_____ each $____
_____ hours for locating the records @ $25/hr each [after the first hour] $____
_____ hours for redacting the records @ $25/hr each [after the first hour] $____
**Total Charges:** 0

Estimated costs are payable *in advance*. We do not waive estimated costs. When we receive payment, we will begin work on your request. The law allows a public entity to charge for electronic records pursuant to N.D.C.C. § 44-04-18(2).

- [ ] If we do not receive payment/hear from you within ten (10) days from today's date, we will assume you have withdrawn your request.
- [ ] Your request for records is extensive. We estimate it will take _____ business days to complete your request, *after* we receive full payment.
- [ ] Your request did not provide sufficient information for us to identify specific records. We cannot comply with your request without clarification. Please call me at (701) 328-8036.
- [x] Please note that all or some of the information you have requested is available through the Oil & Gas Division's Basic or Premium Subscription services. If you are currently a subscriber and have questions regarding using the services or the location of files, please contact our offices. If you are not a subscriber but would like more information, visit our website at www.dmr.nd.gov/oilgas

Bruce E. Hicks
ASSISTANT DIRECTOR
OIL AND GAS DIVISION

Lynn D. Helms
DIRECTOR
DEPT. OF MINERAL RESOURCES

Edward C. Murphy
STATE GEOLOGIST
GEOLOGICAL SURVEY

600 E Boulevard Ave – Dept 405 | Bismarck, ND 58505-0840 | PHONE: 701-328-8020 | FAX: 701-328-8022 | dmr.nd.gov

INDUSTRIAL COMMISSION
STATE OF NORTH DAKOTA
DATE 6/13/24 CASE NO 30869-880
Introduced By Braaten
Exhibit LO-89
Identified By Swenson.

**From:** Magrum, Jeffery
**To:** Kurt Swenson
**Subject:** Fwd: carbon dioxide information
**Date:** Monday, June 10, 2024 9:29:58 AM
**Attachments:** image001.png
CO2 Pipelines Factsheet.pdf
CO2 Pipeline Safety.pdf
Failure Investigation Report - Denbury Gulf Coast Pipeline.pdf

CAUTION: EXTERNAL

**From:** Helms, Lynn D. <lhelms@nd.gov>
**Sent:** Sunday, January 15, 2023 7:03:19 PM
**To:** Magrum, Jeffery <jmagrum@ndlegis.gov>
**Subject:** carbon dioxide information

Senator,

The carbon dioxide pipeline information documents are attached.

Also attached is the Mississippi pipeline break report. The Mississippi pipeline is the same size as the Summit Carbon pipeline so I think it would be better to use the volume leaked instead of the length of time of the leak like I did before. The Mississippi break leaked 31,405 barrels which is 5,587 tons.

Following is the link to the air dispersion model:
RMP*Comp | US EPA

To run the model you click on the link then click on begin.
Scroll down and click on carbon oxysulfide. (COS is the model input chemical with the physical and toxicity properties most similar to carbon dioxide).
Scenario type: worst case
Physical state: Liquefied under pressure
Quantity released: type in 5587 and select tons.
Click on submit
For this volume the distance to "safe" levels is 1 mile.

Lynn D. Helms, PhD
*Director*
701.328.8020 • lhelms@nd.gov • www.dmr.nd.gov

EXHIBIT
tabbies
LO-89
30869-30880

ND 58505

February 25, 2024

To: oilandgasinfo@nd.gov

To whom it may concern,

I am requesting an opportunity to inspect or obtain copies of public records, including spreadsheets, analysis, correspondence by letter, email or phone records that would support the NDIC statutory obligation (38-22-08.10), prior to issuing a permit, to find "That the storage facility will not endanger human health..." for the "Permit for carbon dioxide class VI injection" issued to Blue Flint Sequester Company, LLC, storage facility # 90000373, issued May 31, 2023"

Specifically, I am requesting all related records relating to a carbon dioxide release to atmosphere from the storage facility related equipment, including flow lines, compression and wellbore, including

- Means and methods of analysis
- Scenarios modeled, such as
    - Releases from pressure relief valves
    - Maximum release downstream of compression facilities due to flowline, pipe, flange or valve failure
    - Please include the weather assumptions for each scenario (temperature, humidity, wind speed, wind direction)
- Nam of software utilized to determine to determine the extent of the CO2 plume
- Name, employer, certifications and North Dakota professional engineering license # of the individual that performed the modeling
- CO2 concentration level delineation at which the commission has determined is safe for human health if there is a release
- Geographic topography assumed

If there are any fees for searching or copying these records, please inform me if the cost will exceed $50. I would request a prompt response to this request. If you expect a significant delay in responding to or in fulfilling this request, please contact me with information about when I might expect copies or the ability to inspect the requested records.

If you deny any or all of this request, please cite each specific exemption you feel justifies the refusal to release the information and notify me of the appeal procedures available to me under the law.

Thank you for considering my request.

Sincerely,

Michael J. Haupt

Michael Haupt
5631 Apple Creek Drive
Bismarck, ND 58504
701-426-7526

INDUSTRIAL COMMISSION
STATE OF NORTH DAKOTA
DATE 6/13/24 CASE NO 30869-880
Introduced By Braaten
Exhibit LO-90
Identified By Swenson

EXHIBIT
tabbies
LO-90
30869-30880

**From:** Mike Haupt
**To:** Kurt Swenson
**Subject:** Oil and gas responce
**Date:** Thursday, February 29, 2024 6:51:17 PM
**Attachments:** image001.png

CAUTION: EXTERNAL

Good Afternoon, Michael,

Dispersion models for specific release scenarios from the storage facility isn't information that is provided to our office.

The storage facility permit application within the case file (C29888) does include an Emergency and Remedial Response Plan (ERRP) which discusses the necessary actions that the storage operator will take during a potential emergency event including release of carbon dioxide from storage facility, whether that be from wellbore integrity failure, flow line leak, or other storage facility equipment.

There was also verbal testimony provided during the hearing on what the radius of impact where human life would be endangered during a release would be.

Access to the case file and hearing audio can be found on the Department of Mineral Resources website under premium subscription service.
https://www.dmr.nd.gov/dmr/oilgas
https://www.dmr.nd.gov/oilgas/subscriptionservice.asp

Regards,
Bridget Danso
*Public Information Officer*

701.328.8036 • bydanso@nd.gov • www.dmr.nd.gov

image001.png

**From:** Michael Haupt <bazmakillc@icloud.com>
**Sent:** Sunday, February 25, 2024 2:27 PM
**To:** -Info-Oil & Gas Division <oilandgasinfo@nd.gov>
**Cc:** hauptnd <hauptnd@bis.midco.net>

**Subject:** Landowner Information Request

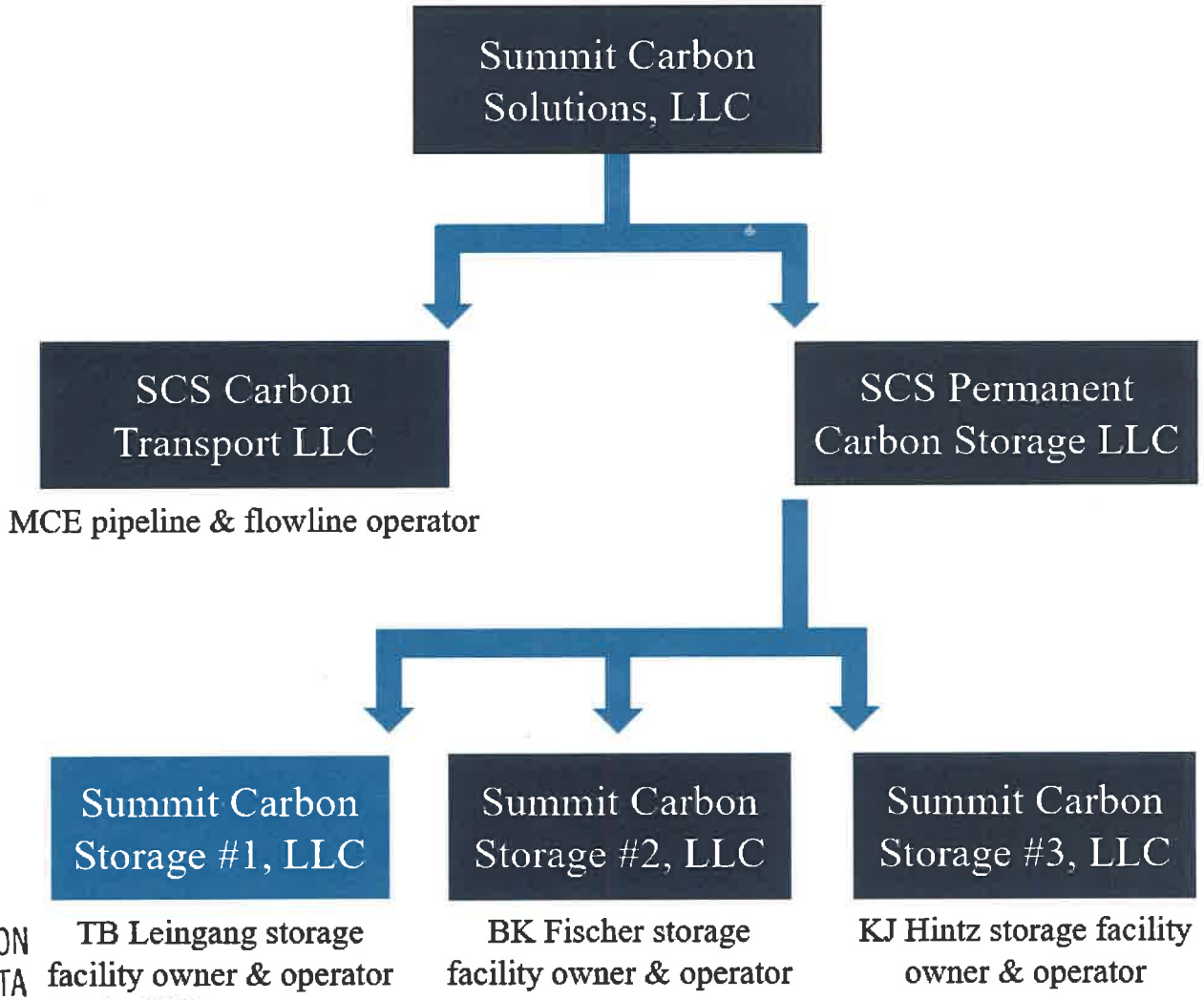
[You don't often get email from bazmakillc@icloud.com. Learn why this is important at https://aka.ms/LearnAboutSenderIdentification ]

***** CAUTION: This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Sent from my iPad Sent from my iPad

**EXHIBIT 2A – SCS1 BUSINESS STRUCTURE**

Exhibit 2A depicts the business structure of Summit Carbon Storage #1, LLC (SCS1) as a wholly owned subsidiary of SCS Permanent Carbon Storage LLC (SCS PCS) which is a wholly owned subsidiary of Summit Carbon Solutions, LLC (SCS).



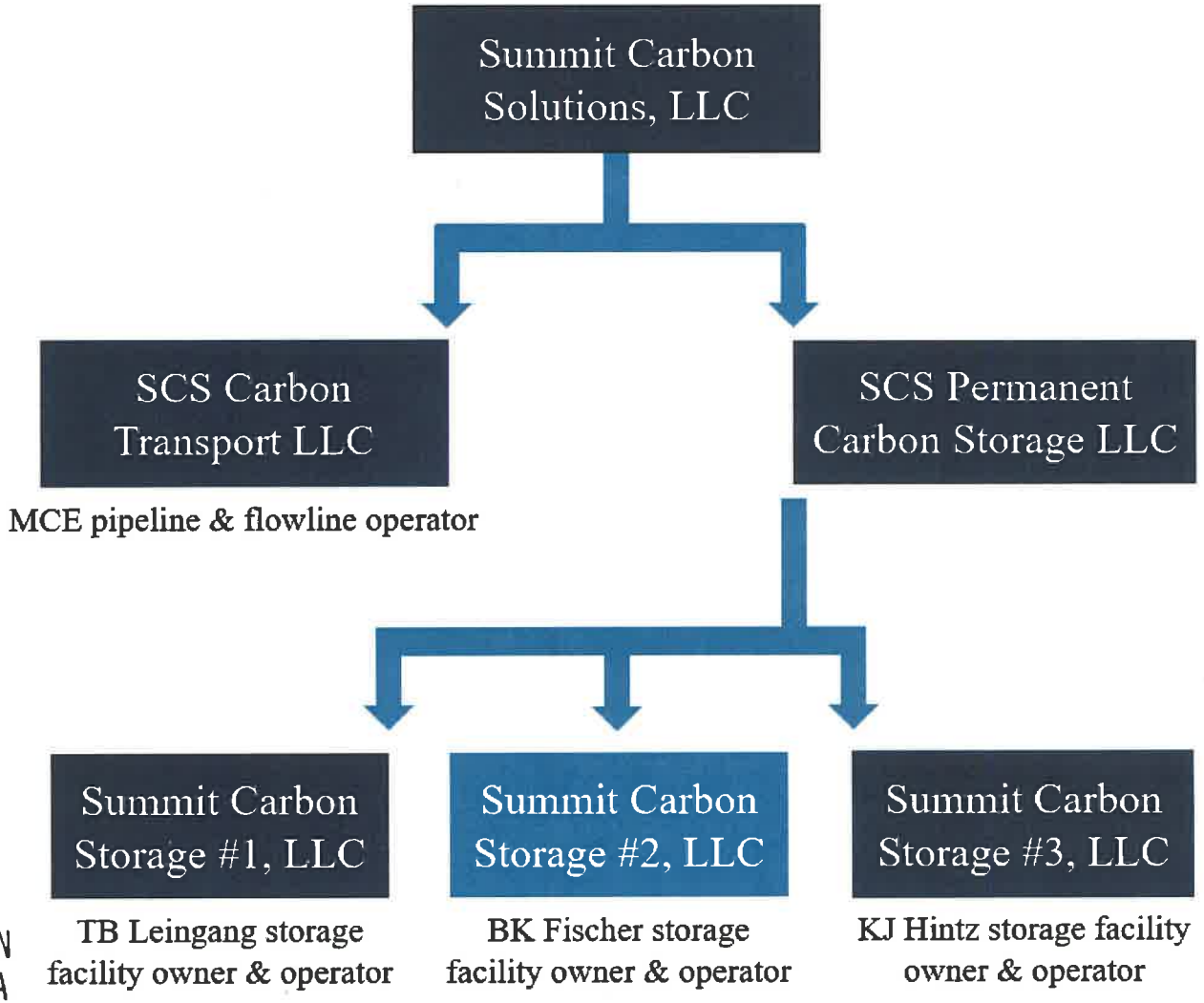

INDUSTRIAL COMMISSION
STATE OF NORTH DAKOTA
DATE 6/11/24 CASE NO. 30869-30872
Introduced By Summit
Exhibit 2A
Identified By Boeshans

Figure PS-1. SCS1 business structure.

Exhibit 2A. Revised Figure PS-1. SCS1 business structure.

**EXHIBIT 2B – SCS2 BUSINESS STRUCTURE**

Exhibit 2B depicts the business structure of Summit Carbon Storage #2, LLC (SCS2) as a wholly owned subsidiary of SCS Permanent Carbon Storage LLC (SCS PCS) which is a wholly owned subsidiary of Summit Carbon Solutions, LLC (SCS).




INDUSTRIAL COMMISSION
STATE OF NORTH DAKOTA
DATE 6/11/24 CASE NO. 30873-876
Introduced By Summit
Exhibit 2B
Identified By Boeshans

Figure PS-1. SCS2 business structure.

Exhibit 2B. Revised Figure PS-1. SCS2 business structure.

**EXHIBIT 2C – SCS3 BUSINESS STRUCTURE**

Exhibit 2C depicts the business structure of Summit Carbon Storage #3, LLC (SCS3) as a wholly owned subsidiary of SCS Permanent Carbon Storage LLC (SCS PCS) which is a wholly owned subsidiary of Summit Carbon Solutions, LLC (SCS).

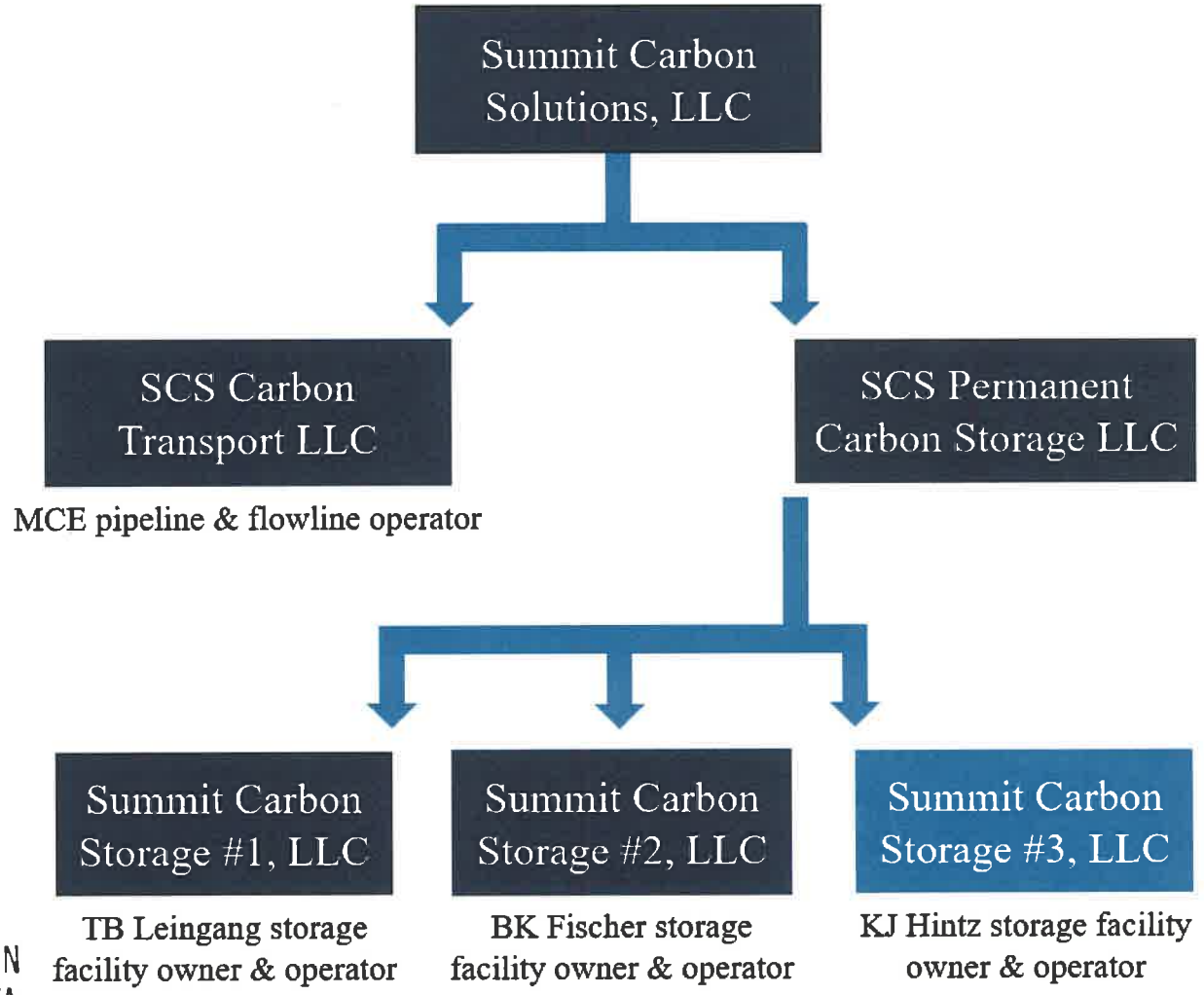



Figure PS-1. SCS3 business structure.

INDUSTRIAL COMMISSION
STATE OF NORTH DAKOTA
DATE 6/11/24 CASE NO. 30877-880
Introduced By Summit
Exhibit 2C
Identified By Boeshans

Exhibit 2C. Revised Figure PS-1. SCS3 business structure.

## EXHIBIT 3A – MCE PROJECT OVERVIEW MAP

Exhibit 3A depicts revised Figure PS-2, MCE Project overview map.

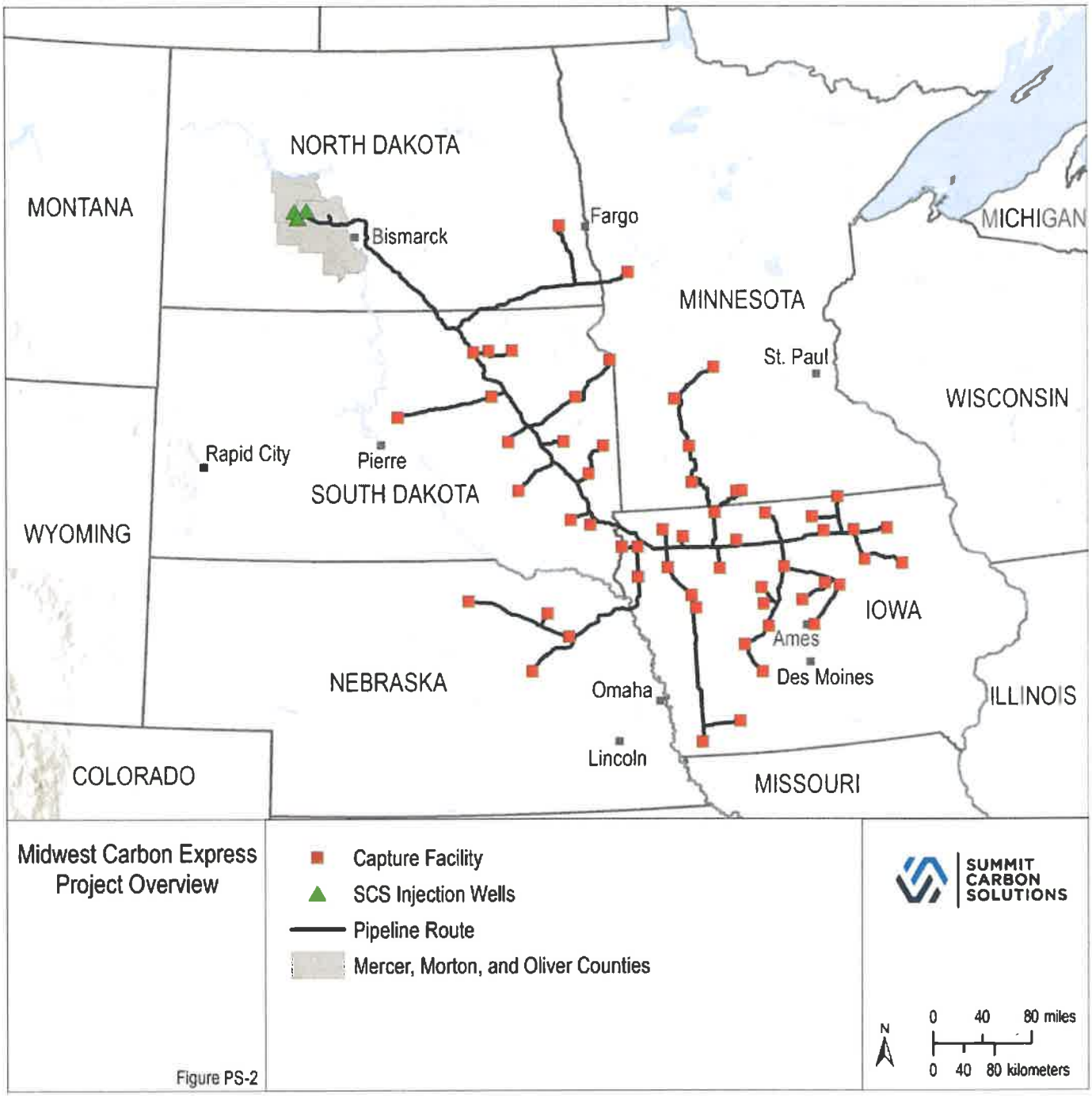



Exhibit 3A. Revised Figure PS-2. MCE Project overview map.

INDUSTRIAL COMMISSION
STATE OF NORTH DAKOTA
DATE 6/11/24 CASE NO. 30869-30880
Introduced By Summit
Exhibit 3A
Identified By Boeshans

## EXHIBIT 4A – SUMMIT & DCC EXTENT COMPARISON

Exhibit 4A depicts the CO2 plume extents after 5 years of injection at permitted injection limits.

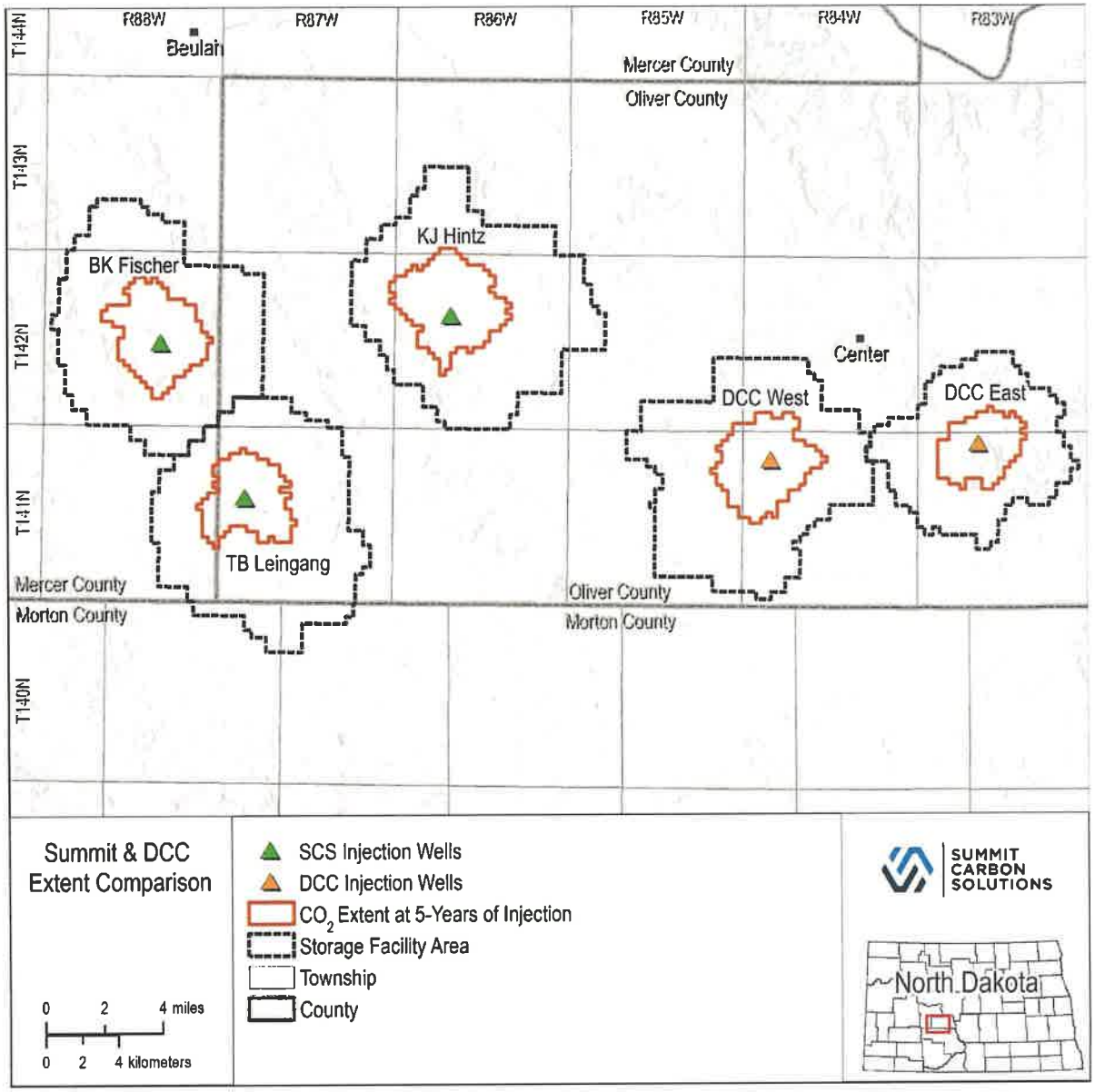



Exhibit 4A. Summit & DCC Extent Comparison.

INDUSTRIAL COMMISSION
STATE OF NORTH DAKOTA
DATE 6/11/24 CASE NO. 30869-30880
Introduced By Summit
Exhibit 4A
Identified By Boeshans

**EXHIBIT B**
**TRACT PARTICIPATION SUMMARY**
(Leased as of June 10, 2024)
SCS1

| Tract No. | Land Description | Owner Name | Tract Net Acres | Tract Participation | Storage Facility Participation | Acreage Leased |
|---|---|---|---|---|---|---|
| 1 | Section 34-T142N-R87W | Gerald R. Skalsky | 40.0000 | 33.33333333% | 0.13584779% | 0.13584779% |
| | | Greg Skalsky | 40.0000 | 33.33333333% | 0.13584779% | 0.13584779% |
| | | Carla R. Lloyd &Willard E. Lloyd, wife and husband, as Joint Tenants | 40.0000 | 33.33333333% | 0.13584779% | 0.13584779% |
| | | **Tract Total:** | **120.0000** | **100.00000000%** | | |
| 2 | Section 33-T142N-R87W | Edward Weiand, Life Estate | 480.0000 | 100.00000000% | 1.63017342% | 1.63017342% |
| | | James Weiand, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | **Tract Total:** | **480.0000** | **100.00000000%** | | |
| 3 | Section 32-T142N-R87W | Lionel Doll & Kathy Doll, as Joint Tenants | 160.0000 | 25.00000000% | 0.54339114% | 0.54339114% |
| | | Robert Schutt & Alberta E. Schutt, Trustees, or their successors in trust, under the Robert Schutt and Alberta E. Schutt Living Trust, dated December 7, 2015, and any amendments thereto | 160.0000 | 25.00000000% | 0.54339114% | 0.54339114% |
| | | Edward Weiand, Life Estate | 240.0000 | 37.50000000% | 0.81508671% | 0.81508671% |
| | | James Weiand, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Gerald R. Skalsky | 80.0000 | 12.50000000% | 0.27169557% | 0.27169557% |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |

INDUSTRIAL COMMISSION
STATE OF NORTH DAKOTA
DATE 6/11/24 CASE NO. 30869-30880
Introduced By Summit
Exhibit 5A
Identified By Skaare





**Exhibit 5A**

| Tract No. | Land Description | Owner Name | Tract Net Acres | Tract Participation | Storage Facility Participation | Acreage Leased |
|---|---|---|---|---|---|---|
| 4 | Section 31-T142N-R87W | Kelly James Kessler & Kimberly Ann Kessler, as Trustees of the Kelly James Kessler Revocable Trust under Agreement dated 10/07/2009 | 317.3300 | 66.48021285% | 1.07771444% | 1.07771444% |
| | | Robb M. Moore & Heidi K. Moore, husband and wife, as Joint Tenants | 160.0000 | 33.51978715% | 0.54339114% | 0.54339114% |
| | | **Tract Total:** | **477.3300** | **100.00000000%** | | |
| 5 | Section 01-T141N-R88W | Stephen Kessler & Leah Kessler, as Joint Tenants | 60.0000 | 12.50156270% | 0.20377168% | 0.20377168% |
| | | Diana Schulz & Clyde Schulz, wife and husband, as Joint Tenants | 100.0000 | 20.83593783% | 0.33961946% | 0.33961946% |
| | | Keith G. Kessler & Deanna A. Kessler, as Joint Tenants | 160.0000 | 33.33750052% | 0.54339114% | 0.54339114% |
| | | Larry Flemmer, aka Larry L. Flemmer | 159.9400 | 33.32499896% | 0.54318737% | 0.54318737% |
| | | **Tract Total:** | **479.9400** | **100.00000000%** | | |
| 6 | Section 06-T141N-R87W | Stanley M. Flemmer & Ginger M. Flemmer, husband and wife, as Joint Tenants | 159.8300 | 25.21932593% | 0.54281379% | 0.54281379% |
| | | Larry Flemmer, aka Larry L. Flemmer | 313.9300 | 49.53452411% | 1.06616738% | 1.06616738% |
| | | Wayne Cline & Kathy Cline, husband and wife, as Joint Tenants | 160.0000 | 25.24614996% | 0.54339114% | 0.54339114% |
| | | **Tract Total:** | **633.7600** | **100.00000000%** | | |
| 7 | Section 05-T141N-R87W | Edward Weiand, Life Estate | 159.8400 | 24.98866568% | 0.54284775% | 0.54284775% |
| | | James Weiand, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Clinton H. Redmann | 159.8100 | 24.98397561% | 0.54274586% | 0.54274586% |

| Tract No. | Land Description | Owner Name | Tract Net Acres | Tract Participation | Storage Facility Participation | Acreage Leased |
|---|---|---|---|---|---|---|
| | | Addriene D. Hafner, Trustee of the Addriene D. Hafner Revocable Living Trust U/I/D July 10, 2003 | 320.0000 | 50.02735871% | 1.08678228% | |
| | | **Tract Total:** | **639.6500** | **100.00000000%** | | |
| 8 | Section 04-T141N-R87W | JoAnne Skalsky, Life Estate | 318.6400 | 49.89352374% | 1.08216346% | 1.08216346% |
| | | Kimberly Delabarre, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Lana Erasmus, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Tanya Doe, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Heather Horning, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | David L. Skalsky & Carol J. Skalsky, husband and wife, as Joint Tenants | 70.5600 | 11.04847802% | 0.23963549% | 0.23963549% |
| | | Leonard Hueske & Mary Hueske, husband and wife, as Joint Tenants | 70.5600 | 11.04847802% | 0.23963549% | 0.23963549% |
| | | Glen C. Lennick & Wanda J. Lennick, husband and wife, as Joint Tenants | 160.0000 | 25.05323813% | 0.54339114% | 0.54339114% |
| | | Paul R. Metz & Christine E. Metz, husband and wife, as Joint Tenants | 18.8800 | 2.95628210% | 0.06412015% | |
| | | **Tract Total:** | **638.6400** | **100.00000000%** | | |
| 9 | Section 03-T141N-R87W | Deborah A. Schlecht & Wayne R. Schlecht, wife and husband, as Joint Tenants | 99.8300 | 15.63214431% | 0.33904211% | 0.33904211% |
| | | Carla R. Lloyd &Willard E. Lloyd, wife and husband, as Joint Tenants | 59.7100 | 9.34984811% | 0.20278678% | 0.20278678% |

| Tract No. | Land Description | Owner Name | Tract Net Acres | Tract Participation | Storage Facility Participation | Acreage Leased |
|---|---|---|---|---|---|---|
| | | Kimberly M. Montoya & Javier Montoya, Trustees, or their successors in trust, under the Kimberly M. Montoya Living Trust, dated November 27, 2018, and any amendments thereto | 79.5400 | 12.45498105% | 0.27013332% | 0.27013332% |
| | | Marvin Fiest & Karen Fiest, husband and wife, as Joint Tenants, Life Estate | 79.5400 | 12.45498105% | 0.27013332% | 0.27013332% |
| | | Amber Myhre, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Nicole Johnson, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Kristen Fiest, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | David L. Skalsky & Carol J. Skalsky, husband and wife, as Joint Tenants | 80.0000 | 12.52701137% | 0.27169557% | 0.27169557% |
| | | Leonard Hueske & Mary Hueske, husband and wife, as Joint Tenants | 80.0000 | 12.52701137% | 0.27169557% | 0.27169557% |
| | | Glen C. Lennick & Wanda J. Lennick, husband and wife, as Joint Tenants | 160.0000 | 25.05402274% | 0.54339114% | 0.54339114% |
| | | **Tract Total:** | **638.6200** | **100.00000000%** | | |
| 10 | Section 02-T141N-R87W | Keith C. Unruh, aka Keith Clayton Unruh, aka Keith Unruh | 159.9000 | 100.00000000% | 0.54305152% | 0.54305152% |
| | | **Tract Total:** | **159.9000** | **100.00000000%** | | |
| 11 | Section 11-T141N-R87W | Gaylen G. Lennick & Koni R. Lennick, husband and wife, as Joint Tenants | 320.0000 | 100.00000000% | 1.08678228% | 1.08678228% |
| | | **Tract Total:** | **320.0000** | **100.00000000%** | | |
| 12 | Section 10-T141N-R87W | Glen C. Lennick & Wanda J. Lennick, husband and wife, as Joint Tenants | 240.0000 | 37.50000000% | 0.81508671% | 0.81508671% |

| Tract No. | Land Description | Owner Name | Tract Net Acres | Tract Participation | Storage Facility Participation | Acreage Leased |
|---|---|---|---|---|---|---|
| | | Jean J. Hoepfner & Debra D. Hoepfner, husband and wife, as Joint Tenants | 200.0000 | 31.25000000% | 0.67923893% | |
| | | Delaphine Schafer (Appears Deceased) | 160.0000 | 25.00000000% | 0.54339114% | |
| | | Mary Winckler (nka Mary Winckler-Beierlein) | 40.0000 | 6.25000000% | 0.13584779% | 0.13584779% |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 13 | Section 09-T141N-R87W | Glen C. Lennick & Wanda J. Lennick, husband and wife, as Joint Tenants | 160.0000 | 25.00000000% | 0.54339114% | 0.54339114% |
| | | David L. Skalsky & Carol J. Skalsky, husband and wife, as Joint Tenants | 80.0000 | 12.50000000% | 0.27169557% | 0.27169557% |
| | | Leonard Hueske & Mary Hueske, husband and wife, as Joint Tenants | 80.0000 | 12.50000000% | 0.27169557% | 0.27169557% |
| | | Glynn R. Haag & Dianne D. Haag, Co-Trustees of the Haag Family Trust | 160.0000 | 25.00000000% | 0.54339114% | 0.54339114% |
| | | Jean J. Hoepfner & Debra D. Hoepfner, husband and wife, as Joint Tenants | 160.0000 | 25.00000000% | 0.54339114% | |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 14 | Section 08-T141N-R87W | Darwin Huber & Susan E. Huber, husband and wife, as Joint Tenants, Life Estate | 360.0000 | 56.25000000% | 1.22263007% | |
| | | Daryl D. Huber, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Darren D. Huber, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Jeffrey Schutt | 160.0000 | 25.00000000% | 0.54339114% | 0.54339114% |

| Tract No. | Land Description | Owner Name | Tract Net Acres | Tract Participation | Storage Facility Participation | Acreage Leased |
|---|---|---|---|---|---|---|
| | | Jason J. Pulver & Melanee L. Pulver, as Joint Tenants | 120.0000 | 18.75000000% | 0.40754336% | 0.40754336% |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 15 | Section 07-T141N-R87W | Jeffrey Schutt, aka Jeffrey J. Schutt | 160.0000 | 25.15565059% | 0.54339114% | 0.54339114% |
| | | Jason J. Pulver & Melanee L. Pulver, as Joint Tenants | 157.6700 | 24.78932143% | 0.53547801% | 0.53547801% |
| | | Terrence M. Leingang aka Terry Leingang and Beverly J. Leingang, husband and wife, Life Estate | 318.3700 | 50.05502799% | 1.08124648% | 1.08124648% |
| | | Adrienne Arndt, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Brandi Mittleider, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Dylan Leingang, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | **Tract Total:** | **636.0400** | **100.00000000%** | | |
| 16 | Section 12-T141N-R88W | Keith G. Kessler & Deanna A. Kessler, as Joint Tenants | 197.6900 | 30.88906250% | 0.67139372% | 0.67139372% |
| | | Hayden Kessler & Megan Kessler, as Joint Tenants | 2.3100 | 0.36093750% | 0.00784521% | 0.00784521% |
| | | Kelly James Kessler & Kimberly Ann Kessler, as Trustees of the Kelly James Kessler Revocable Trust under Agreement dated 10/07/2009 | 60.0000 | 9.37500000% | 0.20377168% | 0.20377168% |
| | | Diana Schulz & Clyde Schulz, wife and husband, as Joint Tenants | 120.0000 | 18.75000000% | 0.40754336% | 0.40754336% |
| | | Kim K. Kessler & Trisha L. Kessler, as Trustees of the Kim K. Kessler and Trisha L. Kessler Living Trust dated November 30, 2023 | 60.0000 | 9.37500000% | 0.20377168% | |

| Tract No. | Land Description | Owner Name | Tract Net Acres | Tract Participation | Storage Facility Participation | Acreage Leased |
|---|---|---|---|---|---|---|
| | | Larry Flemmer, aka Larry L. Flemmer | 200.0000 | 31.25000000% | 0.67923893% | 0.67923893% |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 17 | Section 11-T141N-R88W | Diana Schulz & Clyde Schulz, wife and husband, as Joint Tenants | 80.0000 | 16.66666667% | 0.27169557% | 0.27169557% |
| | | Corey M. Voegele & Roxanne Voegele, husband and wife, as Joint Tenants | 80.0000 | 16.66666667% | 0.27169557% | 0.27169557% |
| | | Larry Flemmer, aka Larry L. Flemmer | 320.0000 | 66.66666667% | 1.08678228% | 1.08678228% |
| | | **Tract Total:** | **480.0000** | **100.00000000%** | | |
| 18 | Section 15-T141N-R88W | Kim K. Kessler & Trisha L. Kessler, as Trustees of the Kim K. Kessler and Trisha L. Kessler Living Trust dated November 30, 2023 | 120.0000 | 100.00000000% | 0.40754336% | |
| | | **Tract Total:** | **120.0000** | **100.00000000%** | | |
| 19 | Section 14-T141N-R88W | Kim K. Kessler & Trisha L. Kessler, as Trustees of the Kim K. Kessler and Trisha L. Kessler Living Trust dated November 30, 2023 | 320.0000 | 50.00000000% | 1.08678228% | |
| | | Kelly James Kessler & Kimberly Ann Kessler, as Trustees of the Kelly James Kessler Revocable Trust under Agreement dated 10/07/2009 | 320.0000 | 50.00000000% | 1.08678228% | 1.08678228% |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 20 | Section 13-T141N-R88W | Daniel E. Sipes & Esther L. Sipes as Trustees of the Sipes Family Trust U/A Dated 5/11/05 | 373.0000 | 58.28125000% | 1.26678060% | 1.26678060% |

| Tract No. | Land Description | Owner Name | Tract Net Acres | Tract Participation | Storage Facility Participation | Acreage Leased |
|---|---|---|---|---|---|---|
| | | Dean Gerving | 133.5000 | 20.85937500% | 0.45339198% | |
| | | Glenn Gerving | 133.5000 | 20.85937500% | 0.45339198% | |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 21 | Section 18-T141N-R87W | Terrence M. Leingang aka Terry Leingang and Beverly J. Leingang, husband and wife, Life Estate | 160.0000 | 25.08938092% | 0.54339114% | 0.54339114% |
| | | Adrienne Arndt, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Brandi Mittleider, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Dylan Leingang, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Keith G. Kessler and Deanna A. Kessler, husband and wife, as Joint Tenants | 158.7900 | 24.89964248% | 0.53928175% | 0.53928175% |
| | | Jason J. Pulver & Melanee L. Pulver, as Joint Tenants | 318.9300 | 50.01097660% | 1.08314835% | 1.08314835% |
| | | **Tract Total:** | **637.7200** | **100.00000000%** | | |
| 22 | Section 17-T141N-R87W | Clinton H. Redmann | 160.0000 | 25.00000000% | 0.54339114% | 0.54339114% |
| | | Jeffrey S. Biesterfeld and Jessica J. Pulver Biesterfeld, as Joint Tenants | 7.7900 | 1.21718750% | 0.02645636% | 0.02645636% |
| | | Jason J. Pulver & Melanee L. Pulver, as Joint Tenants | 472.2100 | 73.78281250% | 1.60371707% | 1.60371707% |
| | | Jean P. Pulver, aka Penny Pulver, Contract for Deed Seller | 0.0000 | 0.00000000% | 0.00000000% | |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 23 | Section 16-T141N-R87W | Keith G. Kessler and Deanna A. Kessler, husband and wife, as Joint Tenants | 480.0000 | 75.00000000% | 1.63017342% | 1.63017342% |
| | | Hayden Kessler & Megan Kessler, as Joint Tenants | 160.0000 | 25.00000000% | 0.54339114% | 0.54339114% |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |

| Tract No. | Land Description | Owner Name | Tract Net Acres | Tract Participation | Storage Facility Participation | Acreage Leased |
|---|---|---|---|---|---|---|
| 24 | Section 15-T141N-R87W | Glen C. Lennick & Wanda J. Lennick, husband and wife, as Joint Tenants | 160.0000 | 25.00000000% | 0.54339114% | 0.54339114% |
| | | Keith Kessler | 280.0000 | 43.75000000% | 0.95093450% | 0.95093450% |
| | | Clinton H. Redmann | 160.0000 | 25.00000000% | 0.54339114% | 0.54339114% |
| | | Marlene M. Redmann, Life Estate | 40.0000 | 6.25000000% | 0.13584779% | 0.13584779% |
| | | Donald L. Redmann, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Michele Seaman, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Pamela Dugan, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 25 | Section 14-T141N-R87W | Glen C. Lennick & Wanda J. Lennick, husband and wife, as Joint Tenants | 200.0000 | 62.50000000% | 0.67923893% | 0.67923893% |
| | | Marlene M. Redmann, Life Estate | 120.0000 | 37.50000000% | 0.40754336% | 0.40754336% |
| | | Donald L. Redmann, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Michele Seaman, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Pamela Dugan, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | **Tract Total:** | **320.0000** | **100.00000000%** | | |
| 26 | Section 23-T141N-R87W | Jerome Voegele, aka Jerome G. Voegele & Yvonne Voegele, husband and wife, as Joint Tenants, Life Estate | 480.0000 | 100.00000000% | 1.63017342% | 1.63017342% |
| | | Brent Voegele, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Jason Voegele, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Jodi Wos, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | **Tract Total:** | **480.0000** | **100.00000000%** | | |
| 27 | Section 22-T141N-R87W | Marlene M. Redmann, Life Estate | 240.0000 | 37.50000000% | 0.81508671% | 0.81508671% |

| Tract No. | Land Description | Owner Name | Tract Net Acres | Tract Participation | Storage Facility Participation | Acreage Leased |
|---|---|---|---|---|---|---|
| | | Donald L. Redmann, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Michele Seaman, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Pamela Dugan, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Delma Renner | 160.0000 | 25.00000000% | 0.54339114% | |
| | | Keith G. Kessler and Deanna A. Kessler, husband and wife, as Joint Tenants | 160.0000 | 25.00000000% | 0.54339114% | 0.54339114% |
| | | Mary Winckler (nka Mary Winckler-Beierlein) | 80.0000 | 12.50000000% | 0.27169557% | 0.27169557% |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 28 | Section 21-T141N-R87W | Keith G. Kessler and Deanna A. Kessler, husband and wife, as Joint Tenants | 480.0000 | 75.00000000% | 1.63017342% | 1.63017342% |
| | | Terrence M. Leingang aka Terry Leingang and Beverly J. Leingang, husband and wife, Life Estate | 158.0000 | 24.68750000% | 0.53659875% | 0.53659875% |
| | | Adrienne Arndt, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Brandi Mittleider, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Dylan Leingang, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Dylan Leingang & Miranda Leingang, as Joint Tenants | 2.0000 | 0.31250000% | 0.00679239% | 0.00679239% |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 29 | Section 20-T141N-R87W | Clinton Redmann | 400.0000 | 62.50000000% | 1.35847785% | 1.35847785% |
| | | Lance Johnson | 80.0000 | 12.50000000% | 0.27169557% | 0.27169557% |
| | | Rosalie R. Wilmes & Duane L. Wilmes, wife and husband, as Joint Tenants, Life Estate | 40.0000 | 6.25000000% | 0.13584779% | 0.13584779% |
| | | Da Lynn Twigg, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Tracy Wilmes, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |

| Tract No. | Land Description | Owner Name | Tract Net Acres | Tract Participation | Storage Facility Participation | Acreage Leased |
|---|---|---|---|---|---|---|
| | | Rowene J. Skalsky, Life Estate | 40.0000 | 6.25000000% | 0.13584779% | 0.13584779% |
| | | Brenda Owen, fka Brenda Ross, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | David Skalsky, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Cheryl Weigel, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Sandra McKay, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Rodney Skalsky, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Kirk E. Maize, aka Kirk Maize, and Linda L. Maize, aka Linda Maize, husband and wife, as Joint Tenants, a Life Estate | 80.0000 | 12.50000000% | 0.27169557% | |
| | | Allen Maize, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 30 | Section 19-T141N-R87W | Clinton Redmann | 390.5300 | 61.16558075% | 1.32631589% | 1.32631589% |
| | | Bryant H. Voegele & Lora Voegele, husband and wife, as Joint Tenants | 238.9500 | 37.42482145% | 0.81152071% | 0.81152071% |
| | | Lance Johnson | 9.0000 | 1.40959779% | 0.03056575% | 0.03056575% |
| | | **Tract Total:** | **638.4800** | **100.00000000%** | | |
| 31 | Section 24-T141N-R88W | Bryant H. Voegele & Lora Voegele, husband and wife, as Joint Tenants | 422.6100 | 66.03281250% | 1.43526581% | 1.43526581% |
| | | Dean Gerving | 100.0000 | 15.62500000% | 0.33961946% | |
| | | Glenn Gerving & Lisa Gerving, husband and wife, as Joint Tenants | 100.0000 | 15.62500000% | 0.33961946% | |
| | | Leslie Ferguson | 17.3900 | 2.71718750% | 0.05905982% | 0.05905982% |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 32 | Section 23-T141N-R88W | Keith R. Unruh and Stacey Unruh, husband and wife, as Joint Tenants | 320.0000 | 50.00000000% | 1.08678228% | 1.08678228% |

| Tract No. | Land Description | Owner Name | Tract Net Acres | Tract Participation | Storage Facility Participation | Acreage Leased |
|---|---|---|---|---|---|---|
| | | Pearl R. Voegele, Life Estate | 320.0000 | 50.00000000% | 1.08678228% | 1.08678228% |
| | | Linda Jean Stensrud, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 33 | Section 22-T141N-R88W | Kelly James Kessler & Kimberly Ann Kessler, as Trustees of the Kelly James Kessler Revocable Trust under Agreement dated 10/07/2009 | 60.0000 | 37.50000000% | 0.20377168% | 0.20377168% |
| | | Kim K. Kessler & Trisha L. Kessler, as Trustees of the Kim K. Kessler and Trisha L. Kessler Living Trust dated November 30, 2023 | 40.0000 | 25.00000000% | 0.13584779% | 0.13584779% |
| | | Michael Kessler | 20.0000 | 12.50000000% | 0.06792389% | 0.06792389% |
| | | Lavern J. Schilling, Life Estate | 40.0000 | 25.00000000% | 0.13584779% | 0.13584779% |
| | | Glenn Schilling, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | **Tract Total:** | **160.0000** | **100.00000000%** | | |
| 34 | Section 26-T141N-R88W | Debra Koenig & Rodney Koenig | 80.0000 | 12.50000000% | 0.27169557% | 0.27169557% |
| | | Lavern J. Schilling, Life Estate | 160.0000 | 25.00000000% | 0.54339114% | 0.54339114% |
| | | Debra Koenig, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Pearl R. Voegele, Life Estate | 80.0000 | 12.50000000% | 0.27169557% | 0.27169557% |
| | | Linda Jean Stensrud, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Mund Family Enterprises, LLP, Ervin Mund, as Managing Member | 320.0000 | 50.00000000% | 1.08678228% | 1.08678228% |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 35 | Section 25-T141N-R88W | Bryant H. Voegele & Lora Voegele, husband and wife, as Joint Tenants | 120.0000 | 18.75000000% | 0.40754336% | 0.40754336% |

| Tract No. | Land Description | Owner Name | Tract Net Acres | Tract Participation | Storage Facility Participation | Acreage Leased |
|---|---|---|---|---|---|---|
| | | Clinton H. Redmann | 200.0000 | 31.25000000% | 0.67923893% | 0.67923893% |
| | | Pearl R. Voegele, Life Estate | 320.0000 | 50.00000000% | 1.08678228% | 1.08678228% |
| | | Cynthia Martin, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 36 | Section 30-T141N-R87W | Rosalie R. Wilmes & Duane L. Wilmes, wife and husband, as Joint Tenants, Life Estate | 80.0000 | 12.51329538% | 0.27169557% | 0.27169557% |
| | | Da Lynn Twigg, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Tracy Wilmes, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Rowene J. Skalsky, Life Estate | 80.0000 | 12.51329538% | 0.27169557% | 0.27169557% |
| | | Brenda Owen, fka Brenda Ross, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | David Skalsky, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Cheryl Weigel, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Sandra McKay, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Rodney Skalsky, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Lance A. Gartner & Anissa M. Gartner, husband and wife, as Joint Tenants | 319.9000 | 50.03753989% | 1.08644266% | 1.08644266% |
| | | Pearl R. Voegele, Life Estate | 159.4200 | 24.93586936% | 0.54142135% | 0.54142135% |
| | | Cynthia Martin, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | **Tract Total:** | **639.3200** | **100.00000000%** | | |
| 37 | Section 29-T141N-R87W | Rosalie R. Wilmes & Duane L. Wilmes, wife and husband, as Joint Tenants, Life Estate | 240.0000 | 37.50000000% | 0.81508671% | 0.81508671% |
| | | Da Lynn Twigg, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Tracy Wilmes, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Rowene J. Skalsky, Life Estate | 240.0000 | 37.50000000% | 0.81508671% | 0.81508671% |
| | | Brenda Owen, fka Brenda Ross, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |

| Tract No. | Land Description | Owner Name | Tract Net Acres | Tract Participation | Storage Facility Participation | Acreage Leased |
|---|---|---|---|---|---|---|
| | | David Skalsky, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Cheryl Weigel, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Sandra McKay, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Rodney Skalsky, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | William K. Schultz & Louise M. Schultz, Trustees, or their successors in trust, under the William and Louise Schultz Living Trust dated September 10, 1997 | 160.0000 | 25.00000000% | 0.54339114% | 0.54339114% |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 38 | Section 28-T141N-R87W | Mary Winckler (nka Mary Winckler-Beierlein) | 480.0000 | 75.00000000% | 1.63017342% | 1.63017342% |
| | | Gregory J. Voegele and Jeanne M. Voegele, husband and wife, as Joint Tenants | 120.0000 | 18.75000000% | 0.40754336% | 0.40754336% |
| | | James A. Swenson, aka James Swenson aka Jim Swenson & Darlene A. Swenson, aka Darlene Swenson, husband and wife, Life Estate | 40.0000 | 6.25000000% | 0.13584779% | 0.13584779% |
| | | Trent T. Martin & Dawn Martin, as Joint Tenants, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 39 | Section 27-T141N-R87W | Delma Renner | 160.0000 | 25.00000000% | 0.54339114% | |
| | | Robert L. Martin, Life Estate | 320.0000 | 50.00000000% | 1.08678228% | 1.08678228% |
| | | Robert L. Martin, Trustee of the RM Martin Trust, under trust agreement dated May 31, 2002, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |

| Tract No. | Land Description | Owner Name | Tract Net Acres | Tract Participation | Storage Facility Participation | Acreage Leased |
|---|---|---|---|---|---|---|
| | | Gregory J. Voegele and Jeanne M. Voegele, husband and wife, as Joint Tenants | 160.0000 | 25.00000000% | 0.54339114% | 0.54339114% |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 40 | Section 26-T141N-R87W | Andrew Peltz | 80.0000 | 12.50000000% | 0.27169557% | 0.27169557% |
| | | Daniel Peltz | 80.0000 | 12.50000000% | 0.27169557% | 0.27169557% |
| | | Jerome Voegele, aka Jerome G. Voegele & Yvonne Voegele, husband and wife, as Joint Tenants, Life Estate | 160.0000 | 25.00000000% | 0.54339114% | 0.54339114% |
| | | Brent Voegele, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Jason Voegele, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Jodi Wos, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Gregory J. Voegele and Jeanne M. Voegele, husband and wife, as Joint Tenants | 312.0900 | 48.76406250% | 1.05991838% | 1.05991838% |
| | | Teasha Voegele (nka Teasha Bettenhausen) | 7.9100 | 1.23593750% | 0.02686390% | 0.02686390% |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 41 | Section 25-T141N-R87W | Karen Boehm (aka Karen D. Boehm), Life Estate | 35.000000 | 29.16666700% | 0.11886681% | 0.11886681% |
| | | Renee Doll and Sandra Kunz, Trustee of the Karen D. Boehm Family Property Trust, created under a declaration of trust, dated January 26, 2021, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Richard T. Kruger & Richard E. Kruger, as Joint Tenants | 30.0000000 | 25.00000000% | 0.10188584% | |
| | | Keith C. Kruger | 9.9999996 | 8.33333300% | 0.03396194% | |
| | | Jill R. Pacini | 8.3333328 | 6.94444400% | 0.02830162% | |
| | | Gayle M. Williams | 8.3333328 | 6.94444400% | 0.02830162% | |

| Tract No. | Land Description | Owner Name | Tract Net Acres | Tract Participation | Storage Facility Participation | Acreage Leased |
|---|---|---|---|---|---|---|
| | | David C. Henke | 8.3333328 | 6.94444400% | 0.02830162% | |
| | | Russel C. Kruger | 5.0000004 | 4.16666700% | 0.01698097% | |
| | | Kyle Grindahl | 5.0000004 | 4.16666700% | 0.01698097% | 0.01698097% |
| | | Kevin Grindahl | 5.0000004 | 4.16666700% | 0.01698097% | 0.01698097% |
| | | Kelly Grindahl | 5.0000004 | 4.16666700% | 0.01698097% | 0.01698097% |
| | | **Tract Total:** | **120.0000** | **100.00000000%** | | |
| 42 | Section 35-T141N-R87W | Gary L. Hicks, aka Gary Hicks, and Carol L. Hicks, aka Carol Hicks, husband and wife, Life Estate | 320.0000 | 66.66666667% | 1.08678228% | 1.08678228% |
| | | Keith G. and Shannon D. Becher as Trustees of the Amended and Restated Keith G. and Shannon D. Becher Family Revocable Trust Dated May 5, 1998 and as Amended and Restated April 24, 2002, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Andrew L. Peltz | 80.0000 | 16.66666667% | 0.27169557% | 0.27169557% |
| | | Daniel Peltz | 80.0000 | 16.66666667% | 0.27169557% | 0.27169557% |
| | | **Tract Total:** | **480.0000** | **100.00000000%** | | |
| 43 | Section 34-T141N-R87W | Gregory J. Voegele and Jeanne M. Voegele, husband and wife, as Joint Tenants | 300.0000 | 46.87500000% | 1.01885839% | 1.01885839% |
| | | Jerome Voegele, aka Jerome G. Voegele & Yvonne Voegele, husband and wife, as Joint Tenants, Life Estate | 340.0000 | 53.12500000% | 1.15470617% | 1.15470617% |
| | | Brent Voegele, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Jason Voegele, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Jodi Wos, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |

| Tract No. | Land Description | Owner Name | Tract Net Acres | Tract Participation | Storage Facility Participation | Acreage Leased |
|---|---|---|---|---|---|---|
| 44 | Section 33-T141N-R87W | Gregory J. Voegele and Jeanne M. Voegele, husband and wife, as Joint Tenants | 160.0000 | 25.00000000% | 0.54339114% | 0.54339114% |
| | | William K. Schultz & Louise M. Schultz, Trustees, or their successors in trust, under the William and Louise Schultz Living Trust dated September 10, 1997 | 160.0000 | 25.00000000% | 0.54339114% | 0.54339114% |
| | | Glen Beierlein, Life Estate | 40.0000 | 6.25000000% | 0.13584779% | 0.13584779% |
| | | James Beierlein & Mary J. Beierlein, as Joint Tenants, Remaindermen | 0.0000 | 0.00000000% | 0.00000000% | |
| | | James Beierlein & Mary J. Beierlein, as Joint Tenants, Life Estate | 40.0000 | 6.25000000% | 0.13584779% | 0.13584779% |
| | | Jamie Beierlein, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Jessica Miller, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Amanda Gustin, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Roderick (Rick) Schirado | 30.0000 | 4.68750000% | 0.10188584% | 0.10188584% |
| | | Allen Schirado | 30.0000 | 4.68750000% | 0.10188584% | 0.10188584% |
| | | Timothy Schirado | 30.0000 | 4.68750000% | 0.10188584% | 0.10188584% |
| | | Bruce Schirado | 30.0000 | 4.68750000% | 0.10188584% | 0.10188584% |
| | | Russell Schirado | 30.0000 | 4.68750000% | 0.10188584% | 0.10188584% |
| | | Bryan Schirado | 30.0000 | 4.68750000% | 0.10188584% | 0.10188584% |
| | | Kyle Schirado | 30.0000 | 4.68750000% | 0.10188584% | 0.10188584% |
| | | Corrine Vatnsdal | 30.0000 | 4.68750000% | 0.10188584% | 0.10188584% |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |

| Tract No. | Land Description | Owner Name | Tract Net Acres | Tract Participation | Storage Facility Participation | Acreage Leased |
|---|---|---|---|---|---|---|
| 45 | Section 32-T141N-R87W | William K. Schultz & Louise M. Schultz, Trustees, or their successors in trust, under the William and Louise Schultz Living Trust dated September 10, 1997 | 160.0000 | 25.00000000% | 0.54339114% | 0.54339114% |
| | | Roderick (Rick) Schirado | 40.0000 | 6.25000000% | 0.13584779% | 0.13584779% |
| | | Allen Schirado | 40.0000 | 6.25000000% | 0.13584779% | 0.13584779% |
| | | Timothy Schirado | 40.0000 | 6.25000000% | 0.13584779% | 0.13584779% |
| | | Bruce Schirado | 40.0000 | 6.25000000% | 0.13584779% | 0.13584779% |
| | | Russell Schirado | 40.0000 | 6.25000000% | 0.13584779% | 0.13584779% |
| | | Bryan Schirado | 40.0000 | 6.25000000% | 0.13584779% | 0.13584779% |
| | | Kyle Schirado | 40.0000 | 6.25000000% | 0.13584779% | 0.13584779% |
| | | Corrine Vatnsdal | 40.0000 | 6.25000000% | 0.13584779% | 0.13584779% |
| | | Lynnette Schirado | 160.0000 | 25.00000000% | 0.54339114% | 0.54339114% |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 46 | Section 31-T141N-R87W | Lance A. Gartner & Anissa M. Gartner, husband and wife, as Joint Tenants | 159.8800 | 24.98749687% | 0.54298360% | 0.54298360% |
| | | Bernard L. Weinhardt | 159.9600 | 25.00000000% | 0.54325529% | 0.54325529% |
| | | Roderick (Rick) Schirado | 40.0000 | 6.25156289% | 0.13584779% | 0.13584779% |
| | | Allen Schirado | 40.0000 | 6.25156289% | 0.13584779% | 0.13584779% |
| | | Timothy Schirado | 40.0000 | 6.25156289% | 0.13584779% | 0.13584779% |
| | | Bruce Schirado | 40.0000 | 6.25156289% | 0.13584779% | 0.13584779% |
| | | Russell Schirado | 40.0000 | 6.25156289% | 0.13584779% | 0.13584779% |
| | | Bryan Schirado | 40.0000 | 6.25156289% | 0.13584779% | 0.13584779% |
| | | Kyle Schirado | 40.0000 | 6.25156289% | 0.13584779% | 0.13584779% |
| | | Corrine Vatnsdal | 40.0000 | 6.25156289% | 0.13584779% | 0.13584779% |
| | | **Tract Total:** | **639.8400** | **100.00000000%** | | |
| 47 | Section 36-T141N-R88W | Michael Rogstad | 160.0000 | 25.00000000% | 0.54339114% | 0.54339114% |

| Tract No. | Land Description | Owner Name | Tract Net Acres | Tract Participation | Storage Facility Participation | Acreage Leased |
|---|---|---|---|---|---|---|
| | | Pearl R. Voegele, Life Estate | 160.0000 | 25.00000000% | 0.54339114% | 0.54339114% |
| | | Cynthia Martin, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Lance A. Gartner & Anissa M. Gartner, husband and wife, as Joint Tenants | 120.0000 | 18.75000000% | 0.40754336% | 0.40754336% |
| | | Minnesota Power, a Division of Allete, Inc., a MN corporation | 30.0000 | 4.68750000% | 0.10188584% | |
| | | Glen Ullin Energy Center, LLC, a Delaware limited liability company c/o ALLETE Clean Energy | 10.0000 | 1.56250000% | 0.03396195% | |
| | | State of North Dakota | 160.0000 | 25.00000000% | 0.54339114% | |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 48 | Section 35-T141N-R88W | Larry J. Steffen & Lorie L. Steffen, Life Estate | 160.0000 | 50.00000000% | 0.54339114% | 0.54339114% |
| | | Angela Erickson & Jason Erickson, as Joint Tenants, Remaindermen | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Scott Steffen & Amber Stefffen, as Joint Tenants, Remaindermen | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Sandra M. Schnaidt & Larry L. Schnaidt, wife and husband, as Joint Tenants | 160.0000 | 50.00000000% | 0.54339114% | 0.54339114% |
| | | **Tract Total:** | **320.0000** | **100.00000000%** | | |
| 49 | Section 03-T140N-R88W | Richard M. Schirado & Deborah Schirado, as Joint Tenants, Life Estate | 149.0500 | 49.89622389% | 0.50620281% | 0.50620281% |
| | | Brandon Schirado, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Michael Schirado, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Nathan Schirado, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |

| Tract No. | Land Description | Owner Name | Tract Net Acres | Tract Participation | Storage Facility Participation | Acreage Leased |
|---|---|---|---|---|---|---|
| | | Miranda Bergquist, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Viola M. Weinhardt, Life Estate | 149.6700 | 50.10377611% | 0.50830845% | 0.50830845% |
| | | Linda Steiger, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Bernard Weinhardt, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Julie Kramer, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | **Tract Total:** | **298.7200** | **100.00000000%** | | |
| 50 | Section 02-T140N-R88W | Glen Beierlein, Life Estate | 77.2350 | 20.43253968% | 0.26230509% | 0.26230509% |
| | | James Beierlein & Mary J. Beierlein, as Joint Tenants, Remaindermen | 0.0000 | 0.00000000% | 0.00000000% | |
| | | James Beierlein & Mary J. Beierlein, as Joint Tenants, Life Estate | 77.2350 | 20.43253968% | 0.26230509% | 0.26230509% |
| | | Jamie Beierlein, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Jessica Miller, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Amanda Gustin, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Roderick (Rick) Schirado | 18.6250 | 4.92724868% | 0.06325413% | 0.06325413% |
| | | Allen Schirado | 18.6250 | 4.92724868% | 0.06325413% | |
| | | Timothy Schirado | 18.6250 | 4.92724868% | 0.06325413% | |
| | | Bruce Schirado | 18.6250 | 4.92724868% | 0.06325413% | 0.06325413% |
| | | Russell Schirado | 18.6250 | 4.92724868% | 0.06325413% | 0.06325413% |
| | | Bryan Schirado | 18.6250 | 4.92724868% | 0.06325413% | 0.06325413% |
| | | Kyle Schirado | 18.6250 | 4.92724868% | 0.06325413% | 0.06325413% |
| | | Corrine Vatnsdal | 18.6250 | 4.92724868% | 0.06325413% | 0.06325413% |
| | | Viola M. Weinhardt, Life Estate | 74.5300 | 19.71693122% | 0.25311839% | 0.25311839% |
| | | Linda Steiger, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Bernard Weinhardt, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |

| Tract No. | Land Description | Owner Name | Tract Net Acres | Tract Participation | Storage Facility Participation | Acreage Leased |
|---|---|---|---|---|---|---|
| | | Julie Kramer, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | **Tract Total:** | **378.0000** | **100.00000000%** | | |
| 51 | Section 01-T140N-R88W | Glen Beierlein, Life Estate | 387.7800 | 50.00000000% | 1.31697635% | 1.31697635% |
| | | James Beierlein & Mary J. Beierlein, as Joint Tenants, Remaindermen | 0.0000 | 0.00000000% | 0.00000000% | |
| | | James Beierlein & Mary J. Beierlein, as Joint Tenants, Life Estate | 387.7800 | 50.00000000% | 1.31697635% | 1.31697635% |
| | | Jamie Beierlein, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Jessica Miller, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Amanda Gustin, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | **Tract Total:** | **775.5600** | **100.00000000%** | | |
| 52 | Section 06-T140N-R87W | Julianna S. Prescott | 191.1300 | 33.19266437% | 0.64911468% | 0.64911468% |
| | | Jeana J. Phillips, fka Jeana J. Beierlein | 191.1300 | 33.19266437% | 0.64911468% | 0.64911468% |
| | | Glen Beierlein, Life Estate | 16.7800 | 2.91410510% | 0.05698815% | 0.05698815% |
| | | James Beierlein & Mary J. Beierlein, as Joint Tenants, Remaindermen | 0.0000 | 0.00000000% | 0.00000000% | |
| | | James Beierlein & Mary J. Beierlein, as Joint Tenants, Life Estate | 16.7800 | 2.91410510% | 0.05698815% | 0.05698815% |
| | | Jamie Beierlein, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Jessica Miller, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Amanda Gustin, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Andrew L. Peltz | 80.0000 | 13.89323052% | 0.27169557% | 0.27169557% |
| | | Andrew L. Peltz & Heidi Peltz, husband and wife | 80.0000 | 13.89323052% | 0.27169557% | 0.27169557% |
| | | **Tract Total:** | **575.8200** | **100.00000000%** | | |

| Tract No. | Land Description | Owner Name | Tract Net Acres | Tract Participation | Storage Facility Participation | Acreage Leased |
|---|---|---|---|---|---|---|
| 53 | Section 05-T140N-R87W | Darlene A. Swenson | 229.1000 | 50.00000000% | 0.77806819% | 0.77806819% |
| | | Dawn Martin | 229.1000 | 50.00000000% | 0.77806819% | 0.77806819% |
| | | **Tract Total:** | **458.2000** | **100.00000000%** | | |
| 54 | Section 04-T140N-R87W | Kevin Opp, aka Kevin M. Opp | 224.1000 | 73.69286419% | 0.76108722% | |
| | | Andrew L. Peltz | 80.0000 | 26.30713581% | 0.27169557% | |
| | | **Tract Total:** | **304.1000** | **100.00000000%** | | |
| 55 | Section 07-T140N-R87W | Julianna S. Prescott | 37.5400 | 15.96903182% | 0.12749315% | 0.12749315% |
| | | Jeana J. Phillips, fka Jeana J. Beierlein | 37.5400 | 15.96903182% | 0.12749315% | 0.12749315% |
| | | Daryl Winckler, aka Daryl A. Winckler & Brenda Winckler, aka Brenda K. Winckler, husband and wife, as Joint Tenants, Life Estate | 160.0000 | 68.06193636% | 0.54339114% | 0.54339114% |
| | | Tanner J. Winckler, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Tracy Winckler Hulberg, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | **Tract Total:** | **235.0800** | **100.00000000%** | | |
| 56 | Section 12-T140N-R88W | James Beierlein & Mary J. Beierlein, as Joint Tenants, Life Estate | 80.0000 | 50.00000000% | 0.27169557% | 0.27169557% |
| | | Jamie Beierlein, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Jessica Miller, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Amanda Gustin, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Glen Beierlein, Life Estate | 80.0000 | 50.00000000% | 0.27169557% | 0.27169557% |
| | | James Beierlein & Mary J. Beierlein, as Joint Tenants, Remaindermen | 0.0000 | 0.00000000% | 0.00000000% | |
| | | **Tract Total:** | **160.0000** | **100.00000000%** | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| | | | **Total Acres** | | **Storage Facility Participation** | **Acreage Leased** |
| | | | **29,444.7200** | | **100.00000000%** | **89.14158464%** |

**EXHIBIT B**
**TRACT PARTICIPATION SUMMARY**
(Leased as of June 10, 2024)
SCS2

| Tract No. | Land Description | Owner Name | Tract Net Acres | Tract Participation | Storage Facility Participation | Acreage Leased |
|---|---|---|---|---|---|---|
| 1 | Section 27-T143N-R88W | Donlyn J. Erickson & Roberta Erickson, aka Roberta C. Erickson, as Joint Tenants | 40.0000 | 14.28571429% | 0.13867428% | 0.13867428% |
| | | Linda Welk, Life Estate | 80.0000 | 28.57142857% | 0.27734856% | 0.27734856% |
| | | Jonathan Welk, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Stacy Welk, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Jonathan Welk | 40.0000 | 14.28571429% | 0.13867428% | 0.13867428% |
| | | Stacy Welk | 40.0000 | 14.28571429% | 0.13867428% | 0.13867428% |
| | | Kurt M. Swenson & FayE B. Swenson, Trustees of the Swenson Living Trust, dated May 19, 2023, and any amendments thereto | 80.0000 | 28.57142857% | 0.27734856% | |
| | | **Tract Total:** | **280.0000** | **100.00000000%** | | |
| 2 | Section 28-T143N-R88W | Shane Kost & Kristi Kost, husband & wife as, Joint Tenants | 80.0000 | 16.66666667% | 0.27734856% | 0.27734856% |
| | | Ronald E. Gunsch & Janice J. Gunsch, husband & wife as Tenants in Common | 240.0000 | 50.00000000% | 0.83204568% | 0.83204568% |
| | | Myron L. Vigesaa and Nancy L. Vigesaa, Trustees, or their Successors in Trust, Under the Myron L. Vigesaa Revocable Living Trust Dated the 27th Day of June, 2014, and any Amendments thereto | 40.0000 | 8.33333333% | 0.13867428% | 0.13867428% |

INDUSTRIAL COMMISSION
STATE OF NORTH DAKOTA
DATE 6/11/24 CASE NO. 30869-30880
Introduced By Summit
Exhibit 5B
Identified By Skaare

| Tract No. | Land Description | Owner Name | Tract Net Acres | Tract Participation | Storage Facility Participation | Acreage Leased |
|---|---|---|---|---|---|---|
| | | Nancy L. Vigesaa and Myron L. Vigesaa, Trustees, or their Successors in Trust, Under the Nancy L. Vigesaa Revocable Living Trust Dated the 27th Day of June, 2014, and any Amendments thereto | 40.0000 | 8.33333333% | 0.13867428% | 0.13867428% |
| | | Nathan R. Vigesaa & Heather L. Vigesaa, as Joint Tenants | 80.0000 | 16.66666667% | 0.27734856% | 0.27734856% |
| | | **Tract Total:** | **480.0000** | **100.00000000%** | | |
| 3 | Section 29-T143N-R88W | Lyle Winkler & Patricia A. Winkler, husband & wife, as Joint Tenants | 200.0000 | 100.00000000% | 0.69337140% | 0.69337140% |
| | | **Tract Total:** | **200.0000** | **100.00000000%** | | |
| 4 | Section 32-T143N-R88W | U.S. Bank, N.A., of Fargo, North Dakota, as Trustee of the Darwin H. Mueller Irrevocable Trust | 160.0000 | 33.33333333% | 0.55469712% | |
| | | State of North Dakota | 160.0000 | 33.33333333% | 0.55469712% | |
| | | Shane L. Fischer, as Trustee of the Shane L. Fischer Trust | 80.0000 | 16.66666667% | 0.27734856% | 0.27734856% |
| | | Shane Fischer, aka Shane Leo Fischer | 80.0000 | 16.66666667% | 0.27734856% | 0.27734856% |
| | | **Tract Total:** | **480.0000** | **100.00000000%** | | |
| 5 | Section 33-T143N-R88W | Ronald Gunsch | 317.6500 | 49.63281250% | 1.10124713% | 1.10124713% |
| | | Ronald E. Gunsch & Janice J. Gunsch, as Joint Tenants | 2.3500 | 0.36718750% | 0.00814711% | 0.00814711% |
| | | Ronald E. Gunsch & Janice J. Gunsch, husband & wife | 320.0000 | 50.00000000% | 1.10939425% | 1.10939425% |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 6 | Section 34-T143N-R88W | Eric Klindworth, aka Eric H. Klindworth & Jacinta Klindworth, aka Jacinta-Jon T. Klindworth, as Joint Tenants | 160.0000 | 25.00000000% | 0.55469712% | |
| | | Ronald Gunsch | 320.0000 | 50.00000000% | 1.10939425% | 1.10939425% |

| Tract No. | Land Description | Owner Name | Tract Net Acres | Tract Participation | Storage Facility Participation | Acreage Leased |
|---|---|---|---|---|---|---|
| | | Donlyn J. Erickson & Roberta Erickson, aka Roberta C. Erickson, as Joint Tenants | 160.0000 | 25.00000000% | 0.55469712% | 0.55469712% |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 7 | Section 35-T143N-R88W | Rachel Riedemann, fka Rachel Hushka, fka Rachel Erickson | 160.0000 | 33.33333333% | 0.55469712% | 0.55469712% |
| | | Donlyn J. Erickson & Roberta Erickson, aka Roberta C. Erickson, as Joint Tenants | 320.0000 | 66.66666667% | 1.10939425% | 1.10939425% |
| | | **Tract Total:** | **480.0000** | **100.00000000%** | | |
| 8 | Section 05-T142N-R87W | Chad N. Schafer & Lisa L. Schafer, husband & wife, as Joint Tenants | 80.0000 | 100.00000000% | 0.27734856% | 0.27734856% |
| | | **Tract Total:** | **80.0000** | **100.00000000%** | | |
| 9 | Section 06-T142N-R87W | Darell Herman & Sherry Herman, husband & wife, as Joint Tenants | 279.0600 | 100.00000000% | 0.96746112% | 0.96746112% |
| | | **Tract Total:** | **279.0600** | **100.00000000%** | | |
| 10 | Section 01-T142N-R88W | Noel J. Helm & Betty Helm, aka Betty Jean Helm, husband & wife, as Joint Tenants, Life Estate | 320.0000 | 100.00000000% | 1.10939425% | 1.10939425% |
| | | John T. Helm, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Jason J. Helm, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Wayne J. Helm, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Jerome L. Helm, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | **Tract Total:** | **320.0000** | **100.00000000%** | | |
| 11 | Section 02-T142N-R88W | Jason Erickson & Angela Erickson, husband & wife | 81.3600 | 14.42885772% | 0.28206349% | 0.28206349% |
| | | Wanda Gustafson, a married person dealing in her sole & separate property, Life Estate | 162.5100 | 28.82047280% | 0.56339893% | 0.56339893% |
| | | Lori B. Klein, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Sara L. Gustafson, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |

| Tract No. | Land Description | Owner Name | Tract Net Acres | Tract Participation | Storage Facility Participation | Acreage Leased |
|---|---|---|---|---|---|---|
| | | Jason T. Erickson & Angela Erickson, husband & wife, as Joint Tenants | 160.0000 | 28.37533474% | 0.55469712% | 0.55469712% |
| | | Robb M. Moore & Heidi K. Moore, husband & wife, as Joint Tenants | 160.0000 | 28.37533474% | 0.55469712% | 0.55469712% |
| | | **Tract Total:** | **563.8700** | **100.00000000%** | | |
| 12 | Section 03-T142N-R88W | Donlyn J. Erickson & Roberta Erickson, aka Roberta C. Erickson, as Joint Tenants | 322.3500 | 50.00542947% | 1.11754136% | 1.11754136% |
| | | David A. Orth & Ronni L. Huschka | 20.2875 | 3.14715418% | 0.07033386% | |
| | | Joan Cundall | 20.2875 | 3.14715418% | 0.07033386% | |
| | | Robert H. Orth | 6.7625 | 1.04905139% | 0.02344462% | |
| | | Richard A. Orth | 6.7625 | 1.04905139% | 0.02344462% | |
| | | Kimberly Orth | 6.7625 | 1.04905139% | 0.02344462% | 0.02344462% |
| | | Wilfred Orth | 20.2875 | 3.14715418% | 0.07033386% | |
| | | Estate of Cecelia Orth | 81.1300 | 12.58551417% | 0.28126611% | |
| | | David Hottman & Stephanie Hottman, husband & wife, as Joint Tenants | 6.1000 | 0.94627926% | 0.02114783% | |
| | | Donlyn J. Erickson & Roberta Erickson, aka Roberta C. Erickson, as Joint Tenants | 153.9000 | 23.87416037% | 0.53354930% | 0.53354930% |
| | | **Tract Total:** | **644.6300** | **100.00000000%** | | |
| 13 | Section 04-T142N-R88W | Tanner Erickson & Heather Erickson, as Joint Tenants | 2.0000 | 0.31034697% | 0.00693371% | 0.00693371% |
| | | Donlyn J. Erickson & Roberta Erickson, aka Roberta C. Erickson, as Joint Tenants | 320.2300 | 49.69120477% | 1.11019162% | 1.11019162% |
| | | LeeRoy J. Winkler & Sharon L. Winkler, husband & wife, as Joint Tenants, Life Estate | 162.2100 | 25.17069083% | 0.56235888% | 0.56235888% |
| | | Roberta Unruh, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |

| Tract No. | Land Description | Owner Name | Tract Net Acres | Tract Participation | Storage Facility Participation | Acreage Leased |
|---|---|---|---|---|---|---|
| | | Kimberly Dukart, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Amanda Ahlschlager, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Perry Winkler & Beth Winkler, husband & wife, as Joint Tenants | 160.0000 | 24.82775743% | 0.55469712% | 0.55469712% |
| | | **Tract Total:** | **644.4400** | **100.00000000%** | | |
| 14 | Section 05-T142N-R88W | Howard H. Winkler & Bernadette J. Winkler, husband & wife, as Joint Tenants | 162.1100 | 25.16962442% | 0.56201219% | 0.56201219% |
| | | Nichole Lee Sailer, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Arnold V. Winkler & Sharon D. Winkler, husband & wife, as Joint Tenants | 161.9600 | 25.14633503% | 0.56149216% | 0.56149216% |
| | | Russell D. Winkler & Tammy Winkler, husband & wife, as Joint Tenants | 160.0000 | 24.84202028% | 0.55469712% | 0.55469712% |
| | | Perry Winkler & Beth Winkler, husband & wife, as Joint Tenants | 160.0000 | 24.84202028% | 0.55469712% | 0.55469712% |
| | | **Tract Total:** | **644.0700** | **100.00000000%** | | |
| 15 | Section 06-T142N-R88W | Casey Lee Voigt and Julie Anne Voigt, Trustees of the Casey Lee Voigt Living Trust dated January 26, 2023, and any amendments thereto | 160.8400 | 100.00000000% | 0.55760928% | |
| | | Donalda Voigt, Contract for Deed Seller | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Karmen Eslinger, Contract for Deed Seller | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Shawn Voigt, Contract for Deed Seller | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Kenneth Voigt, Contract for Deed Seller | 0.0000 | 0.00000000% | 0.00000000% | |
| | | **Tract Total:** | **160.8400** | **100.00000000%** | | |

| Tract No. | Land Description | Owner Name | Tract Net Acres | Tract Participation | Storage Facility Participation | Acreage Leased |
|---|---|---|---|---|---|---|
| 16 | Section 07-T142N-R88W | Perry Winkler & Beth Winkler, husband & wife, Life Estate | 160.0000 | 50.00000000% | 0.55469712% | 0.55469712% |
| | | Kacey Winkler, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Korey Winkler, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Nancy Flemmer, aka Nancy Lee Flemmer, Life Estate | 160.0000 | 50.00000000% | 0.55469712% | 0.55469712% |
| | | Cherie Ann Fischer, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Shawn Michael Flemmer, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | **Tract Total:** | **320.0000** | **100.00000000%** | | |
| 17 | Section 08-T142N-R88W | LeeRoy J. Winkler & Sharon L. Winkler, husband & wife, as Joint Tenants, Life Estate | 160.0000 | 25.00000000% | 0.55469712% | 0.55469712% |
| | | Roberta Unruh, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Kimberly Dukart, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Amanda Ahlschlager, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Perry Winkler & Beth Winkler, husband & wife, Life Estate | 320.0000 | 50.00000000% | 1.10939425% | 1.10939425% |
| | | Kacey Winkler, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Korey Winkler, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Nancy Flemmer, aka Nancy Lee Flemmer, Life Estate | 160.0000 | 25.00000000% | 0.55469712% | 0.55469712% |
| | | Cherie Ann Fischer, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Shawn Michael Flemmer, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 18 | Section 09-T142N-R88W | James A. Swenson & Darlene A. Swenson, as Joint Tenants, Life Estate | 320.0000 | 50.00000000% | 1.10939425% | 1.10939425% |
| | | Trent T. Martin & Dawn Martin, as Joint Tenants, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |

| Tract No. | Land Description | Owner Name | Tract Net Acres | Tract Participation | Storage Facility Participation | Acreage Leased |
|---|---|---|---|---|---|---|
| | | LeeRoy J. Winkler & Sharon L. Winkler, husband & wife, as Joint Tenants, Life Estate | 160.0000 | 25.00000000% | 0.55469712% | 0.55469712% |
| | | Roberta Unruh, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Kimberly Dukart, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Amanda Ahlschlager, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Perry Winkler & Beth Winkler, husband & wife, Life Estate | 160.0000 | 25.00000000% | 0.55469712% | 0.55469712% |
| | | Kacey Winkler, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Korey Winkler, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 19 | Section 10-T142N-R88W | Donlyn J. Erickson & Roberta Erickson, aka Roberta C. Erickson, as Joint Tenants | 160.0000 | 25.00000000% | 0.55469712% | 0.55469712% |
| | | James A. Swenson & Darlene A. Swenson, as Joint Tenants, Life Estate | 158.0000 | 24.68750000% | 0.54776341% | 0.54776341% |
| | | Trent T. Martin & Dawn Martin, as Joint Tenants, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Trent T. Martin & Dawn Martin, as Joint Tenants | 322.0000 | 50.31250000% | 1.11632796% | 1.11632796% |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 20 | Section 11-T142N-R88W | Fayette L. Cote & Robert V. Cote, as Trustees of the Robert V. Cote and Fayette L. Cote Trust Agreement of April 4, 2016 | 160.0000 | 25.00000000% | 0.55469712% | 0.55469712% |
| | | James A. Swenson & Darlene A. Swenson, as Joint Tenants, Life Estate | 160.0000 | 25.00000000% | 0.55469712% | 0.55469712% |
| | | Trent T. Martin & Dawn Martin, as Joint Tenants, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |

| Tract No. | Land Description | Owner Name | Tract Net Acres | Tract Participation | Storage Facility Participation | Acreage Leased |
|---|---|---|---|---|---|---|
| | | Ryan J. Flemmer | 320.0000 | 50.00000000% | 1.10939425% | 1.10939425% |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 21 | Section 12-T142N-R88W | Johnell J. Kusler | 80.0000 | 12.50000000% | 0.27734856% | 0.27734856% |
| | | Milda L. Hedblom | 80.0000 | 12.50000000% | 0.27734856% | 0.27734856% |
| | | Vivian Viola Hauff, aka Vivian V. Hauff, Life Estate | 80.0000 | 12.50000000% | 0.27734856% | |
| | | Jerry L. Hauff, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Willa Jean Ann Weaver | 80.0000 | 12.50000000% | 0.27734856% | |
| | | Darwin Huber & Susan E. Huber, husband & wife, as Joint Tenants Life Estate | 160.0000 | 25.00000000% | 0.55469712% | |
| | | Daryl D. Huber, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Darren D. Huber, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Jason T. Erickson & Angela Erickson, husband & wife, as Joint Tenants | 160.0000 | 25.00000000% | 0.55469712% | 0.55469712% |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 22 | Section 07-T142N-R87W | Trent T. Martin & Dawn Martin, husband & wife, as Joint Tenants | 190.8800 | 29.95981919% | 0.66175367% | 0.66175367% |
| | | Kurt M. Swenson & Faye B. Swenson, trustees of the Swenson Living Trust dated May 19, 2023 | 120.5500 | 18.92108237% | 0.41792961% | 0.41792961% |
| | | Joseph O. Swenson | 6.0600 | 0.95115520% | 0.02100915% | 0.02100915% |
| | | Johnell J. Kusler & Geoffrey E. Tayler, wife and husband | 0.5750 | 0.09024987% | 0.00199344% | 0.00199344% |
| | | Milda L. Hedblom, aka Milda K. Hedblom & Edwin Fogelman, wife and husband | 0.5750 | 0.09024987% | 0.00199344% | 0.00199344% |
| | | Todd Rueb & Darcy Rueb, husband & wife, as Joint Tenants | 318.4800 | 49.98744350% | 1.10412462% | 1.10412462% |
| | | **Tract Total:** | **637.1200** | **100.00000000%** | | |

| Tract No. | Land Description | Owner Name | Tract Net Acres | Tract Participation | Storage Facility Participation | Acreage Leased |
|---|---|---|---|---|---|---|
| 23 | Section 08-T142N-R87W | Travis Hellickson & Amber Hellickson, as Joint Tenants | 160.0000 | 50.00000000% | 0.55469712% | 0.55469712% |
| | | Noel Helm & Betty Helm, husband & wife | 160.0000 | 50.00000000% | 0.55469712% | 0.55469712% |
| | | **Tract Total:** | **320.0000** | **100.00000000%** | | |
| 24 | Section 17-T142N-R87W | Jason Erickson & Angela Erickson, husband & wife as Joint Tenants | 320.0000 | 100.00000000% | 1.10939425% | 1.10939425% |
| | | **Tract Total:** | **320.0000** | **100.00000000%** | | |
| 25 | Section 18-T142N-R87W | Johnell J. Kusler | 80.0000 | 12.55886970% | 0.27734856% | 0.27734856% |
| | | Milda L. Hedblom | 80.0000 | 12.55886970% | 0.27734856% | 0.27734856% |
| | | Jason Erickson & Angela Erickson, husband & wife as Joint Tenants | 158.4500 | 24.87441130% | 0.54932349% | 0.54932349% |
| | | Robert Schutt & Alberta E. Schutt, Trustees, or their successors in trust, under the Robert Schutt and Alberta E. Schutt Living Trust, dated December 7, 2015, and any amendments thereto | 316.0500 | 49.61538462% | 1.09570016% | 1.09570016% |
| | | Keith Schutt | 2.5000 | 0.39246468% | 0.00866714% | 0.00866714% |
| | | **Tract Total:** | **637.0000** | **100.00000000%** | | |
| 26 | Section 13-T142N-R88W | Jason T. Erickson & Angela Erickson, husband & wife, as Joint Tenants | 318.8500 | 49.82031250% | 1.10540736% | 1.10540736% |
| | | Roughrider Electric Cooperative, Inc. | 1.1500 | 0.17968750% | 0.00398689% | |
| | | Jolene M. Rust aka JoLene M. Rust | 160.0000 | 25.00000000% | 0.55469712% | |
| | | Ernest J. Vollan, Life Estate | 160.0000 | 25.00000000% | 0.55469712% | 0.55469712% |
| | | Cynthia K. Nickel, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 27 | Section 14-T142N-R88W | Carol M. Kaelberer, Life Estate | 80.0000 | 12.50000000% | 0.27734856% | 0.27734856% |
| | | Morgan Nagel, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Garrett Kirchmeier, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |

| Tract No. | Land Description | Owner Name | Tract Net Acres | Tract Participation | Storage Facility Participation | Acreage Leased |
|---|---|---|---|---|---|---|
| | | Chandler J. Kirchmeier, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Kurt M. Swenson and FayE B. Swenson, Trustees, or their successors in interest, of the Swenson Living Trust dated May 19, 2023, and any amendments thereto | 80.0000 | 12.50000000% | 0.27734856% | |
| | | LeeRoy Fischer, aka LeeRoy J. Fischer | 320.0000 | 50.00000000% | 1.10939425% | 1.10939425% |
| | | Fayette L. Cote & Robert V. Cote, as Trustees of the Robert V. Cote and Fayette L. Cote Trust Agreement of April 4, 2016 | 160.0000 | 25.00000000% | 0.55469712% | 0.55469712% |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 28 | Section 15-T142N-R88W | Trent Martin & Dawn Martin, husband & wife, as Joint Tenants | 640.0000 | 100.00000000% | 2.21878849% | 2.21878849% |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 29 | Section 16-T142N-R88W | LeeRoy J. Fischer | 320.0000 | 50.00000000% | 1.10939425% | 1.10939425% |
| | | Perry Winkler & Beth Winkler, husband & wife, Life Estate | 160.0000 | 25.00000000% | 0.55469712% | 0.55469712% |
| | | Kacey Winkler, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Korey Winkler, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Norman R. Winkler & Martha E. Winkler, husband & wife, as Joint Tenants | 160.0000 | 25.00000000% | 0.55469712% | 0.55469712% |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 30 | Section 17-T142N-R88W | Doris B. Mutzenberger & James J. Mutzenberger, wife & husband, as Joint Tenants, Life Estate | 158.0000 | 24.68750000% | 0.54776341% | 0.54776341% |
| | | Tony Mutzenberger, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Casey Mutzenberger, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |

| Tract No. | Land Description | Owner Name | Tract Net Acres | Tract Participation | Storage Facility Participation | Acreage Leased |
|---|---|---|---|---|---|---|
| | | Casey Mutzenberger | 2.0000 | 0.31250000% | 0.00693371% | 0.00693371% |
| | | Tony Mutzenberger | 207.0000 | 32.34375000% | 0.71763940% | 0.71763940% |
| | | Myron Flemmer & Evelyn Flemmer, husband & wife, Contract for Deed Seller | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Perry Winkler & Beth Winkler, as Joint Tenants | 113.0000 | 17.65625000% | 0.39175484% | 0.39175484% |
| | | Christopher Palmer & Kayla Palmer, husband & wife, as Joint Tenants | 160.0000 | 25.00000000% | 0.55469712% | 0.55469712% |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 31 | Section 18-T142N-R88W | Perry Winkler & Beth Winkler, husband & wife, Life Estate | 80.0000 | 20.00000000% | 0.27734856% | 0.27734856% |
| | | Kacey Winkler, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Korey Winkler, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Perry Winkler & Beth Winkler, as Joint Tenants | 120.0000 | 30.00000000% | 0.41602284% | 0.41602284% |
| | | Shawn Unruh & Shevelle Unruh, as Joint Tenants | 20.0000 | 5.00000000% | 0.06933714% | |
| | | Austin Jensen & Destinee Jensen, aka Destiny Jensen, as Joint Tenants | 20.0000 | 5.00000000% | 0.06933714% | |
| | | Paulette White, fka Paulette Hogan | 160.0000 | 40.00000000% | 0.55469712% | 0.55469712% |
| | | **Tract Total:** | **400.0000** | **100.00000000%** | | |
| 32 | Section 19-T142N-R88W | Steven C. Goetz, aka Steve Goetz, a single person, Life Estate | 160.0000 | 50.00000000% | 0.55469712% | 0.55469712% |
| | | Shane J. Goetz and Samantha J. Goetz, Remaindermen | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Paul A. Schock | 160.0000 | 50.00000000% | 0.55469712% | 0.55469712% |
| | | **Tract Total:** | **320.0000** | **100.00000000%** | | |
| 33 | Section 20-T142N-R88W | Christopher Palmer & Kayla Palmer, husband & wife, as Joint Tenants | 160.0000 | 25.00000000% | 0.55469712% | 0.55469712% |

| Tract No. | Land Description | Owner Name | Tract Net Acres | Tract Participation | Storage Facility Participation | Acreage Leased |
|---|---|---|---|---|---|---|
| | | Thomas Welk, aka Thomas C. Welk, Life Estate | 240.0000 | 37.50000000% | 0.83204568% | 0.83204568% |
| | | Amy Dinius, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | David Welk, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Cody S. Thiel & Megan B. Thiel, husband & wife | 240.0000 | 37.50000000% | 0.83204568% | 0.83204568% |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 34 | Section 21-T142N-R88W | Jerry Ballensky and Julie Ballensky, husband & wife, as Joint Tenants | 160.0000 | 25.00000000% | 0.55469712% | 0.55469712% |
| | | David Fischer | 160.0000 | 25.00000000% | 0.55469712% | |
| | | Cody S. Thiel & Megan B. Thiel, husband & wife | 160.0000 | 25.00000000% | 0.55469712% | 0.55469712% |
| | | Sheila Hildebrand & Steven B. Hildebrand, wife & husband, as Joint Tenants | 160.0000 | 25.00000000% | 0.55469712% | 0.55469712% |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 35 | Section 22-T142N-R88W | Irene Fischer, aka Irene E. Fischer, Life Estate | 320.0000 | 50.00000000% | 1.10939425% | 1.10939425% |
| | | Barry R. Fischer, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Brendan B. Flemmer | 297.6000 | 46.50000000% | 1.03173665% | 1.03173665% |
| | | Jerry D. Ballensky and Julie Ballensky, husband & wife, as Joint Tenants | 22.4000 | 3.50000000% | 0.07765760% | 0.07765760% |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 36 | Section 23-T142N-R88W | Irene Fischer, aka Irene E. Fischer, Life Estate | 475.0000 | 74.21875000% | 1.64675708% | 1.64675708% |
| | | Barry R. Fischer, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Brendan B. Flemmer | 160.0000 | 25.00000000% | 0.55469712% | 0.55469712% |
| | | Thomas M. Fandrich & Laura Jane Fandrich, husband & wife as Joint Tenants | 5.0000 | 0.78125000% | 0.01733429% | 0.01733429% |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |

| Tract No. | Land Description | Owner Name | Tract Net Acres | Tract Participation | Storage Facility Participation | Acreage Leased |
|---|---|---|---|---|---|---|
| 37 | Section 24-T142N-R88W | Ernest J. Vollan, Life Estate | 320.0000 | 50.00000000% | 1.10939425% | 1.10939425% |
| | | Cynthia K. Nickel, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | John M. Jochim | 160.0000 | 25.00000000% | 0.55469712% | |
| | | Michael P. Bauman | 140.0000 | 21.87500000% | 0.48535998% | |
| | | Violet J. Jochim | 20.0000 | 3.12500000% | 0.06933714% | |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 38 | Section 19-T142N-R87W | Robert Schutt & Alberta E. Schutt, Trustees, or their successors in trust, under the Robert Schutt and Alberta E. Schutt Living Trust, dated December 7, 2015, and any amendments thereto | 478.5900 | 75.11300144% | 1.65920310% | 1.65920310% |
| | | Jeffrey Schutt | 158.5700 | 24.88699856% | 0.54973952% | 0.54973952% |
| | | **Tract Total:** | **637.1600** | **100.00000000%** | | |
| 39 | Section 20-T142N-R87W | Robert Schutt & Alberta E. Schutt, Trustees, or their successors in trust, under the Robert Schutt and Alberta E. Schutt Living Trust, dated December 7, 2015, and any amendments thereto | 160.0000 | 50.00000000% | 0.55469712% | 0.55469712% |
| | | Mark S. Singer | 160.0000 | 50.00000000% | 0.55469712% | 0.55469712% |
| | | **Tract Total:** | **320.0000** | **100.00000000%** | | |
| 40 | Section 29-T142N-R87W | Jeffrey Schutt | 160.0000 | 50.00000000% | 0.55469712% | 0.55469712% |
| | | Robert Schutt & Alberta E. Schutt, Trustees, or their successors in trust, under the Robert Schutt and Alberta E. Schutt Living Trust, dated December 7, 2015, and any amendments thereto | 60.0000 | 18.75000000% | 0.20801142% | 0.20801142% |
| | | Ernest J. Vollan, Life Estate | 100.0000 | 31.25000000% | 0.34668570% | 0.34668570% |
| | | Cynthia K. Nickel, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | **Tract Total:** | **320.0000** | **100.00000000%** | | |

| Tract No. | Land Description | Owner Name | Tract Net Acres | Tract Participation | Storage Facility Participation | Acreage Leased |
|---|---|---|---|---|---|---|
| 41 | Section 30-T142N-R87W | Rory C. Flemmer & Jennifer Flemmer, husband & wife, as Joint Tenants | 329.0000 | 51.57063139% | 1.14059596% | 1.14059596% |
| | | Jeffrey Schutt | 301.9600 | 47.33212114% | 1.04685215% | 1.04685215% |
| | | The North Dakota State Water Commission | 1.0000 | 0.15674964% | 0.00346686% | |
| | | Church of St. Joseph – Beulah Trustee, Inc., a nonprofit corporation, as trustee | 6.0000 | 0.94049784% | 0.02080114% | |
| | | **Tract Total:** | **637.9600** | **100.00000000%** | | |
| 42 | Section 25-T142N-R88W | Duane Flemmer & Lori Flemmer, husband & wife, as Joint Tenants | 471.4920 | 73.67062500% | 1.63459535% | 1.63459535% |
| | | Elsie Opp, fka Elsie Flemmer, Life Estate, Contract for Deed Seller | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Duane Flemmer, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Linda Flemmer, Contract for Deed Seller & Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Dennis Flemmer, Contract for Deed Seller & Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Ernest J. Vollan, Life Estate | 160.0000 | 25.00000000% | 0.55469712% | 0.55469712% |
| | | Cynthia K. Nickel, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Rory C. Flemmer | 8.5080 | 1.32937500% | 0.02949602% | 0.02949602% |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 43 | Section 26-T142N-R88W | Brendan B. Flemmer | 435.9000 | 68.10937500% | 1.51120298% | 1.51120298% |
| | | Robb M. Moore & Heidi K. Moore, husband & wife, as Joint Tenants | 44.1000 | 6.89062500% | 0.15288839% | 0.15288839% |
| | | Darwin Huber | 54.8100 | 8.56406250% | 0.19001843% | |
| | | Cody Scott Thiel | 105.1900 | 16.43593750% | 0.36467869% | 0.36467869% |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 44 | Section 27-T142N-R88W | Jerry D. Ballensky & Julie Ballensky, husband & wife, as Joint Tenants | 297.6000 | 46.50000000% | 1.03173665% | 1.03173665% |

| Tract No. | Land Description | Owner Name | Tract Net Acres | Tract Participation | Storage Facility Participation | Acreage Leased |
|---|---|---|---|---|---|---|
| | | Brendan B. Flemmer | 22.4000 | 3.50000000% | 0.07765760% | 0.07765760% |
| | | Cody S. Thiel | 80.0000 | 12.50000000% | 0.27734856% | 0.27734856% |
| | | Cody S. Thiel, aka Cody Scott Thiel & Megan B. Thiel | 80.0000 | 12.50000000% | 0.27734856% | 0.27734856% |
| | | | | | | |
| | | Sheila Hildebrand & Steven B. Hildebrand, wife & husband, as Joint Tenants | 160.0000 | 25.00000000% | 0.55469712% | 0.55469712% |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 45 | Section 28-T142N-R88W | Cody S. Thiel, aka Cody Scott Thiel & Megan B. Thiel | 480.0000 | 75.00000000% | 1.66409137% | 1.66409137% |
| | | Cody S. Thiel & Megan B. Thiel, as Joint Tenants | 160.0000 | 25.00000000% | 0.55469712% | 0.55469712% |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 46 | Section 29-T142N-R88W | Emil Vernon Lapp, Jr. aka Emil V. Lapp, Jr. & Donna J. Lapp, husband & wife as Joint Tenants, Life Estate | 480.0000 | 75.00000000% | 1.66409137% | 1.66409137% |
| | | Michael Lapp, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Cody S. Thiel, aka Cody Scott Thiel & Megan B. Thiel | 160.0000 | 25.00000000% | 0.55469712% | 0.55469712% |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 47 | Section 30-T142N-R88W | Clark D. Pochant & Jayne D. Pochant, husband & wife, as Joint Tenants | 73.0100 | 45.63125000% | 0.25311523% | 0.25311523% |
| | | Chance Mastel | 5.0000 | 3.12500000% | 0.01733429% | 0.01733429% |
| | | Jessica Voegele | 1.9900 | 1.24375000% | 0.00689905% | 0.00689905% |
| | | Thomas Welk, aka Thomas C. Welk, Life Estate | 80.0000 | 50.00000000% | 0.27734856% | 0.27734856% |
| | | Amy Dinius, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | David Welk, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | **Tract Total:** | **160.0000** | **100.00000000%** | | |
| 48 | Section 32-T142N-R88W | Walter E. Frank | 160.0000 | 33.33333333% | 0.55469712% | 0.55469712% |

| Tract No. | Land Description | Owner Name | Tract Net Acres | Tract Participation | Storage Facility Participation | Acreage Leased |
|---|---|---|---|---|---|---|
| | | Thomas Welk, aka Thomas C. Welk, Life Estate | 120.0000 | 25.00000000% | 0.41602284% | 0.41602284% |
| | | Amy Dinius, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | David Welk, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Dwight J. Frank & Beverly A. Frank, husband & wife, Joint Tenants | 200.0000 | 41.66666667% | 0.69337140% | 0.69337140% |
| | | **Tract Total:** | **480.0000** | **100.00000000%** | | |
| 49 | Section 33-T142N-R88W | Paul A. Schock | 320.0000 | 50.00000000% | 1.10939425% | 1.10939425% |
| | | Steven C. Goetz, aka Steve Goetz, a single person, Life Estate | 160.0000 | 25.00000000% | 0.55469712% | 0.55469712% |
| | | Shane J. Goetz and Samantha J. Goetz, Remaindermen | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Ruby Emter, Life Estate | 160.0000 | 25.00000000% | 0.55469712% | 0.55469712% |
| | | Leeta Olin, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Tammy Moore, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 50 | Section 34-T142N-R88W | Michelle M. Braun | 640.0000 | 100.00000000% | 2.21878849% | 2.21878849% |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 51 | Section 35-T142N-R88W | Darwin Huber & Susan E. Huber, husband & wife, as Joint Tenants, Life Estate | 126.0500 | 19.69531250% | 0.43699733% | |
| | | Daryl D. Huber, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Darren D. Huber, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Cody Scott Thiel | 33.9500 | 5.30468750% | 0.11769980% | 0.11769980% |
| | | Brendan B. Flemmer | 320.0000 | 50.00000000% | 1.10939425% | 1.10939425% |
| | | Delmer F. Voegele & Cassandra R. Voegele, husband & wife, as Joint Tenants, Life Estate | 160.0000 | 25.00000000% | 0.55469712% | 0.55469712% |
| | | Eric John Voegele, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |

| Tract No. | Land Description | Owner Name | Tract Net Acres | Tract Participation | Storage Facility Participation | Acreage Leased |
|---|---|---|---|---|---|---|
| 52 | Section 36-T142N-R88W | Ralph Kemmet | 300.0000 | 46.87500000% | 1.04005711% | 1.04005711% |
| | | Duane Flemmer & Lori Flemmer, husband & wife, as Joint Tenants | 160.0000 | 25.00000000% | 0.55469712% | 0.55469712% |
| | | Elsie Opp, fka Elsie Flemmer, Life Estate, Contract for Deed Seller | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Duane Flemmer, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Linda Flemmer, Contract for Deed Seller & Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Dennis Flemmer, Contract for Deed Seller & Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Ralph Kemmet & Dena Kemmet, as Joint Tenants | 20.0000 | 3.12500000% | 0.06933714% | |
| | | Jeffrey Schutt, aka Jeffrey J. Schutt | 160.0000 | 25.00000000% | 0.55469712% | 0.55469712% |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 53 | Section 31-T142N-R87W | LeeRoy J. Fischer | 158.7100 | 100.00000000% | 0.55022488% | 0.55022488% |
| | | **Tract Total:** | **158.7100** | **100.00000000%** | | |
| 54 | Section 01-T141N-R88W | Larry Flemmer, aka Larry L. Flemmer | 159.8100 | 100.00000000% | 0.55403842% | 0.55403842% |
| | | **Tract Total:** | **159.8100** | **100.00000000%** | | |
| 55 | Section 02-T141N-R88W | Corey M. Voegele & Roxanne Voegele, husband & wife, as Joint Tenants | 267.7400 | 41.83829734% | 0.92821630% | 0.92821630% |
| | | Delmer F. Voegele & Cassandra R. Voegele, husband & wife, as Joint Tenants, Life Estate | 360.0400 | 56.26152452% | 1.24820720% | 1.24820720% |
| | | Corey Voegele, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Jack J. Kraft & Deborah Kraft, as Joint Tenants | 12.1600 | 1.90017814% | 0.04215698% | |
| | | **Tract Total:** | **639.9400** | **100.00000000%** | | |
| 56 | Section 03-T141N-R88W | Delmer F. Voegele & Cassandra R. Voegele, husband & wife, as Joint Tenants, Life Estate | 319.9600 | 66.66388866% | 1.10925557% | 1.10925557% |

| Tract No. | Land Description | Owner Name | Tract Net Acres | Tract Participation | Storage Facility Participation | Acreage Leased |
|---|---|---|---|---|---|---|
| | | Eric John Voegele, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Delmer F. Voegele & Cassandra R. Voegele, husband & wife, as Joint Tenants, Life Estate | 160.0000 | 33.33611134% | 0.55469712% | 0.55469712% |
| | | Corey Voegele, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | **Tract Total:** | **479.9600** | **100.00000000%** | | |
| | | | **Total Acres** | | **Storage Facility Participation** | **Acreage Leased** |
| | | | **28,844.5700** | | **100.00000000%** | **92.42967567%** |

INDUSTRIAL COMMISSION
STATE OF NORTH DAKOTA
DATE 6/11/24 CASE NO. 30869-30880
Introduced By Summit
Exhibit 5C
Identified By Skaare

# EXHIBIT B
## TRACT PARTICIPATION SUMMARY
(Leased as of June 10, 2024)
SCS3

| Tract No. | Land Description | Owner Name | Tract Net Acres | Tract Participation | Storage Facility Participation | Acreage Leased |
|---|---|---|---|---|---|---|
| 1 | Section 21-143N-86W | Burton Baier & LaRita Baier, aka LaRita R. Baier, as Joint Tenants, Life Estate | 320.0000 | 100.00000000% | 1.02437107% | 1.02437107% |
| | | Joel Baier, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Rachel Baier, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | **Tract Total:** | **320.0000** | **100.00000000%** | | |
| 2 | Section 20-143N-86W | Burton Baier & LaRita Baier, aka LaRita R. Baier, as Joint Tenants, Life Estate | 120.0000 | 18.75000000% | 0.38413915% | 0.38413915% |
| | | Joel Baier, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Rachel Baier, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Chad Oberlander | 320.0000 | 50.00000000% | 1.02437107% | 1.02437107% |
| | | Wade L. Unterseher | 160.0000 | 25.00000000% | 0.51218553% | 0.51218553% |
| | | Lindsey J. Robertson & Tammi M. Robertson | 40.0000 | 6.25000000% | 0.12804638% | 0.12804638% |
| | | Wade L. Unterseher, Contract for Deed Seller | 0.0000 | 0.00000000% | 0.00000000% | |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 3 | Section 19-143N-86W | Jolaine M. Bornemann, a widow, Life Estate | 40.0000 | 100.00000000% | 0.12804638% | 0.12804638% |
| | | Shawn Allen Bornemann, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | **Tract Total:** | **40.0000** | **100.00000000%** | | |
| 4 | Section 30-143N-86W | Wade L. Unterseher & Dorinda L. Unterseher, husband & wife, as Joint Tenants | 396.3800 | 100.00000000% | 1.26887564% | 1.26887564% |
| | | **Tract Total:** | **396.3800** | **100.00000000%** | | |

| Tract No. | Land Description | Owner Name | Tract Net Acres | Tract Participation | Storage Facility Participation | Acreage Leased |
|---|---|---|---|---|---|---|
| 5 | Section 29-143N-86W | Wade L. Unterseher & Dorinda L. Unterseher, husband & wife, as Joint Tenants | 320.0000 | 50.00000000% | 1.02437107% | 1.02437107% |
| | | Joel Baier | 160.0000 | 25.00000000% | 0.51218553% | 0.51218553% |
| | | Burton Baier & LaRita Baier, aka LaRita R. Baier, as Joint Tenants, Life Estate | 160.0000 | 25.00000000% | 0.51218553% | 0.51218553% |
| | | Joel Baier, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Rachel Baier, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 6 | Section 28-143N-86W | Burton Baier & LaRita Baier, aka LaRita R. Baier, as Joint Tenants, Life Estate | 200.0000 | 41.66666667% | 0.64023192% | 0.64023192% |
| | | Joel Baier, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Rachel Baier, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Chad Oberlander | 240.0000 | 50.00000000% | 0.76827830% | 0.76827830% |
| | | James E. Goetz & Sharon M. Goetz, husband & wife as Joint Tenants | 40.0000 | 8.33333333% | 0.12804638% | 0.12804638% |
| | | **Tract Total:** | **480.0000** | **100.00000000%** | | |
| 7 | Section 36-143N-86W | Haley Bohmbach, fka Haley Bargmann | 80.0000 | 25.00000000% | 0.25609277% | 0.25609277% |
| | | Robert Bargmann and Pamela Bargmann, as Joint Tenants, Life Estate | 80.0000 | 25.00000000% | 0.25609277% | 0.25609277% |
| | | Haley Bohmbach, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Free Karges & Endine Karges, as Joint Tenants | 160.0000 | 50.00000000% | 0.51218553% | 0.00000000% |
| | | **Tract Total:** | **320.0000** | **100.00000000%** | | |
| 8 | Section 35-143N-86W | Sandy Bargmann | 320.0000 | 50.00000000% | 1.02437107% | 1.02437107% |
| | | Carolyn Oster, aka Carolyn L. Oster, Life Estate | 320.0000 | 50.00000000% | 1.02437107% | 1.02437107% |
| | | Lyn Kull, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |

| Tract No. | Land Description | Owner Name | Tract Net Acres | Tract Participation | Storage Facility Participation | Acreage Leased |
|---|---|---|---|---|---|---|
| | | Todd Oster, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Audra Oster, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 9 | Section 34-143N-86W | Carolyn Oster, aka Carolyn L. Oster, Life Estate | 640.0000 | 100.00000000% | 2.04874214% | 2.04874214% |
| | | Lyn Kull, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Todd Oster, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Audra Oster, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 10 | Section 33-143N-86W | James E. Goetz & Sharon M. Goetz, husband & wife, as Joint Tenants | 640.0000 | 100.00000000% | 2.04874214% | 2.04874214% |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 11 | Section 32-143N-86W | Rachel Baier | 320.0000 | 50.00000000% | 1.02437107% | 1.02437107% |
| | | Wade L. Unterseher & Dorinda L. Unterseher, husband & wife, as Joint Tenants | 80.0000 | 12.50000000% | 0.25609277% | 0.25609277% |
| | | Charmayne Liebelt | 80.0000 | 12.50000000% | 0.25609277% | 0.00000000% |
| | | Clarence Foss, Jr. | 160.0000 | 25.00000000% | 0.51218553% | 0.51218553% |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 12 | Section 31-143N-86W | Dean D. Unterseher | 614.8900 | 98.13275028% | 1.96836102% | 1.96836102% |
| | | Brandon Unterseher | 11.7000 | 1.86724972% | 0.03745357% | 0.00000000% |
| | | **Tract Total:** | **626.5900** | **100.00000000%** | | |
| 13 | Section 36-143N-87W | Dean D. Unterseher | 160.0000 | 33.33333333% | 0.51218553% | 0.51218553% |
| | | Andrea Joy Blohm | 160.0000 | 33.33333333% | 0.51218553% | 0.51218553% |
| | | State of North Dakota | 160.0000 | 33.33333333% | 0.51218553% | 0.00000000% |
| | | **Tract Total:** | **480.0000** | **100.00000000%** | | |
| 14 | Section 02-142N-87W | Andrea Joy Blohm | 80.0000 | 33.33333333% | 0.25609277% | 0.25609277% |

| Tract No. | Land Description | Owner Name | Tract Net Acres | Tract Participation | Storage Facility Participation | Acreage Leased |
|---|---|---|---|---|---|---|
| | | David Degenstein & Vicki Degenstein, husband and wife, as Joint Tenants | 160.0000 | 66.66666667% | 0.51218553% | 0.51218553% |
| | | **Tract Total:** | **240.0000** | **100.00000000%** | | |
| 15 | Section 01-142N-87W | Andrea Joy Blohm | 640.5000 | 100.00000000% | 2.05034272% | 2.05034272% |
| | | **Tract Total:** | **640.5000** | **100.00000000%** | | |
| 16 | Section 06-142N-86W | Ross Glass & Sheri Glass, husband & wife, as Joint Tenants | 628.4700 | 100.00000000% | 2.01183277% | 2.01183277% |
| | | **Tract Total:** | **628.4700** | **100.00000000%** | | |
| 17 | Section 05-142N-86W | Robert C. Folk & Penelope C. Folk, as Joint Tenants | 159.6800 | 24.95389905% | 0.51116116% | 0.51116116% |
| | | Steven R. Hintz & Stacy Hintz, husband & wife, as Joint Tenants | 53.406667 | 8.34609574% | 0.17096326% | 0.17096326% |
| | | Kevin K. Hintz & Traci Hintz, husband & wife, as Joint Tenants | 53.406667 | 8.34609574% | 0.17096326% | 0.17096326% |
| | | Kelly G. Hintz and Ruby J. Hintz, Trustees of the Kelly G. Hintz Living Trust dated May 5, 2022 and any amendments thereto | 53.406667 | 8.34609574% | 0.17096326% | 0.17096326% |
| | | Ronald Kessler & Carol Kessler, husband & wife, as Joint Tenants | 160.0000 | 25.00390686% | 0.51218553% | 0.51218553% |
| | | Theresa Christenson | 160.0000 | 25.00390686% | 0.51218553% | 0.51218553% |
| | | **Tract Total:** | **639.9000** | **100.00000000%** | | |
| 18 | Section 04-142N-86W | Charles E. Wittenberg, aka Charles Wittenberg & Shiela M. Wittenberg, aka Shiela Wittenberg, husband & wife, as Joint Tenants, Life Estate | 318.2900 | 49.94194439% | 1.01889709% | 1.01889709% |
| | | Dawn D. Wittenberg, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Jacob H. Wittenberg, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |

| Tract No. | Land Description | Owner Name | Tract Net Acres | Tract Participation | Storage Facility Participation | Acreage Leased |
|---|---|---|---|---|---|---|
| | | Steven R. Hintz & Stacy Hintz, husband & wife, as Joint Tenants | 53.0100 | 8.31764263% | 0.16969347% | 0.16969347% |
| | | Kevin K. Hintz & Traci Hintz, husband & wife as Joint Tenants | 53.0100 | 8.31764263% | 0.16969347% | 0.16969347% |
| | | Kelly G. Hintz and Ruby J. Hintz, Trustees of the Kelly G. Hintz Living Trust dated May 5, 2022 and any amendments thereto | 53.0100 | 8.31764263% | 0.16969347% | 0.16969347% |
| | | Karen K. Erwin fka Karen K. Bozenski and Gregory J. Erwin, wife & husband, Life Estate | 160.0000 | 25.10512772% | 0.51218553% | 0.51218553% |
| | | Kristy L. Bozenski, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | **Tract Total:** | **637.3200** | **100.00000000%** | | |
| 19 | Section 03-142N-86W | Carolyn Oster, aka Carolyn L. Oster, Life Estate | 158.0000 | 24.84589257% | 0.50578321% | 0.50578321% |
| | | Lyn Kull, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Todd Oster, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Audra Oster, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Charles E. Wittenberg, aka Charles Wittenberg & Shiela M. Wittenberg, aka Shiela Wittenberg, husband & wife, as Joint Tenants, Life Estate | 317.9200 | 49.99370990% | 1.01771266% | 1.01771266% |
| | | Dawn D. Wittenberg, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Jacob H. Wittenberg, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Rebecca D. Orgaard & Todd M. Orgaard | 160.0000 | 25.16039753% | 0.51218553% | 0.51218553% |
| | | Marc J. Jensen & Marilyn D. Jensen, husband & wife, as Joint Tenants, Contract for Deed Seller | 0.0000 | 0.00000000% | 0.00000000% | |
| | | **Tract Total:** | **635.9200** | **100.00000000%** | | |

| Tract No. | Land Description | Owner Name | Tract Net Acres | Tract Participation | Storage Facility Participation | Acreage Leased |
|---|---|---|---|---|---|---|
| 20 | Section 02-142N-86W | Rebecca D. Orgaard & Todd M. Orgaard | 478.5300 | 75.14840290% | 1.53185090% | 1.53185090% |
| | | Marc J. Jensen & Marilyn D. Jensen, husband & wife, as Joint Tenants, Contract for Deed Seller | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Carolyn Oster, aka Carolyn L. Oster, Life Estate | 158.2500 | 24.85159710% | 0.50658350% | 0.50658350% |
| | | Lyn Kull, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Todd Oster, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Audra Oster, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | **Tract Total:** | **636.7800** | **100.00000000%** | | |
| 21 | Section 01-142N-86W | Lonnie Henke, Trustee of the Joyce Henke Farm Irrevocable Trust U/A dated 04/19/2018 | 478.6400 | 74.94676187% | 1.53220303% | 1.53220303% |
| | | Lonnie Henke | 160.0000 | 25.05323813% | 0.51218553% | 0.51218553% |
| | | Joyce Henke, Contract for Deed Seller | 0.0000 | 0.00000000% | 0.00000000% | |
| | | **Tract Total:** | **638.6400** | **100.00000000%** | | |
| 22 | Section 06-142N-85W | Robert Bargmann & Pamela Bargmann, husband & wife, as Joint Tenants, Life Estate | 117.2800 | 37.21284427% | 0.37543200% | 0.37543200% |
| | | Cody Bargmann, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Delbert Bargmann, aka Delbert H. Bargmann &Audrey Bargmann, aka Audrey I. Bargmann, as Joint Tenants, Life Estate | 157.8800 | 50.09518974% | 0.50539908% | 0.50539908% |
| | | Troy Bargmann, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Justin Bargmann, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Briana Scheid, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Cody Bargmann | 40.0000 | 12.69196599% | 0.12804638% | 0.12804638% |
| | | **Tract Total:** | **315.1600** | **100.00000000%** | | |

| Tract No. | Land Description | Owner Name | Tract Net Acres | Tract Participation | Storage Facility Participation | Acreage Leased |
|---|---|---|---|---|---|---|
| 23 | Section 07-142N-85W | Blaine Douglas Wilkens & Mikell Roeshell Wilkens, as Joint Tenants | 505.2800 | 98.05930756% | 1.61748192% | 1.61748192% |
| | | Blake L. Wilkens & Patricia A. Wilkens, husband & wife as Joint Tenants | 10.0000 | 1.94069244% | 0.03201160% | 0.03201160% |
| | | **Tract Total:** | **515.2800** | **100.00000000%** | | |
| 24 | Section 12-142N-86W | Lonnie Henke | 578.2000 | 90.34375000% | 1.85091047% | 1.85091047% |
| | | Robert Kuch | 7.8000 | 1.21875000% | 0.02496904% | 0.00000000% |
| | | Joelene J. Opp or Larry Opp, as Joint Tenants | 54.0000 | 8.43750000% | 0.17286262% | 0.17286262% |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 25 | Section 11-142N-86W | Rebecca D. Orgaard & Todd M. Orgaard | 600.0000 | 93.75000000% | 1.92069575% | 1.92069575% |
| | | Marc J. Jensen & Marilyn D. Jensen, husband & wife, as Joint Tenants, Contract for Deed Seller | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Marc J. Jensen & Marilyn D. Jensen, husband & wife, as Joint Tenants, Life Estate | 40.0000 | 6.25000000% | 0.12804638% | 0.12804638% |
| | | Rebecca D. Orgaard & Todd M. Orgaard, as Joint Tenants, Remaindermen | 0.0000 | 0.00000000% | 0.00000000% | |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 26 | Section 10-142N-86W | Casey Allen Blohm and Stacy M. Karabensh, Joint Tenants | 160.0000 | 25.00000000% | 0.51218553% | 0.51218553% |
| | | Karen K. Erwin fka Karen K. Bozenski and Gregory J. Erwin, wife & husband, Life Estate | 160.0000 | 25.00000000% | 0.51218553% | 0.51218553% |
| | | Kristy L. Bozenski, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Steven R. Hintz & Stacy Hintz, husband & wife, as Joint Tenants | 53.3333 | 8.33333333% | 0.17072851% | 0.17072851% |
| | | Kevin K. Hintz & Traci Hintz, husband & wife as Joint Tenants | 53.3333 | 8.33333333% | 0.17072851% | 0.17072851% |

| Tract No. | Land Description | Owner Name | Tract Net Acres | Tract Participation | Storage Facility Participation | Acreage Leased |
|---|---|---|---|---|---|---|
| | | Kelly G. Hintz and Ruby J. Hintz, Trustees of the Kelly G. Hintz Living Trust dated May 5, 2022 and any amendments thereto | 53.3333 | 8.33333333% | 0.17072851% | 0.17072851% |
| | | Charles E. Wittenberg, aka Charles Wittenberg & Shiela M. Wittenberg, aka Shiela Wittenberg, husband & wife, as Joint Tenants, Life Estate | 160.0000 | 25.00000000% | 0.51218553% | 0.51218553% |
| | | Dawn D. Wittenberg, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Jacob H. Wittenberg, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 27 | Section 09-142N-86W | Kenneth E. Hintz & Joyce R. Hintz, as Joint Tenants, Life Estate | 160.0000 | 25.00000000% | 0.51218553% | 0.51218553% |
| | | Ginger M. Flemmer, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Danielle R. Werth, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Duane D. Kessler & Marilyn A. Kessler, as Joint Tenants, Life Estate | 160.0000 | 25.00000000% | 0.51218553% | 0.51218553% |
| | | Warren Kessler, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Steven R. Hintz & Stacy Hintz, husband & wife, as Joint Tenants | 106.0000 | 16.56250000% | 0.33932292% | 0.33932292% |
| | | Kevin K. Hintz & Traci Hintz, husband & wife as Joint Tenants | 106.0000 | 16.56250000% | 0.33932292% | 0.33932292% |
| | | Kelly G. Hintz and Ruby J. Hintz, Trustees of the Kelly G. Hintz Living Trust dated May 5, 2022 and any amendments thereto | 106.0000 | 16.56250000% | 0.33932292% | 0.33932292% |
| | | Cemetery | 2.0000 | 0.31250000% | 0.00640232% | 0.00000000% |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |

| Tract No. | Land Description | Owner Name | Tract Net Acres | Tract Participation | Storage Facility Participation | Acreage Leased |
|---|---|---|---|---|---|---|
| 28 | Section 08-142N-86W | Duane D. Kessler & Marilyn A. Kessler, as Joint Tenants, Life Estate | 160.0000 | 25.00000000% | 0.51218553% | 0.51218553% |
| | | Kerry Hinsz, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Donna Soland, Life Estate | 160.0000 | 25.00000000% | 0.51218553% | 0.51218553% |
| | | Jamie L. Soland, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Jesse Roth | 160.0000 | 25.00000000% | 0.51218553% | 0.51218553% |
| | | Duane D. Kessler & Marilyn A. Kessler, as Joint Tenants, Life Estate | 160.0000 | 25.00000000% | 0.51218553% | 0.51218553% |
| | | Warren Kessler, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 29 | Section 07-142N-86W | Ross Glass & Sheri Glass, husband & wife, as Joint Tenants | 429.4400 | 68.22572445% | 1.37470597% | 1.37470597% |
| | | Donna Soland, Life Estate | 160.0000 | 25.41942044% | 0.51218553% | 0.51218553% |
| | | Jamie L. Soland, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Rod W. Allsworth & Luann M Allsworth, husband & wife, as Joint Tenants | 40.0000 | 6.35485511% | 0.12804638% | 0.12804638% |
| | | **Tract Total:** | **629.4400** | **100.00000000%** | | |
| 30 | Section 12-142N-87W | Dennison G. Davis & Brenda K. Davis, husband & wife, as Joint Tenants | 317.5000 | 49.60937500% | 1.01636817% | 1.01636817% |
| | | Mark S. Singer | 320.0000 | 50.00000000% | 1.02437107% | 1.02437107% |
| | | Cemetery | 2.5000 | 0.39062500% | 0.00800290% | 0.00000000% |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 31 | Section 11-142N-87W | Scott Allen Miller & Robyn Marie Miller, husband & wife | 320.0000 | 100.00000000% | 1.02437107% | 1.02437107% |
| | | **Tract Total:** | **320.0000** | **100.00000000%** | | |

| Tract No. | Land Description | Owner Name | Tract Net Acres | Tract Participation | Storage Facility Participation | Acreage Leased |
|---|---|---|---|---|---|---|
| 32 | Section 14-142N-87W | Scott Allen Miller & Robyn Marie Miller, husband & wife | 160.0000 | 100.00000000% | 0.51218553% | 0.51218553% |
| | | **Tract Total:** | **160.0000** | **100.00000000%** | | |
| 33 | Section 13-142N-87W | Mark S. Singer | 320.0000 | 50.00000000% | 1.02437107% | 1.02437107% |
| | | Shirley Riedemann, Life Estate | 320.0000 | 50.00000000% | 1.02437107% | 0.00000000% |
| | | Kyle K. Riedemann, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 34 | Section 18-142N-86W | Byron J. Faut & LaVerne J. Faut, as Trustees of the Faut Family Revocable Living Trust | 475.6800 | 75.24677297% | 1.52272759% | 1.52272759% |
| | | Sandra Riedemann | 156.4800 | 24.75322703% | 0.50091745% | 0.50091745% |
| | | **Tract Total:** | **632.1600** | **100.00000000%** | | |
| 35 | Section 17-142N-86W | Kenneth E. Hintz & Joyce R. Hintz, as Joint Tenants, Life Estate | 160.0000 | 25.00000000% | 0.51218553% | 0.51218553% |
| | | Ginger M. Flemmer, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Danielle R. Werth, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Steven R. Hintz & Stacy Hintz, husband & wife, as Joint Tenants | 106.6667 | 16.66666667% | 0.34145702% | 0.34145702% |
| | | Kevin K. Hintz & Traci Hintz, husband & wife as Joint Tenants | 106.6667 | 16.66666667% | 0.34145702% | 0.34145702% |
| | | Kelly G. Hintz and Ruby J. Hintz, Trustees of the Kelly G. Hintz Living Trust dated May 5, 2022 and any amendments thereto | 106.6667 | 16.66666667% | 0.34145702% | 0.34145702% |
| | | Hintz Buffalo Ranch, LLP | 160.0000 | 25.00000000% | 0.51218553% | 0.51218553% |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 36 | Section 16-142N-86W | Byron J. Faut & LaVerne J. Faut, as Trustees of the Faut Family Revocable Living Trust | 320.0000 | 50.00000000% | 1.02437107% | 1.02437107% |
| | | Donna Soland, Life Estate | 160.0000 | 25.00000000% | 0.51218553% | 0.51218553% |
| | | Jamie L. Soland, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |

| Tract No. | Land Description | Owner Name | Tract Net Acres | Tract Participation | Storage Facility Participation | Acreage Leased |
|---|---|---|---|---|---|---|
| | | Joseph Jochim | 20.0000 | 3.12500000% | 0.06402319% | 0.06402319% |
| | | Hintz Buffalo Ranch, LLP | 140.0000 | 21.87500000% | 0.44816234% | 0.44816234% |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 37 | Section 15-142N-86W | Byron J. Faut & LaVerne J. Faut, as Trustees of the Faut Family Revocable Living Trust | 320.0000 | 50.00000000% | 1.02437107% | 1.02437107% |
| | | Timothy Faut & Sheila Faut, husband & wife, as Joint Tenants | 160.0000 | 25.00000000% | 0.51218553% | 0.51218553% |
| | | Joan M. Bickel | 80.0000 | 12.50000000% | 0.25609277% | 0.25609277% |
| | | John W. Bickel | 80.0000 | 12.50000000% | 0.25609277% | 0.25609277% |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 38 | Section 14-142N-86W | Casey A. Blohm | 73.7500 | 11.52343750% | 0.23608552% | 0.23608552% |
| | | Lonnie Henke | 205.9500 | 32.17968750% | 0.65927882% | 0.65927882% |
| | | Tim Doll & Dianne Doll, as Joint Tenants | 320.0000 | 50.00000000% | 1.02437107% | 1.02437107% |
| | | Mike Huber | 40.3000 | 6.29687500% | 0.12900673% | 0.12900673% |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 39 | Section 13-142N-86W | Lonnie Henke | 319.0000 | 49.84375000% | 1.02116991% | 1.02116991% |
| | | Roughrider Electric Cooperative, Inc. | 1.0000 | 0.15625000% | 0.00320116% | 0.00000000% |
| | | Mark Albers & Laurie Albers, as Joint Tenants | 160.0000 | 25.00000000% | 0.51218553% | 0.51218553% |
| | | Jeffrey Goetz | 160.0000 | 25.00000000% | 0.51218553% | 0.51218553% |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 40 | Section 18-142N-85W | Blaine Wilkens & Mikell R. Wilkens | 472.8600 | 74.54126994% | 1.51370032% | 1.51370032% |
| | | Kelly Hintz & Judith M. Hintz | 160.0000 | 25.22227127% | 0.51218553% | 0.00000000% |
| | | Kelly Hintz, Co-Trustee of the Hintz Irrevocable Children's Trust, Contract for Deed Seller | 0.0000 | 0.00000000% | 0.00000000% | |

| Tract No. | Land Description | Owner Name | Tract Net Acres | Tract Participation | Storage Facility Participation | Acreage Leased |
|---|---|---|---|---|---|---|
| | | Pamela Hintz, Co-Trustee of the Hintz Irrevocable Children's Trust, Contract for Deed Seller | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Carla Hintz, Co-Trustee of the Hintz Irrevocable Children's Trust, Contract for Deed Seller | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Montana-Dakota Utilities Co. | 1.5000 | 0.23645879% | 0.00480174% | 0.00000000% |
| | | **Tract Total:** | **634.3600** | **100.00000000%** | | |
| 41 | Section 17-142N-85W | Raymond W. Hintz, aka Raymond Hintz & Carol Hintz, aka Carol Jenness Hintz, husband & wife, as Joint Tenants | 80.0000 | 50.00000000% | 0.25609277% | 0.25609277% |
| | | Diane E. Wilkens | 80.0000 | 50.00000000% | 0.25609277% | 0.25609277% |
| | | Wesley J. Wilkens & Lori Wilkens, aka Lory Wilkens, husband & wife as Joint Tenants, Contract for Deed Sellers | 0.0000 | 0.00000000% | 0.00000000% | |
| | | **Tract Total:** | **160.0000** | **100.00000000%** | | |
| 42 | Section 20-142N-85W | Travis T. Wilkens & Marcia Wilkens, as Joint Tenants | 40.0000 | 100.00000000% | 0.12804638% | 0.12804638% |
| | | Wesley J. Wilkens & Lori Wilkens, aka Lory Wilkens, husband & wife as Joint Tenants, Contract for Deed Sellers | 0.0000 | 0.00000000% | 0.00000000% | |
| | | **Tract Total:** | **40.0000** | **100.00000000%** | | |
| 43 | Section 19-142N-85W | Blaine Wilkens & Mikell R. Wilkens | 80.0000 | 50.44772355% | 0.25609277% | 0.25609277% |
| | | Kelly Hintz, aka Kelly A. Hintz & Judith M. Hintz, husband & wife as Joint Tenants | 78.5800 | 49.55227645% | 0.25154712% | 0.00000000% |
| | | **Tract Total:** | **158.5800** | **100.00000000%** | | |

| Tract No. | Land Description | Owner Name | Tract Net Acres | Tract Participation | Storage Facility Participation | Acreage Leased |
|---|---|---|---|---|---|---|
| 44 | Section 24-142N-86W | Michael J. Fedorchak & Julie Fedorchak, fka Julie Liffrig, husband & wife, as Joint Tenants | 400.1600 | 76.95384615% | 1.28097602% | 1.28097602% |
| | | Carissa Severance | 39.8400 | 7.66153846% | 0.12753420% | 0.12753420% |
| | | Leona Doll, aka Leona C. Doll, Life Estate | 80.0000 | 15.38461538% | 0.25609277% | 0.25609277% |
| | | Robert Doll, aka Robert C. Doll, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Aaron Huck, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | **Tract Total:** | **520.0000** | **100.00000000%** | | |
| 45 | Section 23-142N-86W | Michael Huber & Laura Huber, husband & wife, as Joint Tenants | 160.0000 | 25.00000000% | 0.51218553% | 0.51218553% |
| | | Timothy Faut & Sheila Faut, husband & wife, as Joint Tenants | 160.0000 | 25.00000000% | 0.51218553% | 0.51218553% |
| | | Dwight K. Huber & Sheila Huber, husband & wife, as Joint Tenants | 160.0000 | 25.00000000% | 0.51218553% | 0.51218553% |
| | | Michael J. Fedorchak & Julie Fedorchak, fka Julie Liffrig, husband & wife, as Joint Tenants | 160.0000 | 25.00000000% | 0.51218553% | 0.51218553% |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 46 | Section 22-142N-86W | Duane M. Goetz, aka Duane Goetz & Claudia A. Goetz, aka Claudia Goetz, husband & wife, as Joint Tenants, Life Estate | 160.0000 | 25.00000000% | 0.51218553% | 0.51218553% |
| | | Darrell O. Goetz, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Ronald D. Goetz, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Gerald E. Goetz, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Lloyd A. Huber & Heidi Huber, husband & wife, as Joint Tenants | 320.0000 | 50.00000000% | 1.02437107% | 1.02437107% |
| | | JoAnn Becker, Life Estate | 160.0000 | 25.00000000% | 0.51218553% | 0.51218553% |
| | | Todd L. Becker, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |

| Tract No. | Land Description | Owner Name | Tract Net Acres | Tract Participation | Storage Facility Participation | Acreage Leased |
|---|---|---|---|---|---|---|
| | | Brad T. Becker, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 47 | Section 21-142N-86W | Jeffrey Goetz | 320.0000 | 50.00000000% | 1.02437107% | 1.02437107% |
| | | Austin Hintz | 320.0000 | 50.00000000% | 1.02437107% | 1.02437107% |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 48 | Section 20-142N-86W | Steve Hintz & Stacy Hintz, as Joint Tenants | 160.0000 | 25.00000000% | 0.51218553% | 0.51218553% |
| | | Donna Soland, Life Estate | 400.0000 | 62.50000000% | 1.28046384% | 1.28046384% |
| | | Jamie L. Soland, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Kelly G. Hintz and Ruby J. Hintz, Trustees of the Ruby J. Hintz Living Trust dated May 5, 2022 and any amendments thereto | 80.0000 | 12.50000000% | 0.25609277% | 0.25609277% |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 49 | Section 19-142N-86W | Donna Soland, Life Estate | 474.7200 | 74.79203428% | 1.51965448% | 1.51965448% |
| | | Jamie L. Soland, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | LaVern Brunmeier, Life Estate | 160.0000 | 25.20796572% | 0.51218553% | 0.51218553% |
| | | Debra Lindquist, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Maurein Schroeder, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Pamela Collar, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Peggy Lewis, fka Peggy Slawson, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | **Tract Total:** | **634.7200** | **100.00000000%** | | |
| 50 | Section 24-142N-87W | Kimberly M. Montoya & Javier Montoya, Trustees, or their successors in trust, under the Kimberly M. Montoya Living Trust, dated November 27, 2018, and any amendments thereto | 80.0000 | 33.33333333% | 0.25609277% | 0.25609277% |

| Tract No. | Land Description | Owner Name | Tract Net Acres | Tract Participation | Storage Facility Participation | Acreage Leased |
|---|---|---|---|---|---|---|
| | | Marvin Fiest & Karen Fiest, husband & wife, as Joint Tenants, Life Estate | 80.0000 | 33.33333333% | 0.25609277% | 0.25609277% |
| | | Amber Myhre, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Nicole Johnson, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Kristen Fiest, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | LaVern Brunmeier, Life Estate | 80.0000 | 33.33333333% | 0.25609277% | 0.25609277% |
| | | Debra Lindquist, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Maurein Schroeder, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Pamela Collar, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Peggy Lewis, fka Peggy Slawson, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | **Tract Total:** | **240.0000** | **100.00000000%** | | |
| 51 | Section 30-142N-86W | LaVern Brunmeier, Life Estate | 158.4800 | 49.76136649% | 0.50731977% | 0.50731977% |
| | | Debra Lindquist, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Maurein Schroeder, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Pamela Collar, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Peggy Lewis, fka Peggy Slawson, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Donna Soland, Life Estate | 160.0000 | 50.23863351% | 0.51218553% | 0.51218553% |
| | | Jamie L. Soland, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | **Tract Total:** | **318.4800** | **100.00000000%** | | |
| 52 | Section 29-142N-86W | Ron Kessler & Carol Kessler, husband & wife, as Joint Tenants | 320.0000 | 50.00000000% | 1.02437107% | 1.02437107% |
| | | Donna Soland, Life Estate | 160.0000 | 25.00000000% | 0.51218553% | 0.51218553% |
| | | Jamie L. Soland, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Dean D. Unterseher | 160.0000 | 25.00000000% | 0.51218553% | 0.51218553% |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 53 | Section 28-142N-86W | Jeffrey Goetz | 320.0000 | 50.00000000% | 1.02437107% | 1.02437107% |
| | | Lloyd A. Huber | 160.0000 | 25.00000000% | 0.51218553% | 0.51218553% |

| Tract No. | Land Description | Owner Name | Tract Net Acres | Tract Participation | Storage Facility Participation | Acreage Leased |
|---|---|---|---|---|---|---|
| | | Donna Soland, Life Estate | 160.0000 | 25.00000000% | 0.51218553% | 0.51218553% |
| | | Darin L. Soland, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 54 | Section 27-142N-86W | Dwight K. Huber & Sheila Huber, husband & wife, as Joint Tenants | 636.0000 | 99.37500000% | 2.03593750% | 2.03593750% |
| | | Justin D. Huber & Crystal L. Huber | 4.0000 | 0.62500000% | 0.01280464% | 0.00000000% |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 55 | Section 26-142N-86W | Duane M. Goetz, aka Duane Goetz & Claudia A. Goetz, aka Claudia Goetz, husband & wife, as Joint Tenants, Life Estate | 280.0000 | 53.846153485% | 0.89632468% | 0.89632468% |
| | | Darrell O. Goetz, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Ronald D. Goetz, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Gerald E. Goetz, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Dwight K. Huber & Sheila Huber, husband & wife, as Joint Tenants | 240.0000 | 46.15384615% | 0.76827830% | 0.76827830% |
| | | **Tract Total:** | **520.0000** | **100.00000000%** | | |
| 56 | Section 25-142N-86W | Michael J. Fedorchak & Julie Fedorchak, fka Julie Liffrig, husband & wife, as Joint Tenants | 80.0000 | 22.22222222% | 0.25609277% | 0.25609277% |
| | | Duane M. Goetz, aka Duane Goetz & Claudia A. Goetz, aka Claudia Goetz, husband & wife, as Joint Tenants, Life Estate | 240.0000 | 66.66666667% | 0.76827830% | 0.76827830% |
| | | Darrell O. Goetz, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Ronald D. Goetz, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Gerald E. Goetz, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Leona Doll, aka Leona C. Doll, Life Estate | 40.0000 | 11.11111111% | 0.12804638% | 0.12804638% |
| | | Robert Doll, aka Robert C. Doll, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |

| Tract No. | Land Description | Owner Name | Tract Net Acres | Tract Participation | Storage Facility Participation | Acreage Leased |
|---|---|---|---|---|---|---|
| | | Aaron Huck, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | **Tract Total:** | **360.0000** | **100.00000000%** | | |
| 57 | Section 35-142N-86W | Joan M. Bickel | 40.0000 | 50.00000000% | 0.12804638% | 0.12804638% |
| | | John W. Bickel | 40.0000 | 50.00000000% | 0.12804638% | 0.12804638% |
| | | **Tract Total:** | **80.0000** | **100.00000000%** | | |
| 58 | Section 34-142N-86W | Joan M. Bickel | 40.0000 | 6.25000000% | 0.12804638% | 0.12804638% |
| | | John W. Bickel | 40.0000 | 6.25000000% | 0.12804638% | 0.12804638% |
| | | Albers Farms, LLP, a North Dakota Limited Liability Partnership | 240.0000 | 37.50000000% | 0.76827830% | 0.76827830% |
| | | William F. Breimeier & Norma J. Breimeier, husband & wife, as Joint Tenants, Life Estate | 140.0000 | 21.87500000% | 0.44816234% | 0.44816234% |
| | | Sandra L. Wolf, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Rachel M. Breimeier, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Ruth Mae Yoder | 20.0000 | 3.12500000% | 0.06402319% | 0.00000000% |
| | | Bruce Huber & Diane Huber, as Joint Tenants | 160.0000 | 25.00000000% | 0.51218553% | 0.51218553% |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 59 | Section 33-142N-86W | Dwight K. Huber & Sheila Huber, husband & wife, as Joint Tenants | 320.0000 | 50.00000000% | 1.02437107% | 1.02437107% |
| | | Craig Albers | 160.0000 | 25.00000000% | 0.51218553% | 0.51218553% |
| | | William F. Breimeier & Norma J. Breimeier, husband & wife, as Joint Tenants, Life Estate | 160.0000 | 25.00000000% | 0.51218553% | 0.51218553% |
| | | Sandra L. Wolf, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Rachel M. Breimeier, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | **Tract Total:** | **640.0000** | **100.00000000%** | | |
| 60 | Section 32-142N-86W | Lynn Hammer | 200.0000 | 55.55555556% | 0.64023192% | 0.64023192% |

| Tract No. | Land Description | Owner Name | Tract Net Acres | Tract Participation | Storage Facility Participation | Acreage Leased |
|---|---|---|---|---|---|---|
| | | Bryan T. Reinhardt and Tammy J. Reinhardt, husband & wife, as Joint Tenants | 120.0000 | 33.33333333% | 0.38413915% | 0.38413915% |
| | | William F. Breimeier & Norma J. Breimeier, husband & wife, as Joint Tenants, Life Estate | 40.0000 | 11.11111111% | 0.12804638% | 0.12804638% |
| | | Sandra L. Wolf, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | Rachel M. Breimeier, Remainderman | 0.0000 | 0.00000000% | 0.00000000% | |
| | | **Tract Total:** | **360.0000** | **100.00000000%** | | |
| | | | **Total Acres** | | **Storage Facility Participation** | **Acreage Leased** |
| | | | **31,238.6800** | | **100.00000000%** | **96.76977388%** |

# STORAGE FACILITY PERMIT APPLICATION COMPARISION SUMMARY

SUMMIT CARBON SOLUTIONS

**This document categorizes the various SFP application section documents across three storage facility permits:**
**Category 1) section content that include predominantly the same or similar information (e.g., application/site/well names may vary but remaining information is essentially the same); and**
**Category 2) section content that is more focused on site-specific data (e.g., unique well or location differences, but predominantly similar processes and analyses).**

**Differences Between SCS Applications**
**The following highlights sections containing site-specific data differences (beyond applicant/site/well names):**

| SFP Permit Section | SUMMIT CARBON STORAGE #1, LLC — TB Leingang / Milton Flemmer 1 | SUMMIT CARBON STORAGE #2, LLC — BK Fischer / Archie Erickson 2 | SUMMIT CARBON STORAGE #3, LLC — KJ Hintz / Slash Lazy H 5 |
|---|---|---|---|
| Project Summary | Applicant name listed first in each application. | Applicant name listed first in each application. | Applicant name listed first in each application. |
| Section 1 Pore Space Access | Minimal content changes between SCS1/TB Leingang & SCS3/KJ Hintz permit applications. | Specific to the SCS2/BKF: due to Coyote Creek Mining Company's Coyote Creek Mine & Dakota Westmoreland Company's Beulah Mine being located within the Hearing Notification Area (HNA) language was added only to SCS2/BK Fischer's Section 1.0. | Minimal content changes between SCS1/TB Leingang & SCS3/KJ Hintz permit applications. |

INDUSTRIAL COMMISSION
STATE OF NORTH DAKOTA
DATE 6/12/24 CASE NO. 30869-880
Introduced By Summit
Exhibit 8B
Identified By Olsen.

**Exhibit 8B**

## Differences Between SCS Applications

**The following highlights sections containing site-specific data differences (beyond applicant/site/well names):**

| SFP Permit Section | SUMMIT CARBON STORAGE #1, LLC — TB Leingang / Milton Flemmer 1 | SUMMIT CARBON STORAGE #2, LLC — BK Fischer / Archie Erickson 2 | SUMMIT CARBON STORAGE #3, LLC — KJ Hintz / Slash Lazy H 5 |
|---|---|---|---|
| **Section 2 Geologic Exhibits** | Primary variations include:<br>1. Minnekahta Formation: present in Milton Flemmer 1; absent in Archie Erickson 2 and Slash Lazy H5.<br><br>2. Site-specific storage complex formation data.<br><br>3. Borehole log images:<br>A. Number of borehole log images varies between all three permits. | Primary variations include:<br>1. Minnekahta Formation: present in Milton Flemmer 1; absent in Archie Erickson 2 and Slash Lazy H5.<br><br>2. Site-specific storage complex formation data.<br><br>3. Borehole log images:<br>A. Number of borehole log images varies between all three permits. | Primary variations include:<br>1. Minnekahta Formation: present in Milton Flemmer 1; absent in Archie Erickson 2 and Slash Lazy H5.<br><br>2. Site-specific storage complex formation data.<br><br>3. Borehole log images:<br>A. Number of borehole log images varies between all three permits. |
| **Section 3 Geologic Model Construction and Numerical Simulation of $CO_2$ Injection** | Minor variations in Section 3.0 exist where site-specific data are used to derive individual injection pressures and rates, temperatures, and critical threshold pressure increase estimations. | Minor variations in Section 3.0 exist where site-specific data are used to derive individual injection pressures and rates, temperatures, and critical threshold pressure increase estimations. | Minor variations in Section 3.0 exist where site-specific data are used to derive individual injection pressures and rates, temperatures, and critical threshold pressure increase estimations. |

## Differences Between SCS Applications

**The following highlights sections containing site-specific data differences (beyond applicant/site/well names):**

| SFP Permit Section | SUMMIT CARBON STORAGE #1, LLC — TB Leingang / Milton Flemmer 1 | SUMMIT CARBON STORAGE #2, LLC — BK Fischer / Archie Erickson 2 | SUMMIT CARBON STORAGE #3, LLC — KJ Hintz / Slash Lazy H 5 |
|---|---|---|---|
| **Section 4 Area of Review** | 1. Differences associated with site-specific surface and subsurface features, including identification of springs, mining land, plugged or abandoned wells, etc.<br><br>2. Site specific groundwater wells selected to be included in the near-surface baseline and operational monitoring plans. | 1. Differences associated with site-specific surface and subsurface features, including identification of springs, mining land, plugged or abandoned wells, etc.<br><br>2. Site specific groundwater wells selected to be included in the near-surface baseline and operational monitoring plans. | 1. Differences associated with site-specific surface and subsurface features, including identification of springs, mining land, plugged or abandoned wells, etc.<br><br>2. Site-specific groundwater wells selected to be included in the near-surface baseline and operational monitoring plans.<br><br>3. Legacy well Raymond Jensen 1-34 falls within the AOR; no corrective action is required. |
| **Section 5 Testing & Monitoring Plan** | 1. There were minimal differences for mechanical integrity testing.<br>A. Milton Flemmer 1 – Tubing-conveyed gauges<br><br>2. Environmental monitoring plans vary as they are site-specific, e.g., the number of existing groundwater wells and legacy oil and gas wells varies per site. | 1. Environmental monitoring plans vary as they are site-specific, e.g., the number of existing groundwater wells and legacy oil and gas wells varies per site.<br>A. Archie Erickson 2 – Casing-conveyed gauges | 1. Environmental monitoring plans vary as they are site-specific, e.g., the number of existing groundwater wells and legacy oil and gas wells varies per site.<br>A. Slash Lazy H 5 – Casing-conveyed gauges<br><br>2. An in-situ micro-fracture test will be performed in one of the KJ Hintz injection wells. |
| **Section 6 Postinjection Site Care and Facility Closure Plan** | There are minimal differences related to monitoring well-specific details (e.g., max pressure differential at the cessation of CO2 injection). | There are minimal differences related to monitoring well-specific details (e.g., max pressure differential at the cessation of CO2 injection). | There are minimal differences related to monitoring well-specific details (e.g., max pressure differential at the cessation of CO2 injection). |

**Differences Between SCS Applications**

**The following highlights sections containing site-specific data differences (beyond applicant/site/well names):**

| SFP Permit Section | SUMMIT CARBON STORAGE #1, LLC — TB Leingang / Milton Flemmer 1 | SUMMIT CARBON STORAGE #2, LLC — BK Fischer / Archie Erickson 2 | SUMMIT CARBON STORAGE #3, LLC — KJ Hintz / Slash Lazy H 5 |
|---|---|---|---|
| **Section 7 Emergency and Remedial Response Plan** | Section 7 content is the same between all three SCS permit applications. | Section 7 content is the same between all three SCS permit applications. | Section 7 content is the same between all three SCS permit applications. |
| **Section 8 Worker Safety Plan** | Section 8 content is the same between all three SCS permit applications. | Section 8 content is the same between all three SCS permit applications. | Section 8 content is the same between all three SCS permit applications. |
| **Section 9 Well Casing and Cementing Program** | 1. Stratigraphic and reservoir-monitoring well<br>A. The Milton Flemmer 1 well is constructed and drilled to total depth at over 12,000 feet. | 1. Stratigraphic and reservoir-monitoring well<br>A. The Archie Erickson 2 well is constructed and drilled to total depth at approximately 6,400 feet. | 1. Stratigraphic and reservoir-monitoring well<br>A. The Slash Lazy H 5 well is constructed and drilled to total depth at approximately 6,100 feet. |
| **Section 10 Plugging Plan** | 1. Stratigraphic and reservoir-monitoring well<br>A. The Milton Flemmer 1 well is constructed and drilled to total depth at over 12,000 feet. | 1. Stratigraphic and reservoir-monitoring well<br>A. The Archie Erickson 2 well is constructed and drilled to total depth at approximately 6,400 feet. | 1. Stratigraphic and reservoir-monitoring well<br>A. The Slash Lazy H 5 well is constructed and drilled to total depth at approximately 6,100 feet. |

## Differences Between SCS Applications

**The following highlights sections containing site-specific data differences (beyond applicant/site/well names):**

| SFP Permit Section | SUMMIT CARBON STORAGE #1, LLC — TB Leingang / Milton Flemmer 1 | SUMMIT CARBON STORAGE #2, LLC — BK Fischer / Archie Erickson 2 | SUMMIT CARBON STORAGE #3, LLC — KJ Hintz / Slash Lazy H 5 |
|---|---|---|---|
| **Section 11 Injection Well and Storage Operations** | 1. Stratigraphic and reservoir-monitoring well:<br>A. Tubing will be installed in the Milton Flemmer 1 to deploy pressure/temperature gauges<br>B. Milton Flemmer 1 well will be plugged back to the Amsden prior to injection operations. | 1. Stratigraphic and reservoir-monitoring well:<br>A. No tubing will be installed in the Archie Erickson | 1. Stratigraphic and reservoir-monitoring well:<br>A. No tubing will be installed in the Slash Lazy H 5. |
| **Section 12 Financial Assurance & Demonstration Plan** | Total Bond: $20,316,000<br>1. There were minimal differences related to :<br>A. Postinjection site care (PISC) plan and facility closure cost estimates:<br>B. Number of wells (monitoring) at each site.<br>C. Reservoir-monitoring well design characteristics.<br>D. Flow line lengths<br>E. Endangerment of USDWs | Total Bond: $20,868,800<br>1. There were minimal differences related to:<br>A. Postinjection site care (PISC) plan and facility closure cost estimates<br>B. Number of wells (monitoring) at each site.<br>C. Reservoir-monitoring well design characteristics.<br>D. Flow line lengths<br>E. Endangerment of USDWs | Total Bond: $20,817,800<br>1.There were minimal differences related to:<br>A. Postinjection site care (PISC) plan and facility closure cost estimates<br>B. Number of wells (monitoring) at each site.<br>C. Reservoir-monitoring well design characteristics.<br>D. Flow line lengths<br>E. Endangerment of USDWs<br><br>2. Additional groundwater monitoring well and soil gas profile station (SGPS) added to the monitoring plan for legacy well No. 4942 is addressed. |
| **Appendix A Well and Well Formation Fluid Sampling Lab Analysis** | Samples from both Broom Creek and Inyan Kara are specific to stratigraphic test well. | Samples from both Broom Creek and Inyan Kara are specific to stratigraphic test well. | Samples from both Broom Creek and Inyan Kara are specific to stratigraphic test well. |

**Differences Between SCS Applications**

**The following highlights sections containing site-specific data differences (beyond applicant/site/well names):**

| SFP Permit Section | SUMMIT CARBON STORAGE #1, LLC TB Leingang / Milton Flemmer 1 | SUMMIT CARBON STORAGE #2, LLC BK Fischer / Archie Erickson 2 | SUMMIT CARBON STORAGE #3, LLC KJ Hintz / Slash Lazy H 5 |
|---|---|---|---|
| **Appendix B** Freshwater Well Sampling Analysis | Existing groundwater sampling locations and results are site-specific. | Existing groundwater sampling locations and results are site-specific; BK Fischer includes data from adjacent mining activities at the Beulah Mine & Coyote Creek Mine. | Existing groundwater sampling locations and results are site-specific |
| **Appendix C** Geochemical Interactions | 1. Strat well-specific x-ray diffraction (XRD) data used to inform mineralogical compositions for injection zone and confining zones.<br><br>2. Strat well-specific ionic compositions used for formation water.<br><br>3. Simulation results are site-specific. | 1. Strat well-specific x-ray diffraction (XRD) data used to inform mineralogical compositions for injection zone and confining zones.<br><br>2. Strat well-specific ionic compositions used for formation water.<br><br>3. Simulation results are site-specific. | 1. Strat well-specific x-ray diffraction (XRD) data used to inform mineralogical compositions for injection zone and confining zones.<br><br>2. Strat well-specific ionic compositions used for formation water.<br><br>3. Simulation results are site-specific. |
| **Appendix D** Monitoring Equipment Specification Information | SCS1/TB Leingang differs as it includes Appendix D-18, Tubing-Conveyed P/T Gauge Specifications | No content change between BK Fischer & KJ Hintz. | No content change between BK Fischer & KJ Hintz. |
| **Appendix E** Regulatory Compliance Table | Section is specific to relevant text in each application | Section is specific to relevant text in each application | Section is specific to relevant text in each application |

**STORAGE AGREEMENT**
**SCS #3 BROOM CREEK – SECURE GEOLOGIC STORAGE**
**OLIVER COUNTY, NORTH DAKOTA**

INDUSTRIAL COMMISSION
STATE OF NORTH DAKOTA
DATE 6/12/24 CASE NO. 30877-880
Introduced By Summit
Exhibit 1C-1
Identified By Boeshans



**Amended Storage Facility Agreement SCS #3**
**Exhibit** 1C-1

**STORAGE AGREEMENT**
**SCS #3 BROOM CREEK – SECURE GEOLOGIC STORAGE**
**OLIVER COUNTY, NORTH DAKOTA**

**THIS AGREEMENT** ("Agreement") is entered into as of the ___ day of _____, 20__, by the parties who have signed the original of this instrument, a counterpart thereof, ratification and joinder or other instrument agreeing to become a Party hereto.

**RECITALS:**

A. It is in the public interest to promote the geologic storage of carbon dioxide in a manner which will benefit the state and the global environment by reducing greenhouse gas emissions and in a manner which will help ensure the viability of the state's coal and power industries, to the economic benefit of North Dakota and its citizens;

B. To further geologic storage of carbon dioxide, a potentially valuable commodity, may allow for its ready availability if needed for commercial, industrial, or other uses, including enhanced recovery of oil, gas, and other minerals; and

C. For geologic storage, however, to be practical and effective it requires cooperative use of surface and subsurface property interests and the collaboration of property owners, which may require procedures that promote, in a manner fair to all interests, cooperative management, thereby ensuring the maximum use of natural resources.

**AGREEMENT:**

It is agreed as follows:

**ARTICLE 1**
**DEFINITIONS**

As used in this Agreement:

1.1 **Carbon Dioxide** means carbon dioxide in gaseous, liquid, or supercritical fluid state together with incidental associated substances derived from the source materials, capture

process and any substances added or used to enable or improve the injection process.

1.2 **Commission** means the North Dakota Industrial Commission (NDIC) acting by and through the Department of Mineral Resources.

1.3 **Effective Date** is the time and date this Agreement becomes effective as provided in Article 14.

1.4 **Facility Area** is the land described by Tracts in Exhibit "B" and shown on Exhibit "A" containing 31,238.68 acres, more or less.

1.5 **Party** is any individual, corporation, limited liability company, partnership, association, receiver, trustee, curator, executor, administrator, guardian, tutor, fiduciary, or other representative of any kind, any department, agency, or instrumentality of the state, or any governmental subdivision thereof, or any other entity capable of holding an interest in the Storage Reservoir.

1.6 **Pore Space** means a cavity or void, whether natural or artificially created, in any subsurface stratum.

1.7 **Pore Space Interest** is a right to or interest in the Pore Space in any Tract within the boundaries of the Facility Area.

1.8 **Pore Space Owner** is a Party hereto who owns Pore Space Interest.

1.9 **Storage Equipment** is any personal property, lease, easement, and well equipment, plants and other facilities and equipment for use in Storage Operations.

1.10 **Storage Expense** is all costs, expense or indebtedness incurred by the Storage Operator pursuant to this Agreement for or on account of Storage Operations.

1.11 **Storage Facility** is the unitized or amalgamated Storage Reservoir created pursuant to an order of the Commission.

1.12 **Storage Facility Participation** is the percentage shown on Exhibit "C" for allocating payments for use of the Pore Space under each Tract identified in Exhibit "B".

1.13 **Storage Operations** are all operations conducted by the Storage Operator pursuant to this Agreement or otherwise authorized by any lease covering any Pore Space Interest.

1.14 **Storage Operator** is the person or entity named in Section 4.1 of this Agreement.

1.15 **Storage Reservoir** consists of the Pore Space and confining subsurface strata underlying the Facility Area described as the Opeche/Spearfish (Upper Confining Zone), Broom Creek (Injection Zone), and Amsden (Lower Confining Zone) Formation(s) and which are defined as identified by the well logging suite performed at one stratigraphic well, the Slash Lazy H 5 well (NDIC File No. 38701) located in Lot 1, Section 6, Township 142 North, Range 86 West, Oliver County, North Dakota. The Storage Reservoir is defined as the stratigraphic interval from below the top of the Opeche/Spearfish Formation found at a depth of 5,587 feet below the Kelly Bushing, to above the base of the Amsden Formation, found at a depth of 6,421 feet below the Kelly Bushing, as identified by the Array Induction Gamma log run in the Milton Flemmer 1 well (NDIC File No. 38594) located in the NW¼ of the NE¼, Section 35, Township 141 North, Range 88 West, Mercer County, North Dakota. The logging suite included triple combo (Gamma Ray [GR], density, porosity, and resistivity), caliper, spectral GR, combinable magnetic resonance (CMR), dipole sonic including four-arm caliper and inclinometer, and an image log. Further, the acquired logs were used to pick formation top depths and interpret lithology, petrophysical properties, and time-to-depth shifting of seismic data obtained from three 3D seismic surveys and one 5-mile long 2D seismic-line covering an area totaling 208 miles in and around the Slash Lazy H 5 stratigraphic well. Formation top depths were picked from the top of the Pierre Formation to the top of the Amsden Formation. The average depth of the top of the Opeche/Spearfish Formation (Upper Confining Zone) across the storage facility area is 5,336 feet total vertical depth (TVD). The

average depth of the base of the Amsden Formation (Lower Confining Zone) across the storage facility area is 6,033 feet TVD. The average thickness of the Storage Reservoir across the storage facility area is 698 feet.

1.16 **Storage Rights** are the rights to explore, develop, and operate lands within the Facility Area for the storage of Storage Substances.

1.17 **Storage Substances** are Carbon Dioxide and incidental associated substances, fluids, and minerals.

1.18 **Tract** is the land described as such and given a Tract number in Exhibit "B."

1.19 **Transfer Storage Facility** has the meaning given such term in Section 3.7 of this Agreement.

## ARTICLE 2
## EXHIBITS

2.1 **Exhibits.** The following exhibits, which are attached hereto, are incorporated herein by reference:

2.1.1 Exhibit "A" is a map that shows the boundary lines of the SCS #3 Broom Creek Facility Area and the tracts therein;

2.1.2 Exhibit "B" is a schedule that describes the acres of each Tract in the SCS #3 Broom Creek Facility Area;

2.1.3 Exhibit "C" is a schedule that shows the Storage Facility Participation of each Tract; and

2.1.4 Exhibit "D" is a form of Pore Space Lease.

2.2 **Reference to Exhibits.** When reference is made to an exhibit, it is to the exhibit as originally attached or, if revised, to the last revision.

2.3 **Exhibits Considered Correct.** Exhibits "A," "B," "C" and "D" shall be considered to be correct until revised as herein provided.

2.4 **Correcting Errors.** The shapes and descriptions of the respective Tracts have been established by using the best information available. If it subsequently appears that any Tract, mechanical miscalculation or clerical error has been made, Storage Operator, with the approval of Pore Space Owners whose interest is affected, shall correct the mistake by revising the exhibits to conform to the facts. The revision shall not include any re-evaluation of engineering or geological interpretations used in determining Storage Facility Participation. Each such revision of an exhibit made prior to thirty (30) days after the Effective Date shall be effective as of the Effective Date. Each such revision thereafter made shall be effective at 7:00 a.m. on the first day of the calendar month next following the filing for record of the revised exhibit or on such other date as may be determined by Storage Operator and set forth in the revised exhibit.

2.5 **Filing Revised Exhibits.** If an exhibit is revised, Storage Operator shall execute an appropriate instrument with the revised exhibit attached and file the same for record in the county or counties in which this Agreement or memorandum of the same is recorded and shall also file the amended changes with the Commission.

## ARTICLE 3
## CREATION AND EFFECT OF STORAGE FACILITY

3.1 **Unleased Pore Space Interests.** Any Pore Space Owner in the Storage Facility who owns a Pore Space Interest in the Storage Reservoir that is not leased for the purposes of this Agreement and during the term hereof, shall be treated as if it were subject to the Pore Space Lease attached hereto as Exhibit "D".

3.2 **Amalgamation of Pore Space.** All Pore Space Interests in and to the Tracts are hereby amalgamated and combined insofar as the respective Pore Space Interests pertain to the Storage Reservoir, so that Storage Operations may be conducted with respect to said Storage Reservoir as if all of the Pore Space Interests in the Facility Area had been included in a single lease executed by all Pore Space Owners, as lessors, in favor of Storage Operator, as lessee and as

if the lease contained all of the provisions of this Agreement.

3.3 **Amendment of Leases and Other Agreements.** The provisions of the various leases, agreements, or other instruments pertaining to the respective Tracts or the storage of the Storage Substances therein, including the Pore Space Lease attached hereto as Exhibit "D", are amended to the extent necessary to make them conform to the provisions of this Agreement, but otherwise shall remain in effect.

3.4 **Continuation of Leases and Term Interests.** Injection in to any part of the Storage Reservoir, or other Storage Operations, shall be considered as injection in to or upon each Tract within said Storage Reservoir, and such injection or operations shall continue in effect as to each lease as to all lands and formations covered thereby just as if such operations were conducted on and as if a well were injecting in each Tract within said Storage Reservoir.

3.5 **Titles Unaffected by Storage.** Nothing herein shall be construed to result in the transfer of title of the Pore Space Interest of any Party hereto to any other Party or to Storage Operator.

3.6 **Injection Rights.** Storage Operator is hereby granted the right to inject into the Storage Reservoir any Storage Substances in whatever amounts Storage Operator may deem expedient for Storage Operations, together with the right to drill, use, and maintain injection wells in the Facility Area, and to use for injection purposes.

3.7 **Transfer of Storage Substances from Storage Facility.** Storage Operator may transfer from the Storage Facility any Storage Substances, in whatever amounts Storage Operator may deem expedient for Storage Operations, to any other reservoir, subsurface stratum or formation permitted by the Commission for the storage of carbon dioxide under Chapter 38-22 of the North Dakota Century Code (a "Transfer Storage Facility"), *provided that*, the Pore Space ownership between the Storage Facility and Transfer Storage Facility is common.

3.8 **Receipt of Storage Substances.** Storage Operator may accept and receive into the Storage Facility any Storage Substances, in whatever amounts Storage Operator may deem expedient for Storage Operations, being stored in any other Transfer Storage Facility, *provided that,* the Pore Space ownership between the Storage Facility and Transfer Storage Facility is common.

3.9 **Royalty Payments Upon Transfer.** The transfer or receipt of Storage Substances to or from a Transfer Storage Facility in accordance with Section 3.7 and Section 3.8 shall be disregarded for the purposes of calculating the royalty under any lease covering a Pore Space Interest (including Exhibit "D") and shall not affect the allocation of Storage Substances injected into the Storage Facility through the surface of the Facility Area in accordance with Article 6 of this Agreement.

3.10 **Cooperative Agreements.** Storage Operator may enter into cooperative agreements with respect to lands adjacent to the Facility Area for the purpose of coordinating Storage Operations. Such cooperative agreements may include, but shall not be limited to, agreements regarding the transfer and receipt of Storage Substances pursuant to Sections 3.7 and 3.8 of this Agreement.

3.11 **Border Agreements.** Storage Operator may enter into an agreement or agreements with owners of adjacent lands or operators within the Storage Reservoir with respect to operations which may enhance the injection of the Storage Substances in the Storage Reservoir in the Facility Area or which may otherwise be necessary for the conduct of Storage Operations.

3.12 **Border Agreement(s) with Minnkota Power Cooperative, Inc.** Summit Carbon Storage #3, LLC ("Summit Carbon Storage") agrees to enter into a certain border agreement ("Border Agreement") with Minnkota Power Cooperative, Inc., its affiliates or successors in interest to the DCC Permits (as defined herein) ("Minnkota") which terms and conditions if more

stringent than those contained herein shall supplement conditions contained in orders issued or arising from Summit Carbon Storage's application to the Commission in Case Nos. Case Nos. 30877 – 30880 including any revisions thereto (the "Summit Carbon Storage Application"), and Minnkota's prior vested approved permits from the Commission, including but not limited to those issued in Case Nos. 29029 – 29034, and 30122 – 30125, including all related Orders issued to Minnkota's (collectively referred to as " DCC Permits"). Summit Carbon Storage agrees that prior to the Commission's authorization to inject under NDAC 43-05-01-09(3) on any injection facility and/or facilities, identified, arising from, or developed as a result of Summit Carbon Storage Application and/or prior to any future application of Summit Carbon Storage under the authority of the Commission, which seek to establish operating rights, or to locate or site facilities within an Area of Review containing Minnkota's facilities as described in or interests vested by the DCC Permits Summit must get the written consent and authorization of Minnkota. These conditions are necessary to protect Minnkota's rights and interests vested under the DCC Permits, from any damage and/or adverse impacts caused by Summit Carbon Storage's operations, including but not limited to, location of injection or extraction facilities, rates of injection. Any violation of the terms of the Border Agreement, or the terms contained in this Article 3.12, will result in irreparable harm to Minnkota, and that as a result, Minnkota is entitled to immediate relief from the Commission to enforce the terms of thereof, and that the terms of the Border Agreement are a condition of the issuance of any permits to Summit Carbon Storage by the Commission. To the extent anything in the Border Agreement is inconsistent with, or otherwise conflicts with, the terms in this Article 3.12, the terms in Article 3.12 control and will be enforced. If Minnkota unreasonably withholds consent and authorization, Summit Carbon Storage may apply to the Commission for waiver of the requirements of this Article 3.12 prior to first injection, in accordance with NDAC 43-05-01-09(3), or at any point during operation, in accordance NDAC

43-05-01-12(1)(n), which application shall include supporting data and information, that establishes that Summit Carbon Storage's operations as described in the Summit Carbon Storage Application do not damage or adversely impact Minnkota's rights under the DCC Permits. Upon at least a thirty-day notice to Minnkota and after an evidentiary hearing, the Commission will determine and set appropriate operating standards consistent with correlative rights and the efficient development of resources.

## ARTICLE 4
## STORAGE OPERATIONS

4.1 **Storage Operator.** Summit Carbon Storage #3, LLC is hereby designated as the initial Storage Operator. Storage Operator shall have the exclusive right to conduct Storage Operations, which shall conform to the provisions of this Agreement and any lease covering a Pore Space Interest. If there is any conflict between such agreements, this Agreement shall govern.

4.2 **Successor Operators**. The initial Storage Operator and any subsequent operator may, at any time, transfer operatorship of the Storage Facility with and upon the approval of the Commission.

4.3 **Method of Operation.** Storage Operator shall engage in Storage Operations with diligence and in accordance with good engineering and injection practices.

4.4 **Change of Method of Operation.** As permitted by the Commission nothing herein shall prevent Storage Operator from discontinuing or changing in whole or in part any method of operation which, in its opinion, is no longer in accord with good engineering or injection practices. Other methods of operation may be conducted or changes may be made by Storage Operator from time to time if determined by it to be feasible, necessary or desirable to increase the injection or storage of Storage Substances.

## ARTICLE 5
## TRACT PARTICIPATIONS

5.1 **Tract Participations.** The Storage Facility Participation of each Tract is shown in Exhibit "C." The Storage Facility Participation of each Tract shall be based 100% upon the ratio of surface acres in each Tract to the total surface acres for all Tracts within the Facility Area.

5.2 **Relative Storage Facility Participations.** If the Facility Area is enlarged or reduced, the revised Storage Facility Participation of the Tracts remaining in the Facility Area and which were within the Facility Area prior to the enlargement or reduction shall remain in the same ratio to one another.

## ARTICLE 6
## ALLOCATION OF STORAGE SUBSTANCES

6.1 **Allocation of Tracts.** All Storage Substances injected shall be allocated to the several Tracts in accordance with the respective Storage Facility Participation effective during the period that the Storage Substances are injected. The amount of Storage Substances allocated to each tract, regardless of whether the amount is more or less than the actual injection of Storage Substances from the well or wells, if any, on such Tract, shall be deemed for all purposes to have been injected into such Tract. Storage Substances transferred or received pursuant to Sections 3.7 and 3.8 of this Agreement shall be disregarded for the purposes of this Section 6.1.

6.2 **Distribution within Tracts.** The Storage Substances injected and allocated to each Tract shall be distributed among, or accounted for to the Pore Space Owners who own a Pore Space Interest in such Tract in accordance with each Pore Space Owner's Storage Facility Participation effective during the period that the Storage Substances were injected. If any Pore Space Interest in a Tract hereafter becomes divided and owned in severalty as to different parts of the Tract, the owners of the divided interests, in the absence of an agreement providing for a different division, shall be compensated for the storage of the Storage Substances in proportion to the surface acreage of their respective parts of the Tract. Subject to Section 3.9, Storage

Substances transferred or received pursuant to Sections 3.7 and 3.8 of this Agreement shall be disregarded for the purposes of this Section 6.2.

## ARTICLE 7
## TITLES

7.1 **Warranty and Indemnity.** Each Pore Space Owner who, by acceptance of revenue for the injection of Storage Substances into the Storage Reservoir, shall be deemed to have warranted title to its Pore Space Interest, and, upon receipt of the proceeds thereof to the credit of such interest, shall indemnify and hold harmless the Storage Operator and other Parties from any loss due to failure, in whole or in part, of its title to any such interest.

7.2 **Injection When Title Is in Dispute.** If the title or right of any Pore Space Owner claiming the right to receive all or any portion of the proceeds for the storage of any Storage Substances allocated to a Tract is in dispute, Storage Operator shall require that the Pore Space Owner to whom the proceeds thereof are paid to furnish security for the proper accounting thereof to the rightful Pore Space Owner, if the title or right of such Pore Space Owner fails in whole or in part.

7.3 **Payments of Taxes to Protect Title.** The owner of surface rights to lands within the Facility Area is responsible for the payment of any *ad valorem* taxes on all such rights, interests or property, unless such owner and the Storage Operator otherwise agree. If any *ad valorem* taxes are not paid by or for such owner when due, Storage Operator may at any time prior to tax sale or expiration of period of redemption after tax sale, pay the tax, redeem such rights, interests or property, and discharge the tax lien. Storage Operator shall, if possible, withhold from any proceeds derived from the storage of Storage Substances otherwise due any Pore Space Owner who is a delinquent taxpayer up to an amount sufficient to defray the costs of such payment or redemption; *provided* that such withholding to be credited to the Storage Operator. Such withholding shall be without prejudice to any other remedy available to Storage Operator.

7.4 **Pore Space Interest Titles.** If title to a Pore Space Interest fails, but the tract to which it relates is not removed from the Facility Area, the Party whose title failed shall not be entitled to share under this Agreement with respect to that interest.

## ARTICLE 8
## EASEMENTS OR USE OF SURFACE

8.1 **Grant of Easement.** Storage Operator shall have the right to use as much of the surface of the land within the Facility Area as may be reasonably necessary for Storage Operations and the injection of Storage Substances.

8.2 **Use of Water.** Storage Operator shall have and is hereby granted free use of water from the Facility Area for Storage Operations, except water from any well, lake, pond or irrigation ditch of a Pore Space Owner; notwithstanding the foregoing, Storage Operator may access any well, lake, or pond as provided in Exhibit "D".

8.3 **Surface Damages.** Storage Operator shall pay surface owners for damage to growing crops, timber, fences, improvements and structures located on the Facility Area that result from Storage Operations.

8.4 **Surface and Sub-Surface Operating Rights.** Except to the extent modified in this Agreement, Storage Operator shall have the same rights to use the surface and sub-surface and use of water and any other rights granted to Storage Operator in any lease covering Pore Space Interests. Except to the extent expanded by this Agreement or the extent that such rights are common to the effected leases, the rights granted by a lease may be exercised only on the land covered by that lease. Storage Operator will to the extent possible minimize surface impacts.

## ARTICLE 9
## ENLARGEMENT OF STORAGE FACILITY

9.1 **Enlargement of Storage Facility.** The Storage Facility may be enlarged from time to time to include acreage and formations reasonably proven to be geologically capable of storing

Storage Substances. Any expansion must be approved in accordance with the rules and regulations of the Commission.

9.2 **Determination of Tract Participation.** Storage Operator, subject to Section 5.2, shall determine the Storage Facility Participation of each Tract within the Storage Facility as enlarged, and shall revise Exhibits "A", "B" and "C" accordingly and in accordance with the rules, regulations and orders of the Commission.

9.3 **Effective Date.** The effective date of any enlargement of the Storage Facility shall be effective as determined by the Commission.

## ARTICLE 10
## TRANSFER OF TITLE PARTITION

10.1 **Transfer of Title.** Any conveyance of all or part of any interest owned by any Party hereto with respect to any Tract shall be made expressly subject to this Agreement. No change of title shall be binding upon Storage Operator, or any Party hereto other than the Party so transferring, until 7:00 a.m. on the first day of the calendar month following thirty (30) days from the date of receipt by Storage Operator of a photocopy, or a certified copy, of the recorded or filed instrument evidencing such a change in ownership.

10.2 **Waiver of Rights to Partition.** Each Party hereto agrees that, during the existence of this Agreement, it will not resort to any action to partition any Tract or parcel within the Facility Area or the facilities used in the development or operation thereof, and to that extent waives the benefits or laws authorizing such partition.

## ARTICLE 11
## RELATIONSHIP OF PARTIES

11.1 **No Partnership.** The duties, obligations and liabilities arising hereunder shall be several and not joint or collective. This Agreement is not intended to create, and shall not be construed to create, an association or trust, or to impose a partnership duty, obligation or liability with regard to any one or more of the Parties hereto. Each Party hereto shall be individually responsible for its own obligations as herein provided.

11.2 **No Joint Marketing.** This Agreement is not intended to provide, and shall not be construed to provide, directly or indirectly, for any joint marketing of Storage Substances.

11.3 **Pore Space Owners Free of Costs.** This Agreement is not intended to impose, and shall not be construed to impose, upon any Pore Space Owner any obligation to pay any Storage Expense unless such Pore Space Owner is otherwise so obligated.

11.4 **Information to Pore Space Owners.** Each Pore Space Owner shall be entitled to all information in possession of Storage Operator to which such Pore Space Owner is entitled by an existing lease or a lease imposed by this Agreement.

## ARTICLE 12
## LAWS AND REGULATIONS

12.1 **Laws and Regulations.** This Agreement shall be subject to all applicable federal, state and municipal laws, rules, regulations and orders.

## ARTICLE 13
## FORCE MAJEURE

13.1 **Force Majeure.** All obligations imposed by this Agreement on each Party, except for the payment of money, shall be suspended while compliance is prevented, in whole or in part, by a labor dispute, fire, war, civil disturbance, or act of God; by federal, state or municipal laws; by any rule, regulation or order of a governmental agency; by inability to secure materials; or by any other cause or causes, whether similar or dissimilar, beyond reasonable control of the Party. No Party shall be required against their will to adjust or settle any labor dispute. Neither this Agreement nor any lease or other instrument subject hereto shall be terminated by reason of suspension of Storage Operations due to any one or more of the causes set forth in this Article.

## ARTICLE 14
## EFFECTIVE DATE

14.1 **Effective Date.** This Agreement shall become effective as determined by the Commission.

14.2 **Certificate of Effectiveness.** Storage Operator shall file for record in the county or counties in which the land affected is located a certificate stating the Effective Date of this Agreement.

## ARTICLE 15
## TERM

15.1 **Term.** Unless sooner terminated in the manner hereinafter provided or by order of the Commission, this Agreement shall remain in full force and effect until the Commission has issued a certificate of project completion with respect to the Storage Facility in accordance with § 38-22-17 of the North Dakota Century Code.

15.2 **Termination by Storage Operator.** This Agreement may be terminated at any time by the Storage Operator with the approval of the Commission.

15.3 **Effect of Termination.** Upon termination of this Agreement all Storage Operations shall cease. Each lease and other agreement covering Pore Space within the Facility Area shall remain in force for ninety (90) days after the date on which this Agreement terminates, and for such further period as is provided by Exhibit "D" or other agreement.

15.4 **Salvaging Equipment Upon Termination.** If not otherwise granted by Exhibit "D" or other instruments affecting each Tract, Pore Space Owners hereby grant Storage Operator a period of six (6) months after the date of termination of this Agreement within which to salvage and remove Storage Equipment.

15.5 **Certificate of Termination.** Upon termination of this Agreement, Storage Operator shall file for record in the county or counties in which the land affected is located a certificate that this Agreement has terminated, stating its termination date.

## ARTICLE 16
## APPROVAL

16.1 **Original, Counterpart or Other Instrument.** A Pore Space Owner may approve this Agreement by signing the original of this instrument, a counterpart thereof, ratification or joinder or other instrument approving this instrument hereto. The signing of any such instrument shall have the same effect as if all Parties had signed the same instrument.

16.2 **Joinder in Dual Capacity.** Execution as herein provided by any Party as either a Pore Space Owner or the Storage Operator shall commit all interests owned or controlled by such Party and any additional interest thereafter acquired in the Facility Area.

16.3 **Approval by the North Dakota Industrial Commission.** Notwithstanding anything in this Article to the contrary, all Tracts within the Facility Area shall be deemed to be qualified for participation if this Agreement is duly approved by order of the Commission.

## ARTICLE 17
## GENERAL

17.1 **Amendments Affecting Pore Space Owners.** Amendments hereto relating wholly to Pore Space Owners may be made with approval by the Commission.

17.4 **Construction.** This agreement shall be construed according to the laws of the State of North Dakota.

## ARTICLE 18
## SUCCESSORS AND ASSIGNS

18.1 **Successors and Assigns.** This Agreement shall extend to, be binding upon, and inure to the benefit of the Parties hereto and their respective heirs, devisees, legal representatives, successors and assigns and shall constitute a covenant running with the lands, leases and interests covered hereby.

[*Remainder of page intentionally left blank. Signature page follows.*]

Executed the date set opposite each name below but effective for all purposes as provided by Article 14.

Dated: _____, 20__

**STORAGE OPERATOR**

Summit Carbon Storage #3, LLC

By:_____
[Name]
Its: [Title]

#81618965v1

Hand-delivered to
Commission on 6/11/24

**BEFORE THE INDUSTRIAL COMMISSION**

**STATE OF NORTH DAKOTA**

**CASE NOS. 30873 - 30876**

**On a motion of the Commission to consider the application of Summit Carbon Storage #2, LLC for a storage facility permit for geologic storage of carbon dioxide pursuant to NDCC Ch. 38-22 and NDAC Ch. 43-05-01.**

## AFFIDAVIT OF SERVICE BY MAIL

STATE OF NORTH DAKOTA )
) ss.
COUNTY OF BURLEIGH )

Jessica Pulver Biesterfeld, being first duly sworn, deposes and says that on the 16th day of April, 2024, she served the attached:

**Memo**
**Notice of Hearing; and**
**Summit Carbon Solutions Project Pamphlet**

by placing a true and correct copy thereof in an envelope addressed as follows:

**See attached Exhibit A**

and deposited the same, with postage prepaid, certified mail, return receipt requested, in the United States mail at Bismarck, North Dakota.

Jessica Pulver Biesterfeld

Subscribed and sworn to before me this 7th day of June, 2024.

JEFFREY L SKAARE
NOTARY PUBLIC, STATE OF NORTH DAKOTA
MY COMMISSION EXPIRES SEPT 16, 2026

Notary Public
My Commission expires: Sept. 16, 2026

SUMMIT CARBON SOLUTIONS

April 15, 2024

TO: OWNER, LESSEE OR OPERATOR OF RECORD

**RE: APPLICATION OF SUMMIT CARBON STORAGE #2, LLC FOR A CARBON DIOXIDE STORAGE FACILITY**

Dear Sir/Madam:

Summit Carbon Storage #2, LLC ("Summit") has made application to the North Dakota Industrial Commission ("Commission") requesting an order providing approval of a carbon dioxide storage facility project ("Project"). A hearing to consider the application of Summit for the Project has been scheduled before the Commission as set forth in the attached Notice of Hearing ("Notice"). You are receiving this Notice because you have been identified as an owner, lessee or operator of record within the lands identified in the Notice or within one-half mile of the outside boundary of the proposed Project.

Details concerning the Project are included in the enclosed information pamphlet or are available from the Commission; however, should you have any questions regarding the Project or Summit's application, please leave a message at (701) 505-8676 or email option-info@summitcarbon.com. A qualified representative will respond promptly to answer your questions.

Sincerely,

Jeffrey L. Skaare, J.D., C.P.L.
Summit Carbon Storage #2, LLC

Enclosure(s)
#80961283v1

**BEFORE THE INDUSTRIAL COMMISSION**

**STATE OF NORTH DAKOTA**

**CASE NO. 30873 - 30876**

**On a motion of the Commission to consider the application of Summit Carbon Storage #2, LLC for a storage facility permit for geologic storage of carbon dioxide pursuant to NDCC Ch. 38-22 and NDAC Ch. 43-05-01.**

## NOTICE OF HEARING

**PLEASE TAKE NOTICE** that Summit Carbon Storage #2, LLC ("Summit") has made application to the North Dakota Industrial Commission ("Commission") requesting an order providing approval of a carbon dioxide storage facility permit as follows.

1. The carbon dioxide storage facility will be located south of the city of Beulah, in Oliver and Mercer Counties, North Dakota, and comprised of the following described lands:

**Oliver County**
**Township 142 North, Range 87 West**
Section 05: S2SW
Section 06: Lots 6 (39.62), 7 (39.44), E2SW, W2SE, SESE
Section 07: Lots 1 (39.34), 2 (39.30), 3 (39.26), 4 (39.22), E2W2, E2
Section 08: W2
Section 17: W2
Section 18: Lots 1 (39.21), 2 (39.24), 3 (39.26), 4 (39.29), E2W2, E2
Section 19: Lots 1 (39.30), 2 (39.29), 3 (39.29), 4 (39.28), E2W2, E2
Section 20: W2
Section 29: W2
Section 30: Lots 1 (39.33), 2 (39.44), 3 (39.54), 4 (39.65), E2W2, E2
Section 31: Lots 1 (39.53), 2 (39.18), E2NW

**Mercer County**

**Township 143 North, Range 88 West**

Section 27: SWNW, SW, S2SE
Section 28: S2N2, S2
Section 29: SENE, SE
Section 32: SW, E2
Section 33: All
Section 34: All
Section 35: W2, W2E2

**Township 142 North, Range 88 West**

Section 01: S2
Section 02: Lot 2 (41.36), SWNE, Lots 3 (41.29), 4 (41.22), S2NW, S2
Section 03: Lots 1 (41.18), 2 (41.17), 3 (41.15), 4 (41.13), S2N2, S2
Section 04: Lots 1 (41.12), 2 (41.11), 3 (41.11), 4 (41.10), S2N2, S2
Section 05: Lots 1 (41.07), 2 (41.04), 3 (41.00), 4 (40.96), S2N2, S2
Section 06: Lot 1 (40.84), SENE, E2SE
Section 07: E2
Section 08: All
Section 09: All
Section 10: All
Section 11: All
Section 12: All
Section 13: All
Section 14: All
Section 15: All
Section 16: All
Section 17: All
Section 18: E2, SENW, NESW
Section 19: E2
Section 20: All
Section 21: All
Section 22: All
Section 23: All
Section 24: All
Section 25: All
Section 26: All
Section 27: All
Section 28: All
Section 29: All
Section 30: E2E2
Section 32: NW, E2
Section 33: All

Section 34: All
Section 35: All
Section 36: All

**Township 141 North, Range 88 West**
Section 01: Lots 3 (39.92), 4 (39.89), S2NW
Section 02: Lots 1 (39.90), 2 (39.96), 3 (40.01), 4 (40.07), S2N2, S2
Section 03: Lots 1 (40.07), 2 (40.02), 3 (39.96), 4 (39.91), S2N2, SE

2. A hearing to consider the application of Summit will be held before the Commission at 9:00 AM CDT Tuesday, June 11, 2024 – Wednesday, June 12, 2024, at the Department of Mineral Resources Conference Room, Oil and Gas Division, 1000 East Calgary Avenue, Bismarck, North Dakota.
3. A copy of the permit application and draft permit may be obtained from the Commission.
4. All comments regarding the application for the storage facility permit must be in writing and submitted to the Commission prior to hearing or presented at the hearing.
5. Amalgamation of the storage reservoirs pore space is required to operate the storage facility and the Commission may require that the pore space owned by nonconsenting owners be included in the storage facility and subject to geologic storage. The amalgamation of pore space will be considered at the hearing.

**DATED** this 15TH day of April, 2024.

FREDRIKSON & BYRON, P.A.

By _____
LAWRENCE BENDER, ND Bar #03908
*Attorneys for Applicant,*
*Summit Carbon Storage #2, LLC*
1133 College Drive, Suite 1000
P. O. Box 1855
Bismarck, ND 58502-1000
(701) 221-8700

SUMMIT CARBON SOLUTIONS

**For more information, visit: www.summitcarbonsolutions.com**

## Why am I Receiving This Letter?

Summit Carbon Solutions (Summit) is developing a large-scale Carbon Capture and Underground Storage (CCUS) project across the Midwest, with injection wells located in the Mercer, Oliver and Morton County, ND regions. Recently, Summit submitted *Class VI Storage Facility Permits* to the North Dakota Industrial Commission.

North Dakota Administrative Code 43-05-01-08 entitled, **Storage facility permit hearing**, states, the commission shall hold a public hearing before issuing a storage facility permit. At least 45 days prior to the hearing, the applicant shall give notice of the hearing to the following:

- Each **operator of mineral extraction activities** within the facility area and within ½ mile of its outside boundary
- Each **mineral lessee of record** within the facility area and within ½ mile of its outside boundary
- Each **owner of record of the surface** within the facility area and within ½ mile of its outside boundary
- Each **owner of record of minerals** within the facility area and within ½ mile of its outside boundary
- Each **owner** and each **lessee of record of the pore space** within the facility area and within ½ mile of its outside boundary; and
- Any other persons as required by the commission.

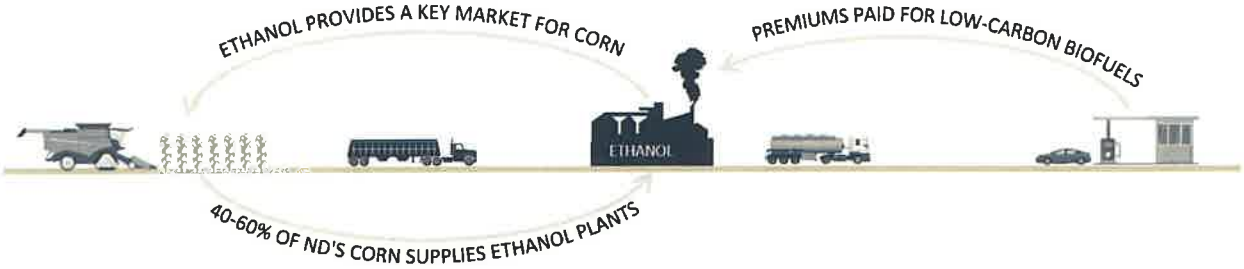
You are receiving this letter because you fit one of the above descriptions.

## Why is This Project Important?

Summit Carbon Solutions will open new economic opportunities for the **ethanol** and **agricultural** industries that are so critical to the Midwest economy. Our carbon capture and storage project will put the ethanol produced at our 57 partner facilities on track to *become eligible for emerging low carbon fuel markets.* This will allow these plants to sell their product at a premium in the growing number of states and countries that have adopted low carbon fuel standards.

*Over the last 10 years, the U.S. ethanol industry has created a market for 53 billion bushels of corn.* Today, ethanol supports 360,000 jobs and contributes $45 billion to the annual U.S. GDP. But maybe most importantly, ***ethanol plants purchase approximately half of all the corn produced in the United States***. Summit Carbon Solutions' investment will strengthen this marketplace even further for farmers, while maintaining strong land and commodity prices.

Once completed, Summit Carbon Solutions' Project will be the largest carbon capture and storage project in the world.




ETHANOL AND AGRICULTURE WORK TOGETHER TO ADD VALUE ACROSS THE SUPPLY CHAIN AS WELL AS CREATE ECONOMIC IMPACT AND JOBS FOR RURAL AMERICA.

## Hearing Details

Pursuant to the enclosed notice, a hearing to consider the application of Summit Carbon Solutions will be held before the Commission at the Department of Mineral Resources Conference Room, Oil and Gas Division, 1000 East Calgary Avenue, Bismarck, North Dakota. A copy of the permit application and draft permit can be found on NDIC's website, https://www.dmr.nd.gov/dmr/oilgas/ClassVI. All comments regarding the application for the storage facility permit must be in writing and submitted to the Commission prior to the hearing or presented at the hearing. These can be sent to the Department of Mineral Resources, Oil and Gas Division, 1000 East Calgary Avenue, Bismarck, North Dakota 58503.

## Who is Summit Carbon Solutions?

Summit Carbon Solutions is a U.S. company with U.S. roots committed to driving job growth across the Midwest, reducing emissions, and providing a substantial boost to the ethanol and agricultural industries that are so critical to the economy. We believe in advancing communities through decarbonization solutions. Currently, the company has announced a partnership with 57 ethanol plants across the Midwest. Utilizing proven technology, Summit Carbon Solutions will capture carbon dioxide before it is emitted into the atmosphere and channel it to North Dakota where it will be permanently and safely stored deep underground.

## What is the Timeline?

While there are variables when it comes to a project of this size, particularly one that requires permits at the federal, state, and local levels, we anticipate construction will begin in 2025.

## Mineral Rights and Pore Space Rights

Pore space is owned by surface owners. That is not always the case when it comes to mineral rights. Summit Carbon Solutions believes that these different rights can live and operate in harmony. Summit chose an area with little to no hydrocarbon exploration. In addition, Summit chose injections zones that are nonhydrocarbon bearing zones. Nonetheless, should a mineral owner wish to develop its interests in these areas, there are still extraction methods, such as horizontal drilling, that would allow development.

## Determining Storage Zones

Summit Carbon Solutions drilled three stratigraphic test wells and collected stratigraphic information to investigate the feasibility of developing permanent and safe $CO_2$ storage. Methodologies include extracting whole cores, wireline logging, injectivity test and more. Information collected from the coring activities along with data from wireline logging, testing and existing information help scientists verify that the deep rock layers overlying and underlying the study zone will safely and permanently store $CO_2$. Summit successfully extracted over 3,500 ft of whole cores across three wells, the deepest core interval being over two miles deep below ground level. Results from core and log analysis show ideal geological and reservoir characteristics for storage with impermeable cap rocks above and below the study zone.

## What is Amalgamation?

Effective geologic storage requires cooperative use of subsurface property interests and the collaboration of property owners. Obtaining consent to store $CO_2$ from all owners in a unit may not be feasible, thus requiring procedures that promote, in a manner fair to all interests, cooperative management, thereby ensuring the maximum use of our natural resources. North Dakota Century Code 38-22-10 entitled **Amalgamating property interests**, provides: "*If a storage operator does not obtain the consent of all persons who own the storage reservoir's pore space, the commission may require that the pore space owned by nonconsenting owners be included in a storage facility and subject to geologic storage.*"

Should you have any questions regarding the Project or Summit's application, please leave a message at (701) 505-8676 or email option-info@summitcarbon.com. A qualified representative will respond promptly to answer your questions.

SUMMIT CARBON SOLUTIONS

**EXHIBIT A**

Rita Schmidt
PO Box 3175
Bismarck, ND 58502-3175

Debra A. Hoerer & Bonnita Schmidt
618 N. 13th St
Bismarck, ND 58504

Darla M. Ratzak
Box 2740
Williston, ND 58801

Candida L. Rhodes
823 N 11th St
Bismarck, ND 58501

Vergene Christianson
14509 Lanier Ct
Naples, FL 34114

Nicholas & Amy Bachler
508 1st Ave SW
Beulah, ND 58523

Brush Creek Land Company, LLC
5774 21st Street SW
Beulah, ND 58523

Ashley R. Scholl
1731 5th Ave NE
Beulah, ND 58523

Michael J. Marshall & Cheryl J. Marshall
1651 Hwy 49
Beulah, ND 58523

Terence Schmidt
312 10th St NW
Beulah, ND 58523

Mardee A. Reich
1605 63rd Ave SW
Zap, ND 58580

Kenneth J. Unruh
6315 County Rd 12
Zap, ND 58580

County of Mercer
PO Box 39
Stanton, ND 58571

Maxine Cline
5998 17th Street SW
Beulah, ND 58523

Susan Voegele
2090 Valley Creek Lane
Shakopee, MN 55379

Brian A. Gierke and Deanne J. Gierke,
Trustees, or their successors in trust, under
the Brian A. Gierke Living Trust
1761 60th Ave SW
Beulah, ND 58523

Peggy Huffman
1218 North 35th Street #2
Bismarck, ND 58501

Stephanie Garrison
624 Flint Drive
Bismarck, ND 58501

Troy Garrison
4036 Knudson Loop
Bismarck, ND 58503

Heidi Garrison
624 Flint Drive
Bismarck, ND 58501

Jeb N. Schafer
1805 59th Avenue SW
Beulah, ND 58523

Rodney L. Miller
2591 Abbot Lane North
Mandan, ND 58554

Eva M. Dwyer
925 14th Ave W
Williston, ND 58801

Donald A. Heth
4962 140th Avenue Northwest L36
Williston, ND 58801

Bernice I. Mischel
614 E Hughes Street
Glendive, MT 59330

Patrick A. Mischel
47 Road 261
Glendive, MT 59330

Judy A. Mischel Cheff
805 Amethyst Avenue
Helena, MT 59602

Nancy S. Keller
700 East Hughes
Glendive, MT 59330

Timothy P. Mischel & Marilyn L. Mischel, Trustees and their successors in interest under the T & M Mischel Living Trust, dated June 4, 2018
PO Box 1476
Evansville, WY 82636

Gary A. Smith
2144 56th Avenue SW
Beulah, ND 58523

Jennifer L. Smith
5400 Kayley Drive
Bismarck, ND 58504

Jordan B. Smith
15219 French Drive North
Hugo, MN 55038

Edward Weiand
5735 23rd St SW
Beulah, ND 58523

Joanne Skalsky
417 Hwy 49N
Beulah, ND 58523

Kimberly Delabarre
5419 Ridgewood Dr
Bismarck, ND 58501

Lana Erasmus
1412 Main Ave
Washburn, ND 58577

Tanya Doe
PO Box 494
Beulah, ND 58523

Heather Horning
PO Box 274
Golden Valley, ND 58541

Wade M. and Eden K Bachmeier
8315 Willow Road N
Mandan, ND 58554

Lionel Doll & Kathy Doll
3130 49th Avenue
New Salem, ND 58563

Larry Flemmer
2404 Ottercreek Rd
Mandan, ND 58554

Stephen & Leah Kessler
4904 34th Avenue NW
Mandan, ND 58554

Diana & Clyde Schulz
PO Box 57
Beulah, ND 58523

Jane C. Craig
6370 County Road 16
Glen Ullin, ND 58631

Scott & Tosha Frank
674 17th Ave East
Dickinson, ND 58601

Kelly James Kessler & Kimberly Ann Kessler, as Trustees of the Kelly James Kessler Revocable Trust under Agreement dated 10/07/2009
PO Box 942
Beulah, ND 58523

Kim & Trisha Kessler
6120 26th St SW
Glen Ullin, ND 58631

Shane J. & Samantha J. Goetz
2503 County 13
Zap, ND 58580

Duane L. & Patricia A. Otto
870 Highway 49
Beulah, ND 58523

John P. Klein Family Partnership, LLP
4766 Pelican Drive
Medina, ND 58467

Sharon L. Unruh
2051 County Rd 13
Zap, ND 58580

Denver Unruh
2052 County Rd 13
Zap, ND 58580

Ernest Boehler
717 4th Street NE
Hazen, ND 58545

Chad N. Schafer & Lisa L. Schafer
1834 – 60th Avenue SW
Beulah, ND 58523

Darell Herman & Sherry Herman
1605 59th Avenue SW
Beulah, ND 58523

Kurt M. Swenson & Faye B. Swenson, Living Trust
5774 21st Street SW
Beulah, ND 58523

Joseph O. Swenson
5774 21st Street SW
Beulah, ND 58523

Johnell J. Kusler
1885 Hillcrest Avenue
St. Paul, MN 55117

Milda L. Hedblom
1801 Summit Avenue
St. Paul, MN 55116

Todd Rueb & Darcy Rueb
PO Box 103
Beulah, ND 58523

Travis Hellickson &
Amber Hellickson
5896 19th St. SW
Beulah, ND 58523

Noel Helm & Betty Helm Life Estate
6140 County 20
Beulah, ND 58523

Jason Erickson & Angela Erickson
2032 60th Ave. SW
Beulah, ND 58523

Robert Schutt & Alberta E. Schutt, under the Robert Schutt and Alberta E. Schutt Living Trust
5991 21st St. SW
Beulah, ND 58523

Keith Schutt
5995 21st St. SW
Beulah, ND 58523

Jeffrey J. and Darcy Schutt
5970 22nd Street SW
Beulah, ND 58523

Mark S. Singer
46 Hina St.
Hilo, HI 96270

Ernest J. Vollan
3124 Colorado Lane, Apt #326
Bismarck, ND 58503

Cynthia K. Nickel
2907 Westside Street
Grand Island, NE 68803

Rory C. Flemmer & Jennifer Flemmer
PO Box 1151
Beulah, ND 58523

The North Dakota State Water Commission
900 East Boulevard Avenue, Dept. 770
Bismarck, ND 58505-0850

Church of St. Joseph (of Beulah)
PO Box 146
Beulah, ND 58523-0146

LeeRoy Fischer
6171 – 21st Street SW
Beulah, ND 58523

Donlyn J. Erickson & Roberta Erickson
PO Box 326
Beulah, ND 58523

Linda Welk
1650 63rd Avenue SW
Zap, ND 58580

Jonathan Welk
237 Sheila Drive
Beulah, ND 58523

Stacy Welk
401 4th Avenue SW
Beulah, ND 58523

Shane Kost & Kristi Kost
1651 63rd Avenue SW
Zap, ND 58580

Ronald E. Gunsch & Janice J. Gunsch
6300 County Road 25
Zap, ND 58580

Myron L. Vigesaa and Nancy L. Vigesaa, Trustees, or their Successors in Trust, Under the Myron L. Vigesaa Revocable Living Trust
1632 82nd Avenue SE
Kensal, ND 58455

Nancy L. Vigesaa and Myron L. Vigesaa, Trustees, or their Successors in Trust, Under the Nancy L. Vigesaa Revocable Living Trust
1632 82nd Avenue SE
Kensal, ND 58455

Nathan R. Vigesaa & Heather L. Vigesaa
1671 63rd Ave SW
Zap, ND 58580

Lyle Winkler & Patricia A. Winkler
6401 County Road 25
Zap, ND 58580

U.S. Bank, N.A., of Fargo, North Dakota, as Trustee of the
Darwin H. Mueller Irrevocable Trust
PO Box 1980
Fargo, ND 58107

State of North Dakota
1707 North 9th Street
Bismarck, ND 58501

Shane L. Fischer, Individually & as Trustee of the Shane L. Fischer Trust
42326 Highland Ct
Lancaster, CA 93536

Eric H. Klindworth & Jacinta Klindworth
1710 62nd Avenue SW
Beulah, ND 58523

Rachel Riedemann
1747 Hwy. 49
Beulah, ND 58523

Wanda Gustafson
PO Box 155
Dodge, ND 58625-0155

Lori B. Klein
PO Box 176
Dodge, ND 58625-0176

Sara L. Gustafson
PO Box 155
Dodge, ND 58625-0155

Robb Moore & Heidi Moore
2213 Highway 49
Beulah, ND 58523-9166

David A. Orth & Ronni L. Huschka
10880 Bruin Ln
Missoula, MT 59808

Joan Cundall
613 S 2400th W
Vernal, UT 84078

Richard A. Orth
11 Bonanza Drive
Billings, MT 59102

Robert H. Orth
1325 Bluebell Drive
Billings, MT 59105

Kimberly Orth
143 North Calle Del Diablo
Green Valley, AZ 85614

Wilfred Orth
108 First Street
Glendive, MT 59330

Estate of Cecelia Orth c/o Ruben J. Orth, Jr
3674 115G Ave SW
Dickinson, ND 58601-9706

David Hottman & Stephanie Hottman
6201 19th Street SW
Beulah, ND 58523

Tanner Erickson & Heather Erickson
PO Box 4
Beulah, ND 58523

LeeRoy J. Winkler & Sharon L. Winkler
PO Box 196
Zap, ND 58580

Roberta Unruh
807 Cow Bell Court
Montrose, CO 81401

Kimberly Dukart
206 Hawthorn Street
Frederick, CO 80530

Amanda Ahlschlager
1719 Blackstone Loop W
Beulah, ND 58523

Perry Winkler & Beth Winkler
1960 County Road 25
Zap, ND 58580

Kacey Winkler
4102 Shoal Loop SE, #304
Mandan, ND 58554

Korey Winkler
1960 County Road 25
Zap, ND 58580

Howard H. Winkler & Bernadette J. Winkler
1809 County Road 25
Zap, ND 58580

Nichole Lee Sailer
1217 Crestview Lane
Bismarck, ND 58501

Arnold V. Winkler & Sharon D. Winkler
PO Box 42
Zap, ND 58580

Russell D. Winkler & Tammy Winkler
509 2nd Ave SE
Beulah, ND 58523

Casey Lee Voigt and Julie Anne Voigt,
Trustees of the Casey Lee Voigt Living Trust dated January 26, 2033, and any amendments thereto
PO Box 454
Beulah, ND 58523

Donalda Voigt
Box 874
Beulah, ND 58523

Karmen Eslinger
713 3rd Ave. NW
Beulah, ND 58523

Shawn Voigt
412 Central Avenue N
Beulah, ND 58523

Kenneth Voigt
1206 3rd Ave. NW Apt. 14
Beulah, ND 58523

Nancy Flemmer
324 North 31st St. #7
Bismarck, ND 58501

Cherie Ann Fischer
6339 Osgood Pkwy. S.
Fargo, ND 58104

Shawn Michael Flemmer
3900 Poseidon Loop
Bismarck, ND 58504

James A. Swenson & Darlene A. Swenson
1941 62nd Ave SW
Beulah, ND 58523

Trent T. Martin & Dawn Martin
1943 – 62nd Avenue SW
Beulah, ND 58523

Fayette L. Cote & Robert V. Cote, as Trustees of the Robert V. Cote and Fayette L. Cote Trust
14670 – 72nd Street NE
Otsego, MN 55330

Ryan J. Flemmer
1961 Highway 49
Beulah, ND 58523

Vivian V. Hauff
1144 College Drive Unit #215
Bismarck, ND 58501

Jerry L. Hauff
1133 West Mountain Peak Way
San Tan Valley, AZ 85143

Willa Jean Ann Weaver
805 – 11th Street
Wheatland, WY 82201

Darwin Huber & Susan E. Huber
506 1st Avenue NW
Beulah, ND 58523

Daryl D. Huber
5254 South Hoopes Circle
Kearns, UT 84118

Darren D. Huber
800 18th Street
Wheatland, WY 82201

Roughrider Electric Cooperative, Inc.
2156 4th Avenue E.
Dickinson, ND 58601-6559

JoLene M. Rust
PO Box 86
Mercer, ND 58559

Carol Kaelberer
4595 38th St
New Salem, ND 58563

Morgan Nagel
4609 5th St NW
Rochester, MN 55901

Garrett Kirchmeier
4554 County Road 138
Mandan, ND 58554

Chandler J. Kirchmeier
1573 Woodridge Ln
West Fargo, ND 58078

Norman R. Winkler & Martha E. Winkler
14300 184th Street NE
Menoken, ND 58558

Doris B. Mutzenberger & James J. Mutzenberger
1022 1st Avenue NW
Hazen, ND 58545

Tony Mutzenberger
1907 Pacific Lane
Bismarck, ND 58501

Casey Mutzenberger
2000 County Rd 25
Zap, ND 58580

Myron Flemmer & Evelyn Flemmer
PO Box 523
Scranton, ND 58653

Christopher Palmer & Kayla Palmer
2090 County Road 25
Zap, ND 58580

Shawn Unruh & Shevelle Unruh
2052 County 13
Zap, ND 58580

Austin Jensen & Destinee Jensen
2061 County 13
Zap, ND 58580

Paulette White
2476 Boutwell Road
Richton, MS 39476

Steven C. Goetz
2501 County 13
Zap, ND 58580

Paul A. Schock
230 Sheila Drive
Beulah, ND 58523

Thomas Welk
6540 – 23rd Street Southwest
Zap, ND 58580

Amy Dinius
1930 – 17th Avenue West
Dickinson, ND 58601

David Welk
669 – 4th Avenue Southeast
Dickinson, ND 58601

Cody S. Thiel & Megan B. Thiel
2245 Highway 49
Beulah, ND 58523

Jerry Ballensky &
Julie Ballensky
2175 – 62nd Avenue SW
Beulah, ND 58523

Jason Allen Ballensky, asp
1515 – 5th Avenue West
Williston, ND 58801

David Fischer
2904 Belgian Bend SE
Mandan, ND 58554

Sheila Hildebrand & Steven B. Hildebrand
1201 – 56th Avenue SW
Hazen, ND 58545

Irene Fischer
100 – 7th Street Northwest
Unit 306
Beulah, ND 58523

Barry R. Fischer
6160 – 21st Street Southwest
Beulah, ND 58523

Brendan B. Flemmer
3725 Augusta Way
Bismarck, ND 58503

Thomas M. Fandrich & Laura Jane Fandrich
6135 22nd Street SW
Beulah, ND 58523

John M. Jochim
1444 Maple Lane
West Fargo, ND 58078

Michael P. Bauman
1632 Royal Fern Ln
Fleming Island, FL 32003

Violet J. Jochim
316 – 3rd Avenue Northwest
Beulah, ND 58523

Duane Flemmer & Lori Flemmer
PO Box 962
Beulah, ND 58523

Elsie Opp
609 3rd Ave. NW
Beulah, ND 58523

Linda Flemmer
1113 Blackstone Lane
Beulah, ND 58523

Dennis Flemmer
6450 County Rd. 26
Zap, ND 58580

Emil V. Lapp, Jr. & Donna J. Lapp
1931 Constitution Drive
Bismarck, ND 58501

Michael Lapp
11269 – 29D Street Southwest
Dickinson, ND 58601

Clark D. Pochant & Jayne D. Pochant
2650 St. SW
Center, ND 58530

Chance Mastel
2230 County 25
Zap, ND 58580

Jessica Voegele
2230 County 25
Zap, ND 58580

Walter E. Frank
39923 730th Street
Lakefield, MN 56150

Dwight J. Frank & Beverly A. Frank
1816 Murray Drive
Beulah, ND 58523

Ruby Emter
100 – 7th Street Northwest Unit #105
Beulah, ND 58523

Leeta Olin
316 Iowa Avenue
Mott, ND 58646

Tammy Moore
1801 – 6th Avenue Northeast
Beulah, ND 58523

Lila A. Braun
6251 County Road 16
Beulah, ND 58523

Michelle M. Braun
6113 Whiskerbrush Road
Argyle, TX 76226

Delmer F. Voegele & Cassandra R. Voegele
1907 5th Ave NE
Beulah, ND 58523

Eric John Voegele
258 Country Club Place
Spring Creek, NV 89815

Ralph Kemmet & Dena Kemmet
2360 Highway 49
Beulah, ND 58523

Corey M. Voegele & Roxanne Voegele
6181 25th Street SW
Glen Ullin, ND 58631

Jack J. Kraft & Deborah Kraft
2481 Highway 49 S.
Glen Ullin, ND 58631

Sandra M. Schnaidt
413 7th St. NW
Beulah, ND 58523

Bonnie L. Haupt
5631 Apple Creek Drive
Bismarck, ND 58504

Brenda Owen
5963 Highway 85, Apt. 9104
Williston, ND 58801

Cheryl Weigel
2412 72nd Street SE
Kintyre, ND 58549-9650

Sandra McKay
5524 Shoal Drive
Bismarck, ND 58503

Ernest A. Kemmet
Route Z, Box 135
Glen Ulin, ND 58631

Clifford J. Helm aka Clifford Helm
709 3rd Avenue NW
Beulah, ND 58523

Patsy Frafford
51 Lincoln Street NE
Killdeer, ND 58640

Jody Barnick
108 First Street SE
Beulah, ND 58523

David Helm
800 Oak Avenue
New Salem, ND 58563

Julie M. Dschaak f/k/a Julie M. Flemmer
PO Box 904
Beulah, ND 58523

Veronica M. Heier
205 – 2nd Street NW, Apt. #210
Beulah, ND 58523

Keith R. Unruh and Stacey L. Unruh
6261 – 7th Street NE
Glen Ullin, ND 58631

Assumption Abbey, Inc., Inc. -c/o Abbot Brian Wangler
418 – 3rd Avenue West
Richardton, ND 58652

Estate of Mary Eva Schumacher, Regina Weiand f/k/a Regina Schumacher and Joe Weiand, heirs
222 – 3rd NW, Beulah, ND 58523
Beulah, ND 58523

Bonnie Haupt aka Bonnie L. Haupt
56331 Apple Creek Drive
Bismarck, ND 58504

Jerome Skalsky and Ida L. Skalsky
1403 North Louis Avenue
Tucson, AZ 85712

Duane Skalsky
9110 North Shadow Mountain Drive
Tucson, AZ 85737

David & Rebecca Skalsky - Dawson & Noah Skalsky
8109 Northwood Place
Bismarck, ND 58503

Keith G. Kessler and Deanna A. Kessler
6001 – 26th Street SW
Glen Ullin, ND 58631-9529

Charlotte R. Richards, Trustee Fohs-Sohn Oil and Gas Trust
PO Box 1001
Roseburg, OR 97470

Linda L. Schmidt, Trustee of the Linda L. Schmidt 2007 Revocable Trust
11704 South Kingston Avenue
Tulsa, OK 74137

Sidney S. Lawler, Trustee of the Sidney S. Lawler Trust dated 6-14-11
3906 South Delaware Place
Tulsa, Ok 74105-3745

Patrick W. Fisher Minerals, LLC
3117 Edgewood Pointe
Bismarck, ND 58503

Loretta Moe
1416 Dogwood Avenue
Grafton, ND 58237

Chad A. Winter
67 Bidwell Square
Unionville, CT 06085

Lagness Properties, a partnership, c/o Gail A. Barsness
6913 West Shore Drive
Edina, MN 55435

T.S. Snydal
95 Wedgefield Drive
Hilton Head Island, SC 29926

Richard S. Johnson
823 – 13th Avenue
Langdon, ND 58249

Rita A. Johnson
3124 Colorado Lane. #224
Bismarck, ND 58503

Anne M. Johnson, Trustee of the Margaret M. Olson Trust dated 3/14/2012
31219 River Road
Redwood Falls, MN 56283

Vivian Dunbar
618 Hickory Road
Hudson, WI 54016

Emily Laxdal Sommer
3645 Trenton Lane North
Plymouth, MN 55441

Edward Laxdal
PO Box 146
Hillsboro, ND 58045-0146

Stefan D. Laxdal
211 Peninsula Road
Medicine Lake, MN 55441

Geraldine A. Kennedy
3630 Sun Valley
Houston, TX 77025

Anna M. McCormick
Route 1, Box 1345
Splendora, TX 77372

Alexandra (Sandra) V. Dehaini
814 Pinemont Drive
Houston, TX 77018

Blaire Christie
7316 Cornelia Drive
Edina, MN 55435

Mark S. Wilhelm
8561 – 4th Avenue SE
Bismarck, ND 58501

Mary Sandbergen
937 Valley View Circle
Palm Harbor, FL 34684

Megan R. Harris
1900 No Name Road
Loomis, CA 95650

Spotted Dog Holdings, LLC,
c/o Randolph E. Stefanson
428 – 8th Street South
Moorhead, MN 56560

Linda S. Smith
618 Dohn Avenue
Bismarck, ND 58501-1012

Jennifer S. Rova
2946 Point Hayden Drive
Hayden Lake, ID 83835-9537

Gwendolyn M. Schaeffer
24057 Fawnskin Drive
Corona, CA 92883

Gregory Paul Eizensimmer
212 – 4th Avenue
Munich, ND 58352

Gary N. Hagen
4310 Puma Drive
Casper, WY 82604

John Knudson, Jr.
4516 Belmont Road
Grand Forks, ND 58201

John A. DePuy
4113 B Latricia Lane
Wichita Falls, TX 76302-2751

Claudette Molicard
39 Queensway Crescent
Winnipeg, MB, Canada, R2J 3P3

Torben Hendrick Thies
Oedenweg 62
22397 Hamburg, Germany

Betty A. Lapp
404 North Buffalo
Hebron, ND 58638

Duane D. Voegele
West Heart Estates
Bismarck, ND 58501

Theophil Flemmer
1602 Sunset Drive
Mandan, ND 58554

Mark John Flemmer aka Mark Flemmer
R.R. #5, 226 A
Devils Lake, ND 58301

Mona Jane Adams
5958 Mimosa
Orlando, FL 32807

Marv Joel Flemmer
1602 Sunset Drive
Mandan, ND 58554

Myra Jean Flemmer
1602 Sunset Drive
Mandan, ND 58554

Annie Mittelsteadt
117 2nd Street, Highland Park
Glendive, MT 59330

Brandon Newman
PO Box 874
Cando, ND 58324

Melanie Newman Morrow
1013 Park Drive
Grand Forks, ND 58201

Tillie Martin
508 4th Street NE
Valley City, ND 58072

Daniel Voegele aka Dan J. Voegele
809 Holiday Park Village
Jamestown, ND 58401

Delores Hall
Box 75
Richland, MT 59260

Chris Voegele, Jr.
Box 273
Bowman, ND 58623

Ray Voegele aka Ray C. Voegele
HCR 3, Box 58
Richardton, ND 58652

Leona Mattheis
Box 150, Route 1
Hazen, ND 58545

Arlene Schwarz
PO Box 309
Washburn, ND 58577

Alice Neuberger
2015 Primrose Street
Eugene, OR 97402

Frieda Voegele
411 2nd Street South
Glen Ullin, ND 58631

Bertha Kessler
PO Box 66
Glen Ullin, ND 58631

Alvin Flemmer
RR1, Box 170
Beulah, ND 58523

Anna Voegele (Mittlesteadt, Adolf Mittlesteadt)
117 2nd Street, Glendive
Glendive, MT 59330

Gertrude Voegele, apparent heir of John and Rosina Flemmer.
2077 38th Street
Mandan, ND 58554

Donald D. Flemmer, apparent heir of John and Rosina Flemmer
1304 Richmond Avenue
Bismarck, ND 58501

Arlene Flemmer
1304 Richmond Avenue
Bismarck, ND 58501

Red Crown Royalties, LLC
1490 W. Canal Court, Suite 3000
Littleton, Co 80120

J. Hiram Moore, LTD, a Texas limited partnership
16400 North Dallas Parkway, Suite 400
Dallas, TX 75248

MHM Resources, LP
PO Box 51570
Midland, TX 79710-1570

Pheasant Energy, LLC
PO Box 471458
Fort Worth, TX 76147

David Retzer and Gertrude Retzer
PO Box 133, 301 East Main
Beulah, ND 58523

Sandra M. Zinke
3566 146th Street West
Rosemount, MN 58068

Sharon Nieuwsma
PO Box 71
Beulah, ND 58523

Ron Hausauer
3163 White Oak Street
Highlands Ranch, CO 80129

William K. Schultz
4427 Palisades Park Drive
Billings, MT 59106

Mark E. Schultz
11402 Towering Oak Way
Reston, VA 20194

Brenda L. Lipp
126 Estevan Drive
Bismarck, ND 58503

Victorie E. Brown
PO Box 370
Solomons, MD 20688

Eric R. Schultz
PO Box 13
Almont, ND 58520

Wade S. Schultz
2416 East 21st Street
Odessa, TX 79761

Meda J. Schultz
21804 248th Street SE
Maple Valley, WA 98038

Sherwood G. Moore
453 Minnesota
East Missoula, MT 59802

Margaret G. Gorman
31134 East Wind Drive
Fraser, MI 48026-2480

Leander E. Houghland and Shirley J. Houghland, as joint tenants
319 Glee Place
Billings, MT 59102

Ole B. Haroldson and Junette Althea Haroldson as Co-Trustees of the Haroldson Family Trust,
Attn: Thomas A. Davis of Smith & Davis
610 SW Broadway #310
Portland, OR 97205

Ray Haroldson, individually and as an heir of Junette Haroldson
1828 Eagan Way
Lake Oswego, OR 97034

Bruce Haroldson, individually and as an heir of Junette Haroldson
14701 West Clarendon Avenue
Goodyear, AZ 85395

ANR Western Coal Development Company
-c/o ANR Coal Company
PO Box 1871
Roanoke, VA 24008

Scott M. Frank, as Trustee of the Clyde M. Frank Family Mineral Trust dated March 4, 2016
1483 – 2nd Avenue East
Dickinson, ND 58601

Robert P. Frank and Marlene L. Frank
PO Box 175
Washburn, ND 58577

Cheri Hanel
209 G Street
Dickinson, ND 58601

Amy Gervers
PO Box 143
Dodge, ND 58625

JoAnn E. and James E. Kitzmann
913 Collins Avenue
Mandan, ND 58554

Christ Fuchs aka Christian Fuchs (Ruth M. Fuchs, his wife)
PO Box 216
Eaton, CO 80615

Estate of Herman Schoenbeck
RR 2
Belfield, ND 58622

Patricia Madler, individually & as heir of Herman Schoenbeck
Box 113
Baker, MT 59313

Estate of Ludwig Schoenbeck, (wife Helen Schoenbeck)
2639 Miles Avenue
Billings, MT 59102

Kathleen Schoenbeck, Individually & as heir of Ludwig and Helen Schoenbeck
711 Avenue B, Apt 1
Billings, MT 59102

Phyllis Schoenbeck, Individually & heir of Ludwig and Helen Schoenbeck
120 Tamarack
Bozeman, MT 59715

Irene Buchman, heir of Katharine Schoenbeck
Box 283
Belfield, ND 58622

Karl Fischer
Route 1
Zap, ND 58580

Regina Fischer
Route 1
Zap, ND 58580

Robert Fischer
Route 1
Zap, ND 58580

Bruce W. Voegele
215 13th Street West, Apartment #1
Williston, ND 58801

Estate of Anna M. Weisz, Elizabeth M. Borkhuis, heir
4182 Whispering Forest
Lilburn, GA 30247

Estate of Anna M. Weisz, Annette M. Young, heir
999 Campbell Road
Lawrenceville, GA 30245

Sophia Wallender(Herbert E. Wallender, her husband)
RR 1
Hazen, ND 58545

Estate of G.F. Ray
1348 One Energy Square Building, 4925 Greenville Avenue
Dallas, TX 75206

G.F. Ray Jr.
4925 Greenville Avenue, Suite 1348
Dallas, TX 75206

Robert B. Ray
5223 Beckington Lane
Dallas, TX 75287

Charles H. Ray
128 Hearthwood
Coppell, TX 75019

Barbara L. Ray, Trustee of the Ray Family Trust established purusant to the Last Will and Testament of G. Farrell Ray Jr. dated March 24, 1994
PO Box 702746
Dallas. TX 75370-2746

Jacqulynn R. Johnson
7009 Kingsbury Drive
Dallas, TX 75231

Anne C. Ray
5223 Beckington Lane
Dallas, TX 75287

Betty Faye Fisher
613 DeSoto Drive
DeSoto, TX 75115

Catherine B. Ray
5223 Beckington Lane
Dallas, TX 75287

William Harlan Ray
16475 Dallas Parkway, Suite 320
Addison, TX 75001

Lucy Anne Ray
5223 Beckington Lane
Dallas, TX 75287

Kathy Whitworth
PO Box 1088
Kingston, OK 73439

Kevin Flynn
1134 Thistlemeade Drive
Houston, TX 77094

George Coleman as Trustee of the G.F. Ray Sr. Trust
4925 Greenville Avenue, Suite 1348
Dallas, TX 75206

Gertrude Voegele, Individually & apparent heir of John and Rosina Flemmer
HC05 Box 30
Mandan, ND 58554

Lester Heier
1002 Highway 200
Hazen, ND 58545

Evan Schwab (and Melissa Schwab, his wife) c/o Veronica M. Heier
205 2nd Street NW
Beulah, ND 58523

Erin Schwab and (Melanie Schwab, his wife), c/o Veronica M. Heier
205 2nd Street NW
Beulah, ND 58523

Candance Schwab, (Candace Schwab) -c/o Veronica M. Heier
205 2nd Street NW
Beulah, ND 58523

Meyer E. Franks
PO Box 658
Tyler, TX 75710

The Nokota Company
P.O. Box 1633
Bismarck, ND 58502

Orville M. Erickson
PO Box 694
Williston, ND 58801

Dustin J. Stuber, Trustee of The D.J. Stuber Land & Royalty Trust
PO Box 1414
Dickinson, ND 58602

Raymond E. Bostick
214½ W Elm
Tyler, TX 75702

Pogue Family Partnership, a Texas general partnership
PO Box 9783
Midland, TX 79708

Minerva E. Robinson
802 S. Ross
Tyler, TX 75701

Thomas Huff McClendon
1515-½ East Elm Street
Tyler, TX 75702

K-2 Properties
121 S. Broadway, Suite 528
Tyler, TX 75702

Linda L. Schmidt, Trustee of the Linda L. Schmidt 2007 Revocable Trust
PO Box 11704 S. Kingston Ave
Tulsa, OK 74137

B.M. Kennelly Farm Management Group, LLPD -c/o Rebecca Heazlett
17149 Pheasant Meadow Lane SW
Prior Lake, MN 55372

Dianne aka Diane Bakken
10823 Big Chip Road
Brandon, MN 56315

FME, LLC, c/o Wayne Bernhoft
12963 87th Street NE
Mountain, ND 58262

Galye Sette, Trustee of the Sette Bypass Trust, udt 3/2/2001
190 Oakridge Way
Rio Vista, CA 94571

Reuben I. Wolfson Properties, a Texas General Partnership
12700 Hillcrest Road, Suite 275
Dallas, TX 75230

Kevin K. & Traci Hintz
1007 Deapolis Dr.
Hazen, ND 58545

Stamford Minerals Organization
13 Royal Road
Darien, CT 06820

Johnnie Wilks
16705 CR 363
Winona, TX 75792

Jennifer Franks Mineo
2306 Tangley St.
Houston, TX 77005

Dale Strom
5920 60th St. SW
Carson, ND 58529

Jerome L. Strom
13057 La Cresta Dr.
Los Altos Hills, CA 94022

Judith Dearduff
512 E. 7th St.
Dell Rapids, SD 57022

Robert R. Tangsrud Jr. and Darnell L. Tangsrud
421 1st St. NW
Mayville, ND 58257

Matthew R. Tangsrud
1807 8th Ave. N.
Grand Forks, ND 58201

Eunice Tangsrud
10725 88th St. NW
McGregor, ND 58755

Amy L. Brown
147 Acheson Dr.
Winnipeg MB R2Y 2E8, Canada

Aaron C. Tangsrud
421 1st St. NW
Mayville, ND 58257

Vivian Strom aka Viviam M Strom
Box 121
Redwater, Alberta, Canada

Charles M. Strom and Christine M. Strom
1200 32nd Ave. SW, Apt. #205
Minot, ND 58701

Franklin W. Strom, a/k/a Frank Strom
709 19th St. W.
Williston, ND 58801

Joan M. Stephens
Rt. #2, Box 211
Stevensville, MT 59870

Janet L. Strom aka Janet Strom
1834 60th Avenue SW
Beulah, ND 58523

Hancock Enterprises
PO Box 2527
Billings, MT 59103

Brehm Investment Group, Inc.
PO Box 468
Mt. Vernon, IL 62864

Wildcat Investment Corp.
10112 Wood Acre Court
Peoria, IL 61615-1393

Flying Wolf Enterprises, Inc.
21174 S. Sylvan Drive
Mundelein, IL 60060-9518

Melissa Moon, Trustee of the Akamai Trust dated 3/2/2010
PO Box 4016
Chico, CA 95927-4016

Jasmine Properties, LLC
230 West 14th Street
Casper, WY 82601

Elizabeth Mertz
1400 Skrivanek Court
College Station, TX 77840

Marilyn Bennett Alexander
1039 Butte Avenue
Helena, MT 59601

Curtis Bennett
PO Box 4381
Houston, TX 77210

Paul Bennett
820 West End Ave. #10B
New York, NY 10025

Raymond A. Binder
460 S. 81st Place
Mesa, AZ 85208

Lance A. Binder (a/k/a Lance Albert Binder)
2108 Vinton Avenue
Memphis, TN 38104

Stephanie R. Hayes and Thomas P. Hayes
2500 6th St. NE
Waseca, MN 56093

Joseph W. and Heather M. Bennett
927 Pines Lake Drive West
Wayne, NJ 07470

Merlin William Binder
5236 East 14th Street No. 56
Brownsville, TX 78529

Ronald Menge
6907 227 St. E
Spanaway, WA 98387

Edwinetta Mae Bentley
2344 Beasley Lane
Columbia, TN 38401

Great Northern Properties Limited Partnership
601 Jefferson Street, Suite 3600
Houston, TX 77002

Meridian Minerals Company,a Montana corporation
5613 DTC Parkway, Suite 1100
Englewood. CO 80111

Glacier Park Company
PO Box 7500
Bartlesville, OK 74005-7500

Jimo Menge
101 Grinnell St.
Colorado Springs, CO 80911-2218

Estate of Audrey Erickson
2034 60th Av. SW
Beulah, ND 58523

Kerrick Family Trust. c/o Lewis M. Kerrick
50 Three Star Lane
Roxboro, NC 27574

Clyde W. Jones and Joan E. Houston, as Trustees of The Jones & Houston-Jones Living Trust dated February 1, 2011
1314 West McDermott Drive #106-810
Allen, TX 75013

Lillian B. Kling
West 718 Carolina Way
Spokane, WA 99208

Joann Hall Swenson
4865 Island View Drive
Unionville, CT 06085

Myrtle E. Savidge
2336 Channing Way
Berkley, CA 94704

Arthur Huber and June E. Huber, Trustees of the Arthur Huber and June E. Huber Revocable Living Trust, dated 10/14/1993
RR 3 Boc 112
Astoria, OR 97103

Laura Schwalbe
147 Mountain View Dr.
Packwood, WA 98361

Julie D. Coffin Herren
3208 Dickinson Court
Evans, CO 80620

Rudolph J. Kwak and Wilma A. Kwak, Trustees of the Kwak Trust, under agreement dated July 10, 2009
801 NE 4th Avenue
Mulberry, FL 33860

Jason W. Paulson and Crystal L. Paulson
14888 367th Avenue
Waseca. MN 56093

Holly M. McNair
4777 Kamakani Place
Honolulu, HI 96818

Herb Singer, a/k/a Herbert Singer and Alice M. Singer
501 Seventh Ave. NW
Mandan, ND 58554

Deborah Durand
2436 Circle Dr.
West Palm Beach, FL 33406

Jeffrey John Kwak
6041 SW 9th St.
Olantation, FL 33317

Catherin Ost
14909 91st Ave North
Maple Grove, MN 55369

Michael W. Milde, M.D.
W5465 Mielke Rd.
Menasha, WI 54952

James A. Huber
295 54th St.
Astoria, OR 97103

Rosemary L.M. Hill
333 Stonewall Court
Dublin, OH 43017-1333

Arthur V. Seay III
PO Box 2324
Nixa, MO 65714

Gayle Sette, Trustee of the Sette Bypass Trust, udt 3/2/2001
190 Oakridge Way
Rio Vista, CA 94571

Andary Resources, LLC -c/o Angela Thompson
108 Charles St.
Park River, ND 58270

Arthur V. Seay, Jr.
P.O. Box 176
Bismarck, ND 58502

Esther R. Shaw
1920 Beech Street
Amarillo, TX 79106

Shirley M. Lynam
1308 Love Lane
Wenatchee, WA 98801

Gary L. Heth
925 14th Avenue West
Williston, ND 58801

Mary Kae Kelsch
8025 Ridgeland Dr.
Bismarck, ND 58503

Miles P. Heth
4087 111F Avenue Southwest
Dickinson, ND 58601

Wilma A. Binder
1120 N. 12th Street #19
Bismarck, ND 58501

North American Baptist Conference
1219 Pleasant Grove Boulevard
Roseville, CA 95678

Saker Baptist College
Box 29
Limbe, Republic of Cameroon, Africa

Patricia Arrey Curry
98755 Meadowglen Lane #188
Houston, TX 77042

Ntui Andrew Ntui
98755 Meadowglen Lane #188
Houston, TX 77042

Ntui Wemson Mborray
98755 Meadowglen Lane #188
Houston, TX 77042

Ntui Ezekiel Oruh
98755 Meadowglen Lane #188
Houston, TX 77042

Ntui Gideon Akeb
98755 Meadowglen Lane #188
Houston, TX 77042

Susan Langki
1203 Glenview Drive SE
Lonsdale, MN 55046

Catherine Ofundem Arung
11550 Stewart Lane #711
Silver Springs, MD 20904

Jacob Ewumbu Monono
Box 65
Soppo, Republic of Cameroon, Africa

Anne Isabel Tanga
Box 29
Limbe, Republic of Cameroon, Africa

Lucy Nnoke
Teritorial Government
Yaounde, Republic of Cameroon, Africa

Walter Grob and Florence Grob
Box 1
Bamenda, N.W.P, Republic of Cameroon, Africa

Sarah Nsah, c/o Ebenzer Baptist Church
Limbe, Republic of Cameroon, Africa

Chantal Kuyuh, c/o Ebenzer Baptist Church
Limbe, Republic of Cameroon, Africa

Charissa Kuyuh, c/o Ebenzer Baptist Church
Limbe, Republic of Cameroon, Africa

Fluth Kuyuh, c/o Ebenzer Baptist Church
Limbe, Republic of Cameroon, Africa

Schuh Kuyuh, c/o Ebenzer Baptist Church
Limbe, Republic of Cameroon, Africa

Norine M. Paulson
601 10th Ave. NW
Waseca, MN 56093

Lori Leutz, r, As Trustee of the Helen and Nick Weiand Family Mineral Trust
708 Brome Ave
Bismarck, ND 58503

Nick Weiand, a/k/a Nick S. and Helen Weiand
207 South Main
Glen Ullin, ND 58631

Rose Zahn Carroll, a/k/a Rose Zahn
1540 Burlington
Billings, MT 59102

Black Stone Minerals Company, L.P.
1001 Fannin, Suite 2020
Houston, TX 77002-6709

LeeAnn Streitmatter, As Trustee of the Helen and Nick Weiand Family Mineral Trust
PO Box 565
Glen Ullin, ND 58631

Zella V. Zahn
107 E. Bowen Ave, Apt. 218
Bismarck, ND 58504

Douglas David Zahn, a/k/a Douglas Zahn
Box 185
McKenzie, ND 58553

Gabriel J. Brown, Roy Brown and Beverly Wescott Trustees of the Brown Trust
200 East Kavaney Drive
Bismarck, ND 58501

Timothy Patrick Gross
2702 N. 4th Str.
Bismarck, ND 58503

Sharon Berger
4625 Granite Drive
Bismarck, ND 58503

Evangeline Fitzgerald
2630 Gateway Ave. #203
Bismarck, ND 58503

Sandra C. Gross
205 Hammock Trail East #H306
Freeport, FL 32439

Rosina Miller
2844 Bailey Acenue
San Diego, CA 92105

Marie Miller
805 Sixth Avenue NW
Mandan, ND 58554

Hank Keller
4886 Lisa Court
Trenton, MI 48183

Barbara Celestine Selby
5608 Gateway Drive
Tampa, FL 33615

Eva Kottre
624 West Turnpike Avenue
Bismarck, ND 58501

David Dietrich
3257 East Capitol Avenue
Bismarck, ND 58501

Frances Dietrich
3257 East Capitol Avenue
Bismarck, ND 58501

Leo N. Ziegler
3413 W. Ravalli St.
Bozeman, MT 59718

Michael Ziegler
3346 Old Line Ave.
Laurel, MD 20724

LaVerne Vetter
104 1st St. NE
Garrison, ND 58540

Kim Witthauer, Individually & as Trustee of the Esther Kyser Mineral Trust u/d August 4, 2008
436 Maple Lane
Shoreview, MN 55126

Irene Trinko, Trustee of the Irene Trinko Mineral Trust u/d August 16, 2008
77 W. Huron St. #1408
Chicago, IL 60654

Nathan L. Mastel aka Nathan Mastel
13214 North 13th Place
Phoenix, AZ 85022

Denise Ziegler
13201 Linden Ave. N, Unit 306A
Seattle, WA 98133

Janice Ray
14614 E Mission
Spokane, WA 98133

Gene Ziegler
11204 E. Aloha Ct.
Spokane, WA 99206

Gary Ziegler
Military Dr.
Trout Creek, MT 59874

Terry Ziegler
4011 N. 36th Ave.
Tacoma, WA 98407

Larry Ziegler
200 Country Crest Rd
Yakima, WA 98907

Evelyn F. Tonra aka Evelyn Tonra
2601 Georgia Ave S.
St. Louis Park, MN 55426

Lisa C. Tonra
530 Stockton #301
San Francisco, CA 94108

Earle M. Tonra
1820 1st Avenue #103
Minneapolis, MN 55403

Krista H. Tonra
100 E. 31st. St. Apt 3C
New York, NY 10016

Kelly Koch
211 West Avenue D.
Bismarck, ND 58501

Nathan L. Mastel a/k/a Nathan Mastel
3139 Rose Street
Bozeman, MT 59718

Rebecca M. (Mastel) Himbaugh
13214 North 13th Place
Phoenix, AZ 85022

Mitchell R. Mastel
1716 4th Street NE
Mandan, ND 58554

Vernon L. Mastel
807 5th Ave. NE
Mandan, ND 58554

Lee Ziegler
Military Drive
Trout Creek, MT 59874

Gary Ziegler
7601 State Route 410
Naches, WA 98937

Lorie Steffen & Larry J. Steffen
PO Box 394
Beulah, ND 58523

Rodney Skalaky
113 4th Street NW, Box 121
Beulah, ND 58523

Leo N. Ziegler
105 North 10th Street
Bozeman, MT 59715

Wilfred Fetch and Elaine M. Fetch
431 Nature Haven Boulevard
Kewaskum, WI 53040

Jacqueline M. Golownia
N168 W 21700 Main Street #107
Jackson, WI 53037

Mary A. Luser
4921 Joshua Drive
West Bend, WI 53090

Amanda R. Schmidt
3149 Skyline Drive
Hubertus, WI 53033

William J. Fetch
914 Linden Street
Waukesha, WI 53186

Angeline Braun
14819 Buttonwood Drive
Sun City West, AZ 85375

William Braun
4213 Dickason Ave. #2
Dallas, TX 75219

Barbara Knutson
7709 Iris Drive
Brooklyn Park, MN 55428

Gene Braun
16832 North Stoneridge Court
Fountain Hills, AZ 85268

Cary Unterseher
1713 Third Street NE
Mandan, ND 58554

Michael Unterseher
600 10th Avenue SW
Mandan, ND 58554

Mark Unterseher
4310 Fernwood Drive
Bismarck, ND 58503

Melissa Ketterling
658 16th Street NW
Mercer, ND 58559

Mitchell Unterseher
3702 Bayshore Bend SE
Mandan, ND 58554

John P. Ryan, Jr. and Dolores M. Ryan, original Co-Trustees, or their successors in Trust, under the Ryan Living Trust dated 6/2/1997
12351 Martha Ann Drive
Los Alamitos, CA 90720

Joseph Erickson
409 3rd Ave. NW
Beulah, ND 58523

Jennifer Moore
624 1st St. NW
Beulah, ND 58523

Josie Armbrust
12649 20th St. SW
Belfield, ND 58622

Tyrel Erickson
624 1st St. NW
Beulah, ND 58523

Leland Erickson
Rt. 1, Box 158
Beulah, ND 58523

Kyla Erickson Shay
2912 SW Trailside Path
Stuart, FL 34997

Beth Erickson Barone
5 Mansfield Place
Suffern, NY 10901

Myron Orth
Box 340
Baker, MT 59313

Marshall & Winston, Inc.
P.O. Box 50880
Midland, TX 79710-0880

Puckett Investment Co.
5460 S. Quebec St., Ste. 250
Greenwood Village, CO 80111

Fortin Enterprises, Inc.
201 Chilean Avenue
Palm Beach, FL 33480

Estate of W.T. Bristol
815 1st Street
Bismarck, ND 58501

Walter L. Binder and Marlys Binder
1212 9th Ave. SW
Sidney, MT 59270

Leslie McPherson
12284 Western Street
Sidney, MT 59270

Mark Binder
1697 Crocus Drive
Sidney, MT 59270

Kerri Simard
11987 Highway 16
Sidney, MT 59270

Margie E. Kohm, aka Marge E. Kohm
437 Upper Lynch Creek Road
Plains, MT 59859

Cory T. Kohm
2120 Snowghost Drive
Whitefish, MT 59937

Duane Orth
1540 Maurine St.
Billings, MT 59105

Myron Orth
518 South 5th West
Baker, MT 59313

Walter Buechler and Laurie Buechler
831 Christian Way
Bellingham, WA 98229

Robert H. Orth
1325 Bluebell Drive
Billings, MT 59105

Richard A. Orth
11 Bonanza Drive
Billings, MT 59102

Edwin P. Romanyshyn
1287 123rd Ave. SW
Fairfield, ND 58627

LeeAnn Winkler Draper, fka LeeAnn Winkler
1697 S. Highway 77
Malta, ID 83342

Lyndell Watson, fka Lyndell Winkler
P.O. Box 1115
Delta, UT 84624

Mrs. Lois H. Bristol, aka Mrs. W.T. Bristol
815 1st Street
Bismarck, ND 58501

The Ursula G. Lusk 2005 Trust, Ursula G. Lusk, Trustee
3201 Kirby Dr., Ste. 500
Houston, TX 77098

WLCUM Oil & Gas, Ltd.
3440 South Loop West
Houston, TX 77025

Enchanted Royalty, LLC
P.O. Box 9100-253
Bandera, TX 78003

Stockade Royalty Partners
P.O. Box 2048
Brenham, TX 77834

Kazoku Interests, LLC
P.O. Box 27202
Houston, TX 77227

Starhut G3, LLC
P.O. Box 27202
Houston, TX 77227

Steven Lane Harrison, Jr.
1236 Allston Street
Houston, TX 77008

Heather C. Harrison
2711 Briarglen Dr., #710
Houston, TX 77027

Margo S. Harrison
2711 Briarglen Dr., #710
Houston, TX 77027

Parker L. Harrison
2200 Willowick, #2G
Houston, TX 77027

Leslie Winkler
162 9th Ave East, #3
Dickinson, ND 58601

Virginia Lee Hughes
606 Glen Hwy.
Madison, WI 53705

Thomas David Gosse
1835 Winnebago St., Unit #111
Madison, WI 53704

Melissa Ann Farrar
9856 Zenith Dr.
Saint Louis, MO 63123

Gregory Edward Pierce
950 W. Cullerton Street, Unit A
Chicago, IL 60608

Brian Joseph Pierce
417 K Street NE
Washington, DC 20002

Kasmer & Aafedt Oil, Inc.
P.O. Box 1949
Williston, ND 58802

Pierce Exploration & Production Corporation
1133 Bal Harbor Blvd., #1139
Punta Gorda, FL 33950

Osmund Gunvaldsen Family Limited Liability Partnership
Post Office Box 406
Fargo, ND 58107-0406

William Rummel, Trustee under Agreement dated 2/10/1993
#4 Jackie Lane
Billings, MT 59102

Margaret H. Rummel
734 W 2nd St, Dickinson, ND 58601
Dickinson, ND 58601

Powers Energy Corporation
P.O. Box 1221
Williston, ND 58802-1221

Patience Sayler
26095 Boulder Ridge Drive
Rogers, MN 55374-8102

Kari Trappen
P. O. Box 667
Beulah, ND 58523

Craig H. and Karmen K. Eslinger Living Trust Agreement dated June 13, 2017 -c/o Craig H. and Karmen Eslinger, Trustees
713 - 3rd Avenue Northwest
Beulah, ND 58523

El Paso Energy Service Company
1001 Louisiana Street
Houston, TX 77002

North American Coal Royalty Company, Lessee
2000 Schafer Street, Suite D
Bismarck, ND 58501-1204

Melvin Mertz
210 South Montana Street
Elgin, ND 58533-7300

Carol Winkler
407 East Street North
Elgin, ND 58533

Susan Heidrich
1111 West Capitol Ave. #134
Bismarck, ND 58501

MODAK TRUST A, c/o Al E. Nick, a trustee (& Al Nick, individually)
111 Church St.
Ferguson, MO 63135

Bresco, Inc.
1215 Orchard Road
Essexville, MI 48732

Bavendick Minerals & Royalty, LLC, a North Dakota limited liability company
PO Box 313
Bismarck, ND 58502-0313

Crescent Energy, Inc.
PO Box 271229
Louisville, CO 80027

Raymond M. Mizak & Phyllis F. Mizak
794 E. Gemini Place
Chandler, AZ 85249

Kent & Brenda Littlejohn
10777 N. Friendship Road
Casey, IL 62420

Northern Pacific Royalties, LLC
PO Box 572
Bismarck, ND 58502

Thomas D. Selby
P.O. Box 2344
Williston, ND 58801

Dennis W. Yockim
P.O. Box 477
Williston, ND 58801

Michael J. Wetzel
7880 Shelbyville Road
Indianapolis, IN 45259

Aqua Purple Reef, LLC, a North Dakota Limited Liability Company
7582 Mulholland Drive
Los Angeles, CA 90046

Elgar Law Office, Margaret Leone Sutton Revocable Trust Agreement dated April 10, 1993
207 E. Washington
Mt. Pleasant, IA 52641

Margaret Leone Sutton
103 S. White
Mt. Pleasant, IA 52641

David Drasnin & Sharon Drasnin
22 Kingswood Drive
Dallas, PA 18612

Michael D. & Joyce A. Glaspey
PO Box 77
Lignite, ND 58752

Lisa Hatlestad
3603 Crater Lake Avenue
Billings, MT 59102-7733

W.R. Everett
PO Box 1999
Dickinson, ND 58602

Armstrong Minerals LLC
PO Box 1999
Dickinson, ND 58602

Michelle M. Miller
668 W. 27th
Dickinson, ND 58601

Ronald A. & Bette A. Ljunggren
414 23rd Street SW
Minot, ND 58701

Martha F. Thomas, Trustee of the Martha F. Thomas Trust, u/a/d December 12, 2019
125 Rosewood Drive
Nellysford, VA 22958

Benjamin R. Forsyth & Mary Janette Forsyth
3301 9th Street NE
Great Falls, MT 59404

Bradley Scott
7905 Apache Canyon Drive
Las Cruces, NM 88007

John Patrick McGregor, Jr. & Melissa McGregor, Trustees of the Glenstra Trust dated November 20, 2019
1014 Russel Avenue
Los Altos, CA 94024

Kristi Anseth
4321 Clay Commons Ct.
Boulder, CO 80303

Jay Anseth
500C Falls Blvd. #3211
Quincy, MA 02169

Gramercy, LLC
7308 Arrowwood Rd.
Louisville, KY 40222

Valerian L. Roberts
2921 Cronin Drive
Springfield, IL 62711

Joe E. Harrison, Jr.
778 West Decatur Street
Decatur, IL 62522

Stewart J. Schutte
6592 N. 1075th Street
Robinson, IL 62454

Tyler R. Tedford
10250 Wicklow Court
Fishers, IN 46040

Kent A. Tedford
3823 N. Ashland Avenue, #203
Chicago, IL 60613

Julie M. Fadden Langemo, Trustee of the Patrick Fadden Residuary Trust
1007 Highland Place
Bismarck, ND 58501

Northern Energy Corporation
PO Box 2283
Bismarck, ND 58501

Missouri River Royalty Corporation
919 South 7th Street, Suite 405
Bismarck, ND 58504

Robert C. Simpson, Trustee of The Robert C. Simpson Living Trust Created by Declaration of Trust Dated April 5, 1999
PO Box 700216
Tulsa, OK 74170-0216

William G. Seal, a/k/a W.G. Seal
4662 S. Troost
Tulsa, OK 74105

Betty Eileen Ferrel
3740 Pinebrook Circle, #107
Bradenton, FL 34209

Rikki P. Doyle
3740 Pinebrook Circle, #207
Bradenton, FL 34209

Marcy P. Stacy
5619 Open Gate Court
Cincinnati, OH 45247

Chester C. Alexander
1590 Martha Drive
Elgin, IL 60123

Jane Ogilvie, Individually & as heir to Mason W. Potter
23 Geneva Dr.
Muscatine, IA 52761

The David Keith Sutton Trust dated August 7, 2017, c/o The Ownes Law Firm, P.C.
234 West 13th Street
Tulsa, OK 74119

Steven Ballinger
PO Box 1271
Catoosa, OK 74015

Susan Kim Ballinger
PO Box 1271
Catoosa, OK 74015

Trust for the Benefit of Ashley Ballinger, beneficiary of The Ashley and Steven Ballinger Trust dated August 7, 2017,
c/o The Owens Law Firm, P.C.
234 West 13th Street
Tulsa, OK 74119

Joy Davison
523 N. Boone Street
Olney, IL 62450

Lamont B. Forsyth
18 Keiffer Drive
Olney, IL 62450

Virginia W. Forsyth
100 Northshore Drive
Morton, IL 61550

Gordon C. Thompson
PO Box 1246
Williston, ND 58802-1246

Ronald L. Ackerson, Trustee of the Ackerson Family Trust U/T/A dated 2/1/1998
815 First Avenue East
Williston, ND 58801

LARCO Resources, LLC, c/o Benjamin J. Larson
PO Box 821
Bismarck, ND 58502-0821

Clark James Crawford
1930 Riverwood Drive
Bismarck, ND 58504

Sherry D. Wilken & Paul W. Wilkken
285 Falcon Drive
Highland, IL 62245

James Yockim Resources LLC
P.O. Box 2344
Williston, ND 58802

Coyote Creek Mining Company, L.L.C., a Nevada limited liability company
2000 Schaefer Street, Suite D
Bismarck, ND 58501-1204

Ursula G. Lusk, Trustee The Ursula G. Lusk 2005 Trust
3201 Kirby Dr., Ste. 500
Houston, TX 77098

John J. Toomey, Trustee of the John J. Toomey Revocable Trust
1511 North Boulevard
Houston, TX 77006

M. Sue Bruce & Clifford R. Bruce, Sr. as Co-Trustees of the M. Sue Bruce Declaration of Trust dated January 30, 2015
36 Greenridge Drive
Decatur, IL 62526-1404

TurmOil, Inc.
PO Box 5
Bismarck, ND 58502

Douglas C. McLeod
Suite 1140 518 17th St.
Denver, CO 80202

Arkoma Bakken, LLC
203 E. Interstate 30
Rockwall, TX 75087

James Butler
300 North 4th St. Apt. 2406
St. Louis, MO 63102

Tricia Steffan
841 Shadyridge Ct.
Grand Forks, ND 58201

Shari R. Weber, as Trustee of the Shari R. Weber Trust Dated August 10, 2008
107 W. Cedar, PO Box 137
Robinson, IL 62454

The Deborah Lynn Sutton Trust dated August 7, 2017, c/o The Ownes Law Firm, P.C.
234 West 13th Street
Tulsa, OK 74119

Trust for the Benefit of Steven Ballinger,
beneficiary of The Ashley and Steven Ballinger Trust dated August 7, 2017,
c/o The Owens Law Firm, P.C.
234 West 13th Street
Tulsa, OK 74119

Alice Arends, c/o Sigma Kappa Sorority
928 Hillcress Drive
DeKalb, IL 60115

Rachel Ann Wykes
487 Miner Ct.
Washington, MO 63090-6906

Great Northern Properties Limited Partnership
1658 Cole Blvd., Building #6, Suite 2
Golden, CO 80401

Eva Branson
112 East Cameron Avenue
Kellog, ID 83837

Estate of Ruben Orth
1422 13½ Street South
Fargo, ND 58103

Estate of Ruben Orth
1433 13½ Street South
Fargo, ND 58103

Jeryl L. Carlberg
1324 Toledo
Bellingham, WA 98229

Cory T. Kohm
2120 Snowghost Drive
Whitefish, MT 59937

Brad C. Binder (a/k/a Brad Binder)
2 Fruitdale Terrace
Brownsville, TX 78521

Glenn Erickson & Carroll W. Erickson, Trustee of Glenn Erickson Trust
1217 7th Street NW
Minot, ND 58703

Donlyn J. Erickson, Personal Representative of the Estate of Leland Erickson
1781 62nd Ave. SW
Beulah, ND 58523

Gretchen C. Northrup Foundation, c/o Trinity University
One Trinity Place
San Antonio, TX 78212

Sunshine Cottage School for Deaf Children
603 E. Hildebrand
San Antonio, TX 78212

Marlys Mosbrucker
PO Box 162
Beulah, ND 58523

Gail M. Myers
314 8th Street
Springfield, SD 57062

Jerry L. Johnson
155 Gray
Waukee, IA 50263

Roy D. Johnson
25345 407th Avenue
Mitchell, SD 57301

Sherry L. Barns
421 E. Liberty Street
Rapid City, SD 57701

Teresa M. Jorgenson
4500 Eagle Ridge Ct.
Independence, MN 55357

Jean E. Belford, as Trustee of the Jean E. Belford Revocable Living Trust
Unit #105, 7220 York Avenue South
Edina, MN 55435

Susan M. Winkelstern, a/k/a Susan Merriam Winkelstern &Rebecca M. Zambito, a/k/aRebecca Merriam Zambito
4754 W. Saint Joe Highway
Mulliken, MI 48861

Jane Turner
220 Rustic Lane
Gallatin, TN 37066

Charles Robert Johnson
220 Rustic Lane
Gallatin, TN 37066

Gary Michael Johnson
220 Rustic Lane
Gallatin, TN 37066

Fern Powell
305 N.W. Englewood Road
Gladstone, MO 64118

Thomas H. Powell
7857 S. County Road 25 E.
Cloverdale, IN 46120

Roughrider Electric Cooperative, Inc.
800 Highway Drive
Hazen, ND 58545

Neil Sebastian
324 North St. Louis
Loveland, CO 80536

Clara Nesper(Wilfred Nesper - husband)
14224 144th SE
Renton, WA 98055

Donald Jochim (Norma June Jochim - wife)
8605 91st Street
Kansas City 38, MO 64138

Raymond Jochim (Mary E. Jochim - wife)
1226 2nd Ave. North
Texas City, TX 77590

Bernice Richter(Kenneth C. Richter - husband)
2813 8th Ave. North
Texas City, TX 77590

Gwendolyn Lantz
110 Cliff
Gladstone, ND 58630

Curtis Veitenheimer
2300 East 12th, Lot 12
Post Falls, ID 83854

Beverly Feland
208 4th Street North
New Salem, ND 58563

Doreen Veitenheimer
1111 Gillespie
Richland, WA 99352

Annette Greff
402 "D" Street South
Glen Ullin, ND 58631

Rick R. Schuh
6100 Rocky Road
Bismarck, ND 58503

Vivian V. Hauff
748 W. Interstate Ave.
Bismarck, ND 58503

Joanne E. Haugland
216 6th Ave NE
Kenmare, ND 58746-7328

Jerry L. Hauff
2213 Pebbleview Loop
Bismarck, ND 58503

Mary A. Prigge
2698 South 36th Street
Grand Forks, ND 58201

Janice F. Merkel
5026 River Front
Mandan, ND 58554

Rory Schuh, a/k/a Rory L. Schuh
3701 Coleman Street
Bismarck, ND 58503

Rich Schuh, a/k/a Rich E. Schuh
704 South 4th Street
LaCrescent, MN 55947

Sandy Seim, a/k/a Sandy L. Seim
1383 126th Ave. NW
Coon Rapids, MN 55448

Bruce Winkler, Individually & as Personal Representative of the Estate of Berniece Scheid f/k/a Berniece Winkler
470 50th Ave SW
Hazen, ND 58545

Randy Winkler
32859 Diagonal Rd
Hermiston, OR 97838

Bernice Beick
6001 N. Wiscomb
Spokane, WA 99208-1145

Connie Moran
PO Box 2556
Coeur d'Alene, ID 83816-2507

Debra Holm
4213 E. Wilding Ave.
Spokane, WA 99217-8021

Karen Pavoni
29037 Prestwick Rd.
Menifee, CA 92586-2888

Fred Scheid
PO Box 4589
Oceanside, CA 92052-4589

Pamela Moyet
5411 E. Willowick Cir.
Anaheim, CA 92807-4629

Lori Fisher
110 6th St. NW
Mandan, ND 58554

Donna Sommer
1416 Northgate Rd.
Washburn, ND 58577-4156

St. Matthew Lutheran Church
PO Box 523
Hazen, ND 58545

Weslie D. Gunsch and Jane J. Gunsch,
Trustees, or their successors in trust, under the Weslie D. and Jane J. Gunsch Revocable Living Trust, dated June 25, 2019
1720 Blackstone Loop West
Beulah, ND 58523

DeAnn Riegel
1112 Cherry Lane
Beulah, ND 58523

Leslie M. Mahin, Sr.
PO Box 2676
Bismarck, ND 58502

Cheryl Wynn
3609 Southridge Lane
Bismarck, ND 58504

Michele Clark
3303 Bowdenhill Lane North
Colleyville, TX 76034

Leslie M. Mahin, Jr.
100 9th Street NW
Beulah, ND 58523

Linda Graham
Rt 1 Box 6A
Comanche, OK 73529

Dwain Wall
801 South Olive Ave #1102
West Palm Beach, FL 33401

Cathy Cadell, a/k/a Kathy Cadell
Rt 2, Box 516
Comanche, OK 73529

Marvin William Ballensky, Jr.
PO Box 227
Hazen, ND 58545

Lisa McDonald
5520 Falconer Dr.
Bismarck, ND 58504

Mark Ballensky
108 1st St. SW
Braddock, ND 58524

LaWanda Wiedrich
505 6th Ave. NE
Hazen, ND 58545

Leonard Krausz
Rt. 2, Box 210
Beulah, ND 58523

Marshall C. Harrison
12114 Kimberley Lane
Houston, TX 77024

North American Coal Royalty Company
5340 Legacy Drive, Building 1, Suite 300
Plano, TX 75024

Burton D. Buckley Trust -c/o BOKF, NA, Agent
P. O. Box 1588
Tulsa, OK 74101

Verda Krizan
704 - 12th Avenue Northeast
Beulah, ND 58523

Susan Heidrich
1003 Michigan Avenue
Bismarck, ND 58504

F. L. Hawk
Box 1602
Midland, TX

Anna Lee Hawk Hawkins Revocable Trust
c/o Ann Lee Hawk Hawkins, Trustee
4334 Garden Grove Lane
Abilene, TX 79606

C. V. Lyman
Box 1141
Midland, TX 79708

Penwell Lyman, Ltd.
3838 Oak Lawn Avenue, Suite 1216
Dallas, TX 75219

Rachel Lyman Charitable Trust -c/o Bank of America National Association, Trustee
P. O. Box 830308
Dallas, TX 75283-0308

Chester Beckwith
7065 Boyce Drive
Baton Rouge, LA 70809

Eugene P. McCahill
109 7th St S, 338 Roanoke Building
Minneapolis, MN 55402

Francis T. McCahill
29 Pelican Isle
Fort Lauderdale, FL 33301

Pal Properties Inc.
Box 188
Dickinson, ND 58602

P. J. Burton
5023 Creek Bend
Houston, TX 77035

Vera B. Kelly
505 Bellview
Cleburne, TX 76301

Person Brothers, LLP
322 Lunar Lane
Bismarck, ND 58503

J. R. Satterwhite
P. O. Box 427
Sinton, TX 78387

Piranha Partners
P. O. Box 573051
Houston, TX 77257-3051

Mary Blanche LaRue
606 West Tyler, Suite #107
Ennis, TX 75119

John J. Sloan
1201 - 3rd Street
Corpus Christi, TX 78404

Tom F. Ivey
446 Bartlett
Corpus Christi, TX 78408

M. E. Tonroy
446 Bartlett
Corpus Christi, TX 78408

Henry E. Reams
905 Ohio
Corpus Christi, TX 78404

Ora Lee Reams
Box 495
Fredericksburg, TX 78624

Nancy Reams Coon
Box 495
Fredericksburg, TX 78624

Thos. B. Hallanan
Route #2, Box 8
Taft, TX 78390

W. C. Hicks
P. O. Box 31
Sinton, TX 78387

Hayward L. Ford and Annie Pogue Ford
Box 475
Iraan, TX 79744

H. E. Schuchard
Rt. 11, Box 562
San Antonio, TX

Robert D. and LeEtta Schuchard
2920 Selma
Fort Worth, TX 76111

Francis L. Schuchard and Ruby Schuchard
2901 Race
Fort Worth, TX 76111

James H. and Doris Marie Schuchard
3206 - 69th Street
Lubbock, TX 79413

Walter E. and Doris June Schuchard
2502 Hollis Drive
Abilene, TX 79605

Gladys Schuchard
309 Albany
San Antonio, TX 78209

J. A. Witte
7703 Valley View Lane
Houston, TX 77074

T. E. Fullick
600 West Market Steet
Sinton, TX 78387

Sagemoh Company of Dakota(formerly
Home Gas Company of Dakota)
109 7th St S, 338 Roanoke Building
Minneapolis, MN 55402

Mitchell M. and Angela J. Weigum
6441 6th Street SW
Zap, ND 58580

Melanie K. Gion and Brian F. Gion
PO Box 43
Cascade, MT 59421

Monty A. and Bethany A. Weigum
1657 Vincent Avenue N
Minneapolis, MN 55411-2838

State of ND and the Board of University and School Lands of the State of ND
1707 N 9th Street
Bismarck, ND 58501

Agribank, FCB (fka The Federal Land Bank and Farm Credit Bank of Saint Paul)
375 Jackson Street
St. Paul, MN 551564-0949

Ruth H. and Henry H. Ponchant
RR 1, Box 11
Coleharbor, ND 58531

Davis Oil Company
2121 Avenue of the Stars, Suite 2800
Los Angeles, CA 90067-5000

Estate of Ruth Davis Johnson, c/o The First National Bank of El Dorado, Executor and Trustee under the will of Ruth Davis Johnson
PO Box 751
El Dorado, AR 71730

Estate of C.H. Moses, C. Hamilton Moses, Jr
Rt #1 Box 707
Marion, AR 72634

Rocky Mountain Oil, Gas and Minerals, LLC, a Wyoming Close Limited Liability Company
PO Box 4344
Greenwood Village, CO 80455-4344

Francis P. Borden III
PO Box 10086
El Dorado, AR 71730-0022

Patricia Borden Mosier
PO Box 94223
North Little Rock, AR 72190

Therese Borden Sloane
PO Box 3968
Farmington, NM 87499

James M. Borden
4190 Hidden Acres
Fayetteville, AR 72704

Paul H. McKnight(Blanche W. McKnight - wife)
328 Hall Building
Little Rock, AR 72201

Estate of C.H. Moses, Nancy Moses Eubanks
Rt #1 Box 707
Marion, AR 72634

Estate of C.H. Moses, Francis Moses Bransford
Rt #1 Box 707
Marion, AR 72634

AgriBank, FCB (fka the Federal Land Bank and Farm Credit Bank of St Paul)
PO Box 64949
St Paul, MN 55164-0949

Ida Gulbro f/k/a Ida Ballensky
2616 Walnut St.
Butte, MT 59701

Peggy L. Bundy, f/k/a Peggy L. Mohl
6400 23rd Street SW
Beulah, ND 58523

Estate of Elma M. Lapp, c/o Emil V. Lapp, Jr.
1931 Constitution Dr.
Bismarck, ND 58501

Marlene M. Goetz
420 West Main St.
Beulah, ND 58523

Dennis Moore & Jodi Moore
PO Box 244
Gladstone, ND 58630

Frase-Tucker Resources, LLC
P.O. Box 994486
Redding, CA 96099

Richard L. Welk and Tabea Welk
2230 County Road 25
Zap, ND 58580

The Carter Investment Company
333 Clay Street, Suite 3439
Houston, TX 77002

Bradley Gunsch
5500 County Road 26
Beulah, ND 58523

Howard J. Shipley
Box 559
Lubbock, TX 79408

Browncow, LLC
27304 Ranch Creek
Boerne, TX 78006

June Fiel
5750 Brockton Drive
Indianapolis, IN 46220

Hut, Inc.
P. O. Box 6666
Lubbock, TX 79413

Gerald L. Woolam, M. D.
3702 - 21st Street
Lubbock, TX 79410

Charles Richard Fiel Testamentary Trust - c/o Audrey Rhodes Fiel
3717 - 27th Street
Lubbock, TX 79410

Richard Alan Fiel Testamentary Trust -c/o
Audrey Rhodes Fiel
3717 - 27th Street
Lubbock, TX 79410

James C. Reeder
512 North Foothill Road
Beverly Hills, CA 90210

Patricia Reeder Eubank, a/k/a Patricia R. Eubank
529½ North LaCienega Boulevard, Suite 1
West Hollywood, CA 92048

Kaiser-Francis Oil Company
P. O. Box 21468
Tulsa, OK 74121-1468

Gert Flemmer aka Gertie Flemmer(George Flemmer, husband)
15100 SW Pleasant Valley Road
Beaverton, OR 97007

Euela Laubenheim Trust B, Jeannie S. Tottenham, Trustee
4150 International Plaza, Suite 600
Fort Worth, TX 76109

Hedberg Family Limited Partnership
PO Box 470337
Fort Worth, TX 76147-0337

Robert Ryemon, as Trustee of the Robert Ryemon Revocable Trust dated June 5, 2005
337 Trevi Place
Oak Park, CA 91377

Arnold Ryemon
210 Park Lane
Austin, TX 78704

Mary Ann Ryemon
1203 Pine Field Ct.
Pearland, TX 77581

Sterling F. Smythe
200 11th Street SW
Minot, ND 5870

Ada H. Smythe
2443 E Club Drive, Apt. 110B
Atlanta, GA 30319

Ralph Edward Smythe
149 Harding Ave.
Camden, AR 71701

Donald French Smyth and Phyllis Smythe
786 Oyster Point Road
Newport News, VA 23602

Clay K. Davis
4312 N McKinley
Oklahoma City, OK 73118

Amarillo National Bank, Trustee of the Lolisa Horton Revocable Living Trust Agreement
PO Box 1
Amarillo, TX 79105

Charvais Company, LLC, Louie D. Barbe, III, Manager
905 Shellbeach Drive
Lake Charles, LA 70601

Chalfant, Inc., Wesley Chalfant, President
PO Box 3123
Midland, TX 79702

Chalfant Family Partnership, LP,
William A. Chalfant, President
PO Box 3123
Midland, TX 79702

Amarillo National Bank as Trustee of the Susan Landers Grantor Trust
PO Box 1
Amarillo, TX 79105

Amarillo National Bank as Trustee of the Sally Ingerton Grantor Trust
PO Box 1
Amarillo, TX 79105

Arapahoe Resources, LLC
PO Box 57107
Oklahoma City, OK 73157

The Board of Regents of the University of Texas System, Trust Minerals Department
PO Box 551
Midland, TX 79702

Sharyn Gillespie Thornton
PO Box 470337
Fort Worth, TX 76147-0337

Magspie, LLC
1027 Tramway Lane NE
Albuquerque, NM 87122

Miller Mineral, LLC
PO Box 470337
Fort Worth, TX 76147-0337

One L Minerals, LLC
2825 Bledsoe Street
Fort Worth, TX 76107

42 Interests, LLC
2825 Bledsoe Street
Fort Worth, TX 76107

Elizabeth Borkhuis, heir of Anna M. Weisz
4182 Whispering Forrest
Lilburn, GA 30247

Annette M. Young, heir of Anna M. Weisz
999 Campbell Road
Lawrenceville, GA 30245

Dawn Reinhardt
6481 County 20
Beulah, ND 58523

Diane Gomendi, heir of Ludwig and Helen Schoenbeck
729 Tanglewood Drive
Billings, MT 59102

Deborah Perryman, heir of Ludwig & Helen Schoenbeck
335 West Phyllis Circle
Billings, MT 59102

William L. Schoenbeck, Individually & heir of Ludwig and Helen Schoenbeck
2639 Miles Avenue
Billings, MT 59102

David J. Schoenbeck, heir of Ludwig and Helen Schoenbeck
2639 Miles Avenue
Billings, MT 59102

Nancy Swanke, Individually & heir of Ludwig and Helen Schoenbeck
2928 Lyle
Billings, MT 59102

Fred Fischer
305 2nd Street SE
Beulah, ND 58523

Anne Carlsen Center for Children, a North Dakota nonprofit corporation
301 7th Avenue NW
Jamestown, ND 58401-2971

Susan Voegele
9009 Richman #113
Houston, TX 77063

Peggy Bundy Wolf
PO Box 811
Beulah, ND 58523

Come Big or Stay Home, LLC, an Oklahoma limited liability company
9701 N. Broadway
Oklahoma City, OK 73114

Garrett BTF Minerals, LLC, an Oklahoma limited liability company
9701 North Broadway
Oklahoma City, OK 731114

Edward Voegele (Vera M. Voegele, his wife)
8758 2nd Avenue NW
Seattle, WA 98117

Irene Cherrey
414 12th Avenue West
Williston, ND 58801

Elsie Baier (Walter Baier)
201 10th Street NW
Beulah, ND 58523

Debra A. Baier
2905 Warwick Loop
Bismarck, ND 58504

Walter Baier
201 10th Street NW
Beulah, ND 58523

Kary Grote
2432 East Center ane
Deer Park, WA 99006

Kenneth M. Krauth
703 Citrus Avenue
Concord, CA 94518

Constance Krauth
2040 Kentucky Avenue South Street
St. Louis Park, MN 55426

Kurt C. Krauth
411 North Mayhew Lane
Spokane Valley, WA 99216

Carla M. Cagle-Pereira
3421 Padre Lane
Chico, CA 95973

Kurt H. Krieg
21103 Old Ranch Court
Salinas, CA 93908

Catherine J. Moore as Trustee of the Catherine J. Moore Revocable Trust dated August 5, 2021
2145 Verona Avenue
Oakley, CA 94561

Mark S. Draeb
PO Box 213
Hebron, ND 58638

Melanie E. Mack (fka Melanie E. Draeb)
8378 E. Jamison Circle
Centennial, CO 80112

Jon D. Draeb
11426 West Atlantic Avenue
Lakewood, CO 80227

Charmain M. Kleiber and Paul D. Kleiber as Trustees of the Kleiber Mineral Trust dated July 25th, 2007
1819 Flanigan Court
Iowa City, IA 52246

Francis J. Weyrens, Trustee of the Francis J. Weyrens Trust, u/a/d/ 05/11/00
7548 SW Blue Inn Place
Topeka, KS 66614

Robert L. Foree Jr. Trust, Robert L. Foree, Jr. Trustee
PO Box 838
Terrell, TX 75160

Barbara F. Langston, Trustee of Barbara F. Langston Trust (also recorded as Barbara Foree Oil Trust, Barbara Foree Wallace, Trustee)
8235 Douglas Avenue, Suite 402, LB 27
Dallas, TX 75225

Ann Elise Bennett
9600 Prairie Chapel Road
Crandall, TX 75114

Brenda Carol Haskin
1530 West Exchange Parkway
Allen, TX 75013

James Robert Flickinger
1217 Magnolia
Richardson, TX 75080

Wendy Lee Meisenbach
6624 Westlake
Dallas, TX 75214

Nancilee Foree, Trustee of Nancilee Foree Trust (FKA Nancilee Pearcy Trust, Nancilee Pearcy, Trustee)
PO Box 838
Terrell, TX 75160

Christopher C. Braendlin, as Successor Trustee of the Carlo Brendlin Trust - c/o Solem Law Office
PO Box 33
Hebron, ND 58638

MAP2006-OK, an Oklahoma general partnership
101 North Robinson, Suite 1000
Oklahoma City, OK 73102

McKinney Avenue Holdings SPE 1, Inc. a Texas corporation
7777 Henneman Way
McKinney, TX 75070

Youngblood, Ltd, a Texas limited liabillity partnership
3826 North Vesailles Avenue
Dallas, TX 75209

August C. Draeb as Trustee of the Auust C. Draeb Mineral Trust dated September 1, 1992
PO Box 1
Hebron, ND 58638

Bernard O. Caspary
Boissonnet, 81
1010 Lausanne, Switzerland

Ryan Oil Company, LLC, Kelly Ryan, Managing Member
PO Box 55277
Sherman Oaks, CA 91413-0277

Derby Energy, LLC c/o Woodstone Resources, LLC, Warren McFatter, Manager
6420 Richmond Avenue, Suite 210
Houston, TX 77057

Emma Kessler
5325 Newland Street
Arvada, CO 80002

Ruby Boeckel
6251 County Road 16
Beulah, ND 58523

Marc L. Voegele
818 North 3rd Street
Bismarck, ND 58501

Bertha Boeckel
518 7th Avenue NE
Hazen, ND 58545

Kenneth Voegele
Box 821
Beulah, ND 58523

Otto Voegele
PO Box 277
Beulah, ND 58523

Ruben Voegele, aka Rueben Voegele
2015 Ohio SW
Huron, SD 57350

Lenora Sayler
PO Box 301
Hebron, ND 58638

Esther L. Bauer-Winkler (fka Esther L. Bauer)
409 North 10th Street
New Salem, ND 58563

Alice Neuberger
2015 Primrose Street
Eugene, OR 97402

Linda Flemmer
RR 2, TH 3
Beulah, ND 58523

Dale Boeckel
PO Box 669
Beulah, ND 58523

Brad E. Flemmer
1304 Richmond Drive
Bismarck, ND 58501

Donna Soland
Rural Route
Hazen, ND 58545

Dennis Flemmer
RR 2, TH 3
Beulah, ND 58523

Wilbert Flemmer
Box 161
Beulah, ND 58523

Dennis Flemmer
6450 County Road 26
Zap, ND 58580

Patricia Marie Vollan
1029 North 9th Street
Bismarck, ND 58501

John P. Klein Family Partnership, LLP
4766 Pelican Drive
Medina, ND 58467-9317

Rose Zimmer
Simms Road, RFD 5
Lockport, NY 14094

Schoellkopf Shenandoah Partnership, LTD.,
Schoellkopf Management Corporation, General
Partner, Gail O. Schoellkopf, President
3303 Lee Parkway, Suite 405
Dallas, TX 75219-5109

Dr. Lou Bonnick
37 Wellington Oaks Cir.
Denton, TX 76210-5571

Ann Robertson
9013 Green Oaks Cir.
Dallas, TX 75243-7254

Mary Alan Bonnick
3834 Regent Dr
Dallas, TX 75229-5244

Thomas A. Obenchain, Trustee of the
Thomas Obenchain Management Trust
2200 Ross Avenue, Suite 3800
Dallas, TX 75201

Worsham Family Limited Partnership, c/o
Bank of America, N.A., Agent
PO Box 830308
Dallas, TX 75283-0308

Cynthia Burrow Conger
265 North Ithan Avenue
Bryn, PA 19010

Elizabeth Brownrigg Farley
3200 Greenbriar Drive
Dallas, TX 75225

Carolyn Raguet Barber
5961 Germaine Lane
La Jolla, CA 92037-6425

Katherine Lindsey Burrow
14417 W. Yale Place
Lakewood, CO 80228

Nancy Burrow Parrish as Trustee of the
Nancy Burrow Parrish Inheritance Trust
1604 Lightsey Road
Austin, TX 78704

Christopher R. Burrow, as Trustee of the
Christopher R. Burrow Inheritance Trust
1155 Camino Del Mar, #429
Del Mar, CA 92014

Elysse Denton as Trustee of the Elysse
Burrow Denton Trust
9 Harpers Ferry Drive
Richardson, TX 75080

Harriet Shields as Trustee of the Harriet
Anna Burrow Shields Trust
10800 Hawkins Home Boulvard
Benbrook, TX 76126

C.O. Girard
5313 Livingston
Dallas, TX 75209

Guthrie Minerals, L.P.
611 South Main Street
Big Spring, TX 79720

Christopher C. Braendlin, Successor, Trustee
of the Carlo Braendlin Trust dated, December 20, 1988
and most recently amended October 11, 2004
849 Sierra Lane NE
Rochester, MN 55904

Kay Grote
2432 East Center Lane
Deer Park, WA 99006

Maxine Lecy
3602 Northhome Road
Deephaven, MN 55391

Unruh Cattle Company
2052 County Road 13
Zap, ND 58580

St. Paul Minerals Company
Box 35041
Dallas, TX 75235

Tierra Oil Company
P.O. Box 1220
Jupiter, FL 33468-1220

Kathleen Thompson
7139 Cosgrove Drive
Dallas, TX 75231

Mark Hagen
PO Box 47
Arlington, WA 98223

Mary Bodine
3913 West Teter Street
Meridian, ID 83646

Ann Hagen Reinholt and Jeffrey J. Reinholt
4166 13st Street NW
Garrison, ND 58540

Blake Reinholt
213 Dongola Lane
Shakopee, MN 55379

Elizabeth Diffely
333 6th Street NE
Garrison, ND 58540

Brookes Reinholt
4166 13th Street NW
Garrison, ND 58540

Barbara Hagen
11791 Pheasant Run Court
Caldwell, ID 83605

Paula D. Berg
120 Nebraska Street
Rapid City, SD 57701

Elizabeth C. Power Hawkinson
722 North Ninth Street
St. Peter, MN 56082

Holly M. Bommersbach
2611 S. 20th St.
Grand Forks, ND 58201

Kathryn L. Powers Sampedro, c/o Paula D. Berg
120 Nebraska Street
Rapid City, SD 57701

Wilmer R. Sayler
505 2nd Avenue NW
Beulah, ND 58523

Estate of James Aanderud c/o Leeta Aanderud, a/k/a Leeta A. Aanderud
5801 Lake Shore Estates #25
Beulah, ND 58523

Michael Aanderud
8407 North Star Road
Rapid City, SD 57702

Tamara Bogo
5801 Lakeshore Estates, Unit 25
Beulah, ND 58523

PitchBlack Oil, LLC
PO Box 1404
Dickinson, ND 58602

B.H. Grace Oil, LLC
PO Box 1385
Dickinson, ND 58602-1385

Brandon Newman
Box 874
Cando, ND 58324

Melanie Newman
1810 39th St. SW
Fargo, ND 58103

Elfrieda L. Teske
1116 SW 160th
Seattle, WA 98166

Frederick D. Schmidt
PO Box 188
Beulah, ND 55823

Aloha Raber
PO Box 332
Hebron, ND 58638

Clayton H. Teske and Carol J. Teske, Trustees of the Teske Living Trust dated May 9, 1997
904 Kohl Road
Bellevue, NE 68005

Glenn R. Schmidt
516 S. 14th St.
Bismarck, ND 58504

Rita K. Schmidt
PO Box 3175
Bismarck, ND 58502-3175

Bonita F. Schmidt -C/O Debra A. Hoerer
618 N. 13th St.
Bismarck, ND 58504

Debra A. Hoerer
618 N. 13th St.
Bismarck, ND 58504

Gene A. Schmidt
516 S. 14th St
Bismarck, ND 58504

Candida I. Rhodes
823 N. 11th St.
Bismarck, ND 58501

Edgar W. Schulz
712 Jamacia Way
Bakersfield, CA 93309

Waldo P. Schulz
266 Harrington Drive
Long Lake, MN 55356

Curtis L. Schulz
1114 2nd Avenue W.
Beulah, ND 58523

Paula M. Battest
RR 2, Box 40
Beulah, ND 58523

Brian K. Schulz and Angela N. Schulz
223 8th Avenue
Moorhead, MN 56560

Ardella E. Schafer and Gerald Schafer
15026 40th Avenue West, #6-104
Lynnwood, WA 98087

Brooke Schafer
1010 Palm Avenue, Apt. 212
West Hollywood, CA 90069

Cyd Anderson and Erick Anderson
17419 34th Drive SE
Bothell, WA 98012

Lori and Todd Wendt
15421 52nd Place West
Edmonds, WA 98026

Jennifer Schafer
11920 98th Avenue NE, #203
Kirkland, WA 98034

Norlyn E. and Nicholette C. Schulz
73P Calle Aragon
Laguna Woods, CA 92653

Britany Shotkoski
1320 S. 172nd Street
Omaha, NE 68130

John Schulz
300 N. 90th Street
Omaha, NE 68114

Gary L. Schulz
207 Aspen Avenue
Bismarck, ND 58503

Patricia Krueger
PO Box 669
Beulah, ND 58523

Pamella Fischer
614 8th Street East, Lot 4
Mobridge, SD 57601

Darnell Boeckel
7558 101st Street
Lemmon, SD 57638

Marlene Buehner and Cheryl Buehner,
Trustees of the Marlene Buehner Living
Trust dated November 7, 2006
1304 2nd Ave. NW
Beulah, ND 58523

Marvin Unterseher
406 4th Avenue West
Velva, ND 58790

Bonita Horn, a/k/a Bonnie Horn
2013 US Hwy 287
Longmont, CO 80501

Luella Kroh and Albert J. Kroh, a/k/a Albert
Kroh
2300 14th Ave SE
Mandan, ND 58554

Glenn D. Kroh
7525 Sunshine Lane
Bismarck, ND 58503

Tamara J. Barber
1224 N. Parkview Dr.
Bismarck, ND 58501

Terry J. Kroh
4159 E. 42nd Place
Tulsa, OK 74135

Kenneth L. Kroh
7 Camelot Dr.
Hooksett, NH 03106

Arvid Unterseher
9493 Woodland Road
Longmont, CO

William Schulz
320 - 1st Avenue Northwest
Beulah, ND 58523

Patricia Krueger
1112 Portland Drive, Apt. 307
Bismark, ND 58504

Claudette Boeckel
P. O. Box 669
Beulah, ND 58523

Grace McLane
1211 East Lime Street
Tarpon Springs, FL 34689

Sandra L. Gustafson
P.O. Box 155
Dodge, ND 58625-0155

Sharon Axvig, f/k/a Sharon Newman
Box 874
Cando, ND 58324

Alfreda Teske, f/k/a Alfredia Schmidt
1116 Southwest 160th
Seattle, WA 98166

Martha Sommer, f/k/a Martha Schmidt
1831 South 268th
Kent, WA 98031

LySandra Boespflug
11008 Iron Creek Avenue
Bakersfield, CA 93312

Yvonne Stine
29741 State Road 70 East
Myakka City, FL 34251

Jeffrey Sommer
6000 Meadow Glen Way
Bakersfield, CA 93306

Tammy Schmidt
P. O. Box 258
Zap, ND 58580

Scott J. K. Hedblom
13929 Marquesas Way, #105A
Marina del Rey, CA 90292

Morgan Taylor
1827 Cedar Shoals Drive, Apt. 404
Athens, GA 30605

Shad Jeremy Kusler, a/k/a Shad J. Kusler
4109 - 36th Avenue Northwest
Mandan, ND 58554

Mathilda Wolf, f/k/a Mathilda Schmidt
310 Fair Street, Route 2
Beulah, ND 58523

Tabea Welk and Richard Welk
3124 Colorado Lane, Apartment 318
Bismarck, ND 58503

Edwin Schmidt
340 West Ridge Road
Moses Lake, WA 98837

Jeffrey Lee
4750 Southeast Montego Drive
Hillsboro, OR 97123

Shannon Wilhelm, f/k/a Shannon Lee
1526 Northeast 146th Avenue
Portland, OR 97230

Loraine Endreson Elliot
2194 Hammerle Steet
West Linn, OR 97068

Cleo Endreson David
East 1723 - 36th Avenue
Spokane, WA 99203

Myron Neuberger
214 Connecticut Street
Bismarck, ND 58504

Dale Endreson and Sehnaz Endreson
14806 Priscilla Street
San Diego, CA 92129

Donna Kummer
1459 North 50th Place
Milwaukee, WI 53208-2202

Linda Dittman
8759 Liberator Avenue
Los Angeles, CA 90045

Max F. Hemmert
P. O. Box 498
Salmon, ID 83467

Dean Voigt
P. O. Box 73
Calistoga, CA 94515-0073

Darwin H. Mueller Irrevocable Trust, dated January 2, 1997, as amended (Susan R. Richard, Vice President of U.S. Bank, N.A., Trustee)
PO Box 1980
Fargo, ND 58107

Dakota Westmoreland Corporation
P. O. Box 39
Beulah, ND 58523-0039

Janice and Marvin Sigman
670 - 60th Avenue Southwest
Beulah, ND 58523

John Galster and Edna Galster
5521 County Road 26
Beulah, ND 58523

Darrel Galster
4264 West Center Drive
Lakewood, CO 80228

Verna Matthews
1311 Meredith Drive
Bismarck, ND 58501

Dana Kitsch
907 - 4th Avenue
Cando, ND 58324

Lisa Nodland
2200 - 10th Avenue Southeast
Mandan, ND 58554

Ryan Oil Company, LLC
P. O. Box 507
Evansville, IN 47703

DuWayne Kemmet
4919 Westview Drive
Austin, TX 78731

Vergil Bentz
3891 SW Canby
Portland, OR 97219

Sylvia and Dalton Zeiszler
101 3rd Venue NW
Beulah, ND 58523

Vera Kummer
Box 416
Watford City, ND 58854

Janis K. Hemmesch
1902 N. Washington Street, Apt. #5
Bismarck, ND 58501

James Erickson, Individually & PR of the Estate of Audrey Erickson
10755 38th St SW
Dickinson, ND 58601

Fortin Enterprises, Inc.
345 Australian Avenue, Townhouse #6
Palm Beach, FL 33480

W. T. Bristol, Estate
815 - 1st Street
Bismarck, ND 58501

Duane Skalsky
2696 Santa Ana Ave Apt 2
Costa Mesa, CA 92627-6668

Virginia Rathburn
971 Princeton Dr
Clearwater, FL 34711

Jarrod Skalsky
1834 Iron Horse Rd
Eugene, OK 97402-7535

Lester Heier
1009 Hwy 200 E,
Hazen, ND 58545-9530

Evan Schwab (Melissa)
5515 Country Creek Dr,
Bismarck, ND 58503-1525

Erin Schwab and Melanie Schwab
3501 Sandpiper Trl SE
Mandan, ND 58554-7965

Candance Schwab
47309 Rogness Pl.
Renner, SD 57055-6526

Brad E. Flemmer
13304 Richmond Dr
Bismarck, ND 58504-6568

UV Industries, Inc., a Maine corporation
One Monument Square
Portland, ME 04111

Gaylen Boeckel
4113 Huron Dr
Bismarck, ND 58503

Gary Boeckel
11th St SW
Stanton, ND 58571

Fern Schlender
338 County 11
Golden Valley, ND 58541

Fay Hill
211 2nd Ave
Washburn, ND 58577-4233

Ute Royalty Corporation
3100 E Cherry Dr. 205 Cherry Creek Tower
Denver, CO 80209

Mountain States Development Company, a Utah Corporation, (Merged with Ute Royalty Corporation, a Utah Corporation, March 3, 1967)
501 NE Greenwood Ave, Ste 700
Bend, OR 97701

The North American Resources Corporation (who was formerly Texota Oil Company)
PO Box 27945
Houston, TX 77227

Carol Schoenbeck
12780 30th St SW
Belfield, ND 58622

Frederick Schoenbeck
PO Box 432
Park City, MT 59063-0432

Gwen Hathaway
5550 Harvest Hill Rd Apt W325
Dallas, TX 5550

Renee Ann Schaff
19 Greeley Dr
Lincoln, ND 58504

Sarah Nsah, c/o Ebenzer Baptist Church
2645+V94
Limbe, Republic of Cameroon, Africa

Chantal Kuyuh, c/o Ebenzer Baptist Church
2645+V95
Limbe, Republic of Cameroon, Africa

Charissa Kuyuh, c/o Ebenzer Baptist Church
2645+V96
Limbe, Republic of Cameroon, Africa

Fluth Kuyuh, c/o Ebenzer Baptist Church
2645+V97
Limbe, Republic of Cameroon, Africa

Schuh Kuyuh, c/o Ebenzer Baptist Church
2645+V98
Limbe, Republic of Cameroon, Africa

Norman B. Kemper and Maureen C. Kemper
33053 154th Ave
Avon, MN 56310-9647

Henry E. Singer and Mable Singer
3179 11th Ave S
Moorhead, MN 56560-6811

D. W. Graham
1705 Ridgecrest Ave.
Odessa, TX 79763-2820

Charles C. Schuchard, Jr.
1302 S. 3rd St.
Bismarck, ND 58504-6507

Susan Elizabeth Schuchard
6322 Breezy Hollow Ln # 1018,
Katy, TX 77450-5502

J.W. Coan Merchants & Planters Bank
123 Washington St
Camden, AR 71701

Ann D. Cardwell
1N078 Mission Ct
Winfield, IL 60190-2065

R.H. Lightfoot
5708 Paint Trl
College Station, TX 77845-2329

Richard Schoenbeck, Individually & heir of Herman Schoenbeck and Betty Schoenbeck
12780 30th St SW
Belfield, ND 58622

Carol Schoenbeck, heir of Herman Schoenbeck and Betty Schoenbeck
12780 30th St SW
Belfield, ND 58622

Frederick Schoenbeck, heir of Herman Schoenbeck and Betty Schoenbeck
PO Box 432
Park City, MT 59063-0432

Kathleen McLaren
3604 BLUE BIRD DR
Flower Mound, TX 75022

Joyce Lynn McLanahan
1819 W Lakeside Dr
Moses Lake, WA 98837-2724

German Congregational Emmaus Church
116 3rd Ave NW
Beulah, ND 58523

Bonnie Lewton
218 4th St NE
Hazen, ND 58545-4410

Randy Strom aka Randy J. Strom
PO Box 244
Castle Rock, WA 98611

AgriBank, FCB
30 E 7th St, Suite 1600
St. Paul, MN 55101

David J. Houghland
2014 Center Court Dr
Wenatchee, WA 98801

Mark Houghland
7678 Narcissus Lane
Maple Grove, MN 55311

Stephen Houghland
4273 W. 137th St
Savage, MN 55378

Annette M. Young
2190 Spruce Lake Dr
Dacula, GA 30019

Coastal Management Trust
PO Box 1569
Porter, TX 77365

Justin Lee Whitecalfe
1816 Garden Flourish
Windsor, CO 80550

Garrett Frank Whitecalfe
2163 Montauk Lane #1
Windsor, CO 80550

Tyler Allen Whitecalfe
PO Box 874
Beulah, ND 58523

Joanne Haugland
1282 42B Ave NW
Garrison, ND 58540

Candace Smith
2019 Maple Ave
Rapid City, SD 57701

Renea Labrensz
1629 S 3rd St
Bismarck, ND 58504

Ann Elise Bennett
9600 Taxiway Drive
Granbury, TX 76049

Reagan Waskom, Trustee of Barbara Foree Oil Trust
PO Box 838
Terrell, TX 75160

Carol Flickinger Bird
7552 CR 466
Princeton, TX 76049

I.K. Frenkel
910 Peoples Bank Bldg.
Tyler, TX 75702

Blanche Friedlander
207 E. Elm St
Tyler, TX 75702

Glenn Schmidt & Gene Schmidt
516 14th St
Bismarck, ND 58504

Westmoreland Beulah Mining LLC
PO Box 39
Beulah, ND 58523

Michael & Tina Schirado
3032 Promontory Drive
Bismarck, ND 58503

**BEFORE THE INDUSTRIAL COMMISSION**

**STATE OF NORTH DAKOTA**

**CASE NOS. 30873 - 30876**

**On a motion of the Commission to consider the application of Summit Carbon Storage #2, LLC for a storage facility permit for geologic storage of carbon dioxide pursuant to NDCC Ch. 38-22 and NDAC Ch. 43-05-01.**

## AFFIDAVIT OF SERVICE BY MAIL

STATE OF NORTH DAKOTA )
) ss.
COUNTY OF BURLEIGH )

Jessica Pulver Biesterfeld, being first duly sworn, deposes and says that she served the attached:

**Memo**
**Notice of Hearing; and**
**Summit Carbon Solutions Project Pamphlet**

as a second mailing to an updated address by placing a true and correct copy thereof in an envelope addressed as follows:

**See attached Exhibit A**

and deposited the same, with postage prepaid, certified mail, return receipt requested, in the United States mail at Bismarck, North Dakota.

Jessica Pulver Biesterfeld

Subscribed and sworn to before me this 7 day of June, 2024.

JEFFREY L SKAARE
NOTARY PUBLIC, STATE OF NORTH DAKOTA
MY COMMISSION EXPIRES SEPT 16, 2026

Notary Public
My Commission expires: Sept. 16, 2026

SUMMIT CARBON SOLUTIONS

April 15, 2024

TO: OWNER, LESSEE OR OPERATOR OF RECORD

**RE: APPLICATION OF SUMMIT CARBON STORAGE #2, LLC FOR A CARBON DIOXIDE STORAGE FACILITY**

Dear Sir/Madam:

Summit Carbon Storage #2, LLC ("Summit") has made application to the North Dakota Industrial Commission ("Commission") requesting an order providing approval of a carbon dioxide storage facility project ("Project"). A hearing to consider the application of Summit for the Project has been scheduled before the Commission as set forth in the attached Notice of Hearing ("Notice"). You are receiving this Notice because you have been identified as an owner, lessee or operator of record within the lands identified in the Notice or within one-half mile of the outside boundary of the proposed Project.

Details concerning the Project are included in the enclosed information pamphlet or are available from the Commission; however, should you have any questions regarding the Project or Summit's application, please leave a message at (701) 505-8676 or email option-info@summitcarbon.com. A qualified representative will respond promptly to answer your questions.

Sincerely,

Jeffrey L. Skaare, J.D., C.P.L.
Summit Carbon Storage #2, LLC

Enclosure(s)
#80961283v1

**BEFORE THE INDUSTRIAL COMMISSION**

**STATE OF NORTH DAKOTA**

**CASE NO. 30873 - 30876**

**On a motion of the Commission to consider the application of Summit Carbon Storage #2, LLC for a storage facility permit for geologic storage of carbon dioxide pursuant to NDCC Ch. 38-22 and NDAC Ch. 43-05-01.**

## NOTICE OF HEARING

**PLEASE TAKE NOTICE** that Summit Carbon Storage #2, LLC ("Summit") has made application to the North Dakota Industrial Commission ("Commission") requesting an order providing approval of a carbon dioxide storage facility permit as follows.

1. The carbon dioxide storage facility will be located south of the city of Beulah, in Oliver and Mercer Counties, North Dakota, and comprised of the following described lands:

**Oliver County**
**Township 142 North, Range 87 West**
Section 05: S2SW
Section 06: Lots 6 (39.62), 7 (39.44), E2SW, W2SE, SESE
Section 07: Lots 1 (39.34), 2 (39.30), 3 (39.26), 4 (39.22), E2W2, E2
Section 08: W2
Section 17: W2
Section 18: Lots 1 (39.21), 2 (39.24), 3 (39.26), 4 (39.29), E2W2, E2
Section 19: Lots 1 (39.30), 2 (39.29), 3 (39.29), 4 (39.28), E2W2, E2
Section 20: W2
Section 29: W2
Section 30: Lots 1 (39.33), 2 (39.44), 3 (39.54), 4 (39.65), E2W2, E2
Section 31: Lots 1 (39.53), 2 (39.18), E2NW

**Mercer County**

**Township 143 North, Range 88 West**

Section 27: SWNW, SW, S2SE
Section 28: S2N2, S2
Section 29: SENE, SE
Section 32: SW, E2
Section 33: All
Section 34: All
Section 35: W2, W2E2

**Township 142 North, Range 88 West**

Section 01: S2
Section 02: Lot 2 (41.36), SWNE, Lots 3 (41.29), 4 (41.22), S2NW, S2
Section 03: Lots 1 (41.18), 2 (41.17), 3 (41.15), 4 (41.13), S2N2, S2
Section 04: Lots 1 (41.12), 2 (41.11), 3 (41.11), 4 (41.10), S2N2, S2
Section 05: Lots 1 (41.07), 2 (41.04), 3 (41.00), 4 (40.96), S2N2, S2
Section 06: Lot 1 (40.84), SENE, E2SE
Section 07: E2
Section 08: All
Section 09: All
Section 10: All
Section 11: All
Section 12: All
Section 13: All
Section 14: All
Section 15: All
Section 16: All
Section 17: All
Section 18: E2, SENW, NESW
Section 19: E2
Section 20: All
Section 21: All
Section 22: All
Section 23: All
Section 24: All
Section 25: All
Section 26: All
Section 27: All
Section 28: All
Section 29: All
Section 30: E2E2
Section 32: NW, E2
Section 33: All

Section 34: All
Section 35: All
Section 36: All

**Township 141 North, Range 88 West**
Section 01: Lots 3 (39.92), 4 (39.89), S2NW
Section 02: Lots 1 (39.90), 2 (39.96), 3 (40.01), 4 (40.07), S2N2, S2
Section 03: Lots 1 (40.07), 2 (40.02), 3 (39.96), 4 (39.91), S2N2, SE

2. A hearing to consider the application of Summit will be held before the Commission at 9:00 AM CDT Tuesday, June 11, 2024 – Wednesday, June 12, 2024, at the Department of Mineral Resources Conference Room, Oil and Gas Division, 1000 East Calgary Avenue, Bismarck, North Dakota.
3. A copy of the permit application and draft permit may be obtained from the Commission.
4. All comments regarding the application for the storage facility permit must be in writing and submitted to the Commission prior to hearing or presented at the hearing.
5. Amalgamation of the storage reservoirs pore space is required to operate the storage facility and the Commission may require that the pore space owned by nonconsenting owners be included in the storage facility and subject to geologic storage. The amalgamation of pore space will be considered at the hearing.

**DATED** this 15TH day of April, 2024.

FREDRIKSON & BYRON, P.A.

By _____
LAWRENCE BENDER, ND Bar #03908
*Attorneys for Applicant,*
*Summit Carbon Storage #2, LLC*
1133 College Drive, Suite 1000
P. O. Box 1855
Bismarck, ND 58502-1000
(701) 221-8700

#80961030v1

SUMMIT CARBON SOLUTIONS

**For more information, visit: www.summitcarbonsolutions.com**

## Why am I Receiving This Letter?

Summit Carbon Solutions (Summit) is developing a large-scale Carbon Capture and Underground Storage (CCUS) project across the Midwest, with injection wells located in the Mercer, Oliver and Morton County, ND regions. Recently, Summit submitted *Class VI Storage Facility Permits* to the North Dakota Industrial Commission.

North Dakota Administrative Code 43-05-01-08 entitled, **Storage facility permit hearing**, states, the commission shall hold a public hearing before issuing a storage facility permit. At least 45 days prior to the hearing, the applicant shall give notice of the hearing to the following:

- Each **operator of mineral extraction activities** within the facility area and within ½ mile of its outside boundary
- Each **mineral lessee of record** within the facility area and within ½ mile of its outside boundary
- Each **owner of record of the surface** within the facility area and within ½ mile of its outside boundary
- Each **owner of record of minerals** within the facility area and within ½ mile of its outside boundary
- Each **owner** and each **lessee of record of the pore space** within the facility area and within ½ mile of its outside boundary; and
- Any other persons as required by the commission.

You are receiving this letter because you fit one of the above descriptions.

## Why is This Project Important?

Summit Carbon Solutions will open new economic opportunities for the **ethanol** and **agricultural** industries that are so critical to the Midwest economy. Our carbon capture and storage project will put the ethanol produced at our 57 partner facilities on track to *become eligible for emerging low carbon fuel markets.* This will allow these plants to sell their product at a premium in the growing number of states and countries that have adopted low carbon fuel standards.

*Over the last 10 years, the U.S. ethanol industry has created a market for 53 billion bushels of corn.* Today, ethanol supports 360,000 jobs and contributes $45 billion to the annual U.S. GDP. But maybe most importantly, ***ethanol plants purchase approximately half of all the corn produced in the United States***. Summit Carbon Solutions' investment will strengthen this marketplace even further for farmers, while maintaining strong land and commodity prices.

Once completed, Summit Carbon Solutions' Project will be the largest carbon capture and storage project in the world.

ETHANOL AND AGRICULTURE WORK TOGETHER TO ADD VALUE ACROSS THE SUPPLY CHAIN AS WELL AS CREATE ECONOMIC IMPACT AND JOBS FOR RURAL AMERICA.

## Hearing Details

Pursuant to the enclosed notice, a hearing to consider the application of Summit Carbon Solutions will be held before the Commission at the Department of Mineral Resources Conference Room, Oil and Gas Division, 1000 East Calgary Avenue, Bismarck, North Dakota. A copy of the permit application and draft permit can be found on NDIC's website, https://www.dmr.nd.gov/dmr/oilgas/ClassVI. All comments regarding the application for the storage facility permit must be in writing and submitted to the Commission prior to the hearing or presented at the hearing. These can be sent to the Department of Mineral Resources, Oil and Gas Division, 1000 East Calgary Avenue, Bismarck, North Dakota 58503.

## Who is Summit Carbon Solutions?

Summit Carbon Solutions is a U.S. company with U.S. roots committed to driving job growth across the Midwest, reducing emissions, and providing a substantial boost to the ethanol and agricultural industries that are so critical to the economy. We believe in advancing communities through decarbonization solutions. Currently, the company has announced a partnership with 57 ethanol plants across the Midwest. Utilizing proven technology, Summit Carbon Solutions will capture carbon dioxide before it is emitted into the atmosphere and channel it to North Dakota where it will be permanently and safely stored deep underground.

## What is the Timeline?

While there are variables when it comes to a project of this size, particularly one that requires permits at the federal, state, and local levels, we anticipate construction will begin in 2025.

## Mineral Rights and Pore Space Rights

Pore space is owned by surface owners. That is not always the case when it comes to mineral rights. Summit Carbon Solutions believes that these different rights can live and operate in harmony. Summit chose an area with little to no hydrocarbon exploration. In addition, Summit chose injections zones that are nonhydrocarbon bearing zones. Nonetheless, should a mineral owner wish to develop its interests in these areas, there are still extraction methods, such as horizontal drilling, that would allow development.

## Determining Storage Zones

Summit Carbon Solutions drilled three stratigraphic test wells and collected stratigraphic information to investigate the feasibility of developing permanent and safe $CO_2$ storage. Methodologies include extracting whole cores, wireline logging, injectivity test and more. Information collected from the coring activities along with data from wireline logging, testing and existing information help scientists verify that the deep rock layers overlying and underlying the study zone will safely and permanently store $CO_2$. Summit successfully extracted over 3,500 ft of whole cores across three wells, the deepest core interval being over two miles deep below ground level. Results from core and log analysis show ideal geological and reservoir characteristics for storage with impermeable cap rocks above and below the study zone.

## What is Amalgamation?

Effective geologic storage requires cooperative use of subsurface property interests and the collaboration of property owners. Obtaining consent to store $CO_2$ from all owners in a unit may not be feasible, thus requiring procedures that promote, in a manner fair to all interests, cooperative management, thereby ensuring the maximum use of our natural resources. North Dakota Century Code 38-22-10 entitled **Amalgamating property interests**, provides: "*If a storage operator does not obtain the consent of all persons who own the storage reservoir's pore space, the commission may require that the pore space owned by nonconsenting owners be included in a storage facility and subject to geologic storage.*"

Should you have any questions regarding the Project or Summit's application, please leave a message at (701) 505-8676 or email option-info@summitcarbon.com. A qualified representative will respond promptly to answer your questions.

SUMMIT CARBON SOLUTIONS

# EXHIBIT A

Date Sent: 4/26/2024
Arvid Unterseher
7 Marina Way
Kimberling City, MO 65686

Date Sent: 4/29/2024
Dale Strom
64 Custer Drive
Lincoln, ND 58504

Date Sent: 4/29/2024
Rory Schuh, a/k/a Rory L. Schuh
3422 Bay Shore Bend SE
Mandan, ND 58554

Date Sent: 4/29/2024
Sandy Seim, a/k/a Sandy L. Seim
2586 110th Court NE
Blaine, MN 55449

Date Sent: 5/1/2024
Francis P. Borden III
PO Box 7330
Monroe, LA 7330

Date Sent: 5/1/2024
Therese Borden Sloane
6362 West Blackhawk Dr
Glendale, AZ 85308

Date Sent: 5/6/2024
Darla M. Ratzak
2205 16th Street E
Williston, ND 58801

Date Sent: 5/6/2024
Shawn Michael Flemmer
30888 Rosemond Lane
Franklin, MI 48025

Date Sent: 5/6/2024
Tillie Martin
1024 E. Main Street
Valley City, ND 58072

Date Sent: 5/6/2024
Thomas D. Selby
3930 149th Avenue NW
Williston, ND 58801

Date Sent: 5/6/2024
Gary L. Schulz
726 Avenida Majorca, Unit N
Laguna Woods, CA 92637

Date Sent: 5/6/2024
Ryan Oil Company, LLC
Ryan Hurst, Registered Agent
238 S. Meridian Street, Suite 201
Indianapolis, IN 46225

Date Sent: 5/10/2024
Johnell J. Kusler
1884 Hillcrest Avenue
St. Paul, MN 55117

Date Sent: 5/10/2024
Vivian Dunbar
2424 Leisure World
Mesa, AZ 85206

Date Sent: 5/10/2024
Rodney Skalaky
PO Box 121
Beulah, ND 58523

Date Sent: 5/16/2024
Sandra M. Schnaidt
502 Bay Drive
Beulah, ND 58523

Date Sent: 5/16/2024
Clifford J. Helm aka Clifford Helm
4808 Windsor Street
Bismarck, ND 58503

Date Sent: 5/16/2024
Anna M. McCormick
843 County Road 3704b
Splendora, TX 77372

Date Sent: 5/16/2024
Linda S. Smith
1622 38th Street S
St. Cloud, MN 56301

Date Sent: 5/16/2024
Betty A. Lapp
4022 Downing Street
Bismarck, ND 58504

Date Sent: 5/16/2024
Melanie Newman Morrow
1607 Rider Road
Grand Forks, ND 58201

Date Sent: 5/16/2024
Great Northern Properties Limited Partnership
RA: Capitol Corporate Services, Inc.
1213 NP Avenue, Suite 301
Fargo, ND 58102

Date Sent: 5/16/2024
Patricia Arrey Curry
8201 W. Bellfort St., #1488
Houston, TX 77071

Date Sent: 5/16/2024
Earle M. Tonra
3911 Girard Avenue N
Minneapolis, MN 55412

Date Sent: 5/16/2024
Krista H. Tonra
159 Madison Avenue, 4K
New York, NY 10016

Date Sent: 5/16/2024
Walter Buechler and Laurie Buechler
P.O. Box 333
Soap Lake, WA 98851

Date Sent: 5/16/2024
Leslie M. Mahin, Sr.
7488 E Wildcat Drive
Gold Canyon, AZ 85118

Date Sent: 5/16/2024
Mark Ballensky
1826 8th Avenue NW
Jamestown, ND 58401

Date Sent: 5/16/2024
Gerald L. Woolam, M. D.
c/o Baker, Brown & Thompson, P.C.
5010 University Avenue, Suite 433
Lubbock, TX 79413

Date Sent: 5/16/2024
Mark Hagen
3405 172nd Street, #5
Arlington, WA 98223

Date Sent: 5/16/2024
Duane Skalsky
10975 N Paisana Ave
Tuscon, AZ 85742

Date Sent: 5/22/2024
Debra A. Hoerer & Bonnita Schmidt
9005 Lincoln Rd.
Bismarck, ND 58504

Date Sent: 5/22/2024
Patsy Frafford
11250 29d St. SW
Dickinson, ND 58601

Date Sent: 5/22/2024
Duane D. Voegele
4301 W. Heart Rd.
Bismarck, ND 58504

Date Sent: 5/22/2024
Leona Mattheis
170 55th Ave. NW
Hazen, ND 58545

Date Sent: 5/22/2024
K-2 Properties
3614 Lajitas
Leander, TX 78641

Date Sent: 5/22/2024
Shirley M. Lynam
1648 E. Glass Ave
Spokane, WA 99207

Date Sent: 5/16/2024
LaWanda Wiedrich
301 S. Worley Avenue
Holyoke, CO 80734

Date Sent: 5/16/2024
Elsie Baier (Walter Baier)
1000 W Century Ave, Apt 386
Bismarck, ND 58503-0928

Date Sent: 5/16/2024
Aloha Raber
434 E. Calgary Avenue
Bismarck, ND 58503

Date Sent: 5/16/2024
J.W. Coan Merchants & Planters Bank
P.O. Box 540
Manila, AR 72442

Date Sent: 5/22/2024
Jennifer L. Smith
322 5th St NW
Hazen, ND 58545-4121

Date Sent: 5/22/2024
Jody Barnick
3124 Stonewall Dr.
Bismarck, ND 58503

Date Sent: 5/22/2024
Mark John Flemmer aka Mark Flemmer
408 W Fir Ave.
Frazee, MN 56544

Date Sent: 5/22/2024
Ray Haroldson, individually and as an heir
of Junette Haroldson
3331 Fir Ridge Rd.
Lake Oswego, OR 97035

Date Sent: 5/22/2024
Jimo Menge
2012 Calle Fontana
Fountain, CO 80817

Date Sent: 5/22/2024
Norine M. Paulson
1104 3rd St. NE
Waseca, MN 56093

Date Sent: 5/16/2024
The Carter Investment Company
c/o Registered Agent William Winkler
708 Kipling Street
Houston, TX 77006

Date Sent: 5/16/2024
Christopher C. Braendlin, Successor, Trustee
of the Carlo Braendlin Trust dated, December 20, 1988
and most recently amended October 11, 2004
422 9th Avenue NE
Rochester, MN 55906

Date Sent: 5/16/2024
Tammy Schmidt
106 4th Avenue E
Zap, ND 58580

Date Sent: 5/20/2024
Denise Ziegler
2620 NE 195th St. Apt A-3
Shoreline, WA 98155

Date Sent: 5/22/2024
Chandler J. Kirchmeier
454 Foxtain Dr.
West Fargo, ND 58078

Date Sent: 5/22/2024
Alexandra (Sandra) V. Dehaini
16361 Westwood Dr.
Conroe, TX 77302

Date Sent: 5/22/2024
Mona Jane Adams
306 Casa Grande Ct.
Winter Springs, FL 32708

Date Sent: 5/22/2024
Raymond E. Bostick
PO Box 8539
Tyler, TX 75711

Date Sent: 5/22/2024
Gayle Sette, Trustee of the Sette Bypass
Trust, udt 3/2/2001
799 Yellowstone Dr. #178
Vacaville, CA 95687

Date Sent: 5/22/2024
Gabriel J. Brown, Roy Brown and Beverly
Wescott Trustees of the Brown Trust
6238 Heritage Ridge Rd.
Bismarck, ND 58503

Date Sent: 5/22/2024
Douglas C. McLeod
600 N Grant St. #850
Denver, CO 80203

Date Sent: 5/22/2024
Verda Krizan
PO Box 1033
Beulah, ND 58523

Date Sent: 5/22/2024
Derby Energy, LLC c/o Woodstone Resources, LLC, Warren McFatter, Manager
820 Gessner Rd Ste 1275
Houston, TX 77024

Date Sent: 5/22/2024
Ardella E. Schafer and Gerald Schafer
1416 Lindsay Loop #302
Mount Vernon, WA 98274

Date Sent: 5/22/2024
Teresa M. Jorgenson
6415 County Road 19
Loretto, MN 55357

Date Sent: 5/22/2024
Gladys Schuchard
228 Wildrose Ave.
San Antonio, TX 78209

Date Sent: 5/22/2024
St. Paul Minerals Company
PO Box 25163
Dallas, TX 75225

Date Sent: 5/22/2024
Bonita Horn, a/k/a Bonnie Horn
2013 S US Highway 287
Berthoud, CO 80513

Date Sent: 5/22/2024
Curtis Veitenheimer
9525 N Spokane St.
Post Falls, ID 83854

Date Sent: 5/22/2024
Deborah Perryman, heir of Ludwig & Helen Schoenbeck
217 S 10th Street
Livingston, MT 59047-2909

Date Sent: 5/22/2024
Clayton H. Teske and Carol J. Teske, Trustees of the Teske Living Trust dated May 9, 1997
18013 Gertrude St
Omaha, NE 68136

Date Sent: 4/26/2026
Luella Kroh and Albert J. Kroh, a/k/a Albert Kroh
916 Ash Coulee Place
Bismarck, ND 58503

**From:** L R
**To:** Forsberg, Sara L.
**Subject:** objection comments Summit Carbon Storage
**Date:** Monday, June 10, 2024 5:28:20 PM

You don't often get email from lritzert@hotmail.com. Learn why this is important

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Ms. Forsberg,

Carbon capture and sequestration is and underregulated industry that needs greater consideration for people, community, and resources protection and safety before pipelines of this nature can even be considered.

CO2 pipelines are less than 1% of the 3.4 million miles of regulatory pipelines in the U.S. Predominantly, they have been used to transport natural underground CO2 to oil fields for oil fracking, or enhanced oil recovery (EOR) across sparsely-populated areas. CO2 pipelines in first-in-kind concentrations right up on people is a disaster waiting to happen with the inadequate regulations.

25 years ago today, June 10, 1999, three boys were killed in a horrific gas pipeline explosion in Bellingham, Washington because pipelines were under-regulated.

Watch here:
https://www.youtube.com/watch?v=kJaeQ5ziX4s

The June 10, 1999 Olympic Pipeline Tragedy

On June 10, 1999, the Olympic pipeline ruptured and spilled nearly 250,000 gallons of gasoline into Whatcom Creek which ignited and killed two boys and a young man in Bellingham, WA. To learn more about the tragedy and Bellingham's response, visit the link below.

www.youtube.com

The intentions of these pipelines has not been clear. First, it was climate change mitigation. Then, it was a savior for corn and the ethanol industry, After that, it was sustained aviation fuel. It has been rumored from the start and supporting evidence exist for oil fracking. In any case, monetary profits are being put ahead of people.

https://www.desmog.com/2024/06/10/carbon-capture-will-extend-oil-production-by-84-years-industry-study-finds/?fbclid=IwZXh0bgNhZW0CMTEAAR1DzV_iMLqC6ggit0mNyF2R10T-35hvVU0Dna_vNOj3UphCkdorr9fZXtw_aem_ZmFrZWR1bW15MTZieXRlcw

## Carbon Capture Will Extend Oil Production by 84 Years, Industry Study Finds

The study focuses on a Canadian oil field that should have shut down in 2016 but could now keep producing oil until 2100.

www.desmog.com

It's okay to serve the people and say no.

Thank you,
Lisa Ritzert

**From:** Kathy Carter
**To:** Forsberg, Sara L.
**Subject:** Summit Carbon Storage Cases 30869, 30873, 30877
**Date:** Monday, June 10, 2024 5:01:08 PM

You don't often get email from willford21@myomnitel.com. Learn why this is important

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Regarding the injection wells for CO2 storage:

Can ANYONE be really certain that this dangerous product will STAY where Summit claims it will stay? Summit, after all, has never built a highly pressurized, highly hazardous pipeline, much less had any experience with injection wells.

Can anyone know that the CO2 will not travel via multiple strata, reaching and contaminating underground water sources? Those same sources so very critical to the survival and economics of the North Dakota citizens?

Are the citizens of North Dakota FULLY informed of what may lie beneath them? Of what will be traveling beneath them? Of what could contaminate the water for them, for their families, for their livestock, for their crops? When CO2 mixes with water, it creates carbonic acid. If wells and water sources are contaminated, it might not be known for years, when it will be far too late to correct.

You've seen letters & emails & comments with statistics and documentation, but I am writing from the heart. I may be in Iowa, but I have friends in North Dakota that don't want this beneath their feet.

To be completely fair, it should not be the ND Governor, AG, and Ag commissioner who make this decision. Governor in particular has made no secret of his stance on CO2 pipelines; he can hardly be expected to be unbiased.

Say NO to these injection wells. The CO2 projects are being proposed for one reason only : money. To harvest taxpayer dollars as well as oil fracking income. It is greed, plain & simple.

Kathy Carter
Rockford Iowa
515-297-2801

**From:** Forsberg, Sara L.
**To:** Alexis Varvel
**Subject:** RE: Real Time Simulations
**Date:** Monday, June 10, 2024 3:51:00 PM

---

Good afternoon:

On behalf of the Hearing Examiner:

Oral testimony is allowed. We do not allow physical demonstrations at the hearings; due to their visual nature they cannot be put into the record and there is also a safety concern. Pictures or video would be allowed since they can be preserved as a physical record.

Please let me know if you have any further questions/concerns.

Thank you,

Sara Forsberg

---

**From:** Alexis Varvel <mr.a.alexis.varvel@gmail.com>
**Sent:** Monday, June 10, 2024 10:57 AM
**To:** Forsberg, Sara L. <slforsberg@nd.gov>
**Subject:** Real Time Simulations

You don't often get email from mr.a.alexis.varvel@gmail.com. Learn why this is important

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Good morning,

I would like to know whether the Industrial Commission will permit the presentation of exhibits for oral testimony during the upcoming hearing on the carbon dioxide storage facility. In particular, I would like to know whether you will be permitting simulations involving the real time interactions of a latex gas containment simulator with a crack simulator to illustrate sudden decompression events.

Thank you.

Sincerely,

Andrew Alexis Varvel
2630 Commons Avenue
Bismarck, ND 58503
mr.a.alexis.varvel@gmail.com

| | |
|---|---|
| **From:** | Desirae Zaste |
| **To:** | -Info-Oil & Gas Division; Forsberg, Sara L.; Bender, Lawrence; TThrone@thronelaw.com; Helms, Lynn D.; Garner, David P.; Knutson, Amy N.; Joshua A. Swanson |
| **Cc:** | Derrick Braaten; Hughes, Bethany; Etter, Mary |
| **Subject:** | Summit Carbon Storage (Case Nos. 30869-30880) |
| **Date:** | Monday, June 10, 2024 4:57:11 PM |
| **Attachments:** | image001.png |

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Good afternoon,

Below is a link containing the following documents for filing and service:

- **Motion to Compel;**
- **Brief in Support of Motion to Compel;**
- **Declaration of Derrick Braaten in Support of Motion to Compel;**
- **Exhibit 1 - Landowners Notice of 30(b)(6) Deposition of Summit Carbon Solutions;**
- **Exhibit 2 - Intervenor Landowners' Amended Notice of 30(b)(6) Deposition of Summit Carbon Solutions;**
- **Exhibit 3 - Letter from Lawrence Bender regarding the Amended Notice of Deposition dated June 4, 2024;**
- **Exhibit 4 - Intervenor Landowners' Second Amended Notice of 30(b)(6) Deposition of Summit Carbon Storage #1, LLC;**
- **Exhibit 5 - Intervenor Landowners' Second Amended Notice of 30(b)(6) Deposition of Summit Carbon Storage #2, LLC;**
- **Exhibit 6 - Intervenor Landowners' Second Amended Notice of 30(b)(6) Deposition of Summit Carbon Storage #3, LLC;**
- **Exhibit 7 - Letter from Lawrence Bender dated June 5, 2024;**
- **Exhibit 8 - Email response on June 5, 2024 to Mr. Bender's email response;**
- **Exhibit 9 - Letter dated May 2, 2024 asking to confer regarding a 30(b)(6) deposition;**
- **Exhibit 10 - Email correspondence dated May 9, 2024;**
- **Exhibit 11 - Native Outlook Email regarding Exhibit 8;**
- **Exhibit 12 - Transcript of Proceedings regarding the nonappearance deposition of Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC; and**
- **Declaration of Service.**

Motion to Compel - Swenson et al

**Desirae Zaste¦ Certified Paralegal**

**BRAATEN LAW FIRM**
109 N. 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
Fax: 701-221-5842
www.braatenlawfirm.com

**PRIVILEGED COMMUNICATION**
**This e-mail message is intended only for the named recipient(s) above and is covered by the Electronic Communications Privacy Act, 18 U.S.C. Sections 2510-2521. This e-mail is confidential and may contain information that is privileged, attorney work product or exempt from disclosure under applicable law. Recipients should not file copies of this e-mail with publicly accessible records. If you have received this message in error, please immediately notify the sender by return e-mail and delete this e-mail message from your computer. Thank you for your cooperation.**

**NORTH DAKOTA INDUSTRIAL COMMISSION**

**OIL AND GAS DIVISION**

**In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**Case No(s). 30869**
**30870**
**30871**
**30872**
**30873**
**30874**
**30875**
**30876**
**30877**
**30878**
**30879**
**30880**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## MOTION TO COMPEL

Intervenor Landowners, by and through its undersigned counsel, hereby moves to compel Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC. This Motion is supported by the Brief in Support, Declaration, and Exhibits filed herewith.

DATED this 10th day of June, 2024.

**BRAATEN LAW FIRM**

*/s/ Derrick Braaten*
Derrick Braaten (ND #06394)
109 North 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
derrick@braatenlawfirm.com

*Attorneys for Intervenors the Swenson Living Trust, Bauman, Gerving, Haupt, Jochim, Kraft, Liebelt, Maize, Metz, Rust, and Smith*

**NORTH DAKOTA INDUSTRIAL COMMISSION**

**OIL AND GAS DIVISION**

**In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**Case No(s). 30869**
**30870**
**30871**
**30872**
**30873**
**30874**
**30875**
**30876**
**30877**
**30878**
**30879**
**30880**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## BRIEF IN SUPPORT OF MOTION TO COMPEL

[¶1] Intervenor Landowners are a group of North Dakota landowners whose property rights stand to be significantly impacted by the acts of Summit Carbon Solutions, LLC through its related entities, Summit Cabon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC (collectively, "Summit"). To protect their rights, Intervenor Landowners intervened in these proceedings and, from the beginning, have diligently pursued information concerning Summit's proposal to conduct activities that will irreversibly affect their properties. In response, Summit has refused to engage with them in good faith and has applied narrow interpretations of the rules of discovery to hide information from the Intervenor Landowners necessary to fully assess Summit's proposal *on their land*. The Commission should see past this gamesmanship and grant Intervenor Landowner's motion to compel and allow procedural due process in this proceeding for the landowners with the most to lose.

### I. FACTS

[¶2] Six weeks ago, on May 2, 2024, Intervenor Landowners advised Summit of their intention to conduct discovery, including written discovery and a 30(b)(6) deposition, and invited Summit to engage in a dialogue regarding the timing and best methods to complete this sharing of information prior to the NDIC hearing. Ex. 9, May 2, 2024 Letter, attached to the Decl. of Derrick Braaten.

[¶3] One week later, after being met with silence, Intervenor Landowners proceeded with noticing a 30(b)(6) deposition of Summit Carbon Solutions, LLC for June 6, 2024. Ex. 1, May 9, 2024 30(b)(6) Notice, attached to the Decl. of Derrick Braaten. Along with the notice, Intervenor Landowners advised Summit by email that the June 6, 2024 date was chosen because it appeared

to work with their counsel's schedule and invited Summit to choose a different, mutually agreed upon date in case June 6 was not feasible. Ex. 10, May 9, 2024 Email, attached to the Decl. of Derrick Braaten.

[¶4] The Commission formally granted Intervenor Landowner's motion to intervene on May 31, 2024. Intervenor Landowners then promptly filed an amended notice of 30(b)(6) deposition merely to indicate on the notice that the landowners were now intervenors. Ex. 2, May 31, 2024 First Am. Notice, attached to the Decl. of Derrick Braaten.

[¶5] On June 4, 2024, Summit responded to the May 31, 2024 amended notice, advising Intervenor Landowners of the notice's purported technical insufficiencies due to the fact Summit Carbon Solutions, LLC, as a nonparty, should have been served a *subpoena* as opposed to a *notice*. Ex. 3, June 4, 2024 Letter, attached to the Decl. of Derrick Braaten. The correspondence included no other challenges to the notice.

[¶6] In response to the letter, Intervenor Landowners filed three second amended notices of the 30(b)(6) deposition, specifically naming the three LLC subsidiaries— Summit Cabon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC. Exs. 4-6, June 4, 2024 Sec. Am. Notice, attached to the Decl. of Derrick Braaten. No changes were made to the topics listed in the notice at any time. *Id*.

[¶7] Then, Summit gave *new* reasons as to why it believed it need not comply with the amended notices—objections related to notice to other parties (Minnkota Power Cooperative, Inc.), notice to Summit, the time for conferral, and the description of the deposition topics. Ex. 7, June 5, 2024 Letter, attached to the Decl. of Derrick Braaten.

[¶8] On June 5, 2024, Intervenor Landowners responded to Summit's objections, advising Summit that Minnkota did have notice, that Intervenor Landowner's have been attempting to

confer for weeks, and that the notice was reasonably particular with respect to the proposed topics of questioning. Ex. 8, June 5, 2024 Email, attached to the Decl. of Derrick Braaten. The email was sent on June 5, 2024, but AgileLaw converted it to an alternate time zone when it was uploaded via its system for the deposition exhibit. The native email file as attached to the Decl. of Derrick Braaten indicates the email was sent on June 5, 2024 in response. Ex. 11, June 5, 2024 Native Email.

[¶9] The deposition went forward on June 6, 2024. Although Summit had notice of the deposition since May 9, 2024 and was given ample opportunity to confer about selecting a different date, Summit refused to appear. Ex. 12, Dep. 30(b)(6) Summit Carbon Storage #1, #2, #3 attached to the Decl. of Derrick Braaten.

## II. LAW & ANALYSIS

[¶10] North Dakota allows broad discovery, whereby "[p]arties may obtain discovery regarding any nonprivileged matter that is relevant to any party's claim or defense." N.D. R. CIV. P. 26(b)(1)(A). The discovery rules should be construed "liberally." *See Marmon v. Hodny*, 287 N.W.2d 470, 476 (N.D. 1980). Additionally, courts have "broad discretion" under Rule 37 to compel discovery upon a party's motion. *Voracheck v. Citizens State Bank of Lankin*, 421 N.W.2d 45, 50 (N.D. 1988); *see* N.D. R. CIV. P. 37(a)(1).

[¶11] Intervenor Landowners have attempted to confer with Summit in good faith multiple times, but Summit rebuffed those efforts. The record is clear that the Summit entities had ample notice of the deposition, and the topics of questioning were reasonably particular. The Summit entities stand to gain from the use of the property of Intervenor Landowners and have critical information concerning their proposed activities. Under North Dakota's liberal discovery rules, the

Commission should therefore use its discretion to enter an order compelling the depositions of the three Summit entities.

### A. The Summit Entities & Minnkota Had Sufficient Notice

[¶12] Summit had notice that Intervenor Landowners wished to take a 30(b)(6) deposition concerning its application as early as May 2, 2024. Ex. 9. It then received notice of the particular topics of questioning on May 9, 2024, nearly a month before the date of the deposition. Ex. 1. Summit then received additional notice of the topics in the form of the First Amended Notice. Ex. 2. And throughout this time, Intervenor Landowners invited Summit to confer so that discovery could be completed in a mutually agreed upon manner. Ex. 9; Ex. 10.

[¶13] The topics of questioning have remained unchanged since the first notice was filed. Therefore, since May 9, 2024, Summit has been on notice of what information Intervenor Landowner's seek. It cannot credibly claim lack of notice now.

[¶14] Summit's argument regarding notice to Minnkota is also unfounded. Indeed, counsel for Minnkota communicated that it did have notice. Ex. 11.

### B. The Notice Is Reasonably Particular

[¶15] Summit also contends that the deposition notices are insufficient due to a lack of specificity concerning the matters of questioning, but even a cursory review of the notices demonstrates this argument is without merit.

[¶16] The topics of questioning span more than two pages, single spaced. They start with the category of Summit's application which is then finely narrowed to specific models and data, including but not limited to the following:

1. The data and interpretations and inputs for the geologic model created with SLB's Petrel software (Schlumberger, 2020).
2. The data and inputs and model referred to in Section 3.1 of the applications as follows:

a. "The geologic model and properties served as inputs for numerical simulations of CO2 injection using Computer Modelling Group Ltd.'s (CMG's) GEM software (Computer Modelling Group Ltd., 2021). Numerical simulations of CO2 injection were conducted to assess potential CO2 injection rate, disposition of injected CO2, wellhead pressure (WHP), bottomhole pressure (BHP), and pressure changes in the storage reservoir throughout the expected injection time frame and postinjection period. Results of the numerical simulations were then used to determine the project's area of review (AOR) pursuant to North Dakota's geologic CO2 storage regulations."

3. United States Geological Survey's PHREEQC geochemical model and both the data files and data inputs used to run this model and bases for using the chosen inputs.
4. The data and load files and data decks for the SLB Petrel model that was run for Summit's applications.
5. Computer Modelling Group Ltd.'s GEM model and both the data files and data inputs used to run this model and bases for using the chosen inputs.
6. 3D numerical reservoir simulation model data decks, output files and graphing files of the Storage Reservoir in original electronic format. Without limiting the foregoing, such files may commonly be stored in Schlumberger SEclipse format, CMG (Canadian Modeling Group) Imex format, or other similar format.
7. Input files, field and analytical data, and the model geochemical database (and the sources of the foregoing) used to run any modelling or analysis of critical threshold pressures or areal extent of review or impact and pressure buildup, or which was used to do any kind of analysis related to EPA Method 1 or EPA Method 2 or Analytical Solution for Leakage in Multilayered Aquifers – ASLMA, or any risk-based area-of-review analysis.

Exs. 1, 2, 4, 5, 6.

[¶17] The level of specificity required under Rule 30(b)(6) is "reasonable particularity." N.D.R.Civ.P. 30(b)(6). If the above level of detail is insufficient for Summit to be apprised of what information the Intervenor Landowners are requesting, it is difficult to imagine what would be sufficient.

## III. CONCLUSION

[¶18] Intervenor Landowners have been trying to work with Summit to schedule a 30(b)(6) deposition regarding its application for six weeks. As parties, they deserve to have information prior to the hearing—the hearing at which decisions will be made that greatly affect their property

rights. The Commission should not reward Summit's refusal to engage in good faith and its gamesmanship of the discovery rules. Rather, the Commission should see Summit's tactics for what they are and grant Intervenor Landowner's motion.

DATED this 10th day of June, 2024.

**BRAATEN LAW FIRM**

*/s/ Derrick Braaten*

Derrick Braaten (ND #06394)
109 North 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
derrick@braatenlawfirm.com

*Attorneys for Intervenors the Swenson Living Trust, Bauman, Gerving, Haupt, Jochim, Kraft, Liebelt, Maize, Metz, Rust, and Smith*

**NORTH DAKOTA INDUSTRIAL COMMISSION**

**OIL AND GAS DIVISION**

**In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**Case No(s). 30869**
**30870**
**30871**
**30872**
**30873**
**30874**
**30875**
**30876**
**30877**
**30878**
**30879**
**30880**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## DECLARATION OF DERRICK BRAATEN IN SUPPORT OF MOTION TO COMPEL

1. I am an attorney for the Intervenor Landowners ("Landowners"), in the above-captioned matter.
2. I represent the Lanodowners in matters involving the applications submitted by Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, and Summit Carbon Storage #3, LLC ("SCS").
3. Attached hereto as Exhibit 1 is a true and correct copy of Landowners Notice of 30(b)(6) Deposition of Summit Carbon Solutions which was served on May 9, 2024.
4. Attached hereto as Exhibit 2 is a true and correct copy of Intervenor Landowners' Amended Notice of 30(b)(6) Deposition of Summit Carbon Solutions which was served on May 31, 2024. None of the substance of the topics had changed when the amended notice was issued.
5. Attached hereto as Exhibit 3 is a true and correct copy of Letter from Lawrence Bender regarding the Amended Notice of Deposition dated June 4, 2024.
6. Attached hereto as Exhibit 4 is a true and correct copy of Intervenor Landowners' Second Amended Notice of 30(b)(6) Deposition of Summit Carbon Storage #1, LLC which was served on June 4, 2024. None of the substance of the topics had changed when the second amended notice was issued.
7. Attached hereto as Exhibit 5 is a true and correct copy of Intervenor Landowners' Second Amended Notice of 30(b)(6) Deposition of Summit Carbon Storage #2, LLC

which was served on June 4, 2024. None of the substance of the topics had changed when the second amended notice was issued.

8. Attached hereto as Exhibit 6 is a true and correct copy of Intervenor Landowners' Second Amended Notice of 30(b)(6) Deposition of Summit Carbon Storage #3, LLC which was served on June 4, 2024. None of the substance of the topics had changed when the second amended notice was issued.
9. Attached hereto as Exhibit 7 is a true and correct copy of Letter from Lawrence Bender dated June 5, 2024 which was received at 5:55 PM CT, the day before the deposition and less than 24 hours before the start of the deposition.
10. Attached hereto as Exhibit 8 is a true and correct copy of my email response on June 5, 2024 to Mr. Bender's email response.
11. Attached hereto as Exhibit 9 is a true and correct copy of letter dated May 2, 2024 asking to confer regarding a 30(b)(6) deposition.
12. Attached hereto as Exhibit 10 is a true and correct copy of email correspondence dated May 9, 2024 regarding willingness to confer on a date for the 30(b)(6) deposition.
13. Attached hereto as Exhibit 11 is a true and correct copy of the Native Outlook Email regarding Exhibit 8 above indicating my response to Mr. Bender's letter on June 5, 2024 was sent June 5, 2024 at 7:39 PM CT.
14. Attached hereto as Exhibit 12 is a true and correct copy of the Transcript of Proceedings regarding the nonappearance deposition of Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC.

**I declare under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.**

Executed this 10th day of June, 2024 in Bismarck, North Dakota.

**Derrick Braaten**

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case No(s). 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**



30(b)(6) Deposition of Summit Carbon Storage #1, #2, #3, LLC06-06-2024
EXHIBIT
001
30869-30880

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**LANDOWNERS NOTICE OF 30(b)(6) DEPOSITION OF SUMMIT CARBON SOLUTIONS**

**TO:** Summit Carbon Solutions, by and through its attorney, Lawrence Bender, Fredrickson & Byron, P.A., 1133 College Drive, Suite 1000, Bismarck, North Dakota, 58501:

[¶1] PLEASE TAKE NOTICE that, pursuant to N.D.C.C. § 28-32-33 and Rule 30(b)(6) of the North Dakota Rules of Civil Procedure, Intervenor The Swenson Living Trust ("Landowners" or "Swenson Trust") will take the deposition upon oral examination of Summit Carbon Solutions ("SCS" or "$CO_2$ injector") through one or more of its officers, directors, managing agents, or other representatives who shall be designated to testify on the $CO_2$ injector's behalf regarding all information known or reasonably available to the $CO_2$ injector with respect to the subject matters identified in Exhibit A.

[¶2] The deposition shall commence on June 6, 2024 at 9:00 a.m. (Central Time), and continue thereafter until complete, at the offices of Braaten Law Firm, 100 N. 4th St., Ste. 100, Bismarck, North Dakota 58501. The deposition shall be conducted before a court reporter, or other officer authorized by law to administer oaths, and shall be recorded by stenographic means and supplementally recorded by video. The deposition will be taken for the purposes of discovery, for use at hearings, or for other purposes as permitted under the North Dakota Rules of Civil Procedure and N.D.C.C. ch. 28-32.

Dated this 9th day of May, 2024.

**BRAATEN LAW FIRM**

*/s/ Derrick Braaten*

Derrick Braaten (ND #06394)
109 North 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
derrick@braatenlawfirm.com

*Attorneys for Intervenor*
*The Swenson Living Trust*

**EXHIBIT A TO NOTICE OF DEPOSITION OF SUMMIT CARBON SOLUTIONS**

**DEFINITIONS**

As used in this Notice, the following terms shall have the meanings and definitions as indicated:

1. "SCS" or "Summit" means the applicants in NDIC Case Nos. 30869, 30870, 30871, 30872 (for "Summit Carbon Storage #1, LLC,"); 30873, 30874, 30875, 30876 (for "Summit Carbon Storage #2,") and 30877, 30878, 30879, 30880 (for "Summit Carbon Storage #3, LLC,"). and each of those entities' authorized agents.

2. "Landowner" means The Swenson Living Trust.

3. "Storage Reservoir" means the reservoir and formation into which Summit intends to inject CO2 and the confining zones within the Areas of Review, as defined and depicted by Summit's applications herein (*see e.g.* Figure 1-1, NDIC Case No. 30869) including but not limited to the Storage Reservoir as defined by Section 1.15 of the Storage Agreement included with Summit's applications in NDIC Case No. 30869, and includes the confining layers/zones, to wit:

> the Pore Space and confining subsurface strata underlying the Facility Area described as the Opeche/Spearfish (Upper Confining Zone), Broom Creek (Injection Zone), and Amsden (Lower Confining Zone) Formation(s) and which are defined as identified by the well logging suite performed at one stratigraphic well, the Milton Flemmer 1 well (NDIC File No. 38594) located in the NW¼ of the NE¼, Section 35, Township 141 North, Range 88 West, Mercer County, North Dakota. The Storage Reservoir is defined as the stratigraphic interval from below the top of the Opeche/Spearfish Formation found at a depth of 5,587 feet below the Kelly Bushing, to above the base of the Amsden Formation, found at a depth of 6,421 feet below the Kelly Bushing, as identified by the Array Induction Gamma log run in the Milton Flemmer 1 well. The logging suite included triple combo (gamma ray [GR], density porosity, and resistivity), caliper, spectral GR, combinable magnetic resonance (CMR), elemental capture spectroscopy (ESC), dipole sonic including four-arm caliper and inclinometer, and an image log. Further, the acquired logs were used to pick formation top depths and interpret lithology, petrophysical properties, and time-to-depth shifting of seismic data obtained from three 3D seismic surveys and one 5-mile long 2D seismic line covering an area totaling 208 miles in and around the Milton Flemmer 1 stratigraphic well. Formation top depths

were picked from the top of the Pierre Formation to the base of the Amsden Formation. The average depth of the top of the Opeche/Spearfish Formation (Upper Confining Zone) across the storage facility area is 5,464 total vertical depth (TVD). The average depth of the base of the Amsden Formation (Lower Confining Summit Carbon Storage #1, LLC – Broom Creek 5 Zone) across the storage facility area is 6,270 feet TVD. The average thickness of the Storage Reservoir across the storage facility area is 806 feet.

4. "Communication" means any oral or written utterance, notation, or statement of any nature, by and to whomever, including, but not limited to, correspondence, text messages, chat messages, emails, letters, and any other oral or written conversations, dialogues, discussions, interviews, or consultations, between or among two or more persons.

5. "Document" means all documents or electronically stored information discoverable under N.D.R.Civ.P. 34 - including writings, drawings, graphs, charts, photographs, sound recordings, images, and other data or data compilations - stored in any medium from which information can be obtained either directly or, if necessary, after translation by you into a reasonably usable form. Documents and electronically stored information encompasses and includes all file formats in which electronically stored information is or can be stored or saved, and always includes the native file format if one exists.

6. "ESI" or "electronically stored information" means all electronically stored information discoverable under N.D.R.Civ.P. 34 - including writings, databases, shapefiles, electronic or computer files, graphs, charts, photographs, sound recordings, images, and other data or data compilations - stored in any medium from which information can be obtained either directly or, if necessary, after translation by you into a reasonably usable form. ESI encompasses and includes all file formats in which electronically stored information is or can be stored or saved, and always includes the native file format if one exists.

7. "Identification," "identify," or "identity," when used in reference to (a) a natural person, requires you to state his or her full name and residential and business addresses; (b) a corporation, requires you to state its full corporate name and any names under which it does business, its state of incorporation, the address of its principal place of business, and the addresses of all of its offices in the State of North Dakota; (c) a business, requires you to state the full name or style under which the business is conducted, its business address or addresses, the types of businesses in which it is engaged, the geographic area in which it conducts those businesses, and the identity of the person or persons who own, operate, and control the business; (d) a document, requires you to state the number of pages and the nature of the document (e.g., letter or memorandum), and if not apparent on the face of the document or ESI, its title, its date, the name or names of its authors and recipients, and its present location and custodian; (e) a communication, requires you, if any part of the communication was written, to identify the document or documents which refer to or evidence the communication, and, to the extent that the communication was non-written, to identify the persons participating in the communication and to state the date, manner, place, and substance of the communication.

8. "Person" means any individual acting in any capacity as well as any entity or organization, including divisions, departments, and other units of the organization, and shall include such organizations as public or private corporations, partnerships, joint ventures, voluntary or unincorporated associations, sole proprietorships, trusts, estates, governmental agencies, commissions, bureaus, or departments.

9. "Representative" means any agent, employee, servant, officer, director, attorney, or other person acting or purporting to act on behalf of the person in question.

10. "You," "your," or "yourself" refer to "SCS" or "Summit", and each of its authorized agents.

## TOPICS FOR EXAMINATION

In accordance with N.D.R.Civ.P. 30(b)(6), The Swenson Living Trust designates the following topics and matters for examination.

I. Summit's applications and the information contained in and created or submitted in support of the applications and conclusions drawn therefrom in NDIC Case Nos. 30869, 30870, 30871, 30872 (for "Summit Carbon Storage #1, LLC,"); 30873, 30874, 30875, 30876 (for "Summit Carbon Storage #2,") and 30877, 30878, 30879, 30880 (for "Summit Carbon Storage #3, LLC,") (all applications hereafter referred to collectively as "Summit's applications").
   a. Summit's applications include all documents submitted to the North Dakota Industrial Commission including its Department of Mineral Resources and its Oil and Gas Division (collectively "NDIC") as part of or in support of or in relation to Summit's applications, and all correspondence between Summit and NDIC whether in writing and whether electronic or physical, and whether written or oral. This topic and the scope of Summit's applications as used herein includes all data files, spreadsheets, databases, and models (including loading files necessary to make data files useable with any model) and all of the information, data, documents, calculations, and non-attorney work product that was created in support of Summit's applications or which was necessary to create or is materially supportive of Summit's applications.
      i. Without limiting the generality of the foregoing, this topic includes the following models and associated data:
         1. The data and interpretations and inputs for the geologic model created with SLB's Petrel software (Schlumberger, 2020).
         2. The data and inputs and model referred to in Section 3.1 of the applications as follows:
            a. "The geologic model and properties served as inputs for numerical simulations of CO2 injection using Computer Modelling Group Ltd.'s (CMG's) GEM software (Computer Modelling Group Ltd., 2021). Numerical simulations of CO2 injection were conducted to assess potential CO2 injection rate, disposition of injected CO2, wellhead pressure (WHP), bottomhole pressure (BHP), and pressure changes in the storage reservoir throughout the expected injection time frame and postinjection period. Results of the numerical simulations were then used to determine the

project's area of review (AOR) pursuant to North Dakota's geologic CO2 storage regulations."

3. United States Geological Survey's PHREEQC geochemical model and both the data files and data inputs used to run this model and bases for using the chosen inputs.
4. The data and load files and data decks for the SLB Petrel model that was run for Summit's applications.
5. Computer Modelling Group Ltd.'s GEM model and both the data files and data inputs used to run this model and bases for using the chosen inputs.
6. 3D numerical reservoir simulation model data decks, output files and graphing files of the Storage Reservoir in original electronic format. Without limiting the foregoing, such files may commonly be stored in Schlumberger SEclipse format, CMG (Canadian Modeling Group) Imex format, or other similar format.
7. Input files, field and analytical data, and the model geochemical database (and the sources of the foregoing) used to run any modelling or analysis of critical threshold pressures or areal extent of review or impact and pressure buildup, or which was used to do any kind of analysis related to EPA Method 1 or EPA Method 2 or Analytical Solution for Leakage in Multilayered Aquifers – ASLMA, or any risk-based area-of-review analysis.

ii. These models also include the conclusions drawn from the models and the data inputs used, particularly as those conclusions were used to support Summit's applications as referenced in these topics.

iii. The identity of the person most familiar with the workflows described in Section 3.2.3 of Summit's application in NDIC Case No. 30869 and how it was performed for purposes of Summit's applications and the identity of the person who wrote this passage.

iv. The meaning and context and details of how the various processes and functions described in Section 3.2.3 of Summit's applications and how they were actually performed and the models and calculations used to support them.

b. The factual documentation and information that might support or that Summit will use to support a finding "[t]hat the storage operator has obtained the consent of persons who own at least sixty percent of the storage reservoir's pore space" as required by N.D.C.C. § 38-22-08(5).

c. The factual documentation and information that might support or that Summit will use to support any finding in this proceeding "[t]hat the proposed storage facility will not adversely affect surface waters or formations containing fresh water" as is stated at N.D.C.C. § 38-22-08(7).

d. The factual documentation and information that might support or that Summit will use to support any finding in this proceeding that "[t]hat the storage facility will not

endanger human health nor unduly endanger the environment" as is stated at N.D.C.C. § 38-22-08(10).

e. The factual documentation and information that might support or that Summit will use to support any finding in this proceeding "[t]hat the horizontal and vertical boundaries of the storage reservoir are defined [and] include buffer areas to ensure that the storage facility is operated safely and as contemplated" as is stated at N.D.C.C. § 38-22-08(12).
f. The factual documentation and information related to or that might support or that Summit will use to support any finding in this proceeding that "all nonconsenting pore space owners are or will be equitably compensated" as that phrase is used in N.D.C.C. § 38-22-08(14) and any documentation, information, data sets, comparable sales, comparable transactions, appraisals, market reports, financial reports, or other documents related to or referencing compensation paid to nonconsenting pore space owners.
    i. This subtopic I.b. includes all amounts paid by Summit to any individual or entity for use of or damages to pore space or property rights associated with or related to its storage facility that is the subject of Summit's application and the Storage Reservoir, and all agreements for such use or damages or payments.
    ii. This subtopic I.b. includes all reports and agreements in Summit's possession indicating any amount of compensation paid for any kind of use of or damage to pore space or property for CO2 sequestration. If Summit has in its possession any agreement with any property owner for use of property or damage to property arising from use of pore space or property for storage or sequestration of CO2 it is included in this topic.

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case No(s). 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**



30(b)(6) Deposition of Summit Carbon Storage #1, #2, #3, LLC06-06-2024
EXHIBIT
002
30869-30880

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**INTERVENOR LANDOWNERS' AMENDED NOTICE OF 30(b)(6) DEPOSITION OF SUMMIT CARBON SOLUTIONS**

**TO:** Summit Carbon Solutions, by and through its attorney, Lawrence Bender, Fredrickson & Byron, P.A., 1133 College Drive, Suite 1000, Bismarck, North Dakota, 58501:

[¶1] PLEASE TAKE NOTICE that, pursuant to N.D.C.C. § 28-32-33 and Rule 30(b)(6) of the North Dakota Rules of Civil Procedure, Intervenors Landowners the Swenson Living Trust, Michael Bauman, Glenn and Lisa Gerving, Michael and Bonnie Haupt, John Jochim, Kevin and Kimberly Kraft, Charmayne Liebelt, Kirk and Linda Maize and Allen Maize, Paul and Christy Metz, JoLene M. Rust, and Gary and Cassie Smith ("Landowners") will take the deposition upon oral examination of Summit Carbon Solutions ("SCS" or "$CO_2$ injector") through one or more of its officers, directors, managing agents, or other representatives who shall be designated to testify on the $CO_2$ injector's behalf regarding all information known or reasonably available to the $CO_2$ injector with respect to the subject matters identified in Exhibit A.

[¶2] The deposition shall commence on June 6, 2024 at 9:00 a.m. (Central Time), and continue thereafter until complete, at the offices of Braaten Law Firm, 100 N. 4th St., Ste. 100, Bismarck, North Dakota 58501. The deposition shall be conducted before a court reporter, or other officer authorized by law to administer oaths, and shall be recorded by stenographic means and supplementally recorded by video. The deposition will be taken for the purposes of discovery, for use at hearings, or for other purposes as permitted under the North Dakota Rules of Civil Procedure and N.D.C.C. ch. 28-32.

Dated this 31st day of May, 2024.

**BRAATEN LAW FIRM**

*/s/ Derrick Braaten*

Derrick Braaten (ND #06394)
109 North 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
derrick@braatenlawfirm.com

*Attorneys for Intervenors the Swenson Living Trust, Bauman, Gerving, Haupt, Jochim, Kraft, Liebelt, Maize, Metz, Rust, and Smith*

**EXHIBIT A TO NOTICE OF DEPOSITION OF SUMMIT CARBON SOLUTIONS**

**DEFINITIONS**

As used in this Notice, the following terms shall have the meanings and definitions as indicated:

1. "SCS" or "Summit" means the applicants in NDIC Case Nos. 30869, 30870, 30871, 30872 (for "Summit Carbon Storage #1, LLC,"); 30873, 30874, 30875, 30876 (for "Summit Carbon Storage #2,") and 30877, 30878, 30879, 30880 (for "Summit Carbon Storage #3, LLC,"). and each of those entities' authorized agents.

2. "Landowners" means The Swenson Living Trust, Michael Bauman, Glenn and Lisa Gerving, Michael and Bonnie Haupt, John Jochim, Kevin and Kimberly Kraft, Charmayne Liebelt, Kirk and Linda Maize and Allen Maize, Paul and Christy Metz, JoLene M. Rust, and Gary and Cassie Smith.

3. "Storage Reservoir" means the reservoir and formation into which Summit intends to inject CO2 and the confining zones within the Areas of Review, as defined and depicted by Summit's applications herein (*see e.g.* Figure 1-1, NDIC Case No. 30869) including but not limited to the Storage Reservoir as defined by Section 1.15 of the Storage Agreement included with Summit's applications in NDIC Case No. 30869, and <u>includes</u> the confining layers/zones, to wit:

> the Pore Space and confining subsurface strata underlying the Facility Area described as the Opeche/Spearfish (Upper Confining Zone), Broom Creek (Injection Zone), and Amsden (Lower Confining Zone) Formation(s) and which are defined as identified by the well logging suite performed at one stratigraphic well, the Milton Flemmer 1 well (NDIC File No. 38594) located in the NW¼ of the NE¼, Section 35, Township 141 North, Range 88 West, Mercer County, North Dakota. The Storage Reservoir is defined as the stratigraphic interval from below the top of the Opeche/Spearfish Formation found at a depth of 5,587 feet below the Kelly Bushing, to above the base of the Amsden Formation, found at a depth of 6,421 feet below the Kelly Bushing, as identified by the Array Induction Gamma log run in the Milton Flemmer 1 well. The logging suite included triple combo (gamma ray [GR], density porosity, and resistivity), caliper, spectral GR, combinable magnetic

resonance (CMR), elemental capture spectroscopy (ESC), dipole sonic including four-arm caliper and inclinometer, and an image log. Further, the acquired logs were used to pick formation top depths and interpret lithology, petrophysical properties, and time-to-depth shifting of seismic data obtained from three 3D seismic surveys and one 5-mile long 2D seismic line covering an area totaling 208 miles in and around the Milton Flemmer 1 stratigraphic well. Formation top depths were picked from the top of the Pierre Formation to the base of the Amsden Formation. The average depth of the top of the Opeche/Spearfish Formation (Upper Confining Zone) across the storage facility area is 5,464 total vertical depth (TVD). The average depth of the base of the Amsden Formation (Lower Confining Summit Carbon Storage #1, LLC – Broom Creek 5 Zone) across the storage facility area is 6,270 feet TVD. The average thickness of the Storage Reservoir across the storage facility area is 806 feet.

4. "Communication" means any oral or written utterance, notation, or statement of any nature, by and to whomever, including, but not limited to, correspondence, text messages, chat messages, emails, letters, and any other oral or written conversations, dialogues, discussions, interviews, or consultations, between or among two or more persons.

5. "Document" means all documents or electronically stored information discoverable under N.D.R.Civ.P. 34 - including writings, drawings, graphs, charts, photographs, sound recordings, images, and other data or data compilations - stored in any medium from which information can be obtained either directly or, if necessary, after translation by you into a reasonably usable form. Documents and electronically stored information encompasses and includes all file formats in which electronically stored information is or can be stored or saved, and always includes the native file format if one exists.

6. "ESI" or "electronically stored information" means all electronically stored information discoverable under N.D.R.Civ.P. 34 - including writings, databases, shapefiles, electronic or computer files, graphs, charts, photographs, sound recordings, images, and other data or data compilations - stored in any medium from which information can be obtained either directly or, if necessary, after translation by you into a reasonably usable form. ESI encompasses and

includes all file formats in which electronically stored information is or can be stored or saved, and always includes the native file format if one exists.

7. "Identification," "identify," or "identity," when used in reference to (a) a natural person, requires you to state his or her full name and residential and business addresses; (b) a corporation, requires you to state its full corporate name and any names under which it does business, its state of incorporation, the address of its principal place of business, and the addresses of all of its offices in the State of North Dakota; (c) a business, requires you to state the full name or style under which the business is conducted, its business address or addresses, the types of businesses in which it is engaged, the geographic area in which it conducts those businesses, and the identity of the person or persons who own, operate, and control the business; (d) a document, requires you to state the number of pages and the nature of the document (e.g., letter or memorandum), and if not apparent on the face of the document or ESI, its title, its date, the name or names of its authors and recipients, and its present location and custodian; (e) a communication, requires you, if any part of the communication was written, to identify the document or documents which refer to or evidence the communication, and, to the extent that the communication was non-written, to identify the persons participating in the communication and to state the date, manner, place, and substance of the communication.

8. "Person" means any individual acting in any capacity as well as any entity or organization, including divisions, departments, and other units of the organization, and shall include such organizations as public or private corporations, partnerships, joint ventures, voluntary or unincorporated associations, sole proprietorships, trusts, estates, governmental agencies, commissions, bureaus, or departments.

9. "Representative" means any agent, employee, servant, officer, director, attorney, or other person acting or purporting to act on behalf of the person in question.

10. "You," "your," or "yourself" refer to "SCS" or "Summit", and each of its authorized agents.

## TOPICS FOR EXAMINATION

In accordance with N.D.R.Civ.P. 30(b)(6), Landowners designate the following topics and matters for examination.

I. Summit's applications and the information contained in and created or submitted in support of the applications and conclusions drawn therefrom in NDIC Case Nos. 30869, 30870, 30871, 30872 (for "Summit Carbon Storage #1, LLC,"); 30873, 30874, 30875, 30876 (for "Summit Carbon Storage #2,") and 30877, 30878, 30879, 30880 (for "Summit Carbon Storage #3, LLC,") (all applications hereafter referred to collectively as "Summit's applications").
   a. Summit's applications include all documents submitted to the North Dakota Industrial Commission including its Department of Mineral Resources and its Oil and Gas Division (collectively "NDIC") as part of or in support of or in relation to Summit's applications, and all correspondence between Summit and NDIC whether in writing and whether electronic or physical, and whether written or oral. This topic and the scope of Summit's applications as used herein includes all data files, spreadsheets, databases, and models (including loading files necessary to make data files useable with any model) and all of the information, data, documents, calculations, and non-attorney work product that was created in support of Summit's applications or which was necessary to create or is materially supportive of Summit's applications.
      i. Without limiting the generality of the foregoing, this topic includes the following models and associated data:
         1. The data and interpretations and inputs for the geologic model created with SLB's Petrel software (Schlumberger, 2020).
         2. The data and inputs and model referred to in Section 3.1 of the applications as follows:
            a. "The geologic model and properties served as inputs for numerical simulations of CO2 injection using Computer Modelling Group Ltd.'s (CMG's) GEM software (Computer Modelling Group Ltd., 2021). Numerical simulations of CO2 injection were conducted to assess potential CO2 injection rate, disposition of injected CO2, wellhead pressure (WHP), bottomhole pressure (BHP), and pressure

changes in the storage reservoir throughout the expected injection time frame and postinjection period. Results of the numerical simulations were then used to determine the project's area of review (AOR) pursuant to North Dakota's geologic CO2 storage regulations."

3. United States Geological Survey's PHREEQC geochemical model and both the data files and data inputs used to run this model and bases for using the chosen inputs.
4. The data and load files and data decks for the SLB Petrel model that was run for Summit's applications.
5. Computer Modelling Group Ltd.'s GEM model and both the data files and data inputs used to run this model and bases for using the chosen inputs.
6. 3D numerical reservoir simulation model data decks, output files and graphing files of the Storage Reservoir in original electronic format. Without limiting the foregoing, such files may commonly be stored in Schlumberger SEclipse format, CMG (Canadian Modeling Group) Imex format, or other similar format.
7. Input files, field and analytical data, and the model geochemical database (and the sources of the foregoing) used to run any modelling or analysis of critical threshold pressures or areal extent of review or impact and pressure buildup, or which was used to do any kind of analysis related to EPA Method 1 or EPA Method 2 or Analytical Solution for Leakage in Multilayered Aquifers – ASLMA, or any risk-based area-of-review analysis.

ii. These models also include the conclusions drawn from the models and the data inputs used, particularly as those conclusions were used to support Summit's applications as referenced in these topics.

iii. The identity of the person most familiar with the workflows described in Section 3.2.3 of Summit's application in NDIC Case No. 30869 and how it was performed for purposes of Summit's applications and the identity of the person who wrote this passage.

iv. The meaning and context and details of how the various processes and functions described in Section 3.2.3 of Summit's applications and how they were actually performed and the models and calculations used to support them.

b. The factual documentation and information that might support or that Summit will use to support a finding "[t]hat the storage operator has obtained the consent of persons who own at least sixty percent of the storage reservoir's pore space" as required by N.D.C.C. § 38-22-08(5).

c. The factual documentation and information that might support or that Summit will use to support any finding in this proceeding "[t]hat the proposed storage facility

will not adversely affect surface waters or formations containing fresh water" as is stated at N.D.C.C. § 38-22-08(7).

d. The factual documentation and information that might support or that Summit will use to support any finding in this proceeding that "[t]hat the storage facility will not endanger human health nor unduly endanger the environment" as is stated at N.D.C.C. § 38-22-08(10).
e. The factual documentation and information that might support or that Summit will use to support any finding in this proceeding "[t]hat the horizontal and vertical boundaries of the storage reservoir are defined [and] include buffer areas to ensure that the storage facility is operated safely and as contemplated" as is stated at N.D.C.C. § 38-22-08(12).
f. The factual documentation and information related to or that might support or that Summit will use to support any finding in this proceeding that "all nonconsenting pore space owners are or will be equitably compensated" as that phrase is used in N.D.C.C. § 38-22-08(14) and any documentation, information, data sets, comparable sales, comparable transactions, appraisals, market reports, financial reports, or other documents related to or referencing compensation paid to nonconsenting pore space owners.
    i. This subtopic I.b. includes all amounts paid by Summit to any individual or entity for use of or damages to pore space or property rights associated with or related to its storage facility that is the subject of Summit's application and the Storage Reservoir, and all agreements for such use or damages or payments.
    ii. This subtopic I.b. includes all reports and agreements in Summit's possession indicating any amount of compensation paid for any kind of use of or damage to pore space or property for CO2 sequestration. If Summit has in its possession any agreement with any property owner for use of property or damage to property arising from use of pore space or property for storage or sequestration of CO2 it is included in this topic.

Fredrikson

**Fredrikson & Byron, P.A.**
Attorneys and Advisors

304 East Front Avenue, Suite 400
Bismarck, ND 58504-5639
Main: 701.221.8700
fredlaw.com

June 4, 2024

***VIA E-MAIL***

Derrick L. Braaten
Braaten Law Firm
109 N. Fourth St., Ste. 100
Bismarck, ND 58501-4003

derrick@braatenlawfirm.com

**RE: NDIC Case Nos. 30869–30880**

Dear Derrick:

This letter concerns the Intervenor Landowners' Amended Notice of 30(b)(6) Deposition of Summit Carbon Solutions in NDIC Case Nos. 30869–30880, which I received via e-mail last Friday afternoon, May 31, 2024.

Summit Carbon Solutions, LLC is not a party to NDIC Case Nos. 30869–30880. "A non-party deponent's attendance may be compelled by subpoena under Rule 45." N.D.R.Civ.P. 30(a)(1). As a result, a notice of deposition alone is not sufficient to compel the attendance of Summit Carbon Solutions, LLC at a deposition. *See, e.g.*, N.D.R.Civ.P. 30(g)(2).

The notice we received is directed to "Summit Carbon Solutions" and gives no indication that a subpoena has been or will be served on Summit Carbon Solutions, LLC. Instead, the Intervenor Landowners' Amended Notice of 30(b)(6) Deposition of Summit Carbon Solutions appears to assume that Summit Carbon Solutions, LLC is a party to NDIC Case Nos. 30869–30880 and that a subpoena is unnecessary. If that is the case, please be advised the notice is ineffective.

Thank you for your attention to this matter. Should you have any questions, please advise.

Sincerely,

LAWRENCE BENDER

LB/sdp
#82687405v1

cc: Summit Carbon Solutions, LLC

30(b)(6) Deposition of Summit Carbon Storage #1, #2, #3, LLC06-06-2024
EXHIBIT
003
30869-30880

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case No(s). 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**



30(b)(6) Deposition of Summit Carbon Storage #1, #2, #3, LLC06-06-2024
EXHIBIT
004
30869-30880

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**INTERVENOR LANDOWNERS' SECOND AMENDED NOTICE OF 30(b)(6) DEPOSITION OF SUMMIT CARBON STORAGE #1, LLC**

**TO:** Summit Carbon Storage #1, LLC, by and through its attorney, Lawrence Bender, Fredrickson & Byron, P.A., 304 East Front Avenue, Suite 400, Bismarck, North Dakota, 58504:

[¶1] PLEASE TAKE NOTICE that, pursuant to N.D.C.C. § 28-32-33 and Rule 30(b)(6) of the North Dakota Rules of Civil Procedure, Intervenors Landowners the Swenson Living Trust, Michael Bauman, Glenn and Lisa Gerving, Michael and Bonnie Haupt, John Jochim, Kevin and Kimberly Kraft, Charmayne Liebelt, Kirk and Linda Maize and Allen Maize, Paul and Christy Metz, JoLene M. Rust, and Gary and Cassie Smith ("Landowners") will take the deposition upon oral examination of Summit Carbon Storage #1, LLC ("SCS" or "$CO_2$ injector") through one or more of its officers, directors, managing agents, or other representatives who shall be designated to testify on the $CO_2$ injector's behalf regarding all information known or reasonably available to the $CO_2$ injector with respect to the subject matters identified in Exhibit A.

[¶2] The deposition shall commence on June 6, 2024 at 9:00 a.m. (Central Time), and continue thereafter until complete, at the offices of Braaten Law Firm, 100 N. 4th St., Ste. 100, Bismarck, North Dakota 58501. The deposition shall be conducted before a court reporter, or other officer authorized by law to administer oaths, and shall be recorded by stenographic means and supplementally recorded by video. The deposition will be taken for the purposes of discovery, for use at hearings, or for other purposes as permitted under the North Dakota Rules of Civil Procedure and N.D.C.C. ch. 28-32.

Dated this 4th day of June, 2024.

**BRAATEN LAW FIRM**

*/s/ Derrick Braaten*

Derrick Braaten (ND #06394)
109 North 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
derrick@braatenlawfirm.com

*Attorneys for Intervenors the Swenson Living Trust, Bauman, Gerving, Haupt, Jochim, Kraft, Liebelt, Maize, Metz, Rust, and Smith*

**EXHIBIT A TO NOTICE OF DEPOSITION OF SUMMIT CARBON STORAGE #1, LLC**

**DEFINITIONS**

As used in this Notice, the following terms shall have the meanings and definitions as indicated:

1. "SCS" or "Summit" means the applicants in NDIC Case Nos. 30869, 30870, 30871, 30872 (for "Summit Carbon Storage #1, LLC,"); 30873, 30874, 30875, 30876 (for "Summit Carbon Storage #2,") and 30877, 30878, 30879, 30880 (for "Summit Carbon Storage #3, LLC,"). and each of those entities' authorized agents.

2. "Landowners" means The Swenson Living Trust, Michael Bauman, Glenn and Lisa Gerving, Michael and Bonnie Haupt, John Jochim, Kevin and Kimberly Kraft, Charmayne Liebelt, Kirk and Linda Maize and Allen Maize, Paul and Christy Metz, JoLene M. Rust, and Gary and Cassie Smith.

3. "Storage Reservoir" means the reservoir and formation into which Summit intends to inject CO2 and the confining zones within the Areas of Review, as defined and depicted by Summit's applications herein (*see e.g.* Figure 1-1, NDIC Case No. 30869) including but not limited to the Storage Reservoir as defined by Section 1.15 of the Storage Agreement included with Summit's applications in NDIC Case No. 30869, and <u>includes</u> the confining layers/zones, to wit:

> the Pore Space and confining subsurface strata underlying the Facility Area described as the Opeche/Spearfish (Upper Confining Zone), Broom Creek (Injection Zone), and Amsden (Lower Confining Zone) Formation(s) and which are defined as identified by the well logging suite performed at one stratigraphic well, the Milton Flemmer 1 well (NDIC File No. 38594) located in the NW¼ of the NE¼, Section 35, Township 141 North, Range 88 West, Mercer County, North Dakota. The Storage Reservoir is defined as the stratigraphic interval from below the top of the Opeche/Spearfish Formation found at a depth of 5,587 feet below the Kelly Bushing, to above the base of the Amsden Formation, found at a depth of 6,421 feet below the Kelly Bushing, as identified by the Array Induction Gamma log run in the Milton Flemmer 1 well. The logging suite included triple combo (gamma ray [GR], density porosity, and resistivity), caliper, spectral GR, combinable magnetic

resonance (CMR), elemental capture spectroscopy (ESC), dipole sonic including four-arm caliper and inclinometer, and an image log. Further, the acquired logs were used to pick formation top depths and interpret lithology, petrophysical properties, and time-to-depth shifting of seismic data obtained from three 3D seismic surveys and one 5-mile long 2D seismic line covering an area totaling 208 miles in and around the Milton Flemmer 1 stratigraphic well. Formation top depths were picked from the top of the Pierre Formation to the base of the Amsden Formation. The average depth of the top of the Opeche/Spearfish Formation (Upper Confining Zone) across the storage facility area is 5,464 total vertical depth (TVD). The average depth of the base of the Amsden Formation (Lower Confining Summit Carbon Storage #1, LLC – Broom Creek 5 Zone) across the storage facility area is 6,270 feet TVD. The average thickness of the Storage Reservoir across the storage facility area is 806 feet.

4. "Communication" means any oral or written utterance, notation, or statement of any nature, by and to whomever, including, but not limited to, correspondence, text messages, chat messages, emails, letters, and any other oral or written conversations, dialogues, discussions, interviews, or consultations, between or among two or more persons.

5. "Document" means all documents or electronically stored information discoverable under N.D.R.Civ.P. 34 - including writings, drawings, graphs, charts, photographs, sound recordings, images, and other data or data compilations - stored in any medium from which information can be obtained either directly or, if necessary, after translation by you into a reasonably usable form. Documents and electronically stored information encompasses and includes all file formats in which electronically stored information is or can be stored or saved, and always includes the native file format if one exists.

6. "ESI" or "electronically stored information" means all electronically stored information discoverable under N.D.R.Civ.P. 34 - including writings, databases, shapefiles, electronic or computer files, graphs, charts, photographs, sound recordings, images, and other data or data compilations - stored in any medium from which information can be obtained either directly or, if necessary, after translation by you into a reasonably usable form. ESI encompasses and

includes all file formats in which electronically stored information is or can be stored or saved, and always includes the native file format if one exists.

7. "Identification," "identify," or "identity," when used in reference to (a) a natural person, requires you to state his or her full name and residential and business addresses; (b) a corporation, requires you to state its full corporate name and any names under which it does business, its state of incorporation, the address of its principal place of business, and the addresses of all of its offices in the State of North Dakota; (c) a business, requires you to state the full name or style under which the business is conducted, its business address or addresses, the types of businesses in which it is engaged, the geographic area in which it conducts those businesses, and the identity of the person or persons who own, operate, and control the business; (d) a document, requires you to state the number of pages and the nature of the document (e.g., letter or memorandum), and if not apparent on the face of the document or ESI, its title, its date, the name or names of its authors and recipients, and its present location and custodian; (e) a communication, requires you, if any part of the communication was written, to identify the document or documents which refer to or evidence the communication, and, to the extent that the communication was non-written, to identify the persons participating in the communication and to state the date, manner, place, and substance of the communication.

8. "Person" means any individual acting in any capacity as well as any entity or organization, including divisions, departments, and other units of the organization, and shall include such organizations as public or private corporations, partnerships, joint ventures, voluntary or unincorporated associations, sole proprietorships, trusts, estates, governmental agencies, commissions, bureaus, or departments.

9. "Representative" means any agent, employee, servant, officer, director, attorney, or other person acting or purporting to act on behalf of the person in question.

10. "You," "your," or "yourself" refer to "SCS" or "Summit", and each of its authorized agents.

## TOPICS FOR EXAMINATION

In accordance with N.D.R.Civ.P. 30(b)(6), Landowners designate the following topics and matters for examination.

I. Summit's applications and the information contained in and created or submitted in support of the applications and conclusions drawn therefrom in NDIC Case Nos. 30869, 30870, 30871, 30872 (for "Summit Carbon Storage #1, LLC,"); 30873, 30874, 30875, 30876 (for "Summit Carbon Storage #2,") and 30877, 30878, 30879, 30880 (for "Summit Carbon Storage #3, LLC,") (all applications hereafter referred to collectively as "Summit's applications").
   a. Summit's applications include all documents submitted to the North Dakota Industrial Commission including its Department of Mineral Resources and its Oil and Gas Division (collectively "NDIC") as part of or in support of or in relation to Summit's applications, and all correspondence between Summit and NDIC whether in writing and whether electronic or physical, and whether written or oral. This topic and the scope of Summit's applications as used herein includes all data files, spreadsheets, databases, and models (including loading files necessary to make data files useable with any model) and all of the information, data, documents, calculations, and non-attorney work product that was created in support of Summit's applications or which was necessary to create or is materially supportive of Summit's applications.
      i. Without limiting the generality of the foregoing, this topic includes the following models and associated data:
         1. The data and interpretations and inputs for the geologic model created with SLB's Petrel software (Schlumberger, 2020).
         2. The data and inputs and model referred to in Section 3.1 of the applications as follows:
            a. "The geologic model and properties served as inputs for numerical simulations of CO2 injection using Computer Modelling Group Ltd.'s (CMG's) GEM software (Computer Modelling Group Ltd., 2021). Numerical simulations of CO2 injection were conducted to assess potential CO2 injection rate, disposition of injected CO2, wellhead pressure (WHP), bottomhole pressure (BHP), and pressure

changes in the storage reservoir throughout the expected injection time frame and postinjection period. Results of the numerical simulations were then used to determine the project's area of review (AOR) pursuant to North Dakota's geologic CO2 storage regulations."

3. United States Geological Survey's PHREEQC geochemical model and both the data files and data inputs used to run this model and bases for using the chosen inputs.
4. The data and load files and data decks for the SLB Petrel model that was run for Summit's applications.
5. Computer Modelling Group Ltd.'s GEM model and both the data files and data inputs used to run this model and bases for using the chosen inputs.
6. 3D numerical reservoir simulation model data decks, output files and graphing files of the Storage Reservoir in original electronic format. Without limiting the foregoing, such files may commonly be stored in Schlumberger SEclipse format, CMG (Canadian Modeling Group) Imex format, or other similar format.
7. Input files, field and analytical data, and the model geochemical database (and the sources of the foregoing) used to run any modelling or analysis of critical threshold pressures or areal extent of review or impact and pressure buildup, or which was used to do any kind of analysis related to EPA Method 1 or EPA Method 2 or Analytical Solution for Leakage in Multilayered Aquifers – ASLMA, or any risk-based area-of-review analysis.

ii. These models also include the conclusions drawn from the models and the data inputs used, particularly as those conclusions were used to support Summit's applications as referenced in these topics.

iii. The identity of the person most familiar with the workflows described in Section 3.2.3 of Summit's application in NDIC Case No. 30869 and how it was performed for purposes of Summit's applications and the identity of the person who wrote this passage.

iv. The meaning and context and details of how the various processes and functions described in Section 3.2.3 of Summit's applications and how they were actually performed and the models and calculations used to support them.

b. The factual documentation and information that might support or that Summit will use to support a finding "[t]hat the storage operator has obtained the consent of persons who own at least sixty percent of the storage reservoir's pore space" as required by N.D.C.C. § 38-22-08(5).

c. The factual documentation and information that might support or that Summit will use to support any finding in this proceeding "[t]hat the proposed storage facility

will not adversely affect surface waters or formations containing fresh water" as is stated at N.D.C.C. § 38-22-08(7).

d. The factual documentation and information that might support or that Summit will use to support any finding in this proceeding that "[t]hat the storage facility will not endanger human health nor unduly endanger the environment" as is stated at N.D.C.C. § 38-22-08(10).
e. The factual documentation and information that might support or that Summit will use to support any finding in this proceeding "[t]hat the horizontal and vertical boundaries of the storage reservoir are defined [and] include buffer areas to ensure that the storage facility is operated safely and as contemplated" as is stated at N.D.C.C. § 38-22-08(12).
f. The factual documentation and information related to or that might support or that Summit will use to support any finding in this proceeding that "all nonconsenting pore space owners are or will be equitably compensated" as that phrase is used in N.D.C.C. § 38-22-08(14) and any documentation, information, data sets, comparable sales, comparable transactions, appraisals, market reports, financial reports, or other documents related to or referencing compensation paid to nonconsenting pore space owners.
    i. This subtopic I.b. includes all amounts paid by Summit to any individual or entity for use of or damages to pore space or property rights associated with or related to its storage facility that is the subject of Summit's application and the Storage Reservoir, and all agreements for such use or damages or payments.
    ii. This subtopic I.b. includes all reports and agreements in Summit's possession indicating any amount of compensation paid for any kind of use of or damage to pore space or property for CO2 sequestration. If Summit has in its possession any agreement with any property owner for use of property or damage to property arising from use of pore space or property for storage or sequestration of CO2 it is included in this topic.

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case No(s). 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**



30(b)(6) Deposition of Summit Carbon Storage #1, #2, #3, LLC06-06-2024
EXHIBIT
005
30869-30880

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**INTERVENOR LANDOWNERS' SECOND AMENDED NOTICE OF 30(b)(6) DEPOSITION OF SUMMIT CARBON STORAGE #2, LLC**

**TO:** Summit Carbon Storage #2, by and through its attorney, Lawrence Bender, Fredrickson & Byron, P.A., 304 East Front Avenue, Suite 400, Bismarck, North Dakota, 58504:

[¶1] PLEASE TAKE NOTICE that, pursuant to N.D.C.C. § 28-32-33 and Rule 30(b)(6) of the North Dakota Rules of Civil Procedure, Intervenors Landowners the Swenson Living Trust, Michael Bauman, Glenn and Lisa Gerving, Michael and Bonnie Haupt, John Jochim, Kevin and Kimberly Kraft, Charmayne Liebelt, Kirk and Linda Maize and Allen Maize, Paul and Christy Metz, JoLene M. Rust, and Gary and Cassie Smith ("Landowners") will take the deposition upon oral examination of Summit Carbon Storage #2, LLC ("SCS" or "$CO_2$ injector") through one or more of its officers, directors, managing agents, or other representatives who shall be designated to testify on the $CO_2$ injector's behalf regarding all information known or reasonably available to the $CO_2$ injector with respect to the subject matters identified in Exhibit A.

[¶2] The deposition shall commence on June 6, 2024 at 9:00 a.m. (Central Time), and continue thereafter until complete, at the offices of Braaten Law Firm, 100 N. 4th St., Ste. 100, Bismarck, North Dakota 58501. The deposition shall be conducted before a court reporter, or other officer authorized by law to administer oaths, and shall be recorded by stenographic means and supplementally recorded by video. The deposition will be taken for the purposes of discovery, for use at hearings, or for other purposes as permitted under the North Dakota Rules of Civil Procedure and N.D.C.C. ch. 28-32.

Dated this 4th day of June, 2024.

**BRAATEN LAW FIRM**

*/s/ Derrick Braaten*

Derrick Braaten (ND #06394)
109 North 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
derrick@braatenlawfirm.com

*Attorneys for Intervenors the Swenson Living Trust, Bauman, Gerving, Haupt, Jochim, Kraft, Liebelt, Maize, Metz, Rust, and Smith*

**EXHIBIT A TO NOTICE OF DEPOSITION OF SUMMIT CARBON STORAGE #2, LLC**

## DEFINITIONS

As used in this Notice, the following terms shall have the meanings and definitions as indicated:

1. "SCS" or "Summit" means the applicants in NDIC Case Nos. 30869, 30870, 30871, 30872 (for "Summit Carbon Storage #1, LLC,"); 30873, 30874, 30875, 30876 (for "Summit Carbon Storage #2,") and 30877, 30878, 30879, 30880 (for "Summit Carbon Storage #3, LLC,"). and each of those entities' authorized agents.

2. "Landowners" means The Swenson Living Trust, Michael Bauman, Glenn and Lisa Gerving, Michael and Bonnie Haupt, John Jochim, Kevin and Kimberly Kraft, Charmayne Liebelt, Kirk and Linda Maize and Allen Maize, Paul and Christy Metz, JoLene M. Rust, and Gary and Cassie Smith.

3. "Storage Reservoir" means the reservoir and formation into which Summit intends to inject CO2 and the confining zones within the Areas of Review, as defined and depicted by Summit's applications herein (*see e.g.* Figure 1-1, NDIC Case No. 30869) including but not limited to the Storage Reservoir as defined by Section 1.15 of the Storage Agreement included with Summit's applications in NDIC Case No. 30869, and <u>includes</u> the confining layers/zones, to wit:

> the Pore Space and confining subsurface strata underlying the Facility Area described as the Opeche/Spearfish (Upper Confining Zone), Broom Creek (Injection Zone), and Amsden (Lower Confining Zone) Formation(s) and which are defined as identified by the well logging suite performed at one stratigraphic well, the Milton Flemmer 1 well (NDIC File No. 38594) located in the NW¼ of the NE¼, Section 35, Township 141 North, Range 88 West, Mercer County, North Dakota. The Storage Reservoir is defined as the stratigraphic interval from below the top of the Opeche/Spearfish Formation found at a depth of 5,587 feet below the Kelly Bushing, to above the base of the Amsden Formation, found at a depth of 6,421 feet below the Kelly Bushing, as identified by the Array Induction Gamma log run in the Milton Flemmer 1 well. The logging suite included triple combo (gamma ray [GR], density porosity, and resistivity), caliper, spectral GR, combinable magnetic

resonance (CMR), elemental capture spectroscopy (ESC), dipole sonic including four-arm caliper and inclinometer, and an image log. Further, the acquired logs were used to pick formation top depths and interpret lithology, petrophysical properties, and time-to-depth shifting of seismic data obtained from three 3D seismic surveys and one 5-mile long 2D seismic line covering an area totaling 208 miles in and around the Milton Flemmer 1 stratigraphic well. Formation top depths were picked from the top of the Pierre Formation to the base of the Amsden Formation. The average depth of the top of the Opeche/Spearfish Formation (Upper Confining Zone) across the storage facility area is 5,464 total vertical depth (TVD). The average depth of the base of the Amsden Formation (Lower Confining Summit Carbon Storage #1, LLC – Broom Creek 5 Zone) across the storage facility area is 6,270 feet TVD. The average thickness of the Storage Reservoir across the storage facility area is 806 feet.

4. "Communication" means any oral or written utterance, notation, or statement of any nature, by and to whomever, including, but not limited to, correspondence, text messages, chat messages, emails, letters, and any other oral or written conversations, dialogues, discussions, interviews, or consultations, between or among two or more persons.

5. "Document" means all documents or electronically stored information discoverable under N.D.R.Civ.P. 34 - including writings, drawings, graphs, charts, photographs, sound recordings, images, and other data or data compilations - stored in any medium from which information can be obtained either directly or, if necessary, after translation by you into a reasonably usable form. Documents and electronically stored information encompasses and includes all file formats in which electronically stored information is or can be stored or saved, and always includes the native file format if one exists.

6. "ESI" or "electronically stored information" means all electronically stored information discoverable under N.D.R.Civ.P. 34 - including writings, databases, shapefiles, electronic or computer files, graphs, charts, photographs, sound recordings, images, and other data or data compilations - stored in any medium from which information can be obtained either directly or, if necessary, after translation by you into a reasonably usable form. ESI encompasses and

includes all file formats in which electronically stored information is or can be stored or saved, and always includes the native file format if one exists.

7. "Identification," "identify," or "identity," when used in reference to (a) a natural person, requires you to state his or her full name and residential and business addresses; (b) a corporation, requires you to state its full corporate name and any names under which it does business, its state of incorporation, the address of its principal place of business, and the addresses of all of its offices in the State of North Dakota; (c) a business, requires you to state the full name or style under which the business is conducted, its business address or addresses, the types of businesses in which it is engaged, the geographic area in which it conducts those businesses, and the identity of the person or persons who own, operate, and control the business; (d) a document, requires you to state the number of pages and the nature of the document (e.g., letter or memorandum), and if not apparent on the face of the document or ESI, its title, its date, the name or names of its authors and recipients, and its present location and custodian; (e) a communication, requires you, if any part of the communication was written, to identify the document or documents which refer to or evidence the communication, and, to the extent that the communication was non-written, to identify the persons participating in the communication and to state the date, manner, place, and substance of the communication.

8. "Person" means any individual acting in any capacity as well as any entity or organization, including divisions, departments, and other units of the organization, and shall include such organizations as public or private corporations, partnerships, joint ventures, voluntary or unincorporated associations, sole proprietorships, trusts, estates, governmental agencies, commissions, bureaus, or departments.

9. "Representative" means any agent, employee, servant, officer, director, attorney, or other person acting or purporting to act on behalf of the person in question.

10. "You," "your," or "yourself" refer to "SCS" or "Summit", and each of its authorized agents.

## TOPICS FOR EXAMINATION

In accordance with N.D.R.Civ.P. 30(b)(6), Landowners designate the following topics and matters for examination.

I. Summit's applications and the information contained in and created or submitted in support of the applications and conclusions drawn therefrom in NDIC Case Nos. 30869, 30870, 30871, 30872 (for "Summit Carbon Storage #1, LLC,"); 30873, 30874, 30875, 30876 (for "Summit Carbon Storage #2,") and 30877, 30878, 30879, 30880 (for "Summit Carbon Storage #3, LLC,") (all applications hereafter referred to collectively as "Summit's applications").
   a. Summit's applications include all documents submitted to the North Dakota Industrial Commission including its Department of Mineral Resources and its Oil and Gas Division (collectively "NDIC") as part of or in support of or in relation to Summit's applications, and all correspondence between Summit and NDIC whether in writing and whether electronic or physical, and whether written or oral. This topic and the scope of Summit's applications as used herein includes all data files, spreadsheets, databases, and models (including loading files necessary to make data files useable with any model) and all of the information, data, documents, calculations, and non-attorney work product that was created in support of Summit's applications or which was necessary to create or is materially supportive of Summit's applications.
      i. Without limiting the generality of the foregoing, this topic includes the following models and associated data:
         1. The data and interpretations and inputs for the geologic model created with SLB's Petrel software (Schlumberger, 2020).
         2. The data and inputs and model referred to in Section 3.1 of the applications as follows:
            a. "The geologic model and properties served as inputs for numerical simulations of CO2 injection using Computer Modelling Group Ltd.'s (CMG's) GEM software (Computer Modelling Group Ltd., 2021). Numerical simulations of CO2 injection were conducted to assess potential CO2 injection rate, disposition of injected CO2, wellhead pressure (WHP), bottomhole pressure (BHP), and pressure

changes in the storage reservoir throughout the expected injection time frame and postinjection period. Results of the numerical simulations were then used to determine the project's area of review (AOR) pursuant to North Dakota's geologic CO2 storage regulations."

3. United States Geological Survey's PHREEQC geochemical model and both the data files and data inputs used to run this model and bases for using the chosen inputs.
4. The data and load files and data decks for the SLB Petrel model that was run for Summit's applications.
5. Computer Modelling Group Ltd.'s GEM model and both the data files and data inputs used to run this model and bases for using the chosen inputs.
6. 3D numerical reservoir simulation model data decks, output files and graphing files of the Storage Reservoir in original electronic format. Without limiting the foregoing, such files may commonly be stored in Schlumberger SEclipse format, CMG (Canadian Modeling Group) Imex format, or other similar format.
7. Input files, field and analytical data, and the model geochemical database (and the sources of the foregoing) used to run any modelling or analysis of critical threshold pressures or areal extent of review or impact and pressure buildup, or which was used to do any kind of analysis related to EPA Method 1 or EPA Method 2 or Analytical Solution for Leakage in Multilayered Aquifers – ASLMA, or any risk-based area-of-review analysis.

ii. These models also include the conclusions drawn from the models and the data inputs used, particularly as those conclusions were used to support Summit's applications as referenced in these topics.

iii. The identity of the person most familiar with the workflows described in Section 3.2.3 of Summit's application in NDIC Case No. 30869 and how it was performed for purposes of Summit's applications and the identity of the person who wrote this passage.

iv. The meaning and context and details of how the various processes and functions described in Section 3.2.3 of Summit's applications and how they were actually performed and the models and calculations used to support them.

b. The factual documentation and information that might support or that Summit will use to support a finding "[t]hat the storage operator has obtained the consent of persons who own at least sixty percent of the storage reservoir's pore space" as required by N.D.C.C. § 38-22-08(5).

c. The factual documentation and information that might support or that Summit will use to support any finding in this proceeding "[t]hat the proposed storage facility

will not adversely affect surface waters or formations containing fresh water" as is stated at N.D.C.C. § 38-22-08(7).

d. The factual documentation and information that might support or that Summit will use to support any finding in this proceeding that "[t]hat the storage facility will not endanger human health nor unduly endanger the environment" as is stated at N.D.C.C. § 38-22-08(10).
e. The factual documentation and information that might support or that Summit will use to support any finding in this proceeding "[t]hat the horizontal and vertical boundaries of the storage reservoir are defined [and] include buffer areas to ensure that the storage facility is operated safely and as contemplated" as is stated at N.D.C.C. § 38-22-08(12).
f. The factual documentation and information related to or that might support or that Summit will use to support any finding in this proceeding that "all nonconsenting pore space owners are or will be equitably compensated" as that phrase is used in N.D.C.C. § 38-22-08(14) and any documentation, information, data sets, comparable sales, comparable transactions, appraisals, market reports, financial reports, or other documents related to or referencing compensation paid to nonconsenting pore space owners.
    i. This subtopic I.b. includes all amounts paid by Summit to any individual or entity for use of or damages to pore space or property rights associated with or related to its storage facility that is the subject of Summit's application and the Storage Reservoir, and all agreements for such use or damages or payments.
    ii. This subtopic I.b. includes all reports and agreements in Summit's possession indicating any amount of compensation paid for any kind of use of or damage to pore space or property for CO2 sequestration. If Summit has in its possession any agreement with any property owner for use of property or damage to property arising from use of pore space or property for storage or sequestration of CO2 it is included in this topic.

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case No(s). 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**



30(b)(6) Deposition of Summit Carbon Storage #1, #2, #3, LLC06-06-2024
EXHIBIT
006
30869-30880

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**INTERVENOR LANDOWNERS' SECOND AMENDED NOTICE OF 30(b)(6) DEPOSITION OF SUMMIT CARBON STORAGE #3, LLC**

**TO:** Summit Carbon Storage #3, LLC, by and through its attorney, Lawrence Bender, Fredrickson & Byron, P.A., 304 East Front Avenue, Suite 400, Bismarck, North Dakota, 58504:

[¶1] PLEASE TAKE NOTICE that, pursuant to N.D.C.C. § 28-32-33 and Rule 30(b)(6) of the North Dakota Rules of Civil Procedure, Intervenors Landowners the Swenson Living Trust, Michael Bauman, Glenn and Lisa Gerving, Michael and Bonnie Haupt, John Jochim, Kevin and Kimberly Kraft, Charmayne Liebelt, Kirk and Linda Maize and Allen Maize, Paul and Christy Metz, JoLene M. Rust, and Gary and Cassie Smith ("Landowners") will take the deposition upon oral examination of Summit Carbon Storage #3, LLC ("SCS" or "$CO_2$ injector") through one or more of its officers, directors, managing agents, or other representatives who shall be designated to testify on the $CO_2$ injector's behalf regarding all information known or reasonably available to the $CO_2$ injector with respect to the subject matters identified in Exhibit A.

[¶2] The deposition shall commence on June 6, 2024 at 9:00 a.m. (Central Time), and continue thereafter until complete, at the offices of Braaten Law Firm, 100 N. 4th St., Ste. 100, Bismarck, North Dakota 58501. The deposition shall be conducted before a court reporter, or other officer authorized by law to administer oaths, and shall be recorded by stenographic means and supplementally recorded by video. The deposition will be taken for the purposes of discovery, for use at hearings, or for other purposes as permitted under the North Dakota Rules of Civil Procedure and N.D.C.C. ch. 28-32.

Dated this 4th day of June, 2024.

**BRAATEN LAW FIRM**

*/s/ Derrick Braaten*

Derrick Braaten (ND #06394)
109 North 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
derrick@braatenlawfirm.com

*Attorneys for Intervenors the Swenson Living Trust, Bauman, Gerving, Haupt, Jochim, Kraft, Liebelt, Maize, Metz, Rust, and Smith*

**EXHIBIT A TO NOTICE OF DEPOSITION OF SUMMIT CARBON STORAGE #3, LLC**

**DEFINITIONS**

As used in this Notice, the following terms shall have the meanings and definitions as indicated:

1. "SCS" or "Summit" means the applicants in NDIC Case Nos. 30869, 30870, 30871, 30872 (for "Summit Carbon Storage #1, LLC,"); 30873, 30874, 30875, 30876 (for "Summit Carbon Storage #2,") and 30877, 30878, 30879, 30880 (for "Summit Carbon Storage #3, LLC,"). and each of those entities' authorized agents.

2. "Landowners" means The Swenson Living Trust, Michael Bauman, Glenn and Lisa Gerving, Michael and Bonnie Haupt, John Jochim, Kevin and Kimberly Kraft, Charmayne Liebelt, Kirk and Linda Maize and Allen Maize, Paul and Christy Metz, JoLene M. Rust, and Gary and Cassie Smith.

3. "Storage Reservoir" means the reservoir and formation into which Summit intends to inject CO2 and the confining zones within the Areas of Review, as defined and depicted by Summit's applications herein (*see e.g.* Figure 1-1, NDIC Case No. 30869) including but not limited to the Storage Reservoir as defined by Section 1.15 of the Storage Agreement included with Summit's applications in NDIC Case No. 30869, and <u>includes</u> the confining layers/zones, to wit:

> the Pore Space and confining subsurface strata underlying the Facility Area described as the Opeche/Spearfish (Upper Confining Zone), Broom Creek (Injection Zone), and Amsden (Lower Confining Zone) Formation(s) and which are defined as identified by the well logging suite performed at one stratigraphic well, the Milton Flemmer 1 well (NDIC File No. 38594) located in the NW¼ of the NE¼, Section 35, Township 141 North, Range 88 West, Mercer County, North Dakota. The Storage Reservoir is defined as the stratigraphic interval from below the top of the Opeche/Spearfish Formation found at a depth of 5,587 feet below the Kelly Bushing, to above the base of the Amsden Formation, found at a depth of 6,421 feet below the Kelly Bushing, as identified by the Array Induction Gamma log run in the Milton Flemmer 1 well. The logging suite included triple combo (gamma ray [GR], density porosity, and resistivity), caliper, spectral GR, combinable magnetic

resonance (CMR), elemental capture spectroscopy (ESC), dipole sonic including four-arm caliper and inclinometer, and an image log. Further, the acquired logs were used to pick formation top depths and interpret lithology, petrophysical properties, and time-to-depth shifting of seismic data obtained from three 3D seismic surveys and one 5-mile long 2D seismic line covering an area totaling 208 miles in and around the Milton Flemmer 1 stratigraphic well. Formation top depths were picked from the top of the Pierre Formation to the base of the Amsden Formation. The average depth of the top of the Opeche/Spearfish Formation (Upper Confining Zone) across the storage facility area is 5,464 total vertical depth (TVD). The average depth of the base of the Amsden Formation (Lower Confining Summit Carbon Storage #1, LLC – Broom Creek 5 Zone) across the storage facility area is 6,270 feet TVD. The average thickness of the Storage Reservoir across the storage facility area is 806 feet.

4. "Communication" means any oral or written utterance, notation, or statement of any nature, by and to whomever, including, but not limited to, correspondence, text messages, chat messages, emails, letters, and any other oral or written conversations, dialogues, discussions, interviews, or consultations, between or among two or more persons.

5. "Document" means all documents or electronically stored information discoverable under N.D.R.Civ.P. 34 - including writings, drawings, graphs, charts, photographs, sound recordings, images, and other data or data compilations - stored in any medium from which information can be obtained either directly or, if necessary, after translation by you into a reasonably usable form. Documents and electronically stored information encompasses and includes all file formats in which electronically stored information is or can be stored or saved, and always includes the native file format if one exists.

6. "ESI" or "electronically stored information" means all electronically stored information discoverable under N.D.R.Civ.P. 34 - including writings, databases, shapefiles, electronic or computer files, graphs, charts, photographs, sound recordings, images, and other data or data compilations - stored in any medium from which information can be obtained either directly or, if necessary, after translation by you into a reasonably usable form. ESI encompasses and

includes all file formats in which electronically stored information is or can be stored or saved, and always includes the native file format if one exists.

7. "Identification," "identify," or "identity," when used in reference to (a) a natural person, requires you to state his or her full name and residential and business addresses; (b) a corporation, requires you to state its full corporate name and any names under which it does business, its state of incorporation, the address of its principal place of business, and the addresses of all of its offices in the State of North Dakota; (c) a business, requires you to state the full name or style under which the business is conducted, its business address or addresses, the types of businesses in which it is engaged, the geographic area in which it conducts those businesses, and the identity of the person or persons who own, operate, and control the business; (d) a document, requires you to state the number of pages and the nature of the document (e.g., letter or memorandum), and if not apparent on the face of the document or ESI, its title, its date, the name or names of its authors and recipients, and its present location and custodian; (e) a communication, requires you, if any part of the communication was written, to identify the document or documents which refer to or evidence the communication, and, to the extent that the communication was non-written, to identify the persons participating in the communication and to state the date, manner, place, and substance of the communication.

8. "Person" means any individual acting in any capacity as well as any entity or organization, including divisions, departments, and other units of the organization, and shall include such organizations as public or private corporations, partnerships, joint ventures, voluntary or unincorporated associations, sole proprietorships, trusts, estates, governmental agencies, commissions, bureaus, or departments.

9. "Representative" means any agent, employee, servant, officer, director, attorney, or other person acting or purporting to act on behalf of the person in question.

10. "You," "your," or "yourself" refer to "SCS" or "Summit", and each of its authorized agents.

## TOPICS FOR EXAMINATION

In accordance with N.D.R.Civ.P. 30(b)(6), Landowners designate the following topics and matters for examination.

I. Summit's applications and the information contained in and created or submitted in support of the applications and conclusions drawn therefrom in NDIC Case Nos. 30869, 30870, 30871, 30872 (for "Summit Carbon Storage #1, LLC,"); 30873, 30874, 30875, 30876 (for "Summit Carbon Storage #2,") and 30877, 30878, 30879, 30880 (for "Summit Carbon Storage #3, LLC,") (all applications hereafter referred to collectively as "Summit's applications").
   a. Summit's applications include all documents submitted to the North Dakota Industrial Commission including its Department of Mineral Resources and its Oil and Gas Division (collectively "NDIC") as part of or in support of or in relation to Summit's applications, and all correspondence between Summit and NDIC whether in writing and whether electronic or physical, and whether written or oral. This topic and the scope of Summit's applications as used herein includes all data files, spreadsheets, databases, and models (including loading files necessary to make data files useable with any model) and all of the information, data, documents, calculations, and non-attorney work product that was created in support of Summit's applications or which was necessary to create or is materially supportive of Summit's applications.
      i. Without limiting the generality of the foregoing, this topic includes the following models and associated data:
         1. The data and interpretations and inputs for the geologic model created with SLB's Petrel software (Schlumberger, 2020).
         2. The data and inputs and model referred to in Section 3.1 of the applications as follows:
            a. "The geologic model and properties served as inputs for numerical simulations of CO2 injection using Computer Modelling Group Ltd.'s (CMG's) GEM software (Computer Modelling Group Ltd., 2021). Numerical simulations of CO2 injection were conducted to assess potential CO2 injection rate, disposition of injected CO2, wellhead pressure (WHP), bottomhole pressure (BHP), and pressure

changes in the storage reservoir throughout the expected injection time frame and postinjection period. Results of the numerical simulations were then used to determine the project's area of review (AOR) pursuant to North Dakota's geologic CO2 storage regulations."

3. United States Geological Survey's PHREEQC geochemical model and both the data files and data inputs used to run this model and bases for using the chosen inputs.
4. The data and load files and data decks for the SLB Petrel model that was run for Summit's applications.
5. Computer Modelling Group Ltd.'s GEM model and both the data files and data inputs used to run this model and bases for using the chosen inputs.
6. 3D numerical reservoir simulation model data decks, output files and graphing files of the Storage Reservoir in original electronic format. Without limiting the foregoing, such files may commonly be stored in Schlumberger SEclipse format, CMG (Canadian Modeling Group) Imex format, or other similar format.
7. Input files, field and analytical data, and the model geochemical database (and the sources of the foregoing) used to run any modelling or analysis of critical threshold pressures or areal extent of review or impact and pressure buildup, or which was used to do any kind of analysis related to EPA Method 1 or EPA Method 2 or Analytical Solution for Leakage in Multilayered Aquifers – ASLMA, or any risk-based area-of-review analysis.

ii. These models also include the conclusions drawn from the models and the data inputs used, particularly as those conclusions were used to support Summit's applications as referenced in these topics.

iii. The identity of the person most familiar with the workflows described in Section 3.2.3 of Summit's application in NDIC Case No. 30869 and how it was performed for purposes of Summit's applications and the identity of the person who wrote this passage.

iv. The meaning and context and details of how the various processes and functions described in Section 3.2.3 of Summit's applications and how they were actually performed and the models and calculations used to support them.

b. The factual documentation and information that might support or that Summit will use to support a finding "[t]hat the storage operator has obtained the consent of persons who own at least sixty percent of the storage reservoir's pore space" as required by N.D.C.C. § 38-22-08(5).

c. The factual documentation and information that might support or that Summit will use to support any finding in this proceeding "[t]hat the proposed storage facility

will not adversely affect surface waters or formations containing fresh water" as is stated at N.D.C.C. § 38-22-08(7).

d. The factual documentation and information that might support or that Summit will use to support any finding in this proceeding that "[t]hat the storage facility will not endanger human health nor unduly endanger the environment" as is stated at N.D.C.C. § 38-22-08(10).
e. The factual documentation and information that might support or that Summit will use to support any finding in this proceeding "[t]hat the horizontal and vertical boundaries of the storage reservoir are defined [and] include buffer areas to ensure that the storage facility is operated safely and as contemplated" as is stated at N.D.C.C. § 38-22-08(12).
f. The factual documentation and information related to or that might support or that Summit will use to support any finding in this proceeding that "all nonconsenting pore space owners are or will be equitably compensated" as that phrase is used in N.D.C.C. § 38-22-08(14) and any documentation, information, data sets, comparable sales, comparable transactions, appraisals, market reports, financial reports, or other documents related to or referencing compensation paid to nonconsenting pore space owners.
    i. This subtopic I.b. includes all amounts paid by Summit to any individual or entity for use of or damages to pore space or property rights associated with or related to its storage facility that is the subject of Summit's application and the Storage Reservoir, and all agreements for such use or damages or payments.
    ii. This subtopic I.b. includes all reports and agreements in Summit's possession indicating any amount of compensation paid for any kind of use of or damage to pore space or property for CO2 sequestration. If Summit has in its possession any agreement with any property owner for use of property or damage to property arising from use of pore space or property for storage or sequestration of CO2 it is included in this topic.

Fredrikson

Fredrikson & Byron, P.A.
Attorneys and Advisors

304 East Front Avenue, Suite 400
Bismarck, ND 58504-5639
Main: 701.221.8700
fredlaw.com

June 5, 2024

***VIA E-MAIL***

*derrick@braatenlawfirm.com*
Derrick L. Braaten
Braaten Law Firm
109 N. Fourth St., Ste. 100
Bismarck, ND 58501-4003

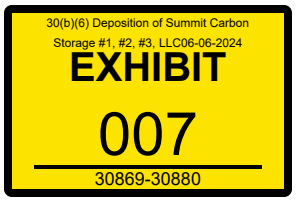
**RE: NDIC Case Nos. 30869–30880**

Dear Derrick:

This letter concerns the following documents you served in the above-referenced cases: Intervenor Landowners' Second Amended Notice of 30(b)(6) Deposition of Summit Carbon Storage #1, LLC; Intervenor Landowners' Second Amended Notice of 30(b)(6) Deposition of Summit Carbon Storage #2, LLC; Intervenor Landowners' Second Amended Notice of 30(b)(6) Deposition of Summit Carbon Storage #3, LLC (collectively, the "Deposition Notices"). I received copies of these documents by e-mail yesterday, June 4, 2024.

Rule 30(b)(1) provides that a party who wants to depose a person by oral questions must give reasonable written notice "to every other party." The North Dakota Industrial Commission ("Commission") issued an order on Monday, June 3, 2024, granting the petition to intervene in NDIC Case Nos. 30869–30880 filed by Minnkota Power Cooperative, Inc. ("Minnkota"). The declaration of service accompanying the Deposition Notices does not indicate that Minnkota has been served with copies thereof. As a result, the Intervenor Landowners have not complied with Rule 30 and the Deposition Notices are ineffective. *Cf. Rolin Mfg., Inc. v. Mosbrucker*, 544 N.W.2d 132, 139 (N.D. 1996) (Noting that issuance of subpoena without written notice to other parties was "not consistent with" the Rules of Civil Procedure and affirming district court order quashing subpoena and imposing sanctions on issuing party).

If Minnkota has been given notice of the proposed depositions of my clients, there remain issues with the Deposition Notices that I believe are ultimately fatal. As noted above, Rule 30(b)(1) requires that a party seeking to depose another person must give "reasonable written notice" thereof. The Deposition Notices were served on June 4, 2024, for a deposition to take place on June 6, 2024. I am not aware of any court that has held less than two days' notice to be "reasonable" under Rule 30. For this reason, the Deposition Notices do not comply with Rule 30.



Rule 30(b)(6) requires that "[b]efore or promptly after the notice . . . is served, the serving party and the organization must confer in good faith about the matters for examination." Intervenor Landowners have not attempted to confer in good faith with my clients regarding the matters for examination, nor does a June 6, 2024 deposition date allow for such conferral. As such, the Intervenor Landowners have not complied with Rule 30(b)(6) and the Deposition Notices are for that additional reason ineffective.

The Intervenor Landowners failure to confer in good faith regarding matters for examination is exacerbated by the fact that the Deposition Notices do not comply with Rule 30(b)(6)'s requirement they "describe with reasonable particularity the matters for examination." As I read the Deposition Notices, I understand the topic for examination to be "Summit's applications and the information contained in and created or submitted in support of the applications and conclusions drawn therefrom in NDIC Case Nos. [30869–30880]." This is analogous to listing "all allegations contained in the complaint" as a matter for examination, which courts routinely reject for failure to comply with the reasonable particularity requirement. *See, e.g.*, *Washington-St. Tammany Elec. Coop., Inc. v. Louisiana Generating, L.L.C.*, No. CV 17-405-JWD-RLB, 2019 WL 1804849, at *12 (M.D. La. Apr. 24, 2019) (concluding that 30(b)(6) deposition topic "which generally refers to allegations in the Complaint" is overly broad and fails to describe the topic with reasonable particularity); *Waste Mgmt. of Louisiana, LLC v. River Birch, Inc.*, No. CV 11-2405, 2017 WL 2831700, at *3 (E.D. La. June 30, 2017) (finding that "The factual basis for the allegations contained in [the Plaintiff's] RICO Statement" and "The factual basis for the allegations contained in [the Plaintiff's] Third Amended Complaint" to be overly broad as written); *Carriage Hills Condo., Inc. v. Roofing*, 109 So.3d 329, 336 (Fla. App. 2013) (finding that "all allegations contained in the complaint" fails to meet reasonable particularity requirement); *E3 Biofuels, LLC v. Biothane, LLC*, No. 8:11CV44, 2013 WL 4400506, at *2 (D. Neb. Aug. 15, 2013) (stating the most obvious example of a failure to particularize the areas of inquiry is a request for testimony regarding "[Plaintiff's] claims as set forth in its Amended Complaint"). Because the Deposition Notices fail to comply with Rule 30(b)(6)'s "reasonable particularity" requirement, they are improper and ineffective.

Ultimately, this letter is intended to inform you that because of the Intervenor Landowners' failure to comply with Rule 30, my clients do not intend to appear for the depositions tomorrow, June 6, 2024, as set forth in the Deposition Notices. Should you have any questions, please advise.

Sincerely,

*/s/ Lawrence Bender*

LAWRENCE BENDER

LB/sdp

cc: Summit Carbon Solutions, LLC

**From:** "Derrick Braaten" <derrick@braatenlawfirm.com>
**Sent:** Thursday, June 6, 2024 12:39 AM
**To:** "Etter, Mary" <METter@fredlaw.com>
**Cc:** "Bender, Lawrence" <LBender@fredlaw.com>; "Ptacek, Spencer" <SPtacek@fredlaw.com>; "Desirae Zaste" <desirae@braatenlawfirm.com>
**Subject:** RE: NDIC Case Nos. 30869-30880
**Attachments:** RE: Summit Carbon Solutions – NDIC Case Nos. 30869-30880, 240502 Bender ltr from DB re discovery and deposition.pdf

Lawrence,

I appreciate your sending this notice and letting me know in advance this evening.

I disagree that there is not an obligation for your client to produce a witness. I'll respond specifically to your points below.

I did provide notice to Minnkota. I was in a hearing all day today with Josh Swanson and explained it to him and he was aware of the deposition and apparently not intending to participate. But he did get notice. We also served him formally with the notice of deposition.

I offered to confer before I even served the notice, and that letter is attached. I then served you with the notice that included the topics for examination on May 9, and they have not changed since then. That was more than sufficient to provide you with reasonable notice as well. You were provided with the topics a month ago and they've not changed, and you were well aware of the date and time. My opening email also offered to confer and adjust the date or work with you on this depo, and you never took me up on that.

As to the particularity of the topics speak for themselves, and I clearly did not simply state "the applications." For example, I narrowed in from the broader category to very specifically request a witness prepared to discuss: "The data and inputs and model referred to in Section 3.1 of the applications as follows: [the] geologic model and properties served as inputs for numerical simulations of CO2 injection using Computer Modelling Group Ltd.'s (CMG's) GEM software (Computer Modelling Group Ltd., 2021). Numerical simulations of CO2 injection were conducted to assess potential CO2 injection rate, disposition of injected CO2, wellhead pressure (WHP), bottomhole pressure (BHP), and pressure changes in the storage reservoir throughout the expected injection time frame and postinjection period. Results of the numerical simulations were then used to determine the project's area of review (AOR) pursuant to North Dakota's geologic CO2 storage regulations." I also specified: "United States Geological Survey's PHREEQC geochemical model and both the data files and data inputs used to run this model and bases for using the chosen inputs."

I intend to move forward with the deposition tomorrow morning. If there is no witness I will put that on record and continue the deposition.

Thank you,
Derrick

**Derrick Braaten**

30(b)(6) Deposition of Summit Carbon Storage #1, #2, #3, LLC06-06-2024
EXHIBIT
008
30869-30880

**BRAATEN LAW FIRM**
109 N. 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
Fax: 701-221-5842
www.braatenlawfirm.com

**PRIVILEGED COMMUNICATION**
**This e-mail message is intended only for the named recipient(s) above and is covered by the Electronic Communications Privacy Act, 18 U.S.C. Sections 2510-2521. This e-mail is confidential and may contain information that is privileged, attorney work product or exempt from disclosure under applicable law. Recipients should not file copies of this e-mail with publicly accessible records. If you have received this message in error, please immediately notify the sender by return e-mail and delete this e-mail message from your computer. Thank you for your cooperation.**

---

**From:** Etter, Mary <METter@fredlaw.com>
**Sent:** Wednesday, June 5, 2024 5:55 PM
**To:** Derrick Braaten <derrick@braatenlawfirm.com>
**Cc:** Bender, Lawrence <LBender@fredlaw.com>
**Subject:** NDIC Case Nos. 30869-30880

[Warning: External Sender]

Good evening, Derrick,

Please see the attached letter from Mr. Bender. If you have any questions, please contact Lawrence.

Thank you,
Mary

***Mary Etter***
*Legal Administrative Assistant to Jason R.S. Cassady,*
*Justin G. Hughes, and Spencer D. Ptacek*
Fredrikson & Byron, P.A.
304 East Front Ave, Suite 400 | Bismarck, ND 58504-5639
Direct: 701.221.8642 | Main: 701.221.8700| metter@fredlaw.com
www.fredlaw.com

*Fredrikson's Bismarck office has moved, please note our new address.*

***This is a transmission from the law firm of Fredrikson & Byron, P.A. and may contain information which is privileged, confidential, and protected by the attorney-client or attorney work product privileges. If you are not the addressee, note that any disclosure, copying, distribution, or use of the contents of this message is prohibited. If you have received this transmission in error, please destroy it and notify us immediately at our telephone number (701) 221-8700.***

BRAATEN
Law Firm

May 2, 2024

**Via Email Only**

Lawrence Bender
304 East Front Avenue, Suite 400
Bismarck, ND 58504-5639
lbender@fredlaw.com

**Re: Summit Carbon Solutions – NDIC Case Nos. 30869-30880**

Lawrence:

I am writing to discuss discovery in this administrative proceeding. I would like to conduct a 30(b)(6) deposition of your client and am currently working on a topic list and will be providing that to you in the next few days. I understand you will need to see the topics in order to determine who at Summit will be testifying, but I would like to put aside some days in late May/early June for the deposition that work for our two schedules at least given how busy we both are and are likely to become. Please let me know what days you have available for a deposition. I also will be serving your client with a couple rounds of written discovery, and I want to give you a heads up that I intend to request that the NDIC expedite the discovery process.

I also would like to know if you would have any objection to my asking the commission for electronic data and files that were provided to the commission on behalf of your client, such as shape files, engineering files for the reservoir modeling and geological data. If I am able to get all data and electronic files the Commission has, that may be sufficient for my experts and their technical review if it contains all of the pertinent data. I'm also happy to sit down with you and anyone from Summit or the NDIC to discuss a way to efficiently exchange data and information prior to the hearing.

Sincerely,

Derrick Braaten

DB/dnz

cc: Clients

30(b)(6) Deposition of Summit Carbon Storage #1, #2, #3, LLC06-06-2024
EXHIBIT
009
30869-30880

**From:** "Derrick Braaten" <derrick@braatenlawfirm.com>
**Sent:** Thursday, May 9, 2024 8:08 PM
**To:** "Desirae Zaste" <desirae@braatenlawfirm.com>; "Bender, Lawrence" <LBender@fredlaw.com>
**Subject:** RE: Summit Carbon Solutions – NDIC Case Nos. 30869-30880

Lawrence,

I scheduled this to get a date down and I did try to look at what I know of your schedule between PSC hearings, etc. I am open to rescheduling this if we can find a mutually agreeable date though, so just wanted to let you know that right away. I realize we may also still get in a fight about whether you're going to show up or respond to anything I am doing until the NDIC responds to the petition, but assuming I move ahead with it just let me know on the date.

Thanks,
Derrick

**Derrick Braaten**

BRAATEN Law Firm

**BRAATEN LAW FIRM**
109 N. 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
Fax: 701-221-5842
www.braatenlawfirm.com

**PRIVILEGED COMMUNICATION**
**This e-mail message is intended only for the named recipient(s) above and is covered by the Electronic Communications Privacy Act, 18 U.S.C. Sections 2510-2521. This e-mail is confidential and may contain information that is privileged, attorney work product or exempt from disclosure under applicable law. Recipients should not file copies of this e-mail with publicly accessible records. If you have received this message in error, please immediately notify the sender by return e-mail and delete this e-mail message from your computer. Thank you for your cooperation.**

**From:** Desirae Zaste <desirae@braatenlawfirm.com>
**Sent:** Thursday, May 9, 2024 3:04 PM
**To:** Bender, Lawrence <LBender@fredlaw.com>
**Cc:** Derrick Braaten <derrick@braatenlawfirm.com>
**Subject:** Summit Carbon Solutions – NDIC Case Nos. 30869-30880

Mr. Bender,

Attached for service are the following documents:

- **Landowners Notice of 30(b)(6) Deposition of Summit Carbon Solutions; and**
- **Declaration of Service.**

A copy will also be sent via US Mail.

**DESIRAE ZASTE** | Certified Paralegal

30(b)(6) Deposition of Summit Carbon Storage #1, #2, #3, LLC06-06-2024
**EXHIBIT**
010
30869-30880

desirae@braatenlawfirm.com

**BRAATEN LAW FIRM**
109 N. 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
Fax: 701-221-5842
www.braatenlawfirm.com

**PRIVILEGED COMMUNICATION**
**This e-mail message is intended only for the named recipient(s) above and is covered by the Electronic Communications Privacy Act, 18 U.S.C. Sections 2510-2521. This e-mail is confidential and may contain information that is privileged, attorney work product or exempt from disclosure under applicable law. Recipients should not file copies of this e-mail with publicly accessible records. If you have received this message in error, please immediately notify the sender by return e-mail and delete this e-mail message from your computer. Thank you for your cooperation.**

**From:** Derrick Braaten <derrick@braatenlawfirm.com>
**Sent on:** Thursday, June 6, 2024 12:39:23 AM
**To:** Etter, Mary <MEtter@fredlaw.com>
**CC:** Bender, Lawrence <LBender@fredlaw.com>; Ptacek, Spencer <SPtacek@fredlaw.com>; Desirae Zaste <desirae@braatenlawfirm.com>
**Subject:** RE: NDIC Case Nos. 30869-30880
**Attachments:** RE Summit Carbon Solutions – NDIC Case Nos. 30869-30880.msg (113 KB), 240502 Bender ltr from DB re discovery and deposition.pdf (162.15 KB)

Lawrence,

I appreciate your sending this notice and letting me know in advance this evening.

I disagree that there is not an obligation for your client to produce a witness. I'll respond specifically to your points below.

I did provide notice to Minnkota. I was in a hearing all day today with Josh Swanson and explained it to him and he was aware of the deposition and apparently not intending to participate. But he did get notice. We also served him formally with the notice of deposition.

I offered to confer before I even served the notice, and that letter is attached. I then served you with the notice that included the topics for examination on May 9, and they have not changed since then. That was more than sufficient to provide you with reasonable notice as well. You were provided with the topics a month ago and they've not changed, and you were well aware of the date and time. My opening email also offered to confer and adjust the date or work with you on this depo, and you never took me up on that.

As to the particularity of the topics speak for themselves, and I clearly did not simply state "the applications." For example, I narrowed in from the broader category to very specifically request a witness prepared to discuss: "The data and inputs and model referred to in Section 3.1 of the applications as follows: [the] geologic model and properties served as inputs for numerical simulations of CO2 injection using Computer Modelling Group Ltd.'s (CMG's) GEM software (Computer Modelling Group Ltd., 2021). Numerical simulations of CO2 injection were conducted to assess potential CO2 injection rate, disposition of injected CO2, wellhead pressure (WHP), bottomhole pressure (BHP), and pressure changes in the storage reservoir throughout the expected injection time frame and postinjection period. Results of the numerical simulations were then used to determine the project's area of review (AOR) pursuant to North Dakota's geologic CO2 storage regulations." I also specified: "United States Geological Survey's PHREEQC geochemical model and both the data files and data inputs used to run this model and bases for using the chosen inputs."

I intend to move forward with the deposition tomorrow morning. If there is no witness I will put that on record and continue the deposition.

Thank you,
Derrick

**Derrick Braaten**

**BRAATEN LAW FIRM**
109 N. 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
Fax: 701-221-5842
www.braatenlawfirm.com

**PRIVILEGED COMMUNICATION**
**This e-mail message is intended only for the named recipient(s) above and is covered by the Electronic Communications Privacy Act, 18 U.S.C. Sections 2510-2521. This e-mail is confidential and may contain information that is privileged, attorney work product or exempt from disclosure under applicable law. Recipients should not file copies of this e-mail with publicly accessible records. If you have received this message in error, please immediately notify the sender by return e-mail and delete this e-mail message from your computer. Thank you for your cooperation.**

---

**From:** Etter, Mary <MEtter@fredlaw.com>
**Sent:** Wednesday, June 5, 2024 5:55 PM
**To:** Derrick Braaten <derrick@braatenlawfirm.com>
**Cc:** Bender, Lawrence <LBender@fredlaw.com>
**Subject:** NDIC Case Nos. 30869-30880

[Warning: External Sender]
Good evening, Derrick,

Please see the attached letter from Mr. Bender. If you have any questions, please contact Lawrence.

Thank you,
Mary

***Mary Etter***
*Legal Administrative Assistant to Jason R.S. Cassady,*
*Justin G. Hughes, and Spencer D. Ptacek*
Fredrikson & Byron, P.A.
304 East Front Ave, Suite 400 | Bismarck, ND 58504-5639
Direct: 701.221.8642 | Main: 701.221.8700| metter@fredlaw.com
www.fredlaw.com

Fredrikson

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

| | | |
|---|---|---|
| In re application of Summit | : Case No(s). | 30869 |
| Carbon Storage #1, LLC requesting | : | 30870 |
| consideration for the geologic | : | 30871 |
| storage of carbon dioxide in the | : | 30872 |
| Broom Creek Formation from the | : | 30873 |
| Midwest Carbon Express Pipeline in | : | 30874 |
| the storage facility located in | : | 30875 |
| Sections 31, 32, 33, and 34, | : | 30876 |
| Township 142 North, Range 87 West, | : | 30877 |
| Sections 1, 11, 12, 13, 14, 15, | : | 30878 |
| 22, 23, 24, 25, 26, 35, and 36, | : | 30879 |
| Township 141 North, Range 88 West, | : | 30880 |
| Sections 2, 3, 4, 5, 6, 7, 8, 9, | : | |
| 10, 11, 14, 15, 16, 17, 18, 19, | : | |
| 20, 21, 22, 23, 25, 26, 27, 28, | : | |
| 29, 30, 31, 32, 33, 34, and 35, | : | |
| Township 141 North, Range 87 West, | : | |
| Sections 1, 2, 3, and 12, Township | : | |
| 140 North, Range 88 West and | : | |
| Sections 4, 5, 6, and 7, Township | : | |
| 140 North, Range 87 West, Mercer, | : | |
| Morton, and Oliver Counties, ND. | : | |
| | | |
| In re application of Summit | : | |
| Carbon Storage #1, LLC to | : | |
| consider the amalgamation of the | : | |
| storage reservoir pore space, in | : | |
| which the Commission may require | : | |
| that the pore space owned by | : | |
| nonconsenting owners be included | : | |
| in the geologic storage, as | : | |
| required to operate the Summit | : | |
| Carbon Storage #1, LLC storage | : | |
| facility located in Sections 31, | : | |
| 32, 33, and 34, Township 142 | : | |
| North, Range 87 West, Sections 1, | : | |
| 11, 12, 13, 14, 15, 22, 23, 24, | : | |
| 25, 26, 35, and 36, Township 141 | : | |
| North, Range 88 West, Sections 2, | : | |
| 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, | : | |
| 15, 16, 17, 18, 19, 20, 21, 22, | : | |
| 23, 25, 26, 27, 28, 29, 30, 31, | : | |
| 32, 33, 34, and 35, Township 141 | : | |

North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re application of Summit Carbon Storage #1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township

140 North, Range 88 West and :
Sections 4, 5, 6, and 7, Township :
140 North, Range 87 West, Mercer, :
Morton, and Oliver Counties, ND, :
subject to the application of :
Summit Carbon Storage #1, LLC for :
the geologic storage of carbon :
dioxide in the Broom Creek :
Formation. :

In re application of Summit :
Carbon Storage #2, LLC requesting :
consideration for the geologic :
storage of carbon dioxide in the :
Broom Creek Formation from the :
Midwest Carbon Express Pipeline :
in the storage facility located in:
Sections 27, 28, 29, 32, 33, 34, :
and 35, Township 143 North, Range :
88 West, Sections 1, 2, 3, 4, 5, :
6, 7, 8, 9, 10, 11, 12, 13, 14, :
15, 16, 17, 18, 19, 20, 21, 22, :
23, 24, 25, 26, 27, 28, 29, 30, :
32, 33, 34, 35, and 36, Township :
142 North, Range 88 West, Sections:
5, 6, 7, 8, 17, 18, 19, 20, 29, :
30, and 31, Township 142 North, :
Range 87 West, and Sections 1, 2, :
and 3, Township 141 North, Range :
88 West, Mercer and Oliver :
Counties, ND. :

In re application of Summit :
Carbon Storage #2, LLC to :
consider the amalgamation of the :
storage reservoir pore space, in :
which the Commission may require :
that the pore space owned by :
nonconsenting owners be included :
in the geologic storage, as :
required to operate the Summit :
Carbon Storage #2, LLC storage :
facility located in Sections 27, :
28, 29, 32, 33, 34, and 35, :
Township 143 North, Range 88 West,:
Sections 1, 2, 3, 4, 5, 6, 7, 8, :
9, 10, 11, 12, 13, 14, 15, 16, 17,:
18, 19, 20, 21, 22, 23, 24, 25, :

26, 27, 28, 29, 30, 32, 33, 34, :
35, and 36, Township 142 North, :
Range 88 West, Sections 5, 6, 7, :
8, 17, 18, 19, 20, 29, 30, and 31,:
Township 142 North, Range 88 West,:
Sections 5, 6, 7, 8, 17, 18, 19, :
20, 29, 30, 31, Township 142 :
North, Range 87 West, and Sections:
1, 2, and 3, Township 141 North, :
Range 88 West, Mercer and Oliver :
Counties, ND in the Broom Creek :
Formation. :

In re application of Summit :
Carbon Storage #2, LLC to :
consider the application of Summit:
Carbon Storage #2, LLC for an :
order of the Commission :
determining the amount of :
financial responsibility for the :
geologic storage of carbon dioxide:
from the Midwest Carbon Express :
Pipeline in the storage facility :
located in Sections 27, 28, 29, :
32, 33, 34, and 35, Township 143 :
North, Range 88 West, Sections 1, :
2, 3, 4, 5, 6, 7, 8, 9, 10, 11, :
12, 13, 14, 15, 16, 17, 18, 19, :
20, 21, 22, 23, 24, 25, 26, 27, :
28, 29, 30, 32, 33, 34, 35, and :
36, Township 142 North, Range 88 :
West, Sections 5, 6, 7, 8, 17, 18,:
19, 20, 29, 30, and 31, Township :
142 North, Range 87 West, and :
Sections 1, 2, and 3, Township 141:
North, Range 88 West, Mercer and :
Oliver Counties, ND, in the Broom :
Creek Formation. :

In re motion of the Commission to :
consider establishing the field :
and pool limits for lands located :
in Sections 27, 28, 29, 32, 33, :
34, and 35, Township 143 North, :
Range 88 West, Sections 1, 2, 3, :
4, 5, 6, 7, 8, 9, 10, 11, 12, 13, :
14, 15, 16, 17, 18, 19, 20, 21, :
22, 23, 24, 25, 26, 27, 28, 29, :

30, 32, 33, 34, 35, and 36, :
Township 142 North, Range 88 West,:
Sections 5, 6, 7, 8, 17, 18, 19, :
20, 29, 30, and 31, Township 142 :
North, Range 87 West, and Sections:
1, 2, and 3, Township 141 North, :
Range 88 West, Mercer and Oliver :
Counties, ND, subject to the :
application of Summit Carbon :
Storage #2, LLC for the geologic :
storage of carbon dioxide in the :
Broom Creek Formation, and enact :
such special field rules as may :
be necessary. :

In re application of Summit :
Carbon Storage #3, LLC requesting :
consideration for the geologic :
storage of carbon dioxide in the :
Broom Creek Formation from the :
Midwest Carbon Express Pipeline in:
the storage facility located in :
Section 36, Township 143 North, :
Range 87 West, Sections 19, 20, :
21, 28, 29, 30, 31, 32, 33, 34, :
35, and 36, Township 143 North, :
Range 87 West, Sections 19, 20, :
21, 28, 29, 30, 31, 32, 33, 34, :
35, and 36, Township 143 North, :
Range 86 West, Sections 1, 2, 11, :
12, 13 14, and 24, Township 142 :
North, Range 87 West, Sections 1, :
2, 3, 4, 5, 6, 7, 8, 9, 10, 11, :
12, 13, 14, and 24, Township 142 :
North, Range 87 West, Sections 1, :
2, 3, 4, 5, 6, 7, 8, 9, 10, 11, :
12, 13, 14, 15, 16, 17, 18, 19, :
20, 21, 22, 23, 25, 26, 26, 27, :
28, 29, 30, 32, 33, 34, and 35, :
Township 142 North, Range 86 West,:
and Sections 6, 7, 17, 18, 19, :
and 20, Township 142 North, Range :
85 West, Oliver County, ND. :

In re application of Summit :
Carbon Storage #3, LLC to consider:
the amalgamation of the storage :
reservoir space, in which the :

Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.

In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.

In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

**TRANSCRIPT OF PROCEEDINGS**

**Taken At**
**100 North Fourth Street**
**Bismarck, North Dakota**
**June 6, 2024**

**(APPEARANCES AS NOTED HEREIN)**

**A P P E A R A N C E S**

MR. DERRICK BRAATEN
MS. DESIRAE ZASTE, Paralegal and Videographer
Braaten Law Firm
Attorneys at Law
Suite 100
109 North Fourth Street
Bismarck, North Dakota 58501

FOR THE INTERVENORS, THE SWENSON LIVING TRUST, BAUMAN, GERVING, HAUPT, JOCHIM, KRAFT, LIEBELT, MAIZE, METZ, RUST, AND SMITH.

---

**C O N T E N T S**


CERTIFICATE OF COURT REPORTER..... 18

---

DEPOSITION EXHIBITS:

| No. | Description | First Referenced |
|---|---|---|
| 1 | Landowners Notice of 30(b)(6) Deposition of Summit Carbon Solutions..... | 11 |
| 2 | Intervenor Landowners' Amended Notice of 30(b)(6) Deposition of Summit Carbon Solutions..... | 12 |
| 3 | June 4, 2024, Letter..... | 12 |
| 4 | Intervenor Landowners' Second Amended Notice of 30(b)(6) Deposition of Summit Carbon Storage #1, LLC..... | 13 |
| 5 | Intervenor Landowners' Second Amended Notice of 30(b)(6) Deposition of Summit Carbon Storage #2, LLC..... | 13 |
| 6 | Intervenor Landowners' Second Amended Notice of 30(b)(6) Deposition of Summit Carbon Storage #3, LLC..... | 13 |
| 7 | June 5, 2024, Letter..... | 14 |
| 8 | June 5 and 6, 2024, Email String... | 14 |
| 9 | May 2, 2024, Letter..... | 15 |
| 10 | May 9, 2024, Email String..... | 16 |


---

10

(Pursuant to Notice to Take 30(b)(6) Deposition of **SUMMIT CARBON STORAGE #1, LLC, SUMMIT CARBON STORAGE #2, LLC, and SUMMIT CARBON STORAGE #3, LLC**, in the above-entitled cause, the following proceeding came on for taking before Stephanie A. Smith, a Registered Professional Reporter and a Notary Public in and for the State of North Dakota, at the Braaten Law Firm, 109 North Fourth Street, Suite 100, in the City of Bismarck, County of Burleigh, State of North Dakota, on the 6th day of June, 2024, commencing at 9:02 a.m., counsel appearing on behalf of the respective parties as hereinbefore indicated:)

---

(The following proceedings were had and made of record:)

THE VIDEOGRAPHER: This is the audiovisual 30(b)(6) deposition of Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC, being taken on behalf of intervenor landowners in the matter of the applications of Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC, Case Numbers 30869, 30870, 30871, 30872, 30873, 30874, 30875, 30876, 30877, 30878,

11

30879 and 30880 before the Oil and Gas Division of the North Dakota Industrial Commission.

This is being taken on behalf of the intervenor landowners represented by Braaten Law Firm. This deposition is being held on June 6, 2024, at the offices of Braaten Law Firm in Bismarck, North Dakota, commencing at 9:02 a.m.

My name is Desirae Zaste of Braaten Law Firm, and I am recording the deposition supplementally. The officer, court reporter and notary public is Stephanie Smith of Emineth & Associates.

Will counsel please state their appearances.

MR. BRAATEN: Derrick Braaten with Braaten Law Firm on behalf of the intervenors, including the Swenson Living Trust and other intervenors granted intervenor status in the proceeding by the Industrial Commission.

I am going to put a few documents down on record to document the fact that the deponent is not going to appear for the deposition today.

Okay. We have marked as Deposition Exhibit No. 1 Landowners Notice of 30(b)(6) Deposition. This is the original deposition notice

12

with topics dated May 9, 2024, and was served on Lawrence Bender of Fredrikson & Byron.

We have now marked Deposition Exhibit 2 electronically for the record. Deposition Exhibit 2 is Intervenor Landowners' Amended Notice of 30(b)(6) Deposition, which was dated May 31, 2024, and served once intervention was granted to Intervenors Swenson Living Trust, Bauman, Gerving, Haupt, Jochim, Kraft, Liebelt, Maize, Metz, Rust and Smith, given an objection from Summit's counsel that intervenors could not serve a deposition notice until officially granted party status. Therefore, immediately upon being granted party status, the notice was re-served with the topics not changing at all.

We have now electronically marked Exhibit No. 3 to the deposition, which is a letter dated June 4, 2024, from Lawrence Bender to Derrick Braaten. In that letter Mr. Bender indicates that the notice was served upon Summit Carbon Solutions, LLC, and he indicates that that entity is not a party to the proceeding and the three subsidiary entities, Summit Carbon Storage #1, #2 and #3, LLC, are the actual parties and, therefore, Summit Carbon Solutions, LLC, would require a subpoena.

13

We -- the intervenors disagree given that the application was submitted for those three subsidiary entities by Summit Carbon Solutions, LLC, in care of Summit Carbon Solutions, LLC.

We will now mark three exhibits, Exhibit Nos. 4, 5 and 6. Beginning with 4, these are three amended notices of deposition, one each directed at Summit Carbon Storage #1, LLC; an amended notice directed at Summit -- Summit Carbon Storage #2, LLC, which is now marked as Exhibit 5 to the deposition; and an amended notice directed to Summit Carbon Storage #3, LLC, which is now electronically marked as Exhibit No. 6 to the deposition.

These three notices were served within a couple hours of receiving Mr. Bender's letter indicating that he believed the Summit Carbon Solutions entity would require a subpoena. We believe that it is clear to who these notices were directed.

Throughout all of these amended deposition notices there was not a single change to any of the topics that had been listed for this 30(b)(6) deposition.

Following service of the amended

deposition notices to Summit Carbon Storage #1, #2 and #3, we received a letter that has now been marked electronically as Exhibit No. 7. That letter is dated June 5 from Lawrence Bender to Derrick Braaten. That letter then sets out a number of additional objections that Mr. Bender and his client raised to the deposition notice. This letter was sent yesterday after close of business, and also advised -- in the last paragraph Mr. Bender states, "Ultimately, this letter is intended to inform you that because of the Intervenor Landowners' failure to comply with Rule 30, my clients do not intend to appear for the depositions tomorrow, June 6, 2024, as set forth in the Deposition Notices."

In response to that letter from Mr. Bender, I sent an email back to Mr. Bender that has now been electronically marked as Exhibit No. 8. That email responded to Mr. Bender's objections and let him know that I disagreed with all of those objections and particularly with the use of such objections to avoid a deposition.

Given that Mr. Bender and his clients have not filed any motions for protective order or otherwise taken any other actions to comply with



the notice in the Rules of Civil Procedure, we intend to seek to compel the deposition and to seek sanctions for the failure to appear.

In my email marked as Exhibit 8, I let Mr. Bender know that we intended to move forward with the deposition this morning, which is what we are doing right now, and I let him know that if there is no witness, I will put that on record and continue the deposition, which is what we intend to do.

To that email, I also attached two different attachments, one being a prior email as well as a prior letter that I sent to Mr. Bender offering to confer on these depositions in order to address any concerns he might have. We have electronically marked as Exhibit 9 one of those attachments, which is a letter dated May 2, 2024, from Derrick Braaten to Lawrence Bender, telling him that I would like to conduct a 30(b)(6) deposition of his client and that I am currently working on a topic list. I indicate that I intend to serve a couple rounds of written discovery and would like to take a 30(b)(6) deposition and asked Mr. Bender to sit down and confer and discuss coordination.



We also electronically marked as Exhibit No. 10 an email from Derrick Braaten to Lawrence Bender dated May 9, which was responding to the service of the 30(b)(6) deposition notice upon Mr. Bender. I indicated to Mr. Bender in that email that I scheduled the deposition to get a date down, and that I did try to look at Mr. Bender's schedule and his PSC hearings and other matters to find a date that I did not think he would have a conflict. I told him I am nonetheless open to rescheduling the deposition if there is another mutually agreeable date.

Other than the communications I've put on record in these exhibits from Mr. Bender, I have not received other communications from him in response to my numerous attempts over the course of the last month to provide notice, meet with and confer with Mr. Bender to conduct this deposition.

We will leave the record open for this deposition and continue the deposition while we file a motion to compel and seek sanctions for the failure to appear.

And with that we can go off the record.

THE VIDEOGRAPHER: This is the end of the audiovisual 30(b)(6) deposition of Summit Carbon



Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC, taken at the offices of Braaten Law Firm in Bismarck, North Dakota, on June 6, 2024.

We are off the video and off the record at 9:16 p.m. [sic], Central time.

MR. BRAATEN: And just to remain on record for one moment, I should have noted this, but we are going to leave the record open for the continuance of the deposition.

(Recessed at 9:17 a.m., Thursday, the 6th day of June, 2024.)

---

CERTIFICATE OF COURT REPORTER

I, Stephanie A. Smith, a Registered Professional Reporter,

DO HEREBY CERTIFY that I recorded in shorthand the foregoing proceedings had and made of record at the time and place hereinbefore indicated.

I DO HEREBY FURTHER CERTIFY that the foregoing typewritten pages contain an accurate transcript of my shorthand notes then and there taken.

Dated at Bismarck, North Dakota, this 6th day of June, 2024.

_____

Stephanie A. Smith
Registered Professional Reporter

## 1

**1** [40] - 1:4, 1:8, 1:12, 1:15, 1:19, 1:21, 2:1, 2:5, 2:10, 2:14, 2:20, 2:24, 3:3, 3:10, 3:14, 3:23, 4:5, 4:13, 4:18, 4:23, 5:3, 5:15, 5:16, 5:18, 6:6, 6:7, 6:18, 6:20, 7:4, 7:5, 9:7, 9:13, 10:2, 10:18, 10:22, 11:24, 12:23, 13:8, 14:1, 17:1
**10** [15] - 1:10, 1:23, 2:12, 2:22, 3:11, 3:24, 4:14, 4:23, 5:17, 5:18, 6:7, 6:20, 7:6, 9:22, 16:2
**100** [3] - 7:19, 8:5, 10:9
**109** [2] - 8:6, 10:8
**11** [22] - 1:8, 1:10, 1:21, 1:23, 2:10, 2:12, 2:20, 2:22, 3:11, 3:24, 4:14, 4:23, 5:15, 5:17, 5:18, 6:6, 6:7, 6:19, 6:20, 7:4, 7:6, 9:8
**12** [23] - 1:8, 1:12, 1:21, 2:1, 2:10, 2:14, 2:20, 2:24, 3:11, 3:24, 4:14, 4:23, 5:16, 5:17, 5:19, 6:6, 6:8, 6:19, 6:20, 7:5, 7:6, 9:10, 9:11
**13** [20] - 1:8, 1:21, 2:10, 2:20, 3:11, 3:24, 4:14, 4:23, 5:16, 5:17, 5:19, 6:6, 6:8, 6:19, 6:20, 7:5, 7:6, 9:13, 9:16, 9:18
**14** [23] - 1:8, 1:10, 1:21, 1:23, 2:10, 2:12, 2:20, 2:22, 3:11, 3:24, 4:14, 4:24, 5:16, 5:17, 5:19, 6:6, 6:8, 6:19, 6:20, 7:5, 7:6, 9:19, 9:20
**140** [8] - 1:12, 1:13, 2:1, 2:2, 2:14, 2:15, 3:1, 3:2
**141** [12] - 1:9, 1:11, 1:22, 1:24, 2:11, 2:13, 2:21, 2:24, 3:15, 4:5, 4:18, 5:3
**142** [26] - 1:7, 1:20, 2:9, 2:20, 3:13, 3:14, 4:1, 4:3, 4:4, 4:16, 4:17, 5:1, 5:2, 5:16, 5:17, 5:20, 5:21, 6:6, 6:9, 6:10, 6:19, 6:22, 6:23, 7:5, 7:8, 7:9
**143** [13] - 3:10, 3:23, 4:13, 4:22, 5:12, 5:13, 5:15, 6:4, 6:5, 6:17, 6:18, 7:2, 7:4
**15** [17] - 1:8, 1:10, 1:21, 1:23, 2:10, 2:12, 2:20, 2:22, 3:11, 3:24, 4:14, 4:24, 5:19, 6:8, 6:20, 7:6, 9:21
**16** [13] - 1:10, 1:23, 2:12, 2:22, 3:11, 3:24, 4:14, 4:24, 5:19, 6:8, 6:20, 7:6, 9:22
**17** [21] - 1:10, 1:23, 2:12, 2:22, 3:11, 3:13, 3:24, 4:2, 4:3, 4:14, 4:16, 4:24, 5:2, 5:19, 5:21, 6:8, 6:10, 6:20, 6:22, 7:6, 7:8
**18** [22] - 1:10, 1:23, 2:12, 2:22, 3:11, 3:13, 3:24, 4:2, 4:3, 4:14, 4:16, 4:24, 5:2, 5:19, 5:21, 6:8, 6:10, 6:21, 6:23, 7:6, 7:8, 9:3
**19** [26] - 1:10, 1:23, 2:12, 2:22, 3:11, 3:13, 3:24, 4:2, 4:3, 4:14, 4:17, 4:24, 5:2, 5:12, 5:14, 5:19, 5:21, 6:4, 6:8, 6:10, 6:17, 6:21, 6:23, 7:3, 7:6, 7:8

## 2

**2** [44] - 1:9, 1:12, 1:22, 2:1, 2:11, 2:14, 2:22, 2:24, 3:6, 3:10, 3:14, 3:17, 3:21, 3:23, 4:5, 4:8, 4:9, 4:14, 4:18, 4:23, 5:3, 5:5, 5:15, 5:17, 5:18, 6:6, 6:7, 6:19, 6:20, 7:4, 7:6, 9:9, 9:16, 9:21, 10:3, 10:19, 10:23, 12:3, 12:5, 12:23, 13:9, 14:1, 15:17, 17:1
**20** [26] - 1:10, 1:23, 2:12, 2:23, 3:11, 3:13, 3:24, 4:2, 4:4, 4:15, 4:17, 4:24, 5:2, 5:12, 5:14, 5:19, 5:21, 6:4, 6:8, 6:10, 6:17, 6:21, 6:23, 7:3, 7:7, 7:9
**2024** [16] - 7:20, 9:11, 9:19, 9:20, 9:21, 9:22, 10:11, 11:6, 12:1, 12:7, 12:18, 14:14, 15:17, 17:4, 17:12, 18:14
**21** [17] - 1:10, 1:23, 2:12, 2:23, 3:11, 3:24, 4:15, 4:24, 5:13, 5:14, 5:19, 6:5, 6:8, 6:17, 6:21, 7:3, 7:7
**22** [16] - 1:8, 1:10, 1:21, 1:23, 2:10, 2:12, 2:21, 2:23, 3:11, 3:24, 4:15, 4:24, 5:19, 6:8, 6:21, 7:7
**23** [16] - 1:8, 1:10, 1:21, 1:24, 2:10, 2:12, 2:21, 2:23, 3:12, 3:24, 4:15, 4:24, 5:19, 6:8, 6:21, 7:7
**24** [16] - 1:8, 1:21, 2:10, 2:21, 3:12, 3:24, 4:15, 4:24, 5:16, 5:17, 6:6, 6:8, 6:19, 6:21, 7:5, 7:7
**25** [16] - 1:8, 1:10, 1:22, 1:24, 2:10, 2:12, 2:21, 2:23, 3:12, 3:24, 4:15, 4:24, 5:19, 6:8, 6:21, 7:7
**26** [17] - 1:8, 1:10, 1:22, 1:24, 2:10, 2:12, 2:21, 2:23, 3:12, 4:1, 4:15, 4:24, 5:19, 6:8, 6:21, 7:7
**27** [16] - 1:10, 1:24, 2:13, 2:23, 3:9, 3:12, 3:22, 4:1, 4:12, 4:15, 4:22, 4:24, 5:19, 6:8, 6:21, 7:7
**28** [21] - 1:10, 1:24, 2:13, 2:23, 3:9, 3:12, 3:22, 4:1, 4:12, 4:15, 4:22, 4:24, 5:13, 5:14, 5:20, 6:5, 6:9, 6:17, 6:21, 7:3, 7:7
**29** [26] - 1:11, 1:24, 2:13, 2:23, 3:9, 3:12, 3:13, 3:22, 4:1, 4:2, 4:4, 4:12, 4:15, 4:17, 4:22, 4:24, 5:2, 5:13, 5:14, 5:20, 6:5, 6:9, 6:17, 6:21, 7:3, 7:7

## 3

**3** [36] - 1:9, 1:12, 1:23, 2:1, 2:11, 2:14, 2:22, 2:24, 3:10, 3:15, 3:23, 4:5, 4:14, 4:18, 4:23, 5:3, 5:9, 5:17, 5:18, 5:23, 6:3, 6:7, 6:13, 6:20, 7:6, 7:10, 9:11, 9:18, 10:4, 10:20, 10:24, 12:17, 12:23, 13:12, 14:2, 17:2
**30** [23] - 1:11, 1:24, 2:13, 2:23, 3:12, 3:14, 4:1, 4:2, 4:4, 4:15, 4:17, 5:1, 5:2, 5:13, 5:14, 5:20, 6:5, 6:9, 6:17, 6:21, 7:3, 7:7, 14:13
**30(b)(6** [14] - 9:7, 9:9, 9:12, 9:15, 9:17, 10:1, 10:18, 11:24, 12:6, 13:23, 15:19, 15:23, 16:4, 16:25
**30869** [2] - 1:3, 10:24
**30870** [2] - 1:4, 10:24
**30871** [2] - 1:4, 10:24
**30872** [2] - 1:5, 10:25
**30873** [2] - 1:5, 10:25
**30874** [2] - 1:6, 10:25
**30875** [2] - 1:6, 10:25
**30876** [2] - 1:7, 10:25
**30877** [2] - 1:7, 10:25
**30878** [2] - 1:8, 10:25
**30879** [2] - 1:8, 11:1
**30880** [2] - 1:9, 11:1
**31** [19] - 1:7, 1:11, 1:20, 1:24, 2:9, 2:13, 2:19, 2:23, 3:14, 4:2, 4:4, 4:17, 5:2, 5:13, 5:14, 6:5, 6:17, 7:3, 12:6
**32** [25] - 1:7, 1:11, 1:20, 1:24, 2:9, 2:13, 2:19, 2:23, 3:9, 3:12, 3:22, 4:1, 4:13, 4:15, 4:22, 5:1, 5:13, 5:14, 5:20, 6:5, 6:9, 6:17, 6:21, 7:3, 7:7
**33** [25] - 1:7, 1:11, 1:20, 1:24, 2:9, 2:13, 2:19, 2:23, 3:9, 3:12, 3:22, 4:1, 4:13, 4:15, 4:22, 5:1, 5:13, 5:14, 5:20, 6:5, 6:9, 6:18, 6:21, 7:3, 7:7
**34** [25] - 1:7, 1:11, 1:20, 1:24, 2:9, 2:13, 2:19, 2:23, 3:9, 3:12, 3:22, 4:1, 4:13, 4:15, 4:22, 5:1, 5:13, 5:14, 5:20, 6:5, 6:9, 6:18, 6:21, 7:3, 7:7
**35** [25] - 1:8, 1:11, 1:22, 1:24, 2:10, 2:13, 2:21, 2:23, 3:10, 3:12, 3:22, 4:1, 4:13, 4:15, 4:22, 5:1, 5:13, 5:15, 5:20, 6:5, 6:9, 6:18, 6:22, 7:4, 7:7
**36** [17] - 1:8, 1:22, 2:11, 2:21, 3:12, 4:1, 4:16, 5:1, 5:12, 5:13, 5:15, 6:4, 6:5, 6:16, 6:18, 7:2, 7:4

## 4

**4** [22] - 1:9, 1:13, 1:23, 2:2, 2:11, 2:15, 2:22, 3:1, 3:10, 3:23, 4:14, 4:23, 5:17, 5:18, 6:7, 6:20, 7:6, 9:11, 9:12, 12:18, 13:6

## 5

**5** [28] - 1:9, 1:13, 1:23, 2:2, 2:11, 2:15, 2:22, 3:1, 3:10, 3:13, 3:23, 4:2, 4:3, 4:14, 4:16, 4:23, 5:2, 5:17, 5:18, 6:7, 6:20, 7:6, 9:14, 9:19, 9:20, 13:6, 13:10, 14:4
**58501** [1] - 8:6

## 6

**6** [34] - 1:9, 1:13, 1:23, 2:2, 2:11, 2:15, 2:22, 3:1, 3:11, 3:13, 3:23, 4:2, 4:3, 4:14, 4:16, 4:23, 5:2, 5:17, 5:18, 5:21, 6:7, 6:10, 6:20, 6:22, 7:6, 7:8, 7:20, 9:17, 9:20, 11:5, 13:6, 13:13, 14:14, 17:4
**6th** [3] - 10:10, 17:11, 18:13

## 7

**7** [28] - 1:9, 1:13, 1:23, 2:2, 2:12, 2:15, 2:22, 3:1, 3:11, 3:13, 3:23, 4:2, 4:3, 4:14, 4:16, 4:23, 5:2, 5:17, 5:18, 5:21, 6:7, 6:10, 6:20, 6:22, 7:6, 7:8, 9:19, 14:3

## 8

**8** [21] - 1:9, 1:23, 2:12, 2:22, 3:11, 3:13, 3:23, 4:2, 4:3, 4:14, 4:16, 4:23, 5:2, 5:17, 5:18, 6:7, 6:20, 7:6, 9:20, 14:19, 15:4
**85** [4] - 5:22, 6:10, 6:23, 7:9
**86** [8] - 5:15, 5:20, 6:6, 6:9, 6:18, 6:22, 7:4, 7:8
**87** [26] - 1:7, 1:11, 1:13, 1:21, 2:1, 2:3, 2:10, 2:14, 2:15, 2:20, 2:24, 3:2, 3:14, 4:4, 4:17, 5:3, 5:12, 5:14, 5:16, 5:18, 6:4, 6:7, 6:17, 6:19, 7:3, 7:5
**88** [21] - 1:9, 1:12, 1:22, 2:2, 2:11, 2:14, 2:21, 3:1, 3:10, 3:13, 3:15, 3:23, 4:2, 4:3, 4:5, 4:13, 4:16, 4:18, 4:23, 5:1, 5:4

## 9

**9** [18] - 1:9, 1:23, 2:12, 2:22, 3:11, 3:24, 4:14, 4:23, 5:17, 5:18, 6:7, 6:20, 7:6, 9:21, 9:22, 12:1, 15:16, 16:3
**9:02** [2] - 10:11, 11:7
**9:16** [1] - 17:6
**9:17** [1] - 17:11

## A

**a.m** [3] - 10:11, 11:7, 17:11
**above-entitled** [1] - 10:4
**accurate** [1] - 18:10
**actions** [1] - 14:25
**actual** [1] - 12:24
**additional** [1] - 14:6
**address** [1] - 15:15
**advised** [1] - 14:9
**agreeable** [1] - 16:12
**amalgamation** [3] - 1:16, 3:18, 5:24
**Amended** [5] - 9:9, 9:12, 9:15, 9:17, 12:5
**amended** [5] - 13:7, 13:8, 13:11, 13:21, 13:25
**amount** [3] - 2:6, 4:10, 6:14
**AND** [2] - 1:2, 8:10
**appear** [4] - 11:22, 14:13, 15:3, 16:22
**appearances** [1] - 11:14
**APPEARANCES** [1] - 7:23
**appearing** [1] - 10:12
**application** [14] - 1:3, 1:15, 2:5, 3:3, 3:6, 3:17, 4:7, 4:8, 5:5, 5:8, 5:23, 6:12, 7:10, 13:2
**applications** [1] - 10:22
**AS** [1] - 7:23
**Associates** [1] - 11:12
**attached** [1] - 15:11
**attachments** [2] - 15:12, 15:17
**attempts** [1] - 16:16
**Attorneys** [1] - 8:5
**audiovisual** [2] - 10:17, 16:25
**avoid** [1] - 14:22

## B

**Bauman** [1] - 12:8
**BAUMAN** [1] - 8:8
**beginning** [1] - 13:6
**behalf** [4] - 10:12, 10:20, 11:3, 11:16
**Bender** [18] - 12:2, 12:18, 12:19, 14:4, 14:6, 14:10, 14:17, 14:23, 15:5, 15:13, 15:18, 15:24, 16:3, 16:5, 16:14, 16:18
**Bender's** [3] - 13:16, 14:19, 16:7
**Bismarck** [6] - 7:19, 8:6, 10:9, 11:7, 17:3, 18:13
**BRAATEN** [3] - 8:3, 11:15, 17:7
**Braaten** [12] - 8:4, 10:8, 11:4, 11:6, 11:8, 11:15, 12:19, 14:5, 15:18, 16:2, 17:3
**Broom** [12] - 1:5, 2:4, 2:16, 3:4, 3:8, 4:6, 4:19, 5:6, 5:10, 6:11, 6:24, 7:11
**Burleigh** [1] - 10:10
**business** [1] - 14:8
**Byron** [1] - 12:2

## C

**Carbon** [46] - 1:4, 1:6, 1:15, 1:19, 2:5, 2:8, 3:3, 3:6, 3:8, 3:17, 3:21, 4:8, 4:9, 4:11, 5:5, 5:9, 5:11, 5:23, 6:3, 6:13, 6:15, 7:10, 9:7, 9:10, 9:13, 9:15, 9:18, 10:18, 10:19, 10:20, 10:22, 10:23, 12:20, 12:23, 12:25, 13:3, 13:4, 13:8, 13:9, 13:12, 13:17, 14:1, 16:25, 17:1, 17:2
**CARBON** [3] - 10:2, 10:3
**carbon** [9] - 1:5, 2:7, 3:4, 3:7, 4:11, 5:6, 5:10, 6:15, 7:11
**care** [1] - 13:4
**Case** [2] - 1:3, 10:24
**Central** [1] - 17:6
**CERTIFICATE** [2] - 9:3, 18:1
**CERTIFY** [2] - 18:5, 18:9
**change** [1] - 13:22
**changing** [1] - 12:15
**City** [1] - 10:9
**Civil** [1] - 15:1
**clear** [1] - 13:19
**client** [2] - 14:7, 15:20
**clients** [2] - 14:13, 14:23
**close** [1] - 14:8
**commencing** [2] - 10:11, 11:7
**Commission** [10] - 1:17, 2:6, 3:19, 4:9, 4:20, 6:1, 6:13, 7:1, 11:2, 11:19
**communications** [2] - 16:13, 16:15
**compel** [2] - 15:2, 16:21
**comply** [2] - 14:12, 14:25
**concerns** [1] - 15:15
**conduct** [2] - 15:19, 16:18
**confer** [3] - 15:14, 15:24, 16:18
**conflict** [1] - 16:10
**consider** [7] - 1:16, 2:18, 3:18, 4:8, 4:21, 5:23, 7:1
**consideration** [3] - 1:4, 3:7, 5:9
**contain** [1] - 18:10
**continuance** [1] - 17:10
**continue** [2] - 15:9, 16:20
**coordination** [1] - 15:25
**counsel** [3] - 10:11, 11:13, 12:10
**Counties** [8] - 1:14, 2:3, 2:16, 3:2, 3:16, 4:6, 4:19, 5:4
**County** [4] - 5:22, 6:11, 6:24, 10:9
**county** [1] - 7:9
**couple** [2] - 13:16, 15:22
**course** [1] - 16:16
**COURT** [2] - 9:3, 18:1
**court** [1] - 11:10
**Creek** [12] - 1:5, 2:4, 2:16, 3:4, 3:8, 4:6, 4:19, 5:6, 5:10, 6:11, 6:24, 7:11

## D

**Dakota** [8] - 7:19, 8:6, 10:7, 10:10, 11:2, 11:7, 17:3, 18:13
**DAKOTA** [1] - 1:1
**date** [3] - 16:6, 16:9, 16:12
**dated** [6] - 12:1, 12:6, 12:17, 14:4, 15:17, 16:3
**Dated** [1] - 18:13
**deponent** [1] - 11:21
**DEPOSITION** [1] - 9:5
**deposition** [28] - 10:18, 11:5, 11:9, 11:22, 11:25, 12:11, 12:17, 13:7, 13:11, 13:14, 13:21, 13:24, 14:1, 14:7, 14:22, 15:2, 15:6, 15:9, 15:20, 15:23, 16:4, 16:6, 16:11, 16:18, 16:20, 16:25, 17:10
**Deposition** [12] - 9:7, 9:9, 9:13, 9:15, 9:18, 10:2, 11:23, 11:25, 12:3, 12:4, 12:6, 14:15
**depositions** [2] - 14:14, 15:14
**DERRICK** [1] - 8:3
**Derrick** [5] - 11:15, 12:18, 14:5, 15:18, 16:2
**Description** [1] - 9:6
**Desirae** [1] - 11:8
**DESIRAE** [1] - 8:3
**determining** [3] - 2:6, 4:10, 6:14
**different** [1] - 15:12
**dioxide** [9] - 1:5, 2:7, 3:4, 3:7, 4:11, 5:6, 5:10, 6:15, 7:11
**directed** [4] - 13:7, 13:9, 13:11, 13:20
**disagree** [1] - 13:1
**disagreed** [1] - 14:20
**discovery** [1] - 15:22
**discuss** [1] - 15:24
**DIVISION** [1] - 1:2
**Division** [1] - 11:1
**DO** [2] - 18:5, 18:9
**document** [1] - 11:21
**documents** [1] - 11:20
**down** [3] - 11:20, 15:24, 16:7

## E

**electronically** [7] - 12:4, 12:16, 13:13, 14:3, 14:18, 15:16, 16:1

**email** [7] - 14:17, 14:19, 15:4, 15:11, 15:12, 16:2, 16:6
**Email** [2] - 9:20, 9:22
**Emineth** [1] - 11:11
**enact** [2] - 5:6, 7:12
**end** [1] - 16:24
**entities** [2] - 12:23, 13:3
**entitled** [1] - 10:4
**entity** [2] - 12:21, 13:18
**establishing** [3] - 2:18, 4:21, 7:1
**Exhibit** [12] - 11:24, 12:3, 12:5, 12:16, 13:5, 13:10, 13:13, 14:3, 14:18, 15:4, 15:16, 16:1
**EXHIBITS** [1] - 9:5
**exhibits** [2] - 13:5, 16:14
**Express** [6] - 1:6, 2:8, 3:8, 4:11, 5:11, 6:15

## F

**facility** [9] - 1:6, 1:20, 2:8, 3:9, 3:22, 4:12, 5:11, 6:3, 6:16
**fact** [1] - 11:21
**failure** [3] - 14:12, 15:3, 16:22
**few** [1] - 11:20
**field** [5] - 2:18, 4:21, 5:7, 7:1, 7:12
**file** [1] - 16:21
**filed** [1] - 14:24
**financial** [3] - 2:7, 4:10, 6:14
**Firm** [7] - 8:4, 10:8, 11:5, 11:6, 11:9, 11:16, 17:3
**First** [1] - 9:5
**following** [3] - 10:4, 10:15, 13:25
**FOR** [1] - 8:7
**foregoing** [2] - 18:6, 18:10
**Formation** [12] - 1:5, 2:4, 2:17, 3:5, 3:8, 4:6, 4:19, 5:6, 5:10, 6:11, 6:24, 7:11
**forth** [1] - 14:14
**forward** [1] - 15:5
**Fourth** [3] - 7:19, 8:6, 10:8
**Fredrikson** [1] - 12:2
**FURTHER** [1] - 18:9

## G

**Gas** [1] - 11:1
**GAS** [1] - 1:2
**geologic** [12] - 1:4, 1:18, 2:7, 3:4, 3:7, 3:20, 4:11, 5:5, 5:9, 6:2, 6:15, 7:11
**GERVING** [1] - 8:8
**Gerving** [1] - 12:8
**given** [3] - 12:10, 13:1, 14:23
**granted** [4] - 11:18, 12:7, 12:12, 12:13

## H

**HAUPT** [1] - 8:9
**Haupt** [1] - 12:9
**hearings** [1] - 16:8
**held** [1] - 11:5
**HEREBY** [2] - 18:5, 18:9
**HEREIN** [1] - 7:23
**hereinbefore** [2] - 10:13, 18:7
**hours** [1] - 13:16

## I

**immediately** [1] - 12:13
**included** [3] - 1:18, 3:20, 6:2
**including** [1] - 11:16
**indicate** [1] - 15:21
**indicated** [3] - 10:13, 16:5, 18:8
**indicates** [2] - 12:19, 12:21
**indicating** [1] - 13:17
**Industrial** [2] - 11:2, 11:19
**inform** [1] - 14:11
**intend** [4] - 14:13, 15:2, 15:9, 15:21
**intended** [2] - 14:11, 15:5
**Intervenor** [6] - 9:9, 9:12, 9:14, 9:17, 12:5, 14:12
**intervenor** [3] - 10:21, 11:4, 11:18
**intervenors** [4] - 11:16, 11:17, 12:11, 13:1
**INTERVENORS** [1] - 8:7
**Intervenors** [1] - 12:8
**intervention** [1] - 12:7

## J

**JOCHIM** [1] - 8:9
**Jochim** [1] - 12:9
**June** [12] - 7:20, 9:11, 9:19, 9:20, 10:11, 11:5, 12:18, 14:4, 14:14, 17:4, 17:12, 18:14

## K

**Kraft** [1] - 12:9
**KRAFT** [1] - 8:9

## L

**landowners** [2] - 10:21, 11:4
**Landowners** [2] - 9:7, 11:24
**Landowners'** [6] - 9:9, 9:12, 9:14, 9:17, 12:5, 14:12
**lands** [3] - 2:19, 4:21, 7:2
**last** [2] - 14:9, 16:17
**Law** [8] - 8:4, 8:5, 10:8, 11:4, 11:6, 11:8, 11:16, 17:3
**Lawrence** [5] - 12:2, 12:18, 14:4, 15:18, 16:2
**leave** [2] - 16:19, 17:9
**letter** [11] - 12:17, 12:19, 13:16, 14:2, 14:4, 14:5, 14:8, 14:10, 14:16, 15:13, 15:17
**Letter.....** [2] - 9:11, 9:19
**Letter.....** [1] - 9:21
**LIEBELT** [1] - 8:9
**Liebelt** [1] - 12:9
**limits** [3] - 2:19, 4:21, 7:2
**list** [1] - 15:21
**listed** [1] - 13:23
**Living** [2] - 11:17, 12:8
**LIVING** [1] - 8:8
**LLC** [36] - 1:4, 1:15, 1:19, 2:5, 3:3, 3:6, 3:17, 3:21, 4:8, 4:9, 5:5, 5:9, 5:23, 6:3, 6:13, 7:10, 10:2, 10:3, 10:4, 10:19, 10:20, 10:22, 10:23, 10:24, 12:21, 12:23, 12:25, 13:4, 13:8, 13:10, 13:12, 17:1, 17:2
**LLC.....** [3] - 9:13, 9:16, 9:18
**located** [12] - 1:6, 1:20, 2:9, 2:19, 3:9, 3:22, 4:12, 4:21, 5:11, 6:3, 6:16, 7:2
**look** [1] - 16:7

## M

**Maize** [1] - 12:9
**MAIZE** [1] - 8:9
**mark** [1] - 13:5
**marked** [10] - 11:23, 12:3, 12:16, 13:10, 13:13, 14:3, 14:18, 15:4, 15:16, 16:1
**matter** [1] - 10:21
**matters** [1] - 16:8
**meet** [1] - 16:17
**Mercer** [8] - 1:13, 2:3, 2:16, 3:2, 3:15, 4:5, 4:18, 5:4
**Metz** [1] - 12:9
**METZ** [1] - 8:9
**Midwest** [6] - 1:6, 2:8, 3:8, 4:11, 5:11, 6:15
**might** [1] - 15:15
**moment** [1] - 17:8
**month** [1] - 16:17
**morning** [1] - 15:6
**Morton** [4] - 1:14, 2:3, 2:16, 3:2
**motion** [4] - 2:18, 4:20, 7:1, 16:21
**motions** [1] - 14:24
**move** [1] - 15:5
**MR** [3] - 8:3, 11:15, 17:7
**MS** [1] - 8:3
**mutually** [1] - 16:12

## N

**name** [1] - 11:8
**ND** [12] - 1:14, 2:3, 2:16, 3:2, 3:16, 4:6, 4:19, 5:4, 5:22, 6:11, 6:24, 7:9
**necessary** [2] - 5:7, 7:12
**No(s)** [1] - 1:3
**nonconsenting** [3] - 1:18, 3:20, 6:1
**nonetheless** [1] - 16:10
**NORTH** [1] - 1:1
**North** [70] - 1:7, 1:9, 1:11, 1:12, 1:13, 1:21, 1:22, 2:1, 2:1, 2:2, 2:9, 2:11, 2:13, 2:14, 2:15, 2:20, 2:21, 2:24, 3:1, 3:2, 3:10, 3:13, 3:14, 3:15, 3:23, 4:1, 4:3, 4:4, 4:5, 4:13, 4:16, 4:17, 4:18, 4:22, 5:1, 5:3, 5:3, 5:12, 5:13, 5:15, 5:16, 5:18, 5:20, 5:21, 6:4, 6:5, 6:7, 6:9, 6:10, 6:17, 6:18, 6:19, 6:22, 6:23, 7:2, 7:4, 7:5, 7:8, 7:9, 7:19, 7:19, 8:6, 8:6, 10:7, 10:8, 10:10, 11:2, 11:7, 17:3, 18:13
**Nos** [1] - 13:6
**Notary** [1] - 10:7
**notary** [1] - 11:11
**NOTED** [1] - 7:23
**noted** [1] - 17:8
**notes** [1] - 18:11
**notice** [10] - 11:25, 12:12, 12:14, 12:20, 13:8, 13:11, 14:7, 15:1, 16:4, 16:17
**Notice** [8] - 9:7, 9:9, 9:12, 9:15, 9:17, 10:1, 11:24, 12:5
**notices** [5] - 13:7, 13:15, 13:19, 13:22, 14:1
**Notices** [1] - 14:15
**number** [1] - 14:6
**Numbers** [1] - 10:24

**numerous** [1] - 16:16

## O

**objection** [1] - 12:10
**objections** [4] - 14:6, 14:20, 14:21, 14:22
**OF** [3] - 7:15, 9:3, 18:1
**offering** [1] - 15:14
**officer** [1] - 11:10
**offices** [2] - 11:6, 17:2
**officially** [1] - 12:12
**OIL** [1] - 1:2
**Oil** [1] - 11:1
**Oliver** [12] - 1:14, 2:3, 2:16, 3:2, 3:15, 4:5, 4:19, 5:4, 5:22, 6:11, 6:23, 7:9
**once** [1] - 12:7
**one** [4] - 13:7, 15:12, 15:16, 17:8
**open** [3] - 16:10, 16:19, 17:9
**operate** [3] - 1:19, 3:21, 6:2
**order** [5] - 2:6, 4:9, 6:13, 14:24, 15:14
**original** [1] - 11:25
**otherwise** [1] - 14:25
**owned** [3] - 1:17, 3:19, 6:1
**owners** [3] - 1:18, 3:20, 6:2

## P

**p.m** [1] - 17:6
**pages** [1] - 18:10
**paragraph** [1] - 14:9
**Paralegal** [1] - 8:3
**particularly** [1] - 14:21
**parties** [2] - 10:12, 12:24
**party** [3] - 12:12, 12:13, 12:22
**Pipeline** [6] - 1:6, 2:8, 3:8, 4:12, 5:11, 6:16
**place** [1] - 18:7
**pool** [3] - 2:18, 4:21, 7:2
**pore** [5] - 1:16, 1:17, 3:18, 3:19, 6:1
**Procedure** [1] - 15:1
**proceeding** [3] - 10:5, 11:18, 12:22
**PROCEEDINGS** [1] - 7:15
**proceedings** [2] - 10:15, 18:6
**Professional** [3] - 10:6, 18:4, 18:18
**protective** [1] - 14:24
**provide** [1] - 16:17
**PSC** [1] - 16:8
**Public** [1] - 10:7
**public** [1] - 11:11
**Pursuant** [1] - 10:1
**put** [3] - 11:20, 15:8, 16:13

## R

**raised** [1] - 14:7
**Range** [59] - 1:7, 1:9, 1:11, 1:12, 1:13, 1:21, 1:22, 2:1, 2:2, 2:3, 2:9, 2:11, 2:13, 2:14, 2:15, 2:20, 2:21, 2:24, 3:1, 3:2, 3:10, 3:13, 3:14, 3:15, 3:23, 4:2, 4:3, 4:4, 4:5, 4:13, 4:16, 4:17, 4:18, 4:23, 5:1, 5:3, 5:4, 5:12, 5:14, 5:15, 5:16, 5:18, 5:20, 5:21, 6:4, 6:6, 6:7, 6:9, 6:10, 6:17, 6:18, 6:19, 6:22, 6:23, 7:3, 7:4, 7:5, 7:8, 7:9
**re** [13] - 1:3, 1:15, 2:5, 2:18, 3:6, 3:17, 4:7, 4:20, 5:8, 5:23, 6:12, 7:1, 12:14
**re-served** [1] - 12:14
**received** [2] - 14:2, 16:15
**receiving** [1] - 13:16
**Recessed** [1] - 17:11
**record** [11] - 10:16, 11:21, 12:4, 15:8, 16:14, 16:19, 16:23, 17:5, 17:7, 17:9, 18:7
**recorded** [1] - 18:5
**recording** [1] - 11:9
**Referenced** [1] - 9:6
**Registered** [3] - 10:6, 18:3, 18:18
**remain** [1] - 17:7
**Reporter** [3] - 10:6, 18:4, 18:18
**REPORTER** [1] - 18:1
**reporter** [1] - 11:10
**REPORTER.....** [1] - 9:3
**represented** [1] - 11:4
**requesting** [3] - 1:4, 3:6, 5:9
**require** [5] - 1:17, 3:19, 6:1, 12:25, 13:18
**required** [3] - 1:19, 3:21, 6:2
**rescheduling** [1] - 16:11
**reservoir** [3] - 1:16, 3:18, 5:24
**respective** [1] - 10:12
**responded** [1] - 14:19
**responding** [1] - 16:3
**response** [2] - 14:16, 16:16
**responsibility** [3] - 2:7, 4:10, 6:14
**rounds** [1] - 15:22
**Rule** [1] - 14:13
**rules** [2] - 5:7, 7:12
**Rules** [1] - 15:1
**RUST** [1] - 8:10
**Rust** [1] - 12:9

## S

**sanctions** [2] - 15:3, 16:21
**schedule** [1] - 16:8
**scheduled** [1] - 16:6
**Second** [3] - 9:12, 9:14, 9:17
**Section** [4] - 5:12, 6:4, 6:16, 7:2
**Sections** [55] - 1:7, 1:8, 1:9, 1:12, 1:13, 1:20, 1:21, 1:22, 2:1, 2:2, 2:9, 2:10, 2:11, 2:14, 2:15, 2:19, 2:20, 2:22, 2:24, 3:1, 3:9, 3:10, 3:13, 3:14, 3:22, 3:23, 4:2, 4:3, 4:4, 4:12, 4:13, 4:16, 4:18, 4:22, 4:23, 5:2, 5:3, 5:12, 5:14, 5:15, 5:16, 5:18, 5:21, 6:4, 6:6, 6:7, 6:10, 6:17, 6:18, 6:20, 6:22, 7:3, 7:4, 7:5, 7:8
**seek** [3] - 15:2, 16:21
**sent** [3] - 14:8, 14:17, 15:13
**serve** [2] - 12:11, 15:22
**served** [5] - 12:1, 12:7, 12:14, 12:20, 13:15
**service** [2] - 13:25, 16:4
**set** [1] - 14:14
**sets** [1] - 14:5
**shorthand** [2] - 18:6, 18:11
**sic** [1] - 17:6
**single** [1] - 13:22
**sit** [1] - 15:24
**Smith** [5] - 10:6, 11:11, 12:10, 18:3, 18:17
**SMITH** [1] - 8:10
**Solutions** [5] - 12:20, 12:25, 13:3, 13:4, 13:18
**Solutions.....** [1] - 9:10
**Solutions.....** [1] - 9:8
**space** [6] - 1:16, 1:17, 3:18, 3:19, 5:24, 6:1
**special** [2] - 5:7, 7:12
**State** [2] - 10:7, 10:10
**state** [1] - 11:13
**states** [1] - 14:10
**status** [3] - 11:18, 12:12, 12:14
**Stephanie** [4] - 10:5, 11:11, 18:3, 18:17
**Storage** [33] - 1:4, 1:15, 1:19, 2:5, 3:3, 3:6, 3:17, 3:21, 4:8, 4:9, 5:5, 5:9, 5:23, 6:3, 6:13, 7:10, 9:13, 9:16, 9:18, 10:18, 10:19, 10:20, 10:22, 10:23, 10:24, 12:23, 13:8, 13:9, 13:12, 14:1, 17:1, 17:2
**STORAGE** [3] - 10:2, 10:3
**storage** [24] - 1:5, 1:6, 1:16, 1:18, 1:19, 2:7, 2:8, 3:4, 3:7, 3:9, 3:18, 3:20, 3:21, 4:11, 4:12, 5:6, 5:10, 5:11, 5:24, 6:2, 6:3, 6:15, 6:16, 7:11
**Street** [3] - 7:19, 8:6, 10:8
**String..** [1] - 9:20
**String.....** [1] - 9:22
**subject** [3] - 3:3, 5:4, 7:9
**submitted** [1] - 13:2
**subpoena** [2] - 12:25, 13:18
**subsidiary** [2] - 12:22, 13:3
**Suite** [2] - 8:5, 10:9
**SUMMIT** [3] - 10:2, 10:3
**Summit** [41] - 1:3, 1:15, 1:19, 2:5, 3:3, 3:6, 3:17, 3:21, 4:7, 4:8, 5:5, 5:8, 5:23, 6:3, 6:12, 7:10, 9:7, 9:10, 9:13, 9:15, 9:18, 10:18, 10:19, 10:22, 10:23, 12:20, 12:23, 12:24, 13:3, 13:4, 13:8, 13:9, 13:12, 13:17, 14:1, 16:25, 17:1, 17:2
**Summit's** [1] - 12:10
**supplementally** [1] - 11:10
**SWENSON** [1] - 8:8
**Swenson** [2] - 11:17, 12:8

## T

**THE** [4] - 8:7, 8:8, 10:17, 16:24
**therefore** [2] - 12:13, 12:24
**three** [5] - 12:22, 13:2, 13:5, 13:6, 13:15
**throughout** [1] - 13:21
**Thursday** [1] - 17:11
**today** [1] - 11:22
**tomorrow** [1] - 14:14
**topic** [1] - 15:21
**topics** [3] - 12:1, 12:14, 13:23
**Township** [59] - 1:7, 1:9, 1:11, 1:12, 1:13, 1:20, 1:22, 1:24, 2:1, 2:2, 2:9, 2:11, 2:13, 2:14, 2:15, 2:20, 2:21, 2:24, 2:24, 3:1, 3:10, 3:12, 3:14, 3:15, 3:23, 4:1, 4:3, 4:4, 4:5, 4:13, 4:16, 4:17, 4:18, 4:22, 5:1, 5:2, 5:3, 5:12, 5:13, 5:15, 5:16, 5:17, 5:20, 5:21, 6:4, 6:5, 6:6,

6:9, 6:10, 6:16, 6:18, 6:19, 6:22, 6:23, 7:2, 7:4, 7:5, 7:8, 7:9
**TRANSCRIPT** [1] - 7:15
**transcript** [1] - 18:11
**Trust** [2] - 11:17, 12:8
**TRUST** [1] - 8:8
**try** [1] - 16:7
**two** [1] - 15:11
**typewritten** [1] - 18:10

## U

**Ultimately** [1] - 14:10

## V

**video** [1] - 17:5
**VIDEOGRAPHER** [2] - 10:17, 16:24
**Videographer** [1] - 8:4

## W

**West** [59] - 1:7, 1:9, 1:11, 1:12, 1:13, 1:21, 1:22, 2:1, 2:2, 2:3, 2:10, 2:11, 2:14, 2:14, 2:15, 2:20, 2:21, 2:24, 3:1, 3:2, 3:10, 3:13, 3:14, 3:15, 3:23, 4:2, 4:3, 4:4, 4:5, 4:13, 4:16, 4:17, 4:18, 4:23, 5:1, 5:3, 5:4, 5:12, 5:14, 5:15, 5:16, 5:18, 5:20, 5:22, 6:4, 6:6, 6:7, 6:9, 6:11, 6:17, 6:18, 6:19, 6:22, 6:23, 7:3, 7:4, 7:5, 7:8, 7:9
**witness** [1] - 15:8
**written** [1] - 15:22

## Y

**yesterday** [1] - 14:8

## Z

**Zaste** [1] - 11:8
**ZASTE** [1] - 8:3

**NORTH DAKOTA INDUSTRIAL COMMISSION**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case No(s). 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

---

## DECLARATION OF SERVICE

---

[¶1] I hereby certify that true and correct copies of the following documents:

- **Motion to Compel;**
- **Brief in Support of Motion to Compel;**
- **Declaration of Derrick Braaten in Support of Motion to Compel;**
- **Exhibit 1 - Landowners Notice of 30(b)(6) Deposition of Summit Carbon Solutions;**
- **Exhibit 2 - Intervenor Landowners' Amended Notice of 30(b)(6) Deposition of Summit Carbon Solutions;**
- **Exhibit 3 - Letter from Lawrence Bender regarding the Amended Notice of Deposition dated June 4, 2024;**
- **Exhibit 4 - Intervenor Landowners' Second Amended Notice of 30(b)(6) Deposition of Summit Carbon Storage #1, LLC;**
- **Exhibit 5 - Intervenor Landowners' Second Amended Notice of 30(b)(6) Deposition of Summit Carbon Storage #2, LLC;**
- **Exhibit 6 - Intervenor Landowners' Second Amended Notice of 30(b)(6) Deposition of Summit Carbon Storage #3, LLC;**
- **Exhibit 7 - Letter from Lawrence Bender dated June 5, 2024;**
- **Exhibit 8 - Email response on June 5, 2024 to Mr. Bender's email response;**
- **Exhibit 9 - Letter dated May 2, 2024 asking to confer regarding a 30(b)(6) deposition;**
- **Exhibit 10 - Email correspondence dated May 9, 2024;**
- **Exhibit 11 - Native Outlook Email regarding Exhibit 8;**
- **Exhibit 12 - Transcript of Proceedings regarding the nonappearance deposition of Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC; and**
- **Declaration of Service.**

were, on the 10th day of June, 2024 sent via electronic mail to the following:

North Dakota Industrial Commission
oilandgasinfo@nd.gov
slforsberg@nd.gov

Lynn Helms
lhelms@nd.gov

Lawrence Bender
Attorney at Law
lbender@fredlaw.com

Thomas Throne
Attorney at Law
tthrone@thronelaw.com

Joshua Swanson
Attorney for Intervenor Minnkota
jswanson@vogellaw.com

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on this 10th day of June, 2024 at Bismarck, North Dakota.

Desirae Zaste

**From:** jmiller2123
**To:** Forsberg, Sara L.
**Subject:** Carbon Storage in Cases 30869, 30873, and 30877
**Date:** Monday, June 10, 2024 4:52:15 PM

You don't often get email from jmiller2123@protonmail.com. Learn why this is important

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Dear Ms. Forsberg,

I am writing to voice my objection to the issuance of carbon dioxide storage facility permits for Summit Carbon Storage in Cases 30869, 30873, and 30877.

Alignment with Federal Policy

In 2022, the EPA presented a report highlighting significant improvements needed in the Class VI well permitting process. Despite North Dakota's authority over these wells, it is crucial that we take federal guidelines into account to maintain a transparent and equitable permitting system. A notable gap exists in addressing environmental justice (EJ) concerns, which the EPA further emphasized in their 2023 guidance. The EPA's recommendations for integrating EJ principles outline five critical areas: identifying communities that may be disproportionately affected, ensuring early and inclusive public engagement throughout the permitting process, conducting thorough EJ assessments, maintaining transparency in decision-making, and implementing mitigation measures to protect underground sources of drinking water (USDWs). Given the significance of these recommendations, the Commission should uphold these values to create a just and thorough permitting process for the benefit of North Dakotans.

Constitutionality

With ongoing legal challenges to North Dakota's amalgamation laws, it would be both prudent and necessary to suspend further actions until the Court reaches a definitive resolution. Advancing permit requests amidst such legal ambiguity not only risks undermining the rule of law but could also cause undue hardship for stakeholders. By waiting for a clear legal direction, the Commission can ensure all actions respect constitutional standards, protecting the interests and rights of all involved parties.

Economic Fallout

Granting Summit the ability to annually store up to 18 million metric tons of CO2 could severely disrupt industries dependent on carbon dioxide, such as fruit and vegetable preservation, beverage production, and pharmaceutical manufacturing. Ethanol plants supply a significant portion of domestic CO2 needed for industrial use; diverting this to underground storage will exacerbate the current CO2 shortage, adversely affecting several sectors crucial to North Dakota's economy. This potential economic damage, affecting jobs and consumers, must be seriously weighed against the claimed benefits of Summit's project.

Information within the Application/Fact Sheet

Summit's applications, submitted on February 6, 2024, fail to acknowledge their expansion with additional ethanol plants in January and March. This oversight, along with discrepancies in their stated CO2 sources (anthropogenic vs. biogenic), necessitates a more detailed review to ensure accurate and transparent information before any decisions are made.

Additional Concerns

I have several additional concerns. The risk of induced seismic activity from CO2 injection has been documented and poses a potentially significant threat. CO2 leakage into water sources could acidify groundwater, leading to heavy metal contamination. The long-term stability of CO2 storage is not guaranteed, risking re-release into the atmosphere and health impacts. Additionally, with CCS technology still evolving and unproven on the proposed scale, North Dakotans should not bear the risk of this experimental approach.

In conclusion, granting permits to Summit Carbon Storage at this juncture seems premature given the numerous unresolved issues. A cautious, thorough review that considers policy, legal, economic, and environmental impacts is essential for protecting North Dakota's communities.

Thank you for considering my comments.

Sincerely,

Janet Miller

**From:** Emma Schmit
**To:** Forsberg, Sara L.
**Subject:** Comment
**Date:** Monday, June 10, 2024 4:35:50 PM

You don't often get email from emmaschmit94@gmail.com. Learn why this is important

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Dear Ms. Forsberg,

Included below are my comments objecting to the issuance of carbon dioxide storage facility permits for Summit Carbon Storage in Cases 30869, 30873, and 30877.

**Alignment with Federal Policy**

As you may be aware, in 2022 the Environmental Protection Agency (EPA) submitted a report to Congress outlining improvements that should be made to the Class VI well permitting process. Many of these recommendations have not been implemented in North Dakota. While acknowledging North Dakota's primacy over underground injection wells, it is still advisable for the Commission to consider federal policy suggestions to ensure a fair, transparent, and thorough permitting process. Of particular concern is the lack of environmental justice (EJ) considerations. In 2023, EPA issued guidance for integrating environmental justice principles into Class VI well permitting procedures. Within the guidance, EPA strongly encouraged states to incorporate five aspects of environmental justice into their primacy programs. These five themes are included below.

1. Identify communities with potential EJ concerns: : UIC well owners/operators, permit applicants, and EPA Regions should [...] identify communities potentially adversely and disproportionately affected by human health, environmental, climate-related, and/or other cumulative harms or risks – that is, affected communities with potential EJ concerns – to help ensure proactive community engagement and promote the just treatment and meaningful involvement of the affected community in UIC permitting actions.

2. Enhance public involvement: Permit applicants and regulators should enhance community engagement and implement an inclusive public participation process. Community outreach should be conducted early in the permit application process for all Class VI projects, and,

especially for those permits that may have EJ concerns, before the permit application is submitted. This practice creates the opportunity to identify resources or any additional information that would facilitate understanding the potential effects of a permitting action on the community and promote just treatment and meaningful participation throughout the permitting process. Early engagement may also facilitate the early identification of mitigation measures that the applicant can take to address potential adverse and disproportionate effects of the permitting action. It is important for EPA and primacy agencies to communicate throughout the permitting process and to address concerns affecting the community.

3. Conduct appropriately scoped EJ assessments: Evaluate whether the siting of a Class VI project at the proposed location will create any new risks or exacerbate any existing impacts on affected communities, including on affected lower-income communities and communities of color. Such evaluations might consider the demographic composition of surrounding communities, the presence of existing environmental hazards, potential exposure pathways, and susceptible sub-populations, as well as the likely distribution of any environmental and public health impacts from the proposed Class VI project in affected communities. These assessments will provide valuable information for facilitating meaningful public engagement, as well as identify concerns (i.e., risks to USDWs) that may need to be addressed in the permitting decision.

4. Enhance transparency throughout the permitting process: It is important that there is transparency in decision making throughout the UIC Class VI permitting process. For example, the administrative record for the permit should be readily available in a format and location that is easily accessible to the affected community. Authoritative agencies should clearly document the affected community's concerns and address those concerns to the greatest extent practicable and permitted by law.

5. Minimize adverse effects to USDWs and the communities they may serve: Proactively work to prevent any adverse impacts to USDWs from all activities throughout the lifetime of the project. Owner/operators should employ a range of project specific mitigation measures to ensure Class VI projects do not increase environmental impacts, resource issues, and public health risks in already overburdened communities.

The issuance of permits for Summit should be approached with caution, particularly in light of

the EPA's recent guidelines and the broader concerns regarding environmental justice. The recommendations from the 2022 EPA report to Congress and the 2023 EJ guidance highlight critical areas for improvement in the permitting process. It is imperative that these considerations are fully addressed to promote a just and balanced permitting process that prioritizes the well-being of North Dakotan communities.

**Constitutionality**

Given the ongoing court proceedings challenging the legality of North Dakota's amalgamation laws, it is both prudent and necessary to delay any further actions on ventures related to these laws until the constitutionality has been definitively resolved by the Court. Proceeding with the permitting requests in the midst of legal uncertainty could not only undermine the rule of law but also expose stakeholders to significant and unnecessary hardship. Furthermore, it is essential to ensure that any actions taken are in full compliance with constitutional principles, safeguarding the rights and interests of all parties involved. By postponing further action until the Court has rendered a clear decision, the Commission can uphold the integrity of the legal process and avoid the complications that may arise from premature enforcement of constitutionally challenged laws. This cautious approach will provide a stable and lawful foundation, ensuring that the Commission's decisions are undertaken with due respect for legal and constitutional standards.

**Economic Fallout**

Allowing Summit to store up to 18 mmt of carbon annually would negatively impact various industries that rely on CO2. Since 2020, there has been a shortage of carbon dioxide for industrial use and it's a trend anticipated to continue. Ethanol provides 43% of domestic CO2 byproduct for industrial use. Diverting the ethanol industry's CO2 to underground storage would further such shortages. Concern surrounding this issue has led to the formation of a national coalition made up of both CO2 suppliers and end-users in opposition to sequestration to prevent the undersupply of CO2 byproduct for industrial use.

Many industries, including fruit and vegetable preservation, beverage production, and pharmaceutical manufacturing rely on carbon dioxide. Those same industries are also top areas of production job growth in North Dakota's manufacturing sphere. The damage Summit's project would have on existing industries, and in turn, the consumers, employees, and communities who rely upon them should be weighed against the 150 direct and indirect

jobs Summit purports will be brought to North Dakota should their project be approved.

**Information within the Application/Fact Sheet**

Summit submitted the applications on February 6, 2024. On January 24, 2024 Summit partnered with POET to add an additional 17 ethanol plants, none of which are included in the Project Summary. In March, an additional 8 Valero ethanol facilities were incorporated into the proposed project – again, none of which are included in the Project Summary. Additionally, both the Application and the Fact Sheet attached to the Draft Storage Facility Permit claim Summit would sequester anthropogenic CO2. This is in direct contrast with statements made by Summit in the media, on their website, and in various state proceedings where they claim they will be capturing and storing biogenic CO2. These issues need to be addressed before a decision is finalized.

**Additional Concerns**

A variety of areas for concern are condensed in this section under the assumption that many of these issues are likely to be addressed by others.

Seismic Activity: Injection of carbon dioxide into underground reservoirs could induce seismic activity.. This has been observed in other regions where similar practices are employed. We've also seen operators underreport seismic activity caused by the injection of CO2 underground. Given the project provides limited, if any, benefits to the people of North Dakota, the possibility of any increase in seismic activity is an unnecessary risk.

Water Contamination: There is a non-zero chance of CO2 leaking into underground water sources. Carbon can dissolve in water, resulting in the formation of carbonic acid . This weak acid can lead to the acidification of groundwater, making it unsuitable for consumption. Acidified water can also cause leaching of toxic metals such as lead and arsenic from surrounding rocks, leading to further water contamination.

Long-Term Storage Uncertainty: The long-term stability and effectiveness of carbon storage are not fully understood. Over time, carbon can escape back into the atmosphere, undermining the purpose of sequestration and potentially risking the health of nearby residents.

Technological Challenges: Despite decades of investments and demo-projects, the technology for CCS is still developing. Given that CCS has never been practiced on the scale proposed by

Summit, there may be technical challenges that could compromise the effectiveness and safety of CO2 storage. There is no reason for North Dakotans to be the test subjects for a risky and proven-to-fail technology.

In light of the significant concerns outlined above, it is clear that the permit requests for Summit Carbon Storage in Cases 30869, 30873, and 30877 should be tabled or outright denied at this point in time. Until the many issues surrounding Summit's proposal have been adequately resolved, North Dakotans should not be subjected to the uncertainties and potential hazards of this project. A thorough and cautious approach to the permitting process for Summit Carbon Storage is imperative. The Commission should ensure that all policy recommendations, constitutional considerations, economic impacts, and potential environmental and public health risks are fully considered and addressed before making any decisions in order to promote a just, transparent, and balanced process that protects the interests and well-being of North Dakota's communities.

Thank you for your consideration,
Emma Schmit

| | |
|---|---|
| **From:** | Joshua A. Swanson |
| **To:** | Knutson, Amy N.; Bender, Lawrence; Derrick Braaten; tthrone@thronelaw.com |
| **Cc:** | Forsberg, Sara L.; Garner, David P.; Helms, Lynn D.; desirae@braatenlawfirm.com; BHughes@fredlaw.com; MEtter@fredlaw.com |
| **Subject:** | Summit Carbon Storage (Case Nos. 30869-30880) |
| **Date:** | Monday, June 10, 2024 3:56:56 PM |
| **Attachments:** | Minnkota Power Coop Letter.pdf<br>Exhibit A Minnkota Letter (RE_ SCS_MPC Agreement).pdf |

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Dear Commission,

Please find attached a letter from Minnkota Power Cooperative, Inc., for Case Nos. 30869 – 30880, along with the Exhibit A referenced in the letter.

As stated in the letter, based on an agreement reached between Minnkota and Summit, Minnkota will not be offering testimony or appearing in the proceedings subject to Summit submitting an amendment to Section 3.12 of the Storage Agreement at the hearing for the KJ Hintz storage facility permit application, and that amended language agreed to (as stated in Exhibit A) being included in the storage agreement at Section 3.12.

If you have any questions, please let me know.

Thank you.

Joshua A. Swanson | Attorney
T: 701.237.6983 | F: 701.356.6395
vogellaw.com | jswanson@vogellaw.com

**Joshua A. Swanson**

Phone: 701.237.6983 jswanson@vogellaw.com

June 10, 2024

North Dakota Industrial Commission
Oil & Gas Division
Attn: Hon. David P. Garner
1000 East Calgary Avenue
Bismarck, North Dakota 58503

e-mail only to: dpgarner@nd.gov, lhelms@nd.gov, lbender@fredlaw.com, slforsberg@nd.gov, oilandgasinfo@nd.gov, derrick@braatenlawfirm.com, and anknutson@nd.gov

**Re: Case Nos. 30869 – 30880**
**Our File No.: 021130.24018**

Dear Industrial Commission:

On June 3, 2024, the Commission granted Minnkota Power Cooperative, Inc.'s ("Minnkota"), Motion to Intervene in these proceedings, at Case Nos. 30869 - 30880. In its Order, the Commission stated that, "Minnkota must demonstrate the existence of the above-described correlative rights." See Order at ¶ 4.

Earlier today, June 10, 2024, Minnkota and Summit reached an agreement with respect to Minnkota's concerns as evidenced by the e-mail attached hereto and marked Exhibit A. In relevant part, as stated by Summit in Exhibit A, Summit and Minnkota agreed as follows: "Summit will submit an amendment to section 3.12 of the storage agreement in the KJ Hintz storage facility permit at the hearing for the KJ Hintz storage facility permit application inserting the language below."

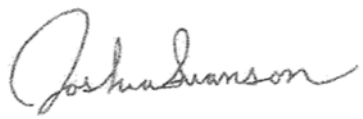
The terms that Summit and Minnkota agreed to, which are provided at Exhibit A, provide for Summit agreeing to submit to the Commission an amendment to Section 3.12 of the storage agreement in the KJ Hintz storage facility permit, as follows:

> 3.12 Border Agreement(s) with Minnkota Power Cooperative, Inc. Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC (collectively, "Summit Carbon Storage") agrees to enter into a certain border agreement ("Border Agreement") with Minnkota Power Cooperative, Inc., its affiliates or successors in interest to the DCC Permits (as defined herein) ("Minnkota") which terms and conditions if more stringent than those contained herein shall supplement conditions contained in orders issued or arising from Summit Carbon Storage's applications to the Commission in Case Nos. Case Nos. 30869 – 30880 including any revisions thereto (the "Summit Carbon Storage Applications"), and Minnkota's prior vested approved permits from the Commission, including but not limited to those issued in Case Nos. 29029 – 29034, and 30122 – 30125,

including all related Orders issued to Minnkota's (collectively referred to as " DCC Permits"). Summit Carbon Storage agrees that prior to the Commission's authorization to inject under NDAC 43-05-01-09(3) on any injection facility and/or facilities, identified, arising from, or developed as a result of Summit Carbon Storage Applications and/or prior to any future Summit Carbon Storage applications under the authority of the Commission, which seek to establish operating rights, or to locate or site facilities within an Area of Review containing Minnkota's facilities as described in or interests vested by the DCC Permits Summit must get the written consent and authorization of Minnkota. These conditions are necessary to protect Minnkota's rights and interests vested under the DCC Permits, from any damage and/or adverse impacts caused by Summit Carbon Storage's operations, including but not limited to, location of injection or extraction facilities, rates of injection. Any violation of the terms of the Border Agreement, or the terms contained in this Article 3.12, will result in irreparable harm to Minnkota, and that as a result, Minnkota is entitled to immediate relief from the Commission to enforce the terms of thereof, and that the terms of the Border Agreement are a condition of the issuance of any permits to Summit Carbon Storage by the Commission. To the extent anything in the Border Agreement is inconsistent with, or otherwise conflicts with, the terms in this Article 3.12, the terms in Article 3.12 control and will be enforced. If Minnkota unreasonably withholds consent and authorization, Summit Carbon Storage may apply to the Commission for waiver of the requirements of this Article 3.12 prior to first injection, in accordance with NDAC 43-05-01-09(3), or at any point during operation, in accordance NDAC 43-05-01-12(1)(n), which application shall include supporting data and information, that establishes that Summit Carbon Storage's operations as described in the Summit Carbon Storage Application do not damage or adversely impact Minnkota's rights under the DCC Permits. Upon at least a thirty-day notice to Minnkota and after an evidentiary hearing, the Commission will determine and set appropriate operating standards consistent with correlative rights and the efficient development of resources.

Based on Summit agreeing to this, and such language being included in the storage agreement at section 3.12, Minnkota does not anticipate offering testimony in Case Nos. 30869 – 30880 or appearing in these proceedings. If you have any questions, please let me know.

Respectfully,



Joshua A. Swanson

enc: Exhibit A

# EXHIBIT A

**From:** Joshua A. Swanson
**To:** Joshua A. Swanson
**Subject:** RE: SCS/MPC Agreement
**Date:** Monday, June 10, 2024 3:17:09 PM

---

**From:** Mac McLennan <mmclennan@minnkota.com>
**Sent:** Monday, June 10, 2024 2:03 PM
**To:** Wade Boeshans <wboeshans@summitcarbon.com>
**Subject:** Re: SCS/MPC Agreement

Wade,

Thank you. Consistent with our conversation, I will advance this to our counsel so they can take the next steps.

Mac

Get Outlook for iOS

---

**From:** Wade Boeshans <wboeshans@summitcarbon.com>
**Sent:** Monday, June 10, 2024 12:55:36 PM
**To:** Mac McLennan <mmclennan@minnkota.com>
**Subject:** [EXTERNAL] SCS/MPC Agreement

**CAUTION: This message originated from outside of the organization. Do not click links or open attachments unless you recognize the sender and know the content is safe.**

---

Mac,
Pursuant to our discussion. Summit and Minnkota agree as follows:

1. Summit will submit an amendment to section 3.12 of the storage agreement in the KJ Hintz storage facility permit at the hearing for the KJ Hintz storage facility permit application inserting the language below.

*3.12 Border Agreement(s) with Minnkota Power Cooperative, Inc. Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC (collectively, "Summit Carbon Storage") agrees to enter into a certain border agreement ("Border Agreement") with Minnkota Power Cooperative, Inc., its affiliates or successors in*

*interest to the DCC Permits (as defined herein) ("Minnkota") which terms and conditions if more stringent than those contained herein shall supplement conditions contained in orders issued or arising from Summit Carbon Storage's applications to the Commission in Case Nos. Case Nos. 30869 – 30880 including any revisions thereto (the "Summit Carbon Storage Applications"), and Minnkota's prior vested approved permits from the Commission, including but not limited to those issued in Case Nos. 29029 – 29034, and 30122 – 30125, including all related Orders issued to Minnkota's (collectively referred to as " DCC Permits"). Summit Carbon Storage agrees that prior to the Commission's authorization to inject under NDAC 43-05-01-09(3) on any injection facility and/or facilities, identified, arising from, or developed as a result of Summit Carbon Storage Applications and/or prior to any future Summit Carbon Storage applications under the authority of the Commission, which seek to establish operating rights, or to locate or site facilities within an Area of Review containing Minnkota's facilities as described in or interests vested by the DCC Permits Summit must get the written consent and authorization of Minnkota. These conditions are necessary to protect Minnkota's rights and interests vested under the DCC Permits, from any damage and/or adverse impacts caused by Summit Carbon Storage's operations, including but not limited to, location of injection or extraction facilities, rates of injection. Any violation of the terms of the Border Agreement, or the terms contained in this Article 3.12, will result in irreparable harm to Minnkota, and that as a result, Minnkota is entitled to immediate relief from the Commission to enforce the terms of thereof, and that the terms of the Border Agreement are a condition of the issuance of any permits to Summit Carbon Storage by the Commission. To the extent anything in the Border Agreement is inconsistent with, or otherwise conflicts with, the terms in this Article 3.12, the terms in Article 3.12 control and will be enforced. If Minnkota unreasonably withholds consent and authorization, Summit Carbon Storage may apply to the Commission for waiver of the requirements of this Article 3.12 prior to first injection, in accordance with NDAC 43-05-01-09(3), or at any point during operation, in accordance NDAC 43-05-01-12(1)(n), which application shall include supporting data and information, that establishes that Summit Carbon Storage's operations as described in the Summit Carbon Storage Application do not damage or adversely impact Minnkota's rights under the DCC Permits. Upon at least a thirty-day notice to Minnkota and after an evidentiary hearing, the Commission will determine and set appropriate operating standards consistent with correlative rights and the efficient development of resources.*

Please review and respond with your concurrence.

Wade

WADE BOESHANS | M: (701)400-8911 | WBOESHANS@SUMMITCARBON.COM

**From:** Carla Poeckes
**To:** Forsberg, Sara L.
**Subject:** Summit Carbon Solutions Support Letter
**Date:** Monday, June 10, 2024 3:47:17 PM

You don't often get email from lvs@westriv.com. Learn why this is important

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

TO WHOM IT MAY CONCERN:

Lake View Services, LLC is a local crane & trucking company located in Beulah and Trenton, ND. We have been serving western ND for 13 years. The last two years we have had the privilege of working with Summit to maintain their current well sites. Our working relationship with them is one we definitely enjoy! They are very easy to communicate with, they pay their bills promptly and are always willing to assist us in helping to assist them. We support this project and are proud of Summit for utilizing local ND contractors and look forward to continuing our working relationship with them.

*Gary & Carla Poeckes*
**LAKE VIEW SERVICES, LLC**
P.O BOX 995
BEULAH, ND 58523
OFFICE : 701-873-2719
CELL ; 701-570-5527 & 701-260-2449
Lvs @w Estr Iv .COm

**From:** Anna Novak For North Dakota
**To:** Forsberg, Sara L.
**Subject:** Letter of support for Summ
**Date:** Monday, June 10, 2024 3:37:56 PM
**Attachments:** Summit support 6.24.docx

---

You don't often get email from novakfornd@gmail.com. Learn why this is important

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Good afternoon.

Please accept this letter in support of the Summit project. Thank you.

Rep Anna Novak

To: NDIC

Re: Summit Carbon Storage Facility Permits

From: Anna Novak, State Representative District 33

Thank you for the opportunity to offer my support of Summit in their applications for the storage facility permits.

We have significant history of carbon management in North Dakota, dating back to the 1990's with the adoption of the legislative framework, and the construction and operation of the Dakota Gasification Company (DGC) pipeline. DGC has a 20+ year history of safely transporting carbon dioxide through a 200-mile pipeline from Beulah to Weyburn Saskatchewan. In addition, DGC has recently begun carbon dioxide injection and sequestration locally. We have also seen the addition of storage facility permits for Red Trail Ethanol. With the steps taken by Summit to ensure safety and compliance with the laws of North Dakota, I have no doubt that this can be done both safely and properly.

Also, the monetization of our landowners' pore space is an important consideration that will lead to improved economics for many in our area, as well as the economic development for our area businesses.

The level of voluntary landowner support in these storage areas has been extremely high, which is an important benchmark for this project. I was told that voluntary landowner easements for storage are at 93%. While 100% voluntary easements are the goal, it is important to understand that both the 93% and the 7% of landowners have rights. Currently, it is highly unlikely that 100% landowner support on any project can be attained. If we would reject projects because of this, we would not have oil pipelines, electrical transmission lines or water projects that provide clean water to all parts of the state or prevent flooding.

I am aware of the ongoing search for technology to enhance the oil recovery in the maturing oil fields of North Dakota. Lynn Helms has testified that significant amounts of carbon dioxide could be necessary to attain the goal of additional reserves that are not available based on our current technologies but could be soon. I am hopeful that the carbon dioxide from this project in addition to the carbon dioxide from our coal-fired power plants will be used for enhanced oil recovery in the not-so-distant future. It is important that we continue working towards that goal and this project gets us closer to enhanced oil recovery in the Bakken.

For these reasons, I support the approval of these storage facility permits.

**From:** MEDA SCHULTZ
**To:** Forsberg, Sara L.
**Cc:** MEDA SCHULTZ
**Subject:** Summit Carbon Solutions Storage #1 - #3 -- OPPOSED
**Date:** Monday, June 10, 2024 3:17:36 PM
**Attachments:** No to Summit Carbon Solutions.pdf

You don't often get email from medajo@comcast.net. Learn why this is important

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Good afternoon,
Please find attached which describes my opposition to Summit Carbon Solution's multiple proposal on the docket at the June 11 commissioner's hearing.
Thank you for your involvement in this matter.
Respectfully,
Meda Schultz

**No to Summit Carbon Solutions**

*Addressed to: North Dakota Industrial Commission | slforsberg@nd.gov*

Regarding Summit Carbon Solutions Storage #1, LLC; Summit Carbon Solutions Storage #2, LLC; and Summit Carbon Solutions Storage #3, LLC.

Summit's proposal serves an old, dying, and harmful industry: the Oil, Gas, and Chemical Industry

Agreement to Summit's proposal:

- Continues the ongoing reliance on OGC, including that of its key components—ethanol in this case. This is counter to modern climate science, which calls for the reduction and eventual elimination of OGC reliance, not continued investment in this industry and its ongoing viability.
- Puts ND's safety at potential risk—new carbon dioxide capture, transport, and storage has a short history and little record of the best, most reliable means and methods to capture and store carbon dioxide in a continuously safe manner. Recent release across the nation demonstrates the unreliability of technology planned to be employed.
- Allocates ND resources to other jurisdictions and owners. Only one ethanol plant is a planned contributor to the proposed CO2 pipeline and storage facilities. Majority contributors come from out of state, causing ND's resources (pore space, etc) to be consumed for the benefit of those out-of state others, Summit, and its investors. In fact, Summit is expected to experience an $85/metric tonne tax credit on its planned storage of 352 metric tonnes over 20 years equal to nearly a $30 billion dollar windfall, and with a plan to only return $0.50/metric tonne or $176 million to the property owner affected returning only six-tenths of a percent of Summit's tax savings to those that give the most for Summit's project. This inequity is further compounded by the property owners' inability to measure the actual tonnage stored on their property, making it impossible to calculate an equitable compensation value.
- Allows Summit to take what is not theirs to take: approval of this project would unjustly harm the surface and mineral property owners of ND and, in so doing, would reward Summit and its investors without demonstrating an equivalent or greater value to the public—the citizens of ND.
    - What is the cost of the impacts to the land and air and wildlife during construction?
    - What energy will be used to construct, operate, and maintain the system? And, shouldn't that energy be conserved in keeping with the latest climate science, which calls for the dismantling of coal-fired power plants, petroleum extraction and refining, and supporting ethanol production, not the continued use of same?
    - Summit plans to consume pore space that may be void, or may contain other gases that hold value, which should be retained by the existing surface- or mineral-owners; these other gases should not be given freely to Summit as they have indicated would be their plan. Understand, the typical ND property owner does not have the means or methods to determine the contents of the void space or how to measure it, making it difficult or impossible to challenge or refute any claim made by Summit.
    - Summit highly encumbers or completely severs any minerals that exist below any storage space by limiting access only via horizontal drilling that may be infeasible due to length of required drilling or access points to initiate and conduct the drilling—access points which may be located on another's property. What is the value of the lost minerals? What is the

cost to access minerals to maintain value and who ensures it remains viable and puts in effort to ensure it occurs at a price equal to or less that paid by Summit as part of the pore space deal that is being considered now?

- What will be the cost of any unplanned, consequential damages to ND and its citizens resulting from the proposed project? Who inherits that risk and cost into the future after Summit is no longer an storage facility owner as allowed by ND law after a 10-year period?

Who are these people—Executive Vice President Wade Boeshans, Chief Operating Officer Jimmy Powell, and Land Appraiser Jeff Olson who come to sell North Dakotans a bill of goods that benefit Summit, its investors, and relieve other out-of-state ethanol plants and the OGC industry (Harold Hamm) generally? Are they North Dakotans? Are their roots here? Do they understand and appreciate the prairie, the waving fields of grain, the sunflowers tracking the sun across the expansive blue sky that stretches across the horizon and frees the eye to see forever? Do they fish in ND's clean waters enjoying walleye caught that day with their families or the reward of a day of walking the fields in search of pheasant, turkey, or a buck? Are they proposing this project because it protects that which is most precious to North Dakotans and their children for today and tomorrow? These men have served the OGC and coal industries their entire careers. All have spent their careers ensuring the ongoing reliance on the old technology. Are these the people that we want to entrust North Dakota's future to?

As North Dakotan's, we must say:

- NO to Summit's plan to transport and store carbon dioxide
- NO to Summit's plan to take our pore space without just compensation and means toe verifiably measure used pore space for each and every owner affected
- NO to Summit's plan to take any displaced gases without just compensation and a means to verifiably identify and measure that which is displaced
- NO to burdening property owners with an overly complicated, costly, and potentially impossible means of accessing minerals
- NO to increasing risks of consequential damages as a result of this project
- NO to giving up our resources for the benefit of Summit, its investors, and out-of-state producers. Each state and its ethanol plants should solve its own carbon dioxide-generation problems. ND is not a dumping ground.

It is time to look for new energy sources. Summit calls on ND to be "early adopters." Yes, ND should be leaders as they have always been. North Dakotans are innovative problem solvers who are tenacious in overcoming challenges like the pressing problem of climate change. North Dakotans should be early innovators and adaptors of new technology that frees us from the costs, burdens, negative affects of dependence upon fossil fuels and similar or constituent products.

Summit's project holds us back. It does not propel us forward. Will North Dakotan's be trend setters or trend followers?

I call on ND Industrial Commission to heartily reject Summit's proposals.

Respectfully,

*ND Property Owner and Native, Meda J Schultz | medajo@comcast.net*

**From:** Scott Skokos
**To:** Forsberg, Sara L.
**Subject:** Dakota Resource Council comments
**Date:** Monday, June 10, 2024 2:23:36 PM
**Attachments:** NDIC class vi comments.pdf

---

You don't often get email from scott@drcinfo.com. Learn why this is important

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Hi,

Please see Dakota Resource Council's attached comments regarding cases: 30869-30880.

Best,

Scott Skokos

Honorable Members of the North Dakota Industrial Commission,

Enclosed Dakota Resource Council Comments re: Case nos. 30869-30880

About Dakota Resource Council:

Founded in 1978, Dakota Resource Council is a family farm and conservation organization that advocates for the sustainable use of North Dakota's natural resources and works to keep family farms in the hands of family farm operators. With over 700 members statewide DRC works with a wide range of people from geographies across North Dakota.

Introduction:

The case before the North Dakota Industrial Commission is complicated in our view due the ongoing litigation over the constitutionality of the amalgamation law in North Dakota. The purpose of our comments will be to first outline why the current laws allowing for amalgamation are unconstitutional, and second urge the North Dakota Industrial Commission to reject the permits in this case or take no action until the courts are able to rule on the constitutionality of North Dakota's amalgamation laws.

Constitutional Issues with North Dakota Amalgamation Law:

In our view North Dakota's amalgamation law is unconstitutional due to the way in which the property owner is compensated under the law. Under the current amalgamation law non-consenting pore space are to be 'equitably compensated' for their pore space, but 'equitable compensation' is not a substitute for the safeguards guaranteed by the Constitution of North Dakota and Chapter 32-15 of the Century Code, which require 'just compensation' to be paid for land or real property that is taken by eminent domain. 'Just compensation' unlike 'equitable compensation' requires a condemnation hearing with a jury that is tasked to decide how much the property owner is compensated for the taking.

The need to pay 'just compensation' for a taking not 'equitable compensation' was recently affirmed by the North Dakota Supreme Court in *Northwest Landowners Association vs State of North Dakota (2022).* And the recent *Northwest Landowners Association vs State of North Dakota (2023),* which is challenging the use of amalgamation specifically, is to our knowledge, progressing through the court system. With both the 2022 ruling that 'equitable compensation' was not constitutional and the 2023 case still in progress, it is our view that it would be prudent for this body to wait to rule on this case or any other case until the courts determine the constitutionality of North Dakota's amalgamation law.

Conclusion:

With the constitutionality surrounding amalgamation (the fundamental reason for the cases in front of the NDIC) under scrutiny, we believe that the NDIC should wait to rule on this case until

the courts settle the constitutionality issue. This is a very important case to get right due to the scale of development and the amount of property owners impacted. We think courts are a more fair venue than the North Dakota Industrial Commission, which has, despite its purported impartiality, ruled in favor of industry in nearly every case for the past decade. Thank you for the opportunity to comment on this matter.

**From:** Paul Schock
**To:** Forsberg, Sara L.
**Subject:** Summit Carbon Solutions quest for a pipeline to transport CO2 into North Dakota
**Date:** Monday, June 10, 2024 1:43:15 PM

---

You don't often get email from pjshkstr@gmail.com. Learn why this is important

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

To Whom this may concern:

My name is Paul Schock and I am a landowner in Mercer County. I own land in township 142N.R88W section 19/33. This email is being sent to show my support for Summit Carbon Solution's quest for a pipeline to bring CO2 into Mercer, Oliver and Morton counties. From the beginning of the project Summit Carbon has been very transparent, open and honest in their dealings with me. This project for me represents the future in sustaining and enhancing the agriculture corridor for years to come. It will provide jobs and it will bring in the tax revenue for the counties and state along with providing supplemental income to the farmers and ranchers.

In Mercer county the Dakota Gasification Company sends CO2 to Canada which has proven safe and reliable for years. With this being said, I would ask you to be open and positive to the completion of this project. Thank you.

Regards,
Paul Schock

| | |
|---|---|
| **From:** | Desirae Zaste |
| **To:** | Forsberg, Sara L. |
| **Cc:** | Derrick Braaten |
| **Subject:** | Written Comments - 30869-30880 |
| **Date:** | Monday, June 10, 2024 1:48:02 PM |
| **Attachments:** | image001.png |

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Ms. Forsberg,

Below is a link containing the following documents:

- **Written Comments of Intervenors The Swenson Living Trust, Michael Bauman, Glenn and Lisa Gerving, Michael and Bonnie Haupt, John M. Jochim, Kevin and Kimberly Kraft, Charmayne Liebelt, Kirk and Linda Maize and Allen Maize, Paul and Christy Metz, JoLene Rust, and Gary and Cassie Smith;**
- **Attachment A – Declarations of Landowners with attachments;**
- **Attachment B – NWLA Briefing in *Northwest Landowners Association, et al. v. State of North Dakota, et al.*, Case No. 05-2023-CV-00065; and**
- **Declaration of Service.**

Written Comments of Intervenors

Please let me know if you have any issues with the link. Thank you.

**Desirae Zaste¦ Certified Paralegal**

**BRAATEN LAW FIRM**
109 N. 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
Fax: 701-221-5842
www.braatenlawfirm.com

**PRIVILEGED COMMUNICATION**
**This e-mail message is intended only for the named recipient(s) above and is covered by the Electronic Communications Privacy Act, 18 U.S.C. Sections 2510-2521. This e-mail is confidential and may contain information that is privileged, attorney work product or exempt from disclosure under applicable law. Recipients should not file copies of this e-mail with publicly accessible records. If you have received this message in error, please immediately notify the sender by return e-mail and delete this e-mail message from your computer. Thank you for your cooperation.**

**NORTH DAKOTA INDUSTRIAL COMISSION**

**OIL AND GAS DIVISION**

**In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**Case No(s). 30869**
**30870**
**30871**
**30872**
**30873**
**30874**
**30875**
**30876**
**30877**
**30878**
**30879**
**30880**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**WRITTEN COMMENTS OF INTERVENORS THE SWENSON LIVING TRUST, MICHAEL BAUMAN, GLENN AND LISA GERVING, MICHAEL AND BONNIE HAUPT, JOHN M. JOCHIM, KEVIN AND KIMBERLY KRAFT, CHARMAYNE LIEBELT, KIRK AND LINDA MAIZE AND ALLEN MAIZE, PAUL AND CHRISTY METZ, JOLENE RUST, AND GARY AND CASSIE SMITH**

.

[¶1] Intervenors Swenson Living Trust by and through its trustees, Bauman, Gerving, Haupt, Jochim, Kraft, Liebelt, Maize, Metz, Rust, and Smith submit the following as their written comments and objection to the issuance of any permits in the above-captioned proceedings. Attached hereto are declarations from the intervenors which set out their land ownership as it relates to the above-captioned proceedings, and identifies the encumbrances to that land. *See* **Attachment A** (combined declarations of Intervenors with Exhibits, also filed into the docket in the above-captioned proceedings).

[¶2] The North Dakota Industrial Commission ("NDIC") has violated Intervenors' due process rights by failing to provide procedural due process and substantive due process, and is without jurisdiction to issue the permits in this proceeding because the laws by which it is conducting these proceedings are unconstitutional. Because the laws and regulations for issuance of Class VI permits for North Dakota are inextricably intertwined with the unconstitutional provisions of the laws and regulations being challenged in other litigation, the NDIC should deny the applications and dismiss the proceeding.

[¶3] As was explained in the Intervenor's prior briefing, the failure to provide the model parameters and electronic data used to run the computer models for these applications is fatal to the permit proceedings and the applications must be denied for failure to afford procedural and substantive due process.

[¶4] Hearing officers have broad discretion in scheduling, granting continuances, and controlling discovery in adjudicative proceedings. *Berger v. North Dakota Dept. Of Transp.*, 2011 ND 55, ¶ 7, 795 N.W.2d 707, ¶ 7 (rejecting plaintiff's claim that he was entitled to have his hearing held at its originally scheduled time). Section 28-32-33, N.D.C.C., provides that discovery may be obtained in an adjudicative proceeding in accordance with the North Dakota Rules of Civil Procedure. This section also grants authority to the hearing officer to issue discovery orders. Rule 34 of the North Dakota Rules of Civil Procedure governs how a party may request and obtain documents from another party. The default rule is that a party to whom a request for production is directed has 30 days in which to respond after being served. But as is relevant here, a shorter time may be ordered by the court (or here, the hearing examiner). Rule 34(b)(2)(A). In other words, under § 28-32-33, N.D.C.C., the hearing officer/examiner is authorized to expedite responses to discovery requests and control the proceeding in a manner that afford due process.

> The Administrative Agencies Practice Act expressly directs that, in all adjudicative proceedings, "[t]he administrative agency shall designate the time and place for the hearing." N.D.C.C. § 28-32-21(1)(c). Furthermore, **the hearing officer has broad discretion to regulate the course of the administrative proceeding**. N.D.C.C. § 28-32-35; Medical Arts Clinic, P.C. v. Franciscan Initiatives, Inc., 531 N.W.2d 289, 300 (N.D. 1995); Knudson v. Director, North Dakota Dep't of Transp., 530 N.W.2d 313, 316 (N.D. 1995). A hearing officer in an adjudicative administrative proceeding functions in a quasi-judicial capacity, and shares the broad discretion accorded to judicial officers. See Medical Arts Clinic, at 297, 300; Loran v. Iszler, 373 N.W.2d 870, 876 (N.D. 1985). Thus, it has been recognized that hearing officers have discretion to control procedural matters such as discovery and admission of evidence. See, e.g., State ex rel. Workforce Safety & Ins. v. Altru Health Sys., 2007 ND 38, ¶ 11, 729 N.W.2d 113; May v. Sprynczynatyk, 2005 ND 76, ¶ 24, 695 N.W.2d 196. Trial courts have broad discretion over the progress and conduct of a trial or hearing, including scheduling and the determination whether to continue a trial or hearing. See Hartleib v. Simes, 2009 ND 205, ¶ 15, 776 N.W.2d 217; State v. Ripley, 2009 ND 105, ¶ 12, 766 N.W.2d 465; State v. Schmidkunz, 2006 ND 192, ¶ 22, 721 N.W.2d 387; Peterson v. Zerr, 443 N.W.2d 293, 297 n.3 (N.D. 1989). A hearing officer conducting an adjudicative administrative proceeding has the same scope of discretion in conducting the hearing, including scheduling and continuances. See Medical Arts Clinic, at 297, 300.

*Berger v. N.D. DOT*, 2011 ND 55, ¶ 7, 795 N.W.2d 707, 710 (emphasis added).

[¶5] Procedural fairness is required at an administrative hearing. *Schlittenhart v. North Dakota Dept. of Transp.*, 2015 ND 179, ¶ 27, 865 N.W.2d 825, ¶ 27 (noting that the Court reviews administrative proceedings to "ensure procedural fairness"). "Procedural due process requires fundamental fairness, which, at a minimum, necessitates notice and a meaningful opportunity for a hearing appropriate to the nature of the case." *Id.* (quoting *In re G.R.H.*, 2006 ND 56, ¶ N.W.2d 587).

[¶6] An agency overseeing an adjudicative proceeding that involves an opportunity to comment and a hearing must present "the data underlying its proposed action *before* the close of the comment and hearing period." *National Wildlife Federation v. Marsh*, 568 F.Supp. 985, 994 (D. D.C. 1983) (emphasis in original). This is because the right to comment or be heard cannot be meaningful "when one is not apprised of the issues and positions to which the argument is relevant." *Id.* at 993 (quoting *U.S. Lines v. Federal Maritime Commission*, 584 F.2d 519, 540 (D.C.Cir. 1978)). In other words, an exchange of views and dialogue is only possible if the public is adequately informed, and "without such dialogue any notion of real public participation is necessarily an illusion." *Id.; see also Chemical Mfrs. Ass'n v. U.S. E.P.A.*, 870 F.2d 177, 200 ("[F]airness requires that the agency afford interested parties an opportunity to challenge the underlying factual data relied on by the agency.").

[¶7] Section 28-32-29, N.D.C.C. also authorizes an agency to conduct a prehearing conference. The only conditions for doing so are giving reasonable notice to all parties and interested persons and conducting the conference in a way that does not substantially prejudice or infringe on the rights of any party. § 28-32-29, N.D.C.C. The NDIC's outright refusal to even attempt to conduct

a fair hearing in this matter is fatal to the permit applications and they should be denied accordingly.

[¶8] The amalgamation laws being administered by the NDIC as well as the laws related to all applications in the above-captioned proceeding, because they are inextricably intertwined, are all unconstitutional. They are the subject of a facial challenge in *Northwest Landowners Association, et al. v. State of North Dakota, et al.*, Case No. 05-2023-CV-00065. The briefing on these legal issues by NWLA is attached hereto as **Attachment B**.

[¶9] Further, the laws by which the NDIC proposes to "amalgamate" Intervenors' property result in a *per se* taking of Intervenors' property and property rights. "From farming to original homesteads, it is in the blood of North Dakota landowners to be protective of their real estate. From family ties to the need for farmers to grow crops, property ownership is near and dear to those who maintain it." *WBI Energy Transmission, Inc. v. Easement & Right-Of-Way*, No. 1:18-cv-078, Doc. ID 131, at *12 (D.N.D. Nov. 1, 2022). These words from the United States District Court for the District of North Dakota are equally applicable to this case. Our North Dakota Constitution begins with the declaration: "All individuals are by nature equally free and independent and have certain inalienable rights, among which are those of … acquiring, possessing and protecting property." N.D. Const. art. I, § 1. The United States Supreme Court agrees: "Property rights are necessary to preserve freedom, for property ownership empowers persons to shape and to plan their own destiny in a world where governments are always eager to do so for them." *Murr v. Wisconsin*, 582 U.S. 383, 394, 137 S. Ct. 1933, 1943 (2017).

[¶10] The NDIC is currently conducting its Class VI program in a manner that flies in the face of the intent of the program's drafters and puts the Class VI primacy of North Dakota in jeopardy.

This risk is being taken to avoid providing due process to North Dakota citizens. It is wrong, legally and morally.

DATED this 10th day of June, 2024.

**BRAATEN LAW FIRM**

*/s/ Derrick Braaten*

Derrick Braaten (ND #06394)
109 North 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
derrick@braatenlawfirm.com

*Attorneys for Intervenors the Swenson Living Trust, Bauman, Gerving, Haupt, Jochim, Kraft, Liebelt, Maize, Metz, Rust, and Smith*

**NORTH DAKOTA INDUSTRIAL COMMISSION**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case Nos. 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## DECLARATION OF MICHAEL BAUMAN

[¶1] I, Michael Bauman, declare the following based on personal knowledge:

[¶2] I have ownership interest in the following property that lies within the boundaries of the BK Fischer Storage Facility.

- Township 142 North, Range 88 West
  Section 24: SW1/4, less a 20-acre parcel & ROW
  Mercer County, ND

[¶3] To the best of my knowledge, the property listed in ¶ 2 above is encumbered by the following easements:

- Oliver-Mercer Electric Cooperative, Inc. Right-of-Way Easement executed by John Jochim on June 25, 1980 (209443).
- West River Telephone Right-of-Way Easement executed by John B. Jochim on April 13, 1993 (153703).
- ND Water State Water Commission Pipeline Easement executed by Rick and Valerie Bauman on August 19, 2010 (195749).
- Southwest Water Authority Right-of-Way Easement executed by Michael Bauman on October 16, 2014 (206892).

[¶4] Attached is the deed which I believe indicates my ownership in the property listed above.

[¶5] Attached are the easements currently encumbering these properties based on the information I have.

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on the 30 day of May , 2024 at Beulah, ND, United States.

Mike Bauman (May 30, 2024 14:29 EDT)

Michael Bauman

# WARRANTY DEED

This deed is made by **Rick Bauman and Valerie K. Bauman**, husband and wife, Grantors, to **Michael P. Bauman**, Grantee, whose post office address is 572 Oemler Loop, Savanna, GA 31410.

For valuable consideration, Grantors' grant and convey to Grantee the following real property (the premises) located in Mercer County, North Dakota:

Township 142 North, Range 88 West
Section 24: SW¼ less a 20 acre parcel described as follows:
Commencing at the NE corner of SW¼, thence West along the North boundary of the SW¼ a distance of 950 feet; thence South in a line parallel to the East boundary of the SW¼ a distance of 915 feet; thence East in a line parallel to the North boundary of the SW¼ a distance of 950 feet to the East boundary of the SW¼; thence North along the East boundary of the SW¼ to the point of beginning.

The legal description was obtained from ☒ a previously recorded instrument ☐ or prepared by Jeffrey T. Landon of Lange & Donovan, PLLP, PO Box 488, Hazen, ND 58545.

Grantor covenants that they are well seized in fee of the premises, which he has the right to sell and convey, and which are free from encumbrances except those of record. Further, they covenant that they will warrant and defend the premises in the quiet and peaceable possession of the Grantee.

Dated this 9th day of May, 2011.

**GRANTOR:**

Rick Bauman
Rick Bauman

Valerie K. Bauman
Valerie K. Bauman

State of North Dakota )
)ss.
County of Mercer )

On this 9th day of May, 2011, before me, a notary public, personally appeared **Rick Bauman and Valerie Bauman**, husband and wife, who acknowledged to me their execution of the foregoing instrument.

My Commission Expires: MORTGAGEE MORTGAGOR INDEXED

Laurie Lange
Notary Public
Mercer County, North Dakota

LAURIE LANGE
Notary Public
State of North Dakota
My commission expires Jan 14, 2015

☒ I certify the requirement for a report of statement of full consideration paid does not apply because this deed is for one of the transactions exempted by Subdivision (c) of Subdivision 7 of Section 11 18-02.2 NDCC.

Signed: Jeffrey T. Landon
(GRANTEE OR AGENT)

Dated: May 9, 2011

197840

STATE OF NORTH DAKOTA
COUNTY OF MERCER

OFFICE OF
COUNTY RECORDER

I hereby certify that the within instrument was filed in this office for record this 10/13/2011 at 9:40 AM, and was duly recorded as Book 151 DEED on Page 648 Fee: $10.00

County Recorder Brenda L. Cook
By Deputy Kathryn Schumann

Return To: LANGE LAW OFFICE, PO BOX 488
HAZEN, ND 58545

COUNTY RECORDER SEAL MERCER COUNTY, N. DAK.

Delinquent Taxes, Special Assessments, or Installments of Special Assessments Paid and Transfer Entered this 13th day of October, 2011.

Mercer County Auditor
By: Paula A. Roth, Clerk
Deputy Auditor

# RIGHT-OF-WAY EASEMENT

KNOW ALL MEN BY THESE PRESENTS, that we the undersigned, (whether one or more)
JOHN Jochim

(unmarried) (husband and wife) for a good and valuable consideration, the receipt whereof is hereby acknowledged, do hereby grant unto the Oliver-Mercer Electric Cooperative, Inc., a cooperative corporation (hereinafter called the "Cooperative") whose post office address is Hazen, North Dakota 58545, and to its successors or assigns, the right to enter upon the lands of the undersigned, situated in the County of Mercer, State of North Dakota, and more particularly described as follows:

S½ of NW¼ of 24

Right-of-way_____feet Township 142 Range 88 Section W½ of SW¼ of 13
Right-of-way_____feet Township ____ Range ____ Section W½ of W½ of 24
N½ of SW¼ of 24

and to construct, operate, maintain and move or relocate on the above-described lands and/or in or upon all streets, roads or highways abutting said lands, an electric transmission line or system, and to cut and trim trees and shrubbery that may interfere with or threaten to endanger the operation and maintenance of said line or system. The easement shall include only that part of the above described land located within 15 feet on each side of the proposed line.

The undersigned agree that all poles, wires and other facilities, installed on the above described lands at the Cooperative's expense shall remain the property of the Cooperative, removable at the option of the Cooperative.

The Cooperative agrees to pay a reasonable sum for any damage caused to crops or fences by the construction, operation, maintenance, or repair of said line or system. The overall operating height of vehicles and equipment known to cultivate or traverse lands within the easement, is less than fourteen (14) feet, unless otherwise noted below.

IN WITNESS WHEREOF, the undersigned have set their hands and seals this 25 day of June, 1980.

Signed, sealed and delivered in the presence of:

John Jochim

STATE OF NORTH DAKOTA )
) ss
COUNTY OF Mercer )

On this 25 day of June, 1980, before me, a Notary Public in and for said County and State, personally appeared JOHN JOCHIM known to me to be the person who described in and who executed the foregoing instrument and acknowledged to me that he executed the same.

My Commission expires: MAY 5, 1986

Notary Public in and for the County of Mercer State of North Dakota

STATE OF NORTH DAKOTA )
) ss
COUNTY OF _____ )

_____ Being first duly sworn says that he is one of the Witnesses to the above and foregoing easements, that _____ name(s) is and/or are subscribed to the above and foregoing instruments as a party is and/or are the persons described in said easement and that he signed said instrument in my presence and that I in their presence signed my name thereto as a subscribing witness.

Subscribed and sworn to before me this ____ day of _____, 19___

My Commission Expires:

_____

Notary Public in and for the County of _____ and the State of North Dakota

209443

**STATE OF NORTH DAKOTA**
**COUNTY OF MERCER**

**OFFICE OF**
**COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 12/9/2015 at 12:16 PM, and was duly recorded a Book 208 MISC on Page 31 Fee: $23.00

MORTGAGEE
MORTGAGOR
INDEXED ✓

County Recorder Brenda L. Cook

By Deputy

Return To: ROUGHRIDER ELECTRIC COOPERATIVE, INC., 800 H
HAZEN, ND 58545

COUNTY RECORDER SEAL MERCER COUNTY, N DAK.

In Computer [ ]
WRT# [ ]
County# [ ]

MORTGAGEE
MORTGAGOR
GRANTOR ✓
GRANTEE ✓
INDEXED ✓

W.O.# 92-272

# West River Telephone Right-of-Way Easement

KNOW ALL MEN BY THESE PRESENT, that we the undersigned, (whether one or more) *John B Jochim*, Grantor(s), do hereby grant and convey unto *West River Telecommunications Cooperative*, a cooperative corporation (hereafter called the "Cooperative"), grantee, whose address is P.O Box 467, Hazen, North Dakota, and its respective successors, assigns, lessees and agents, an easement to survey, construct, reconstruct, operate, upgrade, maintain, relocate, replace and remove such communication systems as the grantee may from time to time require, consisting of but not limited to cables, wires, poles, splicing boxes, surface testing terminals, repeaters, repeater housings and markers, and other appurtenances, upon and over the land which the undersigned owns or in which the undersigned has any interest in the County of *Mercer*, State of *North Dakota*, and more particularly described as follows:

*W/2 24 142 88*

also the right of ingress and egress over and across the lands of the undersigned for the purpose of exercising the rights herein granted; to place surface markers beyond said strip, to clear and keep clear all trees, roots brush and other obstructions from the surface and subsurface of said strip of land and within seven feet thereof. The boundary of said strip shall be a line parallel to and 25 feet either side of the first cable laid, which cable shall have its location indicated by surface markers set at intervals on the land of the undersigned or on adjacent lands. The undersigned for himself, his heirs, executors, administrators, successors, and assigns, hereby covenants that no structure shall be erected on said strip.

The undersigned agrees that all poles, wire and other facilities, including telephone equipment, installed on the above described premises at the Cooperative's expense, shall remain the property of the Cooperative, removable at the option of the Cooperative.

The undersigned covenant that they are the owners of the above described lands and that the said lands are free and clear of encumbrances and liens of whatsoever character except those held by the following persons:

The term of this easement shall be for as long as needed by the grantee, and until a release of this easement is recorded, but to not extend beyond the maximum term authorized by law.

Access is hereby granted for a state or federal historical survey of the cable route, should one be required, unless checked. Access denied ☐

IN WITNESS WHEREOF, this instrument has been executed by the undersigned this the 13 day of April, 1993.

STATE OF NORTH DAKOTA )
)
COUNTY OF Mercer )

by: John B. Jochim

by: _____

The foregoing instrument was acknowledged before me this 13th day of April, 1993. By John B Jochim.

My Commission Expires:

CLYDE FANDRICH
Notary Public, Mercer County, ND
My Commission Expires Feb. 24, 1999
STATE OF NORTH DAKOTA
NOTARY PUBLIC SEAL

Clyde Fandrich
Notary Public, County of Mercer

Document No. 153703
OFFICE OF REGISTER OF DEEDS, COUNTY OF Mercer, North Dakota. I hereby certify that the within instrument was filed in this office for recording on the 10th day of January, A.D., 1994, at 12:10 o'clock P M, and was duly recorded in Book 128, of Misc., on page 521.

By Kathryn Schumann, Deputy Jeanette Sailer
Register of Deeds

REGISTER OF DEEDS SEAL MERCER COUNTY, N.DAK.

$7.00 fee

When recorded, please return to WEST RIVER TELECOMMUNICATION COOPERATIVE.

**PIPELINE EASEMENT**

North Dakota State Water Commission
County of Mercer
Parcel H-MER-131

**ALL PERSONS TAKE NOTICE:**

That the undersigned, Rick Bauman and Valerie K. Bauman, whether one or more, called the Grantor, being the owner of, or having an interest in, land situated in the County of Mercer, State of North Dakota, more fully described below, in consideration of One and No/100 Dollars ($1.00) and other valuable consideration, does hereby grant, convey, and warrant to the State of North Dakota, acting by and through the North Dakota State Water Commission, a state agency and public corporation, with its principal office at 900 East Boulevard Ave., Bismarck, North Dakota 58505, called the Grantee, and to its successors and assigns, the right, privilege, and easement to construct, maintain, operate, inspect, repair, alter, replace, change the size of or remove a pipeline, and appurtenances thereto, for the transportation of water under, across, and through:

Parcel H-MER-131
A 40 foot wide strip of land 20 feet wide on each side of the pipeline centerline lying within the W1/2 SW1/4 and S1/2 SW1/4 all in Section 24, Township 142 North, Range 88 West of the 5th P.M.

Said tract contains 4.84 acres, more or less.

Temporary Construction Easement
An additional 20 feet of temporary right-of-way lying adjacent to the above described tract for a total construction easement width of 60 feet.

Said tract contains 2.42 acres, more or less.

together with the right to utilize additional land for a period up to three years from the date of this easement, adjacent to the above described tract, for purposes of temporary working space during initial construction of the pipeline, and the right of ingress to and egress from said strip of land across the adjacent lands of the Grantor, for the purposes specified above at the will of the Grantee.

**THE GRANTOR AND THE GRANTEE FURTHER AGREE:**

1. **Use of right-of-way by Grantor.** Grantor reserves the right to use the surface of the easement strip provided, however, that Grantor, without prior approval of Grantee, shall neither construct nor permit to be constructed any building, structure, or other improvement upon the easement strip which would interfere with Grantee's exercise of the rights conveyed by this pipeline easement, including access to the easement strip.

2. **Appurtenances.** The Grantee shall have the right to install and construct necessary appurtenances upon the surface of the easement strip. Prior to construction, the Grantee will notify the Grantor of the approximate location of such appurtenances if any, to be located on the easement strip, and shall pay to the Grantor the sum of $500 for each appurtenance located at a distance of more than 5 feet from a field boundary or fence line. Such payments shall be paid prior to construction.

3. **Damages.** The Grantee will pay to Grantor or Grantor's tenants, as their respective interests may appear, for damages caused by the operations or activities of the Grantee; provided, however, that the Grantee shall have the right, without liability for damages, to clear, and keep cleared, all trees, brush, and other obstructions from the easement strip that may, in the Grantee's judgment, interfere with the rights and privileges of the Grantee under this pipeline easement.

If the amount of any damage which Grantor may sustain as a result of Grantee's exercise of rights hereunder cannot be mutually agreed upon, such damages shall be ascertained and determined by three (3) disinterested person; one to be appointed by the Grantor, one by Grantee, and a third by the two so appointed, and the award of such three persons shall be final and conclusive.

4. **Restoration of surface.** The Grantee will restore the surface of the construction area to its original contour as nearly as practicable.

5. **Topsoil segregation.** When excavating the pipeline trench with a backhoe/trackhoe, the Grantee will remove the topsoil separately during the construction of the pipeline for the full width of the pipe trench to a depth of twelve (12) inches or the actual topsoil depth, whichever is less, and to be replaced at the top of the backfill over the pipe trench.

6. **Assignment and covenant by parties.** The rights of either party may be assigned in whole or in part. The terms and provisions of this easement shall constitute covenants running with the land and shall be binding upon, and inure to the benefit of, the parties hereto, their successors, assigns, personal representatives, and heirs.

7. **Grantor's title.** Grantor warrants that he is the owner of, or has an interest in, the land described in this easement, and that he has full right and authority to enter into and deliver this easement. This instrument may be executed in counterparts and each counterpart shall constitute a separate agreement between the parties thereto. Any payments pursuant to this pipeline easement shall be in proportion to the Grantor's interest in the undivided fee simple estate.

8. **Entire agreement.** This instrument contains the entire agreement of the parties and there are no other, or different, agreements or understandings between the Grantor and the Grantee, or its agents. The Grantor, in executing this pipeline easement, has not relied upon any promises, inducements, or representatives of the Grantee, or its agents, except as are set forth herein.

9. **Term of easement.** The term of this easement shall be as long as it is needed by the Grantee, or its assigns, and until a release of this easement is recorded, but shall not exceed ninety-nine (99) years pursuant to NDCC §47-05-02.1.

10. **Tenants.** The Grantor represents that the land described in this easement is (not rented) (rented to) NO.

Dated this 19th day of August, 2010.

Grantor

Grantor

STATE OF NORTH DAKOTA)
) ss.
COUNTY OF Mercer)

On this 19th day of August, 2010, before me personally appeared Rick + Valerie Baumann, known to me to be the person(s) described in and who executed the within and foregoing instrument, and acknowledged to me that he/she executed the same.

BRUCE KOPPINGER
NOTARY PUBLIC, STATE OF NORTH DAKOTA
MY COMMISSION EXPIRES AUG 12, 2014

Notary Public

Stark County, ND

My Commission expires: 8-12-2014

MORTGAGEE
MORTGAGOR
INDEXED

**195749**

**STATE OF NORTH DAKOTA**
**COUNTY OF MERCER**

**OFFICE OF**
**COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 12/6/2010 at 1:07 PM, and was duly recorded as Book 186 MISC on Page 151 Fee: $16.00

County Recorder Brenda L. Cook

By Deputy

Return To: ND STATE WATER COMMISSION, 900 E BOULEVARD A
DEPT 770 BISMARCK, ND 58505-0850

COUNTY RECORDER
SEAL
MERCER COUNTY, N. DAK.

RECEIVED
OCT 20 2014

**SOUTHWEST WATER AUTHORITY**
Southwest Pipeline Project Building
West Industrial Park
4665 2nd Street SW
Dickinson, ND 58601-7231
(701) 225-0241
Toll Free: 1-888-425-0241

Segment **7-9E WEST CENTER SERVICE AREA**
Parcel **142-88-22**

## RIGHT-OF-WAY EASEMENT

**ALL PERSONS TAKE NOTICE:**

In consideration of one dollar ($1.00) and other good and valuable consideration **MICHAEL P. BAUMAN 4717 S 197TH E AVE BROKEN ARROW, OK 74014** hereinafter referred to as Grantor, does hereby grant, bargain, sell, transfer and convey to the Southwest Water Authority, hereinafter referred to as the Grantee, its successor and assigns, a perpetual easement with right to erect, construct, install and lay, and thereafter use, operate, inspect, repair, maintain, replace, and remove water pipelines, connections, valves and all other appurtenant facilities used in connection with the construction, operation and maintenance of the Southwest Pipeline Project, over above, across and through the land of the Grantor, situated in **MERCER** County, State of North Dakota, and said land as identified in Exhibit A described as follows: **SW1/4 SW1/4 SW1/4 SW1/4 & E1/2 E1/2 E1/2 SW1/4 SECTION 24 TOWNSHIP 142 RANGE 88** (the tract that contains **1.24** acres, more or less).

1. The permanent easement will be thirty (30) feet in width, fifteen (15) feet on each side of the center line of the pipeline as constructed, with an additional ten (10) feet of temporary right-of-way for a total construction easement width of forty (40) feet, twenty (20) feet on each side of the center line.

2. The Grantee covenants to maintain the easement in good repair so that no unreasonable damage will result from its use to the adjacent land of the Grantor, successors and assigns. The Grantor will receive compensation for damages to growing crops caused by the construction or operation. The Grantor will report any damages within three (3) years of the construction of the project.

The grant and other provisions of this easement shall constitute a covenant running with the land for the benefit of the Grantee, its successors and assigns.

**IN WITNESS WHEREOF**, the Grantor has executed this instrument this 16th day of October, 2014.

Michael Bauman GRANTOR _____ GRANTOR

State of OKLAHOMA

County of TULSA

On 16th day of October, 2014, personally appeared before me Michael Bauman

_____

__ok__ whom I know personally.
_____ whose identity I verified on the basis of _____.
_____ whose identity I verified on the oath or affirmation of _____, a credible witness to be the signor of the above and he/she acknowledged that he/she signed it.

IRMA J. ARTECHE NOTARY # 12007645 EXP. 08/14/16 PUBLIC STATE OF OKLAHOMA

Notary Public Irma J. Arteche

OKLAHOMA, County TULSA

My Commission Expires: 08/14/16

206892

**STATE OF NORTH DAKOTA**
**COUNTY OF MERCER**

**OFFICE OF**
**COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 5/4/2015 at 11:54 AM, and was duly recorded as Book 202 MISC on Page 387 Fee: $13.00

MORTGAGEE
MORTGAGOR
INDEXED ✓

County Recorder Brenda L. Cook

By Deputy

Return To: SOUTHWEST WATER AUTHORITY, SOUTHWEST PIPE
WEST INDUSTRIAL PARK-4665 2ND ST SW DICKINS

COUNTY RECORDER
SEAL
MERCER COUNTY, N. D.

uploaded to BTW FTP on 10-20-14 (m)

**NORTH DAKOTA INDUSTRIAL COMMISSION**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case Nos. 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## DECLARATION OF GLENN GERVING

[¶1] I, Glenn Gerving, declare the following statements based on personal knowledge:

[¶2] I have ownership interest in the following properties that lie within the boundaries of the proposed TB Leingang Storage Facility.

- Township 141 North, Range 88 West
  Section 13: South fifty-four (54) acres of the South Half of the South Half (S1/2 S1/2)
  Mercer County, ND

- Township 141 North, Range 88 West
  Section 24: S1/2 SW1/4; S1/2 SW1/4 NW1/4
  Mercer County, ND

[¶3] To the best of my knowledge, the properties listed in ¶ 2 above are encumbered by the following easements:

- Section 13:
  i. Southwest Water Authority Right-of-Way Easement executed by Dean and Tania Gerving on June 22, 2015 (207742).

- Section 24:
  i. Southwest Water Authority Right-of-Way Easement executed by Glenn and Lisa Gerving on May 8, 2015 (207178).

[¶4] I have ownership interest in the following properties that lie within the boundaries of the Review Area of the proposed TB Leingang Storage Facility:

- Township 142 North, Range 87 West
  Section 34: E1/2 SE1/4
  Oliver County, ND

- Township 142 North, Range 87 West
  Section 35: S1/2 SW1/4
  Oliver County, ND

[¶5] Attached are the deeds which I believe indicate my ownership in each of the properties listed above.

[¶6] Attached are the easements currently encumbering these properties based on the information I have.

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on the 30 day of May, 2024 at Glen Ullin, ND, United States.

Glenn Gerving

STATE OF NORTH DAKOTA
COUNTY OF MERCER

217088
OFFICE OF
COUNTY RECORDER

I hereby certify that the within instrument was filed in this office for record this 12/19/2018 at 11:20 AM, and was duly recorded Book 169 DEED on Page 347 Fee: $20.00

County Recorder Brenda L. Cook
By ~~Deputy~~ Clerk Heather L. Vigesaa
Return To: GLENN GERVING, PO BOX 607
GLEN ULLIN, ND 58631-0607

Deputy Auditor

Taxes and Special Assessments paid and TRANSFER ACCEPTED this 19th day of December 2018.
Shawna Brost
Mercer County Auditor
By: Amber Gabert
Date

MORTGAGEE
MORTGAGOR
INDEXED ✓

COUNTY RECORDER SEAL MERCER COUNTY, N.DAK

**********

**QUIT CLAIM DEED**

**********

**THIS INDENTURE made this 24 day of October, 2018, between Dean Gerving, 2506 LaCorte Place, Bismarck, ND 58503, formerly of 607 9th Avenue SW, Mandan, ND 58554, Grantor; and Glenn Gerving, P.O. Box 607, Glen Ullin, ND 58631-0607, Grantee;**

**For and in consideration of One Dollar and other good and valuable consideration, Grantor does hereby QUIT CLAIM to Grantee, an undivided one-half (1/2) interest in all those tracts or parcels of land lying and being in the County of Mercer, and State of North Dakota, and described as follows, to wit:**

**The South fifty-three (53) acres of the South Half of the South Half (S1/2S1/2) of Section Thirteen (13), in Township One Hundred Forty-One (141) North, Range Eighty-Eight (88) West of the Fifth Principal Meridian, LESS a tract of land deeded to the State of North Dakota for the use of the State Highway Deptment described as follows:**

**All that portion of the South fifty-four (54) acres of the South Half of the South Half (S 1/2 S 1/2) of Section Thirteen (13), Township One Hundred Forty-One (141) North, Range Eighty-Eight (88) West, lying within a strip of land 100.00 feet wide, located on the Easterly side of and measured at right angles to the following described highway center line, as surveyed and staked: Beginning at a point 154.58 feet East of the Southwwest corner of said Section Thirteen (13), thence from a tangent bearing North 0.09' West running along a 0.30' curve to the left 446.7 feet, more or less, until said stip crosses the North Line of said South 54 acres, also including all that portion lying Westerly of the above described strip except all that portion lying within 33 feet of the section line, tract contains 1.92 acres, more or less.**

**The North one hundred six (106) acres of the South Half of the South Half (S 1/2 S 1/2) of Section Thirteen (13) in Township One Hundred**

**Forty-One (141) North, Range Eighty-Eight (88) West of the Fifth Principal Meridian in Mercer County, North Dakota, subject to all conveyances of record and to all existing easements and rights-of-way.**

**The South fifty-three (53) acres of the North one hundred six (106) acres of the South Half (S 1/2) AND the South fifty-four (54) acres of the North Half of the South Half (N 1/2 S 1/2) of Section Thirteen (13), in Township One Hundred Forty-one (141) North, Range Eighty-Eight (88) West of the Fifth Principal Meridian in Mercer County, North Dakota, subject to all conveyances of record and to all existing easements and rights-of-way.**

**These descriptions were obtained from a previously recorded instrument, namely that Warranty Deed dated March 12, 2007, recorded as Document No. 184674.**

**WITNESS, The hand of the Grantor:**

Dean Gerving

**Dean Gerving**

**STATE OF NORTH DAKOTA )**
**)ss.**
**COUNTY OF** Morton **)**

**On this** 17th **day of** December **, 2018, before me personally appeared Dean Gerving, a single person, known to me to be the same person described in and who executed the within and foregoing instrument, and acknowledged to me that he executed the same.**

SHANE A HELLMAN
Notary Public
State of North Dakota
My Commission Expires July 28, 2021

**Notary Public**
**State of North Dakota**
**My Commission Expires:** July 28, 2021

**I hereby certify that the transaction which is the subject matter of this conveyance is exempt from a statement of full consideration thereof, as it is made by Quit Claim Deed.**

12-19-18
**Date**

James Gerving
**Grantee or Agent**

WARRANTY DEED

THIS INDENTURE, Made this 11th day of January, 2006, between Lynn Flemmer, a single man, grantor, whether one or more and Glenn Gerving and Lisa Gerving, husband and wife, as joint tenants, as to an undivided one-half (1/2) interest and Dean Gerving and Tania Gerving, husband and wife, as joint tenants, as to the other one-half (1/2) interest, grantees, whose postoffice addresses are P.O. Box 607, Glen Ullin, North Dakota 58631 and 607 9th Avenue SW, Mandan, North Dakota 58554, respectively,

WITNNESSETH, For and in consideration of the sum of one dollar ($1.00) and other good and valuable consideration in money or monies worth - - - - - - - - - - - Dollars, grantor does hereby GRANT to the grantees all of the following real property lying and being in the County of Mercer and State of North Dakota, and described as follows, to-wit:

Township 141, Range 88
Mercer County, ND
Sec. 24: SW¼ and SW¼
of the NW¼

Reserving and excepting all minerals owned by the grantor.

[illegible] the property described in this deed is 75,000.00
Dean Gerving 1/11/06

And the said grantor for himself and his heirs, executors and administrators, does covenant with the grantees that he is well-seized in fee of the land and premises aforesaid and has good right to sell and convey the same in manner and form aforesaid; that the same are free from all incumbrances, except installments of special assessments or assessments for special improvements which have not been certified to the County Auditor for collection, easements,

rights of ways, mineral deeds, mineral leases and mineral reservations, and the above granted lands and premises in the quiet and peaceable possession of said grantees, against all persons lawfully claiming or to claim the whole or any part thereof, the said grantor will warrant and defend.

WITNESS, The hand of the grantor:

Lynn Flemmer

STATE OF NORTH DAKOTA )
)ss
COUNTY OF MERCER )

On this 11 day of January, 2006, before me, personally appeared Lynn Flemmer, a single person, known to me to be the person who is described in, and who executed the within and foregoing instrument, and severally acknowledged that he executed the same.

Bethanie Christmann
Notary Public
Mercer County, North Dakota

My Commission Expires:

BETHANIE CHRISTMANN
Notary Public
State of North Dakota
My Commission Expires April 2, 2008

181870

STATE OF NORTH DAKOTA
COUNTY OF MERCER

OFFICE OF
COUNTY RECORDER

I hereby certify that within instrument was filed in this office for record this 01/17/2006 at 09:37 AM and was duly recorded in Book 137 DEEDS on Page 0533. Fee: $13.00

County Recorder Brenda L. Cook

By Deputy Kathryn Shumann

Return To: HALPERN LAW OFFICE PO BOX 606
GLEN ULLIN, ND 58631

COUNTY RECORDER
SEAL
MERCER COUNTY, N. DAK.

MORTGAGEE
MORTGAGOR
INDEXED

Taxes and Special Assessments paid and
TRANSFER ACCEPTED this 17th day of
January, 2006.

Monte J. Eckhardt Mercer County Auditor

By: Pamela L. Drath Clerk ~~Deputy~~

# WARRANTY DEED

THIS INDENTURE, Made this 11 day of May, 2006, between Glenn Gerving and Lisa Gerving, husband and wife and Dean Gerving and Tania Gerving, husband and wife, grantor, whether one or more, and Glenn Gerving and Lisa Gerving, husband and wife, grantees, whose post office address is P.O. Box 607, Glen Ullin, ND 58631-0607.

WITNESSETH, For and in consideration of the sum of one dollar ($1.00) and other good and valuable consideration in money or monies worth - - - - - - - - - - - - - - - - - - - - - - - - - - - - -Dollars, grantor does hereby GRANT to the grantees, as joint tenants and not as tenants in common, all of the following real property lying and being in the County of Mercer and State of North Dakota, and described as follows, to-wit:

1. N½NE¼ of Sec. 13,Twp. 145N, Rng. 89W
2. S½SW¼ of Sec. 24, Twp. 141N, Rng. 88W
3. S½SW¼NW¼ of Sec. 24, Twp. 141N, Rng. 88W

And the said grantor for himself, his heirs, executors and administrators, does covenant with the grantees that he is well seized in fee of the land and premises aforesaid and has good right to sell and convey the same in manner and form aforesaid; that the same are free from all incumbrances, except installments of special assessments or assessments for special improvements which have not been certified to the County Auditor for collection, easements, rights of ways, zoning ordinances and amendments, EPA issues, mineral reservations, mineral leases and mineral deeds and any limitations of record, and the above granted lands and premises in the quiet and

peaceable possession of said grantees, against all persons lawfully claiming or to claim the whole or any part thereof, the said grantor will warrant and defend.

WITNESS, The hand of the grantor:

Glenn Gerving

Lisa Gerving

Dean Gerving

Tania Gerving

STATE OF NORTH DAKOTA )
:)ss
COUNTY OF MORTON )

On this 1st day of May, 2006, before me, personally appeared Glenn Gerving and Lisa Gerving, husband and wife and Dean Gerving and Tania Gerving, husband and wife, known to me to be the persons who are described in, and who executed the within and foregoing instrument, and severally acknowledged that they executed the same.

Mike L. Halpern, Notary Public
Morton County, North Dakota

My Commission Expires:

June 26, 2008

I certify that the requirement for a report or statement of full consideration paid does not apply because this deed is for one of the transactions exempted by subdivision e of subsection 8 of section 4 of Senate Bill 2323 (1993).

Signed: Mike L. Halpern Date: 5/1/06
Grantee or Agent

182609

MORTGAGEE
MORTGAGOR
INDEXED ✓

STATE OF NORTH DAKOTA
COUNTY OF MERCER

OFFICE OF
COUNTY RECORDER

I hereby certify that within instrument was filed in this office for record this 06/02/2006 at 09:28 AM and was duly recorded in Book 138 DEEDS on Page 0439. Fee: $16.00

County Recorder Brenda L. Cook

By Deputy _____

Return To: BANK OF GLEN ULLIN PO BOX 99
GLEN ULLIN, ND 58631-0099

COUNTY RECORDER SEAL MERCER COUNTY, N. DAK.

Delinquent Taxes, Special Assessments, or Installments of Special Assessments Paid and Transfer Entered this 2nd day of June, 2006.

Monte G. Erhardt
Mercer County Auditor

By Pamela K. Wrath Clerk
~~Deputy Auditor~~

**SOUTHWEST WATER AUTHORITY**
Southwest Pipeline Project Building
West Industrial Park
4665 2nd Street SW
Dickinson, ND 58601-7231
(701) 225-0241
Toll Free: 1-888-425-0241

Segment **7-9E WEST CENTER SERVICE AREA**
Parcel **141-88-27**

## RIGHT-OF-WAY EASEMENT

**ALL PERSONS TAKE NOTICE:**

In consideration of one dollar ($1.00) and other good and valuable consideration **GLENN & LISA GERVING PO BOX 607 GLEN ULLIN, ND 58631** hereinafter referred to as Grantor, does hereby grant, bargain, sell, transfer and convey to the Southwest Water Authority, hereinafter referred to as the Grantee, its successor and assigns, a perpetual easement with right to erect, construct, install and lay, and thereafter use, operate, inspect, repair, maintain, replace, and remove water pipelines, connections, valves and all other appurtenant facilities used in connection with the construction, operation and maintenance of the Southwest Pipeline Project, over, above, across and through the land of the Grantor, situated in **Mercer** County, State of North Dakota, said land being described as follows: **S1/2 SW1/4 LESS R/W & S1/2 SW1/4 NW1/4 LESS R/W SECTION 24 TOWNSHIP 141 RANGE 88** (the tract that contains **4.04** acres, more or less), together with the right of ingress and egress over the adjacent lands of the Grantor, successors and assigns for the purposes of this easement.

1. The permanent easement will be thirty (30) feet in width, fifteen (15) feet on each side of the center line of the pipeline as constructed, with an additional ten (10) feet of temporary right-of-way for a total construction easement width of forty (40) feet, twenty (20) feet on each side of the center line.

2. The Grantee covenants to maintain the easement in good repair so that no unreasonable damage will result from its use to the adjacent land of the Grantor, successors and assigns. The Grantor will receive compensation for damages to growing crops caused by the construction or operation. The Grantor will report any damages within three (3) years of the construction of the project.

The grant and other provisions of this easement shall constitute a covenant running with the land for the benefit of the Grantee, its successors and assigns.

**IN WITNESS WHEREOF,** the Grantor has executed this instrument this 8TH day of MAY, 2015.

Glen Gerving GRANTOR Lisa M. Gerving GRANTOR

State of ND

County of MORTON

On 8TH MAY, 2015, personally appeared before me LISA GERVING
GLEN GERVING

X whom I know personally.
_____ whose identity I verified on the basis of _____.
_____ whose identity I verified on the oath or affirmation of _____, a credible witness to be the signor of the above and he/she acknowledged that he/she signed it.

LARRY WAGNER
Notary Public
State of North Dakota
My Commission Expires Nov. 5, 2020

Notary Public Larry Wagner
MORTON, County ND
My Commission Expires: NOV 5, 2020

MORTGAGEE
MORTGAGOR
INDEXED ✓

207178

**STATE OF NORTH DAKOTA**
**COUNTY OF MERCER**

**OFFICE OF**
**COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 5/22/2015 at 12:41 PM, and was duly recorded a Book 203 MISC on Page 209 Fee: $13.00

County Recorder Brenda L. Cook

By Deputy

Return To: SOUTHWEST WATER AUTHORITY, WEST INDUSTRIA
4665 2ND ST SW DICKINSON, ND 58601-7231

COUNTY RECORDER SEAL MERCER COUNTY, N DAK.

RECEIVED
MAY 11 2015
SOUTHWEST WATER AUTHORITY

BTW AP on S14-15

# WARRANTY DEED

THIS INDENTURE, Made this 11 day of May, 2006, between Glenn Gerving and Lisa Gerving, husband and wife and Dean Gerving and Tania Gerving, husband and wife, grantor, whether one or more, and Glenn Gerving and Lisa Gerving, husband and wife, grantees, whose post office address is P.O. Box 607, Glen Ullin, ND 58631-0607.

WITNESSETH, For and in consideration of the sum of one dollar ($1.00) and other good and valuable consideration in money or monies worth - - - - - - - - - - - - - - - - - - - - - - - - - - - - -Dollars, grantor does hereby GRANT to the grantees, as joint tenants and not as tenants in common, all of the following real property lying and being in the County of Mercer and State of North Dakota, and described as follows, to-wit:

1. N½NE¼ of Sec. 13,Twp. 145N, Rng. 89W
2. S½SW¼ of Sec. 24, Twp. 141N, Rng. 88W
3. S½SW¼NW¼ of Sec. 24, Twp. 141N, Rng. 88W

And the said grantor for himself, his heirs, executors and administrators, does covenant with the grantees that he is well seized in fee of the land and premises aforesaid and has good right to sell and convey the same in manner and form aforesaid; that the same are free from all incumbrances, except installments of special assessments or assessments for special improvements which have not been certified to the County Auditor for collection, easements, rights of ways, zoning ordinances and amendments, EPA issues, mineral reservations, mineral leases and mineral deeds and any limitations of record, and the above granted lands and premises in the quiet and

peaceable possession of said grantees, against all persons lawfully claiming or to claim the whole or any part thereof, the said grantor will warrant and defend.

WITNESS, The hand of the grantor:

Glenn Gerving

Lisa Gerving

Dean Gerving

Tania Gerving

STATE OF NORTH DAKOTA )
:)ss
COUNTY OF MORTON )

On this 1st day of May, 2006, before me, personally appeared Glenn Gerving and Lisa Gerving, husband and wife and Dean Gerving and Tania Gerving, husband and wife, known to me to be the persons who are described in, and who executed the within and foregoing instrument, and severally acknowledged that they executed the same.

Mike L. Halpern, Notary Public
Morton County, North Dakota

My Commission Expires:

June 26, 2008

I certify that the requirement for a report or statement of full consideration paid does not apply because this deed is for one of the transactions exempted by subdivision e of subsection 8 of section 4 of Senate Bill 2323 (1993).

Signed: Mike L. Halpern Date: 5/1/06
Grantee or Agent

182609

MORTGAGEE
MORTGAGOR
INDEXED ✓

STATE OF NORTH DAKOTA
COUNTY OF MERCER

OFFICE OF
COUNTY RECORDER

I hereby certify that within instrument was filed in this office for record this 06/02/2006 at 09:28 AM and was duly recorded in Book 138 DEEDS on Page 0439. Fee: $16.00

County Recorder Brenda L. Cook

By Deputy _____

Return To: BANK OF GLEN ULLIN PO BOX 99
GLEN ULLIN, ND 58631-0099

COUNTY RECORDER SEAL MERCER COUNTY, N. DAK.

Delinquent Taxes, Special Assessments, or Installments of Special Assessments Paid and Transfer Entered this 2nd day of June, 2006.

Monte G. Erhardt
Mercer County Auditor

By Pamela K. Wrath Clerk
~~Deputy Auditor~~

96516 12/21/2021 11:47 AM Total Pages: 3
BOOK: 44 PAGE: 235 FEES: $20.00 RB WARRANTY DEED
Mickie McNulty-Eide, OLIVER COUNTY RECORDER
By Rebecca Bathke Deputy

RECORDER OLIVER SEAL COUNTY STATE OF NORTH DAKOTA

THE TITLE TEAM
324 NORTH 3RD STREET
ATTN: KELLY BEHM
BISMARCK, ND 58501

# TRUSTEE'S WARRANTY DEED M159382

**THIS INDENTURE** Made this 15th day of December, 2021, between **Darren D. Senger and Francis M. Senger, Successor Trustees of the Senger Family Joint Asset Trust dated June 26, 2009, and any amendments thereto**, grantors, whether one or more, to **Glenn Gerving and Lisa Gerving**, grantees, whose post office address is PO Box 607 Glen Ullin ND 58631.

**WITNESSETH** for and in consideration of the sum of $10.00 and more consideration, grantors do hereby GRANT to the grantees, as joint tenants and not as tenants in common, all of the following real property lying and being in the County of Oliver, State of North Dakota, and described as follows, to-wit:

The E½SE¼ of Section 34, and the S½SW¼ of Section 35, all in Township 142 North, Range 87 West of the 5th P.M., Oliver County, North Dakota.

Reserving unto the Grantors 100% of whatever mineral interests (rights and royalties) currently owned by the Grantors or determined at a later date, including but not limited to oil, coal, gas, uranium and hydrocarbons owned as of record today.

Subject to easements, rights of way, restrictions and mineral severances and reservations of record.

I certify that the full consideration paid for the property described in this deed is $432,000.-.

Date: 12-15-21 (Sgd.) [signature]
Grantee or Agent

And the said grantors for themselves, their heirs, executors and administrators, do covenant with the grantees that they are well seized in fee of the land and premises aforesaid and have good right to sell and convey the same in manner and form aforesaid; that the same are free from encumbrances, except installments of special assessments or assessments for special improvements which have not been certified to the County Auditor for collection, and the above granted lands and premises in the quiet and peaceable possession of said grantees, against all persons lawfully claiming or to claim the whole or any part thereof, the said grantors will warrant and defend.

**Senger Family Joint Asset Trust dated June 26, 2009, and any amendments thereto**

**BY:** _____

**Francis M. Senger, Successor Trustee**

STATE OF Oregon )
) ss.
COUNTY OF Deschutes )

The foregoing instrument was acknowledged before me this 13th day of Dec, 2021, by Francis M. Senger, Successor Trustee of the Senger Family Joint Asset Trust dated June 26, 2009, and any amendments thereto.

(SEAL)

Rachel Ann Gheen
Notary Public,
Deschutes County, Oregon

My Commission Expires: Sept 12, 2025

OFFICIAL STAMP
RACHEL ANN GHEEN
NOTARY PUBLIC - OREGON
COMMISSION NO. 1016750
MY COMMISSION EXPIRES SEPTEMBER 12, 2025

**WITNESS** the hand of the grantors:

**Senger Family Joint Asset Trust dated June 26, 2009, and any amendments thereto**

**BY:** _____
**Darren D. Senger, Successor Trustee**

STATE OF California )
) ss.
COUNTY OF Santa Clara )

The foregoing instrument was acknowledged before me this 15 day of December, 2021, by Darren D. Senger, Successor Trustee of the Senger Family Joint Asset Trust dated June 26, 2009, and any amendments thereto.

(SEAL)

_____
Notary Public,
Santa Clara County, San Jose, California

My Commission Expires: Jan 26, 2025

TANIA LAL SHARMA
COMM. # 2343551
NOTARY PUBLIC - CALIFORNIA
SANTA CLARA COUNTY
MY COMM. EXP. JANUARY 26, 2025

Auditor's Office
Oliver County, N.D.
transfer entered this 21st day of
December 2021
_____
County Auditor
By _____ Deputy

**SOUTHWEST WATER AUTHORITY**
Southwest Pipeline Project Building
West Industrial Park
4665 2nd Street SW
Dickinson, ND 58601-7231
(701) 225-0241
Toll Free: 1-888-425-0241

Segment 7-9E WEST CENTER SERVICE AREA
Parcel **141-88-15**

## RIGHT-OF-WAY EASEMENT

**ALL PERSONS TAKE NOTICE:**

In consideration of one dollar ($1.00) and other good and valuable consideration **DEAN & TANIA GERVING 6743 PRAIRIE SAGE PL BISMARCK, ND 58503** hereinafter referred to as Grantor, does hereby grant, bargain, sell, transfer and convey to the Southwest Water Authority, hereinafter referred to as the Grantee, its successor and assigns, a perpetual easement with right to erect, construct, install and lay, and thereafter use, operate, inspect, repair, maintain, replace, and remove water pipelines, connections, valves and all other appurtenant facilities used in connection with the construction, operation and maintenance of the Southwest Pipeline Project, over, above, across and through the land of the Grantor, situated in **Mercer** County, State of North Dakota, said land being described as follows: **S1/2 S1/2 SW1/4 LESS R/W, FRAC N1/2 S1/2 SW1/4 LESS R/W SECTION 13 & N1/2 SW1/4 NW1/4 LESS R/W, N1/2 SW1/4 LESS R/W SECTION 24 TOWNSHIP 141 RANGE 88** (the tract that contains **3.88** acres, more or less), together with the right of ingress and egress over the adjacent lands of the Grantor, successors and assigns for the purposes of this easement.

1. The permanent easement will be thirty (30) feet in width, fifteen (15) feet on each side of the center line of the pipeline as constructed, with an additional ten (10) feet of temporary right-of-way for a total construction easement width of forty (40) feet, twenty (20) feet on each side of the center line.

2. The Grantee covenants to maintain the easement in good repair so that no unreasonable damage will result from its use to the adjacent land of the Grantor, successors and assigns. The Grantor will receive compensation for damages to growing crops caused by the construction or operation. The Grantor will report any damages within three (3) years of the construction of the project.

The grant and other provisions of this easement shall constitute a covenant running with the land for the benefit of the Grantee, its successors and assigns.

**IN WITNESS WHEREOF,** the Grantor has executed this instrument this 22 day of June, 2015.

Dean Gerving GRANTOR Tania Gerving GRANTOR

State of ND

County of Morton

On 22 of June, 2015, personally appeared before me Dean Gerving
Tania Gerving

✓ whom I know personally.
_____ whose identity I verified on the basis of _____.
_____ whose identity I verified on the oath or affirmation of _____, a credible witness to be the signor of the above and he/she acknowledged that he/she signed it.

ARTHUR J. HELLMAN
Notary Public
State of North Dakota
My Commission Expires May 20, 2016.

Notary Public Arthur J. Hellman
_____, County Morton

My Commission Expires: _____

207742

**STATE OF NORTH DAKOTA**
**COUNTY OF MERCER**

**OFFICE OF COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 7/16/2015 at 1:43 PM, and was duly recorded as Book 204 MISC on Page 101 Fee: $13.00

County Recorder Brenda K. Cook

By Deputy chg

Return To: SOUTHWEST WATER AUTHORITY, WEST INDUSTRIA
4665 2ND STREET SW DICKINSON, ND 58601-7231

MORTGAGEE
MORTGAGOR
INDEXED ✓

COUNTY RECORDER SEAL MERCER COUNTY, N DAK.

RECEIVED
JUN 24 2015
SOUTHWEST WATER AUTHORITY

Uploaded to BTW RP on 6-24-15 (m)

**SOUTHWEST WATER AUTHORITY**
Southwest Pipeline Project Building
West Industrial Park
4665 2nd Street SW
Dickinson, ND 58601-7231
(701) 225-0241
Toll Free: 1-888-425-0241

Segment **7-9E WEST CENTER SERVICE AREA**
Parcel **141-88-27**

## RIGHT-OF-WAY EASEMENT

**ALL PERSONS TAKE NOTICE:**

In consideration of one dollar ($1.00) and other good and valuable consideration **GLENN & LISA GERVING PO BOX 607 GLEN ULLIN, ND 58631** hereinafter referred to as Grantor, does hereby grant, bargain, sell, transfer and convey to the Southwest Water Authority, hereinafter referred to as the Grantee, its successor and assigns, a perpetual easement with right to erect, construct, install and lay, and thereafter use, operate, inspect, repair, maintain, replace, and remove water pipelines, connections, valves and all other appurtenant facilities used in connection with the construction, operation and maintenance of the Southwest Pipeline Project, over, above, across and through the land of the Grantor, situated in **Mercer** County, State of North Dakota, said land being described as follows: **S1/2 SW1/4 LESS R/W & S1/2 SW1/4 NW1/4 LESS R/W SECTION 24 TOWNSHIP 141 RANGE 88** (the tract that contains **4.04** acres, more or less), together with the right of ingress and egress over the adjacent lands of the Grantor, successors and assigns for the purposes of this easement.

1. The permanent easement will be thirty (30) feet in width, fifteen (15) feet on each side of the center line of the pipeline as constructed, with an additional ten (10) feet of temporary right-of-way for a total construction easement width of forty (40) feet, twenty (20) feet on each side of the center line.

2. The Grantee covenants to maintain the easement in good repair so that no unreasonable damage will result from its use to the adjacent land of the Grantor, successors and assigns. The Grantor will receive compensation for damages to growing crops caused by the construction or operation. The Grantor will report any damages within three (3) years of the construction of the project.

The grant and other provisions of this easement shall constitute a covenant running with the land for the benefit of the Grantee, its successors and assigns.

**IN WITNESS WHEREOF,** the Grantor has executed this instrument this 8TH day of MAY, 2015.

Glen Gerving GRANTOR Lisa M. Gerving GRANTOR

State of ND

County of MORTON

On 8TH MAY, 2015, personally appeared before me LISA GERVING
GLEN GERVING

X whom I know personally.
_____ whose identity I verified on the basis of _____.
_____ whose identity I verified on the oath or affirmation of _____, a credible witness to be the signor of the above and he/she acknowledged that he/she signed it.

LARRY WAGNER
Notary Public
State of North Dakota
My Commission Expires Nov. 5, 2020

Notary Public Larry Wagner
MORTON, County ND
My Commission Expires: NOV 5, 2020

MORTGAGEE
MORTGAGOR
INDEXED ✓

207178

**STATE OF NORTH DAKOTA**
**COUNTY OF MERCER**

**OFFICE OF**
**COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 5/22/2015 at 12:41 PM, and was duly recorded a Book 203 MISC on Page 209 Fee: $13.00

County Recorder Brenda L. Cook

By Deputy

Return To: SOUTHWEST WATER AUTHORITY, WEST INDUSTRIA
4665 2ND ST SW DICKINSON, ND 58601-7231

COUNTY RECORDER SEAL MERCER COUNTY, N DAK.

RECEIVED
MAY 11 2015
SOUTHWEST WATER AUTHORITY

BTW AP on S14-15

**NORTH DAKOTA INDUSTRIAL COMMISSION**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case Nos. 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## DECLARATION OF MICHAEL & BONNIE HAUPT

[¶1] We, Michael and Bonnie Haupt, declare the following based on personal knowledge:

[¶2] We have ownership interest in the following properties that lie within the boundaries of the Review Area of the proposed TB Leingang Storage Facility.

- Township 141 North, Range 88 West
  Section 27: SW1/4
  Mercer County, ND

- Township 141 North, Range 88 West
  Section 35: SE1/4
  Mercer County, ND

[¶3] To the best of our knowledge, the properties listed in ¶ 2 above are encumbered by the following easements:

- Section 27:
  i. Oliver-Mercer Electric Cooperative, Inc. Right-of-Way Easement executed by John and Frances Bechhold on March 23, 1945.

  ii. Glen Ullin Energy Center, LLC Wind Project Easement Agreement executed by Michael and Bonnie Haupt effective as of July 10, 2018

- Section 35:
  i. Mercer Co. Indenture executed by Michael and Elizabeth Bode on October 12, 1933.

  ii. State of North Dakota Indenture executed by Michael and Elizabeth Bode on July 14, 1959.

  iii. West River Telecommunications Right-of-Way Easement executed by Milton Flemmer on April 29, 1996.

  iv. Southwest Water Authority Potable Water Easement executed by Michael and Bonnie Haupt on July 14, 2015.

  v. Oliver-Mercer Electric Cooperative, Inc. Right-of-Way Easement executed by Michael and Elizabeth Bode in July, 1949.

vi. Northwest Bell Telephone Company Right-of-Way Easement executed by Milton Flemmer on July 11, 1969.

vii. Dakota Access, LLC Easement Agreement executed by Bonnie and Michael Haupt on March 4, 2016.

[¶4] Attached are the deeds which we believe indicate our ownership in each of the properties listed above.

[¶5] Attached are the easements currently encumbering these properties based on the information we have.

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on the 3 day of June , 2024 at Bismarck, ND, United States.

Mike Haupt
Mike Haupt (Jun 3, 2024 14:12 CDT)
Michael Haupt

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on the 3 day of June , 2024 at Bismarck, ND, United States.

Bonnie Haupt
Bonnie Haupt (Jun 3, 2024 14:09 CDT)
Bonnie Haupt

# WARRANTY DEED

THIS INDENTURE, Made this 13th day of May, 1998, between **LARRY L SCHNAIDT and SANDRA M SCHNAIDT,** husband and wife, whose post office address is 413 7th Street Northwest, Beulah, North Dakota 58523, Grantor, and **MICHAEL HAUPT and BONNIE HAUPT,** husband and wife, whose post office address is 5631 Apple Creek Drive, Bismarck, North Dakota 58504, Grantee

WITNESSETH, For and in consideration of the sum of Ten Dollars ($10 00) and Other Good and Valuable Consideration, Grantor does hereby GRANT to Grantee, as joint tenants with right of survivorship, and not as tenants in common, the real property lying and being in the County of Mercer and State of North Dakota, described as follows, to-wit

**The Southwest Quarter (SW 1/4) of Section Twenty-Seven (27), Township One Hundred Forty-One (141) North, Range Eighty-Eight (88) West of the Fifth Principal Meridian, Mercer County, North Dakota**

And the said Grantor, for themselves, their survivors and assigns, do covenant with the Grantee that they are well seized in fee of the land and premises aforesaid and have good right to sell and convey the same in manner and form aforesaid, that the same are free from all encumbrances, except mineral reservations and easements of record, and the above granted lands and premises in the quiet and peaceable possession of said Grantee, against all persons lawfully claiming or to claim the whole or any part thereof, the said Grantor will warrant and defend

WITNESS, The hand of the Grantor

Larry L Schnaidt

**LARRY L SCHNAIDT**

Sandra M. Schnaidt

**SANDRA M. SCHNAIDT**

ALEXANDER & SOLEM
ATTORNEYS AT LAW
133 WEST MAIN ST
PO BOX 249
BEULAH, ND 58523
PH (701) 873-5555
FAX (701) 873-4958

STATE OF NORTH DAKOTA )
)
COUNTY OF MERCER )

On this 13th day of May, 1998, before me, personally appeared **LARRY L SCHNAIDT and SANDRA M. SCHNAIDT**, husband and wife, known to me to be the persons who are described in, and who executed the within and foregoing instrument, and severally acknowledged that they executed the same

SCOTT T SOLEM
NOTARY PUBLIC
MERCER COUNTY, NORTH DAKOTA

My commission expires October 28, 2000

**This Deed is exempt from the filing requirements of Section 11-18-02.2, N D C C , under exception 6(c), as Grantor and Grantee are relatives**

**Date:** Sandra M Schnaidt
5/26/98

DOCUMENT NO. 165928

MORTGAGEE
MORTGAGOR
GRANTOR ✓
GRANTEE ✓
INDEXED ✓

DELINQUENT TAXES SPECIAL ASSESSMENTS OR INSTALLMENTS OF SPECIAL ASSESSMENTS PAID AND 9th DAY OF 98

Lessa Ketterak
COUNTY AUDITOR OF MERCER COUNTY, N DAK.
BY Sandra K Bohrer DEPUTY

STATE OF NORTH DAKOTA OFFICE OF
COUNTY OF MERCER REGISTER OF DEEDS
I certify that within instrument was
filed for record this 9th
Dec 1998 at 9:29 o'clock A.
is duly recorded in Book 122 - Deeds
593
Jeanette Sailer
Register of Deeds

ALEXANDER & SOLEM
ATTORNEYS AT LAW
133 WEST MAIN ST
P.O BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958

$10.00 chg Alexander Law Office
Box 219
Beulah, ND 58523

# WARRANTY DEED

THIS INDENTURE, Made this 19th day of May, 1998, between **MILTON FLEMMER, a/k/a MILTON H FLEMMER and ANITA FLEMMER, a/k/a ANITA B. FLEMMER,** husband and wife, whose post office address is P O Box 147, Beulah, North Dakota 58523, Grantor, and **BONNIE HAUPT and MICHAEL HAUPT,** her husband, whose post office address is 5631 Apple Creek Drive, Bismarck, North Dakota 58504, Grantee

WITNESSETH, For and in consideration of the sum of Ten Dollars ($10 00) and Other Good and Valuable Consideration, Grantor does hereby GRANT to Grantee, as joint tenants with right of survivorship, and not as tenants in common, the real property lying and being in the County of Mercer and State of North Dakota, described as follows, to-wit

**The Southeast Quarter (SE 1/4) of Section Thirty-Five (35), Township One Hundred Forty-One (141) North, Range Eighty-Eight (88) West of the Fifth Principal Meridian, Mercer County, North Dakota.**

**Provided, however, that the Grantor, Milton H Flemmer, reserves unto himself, a life estate in and to the property, with full rights of possession, use, and income, during his lifetime, and upon his death, the remainder shall pass to the Grantee, BONNIE HAUPT and MICHAEL HAUPT, her husband**

And the said Grantor, for themselves, their survivors and assigns, do covenant with the Grantee that they are well seized in fee of the land and premises aforesaid and have good right to sell and convey the same in manner and form aforesaid, that the same are free from all encumbrances, except mineral reservations and easements of record, and the above granted lands and premises in the quiet and peaceable possession of said Grantee, against all persons lawfully claiming or to claim the whole or any part thereof, the said Grantor will warrant and defend

ALEXANDER & SOLEM
ATTORNEYS AT LAW
133 WEST MAIN ST
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958

WITNESS, The hand of the Grantor

Anita Flemmer

**ANITA B. FLEMMER, as ATTORNEY-IN-FACT for MILTON FLEMMER, a/k/a MILTON H. FLEMMER**

Anita Flemmer

**ANITA FLEMMER, a/k/a ANITA B FLEMMER**

DELINQUENT TAXES, SPECIAL ASSESSMENTS, OR INSTALLMENTS OF SPECIAL ASSESSMENTS PAID AND TRANSFER ENTERED THIS 25th DAY OF [illegible] 19 98

Dean Kettenack
COUNTY AUDITOR OF MERCER COUNTY N DAK
BY Sandra L Bohrer DEPUTY

STATE OF NORTH DAKOTA )
)
COUNTY OF MERCER )

On this 19th day of May, 1998, before me, personally appeared **ANITA FLEMMER a/k/a ANITA B. FLEMMER, Individually and as ATTORNEY-IN-FACT FOR MILTON FLEMMER, a/k/a MILTON H. FLEMMER,** her husband, known to me to be the persons who are described in, and who executed the within and foregoing instrument, and severally acknowledged that they executed the same

SCOTT T SOLEM
NOTARY PUBLIC
MERCER COUNTY, NORTH DAKOTA

My commission expires October 28, 2000

**This Deed is exempt from the filing requirements of Section 11-18-02 2, N.D.C C , under exception 6(c), as Grantor and Grantee are relatives.**

**Date.** 5-20-98

Anita Flemmer

165421

STATE OF NORTH DAKOTA
COUNTY OF MERCER
I hereby certify that within instrument was filed in this office for record this 25th day of Sept 1998 at 9 17 o'clock A M and was duly recorded in book 122 Deeds on page 319.
Jeanette Sauer, Register of Deeds
Kathryn Schumann, Deputy

$10.00 chg Alexander & Solem Law Offices Box 249 Beulah, ND 58523

ALEXANDER & SOLEM
ATTORNEYS AT LAW
133 WEST MAIN ST
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-6355
FAX (701) 873-4259

Location Number _____

# RIGHT-OF-WAY EASEMENT

KNOW ALL MEN BY THESE PRESENTS, that the undersigned John Beehhold and Frances Beehheld, his wife for a good and valuable consideration, the receipt whereof is hereby acknowledged, does hereby grant unto the

Oliver-Mercer Electric Cooperative, Inc.,

a corporation, whose post office address is Hazen, N. Dak., North Dakota, and to its successors or assigns, the right to enter upon the lands of the undersigned, situated in the county of Mercer, State of North Dakota and more particularly described as follows:

NE¼, S½, of Sec. 27; NW¼, NE¼SW¼ of Sec 34, all in Twp 141 Rge 88.

and to place, construct, operate, repair, maintain, relocate and replace thereon and in or upon all streets, roads or highways abutting said lands an electric transmission or distribution line or system, and to cut and trim trees and shrubbery to the extent necessary to keep them clear of said electric line or system and to cut down from time to time all dead, weak, leaning or dangerous trees that are tall enough to strike the wires in falling.

In granting this easement it is understood that at pole locations, only a single pole and arrurtenance will be used, and that the location of the pole will be such as to form the least possible interference to farm operations, so long as it does not materially increase the cost of construction.

The undersigned covenants that he is the owner of the above described lands and that the said lands are free and clear of encumbrances and liens of whatsoever character except those held by the following persons:

none

It is further understood that, whenever necessary, words in this instrument in the singular shall be construed to read in the plural and that words used in the masculine gender shall be construed to read in the feminine.

IN WITNESS WHEREOF, the undersigned have set their hand s and seals this 23rd day of March, 19 45.

Signed, sealed and delivered in the presence of:

John Beckhold

Frances Beckhold

39 check description

(1)

STATE OF NORTH DAKOTA )
) SS
COUNTY OF Mercer )

On this 2nd day of March 1945 before me a Notary Public in and for said County and State, personally appeared John Bechhold and Frances Bechhold, his wife known to me to be the persons who are described in and who executed the within and foregoing instrument and acknowledged to me that they executed the same.

Notary Public in and for the
County of Mercer and State of
North Dakota.

My commission expires May 15, 1947.

MORTGAGEE
MORTGAGOR
INDEXED ✓

**STATE OF NORTH DAKOTA**
**COUNTY OF MERCER**

**208963**
**OFFICE OF**
**COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 10/28/2015 at 12:07 PM, and was duly recorded Book 207 MISC on Page 13 Fee: $16.00

County Recorder Brenda L Cook

By Deputy Kathryn Schumann

Return To: ROUGHRIDER ELECTRIC COOPERATIVE, INC., 800 H
chg HAZEN, ND 58545

COUNTY RECORDER
SEAL
MERCER COUNTY, N. DAK.

216378

**STATE OF NORTH DAKOTA** **OFFICE OF**
**COUNTY OF MERCER** **COUNTY RECORDER**

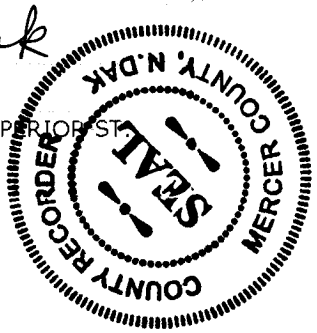
I hereby certify that the within instrument was filed in this office for record this 8/13/2018 at 9:39 AM, and was duly recorded as Book 221 MISC on Page 227 Fee: $20.00

County Recorder Brenda L. Cook

By Deputy

Return To: ALLETE CLEAN ENERGY, 30 WEST SUPERIOR ST., SUITE 200 DULUTH, MN 55802-2093

**MORTGAGEE**
**MORTGAGOR**
**INDEXED** ✓




THIS INSTRUMENT PREPARED BY
AND SHOULD BE RETURNED TO:

Margaret A. Thickens
Glen Ullin Energy Center, LLC
30 West Superior Street, Suite 200
Duluth, MN 55802-2093

**MEMORANDUM OF WIND PROJECT OPTION AGREEMENT**

THIS MEMORANDUM OF WIND PROJECT OPTION AGREEMENT (this "Memorandum") is made, dated and effective as of July 10, 2018 (the "Effective Date"), between Michael Haupt and Bonnie Haupt, husband and wife ("Owner"), and Glen Ullin Energy Center, LLC, a Delaware limited liability company ("Grantee"), in light of the following facts and circumstances:

RECITALS:

WHEREAS, Owner and Grantee have entered a Wind Project Option Agreement dated as of the Effective Date with respect to property more specifically described herein for wind energy purposes (as it may be hereinafter amended, restated or supplemented from time to time, the "Option Agreement"); and

WHEREAS, Owner and Grantee desire to set forth certain terms and conditions of the Option Agreement in a manner suitable for recording in the Public Records of Mercer County, North Dakota, in order to provide record notice of the Option Agreement and Grantee's rights in and to the land subject to the Option Agreement, as provided herein.

NOW, THEREFORE, in consideration of mutual covenants contained in the Option Agreement and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties hereto agree and stipulate as follows:

1. Terms of Option Agreement Incorporated. All of the terms, conditions, provisions and covenants of the Option Agreement are hereby incorporated into this Memorandum by

reference as though fully set forth herein, and the Option Agreement and this Memorandum shall be deemed to constitute a single instrument or document. Should there be any inconsistency between the terms of this Memorandum and the Option Agreement, the terms of the Option Agreement shall prevail.

2. Description of Property. The land subject to the Option Agreement is described on Exhibit A attached hereto, and by this reference made a part hereof (the "Property").

3. Grant of Option. Owner grants and conveys and warrants to Grantee an option for an easement for the purposes described in the Option Agreement and, if exercised the Wind Project Easement Agreement ("Easement Agreement") attached to the Option Agreement.

4. Term of Option Agreement. The term of the Option Agreement shall be Five (5) years (the "Option Term"), unless earlier terminated by Grantee. Grantee may terminate this Option at any time upon thirty (30) days' written notice to Owner.

5. Names and Addresses of Parties. The names and addresses of the parties to the Option Agreement are as follows:

| OWNER: | GRANTEE: |
|---|---|
| Michael & Bonnie Haupt<br>5631 Apple Creek Drive<br>Bismarck, ND 58504 | Glen Ullin Energy Center, LLC<br>30 W. Superior St.<br>Duluth, MN 55802 |

6. Successors and Assigns. The terms of this Memorandum and the Option Agreement are covenants running with the land and inure to the benefit of, and are binding upon, the parties and their respective successors and assigns, including all subsequent owners of all or any portion of the Property. References to Owner and Grantee include their respective successors and assigns. References to the Option Agreement includes any amendments thereto.

7. Miscellaneous. This Memorandum is executed for the purpose of recording in the Public Records of Mercer County, North Dakota, in order to provide public record notice of the Option Agreement. The entire Option Agreement is hereby incorporated into this Memorandum by reference. Notwithstanding anything to the contrary contained herein, the provisions of this Memorandum do not in any way alter, amend, supplement, change or affect the terms, covenants or conditions of the Option Agreement, all of which terms, covenants and conditions shall remain in full force and effect. In the event of any conflict between the terms of this Memorandum and the Option Agreement, the terms of the Option Agreement shall prevail. This instrument may for convenience be executed in any number of original counterparts, each of which shall be an original and all of which taken together shall constitute one instrument.

IN WITNESS WHEREOF, Owner and Grantee, acting through its duly authorized representative, have made and entered into this Memorandum as of the Effective Date.

OWNER SIGNATURE PAGE TO MEMORANDUM OF WIND PROJECT OPTION AGREEMENT

OWNER:

Michael Haupt

Michael Haupt

OWNER:

Bonnie Haupt

Bonnie Haupt

State of North Dakota )

County of Burleigh )

On this 10 day of July, in the year 2018 before me personally appeared Michael Haupt & Bonnie Haupt, known to me (or proved to me on oath of _____) to be the person who is described in and who executed the within instrument, and acknowledged to me that the person (or they) executed the same.

WITNESS MY HAND AND OFFICIAL SEAL.

Signature Linda M. Reis [SEAL]

LINDA M REIS
Notary Public
STATE OF NORTH DAKOTA
My Commission Expires
March 25, 2022

GRANTEE SIGNATURE PAGE TO MEMORANDUM OF WIND PROJECT OPTION AGREEMENT

GRANTEE:

Glen Ullin Energy Center, LLC,
a Delaware limited liability company

By: _____

Name: Allan S. Rudeck Jr.

Title: President

State of Minnesota )

County of St. Louis )

On this 16th day of July, in the year 2018 before me personally appeared Allan S. Rudeck Jr., known to me (or proved to me on oath of _____) to be the President of the limited liability company that is described in and that executed the within instrument, and acknowledged to me that such limited liability company executed the same.

WITNESS MY HAND AND OFFICIAL SEAL.

Signature _____ [SEAL]

CASSEE VALENTINE BRADSHAW
NOTARY PUBLIC - MINNESOTA
My Commission Expires Jan 31, 2019

**EXHIBIT A**

**The Property**

SW ¼ of Section 27, T141N, R88W
Mercer County, North Dakota, 5th Principal Meridian

QUIT-CLAIM DEED—CC-147

Document No. 45781

THIS INDENTURE, Made this 10 day of Oct. in the year of our Lord one thousand nine hundred and Thirty three, between Michael Bode and Elizabeth Bode, his wife

of the County of Mercer and State of North Dakota parties of the first part, and Mercer County

of the County of Mercer and State of North Dakota part of the second part,

WITNESSETH, That the said part of the first part, for and in consideration of the sum of ($500.00) Five Hundred and no/100 DOLLARS, to in hand paid by the said part of the second part, the receipt whereof is hereby acknowledged, do by these presents GRANT, BARGAIN, SELL, REMISE, RELEASE and QUIT-CLAIM unto the said part of the second part, and to heirs and assigns, FOREVER, all the following described lot, piece or parcel of land situate in the County of Mercer and State of North Dakota, and known and described as follows, to-wit: Parcel #45.

All that portion of the SE¼ of Sec. 35 Twp. 141N. Range 88W. lying within a strip of land. Said strip being 90 ft wide, lying 45 ft on each side of the following described center line. Beginning on the North line of said SE¼ Sec. 35 at a point 1553.7 ft. from the NE Corner thereof, ~~of~~ said point being on the center line of the State Highway as surveyed and staked over and across said SE¼, Sec. 35, thence running southerly along a 4° curve to the right 602.1 ft, thence S 10°51'W. 433.1 ft. thence along a 3° curve to the left 372.8 ft thence S 0°20' E 1244.3 ft to the south line of said SE¼ Sec. 35 exceptiing all that portion lying within 33 ft. of a section line.
Tract contains 5.41 acres, more or less and is shown on plat as shaded area.

TO HAVE AND TO HOLD, The above quit-claimed premises, together with all the hereditaments and appurtenances thereunto belonging or in anywise appertaining, to the said part of the second part, heirs and assigns, FOREVER

IN TESTIMONY WHEREOF, The said part of the first part ha hereunto set hand and seal the day and year first above written.

Signed, Sealed and Delivered in presence of
F. O. GENT
C. W. KNATHACK
Witnesses

MICHAEL BODE (SEAL)
ELIZABETH BODE (SEAL)
(SEAL)

STATE OF NORTH DAKOTA, County of Mercer } ss.

On this 12th day of October in the year one thousand nine hundred and Thirty-three, before me C. W. Kanthack a Notary Public in and for said County and State, personally appeared Michael Bode and Elizabeth, his wife known to me to be the person who are described in, and who esecuted the foregoing and within instrument and acknowledged to me that he executed the same.

Seal affixed

C. W. Kanthack
Notary Public, Mercer County,
My Commission expires July 7th 1935

~~Delinquent taxes paid and~~ transfer entered this 10th day of March 1934

Paul Leupp
Auditor

OFFICE OF REGISTER OF DEEDS
STATE OF NORTH DAKOTA, County of Mercer.

I hereby certify that the within Deed was filed in this office for record on the 10th day of March A. D. 1934, at 10:00 o'clock and was duly recorded in Book 26 of Deeds on page 263

R. D. Seal affixed

By Deputy. H. J. Giffey
Register of Deeds.

DOCUMENT NO. 79029

Project No. S 422 (10) Parcel No. 1A

WARRANTY DEED
(State Highway Department)

THIS INDENTURE, Made this 14 day of July in the year of our Lord one thousand nine hundred and Fifty-nine, between Michael Bode & Elizabeth Bode (H & W), whose postoffice address is Glen Ullin, N. Dak., Rte. # 1, parties of the first part, and the State of North Dakota, for the use and benefit of the State Highway Department, whose postoffice address is Bismarck, State of North Dakota, party of the second part;

WITNESSETH, That the said parties of the first part, for and in consideration of the sum of Three Hundred Fifty & 00/100- - - - - Dollars ($350.00/100), to them in hand paid by said party of the second part, the receipt whereof is hereby acknowledged, do by these presents GRANT, BARGAIN, SELL and CONVEY unto the said party of the second part, it_ successors and assigns, FOREVER, all that tract or parcel of land lying and being in the County of Mercer, State of North Dakota, and described as follows, to-wit:

All that portion of the SE¼ of Sec. 35, Twp. 141 N., Rge. 88 W., 5th P. M., lying within a strip of land 200 ft. wide, lying 100 ft, on each side of the following described highway centerline as surveyed and staked over and across said SE¼:

Beginning at a point 40.0 ft. west of the northeast corner of the NW¼ of Sec. 4, Twp. 140 N., Rge. 88 W., 5th P. M., thence running north 1200.0 ft. more or less, until said strip ends, excepting all that portion previously acquired for public right of way and all that portion lying within 33 feet of the second line.

Highway

Tract contains 2.94 acres, more or less, and is shown on plat as shaded area.

Excepting and reserving to the grantors, herein, their successors and assigns, all oil, oil rights, natural gas, natural gas rights and other fluid minerals that may be within or under the parcel of land herein described without however, the right ever to drill, dig or mine through the surface of said land therefore or otherwise in such manner as to endanger the safety of any highway that may be constructed on the lands hereby conveyed.

TO HAVE AND TO HOLD THE SAME, Together with all hereditaments and appurtenances thereunto belonging or in anywise appertaining, to the said party of the second part, its successors and assignsm FOREVER, And the said Michael Bode & Elizabeth Bode ( H & W), said parties of the first part, for themselves, their heirs, executors and administrators, do covenant with the said party of the second part, its successors and assigns, that they are well seized in fee of the land and premises aforesaid, and have good right to sell and convey the same in manner and form aforesaid; that the same are free from all encumberances, whatsoever, and the above bargained and granted land and premises in the quiet and peaceable possession of said party of the second part, its successors and assigns, against all persons lawfully claiming or to claim the whole or any part thereof, the said parties of the first part will warrant and defend.

IN WITNESS WHEREOF, The said parties of the first part hereunto set their hands the day and year first above written.

Signed and Delivered in Presence of

Michael Bode

Elizabeth Bode

STATE OF NORTH DAKOTA, )
)
County of Mercer )

On this 14 day of July, A. D., 1959, before me personally appeared Michael Bode & Elizabeth Bode ( H & W), known to me to be the same persons described in and who executed the within and foregoing instrument, and severally acknowledged to me that they executed the same.

(NOTARIAL SEAL)

J. A. McCann
J.A. McCANN, Notary Public.
Burleigh Co., N. Dak.

My Commission Expires: Aug. 25, 1962.

STATE OF NORTH DAKOTA,)
) SS. OFFICE OF REGISTER OF DEEDS.
COUNTY OF MERCER. )

I hereby certify that the within instrument was filed in this office for record this 29th day of July 1959, at 3:20 o'clock P. M., and was duly recorded in Book 49-Deeds, on Page 430.

(OFFICIAL SEAL)

Emanuel Suess
Register of Deeds.

Delinquent taxes paid and transfer entered this 29 day of July, 1959.
George H. Sagehorn , Auditor of Mercer Co., N.D.
By John Pulles, Dep.

# *West River Telecommunications Right-of-Way Easement*

In Computer [ ]
WRT# [ ]
County# [ ]

W.O.# 96-111

We the undersigned, (whether one or more) ***Milton H Flemmer***, Grantor(s), do hereby grant and convey unto ***West River Telecommunications Cooperative***, a cooperative corporation (hereafter called the "Cooperative"), grantee, whose address is P.O. Box 467, Hazen, North Dakota, and its respective successors, assigns, lessees and agents, an easement to survey, construct, repair, operate, upgrade, maintain, relocate, replace and remove such communication systems as the grantee may from time to time require, consisting of but not limited to cables, wires, poles, splicing boxes, and other appurtenances, upon, over and under the land which the undersigned owns or in which the undersigned has any interest in the County of ***Mercer***, State of ***North Dakota***, and more particularly described as follows:

***E/2 of Section 35, Township 141, Range 88 Less ND Highway ROW***

also the right of ingress and egress over and across the lands of the undersigned for the purpose of exercising the rights herein granted; to place surface markers beyond said strip, to clear and keep clear all trees, roots brush and other obstructions from the surface and subsurface of said strip of land. The boundary of said strip shall be a line parallel to and 25 feet either side of the first cable laid on the land of the undersigned or on adjacent lands. The undersigned for himself, his heirs, executors, administrators, successors, and assigns, hereby covenants that no structure shall be erected on said strip.

The undersigned agrees that all poles, wire and other facilities, including telephone equipment, installed on the above described premises at the Cooperative's expense, shall remain the property of the Cooperative, removable at the option of the Cooperative. The undersigned agrees to this easement with the understanding the Grantor, his heirs, executors, administrators, successors, and assigns, may continue to have access to and use of the easement area in any manner consistent with the rights herein granted to the Cooperative, and that the Cooperative will restore the said strip to as near as reasonable to the pre-plowed condition, and that the Cooperative will erect no buildings on said strip.

The undersigned covenant that they are the owners of the above described lands and that the said lands are free and clear of encumbrances and liens of whatsoever character except those held by the following persons:

The term of this easement shall be for as long as needed by the grantee, and until a release of this easement is recorded, but to not extend beyond the maximum term authorized by law.

Access is hereby granted for a state or federal historical survey of the cable route, should one be required, unless checked. Access denied ☐

IN WITNESS WHEREOF, this instrument has been executed by the undersigned this the 29 day of April, 1996.

STATE OF NORTH DAKOTA )
)
COUNTY OF Mercer )

by: _____

by: _____

The foregoing instrument was acknowledged before me this 29th day of April, 1996.
By Milton H Flemmer.
My Commission Expires:

_____
Notary Public, County of Mercer

Document No. 161439

OFFICE OF REGISTER OF DEEDS, COUNTY OF Mercer, North Dakota. I hereby certify that the within instrument was filed in this office for recording on the 29th day of January, A.D., 1996, at 9:22 o'clock A.M, and was duly recorded in Book 139, of Misc., on page 397.

By Kathryn Schumann, *7.00 pd.

Deputy Jeanette Sailer
Register of Deeds

REGISTER OF DEEDS SEAL MERCER COUNTY, N.DAK.

When recorded, please return to WEST RIVER TELECOMMUNICATION COOPERATIVE, Box 467, Hazen, ND 58545 701-748-2211

CLYDE FANDRICH
Notary Public, Mercer County, ND
My Commission Expires Feb. 24, 1999
STATE OF NORTH DAKOTA
NOTARY PUBLIC SEAL

MORTGAGEE
MORTGAGOR
GRANTOR ✓
GRANTEE ✓
INDEXED ✓

**EASEMENT: Potable Water Pipeline** 

Michael L. and Bonnie L. Haupt, 5631 Apple Creek Drive, Bismarck ND, 58504 (GRANTOR), in consideration of $1.00, conveys to Southwest Water Authority, 4665 2nd Street Southwest, Dickinson ND 58601-7231 (GRANTEE), an easement to construct, operate, maintain and remove one 4-inch diameter poly Potable Water Pipeline with the right of ingress and egress, over certain land hereafter referred to as the "easement area", which is a strip of land 33.0 feet wide, 16.5 feet on each side of the following described centerline:

SE4 of Section 35, T141N, R88W, Mercer County

Commencing at the Southeast Section corner of said Section 35; thence N88°59'43"W along the south section line of said Section 35, a distance of 1519.95 feet to the Point of Beginning; thence N00°22'55"E, a distance of 883.28 feet; thence N10°54'15"E, a distance of 49.62 feet; thence N19°34'06"E, a distance of 93.19 feet; thence N12°28'11"E, a distance of 50.86 feet; thence N26°53'07"W, a distance of 84.38 feet; thence N12°42'49"W, a distance of 55.64 feet; thence N00°07'44"W, a distance of 121.45 feet; thence N00°41'06"E, a distance of 1318.50 feet to the east/west quarter line of said Section 35 and thus terminating, said ending point being located N89°00'25"W along said quarter line, a distance of 1542.10 feet from the East Quarter Corner of said Section 35. The centerline is 2,656.92 feet or 161.03 rods long, and the easement area contains 2.01 acres, more or less. The easement area is further described and illustrated in Exhibits "A1-A2" which are attached to and are a part of this easement.

1. The Potable Water Pipeline shall be built only on the centerline as described above. GRANTEE may also temporarily use an additional 17.0 feet of right-of-way on the working side of the Potable Water Pipeline as a construction right-of-way. This construction right-of-way shall be subject to the topsoil reservation and reclamation provisions of this easement and must be abandoned upon the completion of construction and reclamation.

2. The top of the Potable Water Pipeline must be buried at least 72 inches below the ground's surface.

3. GRANTEE may install the following described appurtenance(s) upon the surface or at a depth less than 72 inches; (NA). For this/these additional appurtenance(s), GRANTEE has paid (NA) as further consideration. GRANTEE shall, when necessary, protect all above-ground appurtenances with a fence adequate to prevent livestock access and shall paint all above ground structures, except wire fences, anchors, guy wires, steel towers, and wood poles, with earth tone colors.

4. If construction of the Potable Water Pipeline within the easement area, is not completed within two (2) years after GRANTOR signs this easement, this easement automatically terminates.

5. For the initial construction of the Potable Water Pipeline, GRANTEE shall pay for labor and new materials for any fences or other improvements owned by the GRANTOR, that are moved or damaged by construction, operation, maintenance, or removal of the Potable Water Pipeline, and shall notify the surface GRANTOR of the construction schedule at least one week before construction within the easement area.

6. GRANTEE, or its agent, shall have a legible copy of this easement with them on-site for reference during construction, operation, maintenance or reclamation and shall present the copy upon GRANTOR's request.

7. This easement is subject to all of the GRANTOR's existing rights and privileges.

8. If, prior to or during construction, archeological or paleontological items are discovered or such items are disturbed, GRANTEE shall cease construction activities immediately. GRANTEE shall then promptly notify GRANTOR and must not resume construction until written approval is given by GRANTOR.

9. GRANTEE shall, prior to construction, maintenance or removal, reserve the top 12 inches of soil from areas subject to topsoil and subsoil mixing. The reserved soil must be stockpiled to minimize wind and water erosion. Upon completion of construction, maintenance, or removal, GRANTEE shall promptly reclaim the disturbed area. The disturbed area must be re-contoured to conform to the adjacent natural topography, rocks exposed by excavation must be hauled off the property or piled on one common pile within the easement area. The reserved soil must be evenly re-spread over the disturbed area, and the entire disturbed area must be re-vegetated with a mixture of native perennial grasses on the native grassland and alfalfa on the hayland, as shown in Exhibit "B". Reclamation is not complete until the activities described in this section are complete and the GRANTOR has approved completion in writing to GRANTEE.

10. GRANTEE shall implement reasonable measures to prevent accelerated erosion. If an erosion problem develops, GRANTEE shall promptly take the necessary actions to correct it and shall repair any erosion damage.

11. GRANTEE shall not discharge oil, gas liquids, salt water, or any other hazardous liquids or toxic substances onto the right-of-way or land adjacent to the right-of-way. All discharges of oil, gas liquids, salt water, or other hazardous liquids or toxic substances shall be stopped as soon as possible after discovery and acted upon immediately to halt movement of such discharges. Any such discharges shall be reported immediately to the GRANTOR. The GRANTEE shall then restore the affected area as closely as possible to its original condition.

12. GRANTEE shall control all noxious weeds in the easement area.

13. GRANTEE may cut or trim trees and shrubs, but only to the extent they interfere with or endanger the construction, operation, maintenance, or removal of the Potable Water Pipeline.

14. GRANTEE shall maintain the natural water flow and drainage.

15. GRANTEE shall take necessary precautions to prevent fires. In the event of a fire caused by the GRANTEE or its agent, GRANTEE shall compensate the GRANTOR and GRANTOR's surface lessee(s) for any losses due to the fire.

16. GRANTEE shall conduct all activities associated with the Potable Water Pipeline in a manner that avoids the degradation of air, land, and water quality and that protects the area's visual resources.

17. GRANTOR reserves the right to use the easement area and to allow others to use the easement area for purposes compatible with GRANTEE's use. If someone other than GRANTOR uses the easement area in a manner inconsistent with GRANTEE's use, GRANTOR is not liable or responsible.

18. Through this easement, GRANTEE is not acquiring any subsurface mineral interest. If any subsurface mineral interest is excluded from mining or development because of the presence of this easement or the Potable Water Pipeline, or if the location of the easement or Potable Water Pipeline interferes with the mining or development of subsurface mineral interests outside of the easement area, GRANTOR will give GRANTEE at least sixty days' written notice of the conflict between this easement and GRANTOR's right to mine and develop subsurface interests. At the end of the sixty-day period, GRANTEE must either pay GRANTOR the amount of lost royalties for the damages suffered because of GRANTOR's inability to mine or develop subsurface mineral interests, or GRANTEE must agree to relocate the easement and the Potable Water Pipeline. If GRANTEE selects relocation, this easement will be revised to describe the easement's new location and GRANTEE will move all structures and other physical features of the easement to the new location. Relocation does not entitle GRANTOR to additional compensation, but GRANTEE must bear all relocation costs. GRANTEE must promptly complete relocation.

19. Any fixtures, structures, installations or facilities constructed or installed by GRANTEE, are the property of GRANTEE and may be removed by GRANTEE at any time.

20. GRANTEE shall remove all improvements from the easement area if the easement is abandoned or terminated, unless authorized to do otherwise in writing by GRANTOR.

21. This easement shall be a covenant running with the land and shall be binding on the heirs, successors, agents, and assigns of the parties.

22. This easement is subject to all existing easements and does not supersede any rights previously granted.

23. GRANTOR neither warrants nor agrees to defend title to the easement area.

Dated this 14th day of July, 2015, at Bismarck, North Dakota.

GRANTOR:
MICHAEL L. AND BONNIE L. HAUPT

Michael L. Haupt
Michael L. Haupt

Bonnie L. Haupt
Bonnie L. Haupt

STATE OF NORTH DAKOTA)
) ss.
COUNTY OF BURLEIGH )

On this 14th day of July, 2015, before me personally appeared Michael L. Haupt and Bonnie L. Haupt, to be the persons who executed this instrument and acknowledged to me that they executed the same.

(SEAL)

DEBRA K. JACOBS
Notary Public
State of North Dakota
My Commission Expires August 2, 2019

Debra K. Jacobs
Notary Public

GRANTEE:

SOUTHWEST WATER AUTHORITY

Mary Massad
(signature) On Behalf of Southwest Water Authority

STATE OF North Dakota )
) ss.
COUNTY OF Stark )

On this 27th day of July, 2015, before me personally appeared Mary Massad, Manager/CEO (title), acting on behalf of Southwest Water Authority, known to me to be the person who executed this instrument and acknowledged to me that he executed the same.

(SEAL)

MISTI M CONZEMIUS
NOTARY PUBLIC, STATE OF NORTH DAKOTA
MY COMMISSION EXPIRES JAN 9, 2019

Misti M. Conzemius
Notary Public

**EASEMENT: Potable Water Pipeline**

**Exhibit "B"**

## Native Grass Seeding Specifications

| Species | lbs. PLS*/acre |
|---|---|
| Western wheatgrass | 8 |
| Slender wheatgrass | 5 |
| Green needlegrass | 4 |
| Side-oats grama | 2 |
| | 19 |

*PLS - Pure Live Seed (based on 50 PLS/sq. feet)

1. The seed bed should be firmly packed (footprints left in the soil should be less than 1/2 inch deep).

2. An early spring seeding (before May 24th) is preferred. A dormant fall seeding (after October 20th) is acceptable.

3. A cover crop of oats at 10 lbs. PLS/acre must be seeded on the disturbed area.

4. A drill designed specifically for native grass seeding will give the best seeding results. The seed should be planted at a depth of 1/2 to 1 inch. Precaution must be taken not to plant the seed too deeply in the soil or poor germination will result.

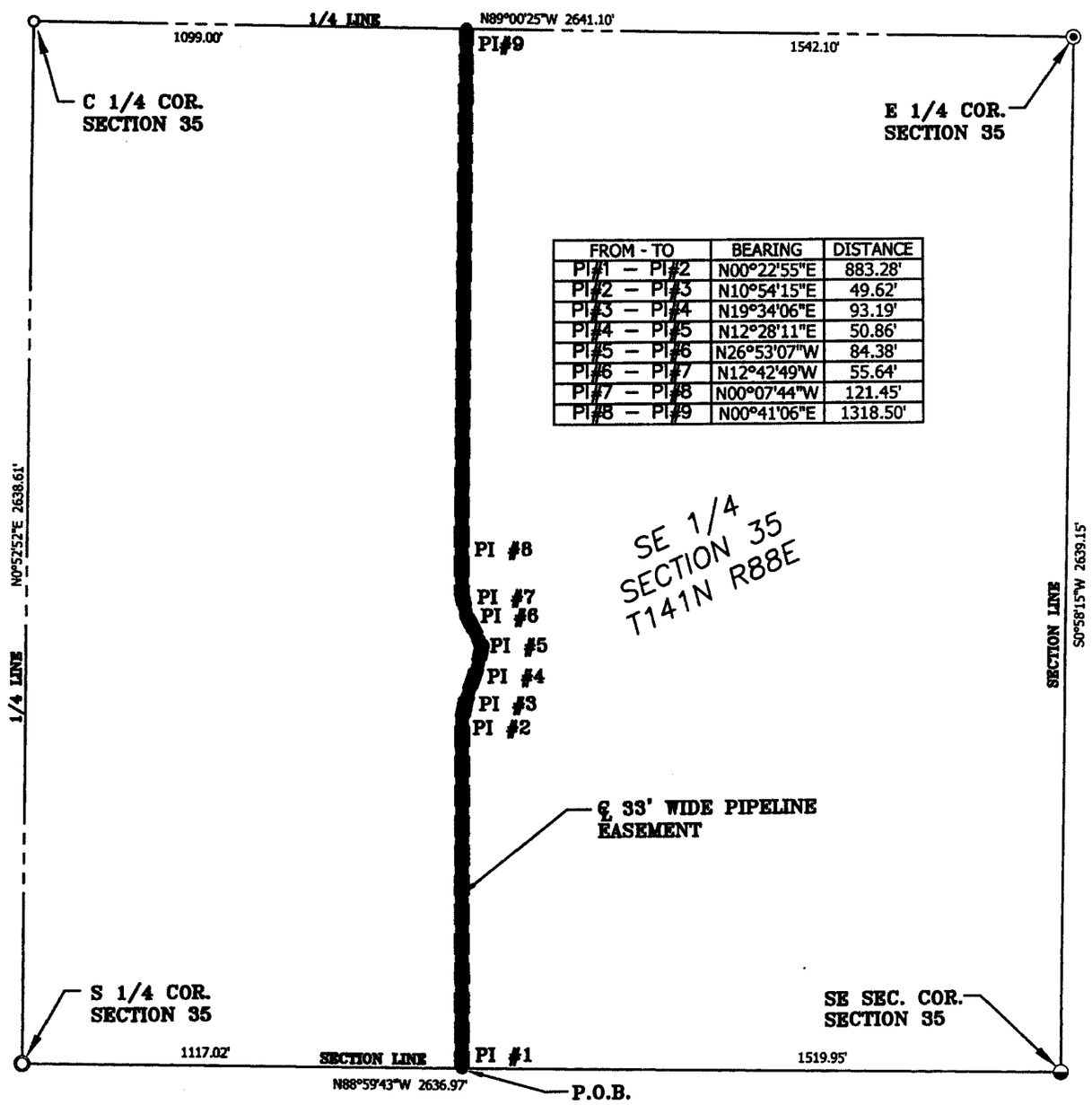
5. On areas where equipment cannot be used, broadcast seed and rake or drag to cover seed. Where seed is broadcast, double the seeding rate.

6. Use only North Dakota certified seed.

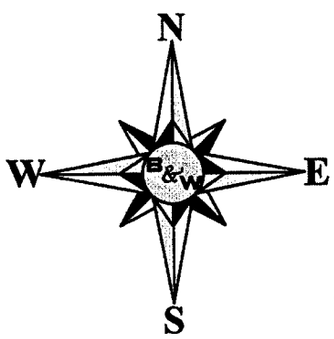
**Caution:** Be sure to clean out the drill before seeding to avoid any contamination with smooth brome grass or crested wheatgrass that may remain in the drill from previous use on private land. These are invasive grasses in native prairie and are not allowed on school trust lands. Contamination with or use of crested wheatgrass or smooth brome will result in the applicant being required to spray out the grass and reseed with the above native grass seed mixture. Sweet clover and alfalfa are also not allowed – only the above native grass seed mixture may be used for revegetation on school trust land.

Alfalfa-Hayland Seeding: Rate 8 lbs. PLS per Acre

# PIPELINE EASEMENT FOR SOUTHWEST PIPELINE PROJECT (S.W.P.P.) IN THE SOUTHEAST QUARTER (SE 1/4) OF SECTION 35, T 141 N, R 88 W OF THE 5TH P.M., MERCER COUNTY, NORTH DAKOTA (NORTH DAKOTA STATE WATER COMMISSION PROJECT 1736)




| FROM - TO | BEARING | DISTANCE |
|---|---|---|
| PI#1 – PI#2 | N00°22'55"E | 883.28' |
| PI#2 – PI#3 | N10°54'15"E | 49.62' |
| PI#3 – PI#4 | N19°34'06"E | 93.19' |
| PI#4 – PI#5 | N12°28'11"E | 50.86' |
| PI#5 – PI#6 | N26°53'07"W | 84.38' |
| PI#6 – PI#7 | N12°42'49"W | 55.64' |
| PI#7 – PI#8 | N00°07'44"W | 121.45' |
| PI#8 – PI#9 | N00°41'06"E | 1318.50' |




GRAPHIC SCALE

400 0 200 400

( IN FEET )
1 inch = 400 ft.

## LEGEND

- FOUND 1–1/2 INCH ALUM D.O.T. 3047
- FOUND .2 INCH ALUM CAP STAMPED 2491 INT. ENG.
- FOUND 5/8" RBR NO CAP
- COMPUTED CORNER POINT
- COMPUTED EASEMENT POINT



PREPARED BY:

BARTLETT & WEST | AECOM

Bartlett & West, Inc.

AECOM Technical Services, Inc.

# PIPELINE EASEMENT FOR SOUTHWEST PIPELINE PROJECT (S.W.P.P.) IN THE SOUTHEAST QUARTER (SE 1/4) OF SECTION 35, T 141 N, R 88 W OF THE 5TH P.M., MERCER COUNTY, NORTH DAKOTA (NORTH DAKOTA STATE WATER COMMISSION PROJECT 1736)

## SURVEYOR'S CERTIFICATE

I, Bruce P. Zelmer, a Professional Land Surveyor in and for the State of North Dakota, do hereby certify that at the request of the Michael Haupt, did complete a survey for the purpose of establishing the permanent pipeline easement located in Southeast Quarter (SE 1/4) of Section 35, Township 141 North, Range 88 West of the 5th P.M., Mercer County, North Dakota, said easement being comprised of a strip of land 33 feet in width, lying 16.5 feet on each side of the following described centerline:

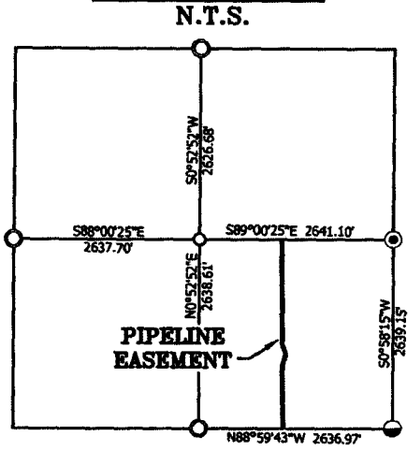
LEGAL DESCRIPTION OF PERMANENT EASEMENT: Commencing at the Southeast Section corner of said Section 35; thence N88°59'43"W along the south section line of said Section 35, a distance of 1519.95 feet to the Point of Beginning; thence N00°22'55"E, a distance of 883.28 feet; thence N10°54'15"E, a distance of 49.62 feet; thence N19°34'06"E, a distance of 93.19 feet; thence N12°28'11"E, a distance of 50.86 feet; thence N26°53'07"W, a distance of 84.38 feet; thence N12°42'49"W, a distance of 55.64 feet; thence N00°07'44"W, a distance of 121.45 feet; thence N00°41'06"E, a distance of 1318.50 feet to the east/west quarter line of said Section 35 and thus terminating, said ending point being located N89°00'25"W along said quarter line, a distance of 1542.10 feet from the East Quarter Corner of said Section 35 and containing 2.01 acres, more or less.

This Certificate is to the best of my knowledge and belief a true description of said survey. I hereby certify that I have executed this document this 11TH day of JANUARY 2017.

Bruce P. Zelmer, L.S. # 3756

BRUCE P. ZELMER
REGISTERED LAND SURVEYOR
L.S. 3756
NORTH DAKOTA

## LOCATION MAP
N.T.S.




SECTION 35
T 141 N, R 88 W

**PIPELINE TO BE INSTALLED**

3" CLASS 160 PVC

**BASIS OF BEARINGS**

ALL BEARINGS SHOWN ARE GRID BEARINGS BASED ON THE NORTH DAKOTA STATE PLANE COORDINATE SYSTEM, NAD 83, SOUTH ZONE.



PREPARED BY:

BARTLETT & WEST | AECOM

Bartlett & West, Inc.

AECOM Technical Services, Inc.

MORTGAGEE
MORTGAGOR
INDEXED ✓

213518

**STATE OF NORTH DAKOTA** **OFFICE OF**
**COUNTY OF MERCER** **COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 3/9/2017 at 9:18 AM, and was duly recorded as Book 216 MISC on Page 301 Fee: $38.00

County Recorder Brenda L Cook

By Deputy Kathryn Schumann

Return To: SOUTHWEST WATER AUTHORITY, 4665 2ND STREET
DICKINSON, ND 58601-7231

01592

FORM LE-189 R

RIGHT OF WAY EASEMENT

KNOW ALL MEN BY THESE PRESENTS, that we the undersigned, (Whether one or more) Mike Bade + Elizabeth Bade

~~(unmarried)~~ (husband and wife), for a good and valuable consideration, the receipt whereof is hereby acknowledged, do hereby grant unto Oliver Mercer Electric Cooperative, Inc., a cooperative corporation (hereinafter called the "Cooperative"), whose post office address is Hazen, North Dakota, and to its successors or assigns, the right to enter upon the lands of the undersigned, situated in the County of Mercer, State of North Dakota, and more particularly described as follows:

A tract of land approximately ---------- acres in area, located ----------miles in a ---------- direction from the town of ----------, and further described as being in the

E½ Section 36 Township 144 Range 88

----------Section----------Township----------Range----------

----------Section----------Township----------Range----------

----------Section----------Township----------Range----------

and to contract, operate and maintain on the above described lands, and/or in or upon all streets, roads or highways abutting said lands, an electric transmission or distribution line or system, and to cut and trim trees and shrubbery that may interfere with or threaten to endanger the operation and maintenance of said line or system.

The undersigned agree that all poles, wires, and other facilities, including any main service entrance equipment , installed on the above-described lands at the Cooperative's expense shall remain the property of the Cooperative, removable at the option of the Cooperative, upon the termination of service to or on said lands.

The undersigned covenant that they are the owners of the above described lands and that the said lands are free and clear of encumberances and liens of whatsoever character except those held by the following persons:

IN WITNESS WHEREOF, the undersigned have set their hands and seals this 26 day of July 19 44

Mike Bade (L.S.)

Elizabeth Bade (L.S.)

Signed, sealed and delivered in the presence of:

Henry Lentz

---

(1)
STATE OF NORTH DAKOTA
COUNTY OF Mercer SS.

Henry Lantz being first duly sworn says that he is one of the witnesses to the above and foregoing easement that Mike Bode and Elizabeth Bode (husband and wife) whose names is and/or are subscribed to the above and foregoing instruments as a party is and/or are the persons described in said easement and that The y signed said instrument in my presence and that I in their presence signed my name thereto as a subscribing witness.

Henry Lantz

SUBSCRIBED and sworn to before me this 2 day of August 1949.

Frank J. Belinskey
Notary Public in and for the
County of Mercer and
State of North Dakota.

FRANK J. BELINSKEY NOTARY PUBLIC STATE OF NORTH DAKOTA

My commission expires March 24, 1953.

(1)
STATE OF NORTH DAKOTA
COUNTY OF Mercer SS.

On this 2 day of Aug. 1949 before me Frank J. Belinskey a Notary Public within and for the State of North Dakota, personally appeared Henry Lantz known to me to be one of the persons who subscribed his name to the above and foregoing instrument as a witness, and who acknowledged to me that he subscribed his name thereto as such witness, and who proved to me that the person who and/or whose names are subscribed to the foregoing instrument are the persons described in it.

Frank J. Belinskey
Notary Public in and for the
County of Mercer and
State of North Dakota.

FRANK J. BELINSKEY NOTARY PUBLIC STATE OF NORTH DAKOTA

My commission expires March 24, 1953.

(2)
STATE OF NORTH DAKOTA
COUNTY OF _____ SS.

On this _____ day of _____ 19___, before me _____, a Notary Public in and for said County and State, personally appeared _____ and _____ known to me to be the persons _____ described in and who executed within and foregoing instrument and acknowledged to me that he executed the same.

_____
Notary Public in and for the
County of _____ and
State of North Dakota.

My commission expires _____.

Henry Lantz

MORTGAGEE
MORTGAGOR
INDEXED ✓

**STATE OF NORTH DAKOTA** **208969**
**COUNTY OF MERCER** **OFFICE OF COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 10/28/2015 at 12:13 PM, and was duly recorded Book 207 MISC on Page 37 Fee: $16.00

County Recorder Brenda L Cook

By Deputy Kathryn Schumann

Return To: ROUGHRIDER ELECTRIC COOPERATIVE, INC., 800 H
chg HAZEN, ND 58545

COUNTY RECORDER
SEAL
MERCER COUNTY, N DAK.

34306

NDE-117

# RIGHT OF WAY EASEMENT

KNOW ALL MEN BY THESE PRESENTS, that for and in consideration of a good and valuable consideration, the receipt whereof is hereby acknowledged, Milton H Plummer and _____, his wife, for themselves, their heirs and assigns, hereby grant to Northwestern Bell Telephone Company, a corporation, and its successors and assigns, a perpetual easement and right of way to construct, operate, maintain, replace and enlarge buried or underground telephone and communications lines, cables, wires and conduits, manholes, drains and splicing boxes, surface testing terminals, markers and other appurtenances under, through, across and upon the following described property in the County of Mercer and State of N.D., to wit:

E½ Sec. 35 T-141N R88W.

consisting of that strip of land one foot wider (6 inches on each side) than that amount of land required by the telephone cable and its associated plant which the Telephone Company shall bury or place underground in or on the real property described above, in, along or near the following route across the property described above:

communication line to be buried in a north to south direction adjacent to and west of hwy.

together with the right of ingress and egress for the purpose of exercising the rights herein granted and the right to clear and keep cleared all trees, roots, branches and other obstructions within seven feet of any telephone plant placed in or on this right of way.

The undersigned, for themselves, their heirs and assigns, hereby covenant that they have good and lawful right to grant this easement and right of way and that no structure shall be erected or permitted on or over the telephone plant to be put in or on the property described above.

WITNESS their hands and seal this 11 day of July, 1969.

Witness C R Nygaard. Signed Milton H Plummer

Witness _____ Signed _____

STATE OF _____)
) SS
COUNTY OF _____)

On this _____ day of _____, 19____, before me a _____ within and for said County, personally appeared _____ to me known to be the person _____ described in, and who executed the foregoing instrument, and acknowledged that _____ he _____ executed the same as _____ free act and deed.

_____

Notary Public _____ County, Minn.

My commission expires _____, 19__

STATE OF North Dakota)
) SS
COUNTY OF Mercer)

On this 11th day of July, 1969, appeared before me C. B. Nygaard to me personally known to be the person whose name is subscribed to this instrument as a subscribing witness, who being first duly sworn, says that Milton H. Flemmer whose name ___ ~~are~~/is subscribed to the instrument as party ___ of the first part ~~are~~/is the person ___ described in it, that such persons executed it in his presence and that the witness subscribed his name thereto as a witness,

(NOTARIAL SEAL)

Anton C Beer

My commission expires _____ _____ County, North Dakota

ANTON C. BEER
Notary Public
Notary Public, Morton Co., N. Dak.
My Commission Expires Jan. 21, 1971

DOCUMENT NO. 92496

STATE OF NORTH DAKOTA, COUNTY OF MERCER. } ss. OFFICE OF REGISTER OF DEEDS

I hereby certify that the within instrument was filed in this office for record this 5th day of September, 1969 at 10:30 o'clock A M., and was duly recorded in Book 44 of Misc. on Page 293

Fred Reuer
Register of Deeds.

By Irma Reinhalt, Deputy

REGISTER OF DEEDS * SEAL * Mercer County, N. Dak.

For Telephone Company Use Only

Name of Exchange Glen Ullin

Job Order # _____

Project. or Est. # 9042

L. S. # _____

R/W Secured By C. B. Nygaard

# EASEMENT AGREEMENT

This easement agreement ("Agreement"), dated the 4 day of March, 2016, is between **Bonnie Haupt and Michael Haupt, her husband, as joint tenants with right of survivorship, and not as tenants in common**, whose mailing address is 531 Apple Creek Drive, Bismarck, ND 58504, (hereinafter referred to as "Grantor", whether one or more), and Dakota Access, LLC, whose mailing address is 1300 Main Street, Houston, Texas 77002, and its successors and assigns (such entity and its successors and assigns are collectively referred to as the "Grantee").

For the consideration of TEN AND No/100 Dollars ($10.00) and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Grantor hereby sells and conveys unto Grantee:

(i) a ninety-nine year fifty foot (50') wide non-exclusive pipeline easement ("Pipeline Easement"), as more particularly described below,

(ii) a temporary construction easement one hundred feet (100') in width and any such additional areas indicated on the Exhibit A more particularly described below ("Temporary Construction Easement"), and

(iii) an easement for access to and from the Pipeline Easement and the Temporary Construction Easement ("Access Easement") as specifically indicated on the attached Exhibit A.

The Pipeline Easement, the Temporary Construction Easement, and the Access Easement (collectively, the "Easements" or "right-of-way") are being sold and conveyed from Grantor to Grantee for the purposes of constructing, maintaining, repairing, and removing at will one steel crude oil transmission pipeline not to exceed thirty inches (30") in diameter, which is more particularly described as follows:

All that certain lot, tract or parcel of land, containing 147.88 acres of land, more or less, being all of the SE¼ of Section 35, Township 141 North, Range 88 West, Mercer County, North Dakota, more particularly described in Warranty Deed dated May 19, 1998 from Milton Flemmer, a/k/a Milton H. Flemmer and Anita Flemmer, a/k/a Anita B. Flemmer, husband and wife, to Bonnie Haupt and Michael Haupt, her husband, as joint tenants with right of survivorship, and not as tenants in common, recorded under Document No. 165421, Deed Records, Mercer County, North Dakota, less and except any conveyances heretofore made.

Exhibit A attached hereto is an image of all or part of the Grantor's Property showing the approximate location of the Pipeline Easement, Temporary Construction Easement, and Access Easement. The precise location of the Temporary Construction Easement or "workspace" will be in an area immediately adjacent to the planned or actual Pipeline Easement and shall not exceed one hundred feet (100') in width exclusive of the Pipeline Easement, and any additional areas indicated on Exhibit A, if any.

Within one hundred eighty (180) days following the completion of construction of the pipeline, Grantee shall supplement Exhibit A with a new Exhibit A-1 that will:

(i) show the definite location of the installed pipeline as determined by an as-built survey, and

(ii) provide the legal description of the definite location of the Pipeline Easement and the Access Easement based on a public land survey corner as defined by N.D.C.C. § 47-20.1-02(7).

Grantor hereby agrees that Grantee shall have the right to and is hereby authorized, with or without the joinder of Grantor, to file Exhibit A-1 by affidavit, to amend this Agreement to include such new Exhibit A-1 or to attach such new Exhibit A-1 to this Agreement, and to record or re-record such affidavit, amendment or Agreement with the new Exhibit A-1. Grantee shall provide Grantor with a copy of the recorded affidavit, amendment or re-recorded Agreement.

Except for pipeline markers and cathodic protection test leads, all other pipeline fittings, cathodic protection equipment, pig launchers and traps, and any other equipment, facilities, or appurtenances that are located above-ground must be consented to in writing by the Grantor. Grantee agrees to place such markers and test leads at property lines, fence lines, points of inflection, or foreign pipeline crossings when practicable to do so.

The rights of the parties to this Easement shall be subject to the following terms and conditions:

## SECTION 1. GENERAL

1.1 Grantee shall have the right to select the exact location of the Pipeline Easement and the location of the pipeline within the Pipeline Easement, such that the centerline of the pipeline may not, in all instances, lie in the middle of the Pipeline Easement as it is approximately shown in Exhibit A; but regardless of the location of the pipeline, the Pipeline Easement shall not exceed fifty feet (50') in width. Generally, the boundary of the pipeline easement will be located within twenty-five feet (25') of the pipeline centerline as it is approximately shown in Exhibit A, unless otherwise agreed to in writing by Grantor which, such agreement will not be unreasonably withheld.

1.2 The Temporary Construction Easement or workspace will be used to construct the single pipeline and any appurtenant facilities in, over, through, across, under, and along the Pipeline Easement area, subject to the limitations on above-ground appurtenances and facilities indicated above. The term of this Temporary Construction Easement shall be for a period to extend eighteen (18) months from the date of construction commencement on Grantor's property, except that if Grantee has conducted any operations or construction which have disturbed the surface of Grantor's land, then Grantee will remain obligated to fulfill all reclamation and remediation as described herein, and will remain liable for damages and indemnification as described herein and will have access to and the ability to reclaim and remediate any such disturbance until such time as the land is reclaimed or remediated. The Grantee will notify the Grantor of the date construction will begin in writing 30 days prior to the date of construction commencement. However, if Grantee has completed its use of this Temporary Construction Easement prior to the end of the eighteen (18) month period, then the Temporary Construction Easement shall immediately terminate.

1.3 Grantee's Easement is subject to Grantor's existing rights and privileges. Grantor reserves the right to use and enjoy Grantee's Right-of-Way and to allow Grantor's invitees, employees, and agents to use any part of it so long as such use does not unreasonably interfere with Grantee's rights as specified in this Easement. Subject to those rights, Grantee shall allow any surface use of the Right-of-Way by the Grantor(s), their permittees, and lessees so long as such use does not interfere with Grantee's rights and no permanent or temporary structure(s), above or below ground are located within 25 feet of the pipeline centerline. Grantor may use the Right-of-Way for any and all purposes not inconsistent with the purposes set forth in this Easement. Without limiting the foregoing, Grantor's uses may include but shall not be limited to using the Right-of-Way for agricultural and open spaces. Grantor is permitted, after review by Grantee, to construct any and all streets and roadways, at any angle of not less than forty five (45) degrees to Grantee's pipeline, across the Right-of-Way which do not damage, destroy or alter the operation of the pipeline and its appurtenant facilities. Grantor may also construct and/or install water, sewer, gas, electric, cable TV, telephone or other utility lines across the Right-of-Way at any angle of not less than forty five (45) degrees to Grantee's pipeline, provided that all of Grantee's required and applicable spacing's, including depth separation limits of at least 24-inches and other protective requirements as established by statue, regulation or industry best practice are met by Grantor. The use of the Right-of-Way by Grantor shall be regulated by all appropriate ordinances, regulations, resolutions or laws of the governmental entity with authority over the Right-of-Way. Grantor must notify Grantee in writing before streets, roadways, utilities or other encroachments are installed. Grantor may not use any part of the Right-of-Way if such use may damage, destroy, injure, and/or interfere with the Grantee's use of the Right-of-Way for the purposes for which the permanent easement is being sought by Grantee. Grantor is not permitted to conduct any of the following activities on the Right-of-Way without the written permission of Grantee: (1) construct any temporary or permanent building or site improvements; (2) drill or operate any well; (3) remove soil or change the grade or slope;

(4) impound surface water; or (5) plant trees or landscaping. Grantor further agrees that no above or below ground obstruction that may interfere with the purposes for which this Easement is being acquired may be placed, erected, installed or permitted upon the Right-of-Way without the written permission of Grantee. In the event the terms of this paragraph are violated, such violation shall be eliminated within thirty days of receipt of written notice from Grantee or Grantee shall have the immediate right to correct or eliminate such violation at the sole expense of Grantor. Grantor shall promptly reimburse Grantee for any expense related thereto. Grantor further agrees that it will not interfere with the purposes for which the Easement is conveyed. Any improvements, whether above or below ground, installed by Grantor subsequent to the date that Grantee acquires possession of the Right-of-Way, may be removed by Grantee without liability to Grantor for damages if Grantee first gives written notice to Grantor and Grantor does not remove the improvement within thirty days.

1.4 If Grantee has not commenced construction of its pipeline on this easement within two (2) years of receipt of all permits necessary for construction of the pipeline in North Dakota, then the easement will become void.

1.5 Prior to construction of the pipeline, Grantee shall contact Grantor to review the timing of construction and discuss site-specific issues and implementation of mitigation and rehabilitation measures in accordance with this Pipeline Easement. Grantee shall review the location of any above-ground structures, other than pipeline markers and cathodic protection test leads, that will be located on the premises and to which Grantor has consented prior to installing such above-ground structures.

1.6 The Easement Agreement may not be recorded without the written consent of both Grantor and Grantee. Grantor and Grantee agree to execute a memorandum version of the Easement Agreement, to be prepared by Grantee, which shall include a plat depicting the location of the Right-of Way and shall be recorded immediately upon execution.

## SECTION 2. WEED CONTROL

2.1 Prior to construction activities, Grantee will document, to the best of its ability and as reasonably able to depending upon time of year of construction and assuming the plants germinate and grow during the year of construction, all noxious and invasive weeds along the pipeline or access road easements including those identified by the North Dakota Department of Agriculture, and county and city weed boards, including the following: Russian knapweed (*Acroptilon repens*), absinth wormwood (*Artemisia absinthium*), musk thistle (*Carduus nutans*), diffuse knapweed (*Centaurea diffusa*), yellow toadflax (*Linaria vulgaris*), spotted knapweed (*Centaurea maculosa*), Canada thistle (*Cirsium arvense*), leafy spurge (*Euphorbia esula*), dalmatian toadflax (*Linaria dalmatica*), purple loosestrife (*Lythrum salicaria*), and saltcedar (*Tamarix chinensis*), black henbane (*Hyoscyamus niger*), common burdock (*Arcticum minus*), houndstongue (*Hieracium cynoglossoides*), halogeton (*Halogeton glomeratus*), baby's breath (*Gypsophila paniculata*), common tansy (*Tanacetum vulgare*), houndstongue (*Hieracium cynoglossoides*), cheatgrass (*Bromus tectorum*), and Japanese brome (*Bromus japonicas*). Grantee does not warrant or guarantee its documentation will be an all-inclusive list or identification of all noxious and invasive weeds that could be located within the pipeline and road easements.

2.2 Grantee will be liable for the introduction of any noxious or invasive weeds caused by Grantee onto Grantor's property and will indemnify Grantor for any violations, enforcement actions, and mitigation requirements imposed by any entity under N.D.C.C. ch. 4.1-47.

2.3 Grantee shall control, to the best of its ability, all noxious weeds resulting from Grantee's activities in the easement areas, and will take steps to control the introduction and spread of weeds, including but not limited to the following:

a. The equipment will be inspected by Grantee or its contractor to verify that it is adequately clean of soil and debris capable of transporting weed propagules prior to commencing work on the project.

b. Areas of noxious and invasive weed infestation along the right-of-way or in other construction areas will be marked by Grantee with staking, flagging, and/or signs prior to clearing activities. To the extent reasonably practicable, all viable propagules (roots, seed, and stems) from noxious and invasive weeds will be destroyed by herbicide application or physical destruction prior to the construction activity.

c. Cleared vegetation and segregated topsoil from areas of weed infestation will be placed adjacent to the areas from which they were removed.

d. Signs will be posted to identify the stockpiles or reaches of stockpiles containing noxious weed material or material from the species listed in Section 2.1. During reclamation, the materials will be returned to the areas from which they were obtained.

e. Materials used for erosion control (e.g., hay bales or straw mulch) will be certified as weed-free.

2.4 Prior to re-seeding, Grantee will control all weeds in the right-of-way by cultivation, disking or herbicide applications. After seeding is completed, Grantee will monitor for and maintain the rights-of-way to control any identified noxious or invasive weeds resulting from Grantee's activities prior to seed maturation for a minimum of two (2) years following construction activities, unless otherwise agreed to by Grantor.

## SECTION 3. SOIL RESERVATION

3.1 All topsoil in pasture land, range land, grassland, and crop land will be stripped to the first layer of color change as determined by a qualified individual and segregated from subsoils (except as indicated in subsection b below).

a. Except as stated in section 3.1(b), all topsoil will be stripped to the first layer of color change as determined by a qualified individual, and color change is to be understood in the context of the Munsell soil color chart colors.

b. For the specific locations where the first color change of soil is less than 8-inches and as agreed to by Grantor and Grantee in writing and prior to construction commencement, Grantee agrees to strip topsoil and subsoil together to a depth of eight inches (8") and to segregate and preserve this topsoil and subsoil together. Mixing of subsoil with topsoil will be allowed only for the soil types specified in section 3.1(b)(i-v), and only as specified in this section, unless otherwise agreed to in writing by Grantor. If the soil types listed in this section are present on Grantor's land, Grantee will conduct a pre-construction meeting or phone call with Grantor to determine whether topsoil and subsoil should be mixed as indicated above.

i. Dunn County Saline Mapping Units
   1) E0454B – Daglum-Rhoades complex, 0 to 6 percent slopes
   2) E0502A – Vanda silty clay, 0 to 2 percent slopes
   3) E0515B – Rhoades-Daglum complex, 0 to 6 percent slopes
   4) E0557B – Dogtooth-Janesburg silt loams, saline, 0 to 6 percent slopes
   5) E-559B – Dogtooth-Janesburg silt loams, 0 to 6 percent slopes
   6) E0561D – Dogtooth-Janesburg complex, 6 to 15 percent slopes
   7) E0563B – Janesburg-Dogtooth silt loams, 0 to 2 percent slopes
   8) E0701F – Dogtooth-Janesburg-Cabba complex, 0 to 3 percent slopes
   9) E0727A – Barkof-Janesburg complex, 0 to 3 percent slopes
   10) E0727B – Barkoff-Janesburg complex, 0 to 3 percent slopes

11) E-0727C – Barkoff-Janesburg complex 6 to 9 percent slopes
12) E1009A – Moreau-Barkoff silty clays, 0 to 3 percent slopes
13) E1009B – Moreau-Barkoff silty clays, 3 to 6 percent slopes
14) E1009C – Moreau-Barkoff silty clays, 6 to 9 percent slopes
15) E3021F – Dogtooth-Janesburg-Brandenburg complex, 9 to 35 percent slopes
16) E3247 – Lambert-Vanda high precipitation-Rhoades, barren complex, 0 to 9 percent slopes
17) E4005A – Harriet loam, 0 to 2 percent slopes, occasionally flooded
18) E4180A – Korell-Daglum-Fluvaquents complex, channeled, 0 to 2 percent slopes, frequently flooded
19) E4279A – Heil silty clay loam, 0 to 1 percent slopes
20) E4767A – Regan silt loam, saline, 0 to 2 percent slopes, occasionally flooded
21) L0502A – Vanda silty clay loam, 0 to 2 percent slopes
22) L0516B – Gerda-Maltese complex, 0 to 6 percent slopes
23) L0935B – Abor silty clay, 3 to 6 percent slopes
24) L0937C Abor-Yawdim silty clays, 6 to 9 percent slopes
25) L2307F – Rhame-Bullock-Kremlin complex, 9 to 35 percent slopes
26) L2311E – Scairt-Maltese-Boxwell complex, 2 to 25 percent slopes
27) L2313D – Boxwell-Scairt-Maltese complex, 6 to 15 percent slopes
28) L4009A – Harriet loam, low precipitation, 0 to 2 percent slopes, occasionally flooded

ii. McKenzie County Saline Mapping Units

1) E0447B – Daglum-Belfield complex, 0 to 6 percent slopes
2) E0454B – Daglum-Rhoades complex, 0 to 6 percent slopes
3) E0515B – Rhoades-Daglum complex, 0 to 6 percent slopes
4) E0559B – Dogtooth-Janesburg silt loams, 0 to 6 percent slopes
5) E0561D – Dogtooth-Janesburg complex, 6 to 15 percent slopes
6) E0563B – Janesburg-Dogtooth silt loams, 0 to 6 percent slopes
7) E0617B – Belfield-Salvage-Daglum complex, 2 to 6 percent slopes
8) E0701F – Dogtooth-Janesburg-Cabba complex, 6 to 35 percent slopes
9) E1228B – Desart-Janesburg-Ekalaka complex, 0 to 6 percent slopes
10) E3013D – Bradenburg-Searing-Dogtooth complex, 6 to 15 percent slopes (only Dogtooth Saline)
11) E3013F – Bradenburg-Cabba-Dogtooth complex, 15 to 70 percent slopes (only Dogtooth Saline)
12) E3247C – Lambert-Vada, high precipitation-Rhoades, barren complex, 0 to 9 percent slopes (only Vanda Saline)
13) E4005A – Harriet loam, 0 to 2 percent slopes, occasionally flooded
14) E4729A – Heil silty clay loam, 0 to 1 percent slopes
15) E4767A – Regan silt loam, saline, 0 to 2 percent slopes, occasionally flooded
16) L2311E – Scairt-Maltese-Boxwell complex, 2 to 25 percent slopes
17) L2313D – Boxwell-Scairt-Maltese complex, 6 to 15 percent slopes (only Scairt Saline)

18) L3015D – Gerda-Kirby complex, 2 to 15 percent slopes
19) L3247C – Patent, occasionally flooded-Vanda-Gerda, barren complex, 0 to 9 percent slopes
20) L3251B – Kremlin-Ethridge-Gerda complex 0 to 6 percent slopes (only Gerda Saline)
21) L4009A – Harriet loam, low precipitation, 0 to 2 percent slopes, occasionally flooded

iii. Mercer County Saline Mapping Units
1) E0415A – Belfield-Daglum compelx, 0 to 2 percent slopes
2) E0454B – Daglum-Rhoades complex, 0 to 6 percent slopes
3) E0454C – Daglum-Rhoades complex, 6 to 9 percent slopes
4) E0515B – Rhoades-Daglum complex, 0 to 6 percent slopes
5) E0515C – Rhoades-Daglum complex, 6 to 9 percent slopes
6) E0617B – Belfield-Salvage-Daglum complex, 2 to 6 percent slopes
7) E0701F – Dogtooth-Janesburg-Cabba complex, 6 to 35 percent slopes
8) E3247C – Lambert-Vanda, high precipitation-Rhoades, barren complex, 0 to 9 percent slopes
9) E4005A – Harriet loam, 0 to 2 percent slopes, occasionally flooded
10) E4101A – Belfield-Korell loams, 0 to 2 percent slopes, rarely flooded
11) E4181A – Korell-Rhoades-Daglum complex, 0 to 2 percent slopes, rarely flooded (only Rhoades-Daglum Saline)
12) E4729A – Heil silty clay loam, 0 to 1 percent slopes

iv. Morton County Saline Mapping Units
1) E0415A – Belfield-Daglum complex, 0 to 2 percent slopes
2) E0454B – Daglum-Rhoades complex, 0 to 6 percent slopes
3) E0454C – Daglum-Rhoades complex, 6 to 9 percent slopes
4) E0457C – Rhoades-Daglum-Ekalaka fine sandy loams, 0 to 9 percent slopes
5) E0515B – Rhoades-Daglum complex, 0 to 6 percent slopes
6) E0541C – Rhoades-Rhoades, barren-Daglum complex, 0 to 9 percent slopes
7) E0559B – Dogtooth-Janesburg silt loams, 0 to 6 percent slopes
8) E0701F – Dogtooth-Janesburg-Cabba complex, 6 to 35 percent slopes
9) E1227B – Desart-Ekalaka-Telfer complex, 0 to 6 percent slopes
10) E1239B – Ekalaka-Lakota fine sandy loams, 0 to 6 percent slopes
11) E1243C – Lakota-Ekalaka-Sham, high precipitation, gullied, occasionally flooded complex, 0 to 9 percent slopes
12) E1263D – Evridge-Whitebird fine sandy loams, 6 to 15 percent slopes
13) E4005A – Harriet loam, 0 to 2 percent slopes, occasionally flooded
14) E4181A – Korell-Rhoades-Daglum complex, 0 to 2 percent slopes, rarely flooded (only Rhoades-Daglum Saline)
15) E4729A – Heil silty clay loam, 0 to 1 percent slopes

v. Williams County Saline Mapping Units
1) 1871 – Vallers loam, saline, 0 to 1 percent slopes
2) 2270 – Harriet and Stirum soils, 0 to 2 percent slopes
3) 2345 – Daglum-Rhoades comples, 0 to 6 percent slopes

4) C23A – Vallers, saline-Parnell complex, 0 to 1 percent slopes
5) C75A – Vallers loam, saline, 0 to 1 percent slopes
6) C526B – Daglum-Rhoades silt loams, 2 to 6 percent slopes
7) C580A – Harriet-Regan-Stirum complex, 0 to 2 percent slopes, occasionally flooded
8) E4005A – Harriet loam, 0 to 2 percent slopes, occasionally flooded

c. No subsoil will be placed on top of topsoil except as necessary for stripping and mixing of the soils listed in subsection b above.

d. Soils in mapping units identified by the NRCS Web Soil Survey as containing saline, sodic, or saline/sodic series components will not be mixed with non-saline, non-sodic, or non-saline/sodic series components.

## SECTION 4. RESTORATION, REVEGETATION, AND EROSION CONTROL

4.1 Reseeding and stand establishment for native prairie will be considered successful when the following criteria are met:

a. All construction easement areas have been restored to a minimum of 70 percent cover as compared to similarly situated and undisturbed adjacent land. The percent cover will be determined utilizing standard vegetation sampling techniques.

4.2 If these criteria are not met within five years of the date of reseeding, Grantor may give notice to Grantee that success has not been achieved and Grantor and Grantee will work cooperatively together to develop an alternate reseeding plan, of which Grantee will be responsible for any reasonable expenses incurred therefor. At any time when Grantee believes it has met the above-described criteria, it will notify Grantor and Grantor will have Grantor's third party inspectors verify Grantee's compliance.

4.3 For any permanent herbaceous plantings (hay land, pasture land, and native prairie), Grantor's property will be seeded in strict compliance with the specifications contained in the NRCS Herbaceous Vegetation Establishment Guide ("Guide") available at http://efotg.sc.egov.usda.gov/references/public/ND/Herbaceous_Veg_Est_Guide.pdf (last updated April, 2015). Any areas where soil reclamation is not completed such that Grantee is able to comply with the planting deadlines contained in the Guide, Grantee will have erosion control measures applied as specified in Section 4.6 and will have an annual cover crop planted so that proper seeding can take place in the spring of the following year. The cover crop will be drilled cross-wise or zig-zag on the slopes. The cover crop seed mix shall be as follows:

a. June: Two bushels of spring small grains per acre.

b. July and August: Thirty pounds of Sudan grass per acre.

c. September and October: Two bushels of winter wheat or winter rye per acre.

4.4 Soil productivity levels will be measured with reference to re-vegetation success. Re-vegetation on hay land, pasture land, and native prairie shall be considered successful if the density and cover of non-nuisance, desirable plant species is equal to or greater than similarly situated and undisturbed adjacent land. On cropland, re-vegetation shall be considered successful if crop yields are equal to adjacent undisturbed portions of the same field. On hay land, the land will be re-vegetated with similar vegetation as compared to the undisturbed land within the same hay field, which could include an adapted variety of alfalfa at the rate of 5.5 PLS lb./acre, and a cover crop such as oats will be used as necessary to establish the alfalfa on the hay land, or as otherwise agreed to by Grantor. On native prairie, the land will be re-vegetated pursuant to the specifications contained in the Guide hereto with the seed mix specified in Section 9.5 of the Dakota Access, LLC Environmental Construction Plan unless a different, reasonable seed mix is attached hereto as an addendum.

4.5 Grantee will remove stones measuring 3 inches in diameter and larger from the top twelve (12) inches of topsoil. Said stones will be removed from the Premises entirely or moved to a location on the Premises consented to by Grantor in writing.

4.6 Erosion will be controlled according to a Storm Water Pollution Prevention Plan in its final approved form as filed with or approved by the North Dakota Public Service Commission. Following soil replacement, slopes having a length and steepness of slope (LS) factor of 1.0 or greater, as defined by NRCS, or a slope of 5% or greater, will have a blanket mulch, erosion nets or erosion control blankets, and straw wattles applied following soil reclamation. Slopes that are to be planted to permanent vegetative cover with an LS factor of 1.0 or higher that will not be seeded to grass/forbs within 30 days after soil replacement or that are not seeded to grass/forbs before June 1 (unless a different date is agreed to in writing by Grantor), will have a straw mulch cover of two tons per acre applied and anchored according to NRCS specifications for the Mulching-484 conservation practice found in Section IV of the NRCS Field Office Technical Guide (http://efotg.sc.egov.usda.gov/), followed by planting of temporary cover crops as listed in section 4.3. If detrimental erosion is occurring or likely to occur on the Premises, Grantee agrees to consult in good faith with Grantor or Grantor's inspector or other agent to address and mitigate the erosion.

## SECTION 5. SOIL COMPACTION

5.1 Grantee will test for and mitigate compaction. The Grantee will test topsoil and subsoil for compaction at regular intervals in lands disturbed by construction activities. The Grantee will conduct tests on the same soil type under similar moisture conditions in undisturbed and adjacent areas to approximate preconstruction conditions. The Grantee will use penetrometers or other appropriate devices to conduct tests. If compaction has a deleterious impact on productivity or revegetation success, Grantee will plow compacted areas in dry conditions with a paraplow or other deep tillage implement to achieve compaction equal to that on adjacent undisturbed lands. Grantee will plow the subsoil in dry conditions before replacing the segregated topsoil.

## SECTION 6. CONSTRUCTION REQUIREMENTS

6.1 Temporary Fencing. In areas where temporary fencing is necessary to keep livestock out of the easement areas (*i.e.* non-cultivated pasture land), Grantee shall install temporary fencing around the total easement areas (temporary, additional, and permanent) before commencement of construction, which fences shall remain until the entire easement area has been reclaimed. At the conclusion of reclamation activities, temporary fencing shall become the property of Grantor. Before construction of any fence by Grantee, Grantee will consult with Grantor as to the location of the fence and any gates along the easement areas. If Grantor chooses, Grantor may notify Grantee in writing that Grantor will install this fencing, and provide an estimate for one of the types of fences described below. Grantee will reimburse Grantor for the cost of the estimate, unless Grantee believes the estimate is unreasonable, in which case Grantee will obtain a reasonable estimate and reimburse that amount to Grantor.

a. Unless otherwise agreed to in writing by Grantor and as long as Grantor supplies power to the fence, any fence installed by Grantee under this section will be reasonably similar to the two-wire power fence described in the NRCS spec sheet, which requires use of smooth, single-strand, 12.5 gauge high-tensile strength (170,000 psi, minimum), type III galvanized or better wire and a top wire (hot wire) at least 26 inches above ground line and the bottom wire (ground wire) 8 to 12 inches below the top wire. The bottom (ground) wire will be connected either directly to the negative side of the energizer or to the same grounding rod(s) as the energizer. In situations where the earth provides an adequate ground to complete the circuit, both wires may be energized. Tension on each wire shall be sufficient to maintain proper wire spacing between line posts. In-line strainers will be installed on each wire to maintain correct tension on each wire between all brace corners and gate assemblies. Tension springs may be used on each wire to maintain proper tension. In the absence of power, Grantee shall install a basic three strand barbed-wire fence using typical industry practices.

12½ guage red-brand barbed wire 3-4-2016
Minimum 5½ foot steel t-post

6.2 Open Trench. Except where Grantee has installed temporary fencing, Grantee will limit the amount of time any trench is open on Grantor's property to twenty one (21) days from the time the trench is opened. Grantee is strictly liable for any cattle or other livestock killed or injured as a result of an open trench on the Subject Property.

6.3 Cover of Pipeline. Grantee shall install the pipeline with a minimum of forty-eight inches (48") of cover from the top of the pipe.

6.4 Integrity of Land and Services. Grantee shall unless otherwise negotiated with Grantor and agreed to in writing:

a. Provide reasonable passage and land access for agricultural equipment during construction and servicing of the pipeline, and in no case shall Grantee entirely prevent access to any parcel of Grantor's land as a result of Grantee's construction activities;

b. Supply temporary service in the event water or utility lines are interrupted and provide said temporary service before planned interruption or immediately after any interruption if the interruption is unplanned;

c. Provide confirmation to Grantor that Grantee has contacted North Dakota One Call prior to any trenching activities;

d. Install temporary gates at fence crossings at Grantor's reasonable request;

e. Immediately provide temporary water to livestock where temporary fencing has removed livestock from their normal water supply;

f. Immediately repair or replace any fences damaged by Grantee;

g. Grantee agrees to provide training to its staff and contractors on the content of this Easement Agreement sufficient to ensure that Grantee's staff and contractors are aware of the provisions of the Easement Agreement as necessary for Grantee to fully comply with the Easement Agreement. Grantee will ensure that, to the extent necessary for Grantee to comply with this Easement Agreement, it will make its staff and contractors aware of the terms of the Easement Agreement.

## SECTION 7. DRAINAGE AND SURFACE CONTOUR

7.1 Grantee shall restore soils to pre-construction grade as reasonably practicable. Without limiting the foregoing statement, Grantee will ensure no ruts or ridges greater than four inches deep or high remain after post-construction grading.

7.2 Grantee shall repair and restore all surface drainage system functionality to pre-construction condition. Grantee shall cooperate with Grantor to accommodate planned surface drainage systems to the extent that plans are affected by the existence of Grantee's pipeline. Final contours of reconstructed surface drainage systems will be replaced so as to result in the same drainage slope and profile as existed prior to disturbance. Soil settling may occur for an extended period of time after disturbance within reconstructed surface drainage systems. All soil settling in the reconstructed drainage-way will be repaired so that no water will be backed up or retained in the drainage.

7.3 Grantee will excavate the trench so that the pipeline may be laid over or under drain tile with a minimum clearance of 12 inches. If drain tiles are cut during trenching, Grantee will: identify the location of the damaged tile at the trench and at both sides of the construction right-of-way; install a temporary flume to maintain drainage; cap the ends to prevent clogging drains with dirt or debris and; keep plugs in place until the damaged tile is repaired.

7.4 Before backfilling, Grantee will determine whether any drain tiles crossed during trenching were damaged during construction. Grantee will use a sewer rod or pipe snake to probe open ends of tiles and will repair any damaged tiles by inserting a competent support

around the tile to prevent settling. If damage is extensive, broken tile will be removed and replaced with new tile. Drain tiles damaged during construction must be repaired to their pre-construction condition. Grantee will backfill around drain tiles in lifts and compact each lift.

## SECTION 8. WATER WELLS AND SURFACE WATERS

8.1 In the event blasting is required, Grantee shall conduct pre-construction and post-construction certified water quality testing and yield testing and/or sampling of any water well registered with the North Dakota State Engineer or any other water well within 300 feet of the construction right-of-way. Regardless of blasting, Grantee will also conduct certified water quality and reasonable water quantity testing on any other surface waters such as dugouts, ponds, and creeks identified by Grantor and located within 150 feet of the construction right-of-way. Grantee shall analyze any damaged well or water supply system or surface water and perform necessary repairs and/or modifications to return it to its former capacity and quality. In the event that a private well or water supply system or surface water is damaged beyond repair due to Grantee's activities, Grantee will provide a temporary water source and will also replace the well or water source with one of equal or greater quality and quantity (and flow rate). The results of water quality and yield test reports shall be provided to Grantor free of charge. Grantee will also be responsible for any damage to groundwater caused by its operations.

## SECTION 9. INDEMNIFICATION

9.1 Grantee hereby agrees to indemnify and hold Grantor harmless from and against any claim or liability or loss from personal injury or property damage resulting from or arising out of the use of the Easements by Grantee, its servants, agents or invitees, excepting, however, such claims, liabilities or damages as may be due to or caused by the acts of Grantor, or its servants, agents or invitees. Grantee will hold Grantor harmless from any claim or liability or loss caused by trespassers or other third parties who are not the agents or invitees of Grantor. GRANTEE SHALL ALSO INDEMNIFY, DEFEND AND HOLD HARMLESS GRANTOR, GRANTOR'S HEIRS, SUCCESSORS, ASSIGNS, TRANSFEREES, EMPLOYEES, AGENTS, LESSEES, CONTRACTORS, SUBCONTRACTORS, AS WELL AS TRUSTEES, BENEFICIARIES, RELATIVES, PARTNERS, OFFICERS, DIRECTORS AND RELATED OR AFFILIATED ENTITIES FROM AND AGAINST ANY LOSS, LIABILITY, COST, EXPENSE OR CLAIM ARISING FROM THE INCURRING OF COSTS OF REQUIRED REPAIRS, CLEAN UP, OR DETOXIFICATION AND REMOVAL UNDER ANY HAZARDOUS MATERIAL LAW WHICH MAY RESULT FROM GRANTEE'S ACTS OR OMISSIONS ON GRANTOR'S LANDS, OR GRANTOR'S OPERATIONS THEREON. SPECIFICALLY EXCLUDED FROM THE FOREGOING INDEMNITEES IS ANY CLAIM FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES UNLESS CAUSED BY GRANTEE'S GROSS NEGLIGENCE, OR ANY CLAIM FOR THE DISCOVERY OF ADVERSE ENVIRONMENTAL CONDITIONS NOT CAUSED BY GRANTEE. IT IS FURTHER EXPRESSLY AGREED AND UNDERSTOOD THAT THE ABOVE INDEMNITY IS NOT INTENDED TO PROTECT GRANTOR FROM GRANTOR'S OWN NEGLIGENCE OR WILLFUL MISCONDUCT. THE OBLIGATIONS OF GRANTEE HEREUNDER SHALL SURVIVE THE TERMINATION OF THE PIPELINE RIGHT-OF-WAY FOR A PERIOD OF TIME EQUAL TO THE STATUTE OF LIMITATIONS APPLICABLE TO THE RESPECTIVE OBLIGATION.

9.2 Grantee will prevent the filing of Construction Liens, Well and Pipeline Construction Liens, and all other liens resulting from its activities on the lands described above. If any liens are filed on the above-described lands because of Grantee's activities, Grantee shall, at its own expense, bond around the lien or provide other security which provides clear title to Grantor within 30 days of recordation of any lien.

## SECTION 10. SUBSURFACE AND MINERAL INTERESTS

10.1 Grantor reserves all subsurface and surface aggregate or mineral interests. These interests include, but are not limited to, oil, gas, coal, pore space, cement materials, potash, sodium sulfate, sand and gravel, scoria, road material, building stone, chemical substances, metallic ores, uranium ores, or colloidal or other clays that are on and under the Right-of-Way; provided,

however, that Grantor shall not be permitted to drill or operate equipment for the production or development of minerals on the Right-of-Way, but it will be permitted to extract the oil and other minerals from and under the Right-of-Way by directional drilling and other means, so long as such activities do not damage, destroy, injure, and/or interfere with the Grantee's use of the Right-of-Way for the purposes for which the permanent easement is being sought by Grantee.

10.2 Grantee acknowledges that Grantor intends to conduct gravel mining activities adjacent to the Pipeline Easement, and that coal mining might be conducted in the future. Grantee agrees that Grantor may complete its mining activities on all of Grantor's property excluding the area at and from the boundaries of the Pipeline Easement; provided, however, in connection with mining activities on lands adjacent to the Pipeline Easement, Grantor shall maintain a 3:1 slope for thirty-five feet (35') from the boundary lines of the Pipeline Easement, as measured horizontally from the boundary lines of the Pipeline Easement. Upon the commencement of gravel or coal mining up to the thirty-five foot (35') setback from the boundary lines of the Pipeline Easement, Grantee shall pay Grantor for the reasonable prevailing value of the gravel or coal reserves minus the cost of mining the gravel. If a coal reserve is stranded and becomes uneconomical to mine because of the pipeline, Grantee will pay for all of the uneconomical coal minus the cost of mining the coal. Grantor shall have no liability to Grantee for damage to or interference with the pipeline and other facilities of Grantee within the Pipeline Easement, or for disruption of services provided by Grantee with respect to loss of lateral support for the pipeline, if Grantor excavates to and maintains a 3:1 slope over the thirty-five (35) foot area adjacent to the boundaries of the Pipeline Easement. If, prior to commencing mining activities in an area or areas adjacent to the Pipeline Easement, Grantor and Grantee, determine, due to soil stability or otherwise, that it may be desirable to maintain a sloped buffer zone greater than thirty-five feet (35') from the boundary lines of the Pipeline Easement, Grantor shall provide Grantee with written evidence of Grantor's calculation of the amount of recoverable reserves. Within thirty (30) days of receipt of such written evidence, Grantee shall pay to Grantor an additional amount for the minable reserves over the thirty-five (35') mining set back equal to the reasonable prevailing value of the gravel or coal reserves less the costs of mining the reserves that will be rendered un-minable as a result of the expanded, sloped buffer zone, and in that event, Grantor shall maintain an expanded sloped buffer zone for such distance and at such slope as Grantor and Grantee may agree. If Grantee elects not to pay Grantor for the additional value of the gravel or coal reserves that would be rendered un-minable as a result of the expanded, sloped buffer zone, then Grantor shall be obligated to maintain only a 3:1 sloped buffer zone over the thirty-five (35) foot area adjacent to the boundary lines of the Pipeline Easement and Grantor shall have no liability to Grantee for damage to or interference with the pipeline and other facilities of Grantee within the Pipeline Easement, or for disruption of services provided by Grantee with respect to loss of lateral support for the facilities, if Grantor excavates to and maintains a 3:1 slope over the thirty-five (35) foot area adjacent to the boundaries of the Pipeline Easement. In the alternative, Grantor can request that Grantee remove and relocate the pipeline at Grantor's sole cost and expense, to a location on the lands that has been mined and reclaimed. If Grantee elects to remove and relocate the pipeline, Grantee shall not be required to do so until Grantee has received permission and all consents and permissions to abandon the old pipeline and construct the new pipeline. Grantor shall grant Grantee a new easement and Grantee shall pay the entire actual cost and expense of the removal and relocation, including but not limited to the cost to Grantee of permits, materials, installation, surveying, inspection, x-ray, environmental studies, regulatory filings, attorneys' fees, and other expenses or overhead that may be required.

## SECTION 11. GENERAL ENVIRONMENTAL PROTECTIONS

11.1 Grantee shall not discharge oil, gas liquids, salt water, or any other hazardous liquids or toxic substances (including substances with toxic characteristics even if such substances are excluded from the definition of hazardous waste under federal statutes) onto the Right-of-Way or on land adjacent to the Right-of-Way. Grantee shall act immediately to halt movement of all discharges of oil, gas liquids, salt water, or other hazardous liquids or toxic substances after discovery. Grantee shall report any and all discharges of oil, gas liquids, salt water, or other hazardous liquids or toxic substances immediately to the Grantor and to the appropriate regulatory agencies and shall restore the affected area as closely as possible to its original condition.

11.2 Grantee shall take necessary precautions to prevent fires. Grantee will provide local fire departments with reasonable information and maps of temporary access roads along the Right-of-Way to facilitate access in the event of an emergency. In the event a fire is caused by Grantee, Grantee shall compensate the Grantor, or its lessees for all losses including forage, crop, buildings, animals, and any other losses.

11.3 Grantee may cut, trim or remove trees, brush and shrubs to keep the Right-of-Way clear of all obstructions that may, injure, endanger or interfere with the construction, operation or maintenance of the pipeline. Grantee shall consult with Grantor prior to cutting or trimming any trees, brush or shrubs located in the Temporary Construction Easement to determine if any reasonable alternatives exist. In non-cultivated uplands, the entire permanent easement may be maintained by the Grantee in an herbaceous state. In wetlands, a corridor centered on the pipeline and up to 30 feet wide may be maintained by the Grantee in a herbaceous state. In addition, trees within 15 feet of the pipeline centerline in wetlands that are greater than 15 feet in height may be selectively cut and removed. Should it be necessary to remove a tree or shrub off the right-of-way in order for Grantee to construct the pipeline, at the request of Grantor, Grantee will plant or compensate landowner to plant replacement trees on a 2:1 ratio in areas outside the Right-of-Way reasonably satisfactory to Grantor in accordance with the State of North Dakota's Tree and Shrub Mitigation Specifications.

## SECTION 12. NO WARRANTY

12.1 Grantor neither warrants nor agrees to defend title to the Right-of-Way, and disclaims any warranty against encumbrances. Grantor asserts, however, that to the best of Grantor's knowledge, Grantor is unaware of any title defects or adverse claims against Grantor's property interest. Grantor further agrees to notify Grantee in writing within thirty (30) days if Grantor learns of any title defects or adverse claims to the Right-of-Way within the term of the Easement Agreement.

## SECTION 13. DAMAGES

13.1 Grantee agrees to pay for damage to crops, pasture, timber, livestock, fences, drain tiles, water supply pipelines, or any other structures, utilities, and improvements that may result from Grantee's exercise of its rights under this Agreement. In lieu of paying for the cost of repairing damaged improvements, Grantee shall have the right to repair such damage caused by Grantee. The amount to be paid for damage to crops and other improvements and/or the repairs requested to be performed by Grantee shall be mutually agreed upon by Grantor and Grantee based on current market rates. If Grantor and Grantee cannot mutually agree on damage compensation, then Grantor reserves any rights associated with seeking proper compensation, including legal action.

13.2 Grantor and Grantee shall negotiate in good faith when determining damages not already paid for in advance. Grantee specifically agrees that, if soil productivity or re-vegetation has not been achieved as required by Section 4 of this Agreement by the expiration of any negotiated period of advance damages then Grantor shall be entitled to additional damage payments for each subsequent year, made on an annual basis, until soil productivity is restored or re-vegetation is successful. If advance damages are agreed upon, they will be indicated on the attached Exhibit B.

## SECTION 14. COMPENSATION

14.1 In consideration for this easement, Grantee will pay to Grantor an amount per rod as specified on Exhibit B.

14.2 Any payment to be made to Grantor under this Agreement may be made or mailed to Grantor at the address shown above, or to _____, at this address_____, who is hereby appointed agent and authorized to receive and receipt for same, and who is also appointed the true and lawful attorney in fact for the undersigned. The agency and power of attorney granted by Grantor to its agent hereunder shall not be deemed revoked until written notice from Grantor has been received by Grantee.

## SECTION 15. EXECUTION REQUIRED

15.1 The Easement Agreement shall be valid and enforceable upon execution by Grantor and Grantee, and may be executed in counterparts, each of which shall be considered an original for all purposes, but all of which together constitute one and the same instrument.

## SECTION 16. CORPORATE SUCCESSION

16.1 All the terms and provisions of the Easement Agreement shall be binding upon, shall inure to the benefit of and shall be enforceable by the respective representatives, successors and assigns of the Parties.

## SECTION 17. ASSIGNMENT

17.1 This Easement shall inure to and be applicable to Grantor and Grantee and their respective heirs, representatives, successors and assigns. Except for any assignment to Grantee's parent, subsidiary or affiliated entities, Grantee shall not assign this Easement to any other party without the prior written consent of Grantor, with Grantor's consent not to be unreasonably withheld, provided, however, that in the event of any assignment by Grantee or any successive Grantee, the assignor shall remain fully responsible for all obligations, responsibilities and liabilities of Grantee under this Easement (including, but not limited to, requirements as to indemnity and insurance).

## SECTION 18. COMPLIANCE

18.1 In addition to any requirements contained in this Easement, Grantee shall comply with the construction procedures and mitigation measures described in its application and supplements (including responses to staff data requests) to the North Dakota Public Service Commission for its permit in Docket No. PU-14-842, and as identified in the pertinent Environmental Plan, and any final Order of the North Dakota Public Service Commission.

## SECTION 19. COVENANTS RUNNING WITH THE LAND

19.1 By signing this Agreement and accepting the payment and other consideration described in this Agreement, Grantor shall be deemed to have agreed to be bound by the covenants applicable to Grantee hereunder, and the easement and related rights granted to Grantee herein create easements and covenants running with Grantor's land.

## SECTION 20. MISCELLANEOUS

20.1 Grantor acknowledges that Grantee has made no representations, promises, agreements, guarantees, or inducements to Grantor that are not expressly set forth in this Agreement and any simultaneously executed agreements, and that this Agreement is intended to reflect the entire agreement between the parties. The easement and related rights granted in this Agreement may be assigned, from time to time, in whole, by Grantee, and shall apply to each of the Pipeline Facilities installed by Grantee. This Agreement shall be governed by the law of the State in which the land is situated. Grantor's spouse, if not a titleholder, executes this Agreement for the purpose of subordinating all spousal rights to the easement and related rights granted to Grantee in this Agreement. No guns or firearms will be allowed in the Premises by Grantee or its agents or employees, and Grantee will not remove any cultural artifacts without Grantor's consent. Words and phrases herein shall be construed as in the singular or plural number, and as masculine, feminine or neuter gender according to the context. From and after the transfer by any Grantee to a successor Grantee, Grantor shall look solely to the successor Grantee in connection with matters arising after the date of the transfer. If any provision of this Agreement is adjudicated as being unenforceable, the balance of this Agreement shall remain in full force and effect.

## SECTION 21. ARMS-LENGTH NEGOTIATION

21.1 The Easement Agreement has been prepared by the joint efforts of Grantor and Grantee and shall be considered the product of collective, arms-length negotiation.

## SECTION 22. CONFLICT WITH LAWS OR REGULATIONS

22.1 If Grantee is unable, in whole or in part, by reason of any law, regulation, or order enacted or issued by any state or federal agency or court to carry out any of its obligations under this agreement, then such obligation, or any part thereof, shall be suspended.

## SECTION 23. INSURANCE

23.1 Grantee shall maintain in effect at all times comprehensive general liability insurance covering operations on the property of Grantor in an amount not less than Five Million Dollars ($5,000,000) per occurrence and Ten Million Dollars ($10,000,000) in the aggregate and provide Grantor reasonable evidence of the maintenance of such insurance.

## SECTION 24. ABANDONMENT OF PIPELINE

24.1 Grantee agrees that commencing five (5) years following the installation of the pipeline, in the event of the complete non-use of said pipeline by Grantee, its successors or assigns, for a continuous period of two (2) consecutive years this Easement and right of way shall be considered abandoned and Grantee shall furnish at its expense, upon receipt of written request from Grantor, a release of the Easement and right of way, in which event Grantee shall have the right to abandon the pipeline in place or remove said pipeline. "Use" of the pipeline as defined herein shall be defined as being the time period in which Grantee, or its assigns, carries the pipeline on its books. Upon final abandonment of said pipelines, Grantee shall comply with any rule or regulation concerning the condition the pipeline including, but not limited to (i) remediating any contaminants related to the pipeline according to all federal, state, county, township, or other applicable ordinances, rules, and regulations, (ii) removing all liquids from the pipeline, (iii) pipeline shall be severed at the ends and capped to seal the entire pipeline, (iv) all above ground pipeline related appurtenances will be removed from the property, and (v) restore the surface to its original condition as near as practical according to the requirements herein. Grantee shall remain responsible for any hazardous or dangerous condition resulting from the pipeline if it is abandoned in place. If Grantor needs abandoned pipeline removed in order to allow or accommodate full use and enjoyment of property, such as for construction of buildings, then upon Grantor's request, Grantee shall remove at minimum the portion of pipeline impacting such use and enjoyment. Any such removal requests must be made within 2 years of such pipeline abandonment.

EXECUTED this 4 day of March, 2016

GRANTOR:

Bonnie Haupt

Bonnie Haupt

**ACKNOWLEDGMENT**

State of NORTH DAKOTA )
)ss
County of Burleigh )

BEFORE ME, the undersigned authority, on this day personally appeared Bonnie Haupt, known to me to be the person(s) whose name is subscribed to the foregoing instrument and acknowledged to me that he/she/they executed the same for the purposes and consideration therein expressed.

IN TESTIMONY WHEREOF, I have hereunto set my hand and official seal this 4th day of March, 2016.

Notary Public

My Commission Expires:_____

DERRICK BRAATEN
Notary Public
State of North Dakota
My Commission Expires July 23, 2020

EXECUTED this 4 day of March, 2016

GRANTOR:

Michael Haupt

Michael Haupt

**ACKNOWLEDGMENT**

State of NORTH DAKOTA )
)ss
County of Burleigh )

BEFORE ME, the undersigned authority, on this day personally appeared Michael Haupt, known to me to be the person(s) whose name is subscribed to the foregoing instrument and acknowledged to me that he/she/they executed the same for the purposes and consideration therein expressed.

IN TESTIMONY WHEREOF, I have hereunto set my hand and official seal this 4th day of March, 2016.

Notary Public

My Commission Expires:_____

DERRICK BRAATEN
Notary Public
State of North Dakota
My Commission Expires July 23, 2020

# EXHIBIT B

## *DAKOTA ACCESS, LLC CALCULATION WORKSHEET*

***Tract Number(s):*** ND-ME-056.000 ***Property Sketch Rev.:*** Rev. 0

***Landowner(s):***

| | | | |
|---|---|---|---|
| Michael Haupt | | | |
| Bonnie Haupt | | | |

***CL Legal:*** 35 (*Section*) T141N (*Township*) R88W (*Range*)

***Permanent Easement and Right of Way Payment (ROW)***

| | | | | | | |
|---|---|---|---|---|---|---|
| *Permanent Easement* | 3.25 | Acres | X | $2,000.00 | = | $6,500.00 |
| *Temp. Workspace/Temp Access Road* | 5.94 | Acres | X | $1,000.00 | = | $5,940.00 |
| | | | **TOTAL ROW COMPENSATION** | | | **$12,440.00** |

***Crop Damages***

| | | | | | |
|---|---|---|---|---|---|
| Crops | Acres | 4.71 | X | $/Ac | $800.00 |
| | | 1st Year | 100% | = | $3,768.00 |
| | | 2nd Year | 80% | = | $3,014.40 |
| | | 3rd Year | 60% | = | $2,260.80 |
| | | **TOTAL CROP DAMAGES** | | | **$9,043.20** |

***Pasture Damages***

| | | | | | |
|---|---|---|---|---|---|
| Pasture | Acres | 4.48 | X | $/Ac | $650.00 |
| | | 1st Year | 100% | = | $2,912.00 |
| | | 2nd Year | 80% | = | $2,329.60 |
| | | 3rd Year | 60% | = | $1,747.20 |
| | | **TOTAL PASTURE DAMAGES** | | | **$6,988.80** |

**Other Damages/Compensation/Reimbursements to be Calculated:**

Describe:

Calculate: X per =

**TOTAL DAMAGES:**

| | | |
|---|---|---|
| Describe: | ROW damages | $82,970.50 |
| | Administrative Fee | $1,714.50 |
| | | |
| | | |
| | **TOTAL REIMBURSEMENTS:** | **$84,685.00** |

***Total Compensation:*** **$113,157.00**

***UNDIVIDED INTEREST OWNERSHIP:***

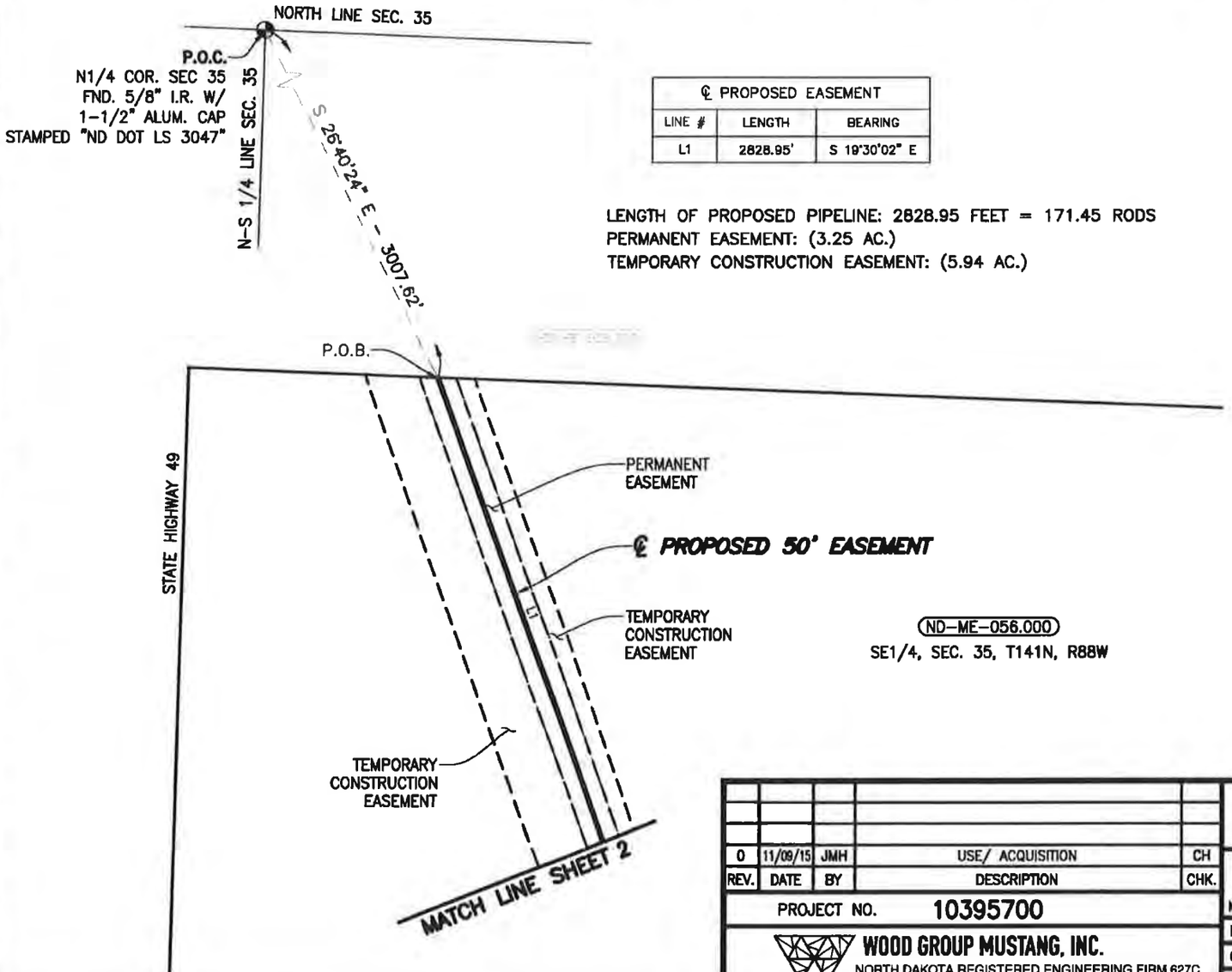
| | | | | |
|---|---|---|---|---|
| Michael Haupt | Bonnie Haupt | 100% | = | $113,157.00 |
| | | | = | $0.00 |
| | | | = | $0.00 |
| | | | = | |
| | | | = | |
| Total Undivided Interest: | | **100%** | = | **$113,157.00** |

***LANDOWNER:*** DATE:

FILE: R:\Projects\103957\DISCIPLINE\CAD\DRAWINGS\94-PROPERTY_PLAT\NORTH DAKOTA\MERCER COUNTY\HAUPT-ND-ME-056.000.WR.dwg PLOT DATE: 11/9/2015 BY: HUMBERSON, JEREMY

# MERCER COUNTY, NORTH DAKOTA

## SECTION 35, TOWNSHIP 141 NORTH, RANGE 88 WEST OF THE 5TH P.M.




| ℄ PROPOSED EASEMENT | | |
|---|---|---|
| LINE # | LENGTH | BEARING |
| L1 | 2828.95' | S 19°30'02" E |

LENGTH OF PROPOSED PIPELINE: 2828.95 FEET = 171.45 RODS
PERMANENT EASEMENT: (3.25 AC.)
TEMPORARY CONSTRUCTION EASEMENT: (5.94 AC.)

SCALE: 1" = 200'

200' 100' 0 200'

LEGEND

- P.O.C. – POINT OF COMMENCEMENT
- P.O.B. – POINT OF BEGINNING
- P.O.T. – POINT OF TERMINATION
- P.E. – PERMANENT EASEMENT
- T.C.E. – TEMPORARY CONSTRUCTION EASEMENT
- – SECTION OR QUARTER CORNER
- – FOUND MONUMENT

NOTES:

1. THIS DRAWING IS NOT TO BE CONSTRUED AS A BOUNDARY SURVEY. BOUNDARY LINES SHOWN IN THEIR APPROXIMATE LOCATION PER DEEDS/TITLE COMMITMENTS.
2. BASIS OF BEARING: NAD 83, UTM ZONE 14, GRID NORTH, USSF DETERMINED THROUGH THE USE OF OPUS SOLUTIONS AND TIED TO THE SURVEY USING GPS RTK METHODS OF SURVEY COMMON TO THE INDUSTRY.

(ND-ME-056.000)
SE1/4, SEC. 35, T141N, R88W



| REV. | DATE | BY | DESCRIPTION | CHK. |
|---|---|---|---|---|
| 0 | 11/09/15 | JMH | USE/ ACQUISITION | CH |

PROJECT NO. 10395700

WOOD GROUP MUSTANG, INC.
NORTH DAKOTA REGISTERED ENGINEERING FIRM 627C

DAKOTA ACCESS, LLC

PROPOSED ℄ 50-FOOT EASEMENT

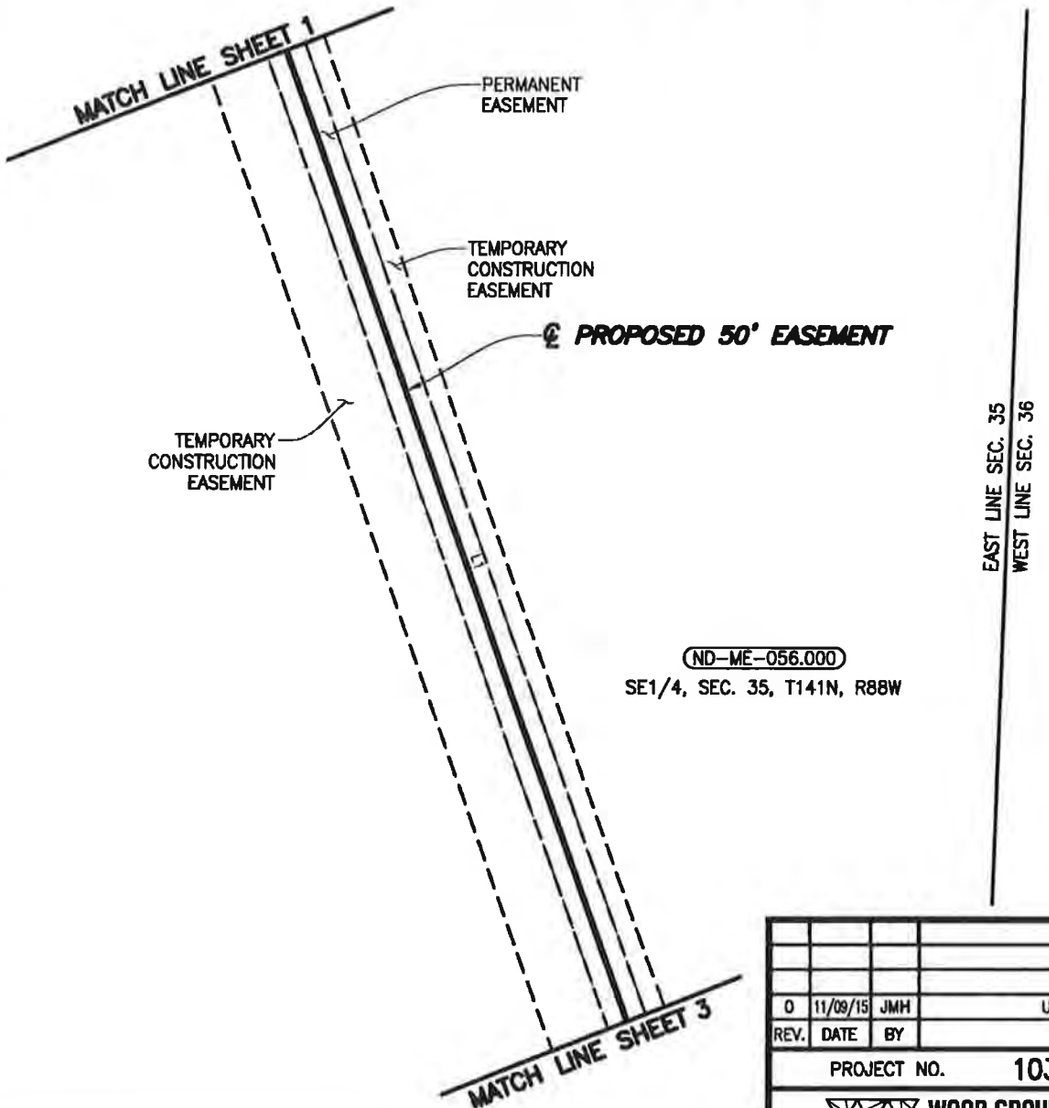
SE1/4, SEC. 35, T141N, R88W, EXCEPT HIGHWAY
MERCER COUNTY NORTH DAKOTA

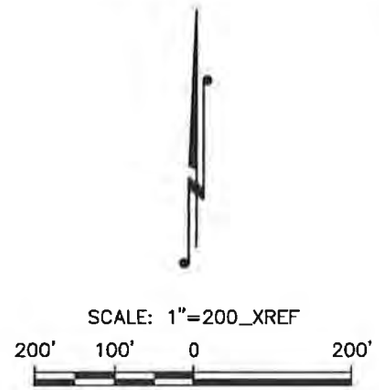
| DRAWN BY: JMH | DATE: 11/05/15 | DWG. NO. HAUPT-ND-ME-056.000.WR | REV. 0 |
|---|---|---|---|
| CHECKED BY: DH | DATE: 11/05/15 | | |
| SCALE: 1" = 200' | APP.: CH | | |

FILE: R:\Projects\103957\DISCIPLINE\CAD\DRAWINGS\94-PROPERTY_PLAT\NORTH DAKOTA\MERCER COUNTY\HAUPT-ND-ME-056.000.WR.dwg PLOT DATE: 11/9/2015 BY: HUMBERSON, JEREMY

# MERCER COUNTY, NORTH DAKOTA

## SECTION 35, TOWNSHIP 141 NORTH, RANGE 88 WEST OF THE 5TH P.M.




SHEET 2 OF 4

| REV. | DATE | BY | DESCRIPTION | CHK. |
|---|---|---|---|---|
| 0 | 11/09/15 | JMH | USE/ ACQUISITION | CH |

PROJECT NO. 10395700

WOOD GROUP MUSTANG, INC.
NORTH DAKOTA REGISTERED ENGINEERING FIRM 627C

DAKOTA ACCESS, LLC

PROPOSED ℄ 50-FOOT EASEMENT

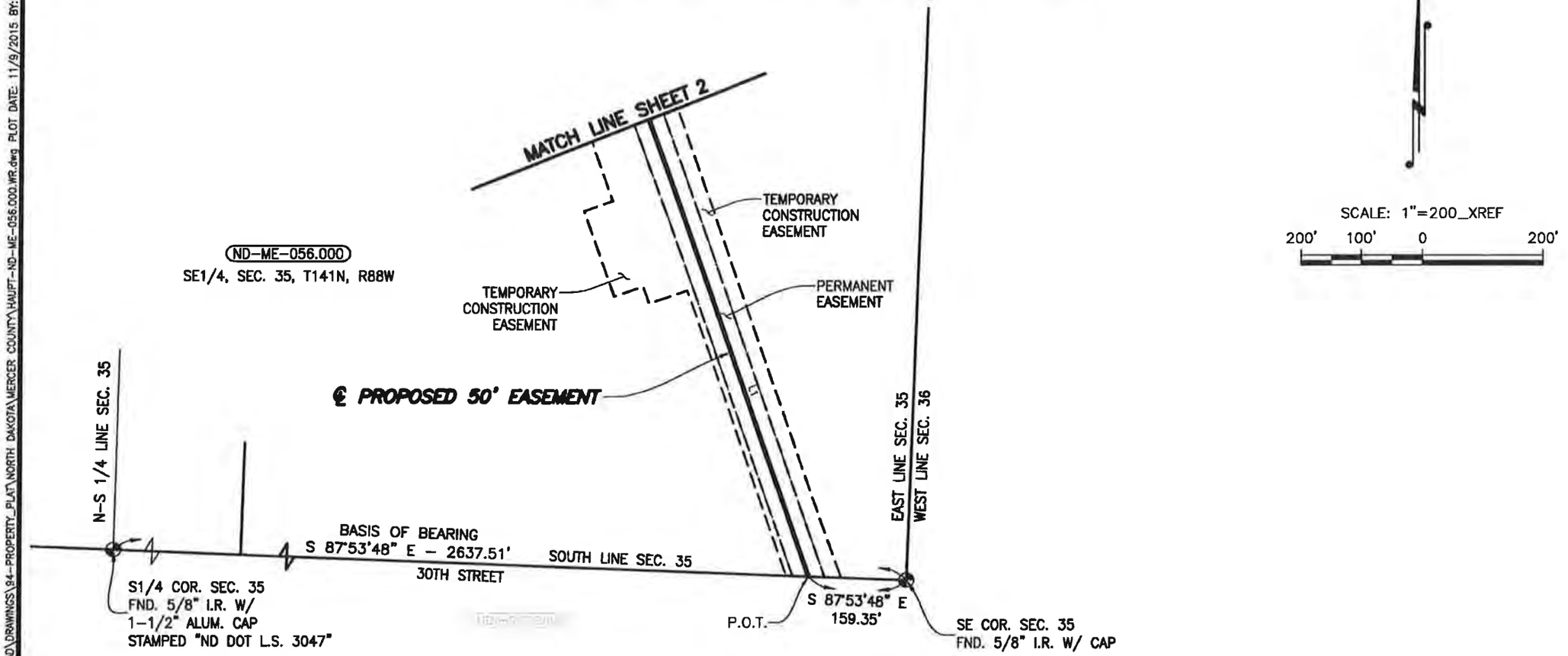
SE1/4, SEC. 35, T141N, R88W, EXCEPT HIGHWAY

MERCER COUNTY NORTH DAKOTA

| | | | |
|---|---|---|---|
| DRAWN BY: JMH | DATE: 11/05/15 | DWG. NO. HAUPT-ND-ME-056.000.WR | REV. 0 |
| CHECKED BY: DH | DATE: 11/05/15 | | |
| SCALE: 1"=200_XREF | APP.: CH | | |

# MERCER COUNTY, NORTH DAKOTA

## SECTION 35, TOWNSHIP 141 NORTH, RANGE 88 WEST OF THE 5TH P.M.



SHEET 3 OF 4

| REV. | DATE | BY | DESCRIPTION | CHK. |
|---|---|---|---|---|
| 0 | 11/09/15 | JMH | USE/ ACQUISITION | CH |

PROJECT NO. 10395700

WOOD GROUP MUSTANG, INC.
NORTH DAKOTA REGISTERED ENGINEERING FIRM 627C

DAKOTA ACCESS, LLC

PROPOSED ℄ 50-FOOT EASEMENT

SE1/4, SEC. 35, T141N, R88W, EXCEPT HIGHWAY

MERCER COUNTY NORTH DAKOTA

| | | | |
|---|---|---|---|
| DRAWN BY: JMH | DATE: 11/05/15 | DWG. NO. HAUPT-ND-ME-056.000.WR | REV. 0 |
| CHECKED BY: DH | DATE: 11/05/15 | | |
| SCALE: 1"=200_XREF | APP.: CH | | |

FILE: R:\Projects\10395700\DISCIPLINE\CAD\DRAWINGS\04-PROPERTY_PLAT\NORTH DAKOTA\MERCER COUNTY\HAUPT-ND-ME-056.000.WR.dwg PLOT DATE: 11/9/2015 BY: HUMBERSON, JEREMY

# MERCER COUNTY, NORTH DAKOTA

## SECTION 35, TOWNSHIP 141 NORTH, RANGE 88 WEST OF THE 5TH P.M.

Commencing at a 5/8 inch iron rod with a 1 1/2 inch cap stamped "ND DOT LS 3047" found at the North Quarter corner of Section 35; thence, S 26°40'24" E 3007.62 feet to the Point of Beginning. Thence, S 19°30'02" E 2828.95 feet along the center line of the permanent easement to the Point of Termination in the south line of Section 35 from which a 5/8 inch Iron Rod with Cap at the Southeast Section corner of Section 35 bears S 87°53'48 E 159.35 feet. Said Permanent Pipeline Easement contains 3.25 Acres more or less.



| REV. | DATE | BY | DESCRIPTION | CHK. |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| 0 | 11/09/15 | JMH | USE/ ACQUISITION | CH |

PROJECT NO. 10395700

**WOOD GROUP MUSTANG, INC.**
NORTH DAKOTA REGISTERED ENGINEERING FIRM 627C

DAKOTA ACCESS, LLC

PROPOSED ℄ 50-FOOT EASEMENT

SE1/4, SEC. 35, T141N, R88W, EXCEPT HIGHWAY

MERCER COUNTY NORTH DAKOTA

| | | | |
|---|---|---|---|
| DRAWN BY: JMH | DATE: 11/05/15 | DWG. NO. HAUPT-ND-ME-056.000.WR | REV. 0 |
| CHECKED BY: DH | DATE: 11/05/15 | | |
| SCALE: N.T.S. | APP.: CH | | |

FILE: R:\Projects\10395?\DISCIPLINES\CAD\DRAWINGS\94-PROPERTY_PLAT\NORTH DAKOTA\MERCER COUNTY\HAUPT-ND-ME-056.000.WR.dwg PLOT DATE: 11/9/2015 BY: HUMBERSON, JEREMY

[Space Above this Line for Recording Office Use Only]

# MEMORANDUM OF EASEMENT AGREEMENT

THIS MEMORANDUM OF EASEMENT AGREEMENT is to provide notice of that certain EASEMENT AGREEMENT ("Easement") dated 4 March, 2016, by and between Bonnie Haupt and Michael Haupt, her husband, as joint tenants with right of survivorship, and not as tenants in common, whose mailing address is 531 Apple Creek Drive, Bismarck, ND 58504, (hereinafter referred to as "Grantor," whether one or more), and Dakota Access, LLC, whose address is 1300 Main Street, Houston, Texas 77002 (hereinafter referred to as "Grantee").

PLEASE TAKE NOTICE AS FOLLOWS:

1. Capitalized terms contained herein and not otherwise defined herein shall have the meanings given to such terms in the Easement Agreement.

2. The Easement Agreement grants to Grantee a Right-of-Way for the purposes constructing, maintaining, repairing, and removing at will one steel crude oil transmission pipeline not to exceed thirty inches (30") in diameter together with all fittings, cathodic protection equipment, pipeline markers, and all other equipment, facilities, and appurtenances used or useful in connection with the foregoing pipeline (collectively "Pipeline Facilities"), along routes convenient for Grantee's operations, on, over, under, across and/or through certain land in the following tracts ("the Premises") located in Mercer County, State of North Dakota:

Township 141 North, Range 88 West
Section 35: SE¼

("Subject Lands") and more specifically described or depicted on the plat or survey attached as Exhibit A to this Memorandum of Easement Agreement.

3. The Easement Agreement grants to Grantee a 99-year easement for the Right-of-Way described and depicted in Exhibit A, as well as the right to use, on a temporary basis, workspace adjacent to the Right-of-Way so as to allow Grantee to exercise any of the rights granted to Grantee in the Easement Agreement.

4. This Memorandum of Easement Agreement is placed of record in the county in which the Subject Lands are located for the purpose of placing all persons on notice of the existence of the Easement Agreement.

5. An executed copy of the Easement Agreement with all exhibits attached is on file in the office of the Grantee at the above-referenced address.

6. The terms and conditions of the Easement Agreement are incorporated by reference into this Memorandum of Easement Agreement as if fully set forth herein.

7. This Memorandum of Easement Agreement is executed by Grantee as of the date of the acknowledgment of the signature below, but is effective for all purposes as of the date of the Easement Agreement.

EXECUTED this 4 day of March, 2016

GRANTOR:

Bonnie Haupt

Bonnie Haupt

**ACKNOWLEDGMENT**

State of NORTH DAKOTA )
)ss
County of Burleigh )

BEFORE ME, the undersigned authority, on this day personally appeared Bonnie Haupt, known to me to be the person(s) whose name is subscribed to the foregoing instrument and acknowledged to me that he/she/they executed the same for the purposes and consideration therein expressed.

IN TESTIMONY WHEREOF, I have hereunto set my hand and official seal this 4th day of March, 2016.

DERRICK BRAATEN
Notary Public
State of North Dakota
My Commission Expires July 23, 2020

Notary Public

My Commission Expires:_____

EXECUTED this 4 day of March, 2016

GRANTOR:

Michael Haupt

Michael Haupt

**ACKNOWLEDGMENT**

State of NORTH DAKOTA )
)ss
County of Burleigh )

BEFORE ME, the undersigned authority, on this day personally appeared Michael Haupt, known to me to be the person(s) whose name is subscribed to the foregoing instrument and acknowledged to me that he/she/they executed the same for the purposes and consideration therein expressed.

IN TESTIMONY WHEREOF, I have hereunto set my hand and official seal this 4th day of March, 2016.

DERRICK BRAATEN
Notary Public
State of North Dakota
My Commission Expires July 23, 2020

Notary Public

My Commission Expires:_____

EXECUTED this _____ day of _____, 2016

GRANTEE:

Dakota Access, LLC

_____

By: Robert Rose
Title: Vice President of Land and Right of Way

**ACKNOWLEDGMENT**

State of _____ )
)ss
County of _____ )

BEFORE ME, the undersigned authority, on this day personally appeared Robert Rose in his capacity as Vice President of Land and Right-of-Way of Dakota Access, LLC, known to me to be the person(s) whose name is subscribed to the foregoing instrument and acknowledged to me that he/she/they executed the same for the purposes and consideration therein expressed.

IN TESTIMONY WHEREOF, I have hereunto set my hand and official seal this ____ day of _____, 2016.

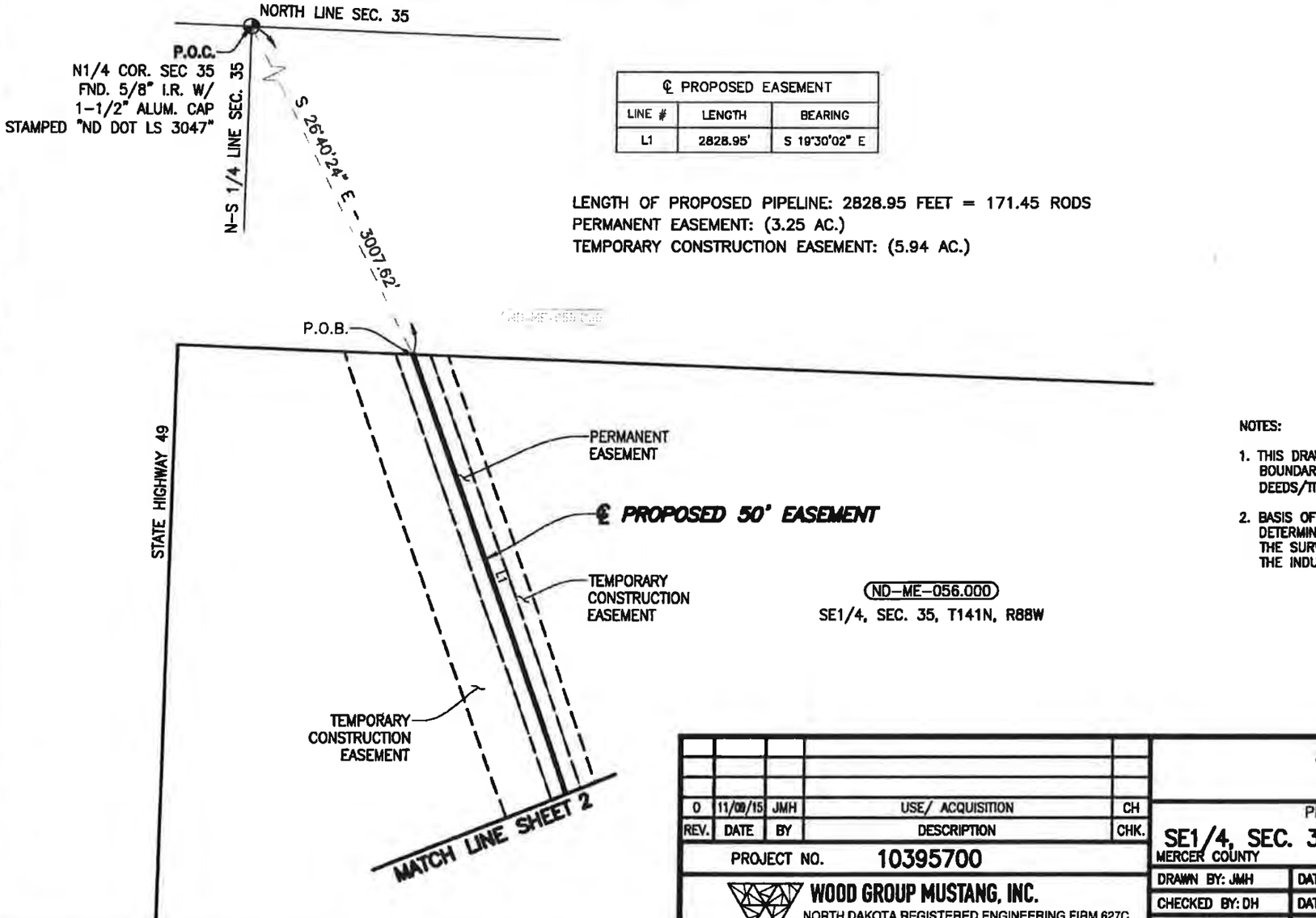
_____

Notary Public
My Commission expires _____

57839353_1.DOC

# MERCER COUNTY, NORTH DAKOTA

## SECTION 35, TOWNSHIP 141 NORTH, RANGE 88 WEST OF THE 5TH P.M.




| ℄ PROPOSED EASEMENT | | |
|---|---|---|
| LINE # | LENGTH | BEARING |
| L1 | 2828.95' | S 19°30'02" E |

LENGTH OF PROPOSED PIPELINE: 2828.95 FEET = 171.45 RODS
PERMANENT EASEMENT: (3.25 AC.)
TEMPORARY CONSTRUCTION EASEMENT: (5.94 AC.)

SCALE: 1" = 200'

200' 100' 0 200'

LEGEND

- P.O.C. – POINT OF COMMENCEMENT
- P.O.B. – POINT OF BEGINNING
- P.O.T. – POINT OF TERMINATION
- P.E. – PERMANENT EASEMENT
- T.C.E. – TEMPORARY CONSTRUCTION EASEMENT
- ⊕ – SECTION OR QUARTER CORNER
- ● – FOUND MONUMENT

NOTES:

1. THIS DRAWING IS NOT TO BE CONSTRUED AS A BOUNDARY SURVEY. BOUNDARY LINES SHOWN IN THEIR APPROXIMATE LOCATION PER DEEDS/TITLE COMMITMENTS.
2. BASIS OF BEARING: NAD 83, UTM ZONE 14, GRID NORTH, USSF DETERMINED THROUGH THE USE OF OPUS SOLUTIONS AND TIED TO THE SURVEY USING GPS RTK METHODS OF SURVEY COMMON TO THE INDUSTRY.

(ND-ME-056.000)
SE1/4, SEC. 35, T141N, R88W



| REV. | DATE | BY | DESCRIPTION | CHK. |
|---|---|---|---|---|
| 0 | 11/09/15 | JMH | USE/ ACQUISITION | CH |

PROJECT NO. 10395700

WOOD GROUP MUSTANG, INC.
NORTH DAKOTA REGISTERED ENGINEERING FIRM 627C

DAKOTA ACCESS, LLC

PROPOSED ℄ 50-FOOT EASEMENT

SE1/4, SEC. 35, T141N, R88W, EXCEPT HIGHWAY

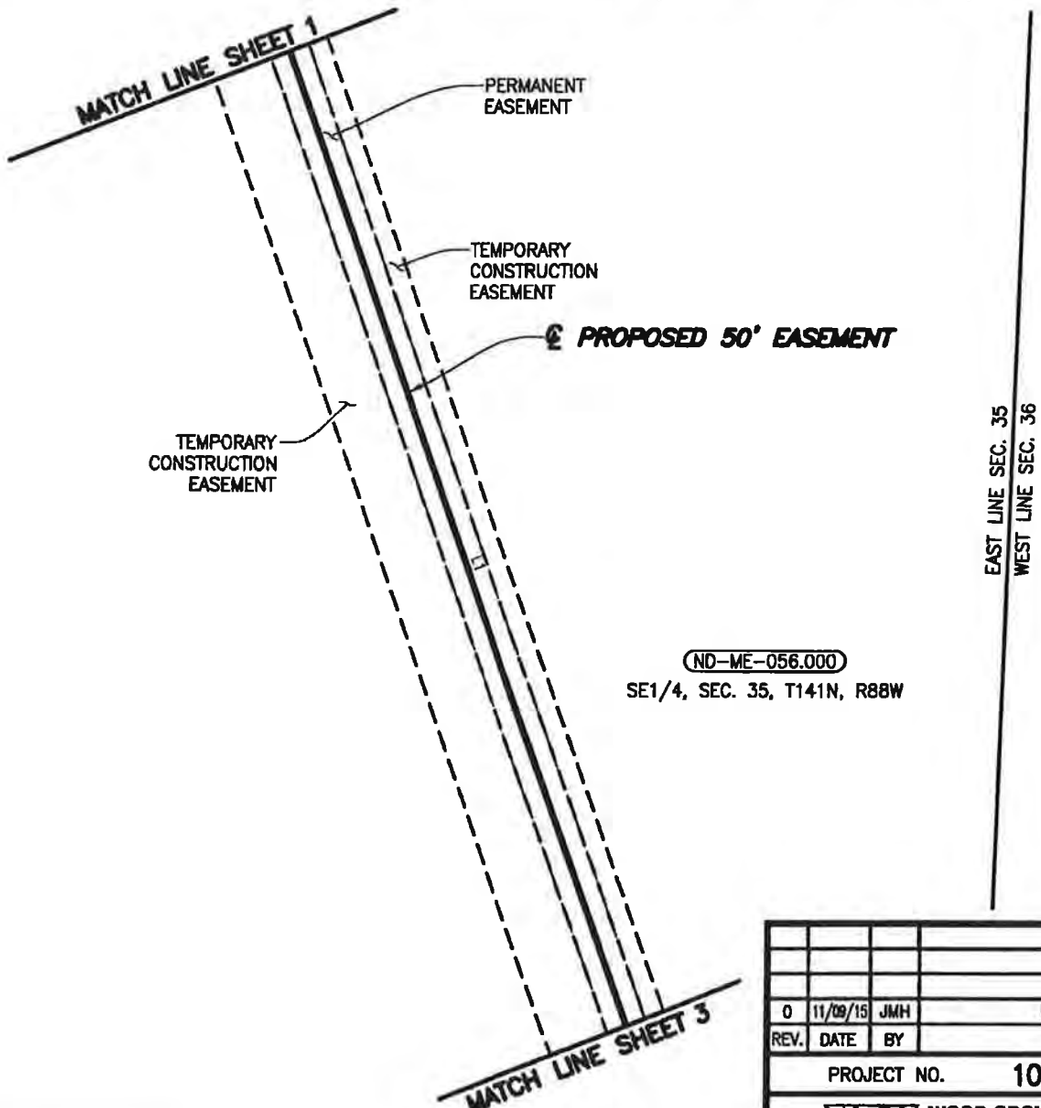
MERCER COUNTY NORTH DAKOTA

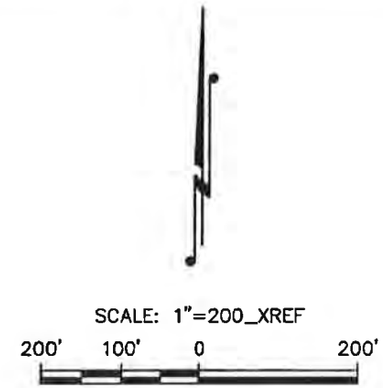
| DRAWN BY: JMH | DATE: 11/05/15 | DWG. NO. HAUPT-ND-ME-056.000.WR | REV. 0 |
|---|---|---|---|
| CHECKED BY: DH | DATE: 11/05/15 | | |
| SCALE: 1" = 200' | APP.: CH | | |

FILE: R:\Projects\10395700\DISCIPLINE\CAD\DRAWINGS\94-PROPERTY_PLAT\NORTH DAKOTA\MERCER COUNTY\HAUPT-ND-ME-056.000.WR.dwg PLOT DATE: 11/9/2015 BY: HUMBERSON, JEREMY

# MERCER COUNTY, NORTH DAKOTA

## SECTION 35, TOWNSHIP 141 NORTH, RANGE 88 WEST OF THE 5TH P.M.




SHEET 2 OF 4

| REV. | DATE | BY | DESCRIPTION | CHK. |
|---|---|---|---|---|
| 0 | 11/09/15 | JMH | USE/ ACQUISITION | CH |

PROJECT NO. 10395700

WOOD GROUP MUSTANG, INC.
NORTH DAKOTA REGISTERED ENGINEERING FIRM 627C

DAKOTA ACCESS, LLC

PROPOSED ℄ 50-FOOT EASEMENT

SE1/4, SEC. 35, T141N, R88W, EXCEPT HIGHWAY

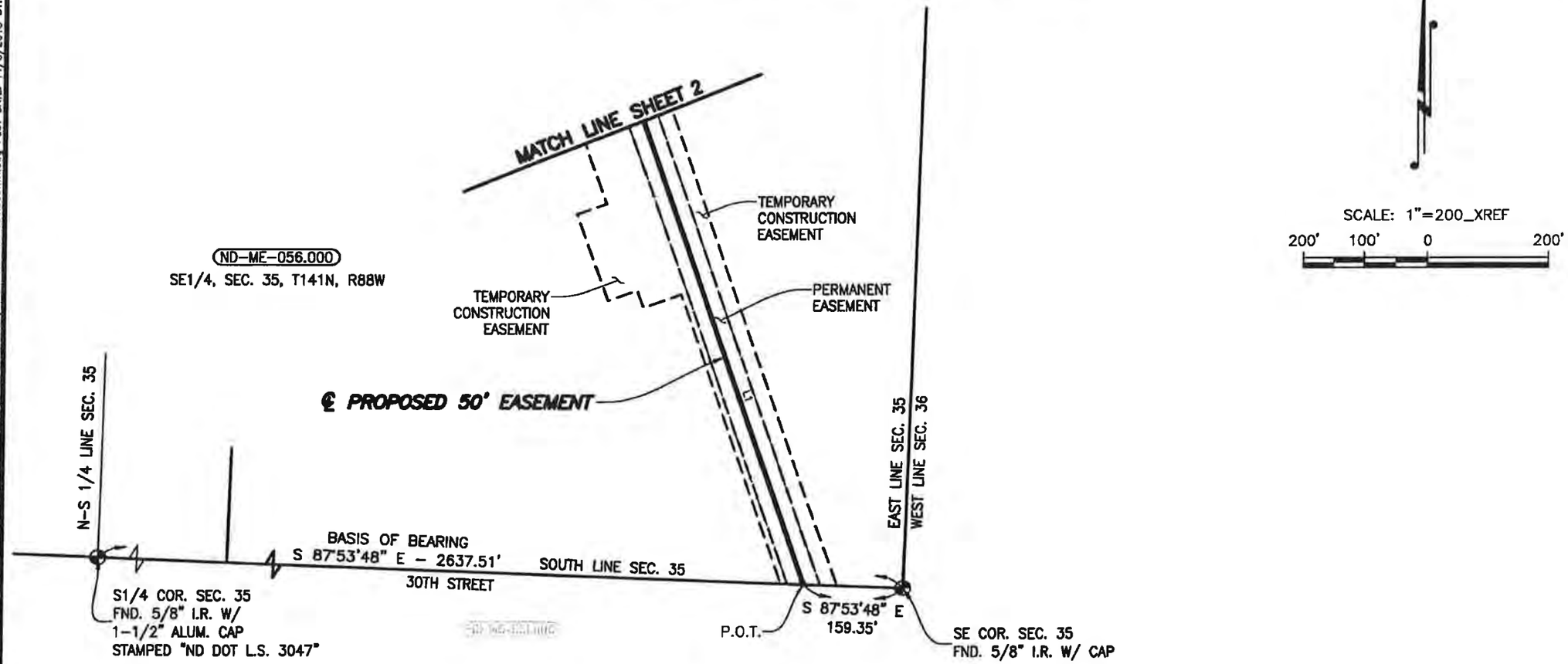
MERCER COUNTY NORTH DAKOTA

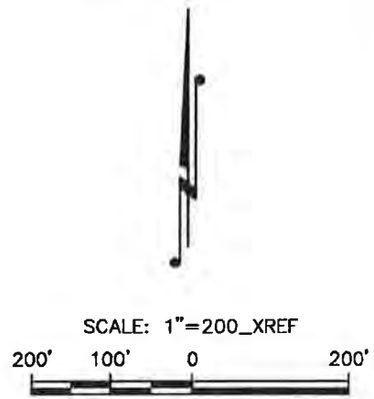
| | | | |
|---|---|---|---|
| DRAWN BY: JMH | DATE: 11/05/15 | DWG. NO. HAUPT-ND-ME-056.000.WR | REV. 0 |
| CHECKED BY: DH | DATE: 11/05/15 | | |
| SCALE: 1"=200_XREF | APP.: CH | | |

FILE: R:\Projects\103957\DISCIPLINE\CAD\DRAWINGS\94-PROPERTY_PLAT\NORTH DAKOTA\MERCER COUNTY\HAUPT-ND-ME-056.000.WR.dwg PLOT DATE: 11/9/2015 BY: HUMBERSON, JEREMY

# MERCER COUNTY, NORTH DAKOTA

## SECTION 35, TOWNSHIP 141 NORTH, RANGE 88 WEST OF THE 5TH P.M.




SHEET 3 OF 4

| REV. | DATE | BY | DESCRIPTION | CHK. |
|---|---|---|---|---|
| 0 | 11/09/15 | JMH | USE/ ACQUISITION | CH |

PROJECT NO. 10395700

WOOD GROUP MUSTANG, INC.
NORTH DAKOTA REGISTERED ENGINEERING FIRM 627C

DAKOTA ACCESS, LLC

PROPOSED ℄ 50-FOOT EASEMENT

SE1/4, SEC. 35, T141N, R88W, EXCEPT HIGHWAY

MERCER COUNTY NORTH DAKOTA

| | | | |
|---|---|---|---|
| DRAWN BY: JMH | DATE: 11/05/15 | DWG. NO. HAUPT-ND-ME-056.000.WR | REV. 0 |
| CHECKED BY: DH | DATE: 11/05/15 | | |
| SCALE: 1"=200_XREF | APP.: CH | | |

FILE: R:\Projects\103957\DISCIPLINE\CAD\DRAWINGS\94-PROPERTY_PLAT\NORTH DAKOTA\MERCER COUNTY\HAUPT-ND-ME-056.000.WR.dwg PLOT DATE: 11/9/2015 BY: HUMBERSON, JEREMY

# MERCER COUNTY, NORTH DAKOTA

## SECTION 35, TOWNSHIP 141 NORTH, RANGE 88 WEST OF THE 5TH P.M.

Commencing at a 5/8 inch iron rod with a 1 1/2 inch cap stamped "ND DOT LS 3047" found at the North Quarter corner of Section 35; thence, S 26°40'24" E 3007.62 feet to the Point of Beginning. Thence, S 19°30'02" E 2828.95 feet along the center line of the permanent easement to the Point of Termination in the south line of Section 35 from which a 5/8 inch Iron Rod with Cap at the Southeast Section corner of Section 35 bears S 87°53'48 E 159.35 feet. Said Permanent Pipeline Easement contains 3.25 Acres more or less.



| REV. | DATE | BY | DESCRIPTION | CHK. |
|---|---|---|---|---|
| 0 | 11/09/15 | JMH | USE/ ACQUISITION | CH |

PROJECT NO. 10395700

WOOD GROUP MUSTANG, INC.
NORTH DAKOTA REGISTERED ENGINEERING FIRM 627C

DAKOTA ACCESS, LLC

PROPOSED ℄ 50-FOOT EASEMENT

SE1/4, SEC. 35, T141N, R88W, EXCEPT HIGHWAY

MERCER COUNTY NORTH DAKOTA

| | | | |
|---|---|---|---|
| DRAWN BY: JMH | DATE: 11/05/15 | DWG. NO. HAUPT-ND-ME-056.000.WR | REV. 0 |
| CHECKED BY: DH | DATE: 11/05/15 | | |
| SCALE: N.T.S. | APP.: CH | | |

FILE: R:\Projects\103957\DISCIPLINES\CAD\DRAWINGS\04-PROPERTY_PLAT\NORTH DAKOTA\MERCER COUNTY\HAUPT-ND-ME-056.000.WR.dwg PLOT DATE: 11/9/2015 BY: HUMBERSON, JEREMY

**NORTH DAKOTA INDUSTRIAL COMMISSION**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case Nos. 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## DECLARATION OF JOHN M. JOCHIM

[¶1] I, John M. Jochim, declare the following based on personal knowledge:

[¶2] I have ownership interest in the following property that lies within the boundaries of the proposed BK Fischer Storage Facility.

- Township 142 North, Range 88 West
  Section 24: NW1/4
  Mercer County, ND

[¶3] The property listed in ¶ 2 above is encumbered by the following easements:

- Oliver Mercer Electric Cooperative Right-of-Way Easement executed by John Jochim on June 25, 1980 (209443).
- West River Telephone Right-of-Way Easement executed by John B. Jochim on April 13, 1993 (153703)
- West River Telecommunications Right-of-Way Easement executed by John M. Jochim on May 29, 2009 (191999).
- ND State Water Commission Pipeline Easement executed by John M. Jochim on July 1, 2010 (195955).

[¶4] Attached are the deeds which I believe indicate my ownership in each of the properties listed above.

[¶5] Attached are the easements currently encumbering these properties based on the information I have.

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on the 23 day of May, 2024 at West Fargo, ND, United States.

John M. Jochim

# WARRANTY DEED

THIS INDENTURE, made this 30 day of Apr. 2001, between **John Jochim a/k/a John B. Jochim and Violet Jochim**, husband and wife, grantor, whether one or more, and **John M. Jochim,** grantee, whose post office address is 371 6th Ave. North. Castleton, ND 58012.

WITNESSETH, for and in consideration of the sum of Ten Dollars and other valuable consideration, grantor does hereby GRANT to the grantee, all of the following real property lying and being in the County of MERCER and State of North Dakota, and described as follows, to-wit:

TOWNSHIP 142 NORTH, RANGE 88 WEST
Section 24: NW/4

Subject to prior mineral reservations and conveyances and reserving to grantor, John B. Jochim, a life estate in the premises conveyed.

And the said grantor for himself, his heirs, executors and administrators, does covenant with the grantee that he is well seized in fee of the land and premises aforesaid and has good right to sell and convey the same in manner and form aforesaid; that the same are free from all encumbrances, except installments of special assessments or assessments for special improvements which have not been certified to the County Auditor for collection; and the above granted lands and premises in the quiet and peaceable possession of said grantees, against all persons lawfully claiming or to claim the whole or any part thereof, the said grantor will warrant and defend.

WITNESS, the hand of the grantor:

John Jochim

Violet Jochim

I certify that the requirement for a report or statement of full consideration paid does not apply because this deed is for one of the transactions exempted by Subdivision "c" of Section 6 of Section 11-18-02.2 NDCC.

Signed: _____ Dated: 5-1-01
(grantee/agent)

STATE OF NORTH DAKOTA )
) ss
COUNTY OF MERCER )

The foregoing instrument was acknowledged before me this 30 day of April, 2001, by John Jochim and Violet Jochim, husband and wife.

Deborah S. Prock
Notary Public
State of North Dakota

My Commission Expires:

DEBORAH S. PROCK
Notary Public, Mercer County, ND
My Commission Expires Mar. 11, 2003
STATE OF NORTH DAKOTA
NOTARY PUBLIC SEAL

*The description was prepared by: Gregory L. Lange, of Richardson, Lange & Donovan, PLLP, P.O. Box 488, Hazen, ND 58545, Ph, 701-748-2206 or obtained from a previously recorded instrument.*

DOCUMENT NO. 170569

MORTGAGEE
MORTGAGOR
INDEXED ✓

STATE OF NORTH DAKOTA
COUNTY OF MERCER

OFFICE OF
REGISTER OF DEEDS

I hereby certify that within instrument was filed in this office for record this 2nd day of May 20 01 at 9:35 o'clock A. M and was duly recorded in Book 127-Deeds on Page 7

Jeanette Sailer,
Register of Deeds

By Kathryn Schumann
Deputy

REGISTER OF DEEDS SEAL MERCER COUNTY, N.DAK.

DELINQUENT TAXES, SPECIAL ASSESSMENTS, OR INSTALLMENTS OF SPECIAL ASSESSMENTS PAID AND TRANSFER ENTERED THIS 2nd DAY OF May 2001

Michelle R Sailer
COUNTY AUDITOR OF MERCER COUNTY, N. DAK.

BY Sandra Baker DEPUTY

$10.00 Chg. Richardson Law Office
P.O. Box 488
Hazen, ND 58545

# RIGHT-OF-WAY EASEMENT

KNOW ALL MEN BY THESE PRESENTS, that we the undersigned, (whether one or more)
JOHN Jochim

(unmarried) (husband and wife) for a good and valuable consideration, the receipt whereof is hereby acknowledged, do hereby grant unto the Oliver-Mercer Electric Cooperative, Inc., a cooperative corporation (hereinafter called the "Cooperative") whose post office address is Hazen, North Dakota 58545, and to its successors or assigns, the right to enter upon the lands of the undersigned, situated in the County of Mercer, State of North Dakota, and more particularly described as follows:

S½ of NW¼ of 24

Right-of-way_____feet Township 142 Range 88 Section W½ of SW¼ of 13
Right-of-way_____feet Township ____ Range ____ Section W½ of W½ of 24
N½ of SW¼ of 24

and to construct, operate, maintain and move or relocate on the above-described lands and/or in or upon all streets, roads or highways abutting said lands, an electric transmission line or system, and to cut and trim trees and shrubbery that may interfere with or threaten to endanger the operation and maintenance of said line or system. The easement shall include only that part of the above described land located within 15 feet on each side of the proposed line.

The undersigned agree that all poles, wires and other facilities, installed on the above described lands at the Cooperative's expense shall remain the property of the Cooperative, removable at the option of the Cooperative.

The Cooperative agrees to pay a reasonable sum for any damage caused to crops or fences by the construction, operation, maintenance, or repair of said line or system. The overall operating height of vehicles and equipment known to cultivate or traverse lands within the easement, is less than fourteen (14) feet, unless otherwise noted below.

IN WITNESS WHEREOF, the undersigned have set their hands and seals this 25 day of June, 1980.

Signed, sealed and delivered in the presence of:

John Jochim

STATE OF NORTH DAKOTA )
) ss
COUNTY OF Mercer )

On this 25 day of June, 1980, before me, a Notary Public in and for said County and State, personally appeared JOHN JOCHIM known to me to be the person who described in and who executed the foregoing instrument and acknowledged to me that he executed the same.

My Commission expires: MAY 5, 1986

Notary Public in and for the County of Mercer State of North Dakota

STATE OF NORTH DAKOTA )
) ss
COUNTY OF _____ )

_____ Being first duly sworn says that he is one of the Witnesses to the above and foregoing easements, that _____ name(s) is and/or are subscribed to the above and foregoing instruments as a party is and/or are the persons described in said easement and that he signed said instrument in my presence and that I in their presence signed my name thereto as a subscribing witness.

Subscribed and sworn to before me this ____ day of _____, 19___

My Commission Expires:

_____

Notary Public in and for the County of _____ and the State of North Dakota

209443

**STATE OF NORTH DAKOTA**
**COUNTY OF MERCER**

**OFFICE OF**
**COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 12/9/2015 at 12:16 PM, and was duly recorded a Book 208 MISC on Page 31 Fee: $23.00

MORTGAGEE
MORTGAGOR
INDEXED ✓

County Recorder Brenda L. Cook

By Deputy

Return To: ROUGHRIDER ELECTRIC COOPERATIVE, INC., 800 H
HAZEN, ND 58545

COUNTY RECORDER SEAL MERCER COUNTY, N DAK.

EXCH: BELH WO#: 29-2680-002

## *West River Telecommunications Right-of-Way Easement*

We the undersigned, (whether one or more) **John M. Jochim,** Grantor(s), do hereby grant and convey unto ***West River Telecommunications Cooperative***, a cooperative corporation (hereafter called the "Cooperative"), grantee, whose address is P.O. Box 467, Hazen, North Dakota, and its respective successors, assigns, lessees and agents, an easement to survey, construct, repair, operate, upgrade, maintain, relocate, replace and remove such communication systems as the grantee may from time to time require, consisting of but not limited to cables, wires, poles, splicing boxes, and other appurtenances, upon, over and under the land which the undersigned owns or in which the undersigned has any interest in the County of ***Mercer***, State of ***North Dakota***, and more particularly described as follows:

***NW/4NW/4 Sec. 24 T142N R88W***

also the right of ingress and egress over and across the lands of the undersigned for the purpose of exercising the rights herein granted; to place surface markers beyond said strip, to clear and keep clear all trees, roots, brush and other obstructions from the surface and subsurface of said strip of land. The boundary of said strip shall be a line parallel to and 10 feet either side of the first cable laid on the land of the undersigned. The undersigned for Grantor(s), their heirs, executors, administrators, successors, and assigns, hereby covenants that no structure shall be erected on said strip.

The undersigned agrees that all poles, wire and other facilities, including telephone equipment, installed on the above described land, shall remain the property of the Cooperative, removable at the option of the Cooperative. The undersigned agrees to this easement with the understanding the Grantor(s), their heirs, executors, administrators, successors, and assigns, may continue to have access to and use of the easement area in any manner consistent with the rights herein granted to the Cooperative, and that the Cooperative will restore the said strip to as near as reasonable to the pre-constructed condition, and that the Cooperative will erect no buildings on said strip.

The undersigned covenant that they are the owners of the above described lands and that the said lands are free and clear of encumbrances and liens of whatsoever character except those held by the following persons:

The term of this easement shall be for as long as needed by the grantee, and until a release of this easement is recorded, but to not extend beyond the maximum term authorized by law.

EXCH: BELH WO#: 29-2680-002

Access is hereby granted for a state or federal historical survey of the cable route, should one be required, unless checked. Access denied ☐

IN WITNESS WHEREOF, this instrument has been executed by the undersigned this the 29th day of May, 2009.

STATE OF )
)
COUNTY OF )

by: John Jochim

by: _____

On this 29 day of May, the year 09 before me personally appeared John Jochim, known to me to be the person(s) who is described in and who executed the within instrument, and acknowledged to me that he/she (or they) executed the same.

AMY HARTZE
Notary Public
State of North Dakota
My Commission Expires Mar. 9, 2012

Amy Hartze
Notary Public, County of Oliver
My Commission Expires: 3/9/2012

IN WITNESS WHEREOF, this instrument has been executed by the undersigned this the ___day of _____, 2009.

STATE OF )
)
COUNTY OF )

by: _____

by: _____

On this _____ day of _____, the year _____ before me personally appeared _____, known to me to be the person(s) who is described in and who executed the within instrument, and acknowledged to me that he/she (or they) executed the same.

Notary Public, County of _____
My Commission Expires:

rev 01/09 Tracking No 29-2680-002

MORTGAGEE
MORTGAGOR
INDEXED ✓

191999
STATE OF NORTH DAKOTA
COUNTY OF MERCER
OFFICE OF
COUNTY RECORDER
I hereby certify that the within instrument was filed in this office for record this 6/3/2009 at 9:37 AM, and was duly recorded as Book 180 MISC on Page 193 Fee: $13.00

County Recorder Brenda L. Cook

By Deputy
Return To: WRT, PO BOX 467
HAZEN, ND 58545

COUNTY RECORDER
SEAL
MERCER COUNTY, N. DAK.

In Computer [ ]
WRT# [ ]
County# [ ]

MORTGAGEE
MORTGAGOR
GRANTOR ✓
GRANTEE ✓
INDEXED ✓

W.O.# 92-272

# West River Telephone Right-of-Way Easement

KNOW ALL MEN BY THESE PRESENT, that we the undersigned, (whether one or more) *John B Jochim*, Grantor(s), do hereby grant and convey unto *West River Telecommunications Cooperative*, a cooperative corporation (hereafter called the "Cooperative"), grantee, whose address is P.O Box 467, Hazen, North Dakota, and its respective successors, assigns, lessees and agents, an easement to survey, construct, reconstruct, operate, upgrade, maintain, relocate, replace and remove such communication systems as the grantee may from time to time require, consisting of but not limited to cables, wires, poles, splicing boxes, surface testing terminals, repeaters, repeater housings and markers, and other appurtenances, upon and over the land which the undersigned owns or in which the undersigned has any interest in the County of *Mercer*, State of *North Dakota*, and more particularly described as follows:

*W/2 24 142 88*

also the right of ingress and egress over and across the lands of the undersigned for the purpose of exercising the rights herein granted; to place surface markers beyond said strip, to clear and keep clear all trees, roots brush and other obstructions from the surface and subsurface of said strip of land and within seven feet thereof. The boundary of said strip shall be a line parallel to and 25 feet either side of the first cable laid, which cable shall have its location indicated by surface markers set at intervals on the land of the undersigned or on adjacent lands. The undersigned for himself, his heirs, executors, administrators, successors, and assigns, hereby covenants that no structure shall be erected on said strip.

The undersigned agrees that all poles, wire and other facilities, including telephone equipment, installed on the above described premises at the Cooperative's expense, shall remain the property of the Cooperative, removable at the option of the Cooperative.

The undersigned covenant that they are the owners of the above described lands and that the said lands are free and clear of encumbrances and liens of whatsoever character except those held by the following persons:

The term of this easement shall be for as long as needed by the grantee, and until a release of this easement is recorded, but to not extend beyond the maximum term authorized by law.

Access is hereby granted for a state or federal historical survey of the cable route, should one be required, unless checked. Access denied ☐

IN WITNESS WHEREOF, this instrument has been executed by the undersigned this the 13 day of April, 1993.

STATE OF NORTH DAKOTA )
)
COUNTY OF Mercer )

by: John B. Jochim

by: _____

The foregoing instrument was acknowledged before me this 13th day of April, 1993. By John B Jochim.

My Commission Expires:

CLYDE FANDRICH
Notary Public, Mercer County, ND
My Commission Expires Feb. 24, 1999
STATE OF NORTH DAKOTA
NOTARY PUBLIC SEAL

Clyde Fandrich
Notary Public, County of Mercer

Document No. 153703
OFFICE OF REGISTER OF DEEDS, COUNTY OF Mercer, North Dakota. I hereby certify that the within instrument was filed in this office for recording on the 10th day of January, A.D., 1994, at 12:10 o'clock P M, and was duly recorded in Book 128, of Misc., on page 521.

By Kathryn Schumann, Deputy Jeanette Sailer
Register of Deeds

REGISTER OF DEEDS SEAL MERCER COUNTY, N.DAK.

$7.00 fee

When recorded, please return to WEST RIVER TELECOMMUNICATION COOPERATIVE.

**PIPELINE EASEMENT**

North Dakota State Water Commission
County of Mercer
Parcel H-MER-130

**ALL PERSONS TAKE NOTICE:**

That the undersigned, John Jochim, whether one or more, called the Grantor, being the owner of, or having an interest in, land situated in the County of Mercer, State of North Dakota, more fully described below, in consideration of One and No/100 Dollars ($1.00) and other valuable consideration, does hereby grant, convey, and warrant to the State of North Dakota, acting by and through the North Dakota State Water Commission, a state agency and public corporation, with its principal office at 900 East Boulevard Ave., Bismarck, North Dakota 58505, called the Grantee, and to its successors and assigns, the right, privilege, and easement to construct, maintain, operate, inspect, repair, alter, replace, change the size of or remove a pipeline, and appurtenances thereto, for the transportation of water under, across, and through:

Parcel H-MER-130
A 40 foot wide strip of land 20 feet wide on each side of the pipeline centerline lying within the W1/2 NW1/4 Section 24, Township 142 North, Range 88 West of the 5th P.M.

Said tract contains 2.42 acres, more or less.

Temporary Construction Easement
An additional 20 feet of temporary right-of-way lying adjacent to the above described tract for a total construction easement width of 60 feet.

Said tract contains 1.21 acres, more or less.

together with the right to utilize additional land for a period up to three years from the date of this easement, adjacent to the above described tract, for purposes of temporary working space during initial construction of the pipeline, and the right of ingress to and egress from said strip of land across the adjacent lands of the Grantor, for the purposes specified above at the will of the Grantee.

**THE GRANTOR AND THE GRANTEE FURTHER AGREE:**

1. **Use of right-of-way by Grantor.** Grantor reserves the right to use the surface of the easement strip provided, however, that Grantor, without prior approval of Grantee, shall neither construct nor permit to be constructed any building, structure, or other improvement upon the easement strip which would interfere with Grantee's exercise of the rights conveyed by this pipeline easement, including access to the easement strip.

2. **Appurtenances.** The Grantee shall have the right to install and construct necessary appurtenances upon the surface of the easement strip. Prior to construction, the Grantee will notify the Grantor of the approximate location of such appurtenances if any, to be located on the easement strip, and shall pay to the Grantor the sum of $500 for each appurtenance located at a distance of more than 5 feet from a field boundary or fence line. Such payments shall be paid prior to construction.

3. **Damages.** The Grantee will pay to Grantor or Grantor's tenants, as their respective interests may appear, for damages caused by the operations or activities of the Grantee; provided, however, that the Grantee shall have the right, without liability for damages, to clear, and keep cleared, all trees, brush, and other obstructions from the easement strip that may, in the Grantee's judgment, interfere with the rights and privileges of the Grantee under this pipeline easement.

   If the amount of any damage which Grantor may sustain as a result of Grantee's exercise of rights hereunder cannot be mutually agreed upon, such damages shall be ascertained and determined by three (3) disinterested person; one to be appointed by the Grantor, one by

Grantee, and a third by the two so appointed, and the award of such three persons shall be final and conclusive.

4. **Restoration of surface.** The Grantee will restore the surface of the construction area to its original contour as nearly as practicable.

5. **Topsoil segregation.** When excavating the pipeline trench with a backhoe/trackhoe, the Grantee will remove the topsoil separately during the construction of the pipeline for the full width of the pipe trench to a depth of twelve (12) inches or the actual topsoil depth, whichever is less, and to be replaced at the top of the backfill over the pipe trench.

6. **Assignment and covenant by parties.** The rights of either party may be assigned in whole or in part. The terms and provisions of this easement shall constitute covenants running with the land and shall be binding upon, and inure to the benefit of, the parties hereto, their successors, assigns, personal representatives, and heirs.

7. **Grantor's title.** Grantor warrants that he is the owner of, or has an interest in, the land described in this easement, and that he has full right and authority to enter into and deliver this easement. This instrument may be executed in counterparts and each counterpart shall constitute a separate agreement between the parties thereto. Any payments pursuant to this pipeline easement shall be in proportion to the Grantor's interest in the undivided fee simple estate.

8. **Entire agreement.** This instrument contains the entire agreement of the parties and there are no other, or different, agreements or understandings between the Grantor and the Grantee, or its agents. The Grantor, in executing this pipeline easement, has not relied upon any promises, inducements, or representatives of the Grantee, or its agents, except as are set forth herein.

9. **Term of easement.** The term of this easement shall be as long as it is needed by the Grantee, or its assigns, and until a release of this easement is recorded, but shall not exceed ninety-nine (99) years pursuant to NDCC §47-05-02.1.

10. **Tenants.** The Grantor represents that the land described in this easement is (not rented) (rented to) _____.

Dated this 1 day of July, 20 10.

John M Jochim
Grantor

Grantor

STATE OF NORTH DAKOTA)
) ss.
COUNTY OF CASS)

On this 1st day of July, 20 10, before me personally appeared John Maurice Jochim, known to me to be the person(s) described in and who executed the within and foregoing instrument, and acknowledged to me that he/she executed the same.

Notary Public

(SEAL)

3/3/16 County, ND
My Commission expires:

RYAN KUCKER
Notary Public
State of North Dakota
My Commission Expires March 3, 2016

195955

**STATE OF NORTH DAKOTA**
**COUNTY OF MERCER**

**OFFICE OF**
**COUNTY RECORDER**

MORTGAGEE
MORTGAGOR
INDEXED ✓

I hereby certify that the within instrument was filed in this office for record this 12/27/2010 at 11:45 AM, and was duly recorded a Book 186 MISC on Page 371 Fee: $16.00

County Recorder Brenda L. Cook

By Deputy

Return To: ND STATE WATER COMMISSION, 900 E BOULEVARD A
DEPT 770 BISMARCK, ND 58505-0850

COUNTY RECORDER SEAL MERCER COUNTY, N. DAK.

**NORTH DAKOTA INDUSTRIAL COMMISSION**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case Nos. 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## DECLARATION OF KEVIN KRAFT

[¶1] I, Kevin Kraft, declare the following based on personal knowledge:

[¶2] I have ownership interest in the following properties that lie within the boundaries of the Review Area of the proposed TB Leingang Storage Facility.

- Township 142 North, Range 87 West
  Section 27: A tract of land located in the S1/2
  Oliver County, ND

  more particularly described as follows:

  Commencing at the Southeast corner of said Section 27; thence N 89°59'36" W a distance of 2070.02 feet to the point of beginning; thence continuing N 89° 59'36" W a distance of 824.50 feet; thence N 0°40'27" E a distance of 2642.32 feet to the mid-section line; thence along the mid-section line S 89°54'53" E a distance of 824.50 feet; thence S 0°40'27" W a distance of 2641.19 feet to the point of beginning. Said tract contains 50.00 acres more or less.

- Township 142 North, Range 87 West
  Section 27: SE1/4 LESS AND EXCEPT a tract of land previously conveyed
  Oliver County, ND

[¶3] To the best of my knowledge, the properties listed in ¶ 2 above are encumbered by the following easements:

- Oliver Mercer Electric Cooperative Right-of-Way Easement executed by Mike and Mary Keller on April 9, 1949.
- Roughrider Electric Cooperative, Inc. Right of Way Easement executed by Kevin Kraft on February 24, 2016.
- Greg Skalsky Right-of-Way Easement granted by Kevin Kraft on July 29, 2022.
- Southwest Water Authority Right-of-Way Easement executed by Kevin Kraft on February 6, 2014.

[¶4] Attached are the deeds which I believe indicate my ownership in each of the properties listed above.

[¶5] Attached are the easements currently encumbering these properties based on the information I have.

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on the 24 day of May, 2024 at Beulah, ND, United States.

Kevin Kraft

Kevin Kraft

**WARRANTY DEED**

THIS INDENTURE, Made this 28th day of September, 2001, between **JOSEPH A. KELLER and ELAINE M. KELLER**, husband and wife, whose post office address is P.O. Box 542, Beulah, North Dakota 58523, Grantors, and **KEVIN KRAFT**, a single person, whose post office address is 5651 23rd Street SW, Beulah, North Dakota 58523, Grantee.

WITNESSETH, For and in consideration of the sum of Sixty-Nine Thousand Nine Hundred Dollars ($69,900.00) And Other Good and Valuable Consideration, Grantors do hereby GRANT to the Grantee, all of the following real property lying and being in the County of Oliver and State of North Dakota, and described as follows, to-wit:

**A tract of land located in the South Half (S1/2), Section Twenty-Seven (27), Township One Hundred Forty-Two (142) North, Range Eighty-Seven (87) West, Fifth Principle Meridian, Oliver County, North Dakota and more particularly described as follows:**

**Commencing at the Southeast corner of Section 27 thence N 89°59'36"W a distance of 2070.02 feet to the Point of beginning; thence continuing N 89°59'36"W a distance of 824.50 feet; thence N 0°40'27E a distance of 2642.32 feet to the mid-section line; thence along the mid-section line S 89°54'53"E a distance of 824.50 feet; thence S 0°40'27"W a distance of 2641.19 feet to the Point of Beginning.**

**Said tract contains 50.00 acres more of less.**

**The above legal description was obtained from a plat drawn by Roy Jensen, a North Dakota Registered Land Surveyor - LS. 4654.**

And the said Grantors, for themselves, their heirs, executors and administrators, does covenant with the Grantee that they are well seized in fee of the land and premises aforesaid and has good right to sell and convey the same in manner and form aforesaid; that

Auditor's Office
Oliver County, N.D.
transfer entered this 23rd day of
January 2002
Barbara Lemm
County Auditor
By _____ Deputy

ALEXANDER & SOLEM
ATTORNEYS AT LAW
133 WEST MAIN ST.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

the same are free from all encumbrances, except installments of special assessments or assessments for special improvements which have not been certified to the County Auditor for collection, and easements of record, if any, and the above granted lands and premises in the quiet and peaceable possession of said Grantee, against all persons lawfully claiming or to claim the whole or any part thereof, the said Grantors will warrant and defend.

WITNESS, The hand of the Grantors:

I (We), the Grantor in this Deed, do hereby certify that the amount shown as consideration above is the full consideration paid for the property conveyed.

Kevin Kraft

Joseph A. Keller
JOSEPH A. KELLER

Elaine M. Keller
ELAINE M. KELLER

STATE OF NORTH DAKOTA )
)
COUNTY OF Mercer )

On this 28th day of September, 2001, before me, personally appeared **JOSEPH A. KELLER and ELAINE M. KELLER**, husband and wife, known to me to be the persons who are described in, and who executed the within and foregoing instrument, and severally acknowledged that they executed the same.

Monica Mamer
NOTARY PUBLIC
Mercer COUNTY, NORTH DAKOTA

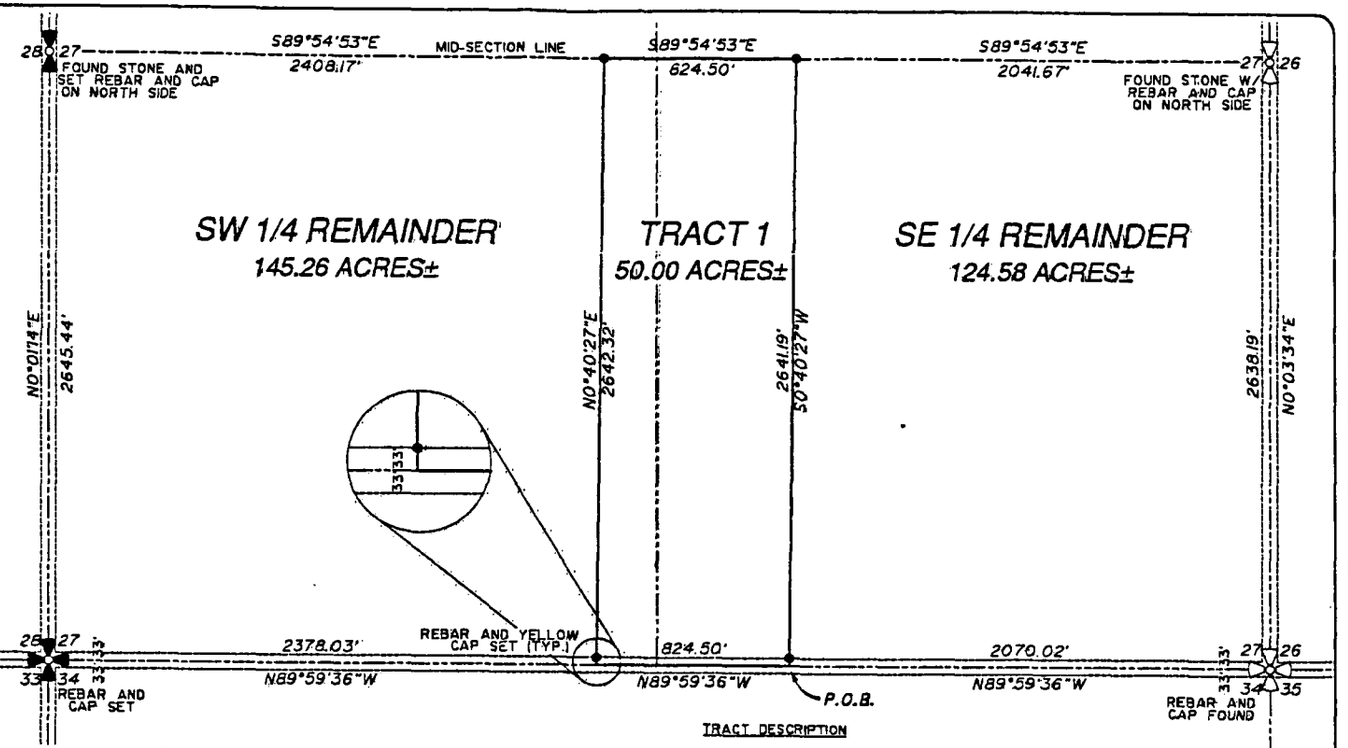
My commission expires: June 20, 2002

MONICA MAMER
Notary Public, STATE OF NORTH DAKOTA
My Commission Expires JUNE 20, 2002

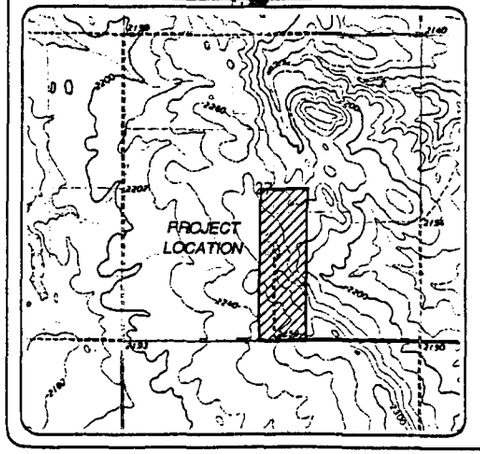
ALEXANDER & SOLEM
ATTORNEYS AT LAW
133 WEST MAIN ST.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

# PARCEL PLAT

S1/2
SEC. 27, T142N, R87W, 5th P.M.
OLIVER COUNTY, NORTH DAKOTA




VICINITY MAP




I, Troy Jensen, Registered land Surveyor No. 4654 in the State of North Dakota, do hereby certify that at the request of the landowner, I made the survey and plat of Tract 1, Located in the S 1/2, Sec. 27, T142N, R87W, 5th P.M., Oliver County, North Dakota.

Dated This 27TH day, AUGUST, 20 01

Troy Jensen
Troy Jensen, RLS 4654
Interstate Engineering Inc.
Beulah, ND

TROY JENSEN
REGISTERED LAND SURVEYOR
LS. - 4654
NORTH DAKOTA

State of Montana
County of Richland

On this 27 day of August 20 01 before me, the undersigned a Notary Public for the State of Montana, personally appeared Troy Jensen, known to me to be the person that executed the same.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal the day and year in the certificate first above written.

Stacy Torgerson-Brown
Notary Public for the State of Montana
Residing at Sidney, Montana
My commission expires June 15, 2003

TRACT DESCRIPTION

A TRACT OF LAND LOCATED IN THE SOUTH HALF (S1/2), SECTION TWENTY SEVEN (SEC. 27), TOWNSHIP ONE HUNDRED FORTY TWO NORTH (T142N), RANGE EIGHTY SEVEN WEST (R87W), FIFTH PRINCIPLE MERIDIAN (5th P.M.), OLIVER COUNTY, NORTH DAKOTA AND MORE PARTICULARLY DESCRIBED AS FOLLOWS:

Commencing at the Southeast corner of Section 27 thence N89°59'36"W a distance of 2070.02 feet to the Point of beginning; thence continuing N89°59'36"W a distance of 824.50 feet; thence N0°40'27"E a distance of 2642.32 feet to the mid-section line; thence along the mid-section line S89°54'53"E a distance of 824.50 feet; thence S0°40'27"W a distance of 2641.19 feet to the Point of Beginning.

Said tract contains 50.00 Acres more or less.

Basis of bearing is from GPS observations of the Section Corners.

LEGEND

1/4 SECTION CORNER - SET
1/4 SECTION CORNER - FOUND
SECTION CORNER - SET
SECTION CORNER - FOUND
REBAR WITH YELLOW CAP - SET
REBAR OR PIPE - FOUND

SCALE

500 0 500 1000
scale 1" = 500 feet

Interstate engineering, Inc.
Engineering - Surveying - Planning
P.O. Box 648 Sidney, Montana 406-433-5617

PARCEL PLAT
SEC. 27, T142N, R87W, 5th P.M.
OLIVER COUNTY, NORTH DAKOTA
Drawn By T.S.J. Project No. 801-8-30
Checked By T.S.J. Date AUG. 2001

SHEET NO.

OFFICE OF COUNTY RECORDER
STATE OF NORTH DAKOTA
COUNTY OF OLIVER
Filed for record this 23 day of January A.D. 2002 at 1:20 o'clock P M., and recorded as document No. 80054 in book 35 of Deeds page 465-467
Kwiekum
County Recorder
Deputy Fee $29.00

467

**WARRANTY DEED**

THIS INDENTURE, made this 13th day of August, 2013, between **Joseph A. Keller and Elaine M. Keller**, husband and wife, Grantors, and **Kevin Kraft**, whose address is 5651 23rd Street SW, Beulah, ND 58523, Grantee.

WITNESSETH, for and in consideration of the sum of Ten and no/100 and other good and valuable consideration ($10.00 & OGVC), Grantors do hereby grant to the Grantee all of the following real property lying and being in the County of **OLIVER**, State of North Dakota, and described as follows, to-wit:

> The Southeast Quarter (SE¼) of Section Twenty-Seven (27), Township One Hundred Forty-Two (142), Range Eighty-Seven (87), Oliver County, North Dakota, LESS AND EXCEPT a tract of land previously conveyed, described as follows:
>
> A tract of land located in the South Half (S½) of Section Twenty-Seven (27), Township One Hundred Forty-Two (142) North, Range Eighty-Seven (87) West of the Fifth Principal Meridian, Oliver County, North Dakota, and more particularly described as follows:
>
> Commencing at the Southeast corner of said Section 27; thence N 89°59'36" W a distance of 2070.02 feet to the point of beginning; thence continuing N 89°59'36" W a distance of 824.50 feet; thence N 0°40'27" E a distance of 2642.32 feet to the mid-section line; thence along the mid-section line S 89°54'53" E a distance of 824.50 feet; thence S 0°40'27" W a distance of 2641.19 feet to the point of beginning.
> Said tract contains 50.00 acres more or less.
>
> The above description taken from a previously recorded instrument.
>
> Grantors hereby reserve to themselves as joint tenants Ninety percent (90%) of all minerals presently owned by them. It is the intention of Grantors to convey to Grantee Ten percent (10%) of all minerals presently owned by Grantors.

And the said Grantors for themselves, their heirs, executors and administrators, do covenant with the Grantee that they are well seized in fee of the land and premises aforesaid and have a good right to sell and convey the same in manner and form aforesaid; that the same are free from all encumbrances, except installments of special assessments or assessments for special improvements which have not been certified to the County Auditor for collection and the above granted lands and premises in the quiet and peaceable possession of said Grantee, against all persons lawfully claiming or to claim the whole or any part thereof, the said Grantors will warrant and defend.

WITNESS, the hand of the Grantors:

Joseph A. Keller

Joseph A. Keller

Elaine M. Keller

Elaine M. Keller

STATE OF NORTH DAKOTA )
)ss
COUNTY OF OLIVER )

On this 13th day of August, 2013, before me, personally appeared **Joseph A. Keller and Elaine M. Keller**, husband and wife, known to me to be the persons who are described in, and who executed the within and foregoing instrument, and severally acknowledged to me that they executed the same.

Ann Mahoney
Notary Public

ANN MAHONEY
Notary Public
State of North Dakota
My Commission Expires Feb. 13, 2015

I certify that the full consideration paid or to be paid for the property described in this deed is $28,125.00.

Signed: Kevin Kraft Date: 8-13-13
Grantee/~~Agent~~

The legal description was prepared by Mahoney & Mahoney Law Office, P.O. Box 355, Center, ND 58530, or obtained from a previously recorded instrument.

Auditor's Office
Oliver County, N.D.
transfer entered this 13th day of
August 2013
Judith M. Wiatz
County Auditor
By_____Deputy

88385 8/13/2013 3:08 PM PAGE: 1 OF 2
BOOK: 39 PAGE: 716 FEES: $13.00 MM WARRANTY DEED
Kim Wilkens, OLIVER COUNTY CLERK
By M M Kelly, Ex Deputy

KRAFT, KEVIN
5651 23RD STREET SW

BEULAH, ND 58523

RECORDER OLIVER SEAL COUNTY STATE OF NORTH DAKOTA

07
220

01111

FORM LE-189 R

RIGHT OF WAY EASEMENT

KNOW ALL MEN BY THESE PRESENTS, that we the undersigned, (Whether one or more) Mike Keller & Mary Keller (unmarried) (husband and wife), for a good and valuable consideration, the receipt whereof is hereby acknowledged, do hereby grant unto Oliver-Mercer Electric Cooperative, Inc. a cooperative corporation, (hereinafter called the "Cooperative"), whose post office address is Hazen, North Dakota, and to its successors or assigns, the right to enterupon the lands of the undersigned, situated in the County of Oliver, State of North Dakota, and more particularly described as follows:

A tract of land approximately _____ acres in area, located _____ miles in a _____ direction from the town of _____, and further described as being in

NE¼, SW¼ and NW¼ Section 26, Township 142 Range 87

NE¼ and S½ Section 27, Township 142 Range 87

____ Section ____, Township _____ Range _____

and to contract, operate and maintain on the above described lands, and/or in or upon all streets, roads or highways abutting said lands, an electric transmission or distribution line or system, and to cut and trim trees and shrubbery that may interfere with or threaten to endanger the operation and maintenance of said line or system.

The undersigned agree that all poles, wires, and other facilities, including any main service entrance equipment, installed on the above-described lands at the Cooperative's expense shall remain the property of the Cooperative, removable at the option of the Cooperative, upon termination of service to or on said lands.

The undersigned covenant that they are the owners of the above-desctibed lands and that the said lands are free and clear of encumberances and liens of whatsoever character except those held by the following persons:

IN WITNESS WHEREOF, the undersigned have set their hands and seals this 9 day of April, 1949.

Mike Keller (L.S.)

Mary Keller (L.S.)

Signed, sealed and delivered in the presence of:

91027 8/20/2015 4:18 PM PAGE: 1 OF 2
BOOK: 1 PAGE: 1028 FEES: $13.00 MM EASEMENT (ROUGHRID
Kim Wilkens, OLIVER COUNTY RECORDER
By _____ Deputy

ROUGHRIDER ELECTRIC COOPERATIVE
800 HWY DR
HAZEN, ND 58545

STATE OF NORTH DAKOTA COUNTY OF RECORDED

(1)
STATE OF NORTH DAKOTA

COUNTY OF _____ SS.

_____ being first duly sworn says that he is one of the witnesses to the above and foregoing easements, that _____ and _____ whose names is and/or are subscribed to the above and foregoing instruments as a party is and/or are the persons described in said easement and that he signed said instrument in my presence and that I in their presence signed my name thereto as a subscribed witness.

SUBSCRIBED and sworn to before me this ____day of_____, 194__

_____
Notary Public in and for the
County of_____ and the State
of North Dakota

My commission expires: _____

(1)
STATE OF NORTH DAKOTA
COUNTY OF _____ SS.

On this _____ day of _____, 194___ , before me _____ a Notary Public within and for the State of North Dakota, personally appeared _____ known to me to be one of the persons who subscribed his name to the above and foregoing instrument as a witness, and who acknowledged to me that he subscribed his name thereto as such witness, and who proved to me that the person who and/or whose names are subscribed to the foregoing instrument are the persons described in it.

_____
Notary Public in and for the
County of _____ AND
State of North Dakota

My commission expires:_____

* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

(2)
State of North Dakota

County of Mercer SS.

On this 9 day of April 1949, before me _____, a Notary Public in and for said County and State, personally appeared Mike Keller and Mary Keller known to me to be the persons who executed within and foregoing instrument and acknowledged to me that they executed the same.

NOTARY PUBLIC STATE OF NORTH DAKOTA

_____
Notary Public in and for the
County of Mercer and
State of North Dakota

NOTARY PUBLIC, MERCER COUNTY, N.D.
MY COMMISSION EXPIRES JULY 8, 1951

My commission expires: _____

# RIGHT OF WAY EASEMENT

THIS AGREEMENT made and entered into this 29th day of February, 2016, between Kevin Kraft of 5651 23rd St SW, Beulah, ND 58523, hereinafter called "Owner" (whether one or more) and ROUGHRIDER ELECTRIC COOPERATIVE, INC., whose post office address is 800 Highway Drive, Hazen, North Dakota 58545-4737, hereinafter called "COOPERATIVE".

WITNESSETH that for valuable consideration, the receipt and sufficiency of which is hereby acknowledged, Owner grants unto Cooperative, its successors and assigns, for a term of 99 years from the date hereof, an easement to construct, reconstruct, operate and maintain an electric distribution system, overhead, underground or both including all poles, guys, anchors wires, surface terminals, and all accessories and appurtenances necessary or desirable in connection therewith, under, over, upon and across lands of Owner and/or in or upon all streets, roads or highways abutting said lands situated in Oliver County, North Dakota, and more particularly described as follows, to-wit:

A parcel of land in the S1/2 of Section 27, Township 142 North, Range 87 West of the Fifth Principal Meridian, 20 feet in width, 10 feet on each side of a centerline described as follows:

Beginning at the east line of the southeast quarter of Section 27, Township 142 North, Range 87 West, at a point which bears N0°56'07"E a distance of 37.91 feet from the southeast corner of Section 27, Township 142N, Range 87W; thence N89°07'40"W a distance of 2894.69 feet more or less; to the POINT OF TERMINATION at a point which bears N89°58'50"E a distance of 2377.36 feet from the southwest corner of Section 27, Township 142N, Range 87W.

In Section 27, Township 142 North, Range 87 West of the Fifth Principal Meridian described as follows:

The facilities erected hereunder shall remain the property of the Cooperative. Cooperative shall have the right to inspect, rebuild, remove, repair, improve and make such changes, alterations, substitutions and additions in and to its facilities as Cooperative may from time to time deem advisable, including the right to increase or decrease the size or capacity of its system, together with necessary accessories and appurtenances; the right to increase or decrease the size of the facilities and equipment situated upon the premises; the right to permit or otherwise agree to the joint use or occupancy of the overhead lines or the trench and related underground facilities by other persons, associations or corporations; and the right to at any time use the property described above to extend lines and facilities to serve the property of persons other than the Owner.

Any damages to the surface of the right-of-way or to crops, fences, gates, drains, ditches, or lines of the Owner, caused by the Cooperative in the installation, repair maintenance, reconstruction or removal of said electrical properties and appurtenances, shall be promptly repaired, replaced or paid for by the Cooperative, provided a claim therefore is presented to the Cooperative at its General Office within ninety (90) days after such damages occur. If the amount of said damages cannot be agreed upon, the Cooperative and the Owner shall each select an arbitrator, and these two shall select a third arbitrator, and the decision and award of the arbitrators shall be final.

Cooperative shall at all times have the right to keep the easement clear of all buildings, structures or other obstructions, trees, shrubbery, undergrowth and roots.

Owner, his successors and assigns, may use the land within the easement for any purpose not inconsistent with the rights granted, provided such use does not interfere with or endanger the Cooperative's facilities or the rights granted under this easement.

For the purpose of constructing, inspecting, maintaining or operating its facilities, Cooperative shall have the right of ingress to and egress from the easement over the lands of Owner adjacent to the easement and lying between public or private roads and the easement, such right to be exercised in such manner as shall occasion the least practicable damage and inconvenience to Owner.

Owner covenants that he is seized of and has the right to convey the said easement, rights and privileges; that Cooperative shall have quiet and peaceable possession, use and enjoyment of the aforesaid easement, rights and privileges, and that Owner shall execute such further assurances thereof as may be requested by the Cooperative.

Kevin C. Kraft

Kevin Kraft

STATE OF NORTH DAKOTA)
)ss
COUNTY OF Oliver )

On this 24th day of February, 2016, before me, a Notary Public in and for said County and State personally appeared Kevin Kraft, known to me to be the person(s) described in and who executed the within and foregoing instrument and acknowledged to me that he/she/they executed the same.

*Notary Seal Location*

JOHN JANGULA
Notary Public
State of North Dakota
My Commission Expires May 15, 2021

Notary Public State of North Dakota

My Commission Expires: May 15, 2021

92449 3/15/2016 3:35 PM PAGE: 1 OF 2
BOOK: MM PAGE: 280 FEES: $13.00 MM EASEMENT
Kim Wilkens, OLIVER COUNTY RECORDER
By Linda Deputy

MOUNTAIN PLAINS LLC
JOSH MUEHLER, FIELD MANAGER
PO BOX 487
BISMARCK, ND 58502

STATE OF NORTH DAKOTA ☆ OLIVER COUNTY RECORDER SEAL

97094 8/10/2022 2:23 PM Total Pages: 1
BOOK: V V PAGE: 217 FEES: $20.00 RB RIGHT OF WAY
Mickie McNulty-Eide, OLIVER COUNTY RECORDER
By Rebecca Bethke, Deputy

RECORDER OLIVER SEAL COUNTY STATE OF NORTH DAKOTA

GREG SKALSKY
5654 23RD STREET SW

BEULAH, ND 58523

## RIGHT-OF-WAY EASEMENT

**ALL PERSONS TAKE NOTICE:**

In consideration of one dollar ($1.00) and other good and valuable consideration paid to Kevin Kraft 5651 23 St. SW Beulah ND 58523 hereinafter referred to as Grantor, by Greg Skalsky 5654 23 St. SW Beulah, ND 58523 does hereby grant, bargain, sell, transfer and convey unto the Grantee, its successor and assigns, a perpetual easement with right to erect, construct, install and lay, and thereafter use, operate, inspect, repair, maintain, replace, and remove water pipelines, connections, valves and all other appurtenant facilities used in connection with the construction, operation and maintenance of the of a water service line, over, above, across and through the land of the Grantor, situated in Oliver County, State of North Dakota, said land being described as follow South half section 27 township 142 North Range 87 west the South west corner of plot.

1. The easement shall be thirty (30) feet in width, fifteen (15) feet on each side of the center line of the pipeline as constructed.

2. The Grantee covenants to maintain the easement in good repair so that no unreasonable damage will result from its use to the adjacent land of the Grantor, his successors and assigns. The Grantee will pay for damages to growing crops caused by the activity or operation of the Grantee.

The grant and other provisions of this easement shall constitute a covenant running with the land for the benefit of the Grantee, its successors and assigns.

**IN WITNESS WHEREOF,** the Grantor has executed this instrument this 29 day of July, 2022.

Kevin E. Kraft GRANTOR K E Kraft GRANTOR

State of North Dakota )

County of Oliver )

Subscribed and sworn before me this 29th day of July, 2022.

JOSEPH SILVERIA
Notary Public
State of North Dakota
My Commission Expires Nov 7, 2023

Notary Public

North Dakota, County Burleigh

My Commission Expires: Nov 7th, 2023

COPY

**SOUTHWEST WATER AUTHORITY**
Southwest Pipeline Project Building
West Industrial Park
4665 2nd Street SW
Dickinson, ND 58601-7231
(701) 225-0241
Toll Free: 1-888-425-0241

Segment **7-9E WEST CENTER SERVICE AREA**
Parcel **142-87-21**

## RIGHT-OF-WAY EASEMENT

**ALL PERSONS TAKE NOTICE:**

In consideration of one dollar ($1.00) and other good and valuable consideration **KEVIN KRAFT 5651 23RD STREET SW BEULAH, ND 58523** hereinafter referred to as Grantor, does hereby grant, bargain, sell, transfer and convey to the Southwest Water Authority, hereinafter referred to as the Grantee, its successor and assigns, a perpetual easement with right to erect, construct, install and lay, and thereafter use, operate, inspect, repair, maintain, replace, and remove water pipelines, connections, valves and all other appurtenant facilities used in connection with the construction, operation and maintenance of the Southwest Pipeline Project, over, above, across and through the land of the Grantor, situated in **Oliver** County, State of North Dakota, said land being described as follows: **HOUSE AND 2 ACRES IN SE1/4 & SE1/4 SECTION 27 TOWNSHIP 142 RANGE 87** (the tract that contains **2.40** acres, more or less), together with the right of ingress and egress over the adjacent lands of the Grantor, successors and assigns for the purposes of this easement.

1. The permanent easement will be thirty (30) feet in width, fifteen (15) feet on each side of the center line of the pipeline as constructed, with an additional ten (10) feet of temporary right-of-way for a total construction easement width of forty (40) feet, twenty (20) feet on each side of the center line.

2. The Grantee covenants to maintain the easement in good repair so that no unreasonable damage will result from its use to the adjacent land of the Grantor, successors and assigns. The Grantor will receive compensation for damages to growing crops caused by the construction or operation. The Grantor will report any damages within three (3) years of the construction of the project.

The grant and other provisions of this easement shall constitute a covenant running with the land for the benefit of the Grantee, its successors and assigns.

**IN WITNESS WHEREOF,** the Grantor has executed this instrument this 6 day of February, 2014.

Kevin E. Kraft GRANTOR _____ GRANTOR

State of North Dakota

County of Oliver

On Feb 6, 2014, personally appeared before me Kevin E. Kraft

X whom I know personally.
_____ whose identity I verified on the basis of _____.
_____ whose identity I verified on the oath or affirmation of _____, a credible witness to be the signor of the above and he/she acknowledged that he/she signed it.

MELISSA WEIDNER
Notary Public
State of North Dakota
My commission expires Oct 3, 2019

Notary Public Melissa Weidner

Mercer, County ND

My Commission Expires: 10-3-19

**NORTH DAKOTA INDUSTRIAL COMMISSION**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case Nos. 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## DECLARATION OF CHARMAYNE LIEBELT

[¶1] I, Charmayne Liebelt, declare the following based on personal knowledge:

[¶2] I have ownership interest in the following property that lies within the boundaries of the proposed KJ Hintz Storage Facility.

- Township 143 North, Range 86 West
  Section 32: S1/2 SW1/4
  Oliver County, ND

[¶3] Attached are the deeds which I believe indicate my ownership in the property listed above.

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on the 3 day of June, 2024 at Aberdeen (City), SD (State), United States.

Charmayne Liebelt
Charmayne Liebelt (Jun 3, 2024 14:04 CDT)

Charmayne Liebelt

PR DEED $20.00 **3089206**
Page: 1 of 3
Lisa A. Guenther, Dunn County Recorder 8/1/2019 2:42 PM
By P. Hendricks, Deputy

RECORDER OF DUNN COUNTY
SEAL
STATE OF NORTH DAKOTA

# PERSONAL REPRESENTATIVE DEED OF DISTRIBUTION

THIS INDENTURE, Made this 3rd day of July, 2019, by and between CHARLOTTE A. LIEBELT, of PO Box 1832, Aberdeen, South Dakota 57402-1832, personal representative of the estate of Jonathan W.A. Liebelt, deceased, as Grantor, and CHARMAYNE LIEBELT, of PO Box 188, Aberdeen, South Dakota 57402-0188, and JONATHAN C. B. LIEBELT, of PO Box 2124, Aberdeen, South Dakota 57402-2124, as Grantees.

WITNESSETH:

WHEREAS, The Grantor is the duly appointed and acting personal representative of the estate of Jonathan W.A. Liebelt, deceased, whose date of death is June 26, 1999; and

WHEREAS, The Grantees are entitled to the following described property by virtue of the Last Will and Testament of Jonathan W.A. Liebelt, and the Disclaimer executed by Charlotte A. Liebelt, his wife.

NOW, THEREFORE, Grantor, as the personal representative of the estate of said decedent, does by this instrument, grant, convey, deed and set over to the Grantees named above, all of the right, title and interest of said decedent and his said estate in and to the following described real property situate in the State of North Dakota, to-wit:

**Dunn County, North Dakota:**

Township 145, Range 93
Section 26: SE¼
Section 35: NE¼

**Mercer County, North Dakota:**

Township 143, Range 88
Section 14: SE¼

Township 144, Range 87
Section 19: S½SE¼SW¼

Township 144, Range 88
Section 34: N½ (except portion north of road)

Township 143, Range 88
Section 24: NW¼

Lots Ten (10), Eleven (11), and Twelve (12), of Block Twelve (12), Original Townsite; and Fractional Lot One (1), Chaffee Parcel Addition to Beulah

**Oliver County, North Dakota:** Township 143, Range 86
Section 32: S½SW¼

Township 143, Range 87
Section 6: All

WITNESS, The hand of the Grantor:

_____
CHARLOTTE A. LIEBELT, Personal Representative of the Jonathan W.A. Liebelt Estate

STATE OF SOUTH DAKOTA )
) ss.
COUNTY OF Brown )

On this 3rd day of July, 2019, Charlotte A. Liebelt, being personally known to me, personally appeared before me and acknowledged that she executed the above Deed as personal representative of the estate of Jonathan W.A. Liebelt.

_____
Notary Public

I certify that the requirement for a report or statement of full consideration paid does not apply because this deed is for one of the transactions exempted by subdivision d of subsection 6, NDCC Section 11-18-02.2.

Grantee or Agent: _____ Date: 7-3-2019

This Deed was prepared by Arlen M. Ruff, of Kelsch, Ruff, Kranda, Nagle & Ludwig, 103 Collins Avenue, PO Box 1266, Mandan ND 58554-7266.

DUNN COUNTY OFFICIAL SEAL STATE OF NORTH DAKOTA

AUDITOR'S OFFICE
Dunn County, N. Dak.
Transfer entered this 1st
day of August 2019
Tracey Odegard
County Auditor
Deputy

3089206
Page: 3 of 3
$20.00
Lisa A. Guenther, Dunn County Recorder 8/1/2019 2:42 PM
PR DEED
By

FILED
OCT 21 1999
M. L. [illegible]
BROWN COUNTY Clerk of Court

STATE OF SOUTH DAKOTA ) IN CIRCUIT COURT
COUNTY OF BROWN ) FIFTH JUDICIAL CIRCUIT

* * * * * * * * * * * * *

In the Matter of the Estate of JONATHAN W. A. LIEBELT, Deceased. * PRO. 99-151

**LETTERS OF PERSONAL REPRESENTATIVE**

* * * * * * * * * * * * *

On October 21st, 1999, Charlotte A. Liebelt was appointed by this Court and qualified as Personal Representative of the estate of Jonathan W. A. Liebelt.

These Letters are issued as evidence of the appointment, qualification, and authority of Charlotte A. Liebelt to do and perform all acts authorized by law.

Issued October 21st, 1999.

BY THE COURT:

(COURT SEAL)

Clerk of the Circuit Court

By Jolene J. Legge Deputy

State of South Dakota )
County of Brown ) ss
I, Maria B. Zastrow, Clerk of the Circuit Court, do hereby certify that the within and foregoing is a full, true and complete copy of the original instrument, as the same appears on file in this office. The same is in full force and effect.
Dated this 18th day of July, 2019
Maria B. Zastrow
Maria B. Zastrow, Clerk of Courts, Brown County
By [illegible] Deputy

MORTGAGEE
MORTGAGOR
INDEXED ✓

Delinquent Taxes, Special Assessments, or Installments of Special Assessments Paid and Transfer Entered this 15th day of August, 2019.

Shana Brost
Mercer County Auditor
By: Amber Gabert
~~Deputy Auditor~~/Clerk

**STATE OF NORTH DAKOTA**
**COUNTY OF MERCER**

**218290**
**OFFICE OF**
**COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 8/15/2019 at 9:27 AM, and was duly recorded as Book 171 DEED on Page 3 Fee: $20.00

County Recorder Brenda L. Cook
By Deputy Heather A. Vigesaa
Return To: KELSCH, RUFF, KRANDA, NAGLE & LUDWIG, 103 COLL
PO BOX 1266 MANDAN, ND 58554-7266

COUNTY RECORDER SEAL MERCER COUNTY, N.DAK.

**94841** 8/21/2019 1:57 PM PAGE: **1** OF **4**
BOOK: ~~42~~ PAGE: 613 FEES: $20.00 RS PR Deed
Mickie McNulty-Eide, OLIVER COUNTY RECORDER
By ~~Rebecca Dishon~~ Deputy

RECORDER OLIVER SEAL COUNTY STATE OF NORTH DAKOTA

KELSCH, RUFF, KRANDA, NAGLE & LUDWIG
103 COLLINS AVENUE
PO BOX 1266
MANDAN, ND 58554

QUIT CLAIM DEED $20.00 **3089577** Page: 1 of 2
Lisa A. Guenther, Dunn County Recorder 9/10/2019 1:54 PM
By Shanna Sherlin, Deputy

RECORDER OF DUNN COUNTY SEAL STATE OF NORTH DAKOTA

# QUIT CLAIM DEED

THIS INDENTURE, Made this 5 day of September, 2019, between JONATHAN C. B. LIEBELT, a married person dealing in his sole and separate property, of PO Box 2124, Aberdeen, South Dakota 57402-2124, hereinafter "Grantor", and CHARMAYNE LIEBELT, of PO Box 188, Aberdeen, South Dakota 57402-0188, hereinafter "Grantee":

WITNESSETH, That Grantor, for and in consideration of the sum of One Dollar ($1.00) and other good and valuable consideration, in hand paid by Grantee, the receipt whereof is hereby acknowledged, does by these presents, BARGAIN, SELL, REMISE, RELEASE and QUIT-CLAIM unto Grantee, and to her heirs and assigns, FOREVER, all the right, title and interest in and to the following described lots, pieces or parcels of land situated in the State of North Dakota, and known and described as follows, to-wit:

**Dunn County, North Dakota:**

Township 145, Range 93
Section 26: SE¼
Section 35: NE¼

**Mercer County, North Dakota:**

Township 143, Range 88
Section 14: SE¼

Township 144, Range 87
Section 19: S½SE¼SW¼

Township 144, Range 88
Section 34: N½ (except portion north of road)

Township 143, Range 88
Section 24: NW¼

Lots Ten (10), Eleven (11), and Twelve (12), of Block Twelve (12), Original Townsite; and Fractional Lot One (1), Chaffee Parcel Addition to Beulah

**Oliver County, North Dakota:** Township 143, Range 86
Section 32: S½SW¼

Township 143, Range 87
Section 6: All

TO HAVE AND TO HOLD the above quit-claimed premises, together with all the hereditaments and appurtenances thereunto belonging or in anywise appertaining, to Grantee, her heirs and assigns, FOREVER

IN TESTIMONY WHEREOF, Grantor has hereunto set his hand and seal the day and year first above written.

JONATHAN C. B. LIEBELT

STATE OF SOUTH DAKOTA )
) ss.
COUNTY OF Brown )

On this 5th day of September, 2019, before me, a notary public, in and for said County and State, personally appeared Jonathan C. B. Liebelt, a married person dealing in his sole and separate property, known to me to be the person who is described in, and who executed the foregoing and within instrument and acknowledged to me that he executed the same.

RITA R. SCHILLE NOTARY Seal PUBLIC STATE OF SOUTH DAKOTA

Notary Public

I certify that the requirement for a report or statement of full consideration paid does not apply because this deed is for one of the transactions exempted by subdivision h of subsection 6, NDCC Section 11-18-02.2.

Grantee or Agent: _____ Date 09/05/2019

This Deed was prepared by Arlen M. Ruff, of Kelsch, Ruff, Kranda, Nagle & Ludwig, 103 Collins Avenue, PO Box 1266, Mandan ND 58554-7266.

DUNN COUNTY OFFICIAL SEAL STATE OF NORTH DAKOTA

AUDITOR'S OFFICE
Dunn County, N. Dak.
Transfer entered this 10th
day of September 2019
Tracey Odegal
County Auditor
Deputy

MORTGAGEE
MORTGAGOR
INDEXED ✓

Delinquent Taxes, Special Assessments, or Installments of Special Assessments Paid and Transfer Entered this 24th day of September, 2019.

Shana Brost
Mercer County Auditor
By: Amber Gobert
~~Deputy Auditor~~/Clerk

**218482**

**STATE OF NORTH DAKOTA** **OFFICE OF**
**COUNTY OF MERCER** **COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 9/24/2019 at 9:21 AM, and was duly recorded as Book 171 DEED on Page 173 Fee: $20.00

County Recorder Brenda L. Cook
By Deputy Heather A. Vigesaa
Return To: KELSCH, RUFF, KRANDA, NAGLE & LUDWIG, 103 COL
PO BOX 1266 MANDAN, ND 58554-7266

SEAL MERCER COUNTY, N.DAK

**94914** 10/3/2019 2:44 PM PAGE: **1** OF **3**
BOOK: 42 PAGE: 658 FEES: $20.00 RS QUIT CLAIM DEED
Mickie McNulty-Eide, OLIVER COUNTY RECORDER
By Rebecca Saxton, Deputy

RECORDER OLIVER SEAL COUNTY STATE OF NORTH DAKOTA

KELSCH, RUFF, KRANDA, NAGEL & LUDWIG
103 COLLINS AVE
PO BOX 1266
MANDAN, ND 58554

**NORTH DAKOTA INDUSTRIAL COMMISSION**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case Nos. 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## DECLARATION OF KIRK MAIZE

[¶1] I, Kirk Maize, declare the following statements based on personal knowledge:

[¶2] I have ownership interest in the following property that lies within the boundaries of the proposed TB Leingang Storage Facility.

- Township 141 North, Range 87 West
  Section 20: S1/2 SE1/4
  Oliver County, ND

[¶3] To the best of my knowledge, the property listed in ¶ 2 above is encumbered by the following easements:

- Minnesota Power Wind Project Easement Agreement executed by Kirk and Linda Maize on September 30, 2013 (88510).
- Southwest Water Authority Right-of-Way Easement executed by Kirk and Linda Maize on November 7, 2014 (89766).
- West River Telecommunications Right-of-Way Easement executed by Kirk and Linda Maize on May 2, 2017 (93550).

[¶4] Attached are the deeds which I believe indicate my ownership in the property listed above.

[¶5] Attached are the easements currently encumbering the property based on the information I have.

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on the 4th day of June, 2024 at Beulah, ND, United States.

Kirk Maize

Kirk Maize

94931 10/14/2019 11:35 AM PAGE: 1 OF 2
BOOK: 42 PAGE: 682 FEES: $20.00 RS WARRANTY DEED
Mickie McNulty-Eide, OLIVER COUNTY RECORDER
By Rebecca Nighton, Deputy

SOLEM LAW OFFICE
PO BOX 249

BEULAH, ND 58523

RECORDER OLIVER SEAL COUNTY STATE OF NORTH DAKOTA

# WARRANTY DEED

THIS INDENTURE, Made this 7th day of October, 2019, by and between **KIRK E. MAIZE, a/k/a KIRK MAIZE, and LINDA L. MAIZE, a/k/a LINDA MAIZE, husband and wife,** whose address is 5851 28th Street SW, Beulah, North Dakota 58523, Grantors, and **ALLEN MAIZE,** whose address is 510 3rd Avenue SE, Mandan, North Dakota 58554, Grantee.

WITNESSETH, For and in consideration of the sum of One Dollar ($1.00) and other good and valuable consideration, Grantors do hereby GRANT to the Grantee, all of the following real property lying and being in the County of Oliver and State of North Dakota, and described as follows, to-wit:

> **The South Half of the Southeast Quarter (S½SE¼) of Section Twenty (20), Township One Hundred Forty-One (141) North, Range Eighty-Seven (87) West of the Fifth Principal Meridian, Oliver County, North Dakota.**
>
> **The Grantors hereby except and reserve unto themselves jointly a life estate interest in and to the above described property for their lifetimes, and upon their deaths, the remainder interest shall pass to Allen Maize.**

SOLEM LAW OFFICE
109 CENTRAL AVENUE S
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail:beulaw@westriv.com

And the said Grantors, for themselves, their heirs, executors and administrators, do covenant with the Grantee, that they are well seized in fee of the land and premises aforesaid and have good right to sell and convey the same in manner and form aforesaid; that the same are free from all encumbrances, except mineral reservations and exceptions of record, and the above granted lands and premises in the quiet and peaceable possession of said Grantee, against all persons lawfully claiming or to claim the whole or any part thereof, the said Grantors will warrant and defend.

WITNESS, The hand of the Grantors:

I certify that the requirement for a report or statement of full consideration paid does not apply because this deed is for one of the transactions exempted by Subdivision c of Section 6 of NDCC 11-18-02.2.

**KIRK E. MAIZE**

**LINDA L. MAIZE**

DATED: Oct. 7, 2019

SIGNED: Agent

STATE OF NORTH DAKOTA )
)
COUNTY OF MERCER )

On this 7th day of October, 2019, before me, personally appeared **KIRK E. MAIZE and LINDA L. MAIZE,** known to me to be the persons who are described in, and who executed the within and foregoing instrument, and severally acknowledged that they executed the same.

**SUSAN NEUBERGER**
**Notary Public**
**State of North Dakota**
**My Commission Expires October 28, 2022**

NOTARY PUBLIC
MERCER COUNTY, NORTH DAKOTA

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

Auditor's Office
Oliver County, N.D.
transfer entered this 14th day of
October 2019
Judith Dmitz
County Auditor
By Linda Nelson Deputy

DOCUMENT NO. 73910

WARRANTY DEED

THIS INDENTURE, Made this 11th day of February, 1992, between ROWENE J. SKALSKY, Personal Representative of the Estate of John Rausch, Deceased, Grantor, whether one or more, and KIRK E. MAIZE and LINDA MAIZE, husband and wife, Grantee, whether one or more, whose post office address is Beulah, North Dakota 58523.

WITNESSETH, For and in consideration of the sum of One Dollar ($1.00), and other good and valuable consideration, Grantor does hereby GRANT to the Grantee, as joint tenants and not as tenants in common, all of the following real property lying and being in the County of Oliver, State of North Dakota, and described as follows, to-wit:

The South Half of the Southeast Quarter ($S\frac{1}{2}SE\frac{1}{4}$) of Section Twenty (20), Township One Hundred Forty-One (141) North, Range Eighty-Seven (87) West of the Fifth Principal Meridian.

EXCEPTING AND RESERVING unto the Estate of John Rausch, Deceased, all right, title and interest in and to any interest now owned by the decedent in and to all of the oil, gas, coal and other minerals, of any nature whatsoever, which may be found on or underlying said lands, together with the right of ingress and egress at all times for the purpose of mining, drilling, exploring, operating and developing said lands for said minerals and storing, handling, transporting and marketing the same therefrom;

FURTHER SUBJECT to all prior valid mineral reservations, conveyances, easements and leases now of record.

This deed is in fulfillment of a Contract for Deed dated February 17, 1984.

And the Grantor, as Personal Representative of the Estate of John Rausch, Deceased, does covenant with the Grantee that said decedent and said estate are well seized in fee of the land and premises aforesaid and have good right to sell and convey the same in manner and form aforesaid; that the same are free from all encumbrances, except installments of special assessments or assessments for special improvements which have not been certified to the County Treasurer for collection, and the above granted lands and premises in the quiet and peaceable possession of the Grantee, against all persons lawfully claiming or to claim the whole or any part thereof, the Grantor will warrant and defend.

WITNESS, the hand of the Grantor:

Rowene J. Skalsky

Rowene J. Skalsky, Personal Representative of the Estate of John Rausch, Deceased

STATE OF NORTH DAKOTA )
) ss.
COUNTY OF MORTON )

On this 11th day of February, 1992, before me personally appeared ROWENE J. SKALSKY, known to me to be the Personal Representative of the Estate of John Rausch, Deceased, and known to me to be the person described in, and who executed the within and foregoing instrument, and acknowledged that she executed the same as such Personal Representative.

Notary Public
State of North Dakota
My commission expires: 5/18/97

(SEAL)

I certify that the full consideration paid or to be paid for the property described in this deed is $45,000.

Signed: _____ Date: 3/4/92
Grantee or Agent

Auditor's Office
Oliver County, N.D.
transfer entered this 5 day of March 1992
Leland Ogden
County Auditor
By _____ Deputy

OFFICE OF REGISTER OF DEEDS
STATE OF NORTH DAKOTA
COUNTY OF OLIVER

Filed for record this 5 day of March A.D. 1992 at 9:34 o'clock A M.
and recorded as document No. 73910 in book 32 of Deeds page 109-110

Bernice C. Bornemann, Register of Deed
LaVerne Rabe, Deputy
fee $7.00

REGISTER OF DEEDS STATE OF NORTH DAKOTA SEAL OLIVER COUNTY



6.23

88510 10/3/2013 2:01 PM PAGE: 1 OF 5
BOOK: II PAGE: 676 FEES: $32.00 MM MEMORANDUM OF EASEI
Kim Wilkens, OLIVER COUNTY RECORDER
By Deputy

MINNESOTA POWER
ATTN: JILL HELMER
30 WEST SUPERIOR STREET
DULUTH, MN 55802

**MEMORANDUM OF EASEMENTS**

This Memorandum of Easements evidences a Wind Project Easement Agreement dated Sept. 30, 2013 by and between **Kirk E. Maize and Linda Maize, husband and wife** ("Owner"), as owner(s) of the real property described on attached **Exhibit A** ("Owner's Property") and Minnesota Power a division of ALLETE, Inc., a Minnesota corporation ("Minnesota Power" or "Developer") (the "Easement Agreement"). Capitalized terms used herein are given the same meaning as in the Easement Agreement.

The Easement Agreement provides, among other things, that for and in consideration of the payments therein provided for, and upon the terms, conditions, covenants, and provisions set forth at length therein, that Owner grants to Minnesota Power the following irrevocable and exclusive easements, covering all or portions of the Owner's Property, in connection with the development, construction, and operation of a wind energy project (individually each an "Easement" and collectively the "Easements"):

1. Turbine Site Easement
2. Access Easement
3. Collection Easement
4. Construction Easement
5. Wind Non-Obstruction Easement
6. Noise Easement
7. Overhang Easement
8. Met Tower Site Easement
9. Met Tower Access Easement

Attached as **Exhibit B** is a preliminary Easement Plan showing the approximate planned location of all Wind Project Improvements and Easements located on the Owner's Property. Within 180 days after completion of construction, Developer will deliver a final as-built Easement Plan to Owner showing the exact locations of all Wind Project Improvements as constructed on Owner's Property and all Easements. Such as-built Easement Plan (Exhibit C) will replace the attached Exhibit B and Developer may record Exhibit C in the public records.

The Easements are granted subject to Owner's retained right to use the affected portions of the Owner's Property for agricultural purposes that do not interfere with the Easements or the other rights granted to Developer in the Easement Agreement.

The Easement Agreement also provides as follows:

> "Owner grants Developer an irrevocable, exclusive easement for the right and privilege to use, maintain and capture the free and unobstructed flow of wind currents over and across the Owner's Property."
>
> And
>
> "Owner shall not engage in any activity on Owner's Property that might interfere with wind speed or wind direction over any portion of the Wind Project; cause a decrease in the output or efficiency of any Turbine or accuracy of any meteorological equipment; or otherwise interfere with Developer's operation of the Wind Project or exercise of any rights or the Easements granted in this Agreement"

Unless earlier terminated as provided therein, the Easement Agreement runs through November 30, 2064.

The Easements and any rights or obligations in the Easement Agreement run with the Owner's Property affected and are binding on, and inure to the benefit of, Owner and Developer and their respective mortgagees, successors and assigns, heirs, personal representatives, tenants, or persons claiming through them

Reference is hereby made to the Easement Agreement as to all remaining terms thereof. This Memorandum of Easements is prepared, signed, and acknowledged solely for recording purposes and does not modify, increase, decrease, or in any other way affect the rights, duties, and obligations of Owner or Minnesota Power under the Easement Agreement.

IN WITNESS WHEREOF, the parties hereto have executed this Memorandum of Easements effective the date set forth above:

OWNER:

**Kirk E. Maize**

**Linda Maize**

MINNESOTA POWER:

By: Bradley W. Oachs

Its: Chief Operating Officer

STATE OF North Dakota )
) SS.
COUNTY OF Mercer )

The foregoing instrument was acknowledged before me this 13th day of September, 2013, by **Kirk E. Maize and Linda Maize, husband and wife.**

Notarial Stamp or Seal

SCOTT MONROE
Notary Public
State of North Dakota
My Commission Expires April 24, 2014

Notary Public

STATE OF MINNESOTA )
) SS.
COUNTY OF ST. LOUIS )

The foregoing instrument was acknowledged before me this 30 day of Sept, 2013, by Bradley W. Oachs the Chief Operating Officer of Minnesota Power, a division of ALLETE, Inc., a Minnesota corporation, on behalf of the company.

Notarial Stamp or Seal

JILL S. HELMER
NOTARY PUBLIC - MINNESOTA
My Commission Expires Jan. 31, 2018

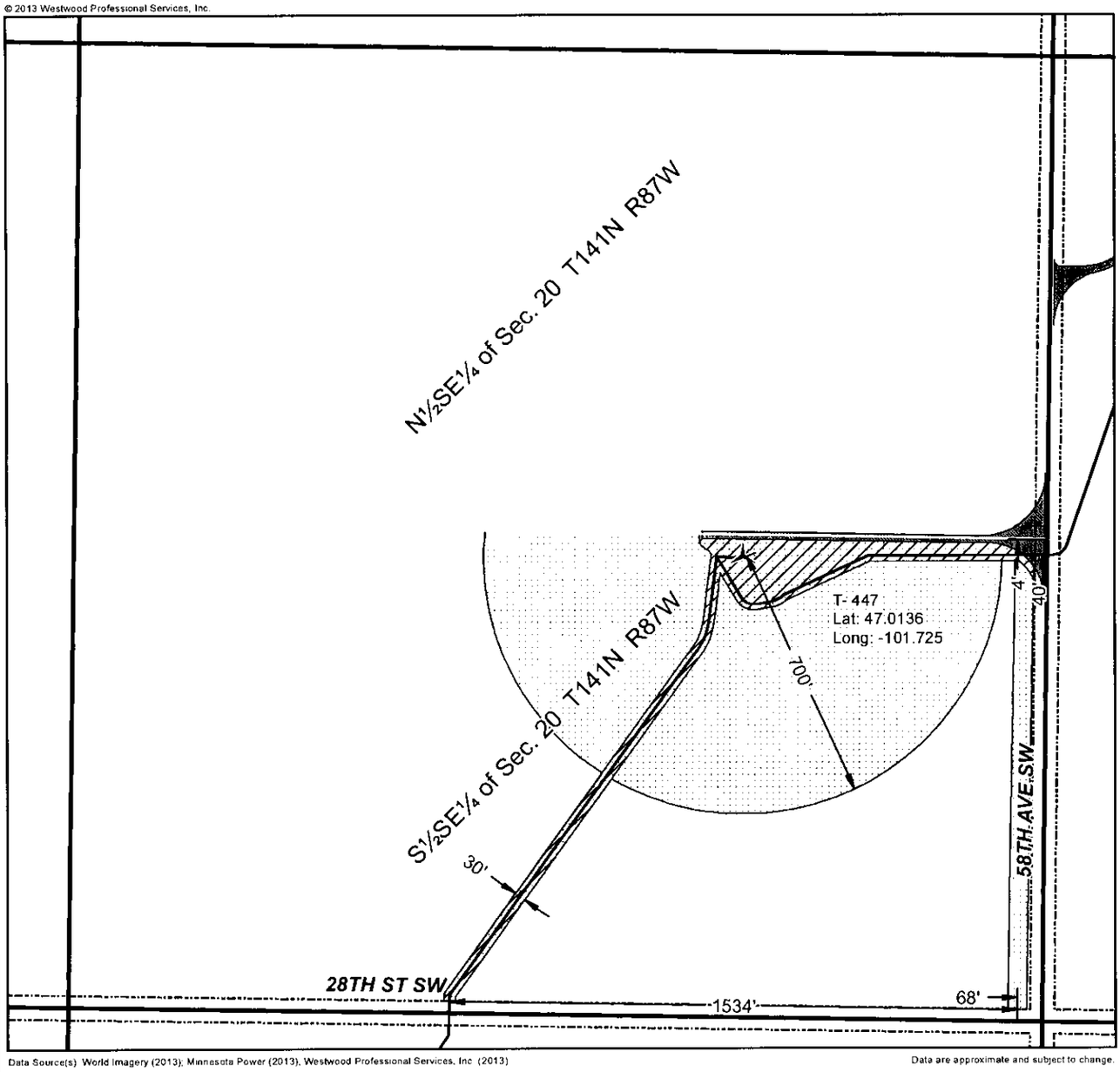
Notary Public

**THIS INSTRUMENT DRAFTED BY:**
Minnesota Power
30 W. Superior St.
Duluth, MN 55802

**EXHIBIT A**

**S½SE¼ of Section 20 T141N R87W**
**Oliver County, North Dakota, 5th Principal Meridian**

© 2013 Westwood Professional Services, Inc.




Data Source(s): World Imagery (2013); Minnesota Power (2013); Westwood Professional Services, Inc (2013)

Data are approximate and subject to change.

**Legend**

- Turbine
- Underground Collection Line
- Turbine Access Road
- Wind Project Improvement Easement
- Construction Easement
- Parcel & Lot Boundary
- ROW Limit
- 1/4 Section Line

| S½SE¼ of Sec. 20 T141N R87W | |
|---|---|
| Wind Project Improvement Easement | 3.12 Acres |

N

0 400 Feet

B4 - 43.2
Rev. A

Westwood

Westwood Professional Services, Inc.
7699 Anagram Drive
Eden Prairie, MN 55344

PHONE 952-937-5150
FAX 952-937-5822
TOLL FREE 1-888-937-5150

www.westwoodps.com

# Bison 4

Oliver County, ND

## Exhibit B - Easement Plan

Map Document: P:\0001265.00\GIS\130820\Bison4_Easement\Plan_SelectedQSecs_BW_130820_Pg43-2.mxd 8/20/2013 10:58:45 AM

89766 5/26/2015 2:34 PM PAGE: 1 OF 1
BOOK: KK PAGE: 355 FEES: $10.00 MM EASEMENT
Kim Wilkens, OLIVER COUNTY RECORDER
By MMMulty-Indr Deputy

SOUTHWEST WATER AUTHORITY
WEST INDUSTRIAL PARK
4665 2ND STREET SW
DICKINSON, ND 58601-7231

RECORDER OLIVER SEAL COUNTY STATE OF NORTH DAKOTA

**SOUTHWEST WATER AUTHORITY**
Southwest Pipeline Project Building
West Industrial Park
4665 2nd Street SW
Dickinson, ND 58601-7231
(701) 225-0241
Toll Free: 1-888-425-0241

Segment **7-9E WEST CENTER SERVICE AREA**
Parcel **141-87-15**

## RIGHT-OF-WAY EASEMENT

**ALL PERSONS TAKE NOTICE:**

In consideration of one dollar ($1.00) and other good and valuable consideration **KIRK MAIZE & Linda Maize 5851 28TH STREET SW BEULAH, ND 58523** hereinafter referred to as Grantor, does hereby grant, bargain, sell, transfer and convey to the Southwest Water Authority, hereinafter referred to as the Grantee, its successor and assigns, a perpetual easement with right to erect, construct, install and lay, and thereafter use, operate, inspect, repair, maintain, replace, and remove water pipelines, connections, valves and all other appurtenant facilities used in connection with the construction, operation and maintenance of the Southwest Pipeline Project, over, above, across and through the land of the Grantor, situated in **Oliver** County, State of North Dakota, said land being described as follows: **S1/2 SE1/4 SECTION 20 TOWNSHIP 141 RANGE 87** (the tract that contains **3.72** acres, more or less), together with the right of ingress and egress over the adjacent lands of the Grantor, successors and assigns for the purposes of this easement.

1. The permanent easement will be thirty (30) feet in width, fifteen (15) feet on each side of the center line of the pipeline as constructed, with an additional ten (10) feet of temporary right-of-way for a total construction easement width of forty (40) feet, twenty (20) feet on each side of the center line.

2. The Grantee covenants to maintain the easement in good repair so that no unreasonable damage will result from its use to the adjacent land of the Grantor, successors and assigns. The Grantor will receive compensation for damages to growing crops caused by the construction or operation. The Grantor will report any damages within three (3) years of the construction of the project.

The grant and other provisions of this easement shall constitute a covenant running with the land for the benefit of the Grantee, its successors and assigns.

**IN WITNESS WHEREOF,** the Grantor has executed this instrument this 7th day of November, 2014.

Kirk Maize GRANTOR Linda Maize GRANTOR

State of NORTH DAKOTA

County of MERCER

On November 7, 2014, personally appeared before me KIRK MAIZE
LINDA MAIZE

X whom I know personally.
_____ whose identity I verified on the basis of _____.
_____ whose identity I verified on the oath or affirmation of _____, a credible witness to be the signor of the above and he/she acknowledged that he/she signed it.

SUSAN NEUBERGER
Notary Public
State of North Dakota
My Commission Expires October 28, 2018

Notary Public Susan Neuberger
SUSAN NEUBERGER
State of North Dakota County of Mercer

My Commission Expires: _____

EXCH: BELH WO#: 2017-281-003

# *West River Telecommunications Right-of-Way Easement*

We the undersigned, (whether one or more) ***Kirk Maize and Linda Maize***, Grantor(s), do hereby grant and convey unto ***West River Telecommunications Cooperative***, a cooperative corporation (hereafter called the "Cooperative"), grantee, whose address is P.O. Box 467, Hazen, North Dakota, and its respective successors, assigns, lessees and agents, an easement to survey, construct, repair, operate, upgrade, maintain, relocate, replace and remove such communication systems as the grantee may from time to time require, consisting of but not limited to cables, wires, poles, splicing boxes, and other appurtenances, upon, over and under the land which the undersigned owns or in which the undersigned has any interest in the County of ***Oliver***, State of ***North Dakota***, and more particularly described as follows:

***SE/4 Sec. 20 T141N R87W***

also the right of ingress and egress over and across the lands of the undersigned for the purpose of exercising the rights herein granted; to place surface markers beyond said strip, to clear and keep clear all trees, roots, brush and other obstructions from the surface and subsurface of said strip of land. The boundary of said strip shall be a line parallel to and 10 feet either side of the first cable laid on the land of the undersigned. The undersigned for Grantor(s), their heirs, executors, administrators, successors, and assigns, hereby covenants that no structure shall be erected on said strip.

The undersigned agrees that all poles, wire and other facilities, including telephone equipment, installed on the above described land, shall remain the property of the Cooperative, removable at the option of the Cooperative. The undersigned agrees to this easement with the understanding the Grantor(s), their heirs, executors, administrators, successors, and assigns, may continue to have access to and use of the easement area in any manner consistent with the rights herein granted to the Cooperative, and that the Cooperative will restore the said strip to as near as reasonable to the pre-constructed condition, and that the Cooperative will erect no buildings on said strip.

The undersigned covenant that they are the owners of the above described lands and that the said lands are free and clear of encumbrances and liens of whatsoever character except those held by the following persons:

The term of this easement shall be for as long as needed by the grantee, and until a release of this easement is recorded, but to not extend beyond the maximum term authorized by law.

**93550** 6/22/2017 11:55 AM PAGE: **1** OF **2**
BOOK: OO PAGE: 200 FEES: $13.00 KW EASEMENT
Kim Wilkens, OLIVER COUNTY RECORDER
By K Wilkens

RECORDER OLIVER SEAL COUNTY STATE OF NORTH DAKOTA

WEST RIVER TELECOMMUNICATIONS
PO BOX 467

HAZEN, ND 58545

EXCH: BELH WO#: 2017-281-003

Access is hereby granted for a state or federal historical survey of the cable route, should one be required, unless checked. Access denied ☐

IN WITNESS WHEREOF, this instrument has been executed by the undersigned this the 2 day of May, 2017.

STATE OF North Dakota )
)
COUNTY OF ~~SK~~ OLIVER )

by: Linda Maize

by: Kirk Maize

On this 2 day of May, the year 2017 before me personally appeared Linda maize, Kirk maize, known to me to be the person(s) who is described in and who executed the within instrument, and acknowledged to me that he/she (or they) executed the same.

STEVEN C. KNUDSON
Notary Public
State of North Dakota
My Commission Expires Aug. 23, 2017

Steven C Knudson
Notary Public, County of Mercer
My Commission Expires: Aug. 23, 2017

IN WITNESS WHEREOF, this instrument has been executed by the undersigned this the ___day of _____, 2017.

STATE OF )
)
COUNTY OF )

by: _____

by: _____

On this _____ day of _____, the year _____ before me personally appeared _____, known to me to be the person(s) who is described in and who executed the within instrument, and acknowledged to me that he/she (or they) executed the same.

_____
Notary Public, County of _____
My Commission Expires:

**NORTH DAKOTA INDUSTRIAL COMMISSION**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case Nos. 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## DECLARATION OF CHRISTY METZ

[¶1] I, Christy Metz, declare the following based on personal knowledge:

[¶2] I have ownership interest in the following property that lies within the boundaries of the TB Leingang Storage Facility.

- Township 141 North, Range 87 West
  Section 4: Auditor's Lot 1, parcel in N1/2 SE1/4
  Oliver County, ND

[¶3] The property listed in ¶ 2 above is encumbered by the following easements:

- Oliver-Mercer Electric Cooperative, Inc. Right-of-Way Easement executed by Anna Skalsky on July 20, 1949 (91532).
- Roughrider Electric Cooperative, Inc. Right-of-Way Easement executed by Paul and Christie Metz on April 25, 2016 (92777).
- Southwest Water Authority Right-of-Way Easement.

[¶4] Attached are the deeds which I believe indicate my ownership in each of the properties listed above.

[¶5] Attached are the easements currently encumbering these properties based on the information I have.

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on the 06 day of 03 , 2024 at Beulahh, ND, United States.

Christy Metz
Christy Metz (Jun 3, 2024 17:44 CDT)

Christy Metz

## WARRANTY DEED

This deed is made by David L. Skalsky and Carol J. Skalsky, husband and wife, whose post office address is 7311 Badger Dr., Bismarck, ND 58503, and Leonard Hueske and Mary Hueske, husband and wife, whose post office address is P.O. Box 311, Richardton, ND 58652, **Grantors,** to Paul R. Metz and Christie E. Metz, husband and wife, as joint tenants, whose post office address is 2451 57th Ave SW, Beulah, ND 58523, **Grantees.**

For valuable consideration, Grantors grant and convey to Grantees the following real property located in Oliver County, North Dakota:

Auditor's Lot 1, a parcel of land in the N½ of the SE¼ of Section 4 Township 141 North Range 87 West of the Fifth Principal Meridian, Oliver County, North Dakota, more particularly described as follows:

Commencing at the East ¼ Corner said Section 4; thence S.00°03'34"E., 774.60', along the East Line of Said Section 4, to the Point of Beginning; thence continuing along the said East line S.00°03'34"E., 58.66'; thence N.63°25'13"W., 803.38'; thence S.01°13'58"E., 416.27'; thence S.74°08'23"W., 204.26'; thence N.61°33'16"W., 577.21'; thence N.60°45'05"W., 404.12'; thence N.01°56'26"W., 407.78'; thence N.89°47'04"E., 1045.86', thence S.01°48'11"E., 412.49'; thence S.63°30'12"E., 805.92', to the Point of Beginning and containing 18.88 acres more or less.

Subject to prior mineral reservations and conveyances, and other limitations of record.

This deed is given in full satisfaction of that Contract for Deed between the parties dated December 10, 2009, recorded in Book 38 of Deeds, pages 485-493.

The legal description was obtained from ☒ a previously recorded instrument ☐ or prepared by Steven G. Podoll of Lange & Donovan, PLLP, PO Box 488, Hazen, ND 58545.

Grantors covenant that they are well seized in fee of the premises, which they have the right to sell and convey, and which are free from encumbrances except those of record, and excepting installments of special assessments or assessments for special improvements which have not been certified to the County Auditor for collection. Further, they covenant that they will warrant and defend the premises in the quiet and peaceable possession of the Grantees.

Dated this 12th day of November, 2013.

GRANTORS:

David L. Skalsky

Carol J. Skalsky

State of North Dakota )
)ss.
County of Morton )

On this 12th day of November, 2013, before me, a notary public, personally appeared David L. Skalsky and Carol J. Skalsky, husband and wife, who acknowledged to me their execution of the foregoing instrument.

MCKENZIE CLOOTEN
Notary Public
State of North Dakota
My Commission Expires March 5, 2015

Notary Public

My Commission Expires: March 5, 2015

**GRANTORS:**

Leonard Hueske

Mary Hueske

State of North Dakota )
)ss.
County of Stark )

On this 12 day of November, 2013, before me, a notary public, personally appeared Leonard Hueske and Mary Hueske, husband and wife, who acknowledged to me their execution of the foregoing instrument.

SUSAN J. HOFF
Notary Public
State of North Dakota
My Commission Expires Mar. 8, 2019

Notary Public

My Commission Expires: 3/8/19

☐ I certify the requirement for a report of statement of full consideration paid does not apply because this deed is for one of the transactions exempted by Subdivision ___ of Subsection 7 of Section 11-18-02.2 NDCC.

☐ I certify that a report of the full consideration paid for the property described in this deed has been filed with the North Dakota State Board of Equalization.

☒ I certify that the full consideration paid for the property described in the deed is $ 107,000.00 .

(Check and complete one paragraph above.)

Signed: _____
(GRANTEE OR AGENT)

Dated: 11-15-13

88676 11/25/2013 3:25 PM PAGE: 1 OF 3
BOOK: 40 PAGE: 87 FEES: $16.00 MM WARRANTY DEED
Kim Wilkens, OLIVER COUNTY RECORDER
By Linda Nelson Deputy

MERCER COUNTY ABSTRACT
PO BOX 1003
614 4TH AVE, NE
HAZEN, ND 58545

RECORDER OLIVER COUNTY SEAL STATE OF NORTH DAKOTA

Auditor's Office
Oliver County, N.D.
transfer entered this 25th day of
November 2013
Judith Hintz
County Auditor
By Linda Nelson Deputy

95093 1/21/2020 8:29 AM PAGE: 1 OF 4
BOOK: RR PAGE: 11 FEES: $20.00 RS ASSIGNMENT
Mickie McNulty-Eide, OLIVER COUNTY RECORDER
By Rebecca Sheldon Deputy

RECORDER OLIVER SEAL COUNTY STATE OF NORTH DAKOTA

VISIONET SYSTEMS
183 INDUSTRY DRIVE

PITTSBURGH, PA 15275

File Number: OS3300-19043751

After Recording, Send To:

TITLE 365
345 Rouser Road, Bldg 5, Ste 300
Coraopolis, PA 15108

**PROPERTY APPRAISAL (TAX/APN) PARCEL IDENTIFICATION NUMBER 01016002 and 01016001**

## QUITCLAIM DEED

**Paul R. Metz** and **Christine E. Metz who erroneously took title as Christie E. Metz**, husband and wife, hereinafter grantors, whose tax-mailing address is **2451 57th Avenue Southwest, Beulah, ND 58523**, for $1.00 (One Dollar and Zero Cents) in consideration paid, grant and quitclaim to **Paul R. Metz** and **Christine E. Metz**, husband and wife as joint tenants, hereinafter grantees, whose tax mailing address is **2451 57th Avenue Southwest, Beulah, ND 58523**, with quitclaim covenants, all right, title, interest and claim to the following land in the following real property:

**The land hereinafter referred to is situated in the City of Beulah, County of Oliver, State of ND, and is described as follows: Auditor's Lot 1, a parcel of land in the N ½ of the SE ¼ of Section 4 Township 141 North, Range 87 West of the Fifth Principal Meridian, Oliver County, North Dakota, more particularly described as follows: Commencing at the East ¼ corner said Section 4; thence S. 00° 03' 34" E, 774.60', along the East Line of said Section 4, to the point of beginning; thence continuing along the said East line S.00° 03' 34" E., 58.66'; thence N. 63° 25' 13" W., 803.38'; thence S. 01° 13' 58" E., 416.27'; thence S. 74° 08' 23" W., 204.26'; thence N. 61° 33' 16" W, 577.21'; thence N. 60° 45' 05" W., 404.12'; thence N. 01° 56' 26" W., 407.78'; thence N. 89° 47' 04" E., 1045.86', thence S. 01° 48' 11" E., 412.49'; thence S. 63° 30' 12" E., 805,92', to the point of beginning and containing 18.88 acres more or less. Being the same**

**property conveyed from David L. Skalsky and Carol J. Skalsky, husband and wife and Leonard Hueske and Mary Hueske, husband and wife to Paul R. Metz and Christie E. Metz, husband and wife as joint tenants by deed dated November 12, 2013 and recorded November 25, 2013 in Instrument Number 88676 in Book 40 Page 87, of Official Records. APN: 01016002 APN: 01016001**
**Property Address is: 2451 57th Avenue Southwest, Beulah, ND 58523**

Prior instrument reference: **88676**

The real property described above is conveyed subject to and with the benefit of: All easements, covenants, conditions and restrictions of record; in so far as in force applicable.

The real property described above is conveyed subject to the following: All easements, covenants, conditions and restrictions of record; All legal highways; Zoning, building and other laws, ordinances and regulations; Real estate taxes and assessments not yet due and payable; Rights of tenants in possession.

TO HAVE AND TO HOLD the same together with all and singular the appurtenances thereunto belonging or in anywise appertaining, and all the estate, right, title interest, lien equity and claim whatsoever of the said grantors, either in law or equity, to the only proper use, benefit and behalf of the grantees forever.

Executed by the undersigned on January 10, 2020:

**Paul R. Metz**

STATE OF North Dakota
COUNTY OF Oliver

The foregoing instrument was acknowledged before me on January 10, 2020 by **Paul R. Metz** who is personally known to me or has produced his Drivers License as identification, and furthermore, the aforementioned person has acknowledged that his/her signature was his/her free and voluntary act for the purposes set forth in this instrument.

Notary Public

BRENDA D ALEMAN
Notary Public
STATE OF NORTH DAKOTA
My Commission Expires
July 03, 2021

Executed by the undersigned on January 10, 2020:

Christine E. Metz
**Christine E. Metz**

STATE OF North Dakota
COUNTY OF Oliver

The foregoing instrument was acknowledged before me on January 10, 2020 by **Christine E. Metz** who is personally known to me or has produced her Drivers License as identification, and furthermore, the aforementioned person has acknowledged that his/her signature was his/her free and voluntary act for the purposes set forth in this instrument.

BRENDA D ALEMAN
Notary Public
STATE OF NORTH DAKOTA
My Commission Expires
July 03, 2021

Notary Public

The grantees hereby certifies that the full consideration paid for the property described above is $1.00.

Signature of Grantee

Paul R. Metz
Paul R. Metz

Signature of Grantee

Christine E. Metz
Christine E. Metz

This instrument prepared by:
Jay A. Rosenberg, Esq., Rosenberg LPA, Attorneys At Law, 3805 Edwards Road, Suite 550, Cincinnati, Ohio 45209 (513) 247-9605 Fax: (866) 611-0170.

01522

FORM LE-189 R

RIGHT OF WAY EASEMENT

KNOW ALL MEN BY THESE PRESENTS, that we the undersigned, (Whether one or more) Anna Skalsky

Widow (unmarried) (~~husband and wife~~), for a good and valuable consideration, the receipt whereof is hereby acknowledged, do hereby grant unto Oliver Mercer Electric Cooperative, Inc., a cooperative corporation, (hereinafter called the "Cooperative"), whose post office address is Hazen, North Dakota, and to its successors or assigns, the right to enter upon the lands of the undersigned, situated in the County of Oliver, State of North Dakota, and more particularly described as follows:

A tract of land approximately ---------- acres in area, located ----------miles in a ---------- direction from the town of ----------, and further described as being in the

SW4 Section 3 Township 141 Range 87

S½NE4 & N½SE4 Section 4 Township 141 Range 87

---------- Section ---------- Township ---------- Range ----------

---------- Section ---------- Township ---------- Range ----------

and to contract, operate and maintain on the above described lands, and/or in or upon all streets, roads or highways abutting said lands, an electric transmission or distribution line or system, and to cut and trim trees and shrubbery that may interfere with or threaten to endanger the operation and maintenance of said line or system.

The undersigned agree that all poles, wires, and other facilities, including any main service entrance equipment , installed on the above described lands at the Cooperative's expense shall remain the property of the Cooperative, removable at the option of the Cooperative, upon the termination of service to or on said lands.

The undersigned covenant that they are the owners of the above described lands and that the said lands are free and clear of encumberances and liens of whatsoever character except those held by the following persons:

IN WITNESS WHEREOF, the undersigned have set their hands and seals this 20 day of July 1949.

---------- (L.S.)

Mrs Anna Skalsky (L.S.)

Signed, sealed and delivered in the presence of:

Harold Henke

91532 10/8/2015 4:13 PM PAGES 1 OF 1 EASEMENT
BOOK: LL PAGE: 466 FEES: $13.00
Kim Wilkens, OLIVER COUNTY RECORDER
By

RECORDER OLIVER COUNTY NORTH DAKOTA SEAL

(1)
STATE OF NORTH DAKOTA
COUNTY OF Oliver SS.

Harold Henke being first duly sworn says that he is one of the witnesses to the above and foregoing easements, that

Anna Skalsky ( a widow) and

whose names is and/or are subscribed to the above and foregoing instruments as a party is and/or are the persons described in said easement and that she signed said instrument in my presence and that I in their presence signed name thereto as a subscribing witness.

Harold Henke

SUBSCRIBED and sworn to before me this 21 day of July 1949.

Frank J Belinskey

Notary Public in and for the
County of Mercer and
State of North Dakota.

FRANK J. BELINSKEY NOTARY PUBLIC STATE OF NORTH DAKOTA

My commission expires March 24, 1953

(1)
STATE OF NORTH DAKOTA
COUNTY OF Oliver SS.

On this 21 day of July 1949 before me Frank J. Belinskey a Notary Public within and for the State of North Dakota, personally appeared

Harold Henke known to me to be one of the persons who subscribed his name to the above and foregoing instrument as a witness, and who acknowledged to me that he subscribed his name thereto as such witness, and who proved to me that the person who and/or whose names are subscribed to the foregoing instrument are the persons described in it.

Frank J Belinskey

Notary Public in and for the
County of Mercer and
State of North Dakota.

FRANK J. BELINSKEY NOTARY PUBLIC STATE OF NORTH DAKOTA

My commission expires March 24, 1953

My commission expires _____.

STATE OF NORTH DAKOTA
COUNTY OF _____ SS.

On this _____ day of _____ 19___, before me _____

_____, a Notary Public in and for said County and State,

personally appeared _____ and _____
known to me to be the persons _____ who _____ described in and who executed within and foregoing instrument and acknowledged to me that he executed the same.

_____

Notary Public in and for the
County of _____ and
State of North Dakota.

My commission expires _____.

ROUGHRIDER ELECTRIC COOPERATIVE
800 HWY DR

HAZEN, ND 58545

# RIGHT OF WAY EASEMENT

THIS AGREEMENT made and entered into this 25th day of April, 2016, between Paul Metz and Christie Metz of 2451 57th Ave SW, Beulah, ND 58523, hereinafter called "Owner" (whether one or more) and ROUGHRIDER ELECTRIC COOPERATIVE, INC., whose post office address is 800 Highway Drive, Hazen, North Dakota 58545-4737, hereinafter called "COOPERATIVE".

WITNESSETH that for valuable consideration, the receipt and sufficiency of which is hereby acknowledged, Owner grants unto Cooperative, its successors and assigns, for a term of 99 years from the date hereof, an easement to construct, reconstruct, operate and maintain an electric distribution system, overhead, underground or both including all poles, guys, anchors wires, surface terminals, and all accessories and appurtenances necessary or desirable in connection therewith, under, over, upon and across lands of Owner and/or in or upon all streets, roads or highways abutting said lands situated in Oliver County, North Dakota, and more particularly described as follows, to-wit:

A parcel of land in the SE1/4 of Section 4, Township 141 North, Range 87 West of the Fifth Principal Meridian, 20 feet in width, 10 feet on each side of a centerline described as follows:

Beginning at the north line of Lot "A" in Section 4, Township 141 North, Range 87 West at a point which bears S3°54'37"W a distance of 755.50 feet from the east quarter corner of Section 4, Township 141N, Range 87W; thence S0°49'11"W a distance of 58.39 feet more or less; to the POINT OF TERMINATION at the south line of Lot "A" in Section 4, Township 141N, Range 87W at a point which bears N0°27'54"W a distance of 1809.76 feet from the southeast corner of Section 4, Township 141N, Range 87W.

In Section 4, Township 141 North, Range 87 West of the Fifth Principal Meridian described as follows:

The facilities erected hereunder shall remain the property of the Cooperative. Cooperative shall have the right to inspect, rebuild, remove, repair, improve and make such changes, alterations, substitutions and additions in and to its facilities as Cooperative may from time to time deem advisable, including the right to increase or decrease the size or capacity of its system, together with necessary accessories and appurtenances; the right to increase or decrease the size of the facilities and equipment situated upon the premises; the right to permit or otherwise agree to the joint use or occupancy of the overhead lines or the trench and related underground facilities by other persons, associations or corporations; and the right to at any time use the property described above to extend lines and facilities to serve the property of persons other than the Owner.

Any damages to the surface of the right-of-way or to crops, fences, gates, drains, ditches, or lines of the Owner, caused by the Cooperative in the installation, repair maintenance, reconstruction or removal of said electrical properties and appurtenances, shall be promptly repaired, replaced or paid for by the Cooperative, provided a claim therefore is presented to the Cooperative at its General Office within ninety (90) days after such damages occur. If the amount of said damages cannot be agreed upon, the Cooperative and the Owner shall each select an arbitrator, and these two shall select a third arbitrator, and the decision and award of the arbitrators shall be final.

Cooperative shall at all times have the right to keep the easement clear of all buildings, structures or other obstructions, trees, shrubbery, undergrowth and roots.

Owner, his successors and assigns, may use the land within the easement for any purpose not inconsistent with the rights granted, provided such use does not interfere with or endanger the Cooperative's facilities or the rights granted under this easement.

For the purpose of constructing, inspecting, maintaining or operating its facilities, Cooperative shall have the right of ingress to and egress from the easement over the lands of Owner adjacent to the easement and lying between public or private roads and the easement, such right to be exercised in such manner as shall occasion the least practicable damage and inconvenience to Owner.

92777 8/2/2016 3:20 PM PAGE: 1 OF 2
BOOK: MM PAGE: 714 FEES: $13.00 KW EASEMENT
Kim Wilkens, OLIVER COUNTY RECORDER
By MM Multy - Ed Deputy

STATE OF NORTH DAKOTA ★ OLIVER COUNTY ★ RECORDER SEAL

**Owner covenants that he is seized of and has the right to convey the said easement, rights and privileges; that Cooperative shall have quiet and peaceable possession, use and enjoyment of the aforesaid easement, rights and privileges, and that Owner shall execute such further assurances thereof as may be requested by the Cooperative.**

Paul Metz

Christie Metz

**STATE OF NORTH DAKOTA)**
**)ss**
**COUNTY OF Olivec )**

**On this** 25th **day of** April, **20** 16, **before me, a Notary Public in and for said County and State personally appeared** Paul + Christie Metz, **known to me to be the person(s) described in and who executed the within and foregoing instrument and acknowledged to me that he/she/they executed the same.**

***Notary Seal Location***

JOHN JANGULA
Notary Public
State of North Dakota
My Commission Expires May 15, 2021

**Notary Public State of North Dakota**

**My Commission Expires:** May 15, 2021

MOUNTAIN PLAINS LLC
JOSH MUEHLER, FIELD MANAGER
PO BOX 487
BISMARCK, ND 58502

# NOTICE OF RURAL WATER LINES
# AND EASEMENTS FOR RURAL WATER LINES

Take notice that the Southwest Water Authority, with offices at 4665 2nd Street SW, West Industrial Park, Dickinson, North Dakota 58601, a political subdivision created by the North Dakota Legislature in 1991 to provide water to southwestern North Dakota, has executed water service agreements requiring water users to grant easements on lands which they own, and has obtained easements for water pipelines, and has installed water delivery facilities on certain lands in Oliver County.

Maps, easements, and water service agreements for these facilities are located at the Southwest Water Authority office and are available for inspection during normal office hours.

Said easements or facilities are located on the following described lands and are shown on the maps attached hereto.

89527 2/12/2015 11:42 AM PAGE: 1 OF 13
BOOK: KK PAGE: 145 FEES: $165.00 MM NOTICE OF RURAL WA
Kim Wilkens, OLIVER COUNTY RECORDER
By MMNulty Eule Deputy

Dated this 29th day of January, 2015.

Larry Bares

Larry Bares
Chairman of the Board
Southwest Water Authority

RECORDER OLIVER COUNTY SEAL STATE OF NORTH DAKOTA

Subscribed and sworn to me this 29th day of January, 2015.

Roger A. Kolling
Notary Public
Burleigh County, North Dakota

ROGER A. KOLLING
Notary Public
State of North Dakota
My Commission Expires Sept. 2, 2016

My Commission Expires:

ND STATE WATER COMMISSION
ROGER KOLLING
900 E BOULEVARD AVE, DEPT 770
BISMARCK, ND 58505-0850

# Easements Obtained in Oliver County

### Township 141 North - Range 87 West 5th P.M.

| | |
|---|---|
| Section 1 | S½ NW¼ and NW¼ NW¼, N½ SW¼ and SE¼ SW¼, S½ SE¼ |
| Section 2 | NE¼ NE¼ |
| Section 3 | S½ SW¼ and NW¼ SW¼, SW¼ SE¼ |
| Section 4 | E½ NE¼, NE¼ SE¼ |
| Section 10 | N½ NE¼ |
| Section 12 | NE¼ NE¼ |

### Township 142 North - Range 84 West 5th P.M.

| | |
|---|---|
| Section 2 | NW¼ NW¼, SW¼ SW¼ |
| Section 3 | E½ NE¼, E½ SE¼ |
| Section 4 | W½ NW¼, W½ SW¼ |
| Section 5 | E½ SE¼ |
| Section 7 | SW¼ SW¼ |
| Section 8 | N½ NE¼ |
| Section 9 | W½ NW¼, W½ SW¼ |
| Section 10 | E½ NE¼, S½ SW¼, E½ SE¼ and SW¼ SE¼ |
| Section 11 | N½ NW¼, N½ NE¼, S½ SW¼, SW¼ SE¼ |
| Section 12 | NW¼ NW¼ |
| Section 14 | NE¼ NW¼ |
| Section 15 | E½ NE¼ and SW¼ NE¼, NE¼ SE¼ |
| Section 16 | W½ NW¼, W½ SW¼ |
| Section 17 | NE¼ NE¼ |
| Section 18 | S½ SE¼ |
| Section 19 | N½ NE¼ and SE¼ NE¼, E½ SE¼ |
| Section 20 | NW¼ NW¼ |
| Section 21 | NW¼ NW¼ |
| Section 29 | NW¼ NW¼ |
| Section 30 | NE¼ NE¼ |

### Township 142 North - Range 85 West 5th P.M.

| | |
|---|---|
| Section 2 | S½ NW¼, SW¼ NE¼, S½ SW¼, SW¼ SE¼ |
| Section 3 | E½ NE¼, E½ SE¼ |
| Section 4 | SE¼ NE¼, E½ SE¼ |
| Section 8 | SE¼ NE¼, E½ SE¼ |
| Section 9 | NE¼ NE¼ |
| Section 10 | N½ NW¼, N½ NE¼ and SE¼ NE¼, E½ SE¼ |
| Section 12 | SE¼ NW¼, NE¼ SW¼, W½ SE¼ and SE¼ SE¼ |
| Section 13 | E½ NE¼, E½ SE¼ and SW¼ SE¼ |
| Section 14 | N½ NW¼, N½ NE¼, NW¼ SW¼ |
| Section 15 | E½ NE¼, E½ SE¼ |
| Section 16 | SW¼ NW¼, NW¼ SW¼ |
| Section 17 | E½ NE¼, E½ SE¼ |
| Section 18 | SE¼ NW¼, E½ SW¼ |
| Section 19 | NE¼ NW¼ |
| Section 20 | NE¼ NE¼ |
| Section 21 | W½ NW¼, W½ SW¼ |
| Section 22 | NE¼ NE¼ |
| Section 23 | NW¼ NW¼, S½ SW¼, SW¼ SE¼ |
| Section 24 | NW¼ NW¼, N½ NE¼ |

### Township 142 North - Range 85 West 5th P.M. (continued)

| | |
|---|---|
| Section 26 | NE¼ NW¼, N½ NE¼, SW¼ SW¼ |
| Section 27 | S½ SW¼, S½ SE¼ |
| Section 28 | N½ NW¼ and SW¼ NW¼, N½ NE¼, SE¼ SE¼ |
| Section 34 | NE¼ SE¼ |
| Section 35 | NW¼ SW¼ |

### Township 142 North - Range 86 West 5th P.M.

| | |
|---|---|
| Section 1 | SW¼ SW¼ |
| Section 2 | E½ NE¼, E½ SE¼ |
| Section 3 | SE¼ SW¼ |
| Section 10 | N½ NW¼, N½ NE¼ |
| Section 11 | N½ NW¼, N½ NE¼ and SE¼ NE¼, E½ SE¼ |
| Section 12 | NW¼ NW¼ |
| Section 13 | SW¼ NW¼, W½ SW¼ |
| Section 14 | E½ NE¼, SE¼ SE¼ |
| Section 16 | SW¼ SW¼ |
| Section 20 | SE¼ SE¼ |
| Section 21 | NW¼ NW¼, S½ SW¼, S½ SE¼ and NE¼ SE¼ |
| Section 22 | W½ NW¼ and NE¼ NW¼, W½ SW¼ |
| Section 23 | NE¼ NE¼ |
| Section 24 | W½ NW¼, NE¼ NE¼, S½ SW¼ and NW¼ SW¼, S½ SE¼ |
| Section 25 | E½ NE¼ |
| Section 27 | W½ NW¼ |
| Section 29 | E½ NE¼ and SW¼ NE¼ |

### Township 142 North - Range 87 West 5th P.M.

| | |
|---|---|
| Section 5 | NW¼ NW¼ |
| Section 6 | NE¼ NE¼ |
| Section 22 | NE¼ SE¼ |
| Section 23 | W½ NW¼, W½ SW¼ |
| Section 26 | W½ NW¼, W½ SW¼ and SE¼ SW¼ |
| Section 27 | S½ SW¼, S½ SE¼ and NW¼ SE¼ |
| Section 28 | S½ SE¼ |
| Section 33 | E½ NE¼, E½ SE¼ |
| Section 34 | NW¼ SW¼ |
| Section 35 | E½ NW¼, N½ NE¼ |
| Section 36 | W½ NW¼, W½ SW¼ |

### Township 143 North - Range 83 West 5th P.M.

| | |
|---|---|
| Section 18 | S½ SW¼ and NW¼ SW¼ |
| Section 19 | NE¼ NW¼ |

**Township 143 North - Range 84 West 5th P.M.**

Section 14 W½ NW¼, W½ SW¼
Section 18 S½ SW¼, SW¼ SE¼
Section 22 W½ SW¼, SE¼ SE¼
Section 23 N½ NW¼ and SW¼ NW¼, N½ NE¼, W½ SW¼
Section 24 N½ NW¼, N½ NE¼
Section 26 NW¼ NW¼
Section 27 N½ NW¼, N½ NE¼ and SE¼ NE¼, E½ SE¼
Section 28 SW¼ SW¼
Section 29 SE¼ SE¼
Section 32 E½ SW¼, E½ SE¼ and SW¼ SE¼
Section 33 W½ NW¼, W½ SW¼
Section 34 E½ NE¼ and SW¼ NE¼, E½ SE¼
Section 35 SW¼ SW¼

**Township 143 North - Range 85 West 5th P.M.**

Section 1 S½ SW¼ and NW¼ SW¼, SW¼ SE¼
Section 2 W½ NW¼, SE¼ NE¼, W½ SW¼, E½ SE¼
Section 3 SE¼ NE¼
Section 4 SW¼ NW¼, N½ SW¼ and SW¼ SW¼, N½ SE¼
Section 5 S½ NE¼
Section 8 SE¼ SE¼
Section 9 W½ NW¼, W½ SW¼ and SE¼ SW¼, S½ SE¼
Section 11 N½ NW¼ and SW¼ NW¼, N½ NE¼, W½ SW¼
Section 13 S½ SW¼ and NW¼ SW¼, S½ SE¼
Section 14 N½ NW¼, N½ NE¼ and SE¼ NE¼, E½ SE¼
Section 15 N½ NW¼ and SW¼ NW¼, N½ NE¼ and SE¼ NE¼, E½ SE¼
Section 16 NE¼ NE¼
Section 22 E½ NE¼, E½ SE¼
Section 27 SW¼ NW¼, E½ NE¼, S½ SW¼ and NW¼ SW¼, S½ SE¼ and NE¼ SE¼
Section 28 N½ NE¼ and SE¼ NE¼, SE¼ SW¼, SE¼ SE¼
Section 30 SE¼ SE¼
Section 31 NE¼ NE¼
Section 32 N½ NW¼, N½ NE¼
Section 33 N½ NW¼, N½ NE¼
Section 34 NW¼ NW¼, E½ NE¼, SE¼ SW¼, S½ SE¼ and NE¼ SE¼,
Section 35 NW¼ NW¼, SW¼ SW¼

**Township 143 North - Range 86 West 5th P.M.**

Section 26 SE¼ SE¼
Section 35 E½ NE¼, E½ SE¼

**Township 143 North - Range 87 West 5th P.M.**

Section 27 SW¼ SW¼
Section 28 S½ SW¼, S½ SE¼
Section 29 NW¼ NW¼, S½ SW¼, S½ SE¼
Section 30 E½ NE¼, S½ SW¼ and NW¼ SW¼, S½ SE¼ and NE¼ SE¼
Section 31 E½ NE¼, NE¼ SE¼
Section 32 W½ SW¼
Section 33 NE¼ NW¼, NE¼ NE¼
Section 34 W½ NW¼

Proud Sponsor of Children's Miracle Network Hospitals Foundation
Sears Hearing Aid Centers
What will your miracle sound like?
Miracle Ear Center at Sears
1-29 & 13th Ave. S. West Acres RSC Fargo, ND 58103 (701) 277-1478 1-800-279-1569
2800 S. Columbia Rd Columbia Mall Grand Forks, ND 58201 (701) 772-5313 1-888-721-6041
2400 10th St. SW Dakota Square Minot, ND 58701 (701) 852-1897 1-800-272-7628
2700 State St. Gateway Mall Bismarck, ND 58501 (701) 222-2484 1-888-313-0832
Miracle Ear - Dickinson
669 12th St. West • Dickinson, ND 58601 • (701) 483-3588 • 1-866-396-8388

# MAP OF T 141 N R 87 W

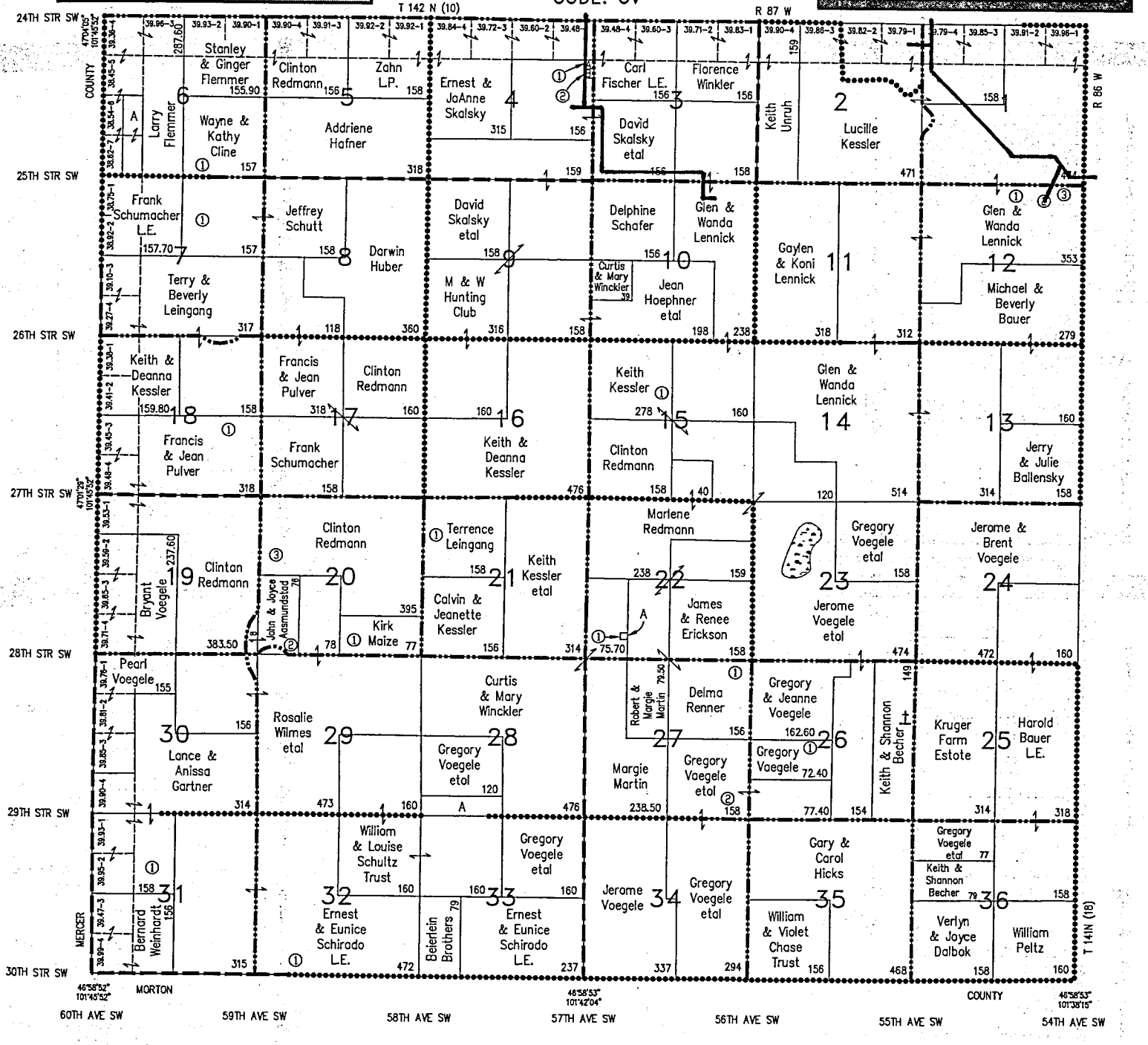
TOWNSHIP: 141 N
OLIVER COUNTY

MIDLAND ATLAS COMPANY LLC COPYRIGHT 2007

RANGE: 87 W
NORTH DAKOTA

INTERSTATE ENGINEERING
P.O. Box 742
117 Highway 49 North
Beulah, ND 58523-0742
P: 701-873-2266
F: 701-873-2627
C: 701-426-7139
Email: steved@iengi.com
www.iengi.com
Steve Dorval, P.E.
Professionals you need, people you trust
Offices in: North Dakota • Montana • Minnesota • South Dakota

CODE: CV




SEE LETTERED SMALL TRACTS DIRECTORY FOLLOWING TOWNSHIP MAPS

Copyrighted by and reprinted with the permission of Midland Atlas Company, Williston, North Dakota.

Sponsored by Children's Miracle Network Hospitals
Children's Miracle Network Hospitals
Sears Hearing Aid Centers
What will your miracle sound like?
Miracle Ear Center at Sears
I-29 & 13th Ave. S. West Acres RSC Fargo, ND 58103 (701) 277-1478 1-800-279-1569
2800 S. Columbia Rd Columbia Mall Grand Forks, ND 58201 (701) 772-5313 1-888-721-6041
2400 10th St. SW Dakota Square Minot, ND 58701 (701) 852-1597 1-800-272-7628
2700 State St. Gateway Mall Bismarck, ND 58501 (701) 222-2484 1-888-313-6832
Miracle Ear - Dickinson
669 12th St. West • Dickinson, ND 58601 • (701) 483-3588 • 1-866-396-8388

# MAP OF T 142 N R 84 W

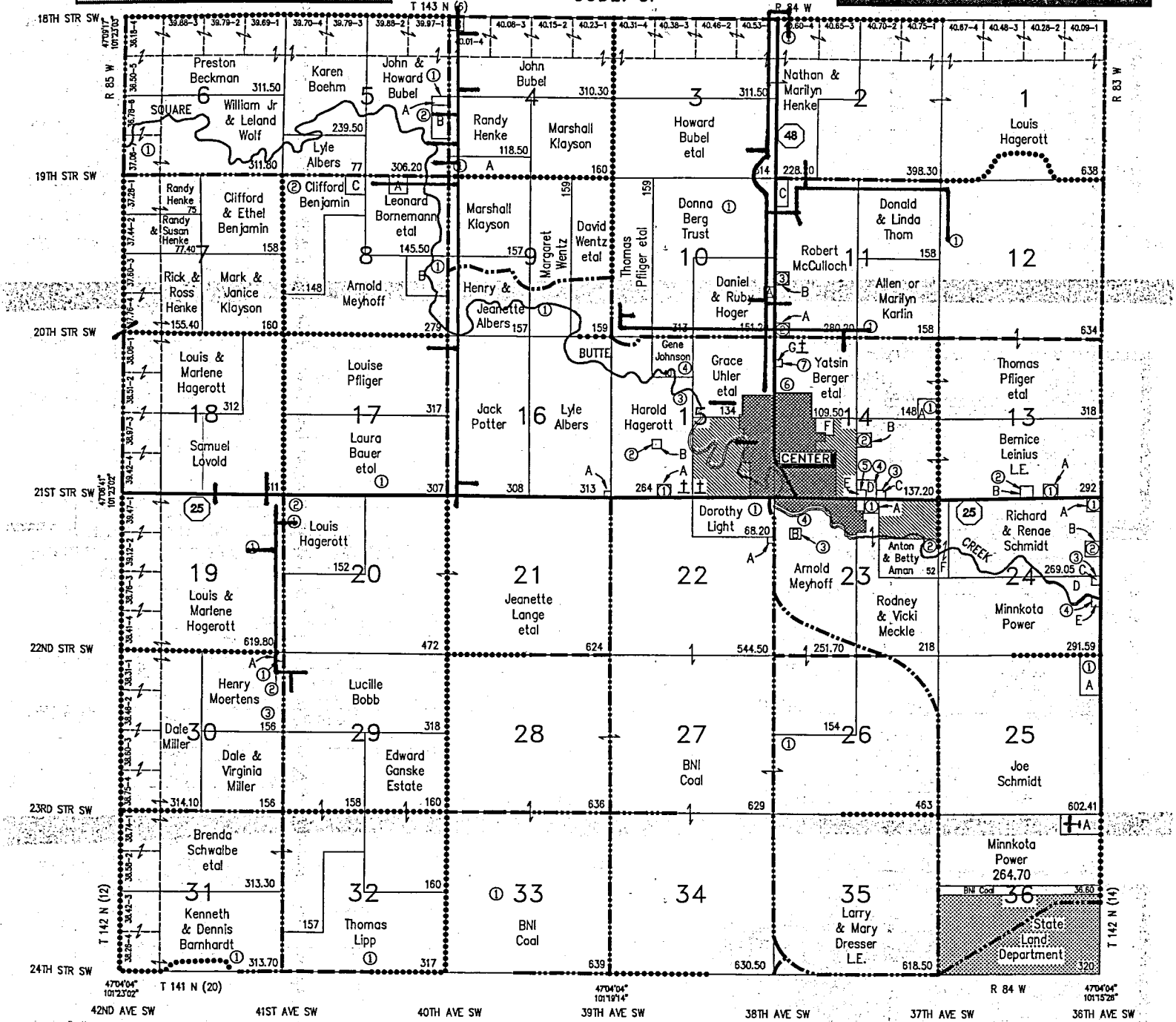
TOWNSHIP: 142 N
OLIVER COUNTY

MIDLAND ATLAS COMPANY LLC COPYRIGHT 2007

RANGE: 84 W
NORTH DAKOTA

INTERSTATE ENGINEERING
P.O. Box 742
117 Highway 49 North
Beulah, ND 58523-0742
P: 701-873-2266
F: 701-873-2627
C: 701-426-7139
Steve Dorval, P.E.
Email: steved@ienginc.com
www.ienginc.com
Professionals you need, people you trust
Offices in: North Dakota • Montana • Minnesota • South Dakota

CODE: CP




Copyrighted by and reprinted with the permission of Midland Atlas Company, Williston, North Dakota.

Proud Sponsor of Children's Miracle Network Hearing Aid Center
Sears Hearing Aid Centers
What will your miracle sound like?
Miracle Ear Center at Sears
I-29 & 13th Ave. S. West Acres RSC Fargo, ND 58103 (701) 277-1478 1-800-279-1569
2800 S. Columbia Rd Columbia Mall Grand Forks, ND 58201 (701) 772-5313 1-888-721-6941
2400 10th St. SW Dakota Square Minot, ND 58701 (701) 852-1897 1-800-272-7628
2700 State St. Gateway Mall Bismarck, ND 58501 (701) 222-2484 1-888-313-0832
Miracle Ear - Dickinson
669 12th St. West • Dickinson, ND 58601 • (701) 483-3588 • 1-866-396-8388

# MAP OF T 142 N R 85 W

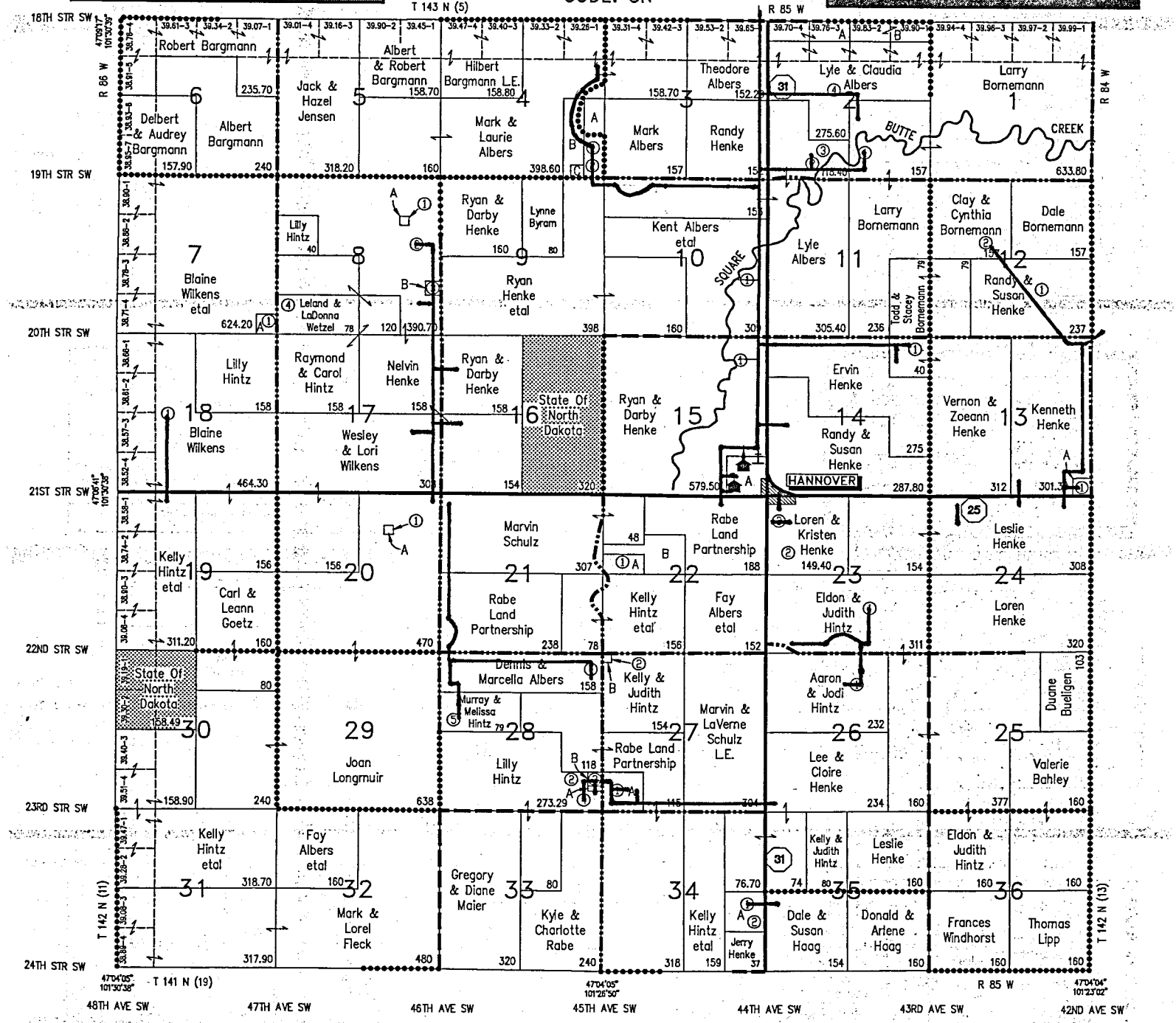
TOWNSHIP: 142 N
OLIVER COUNTY

MIDLAND ATLAS COMPANY LLC COPYRIGHT 2007

RANGE: 85 W
NORTH DAKOTA

CODE: CN

INTERSTATE ENGINEERING
P.O. Box 742
117 Highway 49 North
Beulah, ND 58523-0742
P: 701-873-2266
F: 701-873-2627
C: 701-426-7139
Steve Dorval, P.E.
Email: steved@interstateengineering.com
www.interstateengineering.com
Professionals you need, people you trust
Offices in: North Dakota • Montana • Minnesota • South Dakota




SEE LETTERED SMALL TRACTS DIRECTORY FOLLOWING TOWNSHIP MAPS

Copyrighted by and reprinted with the permission of Midland Atlas Company, Williston, North Dakota.

Proud Sponsor of Miracle Ear Children's Foundation
Miracle Ear Sears Hearing Aid Centers
What will your miracle sound like?
Miracle Ear Center at Sears
I-29 & 13th Ave. S. West Acres RSC Fargo, ND 58103 (701) 277-1478 1-800-279-1569
2800 S. Columbia Rd Columbia Mall Grand Forks, ND 58201 (701) 772-5313 1-888-721-6041
2400 10th St. SW Dakota Square Minot, ND 58701 (701) 852-1897 1-800-272-7628
2700 State St. Gateway Mall Bismarck, ND 58501 (701) 222-2484 1-888-313-0832
Miracle Ear - Dickinson
669 12th St. West • Dickinson, ND 58601 • (701) 483-3588 • 1-866-396-8388

# MAP OF T 142 N R 86 W

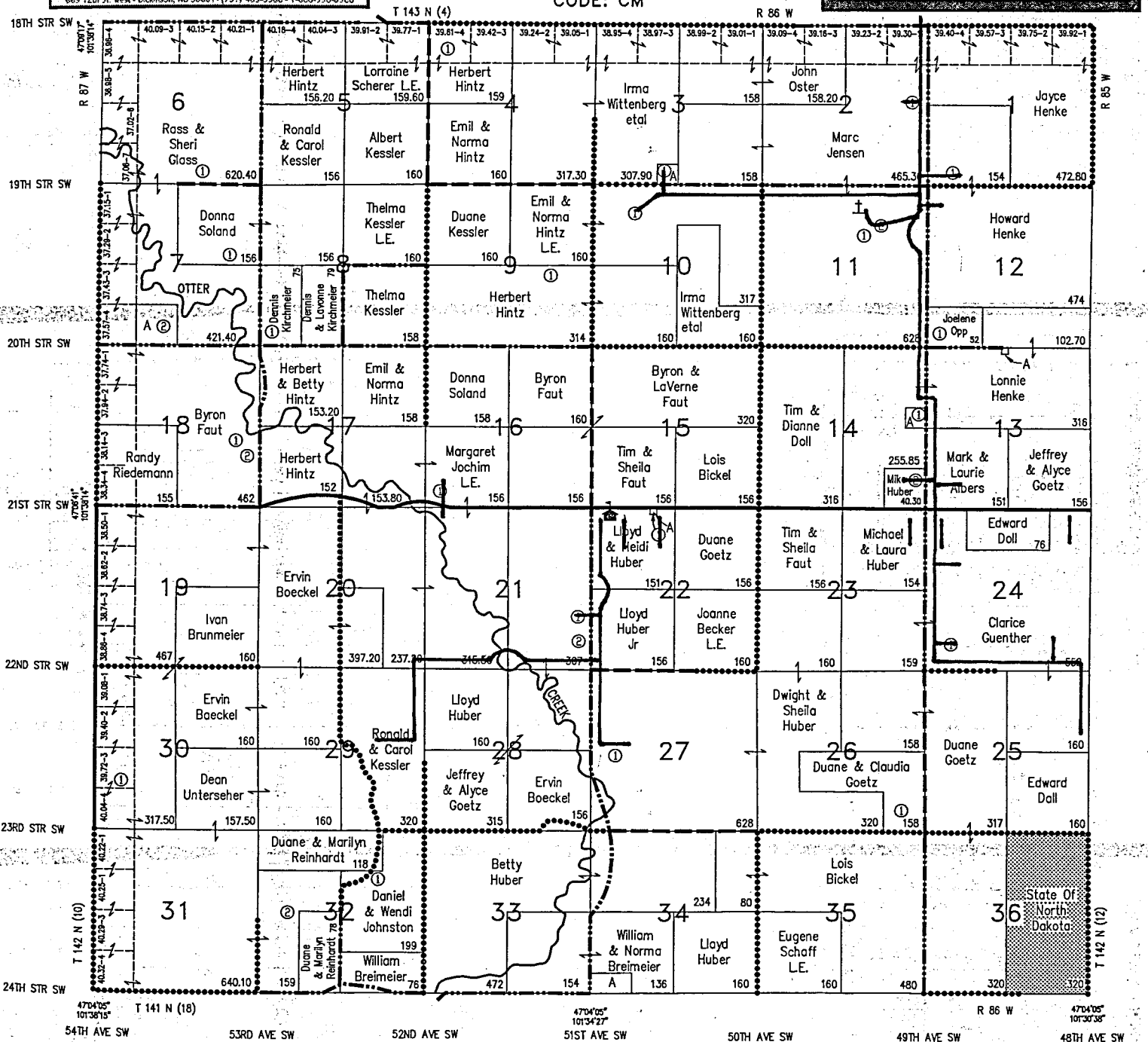
TOWNSHIP: 142 N
OLIVER COUNTY

MIDLAND ATLAS COMPANY LLC COPYRIGHT 2007

RANGE: 86 W
NORTH DAKOTA

INTERSTATE ENGINEERING
P.O. Box 742
117 Highway 49 North
Beulah, ND 58523-0742
P: 701-873-2266
F: 701-873-2627
C: 701-426-7139
Email: steved@iengi.com
www.iengi.com
Steve Dorval, P.E.
Professionals you need, people you trust
Offices in: North Dakota • Montana • Minnesota • South Dakota

CODE: CM




SEE LETTERED SMALL TRACTS DIRECTORY FOLLOWING TOWNSHIP MAPS

Copyrighted by and reprinted with the permission of Midland Atlas Company, Williston, North Dakota.

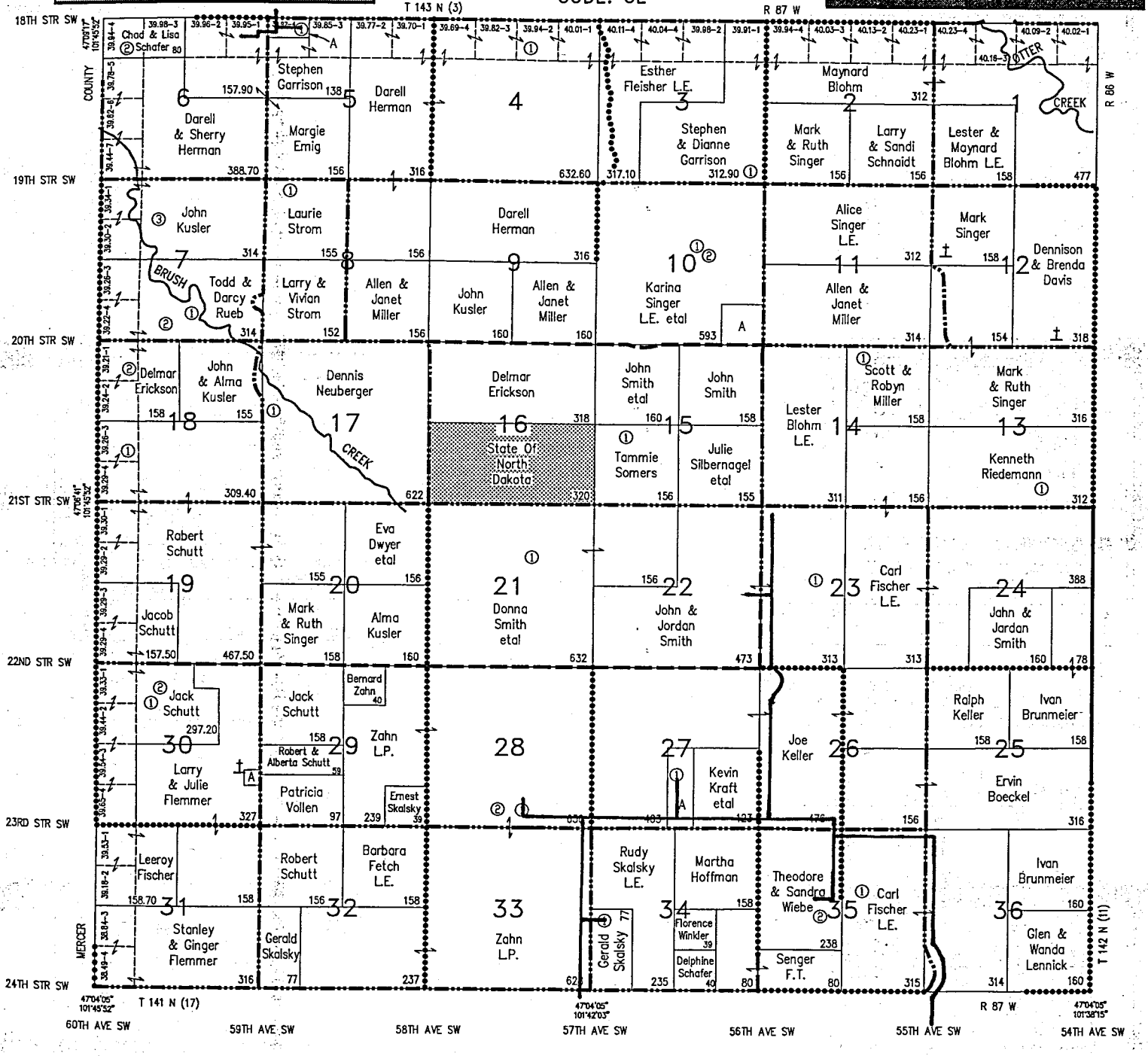
Proud Sponsors of Children's Miracle Network Children's Foundation
Sears Hearing Aid Centers
What will your miracle sound like?
Miracle Ear Center at Sears
I-29 & 13th Ave. S, West Acres RSC, Fargo, ND 58103, (701) 277-1478, 1-800-279-1569
2800 S. Columbia Rd, Columbia Mall, Grand Forks, ND 58201, (701) 772-5313, 1-888-721-6041
2400 10th St. SW, Dakota Square, Minot, ND 58701, (701) 852-1837, 1-800-272-7628
2700 State St, Gateway Mall, Bismarck, ND 58501, (701) 222-2484, 1-888-313-0832
Miracle Ear - Dickinson
669 12th St. West • Dickinson, ND 58601 • (701) 483-3588 • 1-866-396-8388

# MAP OF T 142 N R 87 W

TOWNSHIP: 142 N
OLIVER COUNTY
MIDLAND ATLAS COMPANY LLC COPYRIGHT 2007
RANGE: 87 W
NORTH DAKOTA

CODE: CL

INTERSTATE ENGINEERING
P.O. Box 742
117 Highway 49 North
Beulah, ND 58523-0742
P: 701-873-2266
F: 701-873-2627
C: 701-426-7139
Email: steved@ienginc.com
www.ienginc.com
Steve Dorval, P.E.
Professionals you need, people you trust
Offices in: North Dakota • Montana • Minnesota • South Dakota




SEE LETTERED SMALL TRACTS DIRECTORY FOLLOWING TOWNSHIP MAPS

Copyrighted by and reprinted with the permission of Midland Atlas Company, Williston, North Dakota.

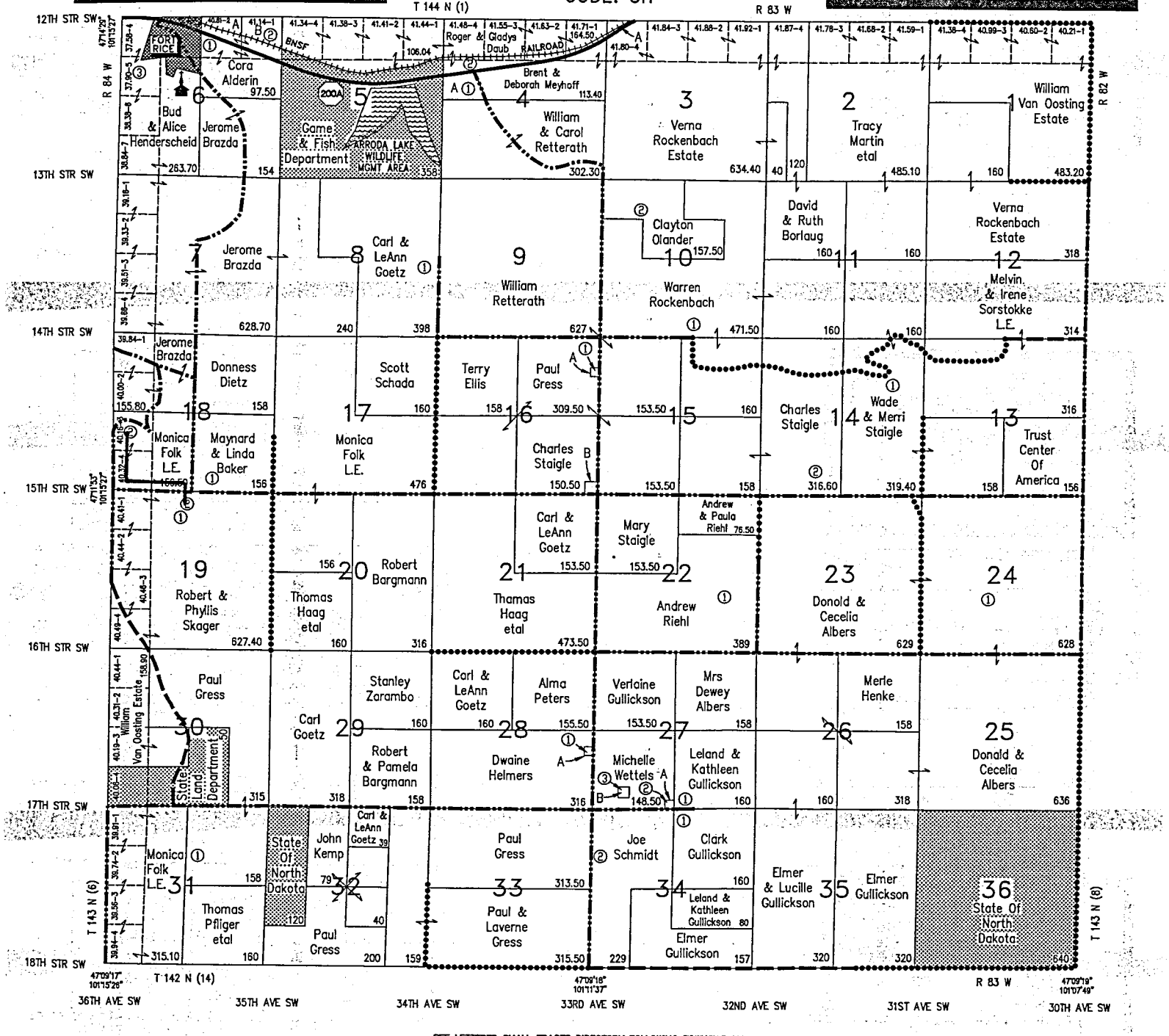
Proud Sponsor of
Ch-Lute-OS FOUNDATION
Sears Hearing Aid Centers
What will your miracle sound like?
Miracle Ear Center at Sears
1-29 & 13th Ave. S. West Acres RSC Fargo, ND 58103 (701) 277-1475 1-800-279-1569
2800 S. Columbia Rd Columbia Mall Grand Forks, ND 58201 (701) 772-5313 1-888-721-6041
2409 10th St. SW Dakota Square Minot, ND 58701 (701) 852-1897 1-800-272-7628
2700 State St. Gateway Mall Bismarck, ND 58501 (701) 222-2484 1-888-313-0832
Miracle Ear - Dickinson
669 12th St. West • Dickinson, ND 58601 • (701) 483-3588 • 1-866-396-8388

# MAP OF T 143 N R 83 W

TOWNSHIP: 143 N
OLIVER COUNTY
MIDLAND ATLAS COMPANY LLC COPYRIGHT 2007
RANGE: 83 W
NORTH DAKOTA

CODE: CH

INTERSTATE ENGINEERING
P.O. Box 742
117 Highway 49 North
Beulah, ND 58523-0742
P: 701-873-2266
F: 701-873-2627
C: 701-426-7139
Steve Dorval, P.E.
Email: steved@ienginc.com
www.ienginc.com
Professionals you need, people you trust
Offices in: North Dakota • Montana • Minnesota • South Dakota




Copyrighted by and reprinted with the permission of Midland Atlas Company, Williston, North Dakota.

Proud Sponsor of Children's Miracle Network Hospitals
Miracle Ear
Sears Hearing Aid Centers
What will your miracle sound like?
Miracle Ear Center at Sears
I-29 & 13th Ave. S. West Acres RSC Fargo, ND 58103 (701) 277-1478 1-800-279-1563
2800 S. Columbia Rd Columbia Mall Grand Forks, ND 58201 (701) 772-5313 1-888-721-6041
2400 10th St. SW Dakota Square Minot, ND 58701 (701) 852-1897 1-800-272-7628
2700 State St. Gateway Mall Bismarck, ND 58501 (701) 222-2484 1-888-313-6832
Miracle Ear - Dickinson
669 12th St. West • Dickinson, ND 58601 • (701) 483-3588 • 1-866-396-8368

# MAP OF T 143 N R 84 W

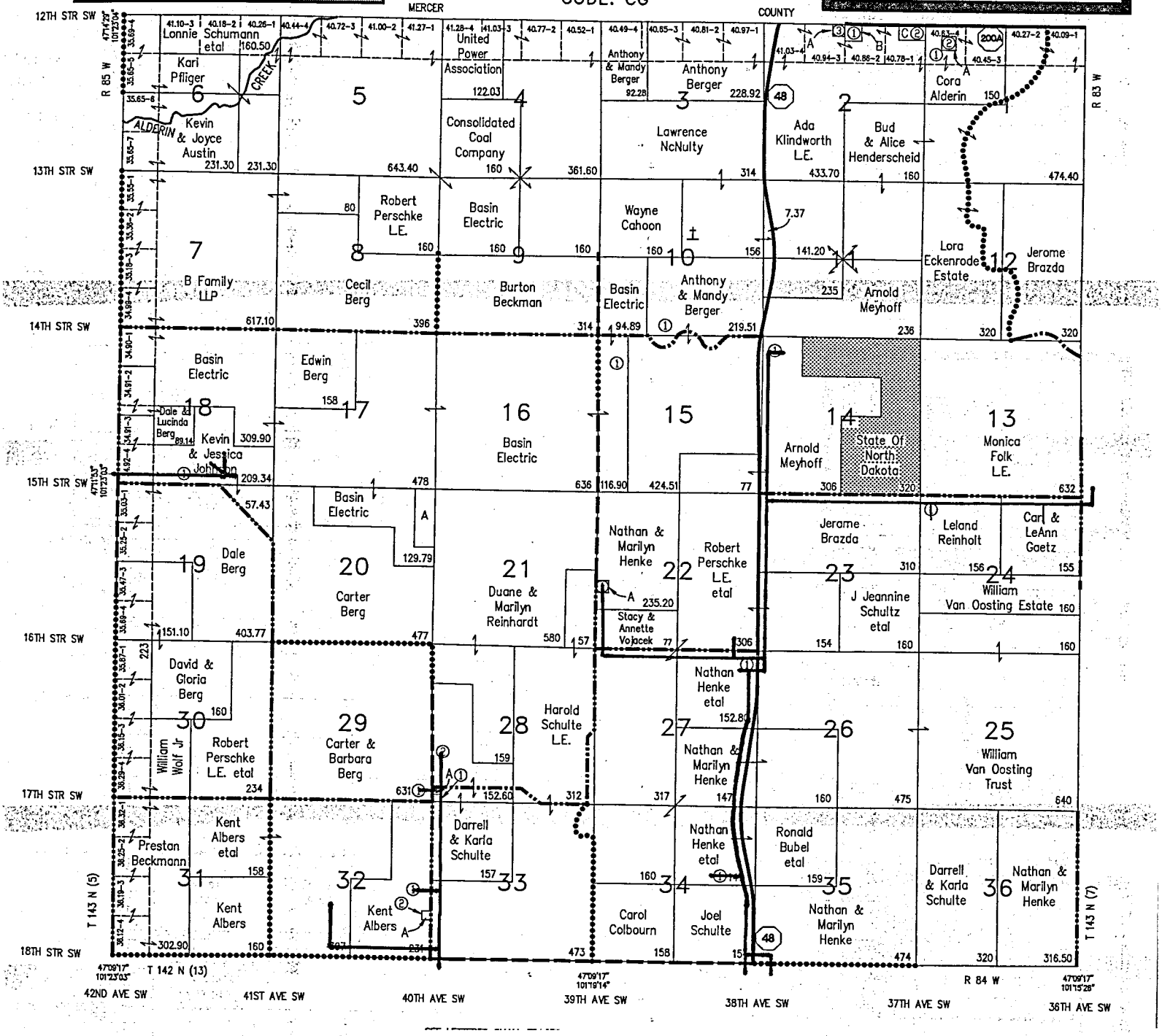
TOWNSHIP: 143 N
OLIVER COUNTY

MIDLAND ATLAS COMPANY LLC COPYRIGHT 2007

RANGE: 84 W
NORTH DAKOTA

CODE: CG

INTERSTATE ENGINEERING
P.O. Box 742
117 Highway 49 North
Beulah, ND 58523-0742
P: 701-873-2266
F: 701-873-2627
C: 701-426-7139
Steve Dorval, P.E.
Email: steved@ienginc.com
www.ienginc.com
Professionals you need, people you trust
Offices in: North Dakota • Montana • Minnesota • South Dakota




Copyrighted by and reprinted with the permission of Midland Atlas Company, Williston, North Dakota.

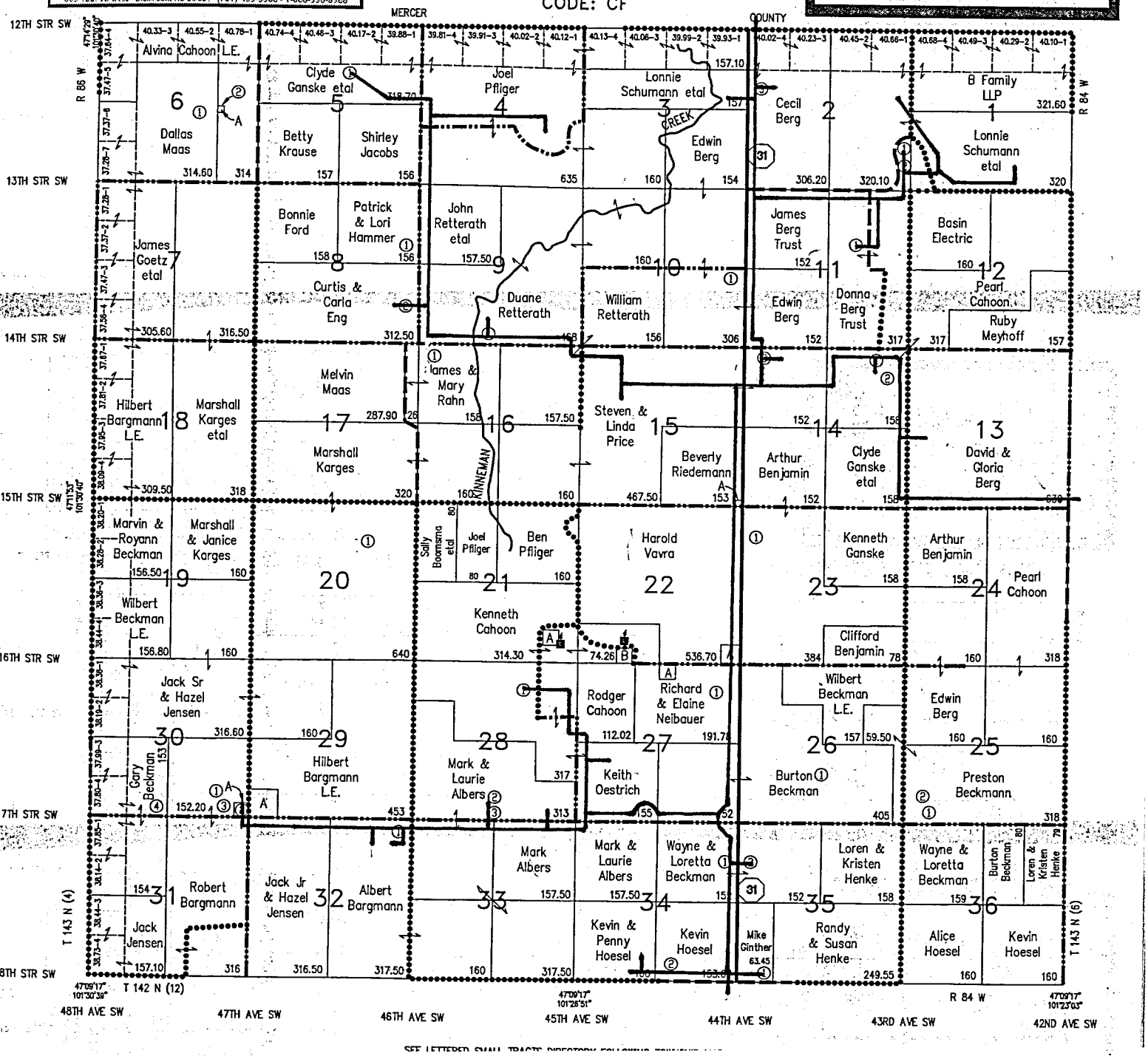
Proud Sponsor of Children's Miracle Network Hospitals
Children's Miracle Network Hospitals
Sears Hearing Aid Centers
What will your miracle sound like?
Miracle Ear Center at Sears
1-29 & 13th Ave. S. West Acres RSC Fargo, ND 58103 (701) 277-1478 1-800-279-1569
2800 S. Columbia Rd Columbia Mall Grand Forks, ND 58201 (701) 772-5313 1-888-721-6041
2400 10th St. SW Dakota Square Minot, ND 58701 (701) 852-1897
2700 State St. Gateway Mall Bismarck, ND 58501 (701) 222-2484 1-888-313-0832
Miracle Ear - Dickinson
669 12th St. West • Dickinson, ND 58601 • (701) 483-3588 • 1-866-396-8388

# MAP OF T 143 N R 85 W

TOWNSHIP: 143 N
OLIVER COUNTY
MIDLAND ATLAS COMPANY LLC COPYRIGHT 2007
RANGE: 85 W
NORTH DAKOTA

CODE: CF

INTERSTATE ENGINEERING
P.O. Box 742
117 Highway 49 North
Beulah, ND 58523-0742
P: 701-873-2266
F: 701-873-2627
C: 701-426-7139
Steve Dorval, P.E.
Email: steved@interstateeng.com
www.interstateeng.com
Professionals you need, people you trust
Offices in: North Dakota • Montana • Minnesota • South Dakota




SEE LETTERED SMALL TRACTS DIRECTORY FOLLOWING TOWNSHIP

Copyrighted by and reprinted with the permission of Midland Atlas Company, Williston, North Dakota.

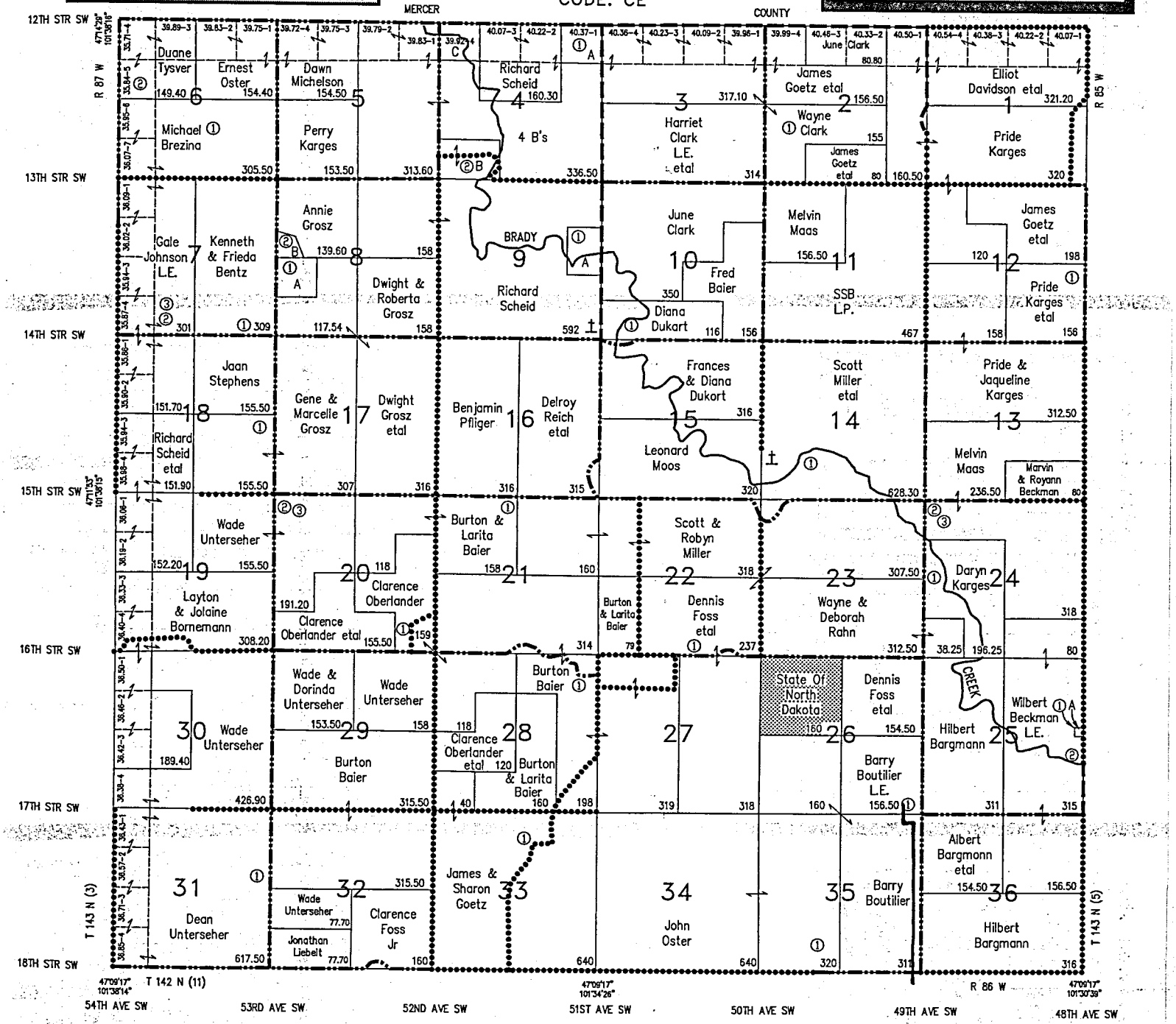
Proud Sponsor of Children's Miracle Network Hospitals FOUNDATION
Sears Hearing Aid Centers
What will your miracle sound like?
Miracle Ear Center at Sears
I-29 & 13th Ave. S. West Acres RSC Fargo, ND 58103 (701) 277-1478 1-800-279-1569
2800 S. Columbia Rd Columbia Mall Grand Forks, ND 58201 (701) 772-5313 1-888-721-6941
2400 10th St. SW Dakota Square Minot, ND 58701 (701) 852-1897 1-800-272-7628
2700 State St. Gateway Mall Bismarck, ND 58501 (701) 222-2484 1-888-313-0832
Miracle Ear - Dickinson
669 12th St. West • Dickinson, ND 58601 • (701) 483-3588 • 1-866-396-8388

# MAP OF T 143 N R 86 W

TOWNSHIP: 143 N
OLIVER COUNTY
MIDLAND ATLAS COMPANY LLC COPYRIGHT 2007
RANGE: 86 W
NORTH DAKOTA

INTERSTATE ENGINEERING
P.O. Box 742
117 Highway 49 North
Beulah, ND 58523-0742
P: 701-873-2266
F: 701-873-2627
C 701-426-7139
Steve Dorval, P.E.
Email: steved@ienginc.com
www.ienginc.com
Professionals you need, people you trust
Offices in: North Dakota • Montana • Minnesota • South Dakota

CODE: CE




SEE LETTERED SMALL TRACTS DIRECTORY FOLLOWING TOWNSHIP MAPS

Copyrighted by and reprinted with the permission of Midland Atlas Company, Williston, North Dakota.

Proud Sponsor of Children's Miracle Network Hospitals
Miracle-Ear
Sears Hearing Aid Centers
What will your miracle sound like?
Miracle Ear Center at Sears
1-29 & 13th Ave. S. West Acres RSC Fargo, ND 58103 (701) 277-1478 1-800-279-1569
2800 S. Columbia Rd Columbia Mall Grand Forks, ND 58201 (701) 772-5313 1-888-721-6041
2400 10th St. SW Dakota Square Minot, ND 58701 (701) 852-1597 1-800-272-7628
2700 State St. Gateway Mall Bismarck, ND 58501 (701) 222-2484 1-888-313-6832
Miracle Ear - Dickinson
669 12th St. West • Dickinson, ND 58601 • (701) 483-3588 • 1-866-396-8388

# MAP OF T 143 N R 87 W

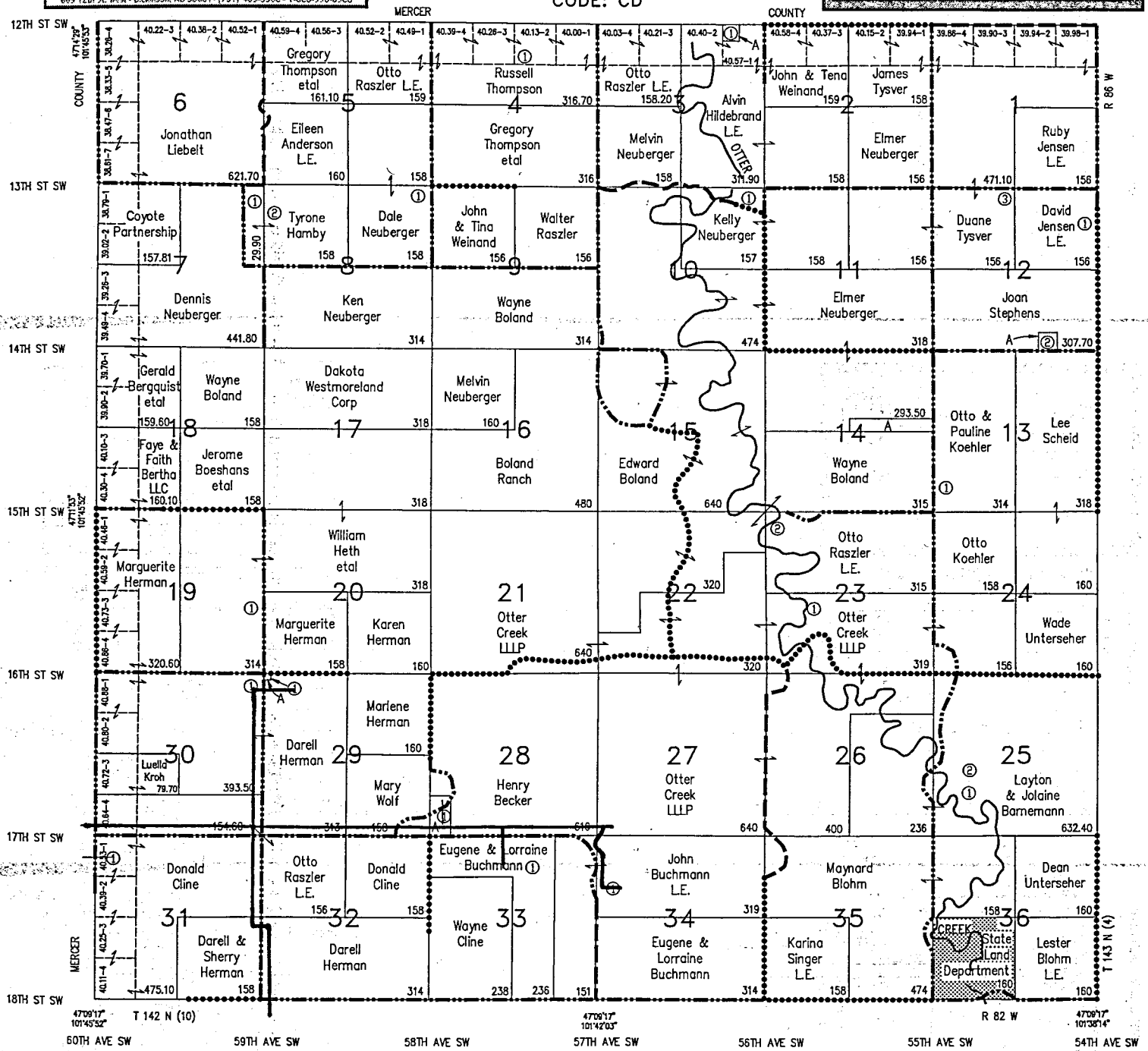
TOWNSHIP: 143 N
OLIVER COUNTY

MIDLAND ATLAS COMPANY LLC COPYRIGHT 2007

RANGE: 87 W
NORTH DAKOTA

CODE: CD

INTERSTATE ENGINEERING
P.O. Box 742
117 Highway 49 North
Beulah, ND 58523-0742
P: 701-873-2266
F: 701-873-2627
C: 701-426-7139
Steve Dorval, P.E.
Email: steved@ienginc.com
www.ienginc.com
Professionals you need, people you trust
Offices in: North Dakota • Montana • Minnesota • South Dakota




SEE LETTERED SMALL TRACTS DIRECTORY FOLLOWING TOWNSHIP MAPS

Copyrighted by and reprinted with the permission of Midland Atlas Company, Williston, North Dakota.

**NORTH DAKOTA INDUSTRIAL COMMISSION**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case Nos. 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## DECLARATION OF JOLENE RUST

[¶1] I, Jolene Rust, declare the following based on personal knowledge:

[¶2] I have ownership interest in the following property that lies within the boundaries of the proposed BK Fischer Storage Facility.

- Township 142 North, Range 88 West
  Section 13: SW1/4
  Mercer County, ND

[¶3] To the best of my knowledge, the property listed in ¶ 2 above is encumbered by the following easements:

- Oliver Mercer Electric Cooperative Right-of-Way Easement executed by John Jochim on June 25, 1980.
- West River Telecommunications Right-of-Way Easement executed by Jolene M. Rust on June 1, 2009.
- Roughrider Electric Cooperative, Inc. Right of Way Easement executed by Jolene Rust on June 1, 2009.
- ND State Water Commission Pipeline Easement executed by Jolene Rust on July 1, 2010.
- Southwest Water Authority Right-of-Way Easement executed by Jolene Rust on March 28, 2014.
- Badlands Cellular of North Dakota d/b/a Verizon Wireless Land Lease Agreement executed by Jolene Rust on November 14, 2008.

[¶4] Attached is the deed which I believe indicates my ownership in the property listed above.

[¶5] Attached are the easements currently encumbering that property based on the information I have.

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on the 23 day of May, 2024 at Turtle Lake, ND, United States.

Jolene Rust

# WARRANTY DEED

THIS INDENTURE, made this 30 day of April, 2001, between **John Jochim a/k/a John B. Jochim and Violet Jochim**, husband and wife, grantor, whether one or more, and **Jolene M. Rust,** grantee, whose post office address is 115 W. Railroad Ave., Mercer, ND 58559.

WITNESSETH, for and in consideration of the sum of Ten Dollars and other valuable consideration, grantor does hereby GRANT to the grantee, all of the following real property lying and being in the County of MERCER and State of North Dakota, and described as follows, to-wit:

TOWNSHIP 142 NORTH, RANGE 88 WEST
Section 13: SW/4

Subject to prior mineral reservations and conveyances and reserving to grantor, John B. Jochim, a life estate in the premises conveyed.

And the said grantor for himself, his heirs, executors and administrators, does covenant with the grantee that he is well seized in fee of the land and premises aforesaid and has good right to sell and convey the same in manner and form aforesaid; that the same are free from all encumbrances, except installments of special assessments or assessments for special improvements which have not been certified to the County Auditor for collection; and the above granted lands and premises in the quiet and peaceable possession of said grantees, against all persons lawfully claiming or to claim the whole or any part thereof, the said grantor will warrant and defend.

WITNESS, the hand of the grantor:

John B. Jochim
John Jochim

Violet J. Jochim
Violet Jochim

I certify that the requirement for a report or statement of full consideration paid does not apply because this deed is for one of the transactions exempted by Subdivision "c" of Section 6 of Section 11-18-02.2 NDCC.

Signed: Greg Lange (grantee/agent) Dated: 5-1-01

STATE OF NORTH DAKOTA )
) ss
COUNTY OF MERCER )

The foregoing instrument was acknowledged before me this 30 day of April, 2001, by John Jochim and Violet Jochim, husband and wife.

Deborah S. Prock
Notary Public
State of North Dakota

My Commission Expires:

DEBORAH S. PROCK
Notary Public, Mercer County, ND
My Commission Expires Mar. 11, 2003
STATE OF NORTH DAKOTA
NOTARY PUBLIC SEAL

*The description was prepared by: Gregory L. Lange, of Richardson, Lange & Donovan, PLLP, P.O. Box 488, Hazen, ND 58545, Ph, 701-748-2206 or obtained from a previously recorded instrument.*

DOCUMENT NO. 170568

MORTGAGEE
MORTGAGOR
INDEXED ✓

STATE OF NORTH DAKOTA
COUNTY OF MERCER

OFFICE OF
REGISTER OF DEEDS

I hereby certify that within instrument was filed in this office for record this 2nd day of May 20 01 at 9:33 o'clock A M and was duly recorded in Book 127 Misc on Page 5

Jeanette Sailer
Register of Deeds

By Kathryn Schumacher
Deputy

SEAL
MERCER COUNTY, N. DAK.

DELINQUENT TAXES, SPECIAL ASSESSMENTS, OR INSTALLMENTS OF SPECIAL ASSESSMENTS PAID AND TRANSFER ENTERED THIS 2nd DAY OF May, 2001

Michelle R Sailer
COUNTY AUDITOR OF MERCER COUNTY, N. DAK.

BY Sandra F Bohrer DEPUTY

$10.00 Chg. Richardson Law Office
P.O. Box 488
Hazen, ND 58545

# RIGHT-OF-WAY EASEMENT

KNOW ALL MEN BY THESE PRESENTS, that we the undersigned, (whether one or more)
JOHN Jochim

(unmarried) (husband and wife) for a good and valuable consideration, the receipt whereof is hereby acknowledged, do hereby grant unto the Oliver-Mercer Electric Cooperative, Inc., a cooperative corporation (hereinafter called the "Cooperative") whose post office address is Hazen, North Dakota 58545, and to its successors or assigns, the right to enter upon the lands of the undersigned, situated in the County of Mercer, State of North Dakota, and more particularly described as follows:

S½ of NW¼ of 24

Right-of-way_____feet Township 142 Range 88 Section W½ of SW¼ of 13
Right-of-way_____feet Township ____ Range ____ Section W½ of W½ of 24
N½ of SW¼ of 24

and to construct, operate, maintain and move or relocate on the above-described lands and/or in or upon all streets, roads or highways abutting said lands, an electric transmission line or system, and to cut and trim trees and shrubbery that may interfere with or threaten to endanger the operation and maintenance of said line or system. The easement shall include only that part of the above described land located within 15 feet on each side of the proposed line.

The undersigned agree that all poles, wires and other facilities, installed on the above described lands at the Cooperative's expense shall remain the property of the Cooperative, removable at the option of the Cooperative.

The Cooperative agrees to pay a reasonable sum for any damage caused to crops or fences by the construction, operation, maintenance, or repair of said line or system. The overall operating height of vehicles and equipment known to cultivate or traverse lands within the easement, is less than fourteen (14) feet, unless otherwise noted below.

IN WITNESS WHEREOF, the undersigned have set their hands and seals this 25 day of June, 1980.

Signed, sealed and delivered in the presence of:

John Jochim

STATE OF NORTH DAKOTA )
) ss
COUNTY OF Mercer )

On this 25 day of June, 1980, before me, a Notary Public in and for said County and State, personally appeared JOHN JOCHIM known to me to be the person who described in and who executed the foregoing instrument and acknowledged to me that he executed the same.

My Commission expires: MAY 5, 1986

Notary Public in and for the County of Mercer State of North Dakota

STATE OF NORTH DAKOTA )
) ss
COUNTY OF _____ )

_____ Being first duly sworn says that he is one of the Witnesses to the above and foregoing easements, that _____ name(s) is and/or are subscribed to the above and foregoing instruments as a party is and/or are the persons described in said easement and that he signed said instrument in my presence and that I in their presence signed my name thereto as a subscribing witness.

Subscribed and sworn to before me this ____ day of _____, 19___

My Commission Expires:

_____

Notary Public in and for the County of _____ and the State of North Dakota

209443

**STATE OF NORTH DAKOTA**
**COUNTY OF MERCER**

**OFFICE OF**
**COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 12/9/2015 at 12:16 PM, and was duly recorded a Book 208 MISC on Page 31 Fee: $23.00

MORTGAGEE
MORTGAGOR
INDEXED ✓

County Recorder Brenda L. Cook

By Deputy

Return To: ROUGHRIDER ELECTRIC COOPERATIVE, INC., 800 H
HAZEN, ND 58545

COUNTY RECORDER SEAL MERCER COUNTY, N DAK.

EXCH: BELH WO#: 29-2680-001

## *West River Telecommunications Right-of-Way Easement*

We the undersigned, (whether one or more) **Jolene M. Rust,** Grantor(s), do hereby grant and convey unto ***West River Telecommunications Cooperative***, a cooperative corporation (hereafter called the "Cooperative"), grantee, whose address is P.O. Box 467, Hazen, North Dakota, and its respective successors, assigns, lessees and agents, an easement to survey, construct, repair, operate, upgrade, maintain, relocate, replace and remove such communication systems as the grantee may from time to time require, consisting of but not limited to cables, wires, poles, splicing boxes, and other appurtenances, upon, over and under the land which the undersigned owns or in which the undersigned has any interest in the County of ***Mercer***, State of ***North Dakota***, and more particularly described as follows:

***SW/4 Sec. 13 T142N R88W***

also the right of ingress and egress over and across the lands of the undersigned for the purpose of exercising the rights herein granted; to place surface markers beyond said strip, to clear and keep clear all trees, roots, brush and other obstructions from the surface and subsurface of said strip of land. The boundary of said strip shall be a line parallel to and 10 feet either side of the first cable laid on the land of the undersigned. The undersigned for Grantor(s), their heirs, executors, administrators, successors, and assigns, hereby covenants that no structure shall be erected on said strip.

The undersigned agrees that all poles, wire and other facilities, including telephone equipment, installed on the above described land, shall remain the property of the Cooperative, removable at the option of the Cooperative. The undersigned agrees to this easement with the understanding the Grantor(s), their heirs, executors, administrators, successors, and assigns, may continue to have access to and use of the easement area in any manner consistent with the rights herein granted to the Cooperative, and that the Cooperative will restore the said strip to as near as reasonable to the pre-constructed condition, and that the Cooperative will erect no buildings on said strip.

The undersigned covenant that they are the owners of the above described lands and that the said lands are free and clear of encumbrances and liens of whatsoever character except those held by the following persons:

The term of this easement shall be for as long as needed by the grantee, and until a release of this easement is recorded, but to not extend beyond the maximum term authorized by law.

EXCH: BELH WO#: 29-2680-001

Access is hereby granted for a state or federal historical survey of the cable route, should one be required, unless checked. Access denied ☐

IN WITNESS WHEREOF, this instrument has been executed by the undersigned this the 1 day of June, 2009.

STATE OF North Dakota )
)
COUNTY OF McLean )

by: Jolene Rust

by: _____

On this 1 day of June, the year 2009 before me personally appeared Jolene Rust, known to me to be the person(s) who is described in and who executed the within instrument, and acknowledged to me that he/she (or they) executed the same.

Steven Knudson

STEVEN C. KNUDSON
Notary Public
State of North Dakota
My Commission Expires Aug. 23, 2011

Notary Public, County of Mercer
My Commission Expires: Aug. 23, 2011

IN WITNESS WHEREOF, this instrument has been executed by the undersigned this the ___day of _____, 2009.

STATE OF )
)
COUNTY OF )

by: _____

by: _____

On this _____ day of _____, the year _____ before me personally appeared _____, known to me to be the person(s) who is described in and who executed the within instrument, and acknowledged to me that he/she (or they) executed the same.

_____

Notary Public, County of _____
My Commission Expires:

rev 01/09 Tracking No 29-2680-001

MORTGAGEE
MORTGAGOR
INDEXED ✓

191998
STATE OF NORTH DAKOTA
COUNTY OF MERCER
OFFICE OF
COUNTY RECORDER
I hereby certify that the within instrument was filed in this office for record this 6/3/2009 at 9:36 AM, and was duly recorded as Book 180 MISC on Page 191 Fee: $13.00

County Recorder Brenda L. Cook

By Deputy
Return To: WRT, PO BOX 467
Chg HAZEN, ND 58545

COUNTY RECORDER SEAL MERCER COUNTY, N. DAK.

## RIGHT OF WAY EASEMENT

THIS AGREEMENT made and entered into this 1st day of June, 2009, between **JOLENE RUST**, hereinafter called "Owner" (whether one or more) and **ROUGHRIDER ELECTRIC COOPERATIVE, INC.**, whose post office address is 800 Highway Drive, Hazen, North Dakota 58545-4737, hereinafter called "COOPERATIVE".

WITNESSETH that for valuable consideration, the receipt and sufficiency of which is hereby acknowledged, Owner grants unto Cooperative, its successors and assigns, for a term of 99 years from the date hereof, an easement to construct, reconstruct, operate and maintain an electric distribution system, overhead, underground or both including all poles, guys, anchors wires, surface terminals, and all accessories and appurtenances necessary or desirable in connection therewith, under, over, upon and across lands of Owner and/or in or upon all streets, roads or highways abutting said lands situated in Mercer County, North Dakota, and more particularly described as follows, to-wit:

A strip of land 20 feet in width, the same being 10 feet on each side of a centerline described as follows.

TOWNSHIP 142 NORTH, RANGE 88 WEST
Section 13: SW/4

The facilities erected hereunder shall remain the property of the Cooperative. Cooperative shall have the right to inspect, rebuild, remove, repair, improve and make such changes, alterations, substitutions and additions in and to its facilities as Cooperative may from time to time deem advisable, including the right to increase or decrease the size or capacity of its system, together with necessary accessories and appurtenances; the right to increase or decrease the size of the facilities and equipment situated upon the premises; the right to permit or otherwise agree to the joint use or occupancy of the overhead lines or the trench and related underground facilities by other persons, associations or corporations; and the right to at any time use the property described above to extend lines and facilities to serve the property of persons other than the Owner.

Any damages to the surface of the right-of-way or to crops, fences, gates, drains, ditches, or lines of the Owner, caused by the Cooperative in the installation, repair maintenance, reconstruction or removal of said electrical properties and appurtenances, shall be promptly repaired, replaced or paid for by the Cooperative, provided a claim therefore is presented to the Cooperative at its General Office within ninety (90) days after such damages occur If the amount of said damages cannot be agreed upon, the Cooperative and the Owner shall each select an arbitrator, and these two shall select a third arbitrator, and the decision and award of the arbitrators shall be final.

Cooperative shall at all times have the right to keep the easement clear of all buildings, structures or other obstructions, trees, shrubbery, undergrowth and roots.

Owner, his successors and assigns, may use the land within the easement for any purpose not inconsistent with the rights granted, provided such use does not interfere with or endanger the Cooperative's facilities or the rights granted under this easement.

For the purpose of constructing, inspecting, maintaining or operating its facilities, Cooperative shall have the right of ingress to and egress from the easement over the lands of Owner adjacent to the easement and lying between public or private roads and the easement, such right to be exercised in such manner as shall occasion the least practicable damage and inconvenience to Owner.

Owner covenants that he is seized of and has the right to convey the said easement, rights and privileges; that Cooperative shall have quiet and peaceable possession, use and enjoyment of the aforesaid easement, rights and privileges, and that Owner shall execute such further assurances thereof as may be requested by the Cooperative.

Jolene Rust

STATE OF NORTH DAKOTA )
)ss
COUNTY OF Mclean )

On this 1st day of June, 2009, before me, a Notary Public in and for said County and State personally appeared Jolene Rust, known to me to be the person(s) described in and who executed the within and foregoing instrument and acknowledged to me that he/she/they executed the same.

*Notary Seal Location*

ALLEN WAGNER
Notary Public
State of North Dakota
My Commission Expires Aug. 23, 2010

Allen Wagner
Notary Public State of North Dakota

My Commission Expires: Aug 23, 2010

**192522**

**STATE OF NORTH DAKOTA**
**COUNTY OF MERCER**

**OFFICE OF**
**COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 8/21/2009 at 9:35 AM, and was duly recorded as Book 180 MISC on Page 642 Fee: $10.00

County Recorder Brenda L Cook

By Deputy

Return To: ROUGHRIDER ELECTRIC COOPERATIVE, INC , 800 HI
HAZEN, ND 58545

COUNTY RECORDER SEAL MERCER COUNTY, N. DAK.

MORTGAGEE
MORTGAGOR
INDEXED

**PIPELINE EASEMENT**

North Dakota State Water Commission
County of Mercer
Parcel H-MER-129

**ALL PERSONS TAKE NOTICE:**

That the undersigned, Jolene Rust, whether one or more, called the Grantor, being the owner of, or having an interest in, land situated in the County of Mercer, State of North Dakota, more fully described below, in consideration of One and No/100 Dollars ($1.00) and other valuable consideration, does hereby grant, convey, and warrant to the State of North Dakota, acting by and through the North Dakota State Water Commission, a state agency and public corporation, with its principal office at 900 East Boulevard Ave., Bismarck, North Dakota 58505, called the Grantee, and to its successors and assigns, the right, privilege, and easement to construct, maintain, operate, inspect, repair, alter, replace, change the size of or remove a pipeline, and appurtenances thereto, for the transportation of water under, across, and through:

Parcel H-MER-129
A 40 foot wide strip of land 20 feet wide on each side of the pipeline centerline lying within the W1/2 SW1/4 Section 13, Township 142 North, Range 88 West of the 5th P.M.

Said tract contains 2.42 acres, more or less.

Temporary Construction Easement
An additional 20 feet of temporary right-of-way lying adjacent to the above described tract for a total construction easement width of 60 feet.

Said tract contains 1.21 acres, more or less.

together with the right to utilize additional land for a period up to three years from the date of this easement, adjacent to the above described tract, for purposes of temporary working space during initial construction of the pipeline, and the right of ingress to and egress from said strip of land across the adjacent lands of the Grantor, for the purposes specified above at the will of the Grantee.

**THE GRANTOR AND THE GRANTEE FURTHER AGREE:**

1. **Use of right-of-way by Grantor.** Grantor reserves the right to use the surface of the easement strip provided, however, that Grantor, without prior approval of Grantee, shall neither construct nor permit to be constructed any building, structure, or other improvement upon the easement strip which would interfere with Grantee's exercise of the rights conveyed by this pipeline easement, including access to the easement strip.

2. **Appurtenances.** The Grantee shall have the right to install and construct necessary appurtenances upon the surface of the easement strip. Prior to construction, the Grantee will notify the Grantor of the approximate location of such appurtenances if any, to be located on the easement strip, and shall pay to the Grantor the sum of $500 for each appurtenance located at a distance of more than 5 feet from a field boundary or fence line. Such payments shall be paid prior to construction.

3. **Damages.** The Grantee will pay to Grantor or Grantor's tenants, as their respective interests may appear, for damages caused by the operations or activities of the Grantee; provided, however, that the Grantee shall have the right, without liability for damages, to clear, and keep cleared, all trees, brush, and other obstructions from the easement strip that may, in the Grantee's judgment, interfere with the rights and privileges of the Grantee under this pipeline easement.

   If the amount of any damage which Grantor may sustain as a result of Grantee's exercise of rights hereunder cannot be mutually agreed upon, such damages shall be ascertained and determined by three (3) disinterested person; one to be appointed by the Grantor, one by

Grantee, and a third by the two so appointed, and the award of such three persons shall be final and conclusive.

4. **Restoration of surface.** The Grantee will restore the surface of the construction area to its original contour as nearly as practicable.

5. **Topsoil segregation.** When excavating the pipeline trench with a backhoe/trackhoe, the Grantee will remove the topsoil separately during the construction of the pipeline for the full width of the pipe trench to a depth of twelve (12) inches or the actual topsoil depth, whichever is less, and to be replaced at the top of the backfill over the pipe trench.

6. **Assignment and covenant by parties.** The rights of either party may be assigned in whole or in part. The terms and provisions of this easement shall constitute covenants running with the land and shall be binding upon, and inure to the benefit of, the parties hereto, their successors, assigns, personal representatives, and heirs.

7. **Grantor's title.** Grantor warrants that he is the owner of, or has an interest in, the land described in this easement, and that he has full right and authority to enter into and deliver this easement. This instrument may be executed in counterparts and each counterpart shall constitute a separate agreement between the parties thereto. Any payments pursuant to this pipeline easement shall be in proportion to the Grantor's interest in the undivided fee simple estate.

8. **Entire agreement.** This instrument contains the entire agreement of the parties and there are no other, or different, agreements or understandings between the Grantor and the Grantee, or its agents. The Grantor, in executing this pipeline easement, has not relied upon any promises, inducements, or representatives of the Grantee, or its agents, except as are set forth herein.

9. **Term of easement.** The term of this easement shall be as long as it is needed by the Grantee, or its assigns, and until a release of this easement is recorded, but shall not exceed ninety-nine (99) years pursuant to NDCC §47-05-02.1.

10. **Tenants.** The Grantor represents that the land described in this easement is (not rented) (rented to) Rick Bauman.

Dated this 1 day of July, 2010.

Solene Rust
Grantor

Grantor

STATE OF NORTH DAKOTA)
) ss.
COUNTY OF McLean )

On this 1st day of July, 2010, before me personally appeared Solene Rust, known to me to be the person(s) described in and who executed the within and foregoing instrument, and acknowledged to me that he/she executed the same.

BEVERLY M NEUMILLER
Notary Public
State of North Dakota
My commission expires July 7, 2011

(SEAL)

Beverly M Neumiller
Notary Public

July 7, 2011 County, ND
My Commission expires:

195748

**STATE OF NORTH DAKOTA**
**COUNTY OF MERCER**

**OFFICE OF**
**COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 12/6/2010 at 1:06 PM, and was duly recorded as Book 186 MISC on Page 147 Fee: $16.00

County Recorder Brenda L. Cook

By Deputy

Return To: ND STATE WATER COMMISSION, 900 E BOULEVARD A
DEPT 770 BISMARCK, ND 58505-0850

MORTGAGEE
MORTGAGOR
INDEXED ✓

COUNTY RECORDER
SEAL
MERCER COUNTY, N. DAK.

JUL 2010

**SOUTHWEST WATER AUTHORITY**
Southwest Pipeline Project Building
West Industrial Park
4665 2nd Street SW
Dickinson, ND 58601-7231
(701) 225-0241
Toll Free: 1-888-425-0241

Segment **7-9E WEST CENTER SERVICE AREA**
Parcel **142-88-18**

## RIGHT-OF-WAY EASEMENT

**ALL PERSONS TAKE NOTICE:**

In consideration of one dollar ($1.00) and other good and valuable consideration **JOLENE RUST PO BOX 86 MERCER, ND 58559** hereinafter referred to as Grantor, does hereby grant, bargain, sell, transfer and convey to the Southwest Water Authority, hereinafter referred to as the Grantee, its successor and assigns, a perpetual easement with right to erect, construct, install and lay, and thereafter use, operate, inspect, repair, maintain, replace, and remove water pipelines, connections, valves and all other appurtenant facilities used in connection with the construction, operation and maintenance of the Southwest Pipeline Project, over, above, across and through the land of the Grantor, situated in **Mercer** County, State of North Dakota, said land being described as follows: **SW1/4 LESS R/W SECTION 13 TOWNSHIP 142 RANGE 88** (the tract that contains **0.18** acres, more or less), together with the right of ingress and egress over the adjacent lands of the Grantor, successors and assigns for the purposes of this easement.

1. The permanent easement will be thirty (30) feet in width, fifteen (15) feet on each side of the center line of the pipeline as constructed, with an additional ten (10) feet of temporary right-of-way for a total construction easement width of forty (40) feet, twenty (20) feet on each side of the center line.

2. The Grantee covenants to maintain the easement in good repair so that no unreasonable damage will result from its use to the adjacent land of the Grantor, successors and assigns. The Grantor will receive compensation for damages to growing crops caused by the construction or operation. The Grantor will report any damages within three (3) years of the construction of the project.

The grant and other provisions of this easement shall constitute a covenant running with the land for the benefit of the Grantee, its successors and assigns.

**IN WITNESS WHEREOF,** the Grantor has executed this instrument this 28 day of March, 2014.

_____ GRANTOR Jolene Rust GRANTOR

State of North Dakota

County of Sheridan

On March 28, 2014, personally appeared before me DeEtta Schindler

_____

____ whom I know personally.
X whose identity I verified on the basis of D.L.
_____ whose identity I verified on the oath or affirmation of _____, a credible witness to be the signor of the above and he/she acknowledged that he/she signed it.

DEETTA SCHINDLER
Notary Public
State of North Dakota
My commission expires June 9, 2018

Notary Public DeEtta Schindler
Sheridan, County _____
My Commission Expires: June 9, 2018

APR - 1 2014

MORTGAGEE
MORTGAGOR
INDEXED ✓

**STATE OF NORTH DAKOTA**
**COUNTY OF MERCER**

**206890**
**OFFICE OF**
**COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 5/4/2015 at 11:52 AM, and was duly recorded as Book 202 MISC on Page 383 Fee: $13.00

County Recorder Brenda L. Cook

By Deputy

Return To: SOUTHWEST WATER AUTHORITY, SOUTHWEST PIPE WEST INDUSTRIAL PARK-4665 2ND AVE SW Beulah, ND 58523

COUNTY RECORDER
SEAL
MERCER COUNTY, N. DAK.

uploaded to BTWPP on 4-2-14 (nc)

DRAFTED BY
AND RETURN TO:
Moss & Barnett (JDL)
4800 Wells Fargo Building
90 South Seventh Street
Minneapolis, MN 55402-4129
(Site Name: ND04 Medicine Butte)
(Prepared by Carin M. Kanstrup, Telephone No. (612) 877-5342)

(Space above this line for Recorder's use.)

## MEMORANDUM OF LAND LEASE AGREEMENT

THIS MEMORANDUM OF LAND LEASE AGREEMENT is made this 14th day of November, 2008, between Jolene M. Rust and Ryan J. Rust, wife and husband, with a mailing address of 115 West Railroad Street, Mercer, North Dakota 58559, hereinafter referred to as ("LESSOR"), and Badlands Cellular of North Dakota Limited Partnership d/b/a Verizon Wireless, with its address for notice located at 180 Washington Valley Road, Bedminster, New Jersey 07921, hereinafter referred to as ("LESSEE"). LESSOR and LESSEE are at times collectively referred to hereinafter as the "Parties" or individually as the "Party".

1. LESSOR and LESSEE entered into a Land Lease Agreement (the "Agreement") on Nov. 14, 2008, for an initial term of five (5) years, commencing on the Commencement Date. The Agreement shall automatically be extended for four (4) additional five (5) year terms unless LESSEE terminates it at the end of the then current term by giving LESSOR written notice of the intent to terminate at least six (6) months prior to the end of the then current term. If at the end of the fourth (4th) five (5) year extension term the Agreement has not been terminated by either Party by giving to the other written notice of an intention to terminate it at least three (3) months prior to the end of such term, the Agreement shall continue in force upon the same covenants, terms and conditions for a further term of five (5) years and for five (5) year terms thereafter until terminated by either Party by giving to the other written notice of its intention to so terminate at least three (3) months prior to the end of such term.

2. Pursuant to the Agreement, LESSOR leased to LESSEE a portion of that certain parcel of property (the entirety of LESSOR's property is referred to hereinafter as the "Property") located near the intersection of Mercer County Road 34 and North Dakota Highway 49, in the City of Beulah, County of Mercer, State of North Dakota, and being legally described on Exhibit "A", together with the non-exclusive right for ingress and egress, seven (7) days a week, twenty-four (24) hours a day, on foot or motor vehicle, including trucks, and for the installation and maintenance of utility wires, poles, cables, conduits, and pipes over, under, or along a right-of-way extending from the nearest public right-of-way, North Dakota Highway 49, to the demised premises. The demised premises and right-of-way are referred to as the "Premises." In the event any public utility is unable to use the aforementioned right-of-way, LESSOR has agreed to grant an additional right-of-way either to the LESSEE or to the public utility at no cost to the LESSEE.

3. The Agreement shall commence based upon the date LESSEE commences installation of the equipment on the Premises.

4. LESSEE has the right of first refusal to purchase the Premises during the initial term and all renewal terms of the Agreement.

5. The terms, covenants and provisions of the Agreement, the terms of which are hereby incorporated by reference into this Memorandum, shall extend to and be binding upon the respective executors, administrators, heirs, successors and assigns of LESSOR and LESSEE.

IN WITNESS WHEREOF, hereunto and to a duplicate hereof, LESSOR and LESSEE have caused this Memorandum to be duly executed on the date written herein below.

**LESSOR:**

Jolene M. Rust

Jolene M. Rust

Ryan J. Rust

Ryan J. Rust

Date: 8-26-08

**LESSEE:**

Badlands Cellular of North Dakota Limited Partnership
d/b/a Verizon Wireless
By: CommNet Cellular Inc.
Its Managing Agent

By: Beth Ann Drohan

Beth Ann Drohan
Its: Midwest Area Vice President – Network

Date: 11/1/08

## ACKNOWLEDGMENTS
## LESSOR ACKNOWLEDGMENT

STATE OF NORTH DAKOTA )
) ss.
COUNTY OF McLean )

On this 26 day of August in the year 2008 before me personally appeared Jolene M. Rust and Ryan J. Rust, wife and husband, known to me (or proved to me on the oath of Jolene M. Rust & Ryan J Rust) to be the persons who are described in and who executed the within and foregoing instrument, and acknowledged to me that they executed the same.

Linda Huelsman
Signature of Person Taking Acknowledgment

LINDA HUELSMAN
Notary Public
State of North Dakota
My commission expires Jun 17, 2011

Notary Public
Title or Rank

Serial Number, if any

## LESSEE ACKNOWLEDGMENT

STATE OF ILLINOIS )
) ss.
COUNTY OF COOK )

On this 14th day of November, 2008, before me, the undersigned, a Notary Public in and for the State of Illinois, duly commissioned and sworn, personally appeared Beth Ann Drohan, to me known to be the Midwest Area Vice President - Network of CommNet Cellular Inc., the Managing Agent of Badlands Cellular of North Dakota Limited Partnership d/b/a Verizon Wireless, that executed the foregoing instrument, and acknowledged said instrument to be the free and voluntary act and deed of Badlands Cellular of North Dakota Limited Partnership d/b/a Verizon Wireless, for the uses and purposes therein mentioned, and on oath stated that she is authorized to execute the said instrument.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal the day and year first above written.

"OFFICIAL SEAL"
LATONYA N ELLIS
NOTARY PUBLIC STATE OF ILLINOIS
COMMISSION EXPIRES 02/03/09

La Tonya Ellis
Print or Type Name: LaTonya Ellis
Notary Public in and for the State of Illinois
My appointment expires: 2-3-09

**Exhibit "A"**

**(Legal Description)**



The Southwest Quarter (SW1/4) of Section 13, Township 142 North, Range 88 West, Mercer County, North Dakota.

MORTGAGEE
MORTGAGOR
INDEXED ✓

**190926**

**STATE OF NORTH DAKOTA**
**COUNTY OF MERCER**

**OFFICE OF**
**COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 12/18/2008 at 12:33 PM, and was duly recorded as Book 178 MISC on Page 445 Fee: $19.00

County Recorder Brenda L. Cook

By Deputy

Return To: MOSS & BARNETT, WELLS FARGO CENTER
90 S 7TH ST - STE 4800 MINNEAPOLIS, MN 55402-4

COUNTY RECORDER SEAL MERCER COUNTY, N DAK.

**NORTH DAKOTA INDUSTRIAL COMMISSION**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case Nos. 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## DECLARATION OF GARY A. SMITH

[¶1] I, Gary A. Smith, declare, based on personal knowledge, as follows:

[¶2] I have ownership interest in the following property that lies within the boundaries of the Review Area of the proposed KJ Hintz Storage Facility.

- Township 142 North, Range 87 West
  Section 15: NE1/4
  Oliver County, ND

[¶3] To the best of my knowledge, the property listed in ¶ 2 above is encumbered by the following easements:

- Oliver-Mercer Electric Cooperative, Inc. Right-of-Way Easement executed by Ralph Smith on June 6, 1946 (91050).

- Roughrider Electric Cooperative, Inc. Right-of-Way Easement executed by Faye Swenson on August 11, 2014 (90519).

[¶4] I have ownership interest in the following properties that lie within the boundaries of the Review Area of the proposed BK Fischer Storage Facility:

- Township 142 North, Range 87 West
  Section 20: NE1/4
  Oliver County, ND

- Township 142 North, Range 87 West
  Section 23: W1/2
  Oliver County, ND

[¶5] To the best of my knowledge, the properties listed in ¶ 4 above are encumbered by the following easements:

- Section 20:
  i. Oliver-Mercer Electric Cooperative, Inc. Right-of-Way Easement executed by George Fetch and Mrs. George Fetch on October 20, 1950 (91054).

  ii. ND State Water Commission Pipeline Easement granted by John and Jordan Smith on March 25, 2011 (86782).

- Section 23:
    i. ND State Water Commission Pipeline Easement granted by John and Jordan Smith on April 8, 2011 (86783).

    ii. Southwest Water Authority Right-of-Way Easement executed by Jennifer Rudolph on May 26, 2015 (90466).

    iii. Roughrider Electric Cooperative, Inc. Right-of-Way Easement executed by Gary Smith on February 25, 2016 (92455).

[¶6] I have ownership interest in the following properties that lie between, and will be impacted by, the proposed Storage Facilities:

- Township 142 North, Range 87 West
  Section 15: NW1/4
  Oliver County, ND

- Township 142 North, Range 87 West
  Section 22: SE1/4
  Oliver County, ND

- Township 142 North, Range 87 West
  Section 22: LOT A, within the SE1/4
  Oliver County, ND

  described as follows;
  COMMENCING at the East Quarter Corner of Section 22;
  THENCE S 00°00'00" W, along the east line of Section 22, a distance of 120.00', to the true point of beginning;
  THENCE S 00°00'00" W, along said line, a distance of 660.00';
  THENCE S 90°00'00" W, a distance of 660.00';
  THENCE N 00°00'00" E, a distance of 660.00';
  THENCE N 90°00'00" E, a distance of 660.00', back to the point of beginning.
  This parcel contains 10.0 acres, more or less.

[¶7] To the best of my knowledge, the properties listed in ¶ 6 above are encumbered by the following easements:

- Section 15:
    i. Roughrider Electric Cooperative, Inc. Right-of-Way Easement executed by Faye Swenson on August 11, 2014 (90519).

- Section 22:
    i. Oliver-Mercer Electric Cooperative, Inc. Right-of-Way Easement executed by S.H. Tjaden and Hannah Tjaden on April 23, 1945 (91056).

    ii. Southwest Water Authority Right-of-Way Easement executed by Jennifer Rudolph on May 26, 2015 (90466).

[¶8] Attached are the deeds which I believe indicate my ownership in each of the properties listed above.

[¶9] Attached are the easements currently encumbering these properties based on the information I have.

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on the 3 day of June , 2024 at 7:18, ND, United States.

Gary A. Smith
Gary A. Smith (Jun 3, 2024 19:20 CDT)

Gary A. Smith

96760 3/14/2022 12:54 PM Total Pages: 2
BOOK: 49 PAGE: 330 FEES: $20.00 RB PR . DEED
Mickie McNulty-Eide, OLIVER COUNTY RECORDER
By Rebecca Bethke, Deputy

LINDELL LAW OFFICE
PO BOX 427

WASHBURN, ND 58577

RECORDER OLIVER SEAL COUNTY STATE OF NORTH DAKOTA

# PERSONAL REPRESENTATIVE'S DEED OF DISTRIBUTION

THIS INDENTURE, Made this 4th day of March, 2022, by and between GARY A. SMITH, Personal Representative of the Estate of JOHN A. SMITH, deceased, hereinafter referred to as Grantor, and GARY A. SMITH, whose postoffice address is 2144 56th Avenue SW, Beulah, ND 58523, and JENNIFER L. SMITH, whose postoffice address is 5400 Kayley Drive, Bismarck, ND 58504, hereinafter referred to as Grantees, WITNESSETH:

1. That the Grantor is the duly appointed and acting Personal Representative of the Estate of JOHN A. SMITH, deceased, who died on October 12, 2020.

2. That the Grantees are entitled to distribution of certain real property, hereinafter described, from the estate of the decedent.

NOW, THEREFORE, Grantor does hereby grant, convey, transfer and distribute all of the right, title and interest of said decedent and said estate to the Grantees in the following proportions:

To: GARY A. SMITH - An undivided one-half (½) interest
JENNIFER L. SMITH - An undivided one-half (½) interest

in and to the following described real property situated in Oliver County, North Dakota, to-wit:

All of the decedent's interest in the following:

TOWNSHIP 142 NORTH, RANGE 87 WEST:
Section 15: NE¼ and NW¼
Section 20: NE¼

Subject to all existing easements and rights of way, prior mineral reservations and to all exceptions, conditions, or limitations expressed in Government Patents or in deeds of record.

together with all hereditaments and appurtenances thereunto belonging or in anywise appertaining, to the above named person, and her heirs, successors or assigns, forever.

Dated this 4th day of March, 2022.

Gary A. Smith

Gary A. Smith, Personal Representative of the Estate of John A. Smith, deceased

STATE OF NORTH DAKOTA )
(ss
COUNTY OF MCLEAN )

On this 4th day of March, 2022, before me personally appeared GARY A. SMITH, known to me to be the Personal Representative described in and who executed the within instrument and acknowledged to me that he executed the same as such Personal Representative.

DAVID A LINDELL
Notary Public
State of North Dakota
My commission expires Nov 30, 2025

(SEAL)

Notary Public

My commission expires:

I certify that the requirement for a report or statement of full consideration paid does not apply because this deed is for one of the transactions exempted by N.D.C.C. Section 11-18-02.2(6)( d ).

3-4-22

Grantee or Agent Date

Auditor's Office
Oliver County, N.D.
transfer entered this 14th day of
March 2022
County Auditor
By Deputy

95919 5/4/2021 9:49 AM PAGE: 1OF 2
BOOK: 43 PAGE: 603 FEES: $20.00 RB QUIT CLAIM DEED
Mickie McNulty-Eide, OLIVER COUNTY RECORDER
By Rebecca Rathro, Deputy

GARY SMITH
1006 CANNON LANE

WASHBURN, ND 58577

QUIT CLAIM DEED (Joint Tenants)

THIS INDENTURE, made this 3rd day of May, in the year of our Lord two thousand twenty one between JENNIFER L. SMITH f/k/a JENNIFER L. RUDOLPH, single, whose post office address is 5400 Kayley Drive, Bismarck, ND 58504, party of the first part, and GARY A. SMITH and CASSIE SMITH, husband and wife, as joint tenants and not as tenants in common, with the right of survivorship, whose postoffice address is 1006 Cannon Lane, Washburn, ND 58577, parties of the second part:

WITNESSETH, That the said party of the first part, for and in consideration of the sum of One Dollar and other valuable consideration, to her in hand paid by said parties of the second part, the receipt whereof is hereby acknowledged, do SELL, REMISE, RELEASE and QUIT CLAIM to the said parties of the second part, their heirs and assigns, the survivor of said parties of the second part, and the heirs, successors and assigns of such survivor, FOREVER, all right, title, interest, claim or demand in and to the tract or parcel of land lying and being in the County of Oliver and State of North Dakota, and described as follows, to-wit:

TOWNSHIP 142 NORTH, RANGE 87 WEST;
Section 22: SE¼

Subject to all existing easements and rights of way, prior mineral reservations and to all exceptions, conditions, or limitations expressed in Government Patents or in deeds of record.

TO HAVE AND TO HOLD The above Quitclaimed premises, together with all the hereditaments and appurtenances thereunto belonging or in anywise appertaining to the said parties of the second part, their assigns, the survivor of said parties of the second part, and the heirs, successors and assigns of such survivor, FOREVER.

05/03/2021 MON 10:44 FAX 701 463 3761 Lindell Law Office 001/001
RECEIVED 05/03/2021 10:19AM 17012508094 PETSMART

IN WITNESS WHEREOF, the said party of the first part hereunto sets her hand the day and year first above written.

Jennifer L. Smith f/k/a Jennifer L. Rudolph

STATE OF NORTH DAKOTA )
(ss
COUNTY OF BURLEIGH )

On this 3rd day of May, 2021, before me personally appeared JENNIFER L. SMITH f/k/a JENNIFER L. RUDOLPH, single, known to me to be the same person described in and who executed the within and foregoing instrument, and severally acknowledged to me that she executed the same.

WYATT JOHNSON
Notary Public
State of North Dakota
My Commission Expires Oct. 24, 2023

Notary Public
My commission expires: 10-24-23

I certify that the requirement for a report or statement of full consideration paid does not apply because this deed is for one of the transactions exempted N.D.C.C. Section 11-18-02.2(6) subdivision h.

Grantee or Agent 4-24-23
Date

Auditor's Office
Oliver County, N.D.
Transfer entered this 4th day of
May 2021
County Auditor
By _____ Deputy

05/03/2021 MON 10:37 FAX 701 462 3761 Lindell Law Office 003/003
RECEIVED 05/03/2021 10:11AM 17012508094
PETSMART

WARRANTY DEED

THIS INDENTURE, Made this 30th day of September, in the year of our Lord two thousand fourteen, between JOHN A. SMITH, single, whose postoffice address is 2144 56th Avenue SW, Beulah, ND 58523, party of the first part, and GARY A. SMITH, whose postoffice address is 6800 81st Street NE, Bismarck, ND 58503, and JENNIFER L. RUDOLPH, whose post office address is 5400 Kayley Drive, Bismarck, ND 58504, parties of the second part;

WITNESSETH, That the said party of the first part, for and in consideration of the sum of ONE DOLLAR AND OTHER VALUABLE CONSIDERATION to him in hand paid by said parties of the second part, the receipt whereof is hereby acknowledged, does by these presents GRANT, BARGAIN, SELL AND CONVEY unto the said party of the second part, their heirs and assigns, FOREVER, all the tract or parcel of land lying and being in the County of Oliver and State of North Dakota, and described as follows, to-wit:

All of the Grantor's interest in the following:

TOWNSHIP 142 NORTH, RANGE 87 WEST:
Section 22: SW¼ and E½
Section 23: W½
Section 24: E½SW¼; W½SE¼

Subject to all existing easements and rights of way, prior mineral reservations and to all exceptions, conditions, or limitations expressed in Government Patents or in deeds of record.

GRANTOR RESERVES UNTO HIMSELF, A LIFE ESTATE IN THE ABOVE DESCRIBED PROPERTY. THIS LIFE ESTATE SHALL INCLUDE THE RIGHT TO EXECUTE MINERAL LEASES AND RECEIVE ANY ROYALTIES PRODUCED FROM THIS REAL ESTATE DURING THE LIFE OF THE GRANTOR.

TO HAVE AND TO HOLD THE SAME, Together with all the hereditaments and appurtenances thereunto belonging or in anywise appertaining, to the said parties of the second part, their heirs and assigns FOREVER. And the said JOHN A. SMITH, single, said party of the first part, for himself, his heirs and assigns, that he is well seized in fee of the land and premises aforesaid, and has good right to sell and convey the same in manner and form aforesaid; that the same are free from all incumbrances,

and the above bargained and granted land and premises in the quiet and peaceable possession of said parties of the second part, their heirs and assigns, against all persons lawfully claiming or to claim the whole or any part thereof, the said party of the first part will warrant and defend.

IN WITNESS WHEREOF, The said party of the first part hereunto sets his hand the day and year first above written.

John A. Smith

STATE OF NORTH DAKOTA )
(ss
COUNTY OF MCLEAN )

On this 30th day of September, 2014, before me personally appeared JOHN A. SMITH, single, known to me to be the same person described in and who executed the within and foregoing instrument, and severally acknowledged to me that he executed the same.

(SEAL) DAVID A LINDELL
Notary Public
State of North Dakota
My commission expires Nov 30, 2017

Notary Public

My commission expires:

I certify that the requirement for a report or statement of full consideration paid does not apply because this deed is for one of the transactions exempted by N.D.C.C. Section 11-18-02.2(7)(c).

Grantee or Agent 9-30-14
Date

89244 10/1/2014 1:14 PM PAGE: 1 OF 2
BOOK: 40 PAGE: 334 FEES: $13.00 MM WARRANTY DEED
Kim Wilkens, OLIVER COUNTY RECORDER
By MM Kelty-Eide Deputy

LINDELL LAW OFFICE
PO BOX 427

WASHBURN, ND 58577

RECORDER OLIVER COUNTY SEAL STATE OF NORTH DAKOTA

Auditor's Office
Oliver County, N.D.
transfer entered this 1st day of
October 20 14
County Auditor
BY Deputy

97435 2/2/2023 11:33 AM Total Pages: 3
BOOK: 45 PAGE: 22 FEES: $20.00 RB QUIT CLAIM DEED
Mickie McNulty-Eide, OLIVER COUNTY RECORDER
By Rebecca Bethke, Deputy

UNION BANK
PO Box 789
BEULAH, ND 58523

RECORDER OLIVER SEAL COUNTY STATE OF NORTH DAKOTA

# QUIT CLAIM DEED

THIS INDENTURE, Made this 27 day of January, 2023, between Kreativ Homes LLC, a North Dakota limited liability company, Grantor and Gary A. Smith and Cassandra Smith, husband and wife, as Grantees, whose post office address is 2143 56th Ave SW Beulah ND 58523

WITNESSETH, for and in consideration of the sum of Ten Dollars ($10.00), grantor does hereby GRANT, CONVEY AND QUIT CLAIM to the said Grantees as joint tenants with rights of survivorship all all of the following real property lying and being in the County of Oliver, State of North Dakota, and described as follows, to-wit:

**SEE EXHIBIT A - LEGAL DESCRIPTION**

The legal description was prepared by Bismarck Title Company, 207 South Washington St., Bismarck, ND 58504 or obtained from a previously recorded instrument.

I certify that the requirement for a report or statement of full consideration paid does not apply because this deed is for one of the transactions exempted by Subdivision H of Section 6 of NDCC 11-18-02.2.

Grantee or Agent

IN TESTIMONY WHEREOF, the grantor has caused these presents to be executed in its company name by its Authorized Agent.

Kreativ Homes LLC

BY: _____, Agent
Sally Goldammer
Authorized Agent

STATE OF ND

COUNTY OF Burleigh

On this 23 day of November, 2022, before me, personally appeared Sally Goldammer, known to me to be the Authorized Agent of the Limited Liability Company that is described in, and that she executed the foregoing instrument, and she acknowledged that such Limited Liability Company executed the same.

(Seal)

HEIDI J BERGLAND
Notary Public
State of North Dakota
My Commission Expires Oct 10, 2026

Heidi J Bergland
Notary Public
My Commission Expires: _____

File No.: **73506**

## EXHIBIT A

LOT A WITHIN THE SE¼ OF SECTION 22, TOWNSHIP 142 NORTH, RANGE 87 WEST OF THE FIFTH PRINCIPAL MERIDIAN, OLIVER COUNTY, NORTH DAKOTA, MORE FULLY DEPICTED IN PLAT FILED FOR RECORD DECEMBER 21, 2020 IN BOOK E, PAGE 51 AS DOCUMENT NO. 95657; DESCRIBED AS COMMENCING AT THE EAST QUARTER CORNER OF SECTION 22; THENCE SOUTH 00 DEG., 00 MIN., 00 SEC., WEST, ALONG THE EAST LINE OF SECTION 22 A DISTANCE OF 120.00 FEET, TO THE TRUE POINT OF BEGINNING; THENCE SOUTH 00 DEG., 00 MIN., 00 SEC., WEST, ALONG SAID LINE, A DISTANCE OF 660.00 FEET; THENCE SOUTH 90 DEG., 00 MIN., 00 SEC., WEST, A DISTANCE OF 660 FEET; THENCE NORTH 00 DEG., 00 MIN., 00 SEC., EAST, A DISTANCE OF 660.00 FEET; THENCE NORTH 90 DEG., 00 MIN., 00 SEC. EAST, A DISTANCE OF 660.00 FEET, BACK TO THE POINT OF BEGINNING.

Auditor's Office
Oliver County, N.D.
transfer entered this 2 day of
February 2023
County Auditor
By_____Deputy

96113 7/23/2021 11:35 AM PAGE: 1 OF 3
BOOK: 43 PAGE: 699 FEES: $20.00 RB QUIT CLAIM DEED
Mickie McNulty-Eide, OLIVER COUNTY RECORDER
By Rebecca Bethke, Deputy

CASSANDRA SMITH
1400 NEW ENERGY DR #110

BEULAH, ND 58523

RECORDER OLIVER SEAL COUNTY STATE OF NORTH DAKOTA

# QUIT CLAIM DEED (Joint Tenants)

THIS INDENTURE, made this 23 day of July, in the year of our Lord two thousand twenty one between JORDAN B. SMITH, single, whose postoffice address is 15219 French Drive North, Hugo, MN 55038 and GARY A. SMITH and CASSIE SMITH, husband and wife, whose post office address is 1006 Cannon Lane, Washburn, ND 58577, parties of the first part, and GARY A. SMITH and CASSIE SMITH, husband and wife, as joint tenants and not as tenants in common, with the right of survivorship, whose postoffice address is 1006 Cannon Lane, Washburn, ND 58577, parties of the second part;

WITNESSETH, That the said parties of the first part, for and in consideration of the sum of One Dollar and other valuable consideration, to them in hand paid by said parties of the second part, the receipt whereof is hereby acknowledged, do SELL, REMISE, RELEASE and QUIT CLAIM to the said parties of the second part, their heirs and assigns, the survivor of said parties of the second part, and the heirs, successors and assigns of such survivor, FOREVER, all right, title, interest, claim or demand in and to the tract or parcel of land lying and being in the County of Oliver and State of North Dakota, and described as follows, to-wit:

All of the Grantors interest in the following:

TOWNSHIP 142 NORTH, RANGE 87 WEST:
Section 22: Lot A within the SE¼ described as follows;
Commencing at the East Quarter Corner of Section 22;
THENCE S00°00'00"W, along the east line of Section 22, a distance of 120 feet, to the true point of beginning;
THENCE S00°00'00"W, along said line, a distance of 660 feet;
THENCE S90°00'00"W, a distance of 660 feet;
THENCE N00°00'00"E, a distance of 660 feet;
THENCE N90°00'00"E, a distance of 660 feet, back to the point of beginning.

Subject to all existing easements and rights of way, prior mineral reservations and to all exceptions, conditions, or limitations expressed in Government Patents or in deeds of record.

TO HAVE AND TO HOLD The above Quitclaimed premises, together with all the hereditaments and appurtenances thereunto belonging or in anywise appertaining to the said parties of the second part, their assigns, the survivor of said parties of the second part, and the heirs, successors and assigns of such survivor, FOREVER.

IN WITNESS WHEREOF, the said parties of the first part hereunto sets his hand the day and year first above written.

Jordan B. Smith

STATE OF MINNESOTA )
(ss
COUNTY OF Swift )

On this 14th day of July, 2021, before me personally appeared JORDAN B. SMITH, single, known to me to be the same person described in and who executed the within and foregoing instrument, and severally acknowledged to me that he executed the same.

KERRY L. WILCOX
NOTARY PUBLIC-MINNESOTA
My Comm. Exp. Jan. 31, 2026

Notary Public
My commission expires:

Auditor's Office
Oliver County, N.D.
transfer entered this 23rd day of
July 2021
County Auditor
By Deputy

IN WITNESS WHEREOF, the said parties of the first part hereunto set their hands the day and year first above written.

Gary A. Smith

Cassie Smith

STATE OF NORTH DAKOTA )
(ss
COUNTY OF MCLEAN)

On this 23 day of July, 2021, before me personally appeared GARY A. SMITH and CASSIE SMITH, husband and wife, known to me to be the same persons described in and who executed the within and foregoing instrument, and severally acknowledged to me that they executed the same.

CASSIE L LEIDHOLM
Notary Public
State of North Dakota
My commission expires Apr 14, 2025

Notary Public
My commission expires:

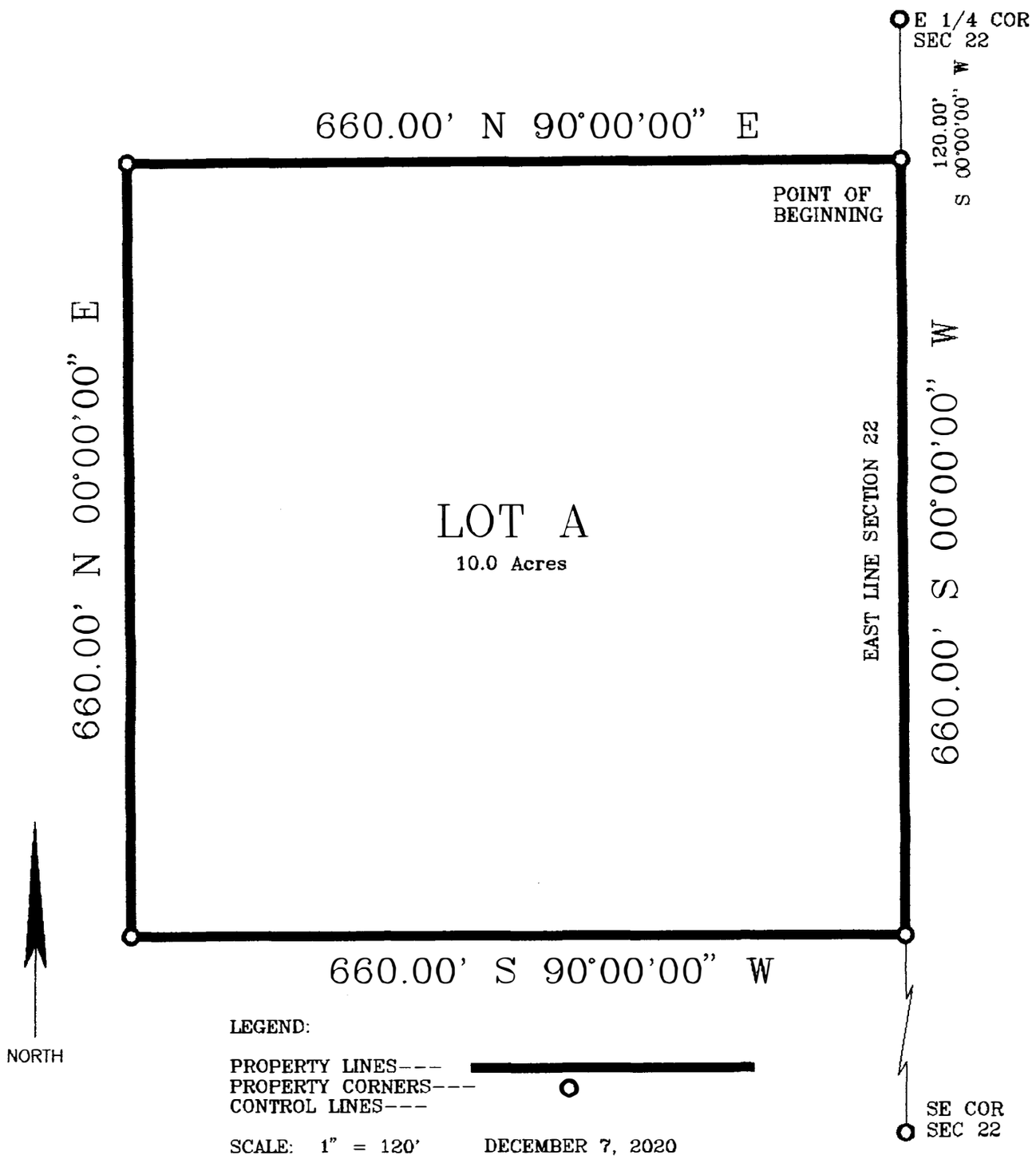
I certify that the requirement for a report or statement of full consideration paid does not apply because this deed is for one of the transactions exempted N.D.C.C. Section 11-18-02.2(6) subdivision h.

Grantee or Agent 7/23/21
Date

# PLAT OF

**LOT A, within the SE¼ of Section 22, Township 142 North, Range 87 West, Oliver County, North Dakota.**

**Present Owner:** Gary Smith




# DESCRIPTION

**LOT A, within the SE¼ of Section 22, Township 142 North, Range 87 West, Oliver County, North Dakota.**
**described as follows;**
**COMMENCING at the East Quarter Corner of Section 22;**
**THENCE S 00°00'00" W, along the east line of Section 22, a distance of 120.00', to the true point of beginning;**
**THENCE S 00°00'00" W, along said line, a distance of 660.00';**
**THENCE S 90°00'00" W, a distance of 660.00';**
**THENCE N 00°00'00" E, a distance of 660.00';**
**THENCE N 90°00'00" E, a distance of 660.00', back to the point of beginning.**

**This parcel contains 10.0 acres, more or less.**
**This parcel is subject to all recorded easements and rights of way.**
**Basis of bearings is assumed.**

THE UNDERSIGNED, Owners of the within described property, in accordance with the provisions of Sec. 57-02-39, North Dakota Century Code, and upon demand of the County Auditor of _____ County, North Dakota, have caused to be made the within and foregoing plat of said land with the lots as herein described, and have caused the same to be placed on record, as provided by law.

Witness our hands and seal, this _____ day of _____, 20_____.
In presence of _____} _____
_____}_____
}
}

STATE OF NORTH DAKOTA, }
SS.
COUNTY OF _____}

I, _____, a _____
within and for said County, do hereby certify that on this _____ day of _____
A.D., 20_____, personally appeared before me _____
_____, to me well known to be the same person____ described in and who executed the within and foregoing instrument and acknowledged that ___he___ executed the same freely and voluntarily.

My commission expires _____, 20____, Notary Public, _____ County, N.D.

I, JOHN R. WICKLUND, do hereby certify that, at the request of GARY SMITH, I made the within and foregoing plat and description of the land herein described and that the lots, distances, area, and locations as indicated on said plat and contained in said description are true and correct to my best knowledge and belief.

JOHN R. WICKLUND REGISTERED LAND SURVEYOR NORTH DAKOTA

John R. Wicklund

Subscribed and sworn to before me this 8 day of December, A.D. 2020.

BRANDIE LANG
Notary Public
State of North Dakota
My Commission Expires Nov 15, 2022

Brandie Lang
NOTARY

My commission expires Nov. 15, 2022, Notary Public, Burleigh County, N.D.

## CERTIFICATE OF APPROVAL

The within and foregoing plat is hereby approved.
Dated _____, 20_____.

City Engineer of (or) _____
_____ of _____County, N.D.

**Plat of**

**Section _____, Township _____, Range _____**

**********

95657 12/21/2020 1:24 PM PAGE: 1 OF 2
BOOK: PAGE: FEES: $20.00 RB Plats
Mickie McNulty-Eide, OLIVER COUNTY RECORDER
By Rebecca Bethke, Deputy

I hereby ... this office
On ... rded on
At ___ CASSANDRA SMITH
Pag 1006 CANNON LANE
____ WASHBURN, ND 58577

RECORDER OLIVER SEAL COUNTY STATE OF NORTH DAKOTA

By _____ Deputy
**********

WARRANTY DEED

THIS INDENTURE, Made this 30th day of September, in the year of our Lord two thousand fourteen, between JOHN A. SMITH, single, whose postoffice address is 2144 56th Avenue SW, Beulah, ND 58523, party of the first part, and GARY A. SMITH, whose postoffice address is 6800 81st Street NE, Bismarck, ND 58503, and JENNIFER L. RUDOLPH, whose post office address is 5400 Kayley Drive, Bismarck, ND 58504, parties of the second part;

WITNESSETH, That the said party of the first part, for and in consideration of the sum of ONE DOLLAR AND OTHER VALUABLE CONSIDERATION to him in hand paid by said parties of the second part, the receipt whereof is hereby acknowledged, does by these presents GRANT, BARGAIN, SELL AND CONVEY unto the said party of the second part, their heirs and assigns, FOREVER, all the tract or parcel of land lying and being in the County of Oliver and State of North Dakota, and described as follows, to-wit:

All of the Grantor's interest in the following:

TOWNSHIP 142 NORTH, RANGE 87 WEST:
Section 22: SW¼ and E½
Section 23: W½
Section 24: E½SW¼; W½SE¼

Subject to all existing easements and rights of way, prior mineral reservations and to all exceptions, conditions, or limitations expressed in Government Patents or in deeds of record.

GRANTOR RESERVES UNTO HIMSELF, A LIFE ESTATE IN THE ABOVE DESCRIBED PROPERTY. THIS LIFE ESTATE SHALL INCLUDE THE RIGHT TO EXECUTE MINERAL LEASES AND RECEIVE ANY ROYALTIES PRODUCED FROM THIS REAL ESTATE DURING THE LIFE OF THE GRANTOR.

TO HAVE AND TO HOLD THE SAME, Together with all the hereditaments and appurtenances thereunto belonging or in anywise appertaining, to the said parties of the second part, their heirs and assigns FOREVER. And the said JOHN A. SMITH, single, said party of the first part, for himself, his heirs and assigns, that he is well seized in fee of the land and premises aforesaid, and has good right to sell and convey the same in manner and form aforesaid; that the same are free from all incumbrances,

and the above bargained and granted land and premises in the quiet and peaceable possession of said parties of the second part, their heirs and assigns, against all persons lawfully claiming or to claim the whole or any part thereof, the said party of the first part will warrant and defend.

IN WITNESS WHEREOF, The said party of the first part hereunto sets his hand the day and year first above written.

John A. Smith

STATE OF NORTH DAKOTA )
(ss
COUNTY OF MCLEAN )

On this 30th day of September, 2014, before me personally appeared JOHN A. SMITH, single, known to me to be the same person described in and who executed the within and foregoing instrument, and severally acknowledged to me that he executed the same.

(SEAL) DAVID A LINDELL
Notary Public
State of North Dakota
My commission expires Nov 30, 2017

Notary Public

My commission expires:

I certify that the requirement for a report or statement of full consideration paid does not apply because this deed is for one of the transactions exempted by N.D.C.C. Section 11-18-02.2(7)(c).

Grantee or Agent 9-30-14
Date

89244 10/1/2014 1:14 PM PAGE: 1 OF 2
BOOK: 40 PAGE: 334 FEES: $13.00 MM WARRANTY DEED
Kim Wilkens, OLIVER COUNTY RECORDER
By MM Kelty-Eide Deputy

LINDELL LAW OFFICE
PO BOX 427

WASHBURN, ND 58577

RECORDER OLIVER COUNTY SEAL STATE OF NORTH DAKOTA

Auditor's Office
Oliver County, N.D.
transfer entered this 1st day of
October 20 14
County Auditor
BY Deputy

97546 3/31/2023 11:30 AM Total Pages: 9
BOOK: 45 PAGE: 75 FEES: $65.00 RB STIPULATION AND CROS
Mickie McNulty-Eide OLIVER COUNTY RECORDER
By Rebecca Bohlke, Deputy

PEARCE & DURICK
314 E THAYER AVE
PO BOX 400
BISMARCK, ND 58502

RECORDER OLIVER SEAL COUNTY STATE OF NORTH DAKOTA

## STIPULATION AND CROSS CONVEYANCE

This Stipulation and Cross-Conveyance is entered into among **JORDAN B. SMITH**, an unmarried single person whose address is 15219 French Dr. N, Hugo, MN 55038, **GARY A. SMITH** and **CASSIE SMITH**, husband and wife, whose address is 2143 56th Avenue SW, Beulah, ND 58523, and **JENNIFER L. RUDOLPH, A/K/A JENNIFER L. SMITH**, an unmarried single person whose address is 5400 Kayley Drive, Bismarck, ND 58504, hereinafter referred to as "**PARTIES.**"

WHEREAS, Jordan B. Smith, Gary Smith, and Jennifer L. Rudolph, whether individually, as tenants in common, as joint tenants, or a combination thereof, are the owners of several tracts of property, some of which are surface interests and some of which include both surface and mineral interests, located in Oliver County, North Dakota, to wit:

**TOWNSHIP 142 NORTH, RANGE 87 WEST:**

**Section 22:** SW¼; NE¼;

SE¼, less Lot A within the SE¼ of Section 22, Township 142 North, Range 87 West of the Fifth Principal Meridian, Oliver County, North Dakota, more fully depicted in Plat Filed For Record December 21, 2020 in Book E, Page 51 as **Document No. 95657;**

Lot A within the SE/4 described as follows:

Commencing at the East Quarter Corner of Section 22;

THENCE S 00°00'00"W, along the east line of Section 22, a distance of 120 feet, to the true point of beginning:

THENCE S 00°00'00'W, along said line, a distance of 660 feet;

THENCE S 90°00'00"W, a distance of 660 feet; THENCE N 00°00'00"E. a distance of 660 feet;

THENCE N 90°00'00"E, a distance of 660 feet, back to the point of beginning.

Subject to all existing easements and rights of way, prior mineral reservations and to all exceptions, conditions, or limitations expressed in Government Patents or in deeds of record.

The legal description was obtained from a previously recorded document (hereafter, ***"SE1/4 of Section 22"***).

**Section 23:** W½

**Section 24:** E½SW¼; W½SE¼

**All subject to existing easements, leases, rights-of-way, restrictive covenants, and mineral conveyances and reservations of record.**

("Property").

AND WHEREAS, the Parties desire to change the ownership of certain tracts of land so as to effectuate their intended ownership interests;

NOW, THEREFORE, in consideration of the sum of Ten Dollars ($10.00) and other good and valuable consideration, including the mutual agreement of the Parties, the receipt and sufficiency of which are hereby acknowledged, the Parties do stipulate, cross-convey, grant, bargain, and sell, each and to the other, to the extent required in order to achieve the following ownership in the Property:

(1) **GARY A. SMITH** and **JENNIFER L. RUDOLPH**, as Tenants in Common:

**Township 142 North, Range 87 West 5th P.M.**

Section 22: SE¼ less Lot A within the SE¼ of Section 22, Township 142 North, Range 87 West of the Fifth Principal Meridian, Oliver County, North Dakota, more fully depicted in Plat Filed For Record December 21, 2020 in Book E, Page 51 as Document No. 95657; Described as commencing at the East Quarter Corner of Section 22; Thence South 00 Deg., 00 Min., 00 Sec., West, Along the East Line of Section 22 a Distance of 120.00 Feet, to the True Point of Beginning; Thence South 00 Deg., 00 Min., 00 Sec., West, Along Said Line, a Distance of 660.00 Feet; Thence South 90 Deg., 00 Min., 00 Sec., West, a Distance of 660 Feet; Thence North 00 Deg., 00 Min., 00 Sec., East, a Distance of 660.00 Feet; Thence North 90 Deg., 00 Min., 00 Sec. East a Distance of 660.00 Feet, Back to the Point of Beginning.

The legal description was obtained from a previously recorded document.

Section 23: W½

(2) **Jordan B. Smith**:

**Township 142 North, Range 87 West 5th P.M.**

Section 22: SW¼; NE¼

Section 24: E½SW¼; W½SE¼

This Stipulation and Cross-Conveyance shall be binding upon the Parties, their heirs, devisees, personal representatives, successors and assigns.

This Stipulation and Cross-Conveyance has been executed by the Parties as of the dates of their respective acknowledgements.

**[REMAINDER OF PAGE LEFT BLANK INTENTIONALLY]**

**[SIGNATURE PAGES FOLLOW]**

Dated this ___ day of 3/7/23____, 2023

JORDAN B. SMITH

STATE OF MINNESOTA )
) ss.
COUNTY OF Swift )

On this 7th day of March____, 2023, before me personally appeared **JORDAN B. SMITH**, known to me to be the person who is described in and who executed the within instrument, and acknowledged to me that he executed the same.

TIMOTHY RYAN OLSON
NOTARY PUBLIC - MINNESOTA
My Comm. Exp. Jan. 31, 2026

Notary Public

Dated this 27 day of March, 2023

Gary A. Smith
GARY A. SMITH

Cassie Smith
CASSIE SMITH

STATE OF NORTH DAKOTA )
) ss.
COUNTY OF BURLEIGH )

On this 27 day of MARCH, 2023, before me personally appeared **GARY A. SMITH** and **CASSIE SMITH**, husband and wife, known to me to be the persons who are described in and who executed the within instrument, and acknowledged to me that they executed the same.

ANNETTE KIRSCHENHEITER
Notary Public
State of North Dakota
My Commission Expires April 18, 2024

Annette Kirschenheiter
Notary Public

Dated this 27 day of March, 2023

JENNIFER L. RUDOLPH
A/K/A JENNIFER L. SMITH

STATE OF NORTH DAKOTA )
) ss.
COUNTY OF BURLEIGH )

On this 27 day of MARCH, 2023, before me personally appeared **JENNIFER L. RUDOLPH A/K/A JENNIFER L. SMITH**, known to me to be the person who is described in and who executed the within instrument, and acknowledged to me that she executed the same.

Notary Public

ANNETTE KIRSCHENHEITER
Notary Public
State of North Dakota
My Commission Expires April 18, 2024

**STATEMENT OF CONSIDERATION**

I certify that the requirement for a report or statement of full consideration paid does not apply because this deed is for one of the transactions exempted by subdivisions (c) of subsection 6 of 11-18-02.2, N.D.C.C.

Date: 03/27/2023

Gary A. Smith / Agent

**STATEMENT OF CONSIDERATION**

I certify that the requirement for a report or statement of full consideration paid does not apply because this deed is for one of the transactions exempted by subdivisions (c) of subsection 6 of 11-18-02.2, N.D.C.C.

Date: 3/7/23 Jordan B. Smith

Jordan B. Smith / Agent

State of Minnesota

County of Swift

On this 7th day of March, 2023, before me personally appeared Jordan B Smith, known to me to be the person who is described in and who executed the within instrument and acknowledged to me that he executed the same.

TIMOTHY RYAN OLSON
NOTARY PUBLIC-MINNESOTA
My Comm. Exp. Jan. 31, 2026

TRO 3-7-23
notary public

**STATEMENT OF CONSIDERATION**

I certify that the requirement for a report or statement of full consideration paid does not apply because this deed is for one of the transactions exempted by subdivisions (c) of subsection 6 of 11-18-02.2, N.D.C.C.

Date: 3/27/2023 _____

Jennifer L. Rudolph a/k/a Jennifer L. Smith / Agent

Auditor's Office
Oliver County, N.D.
transfer entered this 29 day of
March 2023
_____
County Auditor
By_____Deputy

WARRANTY DEED

THIS INDENTURE, Made this 30th day of September, in the year of our Lord two thousand fourteen, between JOHN A. SMITH, single, whose postoffice address is 2144 56th Avenue SW, Beulah, ND 58523, party of the first part, and GARY A. SMITH, whose postoffice address is 6800 81st Street NE, Bismarck, ND 58503, and JENNIFER L. RUDOLPH, whose post office address is 5400 Kayley Drive, Bismarck, ND 58504, parties of the second part;

WITNESSETH, That the said party of the first part, for and in consideration of the sum of ONE DOLLAR AND OTHER VALUABLE CONSIDERATION to him in hand paid by said parties of the second part, the receipt whereof is hereby acknowledged, does by these presents GRANT, BARGAIN, SELL AND CONVEY unto the said party of the second part, their heirs and assigns, FOREVER, all the tract or parcel of land lying and being in the County of Oliver and State of North Dakota, and described as follows, to-wit:

All of the Grantor's interest in the following:

TOWNSHIP 142 NORTH, RANGE 87 WEST:
Section 22: SW¼ and E½
Section 23: W½
Section 24: E½SW¼; W½SE¼

Subject to all existing easements and rights of way, prior mineral reservations and to all exceptions, conditions, or limitations expressed in Government Patents or in deeds of record.

GRANTOR RESERVES UNTO HIMSELF, A LIFE ESTATE IN THE ABOVE DESCRIBED PROPERTY. THIS LIFE ESTATE SHALL INCLUDE THE RIGHT TO EXECUTE MINERAL LEASES AND RECEIVE ANY ROYALTIES PRODUCED FROM THIS REAL ESTATE DURING THE LIFE OF THE GRANTOR.

TO HAVE AND TO HOLD THE SAME, Together with all the hereditaments and appurtenances thereunto belonging or in anywise appertaining, to the said parties of the second part, their heirs and assigns FOREVER. And the said JOHN A. SMITH, single, said party of the first part, for himself, his heirs and assigns, that he is well seized in fee of the land and premises aforesaid, and has good right to sell and convey the same in manner and form aforesaid; that the same are free from all incumbrances,

and the above bargained and granted land and premises in the quiet and peaceable possession of said parties of the second part, their heirs and assigns, against all persons lawfully claiming or to claim the whole or any part thereof, the said party of the first part will warrant and defend.

IN WITNESS WHEREOF, The said party of the first part hereunto sets his hand the day and year first above written.

John A. Smith

STATE OF NORTH DAKOTA )
(ss
COUNTY OF MCLEAN )

On this 30th day of September, 2014, before me personally appeared JOHN A. SMITH, single, known to me to be the same person described in and who executed the within and foregoing instrument, and severally acknowledged to me that he executed the same.

(SEAL) DAVID A LINDELL
Notary Public
State of North Dakota
My commission expires Nov 30, 2017

Notary Public

My commission expires:

I certify that the requirement for a report or statement of full consideration paid does not apply because this deed is for one of the transactions exempted by N.D.C.C. Section 11-18-02.2(7)(c).

Grantee or Agent 9-30-14
Date

89244 10/1/2014 1:14 PM PAGE: 1 OF 2
BOOK: 40 PAGE: 334 FEES: $13.00 MM WARRANTY DEED
Kim Wilkens, OLIVER COUNTY RECORDER
By MM Kelty-Eide Deputy

LINDELL LAW OFFICE
PO BOX 427

WASHBURN, ND 58577

RECORDER OLIVER COUNTY SEAL STATE OF NORTH DAKOTA

Auditor's Office
Oliver County, N.D.
transfer entered this 1st day of
October 20 14
County Auditor
BY Deputy

OK
220

01098

Location Number

RIGHT-OF-WAY EASEMENT

KNOW ALL MEN BY THESE PRESENTS, that the undersigned Ralph Smith (single) for a good and valuable consideration, the receipt whereof is hereby acknowledged, does hereby grant unto the Oliver-Mercer Electric Cooperative, Inc. a corporation, whose post office address is Hazen, N. Dak., North Dakota, and to its successors or assigns, the right to enter upon the lands of the undersigned, situated in the county of Oliver, State of North Dakota and more particularly described as follows:

Sec. 15, 142-87

Shoulder of SE+NE¼ 9pm.

and to place, construct, operate, repair, maintain, relocate and replace thereon and in or upon all streets, roads or highways abutting said lands an electric transmission or distribution line or system, and to cut and trim trees and shrubbery to the extent necessary to keep them clear of said electric line or system and to cut down from time to time all dead, weak, leaning or dangerous trees that are tall enough to strike the wires in falling.

In granting this easement it is understood that at pole locations, only a single pole and arrurtenance will be used, and that the location of the pole will be such as to form the least possible interference to farm operations, so long as it does not materially increase the cost of construction.

The undersigned covenants that he is the owner of the above described lands and that the said lands are free and clear of encumbrances and liens of whatsoever character except those held by the following persons:

It is further understood that, whenever necessary, words in this instrument in the singular shall be construed to read in the plural and that words used in the masculine gender shall be construed to read in the feminine.

IN WITNESS WHEREOF, the undersigned has a set his hand and seal this 6 day of June, 1946.

Signed, sealed and delivered in the presence of:

Ralph Smith

Banks H. Siefer

Ralph E. Smith

STATE OF NORTH DAKOTA
OLIVER COUNTY
SEAL
RECORDER

91050 8/21/2015 10:30 AM PAGE: 1 OF 2
BOOK: 1 PAGE: 1074 FEES: $13.00 MM EASEMENT (ROUGHRID)
Kim Wilkens, OLIVER COUNTY RECORDER
By MMRulty Ed Deputy

5

(1)
STATE OF NORTH DAKOTA

COUNTY OF Mercer SS.

Bank H Sieber being first duly sworn says that he is one of the witnesses to the above and foregoing easements, that Ralph Smith and whose names is and/or are subscribed to the above and foregoing instruments as a party is and/or are the persons described in said easement and that he signed said instrument in my presence and that I in their presence signed my name thereto as a subscribing witness.

Bank H Sieber

SUBSCRIBED and sworn to before me this 15 day of June 1946.

R J Sailer

Notary Public in and for the County of Mercer and State of North Dakota.

My commission expires May 15, 1947

(1)
STATE OF NORTH DAKOTA
COUNTY OF Mercer SS.

On this 15 day of June 1946 before me R J Sailer a Notary Public within and for the State of North Dakota, personally appeared Bank H Sieber known to me to be one of the persons who subscribed his name to the above and foregoing instrument as a witness, and who acknowledged to me that he subscribed his name thereto as such witness, and who proved to me that the person who and/or whose names are subscribed to the foregoing instrument are the persons described

R J Sailer

Notary Public in and for the County of Mercer and State of North Dakota.

My commission expires May 15 1947

**********

(2)
STATE OF

County of SS.

On this day of 19 , before me a Notary Public in and for said County and State, personally appeared

known to me to be the persons who described in and who executed within and foregoing instrument and acknowledged to me that he executed the same.

Notary Public in and for the County of and State North Dakota.

My commission expires

ROUGHRIDER ELECTRIC COOPERATIVE
800 HWY DR

HAZEN, ND 58545

## RIGHT OF WAY EASEMENT

THIS AGREEMENT made and entered into this 11th day of AUGUST, 2014 between Faye Swenson, hereinafter called "Owner" (whether one or more) and **ROUGHRIDER ELECTRIC COOPERATIVE, INC.**, whose post office address is 800 Highway Drive, Hazen, North Dakota 58545-4737, hereinafter called "COOPERATIVE".

WITNESSETH that for valuable consideration, the receipt and sufficiency of which is hereby acknowledged, Owner grants unto Cooperative, its successors and assigns, for a term of 99 years from the date hereof, an easement to construct, reconstruct, operate and maintain an electric distribution system, overhead, underground or both including all poles, guys, anchors wires, surface terminals, and all accessories and appurtenances necessary or desirable in connection therewith, under, over, upon and across lands of Owner and/or in or upon all streets, roads or highways abutting said lands situated in Oliver County, North Dakota, and more particularly described as follows, to-wit:

A strip of land 20 feet in width, the same being 10 feet on each side of a centerline described as follows.

TOWNSHIP 142 NORTH, RANGE 87 WEST
Section 15

The facilities erected hereunder shall remain the property of the Cooperative. Cooperative shall have the right to inspect, rebuild, remove, repair, improve and make such changes, alterations, substitutions and additions in and to its facilities as Cooperative may from time to time deem advisable, including the right to increase or decrease the size or capacity of its system, together with necessary accessories and appurtenances; the right to increase or decrease the size of the facilities and equipment situated upon the premises; the right to permit or otherwise agree to the joint use or occupancy of the overhead lines or the trench and related underground facilities by other persons, associations or corporations; and the right to at any time use the property described above to extend lines and facilities to serve the property of persons other than the Owner.

Any damages to the surface of the right-of-way or to crops, fences, gates, drains, ditches, or lines of the Owner, caused by the Cooperative in the installation, repair maintenance, reconstruction or removal of said electrical properties and appurtenances, shall be promptly repaired, replaced or paid for by the Cooperative, provided a claim therefore is presented to the Cooperative at its General Office within ninety (90) days after such damages occur. If the amount of said damages cannot be agreed upon, the Cooperative and the Owner shall each select an arbitrator, and these two shall select a third arbitrator, and the decision and award of the arbitrators shall be final.

Cooperative shall at all times have the right to keep the easement clear of all buildings, structures or other obstructions, trees, shrubbery, undergrowth and roots.

Owner, his successors and assigns, may use the land within the easement for any purpose not inconsistent with the rights granted, provided such use does not interfere with or endanger the Cooperative's facilities or the rights granted under this easement.

For the purpose of constructing, inspecting, maintaining or operating its facilities, Cooperative shall have the right of ingress to and egress from the easement over the lands of Owner adjacent to the easement and lying between public or private roads and the easement, such right to be exercised in such manner as shall occasion the least practicable damage and inconvenience to Owner.

Owner covenants that he is seized of and has the right to convey the said easement, rights and privileges; that Cooperative shall have quiet and peaceable possession, use and enjoyment of the aforesaid easement, rights and privileges, and that Owner shall execute such further assurances thereof as may be requested by the Cooperative.

Faye Swenson

STATE OF NORTH DAKOTA )
)ss
COUNTY OF MERCER )

On this 11th day of AUGUST, 2014, before me, a Notary Public in and for said County and State personally appeared FAYE SWENSON, known to me to be the person(s) described in and who executed the within and foregoing instrument and acknowledged to me that he/she/they executed the same.

*Notary Seal Location*

90519 7/21/2015 1:56 PM PAGE: 1 OF 1
BOOK: 1 PAGE: 161 FEES: $10.00 MM EASEMENT ROUGHRIDE
Kim Wilkens, OLIVER COUNTY RECORDER
By

RECORDER SEAL OLIVER COUNTY STATE OF NORTH DAKOTA

Notary Public State of North Dakota

My Commission Expires:
6/16/16

ERIC BUCHHOLZ
Notary Public
State of North Dakota
My Commission Expires June 16, 2016

ROUGHRIDER ELECTRIC COOPERATIVE
800 HWY DR

HAZEN, ND 58545

Ofto

01102

FORM LE-189 R

RIGHT OF WAY EASEMENT

KNOW ALL MEN BY THESE PRESENTS, that we the undersigned, (Whether one or more) George Fetch and Mrs. George Fetch

(~~unmarried~~) (husband and wife), for a good and valuable consideration, the receipt whereof is hereby acknowledged, do hereby grant unto Oliver Mercer Electric Cooperative, Inc., a cooperative corporation, (hereinafter called the "Cooperative"), whose post office address is Hazen, North Dakota, and to its successors or assigns, the right to enter upon the lands of the undersigned, situated in the County of Oliver, State of North Dakota, and more particularly described as follows:

A tract of land approximately ---------- acres in area, located ----------miles in a ---------- direction from the town of ----------, and further described as being in the

NE 1/4 Section 20 Township 142 Range 87

Section Township Range

Section Township Range

Section Township Range

and to contract, operate and maintain on the above described lands, and/or in or upon all streets, roads or highways abutting said lands, an electric transmission or distribution line or system, and to cut and trim trees and shrubbery that may interfere with or threaten to endanger the operation and maintenance of said line or system.

The undersigned agree that all poles, wires, and other facilities, including any main service entrance equipment, installed on the above-described lands at the Cooperative's expense shall remain the property of the Cooperative, removable at the option of the Cooperative, upon the termination of service to or on said lands.

The undersigned covenant that they are the owners of the above described lands and that the said lands are free and clear of encumberances and liens of whatsoever character except those held by the following persons:

IN WITNESS WHEREOF, the undersigned have set their hands and seals this 20 day of Oct 1950.

X George Fetch (L.S.)

X Mrs George Fetch (L.S.)

Signed, sealed and delivered in the presence of: Dpm.

Dane P. Maddock

SEAL OLIVER COUNTY NORTH DAKOTA

91054 8/21/2015 10:42 AM PAGE: 1 OF 2
BOOK: 1 PAGE: 1082 FEES: $13.00 MM EASEMENT (ROUGHRID
Kim Wilkens, OLIVER COUNTY RECORDER
By MM Nulty Eng Deputy

(1)
STATE OF NORTH DAKOTA
COUNTY OF Mercer SS.

Dore P. Maddock being first duly sworn says that he is one of the witnesses to the above and foregoing easements, that

George Fetch and Mrs. George Fetch

whose names is and/or are subscribed to the above and foregoing instruments as a party is and/or are the persons described in said easement and that he signed said instrument in my presence and that I in their presence signed my name thereto as a subscribing witness.

Dore P. Maddock.

SUBSCRIBED and sworn to before me this 20th day of October 1950.

Frank J. Belinskey
Notary Public in and for the
County of Mercer and
State of North Dakota.

FRANK J. BELINSKEY NOTARY PUBLIC STATE OF NORTH DAKOTA

My commission expires March 24, 1953

My commission expires _____.

(1)
STATE OF NORTH DAKOTA
COUNTY OF Mercer SS.

On this 20th day of October 1950 before me Frank J. Belinskey a Notary Public within and for the State of North Dakota, personally appeared

Dore P. Maddock known to me to be one of the persons who subscribed his name to the above and foregoing instrument as a witness, and who acknowledged to me that he subscribed his name thereto as such witness, and who proved to me that the person who and/or whose names are subscribed to the foregoing instrument are the persons described in it.

Frank J. Belinskey
Notary Public in and for the
County of Mercer and
State of North Dakota.

FRANK J. BELINSKEY NOTARY PUBLIC STATE OF NORTH DAKOTA

My commission expires March 24, 1953

My commission expires _____.

(2)
STATE OF NORTH DAKOTA
COUNTY OF _____ SS.

On this _____ day of _____ 19___, before me _____

_____, a Notary Public in and for said County and State,

personally appeared _____ and _____
known to me to be the persons _____ who _____ described in and who executed within and foregoing instrument and acknowledged to me that he executed the same.

_____
Notary Public in and for the
County of _____ and
State of North Dakota.

My commission expires _____.

ROUGHRIDER ELECTRIC COOPERATIVE
800 HWY DR

HAZEN, ND 58545

OFFICE OF COUNTY RECORDER
STATE OF NORTH DAKOTA
COUNTY OF OLIVER
Filed for record this 16 day
of Sept A.D. 2011
at 11:45 o'clock M.,
and recorded as document No. 86779
in book FE of Misc page 601-603
[signature]
County Recorder Deputy 16 —

**PIPELINE EASEMENT**

North Dakota State Water Commission
County of Oliver
Parcel H-OL-138

**ALL PERSONS TAKE NOTICE:**

That the undersigned, Eva Dwyer, whether one or more, called the Grantor, being the owner of, or having an interest in, land situated in the County of Oliver, State of North Dakota, more fully described below, in consideration of One and No/100 Dollars ($1.00) and other valuable consideration, does hereby grant, convey, and warrant to the State of North Dakota, acting by and through the North Dakota State Water Commission, a state agency and public corporation, with its principal office at 900 East Boulevard Ave., Bismarck, North Dakota 58505, called the Grantee, and to its successors and assigns, the right, privilege, and easement to construct, maintain, operate, inspect, repair, alter, replace, change the size of or remove a pipeline, and appurtenances thereto, for the transportation of water under, across, and through:

Parcel H-OL-138
A 40 foot wide strip of land 20 feet wide on each side of the pipeline centerline lying within the NE1/4 Section 20, Township 142 North, Range 87 West of the 5th P.M.

Said tract contains 2.42 acres, more or less.

Temporary Construction Easement
An additional 20 feet of temporary right-of-way lying adjacent to the above described tract for a total construction easement width of 60 feet.

Said tract contains 1.21 acres, more or less.

together with the right to utilize additional land for a period up to three years from the date of this easement, adjacent to the above described tract, for purposes of temporary working space during initial construction of the pipeline, and the right of ingress to and egress from said strip of land across the adjacent lands of the Grantor, for the purposes specified above at the will of the Grantee.

**THE GRANTOR AND THE GRANTEE FURTHER AGREE:**

1. **Use of right-of-way by Grantor.** Grantor reserves the right to use the surface of the easement strip provided, however, that Grantor, without prior approval of Grantee, shall neither construct nor permit to be constructed any building, structure, or other improvement upon the easement strip which would interfere with Grantee's exercise of the rights conveyed by this pipeline easement, including access to the easement strip.

2. **Appurtenances.** The Grantee shall have the right to install and construct necessary appurtenances upon the surface of the easement strip. Prior to construction, the Grantee will notify the Grantor of the approximate location of such appurtenances if any, to be located on the easement strip, and shall pay to the Grantor the sum of $500 for each appurtenance located at a distance of more than 5 feet from a field boundary or fence line. Such payments shall be paid prior to construction.

3. **Damages.** The Grantee will pay to Grantor or Grantor's tenants, as their respective interests may appear, for damages caused by the operations or activities of the Grantee; provided, however, that the Grantee shall have the right, without liability for damages, to clear, and keep cleared, all trees, brush, and other obstructions from the easement strip that may, in the Grantee's judgment, interfere with the rights and privileges of the Grantee under this pipeline easement.

   If the amount of any damage which Grantor may sustain as a result of Grantee's exercise of rights hereunder cannot be mutually agreed upon, such damages shall be ascertained and

determined by three (3) disinterested person; one to be appointed by the Grantor, one by Grantee, and a third by the two so appointed, and the award of such three persons shall be final and conclusive.

4. **Restoration of surface.** The Grantee will restore the surface of the construction area to its original contour as nearly as practicable.

5. **Topsoil segregation.** When excavating the pipeline trench with a backhoe/trackhoe, the Grantee will remove the topsoil separately during the construction of the pipeline for the full width of the pipe trench to a depth of twelve (12) inches or the actual topsoil depth, whichever is less, and to be replaced at the top of the backfill over the pipe trench.

6. **Assignment and covenant by parties.** The rights of either party may be assigned in whole or in part. The terms and provisions of this easement shall constitute covenants running with the land and shall be binding upon, and inure to the benefit of, the parties hereto, their successors, assigns, personal representatives, and heirs.

7. **Grantor's title.** Grantor warrants that he is the owner of, or has an interest in, the land described in this easement, and that he has full right and authority to enter into and deliver this easement. This instrument may be executed in counterparts and each counterpart shall constitute a separate agreement between the parties thereto. Any payments pursuant to this pipeline easement shall be in proportion to the Grantor's interest in the undivided fee simple estate.

8. **Entire agreement.** This instrument contains the entire agreement of the parties and there are no other, or different, agreements or understandings between the Grantor and the Grantee, or its agents. The Grantor, in executing this pipeline easement, has not relied upon any promises, inducements, or representatives of the Grantee, or its agents, except as are set forth herein.

9. **Term of easement.** The term of this easement shall be as long as it is needed by the Grantee, or its assigns, and until a release of this easement is recorded, but shall not exceed ninety-nine (99) years pursuant to NDCC §47-05-02.1.

10. **Tenants.** The Grantor represents that the land described in this easement is (not rented) (rented to) _____.

Dated this 23rd day of May, 2011.

Donald A. Stetz
Grantor

Eva Dewyer
Grantor

STATE OF NORTH DAKOTA)
) ss.
COUNTY OF Williams )

On this 31 day of May, 2011, before me personally appeared Donald A. Heth, known to me to be the person(s) described in and who executed the within and foregoing instrument, and acknowledged to me that he/she executed the same.

Kim Schilke
Notary Public

(SEAL)

KIM SCHILKE
Notary Public
State of North Dakota
My Commission Expires October 20, 2012

10-20-2012 County, ND
My Commission expires:

STATE OF NORTH DAKOTA)
) ss.
COUNTY OF Williams )

On this 23rd day of May, 2011, before me personally appeared Eva M. Dwyer, known to me to be the person(s) described in and who executed the within and foregoing instrument, and acknowledged to me that he/she executed the same.

Marri Hammer
Notary Public

(SEAL)

MARRI HAMMER
Notary Public
State of North Dakota
My Commission Expires Aug. 10, 2012

_____ County, ND
My Commission expires:

OFFICE OF COUNTY RECORDER
STATE OF NORTH DAKOTA
COUNTY OF OLIVER
Filed for record this 16 day
Sept A.D. 2011
11:50 o'clock A M.,
Recorded as document No. 56780
Bk FF of Misc page 604-606
B Mitchell
County Recorder Deputy

**PIPELINE EASEMENT**

North Dakota State Water Commission
County of Oliver
Parcel H-OL-138

**ALL PERSONS TAKE NOTICE:**

That the undersigned, Bernice I. Mischel, whether one or more, called the Grantor, being the owner of, or having an interest in, land situated in the County of Oliver, State of North Dakota, more fully described below, in consideration of One and No/100 Dollars ($1.00) and other valuable consideration, does hereby grant, convey, and warrant to the State of North Dakota, acting by and through the North Dakota State Water Commission, a state agency and public corporation, with its principal office at 900 East Boulevard Ave., Bismarck, North Dakota 58505, called the Grantee, and to its successors and assigns, the right, privilege, and easement to construct, maintain, operate, inspect, repair, alter, replace, change the size of or remove a pipeline, and appurtenances thereto, for the transportation of water under, across, and through:

Parcel H-OL-138
A 40 foot wide strip of land 20 feet wide on each side of the pipeline centerline lying within the NE1/4 Section 20, Township 142 North, Range 87 West of the 5th P.M.

Said tract contains 2.42 acres, more or less.

Temporary Construction Easement
An additional 20 feet of temporary right-of-way lying adjacent to the above described tract for a total construction easement width of 60 feet.

Said tract contains 1.21 acres, more or less.

together with the right to utilize additional land for a period up to three years from the date of this easement, adjacent to the above described tract, for purposes of temporary working space during initial construction of the pipeline, and the right of ingress to and egress from said strip of land across the adjacent lands of the Grantor, for the purposes specified above at the will of the Grantee.

**THE GRANTOR AND THE GRANTEE FURTHER AGREE:**

1. **Use of right-of-way by Grantor.** Grantor reserves the right to use the surface of the easement strip provided, however, that Grantor, without prior approval of Grantee, shall neither construct nor permit to be constructed any building, structure, or other improvement upon the easement strip which would interfere with Grantee's exercise of the rights conveyed by this pipeline easement, including access to the easement strip.

2. **Appurtenances.** The Grantee shall have the right to install and construct necessary appurtenances upon the surface of the easement strip. Prior to construction, the Grantee will notify the Grantor of the approximate location of such appurtenances if any, to be located on the easement strip, and shall pay to the Grantor the sum of $500 for each appurtenance located at a distance of more than 5 feet from a field boundary or fence line. Such payments shall be paid prior to construction.

3. **Damages.** The Grantee will pay to Grantor or Grantor's tenants, as their respective interests may appear, for damages caused by the operations or activities of the Grantee; provided, however, that the Grantee shall have the right, without liability for damages, to clear, and keep cleared, all trees, brush, and other obstructions from the easement strip that may, in the Grantee's judgment, interfere with the rights and privileges of the Grantee under this pipeline easement.

   If the amount of any damage which Grantor may sustain as a result of Grantee's exercise of rights hereunder cannot be mutually agreed upon, such damages shall be ascertained and determined by three (3) disinterested person; one to be appointed by the Grantor, one by

Grantee, and a third by the two so appointed, and the award of such three persons shall be final and conclusive.

4. **Restoration of surface.** The Grantee will restore the surface of the construction area to its original contour as nearly as practicable.

5. **Topsoil segregation.** When excavating the pipeline trench with a backhoe/trackhoe, the Grantee will remove the topsoil separately during the construction of the pipeline for the full width of the pipe trench to a depth of twelve (12) inches or the actual topsoil depth, whichever is less, and to be replaced at the top of the backfill over the pipe trench.

6. **Assignment and covenant by parties.** The rights of either party may be assigned in whole or in part. The terms and provisions of this easement shall constitute covenants running with the land and shall be binding upon, and inure to the benefit of, the parties hereto, their successors, assigns, personal representatives, and heirs.

7. **Grantor's title.** Grantor warrants that he is the owner of, or has an interest in, the land described in this easement, and that he has full right and authority to enter into and deliver this easement. This instrument may be executed in counterparts and each counterpart shall constitute a separate agreement between the parties thereto. Any payments pursuant to this pipeline easement shall be in proportion to the Grantor's interest in the undivided fee simple estate.

8. **Entire agreement.** This instrument contains the entire agreement of the parties and there are no other, or different, agreements or understandings between the Grantor and the Grantee, or its agents. The Grantor, in executing this pipeline easement, has not relied upon any promises, inducements, or representatives of the Grantee, or its agents, except as are set forth herein.

9. **Term of easement.** The term of this easement shall be as long as it is needed by the Grantee, or its assigns, and until a release of this easement is recorded, but shall not exceed ninety-nine (99) years pursuant to NDCC §47-05-02.1.

10. **Tenants.** The Grantor represents that the land described in this easement is (not rented) (rented to) _____.

Dated this 8 day of July, 2011.

Bernice A. Muschel
Grantor

STATE OF MONTANA )
) ss.
COUNTY OF Dawson )

On this 8th day of July, 2011, before me personally appeared Bernice I. Mischel, known to me to be the person(s) described in and who executed the within and foregoing instrument, and acknowledged to me that he/she executed the same.

SARAH KAYS
NOTARY PUBLIC for the
State of Montana
Residing at Glendive, Montana
My Commission Expires
March 15, 2012

(SEAL)

Sarah Kays
Notary Public

Dawson County, MT
My Commission expires: March 15, 2012

OFFICE OF COUNTY RECORDER
STATE OF NORTH DAKOTA
COUNTY OF OLIVER
Filed for record this 16 day
of Oct A.D. 2011
at 11:55 o'clock A M.,
and recorded as document No. 86781
in book EF of Misc page 607-609
K Wilkens
County Recorder Deputy 16

**PIPELINE EASEMENT**

North Dakota State Water Commission
County of Oliver
Parcels H-OL-138

**ALL PERSONS TAKE NOTICE:**

That the undersigned, Rose M. Heth, called the Grantor, being the owner of, or having an interest in, land situated in the County of Oliver, State of North Dakota, more fully described below, in consideration of One and No/100 Dollars ($1.00) and other valuable consideration, does hereby grant, convey, and warrant to the State of North Dakota, acting by and through the North Dakota State Water Commission, a state agency and public corporation, with its principal office at 900 East Boulevard Ave., Bismarck, North Dakota 58505, called the Grantee, and to its successors and assigns, the right, privilege, and easement to construct, maintain, operate, inspect, repair, alter, replace, change the size of or remove a pipeline, and appurtenances thereto, for the transportation of water under, across, and through:

Parcel H-OL-138
A 40 foot wide strip of land 20 feet wide on each side of the pipeline centerline lying within the NE1/4 Section 20, Township 142 North, Range 87 West of the 5th P.M.

Said tract contains 2.42 acres, more or less.

Temporary Construction Easement
An additional 20 feet of temporary right-of-way lying adjacent to the above described tract for a total construction easement width of 60 feet.

Said tract contains 1.21 acres, more or less.

together with the right to utilize additional land for a period up to three years from the date of this easement, adjacent to the above described tract, for purposes of temporary working space during initial construction of the pipeline, and the right of ingress to and egress from said strip of land across the adjacent lands of the Grantor, for the purposes specified above at the will of the Grantee.

**THE GRANTOR AND THE GRANTEE FURTHER AGREE:**

1. **Use of right-of-way by Grantor.** Grantor reserves the right to use the surface of the easement strip provided, however, that Grantor, without prior approval of Grantee, shall neither construct nor permit to be constructed any building, structure, or other improvement upon the easement strip which would interfere with Grantee's exercise of the rights conveyed by this pipeline easement, including access to the easement strip.

2. **Appurtenances.** The Grantee shall have the right to install and construct necessary appurtenances upon the surface of the easement strip. Prior to construction, the Grantee will notify the Grantor of the approximate location of such appurtenances if any, to be located on the easement strip, and shall pay to the Grantor the sum of $500 for each appurtenance located at a distance of more than 5 feet from a field boundary or fence line. Such payments shall be paid prior to construction.

3. **Damages.** The Grantee will pay to Grantor or Grantor's tenants, as their respective interests may appear, for damages caused by the operations or activities of the Grantee; provided, however, that the Grantee shall have the right, without liability for damages, to clear, and keep cleared, all trees, brush, and other obstructions from the easement strip that may, in the Grantee's judgment, interfere with the rights and privileges of the Grantee under this pipeline easement.

   If the amount of any damage which Grantor may sustain as a result of Grantee's exercise of rights hereunder cannot be mutually agreed upon, such damages shall be ascertained and determined by three (3) disinterested person; one to be appointed by the Grantor, one by

Grantee, and a third by the two so appointed, and the award of such three persons shall be final and conclusive.

4. **Restoration of surface.** The Grantee will restore the surface of the construction area to its original contour as nearly as practicable.

5. **Topsoil segregation.** When excavating the pipeline trench with a backhoe/trackhoe, the Grantee will remove the topsoil separately during the construction of the pipeline for the full width of the pipe trench to a depth of twelve (12) inches or the actual topsoil depth, whichever is less, and to be replaced at the top of the backfill over the pipe trench.

6. **Assignment and covenant by parties.** The rights of either party may be assigned in whole or in part. The terms and provisions of this easement shall constitute covenants running with the land and shall be binding upon, and inure to the benefit of, the parties hereto, their successors, assigns, personal representatives, and heirs.

7. **Grantor's title.** Grantor warrants that he is the owner of, or has an interest in, the land described in this easement, and that he has full right and authority to enter into and deliver this easement. This instrument may be executed in counterparts and each counterpart shall constitute a separate agreement between the parties thereto. Any payments pursuant to this pipeline easement shall be in proportion to the Grantor's interest in the undivided fee simple estate.

8. **Entire agreement.** This instrument contains the entire agreement of the parties and there are no other, or different, agreements or understandings between the Grantor and the Grantee, or its agents. The Grantor, in executing this pipeline easement, has not relied upon any promises, inducements, or representatives of the Grantee, or its agents, except as are set forth herein.

9. **Term of easement.** The term of this easement shall be as long as it is needed by the Grantee, or its assigns, and until a release of this easement is recorded, but shall not exceed ninety-nine (99) years pursuant to NDCC §47-05-02.1.

10. **Tenants.** The Grantor represents that the land described in this easement is (~~not rented~~) (rented to) Lionell Doll & Lance Doll Thru 12-31-2012.

Dated this 15T day of April, 2011.

Rose M. Heth by:
W. Heth, Dpoa
Grantor William Heth

Rose M. Heth by:
Heth, Dpoa
Grantor Miles Heth

STATE OF NORTH DAKOTA)
) ss.
COUNTY OF Stark )

On this 1 day of April, 2011, before me personally appeared William Hetn and Myles Hetn, known to me to be the person(s) described in and who executed the within and foregoing instrument, and acknowledged to me that he/she executed the same.

Scott Karsky
Notary Public

(SEAL)
Scott Karsky
Notary Public
State of North Dakota
My Commission Expires Feb. 18, 2016

~~February 18~~ Stark County, ND

My Commission expires:
February 18 2011

OFFICE OF COUNTY RECORDER
STATE OF NORTH DAKOTA
COUNTY OF OLIVER
Filed for record this 14 day
of Sept A.D. 2011
at 11:56 o'clock A M.,
and recorded as document No. 56282
in book FF of Misc page 610-613
D Wilkins
County Recorder Deputy 16

**PIPELINE EASEMENT**

North Dakota State Water Commission
County of Oliver
Parcels H-OL-138

**ALL PERSONS TAKE NOTICE:**

That the undersigned, John Smith and Jordan Smith, called the Grantor, being the owner of, or having an interest in, land situated in the County of Oliver, State of North Dakota, more fully described below, in consideration of One and No/100 Dollars ($1.00) and other valuable consideration, does hereby grant, convey, and warrant to the State of North Dakota, acting by and through the North Dakota State Water Commission, a state agency and public corporation, with its principal office at 900 East Boulevard Ave., Bismarck, North Dakota 58505, called the Grantee, and to its successors and assigns, the right, privilege, and easement to construct, maintain, operate, inspect, repair, alter, replace, change the size of or remove a pipeline, and appurtenances thereto, for the transportation of water under, across, and through:

Parcel H-OL-138
A 40 foot wide strip of land 20 feet wide on each side of the pipeline centerline lying within the NE1/4 Section 20, Township 142 North, Range 87 West of the 5th P.M.

Said tract contains 2.42 acres, more or less.

Temporary Construction Easement
An additional 20 feet of temporary right-of-way lying adjacent to the above described tract for a total construction easement width of 60 feet.

Said tract contains 1.21 acres, more or less.

together with the right to utilize additional land for a period up to three years from the date of this easement, adjacent to the above described tract, for purposes of temporary working space during initial construction of the pipeline, and the right of ingress to and egress from said strip of land across the adjacent lands of the Grantor, for the purposes specified above at the will of the Grantee.

**THE GRANTOR AND THE GRANTEE FURTHER AGREE:**

1. **Use of right-of-way by Grantor.** Grantor reserves the right to use the surface of the easement strip provided, however, that Grantor, without prior approval of Grantee, shall neither construct nor permit to be constructed any building, structure, or other improvement upon the easement strip which would interfere with Grantee's exercise of the rights conveyed by this pipeline easement, including access to the easement strip.

2. **Appurtenances.** The Grantee shall have the right to install and construct necessary appurtenances upon the surface of the easement strip. Prior to construction, the Grantee will notify the Grantor of the approximate location of such appurtenances if any, to be located on the easement strip, and shall pay to the Grantor the sum of $500 for each appurtenance located at a distance of more than 5 feet from a field boundary or fence line. Such payments shall be paid prior to construction.

3. **Damages.** The Grantee will pay to Grantor or Grantor's tenants, as their respective interests may appear, for damages caused by the operations or activities of the Grantee; provided, however, that the Grantee shall have the right, without liability for damages, to clear, and keep cleared, all trees, brush, and other obstructions from the easement strip that may, in the Grantee's judgment, interfere with the rights and privileges of the Grantee under this pipeline easement.

   If the amount of any damage which Grantor may sustain as a result of Grantee's exercise of rights hereunder cannot be mutually agreed upon, such damages shall be ascertained and determined by three (3) disinterested person; one to be appointed by the Grantor, one by

Grantee, and a third by the two so appointed, and the award of such three persons shall be final and conclusive.

4. **Restoration of surface.** The Grantee will restore the surface of the construction area to its original contour as nearly as practicable.

5. **Topsoil segregation.** When excavating the pipeline trench with a backhoe/trackhoe, the Grantee will remove the topsoil separately during the construction of the pipeline for the full width of the pipe trench to a depth of twelve (12) inches or the actual topsoil depth, whichever is less, and to be replaced at the top of the backfill over the pipe trench.

6. **Assignment and covenant by parties.** The rights of either party may be assigned in whole or in part. The terms and provisions of this easement shall constitute covenants running with the land and shall be binding upon, and inure to the benefit of, the parties hereto, their successors, assigns, personal representatives, and heirs.

7. **Grantor's title.** Grantor warrants that he is the owner of, or has an interest in, the land described in this easement, and that he has full right and authority to enter into and deliver this easement. This instrument may be executed in counterparts and each counterpart shall constitute a separate agreement between the parties thereto. Any payments pursuant to this pipeline easement shall be in proportion to the Grantor's interest in the undivided fee simple estate.

8. **Entire agreement.** This instrument contains the entire agreement of the parties and there are no other, or different, agreements or understandings between the Grantor and the Grantee, or its agents. The Grantor, in executing this pipeline easement, has not relied upon any promises, inducements, or representatives of the Grantee, or its agents, except as are set forth herein.

9. **Term of easement.** The term of this easement shall be as long as it is needed by the Grantee, or its assigns, and until a release of this easement is recorded, but shall not exceed ninety-nine (99) years pursuant to NDCC §47-05-02.1.

10. **Tenants.** The Grantor represents that the land described in this easement is (not rented) (rented to) Lionel & Lance Doll.

Dated this 25th day of March, 2011.

John Smith
Grantor

Grantor

STATE OF NORTH DAKOTA)
) ss.
COUNTY OF Oliver )

On this 25th day of March, 2011, before me personally appeared John Smith, known to me to be the person(s) described in and who executed the within and foregoing instrument, and acknowledged to me that he/she executed the same.

Notary Public

(SEAL)

Morton County, ND
My Commission expires:

JAY L. PETERSON
Notary Public
State of North Dakota
My Commission Expires Jan. 13, 2015

STATE OF MINNESOTA )
) ss.
COUNTY OF _____)

On this 8 day of April, 2011, before me personally appeared Jordan Smith, known to me to be the person(s) described in and who executed the within and foregoing instrument, and acknowledged to me that he/she executed the same.

Notary Public

(SEAL)

Swift
Jan 31 2012 County, MN
My Commission expires:

MARY S. ERICKSON
NOTARY PUBLIC-MINNESOTA
My Comm. Exp. Jan. 31, 2012

OFFICE OF COUNTY RECORDER
STATE OF NORTH DAKOTA
COUNTY OF OLIVER
Filed for record this 16 day
of Sept A.D. 2011
at 11:57 o'clock A M.,
and recorded as document No. 86783
in book FF of Misc page 613-615
D Williams
County Recorder Deputy

**PIPELINE EASEMENT**

North Dakota State Water Commission
County of Oliver
Parcels H-OL-142, H-OL-144

**ALL PERSONS TAKE NOTICE:**

That the undersigned, John Smith and Jordan Smith, whether one or more, called the Grantor, being the owner of, or having an interest in, land situated in the County of Oliver, State of North Dakota, more fully described below, in consideration of One and No/100 Dollars ($1.00) and other valuable consideration, does hereby grant, convey, and warrant to the State of North Dakota, acting by and through the North Dakota State Water Commission, a state agency and public corporation, with its principal office at 900 East Boulevard Ave., Bismarck, North Dakota 58505, called the Grantee, and to its successors and assigns, the right, privilege, and easement to construct, maintain, operate, inspect, repair, alter, replace, change the size of or remove a pipeline, and appurtenances thereto, for the transportation of water under, across, and through:

Parcel H-OL-142
A 40 foot wide strip of land 20 feet wide on each side of the pipeline centerline lying within the North 200 feet of the East 200 feet of the NE1/4 Section 22, Township 142 North, Range 87 West of the 5th P.M.

Said tract contains 0.18 acres, more or less.

Temporary Construction Easement
An additional 20 feet of temporary right-of-way lying adjacent to the above described tract for a total construction easement width of 60 feet.

Said tract contains 0.10 acres, more or less.

Parcel H-OL-144
A 40 foot wide strip of land 20 feet wide on each side of the pipeline centerline lying within the NW1/4 Section 23, Township 142 North, Range 87 West of the 5th P.M.

Said tract contains 2.42 acres, more or less.

Temporary Construction Easement
An additional 20 feet of temporary right-of-way lying adjacent to the above described tract for a total construction easement width of 60 feet.

Said tract contains 1.21 acres, more or less.

together with the right to utilize additional land for a period up to three years from the date of this easement, adjacent to the above described tract, for purposes of temporary working space during initial construction of the pipeline, and the right of ingress to and egress from said strip of land across the adjacent lands of the Grantor, for the purposes specified above at the will of the Grantee.

**THE GRANTOR AND THE GRANTEE FURTHER AGREE:**

1. **Use of right-of-way by Grantor.** Grantor reserves the right to use the surface of the easement strip provided, however, that Grantor, without prior approval of Grantee, shall neither construct nor permit to be constructed any building, structure, or other improvement upon the easement strip which would interfere with Grantee's exercise of the rights conveyed by this pipeline easement, including access to the easement strip.

2. **Appurtenances.** The Grantee shall have the right to install and construct necessary appurtenances upon the surface of the easement strip. Prior to construction, the Grantee will notify the Grantor of the approximate location of such appurtenances if any, to be located on the easement strip, and shall pay to the Grantor the sum of $500 for each appurtenance located at a distance of more than 5 feet from a field boundary or fence line. Such payments shall be paid prior to construction.

3. **Damages.** The Grantee will pay to Grantor or Grantor's tenants, as their respective interests may appear, for damages caused by the operations or activities of the Grantee; provided, however, that the Grantee shall have the right, without liability for damages, to clear, and keep cleared, all trees, brush, and other obstructions from the easement strip that may, in the Grantee's judgment, interfere with the rights and privileges of the Grantee under this pipeline easement.

   If the amount of any damage which Grantor may sustain as a result of Grantee's exercise of rights hereunder cannot be mutually agreed upon, such damages shall be ascertained and determined by three (3) disinterested person; one to be appointed by the Grantor, one by Grantee, and a third by the two so appointed, and the award of such three persons shall be final and conclusive.

4. **Restoration of surface.** The Grantee will restore the surface of the construction area to its original contour as nearly as practicable.

5. **Topsoil segregation.** When excavating the pipeline trench with a backhoe/trackhoe, the Grantee will remove the topsoil separately during the construction of the pipeline for the full width of the pipe trench to a depth of twelve (12) inches or the actual topsoil depth, whichever is less, and to be replaced at the top of the backfill over the pipe trench.

6. **Assignment and covenant by parties.** The rights of either party may be assigned in whole or in part. The terms and provisions of this easement shall constitute covenants running with the land and shall be binding upon, and inure to the benefit of, the parties hereto, their successors, assigns, personal representatives, and heirs.

7. **Grantor's title.** Grantor warrants that he is the owner of, or has an interest in, the land described in this easement, and that he has full right and authority to enter into and deliver this easement. This instrument may be executed in counterparts and each counterpart shall constitute a separate agreement between the parties thereto. Any payments pursuant to this pipeline easement shall be in proportion to the Grantor's interest in the undivided fee simple estate.

8. **Entire agreement.** This instrument contains the entire agreement of the parties and there are no other, or different, agreements or understandings between the Grantor and the Grantee, or its agents. The Grantor, in executing this pipeline easement, has not relied upon any promises, inducements, or representatives of the Grantee, or its agents, except as are set forth herein.

9. **Term of easement.** The term of this easement shall be as long as it is needed by the Grantee, or its assigns, and until a release of this easement is recorded, but shall not exceed ninety-nine (99) years pursuant to NDCC §47-05-02.1.

10. **Tenants.** The Grantor represents that the land described in this easement is (not rented) (rented to) _____.

Dated this 8 day of April, 2011.

Grantor

Grantor

STATE OF NORTH DAKOTA)
) ss.
COUNTY OF Oliver )

On this 25th day of March, 2011, before me personally appeared John Smith, known to me to be the person(s) described in and who executed the within and foregoing instrument, and acknowledged to me that he/she executed the same.

Notary Public

(SEAL)
JAY L. PETERSON
Notary Public
State of North Dakota
My Commission Expires Jan. 13, 2015

Morton County, ND
My Commission expires:

STATE OF MINNESOTA )
) ss.
COUNTY OF _____)

On this 8 day of April, 2011, before me personally appeared _____, known to me to be the person(s) described in and who executed the within and foregoing instrument, and acknowledged to me that he/she executed the same.

Notary Public

(SEAL)

Swift County, MN
My Commission expires:
1-31-12

MARY S. ERICKSON
NOTARY PUBLIC-MINNESOTA
My Comm. Exp. Jan. 31, 2012

90465 7/17/2015 10:16 AM PAGE: 1 OF 1
BOOK: LL PAGE: 266 FEES: $10.00 MM EASEMENT
Kim Wilkens, OLIVER COUNTY RECORDER
By MM Nelty E. Deputy

SOUTHWEST WATER AUTHORITY
WEST INDUSTRIAL PARK
4665 2ND STREET SW
DICKINSON, ND 58601-7231

STATE OF NORTH DAKOTA ★ RECORDER ★ OLIVER COUNTY SEAL


**SOUTHWEST WATER AUTHORITY**
Southwest Pipeline Project Building
West Industrial Park
4665 2nd Street SW
Dickinson, ND 58601-7231
(701) 225-0241
Toll Free: 1-888-425-0241


Segment **7-9E WEST CENTER SERVICE AREA**
Parcel **142-87-18**

## RIGHT-OF-WAY EASEMENT

### ALL PERSONS TAKE NOTICE:

In consideration of one dollar ($1.00) and other good and valuable consideration **JORDAN B. SMITH 36497 320TH ST. BENSON, MN 56215** hereinafter referred to as Grantor, does hereby grant, bargain, sell, transfer and convey to the Southwest Water Authority, hereinafter referred to as the Grantee, its successor and assigns, a perpetual easement with right to erect, construct, install and lay, and thereafter use, operate, inspect, repair, maintain, replace, and remove water pipelines, connections, valves and all other appurtenant facilities used in connection with the construction, operation and maintenance of the Southwest Pipeline Project, over, above, across and through the land of the Grantor, situated in **Oliver** County, State of North Dakota, said land being described as follows: **SE1/4 SECTION 22 & NW1/4, SW1/4 SECTION 23 TOWNSHIP 142 RANGE 87** (the tract that contains **6.38** acres, more or less), together with the right of ingress and egress over the adjacent lands of the Grantor, successors and assigns for the purposes of this easement.

1. The permanent easement will be thirty (30) feet in width, fifteen (15) feet on each side of the center line of the pipeline as constructed, with an additional ten (10) feet of temporary right-of-way for a total construction easement width of forty (40) feet, twenty (20) feet on each side of the center line.

2. The Grantee covenants to maintain the easement in good repair so that no unreasonable damage will result from its use to the adjacent land of the Grantor, successors and assigns. The Grantor will receive compensation for damages to growing crops caused by the construction or operation. The Grantor will report any damages within three (3) years of the construction of the project.

The grant and other provisions of this easement shall constitute a covenant running with the land for the benefit of the Grantee, its successors and assigns.

**IN WITNESS WHEREOF,** the Grantor has executed this instrument this 29 day of May, 2015.

[signature] GRANTOR _____ GRANTOR

State of Minnesota

County of Swift

On May 29, 2015, personally appeared before me Jordan Smith

_____ whom I know personally.
✓ whose identity I verified on the basis of Drivers License.
_____ whose identity I verified on the oath or affirmation of _____, a credible witness to be the signor of the above and he/she acknowledged that he/she signed it.

HEIDI CHRISTINA SVINGEN
Notary Public
Minnesota
My Comm. Expires
Jan 31, 2018

Notary Public [signature]
Swift, County
My Commission Expires: 1/31/18

RECEIVED JUN - 2 2015 SOUTHWEST WATER AUTHORITY

90466 7/17/2015 10:19 AM PAGE: 1 OF 1
BOOK: LL PAGE: 267 FEES: $10.00 MM EASEMENT
Kim Wilkens, OLIVER COUNTY RECORDER
By MMMulty Ed Deputy

SOUTHWEST WATER AUTHORITY
WEST INDUSTRIAL PARK
4665 2ND STREET SW
DICKINSON, ND 58601-7231

STATE OF NORTH DAKOTA COUNTY OF OLIVER RECORDER SEAL

**SOUTHWEST WATER AUTHORITY**
Southwest Pipeline Project Building
West Industrial Park
4665 2nd Street SW
Dickinson, ND 58601-7231
(701) 225-0241
Toll Free: 1-888-425-0241

Segment **7-9E WEST CENTER SERVICE AREA**
Parcel **142-87-18**

## RIGHT-OF-WAY EASEMENT

## ALL PERSONS TAKE NOTICE:

In considerationof one dollar ($1.00) and other good and valuable consideration **JENNIFER RUDOLPH 5400 KAYLEY DR BISMARCK, ND 58504** hereinafter referred to as Grantor, does hereby grant, bargain, sell, transfer and convey to the Southwest Water Authority, hereinafter referred to as the Grantee, its successor and assigns, a perpetual easement with right to erect, construct, install and lay, and thereafter use, operate, inspect, repair, maintain, replace, and remove water pipelines, connections, valves and all other appurtenant facilities used in connection with the construction, operation and maintenance of the Southwest Pipeline Project, over, above, across and through the land of the Grantor, situated in **Oliver** County, State of North Dakota, said land being described as follows: **SE1/4 SECTION 22 & NW1/4, SW1/4 SECTION 23 TOWNSHIP 142 RANGE 87** (the tract that contains **6.38** acres, more or less), together with the right of ingress and egress over the adjacent lands of the Grantor, successors and assigns for the purposes of this easement.

1. The permanent easement will be thirty (30) feet in width, fifteen (15) feet on each side of the center line of the pipeline as constructed, with an additional ten (10) feet of temporary right-of-way for a total construction easement width of forty (40) feet, twenty (20) feet on each side of the center line.

2. The Grantee covenants to maintain the easement in good repair so that no unreasonable damage will result from its use to the adjacent land of the Grantor, successors and assigns. The Grantor will receive compensation for damages to growing crops caused by the construction or operation. The Grantor will report any damages within three (3) years of the construction of the project.

The grant and other provisions of this easement shall constitute a covenant running with the land for the benefit of the Grantee, its successors and assigns.

**IN WITNESS WHEREOF,** the Grantor has executed this instrument this 26th day of May, 2015.

_____ GRANTOR _____ GRANTOR

State of North Dakota

County of Burleigh

On May 26th, 2015, personally appeared before me Jennifer Rudolph

_____ whom I know personally.
__X__ whose identity I verified on the basis of ND Drivers License.
_____ whose identity I verified on the oath or affirmation of _____, a credible witness to be the signor of the above and he/she acknowledged that he/she signed it.

RICHARD KELLER
Notary Public
State of North Dakota
My Commission Expires October 19, 2016

Notary Public _____

Burleigh, County ND

My Commission Expires: 10/19/16

# RIGHT OF WAY EASEMENT

THIS AGREEMENT made and entered into this 25th day of February, 2016, between Jennifer Rudolph of 5400 Kayley Drive, Bismarck, ND 58504, hereinafter called "Owner" (whether one or more) and ROUGHRIDER ELECTRIC COOPERATIVE, INC., whose post office address is 800 Highway Drive, Hazen, North Dakota 58545-4737, hereinafter called "COOPERATIVE".

WITNESSETH that for valuable consideration, the receipt and sufficiency of which is hereby acknowledged, Owner grants unto Cooperative, its successors and assigns, for a term of 99 years from the date hereof, an easement to construct, reconstruct, operate and maintain an electric distribution system, overhead, underground or both including all poles, guys, anchors wires, surface terminals, and all accessories and appurtenances necessary or desirable in connection therewith, under, over, upon and across lands of Owner and/or in or upon all streets, roads or highways abutting said lands situated in Oliver County, North Dakota, and more particularly described as follows, to-wit:

A parcel of land in the W1/2 of Section 23, Township 142 North, Range 87 West of the Fifth Principal Meridian, 20 feet in width, 10 feet on each side of a centerline described as follows:

Beginning at the east line of the northwest corner of Section 23, Township 142 North, Range 87 West, at a point which bears S87°41'07"E a distance of 2634.65 feet from the northwest corner of Section 23, Township 142N, Range 87W; thence N89°21'16"W a distance of 2599.21 feet; thence S0°56'27"W a distance of 5192.35 feet more or less; to the POINT OF TERMINATION at the south line of the southwest quarter of Section 23, Township 142N, Range 87W, at a point which bears N1°48'17"E a distance of 2637.57 feet from the west quarter of Section 26, Township 142N, Range 87W.

In Section 23, Township 142 North, Range 87 West of the Fifth Principal Meridian described as follows:

The facilities erected hereunder shall remain the property of the Cooperative. Cooperative shall have the right to inspect, rebuild, remove, repair, improve and make such changes, alterations, substitutions and additions in and to its facilities as Cooperative may from time to time deem advisable, including the right to increase or decrease the size or capacity of its system, together with necessary accessories and appurtenances; the right to increase or decrease the size of the facilities and equipment situated upon the premises; the right to permit or otherwise agree to the joint use or occupancy of the overhead lines or the trench and related underground facilities by other persons, associations or corporations; and the right to at any time use the property described above to extend lines and facilities to serve the property of persons other than the Owner.

Any damages to the surface of the right-of-way or to crops, fences, gates, drains, ditches, or lines of the Owner, caused by the Cooperative in the installation, repair maintenance, reconstruction or removal of said electrical properties and appurtenances, shall be promptly repaired, replaced or paid for by the Cooperative, provided a claim therefore is presented to the Cooperative at its General Office within ninety (90) days after such damages occur. If the amount of said damages cannot be agreed upon, the Cooperative and the Owner shall each select an arbitrator, and these two shall select a third arbitrator, and the decision and award of the arbitrators shall be final.

Cooperative shall at all times have the right to keep the easement clear of all buildings, structures or other obstructions, trees, shrubbery, undergrowth and roots.

Owner, his successors and assigns, may use the land within the easement for any purpose not inconsistent with the rights granted, provided such use does not interfere with or endanger the Cooperative's facilities or the rights granted under this easement.

For the purpose of constructing, inspecting, maintaining or operating its facilities, Cooperative shall have the right of ingress to and egress from the easement over the lands of Owner adjacent to the easement and lying between public or private roads and the easement, such right to be exercised in such manner as shall occasion the least practicable damage and inconvenience to Owner.

Owner covenants that he is seized of and has the right to convey the said easement, rights and privileges; that Cooperative shall have quiet and peaceable possession, use and enjoyment of the aforesaid easement, rights and privileges, and that Owner shall execute such further assurances thereof as may be requested by the Cooperative.

Jennifer Rudolph

STATE OF NORTH DAKOTA)
)ss
COUNTY OF Burleigh )

On this 25th day of February, 20 16, before me, a Notary Public in and for said County and State personally appeared Jennifer Rudolph, known to me to be the person(s) described in and who executed the within and foregoing instrument and acknowledged to me that he/she/they executed the same.

*Notary Seal Location*

JOHN JANGULA
Notary Public
State of North Dakota
My Commission Expires May 15, 2021

Notary Public State of North Dakota

My Commission Expires: May 15, 2021

92454 3/15/2016 3:50 PM PAGE: 1 OF 2
BOOK: MM PAGE: 290 FEES: $13.00 MM EASEMENT
Kim Wilkens, OLIVER COUNTY RECORDER
By Deputy

MOUNTAIN PLAINS LLC
JOSH MUEHLER, FIELD MANAGER
PO BOX 487
BISMARCK, ND 58502

OLIVER COUNTY RECORDER SEAL STATE OF NORTH DAKOTA

# RIGHT OF WAY EASEMENT

THIS AGREEMENT made and entered into this 25th day of February, 2016, between Gary Smith of 6800 81st Street NE, Bismarck, ND 58503, hereinafter called "Owner" (whether one or more) and ROUGHRIDER ELECTRIC COOPERATIVE, INC., whose post office address is 800 Highway Drive, Hazen, North Dakota 58545-4737, hereinafter called "COOPERATIVE".

WITNESSETH that for valuable consideration, the receipt and sufficiency of which is hereby acknowledged, Owner grants unto Cooperative, its successors and assigns, for a term of 99 years from the date hereof, an easement to construct, reconstruct, operate and maintain an electric distribution system, overhead, underground or both including all poles, guys, anchors wires, surface terminals, and all accessories and appurtenances necessary or desirable in connection therewith, under, over, upon and across lands of Owner and/or in or upon all streets, roads or highways abutting said lands situated in Oliver County, North Dakota, and more particularly described as follows, to-wit:

A parcel of land in the W1/2 of Section 23, Township 142 North, Range 87 West of the Fifth Principal Meridian, 20 feet in width, 10 feet on each side of a centerline described as follows:

Beginning at the east line of the northwest corner of Section 23, Township 142 North, Range 87 West, at a point which bears S87°41'07"E a distance of 2634.65 feet from the northwest corner of Section 23, Township 142N, Range 87W; thence N89°21'16"W a distance of 2599.21 feet; thence S0°56'27"W a distance of 5192.35 feet more or less; to the POINT OF TERMINATION at the south line of the southwest quarter of Section 23, Township 142N, Range 87W, at a point which bears N1°48'17"E a distance of 2637.57 feet from the west quarter of Section 26, Township 142N, Range 87W.

In Section 23, Township 142 North, Range 87 West of the Fifth Principal Meridian described as follows:

The facilities erected hereunder shall remain the property of the Cooperative. Cooperative shall have the right to inspect, rebuild, remove, repair, improve and make such changes, alterations, substitutions and additions in and to its facilities as Cooperative may from time to time deem advisable, including the right to increase or decrease the size or capacity of its system, together with necessary accessories and appurtenances; the right to increase or decrease the size of the facilities and equipment situated upon the premises; the right to permit or otherwise agree to the joint use or occupancy of the overhead lines or the trench and related underground facilities by other persons, associations or corporations; and the right to at any time use the property described above to extend lines and facilities to serve the property of persons other than the Owner.

Any damages to the surface of the right-of-way or to crops, fences, gates, drains, ditches, or lines of the Owner, caused by the Cooperative in the installation, repair maintenance, reconstruction or removal of said electrical properties and appurtenances, shall be promptly repaired, replaced or paid for by the Cooperative, provided a claim therefore is presented to the Cooperative at its General Office within ninety (90) days after such damages occur. If the amount of said damages cannot be agreed upon, the Cooperative and the Owner shall each select an arbitrator, and these two shall select a third arbitrator, and the decision and award of the arbitrators shall be final.

Cooperative shall at all times have the right to keep the easement clear of all buildings, structures or other obstructions, trees, shrubbery, undergrowth and roots.

Owner, his successors and assigns, may use the land within the easement for any purpose not inconsistent with the rights granted, provided such use does not interfere with or endanger the Cooperative's facilities or the rights granted under this easement.

For the purpose of constructing, inspecting, maintaining or operating its facilities, Cooperative shall have the right of ingress to and egress from the easement over the lands of Owner adjacent to the easement and lying between public or private roads and the easement, such right to be exercised in such manner as shall occasion the least practicable damage and inconvenience to Owner.

Owner covenants that he is seized of and has the right to convey the said easement, rights and privileges; that Cooperative shall have quiet and peaceable possession, use and enjoyment of the aforesaid easement, rights and privileges, and that Owner shall execute such further assurances thereof as may be requested by the Cooperative.

Gary A. Smith

Gary Smith

STATE OF NORTH DAKOTA)
)ss
COUNTY OF Burleigh )

On this 25th day of February, 2016, before me, a Notary Public in and for said County and State personally appeared Gary Smith, known to me to be the person(s) described in and who executed the within and foregoing instrument and acknowledged to me that he/she/they executed the same.

*Notary Seal Location*

JOHN JANGULA
Notary Public
State of North Dakota
My Commission Expires May 15, 2021

Notary Public State of North Dakota

My Commission Expires: May 15, 2021

92455 3/15/2016 3:53 PM PAGE: 1 OF 2
BOOK: MM PAGE: 292 FEES: $13.00 MM EASEMENT
Kim Wilkens, OLIVER COUNTY RECORDER
By MM Mueller Deputy

MOUNTAIN PLAINS LLC
JOSH MUEHLER, FIELD MANAGER
PO BOX 487
BISMARCK, ND 58502

OLIVER COUNTY RECORDER SEAL STATE OF NORTH DAKOTA

01103

Location Number

RIGHT-OF-WAY EASEMENT

KNOW ALL MEN BY THESE PRESENTS, that the undersigned S. H. Tjaden and Hannah Tjaden (wife) for a good and valuable consideration, the receipt whereof is hereby acknowledged, does hereby grant unto the Oliver-Mercer Electric Cooperative, Inc. a corporation, whose post office address is Hazen, N. Dak., North Dakota, and to its successors or assigns, the right to enter upon the lands of the undersigned, situated in the county of Oliver, State of North Dakota and more particularly described as follows:

SE¼ Sec. 22 Township 142-87

and to place, construct, operate, repair, maintain, relocate and replace thereon and in or upon all streets, roads or highways abutting said lands an electric transmission or distribution line or system, and to cut and trim trees and shrubbery to the extent necessary to keep them clear of said electric line or system and to cut down from time to time all dead, weak, leaning or dangerous trees that are tall enough to strike the wires in falling.

In granting this easement it is understood that at pole locations, only a single pole and arrurtenance will be used, and that the location of the pole will be such as to form the least possible interference to farm operations, so long as it does not materially increase the cost of construction.

The undersigned covenants that he is the owner of the above described lands and that the said lands are free and clear of encumbrances and liens of whatsoever character except those held by the following persons:

None

It is further understood that, whenever necessary, words in this instrument in the singular shall be construed to read in the plural and that words used in the masculine gender shall be construed to read in the feminine.

IN WITNESS WHEREOF, the undersigned have set their hands and seals this 23 day of April, 19 45.

Signed, sealed and delivered in the presence of:

Edna Machacek

S. H. Tjaden

Hannah Tjaden

91056 8/21/2015 10:48 AM PAGE: 1 OF 2
BOOK: 1 PAGE: 1086 FEES: $13.00 MM EASEMENT (ROUGHRID
Kim Wilkens, OLIVER COUNTY RECORDER
By MMulty-Ea Deputy

STATE OF NORTH DAKOTA COUNTY OF OLIVER RECORDER SEAL

6010

(1)
STATE OF NORTH DAKOTA

COUNTY OF Oliver SS.

Edna Michaels being first duly sworn says that he is one of the witnesses to the above and foregoing easements, that S. H. Tjaden and Hannah Tjaden whose names is and/or are subscribed to the above and foregoing instruments as a party is and/or are the persons described in said easement and that they signed said instrument in my presence and that I in their presence signed my name thereto as a subscribing witness.

Edna Michaels

SUBSCRIBED and sworn to before me this 21 day of May 1945

Clara W. Wilcox
Notary Public in and for the County of Oliver and State of North Dakota.

My commission expires

NOTARY PUBLIC, OLIVER CO., N. DAK.
My Commission Expires March 5, 1949.

(1)
STATE OF NORTH DAKOTA
COUNTY OF Oliver SS.

On this 21 day of May 1945 before me Clara W. Wilcox a Notary Public within and for the State of North Dakota, personally appeared Edna Michaels known to me to be one of the persons who subscribed his name to the above and foregoing instrument as a witness, and who acknowledged to me that he subscribed his name thereto as such witness, and who proved to me that the person who and/or whose names are subscribed to the foregoing instrument are the persons described in it.

ROUGHRIDER ELECTRIC COOPERATIVE
800 HWY DR

HAZEN, ND 58545

Clara W. Wilcox
Notary Public in and for the County of Oliver and State of North Dakota.

My commission expires

NOTARY PUBLIC, OLIVER CO., N. DAK.
My Commission Expires March 5, 1949.

**********

(2)
STATE OF

County of SS.

On this day of 19, before me , a Notary Public in and for said County and State, personally appeared and known to me to be the persons who described in and who executed within and foregoing instrument and acknowledged to me that he executed the same.

Notary Public in and for the County of and State North Dakota.

My commission expires .

**NORTH DAKOTA INDUSTRIAL COMMISSION**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case Nos. 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## DECLARATION OF KURT SWENSON

[¶1] I, Kurt Swenson, as trustee of The Swenson Living Trust, declare, on behalf of the Trust and based on personal knowledge, as follows :

[¶2] I have ownership interest in the following properties that lie within the boundaries of the proposed BK Fischer Storage Facility.

- Township 142 North, Range 87 West
  Section 7: Outlot B in E1/2 NW1/4 LESS Lot One
  Oliver County, ND

- Township 142 North, Range 88 West
  Section 14: W1/2 NE1/4
  Mercer County, ND

- Township 143 North, Range 88 West
  Section 27: S1/2 SE1/4
  Mercer County, ND

[¶3] To the best of my knowledge, the properties listed in ¶ 2 above are encumbered by the following easements:

- Section 7:
  i. Southwest Water Authority Easement executed by James Kusler, Johnell Kusler, and Milda Hedblom dated February 3, 2014 (90188/90189/90190).
  ii. Trent T. Martin Easement (Water Well and Tank) executed by Johnell Kusler (PR), et al. and dated May 31, 2022 (97087).
  iii. Trent T. Martin Easement (Corrected Reciprocal Access) executed by Johnell Kusler (PR), et al. and dated May 31, 2022 (97731).

- Section 14:
  i. Oliver-Mercer Electric Coop Easement executed by John Scheidt and dated April 22, 1949 (209412).
  ii. Oliver-Mercer Electric Coop Easement executed by Gladys Scheidt and dated July 3, 1990 (209427).
  iii. West River Telecommunications Coop Easement executed by Gladys Scheidt and dated June 29, 1993 (153687).

- Section 27:
    i. Oliver-Mercer Electric Coop Easement executed by Leland Erickson and dated November 6, 1974 (208123).
    ii. Southwest Water Authority Easement executed by James Kusler and dated February 3, 2014 (211517).
    iii. Roughrider Electric Coop, Inc. Right of Way Easement executed by James Kusler and dated June 19, 2014 (206136).
    iv. Southwest Water Authority Easement executed by James Kusler, dated May 22, 2015 (207510).

[¶4] I have ownership interest in the following properties that lie within the boundaries of the Review Area of the proposed BK Fischer Storage Facility:

- Township 142 North, Range 87 West
  Section 9: SW1/4
  Oliver County, ND

- Township 142 North, Range 87 West
  Section 21: W1/2
  Oliver County, ND

- Township 143 North, Range 88 West
  Section 27: N1/2 SE1/4
  Mercer County, ND

[¶5] To the best of my knowledge, the properties listed in ¶ 4 above are encumbered by the following easements:

- Section 21:
    i. Oliver-Mercer Electric Coop. Easement executed by Norman Smith and dated June 6, 1946 (91055).

- Section 27:
    i. Oliver-Mercer Electric Coop Easement executed by Leland Erickson and dated November 6, 1974 (208123).
    ii. Southwest Water Authority Easement executed by James Kusler and dated February 3, 2014 (211517).
    iii. Southwest Water Authority Easement executed by James Kusler and dated May 22, 2015 (207510).

[¶6] I have ownership interest in the following properties that lie between, and will be impacted by, the proposed Storage Facilities:

- Township 142 North, Range 87 West
  Section 21: E1/2
  Oliver County, ND

- Township 142 North, Range 87 West
  Section 22: NW1/4
  Oliver County, ND

[¶7] To the best of my knowledge, the property listed in ¶ 6 above are encumbered by the following easements:

- Section 21:
  i. Roughrider Electric Coop, Inc. Easement executed by Faye Swenson and dated July 1, 2008 (88076).
  ii. Southwest Water Authority Easement executed by Kurt Swenson, et ux. and dated April 2, 2015 (89860).
  iii. West River Telecommunications Cooperative Right-of-Way Easement executed by Donna M. Smith and dated November 18, 2015 (92299).

- Section 22:
  i. West River Telecommunications Cooperative Right-of-Way Easement executed by Donna M. Smith and dated November 18, 2015 (92299).

[¶8] I have ownership interest in the following property that lies within the boundaries of the Review Area of the proposed KJ Hintz Storage Facility:

- Township 142 North, Range 87 West
  Section 15: SE1/4
  Oliver County, ND

[¶9] To the best of my knowledge, the property listed in ¶ 8 above is encumbered by the following easements:

- Section 15:
  i. Oliver-Mercer Electric Coop. Easement executed by Ralph Smith and dated June 6, 1946 (91055).
  ii. Oliver-Mercer Electric Coop. Easement executed by Ralph E. Smith and dated November 20, 1975 (90409).
  iii. North Dakota State Water Commission Pipeline Easement executed by Jule Silbernagel, et al. and dated February 21, 2011 (86785).
  iv. Roughrider Electric Coop, Inc. Easement executed by Faye Swenson and dated August 11, 2014 (90519).

[¶10] Attached are the deeds which I believe indicate my ownership in each of the properties listed above.

[¶11] Attached are the easements currently encumbering these properties based on the information I have.

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on the 23RD day of MAY, 2024 at BEULAH ND, United States.

Kurt Swenson

97803 8/18/2023 11:21 AM Total Pages: 3
BOOK: 45 PAGE: 270 FEES: $20.00 RB WARRANTY DEED
Mickie McNulty-Eide, OLIVER COUNTY RECORDER
By Rebecca Bathke, Deputy

SOLEM LAW OFFICE
PO BOX 249

BEULAH, ND 58523

RECORDER OLIVER SEAL COUNTY STATE OF NORTH DAKOTA

# WARRANTY DEED

THIS INDENTURE, made this 16th day of June, 2023, between **JOHNELL J. KUSLER and GEOFFREY E. TAYLOR**, wife and husband, whose post office address is 1884 Hillcrest Avenue, St. Paul, Minnesota 55116 AND **MILDA L. HEDBLOM, a/k/a MILDA K. HEDBLOM and EDWIN FOGELMAN, wife and husband**, whose post office address is 1801 Summit Avenue, St. Paul, Minnesota 55105, Grantors; and **KURT M. SWENSON and FAYE B. SWENSON Trustees of the Swenson Living Trust dated May 19, 2023**, whose post office address is 5774 21st Street SW, Beulah, North Dakota 58523, Grantees.

WITNESSETH, for and in consideration of the sum of One Hundred Eighty-Four Thousand Four Hundred and Eighty-Six Dollars ($184,486.00), Grantors do hereby GRANT to said Grantees all of the following real property lying and being in the County of Oliver, and State of North Dakota and described as follows, to-wit:

**Outlot "B" located in the East Half (E½) of the Northwest Quarter (NW¼) of Section Seven (7), Township One Hundred Forty-Two (142) North, Range Eighty-Seven (87) West of the 5th P.M., Oliver County, North Dakota LESS Lot One (1) of said Outlot "B".**

**The above legal description was obtained from a previously recorded instrument.**

**The Grantors except and reserve unto themselves all of the oil, gas, coal, and all other minerals presently owned by them and located in and under the above described real property, together with the right of ingress and egress at all times for the purpose of mining, drilling, exploring, operating and developing said lands for oil, gas, coal, and all other minerals containing fissionable materials, and all other minerals, and storing, handling, transporting and marketing the same therefrom with the right to remove from said land all of the Grantees' property and improvements.**

And the said Grantors, for themselves, their successors and assigns, do covenant with the

SOLEM LAW OFFICE
109 CENTRAL AVENUE S
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail:beulaw@westriv.com

Grantees, that they are well seized in fee of the land and premises aforesaid, and have good right to sell and convey the same in manner and form aforesaid; that the same are free from all encumbrances, except easements, reservations of record, and any outstanding protective covenants; and the above granted lands and premises in the quiet and peaceable possession of said Grantees, against all persons lawfully claiming or to claim the whole or any part thereof, the said Grantors will warrant and defend.

WITNESS, the hand of the Grantors:

**I certify that the full consideration paid for the property described in this Deed is $184,486.00.**

DATED: 8-4-23

SIGNED: _____

_____
**JOHNELL J. KUSLER**

_____
**GEOFFREY E. TAYLOR**

STATE OF NORTH DAKOTA )
)
COUNTY OF MERCER )

On this 16th day of June, 2023, before me, a Notary Public in and for said County and State, personally appeared **JOHNELL J. KUSLER and GEOFFREY E. TAYLOR,** known to me to be the persons that are described in and that executed the within instrument, and acknowledged to me that they executed the same.

SCOTT T. SOLEM
NOTARY PUBLIC
State of North Dakota
My Commission Expires: October 28, 2026

_____
NOTARY PUBLIC
MERCER COUNTY, NORTH DAKOTA

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

MILDA L. HEDBLOM

EDWIN FOGELMAN

STATE OF NORTH DAKOTA )
)
COUNTY OF MERCER )

On this 16th day of June, 2023, before me, a Notary Public in and for said County and State, personally appeared **MILDA L. HEDBLOM and EDWIN FOGELMAN,** known to me to be the persons that are described in and that executed the within instrument, and acknowledged to me that they executed the same.

SCOTT T. SOLEM
NOTARY PUBLIC
State of North Dakota
My Commission Expires: October 28, 2026

NOTARY PUBLIC
MERCER COUNTY, NORTH DAKOTA

Auditor's Office
Oliver County, N.D.
transfer entered this 18th day of
August 2023
County Auditor
By Deputy

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

96824 4/11/2022 1:35 PM Total Pages: 3
BOOK: 44 PAGE: 366 FEES: $20.00 RB WARRANTY DEED
Mickie McNulty-Eide, OLIVER COUNTY RECORDER
By Rebecca Bethke, Deputy

SOLEM LAW OFFICE
PO BOX 249

BEULAH, ND 58523

RECORDER OLIVER SEAL COUNTY STATE OF NORTH DAKOTA

# WARRANTY DEED

THIS INDENTURE, Made this 11th day of March, 2022, between **JOHNELL J. KUSLER, as Personal Representative of the Estate of James O. Kusler**, whose post office address is 1884 Hillcrest Avenue, St. Paul, Minnesota 55116, **JOHNELL J. KUSLER and GEOFFREY E. TAYLOR, wife and husband**, whose post office address is 1884 Hillcrest Avenue, St. Paul, Minnesota 55116, AND **MILDA L. HEDBLOM, a/k/a MILDA K. HEDBLOM and EDWIN FOGELMAN, wife and husband**, whose post office address is 1801 Summit Avenue, St. Paul, Minnesota 55105, Grantors; and **KURT M. SWENSON and FAYE B. SWENSON**, husband and wife, whose post office address is 5774 21st Street SW, Beulah, North Dakota 58523, Grantees.

WITNESSETH, For and in consideration of the sum of Two Hundred Twenty-Three Thousand Eight Hundred Eighty Dollars ($223,880.00), Grantors do hereby GRANT to said Grantees, as joint tenants with right of survivorship and not as tenants in common, all of the following real property lying and being in the County of Oliver, and State of North Dakota and described as follows, to-wit:

**The Southwest Quarter (SW¼) of Section Nine (9), Township One Hundred Forty-Two (142) North, Range Eighty-Seven (87) West of the Fifth Principal Meridian, Oliver County, North Dakota.**

**The above legal descriptions were obtained from previously recorded instruments.**

SOLEM LAW OFFICE
109 CENTRAL AVENUE S
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

**The Grantors except and reserve unto themselves all of the oil, gas, coal, and all other minerals presently owned by them and located in and under the above described real property, together with the right of ingress and egress at all times for the purpose of mining, drilling, exploring, operating and developing said lands for oil, gas, coal, and all other minerals containing fissionable materials, and all other minerals, and storing, handling, transporting and marketing the same therefrom with the right to remove from said land all of the Grantee's property and improvements.**

And the said Grantors, for themselves, their successors and assigns, do covenant with the Grantees, that they are well seized in fee of the land and premises aforesaid, and have good right to sell and convey the same in manner and form aforesaid; that the same are free from all encumbrances, except easements, reservations of record, and any outstanding protective covenants; and the above granted lands and premises in the quiet and peaceable possession of said Grantees, against all persons lawfully claiming or to claim the whole or any part thereof, the said Grantors will warrant and defend.

WITNESS, The hand of the Grantors:

**I certify that the full consideration paid for the property described in this Deed is $223,880.00.**

DATED: 4-1-22

SIGNED: _____

Johnell J. Kusler PR

**JOHNELL J. KUSLER, Personal Representative of the Estate of JAMES O. KUSLER**

STATE OF NORTH DAKOTA )
)
COUNTY OF MERCER )

On this 11th day of March, 2022, before me, a Notary Public in and for said County and State, personally appeared **JOHNELL J. KUSLER,** as Personal Representative of the Estate of James O. Kusler, known to me to be the person that is described in and that executed the within instrument, and acknowledged to me that she executed the same.

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

SCOTT T. SOLEM, NOTARY PUBLIC
MERCER COUNTY, NORTH DAKOTA

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

JOHNELL J. KUSLER

GEOFFREY E. TAYLOR

STATE OF NORTH DAKOTA )
)
COUNTY OF MERCER )

On this 11th day of March, 2022, before me, a Notary Public in and for said County and State, personally appeared **JOHNELL J. KUSLER and GEOFFREY E. TAYLOR,** known to me to be the persons that are described in and that executed the within instrument, and acknowledged to me that they executed the same.

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

SCOTT T. SOLEM, NOTARY PUBLIC
MERCER COUNTY, NORTH DAKOTA

MILDA L. HEDBLOM

EDWIN FOGELMAN

STATE OF NORTH DAKOTA )
)
COUNTY OF MERCER )

On this 11th day of March, 2022, before me, a Notary Public in and for said County and State, personally appeared **MILDA L. HEDBLOM and EDWIN FOGELMAN,** known to me to be the persons that are described in and that executed the within instrument, and acknowledged to me that they executed the same.

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

SCOTT T. SOLEM, NOTARY PUBLIC
MERCER COUNTY, NORTH DAKOTA

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com



Auditor's Office
Oliver County, N.D.
Transfer entered this 11th day of
April 2022
County Auditor
Deputy

97715 6/26/2023 11:33 AM Total Pages: 3
BOOK: 45 PAGE: 206 FEES: $20.00 RB WARRANTY DEED
Mickie McNulty-Eide, OLIVER COUNTY RECORDER
By Rebecca Bethke, Deputy

CREATIVE PLANNING LEGAL, P.A.
5454 W 110TH STREET

OVERLAND PARK, KS 66211

RECORDER OLIVER SEAL COUNTY STATE OF NORTH DAKOTA

# WARRANTY DEED

THIS INDENTURE, made this 19th day of MAY, 2023, between Kurt M. Swenson a/k/a Kurt Swenson and FayE B. Swenson a/k/a FayE Swenson, a married couple, GRANTORS; and Kurt M. Swenson and FayE B. Swenson, Trustees of the Swenson Living Trust, dated MAY 19, 2023, and any amendments thereto, 5774 21st Street SW, Beulah, North Dakota 58523, GRANTEES.

WITNESSETH, that the Grantors, for and in consideration of the sum of Ten Dollars ($10.00) and other valuable considerations paid by the Grantees, the receipt of which is hereby acknowledged, do by these presents, GRANT, CONVEY AND WARRANT unto the Grantees all of their right, title, and interest in the following described real property, situated in the County of Oliver, State of North Dakota, described as follows, to-wit:

**A tract of land located within the North Half (N½) of Section Twenty-One (21), Township One Hundred Forty-Two (142) North, Range Eighty-Seven (87) West of the Fifth Principal Meridian, Oliver County, North Dakota more particularly described as follows:**

**Commencing at the NE corner of the NW¼ of said Section 21; thence N89°48'55"W (GPS Bearing) along the north line of the NW¼ of Section 21, 27.84 feet to the point of beginning; thence S7°06'25"E, 1971.43 feet to a point within the NE¼ of said Section 21; thence S84°19'05"W, 828.68 feet to a point within the NW¼ of said Section 21; thence N5°36'08"W, 2050.64 feet to a point on the north line of the NW¼ of said Section 21; thence S89°48'55"E, along the north line of the NW¼ of said Section 21, 780.89 feet to the point of beginning.**

**Said tract of land contains 37.03 acres, of which 4.26 acres are in the NE¼ and 32.77 acres are in the NW¼ of said Section 21.**

**- AND -**

**The Southwest Quarter (SW¼) of Section Nine (9), Township One Hundred Forty-Two (142) North, Range Eighty-Seven (87) West of the Fifth Principal Meridian, Oliver County, North Dakota.**

Grantors covenant that they are well seized in fee of the premises, which they have the right to sell and convey, and which are free from encumbrances except those of record. Further, the Grantors covenant that they will warrant and defend the premises in the quiet and peaceable possession of the Grantees.

IN WITNESS WHEREOF, the Grantors have set their hands the day and year first above written.

Kurt M. Swenson a/k/a Kurt Swenson, Grantor

FayE B. Swenson a/k/a FayE Swenson, Grantor

STATE OF NORTH DAKOTA )
) ss.
COUNTY OF Mercer )

On this 19 day of May, 2023 before me personally appeared Kurt M. Swenson a/k/a Kurt Swenson and FayE B. Swenson a/k/a FayE Swenson, a married couple, known to me to be the same persons described in and who executed the within and foregoing instrument and acknowledged to me that they executed the same as their free act and deed.

AMELIA VELEZ
Notary Public
STATE OF NORTH DAKOTA
My Commission Expires
May 9, 2027

Notary Public
My Commission Expires: May 9th, 2027

Auditor's Office
Oliver County, N.D.
transfer entered this 26 day of
June 2023
County Auditor
By Deputy

## STATEMENT OF FULL CONSIDERATION

We certify that the requirement for a report or statement of the full consideration paid does not apply because this deed is for one of the transactions exempted by N.D.C.C. § 11-18-02.2(6)(c).

Dated this 19th day of May, 2023.

Kurt M. Swenson, Grantee
Trustee

Dated this 19th day of May, 2023.

FayE B. Swenson a/k/a FayE Swenson, Grantee
Trustee

*This deed was drafted by Micheal A. Mulloy of Mulloy Law, PLLC, 101 Slate Street, Suite 7, Bismarck, North Dakota 58503 (ID #07239). Legal descriptions obtained from previously recorded documents on file with the Oliver County Recorder's Office as Document Numbers 85508 and 96824.*

222209

Delinquent Taxes and Special Assessments, or Installments of Special Assessments Paid and Transfer Entered this 01 day of June, 2021

Mercer County Auditor

By: Deputy Auditor/Clerk

**STATE OF NORTH DAKOTA**
**COUNTY OF MERCER**

**OFFICE OF COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 6/1/2021 at 11:47 AM, and was duly recorded as Book 174 DEED on Page 553 Fee: $20.00

County Recorder Brenda L. Cook

By Deputy Shawn L. Senger

Return To: KELSCH RUFF KRANDA NAGLE & LUDWIG, 103 COLLINS MANDAN, ND 58554-3104

# WARRANTY DEED

**THIS INDENTURE,** Made this 3rd day of May, 2021, between Rory Schuh, married person, Rick Schuh, married person, Rich Schuh, married person, and Sandy Seim, married person, Grantors, and Brush Creek Land Company, LLC, Grantee, whose post office address is 5774 -21st Street SW, Beulah, ND 58523.

**WITNESSETH,** For and in consideration of the sum of $85,000 Dollars and other good and valuable consideration, Grantors do hereby GRANT to the Grantee, all of the following real property lying and being in the County of Mercer, and State of North Dakota, and described as follows, to-wit:

**Township 142, Range 88 West, Mercer County, North Dakota**

Section 14: W½ NE¼

Reserving unto Seller 100% of all oil, gas, coal, chemical substances, metallic and uranium ores and other minerals now owned by Sellers of record.

And the Grantors for themselves, their heirs, executors and administrators, do covenant with the Grantee that they are well seized in fee of the land and premises aforesaid and have good right to sell and convey the same in manner and form aforesaid; that the same are free from all incumbrances whatsoever, except future assessments for special improvements and real estate taxes and installments of special assessments, if any, for the year 2021 and subsequent, and the above granted lands and premises in the quiet and peaceable possession of the Grantee, against all persons lawfully claiming or to claim the whole or any part thereof, the Grantors will warrant and defend.

**WITNESS, The hands of the Grantors:**

In presence of

Rory Schuh

RORY SCHUH, Grantor

STATE OF NORTH DAKOTA )
) ss.
COUNTY OF MORTON )

On this 22nd day of April, 2021, before me personally appeared Rory Schuh, the person who is described in, and who executed the within and foregoing instrument, and severally acknowledged that he executed the same.

EMILIE J SAYLER
Notary Public
State of North Dakota
My Commission Expires Nov. 3, 2024

Notary Public

RICK SCHUH, Grantor

STATE OF NORTH DAKOTA )
) ss.
COUNTY OF Morton )

On this 30th day of April, 2021, before me personally appeared Rick Schuh, the person who is described in, and who executed the within and foregoing instrument, and severally acknowledged that he executed the same.

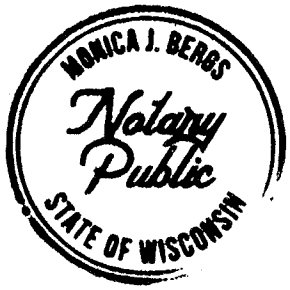
Notary Public

EMILIE J SAYLER
Notary Public
State of North Dakota
My Commission Expires Nov. 3, 2024

RICH SCHUH, Grantor

STATE OF NORTH DAKOTA )
State of Wisconsin ) ss.
COUNTY OF La Crosse )

On this 20th day of April, 2021, before me personally appeared Rich Schuh, the person who is described in, and who executed the within and foregoing instrument, and severally acknowledged that he executed the same.




Notary Public

My commission expires 5/18/2024

SANDY SEIM, Grantor

STATE OF MINNESOTA )
) ss.
COUNTY OF Anoka )

On this 21st day of April, 2021, before me personally appeared Sandy Seim, the person who is described in, and who executed the within and foregoing instrument, and severally acknowledged that he executed the same.

Notary Public

I certify that the full consideration paid for the above-described property is $85,000.00.

Grantee or Agent _____ Date: 6-1-2021

The legal description was obtained from a previously recorded instrument.

This Deed was prepared by Arlen M. Ruff, Kelsch, Ruff, Kranda, Nagle & Ludwig, 103 Collins Avenue, PO Box 1266, Mandan ND 58554-7266.

Delinquent Taxes, Special Assessments, or Installments of Special Assessments Paid and Transfer Entered this 15 day of June, 2023.

Carmen Reed
Mercer County Auditor
By:
Deputy Auditor/Clerk

226288

STATE OF NORTH DAKOTA
COUNTY OF MERCER

OFFICE OF
COUNTY RECORDER

I hereby certify that the within instrument was filed in this office for record this 6/15/2023 at 10:45 AM, and was duly recorded as Book 179 DEED on Page 681 Fee: $20.00

County Recorder Shannan Senger
By Deputy Amber Gabert
Return To: SOLEM LAW OFFICE - BEULAH, PO BOX 249
BEULAH, ND 58523
Chg.

MORTGAGEE
MORTGAGOR
INDEXED ✓

COUNTY RECORDER SEAL MERCER COUNTY, N. DAK

# WARRANTY DEED

THIS INDENTURE, made this 12th day of June, 2023, between **BRUSH CREEK LAND COMPANY, LLC**, whose post office address is 5774 21st Street SW, Beulah, North Dakota 58523, Grantor; and **KURT M. SWENSON and FAYE B. SWENSON, Trustees, or their successors in interest, of the Swenson Living Trust dated May 19, 2023, and any amendments thereto,** whose post office address is 5774 21st Street SW, Beulah, North Dakota 58523, Grantees.

WITNESSETH, for and in consideration of the sum of One Hundred Five Thousand Ninety-Seven and 30/100 Dollars ($105,097.30), Grantors do hereby GRANT to said Grantees, as joint tenants with right of survivorship and not as tenants in common, all of the following real property lying and being in the County of Mercer, and State of North Dakota and described as follows, to-wit:

**Township 142, Range 88 West, Mercer County, North Dakota**

**Section 14: W½NE¼**

And the said Grantor, for itself, its successors and assigns, does covenant with the Grantees, that it is well seized in fee of the land and premises aforesaid, and has good right to sell and convey the same in manner and form aforesaid; that the same are free from all encumbrances, except easements, reservations of record, and any outstanding protective covenants; and the above granted lands and premises in the quiet and peaceable possession of said Grantees, against all persons lawfully claiming or to claim the whole or any part thereof, the said Grantor will warrant and defend.

SOLEM LAW OFFICE
109 CENTRAL AVENUE S
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail:beulaw@westriv.com

WITNESS, the hand of the Grantor:

**BRUSH CREEK LAND COMPANY, LLC**
**By: Eric Klindworth**
**Its: President**

STATE OF NORTH DAKOTA )
)
COUNTY OF MERCER )

On this 12th day of June, 2023, before me, a Notary Public in and for said County and State, personally appeared **ERIC KLINDWORTH,** known to me to be the person that is described in and that executed the within instrument, and acknowledged to me that he executed the same.

SUSAN NEUBERGER
NOTARY PUBLIC
State of North Dakota
My Commission Expires: November 14, 2026

NOTARY PUBLIC
MERCER COUNTY, NORTH DAKOTA

**I certify that the full consideration paid for the property described in this Deed is $105,097.30.**

DATED: 6-12-23

SIGNED: _____

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

98147 3/11/2024 11:39 AM Total Pages: 2
BOOK: 45 PAGE: 476 FEES: $20.00 RB WARRANTY DEED
Mickie McNulty-Eide, OLIVER COUNTY RECORDER
By Rebecca Bothke, Deputy

CREATIVE PLANNING LEGAL, P.A.
5454 W 110TH STREET

Overland Park, KS 66211

# WARRANTY DEED

THIS INDENTURE, made this 12th day of FEBRUARY, 2024, between Kurt M. Swenson and FayE Swenson, a married couple, GRANTORS; and Kurt M. Swenson and FayE B. Swenson, Trustees of the Swenson Living Trust, dated May 19, 2023, and any amendments thereto, 5774 21st Street SW, Beulah, North Dakota 58523, GRANTEES.

WITNESSETH, that the Grantors, for and in consideration of the sum of Ten Dollars ($10.00) and other valuable considerations paid by the Grantees, the receipt of which is hereby acknowledged, do by these presents, GRANT, CONVEY AND WARRANT unto the Grantees all of their right, title, and interest in the following described real property, situated in the County of Oliver, State of North Dakota, described as follows, to-wit:

**An undivided one-half (½) interest in the Southeast Quarter (SE¼) of Section Fifteen (15), Township One Hundred Forty-Two (142), Range Eighty-Seven (87), Oliver County, North Dakota.**

Grantors covenant that they are well seized in fee of the premises, which they have the right to sell and convey, and which are free from encumbrances except those of record. Further, the Grantors covenant that they will warrant and defend the premises in the quiet and peaceable possession of the Grantees.

IN WITNESS WHEREOF, the Grantors have set their hands the day and year first above written.

Kurt M. Swenson, Grantor

FayE Swenson, Grantor

STATE OF NORTH DAKOTA )
) ss.
COUNTY OF MERCER )

AMELIA VELEZ
Notary Public
STATE OF NORTH DAKOTA
My Commission Expires
May 9, 2027

On this 12 day of FEBRUARY, 2024 before me personally appeared Kurt M. Swenson and FayE Swenson, a married couple, known to me to be the same persons described in and who executed the within and foregoing instrument and acknowledged to me that they executed the same as their free act and deed.

Amelia Velez
Notary Public
My Commission Expires: May 9 2027

**STATEMENT OF FULL CONSIDERATION**

We certify that the requirement for a report or statement of the full consideration paid does not apply because this deed is for one of the transactions exempted by N.D.C.C. § 11-18-02.2(6)(c).

Dated this 12th day of FEBRUARY, 2024.

Kurt M. Swenson, Grantee
Trustee

Dated this 12th day of February, 2024.

FayE B. Swenson, Grantee
Trustee

*This deed was drafted by Micheal A. Mulloy of Mulloy Law, PLLC, 101 Slate Street, Suite 7, Bismarck, North Dakota 58503 (ID #07239). Legal description obtained from a previously recorded document on file with the Oliver County Recorder's Office as Document Number 75099.*

Auditor's Office
Oliver County, N.D.
transfer entered this 11 day of
March 2024
County Auditor
By _____ Deputy

# WARRANTY DEED

THIS INDENTURE, Made this 17th day of April, 2009, between **DONNA MAE SMITH,** a single person, whose post office address is 5744 21ST Street SW, Beulah, North Dakota 58523; **TAMMIE SOMERS, f/k/a TAMMIE SMITH, and RICHARD SOMERS**, wife and husband, whose post office address is 7300 Autumn Chace Drive, Bloomington, Minnesota 55438; **JULE SILBERNAGEL, f/k/a JULE SMITH, and DEAN SILBERNAGEL,** wife and husband, whose post office address is 5419 West Wagoner Road, Glendale, Arizona 85308; and **FAYE SWENSON, f/k/a FAYE SMITH, and KURT SWENSON**, wife and husband, whose post office address is 5774 21st Street SW, Beulah, North Dakota 58523; Grantors, and **KURT SWENSON and FAYE SWENSON,** husband and wife, whose post office address is 5774 21st Street SW, Beulah, North Dakota 58523, Grantees.

WITNESSETH, For and in consideration of the sum of One Dollar ($1.00), Grantors do hereby GRANT to the Grantees, as joint tenants with right of survivorship, and not as tenants in common, all of the following real property lying and being in the County of Oliver and State of North Dakota, and described as follows, to-wit:

**A tract of land located within the North Half (N1/2) of Section Twenty-One (21), Township One Hundred Forty-Two (142) North, Range Eighty-Seven (87) West of the Fifth Principal Meridian, Oliver County, North Dakota more particularly described as follows:**

**Commencing at the NE corner of the NW1/4 of said Section 21; thence N89°48'55"W (GPS Bearing) along the north line of the NW1/4 of Section 21, 27.84 feet to the point of beginning; thence S7°06'25"E, 1971.43 feet to a point within the NE1/4 of said Section 21; thence S84°19'05"W, 828.68 feet to a point within the NW1/4 of said Section 21; thence N5°36'08"W, 2050.64 feet to a point on the north line of the NW1/4 of said Section 21; thence S89°48'55"E, along the north line of the NW1/4 of said Section 21, 780.89 feet to the point of beginning.**

**Said tract of land contains 37.03 acres, of which 4.26 acres are in the NE1/4 and 32.77 acres are in the NW1/4 of said Section 21.**

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

**This description taken from a plat drawing of Registered Land Surveyor, James H. Fletchall, LS. -2352.**

And the said Grantors, for themselves, their heirs, executors and administrators, do covenant with the Grantees that they are well seized in fee of the land and premises aforesaid and have good right to sell and convey the same in manner and form aforesaid; that the same are free from all encumbrances, except special assessments; and the above granted lands and premises in the quiet and peaceable possession of said Grantees, against all persons lawfully claiming or to claim the whole or any part thereof, the said Grantors will warrant and defend.

WITNESS, The hand of the Grantors:

I (We), the Grantee in this Deed, do hereby certify that the amount shown as consideration above is the full consideration paid for the property conveyed.

10/23/09

Agent

Donna Mae Smith

**DONNA MAE SMITH**

STATE OF NORTH DAKOTA )
)
COUNTY OF MERCER )

On this 17 day of April, 2009, before me, personally appeared **DONNA MAE SMITH,** known to me to be the person who is described in, and who executed the within and foregoing instrument, and severally acknowledged that she executed the same.

Susan T Neuberger

NOTARY PUBLIC
MERCER COUNTY, NORTH DAKOTA

SUSAN NEUBERGER
Notary Public
State of North Dakota
My commission expires Oct 28, 2012

Auditor's Office
Oliver County, N.D.
transfer entered this 30th day of
October 2009
Barbara Flemming
County Auditor
By_____Deputy

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

Tammie Somers
**TAMMIE SOMERS, f/k/a TAMMIE SMITH**

**RICHARD SOMERS**

STATE OF MINNESOTA )
)
COUNTY OF Hennepin )

On this 20th day of April, 2009, before me, personally appeared **TAMMIE SOMERS, f/k/a TAMMIE SMITH and RICHARD SOMERS,** known to me to be the persons who are described in, and who executed the within and foregoing instrument, and severally acknowledged that they executed the same.

Theresa Marie Mahlum
NOTARY PUBLIC - MINNESOTA
MY COMMISSION
EXPIRES JAN. 31, 2011

Theresa Mahl
NOTARY PUBLIC
Hennepin COUNTY, MINNESOTA

My commission expires: Jan 31, 2011

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

**JULE SILBERNAGEL, f/k/a JULE SMITH**

**DEAN SILBERNAGEL**

STATE OF ~~ARIZONA~~ NORTH DAKOTA )
)
COUNTY OF MERCER )

On this 11 day of June, 2009, before me, personally appeared **JULE SILBERNAGEL, f/k/a JULE SMITH and DEAN SILBERNAGEL,** known to me to be the persons who are described in, and who executed the within and foregoing instrument, and severally acknowledged that they executed the same.

LYNNETTE HARRISON
Notary Public
State of North Dakota
My commission expires Oct 28, 2012

LYNNETTE HARRISON NOTARY PUBLIC
MERCER COUNTY, ~~ARIZONA~~ NORTH DAKOTA

My commission expires: _____

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

FAYE SWENSON, f/k/a FAYE SMITH

KURT SWENSON

STATE OF NORTH DAKOTA )
)
COUNTY OF MERCER )

On this 23rd day of October, 2009, before me, personally appeared **FAYE SWENSON f/k/a FAYE SMITH and KURT SWENSON,** known to me to be the persons who are described in, and who executed the within and foregoing instrument, and severally acknowledged that they executed the same.

LYNNETTE HARRISON
Notary Public
State of North Dakota
My commission expires Oct 28, 2012

NOTARY PUBLIC
MERCER COUNTY, NORTH DAKOTA

OFFICE OF COUNTY RECORDER
STATE OF NORTH DAKOTA
COUNTY OF OLIVER
Filed for record this 30th day
of October A.D. 2009
at 11:30 o'clock A M.,
and recorded as document No. 85508
in book 38 of Deeds page 393-397

County Recorder Deputy

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

3

# QUIT CLAIM DEED

THIS INDENTURE, Made this 23rd day of March, 2012, by and between **TAMMIE SOMERS** f/k/a TAMMIE SMITH **and RICHARD SOMERS,** wife and husband, whose post office address is 7300 Autumn Chace Drive, Bloomington, Minnesota 55438, Grantors, and **JULE SILBERNAGEL,** whose post office address is 5419 West Wagoner Road, Glendale, Arizona 85308 and **FAYE SWENSON,** whose post office address is 5774 21st Street Sw, Beulah, North Dakota 58523, Grantees.

For and in consideration of the sum of Ten Dollars ($10.00) And Other Good and Valuable Consideration, the Grantors do hereby Quit Claim to the said Grantees, as tenants in common, all of the following real property lying and being in the County of Oliver, State of North Dakota, described as follows, to-wit:

**All of my interest in Section Twenty-One (21) and the Northwest Quarter (NW¼) of Section Twenty-Two (22), Township One Hundred Forty-Two (142) North, Range Eighty-Seven (87) West of the Fifth Principal Meridian, Oliver County, North Dakota.**

WITNESS, the hand of the Grantors:

Tammie Somers
**TAMMIE SOMERS**

**RICHARD SOMERS**

**This Deed is exempt from the filing requirements of Section 11-18-02.2, NDCC, as a Quit Claim Deed, under exception 7(i).**

**Dated:** March 27, 2012

**Signed:** agent

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

STATE OF NORTH DAKOTA )
)
COUNTY OF MERCER )

On this 23rd day of March, 2012, before me personally appeared **TAMMIE SOMERS**, known to me to be the person that is described in, and that executed the within and foregoing instrument, and acknowledged to me that she executed the same.

SUSAN NEUBERGER
Notary Public
State of North Dakota
My commission expires Oct 28, 2012

Susan K Neuberger
SUSAN NEUBERGER
NOTARY PUBLIC

STATE OF MINNESOTA )
)
COUNTY OF Hennepin )

JULIE MARIE SATTER
NOTARY PUBLIC—MINNESOTA
My Commission Expires JAN. 31, 2013

On this 27th day of March, 2012, before me personally appeared **RICHARD SOMERS**, known to me to be the person that is described in, and that executed the within and foregoing instrument, and acknowledged to me that he executed the same.

JULIE MARIE SATTER
NOTARY PUBLIC—MINNESOTA
My Commission Expires JAN. 31, 2013

Julie Marie Satter
NOTARY PUBLIC

Auditor's Office
Oliver County, N.D.
transfer entered this 18th day of
April 2012
Judith M Hintz
County Auditor
By_____Deputy

SEAL
COUNTY RECORDER
STATE OF NORTH DAKOTA
OLIVER

**OFFICE OF COUNTY RECORDER**
**STATE OF NORTH DAKOTA**
**COUNTY OF OLIVER**
**Filed for record this** 18th **day**
**of** April **A.D.** 2012
**at** 4:33 **o'clock** P **M.,**
**and recorded as document No.** 82279
**in book** 39 **of** Deeds **page** 338-339
K Willems
**County Recorder** **Deputy**

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

97715 6/26/2023 11:33 AM Total Pages: 3
BOOK: 45 PAGE: 206 FEES: $20.00 RB WARRANTY DEED
Mickie McNulty-Eide, OLIVER COUNTY RECORDER
By Rebecca Bethke, Deputy

CREATIVE PLANNING LEGAL, P.A.
5454 W 110TH STREET

OVERLAND PARK, KS 66211

RECORDER OLIVER SEAL COUNTY STATE OF NORTH DAKOTA

# WARRANTY DEED

THIS INDENTURE, made this 19th day of MAY, 2023, between Kurt M. Swenson a/k/a Kurt Swenson and FayE B. Swenson a/k/a FayE Swenson, a married couple, GRANTORS; and Kurt M. Swenson and FayE B. Swenson, Trustees of the Swenson Living Trust, dated MAY 19, 2023, and any amendments thereto, 5774 21st Street SW, Beulah, North Dakota 58523, GRANTEES.

WITNESSETH, that the Grantors, for and in consideration of the sum of Ten Dollars ($10.00) and other valuable considerations paid by the Grantees, the receipt of which is hereby acknowledged, do by these presents, GRANT, CONVEY AND WARRANT unto the Grantees all of their right, title, and interest in the following described real property, situated in the County of Oliver, State of North Dakota, described as follows, to-wit:

**A tract of land located within the North Half (N½) of Section Twenty-One (21), Township One Hundred Forty-Two (142) North, Range Eighty-Seven (87) West of the Fifth Principal Meridian, Oliver County, North Dakota more particularly described as follows:**

**Commencing at the NE corner of the NW¼ of said Section 21; thence N89°48'55"W (GPS Bearing) along the north line of the NW¼ of Section 21, 27.84 feet to the point of beginning; thence S7°06'25"E, 1971.43 feet to a point within the NE¼ of said Section 21; thence S84°19'05"W, 828.68 feet to a point within the NW¼ of said Section 21; thence N5°36'08"W, 2050.64 feet to a point on the north line of the NW¼ of said Section 21; thence S89°48'55"E, along the north line of the NW¼ of said Section 21, 780.89 feet to the point of beginning.**

**Said tract of land contains 37.03 acres, of which 4.26 acres are in the NE¼ and 32.77 acres are in the NW¼ of said Section 21.**

**- AND -**

**The Southwest Quarter (SW¼) of Section Nine (9), Township One Hundred Forty-Two (142) North, Range Eighty-Seven (87) West of the Fifth Principal Meridian, Oliver County, North Dakota.**

Grantors covenant that they are well seized in fee of the premises, which they have the right to sell and convey, and which are free from encumbrances except those of record. Further, the Grantors covenant that they will warrant and defend the premises in the quiet and peaceable possession of the Grantees.

IN WITNESS WHEREOF, the Grantors have set their hands the day and year first above written.

Kurt M. Swenson a/k/a Kurt Swenson, Grantor

FayE B. Swenson a/k/a FayE Swenson, Grantor

STATE OF NORTH DAKOTA )
) ss.
COUNTY OF Mercer )

On this 19 day of May, 2023 before me personally appeared Kurt M. Swenson a/k/a Kurt Swenson and FayE B. Swenson a/k/a FayE Swenson, a married couple, known to me to be the same persons described in and who executed the within and foregoing instrument and acknowledged to me that they executed the same as their free act and deed.

AMELIA VELEZ
Notary Public
STATE OF NORTH DAKOTA
My Commission Expires
May 9, 2027

Notary Public
My Commission Expires: May 9th, 2027

Auditor's Office
Oliver County, N.D.
transfer entered this 26 day of
June 2023
County Auditor
By Deputy

## STATEMENT OF FULL CONSIDERATION

We certify that the requirement for a report or statement of the full consideration paid does not apply because this deed is for one of the transactions exempted by N.D.C.C. § 11-18-02.2(6)(c).

Dated this 19th day of May, 2023.

Kurt M. Swenson, Grantee
Trustee

Dated this 19th day of May, 2023.

FayE B. Swenson a/k/a FayE Swenson, Grantee
Trustee

*This deed was drafted by Micheal A. Mulloy of Mulloy Law, PLLC, 101 Slate Street, Suite 7, Bismarck, North Dakota 58503 (ID #07239). Legal descriptions obtained from previously recorded documents on file with the Oliver County Recorder's Office as Document Numbers 85508 and 96824.*

3

# QUIT CLAIM DEED

THIS INDENTURE, Made this 23rd day of March, 2012, by and between **TAMMIE SOMERS** f/k/a TAMMIE SMITH **and RICHARD SOMERS,** wife and husband, whose post office address is 7300 Autumn Chace Drive, Bloomington, Minnesota 55438, Grantors, and **JULE SILBERNAGEL,** whose post office address is 5419 West Wagoner Road, Glendale, Arizona 85308 and **FAYE SWENSON,** whose post office address is 5774 21st Street Sw, Beulah, North Dakota 58523, Grantees.

For and in consideration of the sum of Ten Dollars ($10.00) And Other Good and Valuable Consideration, the Grantors do hereby Quit Claim to the said Grantees, as tenants in common, all of the following real property lying and being in the County of Oliver, State of North Dakota, described as follows, to-wit:

**All of my interest in Section Twenty-One (21) and the Northwest Quarter (NW¼) of Section Twenty-Two (22), Township One Hundred Forty-Two (142) North, Range Eighty-Seven (87) West of the Fifth Principal Meridian, Oliver County, North Dakota.**

WITNESS, the hand of the Grantors:

Tammie Somers
**TAMMIE SOMERS**

**RICHARD SOMERS**

**This Deed is exempt from the filing requirements of Section 11-18-02.2, NDCC, as a Quit Claim Deed, under exception 7(i).**

**Dated:** March 27, 2012

**Signed:** agent

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

STATE OF NORTH DAKOTA )
)
COUNTY OF MERCER )

On this 23rd day of March, 2012, before me personally appeared **TAMMIE SOMERS**, known to me to be the person that is described in, and that executed the within and foregoing instrument, and acknowledged to me that she executed the same.

SUSAN NEUBERGER
Notary Public
State of North Dakota
My commission expires Oct 28, 2012

Susan K Neuberger
SUSAN NEUBERGER
NOTARY PUBLIC

STATE OF MINNESOTA )
)
COUNTY OF Hennepin )

JULIE MARIE SATTER
NOTARY PUBLIC—MINNESOTA
My Commission Expires JAN. 31, 2013

On this 27th day of March, 2012, before me personally appeared **RICHARD SOMERS**, known to me to be the person that is described in, and that executed the within and foregoing instrument, and acknowledged to me that he executed the same.

JULIE MARIE SATTER
NOTARY PUBLIC—MINNESOTA
My Commission Expires JAN. 31, 2013

Julie Marie Satter
NOTARY PUBLIC

Auditor's Office
Oliver County, N.D.
transfer entered this 18th day of
April 2012
Judith M Hintz
County Auditor
By_____Deputy

SEAL
COUNTY RECORDER
STATE OF NORTH DAKOTA
OLIVER

**OFFICE OF COUNTY RECORDER**
**STATE OF NORTH DAKOTA**
**COUNTY OF OLIVER**
**Filed for record this** 18th **day**
**of** April **A.D.** 2012
**at** 4:33 **o'clock** P **M.,**
**and recorded as document No.** 82279
**in book** 39 **of** Deeds **page** 338-339
K Willems
**County Recorder** **Deputy**

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

Delinquent Taxes, Special Assessments, or Installments of Special Assessments Paid and Transfer Entered this 27 day of March, 2023.

Samantha Mellberg
Mercer County Auditor
By: Laycee Schneider
Deputy Auditor/Clerk

225879

STATE OF NORTH DAKOTA
COUNTY OF MERCER

OFFICE OF COUNTY RECORDER

I hereby certify that the within instrument was filed in this office for record this 3/27/2023 at 10:40 AM, and was duly recorded as Book 179 DEED on Page 233 Fee: $20.00

County Recorder Shannan Senger
By Deputy Amber Gabert
Return To: SOLEM LAW OFFICE - BEULAH, PO BOX 249
Chg. BEULAH, ND 58523

MORTGAGEE
MORTGAGOR
INDEXED ✓

COUNTY RECORDER SEAL MERCER COUNTY, N. DAK

# WARRANTY DEED

THIS INDENTURE, made this 15th day of March, 2023, between **JOHNELL J. KUSLER, as Personal Representative of the Estate of James O. Kusler**, whose post office address is 1884 Hillcrest Avenue, St. Paul, Minnesota 55116, **JOHNELL J. KUSLER and GEOFFREY E. TAYLOR, wife and husband**, whose post office address is 1884 Hillcrest Avenue, St. Paul, Minnesota 55116, AND **MILDA L. HEDBLOM, a/k/a MILDA K. HEDBLOM and EDWIN FOGELMAN, wife and husband**, whose post office address is 1801 Summit Avenue, St. Paul, Minnesota 55105, Grantors; and **KURT M. SWENSON and FAYE B. SWENSON**, husband and wife, whose post office address is 5774 21st Street SW, Beulah, North Dakota 58523, Grantees.

WITNESSETH, for and in consideration of the sum of Two Hundred Forty-Four Thousand Six Hundred Two Dollars ($244,602.00), Grantors do hereby GRANT to said Grantees, as joint tenants with right of survivorship and not as tenants in common, all of the following real property lying and being in the County of Mercer, and State of North Dakota and described as follows, to-wit:

**Southeast Quarter (SE1/4) of Section Twenty-Seven (27), Township One Hundred Forty-Three (143) North, Range Eighty-Eight (88) West of the Fifth Principal Meridian, Mercer County, North Dakota.**

**The above legal description was obtained from a previously recorded instrument.**

**The Grantors except and reserve unto themselves all of the oil, gas, coal, and all other minerals presently owned by them and located in and under the above described real property, together with the right of ingress and egress at all**

SOLEM LAW OFFICE
109 CENTRAL AVENUE S
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail:beulaw@westriv.com

**times for the purpose of mining, drilling, exploring, operating and developing said lands for oil, gas, coal, and all other minerals containing fissionable materials, and all other minerals, and storing, handling, transporting and marketing the same therefrom with the right to remove from said land all of the Grantees' property and improvements.**

And the said Grantors, for themselves, their successors and assigns, do covenant with the Grantees, that they are well seized in fee of the land and premises aforesaid, and have good right to sell and convey the same in manner and form aforesaid; that the same are free from all encumbrances, except easements, reservations of record, and any outstanding protective covenants; and the above granted lands and premises in the quiet and peaceable possession of said Grantees, against all persons lawfully claiming or to claim the whole or any part thereof, the said Grantors will warrant and defend.

WITNESS, the hand of the Grantors:

**I certify that the full consideration paid for the property described in this Deed is $244,602.00.**

DATED: March 15, 2023

SIGNED: _____

Johnell J Kusler PR

**JOHNELL J. KUSLER, Personal Representative of the Estate of JAMES O. KUSLER**

STATE OF North Dakota )
)
COUNTY OF Mercer )

On this 15th day of March, 2023, before me, a Notary Public in and for said County and State, personally appeared **JOHNELL J. KUSLER,** as Personal Representative of the Estate of James O. Kusler, known to me to be the person that is described in and that executed the within instrument, and acknowledged to me that she executed the same.

SCOTT SOLEM
NOTARY PUBLIC
State of North Dakota
My Commission Expires October 28, 2026

SCOTT SOLEM
NOTARY PUBLIC
State of North Dakota
My Commission Expires October 28, 2026

_____
NOTARY PUBLIC
Mercer COUNTY, North Dakota

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

JOHNELL J. KUSLER

GEOFFREY E. TAYLOR

STATE OF North Dakota )
)
COUNTY OF Mercer )

On this 15th day of March, 2023, before me, a Notary Public in and for said County and State, personally appeared **JOHNELL J. KUSLER and GEOFFREY E. TAYLOR,** known to me to be the persons that are described in and that executed the within instrument, and acknowledged to me that they executed the same.

SCOTT T. SOLEM
NOTARY PUBLIC
State of North Dakota
My Commission Expires: October 28, 2028

NOTARY PUBLIC
Mercer COUNTY, North Dakota

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

MILDA L. HEDBLOM

EDWIN FOGELMAN

STATE OF North Dakota )
)
COUNTY OF Mercer )

On this 15th day of March, 2023, before me, a Notary Public in and for said County and State, personally appeared **MILDA L. HEDBLOM and EDWIN FOGELMAN,** known to me to be the persons that are described in and that executed the within instrument, and acknowledged to me that they executed the same.

SCOTT T. SOLEM
NOTARY PUBLIC
State of North Dakota
My Commission Expires: October 28, 2026

NOTARY PUBLIC
Mercer COUNTY, North Dakota

SCOTT T. SOLEM
NOTARY PUBLIC
State of North Dakota
mission Expires: October 28, 2026

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

Delinquent Taxes and Special Assessments, or Installments of Special Assessments Paid and Transfer Entered this 13 day of June, 2023

Carmen Reed
Mercer County Auditor
By: Amy Bosch
Deputy Auditor/Clerk

**226273**

**STATE OF NORTH DAKOTA**
**COUNTY OF MERCER**

**OFFICE OF COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 6/13/2023 at 2:52 PM, and was duly recorded as Book 179 DEED on Page 655 Fee: $20.00

County Recorder Shannon J. Senger

By Deputy Amber Gebert

Return To: CREATIVE PLANNING LEGAL, PA, 5454 W. 110TH STREET
OVERLAND PARK, KS 66211

COUNTY RECORDER SEAL MERCER COUNTY, N.DAK

# WARRANTY DEED

THIS INDENTURE, made this 19th day of MAY, 2023, between Kurt M. Swenson and FayE B. Swenson, a married couple, GRANTORS; and Kurt M. Swenson and FayE B. Swenson, Trustees of the Swenson Living Trust, dated MAY 19, 2023, and any amendments thereto, 5774 21st Street SW, Beulah, North Dakota 58523, GRANTEES.

WITNESSETH, that the Grantors, for and in consideration of the sum of Ten Dollars ($10.00) and other valuable considerations paid by the Grantees, the receipt of which is hereby acknowledged, do by these presents, GRANT, CONVEY AND WARRANT unto the Grantees all of their right, title, and interest in the following described real property, situated in the County of Mercer, State of North Dakota, described as follows, to-wit:

**Southeast Quarter (SE¼) of Section Twenty-Seven (27), Township One Hundred Forty-Three (143) North, Range Eighty-Eight (88) West of the Fifth Principal Meridian, Mercer County, North Dakota.**

Grantors covenant that they are well seized in fee of the premises, which they have the right to sell and convey, and which are free from encumbrances except those of record. Further, the Grantors covenant that they will warrant and defend the premises in the quiet and peaceable possession of the Grantees.

IN WITNESS WHEREOF, the Grantors have set their hands the day and year first above written.

Kurt M. Swenson, Grantor

FayE B. Swenson, Grantor

STATE OF NORTH DAKOTA )
) ss.
COUNTY OF Mercer )

On this 19 day of May, 2023 before me personally appeared Kurt M. Swenson and FayE B. Swenson, a married couple, known to me to be the same persons described in and who executed the within and foregoing instrument and acknowledged to me that they executed the same as their free act and deed.

AMELIA VELEZ
Notary Public
STATE OF NORTH DAKOTA
My Commission Expires
May 9, 2027

Amelia Velez
Notary Public
My Commission Expires: May 9th, 2027

**STATEMENT OF FULL CONSIDERATION**

We certify that the requirement for a report or statement of the full consideration paid does not apply because this deed is for one of the transactions exempted by N.D.C.C. § 11-18-02.2(6)(c).

Dated this 19th day of MAY, 2023.

Kurt M. Swenson, Grantee
Trustee

Dated this 19th day of MAY, 2023.

FayE B. Swenson a/k/a FayE Swenson, Grantee
Trustee

*This deed was drafted by Micheal A. Mulloy of Mulloy Law, PLLC, 101 Slate Street, Suite 7, Bismarck, North Dakota 58503 (ID #07239). Legal description obtained from a previously recorded document on file with the Mercer County Recorder's Office as Document Number 225879.*

90188 6/25/2015 6:13 PM PAGE: 1 OF 1
BOOK: LL PAGE: 18 FEES: $10.00 MM EASEMENT
Kim Wilkens, OLIVER COUNTY RECORDER
By K Wilkens

RECEIVED
FEB -5 2014
SOUTHWEST WATER AUTHORITY

SOUTHWEST WATER AUTHORITY
Southwest Pipeline Project Building
West Industrial Park
4665 2nd Street SW
Dickinson, ND 58601-7231
(701) 225-0241
Toll Free: 1-888-425-0241

SOUTHWEST WATER AUTHORITY
WEST INDUSTRIAL PARK
4665 2ND STREET SW
DICKINSON, ND 58601-7231

RECORDER OLIVER SEAL COUNTY STATE OF NORTH DAKOTA

Segment 7-9E WEST CENTER SERVICE AREA
Parcel 142-87-6

## RIGHT-OF-WAY EASEMENT

**ALL PERSONS TAKE NOTICE:**

In consideration of one dollar ($1.00) and other good and valuable consideration JAMES O KUSLER 5968 19TH STREET SW BEULAH, ND 58523 hereinafter referred to as Grantor, does hereby grant, bargain, sell, transfer and convey to the Southwest Water Authority, hereinafter referred to as the Grantee, its successor and assigns, a perpetual easement with right to erect, construct, install and lay, and thereafter use, operate, inspect, repair, maintain, replace, and remove water pipelines, connections, valves and all other appurtenant facilities used in connection with the construction, operation and maintenance of the Southwest Pipeline Project, over, above, across and through the land of the Grantor, situated in Oliver County, State of North Dakota, said land being described as follows: NW1/4 SECTION 7 TOWNSHIP 142 RANGE 87 (the tract that contains 1.33 acres, more or less), together with the right of ingress and egress over the adjacent lands of the Grantor, successors and assigns for the purposes of this easement.

1. The permanent easement will be thirty (30) feet in width, fifteen (15) feet on each side of the center line of the pipeline as constructed, with an additional ten (10) feet of temporary right-of-way for a total construction easement width of forty (40) feet, twenty (20) feet on each side of the center line.

2. The Grantee covenants to maintain the easement in good repair so that no unreasonable damage will result from its use to the adjacent land of the Grantor, successors and assigns. The Grantor will receive compensation for damages to growing crops caused by the construction or operation. The Grantor will report any damages within three (3) years of the construction of the project.

The grant and other provisions of this easement shall constitute a covenant running with the land for the benefit of the Grantee, its successors and assigns.

**IN WITNESS WHEREOF,** the Grantor has executed this instrument this 3 day of February, 2014.

James O. Kusler GRANTOR _____ GRANTOR

State of North Dakota

County of Dunn

On February 3, 2014, personally appeared before me James O. Kusler

_____ whom I know personally.
X whose identity I verified on the basis of North Dakota drivers license.
_____ whose identity I verified on the oath or affirmation of _____, a credible witness to be the signor of the above and he/she acknowledged that he/she signed it.

DANIEL T. AICHELE
Notary Public
State of North Dakota
My Commission Expires Mar. 2, 2018

Notary Public Daniel T. Aichele
_____, County Dunn
My Commission Expires: Mar. 2, 2018

90189 6/25/2015 6:16 PM PAGE: 1 OF 1
BOOK: LL PAGE: 19 FEES: $10.00 MM EASEMENT
Kim Wilkens, OLIVER COUNTY RECORDER
By K Wilkens

SOUTHWEST WATER AUTHORITY
WEST INDUSTRIAL PARK
4665 2ND STREET SW
DICKINSON, ND 58601-7231

RECORDER OLIVER SEAL COUNTY STATE OF NORTH DAKOTA

**SOUTHWEST WATER AUTHORITY**
Southwest Pipeline Project Building
West Industrial Park
4665 2nd Street SW
Dickinson, ND 58601-7231
(701) 225-0241
Toll Free: 1-888-425-0241

Segment **7-9E WEST CENTER SERVICE AREA**
Parcel **142-87-6**

## RIGHT-OF-WAY EASEMENT

**ALL PERSONS TAKE NOTICE:**

In consideration of one dollar ($1.00) and other good and valuable consideration JOHNELLE J. KUSLER (OAK) 1884 HILLCREST AVENUE ST. PAUL, MN 55116 hereinafter referred to as Grantor, does hereby grant, bargain, sell, transfer and convey to the Southwest Water Authority, hereinafter referred to as the Grantee, its successor and assigns, a perpetual easement with right to erect, construct, install and lay, and thereafter use, operate, inspect, repair, maintain, replace, and remove water pipelines, connections, valves and all other appurtenant facilities used in connection with the construction, operation and maintenance of the Southwest Pipeline Project, over, above, across and through the land of the Grantor, situated in Oliver County, State of North Dakota, said land being described as follows: NW1/4 SECTION 7 TOWNSHIP 142 RANGE 87 (the tract that contains 1.59 acres, more or less), together with the right of ingress and egress over the adjacent lands of the Grantor, successors and assigns for the purposes of this easement.

1. The permanent easement will be thirty (30) feet in width, fifteen (15) feet on each side of the center line of the pipeline as constructed, with an additional ten (10) feet of temporary right-of-way for a total construction easement width of forty (40) feet, twenty (20) feet on each side of the center line.

2. The Grantee covenants to maintain the easement in good repair so that no unreasonable damage will result from its use to the adjacent land of the Grantor, successors and assigns. The Grantor will receive compensation for damages to growing crops caused by the construction or operation. The Grantor will report any damages within three (3) years of the construction of the project.

The grant and other provisions of this easement shall constitute a covenant running with the land for the benefit of the Grantee, its successors and assigns.

**IN WITNESS WHEREOF,** the Grantor has executed this instrument this 23rd day of May, 20 15

Johnelle J Kusler GRANTOR _____ ~~GRANTOR~~ (NV)

State of MINNESOTA
County of RAMSEY

NICOLE LOUISE VERRILL
NOTARY PUBLIC - MINNESOTA
MY COMMISSION EXPIRES 01/31/19

On 23RD DAY OF MAY, 20 15, personally appeared before me JOHNELLE J. KUSLER (NV)

_____ whom I know personally.
X whose identity I verified on the basis of MINNESOTA DRIVERS LISCENSE.
_____ whose identity I verified on the oath or affirmation of _____, a credible witness to be the signor of the above and he/she acknowledged that he/she signed it.

Notary Public Nicole Louise Verrill
RAMSEY, County MINNESOTA
My Commission Expires: 01/31/2019

90188 6/25/2015 6:13 PM PAGE: 1 OF 1
BOOK: LL PAGE: 18 FEES: $10.00 MM EASEMENT
Kim Wilkens, OLIVER COUNTY RECORDER
By K Wilkens

RECEIVED
FEB -5 2014
SOUTHWEST WATER AUTHORITY

SOUTHWEST WATER AUTHORITY
Southwest Pipeline Project Building
West Industrial Park
4665 2nd Street SW
Dickinson, ND 58601-7231
(701) 225-0241
Toll Free: 1-888-425-0241

SOUTHWEST WATER AUTHORITY
WEST INDUSTRIAL PARK
4665 2ND STREET SW
DICKINSON, ND 58601-7231

RECORDER OLIVER SEAL COUNTY STATE OF NORTH DAKOTA

Segment 7-9E WEST CENTER SERVICE AREA
Parcel 142-87-6

## RIGHT-OF-WAY EASEMENT

**ALL PERSONS TAKE NOTICE:**

In consideration of one dollar ($1.00) and other good and valuable consideration JAMES O KUSLER 5968 19TH STREET SW BEULAH, ND 58523 hereinafter referred to as Grantor, does hereby grant, bargain, sell, transfer and convey to the Southwest Water Authority, hereinafter referred to as the Grantee, its successor and assigns, a perpetual easement with right to erect, construct, install and lay, and thereafter use, operate, inspect, repair, maintain, replace, and remove water pipelines, connections, valves and all other appurtenant facilities used in connection with the construction, operation and maintenance of the Southwest Pipeline Project, over, above, across and through the land of the Grantor, situated in Oliver County, State of North Dakota, said land being described as follows: NW1/4 SECTION 7 TOWNSHIP 142 RANGE 87 (the tract that contains 1.33 acres, more or less), together with the right of ingress and egress over the adjacent lands of the Grantor, successors and assigns for the purposes of this easement.

1. The permanent easement will be thirty (30) feet in width, fifteen (15) feet on each side of the center line of the pipeline as constructed, with an additional ten (10) feet of temporary right-of-way for a total construction easement width of forty (40) feet, twenty (20) feet on each side of the center line.

2. The Grantee covenants to maintain the easement in good repair so that no unreasonable damage will result from its use to the adjacent land of the Grantor, successors and assigns. The Grantor will receive compensation for damages to growing crops caused by the construction or operation. The Grantor will report any damages within three (3) years of the construction of the project.

The grant and other provisions of this easement shall constitute a covenant running with the land for the benefit of the Grantee, its successors and assigns.

**IN WITNESS WHEREOF,** the Grantor has executed this instrument this 3 day of February, 2014.

James O. Kusler GRANTOR _____ GRANTOR

State of North Dakota

County of Dunn

On February 3, 2014, personally appeared before me James O. Kusler

_____ whom I know personally.
X whose identity I verified on the basis of North Dakota drivers license.
_____ whose identity I verified on the oath or affirmation of _____, a credible witness to be the signor of the above and he/she acknowledged that he/she signed it.

DANIEL T. AICHELE
Notary Public
State of North Dakota
My Commission Expires Mar. 2, 2018

Notary Public Daniel T. Aichele
_____, County Dunn
My Commission Expires: Mar. 2, 2018

90190 6/25/2015 6:19 PM PAGE: 1 OF 1
BOOK: LL PAGE: 20 FEES: $10.00 MM EASEMENT
Kim Wilkens, OLIVER COUNTY RECORDER
By K Wilkens

SOUTHWEST WATER AUTHORITY
WEST INDUSTRIAL PARK
4665 2ND STREET SW
DICKINSON, ND 58601-7231

OLIVER SEAL COUNTY STATE OF NORTH DAKOTA

**SOUTHWEST WATER AUTHORITY**
Southwest Pipeline Project Building
West Industrial Park
4665 2nd Street SW
Dickinson, ND 58601-7231
(701) 225-0241
Toll Free: 1-888-425-0241

Segment **7-9E WEST CENTER SERVICE AREA**
Parcel **142-87-6**

## RIGHT-OF-WAY EASEMENT

**ALL PERSONS TAKE NOTICE:**

In consideration of one dollar ($1.00) and other good and valuable consideration **MILDA K. HEDBLOM 1801 SUMMIT AVENUE ST. PAUL, MN 55105** hereinafter referred to as Grantor, does hereby grant, bargain, sell, transfer and convey to the Southwest Water Authority, hereinafter referred to as the Grantee, its successor and assigns, a perpetual easement with right to erect, construct, install and lay, and thereafter use, operate, inspect, repair, maintain, replace, and remove water pipelines, connections, valves and all other appurtenant facilities used in connection with the construction, operation and maintenance of the Southwest Pipeline Project, over, above, across and through the land of the Grantor, situated in **Oliver** County, State of North Dakota, said land being described as follows: **NW1/4 SECTION 7 TOWNSHIP 142 RANGE 87** (the tract that contains **1.59** acres, more or less), together with the right of ingress and egress over the adjacent lands of the Grantor, successors and assigns for the purposes of this easement.

1. The permanent easement will be thirty (30) feet in width, fifteen (15) feet on each side of the center line of the pipeline as constructed, with an additional ten (10) feet of temporary right-of-way for a total construction easement width of forty (40) feet, twenty (20) feet on each side of the center line.

2. The Grantee covenants to maintain the easement in good repair so that no unreasonable damage will result from its use to the adjacent land of the Grantor, successors and assigns. The Grantor will receive compensation for damages to growing crops caused by the construction or operation. The Grantor will report any damages within three (3) years of the construction of the project.

The grant and other provisions of this easement shall constitute a covenant running with the land for the benefit of the Grantee, its successors and assigns.

**IN WITNESS WHEREOF,** the Grantor has executed this instrument this 23 day of May, 2015.

Milda K. Hedblom GRANTOR _____ GRANTOR

State of MN

County of Ramsey

On May 23, 2015, personally appeared before me Milda K. Hedblom

_____ whom I know personally.
✓ whose identity I verified on the basis of Drivers License.
_____ whose identity I verified on the oath or affirmation of _____, a credible witness to be the signor of the above and he/she acknowledged that he/she signed it.

Notary Public _____

Ramsey, County MN

My Commission Expires: 01/31/2016

JUSTIN DAVID HOSMAN
NOTARY PUBLIC - MINNESOTA
MY COMMISSION EXPIRES 01/31/16

97087 8/5/2022 11:38 AM Total Pages: 13
BOOK: V V PAGE: 184 FEES: $65.00 RB EASEMENT
Mickie McNulty-Eide, OLIVER COUNTY RECORDER
By Rebecca Bettke, Deputy

SOLEM LAW OFFICE
PO BOX 249

BEULAH, ND 58523

RECORDER OLIVER SEAL COUNTY STATE OF NORTH DAKOTA

# WATER WELL AND WATER TANK EASEMENT

THIS INDENTURE, made and entered into this 31st day of May, 2022, by and between **JOHNELL J. KUSLER, as personal representative of the Estate of James O. Kusler,** whose post office address is 1884 Hillcrest Avenue, St. Paul, Minnesota 55116, **JOHNELL J. KUSLER,** whose post office address is 1884 Hillcrest Avenue, St. Paul, Minnesota 55116, AND **MILDA L. HEDBLOM, a/k/a MILDA K. HEDBLOM**, whose post office address is 1801 Summit Avenue, St. Paul, Minnesota 55105, hereafter **"Party of the First Part**; and **TRENT T. MARTIN and DAWN MARTIN**, husband and wife, whose post office address is 1943 62ND Avenue SW, Beulah, North Dakota 58523, hereafter **"Party of the Second Part"**.

WITNESSETH, that the Party of the First Part owns the following described parcel of land located in Oliver County, North Dakota, to-wit:

See Exhibit A attached hereto and incorporated herein by reference.

That the Party of the Second Part owns the following described parcel of land located in Oliver County, North Dakota, to-wit:

See Exhibit B attached hereto and incorporated herein by reference.

SOLEM LAW OFFICE
109 CENTRAL AVENUE S
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail:beulaw@westriv.com

That the said Party of the Second Part for and in consideration of the sum of One Dollar ($1.00) and other good and valuable consideration, the receipt of which is hereby acknowledged by the Party of the Second Part, does by these presents grant and convey until the Party of the First Part for their use and benefit upon the parcel of land identified and described in Exhibit A attached hereto and incorporated herein by reference, a Water Well and Water Tank Easement allowing the Party of the First Part, their successors and assigns, access to and use of existing water wells and water tanks located upon the above described parcel of land owned by the Party of the Second Part and described in Exhibit B, attached hereto and incorporated herein by reference. The Party of the First Part may, in the future, add one additional waterline from the existing water wells located on the Party of the Second Part's property described in Exhibit B, which said waterline may extend onto the Party of the First Part's property described in Exhibit A. The Party of the First Part, and their successors and assigns, may use this one future additional waterline for livestock purposes only and this waterline may not be used to service a residence or be sold to another party to be used to service a residence.

This Easement shall be binding and obligatory upon the heirs, administrators, personal representatives, survivors, and assigns of the parties hereto, and this easement shall continue for a term of ninety-nine (99) years or for such longer period of time as may be allowed by state law. It is further understood that the Party of the First Part shall be under no obligation to maintain any existing water wells and water tanks owned by the Party of the Second Party. Any new additional waterline to be established as herein provided by the Party

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

of the First Part shall be established at their sole expense and maintained solely by the Party of the First Part.

IN WITNESS WHEREOF, the said parties hereto set their hands and seals the day and year first above written.

WITNESS, The hands of the parties of the first part:

Johnell J Kusler PR

**JOHNELL J. KUSLER, Personal Representative of the Estate of JAMES O. KUSLER**

STATE OF NORTH DAKOTA )
)
COUNTY OF MERCER )

On this 31st day of May, 2022, before me, a Notary Public in and for said County and State, personally appeared **JOHNELL J. KUSLER, as Personal Representative of the Estate of James O. Kusler**, known to me to be the person that is described in and that executed the within instrument, and acknowledged to me that she executed the same.

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

SCOTT T. SOLEM, NOTARY PUBLIC
MERCER COUNTY, NORTH DAKOTA

Johnell J Kusler

**JOHNELL J. KUSLER**

STATE OF NORTH DAKOTA )
)
COUNTY OF MERCER )

On this 31st day of May, 2022, before me, a Notary Public in and for said County and State, personally appeared **JOHNELL J. KUSLER,** known to me to be the person that is described in and that executed the within instrument, and acknowledged to me that she executed the same.

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

SCOTT T. SOLEM, NOTARY PUBLIC
MERCER COUNTY, NORTH DAKOTA

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

**MILDA L. HEDBLOM,**
**a/k/a MILDA K. HEDBLOM**

STATE OF NORTH DAKOTA )
)
COUNTY OF MERCER )

On this 31st day of May, 2022, before me, a Notary Public in and for said County and State, personally appeared **MILDA L. HEDBLOM, a/k/a MILDA K. HEDBLOM,** known to me to be the person that is described in and that executed the within instrument, and acknowledged to me that she executed the same.

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

SCOTT T. SOLEM, NOTARY PUBLIC
MERCER COUNTY, NORTH DAKOTA

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

WITNESS, the hands of the parties of the second part:

**TRENT T. MARTIN**

**DAWN MARTIN**

STATE OF NORTH DAKOTA )
)
COUNTY OF MERCER )

On this 31st day of May, 2022, before me, a Notary Public in and for said County and State, personally appeared **TRENT T. MARTIN and DAWN MARTIN,** known to me to be the persons that are described in and that executed the within instrument, and acknowledged to me that they executed the same.

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

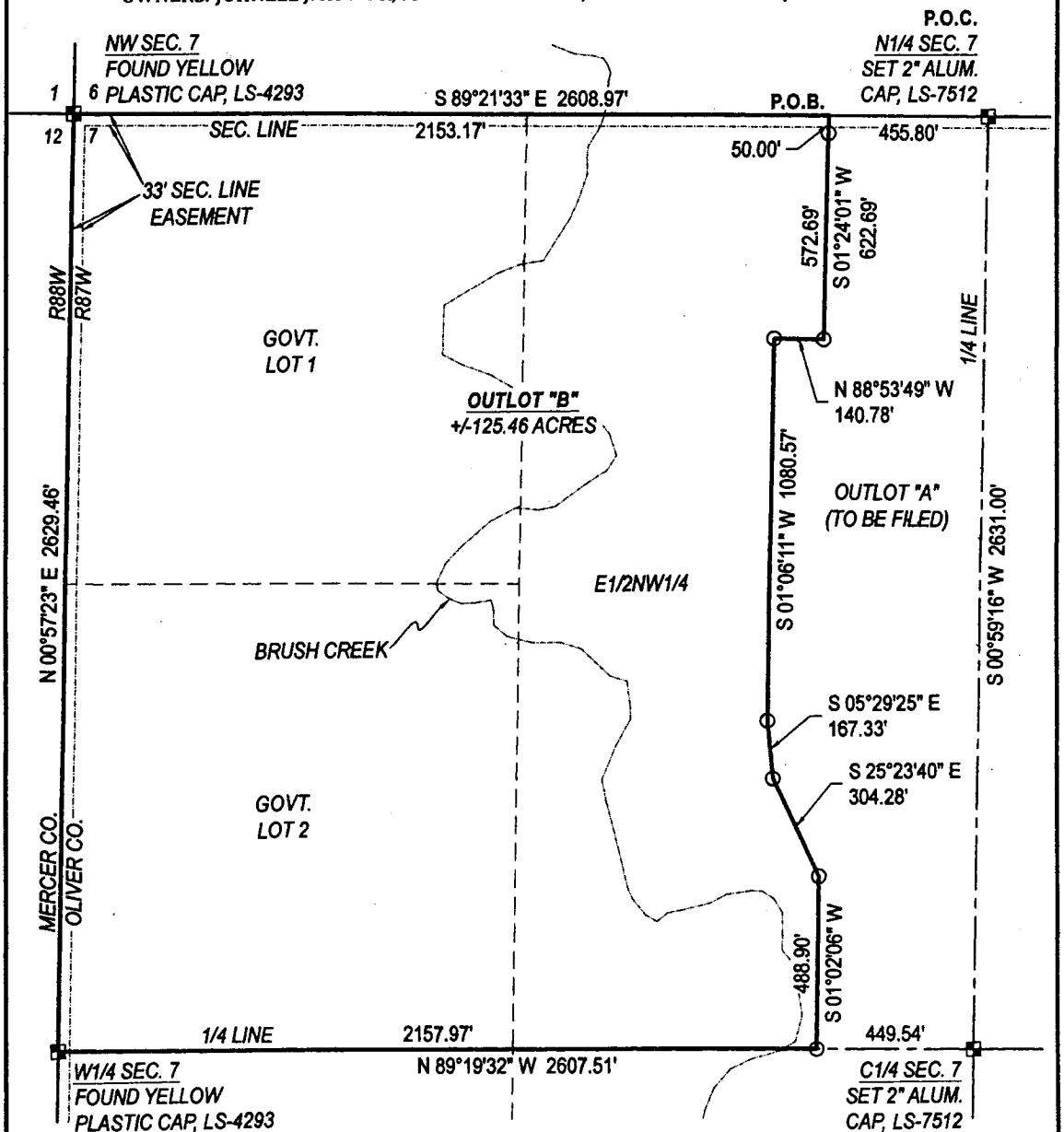
SCOTT T. SOLEM, NOTARY PUBLIC
MERCER COUNTY, NORTH DAKOTA

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

Exhibit A

# PLAT OF OUTLOT "B"

LOCATED IN GOVERNMENT LOTS 1 AND 2, AND THE E1/2NW1/4 OF SECTION 7,
TOWNSHIP 142 NORTH, RANGE 87 WEST, 5th P.M.,
OLIVER COUNTY, NORTH DAKOTA
OWNERS: JOHNELL J. KUSLER, MILDA L. HEDBLOM, AND THE ESTATE OF JAMES O. KUSLER




REGISTERED PROFESSIONAL LAND SURVEYOR
AARON HUMMERT
LS-7512
DATE 2/22/22
NORTH DAKOTA

0 400
SCALE: 1" = 400'
DATE OF FIELD SURVEY:
FEBRUARY 14 & 19, 2022

**LEGEND:**

- ■ – PLSS CORNER (AS NOTED)
- ○ – SET REBAR W/CAP LS-7512

**SURVEYOR'S NOTE:**
The basis of bearing is based on the North Dakota State Plane Coordinate System, South Zone - NAD83. The distances reported hereon are in reference to the international foot definition and are at ground per the NDDOT combination factor for Oliver County (1/CF=1.0001470216). The measurements have been determined by RTK methods using the "Trimble VRSNow" system.

| | |
|---|---|
| DRAWN BY: AH | AARON HUMMERT, PLS<br>PROFESSIONAL LAND SURVEYOR<br>1901 31st STREET NW<br>MANDAN, ND 58554<br>OFFICE: (701) 426-8624 |
| CHECKED BY: AH | |
| PROJECT #: 2022-9 | |
| DATE: 2/20/2022 | SHEET 1 OF 4 |

THE UNDERSIGNED, Owner of the within described property, in accordance with the provisions of section 57-02-39 of the North Dakota Century Code, and upon demand of the County Auditor of Oliver County, North Dakota, have caused to be made the within and foregoing plat of said land with the lots as herein described, and have caused the same to be placed on record, as provided by law.

Witness our hands and seal, this 11th day of March, 2022.

In presence of Scott T. Solem

Johnell J. Kusler

STATE OF NORTH DAKOTA )
ss
COUNTY OF MERCER )

I, SCOTT T. SOLEM, a notary public within and for said County, do hereby certify that on this 11th day of March, A.D. 2022, personally appeared before me to me well known to be the same person described in and who executed the within and foregoing instrument and acknowledged that she executed the same freely and voluntarily.

My commission expires _____, 20___

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

Notary Public

THE UNDERSIGNED, Owner of the within described property, in accordance with the provisions of section 57-02-39 of the North Dakota Century Code, and upon demand of the County Auditor of Oliver County, North Dakota, have caused to be made the within and foregoing plat of said land with the lots as herein described, and have caused the same to be placed on record, as provided by law.

Witness our hands and seal, this 11th day of March, 2022.

In presence of Scott T. Solem

Johnell J. Kusler PR

Johnell J. Kusler, Personal Representative of the Estate of James O. Kusler

STATE OF NORTH DAKOTA )
ss
COUNTY OF MERCER )

I, SCOTT T. SOLEM, a notary public within and for said County, do hereby certify that on this 11th day of March, A.D. 2022, personally appeared before me to me well known to be the same person described in and who executed the within and foregoing instrument and acknowledged that she executed the same freely and voluntarily.

My commission expires _____, 20___

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

Notary Public

| | |
|---|---|
| DRAWN BY: AH | AARON HUMMERT, PLS<br>PROFESSIONAL LAND SURVEYOR<br>1901 31st STREET NW<br>MANDAN, ND 58554<br>OFFICE: (701) 426-8624 |
| CHECKED BY: AH | |
| PROJECT #: 2022-9 | |
| DATE: 2/20/2022 | SHEET 2 OF 4 |

THE UNDERSIGNED, Owner of the within described property, in accordance with the provisions of section 57-02-39 of the North Dakota Century Code, and upon demand of the County Auditor of Oliver County, North Dakota, have caused to be made the within and foregoing plat of said land with the lots as herein described, and have caused the same to be placed on record, as provided by law.

Witness our hands and seal, this 11th day of March, 2022.

In presence of Scott T. Solem

Milda L. Hedblom

STATE OF NORTH DAKOTA )
ss
COUNTY OF MERCER )

I, SCOTT T. SOLEM, a notary public within and for said County, do hereby certify that on this 11th day of March, A.D. 2022, personally appeared before me to me well known to be the same person described in and who executed the within and foregoing instrument and acknowledged that she executed the same freely and voluntarily.

My commission expires ____, 20__

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

Notary Public

SURVEYOR'S CERTIFICATE:

I, Aaron Hummert, a North Dakota Professional Land Surveyor, do hereby certify that this survey was performed by me or under my direct supervision at the request of Johnell J. Kusler, that said survey is true and complete as shown, and that the monuments found and set are of the character and occupy the positions shown thereon. This survey does not represent a complete title search.

REGISTERED PROFESSIONAL LAND SURVEYOR
AARON HUMMERT
LS-7512
DATE 2/22/22
NORTH DAKOTA

AARON HUMMERT, PLS
NORTH DAKOTA REGISTRATION NO. LS-7512

Subscribed and sworn to before me this 22nd day of February, 2022.

AUSTIN EVANS
Notary Public
State of North Dakota
My Commission Expires 11/04/2025

Notary Public

CERTIFICATE OF APPROVAL:

The within and foregoing plat is hereby approved:

Dated: ____ day of ____, 20__.

Chairman

96910 5/6/2022 10:45 AM Total Pages: 4
BOOK: E PAGE: 60 FEES: $20.00 RB Plats
Mickie McNulty-Eide, OLIVER COUNTY RECORDER
By Rebecca Bohlke, Deputy

OLIVER COUNTY RECORDER SEAL STATE OF NORTH DAKOTA

SOLEM LAW OFFICE
PO BOX 249

BEULAH, ND 58523

| | |
|---|---|
| DRAWN BY: AH | AARON HUMMERT, PLS<br>PROFESSIONAL LAND SURVEYOR<br>1901 31st STREET NW<br>MANDAN, ND 58554<br>OFFICE: (701) 426-8624 |
| CHECKED BY: AH | |
| PROJECT #2022-9 | |
| DATE: 2/20/2022 | SHEET 3 OF 4 |

# PLAT OF OUTLOT "B" - ATTACHED DESCRIPTION

LOCATED IN GOVERNMENT LOTS 1 AND 2, AND THE E1/2NW1/4 OF SECTION 7,
TOWNSHIP 142 NORTH, RANGE 87 WEST, 5th P.M.,
OLIVER COUNTY, NORTH DAKOTA

DESCRIPTION:

A tract of land located in Government Lots 1 and 2, and the East Half of the Northwest Quarter (E1/2NW1/4) of Section 7, Township 142 North, Range 87 West of the 5th Principal Meridian, Oliver County, North Dakota, and is more particularly described as follows:

COMMENCING at the north quarter corner of said Section 7; thence on the north line of said Section 7, N89°21'33"W a distance of 455.80 feet to the POINT OF BEGINNING.

From said POINT OF BEGINNING; thence S01°24'01"W a distance of 622.69 feet; thence N88°53'49"W a distance of 140.78 feet; thence S01°06'11"W a distance of 1080.57 feet; thence S05°29'25"E a distance of 167.33 feet; thence S25°23'40"E a distance of 304.28 feet; thence S01°02'06"W a distance of 488.90 feet to the east/west quarter line of said Section 7; thence on said east/west quarter line, N89°19'32"W a distance of 2157.97 feet to the west quarter corner of said Section 7; thence on the west line of said Section 7, N00°57'23"E a distance of 2629.46 feet to the northwest corner of said Section 7; thence on the north line of said Section 7, S89°21'33"E a distance of 2153.17 feet to the POINT OF BEGINNING.

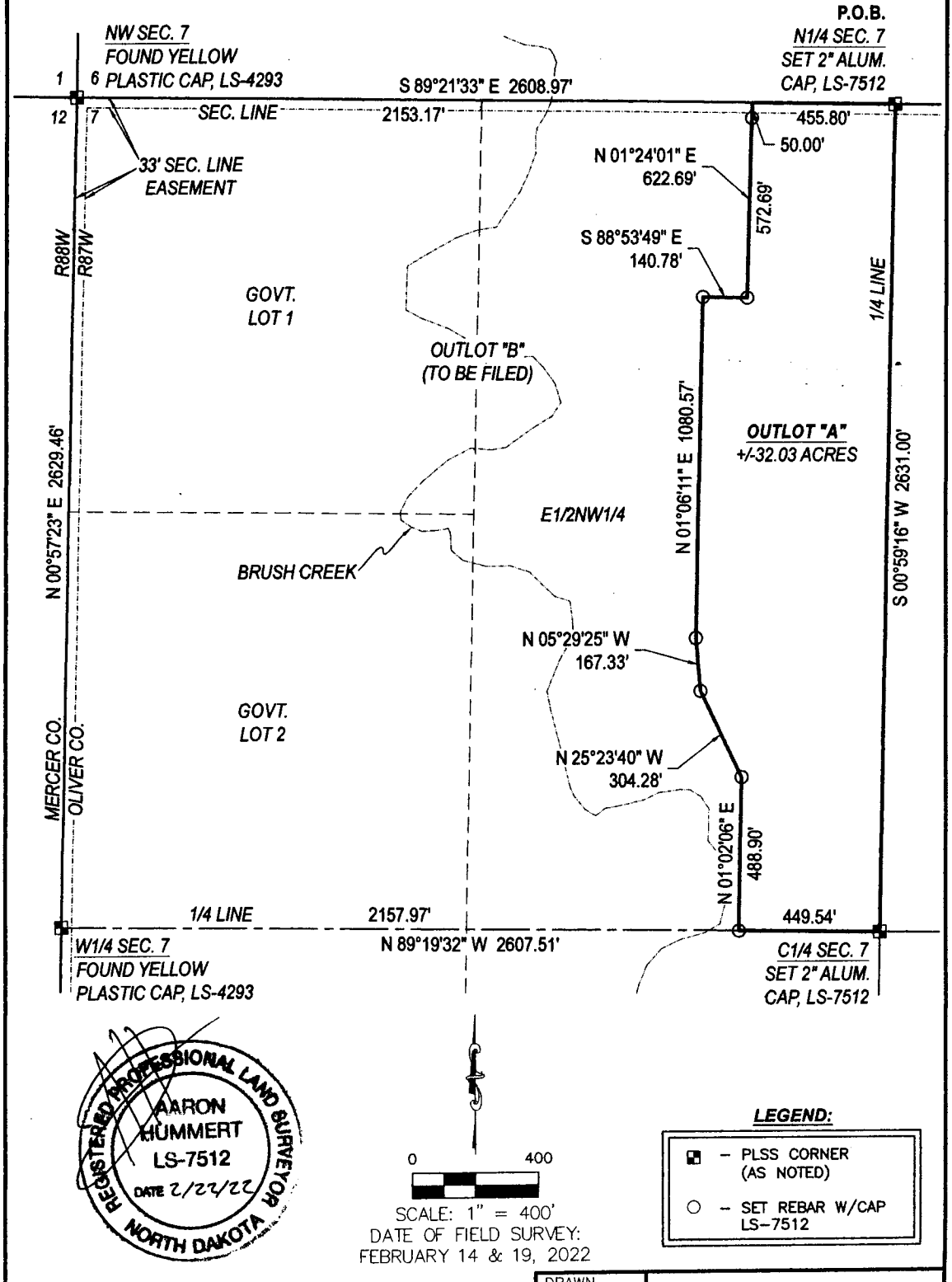
Said tract of land contains 125.46 acres more or less and is subject to any previous easements, agreements, conveyances, and surveys.

| | |
|---|---|
| DRAWN BY: AH | AARON HUMMERT, PLS<br>PROFESSIONAL LAND SURVEYOR<br>1901 31st STREET NW<br>MANDAN, ND 58554<br>OFFICE: (701) 426-8624 |
| CHECKED BY: AH | |
| PROJECT #: 2022-9 | |
| DATE: 2/20/2022 | SHEET 4 OF 4 |

Exhibit B

# PLAT OF OUTLOT "A"

LOCATED IN THE E1/2NW1/4 OF SECTION 7,
TOWNSHIP 142 NORTH, RANGE 87 WEST, 5th P.M.,
OLIVER COUNTY, NORTH DAKOTA
OWNERS: JOHNELL J. KUSLER, MILDA L. HEDBLOM, AND THE ESTATE OF JAMES O. KUSLER




REGISTERED PROFESSIONAL LAND SURVEYOR
AARON HUMMERT
LS-7512
DATE 2/22/22
NORTH DAKOTA

0 400
SCALE: 1" = 400'
DATE OF FIELD SURVEY:
FEBRUARY 14 & 19, 2022

**LEGEND:**

- ■ – PLSS CORNER (AS NOTED)
- ○ – SET REBAR W/CAP LS–7512

**SURVEYOR'S NOTE:**

The basis of bearing is based on the North Dakota State Plane Coordinate System, South Zone - NAD83. The distances reported hereon are in reference to the international foot definition and are at ground per the NDDOT combination factor for Oliver County (1/CF=1.0001470216). The measurements have been determined by RTK methods using the "Trimble VRSNow" system.

| | |
|---|---|
| DRAWN BY: AH | |
| CHECKED BY: AH | |
| PROJECT #: 2022–9 | |
| DATE: 2/20/2022 | |


AARON HUMMERT, PLS
PROFESSIONAL LAND SURVEYOR
1901 31st STREET NW
MANDAN, ND 58554
OFFICE: (701) 426-8624


SHEET 1 OF 4

THE UNDERSIGNED, Owner of the within described property, in accordance with the provisions of section 57-02-39 of the North Dakota Century Code, and upon demand of the County Auditor of Oliver County, North Dakota, have caused to be made the within and foregoing plat of said land with the lots as herein described, and have caused the same to be placed on record, as provided by law.

Witness our hands and seal, this 11th day of March, 20 22.

In presence of Scott T. Solem

Johnell J. Kusler

STATE OF NORTH DAKOTA )
ss
COUNTY OF MERCER )

I, SCOTT T. SOLEM, a notary public within and for said County, do hereby certify that on this 11th day of March, A.D. 20 22, personally appeared before me to me well known to be the same person described in and who executed the within and foregoing instrument and acknowledged that she executed the same freely and voluntarily.

My commission expires _____, 20___

SCOTT T. SOLEM, 20___
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

Notary Public

THE UNDERSIGNED, Owner of the within described property, in accordance with the provisions of section 57-02-39 of the North Dakota Century Code, and upon demand of the County Auditor of Oliver County, North Dakota, have caused to be made the within and foregoing plat of said land with the lots as herein described, and have caused the same to be placed on record, as provided by law.

Witness our hands and seal, this 11th day of March, 20 22.

In presence of Scott T. Solem

Johnell J. Kusler PR

Johnell J. Kusler, Personal Representative of the Estate of James O. Kusler

STATE OF NORTH DAKOTA )
ss
COUNTY OF MERCER )

I, SCOTT T. SOLEM, a notary public within and for said County, do hereby certify that on this 11th day of March, A.D. 2022, personally appeared before me to me well known to be the same person described in and who executed the within and foregoing instrument and acknowledged that she executed the same freely and voluntarily.

My commission expires _____, 20___

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

Notary Public

| | |
|---|---|
| DRAWN BY: AH | AARON HUMMERT, PLS<br>PROFESSIONAL LAND SURVEYOR<br>1901 31st STREET NW<br>MANDAN, ND 58554<br>OFFICE: (701) 426-8624 |
| CHECKED BY: AH | |
| PROJECT #: 2022-9 | |
| DATE: 2/20/2022 | SHEET 2 OF 4 |

THE UNDERSIGNED, Owner of the within described property, in accordance with the provisions of section 57-02-39 of the North Dakota Century Code, and upon demand of the County Auditor of Oliver County, North Dakota, have caused to be made the within and foregoing plat of said land with the lots as herein described, and have caused the same to be placed on record, as provided by law.

Witness our hands and seal, this 11th day of March, 2022.

In presence of Scott T. Solem

Milda L. Hedblom

STATE OF NORTH DAKOTA )
SS
COUNTY OF MERCER )

I, SCOTT T. SOLEM, a notary public within and for said County, do hereby certify that on this 11th day of March, A.D. 2022, personally appeared before me to me well known to be the same person described in and who executed the within and foregoing instrument and acknowledged that she executed the same freely and voluntarily.

My commission expires _____, 20___

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

Notary Public

SURVEYOR'S CERTIFICATE:

I, Aaron Hummert, a North Dakota Professional Land Surveyor, do hereby certify that this survey was performed by me or under my direct supervision at the request of Johnell J. Kusler, that said survey is true and complete as shown, and that the monuments found and set are of the character and occupy the positions shown thereon. This survey does not represent a complete title search.

AARON HUMMERT, PLS
NORTH DAKOTA REGISTRATION NO. LS-7512

REGISTERED PROFESSIONAL LAND SURVEYOR
AARON HUMMERT
LS-7512
DATE 2/22/22
NORTH DAKOTA

Subscribed and sworn to before me this 22nd day of 22, 2022.

AUSTIN EVANS
Notary Public
State of North Dakota
My Commission Expires 11/04/2025

Notary Public

CERTIFICATE OF APPROVAL:

The within and foregoing plat is hereby approved:

Dated: _____ day of _____, 20___.

Chairman

96898 4/26/2022 1:17 PM Total Pages: 4
BOOK: E PAGE: 59 FEES: $20.00 RB Plats
Mickie McNulty-Eide, OLIVER COUNTY RECORDER
By Rebecca Bethke, Deputy

SOLEM LAW OFFICE
PO BOX 249

BEULAH, ND 58523

OLIVER COUNTY RECORDER SEAL STATE OF NORTH DAKOTA

| | |
|---|---|
| DRAWN BY: AH | AARON HUMMERT, PLS<br>PROFESSIONAL LAND SURVEYOR<br>1901 31st STREET NW<br>MANDAN, ND 58554<br>OFFICE: (701) 426-8624 |
| CHECKED BY: AH | |
| PROJECT #: 2022-9 | |
| DATE: 2/20/2022 | SHEET 3 OF 4 |

# PLAT OF OUTLOT "A" - ATTACHED DESCRIPTION

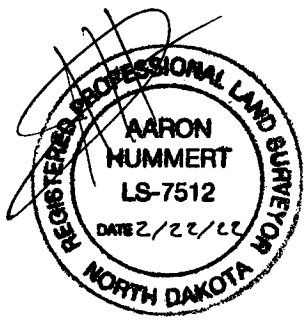
LOCATED IN THE E1/2NW1/4 OF SECTION 7,
TOWNSHIP 142 NORTH, RANGE 87 WEST, 5th P.M.,
OLIVER COUNTY, NORTH DAKOTA

DESCRIPTION:

A tract of land located in the East Half of the Northwest Quarter (E1/2NW1/4) of Section 7, Township 142 North, Range 87 West of the 5th Principal Meridian, Oliver County, North Dakota, and is more particularly described as follows:

BEGINNING at the north quarter corner of said Section 7; thence on the north/south quarter line of said Section 7, S00°59'16"W a distance of 2631.00 feet to the center quarter corner of said Section 7; thence on the east/west quarter line of said Section 7, N89°19'32"W a distance of 449.54 feet; thence N01°02'06"E a distance of 488.90 feet; thence N25°23'40"W a distance of 304.28 feet; thence N05°29'25"W a distance of 167.33 feet; thence N01°06'11"E a distance of 1080.57 feet; thence S88°53'49"E a distance of 140.78 feet; thence N01°24'01"E a distance of 622.69 feet to the north line of said Section 7; thence on said north line, S89°21'33"E a distance of 455.80 feet to the POINT OF BEGINNING.

Said tract of land contains 32.03 acres more or less and is subject to any previous easements, agreements, conveyances, and surveys.




| | |
|---|---|
| DRAWN BY: AH | AARON HUMMERT, PLS<br>PROFESSIONAL LAND SURVEYOR<br>1901 31st STREET NW<br>MANDAN, ND 58554<br>OFFICE: (701) 426-8624 |
| CHECKED BY: AH | |
| PROJECT #: 2022-9 | |
| DATE: 2/20/2022 | SHEET 4 OF 4 |

97731 7/6/2023 10:13 AM Total Pages: 13
BOOK: XX PAGE: 178 FEES: $65.00 RB EASEMENT
Mickie McNulty-Eide, OLIVER COUNTY RECORDER
By Rebecca Bethke, Deputy

SOLEM LAW OFFICE
PO BOX 249

BEULAH, ND 58523

RECORDER OLIVER SEAL COUNTY STATE OF NORTH DAKOTA

# CORRECTED
# RECIPROCAL ACCESS EASEMENT

THIS INDENTURE, made and entered into this 31st day of May, 2022, by and between **JOHNELL J. KUSLER, as personal representative of the Estate of James O. Kusler,** whose post office address is 1884 Hillcrest Avenue, St. Paul, Minnesota 55116, **JOHNELL J. KUSLER**, whose post office address is 1884 Hillcrest Avenue, St. Paul, Minnesota 55116, AND **MILDA L. HEDBLOM, a/k/a MILDA K. HEDBLOM,** whose post office address is 1801 Summit Avenue, St. Paul, Minnesota 55105, hereafter "Party of the First Part"; and **TRENT T. MARTIN and DAWN MARTIN**, husband and wife, whose post office address is 1943 62ND Avenue SW, Beulah, North Dakota 58523, hereafter "Party of the Second Part".

WITNESSETH, that the said Party of the First Part and the said Party of the Second Part, for and in consideration of the sum of One Dollar ($1.00) and other good and valuable consideration, the receipt of which is hereby acknowledged by each party, due by these presents grant and convey unto each other, their heirs, successors, and assigns for their use a Reciprocal Access Easement for purposes of ingress and egress allowing each party, their heirs, successors, and assigns to cross the land of each other specifically identified herein on

SOLEM LAW OFFICE
109 CENTRAL AVENUE S
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail:beulaw@westriv.com

existing roads and trails.

The Party of the First Part owns the following described parcel of land located in Oliver County, North Dakota, to-wit:

See Exhibit A attached hereto and incorporated herein by reference.

The Party of the Second Part owns the following described parcel of land located in Oliver County, North Dakota, to-wit:

See Exhibit B attached hereto and incorporated herein by reference.

It is understood that this Reciprocal Access Agreement is being granted by the parties herein to each other for ingress and egress access purposes allowing each party to cross the land of the other to access their own parcels and that this Reciprocal Access Easement shall be binding and obligatory upon the heirs, administrators, personal representatives, survivors, and assigns of the parties hereto, and shall continue for a term of ninety-nine (99) years or for such longer time as may be allowed by state law. It is further understood that neither party is obligated to the other to maintain the trails and roads located upon the parcels described herein.

IN WITNESS WHEREOF, the said parties have hereunto set their hands and seals the day and year first above written.

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

WITNESS, the hands of the Parties of the First Part:

**JOHNELL J. KUSLER, Personal Representative of the Estate of JAMES O. KUSLER**

STATE OF NORTH DAKOTA )
)
COUNTY OF MERCER )

On this 31st day of May, 2022, before me, a Notary Public in and for said County and State, personally appeared **JOHNELL J. KUSLER,** as Personal Representative of the Estate of James O. Kusler, known to me to be the person that is described in and that executed the within instrument, and acknowledged to me that she executed the same.

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

SCOTT T. SOLEM, NOTARY PUBLIC
MERCER COUNTY, NORTH DAKOTA

**JOHNELL J. KUSLER**

STATE OF NORTH DAKOTA )
)
COUNTY OF MERCER )

On this 31st day of May, 2022, before me, a Notary Public in and for said County and State, personally appeared **JOHNELL J. KUSLER,** known to me to be the person that is described in and that executed the within instrument, and acknowledged to me that she executed the same.

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

SCOTT T. SOLEM, NOTARY PUBLIC
MERCER COUNTY, NORTH DAKOTA

**MILDA L. HEDBLOM,**
**a/k/a MILDA K. HEDBLOM**

STATE OF NORTH DAKOTA )
)
COUNTY OF MERCER )

On this 31st day of May, 2022, before me, a Notary Public in and for said County and State, personally appeared **MILDA L. HEDBLOM, a/k/a MILDA K. HEDBLOM,** known to me to be the person that is described in and that executed the within instrument, and acknowledged to me that she executed the same.

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

SCOTT T. SOLEM, NOTARY PUBLIC
MERCER COUNTY, NORTH DAKOTA

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

WITNESS, the hands of the Party of the Second Part:

**TRENT T. MARTIN**

**DAWN MARTIN**

STATE OF NORTH DAKOTA )
)
COUNTY OF MERCER )

On this 31st day of May, 2022, before me, a Notary Public in and for said County and State, personally appeared **TRENT T. MARTIN and DAWN MARTIN,** known to me to be the persons that are described in and that executed the within instrument, and acknowledged to me that they executed the same.

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

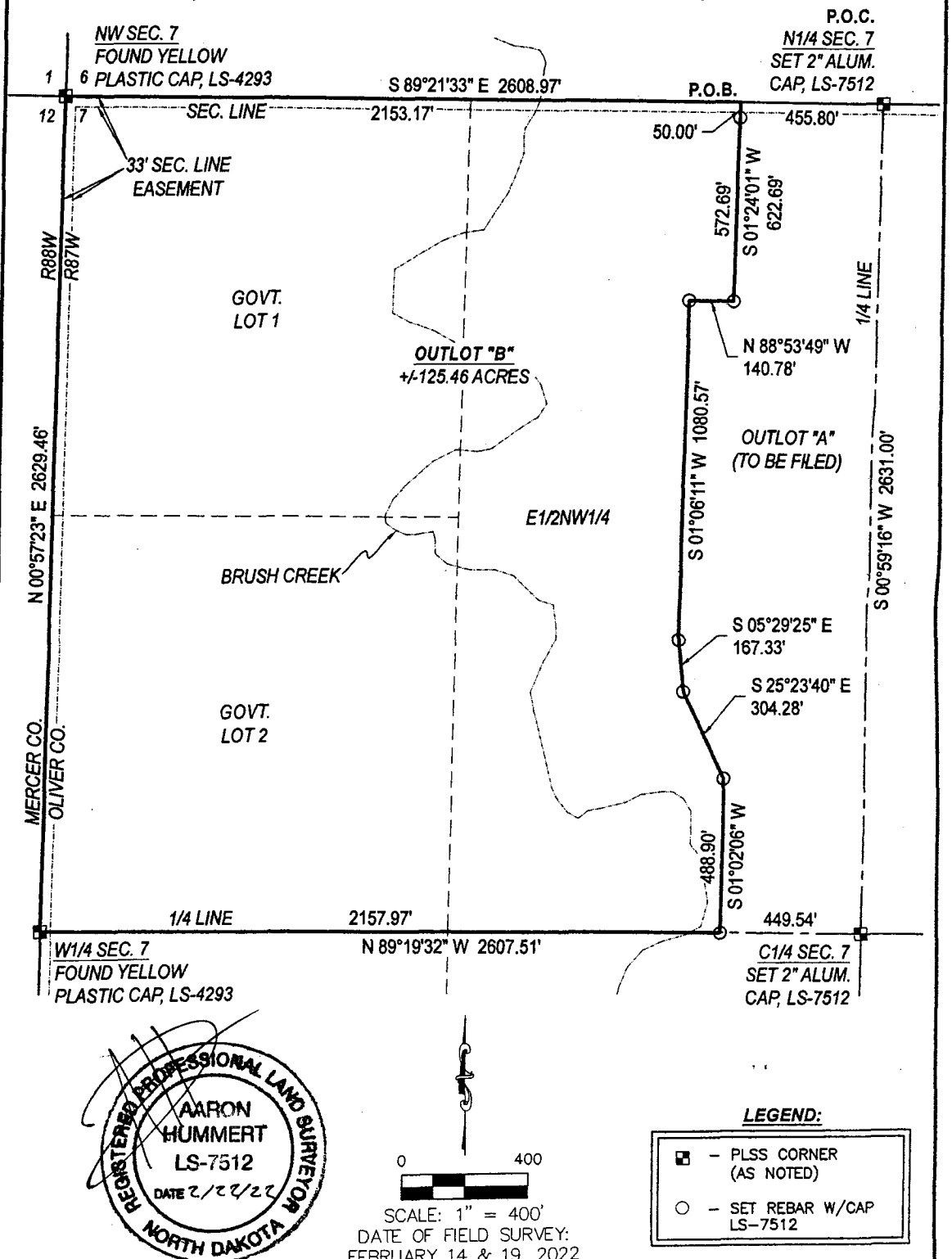
SCOTT T. SOLEM, NOTARY PUBLIC
MERCER COUNTY, NORTH DAKOTA

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

Exhibit A

# PLAT OF OUTLOT "B"

LOCATED IN GOVERNMENT LOTS 1 AND 2, AND THE E1/2NW1/4 OF SECTION 7,
TOWNSHIP 142 NORTH, RANGE 87 WEST, 5th P.M.,
OLIVER COUNTY, NORTH DAKOTA
OWNERS: JOHNELL J. KUSLER, MILDA L. HEDBLOM, AND THE ESTATE OF JAMES O. KUSLER




REGISTERED PROFESSIONAL LAND SURVEYOR
AARON HUMMERT
LS-7512
DATE 2/22/22
NORTH DAKOTA

0 400
SCALE: 1" = 400'
DATE OF FIELD SURVEY:
FEBRUARY 14 & 19, 2022

**LEGEND:**

- ■ – PLSS CORNER (AS NOTED)
- ○ – SET REBAR W/CAP LS–7512

**SURVEYOR'S NOTE:**
The basis of bearing is based on the North Dakota State Plane Coordinate System, South Zone - NAD83. The distances reported hereon are in reference to the international foot definition and are at ground per the NDDOT combination factor for Oliver County (1/CF=1.0001470216). The measurements have been determined by RTK methods using the "Trimble VRSNow" system.

| | |
|---|---|
| DRAWN BY: AH | |
| CHECKED BY: AH | |
| PROJECT #: 2022–9 | |
| DATE: 2/20/2022 | |


AARON HUMMERT, PLS
PROFESSIONAL LAND SURVEYOR
1901 31st STREET NW
MANDAN, ND 58554
OFFICE: (701) 426-8624


SHEET 1 OF 4

THE UNDERSIGNED, Owner of the within described property, in accordance with the provisions of section 57-02-39 of the North Dakota Century Code, and upon demand of the County Auditor of Oliver County, North Dakota, have caused to be made the within and foregoing plat of said land with the lots as herein described, and have caused the same to be placed on record, as provided by law.

Witness our hands and seal, this 11th day of March, 2022.

In presence of Scott T. Solem

Johnell J. Kusler

STATE OF NORTH DAKOTA )
ss
COUNTY OF MERCER )

I, SCOTT T. SOLEM, a notary public within and for said County, do hereby certify that on this 11th day of March, A.D. 2022, personally appeared before me to me well known to be the same person described in and who executed the within and foregoing instrument and acknowledged that she executed the same freely and voluntarily.

My commission expires _____, 20___

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

Notary Public

THE UNDERSIGNED, Owner of the within described property, in accordance with the provisions of section 57-02-39 of the North Dakota Century Code, and upon demand of the County Auditor of Oliver County, North Dakota, have caused to be made the within and foregoing plat of said land with the lots as herein described, and have caused the same to be placed on record, as provided by law.

Witness our hands and seal, this 11th day of March, 2022.

In presence of Scott T. Solem

Johnell J. Kusler PR

Johnell J. Kusler, Personal Representative of the Estate of James O. Kusler

STATE OF NORTH DAKOTA )
ss
COUNTY OF MERCER )

I, SCOTT T. SOLEM, a notary public within and for said County, do hereby certify that on this 11th day of March, A.D. 2022, personally appeared before me to me well known to be the same person described in and who executed the within and foregoing instrument and acknowledged that she executed the same freely and voluntarily.

My commission expires _____, 20___

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

Notary Public

| | |
|---|---|
| DRAWN BY: AH | AARON HUMMERT, PLS<br>PROFESSIONAL LAND SURVEYOR<br>1901 31st STREET NW<br>MANDAN, ND 58554<br>OFFICE: (701) 426-8624 |
| CHECKED BY: AH | |
| PROJECT #: 2022-9 | |
| DATE: 2/20/2022 | SHEET 2 OF 4 |

THE UNDERSIGNED, Owner of the within described property, in accordance with the provisions of section 57-02-39 of the North Dakota Century Code, and upon demand of the County Auditor of Oliver County, North Dakota, have caused to be made the within and foregoing plat of said land with the lots as herein described, and have caused the same to be placed on record, as provided by law.

Witness our hands and seal, this 11th day of March, 2022.

In presence of Scott T. Solem

Milda L. Hedblom

STATE OF NORTH DAKOTA )
ss
COUNTY OF MERCER )

I, SCOTT T. SOLEM, a notary public within and for said County, do hereby certify that on this 11th day of March, A.D. 2022, personally appeared before me to me well known to be the same person described in and who executed the within and foregoing instrument and acknowledged that she executed the same freely and voluntarily.

My commission expires _____, 20___

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

Notary Public

SURVEYOR'S CERTIFICATE:

I, Aaron Hummert, a North Dakota Professional Land Surveyor, do hereby certify that this survey was performed by me or under my direct supervision at the request of Johnell J. Kusler, that said survey is true and complete as shown, and that the monuments found and set are of the character and occupy the positions shown thereon. This survey does not represent a complete title search.

REGISTERED PROFESSIONAL LAND SURVEYOR
AARON HUMMERT
LS-7512
DATE 2/22/22
NORTH DAKOTA

AARON HUMMERT, PLS
NORTH DAKOTA REGISTRATION NO. LS-7512

Subscribed and sworn to before me this 22nd day of February, 2022.

AUSTIN EVANS
Notary Public
State of North Dakota
My Commission Expires 11/04/2025

Notary Public

CERTIFICATE OF APPROVAL:

The within and foregoing plat is hereby approved:

Dated: _____ day of _____, 20___.

Chairman

96910 5/6/2022 10:45 AM Total Pages: 4
BOOK: E PAGE: 60 FEES: $20.00 RB Plats
Mickie McNulty-Eide, OLIVER COUNTY RECORDER
By Rebecca Bohlke, Deputy

OLIVER COUNTY SEAL

SOLEM LAW OFFICE
PO BOX 249

BEULAH, ND 58523

| | |
|---|---|
| DRAWN BY: AH | AARON HUMMERT, PLS<br>PROFESSIONAL LAND SURVEYOR<br>1901 31st STREET NW<br>MANDAN, ND 58554<br>OFFICE: (701) 426-8624 |
| CHECKED BY: AH | |
| PROJECT 2022-9 | |
| DATE: 2/20/2022 | SHEET 3 OF 4 |

# PLAT OF OUTLOT "B" - ATTACHED DESCRIPTION

LOCATED IN GOVERNMENT LOTS 1 AND 2, AND THE E1/2NW1/4 OF SECTION 7,
TOWNSHIP 142 NORTH, RANGE 87 WEST, 5th P.M.,
OLIVER COUNTY, NORTH DAKOTA

DESCRIPTION:

A tract of land located in Government Lots 1 and 2, and the East Half of the Northwest Quarter (E1/2NW1/4) of Section 7, Township 142 North, Range 87 West of the 5th Principal Meridian, Oliver County, North Dakota, and is more particularly described as follows:

COMMENCING at the north quarter corner of said Section 7; thence on the north line of said Section 7, N89°21'33"W a distance of 455.80 feet to the POINT OF BEGINNING.

From said POINT OF BEGINNING; thence S01°24'01"W a distance of 622.69 feet; thence N88°53'49"W a distance of 140.78 feet; thence S01°06'11"W a distance of 1080.57 feet; thence S05°29'25"E a distance of 167.33 feet; thence S25°23'40"E a distance of 304.28 feet; thence S01°02'06"W a distance of 488.90 feet to the east/west quarter line of said Section 7; thence on said east/west quarter line, N89°19'32"W a distance of 2157.97 feet to the west quarter corner of said Section 7; thence on the west line of said Section 7, N00°57'23"E a distance of 2629.46 feet to the northwest corner of said Section 7; thence on the north line of said Section 7, S89°21'33"E a distance of 2153.17 feet to the POINT OF BEGINNING.

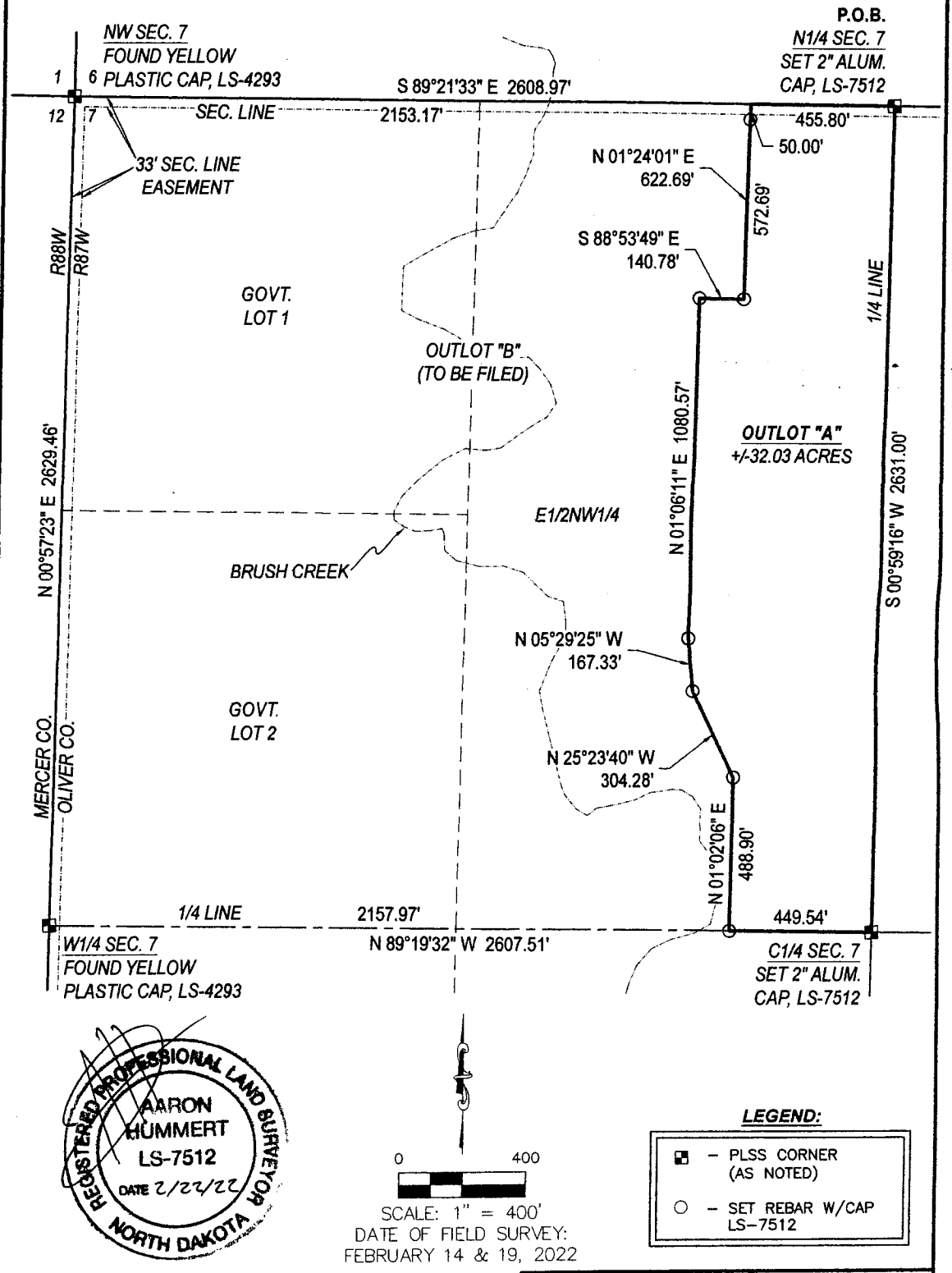
Said tract of land contains 125.46 acres more or less and is subject to any previous easements, agreements, conveyances, and surveys.

| | |
|---|---|
| DRAWN BY: AH | AARON HUMMERT, PLS<br>PROFESSIONAL LAND SURVEYOR<br>1901 31st STREET NW<br>MANDAN, ND 58554<br>OFFICE: (701) 426-8824 |
| CHECKED BY: AH | |
| PROJECT #: 2022-9 | |
| DATE: 2/20/2022 | SHEET 4 OF 4 |

Exhibit B

# PLAT OF OUTLOT "A"

LOCATED IN THE E1/2NW1/4 OF SECTION 7,
TOWNSHIP 142 NORTH, RANGE 87 WEST, 5th P.M.,
OLIVER COUNTY, NORTH DAKOTA
OWNERS: JOHNELL J. KUSLER, MILDA L. HEDBLOM, AND THE ESTATE OF JAMES O. KUSLER




REGISTERED PROFESSIONAL LAND SURVEYOR
AARON HUMMERT
LS-7512
DATE 2/22/22
NORTH DAKOTA

0 400
SCALE: 1" = 400'
DATE OF FIELD SURVEY:
FEBRUARY 14 & 19, 2022

**LEGEND:**

- ■ – PLSS CORNER (AS NOTED)
- ○ – SET REBAR W/CAP LS–7512

**SURVEYOR'S NOTE:**

The basis of bearing is based on the North Dakota State Plane Coordinate System, South Zone - NAD83. The distances reported hereon are in reference to the international foot definition and are at ground per the NDDOT combination factor for Oliver County (1/CF=1.0001470216). The measurements have been determined by RTK methods using the "Trimble VRSNow" system.

| | |
|---|---|
| DRAWN BY: AH | |
| CHECKED BY: AH | |
| PROJECT #: 2022–9 | |
| DATE: 2/20/2022 | |


AARON HUMMERT, PLS
PROFESSIONAL LAND SURVEYOR
1901 31st STREET NW
MANDAN, ND 58554
OFFICE: (701) 426-8624


SHEET 1 OF 4

THE UNDERSIGNED, Owner of the within described property, in accordance with the provisions of section 57-02-39 of the North Dakota Century Code, and upon demand of the County Auditor of Oliver County, North Dakota, have caused to be made the within and foregoing plat of said land with the lots as herein described, and have caused the same to be placed on record, as provided by law.

Witness our hands and seal, this 11th day of March, 20 22.

In presence of Scott T. Solem

Johnell J. Kusler

STATE OF NORTH DAKOTA )
ss
COUNTY OF MERCER )

I, SCOTT T. SOLEM, a notary public within and for said County, do hereby certify that on this 11th day of March, A.D. 20 22, personally appeared before me to me well known to be the same person described in and who executed the within and foregoing instrument and acknowledged that she executed the same freely and voluntarily.

My commission expires SCOTT T. SOLEM, 20
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

Notary Public

THE UNDERSIGNED, Owner of the within described property, in accordance with the provisions of section 57-02-39 of the North Dakota Century Code, and upon demand of the County Auditor of Oliver County, North Dakota, have caused to be made the within and foregoing plat of said land with the lots as herein described, and have caused the same to be placed on record, as provided by law.

Witness our hands and seal, this 11th day of March, 20 22.

In presence of Scott T. Solem

Johnell J. Kusler PR
Johnell J. Kusler, Personal Representative of the Estate of James O. Kusler

STATE OF NORTH DAKOTA )
ss
COUNTY OF MERCER )

I, SCOTT T. SOLEM, a notary public within and for said County, do hereby certify that on this 11th day of March, A.D. 2022, personally appeared before me to me well known to be the same person described in and who executed the within and foregoing instrument and acknowledged that she executed the same freely and voluntarily.

My commission expires _____, 20___

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

Notary Public

| | |
|---|---|
| DRAWN BY: AH | AARON HUMMERT, PLS<br>PROFESSIONAL LAND SURVEYOR<br>1901 31st STREET NW<br>MANDAN, ND 58554<br>OFFICE: (701) 426-8624 |
| CHECKED BY: AH | |
| PROJECT #: 2022-9 | |
| DATE: 2/20/2022 | SHEET 2 OF 4 |

THE UNDERSIGNED, Owner of the within described property, in accordance with the provisions of section 57-02-39 of the North Dakota Century Code, and upon demand of the County Auditor of Oliver County, North Dakota, have caused to be made the within and foregoing plat of said land with the lots as herein described, and have caused the same to be placed on record, as provided by law.

Witness our hands and seal, this 11th day of March, 20 22.

In presence of Scott T. Solem

Milda L. Hedblom

STATE OF NORTH DAKOTA )
ss
COUNTY OF MERCER )

I, SCOTT T. SOLEM, a notary public within and for said County, do hereby certify that on this 11th day of March, A.D. 20 22, personally appeared before me to me well known to be the same person described in and who executed the within and foregoing instrument and acknowledged that she executed the same freely and voluntarily.

My commission expires _____, 20___

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

Notary Public

SURVEYOR'S CERTIFICATE:

I, Aaron Hummert, a North Dakota Professional Land Surveyor, do hereby certify that this survey was performed by me or under my direct supervision at the request of Johnell J. Kusler, that said survey is true and complete as shown, and that the monuments found and set are of the character and occupy the positions shown thereon. This survey does not represent a complete title search.

REGISTERED PROFESSIONAL LAND SURVEYOR
AARON HUMMERT
LS-7512
DATE 2/22/22
NORTH DAKOTA

AARON HUMMERT, PLS
NORTH DAKOTA REGISTRATION NO. LS-7512

Subscribed and sworn to before me this 22nd day of 22, 20 22.

AUSTIN EVANS
Notary Public
State of North Dakota
My Commission Expires 11/04/2025

Notary Public

CERTIFICATE OF APPROVAL:

The within and foregoing plat is hereby approved:

Dated: _____ day of _____, 20___.

Chairman

96898 4/26/2022 1:17 PM Total Pages: 4
BOOK: E PAGE: 59 FEES: $20.00 RB Plats
Mickie McNulty-Eide, OLIVER COUNTY RECORDER
By Rebecca Bethke, Deputy

SOLEM LAW OFFICE
PO BOX 249

BEULAH, ND 58523

OLIVER COUNTY RECORDER SEAL STATE OF NORTH DAKOTA

| | |
|---|---|
| DRAWN BY: AH | AARON HUMMERT, PLS<br>PROFESSIONAL LAND SURVEYOR<br>1901 31st STREET NW<br>MANDAN, ND 58554<br>OFFICE: (701) 426-8624 |
| CHECKED BY: AH | |
| PROJECT #: 2022-9 | |
| DATE: 2/20/2022 | SHEET 3 OF 4 |

# PLAT OF OUTLOT "A" - ATTACHED DESCRIPTION

LOCATED IN THE E1/2NW1/4 OF SECTION 7,
TOWNSHIP 142 NORTH, RANGE 87 WEST, 5th P.M.,
OLIVER COUNTY, NORTH DAKOTA

DESCRIPTION:

A tract of land located in the East Half of the Northwest Quarter (E1/2NW1/4) of Section 7, Township 142 North, Range 87 West of the 5th Principal Meridian, Oliver County, North Dakota, and is more particularly described as follows:

BEGINNING at the north quarter corner of said Section 7; thence on the north/south quarter line of said Section 7, S00°59'16"W a distance of 2631.00 feet to the center quarter corner of said Section 7; thence on the east/west quarter line of said Section 7, N89°19'32"W a distance of 449.54 feet; thence N01°02'06"E a distance of 488.90 feet; thence N25°23'40"W a distance of 304.28 feet; thence N05°29'25"W a distance of 167.33 feet; thence N01°06'11"E a distance of 1080.57 feet; thence S88°53'49"E a distance of 140.78 feet; thence N01°24'01"E a distance of 622.69 feet to the north line of said Section 7; thence on said north line, S89°21'33"E a distance of 455.80 feet to the POINT OF BEGINNING.

Said tract of land contains 32.03 acres more or less and is subject to any previous easements, agreements, conveyances, and surveys.

| | |
|---|---|
| DRAWN BY: AH | AARON HUMMERT, PLS<br>PROFESSIONAL LAND SURVEYOR<br>1901 31st STREET NW<br>MANDAN, ND 58554<br>OFFICE: (701) 426-8624 |
| CHECKED BY: AH | |
| PROJECT #: 2022-9 | |
| DATE: 2/20/2022 | SHEET 4 OF 4 |

01082

FORM LE-189 R

RIGHT OF WAY EASEMENT

KNOW ALL MEN BY THESE PRESENTS, that we the undersigned, (Whether one or more) John Scheidt and Gladys M. Scheidt (joint tenants, and not as tenants in common, with full rights of survivorship) (unmarried) (husband and wife), for a good and valuable consideration, the receipt whereof is hereby acknowledged, do hereby grant unto Oliver-Mercer Electric Cooperative, Inc. a cooperative corporation, (hereinafter called the "Cooperative"), whose post office address is Hazen, North Dakota, and to its successors or assigns, the right to enterupon the lands of the undersigned, situated in the County of Mercer, State of North Dakota, and more particularly described as follows:

A tract of land approximately _____ acres in area, located _____ miles in a _____ direction from the town of _____, and further described as being in common tenancy in SE¼ Section 2, Township 142 Range 88
joint tenandy in S½NE¼ Section 12, Township 142 Range 88
and NE¼ Section 14, Township 142 Range 88

and to contract, operate and maintain on the above described lands, and/or in or upon all streets, roads or highways abutting said lands, an electric transmission or distribution line or system, and to cut and trim trees and shrubbery that may interfere with or threaten to endanger the operation and maintenance of said line or system.

The undersigned agree that all poles, wires, and other facilities, including any main service entrance equipment, installed on the above-described lands at the Cooperative's expense shall remain the property of the Cooperative, removable at the option of the Cooperative, upon termination of service to or on said lands.

The undersigned covenant that they are the owners of the above-desctibed lands and that the said lands are free and clear of encumberances and liens of whatsoever character except those held by the following persons:

IN WITNESS WHEREOF, the undersigned have set their hands and seals, this 22 day of April, 1949.

John Scheidt (L.S.)

Gladys M. Scheidt (L.S.)

Signed, sealed and delivered in the presence of:

Leo Goetz

_____

S8010

(1)
STATE OF NORTH DAKOTA

COUNTY OF Mercer SS.

Leo Goetz being first duly sworn says that he is one of the witnesses to the above and foregoing easements, that John Scheidt and Gladys M. Scheidt (joint tenants, and not as tenants in common, with full rights of survivorship) whose names is and/or are subscribed to the above and foregoing instruments as a party is and/or are the persons described in said easement and that they signed said instrument in my presence and that I in their presence signed my name thereto as a subscribed witness.

Leo Goetz

SUBSCRIBED and sworn to before me this 25 day of April, 1949

Frank J. Belinskey
Notary Public in and for the
County of Mercer and the State
of North Dakota

FRANK J. BELINSKEY NOTARY PUBLIC STATE OF NORTH DAKOTA

My commission expires: March 24, 1953

(1)
STATE OF NORTH DAKOTA
COUNTY OF Mercer SS.

On this 25 day of April, 1949, before me Frank J. Belinskey a Notary Public within and for the State of North Dakota, personally appeared Leo Goetz known to me to be one of the persons who subscribed his name to the above and foregoing instrument as a witness, and who acknowledged to me that he subscribed his name thereto as such witness, and who proved to me that the person who and/or whose names are subscribed to the foregoing instrument are the persons described in it.

Frank J. Belinskey
Notary Public in and for the
County of Mercer AND
State of North Dakota

FRANK J. BELINSKEY NOTARY PUBLIC STATE OF NORTH DAKOTA

My commission expires: March 24, 1953

* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

(2)
State of North Dakota

County of _____ SS.

On this _____ day of _____ 194___, before me

_____, a Notary Public in and for said County and State, personally appeared _____ and _____ known to me to be the persons _____ who _____ described in and who executed within and foregoing instrument and acknowledged to me that he executed the same.

Notary Public in and for the
County of _____ and
State of North Dakota

My commission expires: _____

MORTGAGEE
MORTGAGOR
INDEXED ✓

**STATE OF NORTH DAKOTA**
**COUNTY OF MERCER**

**209412**
**OFFICE OF**
**COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 12/9/2015 at 8:31 AM, and was duly recorded as Book 207 MISC on Page 653 Fee: $16.00

County Recorder Brenda L. Cook

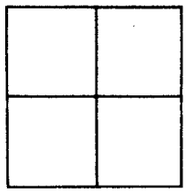
By Deputy

Return To: ROUGHRIDER ELECTRIC COOPERATIVE, INC., 800 H
HAZEN, ND 58545

# RIGHT-OF-WAY EASEMENT

Gladys Scheid (hereinafter called the "Grantor") (unmarried) (husband and wife) for a good and valuable consideration, the receipt whereof is hereby acknowledged, do hereby grant unto Oliver-Mercer Electric Cooperative, Inc., (hereinafter called "Grantee") whose post office address is Hazen, North Dakota, 58545, and to its successors or assigns, an easement for 99 years, situated in the County of Mercer, State of North Dakota, and more particularly described as follows:

Twn 142 Rge 88
Sec 14 NE¼



to construct, reconstruct, relocate, rephase, remove, repair, operate and maintain on or under the above described lands, and/or in, upon or under all streets, roads or highways abutting said lands, an electric distribution line or system; to cut, trim eradicate and control the growth by chemical means, machinery or otherwise, of trees and shrubbery located within 15 feet of the center of line of said line system, or that may interfere with or threaten to endanger the operation and maintenance of said line or system (indicating any control of the growth of other vegetation in the right-of-way which may incidentally and necessarily result from the means of control employed); and to license, permit or otherwise agree to the joint use or occupancy of the line or system by any other person, association or corporation, for electrification or communication purposes.

The undersigned Grantor agrees that all poles, wires, cables and other facilities including any main service entrance equipment installed on or below the above described lands at the Grantee's expense shall remain the property of Grantee, removable at its option upon termination of service to or on said lands.

Any damages to the surface of the right-of-way or to crops, fences, gates, drains, ditches or lines of the Grantor, caused by the Grantee in the installation, repair, maintenance, reconstruction or removal of said electric properties and appurtenances, shall be promptly repaired, replaced or paid for by the Grantee, provided a claim therefore is presented to the Grantee at its General Office within ninety (90) days after such damages occur. If the amount of said damages cannot be agreed upon, then the Grantor and Grantee shall each select an arbitrator, and these two shall select a third arbirator, and the decision and award of the arbitrators shall be final.

The undersigned Grantor convenants and agrees that no barrier of trees, shrubs, etc., and no structure or building shall be placed over underground conduits and electric lines and no construction shall be maintained or placed beneath over-the-ground electric lines and associated structures without the express written consent of the Grantee.

This Easement also includes a right-of-access to and from said real estate and Grantee's right-of-way for the purpose of connecting or reconnecting any part of the Grantee's system to or from said property with said system or to or from any other property on or coming on said system.

This Easement includes such additional rights of use and occupancy as shall be necessary for the use, maintenance, and operation of Grantee's system on said right-of-way, including but not limited to, anchors, guy wires, supporting poles or structures and the like as they were originally constructed or may thereafter be constructed.

The overall operating height of vehicles and equipment known to cultivate or traverse lands within the easement is less than _____ feet.

Dated this 3rd day of July, 19 90.

_____ Gladys M. Scheidt

STATE OF NORTH DAKOTA)
) ss
COUNTY OF MERCER)

The foregoing instrument was acknowledged before me this 3rd day of July 19 90

by Gladys M. Scheidt

My Commission Expires: May 20, 1991

Lynell Renner
Notary Public, State of North Dakota

LYNELL RENNER

MORTGAGEE
MORTGAGOR
INDEXED ✓

**209427**

**STATE OF NORTH DAKOTA**
**COUNTY OF MERCER**

**OFFICE OF**
**COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 12/9/2015 at 8:46 AM, and was duly recorded as Book 207 MISC on Page 701 Fee: $23.00

County Recorder Brenda L. Cook

By Deputy

Return To: ROUGHRIDER ELECTRIC COOPERATIVE, INC., 800 H
HAZEN, ND 58545

COUNTY RECORDER
SEAL
MERCER COUNTY, N. DAK.

MORTGAGEE
MORTGAGOR
In Computer [ ] GRANTOR ✓
WRT# [ ] GRANTEE ✓
County# [ ] INDEXED ✓

W.O.# 92-272

# West River Telephone Right-of-Way Easement

KNOW ALL MEN BY THESE PRESENT, that we the undersigned, (whether one or more) *Gladys M Scheidt*, Grantor(s), do hereby grant and convey unto *West River Telecommunications Cooperative*, a cooperative corporation (hereafter called the "Cooperative"), grantee, whose address is P.O Box 467, Hazen, North Dakota, and its respective successors, assigns, lessees and agents, an easement to survey, construct, reconstruct, operate, upgrade, maintain, relocate, replace and remove such communication systems as the grantee may from time to time require, consisting of but not limited to cables, wires, poles, splicing boxes, surface testing terminals, repeaters, repeater housings and markers,and other appurtenances, upon and over the land which the undersigned owns or in which the undersigned has any interest in the County of *Mercer*, State of *North Dakota*, and more particularly described as follows:

*S/2SE/4 2 142 88*
*NE/4 14 142 88*

***This easement is to cover this line only. Any additional future new lines will require a new easement.***

also the right of ingress and egress over and across the lands of the undersigned for the purpose of exercising the rights herein granted; to place surface markers beyond said strip, to clear and keep clear all trees, roots brush and other obstructions from the surface and subsurface of said strip of land and within seven feet thereof. The boundary of said strip shall be a line parallel to and 25 feet either side of the first cable laid, which cable shall have its location indicated by surface markers set at intervals on the land of the undersigned or on adjacent lands. The undersigned for himself, his heirs, executors, administrators, successors, and assigns, hereby covenants that no structure shall be erected on said strip.

The undersigned agrees that all poles, wire and other facilities, including telephone equipment, installed on the above described premises at the Cooperative's expense, shall remain the property of the Cooperative, removable at the option of the Cooperative.

The undersigned covenant that they are the owners of the above described lands and that the said lands are free and clear of encumbrances and liens of whatsoever character except those held by the following persons:

The term of this easement shall be for as long as needed by the grantee, and until a release of this easement is recorded, but to not extend beyond the maximum term authorized by law.

Access is hereby granted for a state or federal historical survey of the cable route, should one be required, unless checked. Access denied ☐

IN WITNESS WHEREOF, this instrument has been executed by the undersigned this the 29th day of June, 1993.

STATE OF NORTH DAKOTA )
)
COUNTY OF Mercer )

by: Gladys M Scheidt

by: _____

The foregoing instrument was acknowledged before me this 29th day of June, 1993. By Gladys M Scheidt.

My Commission Expires:

CLYDE FANDRICH
Notary Public, Mercer County, ND
My Commission Expires Feb. 24, 1999
STATE OF NORTH DAKOTA

Notary Public, County of Mercer.

Document No. 153687
OFFICE OF REGISTER OF DEEDS, COUNTY OF Mercer, North Dakota. I hereby certify that the within instrument was filed in this office for recording on the 10th day of January, A.D., 1994, at 11:38 o'clock A.M, and was duly recorded in Book 128, of Misc., on page 505.

By Kathryn Schumann Deputy Jeanette Sailer Register of Deeds

$7.00 fee

When recorded, please return to WEST RIVER TELECOMMUNICATION COOPERATIVE.

REGISTER OF DEEDS SEAL COUNTY, N.DAK.

## RIGHT-OF-WAY EASEMENT

KNOW ALL MEN BY THESE PRESENTS, that we the undersigned, (whether one or more) Leland Erickson (unmarried) (husband and wife) for a good and valuable consideration, the receipt whereof is hereby acknowledged, do hereby grant unto Oliver-Mercer Electric a cooperative corporation (hereinafter called the "Cooperative") whose post office address is Hazen, and to its successors or assigns, the right to enter upon the lands of the undersigned, situated in the County of Mercer, State of North Dakota, and more particularly described as follows:

SE¼ Sec. 27, Twp. 143, Rge. 88

and to construct, operate and maintain an electric transmission and/or distribution line or system on or under the above-described lands and/or in, upon or under all streets, raods or highways abutting said lands; to inspect and make such repairs, changes, alterations, improvements, removals from, substitutions and additions to its facilities as Cooperative may from time to time deem advisable, including, by way of example and not by way of limitation, the right to increase or decrease the number of conduits, wires, cables, handholes, manholes, connection boxes, transformers and transformer enclosures; to cut, trim and control the growth by chemical means, machinery or otherwise of trees and shrubbery located within _____ feet of the center line of said line or system, or that may interfere with or threaten to endanger the operation and maintenance of said line or system (including any control of the growth of other vegetation in the right-of-way which may incidentally and necessarily result from the means of control employed); to keep the easement clear of all buildings, structures or other obstructions; and to license, permit or otherwise agree to the joint use or occupancy of the lines, system or, if any of said system is placed underground, of the trench and related underground facilities, by any other person, association or corporation.

The undersigned agree that all poles, wires and other facilities including any main service entrance equipment, installed in, upon or under the above-described lands at the Cooperative's expense shall remain the property of the Cooperative, removable at the option of the Cooperative.

The undersigned covenant that they are the owners of the above-described lands.

IN WITNESS WHEREOF, the undersigned have set their hands and seals this 6th day of November, 1974.

Leland Erickson (L.S.)

_____ (L.S.)

Signed, sealed and delivered in the presence of:

Eldora Sailer

_____

State of North Dakota )
) ss
Mercer County )

Personally came before me this 6th day of November 1975 the above named Eldora Sailer to me known to be the person (s) who executed the foregoing instrument and acknowledged the same.

VIVIAN J. RICKERT NOTARY PUBLIC STATE OF NORTH DAKOTA

Vivian J. Rickert

Notary Public, Mercer, County, North Dakota, State.

My Commission expires 12-31-77

208123

**STATE OF NORTH DAKOTA**
**COUNTY OF MERCER**

**OFFICE OF**
**COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 8/18/2015 at 8:15 AM, and was duly recorded as Book 204 MISC on Page 729 Fee: $13.00

County Recorder Brenda L. Cook

By Deputy

Return To: ROUGHRIDER ELECTRIC COOPERATIVE, INC., 800 H
chg HAZEN, ND 58545

MORTGAGEE
MORTGAGOR
INDEXED ✓

COUNTY RECORDER SEAL MERCER COUNTY, N. DAK.

RECEIVED
FEB 5 2014

**SOUTHWEST WATER AUTHORITY**
Southwest Pipeline Project Building
West Industrial Park
4665 2nd Street SW
Dickinson, ND 58601-7231
(701) 225-0241
Toll Free: 1-888-425-0241

Segment **7-9E WEST CENTER SERVICE AREA**
Parcel **142-88-17**

## RIGHT-OF-WAY EASEMENT

**ALL PERSONS TAKE NOTICE:**

In consideration of one dollar ($1.00) and other good and valuable consideration **JAMES O KUSLER 5968 19TH STREET SW BEULAH, ND 58523** hereinafter referred to as Grantor, does hereby grant, bargain, sell, transfer and convey to the Southwest Water Authority, hereinafter referred to as the Grantee, its successor and assigns, a perpetual easement with right to erect, construct, install and lay, and thereafter use, operate, inspect, repair, maintain, replace, and remove water pipelines, connections, valves and all other appurtenant facilities used in connection with the construction, operation and maintenance of the Southwest Pipeline Project, over, above, across and through the land of the Grantor, situated in **Mercer** County, State of North Dakota, said land being described as follows: **N1/2 N1/2 LESS R/W SECTION 12 TOWNSHIP 142 RANGE 88 & SE1/4 SECTION 27 TOWNSHIP 143 RANGE 88** (the tract that contains **6.34** acres, more or less), together with the right of ingress and egress over the adjacent lands of the Grantor, successors and assigns for the purposes of this easement.

1. The permanent easement will be thirty (30) feet in width, fifteen (15) feet on each side of the center line of the pipeline as constructed, with an additional ten (10) feet of temporary right-of-way for a total construction easement width of forty (40) feet, twenty (20) feet on each side of the center line.

2. The Grantee covenants to maintain the easement in good repair so that no unreasonable damage will result from its use to the adjacent land of the Grantor, successors and assigns. The Grantor will receive compensation for damages to growing crops caused by the construction or operation. The Grantor will report any damages within three (3) years of the construction of the project.

The grant and other provisions of this easement shall constitute a covenant running with the land for the benefit of the Grantee, its successors and assigns.

**IN WITNESS WHEREOF,** the Grantor has executed this instrument this 3 day of February, 2014

James O. Kusler GRANTOR _____ GRANTOR

State of North Dakota

County of Dunn

On February 3, 2014, personally appeared before me James O. Kusler

_____ whom I know personally.
X whose identity I verified on the basis of North Dakota drivers license
_____ whose identity I verified on the oath or affirmation of _____, a credible witness to be the signor of the above and he/she acknowledged that he/she signed it.

DANIEL T. AICHELE
Notary Public
State of North Dakota
My Commission Expires Mar. 2, 2018

Notary Public Daniel T. Aichele

_____, County Dunn

My Commission Expires: Mar. 2, 2018

MORTGAGEE
MORTGAGOR
INDEXED ✓

**STATE OF NORTH DAKOTA**
**COUNTY OF MERCER**

**211517**
**OFFICE OF**
**COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 6/14/2016 at 9:26 AM, and was duly recorded as Book 213 MISC on Page 17 Fee: $13.00

County Recorder Brenda L Cook

By Deputy Kathryn Schumann

Return To: SOUTHWEST WATER AUTHORITY, WEST INDUSTRIA
4665 2ND ST SW DICKINSON, ND 58601-7231

COUNTY RECORDER
SEAL
MERCER COUNTY, N DAK.

Uploaded to BtW FTP on 2-5-14 (mc)

## RIGHT OF WAY EASEMENT

THIS AGREEMENT made and entered into this 19th day of June, 2019, between James Kusler, hereinafter called "Owner" (whether one or more) and **ROUGHRIDER ELECTRIC COOPERATIVE, INC.**, whose post office address is 800 Highway Drive, Hazen, North Dakota 58545-4737, hereinafter called "COOPERATIVE".

WITNESSETH that for valuable consideration, the receipt and sufficiency of which is hereby acknowledged, Owner grants unto Cooperative, its successors and assigns, for a term of 99 years from the date hereof, an easement to construct, reconstruct, operate and maintain an electric distribution system, overhead, underground or both including all poles, guys, anchors wires, surface terminals, and all accessories and appurtenances necessary or desirable in connection therewith, under, over, upon and across lands of Owner and/or in or upon all streets, roads or highways abutting said lands situated in Mercer County, North Dakota, and more particularly described as follows, to-wit:

A strip of land 20 feet in width, the same being 10 feet on each side of a centerline described as follows.

**Township 143 North Range 88 West**

S1/2SE1/4 of Section 27

The facilities erected hereunder shall remain the property of the Cooperative. Cooperative shall have the right to inspect, rebuild, remove, repair, improve and make such changes, alterations, substitutions and additions in and to its facilities as Cooperative may from time to time deem advisable, including the right to increase or decrease the size or capacity of its system, together with necessary accessories and appurtenances; the right to increase or decrease the size of the facilities and equipment situated upon the premises; the right to permit or otherwise agree to the joint use or occupancy of the overhead lines or the trench and related underground facilities by other persons, associations or corporations; and the right to at any time use the property described above to extend lines and facilities to serve the property of persons other than the Owner.

Any damages to the surface of the right-of-way or to crops, fences, gates, drains, ditches, or lines of the Owner, caused by the Cooperative in the installation, repair maintenance, reconstruction or removal of said electrical properties and appurtenances, shall be promptly repaired, replaced or paid for by the Cooperative, provided a claim therefore is presented to the Cooperative at its General Office within ninety (90) days after such damages occur. If the amount of said damages cannot be agreed upon, the Cooperative and the Owner shall each select an arbitrator, and these two shall select a third arbitrator, and the decision and award of the arbitrators shall be final.

Cooperative shall at all times have the right to keep the easement clear of all buildings, structures or other obstructions, trees, shrubbery, undergrowth and roots.

Owner, his successors and assigns, may use the land within the easement for any purpose not inconsistent with the rights granted, provided such use does not interfere with or endanger the Cooperative's facilities or the rights granted under this easement.

For the purpose of constructing, inspecting, maintaining or operating its facilities, Cooperative shall have the right of ingress to and egress from the easement over the lands of Owner adjacent to the easement and lying between public or private roads and the easement, such right to be exercised in such manner as shall occasion the least practicable damage and inconvenience to Owner.

Owner covenants that he is seized of and has the right to convey the said easement, rights and privileges; that Cooperative shall have quiet and peaceable possession, use and enjoyment of the aforesaid easement, rights and privileges, and that Owner shall execute such further assurances thereof as may be requested by the Cooperative.

James D. Kusler

STATE OF NORTH DAKOTA )
)ss
COUNTY OF Dunn )

On this 19th day of June, 2019, before me, a Notary Public in and for said County and State personally appeared James Kusler, known to me to be the person(s) described in and who executed the within and foregoing instrument and acknowledged to me that he/she/they executed the same.

***Notary Seal Location***

Notary Public State of North Dakota

My Commission Expires: 05/10/19

JOSH PAPE
Notary Public
State of North Dakota
My Commission Expires May 10, 2019

MORTGAGEE
MORTGAGOR
INDEXED ✓

**STATE OF NORTH DAKOTA**
**COUNTY OF MERCER**

**206136**
**OFFICE OF**
**COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 1/15/2015 at 11:12 AM, and was duly recorded a Book 200 MISC on Page 647 Fee: $13.00

County Recorder Brenda L Cook

By Deputy Kathryn Schumann

Return To: ROUGHRIDER ELECTRIC COOPERATIVE, INC., 800 H
cfg HAZEN, ND 58545

COUNTY RECORDER
SEAL
MERCER COUNTY, N. DAK.

**SOUTHWEST WATER AUTHORITY**
Southwest Pipeline Project Building
West Industrial Park
4665 2nd Street SW
Dickinson, ND 58601-7231
(701) 225-0241
Toll Free: 1-888-425-0241

Segment **7-9E WEST CENTER SERVICE AREA**
Parcel **142-88-17**

## RIGHT-OF-WAY EASEMENT

**ALL PERSONS TAKE NOTICE:**

In consideration of one dollar ($1.00) and other good and valuable consideration JOHNELLE J. KUSLER 1884 HILLCREST AVENUE ST. PAUL, MN 55116 hereinafter referred to as Grantor, does hereby grant, bargain, sell, transfer and convey to the Southwest Water Authority, hereinafter referred to as the Grantee, its successor and assigns, a perpetual easement with right to erect, construct, install and lay, and thereafter use, operate, inspect, repair, maintain, replace, and remove water pipelines, connections, valves and all other appurtenant facilities used in connection with the construction, operation and maintenance of the Southwest Pipeline Project, over, above, across and through the land of the Grantor, situated in MERCER County, State of North Dakota, said land being described as follows: E1/2 NE1/4 LESS R/W SECTION 12 TOWNSHIP 142 RANGE 88 & SE1/4 SECTION 27 TOWNSHIP 143 RANGE 88 (the tract that contains 3.35 acres, more or less), together with the right of ingress and egress over the adjacent lands of the Grantor, successors and assigns for the purposes of this easement.

1. The permanent easement will be thirty (30) feet in width, fifteen (15) feet on each side of the center line of the pipeline as constructed, with an additional ten (10) feet of temporary right-of-way for a total construction easement width of forty (40) feet, twenty (20) feet on each side of the center line.

2. The Grantee covenants to maintain the easement in good repair so that no unreasonable damage will result from its use to the adjacent land of the Grantor, successors and assigns. The Grantor will receive compensation for damages to growing crops caused by the construction or operation. The Grantor will report any damages within three (3) years of the construction of the project.

The grant and other provisions of this easement shall constitute a covenant running with the land for the benefit of the Grantee, its successors and assigns.

**IN WITNESS WHEREOF,** the Grantor has executed this instrument this 23rd day of May, 2015.

Johnell J Kusler GRANTOR _____ ~~GRANTOR~~ NV

State of MINNESOTA

County of RAMSEY

NICOLE LOUISE VERRILL
NOTARY PUBLIC - MINNESOTA
MY COMMISSION EXPIRES 01/31/19

On 23RD DAY OF MAY, 2015, personally appeared before me JOHNELL J. KUSLER NV

_____ whom I know personally.
__X__ whose identity I verified on the basis of MINNESOTA DRIVERS LISCENSE.
_____ whose identity I verified on the oath or affirmation of _____, a credible witness to be the signor of the above and he/she acknowledged that he/she signed it.

Notary Public Nicole Louise Verrill

RAMSEY, County MINNESOTA

My Commission Expires: 01/31/2019

207510

**STATE OF NORTH DAKOTA**
**COUNTY OF MERCER**

**OFFICE OF COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 6/19/2015 at 12:20 PM, and was duly recorded a Book 203 MISC on Page 599 Fee: $13.00

County Recorder Brenda L. Cook

By Deputy

Return To: SOUTHWEST WATER AUTHORITY, 4665 2ND STREET
DICKINSON, ND 58601-7231

MORTGAGEE
MORTGAGOR
INDEXED ✓

COUNTY RECORDER SEAL MERCER COUNTY, N DAK.

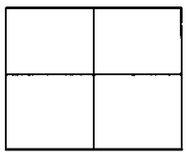
RECEIVED
MAY 28 2015
SOUTHWEST WATER AUTHORITY

uploaded to BTW AP on 5-28-15 ed

# RIGHT-OF-WAY EASEMENT

Faye Swenson (hereinafter called the "Grantor") (unmarried) (husband and wife) for a good and valuable consideration, the receipt whereof is hereby acknowledged, do hereby grant unto Roughrider Electric Cooperative, Inc. (hereinafter called "Grantee") whose post office address is Hazen, North Dakota 58545, and to its successors or assigns, an easement for 99 years, situated in the County of Oliver, State of North Dakota, and more particularly described as follows:

TOWNSHIP 142 NORTH, RANGE 87 WEST
Section 21 NE 1/4



To construct, reconstruct, relocate, rephase, remove, repair, operate and maintain on or under the above described lands, and/or in, upon or under all streets, roads or highways abutting said lands, an electric distribution line or system; to cut, trim eradicate and control the growth by chemical means, machinery or otherwise, or trees and shrubbery located within -15- feet of the center of said line system, or that may interfere with or threaten to endanger the operation and maintenance of said line system (indicating any control of the growth of other vegetation in the right-of-way which may incidentally and necessarily result from the means of control employed); and to license, permit or otherwise agree to the joint use or occupancy of the line or system by any other person, association or corporation, for electrification or communication purposes.

The undersigned Grantor agrees that all poles, wires, cables and other facilities including any main service entrance equipment installed on or below the above described lands at the Grantee's expense shall remain the property of Grantee, removable at its option upon termination of service to or on said lands.

Any damages to the surface of the right-of-way or to crops, fences, gates, drains, ditches or lines of the Grantor, caused by the Grantee in the installation, repair, maintenance, reconstruction or removal of said electric properties and appurtenances, shall be promptly repaired, replaced or paid for by the Grantee, provided a claim therefore is presented to the Grantee at its General Office within ninety (90) days after such damages occur. If the amount of said damages cannot be agreed upon, the Grantor and Grantee shall each select an arbitrator, and these two shall select a third arbitrator, and the decision and award of the arbitrators shall be final.

The undersigned Grantor convenants and agrees that no barrier of trees, shrubs, etc., and no structure or building shall be placed over underground conduits and electric lines and no construction shall be maintained or placed beneath over-the-ground electric lines and associated structures without the express written consent of the Grantee.

This Easement also includes a right-of-access to and from said real estate and Grantee's right-of-way for the purpose of connecting or reconnecting any part of the Grantee's system to or from said property with said system or to or from any other property on or coming on said system.

This Easement includes such additional rights of use and occupancy as shall be necessary for the use, maintenance, and operation of Grantee's system on said right-of-way, including but not limited to, anchors, guy wires, supporting poles or structures and the like as they were originally constructed or may thereafter be constructed.

The overall operating height of vehicles and equipment known to cultivate or traverse lands within the easement is less than _____ feet.

Dated this 1 day of July, 2008.

Faye B Swenson

RECORDER OLIVER COUNTY SEAL STATE OF NORTH DAKOTA

STATE OF NORTH DAKOTA )
)ss
COUNTY OF OLIVER )

The foregoing instrument was acknowledged before me this 1st day of July, 2008, by Faye B. Swenson.

My Commission Expires:
May 15, 2014

TIMOTHY J. VOLK
Notary Public
State of North Dakota
My Commission Expires May 15, 2014

Notary Public, State of North Dakota

88076 623 4/18/2013 10:17 AM PAGE: 1 OF 1
BOOK: HH PAGE: 3 FEES: $10.00 KW RIGHT OF WAY
Kim Wilkens, OLIVER COUNTY CLERK
By K Wilkens

ROUGHRIDER ELECTRIC COOP
2156 4TH AVE E
PO BOX 1038
DICKINSON, ND 58602

89860 5/27/2015 3:25 PM PAGE: 1 OF 1
BOOK: KK PAGE: 449 FEES: $10.00 MM EASEMENT
Kim Wilkens, OLIVER COUNTY RECORDER
By [signature]

SOUTHWEST WATER AUTHORITY
WEST INDUSTRIAL PARK
4665 2ND STREET SW
DICKINSON, ND 58601-7231

RECORDER OLIVER SEAL COUNTY STATE OF NORTH DAKOTA

**SOUTHWEST WATER AUTHORITY**
Southwest Pipeline Project Building
West Industrial Park
4665 2nd Street SW
Dickinson, ND 58601-7231
(701) 225-0241
Toll Free: 1-888-425-0241

Segment **7-9E WEST CENTER SERVICE AREA**
Parcel **142-87-16**

## RIGHT-OF-WAY EASEMENT

**ALL PERSONS TAKE NOTICE:**

In consideration of one dollar ($1.00) and other good and valuable consideration **KURT & FAYE SWENSON 5774 21ST STREET SW BEULAH, ND 58523** hereinafter referred to as Grantor, does hereby grant, bargain, sell, transfer and convey to the Southwest Water Authority, hereinafter referred to as the Grantee, its successor and assigns, a perpetual easement with right to erect, construct, install and lay, and thereafter use, operate, inspect, repair, maintain, replace, and remove water pipelines, connections, valves and all other appurtenant facilities used in connection with the construction, operation and maintenance of the Southwest Pipeline Project, over, above, across and through the land of the Grantor, situated in **Oliver** County, State of North Dakota, said land being described as follows: **NE1/4 SECTION 21 TOWNSHIP 142 RANGE 87** (the tract that contains **2.32** acres, more or less), together with the right of ingress and egress over the adjacent lands of the Grantor, successors and assigns for the purposes of this easement.

1. The permanent easement will be thirty (30) feet in width, fifteen (15) feet on each side of the center line of the pipeline as constructed, with an additional ten (10) feet of temporary right-of-way for a total construction easement width of forty (40) feet, twenty (20) feet on each side of the center line.

2. The Grantee covenants to maintain the easement in good repair so that no unreasonable damage will result from its use to the adjacent land of the Grantor, successors and assigns. The Grantor will receive compensation for damages to growing crops caused by the construction or operation. The Grantor will report any damages within three (3) years of the construction of the project.

The grant and other provisions of this easement shall constitute a covenant running with the land for the benefit of the Grantee, its successors and assigns.

**IN WITNESS WHEREOF,** the Grantor has executed this instrument this 2 day of April, 2015.

[signature] GRANTOR [signature] GRANTOR

State of North Dakota

County of Mercer

On April 2, 2015, personally appeared before me Faye Swenson
Kurt Swenson

RECEIVED SOUTHWEST WATER AUTHORITY

X whom I know personally.
____ whose identity I verified on the basis of _____.
____ whose identity I verified on the oath or affirmation of _____, a credible witness to be the signor of the above and he/she acknowledged that he/she signed it.

Notary Public [signature]

_____, County Mercer

My Commission Expires: 6/16/16

ERIC BUCHHOLZ
Notary Public
State of North Dakota
My Commission Expires June 16, 2016

EXCH: BELH WO#: 2015-206-038

# *West River Telecommunications Right-of-Way Easement*

We the undersigned, (whether one or more) ***Donna M. Smith***, Grantor(s), do hereby grant and convey unto ***West River Telecommunications Cooperative***, a cooperative corporation (hereafter called the "Cooperative"), grantee, whose address is P.O. Box 467, Hazen, North Dakota, and its respective successors, assigns, lessees and agents, an easement to survey, construct, repair, operate, upgrade, maintain, relocate, replace and remove such communication systems as the grantee may from time to time require, consisting of but not limited to cables, wires, poles, splicing boxes, and other appurtenances, upon, over and under the land which the undersigned owns or in which the undersigned has any interest in the County of ***Oliver***, State of ***North Dakota***, and more particularly described as follows:

W sec

*NE/4 Sec. 22 T142N R87W*

E sec.

*NW/4 Sec. 21 T142N R87W*

also the right of ingress and egress over and across the lands of the undersigned for the purpose of exercising the rights herein granted; to place surface markers beyond said strip, to clear and keep clear all trees, roots, brush and other obstructions from the surface and subsurface of said strip of land. The boundary of said strip shall be a line parallel to and 10 feet either side of the first cable laid on the land of the undersigned. The undersigned for Grantor(s), their heirs, executors, administrators, successors, and assigns, hereby covenants that no structure shall be erected on said strip.

The undersigned agrees that all poles, wire and other facilities, including telephone equipment, installed on the above described land, shall remain the property of the Cooperative, removable at the option of the Cooperative. The undersigned agrees to this easement with the understanding the Grantor(s), their heirs, executors, administrators, successors, and assigns, may continue to have access to and use of the easement area in any manner consistent with the rights herein granted to the Cooperative, and that the Cooperative will restore the said strip to as near as reasonable to the pre-constructed condition, and that the Cooperative will erect no buildings on said strip.

The undersigned covenant that they are the owners of the above described lands and that the said lands are free and clear of encumbrances and liens of whatsoever character except those held by the following persons:

The term of this easement shall be for as long as needed by the grantee, and until a release of this easement is recorded, but to not extend beyond the maximum term authorized by law.

92299 12/24/2015 11:05 AM PAGE: 1 OF 2
BOOK: MM PAGE: 109 FEES: $13.00 KW EASEMENT
Kim Wilkens, OLIVER COUNTY RECORDER
By K Wilkens

STATE OF NORTH DAKOTA ★ COUNTY SEAL ★ OLIVER RECORDER

WEST RIVER COMMUNICATIONS
PO BOX 467

HAZEN, ND 58545

EXCH: BELH WO#: 2015-206-038

Access is hereby granted for a state or federal historical survey of the cable route, should one be required, unless checked. Access denied ☐

IN WITNESS WHEREOF, this instrument has been executed by the undersigned this the 18 day of Nov, 2015.

STATE OF North Dakota )
)
COUNTY OF Oliver. )

by: Donna Mae Smith

by: _____

On this 18 day of November, the year 2015 before me personally appeared Donna Mae Smith, known to me to be the person(s) who is described in and who executed the within instrument, and acknowledged to me that he/she (or they) executed the same.

STEVEN C. KNUDSON
Notary Public
State of North Dakota
My Commission Expires Aug. 23, 2017

Steven C Knudson
Notary Public, County of Mercer
My Commission Expires: Aug. 23, 2017

IN WITNESS WHEREOF, this instrument has been executed by the undersigned this the ___ day of _____, 2015.

STATE OF )
)
COUNTY OF )

by: _____

by: _____

On this _____ day of _____, the year _____ before me personally appeared _____, known to me to be the person(s) who is described in and who executed the within instrument, and acknowledged to me that he/she (or they) executed the same.

_____
Notary Public, County of _____
My Commission Expires:

01104

(I)

Location Number

RIGHT-OF-WAY EASEMENT

KNOW ALL MEN BY THESE PRESENTS, that the undersigned Norman Smith, for a good and valuable consideration, the receipt whereof is hereby acknowledged, does hereby grant unto the Oliver-Mercer Electric Cooperative, Inc., a corporation, whose post office address is Hazen, N. Dak., North Dakota, and to its successors or assigns, the right to enter upon the lands of the undersigned, situated in the county of Oliver, State of North Dakota and more particularly described as follows:

NW¼ Sec. 22, Sec. 21, 142-87

~~SW¼ Sec. 15, 142-87~~

(I)

and to place, construct, operate, repair, maintain, relocate and replace thereon and in or upon all streets, roads or highways abutting said lands an electric transmission or distribution line or system, and to cut and trim trees and shrubbery to the extent necessary to keep them clear of said electric line or system and to cut down from time to time all dead, weak, leaning or dangerous trees that are tall enough to strike the wires in falling.

In granting this easement it is understood that at pole locations, only a single pole and arrurtenance will be used, and that the location of the pole will be such as to form the least possible interference to farm operations so long as it does not materially increase the cost of construction.

The undersigned covenants that he is the owner of the above described lands and that the said lands are free and clear of encumbrances and liens of whatsoever character except those held by the following persons:

(S)

It is further understood that, whenever necessary, words in this instrument in the singular shall be construed to read in the plural and that words used in the masculine gender shall be construed to read in the feminine.

IN WITNESS WHEREOF, the undersigned has set his hand and seal this 26 day of June, 1946.

Signed, sealed and delivered in the presence of:

Norman Smith

Banks H. Leeb

91055 8/21/2015 10:45 AM PAGE: 1 OF 2
BOOK: 1 PAGE: 1084 FEES: $13.00 MM EASEMENT (ROUGHRID
Kim Wilkens, OLIVER COUNTY RECORDER
By Deputy

RECORDER OLIVER COUNTY SEAL STATE OF NORTH DAKOTA

(1)
STATE OF NORTH DAKOTA

COUNTY OF Mercer SS.

Banks H Sieber being first duly sworn says that he is one of the witnesses to the above and foregoing easements, that Norman Smith and whose names is and/or are subscribed to the above and foregoing instruments as a party is and/or are the persons described in said easement and that he signed said instrument in my presence and that I in their presence signed my name thereto as a subscribing witness.

Banks H Sieber

SUBSCRIBED and sworn to before me this 15 day of June 1946

R J Sailer
Notary Public in and for the County of Mercer and State of North Dakota.

R. J. SAILER NOTARY PUBLIC STATE OF NORTH DAKOTA

My commission expires May 15 1947

(1)
STATE OF NORTH DAKOTA
COUNTY OF Mercer SS.

On this 15th day of June 1946 before me R J Sailer a Notary Public within and for the State of North Dakota, personally appeared Banks H Sieber known to me to be one of the persons who subscribed his name to the above and foregoing instrument as a witness, and who acknowledged to me that he subscribed his name thereto as such witness, and who proved to me that the person who and/or whose names are subscribed to the foregoing instrument are the persons described in it.

R J Sailer
Notary Public in and for the County of Mercer and State of North Dakota.

R. J. SAILER NOTARY PUBLIC STATE OF NORTH DAKOTA

My commission expires May 15 1947

********************

(2)
STATE OF

County of SS

ROUGHRIDER ELECTRIC COOPERATIVE
800 HWY DR

HAZEN, ND 58545

On this day of 19, before me , a Notary Public in and for said County and State, personally appeared and known to me to be the persons who described in and who executed within and foregoing instrument and acknowledged to me that he executed the same.

Notary Public in and for the County of and State North Dakota.

My commission expires

## RIGHT-OF-WAY EASEMENT

KNOW ALL MEN BY THESE PRESENTS, that we the undersigned, (whether one or more) Ralph E. Smith (unmarried) (husband and wife) for a good and valuable consideration, the receipt whereof is hereby acknowledged, do hereby grant unto Oliver-Mercer Electric Cooperative, Inc. a cooperative corporation (hereinafter called the "Cooperative") whose post office address is Hazen, North Dakota, and to its successors or assigns, the right to enter upon the lands of the undersigned, situated in the County of Oliver, State of North Dakota, and more particularly described as follows:

South ½ Section 15 Township 142N Range 87W

and to construct, operate and maintain an electric transmission and/or distribution line or system on or under the above-described lands and/or in, upon or under all streets, raods or highways abutting said lands; to inspect and make such repairs, changes, alterations, improvements, removals from, substitutions and additions to its facilities as Cooperative may from time to time deem advisable, including, by way of example and not by way of limitation, the right to increase or decrease the number of conduits, wires, cables, handholes, manholes, connection boxes, transformers and transformer enclosures; to cut, trim and control the growth by chemical means, machinery or otherwise of trees and shrubbery located within 100 feet of the center line of said line or system, or that may interfere with or threaten to endanger the operation and maintenance of said line or system (including any control of the growth of other vegetation in the right-of-way which may incidentally and necessarily result from the means of control employed); to keep the easement clear of all buildings, structures or other obstructions; and to license, permit or otherwise agree to the joint use or occupancy of the lines, system or, if any of said system is placed underground, of the trench and related underground facilities, by any other person, association or corporation.

The undersigned agree that all poles, wires and other facilities including any main service entrance equipment, installed in, upon or under the above-described lands at the Cooperative's expense shall remain the property of the Cooperative, removable at the option of the Cooperative.

The undersigned covenant that they are the owners of the above-described lands.

IN WITNESS WHEREOF, the undersigned have set their hands and seals this 20th day of November, 1975.

Ralph E. Smith (L.S.)

(L.S.)

Signed, sealed and delivered in the presence of:

Leonard H. Wohlfeil

90409 7/15/2015 3:20 PM PAGE: 1 OF 1
BOOK: 1 PAGE: 36 FEES: $10.00 MM EASEMENT (ROUGHRIDER
Kim Wilkens, OLIVER COUNTY RECORDER
By MMBulty Eule Deputy

ROUGHRIDER ELECTRIC COOPERATIVE
800 HWY DR

HAZEN, ND 58545

RECORDER OLIVER COUNTY SEAL STATE OF NORTH DAKOTA

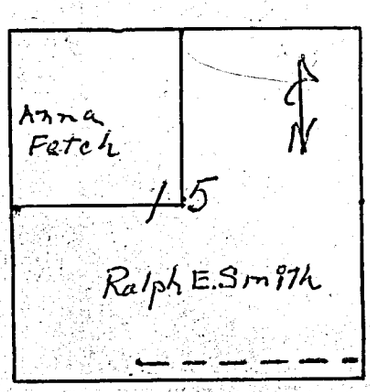
State of North Dakota )
) ss
Mercer County )

Personally came before me this 20th day of November 1975 the above named Leonard H. Wohlfeil to me known to be the person (s) who executed the foregoing instrument and acknowledged the same.

Vivian J. Rickertt

Notary Public, Mercer, County, North Dakota, State.

My Commission expires 12-31-77



VIVIAN J. RICKERTT NOTARY PUBLIC STATE OF NORTH DAKOTA

Anna Fetch
15
Ralph E. Smith

OFFICE OF COUNTY RECORDER
STATE OF NORTH DAKOTA
COUNTY OF OLIVER
Filed for record this 16 day
of Sept A.D. 2011
at 11:59 o'clock A M.,
and recorded as document No. 56785
in book FF of Misc page 619-621
B Wilkens
County Recorder Deputy

**PIPELINE EASEMENT**

North Dakota State Water Commission
County of Oliver
Parcels H-OL-141

**ALL PERSONS TAKE NOTICE:**

That the undersigned, Jule Silbernagel and Faye Swenson, as tenants in common, called the Grantor, being the owner of, or having an interest in, land situated in the County of Oliver, State of North Dakota, more fully described below, in consideration of One and No/100 Dollars ($1.00) and other valuable consideration, does hereby grant, convey, and warrant to the State of North Dakota, acting by and through the North Dakota State Water Commission, a state agency and public corporation, with its principal office at 900 East Boulevard Ave., Bismarck, North Dakota 58505, called the Grantee, and to its successors and assigns, the right, privilege, and easement to construct, maintain, operate, inspect, repair, alter, replace, change the size of or remove a pipeline, and appurtenances thereto, for the transportation of water under, across, and through:

Parcel H-OL-141
A 40 foot wide strip of land 20 feet wide on each side of the pipeline centerline lying within the SE1/4 Section 15, Township 142 North, Range 87 West of the 5th P.M.

Said tract contains 2.42 acres, more or less.

Temporary Construction Easement
An additional 20 feet of temporary right-of-way lying adjacent to the above described tract for a total construction easement width of 60 feet.

Said tract contains 1.21 acres, more or less.

together with the right to utilize additional land for a period up to three years from the date of this easement, adjacent to the above described tract, for purposes of temporary working space during initial construction of the pipeline, and the right of ingress to and egress from said strip of land across the adjacent lands of the Grantor, for the purposes specified above at the will of the Grantee.

**THE GRANTOR AND THE GRANTEE FURTHER AGREE:**

1. **Use of right-of-way by Grantor.** Grantor reserves the right to use the surface of the easement strip provided, however, that Grantor, without prior approval of Grantee, shall neither construct nor permit to be constructed any building, structure, or other improvement upon the easement strip which would interfere with Grantee's exercise of the rights conveyed by this pipeline easement, including access to the easement strip.

2. **Appurtenances.** The Grantee shall have the right to install and construct necessary appurtenances upon the surface of the easement strip. Prior to construction, the Grantee will notify the Grantor of the approximate location of such appurtenances if any, to be located on the easement strip, and shall pay to the Grantor the sum of $500 for each appurtenance located at a distance of more than 5 feet from a field boundary or fence line. Such payments shall be paid prior to construction.

3. **Damages.** The Grantee will pay to Grantor or Grantor's tenants, as their respective interests may appear, for damages caused by the operations or activities of the Grantee; provided, however, that the Grantee shall have the right, without liability for damages, to clear, and keep cleared, all trees, brush, and other obstructions from the easement strip that may, in the Grantee's judgment, interfere with the rights and privileges of the Grantee under this pipeline easement.

   If the amount of any damage which Grantor may sustain as a result of Grantee's exercise of rights hereunder cannot be mutually agreed upon, such damages shall be ascertained and

determined by three (3) disinterested person; one to be appointed by the Grantor, one by Grantee, and a third by the two so appointed, and the award of such three persons shall be final and conclusive.

4. **Restoration of surface.** The Grantee will restore the surface of the construction area to its original contour as nearly as practicable.

5. **Topsoil segregation.** When excavating the pipeline trench with a backhoe/trackhoe, the Grantee will remove the topsoil separately during the construction of the pipeline for the full width of the pipe trench to a depth of twelve (12) inches or the actual topsoil depth, whichever is less, and to be replaced at the top of the backfill over the pipe trench.

6. **Assignment and covenant by parties.** The rights of either party may be assigned in whole or in part. The terms and provisions of this easement shall constitute covenants running with the land and shall be binding upon, and inure to the benefit of, the parties hereto, their successors, assigns, personal representatives, and heirs.

7. **Grantor's title.** Grantor warrants that he is the owner of, or has an interest in, the land described in this easement, and that he has full right and authority to enter into and deliver this easement. This instrument may be executed in counterparts and each counterpart shall constitute a separate agreement between the parties thereto. Any payments pursuant to this pipeline easement shall be in proportion to the Grantor's interest in the undivided fee simple estate.

8. **Entire agreement.** This instrument contains the entire agreement of the parties and there are no other, or different, agreements or understandings between the Grantor and the Grantee, or its agents. The Grantor, in executing this pipeline easement, has not relied upon any promises, inducements, or representatives of the Grantee, or its agents, except as are set forth herein.

9. **Term of easement.** The term of this easement shall be as long as it is needed by the Grantee, or its assigns, and until a release of this easement is recorded, but shall not exceed ninety-nine (99) years pursuant to NDCC §47-05-02.1.

10. **Tenants.** The Grantor represents that the land described in this easement is (not rented) (rented to) John Smith.

Dated this 21st day of February, 20 11.

Faye Swenson
Grantor

Jule Silbernagel
Grantor

STATE OF NORTH DAKOTA)
) ss.
COUNTY OF Diver )

On this 24 day of February, 20 11, before me personally appeared Faye Swenson, known to me to be the person(s) described in and who executed the within and foregoing instrument, and acknowledged to me that he/she executed

the same.

Notary Public

(SEAL)
JAY L. PETERSON
Notary Public
State of North Dakota
My Commission Expires Jan. 13, 2015

Morton County, ND

My Commission expires:

STATE OF ARIZONA )
) ss.
COUNTY OF Maricopa )

On this 1 day of March, 20 11, before me personally appeared Jule D. Silberwagel, known to me to be the person(s) described in and who executed the within and foregoing instrument, and acknowledged to me that he/she executed the same.

Notary Public

(SEAL)
CYNTHIA A. CLARK
Notary Public - Arizona
Maricopa County
My Commission Expires
July 3, 2014

July 3, 2014 County, AZ

My Commission expires:

90190 6/25/2015 6:19 PM PAGE: 1 OF 1
BOOK: LL PAGE: 20 FEES: $10.00 MM EASEMENT
Kim Wilkens, OLIVER COUNTY RECORDER
By K Wilkens

SOUTHWEST WATER AUTHORITY
WEST INDUSTRIAL PARK
4665 2ND STREET SW
DICKINSON, ND 58601-7231

OLIVER SEAL COUNTY STATE OF NORTH DAKOTA

**SOUTHWEST WATER AUTHORITY**
Southwest Pipeline Project Building
West Industrial Park
4665 2nd Street SW
Dickinson, ND 58601-7231
(701) 225-0241
Toll Free: 1-888-425-0241

Segment **7-9E WEST CENTER SERVICE AREA**
Parcel **142-87-6**

## RIGHT-OF-WAY EASEMENT

**ALL PERSONS TAKE NOTICE:**

In consideration of one dollar ($1.00) and other good and valuable consideration **MILDA K. HEDBLOM 1801 SUMMIT AVENUE ST. PAUL, MN 55105** hereinafter referred to as Grantor, does hereby grant, bargain, sell, transfer and convey to the Southwest Water Authority, hereinafter referred to as the Grantee, its successor and assigns, a perpetual easement with right to erect, construct, install and lay, and thereafter use, operate, inspect, repair, maintain, replace, and remove water pipelines, connections, valves and all other appurtenant facilities used in connection with the construction, operation and maintenance of the Southwest Pipeline Project, over, above, across and through the land of the Grantor, situated in **Oliver** County, State of North Dakota, said land being described as follows: **NW1/4 SECTION 7 TOWNSHIP 142 RANGE 87** (the tract that contains **1.59** acres, more or less), together with the right of ingress and egress over the adjacent lands of the Grantor, successors and assigns for the purposes of this easement.

1. The permanent easement will be thirty (30) feet in width, fifteen (15) feet on each side of the center line of the pipeline as constructed, with an additional ten (10) feet of temporary right-of-way for a total construction easement width of forty (40) feet, twenty (20) feet on each side of the center line.

2. The Grantee covenants to maintain the easement in good repair so that no unreasonable damage will result from its use to the adjacent land of the Grantor, successors and assigns. The Grantor will receive compensation for damages to growing crops caused by the construction or operation. The Grantor will report any damages within three (3) years of the construction of the project.

The grant and other provisions of this easement shall constitute a covenant running with the land for the benefit of the Grantee, its successors and assigns.

**IN WITNESS WHEREOF,** the Grantor has executed this instrument this 23 day of May, 2015.

Milda K. Hedblom GRANTOR _____ GRANTOR

State of MN

County of Ramsey

On May 23, 2015, personally appeared before me Milda K. Hedblom

_____ whom I know personally.
✓ whose identity I verified on the basis of Drivers License.
_____ whose identity I verified on the oath or affirmation of _____, a credible witness to be the signor of the above and he/she acknowledged that he/she signed it.

Notary Public _____

Ramsey, County MN

My Commission Expires: 01/31/2016

JUSTIN DAVID HOSMAN
NOTARY PUBLIC - MINNESOTA
MY COMMISSION EXPIRES 01/31/16

97087 8/5/2022 11:38 AM Total Pages: 13
BOOK: V V PAGE: 184 FEES: $65.00 RB EASEMENT
Mickie McNulty-Eide, OLIVER COUNTY RECORDER
By Rebecca Bettke, Deputy

SOLEM LAW OFFICE
PO BOX 249

BEULAH, ND 58523

RECORDER OLIVER SEAL COUNTY STATE OF NORTH DAKOTA

# WATER WELL AND WATER TANK EASEMENT

THIS INDENTURE, made and entered into this 31st day of May, 2022, by and between **JOHNELL J. KUSLER, as personal representative of the Estate of James O. Kusler,** whose post office address is 1884 Hillcrest Avenue, St. Paul, Minnesota 55116, **JOHNELL J. KUSLER,** whose post office address is 1884 Hillcrest Avenue, St. Paul, Minnesota 55116, AND **MILDA L. HEDBLOM, a/k/a MILDA K. HEDBLOM**, whose post office address is 1801 Summit Avenue, St. Paul, Minnesota 55105, hereafter **"Party of the First Part**; and **TRENT T. MARTIN and DAWN MARTIN**, husband and wife, whose post office address is 1943 62ND Avenue SW, Beulah, North Dakota 58523, hereafter **"Party of the Second Part"**.

WITNESSETH, that the Party of the First Part owns the following described parcel of land located in Oliver County, North Dakota, to-wit:

See Exhibit A attached hereto and incorporated herein by reference.

That the Party of the Second Part owns the following described parcel of land located in Oliver County, North Dakota, to-wit:

See Exhibit B attached hereto and incorporated herein by reference.

SOLEM LAW OFFICE
109 CENTRAL AVENUE S
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail:beulaw@westriv.com

That the said Party of the Second Part for and in consideration of the sum of One Dollar ($1.00) and other good and valuable consideration, the receipt of which is hereby acknowledged by the Party of the Second Part, does by these presents grant and convey until the Party of the First Part for their use and benefit upon the parcel of land identified and described in Exhibit A attached hereto and incorporated herein by reference, a Water Well and Water Tank Easement allowing the Party of the First Part, their successors and assigns, access to and use of existing water wells and water tanks located upon the above described parcel of land owned by the Party of the Second Part and described in Exhibit B, attached hereto and incorporated herein by reference. The Party of the First Part may, in the future, add one additional waterline from the existing water wells located on the Party of the Second Part's property described in Exhibit B, which said waterline may extend onto the Party of the First Part's property described in Exhibit A. The Party of the First Part, and their successors and assigns, may use this one future additional waterline for livestock purposes only and this waterline may not be used to service a residence or be sold to another party to be used to service a residence.

This Easement shall be binding and obligatory upon the heirs, administrators, personal representatives, survivors, and assigns of the parties hereto, and this easement shall continue for a term of ninety-nine (99) years or for such longer period of time as may be allowed by state law. It is further understood that the Party of the First Part shall be under no obligation to maintain any existing water wells and water tanks owned by the Party of the Second Party. Any new additional waterline to be established as herein provided by the Party

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

of the First Part shall be established at their sole expense and maintained solely by the Party of the First Part.

IN WITNESS WHEREOF, the said parties hereto set their hands and seals the day and year first above written.

WITNESS, The hands of the parties of the first part:

Johnell J Kusler PR

**JOHNELL J. KUSLER, Personal Representative of the Estate of JAMES O. KUSLER**

STATE OF NORTH DAKOTA )
)
COUNTY OF MERCER )

On this 31st day of May, 2022, before me, a Notary Public in and for said County and State, personally appeared **JOHNELL J. KUSLER, as Personal Representative of the Estate of James O. Kusler**, known to me to be the person that is described in and that executed the within instrument, and acknowledged to me that she executed the same.

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

SCOTT T. SOLEM, NOTARY PUBLIC
MERCER COUNTY, NORTH DAKOTA

Johnell J Kusler

**JOHNELL J. KUSLER**

STATE OF NORTH DAKOTA )
)
COUNTY OF MERCER )

On this 31st day of May, 2022, before me, a Notary Public in and for said County and State, personally appeared **JOHNELL J. KUSLER,** known to me to be the person that is described in and that executed the within instrument, and acknowledged to me that she executed the same.

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

SCOTT T. SOLEM, NOTARY PUBLIC
MERCER COUNTY, NORTH DAKOTA

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

**MILDA L. HEDBLOM,**
**a/k/a MILDA K. HEDBLOM**

STATE OF NORTH DAKOTA )
)
COUNTY OF MERCER )

On this 31st day of May, 2022, before me, a Notary Public in and for said County and State, personally appeared **MILDA L. HEDBLOM, a/k/a MILDA K. HEDBLOM,** known to me to be the person that is described in and that executed the within instrument, and acknowledged to me that she executed the same.

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

SCOTT T. SOLEM, NOTARY PUBLIC
MERCER COUNTY, NORTH DAKOTA

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

WITNESS, the hands of the parties of the second part:

**TRENT T. MARTIN**

**DAWN MARTIN**

STATE OF NORTH DAKOTA )
)
COUNTY OF MERCER )

On this 31st day of May, 2022, before me, a Notary Public in and for said County and State, personally appeared **TRENT T. MARTIN and DAWN MARTIN,** known to me to be the persons that are described in and that executed the within instrument, and acknowledged to me that they executed the same.

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

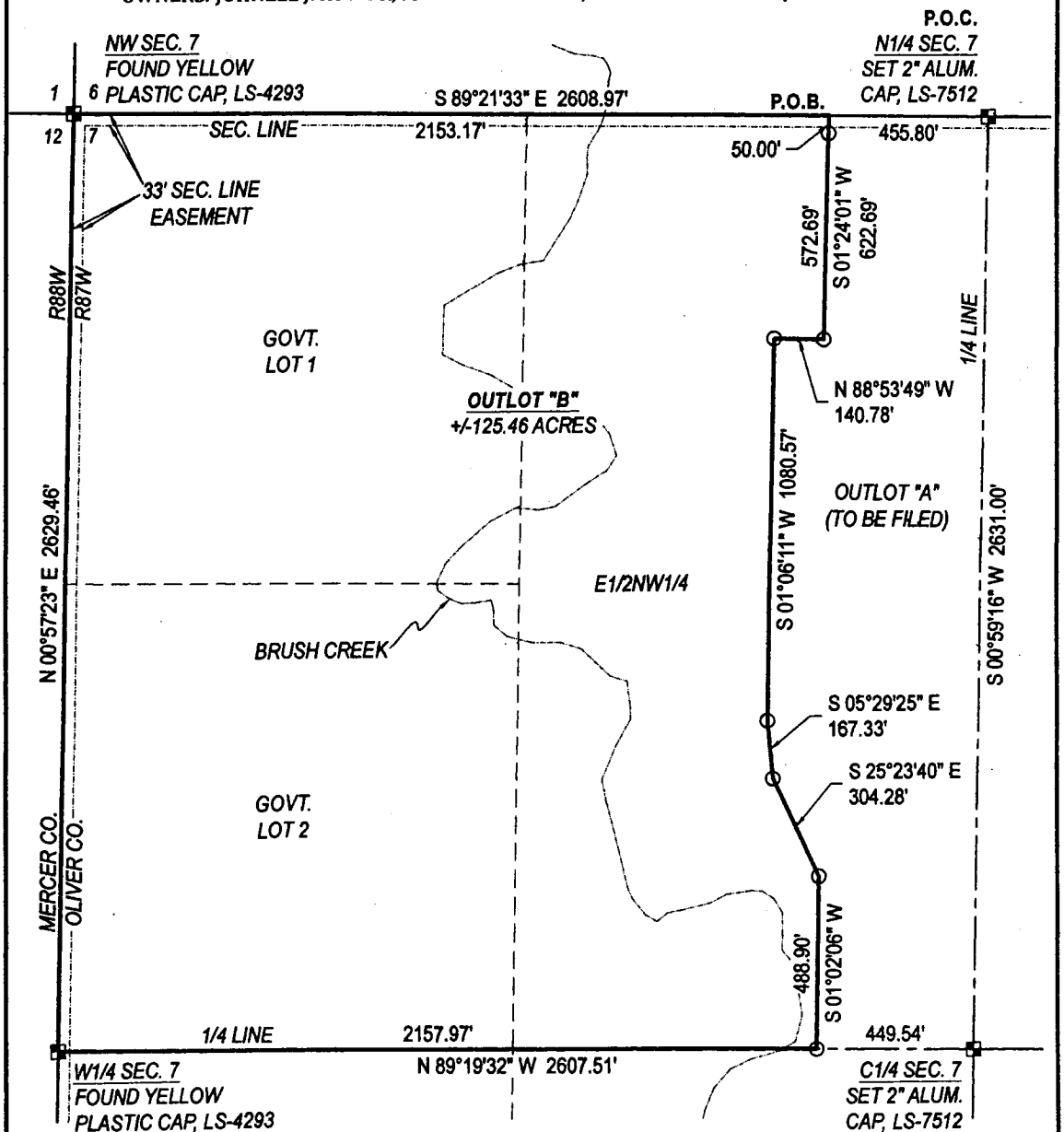
SCOTT T. SOLEM, NOTARY PUBLIC
MERCER COUNTY, NORTH DAKOTA

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

Exhibit A

# PLAT OF OUTLOT "B"

LOCATED IN GOVERNMENT LOTS 1 AND 2, AND THE E1/2NW1/4 OF SECTION 7,
TOWNSHIP 142 NORTH, RANGE 87 WEST, 5th P.M.,
OLIVER COUNTY, NORTH DAKOTA
OWNERS: JOHNELL J. KUSLER, MILDA L. HEDBLOM, AND THE ESTATE OF JAMES O. KUSLER




REGISTERED PROFESSIONAL LAND SURVEYOR
AARON HUMMERT
LS-7512
DATE 2/22/22
NORTH DAKOTA

0 400
SCALE: 1" = 400'
DATE OF FIELD SURVEY:
FEBRUARY 14 & 19, 2022

**LEGEND:**

- ■ – PLSS CORNER (AS NOTED)
- ○ – SET REBAR W/CAP LS-7512

**SURVEYOR'S NOTE:**
The basis of bearing is based on the North Dakota State Plane Coordinate System, South Zone - NAD83. The distances reported hereon are in reference to the international foot definition and are at ground per the NDDOT combination factor for Oliver County (1/CF=1.0001470216). The measurements have been determined by RTK methods using the "Trimble VRSNow" system.

| | |
|---|---|
| DRAWN BY: AH | AARON HUMMERT, PLS<br>PROFESSIONAL LAND SURVEYOR<br>1901 31st STREET NW<br>MANDAN, ND 58554<br>OFFICE: (701) 426-8624 |
| CHECKED BY: AH | |
| PROJECT #: 2022-9 | |
| DATE: 2/20/2022 | SHEET 1 OF 4 |

THE UNDERSIGNED, Owner of the within described property, in accordance with the provisions of section 57-02-39 of the North Dakota Century Code, and upon demand of the County Auditor of Oliver County, North Dakota, have caused to be made the within and foregoing plat of said land with the lots as herein described, and have caused the same to be placed on record, as provided by law.

Witness our hands and seal, this 11th day of March, 2022.

In presence of Scott T. Solem

Johnell J. Kusler

STATE OF NORTH DAKOTA )
ss
COUNTY OF MERCER )

I, SCOTT T. SOLEM, a notary public within and for said County, do hereby certify that on this 11th day of March, A.D. 2022, personally appeared before me to me well known to be the same person described in and who executed the within and foregoing instrument and acknowledged that she executed the same freely and voluntarily.

My commission expires _____, 20___

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

Notary Public

THE UNDERSIGNED, Owner of the within described property, in accordance with the provisions of section 57-02-39 of the North Dakota Century Code, and upon demand of the County Auditor of Oliver County, North Dakota, have caused to be made the within and foregoing plat of said land with the lots as herein described, and have caused the same to be placed on record, as provided by law.

Witness our hands and seal, this 11th day of March, 2022.

In presence of Scott T. Solem

Johnell J. Kusler PR

Johnell J. Kusler, Personal Representative of the Estate of James O. Kusler

STATE OF NORTH DAKOTA )
ss
COUNTY OF MERCER )

I, SCOTT T. SOLEM, a notary public within and for said County, do hereby certify that on this 11th day of March, A.D. 2022, personally appeared before me to me well known to be the same person described in and who executed the within and foregoing instrument and acknowledged that she executed the same freely and voluntarily.

My commission expires _____, 20___

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

Notary Public

| | |
|---|---|
| DRAWN BY: AH | AARON HUMMERT, PLS<br>PROFESSIONAL LAND SURVEYOR<br>1901 31st STREET NW<br>MANDAN, ND 58554<br>OFFICE: (701) 426-8624 |
| CHECKED BY: AH | |
| PROJECT #: 2022-9 | |
| DATE: 2/20/2022 | SHEET 2 OF 4 |

THE UNDERSIGNED, Owner of the within described property, in accordance with the provisions of section 57-02-39 of the North Dakota Century Code, and upon demand of the County Auditor of Oliver County, North Dakota, have caused to be made the within and foregoing plat of said land with the lots as herein described, and have caused the same to be placed on record, as provided by law.

Witness our hands and seal, this 11th day of March, 2022.

In presence of Scott T. Solem

Milda L. Hedblom

STATE OF NORTH DAKOTA )
ss
COUNTY OF MERCER )

I, SCOTT T. SOLEM, a notary public within and for said County, do hereby certify that on this 11th day of March, A.D. 2022, personally appeared before me to me well known to be the same person described in and who executed the within and foregoing instrument and acknowledged that she executed the same freely and voluntarily.

My commission expires ____, 20__

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

Notary Public

SURVEYOR'S CERTIFICATE:

I, Aaron Hummert, a North Dakota Professional Land Surveyor, do hereby certify that this survey was performed by me or under my direct supervision at the request of Johnell J. Kusler, that said survey is true and complete as shown, and that the monuments found and set are of the character and occupy the positions shown thereon. This survey does not represent a complete title search.

REGISTERED PROFESSIONAL LAND SURVEYOR
AARON HUMMERT
LS-7512
DATE 2/22/22
NORTH DAKOTA

AARON HUMMERT, PLS
NORTH DAKOTA REGISTRATION NO. LS-7512

Subscribed and sworn to before me this 22nd day of February, 2022.

AUSTIN EVANS
Notary Public
State of North Dakota
My Commission Expires 11/04/2025

Notary Public

CERTIFICATE OF APPROVAL:

The within and foregoing plat is hereby approved:

Dated: ____ day of ____, 20__.

Chairman

96910 5/6/2022 10:45 AM Total Pages: 4
BOOK: E PAGE: 60 FEES: $20.00 RB Plats
Mickie McNulty-Eide, OLIVER COUNTY RECORDER
By Rebecca Bohlke, Deputy

OLIVER COUNTY RECORDER SEAL STATE OF NORTH DAKOTA

SOLEM LAW OFFICE
PO BOX 249

BEULAH, ND 58523

| | |
|---|---|
| DRAWN BY: AH | AARON HUMMERT, PLS<br>PROFESSIONAL LAND SURVEYOR<br>1901 31st STREET NW<br>MANDAN, ND 58554<br>OFFICE: (701) 426-8624 |
| CHECKED BY: AH | |
| PROJECT #2022-9 | |
| DATE: 2/20/2022 | SHEET 3 OF 4 |

# PLAT OF OUTLOT "B" - ATTACHED DESCRIPTION

LOCATED IN GOVERNMENT LOTS 1 AND 2, AND THE E1/2NW1/4 OF SECTION 7,
TOWNSHIP 142 NORTH, RANGE 87 WEST, 5th P.M.,
OLIVER COUNTY, NORTH DAKOTA

DESCRIPTION:

A tract of land located in Government Lots 1 and 2, and the East Half of the Northwest Quarter (E1/2NW1/4) of Section 7, Township 142 North, Range 87 West of the 5th Principal Meridian, Oliver County, North Dakota, and is more particularly described as follows:

COMMENCING at the north quarter corner of said Section 7; thence on the north line of said Section 7, N89°21'33"W a distance of 455.80 feet to the POINT OF BEGINNING.

From said POINT OF BEGINNING; thence S01°24'01"W a distance of 622.69 feet; thence N88°53'49"W a distance of 140.78 feet; thence S01°06'11"W a distance of 1080.57 feet; thence S05°29'25"E a distance of 167.33 feet; thence S25°23'40"E a distance of 304.28 feet; thence S01°02'06"W a distance of 488.90 feet to the east/west quarter line of said Section 7; thence on said east/west quarter line, N89°19'32"W a distance of 2157.97 feet to the west quarter corner of said Section 7; thence on the west line of said Section 7, N00°57'23"E a distance of 2629.46 feet to the northwest corner of said Section 7; thence on the north line of said Section 7, S89°21'33"E a distance of 2153.17 feet to the POINT OF BEGINNING.

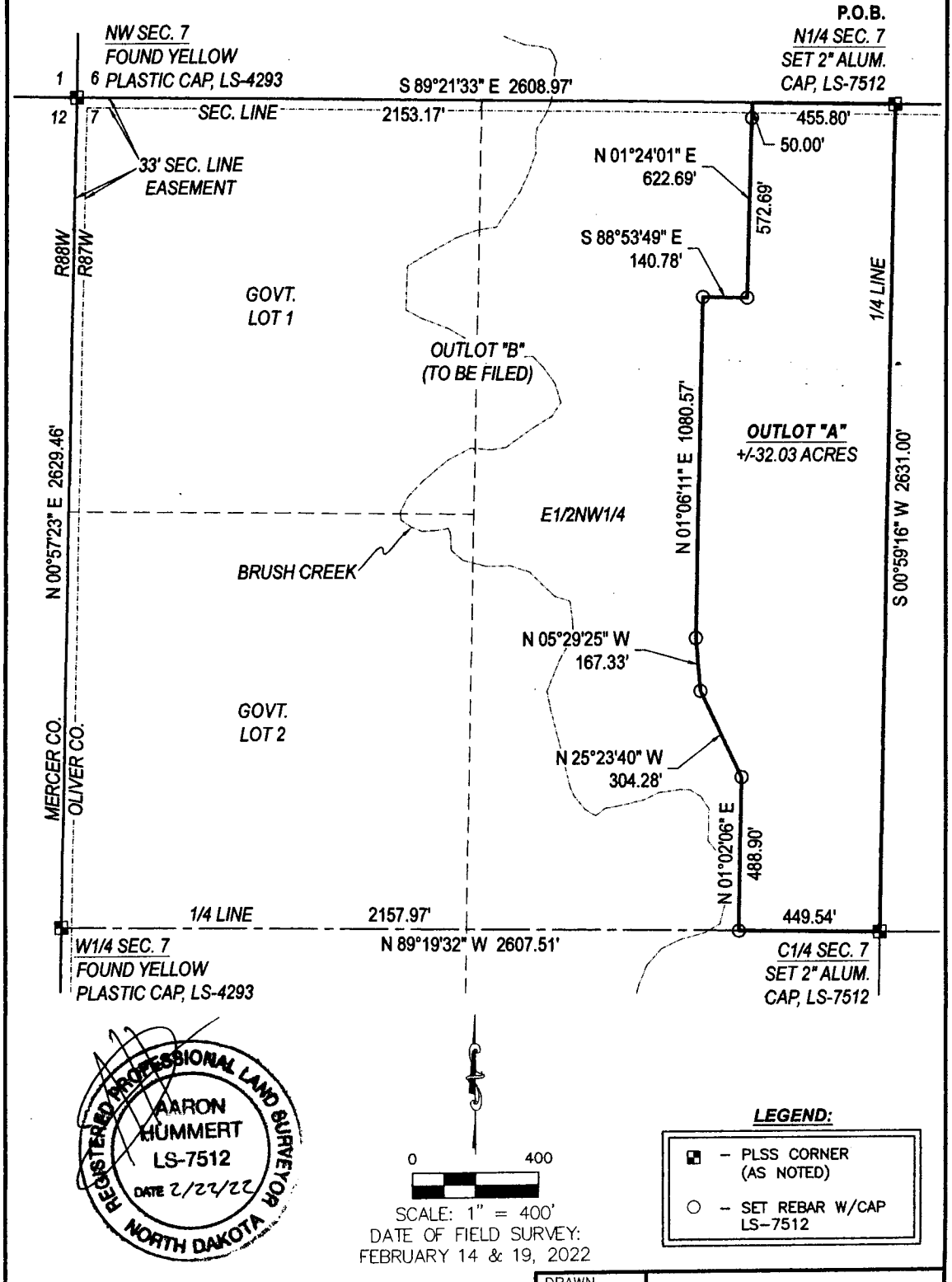
Said tract of land contains 125.46 acres more or less and is subject to any previous easements, agreements, conveyances, and surveys.

| | |
|---|---|
| DRAWN BY: AH | AARON HUMMERT, PLS<br>PROFESSIONAL LAND SURVEYOR<br>1901 31st STREET NW<br>MANDAN, ND 58554<br>OFFICE: (701) 426-8624 |
| CHECKED BY: AH | |
| PROJECT #: 2022-9 | |
| DATE: 2/20/2022 | SHEET 4 OF 4 |

Exhibit B

# PLAT OF OUTLOT "A"

LOCATED IN THE E1/2NW1/4 OF SECTION 7,
TOWNSHIP 142 NORTH, RANGE 87 WEST, 5th P.M.,
OLIVER COUNTY, NORTH DAKOTA
OWNERS: JOHNELL J. KUSLER, MILDA L. HEDBLOM, AND THE ESTATE OF JAMES O. KUSLER




REGISTERED PROFESSIONAL LAND SURVEYOR
AARON HUMMERT
LS-7512
DATE 2/22/22
NORTH DAKOTA

0 400
SCALE: 1" = 400'
DATE OF FIELD SURVEY:
FEBRUARY 14 & 19, 2022

**LEGEND:**

- ■ – PLSS CORNER (AS NOTED)
- ○ – SET REBAR W/CAP LS–7512

**SURVEYOR'S NOTE:**

The basis of bearing is based on the North Dakota State Plane Coordinate System, South Zone - NAD83. The distances reported hereon are in reference to the international foot definition and are at ground per the NDDOT combination factor for Oliver County (1/CF=1.0001470216). The measurements have been determined by RTK methods using the "Trimble VRSNow" system.

| | |
|---|---|
| DRAWN BY: AH | |
| CHECKED BY: AH | |
| PROJECT #: 2022–9 | |
| DATE: 2/20/2022 | |


AARON HUMMERT, PLS
PROFESSIONAL LAND SURVEYOR
1901 31st STREET NW
MANDAN, ND 58554
OFFICE: (701) 426-8624


SHEET 1 OF 4

THE UNDERSIGNED, Owner of the within described property, in accordance with the provisions of section 57-02-39 of the North Dakota Century Code, and upon demand of the County Auditor of Oliver County, North Dakota, have caused to be made the within and foregoing plat of said land with the lots as herein described, and have caused the same to be placed on record, as provided by law.

Witness our hands and seal, this 11th day of March, 20 22.

In presence of Scott T. Solem

Johnell J. Kusler

STATE OF NORTH DAKOTA )
ss
COUNTY OF MERCER )

I, SCOTT T. SOLEM, a notary public within and for said County, do hereby certify that on this 11th day of March, A.D. 20 22, personally appeared before me to me well known to be the same person described in and who executed the within and foregoing instrument and acknowledged that she executed the same freely and voluntarily.

My commission expires _____, 20___

SCOTT T. SOLEM, 20___
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

Notary Public

THE UNDERSIGNED, Owner of the within described property, in accordance with the provisions of section 57-02-39 of the North Dakota Century Code, and upon demand of the County Auditor of Oliver County, North Dakota, have caused to be made the within and foregoing plat of said land with the lots as herein described, and have caused the same to be placed on record, as provided by law.

Witness our hands and seal, this 11th day of March, 20 22.

In presence of Scott T. Solem

Johnell J. Kusler PR

Johnell J. Kusler, Personal Representative of the Estate of James O. Kusler

STATE OF NORTH DAKOTA )
ss
COUNTY OF MERCER )

I, SCOTT T. SOLEM, a notary public within and for said County, do hereby certify that on this 11th day of March, A.D. 2022, personally appeared before me to me well known to be the same person described in and who executed the within and foregoing instrument and acknowledged that she executed the same freely and voluntarily.

My commission expires _____, 20___

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

Notary Public

| | |
|---|---|
| DRAWN BY: AH | AARON HUMMERT, PLS<br>PROFESSIONAL LAND SURVEYOR<br>1901 31st STREET NW<br>MANDAN, ND 58554<br>OFFICE: (701) 426-8624 |
| CHECKED BY: AH | |
| PROJECT #: 2022-9 | |
| DATE: 2/20/2022 | SHEET 2 OF 4 |

THE UNDERSIGNED, Owner of the within described property, in accordance with the provisions of section 57-02-39 of the North Dakota Century Code, and upon demand of the County Auditor of Oliver County, North Dakota, have caused to be made the within and foregoing plat of said land with the lots as herein described, and have caused the same to be placed on record, as provided by law.

Witness our hands and seal, this 11th day of March, 2022.

In presence of Scott T. Solem

Milda L. Hedblom

STATE OF NORTH DAKOTA )
SS
COUNTY OF MERCER )

I, SCOTT T. SOLEM, a notary public within and for said County, do hereby certify that on this 11th day of March, A.D. 2022, personally appeared before me to me well known to be the same person described in and who executed the within and foregoing instrument and acknowledged that she executed the same freely and voluntarily.

My commission expires _____, 20___

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

Notary Public

SURVEYOR'S CERTIFICATE:

I, Aaron Hummert, a North Dakota Professional Land Surveyor, do hereby certify that this survey was performed by me or under my direct supervision at the request of Johnell J. Kusler, that said survey is true and complete as shown, and that the monuments found and set are of the character and occupy the positions shown thereon. This survey does not represent a complete title search.

AARON HUMMERT, PLS
NORTH DAKOTA REGISTRATION NO. LS-7512

REGISTERED PROFESSIONAL LAND SURVEYOR
AARON HUMMERT
LS-7512
DATE 2/22/22
NORTH DAKOTA

Subscribed and sworn to before me this 22nd day of 22, 2022.

AUSTIN EVANS
Notary Public
State of North Dakota
My Commission Expires 11/04/2025

Notary Public

CERTIFICATE OF APPROVAL:

The within and foregoing plat is hereby approved:

Dated: _____ day of _____, 20___.

Chairman

96898 4/26/2022 1:17 PM Total Pages: 4
BOOK: E PAGE: 59 FEES: $20.00 RB Plats
Mickie McNulty-Eide, OLIVER COUNTY RECORDER
By Rebecca Bethke, Deputy

SOLEM LAW OFFICE
PO BOX 249

BEULAH, ND 58523

OLIVER COUNTY RECORDER SEAL STATE OF NORTH DAKOTA

| | |
|---|---|
| DRAWN BY: AH | AARON HUMMERT, PLS<br>PROFESSIONAL LAND SURVEYOR<br>1901 31st STREET NW<br>MANDAN, ND 58554<br>OFFICE: (701) 426-8624 |
| CHECKED BY: AH | |
| PROJECT #: 2022-9 | |
| DATE: 2/20/2022 | SHEET 3 OF 4 |

# PLAT OF OUTLOT "A" - ATTACHED DESCRIPTION

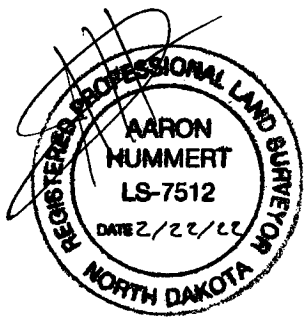
LOCATED IN THE E1/2NW1/4 OF SECTION 7,
TOWNSHIP 142 NORTH, RANGE 87 WEST, 5th P.M.,
OLIVER COUNTY, NORTH DAKOTA

DESCRIPTION:

A tract of land located in the East Half of the Northwest Quarter (E1/2NW1/4) of Section 7, Township 142 North, Range 87 West of the 5th Principal Meridian, Oliver County, North Dakota, and is more particularly described as follows:

BEGINNING at the north quarter corner of said Section 7; thence on the north/south quarter line of said Section 7, S00°59'16"W a distance of 2631.00 feet to the center quarter corner of said Section 7; thence on the east/west quarter line of said Section 7, N89°19'32"W a distance of 449.54 feet; thence N01°02'06"E a distance of 488.90 feet; thence N25°23'40"W a distance of 304.28 feet; thence N05°29'25"W a distance of 167.33 feet; thence N01°06'11"E a distance of 1080.57 feet; thence S88°53'49"E a distance of 140.78 feet; thence N01°24'01"E a distance of 622.69 feet to the north line of said Section 7; thence on said north line, S89°21'33"E a distance of 455.80 feet to the POINT OF BEGINNING.

Said tract of land contains 32.03 acres more or less and is subject to any previous easements, agreements, conveyances, and surveys.




| | |
|---|---|
| DRAWN BY: AH | AARON HUMMERT, PLS<br>PROFESSIONAL LAND SURVEYOR<br>1901 31st STREET NW<br>MANDAN, ND 58554<br>OFFICE: (701) 426-8624 |
| CHECKED BY: AH | |
| PROJECT #: 2022-9 | |
| DATE: 2/20/2022 | SHEET 4 OF 4 |

97731 7/6/2023 10:13 AM Total Pages: 13
BOOK: XX PAGE: 178 FEES: $65.00 RB EASEMENT
Mickie McNulty-Eide, OLIVER COUNTY RECORDER
By Rebecca Bethke, Deputy

SOLEM LAW OFFICE
PO BOX 249

BEULAH, ND 58523

RECORDER OLIVER SEAL COUNTY STATE OF NORTH DAKOTA

# CORRECTED
# RECIPROCAL ACCESS EASEMENT

THIS INDENTURE, made and entered into this 31st day of May, 2022, by and between **JOHNELL J. KUSLER, as personal representative of the Estate of James O. Kusler,** whose post office address is 1884 Hillcrest Avenue, St. Paul, Minnesota 55116, **JOHNELL J. KUSLER**, whose post office address is 1884 Hillcrest Avenue, St. Paul, Minnesota 55116, AND **MILDA L. HEDBLOM, a/k/a MILDA K. HEDBLOM,** whose post office address is 1801 Summit Avenue, St. Paul, Minnesota 55105, hereafter "Party of the First Part"; and **TRENT T. MARTIN and DAWN MARTIN**, husband and wife, whose post office address is 1943 62ND Avenue SW, Beulah, North Dakota 58523, hereafter "Party of the Second Part".

WITNESSETH, that the said Party of the First Part and the said Party of the Second Part, for and in consideration of the sum of One Dollar ($1.00) and other good and valuable consideration, the receipt of which is hereby acknowledged by each party, due by these presents grant and convey unto each other, their heirs, successors, and assigns for their use a Reciprocal Access Easement for purposes of ingress and egress allowing each party, their heirs, successors, and assigns to cross the land of each other specifically identified herein on

SOLEM LAW OFFICE
109 CENTRAL AVENUE S
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail:beulaw@westriv.com

existing roads and trails.

The Party of the First Part owns the following described parcel of land located in Oliver County, North Dakota, to-wit:

See Exhibit A attached hereto and incorporated herein by reference.

The Party of the Second Part owns the following described parcel of land located in Oliver County, North Dakota, to-wit:

See Exhibit B attached hereto and incorporated herein by reference.

It is understood that this Reciprocal Access Agreement is being granted by the parties herein to each other for ingress and egress access purposes allowing each party to cross the land of the other to access their own parcels and that this Reciprocal Access Easement shall be binding and obligatory upon the heirs, administrators, personal representatives, survivors, and assigns of the parties hereto, and shall continue for a term of ninety-nine (99) years or for such longer time as may be allowed by state law. It is further understood that neither party is obligated to the other to maintain the trails and roads located upon the parcels described herein.

IN WITNESS WHEREOF, the said parties have hereunto set their hands and seals the day and year first above written.

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

WITNESS, the hands of the Parties of the First Part:

**JOHNELL J. KUSLER, Personal Representative of the Estate of JAMES O. KUSLER**

STATE OF NORTH DAKOTA )
)
COUNTY OF MERCER )

On this 31st day of May, 2022, before me, a Notary Public in and for said County and State, personally appeared **JOHNELL J. KUSLER,** as Personal Representative of the Estate of James O. Kusler, known to me to be the person that is described in and that executed the within instrument, and acknowledged to me that she executed the same.

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

SCOTT T. SOLEM, NOTARY PUBLIC
MERCER COUNTY, NORTH DAKOTA

**JOHNELL J. KUSLER**

STATE OF NORTH DAKOTA )
)
COUNTY OF MERCER )

On this 31st day of May, 2022, before me, a Notary Public in and for said County and State, personally appeared **JOHNELL J. KUSLER,** known to me to be the person that is described in and that executed the within instrument, and acknowledged to me that she executed the same.

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

SCOTT T. SOLEM, NOTARY PUBLIC
MERCER COUNTY, NORTH DAKOTA

**MILDA L. HEDBLOM,**
**a/k/a MILDA K. HEDBLOM**

STATE OF NORTH DAKOTA )
)
COUNTY OF MERCER )

On this 31st day of May, 2022, before me, a Notary Public in and for said County and State, personally appeared **MILDA L. HEDBLOM, a/k/a MILDA K. HEDBLOM,** known to me to be the person that is described in and that executed the within instrument, and acknowledged to me that she executed the same.

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

SCOTT T. SOLEM, NOTARY PUBLIC
MERCER COUNTY, NORTH DAKOTA

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

WITNESS, the hands of the Party of the Second Part:

**TRENT T. MARTIN**

**DAWN MARTIN**

STATE OF NORTH DAKOTA )
)
COUNTY OF MERCER )

On this 31st day of May, 2022, before me, a Notary Public in and for said County and State, personally appeared **TRENT T. MARTIN and DAWN MARTIN,** known to me to be the persons that are described in and that executed the within instrument, and acknowledged to me that they executed the same.

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

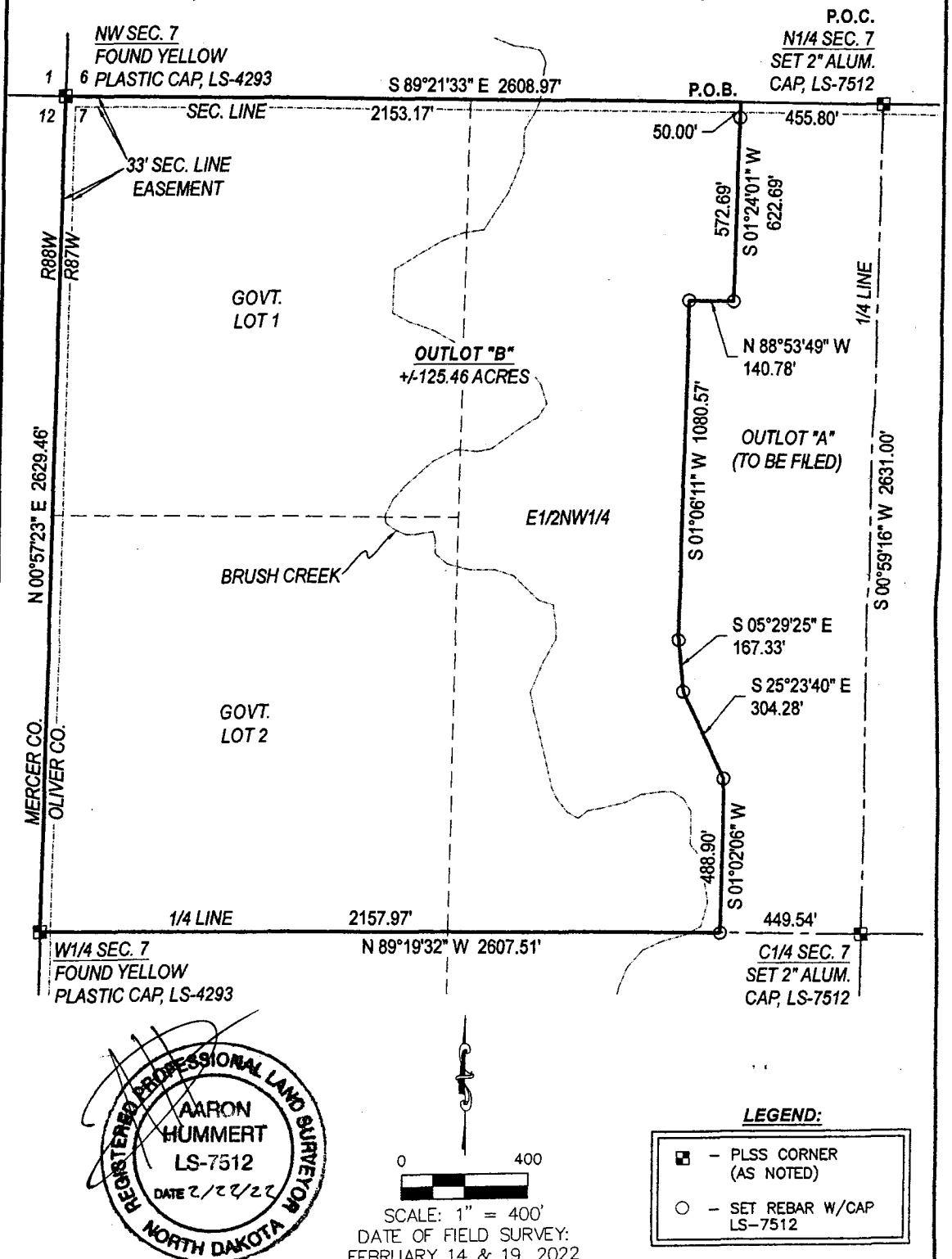
SCOTT T. SOLEM, NOTARY PUBLIC
MERCER COUNTY, NORTH DAKOTA

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

Exhibit A

# PLAT OF OUTLOT "B"

LOCATED IN GOVERNMENT LOTS 1 AND 2, AND THE E1/2NW1/4 OF SECTION 7,
TOWNSHIP 142 NORTH, RANGE 87 WEST, 5th P.M.,
OLIVER COUNTY, NORTH DAKOTA
OWNERS: JOHNELL J. KUSLER, MILDA L. HEDBLOM, AND THE ESTATE OF JAMES O. KUSLER




REGISTERED PROFESSIONAL LAND SURVEYOR
AARON HUMMERT
LS-7512
DATE 2/22/22
NORTH DAKOTA

0 400
SCALE: 1" = 400'
DATE OF FIELD SURVEY:
FEBRUARY 14 & 19, 2022

**LEGEND:**

- ■ – PLSS CORNER (AS NOTED)
- ○ – SET REBAR W/CAP LS–7512

**SURVEYOR'S NOTE:**
The basis of bearing is based on the North Dakota State Plane Coordinate System, South Zone - NAD83. The distances reported hereon are in reference to the international foot definition and are at ground per the NDDOT combination factor for Oliver County (1/CF=1.0001470216). The measurements have been determined by RTK methods using the "Trimble VRSNow" system.

| | |
|---|---|
| DRAWN BY: AH | |
| CHECKED BY: AH | |
| PROJECT #: 2022–9 | |
| DATE: 2/20/2022 | |


AARON HUMMERT, PLS
PROFESSIONAL LAND SURVEYOR
1901 31st STREET NW
MANDAN, ND 58554
OFFICE: (701) 426-8624


SHEET 1 OF 4

THE UNDERSIGNED, Owner of the within described property, in accordance with the provisions of section 57-02-39 of the North Dakota Century Code, and upon demand of the County Auditor of Oliver County, North Dakota, have caused to be made the within and foregoing plat of said land with the lots as herein described, and have caused the same to be placed on record, as provided by law.

Witness our hands and seal, this 11th day of March, 2022.

In presence of Scott T. Solem

Johnell J. Kusler

STATE OF NORTH DAKOTA )
ss
COUNTY OF MERCER )

I, SCOTT T. SOLEM, a notary public within and for said County, do hereby certify that on this 11th day of March, A.D. 2022, personally appeared before me to me well known to be the same person described in and who executed the within and foregoing instrument and acknowledged that she executed the same freely and voluntarily.

My commission expires _____, 20___

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

Notary Public

THE UNDERSIGNED, Owner of the within described property, in accordance with the provisions of section 57-02-39 of the North Dakota Century Code, and upon demand of the County Auditor of Oliver County, North Dakota, have caused to be made the within and foregoing plat of said land with the lots as herein described, and have caused the same to be placed on record, as provided by law.

Witness our hands and seal, this 11th day of March, 2022.

In presence of Scott T. Solem

Johnell J. Kusler PR

Johnell J. Kusler, Personal Representative of the Estate of James O. Kusler

STATE OF NORTH DAKOTA )
ss
COUNTY OF MERCER )

I, SCOTT T. SOLEM, a notary public within and for said County, do hereby certify that on this 11th day of March, A.D. 2022, personally appeared before me to me well known to be the same person described in and who executed the within and foregoing instrument and acknowledged that she executed the same freely and voluntarily.

My commission expires _____, 20___

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

Notary Public

| | |
|---|---|
| DRAWN BY: AH | AARON HUMMERT, PLS<br>PROFESSIONAL LAND SURVEYOR<br>1901 31st STREET NW<br>MANDAN, ND 58554<br>OFFICE: (701) 426-8624 |
| CHECKED BY: AH | |
| PROJECT #: 2022-9 | |
| DATE: 2/20/2022 | SHEET 2 OF 4 |

THE UNDERSIGNED, Owner of the within described property, in accordance with the provisions of section 57-02-39 of the North Dakota Century Code, and upon demand of the County Auditor of Oliver County, North Dakota, have caused to be made the within and foregoing plat of said land with the lots as herein described, and have caused the same to be placed on record, as provided by law.

Witness our hands and seal, this 11th day of March, 2022.

In presence of Scott T. Solem

Milda L. Hedblom

STATE OF NORTH DAKOTA )
ss
COUNTY OF MERCER )

I, SCOTT T. SOLEM, a notary public within and for said County, do hereby certify that on this 11th day of March, A.D. 2022, personally appeared before me to me well known to be the same person described in and who executed the within and foregoing instrument and acknowledged that she executed the same freely and voluntarily.

My commission expires _____, 20___

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

Notary Public

SURVEYOR'S CERTIFICATE:

I, Aaron Hummert, a North Dakota Professional Land Surveyor, do hereby certify that this survey was performed by me or under my direct supervision at the request of Johnell J. Kusler, that said survey is true and complete as shown, and that the monuments found and set are of the character and occupy the positions shown thereon. This survey does not represent a complete title search.

REGISTERED PROFESSIONAL LAND SURVEYOR
AARON HUMMERT
LS-7512
DATE 2/22/22
NORTH DAKOTA

AARON HUMMERT, PLS
NORTH DAKOTA REGISTRATION NO. LS-7512

Subscribed and sworn to before me this 22nd day of February, 2022.

AUSTIN EVANS
Notary Public
State of North Dakota
My Commission Expires 11/04/2025

Notary Public

CERTIFICATE OF APPROVAL:

The within and foregoing plat is hereby approved:

Dated: _____ day of _____, 20___.

Chairman

96910 5/6/2022 10:45 AM Total Pages: 4
BOOK: E PAGE: 60 FEES: $20.00 RB Plats
Mickie McNulty-Eide, OLIVER COUNTY RECORDER
By Rebecca Bohlke, Deputy

OLIVER COUNTY SEAL

SOLEM LAW OFFICE
PO BOX 249

BEULAH, ND 58523

| | |
|---|---|
| DRAWN BY: AH | AARON HUMMERT, PLS<br>PROFESSIONAL LAND SURVEYOR<br>1901 31st STREET NW<br>MANDAN, ND 58554<br>OFFICE: (701) 426-8624 |
| CHECKED BY: AH | |
| PROJECT 2022-9 | |
| DATE: 2/20/2022 | SHEET 3 OF 4 |

# PLAT OF OUTLOT "B" - ATTACHED DESCRIPTION

LOCATED IN GOVERNMENT LOTS 1 AND 2, AND THE E1/2NW1/4 OF SECTION 7,
TOWNSHIP 142 NORTH, RANGE 87 WEST, 5th P.M.,
OLIVER COUNTY, NORTH DAKOTA

DESCRIPTION:

A tract of land located in Government Lots 1 and 2, and the East Half of the Northwest Quarter (E1/2NW1/4) of Section 7, Township 142 North, Range 87 West of the 5th Principal Meridian, Oliver County, North Dakota, and is more particularly described as follows:

COMMENCING at the north quarter corner of said Section 7; thence on the north line of said Section 7, N89°21'33"W a distance of 455.80 feet to the POINT OF BEGINNING.

From said POINT OF BEGINNING; thence S01°24'01"W a distance of 622.69 feet; thence N88°53'49"W a distance of 140.78 feet; thence S01°06'11"W a distance of 1080.57 feet; thence S05°29'25"E a distance of 167.33 feet; thence S25°23'40"E a distance of 304.28 feet; thence S01°02'06"W a distance of 488.90 feet to the east/west quarter line of said Section 7; thence on said east/west quarter line, N89°19'32"W a distance of 2157.97 feet to the west quarter corner of said Section 7; thence on the west line of said Section 7, N00°57'23"E a distance of 2629.46 feet to the northwest corner of said Section 7; thence on the north line of said Section 7, S89°21'33"E a distance of 2153.17 feet to the POINT OF BEGINNING.

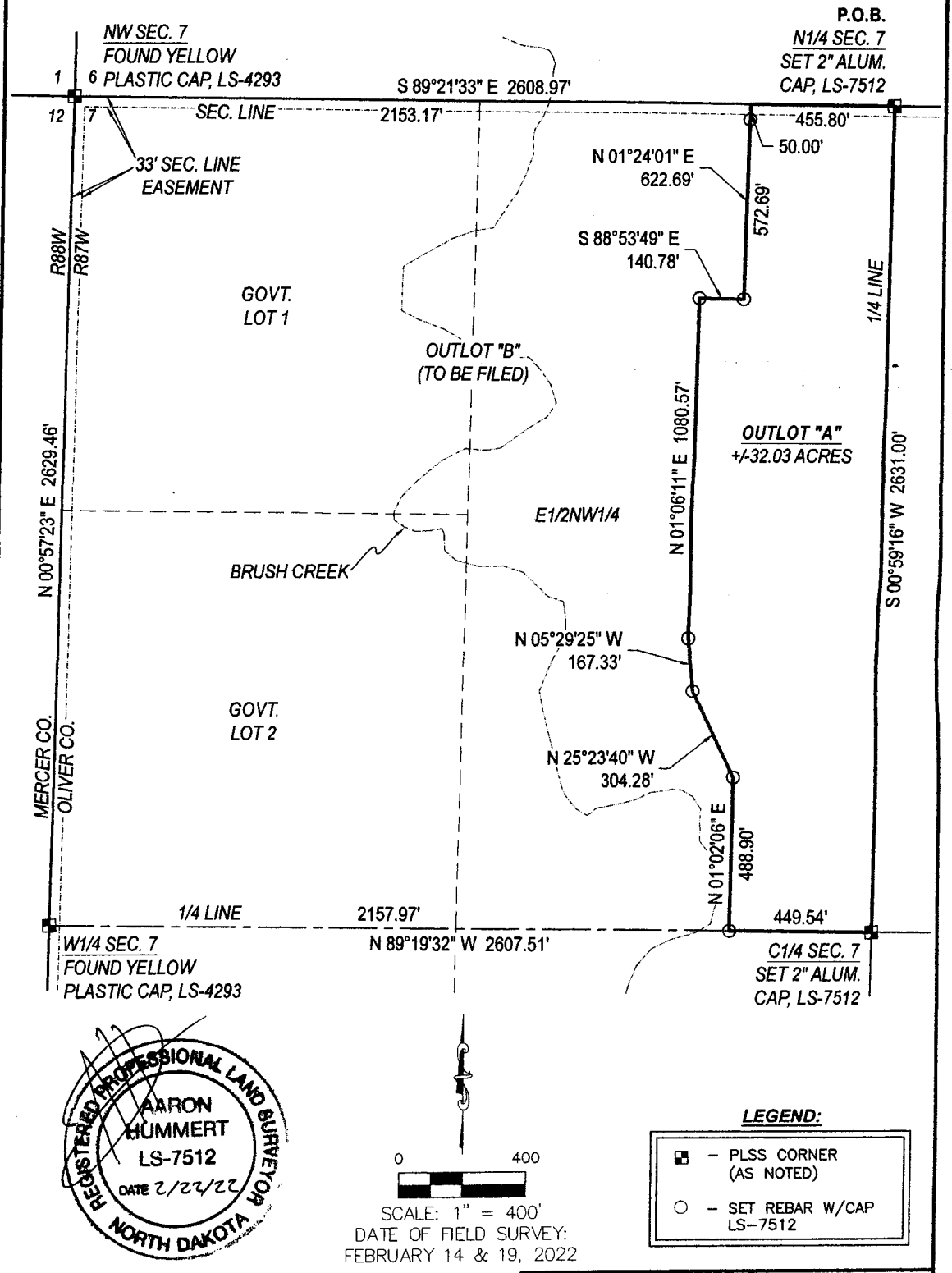
Said tract of land contains 125.46 acres more or less and is subject to any previous easements, agreements, conveyances, and surveys.

| | |
|---|---|
| DRAWN BY: AH | AARON HUMMERT, PLS<br>PROFESSIONAL LAND SURVEYOR<br>1901 31st STREET NW<br>MANDAN, ND 58554<br>OFFICE: (701) 426-8824 |
| CHECKED BY: AH | |
| PROJECT #: 2022-9 | |
| DATE: 2/20/2022 | SHEET 4 OF 4 |

Exhibit B

# PLAT OF OUTLOT "A"

LOCATED IN THE E1/2NW1/4 OF SECTION 7,
TOWNSHIP 142 NORTH, RANGE 87 WEST, 5th P.M.,
OLIVER COUNTY, NORTH DAKOTA
OWNERS: JOHNELL J. KUSLER, MILDA L. HEDBLOM, AND THE ESTATE OF JAMES O. KUSLER




REGISTERED PROFESSIONAL LAND SURVEYOR
AARON HUMMERT
LS-7512
DATE 2/22/22
NORTH DAKOTA

0 400
SCALE: 1" = 400'
DATE OF FIELD SURVEY:
FEBRUARY 14 & 19, 2022

**LEGEND:**

- ■ – PLSS CORNER (AS NOTED)
- ○ – SET REBAR W/CAP LS–7512

**SURVEYOR'S NOTE:**

The basis of bearing is based on the North Dakota State Plane Coordinate System, South Zone - NAD83. The distances reported hereon are in reference to the international foot definition and are at ground per the NDDOT combination factor for Oliver County (1/CF=1.0001470216). The measurements have been determined by RTK methods using the "Trimble VRSNow" system.

| | |
|---|---|
| DRAWN BY: AH | |
| CHECKED BY: AH | |
| PROJECT #: 2022–9 | |
| DATE: 2/20/2022 | |


AARON HUMMERT, PLS
PROFESSIONAL LAND SURVEYOR
1901 31st STREET NW
MANDAN, ND 58554
OFFICE: (701) 426-8624


SHEET 1 OF 4

THE UNDERSIGNED, Owner of the within described property, in accordance with the provisions of section 57-02-39 of the North Dakota Century Code, and upon demand of the County Auditor of Oliver County, North Dakota, have caused to be made the within and foregoing plat of said land with the lots as herein described, and have caused the same to be placed on record, as provided by law.

Witness our hands and seal, this 11th day of March, 20 22.

In presence of Scott T. Solem

Johnell J. Kusler

STATE OF NORTH DAKOTA )
ss
COUNTY OF MERCER )

I, SCOTT T. SOLEM, a notary public within and for said County, do hereby certify that on this 11th day of March, A.D. 20 22, personally appeared before me to me well known to be the same person described in and who executed the within and foregoing instrument and acknowledged that she executed the same freely and voluntarily.

My commission expires SCOTT T. SOLEM, 20
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

Notary Public

THE UNDERSIGNED, Owner of the within described property, in accordance with the provisions of section 57-02-39 of the North Dakota Century Code, and upon demand of the County Auditor of Oliver County, North Dakota, have caused to be made the within and foregoing plat of said land with the lots as herein described, and have caused the same to be placed on record, as provided by law.

Witness our hands and seal, this 11th day of March, 20 22.

In presence of Scott T. Solem

Johnell J. Kusler PR
Johnell J. Kusler, Personal Representative of the Estate of James O. Kusler

STATE OF NORTH DAKOTA )
ss
COUNTY OF MERCER )

I, SCOTT T. SOLEM, a notary public within and for said County, do hereby certify that on this 11th day of March, A.D. 2022, personally appeared before me to me well known to be the same person described in and who executed the within and foregoing instrument and acknowledged that she executed the same freely and voluntarily.

My commission expires _____, 20___

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

Notary Public

| | |
|---|---|
| DRAWN BY: AH | AARON HUMMERT, PLS<br>PROFESSIONAL LAND SURVEYOR<br>1901 31st STREET NW<br>MANDAN, ND 58554<br>OFFICE: (701) 426-8624 |
| CHECKED BY: AH | |
| PROJECT #: 2022-9 | |
| DATE: 2/20/2022 | SHEET 2 OF 4 |

THE UNDERSIGNED, Owner of the within described property, in accordance with the provisions of section 57-02-39 of the North Dakota Century Code, and upon demand of the County Auditor of Oliver County, North Dakota, have caused to be made the within and foregoing plat of said land with the lots as herein described, and have caused the same to be placed on record, as provided by law.

Witness our hands and seal, this 11th day of March, 20 22.

In presence of Scott T. Solem

Milda L. Hedblom

STATE OF NORTH DAKOTA )
ss
COUNTY OF MERCER )

I, SCOTT T. SOLEM, a notary public within and for said County, do hereby certify that on this 11th day of March, A.D. 20 22, personally appeared before me to me well known to be the same person described in and who executed the within and foregoing instrument and acknowledged that she executed the same freely and voluntarily.

My commission expires _____, 20___

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

Notary Public

SURVEYOR'S CERTIFICATE:

I, Aaron Hummert, a North Dakota Professional Land Surveyor, do hereby certify that this survey was performed by me or under my direct supervision at the request of Johnell J. Kusler, that said survey is true and complete as shown, and that the monuments found and set are of the character and occupy the positions shown thereon. This survey does not represent a complete title search.

REGISTERED PROFESSIONAL LAND SURVEYOR
AARON HUMMERT
LS-7512
DATE 2/22/22
NORTH DAKOTA

AARON HUMMERT, PLS
NORTH DAKOTA REGISTRATION NO. LS-7512

Subscribed and sworn to before me this 22nd day of 22, 20 22.

AUSTIN EVANS
Notary Public
State of North Dakota
My Commission Expires 11/04/2025

Notary Public

CERTIFICATE OF APPROVAL:

The within and foregoing plat is hereby approved:

Dated: _____ day of _____, 20___.

Chairman

96898 4/26/2022 1:17 PM Total Pages: 4
BOOK: E PAGE: 59 FEES: $20.00 RB Plats
Mickie McNulty-Eide, OLIVER COUNTY RECORDER
By Rebecca Bethke, Deputy

SOLEM LAW OFFICE
PO BOX 249

BEULAH, ND 58523

OLIVER COUNTY RECORDER SEAL STATE OF NORTH DAKOTA

| | |
|---|---|
| DRAWN BY: AH | AARON HUMMERT, PLS<br>PROFESSIONAL LAND SURVEYOR<br>1901 31st STREET NW<br>MANDAN, ND 58554<br>OFFICE: (701) 426-8624 |
| CHECKED BY: AH | |
| PROJECT #: 2022-9 | |
| DATE: 2/20/2022 | SHEET 3 OF 4 |

# PLAT OF OUTLOT "A" - ATTACHED DESCRIPTION

LOCATED IN THE E1/2NW1/4 OF SECTION 7,
TOWNSHIP 142 NORTH, RANGE 87 WEST, 5th P.M.,
OLIVER COUNTY, NORTH DAKOTA

DESCRIPTION:

A tract of land located in the East Half of the Northwest Quarter (E1/2NW1/4) of Section 7, Township 142 North, Range 87 West of the 5th Principal Meridian, Oliver County, North Dakota, and is more particularly described as follows:

BEGINNING at the north quarter corner of said Section 7; thence on the north/south quarter line of said Section 7, S00°59'16"W a distance of 2631.00 feet to the center quarter corner of said Section 7; thence on the east/west quarter line of said Section 7, N89°19'32"W a distance of 449.54 feet; thence N01°02'06"E a distance of 488.90 feet; thence N25°23'40"W a distance of 304.28 feet; thence N05°29'25"W a distance of 167.33 feet; thence N01°06'11"E a distance of 1080.57 feet; thence S88°53'49"E a distance of 140.78 feet; thence N01°24'01"E a distance of 622.69 feet to the north line of said Section 7; thence on said north line, S89°21'33"E a distance of 455.80 feet to the POINT OF BEGINNING.

Said tract of land contains 32.03 acres more or less and is subject to any previous easements, agreements, conveyances, and surveys.

| | |
|---|---|
| DRAWN BY: AH | AARON HUMMERT, PLS<br>PROFESSIONAL LAND SURVEYOR<br>1901 31st STREET NW<br>MANDAN, ND 58554<br>OFFICE: (701) 426-8624 |
| CHECKED BY: AH | |
| PROJECT #: 2022-9 | |
| DATE: 2/20/2022 | SHEET 4 OF 4 |

01082

FORM LE-189 R

RIGHT OF WAY EASEMENT

KNOW ALL MEN BY THESE PRESENTS, that we the undersigned, (Whether one or more) John Scheidt and Gladys M. Scheidt (joint tenants, and not as tenants in common, with full rights of survivorship) (unmarried) (husband and wife), for a good and valuable consideration, the receipt whereof is hereby acknowledged, do hereby grant unto Oliver-Mercer Electric Cooperative, Inc. a cooperative corporation, (hereinafter called the "Cooperative"), whose post office address is Hazen, North Dakota, and to its successors or assigns, the right to enterupon the lands of the undersigned, situated in the County of Mercer, State of North Dakota, and more particularly described as follows:

A tract of land approximately _____ acres in area, located _____ miles in a _____ direction from the town of _____, and further described as being in common tenancy in SE¼ Section 2, Township 142 Range 88
joint tenandy in S½NE¼ Section 12, Township 142 Range 88
and NE¼ Section 14, Township 142 Range 88

and to contract, operate and maintain on the above described lands, and/or in or upon all streets, roads or highways abutting said lands, an electric transmission or distribution line or system, and to cut and trim trees and shrubbery that may interfere with or threaten to endanger the operation and maintenance of said line or system.

The undersigned agree that all poles, wires, and other facilities, including any main service entrance equipment, installed on the above-described lands at the Cooperative's expense shall remain the property of the Cooperative, removable at the option of the Cooperative, upon termination of service to or on said lands.

The undersigned covenant that they are the owners of the above-desctibed lands and that the said lands are free and clear of encumberances and liens of whatsoever character except those held by the following persons:

IN WITNESS WHEREOF, the undersigned have set their hands and seals, this 22 day of April, 1949.

John Scheidt (L.S.)

Gladys M. Scheidt (L.S.)

Signed, sealed and delivered in the presence of:

Leo Goetz

_____

S8010

(1)
STATE OF NORTH DAKOTA

COUNTY OF Mercer SS.

Leo Goetz being first duly sworn says that he is one of the witnesses to the above and foregoing easements, that John Scheidt and Gladys M. Scheidt (joint tenants, and not as tenants in common, with full rights of survivorship) whose names is and/or are subscribed to the above and foregoing instruments as a party is and/or are the persons described in said easement and that they signed said instrument in my presence and that I in their presence signed my name thereto as a subscribed witness.

Leo Goetz

SUBSCRIBED and sworn to before me this 25 day of April, 1949

Frank J. Belinskey
Notary Public in and for the
County of Mercer and the State
of North Dakota

FRANK J. BELINSKEY NOTARY PUBLIC STATE OF NORTH DAKOTA

My commission expires: March 24, 1953

(1)
STATE OF NORTH DAKOTA
COUNTY OF Mercer SS.

On this 25 day of April, 1949, before me Frank J. Belinskey a Notary Public within and for the State of North Dakota, personally appeared Leo Goetz known to me to be one of the persons who subscribed his name to the above and foregoing instrument as a witness, and who acknowledged to me that he subscribed his name thereto as such witness, and who proved to me that the person who and/or whose names are subscribed to the foregoing instrument are the persons described in it.

Frank J. Belinskey
Notary Public in and for the
County of Mercer AND
State of North Dakota

FRANK J. BELINSKEY NOTARY PUBLIC STATE OF NORTH DAKOTA

My commission expires: March 24, 1953

* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

(2)
State of North Dakota

County of _____ SS.

On this _____ day of _____ 194___, before me

_____, a Notary Public in and for said County and State, personally appeared _____ and _____ known to me to be the persons _____ who _____ described in and who executed within and foregoing instrument and acknowledged to me that he executed the same.

Notary Public in and for the
County of _____ and
State of North Dakota

My commission expires: _____

MORTGAGEE
MORTGAGOR
INDEXED ✓

**STATE OF NORTH DAKOTA**
**COUNTY OF MERCER**

**209412**
**OFFICE OF**
**COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 12/9/2015 at 8:31 AM, and was duly recorded as Book 207 MISC on Page 653 Fee: $16.00

County Recorder Brenda L. Cook

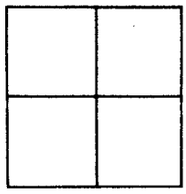
By Deputy

Return To: ROUGHRIDER ELECTRIC COOPERATIVE, INC., 800 H
HAZEN, ND 58545

# RIGHT-OF-WAY EASEMENT

Gladys Scheid (hereinafter called the "Grantor") (unmarried) (husband and wife) for a good and valuable consideration, the receipt whereof is hereby acknowledged, do hereby grant unto Oliver-Mercer Electric Cooperative, Inc., (hereinafter called "Grantee") whose post office address is Hazen, North Dakota, 58545, and to its successors or assigns, an easement for 99 years, situated in the County of Mercer, State of North Dakota, and more particularly described as follows:

Twn 142 Rge 88
Sec 14 NE¼



to construct, reconstruct, relocate, rephase, remove, repair, operate and maintain on or under the above described lands, and/or in, upon or under all streets, roads or highways abutting said lands, an electric distribution line or system; to cut, trim eradicate and control the growth by chemical means, machinery or otherwise, of trees and shrubbery located within 15 feet of the center of line of said line system, or that may interfere with or threaten to endanger the operation and maintenance of said line or system (indicating any control of the growth of other vegetation in the right-of-way which may incidentally and necessarily result from the means of control employed); and to license, permit or otherwise agree to the joint use or occupancy of the line or system by any other person, association or corporation, for electrification or communication purposes.

The undersigned Grantor agrees that all poles, wires, cables and other facilities including any main service entrance equipment installed on or below the above described lands at the Grantee's expense shall remain the property of Grantee, removable at its option upon termination of service to or on said lands.

Any damages to the surface of the right-of-way or to crops, fences, gates, drains, ditches or lines of the Grantor, caused by the Grantee in the installation, repair, maintenance, reconstruction or removal of said electric properties and appurtenances, shall be promptly repaired, replaced or paid for by the Grantee, provided a claim therefore is presented to the Grantee at its General Office within ninety (90) days after such damages occur. If the amount of said damages cannot be agreed upon, then the Grantor and Grantee shall each select an arbitrator, and these two shall select a third arbirator, and the decision and award of the arbitrators shall be final.

The undersigned Grantor convenants and agrees that no barrier of trees, shrubs, etc., and no structure or building shall be placed over underground conduits and electric lines and no construction shall be maintained or placed beneath over-the-ground electric lines and associated structures without the express written consent of the Grantee.

This Easement also includes a right-of-access to and from said real estate and Grantee's right-of-way for the purpose of connecting or reconnecting any part of the Grantee's system to or from said property with said system or to or from any other property on or coming on said system.

This Easement includes such additional rights of use and occupancy as shall be necessary for the use, maintenance, and operation of Grantee's system on said right-of-way, including but not limited to, anchors, guy wires, supporting poles or structures and the like as they were originally constructed or may thereafter be constructed.

The overall operating height of vehicles and equipment known to cultivate or traverse lands within the easement is less than _____ feet.

Dated this 3rd day of July, 19 90.

_____ Gladys M. Scheidt

STATE OF NORTH DAKOTA)
) ss
COUNTY OF MERCER)

The foregoing instrument was acknowledged before me this 3rd day of July 19 90

by Gladys M. Scheidt

My Commission Expires: May 20, 1991

Lynell Renner
Notary Public, State of North Dakota

LYNELL RENNER

MORTGAGEE
MORTGAGOR
INDEXED ✓

**209427**

**STATE OF NORTH DAKOTA**
**COUNTY OF MERCER**

**OFFICE OF**
**COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 12/9/2015 at 8:46 AM, and was duly recorded as Book 207 MISC on Page 701 Fee: $23.00

County Recorder Brenda L. Cook

By Deputy

Return To: ROUGHRIDER ELECTRIC COOPERATIVE, INC., 800 H
HAZEN, ND 58545

COUNTY RECORDER
SEAL
MERCER COUNTY, N. DAK.

MORTGAGEE
MORTGAGOR
In Computer [ ] GRANTOR ✓
WRT# [ ] GRANTEE ✓
County# [ ] INDEXED ✓

W.O.# 92-272

# West River Telephone Right-of-Way Easement

KNOW ALL MEN BY THESE PRESENT, that we the undersigned, (whether one or more) *Gladys M Scheidt*, Grantor(s), do hereby grant and convey unto *West River Telecommunications Cooperative*, a cooperative corporation (hereafter called the "Cooperative"), grantee, whose address is P.O Box 467, Hazen, North Dakota, and its respective successors, assigns, lessees and agents, an easement to survey, construct, reconstruct, operate, upgrade, maintain, relocate, replace and remove such communication systems as the grantee may from time to time require, consisting of but not limited to cables, wires, poles, splicing boxes, surface testing terminals, repeaters, repeater housings and markers,and other appurtenances, upon and over the land which the undersigned owns or in which the undersigned has any interest in the County of *Mercer*, State of *North Dakota*, and more particularly described as follows:

*S/2SE/4 2 142 88*
*NE/4 14 142 88*

***This easement is to cover this line only. Any additional future new lines will require a new easement.***

also the right of ingress and egress over and across the lands of the undersigned for the purpose of exercising the rights herein granted; to place surface markers beyond said strip, to clear and keep clear all trees, roots brush and other obstructions from the surface and subsurface of said strip of land and within seven feet thereof. The boundary of said strip shall be a line parallel to and 25 feet either side of the first cable laid, which cable shall have its location indicated by surface markers set at intervals on the land of the undersigned or on adjacent lands. The undersigned for himself, his heirs, executors, administrators, successors, and assigns, hereby covenants that no structure shall be erected on said strip.

The undersigned agrees that all poles, wire and other facilities, including telephone equipment, installed on the above described premises at the Cooperative's expense, shall remain the property of the Cooperative, removable at the option of the Cooperative.

The undersigned covenant that they are the owners of the above described lands and that the said lands are free and clear of encumbrances and liens of whatsoever character except those held by the following persons:

The term of this easement shall be for as long as needed by the grantee, and until a release of this easement is recorded, but to not extend beyond the maximum term authorized by law.

Access is hereby granted for a state or federal historical survey of the cable route, should one be required, unless checked. Access denied ☐

IN WITNESS WHEREOF, this instrument has been executed by the undersigned this the 29th day of June, 1993.

STATE OF NORTH DAKOTA )
)
COUNTY OF Mercer )

by: Gladys M Scheidt

by: _____

The foregoing instrument was acknowledged before me this 29th day of June, 1993. By Gladys M Scheidt.

My Commission Expires:

CLYDE FANDRICH
Notary Public, Mercer County, ND
My Commission Expires Feb. 24, 1999
STATE OF NORTH DAKOTA

Notary Public, County of Mercer.

Document No. 153687
OFFICE OF REGISTER OF DEEDS, COUNTY OF Mercer, North Dakota. I hereby certify that the within instrument was filed in this office for recording on the 10th day of January, A.D., 1994, at 11:38 o'clock A.M, and was duly recorded in Book 128, of Misc., on page 505.

By Kathryn Schumann Deputy Jeanette Sailer Register of Deeds

$7.00 fee

When recorded, please return to WEST RIVER TELECOMMUNICATION COOPERATIVE.

REGISTER OF DEEDS SEAL COUNTY, N.DAK.

## RIGHT-OF-WAY EASEMENT

KNOW ALL MEN BY THESE PRESENTS, that we the undersigned, (whether one or more) Leland Erickson (unmarried) (husband and wife) for a good and valuable consideration, the receipt whereof is hereby acknowledged, do hereby grant unto Oliver-Mercer Electric a cooperative corporation (hereinafter called the "Cooperative") whose post office address is Hazen, and to its successors or assigns, the right to enter upon the lands of the undersigned, situated in the County of Mercer, State of North Dakota, and more particularly described as follows:

SE¼ Sec. 27, Twp. 143, Rge. 88

and to construct, operate and maintain an electric transmission and/or distribution line or system on or under the above-described lands and/or in, upon or under all streets, raods or highways abutting said lands; to inspect and make such repairs, changes, alterations, improvements, removals from, substitutions and additions to its facilities as Cooperative may from time to time deem advisable, including, by way of example and not by way of limitation, the right to increase or decrease the number of conduits, wires, cables, handholes, manholes, connection boxes, transformers and transformer enclosures; to cut, trim and control the growth by chemical means, machinery or otherwise of trees and shrubbery located within _____ feet of the center line of said line or system, or that may interfere with or threaten to endanger the operation and maintenance of said line or system (including any control of the growth of other vegetation in the right-of-way which may incidentally and necessarily result from the means of control employed); to keep the easement clear of all buildings, structures or other obstructions; and to license, permit or otherwise agree to the joint use or occupancy of the lines, system or, if any of said system is placed underground, of the trench and related underground facilities, by any other person, association or corporation.

The undersigned agree that all poles, wires and other facilities including any main service entrance equipment, installed in, upon or under the above-described lands at the Cooperative's expense shall remain the property of the Cooperative, removable at the option of the Cooperative.

The undersigned covenant that they are the owners of the above-described lands.

IN WITNESS WHEREOF, the undersigned have set their hands and seals this 6th day of November, 1974.

Leland Erickson (L.S.)

_____ (L.S.)

Signed, sealed and delivered in the presence of:

Eldora Sailer

_____

State of North Dakota )
) ss
Mercer County )

Personally came before me this 6th day of November 1975 the above named Eldora Sailer to me known to be the person (s) who executed the foregoing instrument and acknowledged the same.

VIVIAN J. RICKERT NOTARY PUBLIC STATE OF NORTH DAKOTA

Vivian J. Rickert

Notary Public, Mercer, County, North Dakota, State.

My Commission expires 12-31-77

208123

**STATE OF NORTH DAKOTA**
**COUNTY OF MERCER**

**OFFICE OF**
**COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 8/18/2015 at 8:15 AM, and was duly recorded as Book 204 MISC on Page 729 Fee: $13.00

County Recorder Brenda L. Cook

By Deputy

Return To: ROUGHRIDER ELECTRIC COOPERATIVE, INC., 800 H
chg HAZEN, ND 58545

MORTGAGEE
MORTGAGOR
INDEXED ✓

COUNTY RECORDER SEAL MERCER COUNTY, N. DAK.

RECEIVED
FEB 5 2014

**SOUTHWEST WATER AUTHORITY**
Southwest Pipeline Project Building
West Industrial Park
4665 2nd Street SW
Dickinson, ND 58601-7231
(701) 225-0241
Toll Free: 1-888-425-0241

Segment **7-9E WEST CENTER SERVICE AREA**
Parcel **142-88-17**

## RIGHT-OF-WAY EASEMENT

**ALL PERSONS TAKE NOTICE:**

In consideration of one dollar ($1.00) and other good and valuable consideration **JAMES O KUSLER 5968 19TH STREET SW BEULAH, ND 58523** hereinafter referred to as Grantor, does hereby grant, bargain, sell, transfer and convey to the Southwest Water Authority, hereinafter referred to as the Grantee, its successor and assigns, a perpetual easement with right to erect, construct, install and lay, and thereafter use, operate, inspect, repair, maintain, replace, and remove water pipelines, connections, valves and all other appurtenant facilities used in connection with the construction, operation and maintenance of the Southwest Pipeline Project, over, above, across and through the land of the Grantor, situated in **Mercer** County, State of North Dakota, said land being described as follows: **N1/2 N1/2 LESS R/W SECTION 12 TOWNSHIP 142 RANGE 88 & SE1/4 SECTION 27 TOWNSHIP 143 RANGE 88** (the tract that contains **6.34** acres, more or less), together with the right of ingress and egress over the adjacent lands of the Grantor, successors and assigns for the purposes of this easement.

1. The permanent easement will be thirty (30) feet in width, fifteen (15) feet on each side of the center line of the pipeline as constructed, with an additional ten (10) feet of temporary right-of-way for a total construction easement width of forty (40) feet, twenty (20) feet on each side of the center line.

2. The Grantee covenants to maintain the easement in good repair so that no unreasonable damage will result from its use to the adjacent land of the Grantor, successors and assigns. The Grantor will receive compensation for damages to growing crops caused by the construction or operation. The Grantor will report any damages within three (3) years of the construction of the project.

The grant and other provisions of this easement shall constitute a covenant running with the land for the benefit of the Grantee, its successors and assigns.

**IN WITNESS WHEREOF,** the Grantor has executed this instrument this 3 day of February, 2014

James O. Kusler GRANTOR _____ GRANTOR

State of North Dakota

County of Dunn

On February 3, 2014, personally appeared before me James O. Kusler

_____ whom I know personally.
X whose identity I verified on the basis of North Dakota drivers license
_____ whose identity I verified on the oath or affirmation of _____, a credible witness to be the signor of the above and he/she acknowledged that he/she signed it.

DANIEL T. AICHELE
Notary Public
State of North Dakota
My Commission Expires Mar. 2, 2018

Notary Public Daniel T. Aichele

_____, County Dunn

My Commission Expires: Mar. 2, 2018

MORTGAGEE
MORTGAGOR
INDEXED ✓

**STATE OF NORTH DAKOTA**
**COUNTY OF MERCER**

**211517**
**OFFICE OF**
**COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 6/14/2016 at 9:26 AM, and was duly recorded as Book 213 MISC on Page 17 Fee: $13.00

County Recorder Brenda L Cook

By Deputy Kathryn Schumann

Return To: SOUTHWEST WATER AUTHORITY, WEST INDUSTRIA
4665 2ND ST SW DICKINSON, ND 58601-7231

COUNTY RECORDER
SEAL
MERCER COUNTY, N DAK.

Uploaded to BtW FTP on 2-5-14 (mc)

## RIGHT OF WAY EASEMENT

THIS AGREEMENT made and entered into this 19th day of June, 2019, between James Kusler, hereinafter called "Owner" (whether one or more) and **ROUGHRIDER ELECTRIC COOPERATIVE, INC.**, whose post office address is 800 Highway Drive, Hazen, North Dakota 58545-4737, hereinafter called "COOPERATIVE".

WITNESSETH that for valuable consideration, the receipt and sufficiency of which is hereby acknowledged, Owner grants unto Cooperative, its successors and assigns, for a term of 99 years from the date hereof, an easement to construct, reconstruct, operate and maintain an electric distribution system, overhead, underground or both including all poles, guys, anchors wires, surface terminals, and all accessories and appurtenances necessary or desirable in connection therewith, under, over, upon and across lands of Owner and/or in or upon all streets, roads or highways abutting said lands situated in Mercer County, North Dakota, and more particularly described as follows, to-wit:

A strip of land 20 feet in width, the same being 10 feet on each side of a centerline described as follows.

**Township 143 North Range 88 West**

S1/2SE1/4 of Section 27

The facilities erected hereunder shall remain the property of the Cooperative. Cooperative shall have the right to inspect, rebuild, remove, repair, improve and make such changes, alterations, substitutions and additions in and to its facilities as Cooperative may from time to time deem advisable, including the right to increase or decrease the size or capacity of its system, together with necessary accessories and appurtenances; the right to increase or decrease the size of the facilities and equipment situated upon the premises; the right to permit or otherwise agree to the joint use or occupancy of the overhead lines or the trench and related underground facilities by other persons, associations or corporations; and the right to at any time use the property described above to extend lines and facilities to serve the property of persons other than the Owner.

Any damages to the surface of the right-of-way or to crops, fences, gates, drains, ditches, or lines of the Owner, caused by the Cooperative in the installation, repair maintenance, reconstruction or removal of said electrical properties and appurtenances, shall be promptly repaired, replaced or paid for by the Cooperative, provided a claim therefore is presented to the Cooperative at its General Office within ninety (90) days after such damages occur. If the amount of said damages cannot be agreed upon, the Cooperative and the Owner shall each select an arbitrator, and these two shall select a third arbitrator, and the decision and award of the arbitrators shall be final.

Cooperative shall at all times have the right to keep the easement clear of all buildings, structures or other obstructions, trees, shrubbery, undergrowth and roots.

Owner, his successors and assigns, may use the land within the easement for any purpose not inconsistent with the rights granted, provided such use does not interfere with or endanger the Cooperative's facilities or the rights granted under this easement.

For the purpose of constructing, inspecting, maintaining or operating its facilities, Cooperative shall have the right of ingress to and egress from the easement over the lands of Owner adjacent to the easement and lying between public or private roads and the easement, such right to be exercised in such manner as shall occasion the least practicable damage and inconvenience to Owner.

Owner covenants that he is seized of and has the right to convey the said easement, rights and privileges; that Cooperative shall have quiet and peaceable possession, use and enjoyment of the aforesaid easement, rights and privileges, and that Owner shall execute such further assurances thereof as may be requested by the Cooperative.

James D. Kusler

STATE OF NORTH DAKOTA )
)ss
COUNTY OF Dunn )

On this 19th day of June, 2019, before me, a Notary Public in and for said County and State personally appeared James Kusler, known to me to be the person(s) described in and who executed the within and foregoing instrument and acknowledged to me that he/she/they executed the same.

***Notary Seal Location***

Notary Public State of North Dakota

My Commission Expires: 05/10/19

JOSH PAPE
Notary Public
State of North Dakota
My Commission Expires May 10, 2019

MORTGAGEE
MORTGAGOR
INDEXED ✓

**STATE OF NORTH DAKOTA**
**COUNTY OF MERCER**

**206136**
**OFFICE OF**
**COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 1/15/2015 at 11:12 AM, and was duly recorded a Book 200 MISC on Page 647 Fee: $13.00

County Recorder Brenda L Cook

By Deputy Kathryn Schumann

Return To: ROUGHRIDER ELECTRIC COOPERATIVE, INC., 800 H
cfg HAZEN, ND 58545

COUNTY RECORDER
SEAL
MERCER COUNTY, N. DAK.

**SOUTHWEST WATER AUTHORITY**
Southwest Pipeline Project Building
West Industrial Park
4665 2nd Street SW
Dickinson, ND 58601-7231
(701) 225-0241
Toll Free: 1-888-425-0241

Segment **7-9E WEST CENTER SERVICE AREA**
Parcel **142-88-17**

## RIGHT-OF-WAY EASEMENT

**ALL PERSONS TAKE NOTICE:**

In consideration of one dollar ($1.00) and other good and valuable consideration JOHNELLE J. KUSLER 1884 HILLCREST AVENUE ST. PAUL, MN 55116 hereinafter referred to as Grantor, does hereby grant, bargain, sell, transfer and convey to the Southwest Water Authority, hereinafter referred to as the Grantee, its successor and assigns, a perpetual easement with right to erect, construct, install and lay, and thereafter use, operate, inspect, repair, maintain, replace, and remove water pipelines, connections, valves and all other appurtenant facilities used in connection with the construction, operation and maintenance of the Southwest Pipeline Project, over, above, across and through the land of the Grantor, situated in MERCER County, State of North Dakota, said land being described as follows: E1/2 NE1/4 LESS R/W SECTION 12 TOWNSHIP 142 RANGE 88 & SE1/4 SECTION 27 TOWNSHIP 143 RANGE 88 (the tract that contains 3.35 acres, more or less), together with the right of ingress and egress over the adjacent lands of the Grantor, successors and assigns for the purposes of this easement.

1. The permanent easement will be thirty (30) feet in width, fifteen (15) feet on each side of the center line of the pipeline as constructed, with an additional ten (10) feet of temporary right-of-way for a total construction easement width of forty (40) feet, twenty (20) feet on each side of the center line.

2. The Grantee covenants to maintain the easement in good repair so that no unreasonable damage will result from its use to the adjacent land of the Grantor, successors and assigns. The Grantor will receive compensation for damages to growing crops caused by the construction or operation. The Grantor will report any damages within three (3) years of the construction of the project.

The grant and other provisions of this easement shall constitute a covenant running with the land for the benefit of the Grantee, its successors and assigns.

**IN WITNESS WHEREOF,** the Grantor has executed this instrument this 23rd day of May, 2015.

Johnell J Kusler GRANTOR _____ ~~GRANTOR~~ NV

State of MINNESOTA

County of RAMSEY

NICOLE LOUISE VERRILL
NOTARY PUBLIC - MINNESOTA
MY COMMISSION EXPIRES 01/31/19

On 23RD DAY OF MAY, 2015, personally appeared before me JOHNELL J. KUSLER NV

_____ whom I know personally.
__X__ whose identity I verified on the basis of MINNESOTA DRIVERS LISCENSE.
_____ whose identity I verified on the oath or affirmation of _____, a credible witness to be the signor of the above and he/she acknowledged that he/she signed it.

Notary Public Nicole Louise Verrill

RAMSEY, County MINNESOTA

My Commission Expires: 01/31/2019

207510

**STATE OF NORTH DAKOTA**
**COUNTY OF MERCER**

**OFFICE OF COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 6/19/2015 at 12:20 PM, and was duly recorded a Book 203 MISC on Page 599 Fee: $13.00

County Recorder Brenda L. Cook

By Deputy

Return To: SOUTHWEST WATER AUTHORITY, 4665 2ND STREET
DICKINSON, ND 58601-7231

MORTGAGEE
MORTGAGOR
INDEXED ✓

COUNTY RECORDER SEAL MERCER COUNTY, N DAK.

RECEIVED
MAY 28 2015
SOUTHWEST WATER AUTHORITY

uploaded to BTW AP on 5-28-15 ed

01104

(I)

Location Number

RIGHT-OF-WAY EASEMENT

KNOW ALL MEN BY THESE PRESENTS, that the undersigned Norman Smith, for a good and valuable consideration, the receipt whereof is hereby acknowledged, does hereby grant unto the Oliver-Mercer Electric Cooperative, Inc., a corporation, whose post office address is Hazen, N. Dak., North Dakota, and to its successors or assigns, the right to enter upon the lands of the undersigned, situated in the county of Oliver, State of North Dakota and more particularly described as follows:

NW¼ Sec. 22, Sec. 21, 142-87

~~SW¼ Sec. 15, 142-87~~

(I)

and to place, construct, operate, repair, maintain, relocate and replace thereon and in or upon all streets, roads or highways abutting said lands an electric transmission or distribution line or system, and to cut and trim trees and shrubbery to the extent necessary to keep them clear of said electric line or system and to cut down from time to time all dead, weak, leaning or dangerous trees that are tall enough to strike the wires in falling.

In granting this easement it is understood that at pole locations, only a single pole and arrurtenance will be used, and that the location of the pole will be such as to form the least possible interference to farm operations so long as it does not materially increase the cost of construction.

The undersigned covenants that he is the owner of the above described lands and that the said lands are free and clear of encumbrances and liens of whatsoever character except those held by the following persons:

(S)

It is further understood that, whenever necessary, words in this instrument in the singular shall be construed to read in the plural and that words used in the masculine gender shall be construed to read in the feminine.

IN WITNESS WHEREOF, the undersigned has set his hand and seal this 26 day of June, 1946.

Signed, sealed and delivered in the presence of:

Norman Smith

Banks H. Leeb

91055 8/21/2015 10:45 AM PAGE: 1 OF 2
BOOK: 1 PAGE: 1084 FEES: $13.00 MM EASEMENT (ROUGHRID
Kim Wilkens, OLIVER COUNTY RECORDER
By Deputy

RECORDER OLIVER COUNTY SEAL STATE OF NORTH DAKOTA

(1)
STATE OF NORTH DAKOTA

COUNTY OF Mercer SS.

Banks H Sieber being first duly sworn says that he is one of the witnesses to the above and foregoing easements, that Norman Smith and whose names is and/or are subscribed to the above and foregoing instruments as a party is and/or are the persons described in said easement and that he signed said instrument in my presence and that I in their presence signed my name thereto as a subscribing witness.

Banks H Sieber

SUBSCRIBED and sworn to before me this 15 day of June 1946

R J Sailer
Notary Public in and for the County of Mercer and State of North Dakota.

R. J. SAILER NOTARY PUBLIC STATE OF NORTH DAKOTA

My commission expires May 15 1947

(1)
STATE OF NORTH DAKOTA
COUNTY OF Mercer SS.

On this 15th day of June 1946 before me R J Sailer a Notary Public within and for the State of North Dakota, personally appeared Banks H Sieber known to me to be one of the persons who subscribed his name to the above and foregoing instrument as a witness, and who acknowledged to me that he subscribed his name thereto as such witness, and who proved to me that the person who and/or whose names are subscribed to the foregoing instrument are the persons described in it.

R J Sailer
Notary Public in and for the County of Mercer and State of North Dakota.

R. J. SAILER NOTARY PUBLIC STATE OF NORTH DAKOTA

My commission expires May 15 1947

********************

(2)
STATE OF

County of SS

ROUGHRIDER ELECTRIC COOPERATIVE
800 HWY DR

HAZEN, ND 58545

On this day of 19, before me , a Notary Public in and for said County and State, personally appeared and known to me to be the persons who described in and who executed within and foregoing instrument and acknowledged to me that he executed the same.

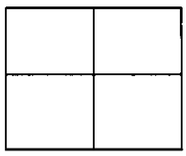
Notary Public in and for the County of and State North Dakota.

My commission expires

# RIGHT-OF-WAY EASEMENT

Faye Swenson (hereinafter called the "Grantor") (unmarried) (husband and wife) for a good and valuable consideration, the receipt whereof is hereby acknowledged, do hereby grant unto Roughrider Electric Cooperative, Inc. (hereinafter called "Grantee") whose post office address is Hazen, North Dakota 58545, and to its successors or assigns, an easement for 99 years, situated in the County of Oliver, State of North Dakota, and more particularly described as follows:

TOWNSHIP 142 NORTH, RANGE 87 WEST
Section 21 NE 1/4



To construct, reconstruct, relocate, rephase, remove, repair, operate and maintain on or under the above described lands, and/or in, upon or under all streets, roads or highways abutting said lands, an electric distribution line or system; to cut, trim eradicate and control the growth by chemical means, machinery or otherwise, or trees and shrubbery located within -15- feet of the center of said line system, or that may interfere with or threaten to endanger the operation and maintenance of said line system (indicating any control of the growth of other vegetation in the right-of-way which may incidentally and necessarily result from the means of control employed); and to license, permit or otherwise agree to the joint use or occupancy of the line or system by any other person, association or corporation, for electrification or communication purposes.

The undersigned Grantor agrees that all poles, wires, cables and other facilities including any main service entrance equipment installed on or below the above described lands at the Grantee's expense shall remain the property of Grantee, removable at its option upon termination of service to or on said lands.

Any damages to the surface of the right-of-way or to crops, fences, gates, drains, ditches or lines of the Grantor, caused by the Grantee in the installation, repair, maintenance, reconstruction or removal of said electric properties and appurtenances, shall be promptly repaired, replaced or paid for by the Grantee, provided a claim therefore is presented to the Grantee at its General Office within ninety (90) days after such damages occur. If the amount of said damages cannot be agreed upon, the Grantor and Grantee shall each select an arbitrator, and these two shall select a third arbitrator, and the decision and award of the arbitrators shall be final.

The undersigned Grantor convenants and agrees that no barrier of trees, shrubs, etc., and no structure or building shall be placed over underground conduits and electric lines and no construction shall be maintained or placed beneath over-the-ground electric lines and associated structures without the express written consent of the Grantee.

This Easement also includes a right-of-access to and from said real estate and Grantee's right-of-way for the purpose of connecting or reconnecting any part of the Grantee's system to or from said property with said system or to or from any other property on or coming on said system.

This Easement includes such additional rights of use and occupancy as shall be necessary for the use, maintenance, and operation of Grantee's system on said right-of-way, including but not limited to, anchors, guy wires, supporting poles or structures and the like as they were originally constructed or may thereafter be constructed.

The overall operating height of vehicles and equipment known to cultivate or traverse lands within the easement is less than _____ feet.

Dated this 1 day of July, 2008.

Faye B Swenson

RECORDER OLIVER COUNTY SEAL STATE OF NORTH DAKOTA

STATE OF NORTH DAKOTA )
)ss
COUNTY OF OLIVER )

The foregoing instrument was acknowledged before me this 1st day of July, 2008, by Faye B. Swenson.

My Commission Expires:
May 15, 2014

TIMOTHY J. VOLK
Notary Public
State of North Dakota
My Commission Expires May 15, 2014

Notary Public, State of North Dakota

88076 623 4/18/2013 10:17 AM PAGE: 1 OF 1
BOOK: HH PAGE: 3 FEES: $10.00 KW RIGHT OF WAY
Kim Wilkens, OLIVER COUNTY CLERK
By K Wilkens

ROUGHRIDER ELECTRIC COOP
2156 4TH AVE E
PO BOX 1038
DICKINSON, ND 58602

89860 5/27/2015 3:25 PM PAGE: 1 OF 1
BOOK: KK PAGE: 449 FEES: $10.00 MM EASEMENT
Kim Wilkens, OLIVER COUNTY RECORDER
By [signature]

SOUTHWEST WATER AUTHORITY
WEST INDUSTRIAL PARK
4665 2ND STREET SW
DICKINSON, ND 58601-7231

RECORDER OLIVER SEAL COUNTY STATE OF NORTH DAKOTA

**SOUTHWEST WATER AUTHORITY**
Southwest Pipeline Project Building
West Industrial Park
4665 2nd Street SW
Dickinson, ND 58601-7231
(701) 225-0241
Toll Free: 1-888-425-0241

Segment **7-9E WEST CENTER SERVICE AREA**
Parcel **142-87-16**

## RIGHT-OF-WAY EASEMENT

**ALL PERSONS TAKE NOTICE:**

In consideration of one dollar ($1.00) and other good and valuable consideration **KURT & FAYE SWENSON 5774 21ST STREET SW BEULAH, ND 58523** hereinafter referred to as Grantor, does hereby grant, bargain, sell, transfer and convey to the Southwest Water Authority, hereinafter referred to as the Grantee, its successor and assigns, a perpetual easement with right to erect, construct, install and lay, and thereafter use, operate, inspect, repair, maintain, replace, and remove water pipelines, connections, valves and all other appurtenant facilities used in connection with the construction, operation and maintenance of the Southwest Pipeline Project, over, above, across and through the land of the Grantor, situated in **Oliver** County, State of North Dakota, said land being described as follows: **NE1/4 SECTION 21 TOWNSHIP 142 RANGE 87** (the tract that contains **2.32** acres, more or less), together with the right of ingress and egress over the adjacent lands of the Grantor, successors and assigns for the purposes of this easement.

1. The permanent easement will be thirty (30) feet in width, fifteen (15) feet on each side of the center line of the pipeline as constructed, with an additional ten (10) feet of temporary right-of-way for a total construction easement width of forty (40) feet, twenty (20) feet on each side of the center line.

2. The Grantee covenants to maintain the easement in good repair so that no unreasonable damage will result from its use to the adjacent land of the Grantor, successors and assigns. The Grantor will receive compensation for damages to growing crops caused by the construction or operation. The Grantor will report any damages within three (3) years of the construction of the project.

The grant and other provisions of this easement shall constitute a covenant running with the land for the benefit of the Grantee, its successors and assigns.

**IN WITNESS WHEREOF,** the Grantor has executed this instrument this 2 day of April, 2015.

[signature] GRANTOR [signature] GRANTOR

State of NORTH DAKOTA

County of MERCER

On April 2, 2015, personally appeared before me FAYE SWENSON
KURT SWENSON

RECEIVED SOUTHWEST WATER AUTHORITY

X whom I know personally.
____ whose identity I verified on the basis of _____.
____ whose identity I verified on the oath or affirmation of _____, a credible witness to be the signor of the above and he/she acknowledged that he/she signed it.

Notary Public [signature]

_____, County MERCER

My Commission Expires: 6/16/16

ERIC BUCHHOLZ
Notary Public
State of North Dakota
My Commission Expires June 16, 2016

EXCH: BELH WO#: 2015-206-038

# *West River Telecommunications Right-of-Way Easement*

We the undersigned, (whether one or more) ***Donna M. Smith***, Grantor(s), do hereby grant and convey unto ***West River Telecommunications Cooperative***, a cooperative corporation (hereafter called the "Cooperative"), grantee, whose address is P.O. Box 467, Hazen, North Dakota, and its respective successors, assigns, lessees and agents, an easement to survey, construct, repair, operate, upgrade, maintain, relocate, replace and remove such communication systems as the grantee may from time to time require, consisting of but not limited to cables, wires, poles, splicing boxes, and other appurtenances, upon, over and under the land which the undersigned owns or in which the undersigned has any interest in the County of ***Oliver***, State of ***North Dakota***, and more particularly described as follows:

W sec

*NE/4 Sec. 22 T142N R87W*

E sec.

*NW/4 Sec. 21 T142N R87W*

also the right of ingress and egress over and across the lands of the undersigned for the purpose of exercising the rights herein granted; to place surface markers beyond said strip, to clear and keep clear all trees, roots, brush and other obstructions from the surface and subsurface of said strip of land. The boundary of said strip shall be a line parallel to and 10 feet either side of the first cable laid on the land of the undersigned. The undersigned for Grantor(s), their heirs, executors, administrators, successors, and assigns, hereby covenants that no structure shall be erected on said strip.

The undersigned agrees that all poles, wire and other facilities, including telephone equipment, installed on the above described land, shall remain the property of the Cooperative, removable at the option of the Cooperative. The undersigned agrees to this easement with the understanding the Grantor(s), their heirs, executors, administrators, successors, and assigns, may continue to have access to and use of the easement area in any manner consistent with the rights herein granted to the Cooperative, and that the Cooperative will restore the said strip to as near as reasonable to the pre-constructed condition, and that the Cooperative will erect no buildings on said strip.

The undersigned covenant that they are the owners of the above described lands and that the said lands are free and clear of encumbrances and liens of whatsoever character except those held by the following persons:

The term of this easement shall be for as long as needed by the grantee, and until a release of this easement is recorded, but to not extend beyond the maximum term authorized by law.

92299 12/24/2015 11:05 AM PAGE: 1 OF 2
BOOK: MM PAGE: 109 FEES: $13.00 KW EASEMENT
Kim Wilkens, OLIVER COUNTY RECORDER
By K Wilkens

STATE OF NORTH DAKOTA ★ COUNTY SEAL ★ OLIVER RECORDER

WEST RIVER COMMUNICATIONS
PO BOX 467

HAZEN, ND 58545

EXCH: BELH WO#: 2015-206-038

Access is hereby granted for a state or federal historical survey of the cable route, should one be required, unless checked. Access denied ☐

IN WITNESS WHEREOF, this instrument has been executed by the undersigned this the 18 day of Nov, 2015.

STATE OF North Dakota )
)
COUNTY OF Oliver. )

by: Donna Mae Smith

by: _____

On this 18 day of November, the year 2015 before me personally appeared Donna Mae Smith, known to me to be the person(s) who is described in and who executed the within instrument, and acknowledged to me that he/she (or they) executed the same.

STEVEN C. KNUDSON
Notary Public
State of North Dakota
My Commission Expires Aug. 23, 2017

Steven C Knudson
Notary Public, County of Mercer
My Commission Expires: Aug. 23, 2017

IN WITNESS WHEREOF, this instrument has been executed by the undersigned this the ___ day of _____, 2015.

STATE OF )
)
COUNTY OF )

by: _____

by: _____

On this _____ day of _____, the year _____ before me personally appeared _____, known to me to be the person(s) who is described in and who executed the within instrument, and acknowledged to me that he/she (or they) executed the same.

_____
Notary Public, County of _____
My Commission Expires:

## RIGHT-OF-WAY EASEMENT

KNOW ALL MEN BY THESE PRESENTS, that we the undersigned, (whether one or more) Ralph E. Smith (unmarried) (husband and wife) for a good and valuable consideration, the receipt whereof is hereby acknowledged, do hereby grant unto Oliver-Mercer Electric Cooperative, Inc. a cooperative corporation (hereinafter called the "Cooperative") whose post office address is Hazen, North Dakota, and to its successors or assigns, the right to enter upon the lands of the undersigned, situated in the County of Oliver, State of North Dakota, and more particularly described as follows:

South ½ Section 15 Township 142N Range 87W

and to construct, operate and maintain an electric transmission and/or distribution line or system on or under the above-described lands and/or in, upon or under all streets, raods or highways abutting said lands; to inspect and make such repairs, changes, alterations, improvements, removals from, substitutions and additions to its facilities as Cooperative may from time to time deem advisable, including, by way of example and not by way of limitation, the right to increase or decrease the number of conduits, wires, cables, handholes, manholes, connection boxes, transformers and transformer enclosures; to cut, trim and control the growth by chemical means, machinery or otherwise of trees and shrubbery located within 100 feet of the center line of said line or system, or that may interfere with or threaten to endanger the operation and maintenance of said line or system (including any control of the growth of other vegetation in the right-of-way which may incidentally and necessarily result from the means of control employed); to keep the easement clear of all buildings, structures or other obstructions; and to license, permit or otherwise agree to the joint use or occupancy of the lines, system or, if any of said system is placed underground, of the trench and related underground facilities, by any other person, association or corporation.

The undersigned agree that all poles, wires and other facilities including any main service entrance equipment, installed in, upon or under the above-described lands at the Cooperative's expense shall remain the property of the Cooperative, removable at the option of the Cooperative.

The undersigned covenant that they are the owners of the above-described lands.

IN WITNESS WHEREOF, the undersigned have set their hands and seals this 20th day of November, 1975.

Ralph E. Smith (L.S.)

(L.S.)

Signed, sealed and delivered in the presence of:

Leonard H. Wohlfeil

90409 7/15/2015 3:20 PM PAGE: 1 OF 1
BOOK: 1 PAGE: 36 FEES: $10.00 MM EASEMENT (ROUGHRIDER
Kim Wilkens, OLIVER COUNTY RECORDER
By MMBulty Eule Deputy

ROUGHRIDER ELECTRIC COOPERATIVE
800 HWY DR

HAZEN, ND 58545

RECORDER OLIVER COUNTY SEAL STATE OF NORTH DAKOTA

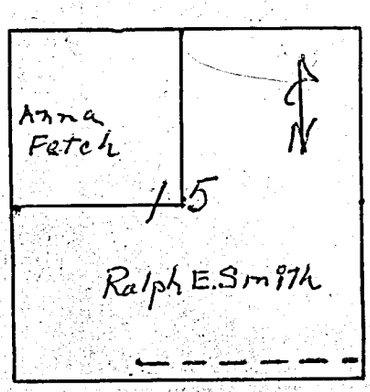
State of North Dakota )
) ss
Mercer County )

Personally came before me this 20th day of November 1975 the above named Leonard H. Wohlfeil to me known to be the person (s) who executed the foregoing instrument and acknowledged the same.

Vivian J. Rickertt

Notary Public, Mercer, County, North Dakota, State.

My Commission expires 12-31-77



VIVIAN J. RICKERTT NOTARY PUBLIC STATE OF NORTH DAKOTA

Anna Fetch
15
Ralph E. Smith

OFFICE OF COUNTY RECORDER
STATE OF NORTH DAKOTA
COUNTY OF OLIVER
Filed for record this 16 day
of Sept A.D. 2011
at 11:59 o'clock A M.,
and recorded as document No. 56785
in book FF of Misc page 619-621
B Wilkens
County Recorder Deputy

**PIPELINE EASEMENT**

North Dakota State Water Commission
County of Oliver
Parcels H-OL-141

**ALL PERSONS TAKE NOTICE:**

That the undersigned, Jule Silbernagel and Faye Swenson, as tenants in common, called the Grantor, being the owner of, or having an interest in, land situated in the County of Oliver, State of North Dakota, more fully described below, in consideration of One and No/100 Dollars ($1.00) and other valuable consideration, does hereby grant, convey, and warrant to the State of North Dakota, acting by and through the North Dakota State Water Commission, a state agency and public corporation, with its principal office at 900 East Boulevard Ave., Bismarck, North Dakota 58505, called the Grantee, and to its successors and assigns, the right, privilege, and easement to construct, maintain, operate, inspect, repair, alter, replace, change the size of or remove a pipeline, and appurtenances thereto, for the transportation of water under, across, and through:

Parcel H-OL-141
A 40 foot wide strip of land 20 feet wide on each side of the pipeline centerline lying within the SE1/4 Section 15, Township 142 North, Range 87 West of the 5th P.M.

Said tract contains 2.42 acres, more or less.

Temporary Construction Easement
An additional 20 feet of temporary right-of-way lying adjacent to the above described tract for a total construction easement width of 60 feet.

Said tract contains 1.21 acres, more or less.

together with the right to utilize additional land for a period up to three years from the date of this easement, adjacent to the above described tract, for purposes of temporary working space during initial construction of the pipeline, and the right of ingress to and egress from said strip of land across the adjacent lands of the Grantor, for the purposes specified above at the will of the Grantee.

**THE GRANTOR AND THE GRANTEE FURTHER AGREE:**

1. **Use of right-of-way by Grantor.** Grantor reserves the right to use the surface of the easement strip provided, however, that Grantor, without prior approval of Grantee, shall neither construct nor permit to be constructed any building, structure, or other improvement upon the easement strip which would interfere with Grantee's exercise of the rights conveyed by this pipeline easement, including access to the easement strip.

2. **Appurtenances.** The Grantee shall have the right to install and construct necessary appurtenances upon the surface of the easement strip. Prior to construction, the Grantee will notify the Grantor of the approximate location of such appurtenances if any, to be located on the easement strip, and shall pay to the Grantor the sum of $500 for each appurtenance located at a distance of more than 5 feet from a field boundary or fence line. Such payments shall be paid prior to construction.

3. **Damages.** The Grantee will pay to Grantor or Grantor's tenants, as their respective interests may appear, for damages caused by the operations or activities of the Grantee; provided, however, that the Grantee shall have the right, without liability for damages, to clear, and keep cleared, all trees, brush, and other obstructions from the easement strip that may, in the Grantee's judgment, interfere with the rights and privileges of the Grantee under this pipeline easement.

   If the amount of any damage which Grantor may sustain as a result of Grantee's exercise of rights hereunder cannot be mutually agreed upon, such damages shall be ascertained and

determined by three (3) disinterested person; one to be appointed by the Grantor, one by Grantee, and a third by the two so appointed, and the award of such three persons shall be final and conclusive.

4. **Restoration of surface.** The Grantee will restore the surface of the construction area to its original contour as nearly as practicable.

5. **Topsoil segregation.** When excavating the pipeline trench with a backhoe/trackhoe, the Grantee will remove the topsoil separately during the construction of the pipeline for the full width of the pipe trench to a depth of twelve (12) inches or the actual topsoil depth, whichever is less, and to be replaced at the top of the backfill over the pipe trench.

6. **Assignment and covenant by parties.** The rights of either party may be assigned in whole or in part. The terms and provisions of this easement shall constitute covenants running with the land and shall be binding upon, and inure to the benefit of, the parties hereto, their successors, assigns, personal representatives, and heirs.

7. **Grantor's title.** Grantor warrants that he is the owner of, or has an interest in, the land described in this easement, and that he has full right and authority to enter into and deliver this easement. This instrument may be executed in counterparts and each counterpart shall constitute a separate agreement between the parties thereto. Any payments pursuant to this pipeline easement shall be in proportion to the Grantor's interest in the undivided fee simple estate.

8. **Entire agreement.** This instrument contains the entire agreement of the parties and there are no other, or different, agreements or understandings between the Grantor and the Grantee, or its agents. The Grantor, in executing this pipeline easement, has not relied upon any promises, inducements, or representatives of the Grantee, or its agents, except as are set forth herein.

9. **Term of easement.** The term of this easement shall be as long as it is needed by the Grantee, or its assigns, and until a release of this easement is recorded, but shall not exceed ninety-nine (99) years pursuant to NDCC §47-05-02.1.

10. **Tenants.** The Grantor represents that the land described in this easement is (not rented) (rented to) John Smith.

Dated this 21st day of February, 20 11.

Faye Swenson
Grantor

Jule Silbernagel
Grantor

STATE OF NORTH DAKOTA)
) ss.
COUNTY OF Diver )

On this 24 day of February, 20 11, before me personally appeared Faye Swenson, known to me to be the person(s) described in and who executed the within and foregoing instrument, and acknowledged to me that he/she executed

the same.

Notary Public

(SEAL)
JAY L. PETERSON
Notary Public
State of North Dakota
My Commission Expires Jan. 13, 2015

Morton County, ND

My Commission expires:

STATE OF ARIZONA )
) ss.
COUNTY OF Maricopa )

On this 1 day of March, 20 11, before me personally appeared Jule D. Silberwagel, known to me to be the person(s) described in and who executed the within and foregoing instrument, and acknowledged to me that he/she executed the same.

Notary Public

(SEAL)
CYNTHIA A. CLARK
Notary Public - Arizona
Maricopa County
My Commission Expires
July 3, 2014

July 3, 2014 County, AZ

My Commission expires:

## RIGHT OF WAY EASEMENT

THIS AGREEMENT made and entered into this 11th day of AUGUST, 2014 between Faye Swenson, hereinafter called "Owner" (whether one or more) and **ROUGHRIDER ELECTRIC COOPERATIVE, INC.**, whose post office address is 800 Highway Drive, Hazen, North Dakota 58545-4737, hereinafter called "COOPERATIVE".

WITNESSETH that for valuable consideration, the receipt and sufficiency of which is hereby acknowledged, Owner grants unto Cooperative, its successors and assigns, for a term of 99 years from the date hereof, an easement to construct, reconstruct, operate and maintain an electric distribution system, overhead, underground or both including all poles, guys, anchors wires, surface terminals, and all accessories and appurtenances necessary or desirable in connection therewith, under, over, upon and across lands of Owner and/or in or upon all streets, roads or highways abutting said lands situated in Oliver County, North Dakota, and more particularly described as follows, to-wit:

A strip of land 20 feet in width, the same being 10 feet on each side of a centerline described as follows.

TOWNSHIP 142 NORTH, RANGE 87 WEST
Section 15

The facilities erected hereunder shall remain the property of the Cooperative. Cooperative shall have the right to inspect, rebuild, remove, repair, improve and make such changes, alterations, substitutions and additions in and to its facilities as Cooperative may from time to time deem advisable, including the right to increase or decrease the size or capacity of its system, together with necessary accessories and appurtenances; the right to increase or decrease the size of the facilities and equipment situated upon the premises; the right to permit or otherwise agree to the joint use or occupancy of the overhead lines or the trench and related underground facilities by other persons, associations or corporations; and the right to at any time use the property described above to extend lines and facilities to serve the property of persons other than the Owner.

Any damages to the surface of the right-of-way or to crops, fences, gates, drains, ditches, or lines of the Owner, caused by the Cooperative in the installation, repair maintenance, reconstruction or removal of said electrical properties and appurtenances, shall be promptly repaired, replaced or paid for by the Cooperative, provided a claim therefore is presented to the Cooperative at its General Office within ninety (90) days after such damages occur. If the amount of said damages cannot be agreed upon, the Cooperative and the Owner shall each select an arbitrator, and these two shall select a third arbitrator, and the decision and award of the arbitrators shall be final.

Cooperative shall at all times have the right to keep the easement clear of all buildings, structures or other obstructions, trees, shrubbery, undergrowth and roots.

Owner, his successors and assigns, may use the land within the easement for any purpose not inconsistent with the rights granted, provided such use does not interfere with or endanger the Cooperative's facilities or the rights granted under this easement.

For the purpose of constructing, inspecting, maintaining or operating its facilities, Cooperative shall have the right of ingress to and egress from the easement over the lands of Owner adjacent to the easement and lying between public or private roads and the easement, such right to be exercised in such manner as shall occasion the least practicable damage and inconvenience to Owner.

Owner covenants that he is seized of and has the right to convey the said easement, rights and privileges; that Cooperative shall have quiet and peaceable possession, use and enjoyment of the aforesaid easement, rights and privileges, and that Owner shall execute such further assurances thereof as may be requested by the Cooperative.

Faye Swenson

STATE OF NORTH DAKOTA )
)ss
COUNTY OF MERCER )

On this 11th day of AUGUST, 2014, before me, a Notary Public in and for said County and State personally appeared FAYE SWENSON, known to me to be the person(s) described in and who executed the within and foregoing instrument and acknowledged to me that he/she/they executed the same.

*Notary Seal Location*

90519 7/21/2015 1:56 PM PAGE: 1 OF 1
BOOK: 1 PAGE: 161 FEES: $10.00 MM EASEMENT ROUGHRIDE
Kim Wilkens, OLIVER COUNTY RECORDER
By

RECORDER SEAL OLIVER COUNTY STATE OF NORTH DAKOTA

Notary Public State of North Dakota

My Commission Expires:
6/16/16

ERIC BUCHHOLZ
Notary Public
State of North Dakota
My Commission Expires June 16, 2016

ROUGHRIDER ELECTRIC COOPERATIVE
800 HWY DR

HAZEN, ND 58545

STATE OF NORTH DAKOTA | DISTRICT COURT

COUNTY OF BOTTINEAU | NORTHEAST JUDICIAL DISTRICT

---

| | |
|---|---|
| Northwest Landowners Association, Mike Dresser, Sandra Short, the Swenson Living Trust, and North Dakota Farm Bureau,<br><br>Plaintiffs,<br><br>vs.<br><br>State of North Dakota, North Dakota Industrial Commission, Hon. Douglas Burgum in his official capacity as Governor of the State of North Dakota and as the Chairman and a member of the North Dakota Industrial Commission, and Hon. Drew Wrigley in his official capacity as Attorney General of North Dakota and as a member of the North Dakota Industrial Commission, and Hon. Doug Goehring in his official capacity as Agriculture Commissioner of North Dakota and as a member of the North Dakota Industrial Commission,<br><br>Defendants,<br><br>and,<br><br>SCS Carbon Transport LLC, SCS Permanent Carbon Storage LLC, Summit Carbon Solution, LLC, Minnkota Power Cooperative, Inc., Basin Electric Power Cooperative and Dakota Gasification Company,<br><br>Intervenor-Defendants. | Case No. 05-2023-CV-00065<br><br>**BRIEF IN SUPPORT OF MOTION FOR SUMMARY JUDGMENT** |

---

## TABLE OF CONTENTS

BACKGROUND AND STANDARDS ..... 1

**I.** Summary of Claims ..... 1

**II.** Summary Judgment is Appropriate and this Court May Rule as a Matter of Law that the Challenged Statutes are Unconstitutional. ..... 2

**III.** Northwest Landowners Association Has Standing to Litigate this Case. ..... 3

ARGUMENT ..... 5

**IV.** This Court Should Grant Summary Judgment to Plaintiffs and Declare that the Challenged Statutes are Unconstitutional and Void. ..... 5

A. The "amalgamation" of property rights for carbon dioxide sequestration is unconstitutional. ..... 7

B. The "amalgamation" of property rights for oil and gas storage is unconstitutional. ..... 10

C. N.D.C.C. § 38-22-03(7) is an unconstitutional delegation of legislative authority to the North Dakota Industrial Commission that violates the principle of separation of powers. ..... 12

D. Pre-condemnation survey authorizations cannot limit entitlement to just compensation assessed and paid prior to a physical invasion. ..... 13

CONCLUSION ..... 15

## BACKGROUND AND STANDARDS

### I. Summary of Claims

[¶1] N.D.C.C. §§ 38-22-10[1] and 38-25-08[2] authorize developers to inject carbon dioxide and natural gas into a nonconsenting landowners' pore space without just compensation. This constitutes an unconstitutional taking without just compensation under art. 1, § 16 of the Constitution of North Dakota and of the United States Constitution, Amendment V (as applied to the state of North Dakota through Amendment XIV), and are a violation of procedural and substantive due process under art. 1, § 12 of the Constitution of North Dakota and of the United States Constitution, Amendment V as applied by Amendment XIV. These provisions also specifically violate the guarantee of a jury trial and the right to just compensation *before* a taking under art. 1, § 16 of the Constitution of North Dakota.

[¶2] N.D.C.C. § 38-22-03(7)[3] is an unconstitutional delegation of legislative power under N.D. Const. Art. IV, § 13 and *State v. Riggin*, 2021 ND 87, 959 N.W.2d 855.

---

[1] "If a storage operator does not obtain the consent of all persons who own the storage reservoir's pore space, the commission may require that the pore space owned by nonconsenting owners be included in a storage facility and subject to geologic storage."

[2] "If a storage operator does not obtain the consent of all persons owning a pore space and of mineral interest owners when required by this chapter, the commission may require the interest owned by the nonconsenting owners be included in an approved storage facility and subject to geologic storage if the minimum percentage of consent is obtained as specified in this chapter. Any pore space owner who does not have responsibility over the construction, management, supervision, or control of the storage facility operations is not liable for money damages for personal or other property damages proximately caused by the operations."

[3] Providing authority to the NDIC "[t]o grant, for good cause, exceptions to this chapter's requirements and implementing rules."

[¶3] Sections 32-15-06[4] and 24-05-09[5] authorize entities who *may* have authority[6] to condemn to physically access private property to conduct surveys, take soil samples, and conduct other activities on the property. *See generally Cass Cnty. Joint Water Res. Dist. v. Brakke* (In re 2015 Application for Permit to Enter Land for Surveys & Examination Associated with a Proposed N.D. Diversion & Associated Structures), 2016 ND 165, 883 N.W.2d 844. These are unconstitutional authorizations of physical invasions without just compensation in violation of art. 1, § 16 of the Constitution of North Dakota and of the United States Constitution, Amendment V (as applied through Amendment XIV).

## II. Summary Judgment is Appropriate and this Court May Rule as a Matter of Law that the Challenged Statutes are Unconstitutional.

[¶4] In *Sorum v. State*, 2020 ND 175, 947 N.W.2d 382, the North Dakota Supreme Court stated:

> Whether a statute is unconstitutional is a question of law, which is fully reviewable on appeal. *Teigen v. State*, 2008 ND 88, ¶ 7, 749 N.W.2d 505 (*citing Best Products Co., Inc. v. Spaeth*, 461 N.W.2d 91, 96 (N.D. 1990)) … .

---

[4] "In all cases when land is required for public use, the person or corporation, or the person's or corporation's agents, in charge of such use may survey and locate the same, but it must be located in the manner which will be compatible with the greatest public benefit and the least private injury and subject to the provisions of section 32-15-21. Whoever is in charge of such public use may enter upon the land and make examinations, surveys, and maps thereof, and such entry constitutes no claim for relief in favor of the owner of the land except for injuries resulting from negligence, wantonness, or malice."

[5] "The board of county commissioners of any county of the state, by resolution or order, as part of the cost of constructing, reconstructing, widening, altering, changing, locating, relocating, aligning, realigning, or maintaining, any highway in said county, may purchase, acquire, take over, or, subject to section 32-15-01, condemn, under the right and power of eminent domain, for such county, any and all lands which it deems necessary for the present use, either temporary or permanent, and to provide adequate drainage in the improvement, constructing, reconstructing, widening, altering, changing, locating, relocating, aligning, realigning, or maintaining of any highways in said county, and by the same means it may acquire said lands notwithstanding the fact that the title thereto is vested in the state or any of its subdivisions. Whenever the board of county commissioners determines, by resolution or order, that the public necessity requires the taking of land as aforesaid, it shall cause said lands to be surveyed and described and a plat thereof prepared and recorded in the office of the recorder of the county wherein the same is located. The board of county commissioners, or its duly authorized agents and employees, may enter upon any land for the purpose of making such survey, examination, or test, but in case of damages to the premises the board of county commissioners forthwith shall pay to the owner of said premises the amount of such damages."

[6] N.D.C.C. § 32-15-06 provides authority to any entity merely in the "category of persons entitled to seek eminent domain." *Square Butte Elec. Coop. v. Dohn*, 219 N.W.2d 877, 883 (N.D. 1974).

> A constitution must be construed in the light of contemporaneous history—of conditions existing at and prior to its adoption. By no other mode of construction can the intent of its framers be determined and their purpose given force and effect. *Hagerty*, 1998 ND 122, ¶ 17, 580 N.W.2d 139 (*quoting Ex parte Corliss*, 16 N.D. 470, 481, 114 N.W. 962, 967 (1907)) ... . A facial challenge is purely a question of law because the violation, if any, occurs at the point of enactment by virtue of the Legislative Assembly enacting a law prohibited by the constitution. *Id.* A violation that occurs at the time of enactment does not depend on any facts or circumstances arising later.

*Sorum*, 2020 ND, at ¶ 19 (internal quotes omitted).

[¶5] "No consideration of circumstances is necessary to resolve a facial challenge because the claim is that upon enactment, the legislation has an immediate unconstitutional legal effect." *Nw. Landowners Ass'n v. State*, 2022 ND 150, ¶ 14, 978 N.W.2d 679, 688. "In *Sorum*, we held that if legislation requires an unconstitutional act (a prohibited gift in that case), the statute does not avoid a facial challenge 'merely because the statute includes constitutional applications along with potentially unconstitutional applications.'" *Id.*

[¶6] As such, pursuant to Rule 56 of the North Dakota Rules of Civil Procedure, "no genuine issue as to any material fact [exists and Landowners are] entitled to judgment as a matter of law."

## III. Northwest Landowners Association Has Standing to Litigate this Case.

[¶7] "Because courts do not render advisory opinions or decide purely abstract questions, parties seeking relief from a court must demonstrate they have standing by alleging such a personal stake in the outcome of a controversy to justify the court's exercise of remedial powers on their behalf." *Dakota Res. Council v. Stark Cty. Bd. of Cty. Comm'rs*, 2012 ND 114, ¶ 5, 817 N.W.2d 373, 375.

> [A] nonprofit organization that has not suffered an injury itself can sue as the representative of its members if: (a) its members would otherwise have standing to sue in their own right; (b) the interests it seeks to protect are germane to the organization; and (c) neither the claim asserted nor the relief requested requires the participation of individual members in the lawsuit. In addition, a nonprofit membership corporation has standing to seek judicial review on behalf of its members, of governmental or municipal regulations directly affecting such members.

*Id.* at ¶ 6; *see also, Students for Fair Admissions, Inc. v. President & Fellows of Harvard College*, 600 U.S. 181 (2023).

[¶8] NWLA has devoted significant resources to identify and counteract the deprivation of civil rights and the unconstitutional attack on private property rights that is inherent in the statutory provisions being challenged here. NWLA has been engaged with its legal counsel for years at the legislative session trying to defend private property rights, and it has expended most of the money, time, and resources it has ever held in this defense. *See* Exhibit D, attached to the Decl. of Derrick Braaten. It has held conferences and community meetings, disseminated data and information, paid to compile expensive and lengthy reports, organized members, commented on agency rulemaking, lobbied at the legislature, and generally spent its entire existence fighting for the farmers and ranchers, and other private property owners of North Dakota. *Id.*

[¶9] Members Kurt and FayE Swenson are ND taxpayers and trustees of The Swenson Living Trust (the "Trust"), which has real property located within the sequestration zones proposed by Summit. Summit has sent maps showing the Trust's property will be impacted by amalgamation. The real property is legally described as follows:

a. W1/2NE1/4 of Section 14, T142N, R88W in Mercer County, ND;
b. SE1/4 of Section 27, T143N, R88W in Mercer County, ND;
c. Outlot B, E1/2 of NW1/4 of Section 7, T142N, R88W in Oliver County, ND.

*See* Exhibit B, attached to the Decl. of Derrick Braaten.

[¶10] Mike Dresser is a ND taxpayer and member of NWLA who owns real property affected by a storage facility operated by Minnkota Power Cooperative, Inc. The property owned by Mr. Dresser is located in Section 35, Township 142 North, Range 84 West in Oliver County, ND. Mr. Dresser's property has been "amalgamated" or taken by government fiat in the following NDIC

cases: 29029, 29030, 29031, 29032, 29033, and 29034. *See* Exhibit A, attached to the Decl. of Derrick Braaten.

[¶11] Sandra Short is a ND taxpayer and member of NWLA and has been impacted by the unconstitutional provisions to N.D.C.C § 32-15-06 or N.D.C.C § 24-05-09. Ms. Short's property that has been impacted is located at Lot 8, NW1/4SW1/4 of Section 22, Township 143, Range 102 in Billing County, ND and N1/2 and S1/2 less 17.26 ARW of Section 34, Township 143, Range 102 in Billings County, ND. *See* Exhibit C, attached to the Decl. of Derrick Braaten.

[¶12] On December 22, 2023, the above members were added as plaintiffs in their individual capacity to also assert taxpayer standing to challenge the pertinent statutes. Index #114. "[A]ny state taxpayer has standing to challenge a statute on the basis state funds are being unlawfully dissipated." *Billey v. N.D. Stockmen's Ass'n*, 1998 ND 120, ¶ 7, 579 N.W.2d 171.

## ARGUMENT

### IV. This Court Should Grant Summary Judgment to Plaintiffs and Declare that the Challenged Statutes are Unconstitutional and Void.

[¶13] In this case,

> The Association's complaint [seeks a declaration that numerous statutes are] unconstitutional and should be declared void, therefore making [sic] a facial challenge rather than an as-applied challenge. "A claim that a statute on its face violates the constitution is a claim that the Legislative Assembly exceeded a constitutional limitation in enacting it, and the practical result of a judgment declaring a statute unconstitutional is to treat it 'as if it never were enacted.'" *Sorum v. State*, 2020 ND 175, ¶ 21, 947 N.W.2d 382 (citing *Hoff v. Berg*, 1999 ND 115, ¶ 19, 595 N.W.2d 285).

*Nw. Landowners Ass'n v. State*, 2022 ND 150, ¶ 12, 978 N.W.2d 679.

[¶14] As in the prior takings litigation brought by Northwest Landowners Association, "[t]o resolve the claim, we need only interpret the enacted language of [the challenged statutes] and the

relevant constitutional provisions to determine whether there is a conflict. … *Sorum* provides the correct framework for this facial challenge." *Id.* at ¶ 15.

[¶15] This action relates to the prior ruling of this Court and the ruling of the Supreme Court of North Dakota in *Nw. Landowners Ass'n v. State*, 2022 ND 150, 978 N.W.2d 679 striking down Senate Bill 2344 (2019). This action also relates to the ruling of the United States Supreme Court quoted therein, *Cedar Point Nursery v. Hassid*, 141 S. Ct. 2063 (2021), wherein the Court stated that "a physical appropriation is a taking whether it is permanent or temporary. Our cases establish that 'compensation is mandated when a leasehold is taken and the government occupies property for its own purposes, even though that use is temporary.'" *Cedar Point Nursery v. Hassid*, 141 S. Ct. 2063, 2074 (2021).

[¶16] In *Nw. Landowners Ass'n v. State* the Supreme Court of North Dakota struck down parts of Senate Bill 2344 (2019), which authorized access to a landowner's pore space by third parties without just compensation in violation of the state and federal constitutions.

[¶17] Senate Bill 2344 (2019) deprived private landowners of their property and of any remedies for temporary and permanent physical occupations of their property, effectively displacing their possession of this private property and handing it over to select private entities for private economic purposes.

[¶18] This Court struck down the law enacted by Senate Bill 2344 (2019) on January 21, 2021 in Case Number 05-2019-CV-00085 stating: "The provisions of SB 2344, both individually and taken together, prohibit landowners from obtaining any compensation for any oil and gas operators' use of their pore space estate, whether reasonable or unreasonable, whether at large or small volumes, whether at a large financial detriment or small financial detriment. These provisions act as an absolute bar to not just money damages, but to all other meaningful remedies,

including trespass, nuisance or other torts. The three provisions at issue here, enacted or amended within SB 2344, render pore space worthless in every instance of its application, and it is unconstitutional on its face."

[¶19] On August 4, 2022, the Supreme Court of North Dakota affirmed, stating: "Senate Bill 2344 constitutes a per se taking. It allows third-party oil and gas operators to physically invade a landowner's property by injecting substances into the landowner's pore space. As demonstrated in *Arkansas Game & Fish Comm'n v. United States*, 568 U.S. 23, 34, 133 S. Ct. 511, 184 L. Ed. 2d 417 (2012), physical invasion by water, even for a limited duration, results in a per se taking. Furthermore, because S.B. 2344 permits oil and gas operators to use pore space to temporarily or permanently store or dispose of gases and wastes, the bill authorizes an occupation of the landowners' property. Similar to the unconstitutional regulation in *Cedar Point Nursey*, S.B. 2344 grants oil and gas operators a right of access to the landowners' private property. Further, as in *Loretto*, 458 U.S. at 436, S.B. 2344 restricts landowners from having any control over the 'timing, extent, or nature of the invasion.'" *Nw. Landowners Ass'n v. State*, 2022 ND 150, ¶ 26, 978 N.W.2d 679.

### A. The "amalgamation" of property rights for carbon dioxide sequestration is unconstitutional.

[¶20] North Dakota Century Code Chapter 38-22 provides authority and procedures for the North Dakota Industrial Commission to authorize the geologic sequestration of carbon dioxide. N.D.C.C. § 38-22-10 is unconstitutional on its face.

[¶21] N.D.C.C. § 38-22-10 provides:

> **38-22-10. Amalgamating property interests.**
> If a storage operator does not obtain the consent of all persons who own the storage reservoir's pore space, the commission may require that the pore space owned by nonconsenting owners be included in a storage facility and

subject to geologic storage.

[¶22] N.D.C.C. § 38-22-02 defines "storage facility" as "…the reservoir, underground equipment, and surface facilities and equipment used or proposed to be used in a geologic storage operation... ."

[¶23] N.D.C.C. § 38-22-02 defines "geologic storage" as "…the permanent or short-term underground storage of carbon dioxide in a storage reservoir."

[¶24] N.D.C.C. § 38-22-02(6) defines "reservoir" to mean "a subsurface sedimentary stratum, formation, aquifer, cavity, or void, whether natural or artificially created, including oil and gas reservoirs, saline formations, and coal seams suitable for or capable of being made suitable for injecting and storing carbon dioxide."

[¶25] N.D.C.C. § 38-22-08(14) provides that "[b]efore issuing a permit, the commission shall find… [t]hat all nonconsenting pore space owners are or will be equitably compensated."

[¶26] The Constitution of North Dakota, Article 1, section 16 states: "Private property shall not be taken or damaged for public use without just compensation having been first made to, or paid into court for the owner… . Compensation shall be ascertained by a jury, unless a jury be waived."

[¶27] N.D.C.C. § 38-22-10 authorizes the North Dakota Industrial Commission to "allow[] third-party … operators to physically invade a landowner's property by injecting substances into the landowner's pore space" which is precisely what the Supreme Court of North Dakota ruled is a *per se* taking because it constitutes a physical invasion of the landowners' property. *Nw. Landowners Ass'n v. State*, 2022 ND 150, ¶ 26, 978 N.W.2d 679. "As demonstrated in *Arkansas Game & Fish Comm'n v. United States*, 568 U.S. 23, 34, 133 S. Ct. 511, 184 L. Ed. 2d 417 (2012), physical invasion by water, even for a limited duration, results in a per se taking." *Id.* So does invasion by carbon dioxide.

[¶28] Although N.D.C.C. § 38-22-08(14) requires the commission to find that all nonconsenting pore space owners are or will be equitably compensated, this finding is not a suitable replacement for just compensation and the safeguards guaranteed by the Constitution of North Dakota and Chapter 32-15.

[¶29] The Constitution requires that just compensation be paid before any taking of private property, and a determination and payment of just compensation, not equitable compensation, is constitutionally required before this taking can occur. N.D. Const. Art. I, § 16 ("…without just compensation having been first made to, or paid into court for the owner…"). A landowner must also be given a jury trial for this determination unless it is waived. *Id.* ("Compensation shall be ascertained by a jury, unless a jury be waived.").

[¶30] In addition to being an unconstitutional taking of private property, N.D.C.C. § 38-22-10 allows the North Dakota Industrial Commission to take private property by fiat without any of the constitutional or statutory safeguards in Article 1, Section 16 of the ND Constitution or Chapter 32-15 of the Century Code. This blatant attempt to bypass constitutional and other safeguards for private property is arbitrary and violates both substantive and procedural due process requirements.

> When reviewing substantive due process arguments not involving fundamental rights, we look to see if the State acts in an arbitrary or unreasonable manner in exercising its police power. . . . To declare a statute unconstitutional on substantive due process grounds, it must appear that the Legislature had no power to act in the particular matter or, having power to act, that such power was exercised in an arbitrary, unreasonable, or discriminatory manner and that the method adopted had no reasonable relation to attaining the desired result.

*Ennis v. City of Ray*, 1999 ND 104, ¶ 18, 595 N.W.2d 305, 311 (internal quotes omitted).

[¶31] "Due process requires that administrative proceedings conform with '[b]asic notions of fundamental fairness.' *Morrell v. N.D. Dep't of Transp.*, 1999 ND 140, ¶ 9, 598 N.W.2d 111. '[D]ue process is flexible and must be analyzed on a case-by-case basis, balancing the competing

interests and assessing whether the basic due process requirement of fairness has been satisfied.'" *Black Hills Trucking Inc. v. N.D. Indus. Comm'n*, 2017 ND 284, ¶ 30, 904 N.W.2d 326, 335.

[¶32] Intentionally bypassing the safeguards of the North Dakota Constitution and Chapter 32-15 and allowing the NDIC to take private property by fiat through administrative proceedings without payment of just compensation determined by a jury violates notions of fundamental fairness and is arbitrary and unreasonable and violative of both substantive and procedural due process under the North Dakota and United States Constitutions. The Legislative Assembly cannot bypass the due process afforded by Article 1, Section 16 of the North Dakota Constitution by authorizing an administrative process that skirts its safeguards. "[I]t is settled law that the government cannot do indirectly what it is barred from doing directly when constitutional rights are implicated." *Patrolmens Benevolent Assn of the City of N.Y., Inc. v. City of N.Y.*, 2004 U.S. Dist. LEXIS 18172, at *40-41 (S.D.N.Y. Aug. 19, 2004) (citing *Rutan v. Republican Party of Illinois*, 497 U.S. 62, 77-78, 111 L. Ed. 2d 52, 110 S. Ct. 2729 (1990)).

### B. The "amalgamation" of property rights for oil and gas storage is unconstitutional.

[¶33] North Dakota Century Code Chapter 38-25 provides authority and procedures for the North Dakota Industrial Commission to authorize the geologic storage of oil and gas. N.D.C.C. § 38-25-08 is unconstitutional on its face.

[¶34] N.D.C.C. § 38-25-08 provides in part:

> **Amalgamating property interests.**
> If a storage operator does not obtain the consent of all persons owning pore space and of mineral interest owners when required by this chapter, the commission may require the interest owned by the nonconsenting owners be included in an approved storage facility and subject to geologic storage if the minimum percentage of consent is obtained as specified in this chapter.

[¶35] N.D.C.C. § 38-25-01 defines "storage facility" as "the reservoir, salt cavern, underground equipment, and surface facilities and equipment used or proposed to be used in an underground storage operation."

[¶36] N.D.C.C. § 38-25-01 defines "geologic storage" as "the underground storage of oil or gas in a storage reservoir or salt cavern."

[¶37] N.D.C.C. § 38-25-01(8) defines "reservoir" as "a subsurface sedimentary stratum, formation, aquifer, or void, whether natural or artificially created, including oil and gas reservoirs and saline formations suitable for or capable of being made suitable for injecting, storing, and withdrawing oil or gas…."

[¶38] N.D.C.C. §§ 38-25-05(18), 38-25-06(15), and 38-25-07(16) all generally state that the commission must find that all nonconsenting owners are or will be equitably compensated before issuing a permit.

[¶39] N.D.C.C. § 38-25-08 authorizes the North Dakota Industrial Commission to "allow[] third-party … operators to physically invade a landowner's property by injecting substances into the landowner's pore space" which is precisely what the Supreme Court of North Dakota ruled is a *per se* taking because it constitutes a physical invasion of the landowners' property. *Nw. Landowners Ass'n v. State*, 2022 ND 150, ¶ 26, 978 N.W.2d 679. "As demonstrated in *Arkansas Game & Fish Comm'n v. United States*, 568 U.S. 23, 34, 133 S. Ct. 511, 184 L. Ed. 2d 417 (2012), physical invasion by water, even for a limited duration, results in a per se taking." *Id.* So does invasion by natural gas.

[¶40] The Constitution requires that just compensation be paid before any taking of private property, and a determination and payment of <u>just</u> compensation, not <u>equitable</u> compensation, is constitutionally required <u>before</u> this taking can occur. N.D. Const. Art. I, § 16 ("…without just

compensation having been first made to, or paid into court for the owner…"). A landowner must also be given a jury trial for this determination unless it is waived. *Id.* ("Compensation shall be ascertained by a jury, unless a jury be waived.").

[¶41] Chapter 38-25 also violates safeguards of procedural and substantive due process as explained with respect to Chapter 38-22 above.

### C. N.D.C.C. § 38-22-03(7) is an unconstitutional delegation of legislative authority to the North Dakota Industrial Commission that violates the principle of separation of powers.

[¶42] N.D.C.C. § 38-22-03(7) states that the North Dakota Industrial Commission has authority to "grant, for good cause, exceptions to this chapter's requirements and implementing rules." The reference to "this chapter's requirements" is to the entirety of Chapter 38-22.

[¶43] This is an unconstitutional delegation of legislative power to the North Dakota Industrial Commission by the Legislative Assembly. Pursuant to Article IV, section 13 of the Constitution of North Dakota, "[n]o law may be enacted except by a bill passed by both houses…."

[¶44] Granting the commission the authority to suspend the operation of any provision of Chapter 38-22 allows the commission to essentially rewrite, ignore, or selectively apply the law in any situation based on its own determination of whether "good cause" exists. This is a delegation of a non-delegable legislative power and even if it was a delegable power, it contains no reasonable guidelines for implementation. Delegating the legislative authority to suspend the entirety of this "chapter's requirements" to an executive agency is unconstitutional on its face.

> "Except as otherwise provided in the constitution, the Legislature may not delegate legislative powers to others . . . ." *Kelsh v. Jaeger*, 2002 ND 53, ¶ 21, 641 N.W.2d 100. "However, the Legislature may delegate powers which are not exclusively legislative and which the Legislature cannot conveniently do because of the detailed nature." *Stutsman Cty. v. State Historical Soc'y of N.D.*, 371 N.W.2d 321, 327 (N.D. 1985)

> When determining whether there has been a proper delegation of power from the legislature to the executive branch, this Court has recognized that the "distinction between a delegable and non-delegable power was whether the power granted gives the authority to make a law or whether that power pertains only to the execution of a law which was enacted by the Legislature." *Stutsman Cty.*, 371 N.W.2d at 327 (citing *Ralston Purina Co. v. Hagemeister*, 188 N.W.2d 405 (N.D. 1971)).

*State v. Riggin*, 2021 ND 87, ¶¶ 28-29, 959 N.W.2d 855.

[¶45] The Court has upheld delegations only when there are "reasonable guidelines for how the delegated power is to be implemented." *Id.* at ¶ 30.

[¶46] The delegation of the power in N.D.C.C. § 38-22-03(7) to grant exceptions to any provisions of an entire chapter of the Century Code does not comply with the requirements set forth in *State v. Riggin*, 2021 ND 87, 959 N.W.2d 855. For that reason it violates the principle of separation of powers and is unconstitutional. It should be struck down.

### D. Pre-condemnation survey authorizations cannot limit entitlement to just compensation assessed and paid prior to a physical invasion.

[¶47] N.D.C.C. § 32-15-06 provides:

> **32-15-06. Entry for making surveys.**
> In all cases when land is required for public use, the person or corporation, or the person's or corporation's agents, in charge of such use may survey and locate the same, but it must be located in the manner which will be compatible with the greatest public benefit and the least private injury and subject to the provisions of section 32-15-21. Whoever is in charge of such public use may enter upon the land and make examinations, surveys, and maps thereof, and such entry constitutes no claim for relief in favor of the owner of the land except for injuries resulting from negligence, wantonness, or malice.

[¶48] The last sentence of N.D.C.C. § 32-15-06 authorizes a physical invasion which the Supreme Court of North Dakota has ruled is a *per se* taking, and by its own language it prohibits just compensation. "It allows third-part[ies] … to physically invade a landowner's property …. Similar to the unconstitutional regulation in *Cedar Point Nursey*, [this statute grants] a right of

access to the landowners' private property. Further, as in *Loretto*, 458 U.S. at 436, [this statute] restricts landowners from having any control over the 'timing, extent, or nature of the invasion.'" *Nw. Landowners Ass'n v. State*, 2022 ND 150, ¶ 26, 978 N.W.2d 679.

[¶49] The last sentence of N.D.C.C. § 32-15-06 violates the Constitution of North Dakota, Article 1, Section 16 and Amendment V of the United States Constitution as applied to the states through Amendment XIV.

[¶50] N.D.C.C. § 24-05-09 provides:

> **24-05-09. Purchase or condemnation of right of way.**
> The board of county commissioners of any county of the state, by resolution or order, as part of the cost of constructing, reconstructing, widening, altering, changing, locating, relocating, aligning, realigning, or maintaining, any highway in said county, may purchase, acquire, take over, or, subject to section 32-15-01, condemn, under the right and power of eminent domain, for such county, any and all lands which it deems necessary for the present use, either temporary or permanent, and to provide adequate drainage in the improvement, constructing, reconstructing, widening, altering, changing, locating, relocating, aligning, realigning, or maintaining of any highways in said county, and by the same means it may acquire said lands notwithstanding the fact that the title thereto is vested in the state or any of its subdivisions. Whenever the board of county commissioners determines, by resolution or order, that the public necessity requires the taking of land as aforesaid, it shall cause said lands to be surveyed and described and a plat thereof prepared and recorded in the office of the recorder of the county wherein the same is located. <u>The board of county commissioners, or its duly authorized agents and employees, may enter upon any land for the purpose of making such survey, examination, or test, but in case of damages to the premises the board of county commissioners forthwith shall pay to the owner of said premises the amount of such damages.</u>

[¶51] The last sentence of Section 24-05-09 provides for damages, but authorizes a physical invasion which the Supreme Court of North Dakota has ruled is a *per se* taking, and by its own language it unconstitutionally deprives landowners of their right to *just compensation*. "It allows third-part[ies] … to physically invade a landowner's property …. Similar to the unconstitutional regulation in *Cedar Point Nursey*, [this statute grants] a right of access to the landowners' private

property. Further, as in *Loretto*, 458 U.S. at 436, [this statute] restricts landowners from having any control over the 'timing, extent, or nature of the invasion.'" *Nw. Landowners Ass'n v. State*, 2022 ND 150, ¶ 26, 978 N.W.2d 679.

[¶52] The Constitution requires that just compensation be paid before any taking of private property, and a determination and payment of *just compensation* is constitutionally required before this taking can occur. And it is a taking that may result in damages, and art. 1, sec. 16 of the ND Constitution protects against and provides just compensation for property when it is *both* "taken **or** damaged." art. 1, sec. 16, ND Const. (emphasis added). Just compensation is not limited to "damages" or claims for "negligence, wantonness, or malice" as these statutes are limited. A landowner must also be given a jury trial for the determination of just compensation unless it is waived, and the just compensation must be for property "taken **or** damaged." *Id.*

[¶53] For these reasons the last sentences of both N.D.C.C. §§ 32-15-06 and 24-05-09 are unconstitutional and should be struck down.

## CONCLUSION

[¶54] It is likely this Court will hear numerous arguments from intervenors and the state of North Dakota about opportunities for economic development and the prosperity of North Dakota's energy industry. Landowners ask only that this Court interpret and apply the law as written in the Century Cody and the constitutions. Policy matters are for the legislature to address *within the bounds* of the constitutions. There are paths forward for industry and for development, beginning with the recognition that taking private property for a public use might be allowed, but it must be done openly and by the courts, and never by fiat of the executive. Such power in the hands of the executive is dangerous, and more importantly, it is unconstitutional since we left behind the days of kings.

DATED this 12th day of April, 2024.

*/s/ Derrick Braaten*

Derrick Braaten (ND #06394)
**BRAATEN LAW FIRM**
109 North 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
derrick@braatenlawfirm.com

*Attorneys for Northwest Landowners Association, Mike Dresser, Sandra Short, and the Swenson Living Trust*

STATE OF NORTH DAKOTA | DISTRICT COURT

COUNTY OF BOTTINEAU | NORTHEAST JUDICIAL DISTRICT

---

Northwest Landowners Association, Mike Dresser, Sandra Short, the Swenson Living Trust, and North Dakota Farm Bureau,

Plaintiffs,

vs.

State of North Dakota, North Dakota Industrial Commission, Hon. Douglas Burgum in his official capacity as Governor of the State of North Dakota and as the Chairman and a member of the North Dakota Industrial Commission, and Hon. Drew Wrigley in his official capacity as Attorney General of North Dakota and as a member of the North Dakota Industrial Commission, and Hon. Doug Goehring in his official capacity as Agriculture Commissioner of North Dakota and as a member of the North Dakota Industrial Commission,

Defendants,

and,

SCS Carbon Transport LLC, SCS Permanent Carbon Storage LLC, Summit Carbon Solution, LLC, Minnkota Power Cooperative, Inc., Basin Electric Power Cooperative and Dakota Gasification Company,

Intervenor-Defendants.

Case No. 05-2023-CV-00065

**DECLARATION OF ATTORNEY DERRICK BRAATEN**

---

[¶1] I am legal counsel for Plaintiff, Northwest Landowners Association ("NWLA") and make this declaration based on personal knowledge.

[¶2] Attached hereto as Exhibit A is a true and correct copy of documents sent to Mike Dresser from Minnkota Power Cooperative with bates numbers NWLA SUPP-001-040.

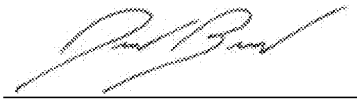
[¶3] Attached hereto as Exhibit B is a true and correct copy of deeds for the property owned by The Swenson Living Trust with bates numbers NWLA SUPP-041-047.

[¶4] Attached hereto as Exhibit C is a true and correct copy of email correspondence and letters sent regarding surveying the property owned by Sandra Short.

[¶5] Attached hereto as Exhibit D is a true and correct copy of NWLA's Fourth Supplemental Responses to State Defendants' First Interrogatories and Request for Production of Documents to Plaintiff. NWLA has served approximately 4.6 gb of documents upon the parties with its responses to discovery.

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on the 12th day of April, 2024 at Bismarck, North Dakota, United States.



Derrick Braaten

Minnkota Power
COOPERATIVE
A Touchstone Energy® Cooperative

5301 32nd Ave. South
Grand Forks, ND 58201
Phone 701.795.4000
www.minnkota.com

October 12, 2023

Micheal Dresser
2435 Concho Loop
New Braunfels, TX 78130

Subject: Project Tundra

Dear Mr. Dresser,

Thank you for your support of Minnkota Power Cooperative, Inc. (Minnkota) in our pursuance of Project Tundra, a bold initiate to capture and inject Carbon Dioxide from our Milton R. Young electrical generation facility located in Oliver County, North Dakota. On January 21, 2022, the North Dakota Industrial Commission issued Order No. 31584 in Case No. 29030 approving the amalgamation of the pore space in the Minnkota Center MRYS Broom Creek Storage Facility #1 and Minnkota Center MRYS Deadwood Storage Facility #1 in Oliver County, North Dakota (the "Storage Facility"). The effective date of amalgamation is 7:00 a.m. on February 1, 2022. A copy of Order No. 31584 and Order No. 31587 (together referred to as the "Order") are enclosed herewith.

The Order incorporates by reference that certain Geologic Storage Agreement for the Broom Creek Formation (the "Storage Agreement") which governs certain operations within the Storage Facility. A copy of the Storage Agreement is also enclosed herewith. As set forth in Section 3.1 of the Storage Agreement, "[a]ny Pore Space Owner in the Storage Facility who owns a Pore Space Interest in the Storage Reservoir that is not leased for the purposes of this [Storage Agreement] and during the term hereof, shall be treated as if it were subject to the Surface Use and Pore Space Lease attached hereto as Exhibit 'D'." Our records indicate that you have not executed a lease covering your pore space interests located within the Storage Facility.

Minnkota Power Cooperative ("Minnkota"), as the initial operator of the Storage Facility, is in the process of exercising its option to lease certain pore space interests within the Storage Facility. Since Minnkota has not obtained an option to lease your pore space interests, such interests must be treated as though subject to the Surface Use and Pore Space Lease attached.

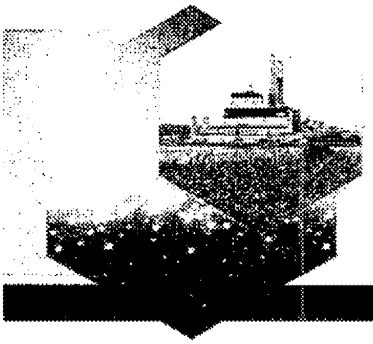
Accordingly, please find enclosed herewith a Pore Space Lease and Lease Payment Calculation along with a check in the amount of $4000.00 which covers the Initial Term Payment under Section 5(a) of the Lease. Upon commencement of Operations and during the Operational Term (as such terms are defined in the Lease), Minnkota shall pay you an annual royalty equal to the grater of $100.00 or your proportionate share of fifty cents ($0.50) per metric ton of carbon dioxide injected into the Storage Facility in accordance with Section 5(b) of the Lease. In the event any Facilities (as such term is defined in the Lease) are constructed or installed on your property, Minnkota shall pay you an Occupancy Fee in accordance with Section 5(c) of the Lease.

Enclosed are the Lease Payment Calculation document, Pore Space Lease documents and a W9 form for tax purposes.

Should you have any immediate questions or concerns, please contact me by phone or text at 218-230-4971 or by email at cbeckel@minnkota.com.

Sincerely,

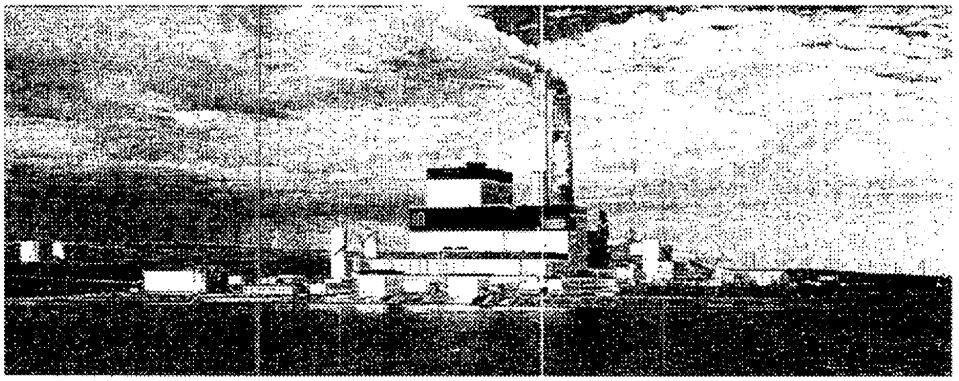
Cole Beckel
Property and Right of Way Supervisor
Enclosures



PROJECT TUNDRA

# Landowner FAQs

For more information, visit ProjectTundraND.com



## What is Project Tundra?

Project Tundra is a bold initiative to retrofit the Milton R. Young Station with carbon dioxide ($CO_2$) capture technology. More than 90% of the $CO_2$ emissions from the Young Station's Unit 2 generator would be captured and safely stored more than a mile underground. North Dakota's geology is ideal for permanent $CO_2$ storage and if Project Tundra moves forward, the state would be a world leader in the development of next-generation energy technologies.

## Can $CO_2$ leak out of the storage zone?

There is very high confidence that all stored $CO_2$ will remain permanently trapped in the selected storage zones. The $CO_2$ will be stored more than mile underground in the same deep rock layers that currently hold water that is saltier than that in the ocean. The saltwater already in the storage site has stayed in place for millions of years and is held there by several layers of sealing rock called cap rocks.

## Will $CO_2$ storage affect my drinking water?

No, fresh water aquifers are located nearly a mile from targeted $CO_2$ storage zones. Thick, dense layers of cap rock separate the $CO_2$ from the fresh water aquifers and prevent it from leaking.

## Are regulations in place for $CO_2$ storage?

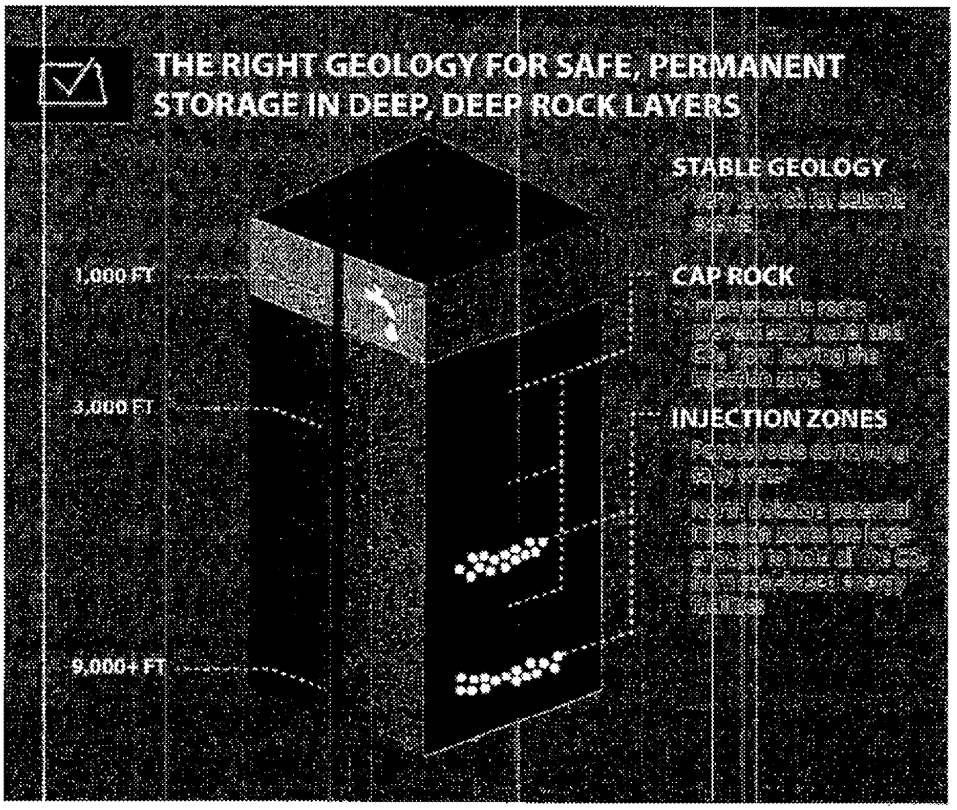
Yes, strict state and federal regulations are in place for $CO_2$ storage. The regulatory framework covers carbon capture and transport, storage property rights, and long-term monitoring of the stored $CO_2$. A wide array of monitoring technologies will be used to track $CO_2$ movement in the subsurface, including down-hole and surface $CO_2$ sensors.

## Is there enough space to store $CO_2$?

Yes, even at the most conservative estimates, scientists and geologists believe the available storage capacity far exceeds what is needed to store the predicted amount of $CO_2$.

## Can $CO_2$ storage cause earthquakes?

North Dakota's stable geology makes the likelihood of earthquakes very remote. $CO_2$ storage projects around the world have not reported significant changes in seismic activity. Advanced seismic testing has not shown earthquake-related risks.



## Has testing been conducted on $CO_2$ storage?

There are multiple active commercial $CO_2$ storage projects around the world that have proven the effectiveness and safety of the technology. Testing has been conducted at the proposed site for $CO_2$ storage near the Milton R. Young Station. The testing included drilling, sampling and data collection, as well as geophysical survey work using seismic technology.

## Will storing $CO_2$ prevent me from harvesting other minerals, such as oil?

No, the $CO_2$ injected for dedicated permanent storage goes into layers that do not contain harvestable minerals, such as oil, and do not commingle with oil-bearing layers. Established state regulations provide for oil/mineral exploration near a dedicated permanent storage zone while keeping the $CO_2$ securely in place.

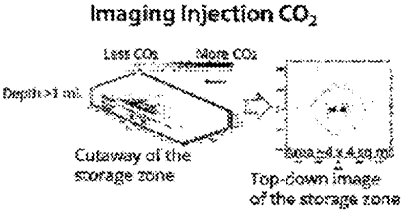
## How do you measure the amount of $CO_2$ injected?

Both the state of North Dakota and the Environmental Protection Agency (EPA) require an annual reporting of $CO_2$ injected for permanent storage (called monitoring, reporting and verification or MRV). Gauges at the well (called flowmeters) measure the amount of $CO_2$ being injected. Calculations translate the gauge data in metric tons of $CO_2$ for reporting.

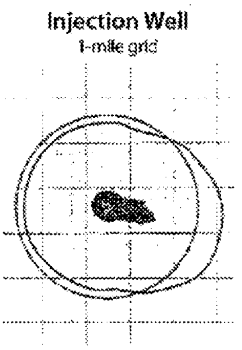

Minnkota Power Cooperative
5301 32nd Ave S
Grand Forks, N.D. 58201-3312
701.795.4000
**www.minnkota.com**

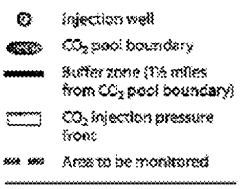

## What happens to the $CO_2$ when it is injected into the storage zone?

$CO_2$ is injected as a dense fluid that slowly spreads out from the injection point (see figure). Since the space between the rock grains is already filled with water, the injected $CO_2$ encounters resistance to flow. Once injection stops, outward flow of $CO_2$ slows as the pressure from the injection dissipates. Eventually, the $CO_2$ combines with elements of water and forms solids that become part of the rock. Several deep subsurface monitoring techniques will track the $CO_2$ to determine where it goes. A nearby monitoring well will test for signs of approaching $CO_2$.



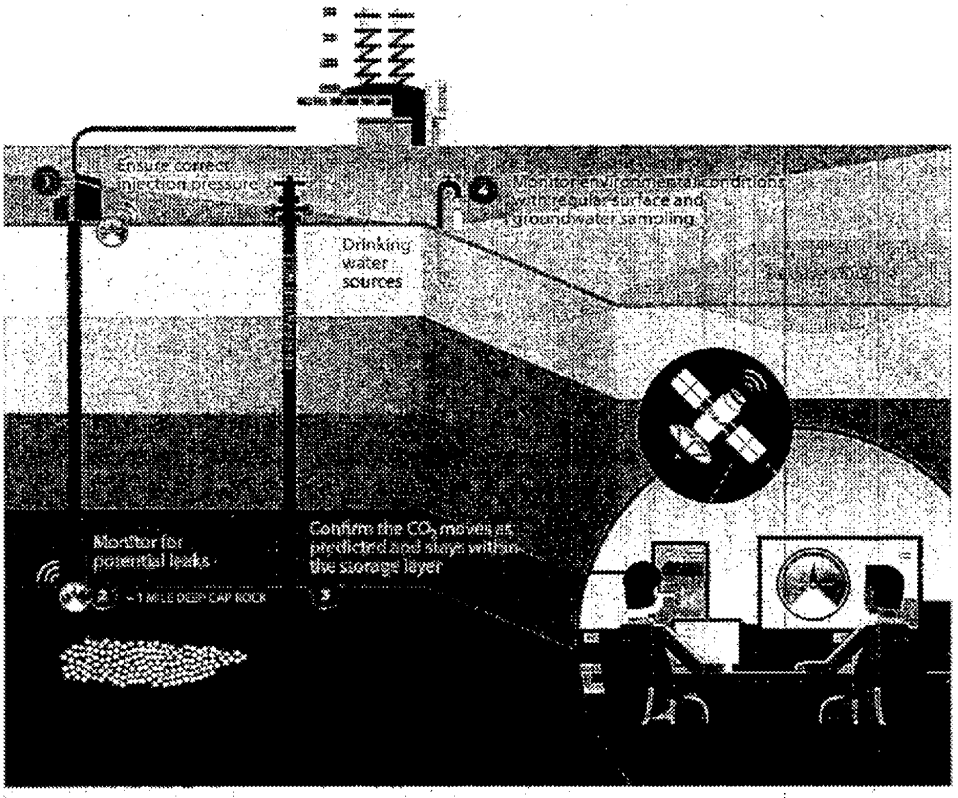

*$CO_2$ Storage Zone. $CO_2$ is injected at two points, shown in red. It floats up and is pushed away from the injection point, becoming less concentrated as it spreads. Lavender shows the outer boundary of the $CO_2$.*




*Simplified surface terms (modified from DMR) regarding ND permit requirements (Connors and others, 2020)*

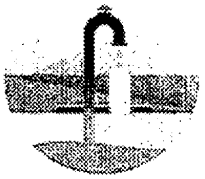
## DURING THE $CO_2$ INJECTION PHASE:




## AFTER THE $CO_2$ INJECTION PHASE HAS ENDED:

**DEEP UNDERGROUND MONITORING**

Monitor to ensure that the $CO_2$ remains securely stored in the storage zone



**AT/NEAR SURFACE MONITORING**

Monitor environmental conditions to assure no effects from $CO_2$

BEFORE THE INDUSTRIAL COMMISSION

OF THE STATE OF NORTH DAKOTA

CASE NO. 29033
ORDER NO. 31587

IN THE MATTER OF A HEARING CALLED ON A MOTION OF THE COMMISSION TO CONSIDER THE APPLICATION OF MINNKOTA POWER COOPERATIVE, INC. TO CONSIDER THE AMALGAMATION OF THE STORAGE RESERVOIR PORE SPACE, IN WHICH THE COMMISSION MAY REQUIRE THAT THE PORE SPACE OWNED BY NONCONSENTING OWNERS BE INCLUDED IN THE GEOLOGIC STORAGE FACILITY AND SUBJECT TO GEOLOGIC STORAGE, AS REQUIRED TO OPERATE THE MINNKOTA POWER COOPERATIVE, INC. STORAGE FACILITY LOCATED IN SECTIONS 35 AND 36, T.142N., R.84W., SECTIONS 19, 20, 21, 22, 26, 27, 28, 29, 30, 31, 32, 33, 34 AND 35, T.142N., R.83W., SECTIONS 1, 2, 12 AND 13, T.141N., R.84W., SECTIONS 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 15, 16, 17, 18, 19, 20 AND 21, T.141N., R.83W., OLIVER COUNTY, ND IN THE DEADWOOD FORMATION, PURSUANT TO NDCC SECTION 38-22-10.

ORDER OF THE COMMISSION

THE COMMISSION FINDS:

(1) This cause came on for hearing at 9:00 a.m. on the 2nd day of November, 2021.

(2) Case No. 29033 is an application by Minnkota Power Cooperative, Inc. (Minnkota) for an order of the Commission determining the amalgamation of storage reservoir pore space, pursuant to a Geologic Storage Agreement for use of pore space falling within portions of Sections 35 and 36, Township 142 North, Range 84 West, Sections 19, 20, 21, 22, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 142 North, Range 83 West, Sections 1, 2, 12, and 13, Township 141 North, Range 84 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 15, 16, 17, 18, 19, 20, and 21, Township 141 North, Range 83 West, Oliver County, North Dakota in the Deadwood Formation, has been signed, ratified, or approved by owners of interest owning at least sixty percent of the pore space interest within said lands, pursuant to North Dakota Century Code (NDCC) 38-22-10.

(3) Case Nos. 29029, 29030, 29031, 29032, 29033, and 29034 were combined for the purposes of hearing.

(4) Case No. 29029, also on today's docket, is an application by Minnkota for an order authorizing geologic storage of carbon dioxide from the Milton R. Young Station in the amalgamated pore space of the Broom Creek Formation in portions of Sections 35 and 36, Township 142 North, Range 84 West, Sections 19, 20, 21, 22, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 142 North, Range 83 West, Sections 1, 2, 12, and 13, Township 141 North, Range 84 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 15, 16, 17, 18, 19, 20, and 21, Township 141 North, Range 83 West, Oliver County, North Dakota, pursuant to North Dakota Administrative Code (NDAC) Chapter 43-05-01.

(5) Case No. 29030, also on today's docket, is an application filed with the Commission by Minnkota for an order of the Commission determining the amalgamation of storage reservoir pore space, pursuant to a Geologic Storage Agreement for use of pore space falling within portions of Sections 35 and 36, Township 142 North, Range 84 West, Sections 19, 20, 21, 22, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 142 North, Range 83 West, Sections 1, 2, 12, and 13, Township 141 North, Range 84 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 15, 16, 17, 18, 19, 20, and 21, Township 141 North, Range 83 West, Oliver County, North Dakota in the Broom Creek Formation, has been signed, ratified, or approved by owners of interest owning at least sixty percent of the pore space interest within said lands pursuant to NDCC 38-22-10.

(6) Case No. 29031, also on today's docket, is a motion of the Commission to determine the amount of financial responsibility for the geologic storage of carbon dioxide from the Milton R. Young Station located in portions of Sections 35 and 36, Township 142 North, Range 84 West, Sections 19, 20, 21, 22, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 142 North, Range 83 West, Sections 1, 2, 12, and 13, Township 141 North, Range 84 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 15, 16, 17, 18, 19, 20, and 21, Township 141 North, Range 83 West, Oliver County, North Dakota in the Broom Creek Formation, pursuant to NDAC Section 43-05-01-09.1.

(7) Case No. 29032, also on today's docket, is an application by Minnkota for an order authorizing geologic storage of carbon dioxide from the Milton R. Young Station in the amalgamated pore space of the Deadwood Formation in portions of Sections 35 and 36, Township 142 North, Range 84 West, Sections 19, 20, 21, 22, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 142 North, Range 83 West, Sections 1, 2, 12, and 13, Township 141 North, Range 84 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 15, 16, 17, 18, 19, 20, and 21, Township 141 North, Range 83 West, Oliver County, North Dakota, pursuant to NDAC Chapter 43-05-01.

(8) Case No. 29034, also on today's docket, is a motion of the Commission to determine the amount of financial responsibility for the geologic storage of carbon dioxide from the Milton R. Young Station located in portions of Sections 35 and 36, Township 142 North, Range 84 West, Sections 19, 20, 21, 22, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 142 North, Range 83 West, Sections 1, 2, 12, and 13, Township 141 North, Range 84 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 15, 16, 17, 18, 19, 20, and 21, Township 141 North, Range 83 West, Oliver County, North Dakota in the Deadwood Formation, pursuant to NDAC Section 43-05-01-09.1.

(9) The record in these matters was left open to receive additional information from Minnkota. Such information was received on November 16, December 8 and December 10, 2021, and the record was closed.

(10) Pursuant to NDCC Section 38-22-06 and NDAC Section 43-05-01-08: The notice of filing of the application and petition and the time and place of hearing thereof was given, and that at least 45 days prior to the hearing, Minnkota, as the applicant, did give notice of the time and place of said hearing and the Commission has accepted the notice as adequate, and that the applicant did, at least 45 days prior to the hearing, file with the Commission engineering, geological and other technical exhibits to be used and which were used at said hearing, and that the notice so given did specify that such material was filed with the Commission; that due public notice having been given, as required by law, the Commission has jurisdiction of this cause and the subject matter.

(11) The Commission gave at least a thirty-day public notice and comment period for the draft storage facility permit and issued all notices using methods required to all entities under NDCC Section 38-22-06 and NDAC Section 43-05-01-08. Publication was made September 29, 2021, and the comment period for written comments ended at 5:00 PM CDT November 1, 2021. The hearing was open to the public to appear and provide comments.

(12) Order No. 31586 entered in Case No. 29032 created the Minnkota Center MRYS Deadwood Storage Facility #1.

(13) The plan for amalgamation proposed by Minnkota includes a Geologic Storage Agreement for the Deadwood Formation for certain lands in Oliver County, North Dakota.

(14) The area proposed to be included within the amalgamation area of the storage facility is as follows:

TOWNSHIP 142 NORTH, RANGE 84 WEST
THE S/2 SE/4 OF SECTION 35, AND THE S/2 OF SECTION 36,

TOWNSHIP 142 NORTH, RANGE 83 WEST
ALL OF SECTIONS 28, 29, 31, 32, 33 AND 34, THE SE/4 SE/4 OF SECTION 19, THE SE/4 AND S/2 SW/4 OF SECTION 20, THE S/2 AND S/2 N/2 OF SECTION 21, THE SW/4 NW/4, W/2 SW/4, AND SE/4 SW/4 OF SECTION 22, THE SW/4 AND SW/4 SE/4 OF SECTION 26, THE W/2, SE/4, AND W/2 NE/4 OF SECTION 27, THE E/2, E/2 SW/4, AND SE/4 NW/4 OF SECTION 30, AND THE W/2, NE/4, AND W/2 SE/4 OF SECTION 35,

TOWNSHIP 141 NORTH, RANGE 84 WEST
ALL OF SECTIONS 1 AND 12, THE E/2, E/2 SW/4, AND E/2 E/2 NW/4 OF SECTION 2, AND THE NE/4, E/2 NW/4, AND NE/4 SE/4 OF SECTION 13,

TOWNSHIP 141 NORTH, RANGE 83 WEST
ALL OF SECTIONS 2, 3, 4, 5, 6, 7, 8, 9, 10, 16, 17 AND 18, THE W/2 SW/4 OF SECTION 1, THE W/2, NE/4, W/2 SE/4, AND NE/4 SE/4 OF SECTION 11, THE W/2 NW/4, NE/4 NW/4, AND NW/4 SW/4 OF SECTION 12, THE N/2 NW/4, SE/4 NW/4, NW/4 NE/4, W/2 SW/4 NW/4, AND NE/4 SW/4 NW/4 OF SECTION 14, THE N/2 N/2, SE/4 NE/4, AND SW/4 NW/4 OF SECTION 15, THE N/2 N/2, SE/4 NW/4, AND SE/4 NE/4 OF SECTION 19, THE N/2 OF SECTION 20, AND THE W/2, W/2 NE/4, AND NW/4 SE/4 OF SECTION 21.

(15) Minnkota is proposing a one-phase formula for the calculation of tract participation, allocating 100% to surface acres.

"Surface acres" means the number of acres within each respective tract.

(16) Pursuant to NDCC Section 47-31-03, title to pore space in all strata underlying surface lands and waters is vested in the owner of the overlying surface estate.

No pore space has been leased out by pore space owners prior to this agreement. Minnkota did not find instances of pore space being severed from the surface estate that was allowed prior to April 9, 2009.

(17) A one-phase formula based on surface acres will fairly compensate owners farther away from the injection well that will eventually have pore space occupied by carbon dioxide. Minnkota testified to a lack of history matched data for carbon dioxide saturation rates in the Deadwood Formation for a pore volume allocation methodology that would fairly apportion use of pore space. Minnkota owns the pore space where the injection wells are to be located. Minnkota indicates that the majority of carbon dioxide stored will remain in close proximity to the well bores for an extensive period of time, making Minnkota the primary beneficiary of a pore volume formula. Computational modeling performed by Minnkota and the Commission supports Minnkota's assessment.

The Commission believes capillary trapping, relative permeability hysteresis, and a lack of local area history matching data from injection of carbon dioxide into the saline Deadwood Formation reservoir provides reasonable doubt for the utility of a pore volume formula. The Commission believes the 100% weighting on surface acreage is acceptable and that the one-phase formula is protective of correlative rights and should not be modified.

(18) Minnkota delineated the tracts to be utilized through computational modeling based on site characterization as required by NDAC Section 43-05-01-05.1. The data acquired during site characterization as well as the reservoir model and all inputs were provided to the Commission. The Commission evaluated the storage reservoir utilizing data acquired during site characterization and other publicly available data before performing computational simulation. The Commission concludes that Minnkota's inclusion of pore space that will be affected by the project has been adequately delineated.

Minnkota proposes amalgamating the same reservoir pore space for the Deadwood reservoir as proposed in Case No. 29030 for the Broom Creek reservoir. A total of 4 million metric tons per year for 15 years, followed by 3.5 million metric tons per year for the final 5 years are planned to

be injected into the Deadwood and Broom Creek reservoirs. Simulation inputs considered a maximum injection of 4 million metric tons per year for 15 years and 3.5 million metric tons for the final 5 years into the Broom Creek, and 1.17 million metric tons per year into the Deadwood for the life of the storage facility. Simulation outputs for the Deadwood utilize less pore space than the Broom Creek and fall within the same defined storage facility boundary. There is significant overlap in surface ownership if the Deadwood were to be fully utilized. There is the potential that the Deadwood will be utilized to a lesser extent than proposed or not at all, making an alternate land proposal from the Broom Creek not feasible at this time. This finding is to be re-evaluated at the 5-year review.

(19) The Geologic Storage Agreement contains fair, reasonable, and equitable provisions for:

(a) The amalgamation of pore space interests for the storage of carbon dioxide within said pore spaces of the storage reservoir.

(b) The division of interest or formula for the apportionment and allocation of carbon dioxide to be stored.

(c) The measurement of quantity of carbon dioxide injected into the pore spaces underlying the delineated storage facility.

(d) The enlargement or reduction of the delineation of pore space utilized for geologic storage of carbon dioxide which may be warranted by review pursuant to NDAC Section 43-05-01-05.1(4).

(e) The time when the Geologic Storage Agreement shall become effective.

(f) The time when, conditions under, and the method by which the Geologic Storage Agreement shall be or may be terminated and its affairs wound up.

(20) Such amalgamation of the storage reservoir's pore space and the Geologic Storage Agreement are in the public interest, and require procedures that promote, in a manner fair to all interested, cooperative management, thereby ensuring the maximum use of natural resources, and that said Geologic Storage Agreement, as contained therein, appears to conform and comply with the provisions and requirements of NDCC Section 38-22-08.

(21) NDCC Section 38-22-10 provides that the Commission may require that the pore space owned by nonconsenting owners be included in a storage facility and subject to geological storage, if a storage operator does not obtain the consent of all persons who own the storage reservoir's pore space.

(22) Pursuant to NDAC Section 43-05-01-08(2)(e), the required notice given by Minnkota included a statement that amalgamation of the storage reservoir's pore space is required to operate the storage facility, that the Commission may require that the pore space owned by nonconsenting owners be included in the storage facility and subject to geologic storage, and that the amalgamation of pore space will be considered at the hearing.

(23) The approval of this application is in the public interest by promoting the policy stated in NDCC Section 38-22-01.

IT IS THEREFORE ORDERED:

(1) The amalgamation of pore space in the Minnkota Center MRYS Deadwood Storage Facility #1 in Oliver County, North Dakota, is hereby approved.

(2) The Geologic Storage Agreement for the Deadwood Formation is hereby incorporated in this order by reference, and shall apply to the same extent and with the same force and effect as if actually set forth herein; that said Geologic Storage Agreement for the amalgamated pore space therein is approved, all to the same extent and with the same force and effect as if set forth herein in its entirety; that if said Geologic Storage Agreement does not in all respects conform to and comply with the provisions and requirements under NDCC Chapter 38-22, the statute shall prevail.

(3) The amalgamated pore space is hereby defined as the following described tracts of land in Oliver County, North Dakota:

TOWNSHIP 142 NORTH, RANGE 84 WEST
THE S/2 SE/4 OF SECTION 35, AND THE S/2 OF SECTION 36,

TOWNSHIP 142 NORTH, RANGE 83 WEST
ALL OF SECTIONS 28, 29, 31, 32, 33 AND 34, THE SE/4 SE/4 OF SECTION 19, THE SE/4 AND S/2 SW/4 OF SECTION 20, THE S/2 AND S/2 N/2 OF SECTION 21, THE SW/4 NW/4, W/2 SW/4, AND SE/4 SW/4 OF SECTION 22, THE SW/4 AND SW/4 SE/4 OF SECTION 26, THE W/2, SE/4, AND W/2 NE/4 OF SECTION 27, THE E/2, E/2 SW/4, AND SE/4 NW/4 OF SECTION 30, AND THE W/2, NE/4, AND W/2 SE/4 OF SECTION 35,

TOWNSHIP 141 NORTH, RANGE 84 WEST
ALL OF SECTIONS 1 AND 12, THE E/2, E/2 SW/4, AND E/2 E/2 NW/4 OF SECTION 2, AND THE NE/4, E/2 NW/4, AND NE/4 SE/4 OF SECTION 13,

TOWNSHIP 141 NORTH, RANGE 83 WEST
ALL OF SECTIONS 2, 3, 4, 5, 6, 7, 8, 9, 10, 16, 17 AND 18, THE W/2 SW/4 OF SECTION 1, THE W/2, NE/4, W/2 SE/4, AND NE/4 SE/4 OF SECTION 11, THE W/2 NW/4, NE/4 NW/4, AND NW/4 SW/4 OF SECTION 12, THE N/2 NW/4, SE/4 NW/4, NW/4 NE/4, W/2 SW/4 NW/4, AND NE/4 SW/4 NW/4 OF SECTION 14, THE N/2 N/2, SE/4 NE/4, AND SW/4 NW/4 OF SECTION 15, THE N/2 N/2, SE/4 NW/4, AND SE/4 NE/4 OF SECTION 19, THE N/2 OF SECTION 20, AND THE W/2, W/2 NE/4, AND NW/4 SE/4 OF SECTION 21.

(4) The storage reservoir containing the amalgamated pore space is hereby defined as the stratigraphic interval from below the top of the Icebox Formation, found at a depth of 9,161 feet below the Kelly Bushing, to above the base of the Deadwood B Member, found at a depth of 9,655 feet below the Kelly Bushing, as identified by the Array Induction Gamma log run in the J-ROC1 #1 well (File No. 37672), located in the SW/4 NW/4 of Section 4, Township 141 North, Range 83 West, Oliver County, North Dakota.



NWLA SUPP-009

(5) The injection of carbon dioxide into the amalgamated pore space by the operator for the purpose of storage of carbon dioxide is authorized through the proposed McCall #1 well, to be located 1,978 feet from the north line and 257 feet from the west line of Section 4, Township 141 North, Range 83 West, Oliver County, North Dakota; provided, however, that prior to the commencement of such injection the operator shall obtain such permits as are required under NDAC Chapter 43-05-01.

(6) The termination of the amalgamation of lands hereinbefore described in paragraph (3) above shall be as prescribed in the Geologic Storage Agreement or at project completion as provided by NDCC Section 38-22-17; and that notwithstanding any provisions to the contrary, in the event that the operator fails to commence or ceases storage operations, the Commission, upon its own motion, after notice and hearing, may consider rescinding this order, or any portion thereof, so that this order of amalgamation will terminate and cease to exist.

(7) The effective date of the amalgamation of pore space in the lands hereinbefore described in paragraph (3) above shall be at 7:00 a.m. on the first day of February, 2021.

(8) No well, other than those proposed in Order No. 31586, shall be hereafter drilled and completed in or injected into in the amalgamated pore space, as defined herein, without order of the Commission after due notice and hearing.

(9) This order shall be reviewed when a review of Order No. 31586 is conducted.

(10) This order shall cover all of the amalgamated pore space, as defined herein, and continues in full force and effect until further order of the Commission.

Dated this 21st day of January, 2022.

INDUSTRIAL COMMISSION
STATE OF NORTH DAKOTA

/s/ Doug Burgum, Governor

/s/ Wayne Stenehjem, Attorney General

/s/ Doug Goehring, Agriculture Commissioner

# EXHIBIT D

## Surface Use And Pore Space Lease
## Attached to and made part of the Storage Agreement
## Tundra Deadwood
## Oliver County, North Dakota

### SURFACE USE AND PORE SPACE LEASE

THIS SURFACE USE AND PORE SPACE LEASE **("Lease")** is made, entered into, and effective as of the _____ day of _____, 2023 **("Effective Date")** by and between _____, whose address is _____ (whether one or more, **"Lessor"),** and Minnkota Power Cooperative, Inc., a Minnesota cooperative association, whose address is _____ (whether one or more, **"Lessee").** Lessor and Lessee are sometimes referred to in this Lease individually as a "**Party**" and collectively as the **"Parties."**

**1. DEFINITIONS.** The following terms shall have the following meanings in this Lease:

**"Carbon Dioxide"** means carbon dioxide in gaseous, liquid, or supercritical fluid state together with incidental associated substances derived from the source materials, capture process and any substances added or used to enable or improve the injection process.

**"Commencement of Operations"** means the date on which Carbon Dioxide is first injected into a Reservoir for commercial operations under this Lease, provided that the performance of test injections and related activities shall not be deemed Commencement of Operations.

**"Commission"** means the North Dakota Industrial Commission.

**"Completion Notice"** means a certificate of project completion issued to Lessee by the Commission pursuant to Chapter 38-22 of the North Dakota Century Code.

**"Environmental Attributes"** means any and all credits, benefits, emissions reductions, offsets, and allowances, howsoever entitled, attributable to the Operations, including any avoided emissions and the reporting rights related to these avoided emissions, such as 26 U.S.C. §45Q Tax Credits.

**"Environmental Incentives"** means any and all credits, rebates, subsidies, payments or other incentives that relate to the use of technology incorporated into the Operations, environmental benefits of Operations, or other similar programs available from any regulated entity or any Governmental Authority.

**"Facilities"** means all facilities, structures, improvements, fixtures, equipment, and any other personal property at any time acquired or constructed by or for Lessee that are necessary or desirable in connection with any use of Reservoirs and their Formations or Operations, including without limitation wells, pipelines, roads, utilities, metering or monitoring equipment, and buildings.

**"Financing Parties"** means person or persons providing construction or permanent financing to Lessee in connection with construction, ownership, operation and maintenance of Facilities or Operations, including financial institutions, leasing companies, institutions, tax equity partners, joint venture partners and/or private lenders.

**"Formation"** means the geological formation of which any Reservoir is a part.

**"Hazardous Substance"** means any chemical, waste or other substances, expressly excluding Carbon Dioxide and Non-Native Carbon Dioxide, (a) which now or hereafter becomes defined as or included in the definition of "hazardous substances," "hazardous wastes," "hazardous materials," "extremely hazardous wastes," "restricted hazardous wastes," "toxic substances," "toxic pollutants," "pollutions," "pollutants," "regulated substances," or words of similar import under any law pertaining

to environment, health, safety or welfare, (b) which is declared to be hazardous, toxic or polluting by any Governmental Authority, (c) exposure to which now or hereafter prohibited, limited or regulated by any Governmental Authority, (d) the storage, use, handling, disposal or release of which is restricted or regulated by any Governmental Authority, or (e) for which remediation or cleanup is required by any Governmental Authority.

**"Leased Premises"** means the surface and subsurface of the land, excluding mineral rights, described in **Exhibit A** of this Lease.

**"Native Oil and Gas"** means all oil, natural gas, and other hydrocarbons present in and under the Leased Premises and not injected by Lessor, Lessee or any third party.

**"Non-Native Carbon Dioxide"** means Carbon Dioxide that is not naturally occurring in the Reservoir together with incidental associated substances, fluids, minerals, oil, and gas, excluding that which, independent of Operations, originates from an accumulation meeting the definition of a Pool. All Non-Native Carbon Dioxide will be considered personal property of the Lessee and its successor and assigns under this Agreement.

**"Operating Year"** means the calendar year or portion of the calendar year following Commencement of Operations during which Operations occur.

**"Operations"** means the transportation and injection of Carbon Dioxide into a Reservoir after Commencement of Operations, and any withdrawal of this Carbon Dioxide, as well as the withdrawal of Non-Native Carbon Dioxide, for sale or disposal in accordance with applicable law.

**"Option Money"** means 20 percent of the Initial Term Payment (as such term is defined in that certain Option to Lease between Lessor and Lessee with respect to the Leased Premises).

**"Pool"** means an underground Reservoir containing a common accumulation of Native Oil and Gas that is economically recoverable. A zone of a structure that is completely separated from any other zone in the same structure is a Pool.

**"Pore Space"** means a cavity or void, whether natural or artificially created, in a Reservoir.

**"Related Person"** means any member, partner, principal, officer, director, shareholder, predecessor-in-interest, successor-in-interest, employee, agent, heir, representative, contractor, lessee, sublessee, licensee, invitee, permittee of a Party, Financing Parties or any other person or entity that has obtained or in future obtains rights or interests from, under or through a Party (excluding the other Party itself).

**"Reservoir"** means any subsurface stratum, sand, formation, aquifer, cavity or void, whether natural or artificially created, wholly or partially within the Leased Premises, suitable for the storage or sequestration of carbon dioxide or other gaseous substances.

**"Storage Fee"** means Lessor's proportionate share of [fifty and 0/100$^{th}$] cents ($0.[50]) per metric ton of Carbon Dioxide ("Storage Rate") as determined by the Lessee's last meter before injection as part of Operations. The Storage Rate was determined based on an agreed commercial value of the lease of the Leased Premises as of the Effective Date. If there is a subsequent change in the commercial value of the lease of the Leased Premises because of a change in Applicable Law resulting in a change in, or Lessee's qualification for, the $85 per metric ton IRC section 45Q tax credit (including for inflation adjustments or changes in Applicable Law), the Storage Rate shall be proportionately changed based on the ratio of the Storage Rate on the Effective Date ($0.[50]) and $85. (effective as of the effective date of the change in the IRC section 45Q tax credit amount) The Storage Fee shall be: (i) calculated separately for each Amalgamated Unit as created and established by the Commission that includes any portion of the Leased Premises; (ii) limited to the Carbon Dioxide injected in said Amalgamated Unit in the immediately preceding Operating Year; and (iii) based on the Lessor's proportionate per net acre share of said unit. For avoidance of doubt, the Lessor shall receive a separate Storage Fee for each Amalgamated Unit created and established by the Commission that includes any portion of the Leased Premises on a net acre basis within the Lessor's interest being the numerator and the acres in the Amalgamated Unit being the denominator.

**"Tax Credits"** means any and all (a) investment tax credits, (b) production tax credits, (c) credits

under 26 U.S.C. §45Q credits, and (d) similar tax credits or grants under federal, state or local law relating to construction, ownership or Operations

**2. LEASE RIGHTS.** In consideration of the compensation, covenants, agreements, and conditions set forth in this Lease, Lessor grants, demises, leases and lets to Lessee the exclusive right to use all Pore Space, Reservoirs and their Formations in the Leased Premises for any purpose not previously granted or reserved by an instrument of record related to the capture, injection, storage, sequestration, sale, withdrawal or disposal of Carbon Dioxide, Non-Native Carbon Dioxide and incidental associated substances, fluids, and minerals, provided that Lessee shall have no right to use potable water from within the Leased Premises in Operations; together with the following exclusive rights:

(a) to use the Leased Premises for developing, constructing, installing, improving, maintaining, replacing, repowering, relocating, removing, abandoning in place, expanding, and operating Facilities;

(b) to lay, maintain, replace, repair, and remove roads on the Leased Premises to allow Lessee, in its sole discretion, to exercise its rights under this Lease; and

(c) to enter upon and use the Leased Premises for the purposes of conducting:

(i) any investigations, studies, surveys, and tests, including without limitation drilling and installing test wells and monitoring wells, seismic testing, and other activities as Lessee deems necessary or desirable to determine the suitability of the Leased Premises for Operations,

(ii) any inspections and monitoring of Reservoirs and Carbon Dioxide as Lessee or any governmental authority deems necessary or desirable during the term of this Lease, and

(iii) any maintenance to the Facilities that Lessee or any governmental authority deems necessary or as required by applicable law.

Lessor also hereby grants and conveys unto Lessee all other and further easements across, over, under and above the Leased Premises as reasonably necessary to provide access to and services reasonably required for Lessee's performance under the Lease. The easements granted hereunder shall run with and burden the Leased Premises for the term of this Lease. Notwithstanding the surface easements granted herein, Lessee shall provide notice to Lessor prior to accessing the surface of the Property, and if such activity requires permit then prior notice shall be in form and not be less than that required by law or rule.

Lessee may exercise its rights under this Lease in conjunction with related operations on other properties near the Leased Premises. Lessee shall have no obligation, express or implied, to begin, prosecute or continue storage operations in, upon or under the Leased Premises, or to store and/or sell or use all or any portion of the gaseous substances stored thereon. The timing, nature, manner and extent of Lessee's operations, if any, under this Lease shall be at the sole discretion of Lessee. All obligations of Lessee are expressed herein, and there shall be no covenants implied under this Lease, it being agreed that all amounts paid hereunder constitute full and adequate consideration for this Lease.

**3. INITIAL TERM.** This Lease shall commence on the Effective Date and shall continue for an initial term of twenty (20) years ("Initial Term") unless sooner terminated in accordance with the terms of this Lease. Lessee may, but is not obligated to, extend the Initial Term for up to four successive five-year periods (each individually an "Extension Period") by paying Lessor $25.00 per net acre in the Leased Premises per five-year Extension Period (the "Renewal Payment") on or prior to the last day of the Initial Term or expiring five-year Extension Period, as applicable. The Initial Term together with any Extension Periods exercised by Lessee are referred to as the "Primary Term." Beginning in the 19th year of the Initial Term, and each successive Extension Period thereafter, the Renewal Payment in this Section 3 shall each be adjusted for inflation as follows: Renewal Payment = (existing Renewal Payment) x (the applicable Cumulative CPI Percentage increase, expressed as a percentage, since the last adjustment, if any) + (existing Renewal Payment). For illustration only, the CPI in 2023 will be compared to the CPI in 2042 and the amount for the five year Extension Period commencing 2043 through 2048 shall be increased by the percentage difference determined as

follows: Cumulative CPI Percentage = (CPI for 2042 - CPI for 2023) / (CPI for 2023) x (100). Further, for the second Extension Period for years 2049 through 2054, the CPI in 2042 will be compared to the CPI in 2048 and the amount for years 2049 through 2054 will be increased by the percentage difference, determined as follows: Cumulative CPI percentage = (CPI for 2048 - CPI for 2042) / (CPI for 2042) x (100), and so on.

For purposes of this Section 3, CPI means Consumer Price Index published by the Bureau of Labor Statistics of the United States Department of Labor for Urban Wage Earners and Clerical Workers (CPI-W) for the Midwest Region, all items, not seasonally adjusted, reference base period of 1982-84= 100. In the event the Consumer Price Index is converted to a different standard reference base or otherwise revised, the determination of Renewal Payment will be made with the use of such conversion factor, formula or table for converting the Consumer Price Index as may be published by the Bureau of Labor Statistics. If the Consumer Price Index ceases to be published and there is no successor thereto, such other index as Lessor and Lessee may agree upon will be substituted for the Consumer Price Index.

**4. OPERATIONAL TERM.** Upon Commencement of Operations at any time during the Primary Term, this Lease shall continue for so long as any portion of the Leased Premises or Lessee's Facilities are subject to a permit issued by the Commission or under the ownership or control of the State of North Dakota ("Operational Term"); *provided, however*, that all of Lessee's obligations under this Lease shall terminate upon issuance of a Completion Notice, except for payment of the Final Royalty Payment (as applicable), and Final Occupancy Fee (as applicable). If Commencement of Operations does not occur during the Primary Term, this Lease shall terminate, and Lessee shall execute a document evidencing termination of this Lease in recordable form and shall record it in the official records of the county in which the Leased Premises is located.

**5. COMPENSATION.**

(a) **Initial Term Payment.** Lessee shall pay to Lessor the greater of $50.00 per net acre in the Leased Premises ("Initial Term Payment") or a one-time flat $500.00 payment, the receipt and sufficiency of which are hereby acknowledged.

(b) **Royalty.** During the Operational Term, Lessee shall annually on or before May 31st pay to Lessor a royalty for the portions of the Leased Premises in an Amalgamated Unit, equal to the greater of a flat $100.00 payment or the Storage Fee(s) for the immediately preceding Operating Year. During the Operational Term, in addition to the forgoing royalty payment, Lessee shall annually on or before May 31st pay to the Lessor a $5.00 per acre payment for portions of the Leased Premises not in an Amalgamated Unit. For the Operating Year in which Lessee provides Lessor with a Completion Notice, Lessee shall pay a pro rata share of the Storage Fee(s) ("Final Royalty Payment"), as applicable, and said payment shall be made within sixty days after the date the Completion Notice was issued.

(c) **Occupancy Fee.** Within sixty days of the anniversary of the Effective Date after which any Facilities are installed or used, Lessee shall pay Lessor, as applicable, a one-time fee of (i) $3,000.00 per net surface acre of the Leased Premises occupied by Facilities (excluding pipelines), and (ii) $1.50 for each linear foot of pipeline in place on the Leased Premises. For the year in which Lessee provides Lessor with a Completion Notice, Lessee shall pay any fees owed pursuant to this provision ("Final Occupancy Fee") within sixty days after the date the Completion Notice was issued.

Lessor and Lessee agree that the Lease shall continue as specified herein even in the absence of Operations and the payment of royalties.

**6. AMALGAMATION.** (a) Lessee, in its sole discretion, shall have the right and power, at any time (including both before and after Commencement of Operations), to pool, unitize, or amalgamate any Reservoir or portion of a Reservoir with any other lands or interests into which that Reservoir extends and document such unit in accordance with applicable law or agency order ("Amalgamated Unit" or "Amalgamated Units"). Amalgamated Units shall be of such shape and dimensions as Lessee may elect and as are approved by the Commission. Amalgamated Units may include, but are not required to include, land upon which injection or extraction wells have been completed or upon which the injection and/or withdrawal of Carbon Dioxide and Non-Native Carbon Dioxide has commenced prior to the effective date

of amalgamation. In exercising its amalgamation rights under this Lease and if required by law, Lessee shall record or cause to be recorded a copy of the Commission's amalgamation order or other notice thereof in the county in which the Amalgamated Unit. Amalgamating in one or more instances shall, if approved by the Commission, not exhaust the rights of Lessee to amalgamate Reservoirs or portions of Reservoirs into other Amalgamated Units, and Lessee shall have the recurring right to revise any Amalgamated Unit formed under this Lease by expansion or contraction or both. Lessee may dissolve any Amalgamated Unit at any time and document such dissolution by recording an instrument in accordance with applicable law or agency order. Lessee shall have the right to negotiate, on behalf of and as agent for Lessor, any unit agreements and operating agreements with respect to the operation of any Amalgamated Units formed under this Lease.

(b) The injection and/or withdrawal of Carbon Dioxide and Non-Native Carbon Dioxide into a Reservoir from any property within a Amalgamated Unit that includes the Leased Premises shall be treated as if Operations were occurring on the Leased Premises, except that the royalty payable to Lessor under Section 5(b) of this Lease shall be Lessor's per net acre proportionate share of the total Storage Fee for the preceding Operating year's injection of Carbon Dioxide into the Amalgamated Unit.

**7. ENVIRONMENTAL INCENTIVES.** Unless otherwise specified, Lessee is the owner of all Environmental Attributes and Environmental Incentives and is entitled to the benefit of all Tax Credits or any other attributes of ownership of the Facilities and Operations. Lessor shall cooperate with Lessee in obtaining, securing and transferring all Environmental Attributes and Environmental Incentives and the benefit of all Tax Credits. Lessor shall not be obligated to incur any out-of-pocket costs or expenses in connection with such actions unless reimbursed by Lessee. If any Environmental Incentives are paid directly to Lessor, Lessor shall immediately pay such amounts over to Lessee.

**8. SURRENDER OF LEASED PREMISES.** Lessee shall have the unilateral right at any time and from time to time to execute and deliver to Lessor a written notice of surrender and/or release covering all or any part of the Leased Premises for which the subsurface pore space is not being utilized for storage as set forth herein, and upon delivery of such surrender and/or release to Lessor this Lease shall terminate as to such lands, and Lessee shall be released from all further obligations and duties as to the lands so surrendered and/or released, including, without limitation, any obligation to make payments provided for herein, except obligations accrued as of the date of the surrender and/or release.

**9. FACILITIES.**

(a) Lessee shall in good faith consult with Lessor regarding the location of any Facilities to be constructed on the Leased Premises. The location of the Facilities shall be within the sole discretion of Lessee with consent of the Lessor, not to be unreasonably withheld. The withholding of such consent by the Lessor regarding the location of the Facilities shall be deemed "unreasonable" if the proposed location of the Facility is located more than 500 feet from any currently occupied dwelling or currently used building existing on the Leased Premises as of the Effective Date. Lessee may erect fences around all or part of any above-ground Facilities (excluding roads) to separate Facilities from adjacent Lessor-controlled lands, and shall do so if Lessor so requests. Lessee shall maintain and repair at its expense any roads it constructs on the Leased Premises in reasonably safe and usable condition.

(b) Lessor and Lessee agree that all Facilities and property of whatever kind and nature constructed, placed or affixed on the rights-of-way, easements, patented or leased lands as part of Lessee's Operations, as against all parties and persons whomsoever (including without limitation any party acquiring interest in the rights-of-way, easements, patented or leased lands or any interest in or lien, claim or encumbrance against any of such Facilities), shall be deemed to be and remain the property of the Lessee, and shall not be considered to be fixtures or a part of the Leased Premises. Lessor waives, to the fullest extent permitted by applicable law, any and all rights it may have under the laws of the State of North Dakota, arising under this Lease, by statute or otherwise to any lien upon, or any right to distress or attachment upon, or any other interest in, any item constituting the Facilities or any other equipment or improvements constructed or acquired by or for Lessee and located on the leased Premises or within any easement area. Each Lessor and

Lessee agree that the Lessee (or the designated assignee of Lessee or Financing Parties) is the tax owner of any such Facilities, structures, improvements, equipment and property of whatever kind and nature and all tax filings and reports will be filed in a manner consistent with this Lease. Facilities shall at all times retain the legal status of personal property as defined under Article 9 of the Uniform Commercial Code. If there is any mortgage or fixture filing against the Premises which could reasonably be construed as prospectively attaching to the Facilities as a fixture of the Premises, Lessor shall provide a disclaimer or release from such lienholder. Lessor, as fee owner, consents to the filing of a disclaimer of the Facilities as a fixture of the Premises in the Oliver County Recorder's Office, or where real estate records of Oliver County are customarily filed.

**10. SURFACE DAMAGE COMPENSATION ACT.** The compensation contemplated and paid to Lessor hereunder is compensation for, among other things, damages sustained by Lessor for the lost use of and access to Lessor's land, pore space (to the extent required under North Dakota law), and any other damages which are contemplated under Ch. 38-11.1 of the North Dakota Century Code (to the extent applicable).

**11. MINERALS, OIL AND GAS.** This Lease is not intended to grant or convey, nor does it grant or convey, any right to or obligation for Lessee to explore for or produce minerals, including Native Oil and Gas, that may exist on the Leased Premises. Lessee shall not engage in any activity or permit its Related Persons to engage in any activity that unreasonably interferes with the Lessor's or third party's (or parties') rights to the granted, leased, or reserved mineral interests. If Lessor owns hydrocarbon mineral interests in the Leased Premises and Lessee should inadvertently discover a Pool in conjunction with its efforts to explore for and develop a Reservoir for Operations, Lessee shall inform Lessor within 60 days of discovery. If Lessee determines that it will not use in conjunction with Operations a well that has encountered a Pool within the Leased Premises, Lessor shall have the option but not the obligation to buy such well at cost, provided Lessor has the ability and assumes all permits and risks and liabilities which are associated with the ownership and operation of an oil, gas or mineral well.

**12. FORCE MAJEURE.** Should Lessee be prevented from complying with any express or implied covenant of this Lease, from utilizing the Leased Premises for underground storage purposes by reason of scarcity of or an inability to obtain or to use equipment or material failure or breakdown of equipment, or by operation of force majeure (including, but not limited to, riot, insurrection, war (declared or not), mobilization, explosion, labor dispute, fire, flood, earthquake, storm, lightning, tsunami, backwater caused by flood, vandalism, act of the public enemy, terrorism, epidemic, pandemic (including COVID-19), civil disturbances, strike, labor disturbances, work slowdown or stoppage, blockades, sabotage, labor or material shortage, national emergency, and the amendment, adoption or repeal of or other change in, or the interpretation or application of, any applicable laws, orders, rules or regulations of governmental authority), then while so prevented, Lessee's obligation to comply with such covenant shall be suspended and this Lease shall be extended while and so long as Lessee is prevented by any such cause from utilizing the property for underground storage purposes and the time while Lessee is so prevented shall not be counted against Lessee, anything in this Lease to the contrary notwithstanding.

**13. DEFAULT/TERMINATION.** Lessor may not terminate the Lease for any reason whatsoever unless a Default Event has occurred and is continuing consistent with the terms of this Section 13. Any Party that fails to perform its responsibilities as listed below shall be deemed to be the "Defaulting Party," the other Party shall be deemed to be the "Non-Defaulting Party," and each event of default shall be a "Default Event." A Default Event is: (a) failure of a Party to pay any amount due and payable under this Lease, other than an amount that is subject to a good faith dispute, within thirty (30) days following receipt of written notice from Non-Defaulting Party of such failure to pay; or (b) a material violation or default of any terms of this Lease by a Party, provided the Non-Defaulting Party provides written notice of violation or default and Defaulting Party fails to substantially cure the violation or default within sixty (60) days after receipt of said notice to cure such violations or defaults. Parties acknowledge that in connection with any construction or long-term financing or other credit support provided to Lessee or its affiliates by Financing Parties, that such Financing Parties may act to cure a continuing Default Event and Lessor agrees to accept performance from any such Financing Parties so long as such Financing Parties perform in accordance with the terms of this Lease. If Lessee, its affiliates or Financing Parties, fail to substantially cure such Default Event within the applicable cure period, Lessor may terminate the Lease.

Lessee may terminate the lease with thirty (30) days written notice to Lessor. Upon termination of this Lease, Lessee shall have one hundred eighty (180) days to remove, plug, and/or abandon in place all Facilities of Lessee located on the Leased Premises in accordance with applicable permit requirements or other applicable statutes, rules or regulations.

**14. ASSIGNMENT.** (a) Lessor shall not sell, transfer, assign or encumber the Facilities or any part of Operations, Lessee's title or Lessee's rights under this Lease. (b) Lessee has the right to sell, assign, mortgage, pledge, transfer, use as collateral, or otherwise collaterally assign or convey all or any of its rights under this Lease, including, without limitation, an assignment by Lessee to Financing Parties. (c) In the event Lessee assigns its rights under this Lease, Lessee shall be relieved of all obligations with respect to the assigned portion arising after the date of assignment so long as notice of such assignment is provided to Lessor, and provided that Lessee shall not be relieved from any obligation in respect of any payment or other obligations that have not been satisfied or performed prior to such date of assignment. (d) This Lease shall be binding on and inure to the benefit of the successors and assignees. The assigning Party shall provide written notice of any assignment within sixty (60) days after such assignment has become effective; provided, however, that an assigning Party's failure to deliver written notice of assignment within such 60-day period shall not be deemed a breach of this Lease unless such failure is willful and intentional. Further, no change or division in Lessor's ownership of or interest in the Leased Premises or royalties shall enlarge the obligations or diminish the rights of Lessee or be binding on Lessee until after Lessee has been furnished with a written assignment or a true copy of the assignment with evidence that same has been recorded with the Oliver County Recorder's Office.

**15. FINANCING.** (a) Lessor acknowledges that Lessee may obtain tax equity, construction, long-term financing and other credit support from one or more Financing Parties and that Lessee intends to enter into various agreements and execute various documents relating to such financing, which documents may, among other things, assign this Lease and any related easements to a Financing Party, grant a sublease in the Leased Premises and a lease of the Facilities from such Financing Party to Lessee, grant the Financing Parties a sublease or other real property interest in Lessee's interests in and to the Leased Premises, grant a first priority security interest in Lessee's interest in the Facilities and/or this Lease and Lessee's other interests in and to the Leased Premises, including, but not limited to, any easements, rights of way or similar interests (such documents, "Financing Documents"). Lessor acknowledges notice of the foregoing and consents to the foregoing actions and Financing Documents described above.

(b) Lessor agrees, to execute, and agrees to cause any and all of Lessor's lenders to execute, such commercially reasonable subordination agreements, non-disturbance agreements, forbearance agreements, consents, estoppels, modifications of this Lease and other acknowledgements of the foregoing as Lessee or the Financing Parties may reasonably request (collectively, "Lessor Financing Consent Instruments"). Lessor acknowledges and agrees that (i) Lessee's ability to obtain financing for the construction and operation of the Facilities is dependent upon the prompt cooperation of Lessor and its lenders as contemplated by this Section 15; (ii) if Lessee is unable to close on the financing for the Facilities, the construction of the Facilities and the Commencement of Operations will not likely occur; and (iii) it is in the best interest of both Lessee and Lessor for Lessee to obtain financing from the Financing Parties as contemplated by this Section 15. Therefore, Lessor agrees to act promptly, reasonably and in good faith in connection with any request for approval and execution of all Lessor Financing Consent Instruments. The Lessor shall also reasonably cooperate with the Lessee or the Financing Party in the making of any filings required by such requesting party for regulatory compliance or in accordance with applicable laws and in the operation and maintenance of the Facilities, all solely at the expense of the Lessee.

(c) As a precondition to exercising any rights or remedies as a result of any default or alleged default by Lessee under this Lease, Lessor shall deliver a duplicate copy of the applicable notice of default to each Financing Parties concurrently with delivery of such notice to Lessee, specifying in detail the alleged default and the required remedy, provided Lessor was given notice of such Financing Parties and if no such notice of default is required to be delivered to Lessee under this Lease, Lessor may not terminate this Lease unless Lessor has delivered a notice of default to each Financing Party specifying in detail the alleged default or breach and permitting each Financing Party the opportunity to cure as provided in this Section 15(c). Each Financing Party shall have the same period after receipt of a notice of default to

remedy default, or cause the same to be remedied, as is given to Lessee after Lessee's receipt of a notice of default under this Lease, plus, in each instance, the following additional time periods: (i) ten (10) Business Days in the event of any monetary default; and (ii) sixty (60) days in the event of any non-monetary default; provided, however, that (A) such sixty (60)-day period shall be extended for an additional sixty 60 days to enable such Financing Party to complete such cure, including the time required for such Financing Party to obtain possession of the Facilities (including possession by a receiver), institute foreclosure proceedings or otherwise perfect its right to effect such cure and (B) such Financing Party shall not be required to cure those defaults which are not reasonably susceptible of being cured or performed. Lessor shall accept such performance by or at the instance of a Financing Party as if the performance had been made by Lessee.

(d) If any Lessee Default Event cannot be cured without obtaining possession of all or part of the Facilities and/or the leasehold interest created by the Lease (the "Leasehold Estate"), then any such Lessee Default Event shall nonetheless be deemed remedied if: (i) within sixty (60) days after receiving the notice of default, a Financing Party acquires possession thereof, or commences appropriate judicial or non-judicial proceedings to obtain the same; (ii) such Financing Party is prosecuting any such proceedings to completion with commercially reasonable diligence; and (iii) after gaining possession thereof, such Financing Party performs all other obligations as and when the same are due in accordance with the terms of the Lease. If a Financing Party is prohibited by any process or injunction issued by any court or by reason of any action of any court having jurisdiction over any bankruptcy or insolvency proceeding involving Lessee from commencing or prosecuting the proceedings described above, then the sixty (60)-day period specified above for commencing such proceedings shall be extended for the period of such prohibition.

(e) Financing Parties shall have no obligation or liability to the Lessor for performance of the Lessee's obligations under the Lease prior to the time the Financing Party acquires title to the Leasehold Estate. A Financing Party shall be required to perform the obligations of the Lessee under this Lease only for and during the period the Financing Party directly holds such Leasehold Estate. Any assignment pursuant to this Section 15 shall release the assignor from obligations accruing under this Lease after the date the liability is assumed by the assignee.

(f) Each Financing Party shall have the absolute right to do one, some or all of the following things: (i) assign the rights, mortgage or pledge held by Financing Party (the "Financing Party's Lien"); (ii) enforce the Financing Party's Lien; (iii) acquire title (whether by foreclosure, assignment in lieu of foreclosure or other means) to the Leasehold Estate; (iv) take possession of and operate the Facilities or any portion thereof and perform any obligations to be performed by Lessee under the Lease, or cause a receiver to be appointed to do so; (v) assign or transfer the Leasehold Estate to a third party; or (vi) exercise any rights of Lessee under this Lease. Lessor's consent shall not be required for any of the foregoing; and, upon acquisition of the Leasehold Estate by a Financing Party or any other third party who acquires the same from or on behalf of the Financing Party or any purchaser who purchases at a foreclosure sale, Lessor shall recognize the Financing Party or such other party (as the case may be) as Lessee's proper successor, and this Lease shall remain in full force and effect.

(g) If this Lease is terminated for any reason whatsoever, including a termination by Lessor on account of a Lessee Default Event, or if this Lease is rejected by a trustee of Lessee in a bankruptcy or reorganization proceeding or by Lessee as a debtor-in-possession (whether or not such rejection shall be deemed to terminate this Lease), if requested by Financing Party, Lessor shall execute a new lease (the "New Lease") for the Leased Premises with the Financing Parties (or their designee(s), if applicable) as Lessee, within thirty (30) days following the date of such request. The New Lease shall be on substantially the same terms and conditions as are in this Lease (except for any requirements or conditions satisfied by Lessee prior to the termination or rejection). Upon execution of the New Lease by Lessor, Financing Parties (or their designee, if applicable) shall pay to Lessor any and all sums owing by Lessee under this Lease that are unpaid and that would, at the time of the execution of the New Lease, be due and payable under this Lease if this Lease had not been terminated or rejected. The provisions of this Section 15(g) shall survive any termination of this Lease prior to the expiration of the Term, and any rejection of this Lease in any bankruptcy or reorganization proceeding.

(h) Lessor consents to each Financing Party's security interest, if any, in the Facilities and waives all right of levy for rent and all claims and demands of every kind against the Facilities, such waiver to

continue so long as any sum remains owing from Lessee to any Financing Parties. Lessor agrees that the Facilities shall not be subject to distraint or execution by, or to any claim of, Lessor.

(i) Notwithstanding Lessor's obligations and consents under this Section 15 Lessor shall not be obligated to execute any mortgage or grant of security interest in Lessor's interest in and to the Leased Premises for the benefit of Lessee.

**16. INDEMNIFICATION; WAIVER.** (a) Each Party shall indemnify, defend, and hold harmless the other Party and its Related Persons from and against any and all third-party suits, claims, or damages suffered or incurred by the indemnified Party and its Related Persons arising out of physical damage to property and physical injuries to any person, including death, caused by the indemnifying Party or its Related Persons except to the extent such claims arise out of the negligence or willful misconduct of the indemnified Party or its Related Persons. (b) Each Party shall indemnify, defend and hold harmless the other Party and its Related Persons from and against all suits, claims, or damages suffered or incurred by the indemnified Party and its Related Persons arising out of or relating to the existence at, on, above, below or near the Leased Premises of any Hazardous Substance, except to the extent deposited, spilled or otherwise caused by the indemnified Party or any of its contractors or agents, provided that Lessee shall not be obligated to indemnify Lessor with respect to any Hazardous Substance on the Leased Premises prior to the Effective Date.

**17. INSURANCE.** Lessee shall, at its sole cost and expense, keep and maintain in force commercial general liability insurance including broad form property damage liability, personal injury liability, and contractual liability coverage, on an "occurrence" basis, with a combined single limit, which may be effected by primary and excess coverage, of not less than Five Million Dollars ($5,000,000.00) during the primary term, except that such limit in the Primary Term shall be instead not less than One Million Dollars ($1,000,000.00) until such time as Lessee commences physical testing of any injection wells or other similar commercial activities, with such commercially reasonable deductibles as Lessee, in its discretion, may deem appropriate. Lessor shall be named as an additional insured in such policy but only to the extent of the liabilities specifically assumed by the Lessee under this Lease. The policy shall contain provisions by which the insurer waives any right of subrogation it may have against Lessor and shall be endorsed to provide that the insurer shall give Lessor thirty days written notice before any material modification or termination of coverage. Upon Lessor's request, Lessee shall promptly deliver certificates of such insurance to Lessor.

**18. MISCELLANEOUS.**

(a) **Confidentiality.** Lessor shall maintain in the strictest confidence, and shall require each of Lessor's Related Persons to hold and maintain in the strictest confidence, for the benefit of Lessee, all information pertaining to the compensation paid under this Lease, any information regarding Lessee and its business, operations on the Leased Premises or on any other lands, the capacity and suitability of the Reservoir, and any other information that is deemed proprietary or that Lessee requests or identifies to be held confidential, in each such case whether disclosed by Lessee or discovered by Lessor.

(b) **Liens.** (i) Lessee shall protect the Leased Premises from liens of every character arising from its activities on the Leased Premises, provided that Lessee may, at any time and without the consent of Lessor, encumber, hypothecate, mortgage, pledge, or collaterally assign (including by mortgage, deed of trust or personal property security instrument) all or any portion of Lessee's right, title or interest under this Lease (but not Lessor's right, title or interest in the Leased Premises), as security for the repayment of any indebtedness and/or the performance of any obligation. (ii) Lessor shall not directly or indirectly cause, create, incur, assume or allow to exist any mortgage, pledge, lien, charge, security interest, encumbrance or other claim of any nature on or with respect to the Facilities, Operations or any interest therein. Lessor shall immediately notify Lessee in writing of the existence of any such mortgage, pledge, lien, charge, security interest, encumbrance or other claim, shall promptly cause the same to be discharged and released of record without cost to Lessee, and shall indemnify the Lessee against all costs and expenses (including reasonable attorneys' fees) incurred in discharging and releasing any such mortgage, pledge, lien, charge, security interest, encumbrance or other claim.

(c) **Warranty of Title.** Lessor represents and warrants to Lessee that Lessor is the owner in fee of the surface and subsurface pore space of the Leased Premises. Lessor hereby warrants and agrees to

defend title to the Leased Premises and Lessor hereby agrees that Lessee, at its option, shall have the right to discharge any tax, mortgage, or other lien upon the Leased Premises, and in the event Lessee does so, Lessee shall be subrogated to such lien with the right to enforce the same and apply annual rental payments or any other such payments due to Lessor toward satisfying the same. At any time on or after the Effective Date, Lessee may obtain for itself and/or any Financing Party, at Lessee's expense, a policy of title insurance in a form and with exceptions acceptable to Lessee and/or such Financing Party in its sole discretion (the "Title Policies"). Lessor agrees to cooperate fully and promptly with Lessee in its efforts to obtain the Title Policies, and Lessor shall take such actions as Lessee or any Financing Party may reasonably request in connection therewith.

(d) **Conduct of Operations.** Each Party shall, at its expense, use best efforts to comply (and cause its Related Persons to comply) in all material respects with all laws applicable to its (or their) activities on the Leased Premises, provided that each Party shall have the right, in its sole discretion, to contest, by appropriate legal proceedings, the validity or applicability of any law, and the other Party shall cooperate in every reasonable way in such contest, at no out-of-pocket expense to the cooperating Party. During the Primary Term, Lessee, its agents, affiliates, servants, employees, nominees and licensees shall be entitled to: (i) apply for and obtain any necessary permits, approvals and other governmental authorizations (collectively called "Governmental Authorizations") required for the development, construction, operation and maintenance of the Project and Lessor agrees to co-operate, execute, obtain or join with Lessee in any applications or proceedings relating to the Governmental Authorizations upon Lessee's written request and at Lessee's direction, cost and expense; and (ii) apply for any approvals and permits and any zoning amendment of any area of the Leased Premises required in connection with the Project, and Lessor agrees to co-operate, execute, obtain or join with Lessee in any applications or proceedings relating to such approvals, permits and zoning amendments upon Lessee's written request and at Lessee's direction, cost and expense.

(e) **Title to Carbon Dioxide.** As between Lessor and Lessee, all right, title, interest and ownership to all Carbon Dioxide injected into any Reservoir shall belong to Lessee, as measured by corresponding Storage Fee payment to Lessor.

(f) **Hazardous Substances.** Lessee shall have no liability for any regulated hazardous substances located on the Leased Premises prior to the Effective Date or placed in, on or within the Leased Premises by Lessor or any of its Related Persons on or after the Effective Date, and nothing in this Lease shall be construed to impose upon Lessee any obligation for the removal of such regulated hazardous substances.

(g) **Interference.** Lessee shall peaceably and quietly have, hold and enjoy the Leased Premises against any person claiming by, through or under the Lessor and without disturbance by the Lessor, unless Lessee is found in default of the terms of this Lease and such default is continuing. Lessor shall not unreasonably interfere with Lessee's access to or maintenance of the Facilities or associated use of Leased Premises under this Lease; endanger the safety of Lessor, Lessee, the general public, private or personal property, or the Facilities; or install or maintain or permit to be installed or maintained vegetation, undergrowth, trees (including overhanging limbs and foliage and any trees standing which are substantially likely to fall), buildings, structures, installations, and any other obstructions which unreasonably interfere to Lessee access or use of the Facilities, Formations or Lessee's use of the Leased Premises under this Lease. Lessor shall not engage in any activity or permit its Related Persons to engage in any activity that might damage or undermine the physical integrity of any Formation or interfere with Lessee's use of the Leased Premises under this Lease, provided however that it is understood by Lessee that Lessor has no right to permit or to prohibit the exercise of any mineral rights not owned by Lessor at the time of entering into the Option to Lease between Lessor and Lessee with respect to the Leased Premises. Neither Lessee nor its agents will engage in any activity that damages existing oil, gas and other mineral exploration and development activities occurring on the Leased Premises without first obtaining permission from the relevant mineral rights holder.

(h) **Reservations.** Lessor reserves the right to sell, lease, or otherwise dispose of any interest in the Leased Premises subject to the rights granted in this Lease and agrees that sales, leases, or other dispositions of any interest or estate in the Leased Premises shall be expressly made subject to the terms of this Lease and shall not unreasonably interfere with Lessee's rights under this Lease.

(i) **Taxes.** Lessor shall pay for all real estate taxes and other assessments levied upon the Leased

Premises. Lessee shall pay any taxes, assessments, fines, fees, and other charges levied by any governmental authority against its Facilities on the Leased Premises. The Parties agree to cooperate fully to obtain any available tax refunds or abatements with respect to the Leased Premises. Lessee shall have the right to pay all taxes, assessments and other fees on behalf of Lessor and to deduct the amount so paid from other payments due to Lessor hereunder.

(j) **Amendments.** Lessee reserves the right to revise this Lease to remedy any mistakes, including correcting the names of the Parties, the legal description of the Leased Premises, or otherwise. In the event that any amendment alters the bonus and royalty payable under Section 5(a)-(b) of this Lease, the Lessee shall pay the Lessor the amount owed under the Lease as amended. Any amendments must be in writing and signed by both parties.

(k) **Remedies.** Notwithstanding anything to the contrary in this Lease, neither Party shall be liable to the other for any indirect, special, punitive, incidental or exemplary damages, whether foreseeable or not and whether arising out of or in connection with this Lease, by statute, in contract, tort, including negligence, strict liability or otherwise, and all such damages are expressly disclaimed.. This provision does not limit Lessee's obligation to indemnify Lessor for third-party suits, claims, or damages under Section 16 of this Lease.

(l) **Financial Responsibility.** Lessee will comply with all applicable law regarding financial responsibility for Carbon Dioxide storage, and will post bonds or other financial guarantees as required by the government entities.

(m) **Attorneys' Fees.** If any suit or action is filed or arbitration commenced by either Party against the other Party to enforce this Lease or otherwise with respect to the subject matter of this Lease, the prevailing party shall be entitled to recover reasonable costs and attorneys' fees incurred in investigation of related matters and in preparation for and prosecution of such suit, action, or arbitration as fixed by the arbitrator or court, and if any appeal or other form of review is taken from the decision of the arbitrator or any court, reasonable costs and attorneys' fees as fixed by the court.

(n) **Representations and Warranties.** Lessor represents and warrants to Lessee the following as of the Effective Date and covenants that throughout the Term: (i) Lessor has the full right, power and authority to grant rights, interests and license as contained in this Lease. Such grant of the right, interests and license does not violate any law, ordinance, rule or other governmental restriction applicable to the Lessor or the Leased Premises and is not inconsistent with and will not result in a breach or default under any agreement by which the Lessor is bound or that affects the Leased Premises. (ii) Neither the execution and delivery of this Lease by Lessor nor the performance by Lessor of any of its obligations under this Lease conflicts with or will result in a breach or default under any agreement or obligation to which Lessor is a party or by which Lessor or the Leased Premises is bound. (iii) All information provided by Lessor to Lessee, as it pertains to the Leased Premises' physical condition, along with Lessor's rights, interests and use of the Leased Premises, is accurate in all material respects. (iv) Lessor has no actual or constructive notice or knowledge of Hazardous Substances at, on, above, below or near the Leased Premises. (v) Each of the undersigned represents and warrants that they have the authority to execute this Lease on behalf of the Party for which they are signing.

(o) **Severability.** Should any provision of this Lease be held, in a final and unappealable decision by a court of competent jurisdiction, to be either invalid, void or unenforceable, the remaining provisions of this Lease shall remain in full force and effect, unimpaired by the holding. If the easements or other rights under this Lease are found to be in excess of the longest duration permitted by applicable law, the term of such easements or other rights shall instead expire on the latest date permitted by applicable law.

(p) **Memorandum of Lease.** This Lease shall not be recorded in the real property records. Lessee shall cause a memorandum of this Lease to be recorded in the real property records of the county in which the Leased Premises is situated. A recorded copy of said memorandum shall be furnished to Lessor within thirty (30) days of recording.

(q) **Notices.** All notices required to be given under this Lease shall be in writing, and shall be deemed to have been given upon (a) personal delivery, (b) one (1) Business Day after being deposited with FedEx or another reliable overnight courier service, with receipt acknowledgment requested, or (c) upon receipt or refused delivery deposited in the United States mail, registered or certified mail, postage prepaid, return

receipt required, and addressed to the respective Party at the addresses set forth at the beginning of this Lease, or to such other address as either Party shall from time to time designate in writing to the other Party.

(r) **No Waiver.** The failure of either Party to insist in any one or more instances upon strict performance of any of the provisions of this Lease or to take advantage of any of its rights hereunder shall not be construed as a waiver of any such provision or the relinquishment of any such rights, but the same shall continue and remain in full force and effect.

(s) **Estoppels.** Either party hereto (the "Receiving Party"), without charge, at any time and from time to time, within ten (10) Business Days after receipt of a written request by the other party hereto (the "Requesting Party"), shall deliver a written statement, duly executed, certifying to such Requesting Party, or any other person, firm or entity specified by such Requesting Party: (i) that this Lease is unmodified and in full force and effect, or if there has been any modification, that the same is in full force and effect as so modified and identifying the particulars of such modification; (ii) whether or not, to the knowledge of the Receiving Party, there are then existing any offsets or defenses in favor of such Receiving Party against enforcement of any of the terms, covenants and conditions of this Lease and, if so, specifying the particulars of same and also whether or not, to the knowledge of such Receiving Party, the Requesting Party has observed and performed all of the terms, covenants and conditions on its part to be observed and performed, and if not, specifying the particulars of same; and (iii) such other information as may be reasonably requested by the Requesting Party. Any written instrument given hereunder may be relied upon by the recipient.

(t) **Counterparts.** This Lease may be executed in any number of counterparts, each of which, when executed and delivered, shall be an original, but all of which shall collectively constitute one and the same instrument.

(u) **Governing Law.** This Lease shall be governed, interpreted, and enforced in accordance with the laws of the state of North Dakota.

(v) **Further Action.** Each Party will execute and deliver all documents, provide all information, and take or forbear from all actions as may be necessary or appropriate to achieve the purposes of this Lease, including without limitation executing a memorandum of easement and all documents required to obtain any necessary government approvals.

(w) **Entire Agreement.** This Lease, into which the attached **Exhibit A** is incorporated by reference, contains the entire agreement of the Parties. There are no other conditions, agreements, representations, warranties, or understandings, express or implied.

[*Remainder of page intentionally left blank. Signature page follows.*]

IN WITNESS OF THE ABOVE, Lessor and Lessee have caused this Lease to be executed and delivered by their duly authorized representatives as of the Effective Date.

**LESSOR:**

By:_____
Print:_____

By:_____
Print:_____

**LESSEE:**

MINNKOTA POWER COOPERATIVE, INC.

By:_____
Print:_____
Its:_____

## Exhibit A

## LEGAL DESCRIPTION OF THE PROPERTY

The Leased Premises consists of the lands located in Oliver County, North Dakota that are owned by the Lessor and generally described as follows:

For purposes of calculating the royalty payable under Section 5(b) of this Lease, the Parties stipulate that the Leased Premises consists of _____ acres.

**SURFACE USE AND PORE SPACE LEASE**

THIS SURFACE USE AND PORE SPACE LEASE **("Lease")** is made, entered into, and effective as of the _____day of _____, 2023 **("Effective Date")** by and Michael Dresser whose address 2435 Concho Loop, New Braunfels, TX 78130 (whether one or more, **"Lessor"),** and Minnkota Power Cooperative, Inc., a Minnesota cooperative association, whose address is 5301 32nd Ave S, Grand Forks, ND 58201 (whether one or more, **"Lessee").** Lessor and Lessee are sometimes referred to in this Lease individually as a **"Party"** and collectively as the **"Parties."**

1. **DEFINITIONS.** The following terms shall have the following meanings in this Lease:

**"Carbon Dioxide"** means carbon dioxide in gaseous, liquid, or supercritical fluid state together with incidental associated substances derived from the source materials, capture process and any substances added or used to enable or improve the injection process.

**"Commencement of Operations"** means the date on which Carbon Dioxide is first injected into a Reservoir for commercial operations under this Lease, provided that the performance of test injections and related activities shall not be deemed Commencement of Operations.

**"Commission"** means the North Dakota Industrial Commission.

**"Completion Notice"** means a certificate of project completion issued to Lessee by the Commission pursuant to Chapter 38-22 of the North Dakota Century Code.

**"Environmental Attributes"** means any and all credits, benefits, emissions reductions, offsets, and allowances, howsoever entitled, attributable to the Operations, including any avoided emissions and the reporting rights related to these avoided emissions, such as 26 U.S.C. §45Q Tax Credits.

**"Environmental Incentives"** means any and all credits, rebates, subsidies, payments or other incentives that relate to the use of technology incorporated into the Operations, environmental benefits of Operations, or other similar programs available from any regulated entity or any Governmental Authority.

**"Facilities"** means all facilities, structures, improvements, fixtures, equipment, and any other personal property at any time acquired or constructed by or for Lessee that are necessary or desirable in connection with any use of Reservoirs and their Formations or Operations, including without limitation wells, pipelines, roads, utilities, metering or monitoring equipment, and buildings.

**"Financing Parties"** means person or persons providing construction or permanent financing to Lessee in connection with construction, ownership, operation and maintenance of Facilities or Operations, including financial institutions, leasing companies, institutions, tax equity partners, joint venture partners and/or private lenders.

**"Formation"** means the geological formation of which any Reservoir is a part.

**"Hazardous Substance"** means any chemical, waste or other substances, expressly excluding Carbon Dioxide and Non-Native Carbon Dioxide, (a) which now or hereafter becomes defined as or included in the definition of "hazardous substances," "hazardous wastes," "hazardous materials," "extremely hazardous wastes," "restricted hazardous wastes," "toxic substances," "toxic pollutants," "pollutions," "pollutants," "regulated substances," or words of similar import under any law pertaining to environment, health, safety or welfare, (b) which is declared to be hazardous, toxic or polluting by any Governmental Authority, (c) exposure to which now or hereafter prohibited, limited or regulated by any Governmental Authority, (d) the storage, use, handling, disposal or release of which is restricted or regulated by any Governmental Authority, or (e) for which remediation or cleanup is required by any Governmental Authority.

**"Leased Premises"** means the surface and subsurface of the land, excluding mineral rights, described in **Exhibit A** of this Lease.

**"Native Oil and Gas"** means all oil, natural gas, and other hydrocarbons present in and under the Leased Premises and not injected by Lessor, Lessee or any third party.

**"Non-Native Carbon Dioxide"** means Carbon Dioxide that is not naturally occurring in the

Reservoir together with incidental associated substances, fluids, minerals, oil, and gas, excluding that which, independent of Operations, originates from an accumulation meeting the definition of a Pool. All Non-Native Carbon Dioxide will be considered personal property of the Lessee and its successor and assigns under this Agreement.

**"Operating Year"** means the calendar year or portion of the calendar year following Commencement of Operations during which Operations occur.

**"Operations"** means the transportation and injection of Carbon Dioxide into a Reservoir after Commencement of Operations, and any withdrawal of this Carbon Dioxide, as well as the withdrawal of Non-Native Carbon Dioxide, for sale or disposal in accordance with applicable law.

**"Option Money"** means 20 percent of the Initial Term Payment (as such term is defined in that certain Option to Lease between Lessor and Lessee with respect to the Leased Premises).

**"Pool"** means an underground Reservoir containing a common accumulation of Native Oil and Gas that is economically recoverable. A zone of a structure that is completely separated from any other zone in the same structure is a Pool.

**"Pore Space"** means a cavity or void, whether natural or artificially created, in a Reservoir.

**"Related Person"** means any member, partner, principal, officer, director, shareholder, predecessor-in-interest, successor-in-interest, employee, agent, heir, representative, contractor, lessee, sublessee, licensee, invitee, permittee of a Party, Financing Parties or any other person or entity that has obtained or in future obtains rights or interests from, under or through a Party (excluding the other Party itself).

**"Reservoir"** means any subsurface stratum, sand, formation, aquifer, cavity or void, whether natural or artificially created, wholly or partially within the Leased Premises, suitable for the storage or sequestration of carbon dioxide or other gaseous substances.

**"Storage Fee"** means Lessor's proportionate share of [fifty and 0/100th] cents ($0.[50]) per metric ton of Carbon Dioxide ("Storage Rate") as determined by the Lessee's last meter before injection as part of Operations. The Storage Rate was determined based on an agreed commercial value of the lease of the Leased Premises as of the Effective Date. If there is a subsequent change in the commercial value of the lease of the Leased Premises because of a change in Applicable Law resulting in a change in, or Lessee's qualification for, the $85 per metric ton IRC section 45Q tax credit (including for inflation adjustments or changes in Applicable Law), the Storage Rate shall be proportionately changed based on the ratio of the Storage Rate on the Effective Date ($0.[50]) and $85. (effective as of the effective date of the change in the IRC section 45Q tax credit amount) The Storage Fee shall be: (i) calculated separately for each Amalgamated Unit as created and established by the Commission that includes any portion of the Leased Premises; (ii) limited to the Carbon Dioxide injected in said Amalgamated Unit in the immediately preceding Operating Year; and (iii) based on the Lessor's proportionate per net acre share of said unit. For avoidance of doubt, the Lessor shall receive a separate Storage Fee for each Amalgamated Unit created and established by the Commission that includes any portion of the Leased Premises on a net acre basis within the Lessor's interest being the numerator and the acres in the Amalgamated Unit being the denominator.

**"Tax Credits"** means any and all (a) investment tax credits, (b) production tax credits, (c) credits under 26 U.S.C. §45Q credits, and (d) similar tax credits or grants under federal, state or local law relating to construction, ownership or Operations

**2. LEASE RIGHTS.** In consideration of the compensation, covenants, agreements, and conditions set forth in this Lease, Lessor grants, demises, leases and lets to Lessee the exclusive right to use all Pore Space, Reservoirs and their Formations in the Leased Premises for any purpose not previously granted or reserved by an instrument of record related to the capture, injection, storage, sequestration, sale, withdrawal or disposal of Carbon Dioxide, Non-Native Carbon Dioxide and incidental associated substances, fluids, and minerals, provided that Lessee shall have no right to use potable water from within the Leased Premises in Operations; together with the following exclusive rights:

(a) to use the Leased Premises for developing, constructing, installing, improving,

maintaining, replacing, repowering, relocating, removing, abandoning in place, expanding, and operating Facilities;

(b) to lay, maintain, replace, repair, and remove roads on the Leased Premises to allow Lessee, in its sole discretion, to exercise its rights under this Lease; and

(c) to enter upon and use the Leased Premises for the purposes of conducting:

(i) any investigations, studies, surveys, and tests, including without limitation drilling and installing test wells and monitoring wells, seismic testing, and other activities as Lessee deems necessary or desirable to determine the suitability of the Leased Premises for Operations,

(ii) any inspections and monitoring of Reservoirs and Carbon Dioxide as Lessee or any governmental authority deems necessary or desirable during the term of this Lease, and

(iii) any maintenance to the Facilities that Lessee or any governmental authority deems necessary or as required by applicable law.

Lessor also hereby grants and conveys unto Lessee all other and further easements across, over, under and above the Leased Premises as reasonably necessary to provide access to and services reasonably required for Lessee's performance under the Lease. The easements granted hereunder shall run with and burden the Leased Premises for the term of this Lease. Notwithstanding the surface easements granted herein, Lessee shall provide notice to Lessor prior to accessing the surface of the Property, and if such activity requires permit then prior notice shall be in form and not be less than that required by law or rule.

Lessee may exercise its rights under this Lease in conjunction with related operations on other properties near the Leased Premises. Lessee shall have no obligation, express or implied, to begin, prosecute or continue storage operations in, upon or under the Leased Premises, or to store and/or sell or use all or any portion of the gaseous substances stored thereon. The timing, nature, manner and extent of Lessee's operations, if any, under this Lease shall be at the sole discretion of Lessee. All obligations of Lessee are expressed herein, and there shall be no covenants implied under this Lease, it being agreed that all amounts paid hereunder constitute full and adequate consideration for this Lease.

**3. INITIAL TERM.** This Lease shall commence on the Effective Date and shall continue for an initial term of twenty (20) years ("Initial Term") unless sooner terminated in accordance with the terms of this Lease. Lessee may, but is not obligated to, extend the Initial Term for up to four successive five-year periods (each individually an "Extension Period") by paying Lessor $25.00 per net acre in the Leased Premises per five-year Extension Period (the "Renewal Payment") on or prior to the last day of the Initial Term or expiring five-year Extension Period, as applicable. The Initial Term together with any Extension Periods exercised by Lessee are referred to as the "Primary Term." Beginning in the 19th year of the Initial Term, and each successive Extension Period thereafter, the Renewal Payment in this Section 3 shall each be adjusted for inflation as follows: Renewal Payment = (existing Renewal Payment) x (the applicable Cumulative CPI Percentage increase, expressed as a percentage, since the last adjustment, if any) + (existing Renewal Payment). For illustration only, the CPI in 2023 will be compared to the CPI in 2042 and the amount for the five year Extension Period commencing 2043 through 2048 shall be increased by the percentage difference determined as follows: Cumulative CPI Percentage = (CPI for 2042 - CPI for 2023) / (CPI for 2023) x (100). Further, for the second Extension Period for years 2049 through 2054, the CPI in 2042 will be compared to the CPI in 2048 and the amount for years 2049 through 2054 will be increased by the percentage difference, determined as follows: Cumulative CPI percentage = (CPI for 2048 - CPI for 2042) / (CPI for 2042) x (100), and so on.

For purposes of this Section 3, CPI means Consumer Price Index published by the Bureau of Labor Statistics of the United States Department of Labor for Urban Wage Earners and Clerical Workers (CPI-W) for the Midwest Region, all items, not seasonally adjusted, reference base period of 1982-84= 100. In the event the Consumer Price Index is converted to a different standard reference base or otherwise revised, the determination of Renewal Payment will be made with the use of such

conversion factor, formula or table for converting the Consumer Price Index as may be published by the Bureau of Labor Statistics. If the Consumer Price Index ceases to be published and there is no successor thereto, such other index as Lessor and Lessee may agree upon will be substituted for the Consumer Price Index.

**4. OPERATIONAL TERM.** Upon Commencement of Operations at any time during the Primary Term, this Lease shall continue for so long as any portion of the Leased Premises or Lessee's Facilities are subject to a permit issued by the Commission or under the ownership or control of the State of North Dakota ("Operational Term"); *provided, however*, that all of Lessee's obligations under this Lease shall terminate upon issuance of a Completion Notice, except for payment of the Final Royalty Payment (as applicable), and Final Occupancy Fee (as applicable). If Commencement of Operations does not occur during the Primary Term, this Lease shall terminate, and Lessee shall execute a document evidencing termination of this Lease in recordable form and shall record it in the official records of the county in which the Leased Premises is located.

**5. COMPENSATION.**

(a) **Initial Term Payment.** Lessee shall pay to Lessor the greater of $50.00 per net acre in the Leased Premises ("Initial Term Payment") or a one-time flat $500.00 payment, the receipt and sufficiency of which are hereby acknowledged.

(b) **Royalty.** During the Operational Term, Lessee shall annually on or before May 31st pay to Lessor a royalty for the portions of the Leased Premises in an Amalgamated Unit, equal to the greater of a flat $100.00 payment or the Storage Fee(s) for the immediately preceding Operating Year. During the Operational Term, in addition to the forgoing royalty payment, Lessee shall annually on or before May 31st pay to the Lessor a $5.00 per acre payment for portions of the Leased Premises not in an Amalgamated Unit. For the Operating Year in which Lessee provides Lessor with a Completion Notice, Lessee shall pay a pro rata share of the Storage Fee(s) ("Final Royalty Payment"), as applicable, and said payment shall be made within sixty days after the date the Completion Notice was issued.

(c) **Occupancy Fee.** Within sixty days of the anniversary of the Effective Date after which any Facilities are installed or used, Lessee shall pay Lessor, as applicable, a one-time fee of (i) $3,000.00 per net surface acre of the Leased Premises occupied by Facilities (excluding pipelines), and (ii) $1.50 for each linear foot of pipeline in place on the Leased Premises. For the year in which Lessee provides Lessor with a Completion Notice, Lessee shall pay any fees owed pursuant to this provision ("Final Occupancy Fee") within sixty days after the date the Completion Notice was issued.

Lessor and Lessee agree that the Lease shall continue as specified herein even in the absence of Operations and the payment of royalties.

**6. AMALGAMATION.** (a) Lessee, in its sole discretion, shall have the right and power, at any time (including both before and after Commencement of Operations), to pool, unitize, or amalgamate any Reservoir or portion of a Reservoir with any other lands or interests into which that Reservoir extends and document such unit in accordance with applicable law or agency order ("Amalgamated Unit" or "Amalgamated Units"). Amalgamated Units shall be of such shape and dimensions as Lessee may elect and as are approved by the Commission. Amalgamated Units may include, but are not required to include, land upon which injection or extraction wells have been completed or upon which the injection and/or withdrawal of Carbon Dioxide and Non-Native Carbon Dioxide has commenced prior to the effective date of amalgamation. In exercising its amalgamation rights under this Lease and if required by law, Lessee shall record or cause to be recorded a copy of the Commission's amalgamation order or other notice thereof in the county in which the Amalgamated Unit. Amalgamating in one or more instances shall, if approved by the Commission, not exhaust the rights of Lessee to amalgamate Reservoirs or portions of Reservoirs into other Amalgamated Units, and Lessee shall have the recurring right to revise any Amalgamated Unit formed under this Lease by expansion or contraction or both. Lessee may dissolve any Amalgamated Unit at any time and document such dissolution by recording an instrument in accordance with applicable law or agency order. Lessee shall have the right to negotiate, on behalf of and as agent for Lessor, any unit agreements and operating agreements with respect to the operation of any Amalgamated Units formed under this Lease.

(b) The injection and/or withdrawal of Carbon Dioxide and Non-Native Carbon Dioxide into a Reservoir from any property within a Amalgamated Unit that includes the Leased Premises shall be treated as if Operations were occurring on the Leased Premises, except that the royalty payable to Lessor under Section 5(b) of this Lease shall be Lessor's per net acre proportionate share of the total Storage Fee for the preceding Operating year's injection of Carbon Dioxide into the Amalgamated Unit.

**7. ENVIRONMENTAL INCENTIVES.** Unless otherwise specified, Lessee is the owner of all Environmental Attributes and Environmental Incentives and is entitled to the benefit of all Tax Credits or any other attributes of ownership of the Facilities and Operations. Lessor shall cooperate with Lessee in obtaining, securing and transferring all Environmental Attributes and Environmental Incentives and the benefit of all Tax Credits. Lessor shall not be obligated to incur any out-of-pocket costs or expenses in connection with such actions unless reimbursed by Lessee. If any Environmental Incentives are paid directly to Lessor, Lessor shall immediately pay such amounts over to Lessee.

**8. SURRENDER OF LEASED PREMISES.** Lessee shall have the unilateral right at any time and from time to time to execute and deliver to Lessor a written notice of surrender and/or release covering all or any part of the Leased Premises for which the subsurface pore space is not being utilized for storage as set forth herein, and upon delivery of such surrender and/or release to Lessor this Lease shall terminate as to such lands, and Lessee shall be released from all further obligations and duties as to the lands so surrendered and/or released, including, without limitation, any obligation to make payments provided for herein, except obligations accrued as of the date of the surrender and/or release.

**9. FACILITIES.**

(a) Lessee shall in good faith consult with Lessor regarding the location of any Facilities to be constructed on the Leased Premises. The location of the Facilities shall be within the sole discretion of Lessee with consent of the Lessor, not to be unreasonably withheld. The withholding of such consent by the Lessor regarding the location of the Facilities shall be deemed "unreasonable" if the proposed location of the Facility is located more than 500 feet from any currently occupied dwelling or currently used building existing on the Leased Premises as of the Effective Date. Lessee may erect fences around all or part of any above-ground Facilities (excluding roads) to separate Facilities from adjacent Lessor-controlled lands, and shall do so if Lessor so requests. Lessee shall maintain and repair at its expense any roads it constructs on the Leased Premises in reasonably safe and usable condition.

(b) Lessor and Lessee agree that all Facilities and property of whatever kind and nature constructed, placed or affixed on the rights-of-way, easements, patented or leased lands as part of Lessee's Operations, as against all parties and persons whomsoever (including without limitation any party acquiring interest in the rights-of-way, easements, patented or leased lands or any interest in or lien, claim or encumbrance against any of such Facilities), shall be deemed to be and remain the property of the Lessee, and shall not be considered to be fixtures or a part of the Leased Premises. Lessor waives, to the fullest extent permitted by applicable law, any and all rights it may have under the laws of the State of North Dakota, arising under this Lease, by statute or otherwise to any lien upon, or any right to distress or attachment upon, or any other interest in, any item constituting the Facilities or any other equipment or improvements constructed or acquired by or for Lessee and located on the leased Premises or within any easement area. Each Lessor and Lessee agree that the Lessee (or the designated assignee of Lessee or Financing Parties) is the tax owner of any such Facilities, structures, improvements, equipment and property of whatever kind and nature and all tax filings and reports will be filed in a manner consistent with this Lease. Facilities shall at all times retain the legal status of personal property as defined under Article 9 of the Uniform Commercial Code. If there is any mortgage or fixture filing against the Premises which could reasonably be construed as prospectively attaching to the Facilities as a fixture of the Premises, Lessor shall provide a disclaimer or release from such lienholder. Lessor, as fee owner, consents to the filing of a disclaimer of the Facilities as a fixture of the Premises in the Oliver County Recorder's Office, or where real estate records of Oliver County are customarily filed.

**10. SURFACE DAMAGE COMPENSATION ACT.** The compensation contemplated and paid to Lessor hereunder is compensation for, among other things, damages sustained by Lessor for the lost use of and access to Lessor's land, pore space (to the extent required under North Dakota law), and any other damages which are contemplated under Ch. 38-11.1 of the North Dakota Century Code (to the extent applicable).

**11. MINERALS, OIL AND GAS.** This Lease is not intended to grant or convey, nor does it grant or convey, any right to or obligation for Lessee to explore for or produce minerals, including Native Oil and Gas, that may exist on the Leased Premises. Lessee shall not engage in any activity or permit its Related Persons to engage in any activity that unreasonably interferes with the Lessor's or third party's (or parties') rights to the granted, leased, or reserved mineral interests. If Lessor owns hydrocarbon mineral interests in the Leased Premises and Lessee should inadvertently discover a Pool in conjunction with its efforts to explore for and develop a Reservoir for Operations, Lessee shall inform Lessor within 60 days of discovery. If Lessee determines that it will not use in conjunction with Operations a well that has encountered a Pool within the Leased Premises, Lessor shall have the option but not the obligation to buy such well at cost, provided Lessor has the ability and assumes all permits and risks and liabilities which are associated with the ownership and operation of an oil, gas or mineral well.

**12. FORCE MAJEURE.** Should Lessee be prevented from complying with any express or implied covenant of this Lease, from utilizing the Leased Premises for underground storage purposes by reason of scarcity of or an inability to obtain or to use equipment or material failure or breakdown of equipment, or by operation of force majeure (including, but not limited to, riot, insurrection, war (declared or not), mobilization, explosion, labor dispute, fire, flood, earthquake, storm, lightning, tsunami, backwater caused by flood, vandalism, act of the public enemy, terrorism, epidemic, pandemic (including COVID-19), civil disturbances, strike, labor disturbances, work slowdown or stoppage, blockades, sabotage, labor or material shortage, national emergency, and the amendment, adoption or repeal of or other change in, or the interpretation or application of, any applicable laws, orders, rules or regulations of governmental authority), then while so prevented, Lessee's obligation to comply with such covenant shall be suspended and this Lease shall be extended while and so long as Lessee is prevented by any such cause from utilizing the property for underground storage purposes and the time while Lessee is so prevented shall not be counted against Lessee, anything in this Lease to the contrary notwithstanding.

**13. DEFAULT/TERMINATION.** Lessor may not terminate the Lease for any reason whatsoever unless a Default Event has occurred and is continuing consistent with the terms of this Section 13. Any Party that fails to perform its responsibilities as listed below shall be deemed to be the "Defaulting Party," the other Party shall be deemed to be the "Non-Defaulting Party," and each event of default shall be a "Default Event." A Default Event is: (a) failure of a Party to pay any amount due and payable under this Lease, other than an amount that is subject to a good faith dispute, within thirty (30) days following receipt of written notice from Non-Defaulting Party of such failure to pay; or (b) a material violation or default of any terms of this Lease by a Party, provided the Non-Defaulting Party provides written notice of violation or default and Defaulting Party fails to substantially cure the violation or default within sixty (60) days after receipt of said notice to cure such violations or defaults. Parties acknowledge that in connection with any construction or long-term financing or other credit support provided to Lessee or its affiliates by Financing Parties, that such Financing Parties may act to cure a continuing Default Event and Lessor agrees to accept performance from any such Financing Parties so long as such Financing Parties perform in accordance with the terms of this Lease. If Lessee, its affiliates or Financing Parties, fail to substantially cure such Default Event within the applicable cure period, Lessor may terminate the Lease. Lessee may terminate the lease with thirty (30) days written notice to Lessor. Upon termination of this Lease, Lessee shall have one hundred eighty (180) days to remove, plug, and/or abandon in place all Facilities of Lessee located on the Leased Premises in accordance with applicable permit requirements or other applicable statutes, rules or regulations.

**14. ASSIGNMENT.** (a) Lessor shall not sell, transfer, assign or encumber the Facilities or any part of Operations, Lessee's title or Lessee's rights under this Lease. (b) Lessee has the right to sell, assign, mortgage, pledge, transfer, use as collateral, or otherwise collaterally assign or convey all or any of its rights under this Lease, including, without limitation, an assignment by Lessee to Financing Parties. (c) In the event Lessee assigns its rights under this Lease, Lessee shall be relieved of all obligations with respect to the assigned portion arising after the date of assignment so long as notice

of such assignment is provided to Lessor, and provided that Lessee shall not be relieved from any obligation in respect of any payment or other obligations that have not been satisfied or performed prior to such date of assignment. (d) This Lease shall be binding on and inure to the benefit of the successors and assignees. The assigning Party shall provide written notice of any assignment within sixty (60) days after such assignment has become effective; provided, however, that an assigning Party's failure to deliver written notice of assignment within such 60-day period shall not be deemed a breach of this Lease unless such failure is willful and intentional. Further, no change or division in Lessor's ownership of or interest in the Leased Premises or royalties shall enlarge the obligations or diminish the rights of Lessee or be binding on Lessee until after Lessee has been furnished with a written assignment or a true copy of the assignment with evidence that same has been recorded with the Oliver County Recorder's Office.

**15. FINANCING.** (a) Lessor acknowledges that Lessee may obtain tax equity, construction, long-term financing and other credit support from one or more Financing Parties and that Lessee intends to enter into various agreements and execute various documents relating to such financing, which documents may, among other things, assign this Lease and any related easements to a Financing Party, grant a sublease in the Leased Premises and a lease of the Facilities from such Financing Party to Lessee, grant the Financing Parties a sublease or other real property interest in Lessee's interests in and to the Leased Premises, grant a first priority security interest in Lessee's interest in the Facilities and/or this Lease and Lessee's other interests in and to the Leased Premises, including, but not limited to, any easements, rights of way or similar interests (such documents, "Financing Documents"). Lessor acknowledges notice of the foregoing and consents to the foregoing actions and Financing Documents described above.

(b) Lessor agrees, to execute, and agrees to cause any and all of Lessor's lenders to execute, such commercially reasonable subordination agreements, non-disturbance agreements, forbearance agreements, consents, estoppels, modifications of this Lease and other acknowledgements of the foregoing as Lessee or the Financing Parties may reasonably request (collectively, "Lessor Financing Consent Instruments"). Lessor acknowledges and agrees that (i) Lessee's ability to obtain financing for the construction and operation of the Facilities is dependent upon the prompt cooperation of Lessor and its lenders as contemplated by this Section 15; (ii) if Lessee is unable to close on the financing for the Facilities, the construction of the Facilities and the Commencement of Operations will not likely occur; and (iii) it is in the best interest of both Lessee and Lessor for Lessee to obtain financing from the Financing Parties as contemplated by this Section 15. Therefore, Lessor agrees to act promptly, reasonably and in good faith in connection with any request for approval and execution of all Lessor Financing Consent Instruments. The Lessor shall also reasonably cooperate with the Lessee or the Financing Party in the making of any filings required by such requesting party for regulatory compliance or in accordance with applicable laws and in the operation and maintenance of the Facilities, all solely at the expense of the Lessee.

(c) As a precondition to exercising any rights or remedies as a result of any default or alleged default by Lessee under this Lease, Lessor shall deliver a duplicate copy of the applicable notice of default to each Financing Parties concurrently with delivery of such notice to Lessee, specifying in detail the alleged default and the required remedy, provided Lessor was given notice of such Financing Parties and if no such notice of default is required to be delivered to Lessee under this Lease, Lessor may not terminate this Lease unless Lessor has delivered a notice of default to each Financing Party specifying in detail the alleged default or breach and permitting each Financing Party the opportunity to cure as provided in this Section 15(c). Each Financing Party shall have the same period after receipt of a notice of default to remedy default, or cause the same to be remedied, as is given to Lessee after Lessee's receipt of a notice of default under this Lease, plus, in each instance, the following additional time periods: (i) ten (10) Business Days in the event of any monetary default; and (ii) sixty (60) days in the event of any non-monetary default; provided, however, that (A) such sixty (60)-day period shall be extended for an additional sixty 60 days to enable such Financing Party to complete such cure, including the time required for such Financing Party to obtain possession of the Facilities (including possession by a receiver), institute foreclosure proceedings or otherwise perfect its right to effect such cure and (B) such Financing Party shall not be required to cure those defaults which are not reasonably susceptible of being cured or performed. Lessor shall accept such performance by or at the instance of a Financing Party as if the performance had been made by Lessee.

(d) If any Lessee Default Event cannot be cured without obtaining possession of all or part of the Facilities and/or the leasehold interest created by the Lease (the "Leasehold Estate"), then any such Lessee Default Event shall nonetheless be deemed remedied if: (i) within sixty (60) days after receiving the notice of default, a Financing Party acquires possession thereof, or commences appropriate judicial or non-judicial proceedings to obtain the same; (ii) such Financing Party is prosecuting any such proceedings to completion with commercially reasonable diligence; and (iii) after gaining possession thereof, such Financing Party performs all other obligations as and when the same are due in accordance with the terms of the Lease. If a Financing Party is prohibited by any process or injunction issued by any court or by reason of any action of any court having jurisdiction over any bankruptcy or insolvency proceeding involving Lessee from commencing or prosecuting the proceedings described above, then the sixty (60)-day period specified above for commencing such proceedings shall be extended for the period of such prohibition.

(e) Financing Parties shall have no obligation or liability to the Lessor for performance of the Lessee's obligations under the Lease prior to the time the Financing Party acquires title to the Leasehold Estate. A Financing Party shall be required to perform the obligations of the Lessee under this Lease only for and during the period the Financing Party directly holds such Leasehold Estate. Any assignment pursuant to this Section 15 shall release the assignor from obligations accruing under this Lease after the date the liability is assumed by the assignee.

(f) Each Financing Party shall have the absolute right to do one, some or all of the following things: (i) assign the rights, mortgage or pledge held by Financing Party (the "Financing Party's Lien"); (ii) enforce the Financing Party's Lien; (iii) acquire title (whether by foreclosure, assignment in lieu of foreclosure or other means) to the Leasehold Estate; (iv) take possession of and operate the Facilities or any portion thereof and perform any obligations to be performed by Lessee under the Lease, or cause a receiver to be appointed to do so; (v) assign or transfer the Leasehold Estate to a third party; or (vi) exercise any rights of Lessee under this Lease. Lessor's consent shall not be required for any of the foregoing; and, upon acquisition of the Leasehold Estate by a Financing Party or any other third party who acquires the same from or on behalf of the Financing Party or any purchaser who purchases at a foreclosure sale, Lessor shall recognize the Financing Party or such other party (as the case may be) as Lessee's proper successor, and this Lease shall remain in full force and effect.

(g) If this Lease is terminated for any reason whatsoever, including a termination by Lessor on account of a Lessee Default Event, or if this Lease is rejected by a trustee of Lessee in a bankruptcy or reorganization proceeding or by Lessee as a debtor-in-possession (whether or not such rejection shall be deemed to terminate this Lease), if requested by Financing Party, Lessor shall execute a new lease (the "New Lease") for the Leased Premises with the Financing Parties (or their designee(s), if applicable) as Lessee, within thirty (30) days following the date of such request. The New Lease shall be on substantially the same terms and conditions as are in this Lease (except for any requirements or conditions satisfied by Lessee prior to the termination or rejection). Upon execution of the New Lease by Lessor, Financing Parties (or their designee, if applicable) shall pay to Lessor any and all sums owing by Lessee under this Lease that are unpaid and that would, at the time of the execution of the New Lease, be due and payable under this Lease if this Lease had not been terminated or rejected. The provisions of this Section 15(g) shall survive any termination of this Lease prior to the expiration of the Term, and any rejection of this Lease in any bankruptcy or reorganization proceeding.

(h) Lessor consents to each Financing Party's security interest, if any, in the Facilities and waives all right of levy for rent and all claims and demands of every kind against the Facilities, such waiver to continue so long as any sum remains owing from Lessee to any Financing Parties. Lessor agrees that the Facilities shall not be subject to distraint or execution by, or to any claim of, Lessor.

(i) Notwithstanding Lessor's obligations and consents under this Section 15 Lessor shall not be obligated to execute any mortgage or grant of security interest in Lessor's interest in and to the Leased Premises for the benefit of Lessee.

**16. INDEMNIFICATION; WAIVER.** (a) Each Party shall indemnify, defend, and hold harmless the other Party and its Related Persons from and against any and all third-party suits, claims, or damages suffered or incurred by the indemnified Party and its Related Persons arising out of

physical damage to property and physical injuries to any person, including death, caused by the indemnifying Party or its Related Persons except to the extent such claims arise out of the negligence or willful misconduct of the indemnified Party or its Related Persons. (b) Each Party shall indemnify, defend and hold harmless the other Party and its Related Persons from and against all suits, claims, or damages suffered or incurred by the indemnified Party and its Related Persons arising out of or relating to the existence at, on, above, below or near the Leased Premises of any Hazardous Substance, except to the extent deposited, spilled or otherwise caused by the indemnified Party or any of its contractors or agents, provided that Lessee shall not be obligated to indemnify Lessor with respect to any Hazardous Substance on the Leased Premises prior to the Effective Date.

**17. INSURANCE.** Lessee shall, at its sole cost and expense, keep and maintain in force commercial general liability insurance including broad form property damage liability, personal injury liability, and contractual liability coverage, on an "occurrence" basis, with a combined single limit, which may be effected by primary and excess coverage, of not less than Five Million Dollars ($5,000,000.00) during the primary term, except that such limit in the Primary Term shall be instead not less than One Million Dollars ($1,000,000.00) until such time as Lessee commences physical testing of any injection wells or other similar commercial activities, with such commercially reasonable deductibles as Lessee, in its discretion, may deem appropriate. Lessor shall be named as an additional insured in such policy but only to the extent of the liabilities specifically assumed by the Lessee under this Lease. The policy shall contain provisions by which the insurer waives any right of subrogation it may have against Lessor and shall be endorsed to provide that the insurer shall give Lessor thirty days written notice before any material modification or termination of coverage. Upon Lessor's request, Lessee shall promptly deliver certificates of such insurance to Lessor.

**18. MISCELLANEOUS.**

(a) **Confidentiality.** Lessor shall maintain in the strictest confidence, and shall require each of Lessor's Related Persons to hold and maintain in the strictest confidence, for the benefit of Lessee, all information pertaining to the compensation paid under this Lease, any information regarding Lessee and its business, operations on the Leased Premises or on any other lands, the capacity and suitability of the Reservoir, and any other information that is deemed proprietary or that Lessee requests or identifies to be held confidential, in each such case whether disclosed by Lessee or discovered by Lessor.

(b) **Liens.** (i) Lessee shall protect the Leased Premises from liens of every character arising from its activities on the Leased Premises, provided that Lessee may, at any time and without the consent of Lessor, encumber, hypothecate, mortgage, pledge, or collaterally assign (including by mortgage, deed of trust or personal property security instrument) all or any portion of Lessee's right, title or interest under this Lease (but not Lessor's right, title or interest in the Leased Premises), as security for the repayment of any indebtedness and/or the performance of any obligation. (ii) Lessor shall not directly or indirectly cause, create, incur, assume or allow to exist any mortgage, pledge, lien, charge, security interest, encumbrance or other claim of any nature on or with respect to the Facilities, Operations or any interest therein. Lessor shall immediately notify Lessee in writing of the existence of any such mortgage, pledge, lien, charge, security interest, encumbrance or other claim, shall promptly cause the same to be discharged and released of record without cost to Lessee, and shall indemnify the Lessee against all costs and expenses (including reasonable attorneys' fees) incurred in discharging and releasing any such mortgage, pledge, lien, charge, security interest, encumbrance or other claim.

(c) **Warranty of Title.** Lessor represents and warrants to Lessee that Lessor is the owner in fee of the surface and subsurface pore space of the Leased Premises. Lessor hereby warrants and agrees to defend title to the Leased Premises and Lessor hereby agrees that Lessee, at its option, shall have the right to discharge any tax, mortgage, or other lien upon the Leased Premises, and in the event Lessee does so, Lessee shall be subrogated to such lien with the right to enforce the same and apply annual rental payments or any other such payments due to Lessor toward satisfying the same. At any time on or after the Effective Date, Lessee may obtain for itself and/or any Financing Party, at Lessee's expense, a policy of title insurance in a form and with exceptions acceptable to Lessee and/or such Financing Party in its sole discretion (the "Title Policies"). Lessor agrees to cooperate fully and promptly with Lessee in its efforts to obtain the Title Policies, and Lessor shall take such actions as Lessee or any Financing Party may reasonably request in connection therewith.

(d) **Conduct of Operations.** Each Party shall, at its expense, use best efforts to comply (and cause its Related Persons to comply) in all material respects with all laws applicable to its (or their) activities on the Leased Premises, provided that each Party shall have the right, in its sole discretion, to contest, by appropriate legal proceedings, the validity or applicability of any law, and the other Party shall cooperate in every reasonable way in such contest, at no out-of-pocket expense to the cooperating Party. During the Primary Term, Lessee, its agents, affiliates, servants, employees, nominees and licensees shall be entitled to: (i) apply for and obtain any necessary permits, approvals and other governmental authorizations (collectively called "Governmental Authorizations") required for the development, construction, operation and maintenance of the Project and Lessor agrees to co-operate, execute, obtain or join with Lessee in any applications or proceedings relating to the Governmental Authorizations upon Lessee's written request and at Lessee's direction, cost and expense; and (ii) apply for any approvals and permits and any zoning amendment of any area of the Leased Premises required in connection with the Project, and Lessor agrees to co-operate, execute, obtain or join with Lessee in any applications or proceedings relating to such approvals, permits and zoning amendments upon Lessee's written request and at Lessee's direction, cost and expense.

(e) **Title to Carbon Dioxide.** As between Lessor and Lessee, all right, title, interest and ownership to all Carbon Dioxide injected into any Reservoir shall belong to Lessee, as measured by corresponding Storage Fee payment to Lessor.

(f) **Hazardous Substances.** Lessee shall have no liability for any regulated hazardous substances located on the Leased Premises prior to the Effective Date or placed in, on or within the Leased Premises by Lessor or any of its Related Persons on or after the Effective Date, and nothing in this Lease shall be construed to impose upon Lessee any obligation for the removal of such regulated hazardous substances.

(g) **Interference.** Lessee shall peaceably and quietly have, hold and enjoy the Leased Premises against any person claiming by, through or under the Lessor and without disturbance by the Lessor, unless Lessee is found in default of the terms of this Lease and such default is continuing. Lessor shall not unreasonably interfere with Lessee's access to or maintenance of the Facilities or associated use of Leased Premises under this Lease; endanger the safety of Lessor, Lessee, the general public, private or personal property, or the Facilities; or install or maintain or permit to be installed or maintained vegetation, undergrowth, trees (including overhanging limbs and foliage and any trees standing which are substantially likely to fall), buildings, structures, installations, and any other obstructions which unreasonably interfere to Lessee access or use of the Facilities, Formations or Lessee's use of the Leased Premises under this Lease. Lessor shall not engage in any activity or permit its Related Persons to engage in any activity that might damage or undermine the physical integrity of any Formation or interfere with Lessee's use of the Leased Premises under this Lease, provided however that it is understood by Lessee that Lessor has no right to permit or to prohibit the exercise of any mineral rights not owned by Lessor at the time of entering into the Option to Lease between Lessor and Lessee with respect to the Leased Premises. Neither Lessee nor its agents will engage in any activity that damages existing oil, gas and other mineral exploration and development activities occurring on the Leased Premises without first obtaining permission from the relevant mineral rights holder.

(h) **Reservations.** Lessor reserves the right to sell, lease, or otherwise dispose of any interest in the Leased Premises subject to the rights granted in this Lease and agrees that sales, leases, or other dispositions of any interest or estate in the Leased Premises shall be expressly made subject to the terms of this Lease and shall not unreasonably interfere with Lessee's rights under this Lease.

(i) **Taxes.** Lessor shall pay for all real estate taxes and other assessments levied upon the Leased Premises. Lessee shall pay any taxes, assessments, fines, fees, and other charges levied by any governmental authority against its Facilities on the Leased Premises. The Parties agree to cooperate fully to obtain any available tax refunds or abatements with respect to the Leased Premises. Lessee shall have the right to pay all taxes, assessments and other fees on behalf of Lessor and to deduct the amount so paid from other payments due to Lessor hereunder.

(j) **Amendments.** Lessee reserves the right to revise this Lease to remedy any mistakes, including correcting the names of the Parties, the legal description of the Leased Premises, or otherwise. In the event that any amendment alters the bonus and royalty payable under Section 5(a)-(b) of this Lease, the Lessee shall pay the Lessor the amount owed under the Lease as amended. Any amendments must be in writing

and signed by both parties.

(k) **Remedies.** Notwithstanding anything to the contrary in this Lease, neither Party shall be liable to the other for any indirect, special, punitive, incidental or exemplary damages, whether foreseeable or not and whether arising out of or in connection with this Lease, by statute, in contract, tort, including negligence, strict liability or otherwise, and all such damages are expressly disclaimed.. This provision does not limit Lessee's obligation to indemnify Lessor for third-party suits, claims, or damages under Section 16 of this Lease.

(l) **Financial Responsibility.** Lessee will comply with all applicable law regarding financial responsibility for Carbon Dioxide storage, and will post bonds or other financial guarantees as required by the government entities.

(m) **Attorneys' Fees.** If any suit or action is filed or arbitration commenced by either Party against the other Party to enforce this Lease or otherwise with respect to the subject matter of this Lease, the prevailing party shall be entitled to recover reasonable costs and attorneys' fees incurred in investigation of related matters and in preparation for and prosecution of such suit, action, or arbitration as fixed by the arbitrator or court, and if any appeal or other form of review is taken from the decision of the arbitrator or any court, reasonable costs and attorneys' fees as fixed by the court.

(n) **Representations and Warranties.** Lessor represents and warrants to Lessee the following as of the Effective Date and covenants that throughout the Term: (i) Lessor has the full right, power and authority to grant rights, interests and license as contained in this Lease. Such grant of the right, interests and license does not violate any law, ordinance, rule or other governmental restriction applicable to the Lessor or the Leased Premises and is not inconsistent with and will not result in a breach or default under any agreement by which the Lessor is bound or that affects the Leased Premises. (ii) Neither the execution and delivery of this Lease by Lessor nor the performance by Lessor of any of its obligations under this Lease conflicts with or will result in a breach or default under any agreement or obligation to which Lessor is a party or by which Lessor or the Leased Premises is bound. (iii) All information provided by Lessor to Lessee, as it pertains to the Leased Premises' physical condition, along with Lessor's rights, interests and use of the Leased Premises, is accurate in all material respects. (iv) Lessor has no actual or constructive notice or knowledge of Hazardous Substances at, on, above, below or near the Leased Premises. (v) Each of the undersigned represents and warrants that they have the authority to execute this Lease on behalf of the Party for which they are signing.

(o) **Severability.** Should any provision of this Lease be held, in a final and unappealable decision by a court of competent jurisdiction, to be either invalid, void or unenforceable, the remaining provisions of this Lease shall remain in full force and effect, unimpaired by the holding. If the easements or other rights under this Lease are found to be in excess of the longest duration permitted by applicable law, the term of such easements or other rights shall instead expire on the latest date permitted by applicable law.

(p) **Memorandum of Lease.** This Lease shall not be recorded in the real property records. Lessee shall cause a memorandum of this Lease to be recorded in the real property records of the county in which the Leased Premises is situated. A recorded copy of said memorandum shall be furnished to Lessor within thirty (30) days of recording.

(q) **Notices.** All notices required to be given under this Lease shall be in writing, and shall be deemed to have been given upon (a) personal delivery, (b) one (1) Business Day after being deposited with FedEx or another reliable overnight courier service, with receipt acknowledgment requested, or (c) upon receipt or refused delivery deposited in the United States mail, registered or certified mail, postage prepaid, return receipt required, and addressed to the respective Party at the addresses set forth at the beginning of this Lease, or to such other address as either Party shall from time to time designate in writing to the other Party.

(r) **No Waiver.** The failure of either Party to insist in any one or more instances upon strict performance of any of the provisions of this Lease or to take advantage of any of its rights hereunder shall not be construed as a waiver of any such provision or the relinquishment of any such rights, but the same shall continue and remain in full force and effect.

(s) **Estoppels.** Either party hereto (the "Receiving Party"), without charge, at any time and from time to time, within ten (10) Business Days after receipt of a written request by the other party hereto (the

"Requesting Party"), shall deliver a written statement, duly executed, certifying to such Requesting Party, or any other person, firm or entity specified by such Requesting Party: (i) that this Lease is unmodified and in full force and effect, or if there has been any modification, that the same is in full force and effect as so modified and identifying the particulars of such modification; (ii) whether or not, to the knowledge of the Receiving Party, there are then existing any offsets or defenses in favor of such Receiving Party against enforcement of any of the terms, covenants and conditions of this Lease and, if so, specifying the particulars of same and also whether or not, to the knowledge of such Receiving Party, the Requesting Party has observed and performed all of the terms, covenants and conditions on its part to be observed and performed, and if not, specifying the particulars of same; and (iii) such other information as may be reasonably requested by the Requesting Party. Any written instrument given hereunder may be relied upon by the recipient.

(t) **Counterparts.** This Lease may be executed in any number of counterparts, each of which, when executed and delivered, shall be an original, but all of which shall collectively constitute one and the same instrument.

(u) **Governing Law.** This Lease shall be governed, interpreted, and enforced in accordance with the laws of the state of North Dakota.

(v) **Further Action.** Each Party will execute and deliver all documents, provide all information, and take or forbear from all actions as may be necessary or appropriate to achieve the purposes of this Lease, including without limitation executing a memorandum of easement and all documents required to obtain any necessary government approvals.

(w) **Entire Agreement.** This Lease, into which the attached **Exhibit A** is incorporated by reference, contains the entire agreement of the Parties. There are no other conditions, agreements, representations, warranties, or understandings, express or implied.

[*Remainder of page intentionally left blank. Signature page follows.*]

IN WITNESS OF THE ABOVE, Lessor and Lessee have caused this Lease to be executed and delivered by their duly authorized representatives as of the Effective Date.

**LESSOR:**

By:_____
Print:_____

By:_____
Print:_____

**LESSEE:**

MINNKOTA POWER COOPERATIVE, INC.

By:_____
Print:_____
Its:_____

**Exhibit A**

## LEGAL DESCRIPTION OF THE PROPERTY

The Leased Premises consists of the lands located in Oliver County, North Dakota that are owned by the Lessor and generally described as follows:

**Southeast Quarter of Section 35 of Township 142 North, Range 84 West of the Fifth Principal Meridian, Oliver County, North Dakota:**

The Southwest Quarter and Southeast Quarter of the Southeast Quarter of Section 35, Township 142 North, Range 84 West, Oliver County, North Dakota,

Containing 80 acres, more or less, according to the original Government Survey.

For purposes of calculating the royalty payable under Section 5(b) of this Lease, the Parties stipulate that the Leased Premises consists of 80 acres.

## LEASE PAYMENT CALCULATION

Enclosed is a check in the amount of $4,000.00 to for the following real property located in Oliver County, North Dakota described as:

| | |
|---|---|
| Total Initial Term Payment for Lease | $4,000.00 |

Including the enclosed check, MINNKOTA POWER COOPERATIVE, INC., has paid Michael Dresser ("Landowner") hereby acknowledges receipt of the sum of $4,000.00 in full payment for the initial term of the Lease.

Please return one (1) copy of this Lease Payment Calculation Minnkota Power Cooperative, within 30 days of your receipt of the enclosed notice and payment.

## PAYMENT RECORD

Paid by Company Voucher No. _____ Check No. 7900

Date 10/11/2023 Amount $4,000.00

Acknowledged by:

_____

_____

97803 8/18/2023 11:21 AM Total Pages: 3
BOOK: 45 PAGE: 270 FEES: $20.00 RB WARRANTY DEED
Mickie McNulty-Eide, OLIVER COUNTY RECORDER
By Rebecca Bethke, Deputy

SOLEM LAW OFFICE
PO BOX 249

BEULAH, ND 58523

RECORDER OLIVER SEAL COUNTY STATE OF NORTH DAKOTA

# WARRANTY DEED

THIS INDENTURE, made this 16th day of June, 2023, between **JOHNELL J. KUSLER and GEOFFREY E. TAYLOR**, wife and husband, whose post office address is 1884 Hillcrest Avenue, St. Paul, Minnesota 55116 AND **MILDA L. HEDBLOM, a/k/a MILDA K. HEDBLOM and EDWIN FOGELMAN, wife and husband**, whose post office address is 1801 Summit Avenue, St. Paul, Minnesota 55105, Grantors; and **KURT M. SWENSON and FAYE B. SWENSON Trustees of the Swenson Living Trust dated May 19, 2023**, whose post office address is 5774 21st Street SW, Beulah, North Dakota 58523, Grantees.

WITNESSETH, for and in consideration of the sum of One Hundred Eighty-Four Thousand Four Hundred and Eighty-Six Dollars ($184,486.00), Grantors do hereby GRANT to said Grantees all of the following real property lying and being in the County of Oliver, and State of North Dakota and described as follows, to-wit:

**Outlot "B" located in the East Half (E½) of the Northwest Quarter (NW¼) of Section Seven (7), Township One Hundred Forty-Two (142) North, Range Eighty-Seven (87) West of the 5th P.M., Oliver County, North Dakota LESS Lot One (1) of said Outlot "B".**

**The above legal description was obtained from a previously recorded instrument.**

**The Grantors except and reserve unto themselves all of the oil, gas, coal, and all other minerals presently owned by them and located in and under the above described real property, together with the right of ingress and egress at all times for the purpose of mining, drilling, exploring, operating and developing said lands for oil, gas, coal, and all other minerals containing fissionable materials, and all other minerals, and storing, handling, transporting and marketing the same therefrom with the right to remove from said land all of the Grantees' property and improvements.**

And the said Grantors, for themselves, their successors and assigns, do covenant with the

SOLEM LAW OFFICE
109 CENTRAL AVENUE S
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail:beulaw@westriv.com

Grantees, that they are well seized in fee of the land and premises aforesaid, and have good right to sell and convey the same in manner and form aforesaid; that the same are free from all encumbrances, except easements, reservations of record, and any outstanding protective covenants; and the above granted lands and premises in the quiet and peaceable possession of said Grantees, against all persons lawfully claiming or to claim the whole or any part thereof, the said Grantors will warrant and defend.

WITNESS, the hand of the Grantors:

**I certify that the full consideration paid for the property described in this Deed is $184,486.00.**

DATED: 8-4-23

SIGNED: _____

_____
**JOHNELL J. KUSLER**

_____
**GEOFFREY E. TAYLOR**

STATE OF NORTH DAKOTA )
)
COUNTY OF MERCER )

On this 16th day of June, 2023, before me, a Notary Public in and for said County and State, personally appeared **JOHNELL J. KUSLER and GEOFFREY E. TAYLOR,** known to me to be the persons that are described in and that executed the within instrument, and acknowledged to me that they executed the same.

SCOTT T. SOLEM
NOTARY PUBLIC
State of North Dakota
My Commission Expires: October 28, 2026

_____
NOTARY PUBLIC
MERCER COUNTY, NORTH DAKOTA

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

MILDA L. HEDBLOM

EDWIN FOGELMAN

STATE OF NORTH DAKOTA )
)
COUNTY OF MERCER )

On this 16th day of June, 2023, before me, a Notary Public in and for said County and State, personally appeared **MILDA L. HEDBLOM and EDWIN FOGELMAN,** known to me to be the persons that are described in and that executed the within instrument, and acknowledged to me that they executed the same.

SCOTT T. SOLEM
NOTARY PUBLIC
State of North Dakota
My Commission Expires: October 28, 2026

NOTARY PUBLIC
MERCER COUNTY, NORTH DAKOTA

Auditor's Office
Oliver County, N.D.
transfer entered this 18th day of
August 2023
County Auditor
By Deputy

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com



NWLA SUPP-043

Delinquent Taxes, Special Assessments, or Installments of Special Assessments Paid and Transfer Entered this 27 day of March, 2023.

Samantha Nelberg
Mercer County Auditor
By: Laycee Schneider
Deputy Auditor/Clerk

**225879**

**STATE OF NORTH DAKOTA**
**COUNTY OF MERCER**

**OFFICE OF COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 3/27/2023 at 10:40 AM, and was duly recorded as Book 179 DEED on Page 233 Fee: $20.00

County Recorder Shannan Senger
By Deputy Amber Gabert
Return To: SOLEM LAW OFFICE - BEULAH, PO BOX 249
Chg. BEULAH, ND 58523

MORTGAGEE
MORTGAGOR
INDEXED ✓

COUNTY RECORDER SEAL MERCER COUNTY, N. DAK

# WARRANTY DEED

THIS INDENTURE, made this 15th day of March, 2023, between **JOHNELL J. KUSLER, as Personal Representative of the Estate of James O. Kusler**, whose post office address is 1884 Hillcrest Avenue, St. Paul, Minnesota 55116, **JOHNELL J. KUSLER and GEOFFREY E. TAYLOR, wife and husband**, whose post office address is 1884 Hillcrest Avenue, St. Paul, Minnesota 55116, AND **MILDA L. HEDBLOM, a/k/a MILDA K. HEDBLOM and EDWIN FOGELMAN, wife and husband**, whose post office address is 1801 Summit Avenue, St. Paul, Minnesota 55105, Grantors; and **KURT M. SWENSON and FAYE B. SWENSON**, husband and wife, whose post office address is 5774 21st Street SW, Beulah, North Dakota 58523, Grantees.

WITNESSETH, for and in consideration of the sum of Two Hundred Forty-Four Thousand Six Hundred Two Dollars ($244,602.00), Grantors do hereby GRANT to said Grantees, as joint tenants with right of survivorship and not as tenants in common, all of the following real property lying and being in the County of Mercer, and State of North Dakota and described as follows, to-wit:

**Southeast Quarter (SE1/4) of Section Twenty-Seven (27), Township One Hundred Forty-Three (143) North, Range Eighty-Eight (88) West of the Fifth Principal Meridian, Mercer County, North Dakota.**

**The above legal description was obtained from a previously recorded instrument.**

**The Grantors except and reserve unto themselves all of the oil, gas, coal, and all other minerals presently owned by them and located in and under the above described real property, together with the right of ingress and egress at all**

SOLEM LAW OFFICE
109 CENTRAL AVENUE S
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail:beulaw@westriv.com

**times for the purpose of mining, drilling, exploring, operating and developing said lands for oil, gas, coal, and all other minerals containing fissionable materials, and all other minerals, and storing, handling, transporting and marketing the same therefrom with the right to remove from said land all of the Grantees' property and improvements.**

And the said Grantors, for themselves, their successors and assigns, do covenant with the Grantees, that they are well seized in fee of the land and premises aforesaid, and have good right to sell and convey the same in manner and form aforesaid; that the same are free from all encumbrances, except easements, reservations of record, and any outstanding protective covenants; and the above granted lands and premises in the quiet and peaceable possession of said Grantees, against all persons lawfully claiming or to claim the whole or any part thereof, the said Grantors will warrant and defend.

WITNESS, the hand of the Grantors:

**I certify that the full consideration paid for the property described in this Deed is $244,602.00.**

DATED: March 15, 2023

SIGNED: _____

Johnell J Kusler PR

**JOHNELL J. KUSLER, Personal Representative of the Estate of JAMES O. KUSLER**

STATE OF North Dakota )
)
COUNTY OF Mercer )

On this 15th day of March, 2023, before me, a Notary Public in and for said County and State, personally appeared **JOHNELL J. KUSLER,** as Personal Representative of the Estate of James O. Kusler, known to me to be the person that is described in and that executed the within instrument, and acknowledged to me that she executed the same.

SCOTT T SOLEM
NOTARY PUBLIC
State of North Dakota
My Commission Expires October 28, 2026

_____
NOTARY PUBLIC
Mercer COUNTY, North Dakota

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

Johnell J. Kusler
**JOHNELL J. KUSLER**

Geoffrey E. Taylor
**GEOFFREY E. TAYLOR**

STATE OF North Dakota )
)
COUNTY OF Mercer )

On this 15th day of March, 2023, before me, a Notary Public in and for said County and State, personally appeared **JOHNELL J. KUSLER and GEOFFREY E. TAYLOR,** known to me to be the persons that are described in and that executed the within instrument, and acknowledged to me that they executed the same.

SCOTT T. SOLEM
NOTARY PUBLIC
State of North Dakota
My Commission Expires: October 28, 2026

NOTARY PUBLIC
Mercer COUNTY, North Dakota

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

MILDA L. HEDBLOM

EDWIN FOGELMAN

STATE OF North Dakota )
)
COUNTY OF Mercer )

On this 15th day of March, 2023, before me, a Notary Public in and for said County and State, personally appeared **MILDA L. HEDBLOM and EDWIN FOGELMAN,** known to me to be the persons that are described in and that executed the within instrument, and acknowledged to me that they executed the same.

SCOTT T. SOLEM
NOTARY PUBLIC
State of North Dakota
My Commission Expires: October 28, 2026

NOTARY PUBLIC
Mercer COUNTY, North Dakota

SCOTT T. SOLEM
NOTARY PUBLIC
State of North Dakota
My Commission Expires: October 28, 2026

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

## Desirae Zaste

**From:** Tami L Norgard <tnorgard@vogellaw.com>
**Sent:** Wednesday, March 25, 2020 3:47 PM
**To:** Derrick Braaten
**Cc:** McCrum, Timothy; Weir, Pat
**Subject:** Contractor access for survey work on K-1 Alternative parcels

[Warning: External Sender]

Mr. Braaten,

As you know, I work with Billings County as local counsel on the Short's NEPA litigation and have otherwise worked with Billings County as special counsel for many years. Per your request of Tim McCrum last Wednesday, you asked that all right-of-way communications from KLJ to you clients should be transmitted solely through you. As such, I write to confirm that KLJ will have consultants on the Short parcels tomorrow in order to conduct the surveying identified in the attached March 12, 2020 letter. They may continue day to day if the work is not complete tomorrow. This plan was discussed yesterday during the status conference with the Federal Magistrate Judge, but I wanted to reiterate it in writing for everyone's confirmation. This type of pre-condemnation access is allowed by state law without an access agreement and without payment pursuant to NDCC 32-15-06 so long as the contractors conduct themselves in a manner that creates the least possible private injury and so long as they repair any damage that may be occasioned. No damage is expected, but the contractors will repair any damage caused.

If you have any questions or comments, please do not hesitate to contact me.

Tami Norgard

## Desirae Zaste

**From:** Tami L Norgard <tnorgard@vogellaw.com>
**Sent:** Thursday, March 26, 2020 3:39 PM
**To:** Derrick Braaten; JJ England
**Cc:** Weir, Pat; McCrum, Timothy
**Subject:** RE: Short v. Billings County

[Warning: External Sender]

Thank you.

**From:** Derrick Braaten <derrick@braatenlawfirm.com>
**Sent:** Thursday, March 26, 2020 3:36 PM
**To:** Tami L Norgard <tnorgard@vogellaw.com>; JJ England <jj@braatenlawfirm.com>
**Cc:** Weir, Pat <pweir@nd.gov>; McCrum, Timothy <rmccrum@crowell.com>
**Subject:** RE: Short v. Billings County

Ms. Norgard:

I disagree with your legal conclusions. Mr. Short is, however, communicating to the tenants that they should not obstruct surveyor access in the next week. This should not be construed as a waiver or acquiescence.

Derrick Braaten
BRAATEN LAW FIRM
109 North 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
Fax: 701-221-5842
derrick@braatenlawfirm.com
www.braatenlawfirm.com

**PRIVILEGED COMMUNICATION**
**This e-mail message is intended only for the named recipient(s) above and is covered by the Electronic Communications Privacy Act, 18 U.S.C. Sections 2510-2521. This e-mail is confidential and may contain information that is privileged, attorney work product or exempt from disclosure under applicable law. Recipients should not file copies of this e-mail with publicly accessible records. If you have received this message in error, please immediately notify the sender by return e-mail and delete this e-mail message from your computer.**

**From:** Tami L Norgard <tnorgard@vogellaw.com>
**Sent:** Thursday, March 26, 2020 1:52 PM
**To:** Derrick Braaten <derrick@braatenlawfirm.com>; JJ England <jj@braatenlawfirm.com>
**Cc:** Weir, Pat <pweir@nd.gov>; McCrum, Timothy <rmccrum@crowell.com>
**Subject:** Short v. Billings County

[Warning: External Sender]

Hi Derrick and JJ,

I tried to call your office today, but it appears your office is closed, so I will initiate this discussion by email. Per the KLJ letter dated March 12 to Shorts, the discussion in Federal Court on Tuesday and my confirming email yesterday, KLJ has surveyors on the Short property today to conduct the survey work indicated in the March 12 letter. Apparently, they

were stopped by the Short's tenants today, who threatened to call the Sheriff if KLJ steps foot off public roadways. Clearly the survey work will require them to step off the roadways, starting tomorrow. We are arming the Sheriff with appropriate information to respond to any tenant complaints. That said, you indicated that you wanted all landowner communication to be run through you, so I'm asking if you will please reach out to the Shorts' and their tenants and advise that KLJ has the right to survey the property, pursuant to NDCC 32-15-06.

> **32-15-06. Entry for making surveys.**
> In all cases when land is required for public use, the person or corporation, or the person's or corporation's agents, in charge of such use may survey and locate the same, but it must be located in the manner which will be compatible with the greatest public benefit and the least private injury and subject to the provisions of section 32-15-21. Whoever is in charge of such public use may enter upon the land and make examinations, surveys, and maps thereof, and such entry constitutes no claim for relief in favor of the owner of the land except for injuries resulting from negligence, wantonness, or malice.

KLJ has approximately 3-5 days of survey work on the property. I hope a discussion with the Sheriff isn't necessary. Please call me on my cell phone if you have questions or comments 218-790-1437.

Thank you,

Tami Norgard

Click here to report this email as spam.

## Desirae Zaste

**From:** Tami L Norgard <tnorgard@vogellaw.com>
**Sent:** Friday, April 10, 2020 5:25 PM
**To:** Derrick Braaten
**Cc:** Marcia Lamb; Weir, Pat
**Subject:** Little Mo-Survey follow up letters
**Attachments:** Litttle Mo-Survey letter follow up-Johnson Family.pdf; Billings County Litttle Mo-Survey letter follow up-Sarah Short Sarbacker.pdf; Billings County Litttle Mo-Survey letter follow up-Sandra Short.pdf

[Warning: External Sender]

Hello Mr. Braaten,

Attached please find follow up notice letters to Peggy Anderson, Sarah Short Sarbacker and Sandra Short, who I understand to be your clients. Per your directive that all right-of-way related correspondence go through you, I'm forwarding the letters to you by email. No paper copy will be sent to your clients.

Thank you,

Tami Norgard

April 10, 2020

Sandra Short
804 W. Merle Hibbs Blvd.
Marshalltown, IA 50158

Re: Research and Survey

Dear Sandra Short:

The purpose of this letter is a follow up to the letter mailed & dated March 12, 2020 and to notify you that crews have begun and will continue to be working in the area.

Contractors will conduct various survey activities that are necessary for us to complete the project, pursuant to the authority granted to the County pursuant to North Dakota Century Code 32-15-06 and 24-05-09. The surveys would generally consist of the following:

- Topographic Survey—A survey crew measuring the location and elevation of landforms and various features such as utility lines (above and below ground), property, and building corners.
- Soil Survey— A geotechnical engineering firm will be taking soil borings in order to analysis the soil at vary depths. To complete this operation a drilling truck will be used.

Be advised that the consultants will make every effort to cause no damage to your property. They want to complete the survey work now, while the ground is frozen, to cause the least private injury possible. If there is any damage occasioned by the access, Billings County will make sure the repairs are completed or injury remedied.

If you have questions or concerns regarding any of the information listed above, please contact KLJ Agent, Denese McLeish, at (701)355-8741 or email denese.mcleish@kljeng.com.

Sincerely,

Denese McLeish
ROW Department Manager

# ACCESS AGREEMENT

**Name:** Sarah Short Sarbacker

**Address:** 5608 S. Deer Park Dr., Sioux Falls, SD 57108

**Phone: Home** (701) _____-_____ **Cell** (  ) _____-_____

**Cell #:** 605-261-5636
**Email:** sarabsd@msn.com

I hereby give Billings County, and its agent, Kadrmas, Lee & Jackson, Inc. access to enter/cross/work on the property described below:

Lot 8, NW¼SW¼ of Section 22, Township 143, Range 102, ID #: 27 0000 01220 000

N½ and S½ less 17.26 ARW of Section 34, Township 143, Range 102, ID #: 27 0000 01231 001 & 27 0000 01231 000

County of Billings, State of North Dakota.

Billings County, and its agent, Kadrmas, Lee & Jackson, Inc. will enter the property identified above for the purpose of doing those things reasonably convenient or necessary to complete a survey, take soil samples, and prepare maps. They will follow landowner requested instructions

to the extent possible. While no damage is expected, any property damage will be promptly repaired and/or reimbursed by Billings County or its agents.

***This form does not authorize any construction of any type.***

Owner:_____ Date: _____

Special Notes:

_____

_____

_____

Tenant/Renter Name:_____Phone Number:_____

April 10, 2020

Sarah Short Sarbacker
5608 S. Deer Park Dr.
Sioux Falls, SD 57108

Re: Research and Survey

Dear Sarah Short Sarbacker:

The purpose of this letter is a follow up to the letter mailed & dated March 12, 2020 and to notify you that crews have begun and will continue to be working in the area.

Contractors will conduct various survey activities that are necessary for us to complete the project, pursuant to the authority granted to the County pursuant to North Dakota Century Code 32-15-06 and 24-05-09. The surveys would generally consist of the following:

- Topographic Survey—A survey crew measuring the location and elevation of landforms and various features such as utility lines (above and below ground), property, and building corners.
- Soil Survey— A geotechnical engineering firm will be taking soil borings in order to analysis the soil at vary depths. To complete this operation a drilling truck will be used.

Be advised that the consultants will make every effort to cause no damage to your property. They want to complete the survey work now, while the ground is frozen, to cause the least private injury possible. If there is any damage occasioned by the access, Billings County will make sure the repairs are completed or injury remedied.

If you have questions or concerns regarding any of the information listed above, please contact KLJ Agent, Denese McLeish, at (701)355-8741 or email denese.mcleish@kljeng.com.

Sincerely,

Denese McLeish
ROW Department Manager

# ACCESS AGREEMENT

**Name:** Sarah Short Sarbacker

**Address:** 5608 S. Deer Park Dr., Sioux Falls, SD 57108

**Phone: Home** (701) _____-_____ **Cell** (  ) _____-_____

**Cell #:** 605-261-5636
**Email:** sarabsd@msn.com

I hereby give Billings County, and its agent, Kadrmas, Lee & Jackson, Inc. access to enter/cross/work on the property described below:

Lot 8, NW¼SW¼ of Section 22, Township 143, Range 102, ID #: 27 0000 01220 000

N½ and S½ less 17.26 ARW of Section 34, Township 143, Range 102, ID #: 27 0000 01231 001 & 27 0000 01231 000

County of Billings, State of North Dakota.

Billings County, and its agent, Kadrmas, Lee & Jackson, Inc. will enter the property identified above for the purpose of doing those things reasonably convenient or necessary to complete a survey, take soil samples, and prepare maps. They will follow landowner requested instructions

to the extent possible. While no damage is expected, any property damage will be promptly repaired and/or reimbursed by Billings County or its agents.

***This form does not authorize any construction of any type.***

Owner:_____ Date: _____

Special Notes:

_____

_____

_____

Tenant/Renter Name:_____Phone Number:_____

April 10, 2020

Peggy L. Anderson, as Personal Representative
of the Estate of Anne W.S. Johnson
6805 West 8th Street
Sioux Falls, SD 57107

Re: Research and Survey

Dear Peggy L. Anderson, PR of the Estate of Anne W.S. Johnson:

The purpose of this letter is a follow up to the letter mailed & dated March 12, 2020 and to notify you that crews have begun and will continue to be working in the area.

Contractors will conduct various survey activities that are necessary for us to complete the project, pursuant to the authority granted to the County pursuant to North Dakota Century Code 32-15-06 and 24-05-09. The surveys would generally consist of the following:

- Topographic Survey—A survey crew measuring the location and elevation of landforms and various features such as utility lines (above and below ground), property, and building corners.
- Soil Survey— A geotechnical engineering firm will be taking soil borings in order to analysis the soil at vary depths. To complete this operation a drilling truck will be used.

Be advised that the consultants will make every effort to cause no damage to your property. They want to complete the survey work now, while the ground is frozen, to cause the least private injury possible. If there is any damage occasioned by the access, Billings County will make sure the repairs are completed or injury remedied.

If you have questions or concerns regarding any of the information listed above, please contact KLJ Agent, Denese McLeish, at (701)355-8741 or email denese.mcleish@kljeng.com.

Sincerely,

Denese McLeish
ROW Department Manager

# ACCESS AGREEMENT

**Name:** Sarah Short Sarbacker

**Address:** 5608 S. Deer Park Dr., Sioux Falls, SD 57108

**Phone: Home** (701) _____-_____ **Cell** (  ) _____-_____

**Cell #:** 605-261-5636
**Email:** sarabsd@msn.com

I hereby give Billings County, and its agent, Kadrmas, Lee & Jackson, Inc. access to enter/cross/work on the property described below:

Lot 8, NW¼SW¼ of Section 22, Township 143, Range 102, ID #: 27 0000 01220 000

N½ and S½ less 17.26 ARW of Section 34, Township 143, Range 102, ID #: 27 0000 01231 001 & 27 0000 01231 000

County of Billings, State of North Dakota.

Billings County, and its agent, Kadrmas, Lee & Jackson, Inc. will enter the property identified above for the purpose of doing those things reasonably convenient or necessary to complete a

survey, take soil samples, and prepare maps. They will follow landowner requested instructions to the extent possible. While no damage is expected, any property damage will be promptly repaired and/or reimbursed by Billings County or its agents.

***This form does not authorize any construction of any type.***

Owner:_____ Date: _____

Special Notes:

_____

_____

_____

Tenant/Renter Name:_____Phone Number:_____

STATE OF NORTH DAKOTA | DISTRICT COURT

COUNTY OF BOTTINEAU | NORTHEAST JUDICIAL DISTRICT

| | |
|---|---|
| Northwest Landowners Association,<br><br>Plaintiff,<br><br>v.<br><br>State of North Dakota, North Dakota Industrial Commission, Hon. Douglas Burgum in his official capacity as Governor of the State of North Dakota and as the Chairman and a member of the North Dakota Industrial Commission, and Hon. Drew Wrigley in his official capacity as Attorney General of North Dakota and as a member of the North Dakota Industrial Commission, and Hon. Doug Goehring in his official capacity as Agriculture Commissioner of North Dakota and as a member of the North Dakota Industrial Commission,<br><br>Defendants. | Case No. 05-2023-CV-00065 |

**PLAINTIFF NORTHWEST LANDOWNERS ASSOCIATION'S FOURTH SUPPLEMENTAL ANSWERS AND RESPONSES TO STATE DEFENDANTS' FIRST INTERROGATORIES AND REQUEST FOR PRODUCTION OF DOCUMENTS TO PLAINTIFF**

**TO: STATE DEFENDANTS AND THEIR ATTORNEYS OF RECORD:**

## INTERROGATORIES

**Interrogatory No. 1:** Identify the name and title or position of each person who participated in preparing the answers to these interrogatories.

**ANSWER:** Troy Coons, President; Bob Grant, Treasurer. Legal counsel and staff also

assisted with these answers and responses.

**Interrogatory No. 2:** Identify the name, current address, contact information, and title or position of each person you will be calling, or anticipate that you may be calling, as a non-expert witness at trial or for any other proceedings in this litigation. For each person so identified, also state the anticipated substance of the person's testimony.

**OBJECTION:** Plaintiffs object to this interrogatory as calling for attorney work product and premature disclosure of witnesses. This interrogatory is also objected to because it exceeds the scope of discoverable information pursuant to N.D.R.Civ.P. with respect to its demand for identification of witnesses "for any other proceedings in this litigation." Witnesses will be disclosed according to this Court's scheduling order.

**Interrogatory No. 3:** Identify each document, communication, or tangible thing that you will or might use as an exhibit at trial or for any other proceedings in this litigation. For each document, communication, or tangible thing so identified, state:

(1) the name, address, and contact information of the individuals who have custody of each original document, communication, or tangible thing;

(2) the name, address, and contact information of the individuals involved in creating or acquiring each document, communication, or tangible thing.

**OBJECTION:** Plaintiffs object to this interrogatory as calling for attorney work product and premature disclosure of exhibits. This interrogatory is also objected to because it exceeds the scope of discoverable information pursuant to N.D.R.Civ.P. with respect to its demand for identification of exhibits "for any other proceedings in this litigation." Exhibits will be disclosed according to this Court's scheduling order.

**Interrogatory No. 4:** Identify the name, current address, contact information, and title or position of each expert witness you anticipate calling at trial or for any other proceedings in this litigation, to include any experts whom you expect to submit an expert report in this litigation. With respect to each person so identified, state:

(1) The professional qualifications of the expert witness;

(2) The subject matter on which the expert witness is expected to testify;

(3) The substance of the facts and opinions to which the expert witness is expected to testify; and

(4) A summary of the grounds for each opinion to be expressed by the expert witness.

**OBJECTION:** Plaintiff objects to this interrogatory to the extent it requests information exceeding the requirements of N.D.R.Civ.P. 26 and this Court's scheduling order, and specifically the demand to identify witnesses who may be called "for any other proceedings in this litigation."

**ANSWER:** At this time Plaintiff does not anticipate calling expert witnesses at trial except as necessary for rebuttal.

**Interrogatory No. 5:** Pertaining to the claims in your Complaint challenging N.D.C.C. § 38-22-10 (relating to the Industrial Commission's authority to amalgamate property interests for pore space storage of carbon dioxide), identify:

a. The name, address, and contact information for each member of your organization that you claim owns real property where the pore space is or will be subject to an amalgamation order pursuant to N.D.C.C.§ 38-22-10, as well as the date when that individual became a member of your organization;

b. For each member or your organization so identified, further provide:

(i) the legal description(s) of the member's real property(ies) that you claim is or will be affected by an amalgamation order;

(ii) the date(s) when the member was presented with a voluntary lease, easement, or other contract for the storage of carbon dioxide in the pore space of the affected real property(ies);

(iii) the date(s) when the member accepted or rejected any such voluntary lease, easement, or contract for the storage of carbon dioxide in the pore space of the affected real property(ies);

(iv) the date(s) of the order(s) (or other directive(s), however styled) from the Industrial Commission subjecting the member's affected real property(ies) to amalgamation for the storage of carbon dioxide without the member's consent;

(v) the date(s) when the member's affected real property interests became or will become subject to amalgamation for the storage of carbon dioxide without the member's consent;

(vi) the compensation or payments that the member has received, is receiving, or will receive for the storage of carbon dioxide in the affected real property(ies);

(vii) how, if at all, the member is currently using the pore space of the affected real property(ies) or intends to use the pore space of the affected real property(ies); and

(viii) a brief description of the member's basis for opposing the storage of carbon dioxide in the affected real property(ies), and any additional information you believe would assist State Defendants in identifying and validating the member's claim of possessing affected real property(ies).

c. If you claim that you—as an organization—possess any real property(ies) that have been or will be subject to an amalgamation order pursuant to N.D.C.C. 38-22-10, provide the same information requested in the preceding subsection.

**OBJECTION:** Plaintiffs object to this interrogatory as irrelevant and not reasonably calculated to lead to discoverable evidence, and as overly burdensome and not reasonably proportional to the needs of this matter. Additionally, the State of ND has indicated that it intends to attempt to depose the members of NWLA who are listed in these interrogatories. These interrogatories and the State's intended depositions are unreasonable and unnecessary and NWLA will seek a protective order to prevent the taking of such depositions.

Further, subsections b (ii), (iii), (vi), (vii), and (viii) are improper and irrelevant on there face and appear to be interposed for the purpose of harassing NWLA and its members. The other parts of this interrogatory appear intended to obtain information regarding NWLA's standing to bring this lawsuit, although they are also unreasonably invasive and at times overly broad.

The United States Supreme Court and the Supreme Court of North Dakota recognize associational standing when, as in the case at bar, the plaintiff organization is seeking injunctive relief. *Hunt v. Washington State Apple Adver. Comm'n*, 432 U.S. 333 (1977); *First Intern. Bank v. Peterson*, 797 N.W.2d 316, 2011 ND 87. An organization may have associational standing and may sue on its members' behalf, where: "(a) [at least some of] its members would otherwise have standing to sue in their own right; (b) the interests it seeks to protect are germane to the organization; and (c) neither the claim asserted nor the relief requested requires the participation of individual members in the lawsuit." *Nodak Mut. Ins.*, 2004 ND 60, ¶ 14, 676 N.W.2d 752; *see also Hunt*, 432 U.S. at 343. NWLA meets the requirements for associational standing. NWLA's members include many landowners in the oil patch and the area where numerous carbon dioxide

sequestration projects have been permitted or planned, and who own pore space impacted by the unconstitutional provisions in N.D.C.C. ch. 38-22 and chapter 38-25. The interests that NWLA seeks to protect are germane to its purpose of protecting landowners and maintaining a balance in resource development and property rights of individuals. The constitutional claims asserted by NWLA and the injunctive relief requested by NWLA do not require individualized proof from its members and their participation in the lawsuit is not otherwise required. This interrogatory is a tactic being utilized to engage NWLA in a discovery dispute such that the State Defendants can then claim that the individualized proof of members and their participation is required in the lawsuit, and the fact that they have disclosed information in response is evidence of this. Although NWLA will provide some limited information in support of its associational standing, the invasive attempts to depose NWLA members and make its standing a focal point for this litigation is inappropriate and NWLA objects to these transparent attempts to create an issue where none exists, and by providing limited relevant information as it agreed to do in informal conversations with the State Defendants it is not conceding that this discovery is appropriate and objects to the same.

Significantly, NWLA has direct standing to assert the claims in its Complaint. One way for an organization to show direct organizational standing is to show that it has devoted significant resources to identify and counteract the deprivation of civil rights and the unconstitutional attack on private property rights that is inherent in the statutory provisions being challenged here. NWLA has been engaged with its legal counsel for years at the legislative session trying to defend private property rights, and it has expended most of the money, time, and resources it has ever held in this defense. The laws here being challenged undermine not only the very basis of and sanctity of private property rights in North Dakota, but strike at the heart of NWLA's existence as an organization because without private property to defend, NWLA loses its reason to exist. "Such

concrete and demonstrable injury to the organization's activities -- with the consequent drain on the organization's resources -- constitutes far more than simply a setback to the organization's abstract social interests." *Havens Realty Corp. v. Coleman*, 455 U.S. 363, 379, 102 S. Ct. 1114, 1124 (1982). In general, NWLA exists as an organization to defend landowners' property rights. When the government takes those property rights away, there is nothing for an organization like NWLA left to protect.

**ANSWER:** Notwithstanding the objections above and without conceding these objections, NWLA answers as follows.

NWLA's members include many landowners in the oil patch where gas storage projects are most likely to occur (*see* https://www.ndlegis.gov/sites/default/files/resource/67-2021/library/sb2065.pdf) and the area where numerous carbon dioxide sequestration projects have been permitted or planned, and who own pore space impacted by the unconstitutional provisions in N.D.C.C. ch. 38-22 and chapter 38-25. The interests that NWLA seeks to protect are germane to its purpose of protecting landowners and maintaining a balance in resource development and property rights of individuals.

NWLA has devoted significant resources to identify and counteract the deprivation of civil rights and the unconstitutional attack on private property rights that is inherent in the statutory provisions being challenged here. NWLA has been engaged with its legal counsel for years at the legislative session trying to defend private property rights, and it has expended most of the money, time, and resources it has ever held in this defense. It has held conferences and community meetings, disseminated data and information, paid to compile expensive and lengthy reports, organized members, commented on agency rulemaking, lobbied at the legislature, and generally spent its entire existence fighting for the farmers and ranchers, and other private property owners

of North Dakota. NWLA stands behind the landowners of North Dakota, and stands up for them, and the laws here being challenged undermine not only the very basis of and sanctity of private property rights in North Dakota, but strike at the heart of NWLA's existence as an organization because without private property to defend, NWLA loses its reason to exist. "Such concrete and demonstrable injury to the organization's activities -- with the consequent drain on the organization's resources -- constitutes far more than simply a setback to the organization's abstract social interests." *Havens Realty Corp. v. Coleman*, 455 U.S. 363, 379, 102 S. Ct. 1114, 1124 (1982).

NWLA also has members who are directly impacted by the challenged laws.

a. Kurt and FayE Swenson
5774 21st Street SW
Beulah, ND 58523
b. (i) W1/2 NE ¼ of Section 14 T142N R88W, Mercer County Outlot B, E1/2 of Section 7 142N R87W, Oliver County SE1/4 of Section 27 T143N R88W, Mercer County and see also attached documents.
(iv) See attached documents.
(v) See attached documents.

a. Michael Dresser
3731 24th St SW
Center, ND 58530
b. (i) See attached documents.
(iv) See attached documents.
(v) See attached documents.

**SUPPLEMENTAL ANSWER:**

a. Kurt and FayE Swenson
5774 21st Street SW
Beulah, ND 58523
February 17, 2022
b. (i) W1/2 NE ¼ of Section 14 T142N R88W, Mercer County Outlot B, E1/2 of Section 7 142N R87W, Oliver County SE1/4 of Section 27 T143N R88W, Mercer County and see also attached documents in subfolder "Swenson".
(iv) See attached documents in subfolder "Swenson".

(v) See attached documents in subfolder "Swenson".

a. Michael Dresser
3731 24th St SW
Center, ND 58530
June 29, 2023

b. (i) See attached documents in subfolder "Dresser", "C29029", specifically pgs. 953, 981, 1119, 1166, and 1676. Section 35-T142N-R84W, Oliver County which can be easily found in a matter of a few minutes by simply doing a "control + f" search for "Dresser" and see also attached documents in subfolder "Dresser".
(iv) See attached documents in subfolder "Dresser", specifically pgs. 1-50 of the pdf labeled "C29029", pgs. 1-7 of the pdf labeled "C29030", pgs. 1-5 of the pdf labeled "C29031", pgs. 1-48 of the pdf labeled "C29032", pgs. 1-7 of the pdf labeled "C29033", and pgs. 1-5 of the pdf labeled "C29034". See also recording in subfolder "Dresser".
(v) See attached documents in subfolder "Dresser".

**SECOND SUPPLEMENTAL ANSWER:**

c. Kurt and FayE Swenson
5774 21st Street SW
Beulah, ND 58523
February 17, 2022

d. (i) W1/2 NE ¼ of Section 14 T142N R88W, Mercer County
Outlot B, E1/2 of Section 7 142N R87W, Oliver County
SE1/4 of Section 27 T143N R88W, Mercer County and
see also attached documents in subfolder "Swenson".
(iv)See attached documents in subfolder "Swenson".
(v) See attached documents in subfolder "Swenson".

c. Michael Dresser
2435 Concho Loop
New Braunfels, TX 78130
June 29, 2023

d. (i) See attached documents in subfolder "Dresser", "C29029", specifically pgs. 953, 981, 1119, 1166, and 1676. Section 35-T142N-R84W, Oliver County which can be easily found in a matter of a few minutes by simply doing a "control + f" search for "Dresser" and see also attached documents in subfolder "Dresser".
(iv) See attached documents in subfolder "Dresser", specifically pgs. 1-50 of the pdf labeled "C29029", pgs. 1-7 of the pdf labeled "C29030", pgs. 1-5 of the pdf labeled "C29031", pgs. 1-48 of the pdf labeled "C29032", pgs. 1-7 of the pdf labeled "C29033", and pgs. 1-5 of the pdf labeled "C29034". See also recording in subfolder "Dresser". See attached bates stamped documents NWLA SUPP-001-040.

(v) See attached documents in subfolder "Dresser". See attached bates stamped documents NWLA SUPP-001-040.

**THIRD SUPPLEMENTAL ANSWER:**

e. Kurt and FayE Swenson
5774 21st Street SW
Beulah, ND 58523
February 17, 2022

f. (i) W1/2 NE ¼ of Section 14 T142N R88W, Mercer County
Outlot B, E1/2 of NW1/4 Section 7 142N R87W, Oliver County
SE1/4 of Section 27 T143N R88W, Mercer County and
see also attached documents in subfolder "Swenson". See also attached bates stamped documents labeled NWLA SUPP-041-047.
(iv) See attached documents in subfolder "Swenson".
(v) See attached documents in subfolder "Swenson".

e. Michael Dresser
2435 Concho Loop
New Braunfels, TX 78130
June 29, 2023

f. (i) See attached documents in subfolder "Dresser", "C29029", specifically pgs. 953, 981, 1119, 1166, and 1676. Section 35-T142N-R84W, Oliver County which can be easily found in a matter of a few minutes by simply doing a "control + f" search for "Dresser" and see also attached documents in subfolder "Dresser".
(iv) See attached documents in subfolder "Dresser", specifically pgs. 1-50 of the pdf labeled "C29029", pgs. 1-7 of the pdf labeled "C29030", pgs. 1-5 of the pdf labeled "C29031", pgs. 1-48 of the pdf labeled "C29032", pgs. 1-7 of the pdf labeled "C29033", and pgs. 1-5 of the pdf labeled "C29034". See also recording in subfolder "Dresser". See attached bates stamped documents NWLA SUPP-001-040.
(v) See attached documents in subfolder "Dresser". See attached bates stamped documents NWLA SUPP-001-040.

**FOURTH SUPPLEMENTAL ANSWER:**

Surveys were sent to all members on November 14, 2023. As of January 8, 2024, we received 103 responses back from the surveys. The answers were as follows:
9 members answered "yes" to the question: have you ever been involved in eminent domain or a condemnation proceeding?
26 members answered "yes" to the question: "Have had ever had anyone threaten to use eminent domain against you?"
73 members have had requests/demands for access to conduct surveys on their land.

12 members have had someone threaten to do surveys over their objection or they have used eminent domain or condemnation to do surveys.
14 members have had someone ask them about leasing or giving an easement or other agreement for pore space for carbon sequestration or gas storage or something similar.
4 members have leased their pore space or signed any other agreement for use of pore space.

See bates stamped documents labeled NWLA SUPP-048-152. These documents have been redacted to protect the members' identity.

**Interrogatory No. 6:** Pertaining to the claims in your Complaint challenging N.D.C.C. § 38-25-08 (relating to the Industrial Commission's authority to amalgamate property interests for pore space storage of oil and gas), identify:

a. The name, address, and contact information for each member of your organization that you claim owns real property where the pore space is or will be subject to an amalgamation order pursuant to N.D.C.C.§ 38-25-08, as well as the date when that individual became a member of your organization;

b. For each member or your organization so identified, further provide:

(i) the legal description(s) of the member's real property(ies) that you claim is or will be affected by an amalgamation order;

(ii) the date(s) when the member was presented with a voluntary lease, easement, or other contract for the storage of oil and/or gas in the pore space of the affected real property(ies);

(iii) the date(s) when the member accepted or rejected any such voluntary lease, easement, or contract for the storage of oil and/or gas in the pore space of the affected real property(ies);

(iv) the date(s) of the order(s) (or other directive(s), however styled) from the Industrial Commission subjecting the member's affected real property(ies) to amalgamation for the storage of oil and/or gas without the member's consent;

(v) the date(s) when the member's affected real property interests became or will become subject to amalgamation for the storage of oil and/or gas without the members' consent;

(vi) the compensation or payments that the member has received, is receiving, or will receive for the storage of oil and/or gas in the affected real property(ies);

(vii) how, if at all, the member is currently using the pore space of the affected real property(ies) or intends to use the pore space of the affected real property(ies); and

(viii) a brief description of the member's basis for opposing the storage of oil and/or gas in the affected real property(ies), and any additional information you believe would assist State Defendants in identifying and validating the member's claim of possessing affected real property.

c. If you claim that you—as an organization—possess any real property(ies) that have been or will be subject to an amalgamation order pursuant to N.D.C.C. 38-25-08, provide the same information requested in the preceding subsection.

**OBJECTION:** Plaintiffs object to this interrogatory as irrelevant and not reasonably calculated to lead to discoverable evidence, and as overly burdensome and not reasonably proportional to the needs of this matter. Additionally, the State of ND has indicated that it intends to attempt to depose the members of NWLA who are listed in these interrogatories. These interrogatories and the State's intended depositions are unreasonable and unnecessary and NWLA will seek a protective order to prevent the taking of such depositions.

Further, subsections b (ii), (iii), (vi), (vii), and (viii) are improper and irrelevant on their face and appear to be interposed for the purpose of harassing NWLA and its members. The other parts of this interrogatory appear intended to obtain information regarding NWLA's standing to bring this lawsuit, although they are also unreasonably invasive and at times overly broad.

The United States Supreme Court and the Supreme Court of North Dakota recognize associational standing when, as in the case at bar, the plaintiff organization is seeking injunctive relief. *Hunt v. Washington State Apple Adver. Comm'n*, 432 U.S. 333 (1977); *First Intern. Bank v. Peterson*, 797 N.W.2d 316, 2011 ND 87. An organization may have associational standing and may sue on its members' behalf, where: "(a) [at least some of] its members would otherwise have standing to sue in their own right; (b) the interests it seeks to protect are germane to the organization; and (c) neither the claim asserted nor the relief requested requires the participation of individual members in the lawsuit." *Nodak Mut. Ins.*, 2004 ND 60, ¶ 14, 676 N.W.2d 752; *see also Hunt*, 432 U.S. at 343. NWLA meets the requirements for associational standing. NWLA's members include many landowners in who own property impacted by the unconstitutional provisions in N.D.C.C. ch. 38-22 and chapter 38-25. The interests that NWLA seeks to protect are germane to its purpose of protecting landowners and maintaining a balance in resource development and property rights of individuals. The constitutional claims asserted by NWLA and the injunctive relief requested by NWLA do not require individualized proof from its members and their participation in the lawsuit is not otherwise required. This interrogatory is a tactic being utilized to engage NWLA in a discovery dispute such that the State Defendants can then claim that the individualized proof of members and their participation is required in the lawsuit, and the fact that they have disclosed information in response is evidence of this. Although NWLA will provide some limited information in support of its associational standing, the invasive attempts to depose

NWLA members and make its standing a focal point for this litigation is inappropriate and NWLA objects to these transparent attempts to create an issue where none exists, and by providing limited relevant information as it agreed to do in informal conversations with the State Defendants it is not conceding that this discovery is appropriate and objects to the same.

Significantly, NWLA has direct standing to assert the claims in its Complaint. One way for an organization to show direct organizational standing is to show that it has devoted significant resources to identify and counteract the deprivation of civil rights and the unconstitutional attack on private property rights that is inherent in the statutory provisions being challenged here. NWLA has been engaged with its legal counsel for years at the legislative session trying to defend private property rights, and it has expended most of the money, time, and resources it has ever held in this defense. The laws here being challenged undermine not only the very basis of and sanctity of private property rights in North Dakota, but strike at the heart of NWLA's existence as an organization because without private property to defend, NWLA loses its reason to exist. "Such concrete and demonstrable injury to the organization's activities -- with the consequent drain on the organization's resources -- constitutes far more than simply a setback to the organization's abstract social interests." *Havens Realty Corp. v. Coleman*, 455 U.S. 363, 379, 102 S. Ct. 1114, 1124 (1982). In general, NWLA exists as an organization to defend landowners' property rights. When the government takes those property rights away, there is nothing for an organization like NWLA left to protect.

**ANSWER:** Notwithstanding the objections above and without conceding these objections, NWLA answers as follows.

NWLA's members include many landowners in the oil patch where gas storage projects are most likely to occur (*see* https://www.ndlegis.gov/sites/default/files/resource/67-

2021/library/sb2065.pdf) and the area where numerous carbon dioxide sequestration projects have been permitted or planned, and who own pore space impacted by the unconstitutional provisions in N.D.C.C. ch. 38-22 and chapter 38-25. The interests that NWLA seeks to protect are germane to its purpose of protecting landowners and maintaining a balance in resource development and property rights of individuals.

NWLA has devoted significant resources to identify and counteract the deprivation of civil rights and the unconstitutional attack on private property rights that is inherent in the statutory provisions being challenged here. NWLA has been engaged with its legal counsel for years at the legislative session trying to defend private property rights, and it has expended most of the money, time, and resources it has ever held in this defense. It has held conferences and community meetings, disseminated data and information, paid to compile expensive and lengthy reports, organized members, commented on agency rulemaking, lobbied at the legislature, and generally spent its entire existence fighting for the farmers and ranchers, and other private property owners of North Dakota. NWLA stands behind the landowners of North Dakota, and stands up for them, and the laws here being challenged undermine not only the very basis of and sanctity of private property rights in North Dakota, but strike at the heart of NWLA's existence as an organization because without private property to defend, NWLA loses its reason to exist. "Such concrete and demonstrable injury to the organization's activities -- with the consequent drain on the organization's resources -- constitutes far more than simply a setback to the organization's abstract social interests." *Havens Realty Corp. v. Coleman*, 455 U.S. 363, 379, 102 S. Ct. 1114, 1124 (1982).

NWLA also has members who are directly impacted by the challenged laws.

a. Kurt and FayE Swenson
   5775st Street SW

Beulah, ND 58523

b. (i) W1/2 NE ¼ of Section 14 T142N R88W, Mercer County Outlot B, E1/2 of Section 7 142N R87W, Oliver County SE1/4 of Section 27 T143N R88W, Mercer County and see attached documents.
(iv) See attached documents.
(v) See attached documents.

a. Michael Dresser
3731 24th St SW
Center, ND 58530

b. (i) See attached documents.
(iv) See attached documents.
(v) See attached documents.

**SUPPLEMENTAL ANSWER:**

a. Kurt and FayE Swenson
5774 21st Street SW
Beulah, ND 58523
February 17, 2022

b. (i) W1/2 NE ¼ of Section 14 T142N R88W, Mercer County Outlot B, E1/2 of Section 7 142N R87W, Oliver County SE1/4 of Section 27 T143N R88W, Mercer County and see also attached documents in subfolder "Swenson".
(iv) See attached documents in subfolder "Swenson".
(v) See attached documents in subfolder "Swenson".

a. Michael Dresser
3731 24th St SW
Center, ND 58530
June 29, 2023

b. (i) See attached documents in subfolder "Dresser", "C29029", specifically pgs. 953, 981, 1119, 1166, and 1676. Section 35-T142N-R84W, Oliver County which can be easily found in a matter of a few minutes by simply doing a "control + f" search for "Dresser" and see also attached documents in subfolder "Dresser".
(iv) See attached documents in subfolder "Dresser", specifically pgs. 1-50 of the pdf labeled "C29029", pgs. 1-7 of the pdf labeled "C29030", pgs. 1-5 of the pdf labeled "C29031", pgs. 1-48 of the pdf labeled "C29032", pgs. 1-7 of the pdf labeled "C29033", and pgs. 1-5 of the pdf labeled "C29034". See also recording in subfolder "Dresser".
(v) See attached documents in subfolder "Dresser".

**SECOND SUPPLEMENTAL ANSWER:**

c. Kurt and FayE Swenson

5774 21st Street SW
Beulah, ND 58523
February 17, 2022

d. (i) W1/2 NE ¼ of Section 14 T142N R88W, Mercer County
Outlot B, E1/2 of Section 7 142N R87W, Oliver County
SE1/4 of Section 27 T143N R88W, Mercer County and
see also attached documents in subfolder "Swenson".
(iv) See attached documents in subfolder "Swenson".
(v) See attached documents in subfolder "Swenson".

c. Michael Dresser
2435 Concho Loop
New Braunfels, TX 78130
June 29, 2023

d. (i) See attached documents in subfolder "Dresser", "C29029", specifically pgs. 953, 981, 1119, 1166, and 1676. Section 35-T142N-R84W, Oliver County which can be easily found in a matter of a few minutes by simply doing a "control + f" search for "Dresser" and see also attached documents in subfolder "Dresser".
(iv) See attached documents in subfolder "Dresser", specifically pgs. 1-50 of the pdf labeled "C29029", pgs. 1-7 of the pdf labeled "C29030", pgs. 1-5 of the pdf labeled "C29031", pgs. 1-48 of the pdf labeled "C29032", pgs. 1-7 of the pdf labeled "C29033", and pgs. 1-5 of the pdf labeled "C29034". See also recording in subfolder "Dresser". See attached bates stamped documents NWLA SUPP-001-040.
(v) See attached documents in subfolder "Dresser". See attached bates stamped documents NWLA SUPP-001-040.

**THIRD SUPPLEMENTAL ANSWER:**

g. Kurt and FayE Swenson
5774 21st Street SW
Beulah, ND 58523
February 17, 2022

h. (i) W1/2 NE ¼ of Section 14 T142N R88W, Mercer County
Outlot B, E1/2 of NW1/4 Section 7 142N R87W, Oliver County
SE1/4 of Section 27 T143N R88W, Mercer County and
see also attached documents in subfolder "Swenson". See also attached bates stamped documents labeled NWLA SUPP-041-047.
(iv) See attached documents in subfolder "Swenson".
(v) See attached documents in subfolder "Swenson".

g. Michael Dresser
2435 Concho Loop
New Braunfels, TX 78130
June 29, 2023

h. (i) See attached documents in subfolder "Dresser", "C29029", specifically pgs. 953, 981, 1119, 1166, and 1676. Section 35-T142N-R84W, Oliver County which can be easily found in a matter of a few minutes by simply doing a "control + f" search for "Dresser" and see also attached documents in subfolder "Dresser".
(iv) See attached documents in subfolder "Dresser", specifically pgs. 1-50 of the pdf labeled "C29029", pgs. 1-7 of the pdf labeled "C29030", pgs. 1-5 of the pdf labeled "C29031", pgs. 1-48 of the pdf labeled "C29032", pgs. 1-7 of the pdf labeled "C29033", and pgs. 1-5 of the pdf labeled "C29034". See also recording in subfolder "Dresser". See attached bates stamped documents NWLA SUPP-001-040.
(v) See attached documents in subfolder "Dresser". See attached bates stamped documents NWLA SUPP-001-040.

**FOURTH SUPPLEMENTAL ANSWER:**

Surveys were sent to all members on November 14, 2023. As of January 8, 2024, we received 103 responses back from the surveys. The answers were as follows:
9 members answered "yes" to the question: have you ever been involved in eminent domain or a condemnation proceeding?
26 members answered "yes" to the question: "Have had ever had anyone threaten to use eminent domain against you?"
73 members have had requests/demands for access to conduct surveys on their land.
12 members have had someone threaten to do surveys over their objection or they have used eminent domain or condemnation to do surveys.
14 members have had someone ask them about leasing or giving an easement or other agreement for pore space for carbon sequestration or gas storage or something similar.
4 members have leased their pore space or signed any other agreement for use of pore space.

See bates stamped documents labeled NWLA SUPP-048-152. These documents have been redacted to protect the members' identity.

**Interrogatory No. 7:** Pertaining to the claims in your Complaint challenging N.D.C.C. § 32-15-06 (relating to public use entry for surveys) and N.D.C.C. § 24-05-09 (relating to public use entry for roadway surveys by boards of county commissioners), identify:

a. The names, addresses, and contact information for each member of your organization that you claim has been or will be affected by an entry for purposes of conducting a

survey or examination under either N.D.C.C. § 32-15-06 or N.D.C.C. § 24-05-09, as well as the date when that individual became a member of your organization;

b. For each member or your organization so identified, further provide:

(i) the legal description(s) of the member's real property(ies) that you claim was or will be affected by an entry for survey or examination;

(ii) the date(s) when the affected real property(ies) was or will be affected by an entry for survey or examination;

(iii) information sufficient to identify, if any, the litigation, complaints, or other public grievances the member has made or is involved in concerning any such entries for survey or examination of the affected real property(ies); and

(iv) a brief description of any such entries for survey or examination of the affected real property(ies), to include the alleged duration, impacts, and reasons for entry, and any additional information you believe would assist State Defendants in identifying and validating the member's claim of possessing affected real property.

c. If you claim that you—as an organization—possess any real property(ies) that has been or will be affected by an entry for surveys or examination under N.D.C.C. § 32-15-06 and/or N.D.C.C. § 24-05-09, provide the same information requested in the preceding subsection.

**OBJECTION:** Plaintiffs object to this interrogatory as irrelevant and not reasonably calculated to lead to discoverable evidence, and as overly burdensome and not reasonably proportional to the needs of this matter. Additionally, the State of ND has indicated that it intends to attempt to depose the members of NWLA who are listed in these interrogatories. These

interrogatories and the State's intended depositions are unreasonable and unnecessary and NWLA will seek a protective order to prevent the taking of such depositions.

Further, subsection b (iii) is improper and irrelevant on its face and appears to be interposed for the purpose of harassing NWLA and its members. The other parts of this interrogatory appear intended to obtain information regarding NWLA's standing to bring this lawsuit, although they are also unreasonably invasive and at times overly broad.

The United States Supreme Court and the Supreme Court of North Dakota recognize associational standing when, as in the case at bar, the plaintiff organization is seeking injunctive relief. *Hunt v. Washington State Apple Adver. Comm'n*, 432 U.S. 333 (1977); *First Intern. Bank v. Peterson*, 797 N.W.2d 316, 2011 ND 87. An organization may have associational standing and may sue on its members' behalf, where: "(a) [at least some of] its members would otherwise have standing to sue in their own right; (b) the interests it seeks to protect are germane to the organization; and (c) neither the claim asserted nor the relief requested requires the participation of individual members in the lawsuit." *Nodak Mut. Ins.*, 2004 ND 60, ¶ 14, 676 N.W.2d 752; *see also Hunt*, 432 U.S. at 343. NWLA meets the requirements for associational standing. NWLA's members include many landowners in who own property impacted by the unconstitutional provisions in N.D.C.C. § 32-15-06 and N.D.C.C. § 24-05-09. The interests that NWLA seeks to protect are germane to its purpose of protecting landowners and maintaining a balance in resource development and property rights of individuals. The constitutional claims asserted by NWLA and the injunctive relief requested by NWLA do not require individualized proof from its members and their participation in the lawsuit is not otherwise required. This interrogatory is a tactic being utilized to engage NWLA in a discovery dispute such that the State Defendants can then claim that the individualized proof of members and their participation is required in the lawsuit, and the fact

that they have disclosed information in response is evidence of this. Although NWLA will provide some limited information in support of its associational standing, the invasive attempts to depose NWLA members and make its standing a focal point for this litigation is inappropriate and NWLA objects to these transparent attempts to create an issue where none exists, and by providing limited relevant information as it agreed to do in informal conversations with the State Defendants it is not conceding that this discovery is appropriate and objects to the same.

Significantly, NWLA has direct standing to assert the claims in its Complaint. One way for an organization to show direct organizational standing is to show that it has devoted significant resources to identify and counteract the deprivation of civil rights and the unconstitutional attack on private property rights that is inherent in the statutory provisions being challenged here. NWLA has been engaged with its legal counsel for years at the legislative session trying to defend private property rights, and it has expended most of the money, time, and resources it has ever held in this defense. The laws here being challenged undermine not only the very basis of and sanctity of private property rights in North Dakota, but strike at the heart of NWLA's existence as an organization because without private property to defend, NWLA loses its reason to exist. "Such concrete and demonstrable injury to the organization's activities -- with the consequent drain on the organization's resources -- constitutes far more than simply a setback to the organization's abstract social interests." *Havens Realty Corp. v. Coleman*, 455 U.S. 363, 379, 102 S. Ct. 1114, 1124 (1982). In general, NWLA exists as an organization to defend landowners' property rights. When the government takes those property rights away, there is nothing for an organization like NWLA left to protect.

**ANSWER:** Notwithstanding the objections above and without conceding these objections, NWLA answers as follows.

NWLA's members include many landowners who own property impacted by the unconstitutional provisions in N.D.C.C. § 32-15-06 or N.D.C.C. § 24-05-09. The interests that NWLA seeks to protect are germane to its purpose of protecting landowners and maintaining a balance in resource development and property rights of individuals.

NWLA has devoted significant resources to identify and counteract the deprivation of civil rights and the unconstitutional attack on private property rights that is inherent in the statutory provisions being challenged here. NWLA has been engaged with its legal counsel for years at the legislative session trying to defend private property rights, and it has expended most of the money, time, and resources it has ever held in this defense. It has held conferences and community meetings, disseminated data and information, paid to compile expensive and lengthy reports, organized members, commented on agency rulemaking, lobbied at the legislature, and generally spent its entire existence fighting for the farmers and ranchers, and other private property owners of North Dakota. NWLA stands behind the landowners of North Dakota, and stands up for them, and the laws here being challenged undermine not only the very basis of and sanctity of private property rights in North Dakota, but strike at the heart of NWLA's existence as an organization because without private property to defend, NWLA loses its reason to exist. "Such concrete and demonstrable injury to the organization's activities -- with the consequent drain on the organization's resources -- constitutes far more than simply a setback to the organization's abstract social interests." *Havens Realty Corp. v. Coleman*, 455 U.S. 363, 379, 102 S. Ct. 1114, 1124 (1982).

NWLA also has members who are directly impacted by the challenged laws.

a. Sandra Short
804 W. Merle Hibbs Blvd
Marshalltown, IA 50158
b. (i) See attached documents.

(ii) See attached documents.
(iv)See attached documents.

**SUPPLEMENTAL ANSWER:**

a. Sandra Short
804 W. Merle Hibbs Blvd
Marshalltown, IA 50158
April 27, 2022

b. (i) See attached documents in subfolder "Short", specifically pg. 2 of "Billings County Litttle Mo-Survey letter follow up-Sandra Short", pg. 2 of "Billings County Litttle Mo-Survey letter follow up-Sarah Short Sarbacker", generally "Little Mo-Survey follow up letters", pg. 2 of "Litttle Mo-Survey letter follow up-Johnson Family". Lot 8, NW¼SW¼ of Section 22, Township 143, Range 102, ID #: 27 0000 01220 000; N½ and S½ less 17.26 ARW of Section 34, Township 143, Range 102, ID #: 27 0000 01231 001 & 27 0000 01231 000, Billings County.
(ii) See attached documents in subfolder "Short".
(iii) See attached documents in subfolder "Short". Sandra Short is not involved in any legal challenges for entry for surveys and examination under the challenged statutes.
(iv)See attached documents in subfolder "Short".

**SECOND SUPPLEMENTAL ANSWER:**

Surveys were sent to all members on November 14, 2023. As of January 8, 2024 we received 103 responses back from the surveys. The answers were as follows:
9 members answered "yes" to the question: have you ever been involved in eminent domain or a condemnation proceeding?
26 members answered "yes" to the question: "Have had ever had anyone threaten to use eminent domain against you?"
73 members have had requests/demands for access to conduct surveys on their land.
12 members have had someone threaten to do surveys over their objection or they have used eminent domain or condemnation to do surveys.
14 members have had someone ask them about leasing or giving an easement or other agreement for pore space for carbon sequestration or gas storage or something similar.
4 members have leased their pore space or signed any other agreement for use of pore space.

See bates stamped documents labeled NWLA SUPP-048-152. These documents have been redacted to protect the members' identity.

**Interrogatory No. 8.** Pertaining to the claims in your Complaint challenging N.D.C.C. § 38-22-03(7) (relating to the Industrial Commission's ability to grant exceptions to certain requirements and implementing rules), identify:

a. The orders(s) (or other directive(s), however styled) from the Industrial Commission which have granted an exception under N.D.C.C. § 38-22-03(7) that you are challenging in this litigation;

b. The name, address, and contact information for each member of your organization that you claim has been or will be injured by an exception granted under N.D.C.C. § 38-22-03(7), as well as the date when that individual became a member of your organization;

c. For each member or your organization so identified, further provide:

(i) the exception(s) that you claim has caused or will cause injury to that member;

(ii) the legal description(s) of the member's property interest(s) that you claim is or will be affected by the granting of the exception(s);

(iii) the date(s) when the affected property interest(s) was or will be affected by the granting of the exception(s); and

(iv) a brief description of the injury(ies) allegedly suffered by the member as a result of the granting of the exception(s), and any additional information you believe would assist State Defendants in identifying and validating the member's claim of possessing affected property or other interests.

d. If you claim that you—as an organization—possess any property interests that are or will be injured by any exception(s) granted under N.D.C.C. § 38-22-03(7), provide the same information requested in the preceding subsection.

**ANSWER:** See objections and answers to Interrogatory Nos. 5, 6, and 7.

**SUPPLEMENTAL ANSWER**: Without limiting the generality of the foregoing, see attached documents in subfolder "Dresser", specifically pg. 1509 of the pdf labeled "C29032", and pgs. 1-24 of the pdf labeled "C29032". Additionally, Mike Dresser and Kurt Swenson and any member owning pore space (which is all members as property ownership is required for members) are injured by this provision because it allows the NDIC to suspend the law arbitrarily at its whim at any time, making any rights or safeguards provided by the challenged statutes transitory and amorphous.

**Interrogatory No. 9.** If you contend any of the claims asserted in your Complaint are judicially cognizable without your organization (or a bona fide member thereof) having directly suffered an actual or threatened injury to its real property or other property interests, identify the factual basis for any such contention.

**OBJECTION:** Plaintiffs object to this interrogatory as it calls for attorney work product and legal conclusions and is an overly broad and inappropriate contention interrogatory.

**SUPPLEMENTAL ANSWER:** Notwithstanding the objections above and without conceding these objections, NWLA answers as follows: See Complaint filed in the above-captioned matter. This legal challenge is not an as-applied challenge, it is a facial challenge to the constitutionality of the pertinent statutes and for that reason, this interrogatory is not asking for facts, it is asking for attorney work product and legal theories and is inappropriate. Because the statutes at issue are unconstitutional on their face as a matter of law, this inquiry for the "factual basis" of any such contention is artifice. As indicated in response to other interrogatories, NWLA has suffered significant injury because it has expended the majority of its time and resources in the last six years arguing, lobbying, educating, and working on issues related to these challenged statutes and related property rights issues. Because the State of North Dakota, through the Attorney

General, has chosen to attack the standing of NWLA and its members rather than focus on the actual constitutional issues in dispute, NWLA will also move to join additional members as real parties in interest with taxpayer standing in the near future.

**Interrogatory No. 10**. If you contend that you are a trade or professional association with standing to bring this action under N.D.C.C. § 32-23-11, identify the factual bases for such contention, including the identity and contact information for any member of your organization licensed and regulated by state or federal agencies.

**ANSWER:** N/A

**Interrogatory No. 11.** If you contend that Governor Doug Burgum, Attorney General Drew Wrigley, and Agricultural Commissioner Doug Goehring are necessary parties to this action, identify the factual basis for any such contention.

**OBECTION:** This interrogatory calls for attorney work product and is an overly broad and inappropriate contention interrogatory. These executive branch officials are named in their official capacity and are the three members of the North Dakota Industrial Commission which takes private property through the guise of "amalgamation." Governor Burgum and Attorney General Drew Wrigley are responsible for implementing and enforcing the laws being challenged as well as prosecuting and participating in numerous takings of private property rights pursuant to the challenged laws. Governor Burgum and Attorney General Wrigley are also defending the pre-condemnation survey laws rather than the constitutions in an action currently before the North Dakota Supreme Court. This legal response is not a waiver of the objection nor should it be construed as a factual response from NWLA.

**Interrogatory No. 12.** If you contend you are entitled to any damages or monetary payment from the State Defendants through this litigation (other than claims you may make for

attorneys' fees and costs), identify the factual basis for any such contention and the monetary sum you are, or will be, seeking.

**RESPONSE:** N/A.

**REQUESTS FOR PRODUCTION**

**Request for Production No. 1:** All documents and communications that provide the basis for, are referenced by, or are identified in your answers to the above Interrogatories.

**RESPONSE:** See attached documents.

**Request for Production No. 2:** All documents, communications, and tangible things that you will or might introduce as evidence at trial or for any other proceeding in this litigation.

**OBJECTION:** This Request for Production calls for attorney work product and premature disclosure of trial exhibits and does not comport with this Court's scheduling order. Trial exhibits will be identified in accordance with this Court's scheduling order and not in response to this Request.

**RESPONSE:** Without waiving the foregoing objection, see response to Request for Production No. 1.

**Request for Production No. 3.** With respect to each expert witness you anticipate calling at trial or for any other proceedings in this litigation, documents sufficient for identifying the grounds for any opinion expressed, or expected to be expressed, by the expert witness, and documents sufficient for identifying the substance of the facts and opinions to which the expert witness will or might testify.

**OBJECTION:** This Request for Production calls for attorney work product and premature disclosure of trial exhibits and does not comport with this Court's scheduling order. Trial exhibits will be identified in accordance with this Court's scheduling order and not in

response to this Request. This Request for Production is also objected to because it calls for identification and disclosure of any exhibits that may be used "for any other proceedings in this litigation" which is a demand in excess of the requirements of N.D.R.Civ.P. 26 and other rules and is inappropriate.

**RESPONSE:** Without waiving the foregoing objection, see response to Request for Production No. 1.

**AS TO ANSWERS:**

I verify under penalty of perjury that the foregoing answers to interrogatories are true and correct based on the information available to and in the possession of Northwest Landowners Association.

Signed on the 1/08/2024 day of January, 2024, at Donnybrook, North Dakota, United States of America.

Troy Coons (Jan 8, 2024 20:24 CST)

Northwest Landowners Association
By: Troy Coons, its President

**AS TO OBJECTIONS:**

Dated this 8th day of January, 2024.

*/s/ Derrick Braaten*

Derrick Braaten (ND #06394)
**BRAATEN LAW FIRM**
109 North 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
Fax: 701-221-5842
derrick@braatenlawfirm.com

*Attorneys for Northwest Landowners Association*

# 240108 Fourth Supp Answers to Def's Discovery

Final Audit Report 2024-01-09

| | |
|---|---|
| Created: | 2024-01-08 |
| By: | Desirae Zaste (desirae@braatenlawfirm.com) |
| Status: | Signed |
| Transaction ID: | CBJCHBCAABAAOYi-J0f1dau5hqXxUwhFQQ1IQnig-Kce |

## "240108 Fourth Supp Answers to Def's Discovery" History

Document created by Desirae Zaste (desirae@braatenlawfirm.com)
2024-01-08 - 10:24:44 PM GMT

Document emailed to troy.coons22@gmail.com for signature
2024-01-08 - 10:25:43 PM GMT

Email viewed by troy.coons22@gmail.com
2024-01-09 - 2:13:01 AM GMT

Signer troy.coons22@gmail.com entered name at signing as Troy coons
2024-01-09 - 2:24:36 AM GMT

Document e-signed by Troy coons (troy.coons22@gmail.com)
Signature Date: 2024-01-09 - 2:24:38 AM GMT - Time Source: server

Agreement completed.
2024-01-09 - 2:24:38 AM GMT

Adobe Acrobat Sign

STATE OF NORTH DAKOTA | DISTRICT COURT

COUNTY OF BOTTINEAU | NORTHEAST JUDICIAL DISTRICT

| | |
|---|---|
| Northwest Landowners Association, Mike Dresser, Sandra Short, the Swenson Living Trust, and North Dakota Farm Bureau,<br><br>Plaintiffs,<br><br>vs.<br><br>State of North Dakota, North Dakota Industrial Commission, Hon. Douglas Burgum in his official capacity as Governor of the State of North Dakota and as the Chairman and a member of the North Dakota Industrial Commission, and Hon. Drew Wrigley in his official capacity as Attorney General of North Dakota and as a member of the North Dakota Industrial Commission, and Hon. Doug Goehring in his official capacity as Agriculture Commissioner of North Dakota and as a member of the North Dakota Industrial Commission,<br><br>Defendants,<br><br>and,<br><br>SCS Carbon Transport LLC, SCS Permanent Carbon Storage LLC, Summit Carbon Solution, LLC, Minnkota Power Cooperative, Inc., Basin Electric Power Cooperative and Dakota Gasification Company,<br><br>Intervenor-Defendants. | Case No.: 05-2023-CV-00065<br><br>**NORTHWEST LANDOWNERS ASSOCIATION, ET. AL.'S RESPONSE TO MOTIONS FOR SUMMARY JUDGMENT FILED BY MINNKOTA, BASIN ELECTRIC COOPERATIVE AND DAKOTA GASIFICATION COMPANY, SUMMIT, AND STATE OF NORTH DAKOTA** |

## TABLE OF CONTENTS

ARGUMENT ..... 3

I. Landowners' claims are properly brought as a facial challenge because the laws cannot be validly applied under any set of circumstances, and the claims are not barred by any statute of limitation. ..... 3

II. Landowners do not lack standing for any of their claims. ..... 6

A. Landowners have standing to challenge N.D.C.C. § 38-25-08. ..... 6

B. Landowners have standing to challenge N.D.C.C. § 38-22-03(7). ..... 7

C. Northwest Landowners Association has standing in its own right pursuant to *Havens Realty*. ..... 8

D. The individual members of NWLA who asserted the claims in their own right have taxpayer standing. ..... 8

III. The doctrine of correlative rights does not apply to the amalgamation statutes, and regardless its application in this context proves that the challenged laws are unconstitutional takings. ..... 9

IV. The Landowners' due process claims are not derivative and are independent claims. ..... 19

V. There is no requirement to exhaust administrative remedies and obtain an order from the NDIC amalgamating property rights. ..... 22

VI. The *United States v. Causby* case and the nuisance-law interference theory was already argued to the North Dakota Supreme Court and the argument was rejected. ..... 23

VII. The precondemnation survey laws authorize physical invasions in violation of *Cedar Point Nursery v. Hassid*. ..... 25

VIII. The hyperbolic claims made by defendants are not new and are not a reasonable basis for the Court's decision. ..... 30

CONCLUSION ..... 31

[¶1] Plaintiffs Northwest Landowners Association, Mike Dresser, Sandra Short, the Swenson Living Trust, ("Landowners") submit their response to the Motions for Summary Judgment filed by Minnkota (Index #152), Basin Electric Cooperative and Dakota Gasification (Index #163), Summit (Index #179), and State of North Dakota (Index #183).

## ARGUMENT

### I. Landowners' claims are properly brought as a facial challenge because the laws cannot be validly applied under any set of circumstances, and the claims are not barred by any statute of limitation.

[¶2] The State quotes the *Sorum* case with respect to the standard for a facial challenges. Index #184, ¶ 41. The standard from *Sorum* was discussed in *Northwest Landowners Ass'n v. State*, 2022 ND 150 ¶ 14, 978 N.W.2d 679. The Court explained:

> No consideration of circumstances is necessary to resolve a facial challenge because the claim is that upon enactment, the legislation has an immediate unconstitutional legal effect. In *Sorum*, we held that if legislation requires an unconstitutional act (a prohibited gift in that case), the statute does not avoid a facial challenge "merely because the statute includes constitutional applications along with potentially unconstitutional applications." 2020 ND 175, ¶¶ 22-24, 947 N.W.2d 382.

*Id.*

[¶3] Here, the legislation has an unconstitutional legal effect because in no circumstances is the due process required by Article I, § 16 of the ND Constitution provided by the amalgamation statutes and the authorization for physical invasions in the form of amalgamation and precondemnation surveys is similarly unconstitutional in every legal application. The "no set of circumstances" test referenced in *Larimore Pub. Sch. Dist. No. 44 v. Aamodt*, 2018 ND 71, ¶ 37, 908 N.W.2d 442 and *United States v. Salerno*, 481 U.S. 739, 745, 107 S. Ct. 2095, 2100 (1987) has been given negative treatment in recent years. *See Nw. Landowners Ass'n v. State*, 2022 ND 150, ¶ 14, 978 N.W.2d 679. But the issue is with treating the "under no set of circumstances" standard as a threshold for a facial challenge in all instances. It is not.

[¶4] But it is instructive in some as a matter of logic. The courts abandoned the standard because it is not a *necessary condition* for there to be no set of circumstances under which a law can be constitutionally applied in order for it to be facially unconstitutional, as the ND Court said in *Nw. Landowners Ass'n. Id.* But, it is a *sufficient condition* for a facial challenge if it can be shown that there is no set of circumstances under which the law can be applied constitutionally. And that is the case here, as explained in the Landowners' opening brief, and as further explained here, both because the challenged amalgamation and precondemnation survey laws are takings, and also because they violate procedural and substantive due process on their face. *See* Art. I, § 16, Constitution of North Dakota. The NDIC has no authority to require determination of just compensation, and definitely cannot require it be decided by a jury. It can only take the property rights required for the permit in violation of the constitution, and because that is all it can do, the amalgamation statutes can be challenged facially. Similarly, the precondemnation survey laws authorize a physical invasion while simultaneously prohibiting payment of just compensation or its determination by a jury before the taking, so a facial challenge is proper.

[¶5] The State's argument that a statute of limitations applies to this action is incorrect. It cites to *Hager v. City of Devils Lake*, 2009 ND 180, ¶ 34, 773 N.W.2d 420, which involved a claim for compensation for a taking in an inverse condemnation case and based on a theory of implied contract for the promise to pay for the taking, and is therefore inapposite. Similarly the other case cited by the State is *Asociación de Suscripción Conjunta del Seguro de Responsabilidad Obligatorio v. Juarbe-Jiménez*, 659 F.3d 42, 50 (1st Cir. 2011). This case was an action under a federal enabling statute to recover for a violation of constitutional rights and to which a specific statute of limitations applied, and which does not cover the range of claims here. *Id.*

[¶6] More importantly, the claims in this action are that the challenged laws violate the Constitution of North Dakota and the Constitution of the United States of America. This action and the claims asserted are therefore based on "the principle, supposed to be essential to all written constitutions, that a law repugnant to the constitution is void; and that courts, as well as other departments, are bound by that instrument." *Marbury v. Madison*, 5 U.S. (1 Cranch) 137, 180 (1803). The judicial branch of our government has both the ever-present jurisdiction and duty to interpret the law and enforce the Constitution.

[¶7] A statute of limitations does not bar the judiciary from declaring a law void that is repugnant to the Constitution. *Id.* The North Dakota Supreme Court discussed the North Dakota corollary of the principles first espoused in *Marbury v. Madison* in *State v. First State Bank* and its discussion provides a helpful reminder of the important principles guiding the Court in this action:

> Before entering into a discussion of the questions raised by the appellant, we deem it proper and desirable to consider some of the fundamental rules which must guide us in determining them. We are asked to declare a legislative enactment void. The judicial power thus invoked is one of the highest which the people by the Constitution have conferred upon this court, and imposes upon the judges responsibility and duty as grave and solemn as the power is high. The duty imposed is the very source of the power granted. For in establishing government, both in state and nation, the people adopted written constitutions, which it was agreed should constitute the supreme law.…
>
> ***
>
> The Constitution emanates from the people, and is the supreme law. It creates all the departments of government, and is the charter of their authority. This applies as well to the legislative as to the judicial department. '**The powers of the legislature are defined and limited; and that those limits may not be mistaken or forgotten the Constitution was written**.' *Ibid.* The legislature was created by the Constitution and vested with power to enact laws conformable to the provisions of the Constitution… .

*State v. First State Bank*, 52 N.D. 231, 242-44, 202 N.W. 391, 395-96 (1924) (emphasis added).

[¶8] When a challenge is leveled that the Legislative Assembly violated the Constitution in enacting laws, and when a Court is convinced this is the case, it has its own Constitutional obligation to defend the Constitution. *See Bd. of Trs. v. N.D. Legislative Assembly*, 2023 ND 185, ¶¶ 89-91, 996 N.W.2d 873 (explaining that granting a stay is not possible if the effect would be to allow a constitutional law to remain enforceable because the law requires it be treated as *void ab initio*.). A statute of limitations is impotent to shield an unconstitutional law from the supreme power of the Constitution and the Judicial Branch's mandate to protect the sanctity of that Constitution.

## II. Landowners do not lack standing for any of their claims.

[¶9] The State does not challenge Landowners' standing with respect to N.D.C.C. § 38-22-10, 32-15-06, and 24-05-09. The State does dispute that Landowners' have standing with respect to N.D.C.C. § 38-25-08 and 38-22-03(7), either through members or through direct organizational or taxpayer standing.

### A. Landowners have standing to challenge N.D.C.C. § 38-25-08.

[¶10] Landowners recognize that the NDIC has not held any permit proceedings pursuant to N.D.C.C. ch. 38-25. But their members are also well aware of the comments from the North Dakota Petroleum Council during the legislative hearings regarding SB 2065 (2021), which created Chapter 38-25.[1] The Petroleum Council's general counsel and director of government affairs explained the purpose of Chapter 38-25 as follows:

> [T]he regulatory framework in this bill allows the NDIC to properly standardize and control temporary underground injection of associated natural gas, providing oil and gas producers another option by which to avoid flaring. This option is of particular use in instances where a producing unit is considered "stranded" due to geographic challenges in gas gathering pipeline construction. A producer is much more likely to consider and develop stranded areas of the Bakken if the added challenge of meeting gas capture goals may be accomplished by injecting the

[1] https://ndlegis.gov/research-center/history?session_id=34270&bill_number=2065

> produced natural gas underground and temporarily storing it until gas gathering infrastructure is in place. Such a gas capture option provides an added opportunity for gas midstream companies to invest beyond the over-$20 billion they have already invested in the state and continue development of the gathering lines and other infrastructure necessary to successfully gather, transport, and process North Dakota's abundant natural gas resource.

Testimony of Brady Pelton, Senate Bill 2065, Senate Energy and Natural Resources Committee (January 8, 2021).[2] The Landowners' membership spans the oil patch, and those landowners may not like the sound of "develop[ing] stranded areas of the Bakken" or additional gathering lines and infrastructure, in addition to the prospect that their pore space will be taken from them in order to do it all. While it true that involvement in permit proceedings for gas storage would easily qualify an individual for standing, that is not the only set of circumstances that establishes standing. Here, given that the nature of the action is a facial challenge to the constitutional validity of statutes that are directly targeted at the Landowners' property, it is evident that Landowners are the most appropriate party with standing to challenge and strike down these laws.

**B. Landowners have standing to challenge N.D.C.C. § 38-22-03(7).**

[¶11] The State concedes that the Landowners have standing to challenge N.D.C.C. § 38-22-10, but not N.D.C.C. § 38-22-03(7). Index #184, ¶ 52 n.5, 58-62. But the fact that the NDIC has not granted an exception under this standard is not the test of whether Landowners have standing. The State says the landowner members have not been impacted by an exception granted, but this fails to acknowledge that the mere existence of this provision causes harm to the landowners. At any time an exception could be granted to any requirement anywhere in Chapter 38-22 simply because two of three of the Governor, Attorney General, and Agriculture Commissioner decide good cause exists. As explained in Landowners' opening brief, it is an unconstitutional delegation. The

[2] https://ndlegis.gov/research-center/history?session_id=34270&bill_number=2065 (page 8 of .pdf file).

potential for nullification of any and all requirements of Chapter 38-22 causes concrete damage to members of Northwest Landowners and is sufficient for purposes of standing.

### C. Northwest Landowners Association has standing in its own right pursuant to *Havens Realty.*

[¶12] In response to discovery, the Landowners explained the basis for the organization's direct standing: "NWLA stands behind the landowners of North Dakota, and stands up for them, and the laws here being challenged undermine not only the very basis of and sanctity of private property rights in North Dakota, but strike at the heart of NWLA's existence as an organization because without private property to defend, NWLA loses its reason to exist." Index #199, p.8. "Such concrete and demonstrable injury to the organization's activities - with the consequent drain on the organization's resources - constitutes far more than simply a setback to the organization's abstract social interests." *Havens Realty Corp. v. Coleman*, 455 U.S. 363, 379, 102 S. Ct. 1114, 1124 (1982). It is not simply a matter of a special-interest organization diverting funds to lobbying efforts on a bill – it is a matter of a small and scrappy organization of volunteer farmers and ranchers standing up for years to very powerful interests to protect the People and the Land.

### D. The individual members of NWLA who asserted the claims in their own right have taxpayer standing.

[¶13] For the members of NWLA whose pore space is being amalgamated, they will eventually be directly reliant on the public fisc for any claims. Specifically, pursuant to N.D.C.C. § 38-22-17(6), after the storage facility is closed "[t]itle to the storage facility and to the stored carbon dioxide transfers, without payment of any compensation, to the state." This provision means that when the State issues a certificate of project completion, the State steps into the shoes of any property rights held by the operator, such as becoming the lessee of pore space leases. At that time, "[t]he storage operator and all persons who generated any injected carbon dioxide are released from all regulatory requirements associated with the storage facility." N.D.C.C. § 38-22-17(6).

Further, "[a]ny bonds posted by the storage operator must be released." *Id.* As such, it is not only as landowners that the individuals in the complaint object to the taking of their property for the storage facility, it is also as taxpayers who will ultimately be liable for the facility as both lessor and taxpayer to the State government and thereby also his own lessee.

[¶14] As explained below, one landowner is actually subject to a lease imposed against his will, and he will later be forced to look to the State and the public fisc as his lessee. That is a unique and direct relationship with the public fisc that is not generalized to taxpayers and is sufficient to support taxpayer standing.

## III. The doctrine of correlative rights does not apply to the amalgamation statutes, and regardless its application in this context proves that the challenged laws are unconstitutional takings.

[¶15] The State and others argue that the doctrine of correlative rights is applicable to the use of pore space for carbon sequestration. *See, e.g.*, Index #184, at ¶¶ 85-133. But there is no precedent for this sea change in the law and indeed the State cites no standard for its application of oil and gas law to pore space rights. It argues that the policy statements for both activities are "remarkably similar" *Id.*, ¶86, and then frames the issue with a question: "The question then is whether the State's ability to amalgamate pore space interests is analogous to the forced pooling of oil and gas interests." *Id.*, at ¶ 95. But whether the State's "ability" is "analogous" is not a proper standard by which to assess this issue, and applying an entire body of highly technical law to an entirely new field of activities is not something to be done simply because an executive agency's "ability" to do it is "analogous." The State later frames it as "the question of whether pore space amalgamation is *similar* to oil and gas pooling." *Id.*, ¶ 97. Again, this is not a proper standard to begin with, as will be discussed in more detail below.

[¶16] Putting aside the improper standard, the State goes on to explain that both oil and gas development and carbon sequestration are important. *Id.*, ¶98. So are property rights, the

protection of which are enshrined in the Constitution of North Dakota in literally the very first sentence: All individuals are by nature equally free and independent and have certain inalienable rights, among which are those of … acquiring, possessing and protecting property…." N.D. Const. Art. I, § 1.

[¶17] The State then explains that "both exist as underground reservoirs that do not cleanly correspond with surface boundaries and are likely to have shared ownership by multiple individuals." Index #184, ¶ 98. This much is true, but the argument is ultimately specious. If the State is arguing that the courts should adopt the principles of oil and gas law related to correlative rights and force-pooling and spacing, it needs to take the entire corpus of law, not simply the authority it believes allows it to take property from its citizens. Owen Anderson, a supporter of CCUS as a tool to combat climate change, claims that the correlative rights doctrine should apply because pore space owners cannot fence each other out. *Id.*, ¶ 99. What is left out is that Professor Anderson's comment refers to two sides of the coin and the State is only acknowledging one of them. As Professor Anderson goes on to say, "the correlative-rights doctrine recognizes that each pore-space owner must have a fair opportunity to use a fair and common share of the pore space." *Id.* This is presumably the State's argument for why it can amalgamate pore space for a CCUS project. But it forgets to complete the application of the doctrine to the pore space owners who did not participate. In the oil and gas setting, it is necessary to treat them in a very specific way to respect and protect their property rights, and if this is not done it is nonetheless a taking. They must be afforded their full share of the revenue from development of the resource. The State's own cases provide this authority.

[¶18] In *Slawson v. North Dakota Indus. Comm'n*, 339 N.W.2d 772 (ND 1983), the ND Court affirmed rulings from the district court and the ND Industrial Commission ordering, as part of a

force-pooling application, "[t]hat any unleased interests within the spacing unit shall be treated as cost free royalty interests as to 1/8 thereof and as working interests as to the remaining 7/8 of the unleased interest." *Slawson*, 339 N.W.2d at 773. Not only did the NDIC have authority to order this, but the Court ruled it was required as a consequent of the property ownership itself. *Id. et seq.*[3] The Court also discussed *why* the NDIC had this authority, first explaining that "The purposes of pooling are to prevent the physical and economic waste that accompany the drilling of unnecessary wells and to protect the correlative rights of landowners over a reservoir." *Id.* at 774.

[¶19] The Court also explained:

> There appear to be two aspects of the doctrine of correlative rights: (1) as a corollary of the rule of capture, each person has a right to produce oil from his land and capture such oil or gas as may be produced from his well, and (2) a right of the land owner to be protected against damage to a common source of supply and a right to a fair and equitable **share** of the source of supply.

*Id.* at 774, n.1 (emphasis added). The language of N.D.C.C. § 38-22-08(14) requiring "equitable compensation" echoes this but does not require it explicitly. The State concedes that the nonconsenting owners must receive "their equitable portion of the revenues" and "their equitable portion of the proceeds" from the Class VI well but the State has failed to understand the import of this requirement.[4] If the courts agree to its proposal to treat pore space owners as mineral

---

[3] And before the State jumps to conclude that this is inapplicable because the royalty discussed in *Slawson* was a consequent of *mineral* ownership and not pore space ownership, then it is either an argument that the doctrine of correlative rights does not apply or an admission that thus far the State has only applied it half-way (as a way to take, but not as it was intended, as a way to protect the full interest of the owner). The doctrine protects either completely or not at all, for that is the very nature of *correlative* rights.

[4] The State's representations to this Court that nonconsenting owners must receive "their equitable portion of the revenues" is true and as will be explained is ultimately irrelevant because oil and gas law does not apply. But if it did, it should be noted that the State is agreeing to this legal principle before this Court while doing something different in practice. For example, NWLA member Mike Dresser had his property "amalgamated" by Intervenor Minnkota. The NDIC incorporated Minnkota's "Geologic Storage Agreement" directly into its order. Index #28, pp. 5-6. That Agreement then states that "Any Pore Space Owner in the Storage Facility who owns a Pore Space Interest in the Storage Reservoir that is not leased for the purposes of this Agreement and during the term hereof, shall be treated as if it were subject to the Pore Space Lease attached hereto as Exhibit 'D'." Exhibit 1 to Declaration of Derrick Braaten, Section 3.1, p. 5, bates no. 00939. That lease at Exhibit D only provides the following compensation: "During the Operational Term, Lessee shall annually on or before May 31st pay to Lessor a royalty equal to the greater of a flat

owners, then it must do so as the law has always required. Correlative rights, by definition, go both ways – the nonconsent landowners have correlative rights too. And those rights would entitle them to their proportionate share of all revenue for the Class VI well injecting the CO2 just as they share in all revenue from an oil well.

[¶20] The issue was best summed up by another case cited by the State, *Texaco, Inc. v. Indus. Comm'n*, 448 N.W.2d 621, 624 n.4 (N.D. 1989)

> At the moment production commences, resulting pressure differentials in the common source of supply portend, in greater or less degree, drainage from all parts of the unit toward the producing unit well. This drainage is occurring from areas where oil and gas lessees are prohibited from doing anything to protect their leased premises from drainage. With the purpose of § 87.1 [Oklahoma's spacing unit statute] to prevent the drilling of unnecessary wells before it, the Commission will not, except in extreme cases, make an exception to the rule that permits one producing well only on each spacing (drilling) unit. To impose this denial without granting the right to participate in production of the unit well, as of the time the non-drilling owners were prohibited from drilling, **is the taking by the State of their property without due process in violation of the Fourteenth Amendment to the Constitution of the United States.**

*Texaco, Inc. v. Indus. Comm'n*, 448 N.W.2d 621, 624 n.4 (N.D. 1989) (emphasis added). The same principle regarding pressure differentials applies to injection wells and saturated reservoirs in reverse with CO2 sequestration.

---

$100.00 payment or the Storage Fee(s) for the immediately preceding Operating Year." *Id.*, p. 4 of Lease at Exhibit D, bates no. 00966. The "Storage Fee" is defined as "Lessor's proportionate share of **sixteen cents ($0.16) per metric ton** of Carbon Dioxide ("Storage Rate") as determined by the Lessee's last meter before injection as part of Operations....The Storage Fee shall be: (i) calculated separately for each amalgamated area as created and established by the Commission that includes any portion of the Leased Premises; (ii) limited to the Carbon Dioxide injected in said amalgamated area in the immediately preceding Operating Year; and (iii) based on the Lessor's proportionate per net acre share of said unit." *Id.*, p. 2 of Lease at Exhibit D, bates no. 00964. An operator cannot arbitrarily determine that the proportionate share is further reduced to an arbitrary amount it decides unilaterally – as explained above, that is not how even oil and gas law works and is a taking. But this is being pointed out because it appears the State agrees with the legal principle that the proportionate share is required to be provided to the landowner, but is saying something else to the landowners out of the other side of its mouth. The proportionate share is the constitutionally required allocation to the nonconsenting owner, otherwise the very basis for the exercise of the police power through the conservation laws is undermined. That proportionate share is the proportionate share, not the proportionate share of "sixteen cents" as arbitrarily decided by the developer.

[¶21] In *Slawson*, the Court not only stated that the nonconsenting landowner must receive their equitable share of all production or profits, but must *also* receive a portion of that share *cost free*, meaning that there must be an amount paid to the mineral owner that is equal to their proportionate share of 7/8 of net revenues and 1/8 of gross revenues *Slawson*, 339 N.W.2d at 777.

> For conditions of a pooling order to be "just and reasonable," the order must afford an unleased mineral owner all that he is entitled to because of his ownership of the minerals. One of the things to which an owner of minerals is entitled is a cost free portion of production. Any share less than that to which a mineral owner is entitled because of his ownership of minerals is not "just and equitable." We conclude that § 38-08-08(1), N.D.C.C., provides the Commission with authority to treat unleased mineral interests as cost free interests as to a portion thereof when entering a compulsory pooling order.

*Id.* (emphasis added). So too if the State would like to apply these principles to the owners of the pore space, that does not get the State around the problem of taking private property without due process and just compensation. It simply walks the State right back into the same problem, unless the courts construe "equitable compensation" to require the proportionate share (property in the storage facility divided by property owned) of all proceeds from the storage facility and Class VI well for every nonconsenting landowner.

[¶22] The North Dakota Supreme Court explained: "We agree with the Nebraska Supreme Court's rationale that unless the Commission can issue pooling orders retroactive to the date of first operations, an adjoining landowner may not receive his just and equitable share in a pool, thereby confiscating his property without due process." *Texaco, Inc. v. Indus. Comm'n*, 448 N.W.2d 621, 624 (N.D. 1989). Unless the nonconsenting landowners receive their equitable share of revenue for the storage facility, the amalgamation statutes confiscate their property without due process. So the doctrine of correlative rights does not get the State around the fact that it is taking private property without due process and just compensation (among a myriad of other specific due process issues such as a lack of jury trial guaranteed by Art. I, §16 of the ND Constitution).

[¶23] Minnkota cites to Professor Righetti in its brief, but fails to understand her point: "Correlative rights refers to the notion that each property owner in a common pool or source of supply has the opportunity to use his or her just and equitable share of that property." Index #153, ¶ 44 (quoting Righetti, 47 Envtl. L. Rep. News & Analysis at 10421-22) (emphasis added)]. This refers to both the property owner developing his property, and the property owner who does not consent. The nonconsenting property owner receives his or her "just and equitable share of that property" meaning the proportionate share by property of all revenue generated from development of the resource. For Mike Dresser, for example, it is 0.1639142% of the total revenue according to Minnkota's records. *See* Affidavit of Shannon Mikula, Index # 154, ¶ 10. That is also what Professor Righetti meant when she said that correlative rights ensures each owner receives "his or her just and equitable share of that property."

[¶24] The failure to apply principles of oil and gas law in a manner that avoids constitutional due process and takings violations does not end with the failure to recognize the property rights involved and require payment of a proportionate share of proceeds. As explained the State fails first to recognize that correlative rights are also held by the nonconsenting landowners, and they must be paid their equitable share of proceeds which is their *proportionate* share, not merely "compensation."

[¶25] But the principles of oil and gas law such as the doctrine of correlative rights do not apply because as indicated earlier, it is not merely an issue of whether oil and gas development and carbon sequestration are "similar." There are twin purposes for pooling that underpin and justify the authority itself.

[¶26] "The purposes of pooling are to prevent the physical and economic waste that accompany the drilling of unnecessary wells **and** to protect the correlative rights of landowners over a

reservoir." *Slawson* at 774 (emphasis added). It is important to first note that the underlying and implicit assumption here is that drilling unnecessary wells causes physical and economic waste, and it does so by depressurizing the reservoir such that less oil and gas can be produced.

[¶27] For example, in *Syverson v. N.D. State Indus. Comm'n*, 111 N.W.2d 128, 131 (N.D. 1961), the Court explained the circumstances of the case, but also the underlying reason that conservation programs are allowed to force-pool or force-unitize property.

> The Tioga-Madison oil field has been in production since the beginning of oil production in North Dakota, in 1951. In 1957, the twenty-three operators in that field determined that the field had been substantially drilled out and that a program of pressure maintenance, by injection of water, was the proper and necessary method of maintaining the field pressure in order to secure the greatest ultimate recovery of oil therefrom.

[¶28] Drilling unnecessary wells is also a problem for pressure maintenance, and was a particular problem when oil development commenced and the rule of capture allowed property owners to compete to pump oil out of the ground based on that rule. It was this situation that led to pictures of oil derricks almost stacked on top of each other and the end result was depressurization of the reservoir in a profoundly inefficient manner that reduced the overall recovery of oil. "The rule of capture ownership regime creates two major problems: []overdrilling, []and premature dissipation of natural reservoir energy." 1 Bruce M. Kramer & Patrick H. Martin, The Law of Pooling and Unitization 1-3 (3d ed.), Scope and § 2.01.

[¶29] As was recognized in *Syverson*, the point of the conservation programs is that "more oil and gas would ultimately be recovered." *Syverson*, 111 N.W.2d 128, 133 (N.D. 1961). In the *Syverson* case "the appellants themselves [agreed that the conservation program] will substantially increase the amount of oil and gas recovered from the field." *Id.* This is not a surprise or a secondary benefit. It is the entire point and purpose, and the very reason that the conservation programs are not obvious takings of private property. True it is that a mineral owner in a force-

pooling situation might have a stream of revenue reduced from his lease based on the dilution effect of a spacing unit larger than his property. But this is not a *taking* because the overall effect of the conservation program is to produce *more oil* – so it cannot be a *taking*, it is quite literally a *giving*. The landowner must wait longer to get his equitable share of the oil, but the doctrine of correlative rights ensures that he receives his *full share* of the oil in the reservoir, or in the context of CCUS, it would simply be the revenue for injection of the CO2 such as the 45Q credits that are the revenue stream for some commercial CCUS projects. And because the doctrine of correlative rights *requires* that the nonconsenting landowner get his full share of oil and because at the same time the overall amount of oil is being increased, it cannot be a taking as a matter of math. But the key is that this is *why* the conservation laws allow force pooling as an exercise of the State's police power – these things *must be true*. The State continues to argue for an expansive scope to its police power while continuing to forget that even the police power is subject to the Constitution.

[¶30] More importantly, when the State argues for application of the doctrine of correlative rights, it fails to understand that this doctrine is applied first to ensure the landowner gets his equitable (i.e. proportionate) share, and second, that it is applied to *increase the recovery of a resource*, namely oil and gas. And it is *because* the conservation laws *increase the recovery* of the shared resource and ensure a *proportionate share* to each owner that they were not struck down as takings. These things are not true of using pore space for carbon sequestration. No greater amount of pore space is created.

[¶31] In reality, the pore space being used for a storage facility is subject to a set of laws that ensure it will never again be monetized for any such purposes, thus taking away the landowner's right to *any future development* of their pore space resource. For example, it is apparent that by requiring a finding that "carbon dioxide will not escape from the storage reservoir" it would not

be possible for a landowner to later develop their own sequestration project in their own pore space. N.D.C.C. § 38-22-08(8). Similarly, the closure requirements and requirements to prove the stability of the plume foreclose any corollary development by the landowner of their own pore space. *See* N.D.C.C. § 38-22-17. The State of North Dakota is dictating to landowners that they must use their property for storage of carbon dioxide because that is what the State has decided is an important policy. But that policy choice cannot override the constitutional protections for private property and the requirement that the State cannot take property without due process and payment of just compensation. And even if the courts were to start applying the doctrine of correlative rights, it does not get the State around the requirement to then provide those nonconsenting landowners what the doctrine requires, which is their entire proportionate share of the revenue from the development of *their* resource.

[¶32] The State unfairly presumes a bizarre motivation from the Landowners when it states: "And if Plaintiffs are successful in killing the implementation of CCS, the effects will extend far beyond the majority of owners denied the ability to profit from their pore space." Index #184, ¶ 32. Why a group of North Dakota farmers and ranchers would have any interest in "killing the implementation of CCS" is a mystery. It is also histrionic.

[¶33] Just a couple hundred miles west of Bismarck near the border of North Dakota and Montana, there is a natural gas storage facility operated by WBI Energy in Fallon County, Montana. *WBI Energy Transmission, Inc. v. Subsurface Easements for the Storage of Nat. Gas*, No. CV 18-88-BLG-SPW-TJC, 2020 U.S. Dist. LEXIS 144001, at *1 (D. Mont. July 6, 2020).

> The Baker Storage Field is located in Fallon County, Montana, and has been continuously operated as a federally certified natural gas storage field since the 1940's. The Federal Power Commission, the predecessor to the Federal Energy Regulatory Commission ("FERC"), originally certified the Baker Storage Field and determined that its operation was a matter of public convenience and necessity in 1946. In 1985, the FERC issued WBI a Certificate of Public Convenience and

> Necessity to operate the natural gas facilities at the Baker Storage Field. At that time, WBI obtained rights to operate the Baker Storage Field from the fee and mineral rights owners of the properties included in the storage field.
>
> In 2011, however, the Montana Supreme Court held that the surface owner owns the pore space and rights to subsurface storage of natural gas. *See Burlington Res. Oil & Gas Co. v. Lang and Sons Inc.*, 2011 MT 199, 361 Mont. 407, 259 P.3d 766 (Mont. 2011). Due to the change in the law, WBI began working to acquire subsurface storage easements from the surface owners of the properties in the Baker Storage Field. WBI reports that it was able to acquire 99% of the easements by agreement. For the remaining properties, WBI filed this action to condemn the natural gas storage easements.

*Id.*

[¶34] The State's argument that providing due process and just compensation before taking private property is "killing the implementation of CCS" is unsupported and there are examples that prove this literally within eyesight of North Dakota's border. First off, faced with the need to secure the rights for its facility, WBI acquired 99% of them through voluntary agreements. It then brought a condemnation action and condemned the remainder for nominal compensation. *Id.* While Landowners obviously do not agree that nominal compensation is just compensation, the court in the WBI case was clear that it was awarding nominal damages because "the landowners have failed to produce any evidence of the amount of just compensation due." *Id.* (emphasis added).

[¶35] Ultimately the argument made by the State and other intervenors is that the doctrine of correlative rights applies because sequestration of CO2 into pore space is "similar to" production of oil and gas. But the reality is that while certain aspects of this resource are similar to oil and gas development, such as the reservoir dynamics, certain more important aspects are different, such as the reality that force-pooling pore space does not create *more* pore space. When the principles of conservation law are applied piecemeal to carbon sequestration as the State tries to do here, a taking occurs because the assumption that underpins all conservation laws is that they result in

production of *more* of the resource and that every owner gets their proportionate share of the resource. The application of these laws to the development and use of pore space is different and no more pore space is created – it is simply that the owner of the pore space has his pore space used by force (which is the real goal of the State).

[¶36] But the fact that it is unconstitutional to "amalgamate" pore space as that term is used in the challenged laws, or that the doctrine of correlative rights does not apply, does not at all mean the carbon capture and sequestration cannot move forward. To the extent that responsible operators obtain 99% of the property rights by negotiation, they should be applauded. If they bring a condemnation action, with all of the constitutional guarantees that entails and obtain the rights to the remainder of the property through eminent domain, that is how the system works in the United States of America. The Landowners, to be sure, are no fans of the power and process of eminent domain. That process literally takes away what defines their very being. They should be hostile to it. But that process is the one that our Constitution allows when our government takes our property from us, and that process is the only one that our Constitution allows.

**IV. The Landowners' due process claims are not derivative and are independent claims.**

[¶37] The State argues that "Plaintiffs' Due Process claims are entirely derivative of their Takings claims and otherwise undeveloped…." Index #184, ¶ 142. Landowners disagree. For example, the North Dakota Constitution requires payment of just compensation *before* a taking occurs, and it also requires that just compensation be decided by a jury. Constitution of ND, Art. I, § 16. The failure of the amalgamation statute to provide for these rights is not merely part of the takings claims here – it is also a separate due process claim for failure to provide the literal due process required by the North Dakota Constitution. Art. I, § 16 ("Private property shall not be taken or damaged for public use without just compensation having been **first** made to, or paid into court for the owner…."; "Compensation shall be ascertained by a jury, unless a jury be waived.").

[¶38] Where fundamental rights or interests are involved, a state regulation limiting these fundamental rights can be justified only by a compelling state interest and legislative enactments must be narrowly drawn to express only the legitimate state interests at stake. Therefore, state limitations on a fundamental right such as the right of privacy are permissible only if they survive strict constitutional scrutiny." *Hoff v. Berg*, 1999 ND 115, ¶ 13, 595 N.W.2d 285, 290. The rights at issue here are unquestionably fundamental, being some of the first listed in our Constitution. N.D. Const. Art. I, § 1 ("All individuals are by nature equally free and independent and have certain inalienable rights, among which are those of … **acquiring, possessing and protecting property**….").

> Substantive due process analysis requires a close correspondence between legislation and the goals it advances. *See Law v. Maercklein*, 292 N.W.2d 86, 91 (N.D. 1980). This Court may declare a statute unconstitutional on substantive due process grounds if "'the Legislature had no power to act in the particular matter or, having power to act, [] such power was exercised in an arbitrary, unreasonable, or discriminatory manner and [] the method adopted has no reasonable relation to attaining the desired result.

*Hoff v. Berg*, 1999 ND 115, ¶ 14.

[¶39] As to procedural due process, the standard is usually a flexible one, but here the standard is unnecessary given that the procedural due process of which the Landowners are being deprived is literally specified in the North Dakota Constitution.

[¶40] The North Dakota Court in *Bigelow v. Draper*, 6 N.D. 152, 166, 69 N.W. 570, 574 (1896) discussed the clear constitutional requirement for a jury on just compensation as opposed to any requirement for a jury for questions of constitutional necessity or public use which are for the court:

> As the issues in such proceedings were not wont to be tried by a jury, as, with the exception of the matter of compensation, there is no constitutional right to such a mode of trial, we cannot infer from the mere fact that the proceeding in this state is to assume the form of a civil action that a jury trial of the whole case was designed.

> Such radical change in the manner of settling the controverted points in such a proceeding must not be built up on a mere inference in the face of an implication so strong as to be practically equivalent to an express declaration that no other question except that of compensation should be submitted to a jury.

*Id.* (emphasis added).

[¶41] The Court explained, however, that "[t]he constitution requires this question of compensation to be left to a jury. Const. § 14. Section 5955 of the Rev. Codes, declares, in the language of the constitution, that 'compensation shall in all cases be ascertained by a jury unless a jury is waived.' In the absence of the provision contained in § 14, a jury trial in such cases could not be demanded as a constitutional right. *Bigelow*, 6 N.D. 152, 164-65, 69 N.W. 570, 573 (1896) (emphasis added).

[¶42] Thus the North Dakota Court has already explained that absent an explicit requirement in the North Dakota Constitution there would not be a right to a jury on general due process grounds, but in the case of the North Dakota Constitution the right to a jury on compensation is explicit and unquestionable. Summit makes an argument that no jury is required based on its reading of *Martin v. Tyler*, 4 N.D. 278, 60 N.W. 392 (1894). Index #180, ¶¶32-38. It is simply wrong and a jury is a constitutional requirement as was recognized in *Bigelow* in 1896 and recently when the North Dakota Court said "Article I, § 16, N.D. Const., states '[p]rivate property shall not be taken or damaged for public use without just compensation having been first made to, or paid into court for the owner.' A jury decides the amount of compensation due for the taking, unless a jury is waived." *Sauvageau v. Bailey*, 2022 ND 86, ¶ 9, 973 N.W.2d 207. Elsewhere the ND Court has said clearly that "[t]he determination of what constitutes just compensation is a question for the jury to resolve, unless the right to a jury is waived" and cited directly to Section 16 (formerly 14) of the North Dakota Constitution for the proposition. *Hultberg v. Hjelle*, 286 N.W.2d 448, 451 (N.D. 1979).

[¶43] The amalgamation statutes, however, provide for the taking of private property in violation of these procedural due process rights, and this is a violation of both the substantive and procedural due process rights that the Landowners have in their fundamental right to own and protect their property. The Landowners are also entitled to have just compensation (not "equitable compensation" as determined by an executive tribunal (NDIC) consisting of the Governor, Attorney General, and Agriculture Commissioner), and they are entitled to have a jury determine this before their property is taken. Because the amalgamation statutes violate these rights to procedural and substantive due process, they should be struck down on grounds of due process in addition to and independent from the takings claims.

## V. There is no requirement to exhaust administrative remedies and obtain an order from the NDIC amalgamating property rights.

[¶44] This is a facial challenge because there are no constitutional applications of the amalgamation statutes. In every instance, the application of the statute results in an unconstitutional taking because the entire intent, purpose, and effect of the law is to subject property to geologic storage if the landowner does not consent. N.D.C.C. § 38-22-10, § 38-25-08. As explained above, it is unconstitutional to do so without following the constitutional requirements for due process and just compensation found in Article 1, Section 16 of the North Dakota Constitution. Because that section also requires things like just compensation to be determined by a jury, the challenge to these laws is also not merely based on the fact that they constitute a taking, but also that they deny the due process that is required by the North Dakota and federal Constitutions by failing to afford the bare process required by the North Dakota Constitution itself. They further deny the right to just compensation and require only that the NDIC find that pore space owners will be "equitably compensated," a term that is unconstitutional unless

is means just compensation, but was clearly written to mean the equitable or proportionate share of oil production, or for sequestration, revenue from 45Q credits.

[¶45] Regardless, the constitutional challenge mounted is based on both takings claims and due process claims. It is a facial challenge and with respect to the amalgamation laws, the claim is that they are unconstitutional takings because in every instance of their application they result in an unconstitutional taking and violate the due process protections of Article I, Section 16 of the ND Constitution. In such a situation, it is not necessary to obtain an order from the agency or to exhaust administrative remedies, and the challenge is appropriately brought as a facial challenge. *See Larimore Pub. Sch. Dist. No. 44 v. Aamodt*, 2018 ND 71, ¶ 37, 908 N.W.2d 442 and *United States v. Salerno*, 481 U.S. 739, 745, 107 S. Ct. 2095, 2100 (1987). The agency is without even the authority or jurisdiction to provide a jury trial, for example, so because exhaustion would be futile in all instances it is not required nor does it promote the goal of judicial efficiency, which is the basis for the doctrine. *See, e.g.*, *Tracy v. Cent. Cass Pub. Sch. Dist.*, 1998 ND 12, ¶ 13, 574 N.W.2d 781, 783 (noting exhaustion is required "[u]nless exhaustion would be futile … .") (emphasis added).

## VI. The *United States v. Causby* case and the nuisance-law interference theory was already argued to the North Dakota Supreme Court and the argument was rejected.

[¶46] Summit argues that "[t]he issue that Summit is raising in the case at hand *(i.e.,* whether *Causby* or *Loretto* is the proper standard for assessing whether a government-authorized invasion of non-surface property constitutes a taking) was neither considered nor decided by the *Northwest Landowners* Court. *Causby* was not even cited in the Court's opinion. Moreover, the parties in that case never argued that the Court should apply a standard other than *Loretto.*" State brief, Index #184, ¶ 23. These statements are false.

[¶47] The North Dakota Supreme Court's docket can be accessed to view the briefs filed in that case, and Continental clearly made an almost identical argument to the Court in the prior *Northwest Landowners* case regarding the application of the *Causby* case. *See* Appellant Brief of Continental Resources, ¶ 50, ND Supreme Court Case Number 20210148.[5] Indeed, the argument was made in almost the exact same way with almost the exact same block quote. *Id.*[6] The North Dakota Petroleum Council also made a similar argument in the prior *Northwest Landowners* case:

> In *Chance v. BP Chemicals, Inc.*, the Ohio Supreme Court reviewed a claim that BP Chemicals trespassed on the plaintiff's land when legally injected fluids laterally migrated into the plaintiff's subsurface. 670 N.E.2d 985, 986. The court reasoned that "[j]ust as a property owner must accept some limitations on the ownership rights extending above the surface of the property, there are also limitations on property owners' subsurface rights." Id. at 992. Surface owners' "subsurface rights in their properties include the right to exclude invasions of the subsurface property that actually interfere with [landowners'] reasonable and foreseeable use of the subsurface." Id. (emphasis added).The *Chance* holding strikes the proper balance between protecting a landowner's interests and supporting oil and gas development for the public interest.

*See* Brief of Amicus ND Petroleum Council, ¶ 13, ND Supreme Court Case Number 20210148.[7]

---

[5] https://portal.ctrack.ndcourts.gov/portal/court/68f021c4-6a44-4735-9a76-5360b2e8af13/case/07cf5497-116b-44c0-a6df-b08abf9d07f7

[6] Continental argued: "From the standpoint of the statutory phrase 'everything permanently situated beneath or above it,' N.D.C.C. § 47-01-12, the use of pore space is the same as the use of airspace. Yet in 1923 the Legislative Assembly declared the surface owner's right to the air above was subject to the "right of flight." N.D.C.C. §§ 2-03-03, -04 (recognizing North Dakota landowners own space above the land "subject to the right of flight"). The United States Supreme Court later adopted the same view. See *United States v. Causby*, 328 U.S. 256, 260-61 (1946). In *Causby*, the Court considered whether use of the airspace declared by Congress to be a public domain and in accordance with the applicable statutes and regulations could constitute a taking. *Id.* at 260-67. In beginning its analysis, the Court noted:

> It is ancient doctrine that a common law ownership of the land extended to the periphery of the universe—Cujus est solum ejus est usque ad coelum. *But that doctrine has no place in the modern world*. The air is a public highway, as Congress had declared. Were that not true, every transcontinental flight would subject the operator to countless trespass suits. *Common sense revolts at the idea*.

Id. 260-61 (emphasis added).

[7] https://portal.ctrack.ndcourts.gov/portal/court/68f021c4-6a44-4735-9a76-5360b2e8af13/case/07cf5497-116b-44c0-a6df-b08abf9d07f7.

[¶48] Contrary to Summit's claim that the North Dakota Supreme Court did not hear or decide the issue, it had precisely the same arguments about the *Causby* case and limitations on subsurface rights before it in the prior case, and it squarely responded to the *Causby* argument as follows:

> Senate Bill 2344 constitutes a per se taking. It allows third-party oil and gas operators to physically invade a landowner's property by injecting substances into the landowner's pore space. As demonstrated in *Arkansas Game & Fish Comm'n v. United States*, 568 U.S. 23, 34, 133 S. Ct. 511, 184 L. Ed. 2d 417 (2012), physical invasion by water, even for a limited duration, results in a per se taking. Furthermore, because S.B. 2344 permits oil and gas operators to use pore space to temporarily or permanently store or dispose of gases and wastes, the bill authorizes an occupation of the landowners' property. Similar to the unconstitutional regulation in *Cedar Point Nursey*, S.B. 2344 grants oil and gas operators a right of access to the landowners' private property. Further, as in *Loretto*, 458 U.S. at 436, S.B. 2344 restricts landowners from having any control over the "timing, extent, or nature of the invasion." As amended, the statutes would allow anyone conducting operations under Chapter 38-08 to inject waste into a surface owner's pore space without the surface owner's consent. See N.D.C.C. § 47-31-09(1) (stating that "[i]njection . . . of substances into pore space . . . is not unlawful and, by itself, does not constitute trespass"). Allowing such usage takes away one of the most treasured property rights because it takes away landowners' right to exclude oil and gas operators from trespassing and disposing waste into their pore space.

*Nw. Landowners Ass'n v. State*, 2022 ND 150, ¶ 26, 978 N.W.2d 679.

[¶49] Indeed, the Court reiterated: "Furthermore, although the use of pore space may not seriously interfere with a landowner's use of the rest of his land because the pore space is deep beneath the surface, *Loretto* held that compensation is required for physical invasions even if the owner suffers only a 'minimal economic impact.'"

[¶50] Summit's claim that its *Causby* argument was not specifically and squarely rejected by the North Dakota Supreme Court is demonstrably false.

## VII. The precondemnation survey laws authorize physical invasions in violation of *Cedar Point Nursery v. Hassid.*

[¶51] The background principles that are inherent limitations on title and the right to exclude were listed in the United Supreme Court's decision in *Cedar Point Nursery v. Hassid*, 141 S. Ct.

2063, 2079-80 (2021). The lists from both the Court and the dissent did not include the survey statutes claimed by the State to be such a principle. *Id.*

[¶52] In the United States Supreme Court's discussion of background limitations on a landowner's title, it was simply recognizing that if a limitation inheres in property title itself, it cannot be said to be a taking when the state enforces that limitation. *Cedar Point Nursery v. Hassid*, 141 S. Ct. 2063, 2079 (2021). The U.S. Supreme Court was not "carving out exceptions" to allow unconstitutional takings, as presumed by the State and the court in *Klemic v. Dominion Transmission, Inc.*, 138 F. Supp. 3d 673 (W.D. Va. 2015) and *Charlottesville Div. v. Dominion Transmission, Inc.*, 138 F. Supp. 3d 673 (W.D. Va. 2015). The Court, as even Justice Breyer recognized in his dissent, was merely reasserting the principle recognized in *Lucas* that "the government can, without paying compensation, impose a limitation on land that '**inhere[s]** in the title itself, in the restrictions that background principles of the State's law of property and nuisance already place upon land ownership." *Cedar Point Nursery v. Hassid*, 141 S. Ct. 2063, 2088 (2021) (emphasis added). Justice Breyer asks a couple of rhetorical questions in his dissent: "Do only those exceptions that existed in, say, 1789 count? Should courts apply those privileges as they existed at that time, when there were no union organizers?" *Id.* at 2089. The obvious answer based on any reasonable reading of the majority opinion is YES and YES. *Id.*

[¶53] A District Court in Virginia ruled on a case prior to the *Cedar Point* decision and got it wrong. For example, the Virginia court states that there are "common-law privileges to enter private property without trespass liability" as found in some statutes, and proceeds to quote this as an exception to liability for an unconstitutional taking. *Charlottesville Div.*, 138 F. Supp. 3d 673, 688 (W.D. Va. 2015). This statement fundamentally conflates trespass law and takings law. Of course a statute may relieve trespass liability when it provides an "authorization" because the tort

of trespass is an "unauthorized" entry. But whether that is true is irrelevant to whether it is an unconstitutional taking of a private property right, and is also irrelevant to whether such a statute is a limitation that ***inheres*** in the landowner's *title*. If it does, then it cannot be "taken" by a physical invasion because it was never a consequent of the right to exclude in the first place. The language of N.D.C.C. § 32-15-06 that limits just compensation ("…and such entry constitutes no claim for relief in favor of the owner of the land except for injuries resulting from negligence, wantonness, or malice), cannot reasonably be said to *inhere* in any title – it is simply a misstatement of law that violates the state and federal constitutions and must be struck down as unconstitutional on its face.

> Government-authorized physical invasions of property constitute the "clearest sort of taking" and therefore are a per se taking. *Cedar Point Nursery v. Hassid*, 141 S. Ct. 2063, 2071, 210 L. Ed. 2d 369 (2021). "[A]n owner suffers a special kind of injury when a *stranger* directly invades and occupies the owner's property." *Loretto*, 458 U.S. at 436. A physical invasion "is qualitatively more severe than a regulation of the *use* of property . . . since the owner may have no control over the timing, extent, or nature of the invasion." *Id.* Further, regardless of whether the physical occupation is permanent or temporary, just compensation is required. *Cedar Point Nursery*, 141 S. Ct. at 2074. Even if the physical invasion has only minimal economic impact on the owner, compensation is required because when there is a physical occupation of property, it effectively destroys the owner's rights to possess, use, and dispose of the property. *Loretto*, 458 U.S. at 435-36; *Cass Co. Joint Water Res. Dist. v. Aaland*, 2021 ND 57, ¶¶ 13-14, 956 N.W.2d 395. Further, because government-authorized physical invasions take away the landowner's right to exclude—"one of the most treasured" rights of property ownership—they are a per se taking.

*Nw. Landowners Ass'n*, 2022 ND 150, ¶ 25, 978 N.W.2d 679, 691 (emphasis added).

[¶54] In *Jacobsen v. Superior Court of Sonoma*, 192 Cal. 319, 320, 219 P. 986, 987 (1923), the California Supreme Court considered the same statutory language at issue here, and also specific language that had been added to the California constitution which rendered its statute unconstitutional in most regards and also made its takings provision almost identical to North Dakota's:

> At the time the present constitution was adopted (in 1879), the law as declared by the supreme court was as follows: The possession and use in terms authorized by

> the statute, before compensation had been made and while the proceeding was pending, is a taking within the meaning of the constitution, but the requirement of the former constitution, which only provided that private property should not be taken for public use without just compensation, was satisfied by a provision which insured the payment on reasonable terms as to delay and difficulty in the enforcement of the right. Viewed in the light of these facts, the change made in the language by the new constitution becomes significant. The following italicized words were added, and no other change was made in the general provision: 'Private property shall not be taken *or damaged* for public use without just compensation *having been first made to or paid into court for the owner*.

*Id.*, 192 Cal. at 327 (emphasis in original).

[¶55] This language is significant because it also appears verbatim in the North Dakota constitution's takings clause. This Court recognized as much recently when it wrote: "The North Dakota Constitution provides overlapping and broader protection against government interference with property rights [than the federal constitution]: Private property shall not be taken *or damaged* for public use without just compensation having been *first made to, or paid into court for the owner*." *Northwest Landowners Ass'n v. State*, 2022 ND 150, ¶ 16 (quoting N.D. Const. art. I, § 16) (emphasis added).

[¶56] Additionally, the North Dakota constitution requires that just compensation be determined by a jury unless waived by the landowner. ND Const. Art I, § 16. The only exception to this is for the State itself and its political subdivisions, who could utilize quick take procedures in order to effectuate immediate possession subject to appeal on all grounds, and potential reconveyance along with just compensation for the temporary taking if the taking was found to be unconstitutional or unjustified. *Id.* The California Supreme Court agreed with this. *Jacobsen*, 192 Cal. At 331, 219 P. 986 ("The only means by which [the government] can acquire such property without the owner's consent is through the exercise of the right of eminent domain."). And as in California, if the State itself or its political subdivisions seek to acquire survey access in an

expedited manner, it can be done through the quick take procedures allowed by the Constitution and other state law, but not through N.D.C.C. § 32-15-06.

[¶57] Defendants argue that it is impractical as a policy matter to strike down the precondemnation survey statutes because they are relied upon by condemnors to obtain access for surveying activities prior to a project and there will be dire consequences if they cannot. *See, e.g.* Basin Brief, Index #164, ¶ 35 ("If the Survey Statute was held unconstitutional, Basin Electric's ability to provide reliable electricity to its members and to support the reliability of the electrical grid would be seriously impaired."); State brief, Index #184, ¶ 21 ("Plaintiffs' sweeping argument to the contrary would, if taken on its face, destabilize other areas of State law."). As with the amalgamation statutes and the histrionics about having to use condemnation, there are clear legal paths forward if the government needs to conduct surveys that do not involve unconstitutional takings.

[¶58] As one example, on September 27, 2019, in response to concerns over illegal immigration, the United States government filed *United States v. 117.543 Acres of Land*, 504 F. Supp. 3d 595 (S.D. Tex. 2020). In this case it sought a temporary "easement 'to conduct surveying, testing, and other investigatory work needed to plan the proposed construction of roads, fencing, vehicle barriers, security lighting, cameras, sensors, and related structures designed to help secure the United States/Mexico border within the State of Texas.'" *Id.*, 504 F. Supp. 3d 595, 599 (S.D. Tex. 2020). Given the pressing nature of the concerns the government was trying to address, it is hard to square the defendants' claims that government cannot function without invading private property for precondemnation surveys. If the United States government can respect private property rights even while attempting to address a situation it considers to be an emergency of national consequence, so too can the executive branch of the state of North Dakota. The state of

North Dakota also allows "quick take" actions to be filed by the state and its subdivisions and local governments, meaning that it can obtain almost immediate access for this type of survey when necessary.

## VIII. The hyperbolic claims made by defendants are not new and are not a reasonable basis for the Court's decision.

[¶59] Throughout the briefing, defendants make hyperbolic claims about the potential effects and impacts of striking down the challenged laws as unconstitutional. These same claims were made in *NWLA I*, and the energy industry yet survives, and the lights in North Dakota have not gone out.

[¶60] For example, in *NWLA I*, the State warned:

> ***
>
> If this court adopts or accepts the NWLA interpretation of S.B.2344, the court will indirectly, or directly, limit the Industrial Commission's statutory and regulatory authority, and reject the Court's longstanding precedent relative to property rights and mineral development in North Dakota. Such a result would upend mineral development in North Dakota.
>
> ***

(*See* 05-2019-CV-00085, Index #58: State's Motion for Judgment on the Pleadings, at ¶ 2) (emphasis added).

[¶61] The State later doubled down on its dire warning in *NWLA I*, claiming:

> If this Court adopts or accepts NWLA's invitation to read the laws within S.B.2344 in isolation, the Court will significantly impact and upend longstanding precedent relative to mineral rights and development in North Dakota and the Industrial Commission's powers to regulate oil and gas development. The Court will transform the surface estate into the dominant estate.

(*Id.*, Index #115: State's Response to Motion for Summary Judgment and Cross-Motion for Summary Judgment, at ¶ 4) (emphasis added).

[¶62] Continental later told the Supreme Court that this Court's ruling in *NWLA I*, "…places North Dakota in the position, unwittingly, of having seized through the Pore Space Statute potentially tens of billions of dollars of the rights of mineral owners and given them to surface

owners without compensation or public purpose." *See* Supreme Court No. 20210148, filed November 8, 2021: Appellant Continental Resources, Inc.'s Opening Brief & Addendum, ¶ 81.

[¶63] Of course none of this hand waving amounted to anything and the Court should also ignore the current hyperbolic threats from defendants. There are paths for industry to take that are within the bounds of the Constitutions. Responsible developers like WBI have shown that when landowners are treated fairly it is possible to reach agreements with almost all of them, and if there is that 1% that does not agree, there is a process for taking private property through eminent domain that does not run afoul of the myriad constitutional violations that the so-called "amalgamation" statutes create. *See WBI Energy Transmission, Inc. v. Subsurface Easements for the Storage of Nat. Gas*, No. CV 18-88-BLG-SPW-TJC, 2020 U.S. Dist. LEXIS 144001, at *1 (D. Mont. July 6, 2020). Similarly, even the United States government does not appear to have trouble addressing what it considers national emergencies within the bounds of the Constitution and eminent domain law when it needs to conduct surveys prior to condemnation for an actual project. *See United States v. 117.543 Acres of Land*, 504 F. Supp. 3d 595 (S.D. Tex. 2020).

## CONCLUSION

[¶64] Alexander Hamilton once discussed the important role of the judiciary in the American form of government:

> By a limited Constitution, I understand one which contains certain specified exceptions to the legislative authority; such, for instance, as that it shall pass no bills of attainder, no ex-post-facto laws, and the like. Limitations of this kind can be preserved in practice no other way than through the medium of courts of justice, whose duty it must be to declare all acts contrary to the manifest tenor of the Constitution void. Without this, all the reservations of particular rights or privileges would amount to nothing.

Alexander Hamilton, Federalist No. 78, (The Judiciary Department, McLEAN'S Edition, New York).[8]

[¶65] "No legislative act, therefore, contrary to the Constitution, can be valid. To deny this, would be to affirm, that the deputy is greater than his principal; that the servant is above his master; that the representatives of the people are superior to the people themselves; that men acting by virtue of powers, may do not only what their powers do not authorize, but what they forbid." *Id.*

[¶66] "The powers of the legislature are defined and limited; and that those limits may not be mistaken or forgotten the Constitution was written.' The legislature was created by the Constitution and vested with power to enact laws conformable to the provisions of the Constitution… ." *State v. First State Bank*, 52 N.D. 231, 242-44, 202 N.W. 391 (ND 1924).

[¶67] Landowners respectfully request that this Court strike down the challenged laws as unconstitutional and prohibit their implementation and enforcement.

Dated: May 13, 2024.

Respectfully submitted,

*/s/ Derrick Braaten*

Derrick Braaten (ND #06394)
derrick@braatenlawfirm.com
**BRAATEN LAW FIRM**
109 North 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911

*Attorneys for Plaintiffs Northwest Landowners Association, Mike Dresser, Sandra Short, the Swenson Living Trust*

[8] https://guides.loc.gov/federalist-papers/text-71-80#s-lg-box-wrapper-25493470.

STATE OF NORTH DAKOTA | DISTRICT COURT

COUNTY OF BOTTINEAU | NORTHEAST JUDICIAL DISTRICT

---

Northwest Landowners Association, Mike Dresser, Sandra Short, the Swenson Living Trust, and North Dakota Farm Bureau (intervenor),

Plaintiffs,

vs.

State of North Dakota, North Dakota Industrial Commission, Hon. Douglas Burgum in his official capacity as Governor of the State of North Dakota and as the Chairman and a member of the North Dakota Industrial Commission, and Hon. Drew Wrigley in his official capacity as Attorney General of North Dakota and as a member of the North Dakota Industrial Commission, and Hon. Doug Goehring in his official capacity as Agriculture Commissioner of North Dakota and as a member of the North Dakota Industrial Commission,

Defendants,

and,

SCS Carbon Transport LLC, SCS Permanent Carbon Storage LLC, Summit Carbon Solution, LLC, Minnkota Power Cooperative, Inc., Basin Electric Power Cooperative and Dakota Gasification Company,

Intervenor-Defendants.

Case No. 05-2023-CV-00065

**DECLARATION OF ATTORNEY DERRICK BRAATEN**

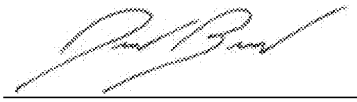
---

[¶1] I am legal counsel for Plaintiffs, Northwest Landowners Association, Mike Dresser, Sandra Short, and the Swenson Living Trust, and make this declaration based on personal knowledge.

[¶2] Attached hereto as Exhibit 1 is a true and correct copy of the Geologic Storage Agreement incorporated in NDIC Order No. 31584 (Index # 28) by reference in paragraph 2 of pp. 5-6. Minnkota Power Cooperative produced this Agreement with bates numbers Minnkota 00935-00976 in response to North Dakota Farm Bureau's Requests for Production of Documents. The property of Mike Dresser is listed on the page bates stamped as Minnkota 00953 and the Surface Use And Pore Space Lease, "Attached to and made part of the Storage Agreement" as Exhibit D, begins at bate stamp Minnkota 00963.

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on the 13th day of May, 2024 at Bismarck, North Dakota, United States.



Derrick Braaten

# STORAGE AGREEMENT
# TUNDRA BROOM CREEK – SECURE GEOLOGIC STORAGE
# OLIVER COUNTY, NORTH DAKOTA

# STORAGE AGREEMENT
# TUNDRA BROOM CREEK – SECURE GEOLOGIC STORAGE
# OLIVER COUNTY, NORTH DAKOTA

**THIS AGREEMENT** ("Agreement") is entered into as of the 1st day of November 1, 2021, by the parties who have signed the original of this instrument, a counterpart thereof, ratification and joinder or other instrument agreeing to become a Party hereto.

## RECITALS:

A. It is in the public interest to promote the geologic storage of carbon dioxide in a manner which will benefit the state and the global environment by reducing greenhouse gas emissions and in a manner which will help ensure the viability of the state's coal and power industries, to the economic benefit of North Dakota and its citizens;

B. To further geologic storage of carbon dioxide, a potentially valuable commodity, may allow for its ready availability if needed for commercial, industrial, or other uses, including enhanced recovery of oil, gas, and other minerals; and

C. For geologic storage, however, to be practical and effective requires cooperative use of surface and subsurface property interests and the collaboration of property owners, which may require procedures that promote, in a manner fair to all interests, cooperative management, thereby ensuring the maximum use of natural resources.

## AGREEMENT:

It is agreed as follows:

## ARTICLE 1
## DEFINITIONS

As used in this Agreement:

1.1 **Carbon Dioxide** means carbon dioxide in gaseous, liquid, or supercritical fluid state together with incidental associated substances derived from the source materials, capture process and any substances added or used to enable or improve the injection process.

1.2 **Commission** means the North Dakota Industrial Commission.

1.3 **Effective Date** is the time and date this Agreement becomes effective as provided in Article 14.

1.4 **Facility Area** is the land described by Tracts in Exhibit "B" and shown on Exhibit "A" containing 18903.211 acres, more or less.

1.5 **Party** is any individual, corporation, limited liability company, partnership, association, receiver, trustee, curator, executor, administrator, guardian, tutor, fiduciary, or other representative of any kind, any department, agency, or instrumentality of the state, or any governmental subdivision thereof, or any other entity capable of holding an interest in the Storage Reservoir.

1.6 **Pore Space** means a cavity or void, whether natural or artificially created, in any subsurface stratum.

1.7 **Pore Space Interest** is a right to or interest in the Pore Space in any Tract within the boundaries of the Facility Area.

1.8 **Pore Space Owner** is a Party hereto who owns Pore Space Interest.

1.9 **Storage Equipment** is any personal property, lease and well equipment, plants and other facilities and equipment for use in Storage Operations.

1.10 **Storage Expense** is all costs, expense or indebtedness incurred by the Storage Operator pursuant to this Agreement for or on account of Storage Operations.

1.11 **Storage Reservoir** consists of the Pore Space and confining subsurface strata underlying the Facility Area described as the Opeche-Picard (Upper Confining Zone), Broom Creek (Storage Reservoir/Injection Zone), and Amsden (Lower Confining Zone) Formation(s) and which are defined as identified by the well logging suite performed at two stratigraphic wells, the J-LOC1 well (File No. 37380) and the J-ROC1 1 well (File No. 37672). The log suites included caliper, gamma ray (GR), density, porosity (neutron, density), dipole sonic, resistivity, spectral GR, a combinable magnetic resonance (CMR), and fracture finder log. Further, the logs were used to pick formation top depths and interpret lithology, petrophysical properties, and time-to-depth shifting of seismic data obtained from two 3D seismic surveys covering an area totaling 18.5 miles in and around the J-ROC1 1 (located in Section 4, Township 141 North, Range 83 West) and the J-LOC 1 (located in Section 27, Township 142 North, Range 84 West) stratigraphic wells located in Oliver County, North Dakota. Formation top depths were picked from the top of the Pierre Formation to the top of the Precambrian. These logs and data which encompass the stratigraphic interval from an average depth of 4,650 feet to an average depth of 5,450 feet within the limits of the Facility Area.

1.12 **Storage Facility** is the unitized or amalgamated Storage Reservoir created pursuant to an order of the Commission.

1.13 **Storage Facility Participation** is the percentage shown on Exhibit "C" for allocating payments for use of the Pore Space under each Tract identified in Exhibit "B".

1.14 **Storage Operations** are all operations conducted by the Storage Operator pursuant to this Agreement or otherwise authorized by any lease covering any Pore Space Interest.

1.15 **Storage Operator** is the person or entity named in Section 4.1 of this Agreement.

1.16 **Storage Rights** are the rights to explore, develop, and operate lands within the Facility Area for the storage of Storage Substances.

1.17 **Storage Substances** are Carbon Dioxide and incidental associated substances, fluids, and minerals.

1.18 **Tract** is the land described as such and given a Tract number in Exhibit "B."

## ARTICLE 2
## EXHIBITS

2.1 **Exhibits.** The following exhibits, which are attached hereto, are incorporated herein by reference:

2.1.1 Exhibit "A" is a map that shows the boundary lines of the Tundra Broom Creek Facility Area and the tracts therein;

2.1.2 Exhibit "B" is a schedule that describes the acres of each Tract in the Tundra Broom Creek Facility Area;

2.1.3 Exhibit "C" is a schedule that shows the Storage Facility Participation of each Tract; and

2.1.4 Exhibit "D" is a form of Surface Use and Pore Space Lease.

2.2 **Reference to Exhibits.** When reference is made to an exhibit, it is to the exhibit as originally attached or, if revised, to the last revision.

2.3 **Exhibits Considered Correct.** Exhibits "A," "B," "C" and "D" shall be considered to be correct until revised as herein provided.

2.4 **Correcting Errors.** The shapes and descriptions of the respective Tracts have been established by using the best information available. If it subsequently appears that any Tract, mechanical miscalculation or clerical error has been made, Storage Operator, with the approval of Pore Space Owners whose interest is affected, shall correct the mistake by revising the exhibits to conform to the facts. The revision shall not include any re-evaluation of engineering or geological interpretations used in determining Storage Facility Participation. Each such revision of an exhibit made prior to thirty (30) days after the Effective Date shall be effective as of the Effective Date. Each such revision thereafter made shall be effective at 7:00 a.m. on the first day of the calendar month next following the filing for record of the revised exhibit or on such other date as may be determined by Storage Operator and set forth in the revised exhibit.

2.5 **Filing Revised Exhibits.** If an exhibit is revised, Storage Operator shall execute an appropriate instrument with the revised exhibit attached and file the same for record in the county or counties in which this Agreement or memorandum of the same is recorded and shall also file the amended changes with the Commission.

## ARTICLE 3
## CREATION AND EFFECT OF STORAGE FACILITY

3.1 **Unleased Pore Space Interests.** Any Pore Space Owner in the Storage Facility who owns a Pore Space Interest in the Storage Reservoir that is not leased for the purposes of this Agreement and during the term hereof, shall be treated as if it were subject to the Surface Use and Pore Space Lease attached hereto as Exhibit "D".

3.2 **Amalgamation of Pore Space.** All Pore Space Interests in and to the Tracts are hereby amalgamated and combined insofar as the respective Pore Space Interests pertain to the Storage Reservoir, so that Storage Operations may be conducted with respect to said Storage Reservoir as if all of the Pore Space Interests in the Facility Area had been included in a single lease executed by all Pore Space Owners, as lessors, in favor of Storage Operator, as lessee and as if the lease contained all of the provisions of this Agreement.

3.3 **Amendment of Leases and Other Agreements.** The provisions of the various leases, agreements, or other instruments pertaining to the respective Tracts or the storage of the Storage Substances therein, including the Surface Use and Pore Space Lease attached hereto as Exhibit "D", are amended to the extent necessary to make them conform to the provisions of this Agreement, but otherwise shall remain in effect.

3.4 **Continuation of Leases and Term Interests.** Injection in to any part of the Storage Reservoir, or other Storage Operations, shall be considered as injection in to or upon each Tract within said Storage Reservoir, and such injection or operations shall continue in effect as to each lease as to all lands and formations covered thereby just as if such operations were conducted on and as if a well were injecting in each Tract within said Storage Reservoir.

3.5 **Titles Unaffected by Storage.** Nothing herein shall be construed to result in the transfer of title of the Pore Space Interest of any Party hereto to any other Party or to Storage Operator.

3.6 **Injection Rights.** Storage Operator is hereby granted the right to inject into the Storage Reservoir any Storage Substances in whatever amounts Storage Operator may deem expedient for Storage Operations, together with the right to drill, use, and maintain injection wells in the Facility Area, and to use for injection purposes.

3.7 **Transfer of Storage Substances from Storage Facility.** Storage Operator may transfer from the Storage Facility any Storage Substances, in whatever amounts Storage Operator may deem expedient for Storage Operations, to any other reservoir, subsurface stratum or formation permitted by the Commission for the storage of carbon dioxide under Chapter 38-22 of the North Dakota Century Code. The transfer of such Storage Substances out of the Storage Facility shall be disregarded for the purposes of calculating the royalty under any lease covering a Pore Space Interest (including Exhibit "D") and shall not affect the allocation of Storage Substances injected into the Storage Facility through the surface of the Facility Area in accordance with Article 6 of this Agreement.

3.8 **Receipt of Storage Substances.** Storage Operator may accept and receive into the Storage Facility any Storage Substances, in whatever amounts Storage Operator may deem expedient for Storage Operations, being stored in any other reservoir, subsurface stratum or formation permitted by the Commission for the storage of carbon dioxide under Chapter 38-22 of the North Dakota Century Code. The receipt of such Storage Substances into the Storage Facility shall be disregarded for the purposes of calculating the royalty under any lease covering a Pore Space Interest (including Exhibit "D") and shall not affect the allocation of Storage Substances injected into the Storage Facility through the surface of the Facility Area in accordance with Article 6 of this Agreement.

3.9 **Cooperative Agreements.** Storage Operator may enter into cooperative agreements with respect to lands adjacent to the Facility Area for the purpose of coordinating Storage Operations. Such cooperative agreements may include, but shall not be limited to, agreements regarding the transfer and receipt of Storage Substances pursuant to Sections 3.7 and 3.8 of this Agreement.

3.10 **Border Agreements.** Storage Operator may enter into an agreement or agreements with owners of adjacent lands with respect to operations which may enhance the injection of the Storage Substances in the Storage Reservoir in the Facility Area or which may otherwise be necessary for the conduct of Storage Operations.

## ARTICLE 4
## STORAGE OPERATIONS

4.1 **Storage Operator.** Minnkota Power Cooperative, Inc. is hereby designated as the initial Storage Operator. Storage Operator shall have the exclusive right to conduct Storage Operations, which shall conform to the provisions of this Agreement and any lease covering a Pore Space Interest. If there is any conflict between such agreements, this Agreement shall govern.

4.2 **Successor Operators.** The initial Storage Operator and any subsequent operator may, at any time, transfer operatorship of the Storage Facility with and upon the approval of the Commission.

4.3 **Method of Operation.** Storage Operator shall engage in Storage Operations with diligence and in accordance with good engineering and injection practices.

4.4 **Change of Method of Operation.** As permitted by the Commission nothing herein shall prevent Storage Operator from discontinuing or changing in whole or in part any method of operation which, in its opinion, is no longer in accord with good engineering or injection practices. Other methods of operation may be conducted or changes may be made by Storage Operator from time to time if determined by it to be feasible, necessary or desirable to increase the injection or storage of Storage Substances.

## ARTICLE 5
## TRACT PARTICIPATIONS

5.1 **Tract Participations.** The Storage Facility Participation of each Tract is shown in Exhibit "C." The Storage Facility Participation of each Tract shall be based 100% upon the ratio of surface acres in each Tract to the total surface acres for all Tracts within the Facility Area.

5.2 **Relative Storage Facility Participations.** If the Facility Area is enlarged or reduced, the revised Storage Facility Participation of the Tracts remaining in the Facility Area and which were within the Facility Area prior to the enlargement or reduction shall remain in the same ratio to one another.

## ARTICLE 6
## ALLOCATION OF STORAGE SUBSTANCES

6.1 **Allocation of Tracts.** All Storage Substances injected shall be allocated to the several Tracts in accordance with the respective Storage Facility Participation effective during the period that the Storage Substances are injected. The amount of Storage Substances allocated to each tract, regardless of whether the amount is more or less than the actual injection of Storage Substances from the well or wells, if any, on such Tract, shall be deemed for all purposes to have been injected into such Tract. Storage Substances transferred or received pursuant to Sections 3.7 and 3.8 of this Agreement shall be disregarded for the purposes of this Section 6.1.

6.2 **Distribution within Tracts.** The Storage Substances injected and allocated to each Tract shall be distributed among, or accounted for to, the Pore Space Owners who own a Pore Space Interest in such Tract in accordance with the Pore Space Owners' Storage Facility Participation effective during the period that the Storage Substances were injected. If any Pore Space Interest in a Tract hereafter becomes divided and owned in severalty as to different parts of the Tract, the owners of the divided interests, in the absence of an agreement providing for a different division, shall be compensated for the storage of the Storage Substances in proportion to the surface acreage of their respective parts of the Tract. Storage Substances transferred or received pursuant to Sections 3.7 and 3.8 of this Agreement shall be disregarded for the purposes of this Section 6.2.

## ARTICLE 7
## TITLES

7.1 **Warranty and Indemnity.** Each Pore Space Owner who, by acceptance of revenue for the injection of Storage Substances into the Storage Reservoir, shall be deemed to have warranted title to its Pore Space Interest, and, upon receipt of the proceeds thereof to the credit of such interest, shall indemnify and hold harmless the Storage Operator and other Parties from any loss due to failure, in whole or in part, of its title to any such interest.

7.2 **Injection When Title Is in Dispute.** If the title or right of any Pore Space Owner claiming the right to receive all or any portion of the proceeds for the storage of any Storage Substances allocated to a Tract is in dispute, Storage Operator shall require that the Pore Space Owner to whom the proceeds thereof are paid furnish security for the proper accounting thereof to the rightful Pore Space Owner if the title or right of such Pore Space Owner fails in whole or in part.

7.3 **Payments of Taxes to Protect Title.** The owner of surface rights to lands within the Facility Area is responsible for the payment of any *ad valorem* taxes on all such rights, interests or property, unless such owner and the Storage Operator otherwise agree. If any *ad valorem* taxes are not paid by or for such owner when due, Storage Operator may at any time prior to tax sale or expiration of period of redemption after tax sale, pay the tax, redeem such rights, interests or property, and discharge the tax lien. Storage Operator shall, if possible, withhold from any proceeds derived from the storage of Storage Substances otherwise due any Pore Space Owner who is a delinquent taxpayer an amount sufficient to defray the costs of such payment or redemption, such withholding to be credited to the Storage Operator. Such withholding shall be without prejudice to any other remedy available to Storage Operator.

7.4 **Pore Space Interest Titles.** If title to a Pore Space Interest fails, but the tract to which it relates is not removed from the Facility Area, the Party whose title failed shall not be entitled to share under this Agreement with respect to that interest.

## ARTICLE 8
## EASEMENTS OR USE OF SURFACE

8.1 **Grant of Easement.** Storage Operator shall have the right to use as much of the surface of the land within the Facility Area as may be reasonably necessary for Storage Operations and the injection of Storage Substances.

8.2 **Use of Water.** Storage Operator shall have and is hereby granted free use of water from the Facility Area for Storage Operations, except water from any well, lake, pond or irrigation ditch of a Pore Space Owner; notwithstanding the foregoing, Storage Operator may access any well, lake, or pond as provided in Exhibit "D".

8.3 **Surface Damages.** Storage Owner shall pay surface owners for damage to growing crops, timber, fences, improvements and structures located on the Facility Area that result from Storage Operations.

8.4 **Surface and Sub-Surface Operating Rights.** Except to the extent modified in this Agreement, Storage Operator shall have the same rights to use the surface and sub-surface and use of water and any other rights granted to Storage Operator in any lease covering Pore Space Interests. Except to the extent expanded by this Agreement or the extent that such rights are common to the effected leases, the rights granted by a lease may be exercised only on the land covered by that lease. Storage Operator will to the extent possible minimize surface impacts.

## ARTICLE 9
## ENLARGEMENT OF STORAGE FACILITY

9.1 **Enlargement of Storage Facility.** The Storage Facility may be enlarged from time to time to include acreage and formations reasonably proven to be geologically capable of storing Storage Substances. Any expansion must be approved in accordance with the rules and regulations of the Commission.

9.2 **Determination of Tract Participation.** Storage Operator, subject to Section 5.2, shall determine the Storage Facility Participation of each Tract within the Storage Facility as enlarged, and shall revise Exhibits "A", "B" and "C" accordingly and in accordance with the rules, regulations and orders of the Commission.

9.3 **Effective Date.** The effective date of any enlargement of the Storage Facility shall be effective as determined by the Commission.

## ARTICLE 10
## TRANSFER OF TITLE PARTITION

10.1 **Transfer of Title.** Any conveyance of all or part of any interest owned by any Party hereto with respect to any Tract shall be made expressly subject to this Agreement. No change of title shall be binding upon Storage Operator, or any Party hereto other than the Party so transferring, until 7:00 a.m. on the first day of the calendar month following thirty (30) days from the date of receipt by Storage Operator of a photocopy, or a certified copy, of the recorded or filed instrument evidencing such a change in ownership.

10.2 **Waiver of Rights to Partition.** Each Party hereto agrees that, during the existence of this Agreement, it will not resort to any action to partition any Tract or parcel within the Facility Area or the facilities used in the development or operation thereof, and to that extent waives the benefits or laws authorizing such partition.

## ARTICLE 11
## RELATIONSHIP OF PARTIES

11.1 **No Partnership.** The duties, obligations and liabilities arising hereunder shall be several and not joint or collective. This Agreement is not intended to create, and shall not be construed to create, an association or trust, or to impose a partnership duty, obligation or liability with regard to any one or more of the Parties hereto. Each Party hereto shall be individually responsible for its own obligations as herein provided.

11.2 **No Joint Marketing.** This Agreement is not intended to provide, and shall not be construed to provide, directly or indirectly, for any joint marketing of Storage Substances.

11.3 **Pore Space Owners Free of Costs.** This Agreement is not intended to impose, and shall not be construed to impose, upon any Pore Space Owner any obligation to pay any Storage Expense unless such Pore Space Owner is otherwise so obligated.

11.4 **Information to Pore Space Owners.** Each Pore Space Owner shall be entitled to all information in possession of Storage Operator to which such Pore Space Owner is entitled by an existing lease or a lease imposed by this Agreement.

## ARTICLE 12
## LAWS AND REGULATIONS

12.1 **Laws and Regulations.** This Agreement shall be subject to all applicable federal, state and municipal laws, rules, regulations and orders.

## ARTICLE 13
## FORCE MAJEURE

13.1 **Force Majeure.** All obligations imposed by this Agreement on each Party, except for the payment of money, shall be suspended while compliance is prevented, in whole or in part, by a labor dispute, fire, war, civil disturbance, or act of God; by federal, state or municipal laws; by any rule, regulation or order of a governmental agency; by inability to secure materials; or by any other cause or causes, whether similar or dissimilar, beyond reasonable control of the Party. No Party shall be required against his will to adjust or settle any labor dispute. Neither this Agreement nor any lease or other instrument subject hereto shall be terminated by reason of suspension of Storage Operations due to any one or more of the causes set forth in this Article.

## ARTICLE 14
## EFFECTIVE DATE

14.1 **Effective Date.** This Agreement shall become effective as determined by the Commission.

14.2 **Ipso Facto Termination.** If the requirements of Section 14.1 are not accomplished on or before April 1, 2022 this Agreement shall *ipso facto* terminate on that date (hereinafter called "termination date") and thereafter be of no further effect, unless prior thereto Pore Space Owners owning a combined Storage Facility Participation of at least thirty percent (30%) of the Facility Area have become Parties to this Agreement and have decided to extend the termination date for a period not to exceed six (6) months. If the termination date is so extended and the requirements of Section 14.1 are not accomplished on or before the extended termination date this Agreement shall *ipso facto* terminate on the extended termination date and thereafter be of no further effect.

14.3 **Certificate of Effectiveness.** Storage Operator shall file for record in the county or counties in which the land affected is located a certificate stating the Effective Date of this Agreement.

## ARTICLE 15
## TERM

15.1 **Term.** Unless sooner terminated in the manner hereinafter provided or by order of the Commission, this Agreement shall remain in full force and effect until the Commission has issued a certificate of project completion with respect to the Storage Facility in accordance with § 38-22-17 of the North Dakota Century Code.

15.2 **Termination by Storage Operator.** This Agreement may be terminated at any time by the Storage Operator with the approval of the Commission.

15.3 **Effect of Termination.** Upon termination of this Agreement all Storage Operations shall cease. Each lease and other agreement covering Pore Space within the Facility Area shall remain in force for ninety (90) days after the date on which this Agreement terminates, and for such further period as is provided by Exhibit "C" or other agreement.

15.4 **Salvaging Equipment Upon Termination.** If not otherwise granted by Exhibit "C" or other instruments affecting each Tract, Pore Space Owners hereby grant Storage Operator a period of six (6) months after the date of termination of this Agreement within which to salvage and remove Storage Equipment.

15.5 **Certificate of Termination.** Upon termination of this Agreement, Storage Operator shall file for record in the county or counties in which the land affected is located a certificate that this Agreement has terminated, stating its termination date.

## ARTICLE 16
## APPROVAL

16.1 **Original, Counterpart or Other Instrument.** A Pore Space Owner may approve this Agreement by signing the original of this instrument, a counterpart thereof, ratification or joinder or other instrument approving this instrument hereto. The signing of any such instrument shall have the same effect as if all Parties had signed the same instrument.

16.2 **Joinder in Dual Capacity.** Execution as herein provided by any Party as either a Pore Space Owner or the Storage Operator shall commit all interests owned or controlled by such Party and any additional interest thereafter acquired in the Facility Area.

16.3 **Approval by the North Dakota Industrial Commission.**
Notwithstanding anything in this Article to the contrary, all Tracts within the Facility Area shall be deemed to be qualified for participation if this Agreement is duly approved by order of the Commission.

## ARTICLE 17
## GENERAL

17.1 **Amendments Affecting Pore Space Owners.** Amendments hereto relating wholly to Pore Space Owners may be made with approval by the Commission.

17.4 **Construction.** This agreement shall be construed according to the laws of the State of North Dakota.

## ARTICLE 18
## SUCCESSORS AND ASSIGNS

18.1 **Successors and Assigns.** This Agreement shall extend to, be binding upon, and inure to the benefit of the Parties hereto and their respective heirs, devisees, legal representatives, successors and assigns and shall constitute a covenant running with the lands, leases and interests covered hereby.

*[Remainder of page intentionally left blank. Signature page follows.]*

Executed the date set opposite each name below but effective for all purposes as provided by Article 14.

Dated: November 1, 2021

**STORAGE OPERATOR**

MINNKOTA POWER COOPERATIVE, INC.

By: _____
Mac McLennan
Its: President and Chief Executive Officer

73023763.1

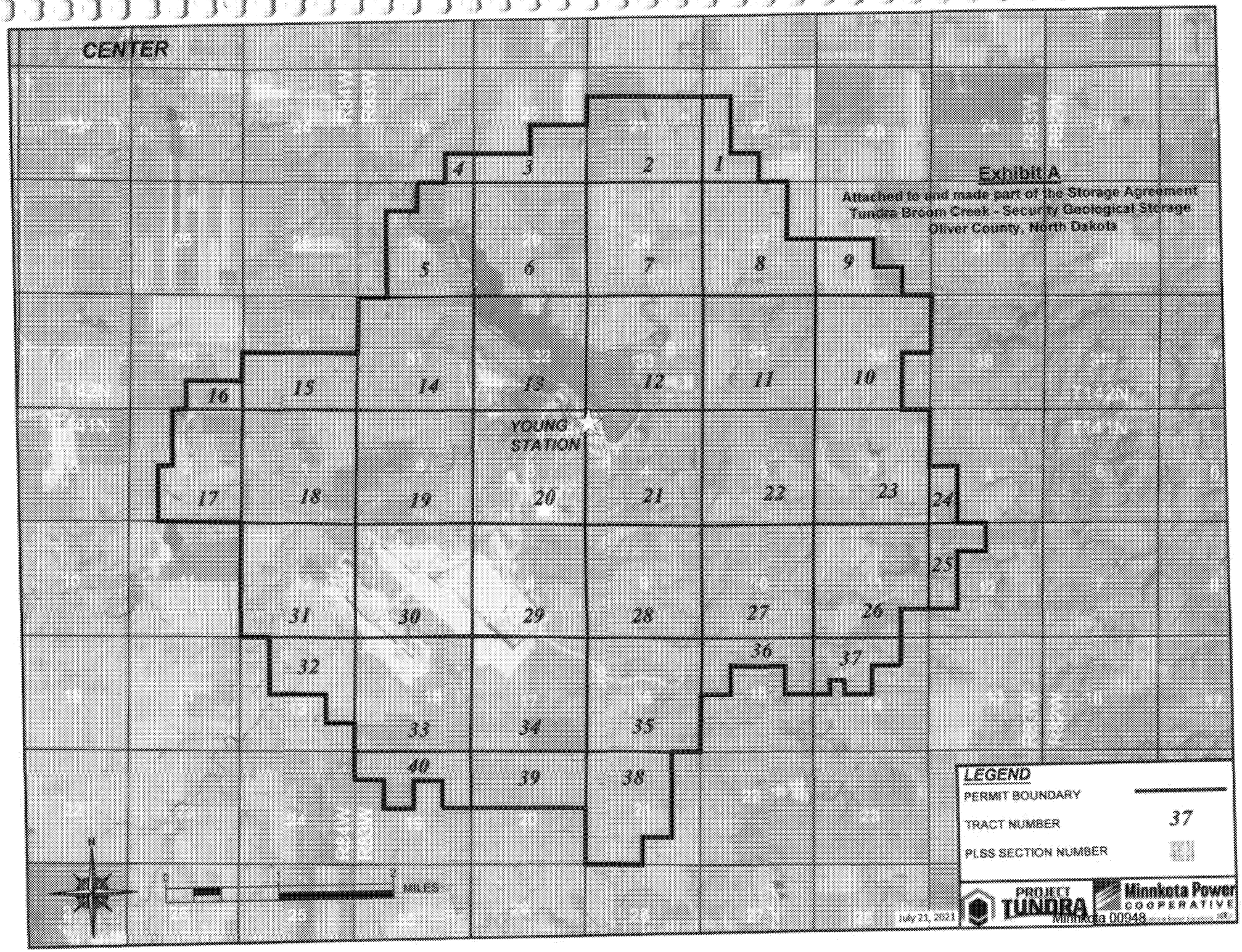

CENTER
YOUNG STATION
Exhibit A
Attached to and made part of the Storage Agreement
Tundra Broom Creek - Security Geological Storage
Oliver County, North Dakota
LEGEND
PERMIT BOUNDARY
TRACT NUMBER 37
PLSS SECTION NUMBER
MILES
PROJECT TUNDRA
Minnkota Power COOPERATIVE
July 21, 2021

**EXHIBIT B**

Tract Summary

Attached to and made part of the Storage Agreement
Tundra Broom Creek - Secure Geological Storage
Oliver County, North Dakota

| Tract No. | Land Description | Owner Name | Tract Net Acres | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|
| 1 | Section 22-T142N-R83W | Melvin Schoepp | 20.000 | 12.50000000% | 0.10580214% |
| | | Caroline K. Schoepp | 20.000 | 12.50000000% | 0.10580214% |
| | | Raymond Friedig, as personal representative of the Estate of Magdalen F. Friedig, deceased | 120.000 | 75.00000000% | 0.63481282% |
| | | **Tract Total:** | **160.000** | **100.00000000%** | |
| 2 | Section 21-T142N-R83W | Mary Erhardt | 120.000 | 25.00000000% | 0.63481282% |
| | | Keith Erhardt | 35.000 | 7.29166667% | 0.18515374% |
| | | Keith Erhardt and Kelly Jo Erhardt | 5.000 | 1.04166667% | 0.02645053% |
| | | Melvin Schoepp and Caroline Schoepp | 320.000 | 66.66666667% | 1.69283418% |
| | | **Tract Total:** | **480.000** | **100.00000000%** | |
| 3 | Section 20-T142N-R83W | Mary Erhardt | 160.000 | 66.66666667% | 0.84641709% |
| | | Matthias A. Erhardt, as trustee of the Matthias A. Erhardt Trust dated December 27, 1994 | 40.000 | 16.66666667% | 0.21160427% |
| | | Josephine Erhardt, as trustee of the Josephine Erhardt Trust dated December 27, 1994 | 40.000 | 16.66666667% | 0.21160427% |

| | | |
|---|---|---|
| **Tract Total:** | **240.000** | **100.00000000%** |

| | | | | | |
|---|---|---|---|---|---|
| 4 | Section 19-T142N-R83W | Matthias A. Erhardt, trustee, or successor trustee(s), of the Matthias A. Erhardt Trust dated December 27, 1994 | 20.000 | 50.00000000% | 0.10580214% |
| | | Josephine Erhardt, trustee, or successor trustee(s), of the Josephine Erhardt Trust dated December 27, 1994 | 20.000 | 50.00000000% | 0.10580214% |
| | | **Tract Total:** | **40.000** | **100.00000000%** | |
| 5 | Section 30-T142N-R83W | Minnkota Power Cooperative, Inc. | 322.170 | 73.22045455% | 1.70431371% |
| | | Ryan J. Weber | 40.000 | 9.09090909% | 0.21160427% |
| | | Darlene Voegele | 77.830 | 17.68863636% | 0.41172901% |
| | | **Tract Total:** | **440.000** | **100.00000000%** | |
| 6 | Section 29-T142N-R83W | Minnkota Power Cooperative, Inc. | 92.360 | 14.43125000% | 0.48859427% |
| | | Darlene Voegele | 227.640 | 35.56875000% | 1.20423991% |
| | | Darlene M. Voegele and Kennie D. Voegele | 300.000 | 46.87500000% | 1.58703204% |
| | | Terrie Nehring | 20.000 | 3.12500000% | 0.10580214% |
| | | **Tract Total:** | **640.000** | **100.00000000%** | |
| 7 | Section 28-T142N-R83W | Minnkota Power Cooperative, Inc. | 160.000 | 25.00000000% | 0.84641709% |
| | | Dale Barth | 476.320 | 74.42500000% | 2.51978368% |
| | | Dusty Backer | 3.680 | 0.57500000% | 0.01946759% |
| | | **Tract Total:** | **640.000** | **100.00000000%** | |
| 8 | Section 27-T142N-R83W | Dale Barth | 560.000 | 100.00000000% | 2.96245982% |
| | | **Tract Total:** | **560.000** | **100.00000000%** | |

| | | | | | |
|---|---|---|---|---|---|
| 9 | Section 26-T142N-R83W | Raymond Friedig, as personal representative of the Estate of Magdalen F. Friedig, deceased | 154.460 | 77.23000000% | 0.81710990% |
| | | Lori Spina-Hoherz | 20.000 | 10.00000000% | 0.10580214% |
| | | Larry Doll | 10.000 | 5.00000000% | 0.05290107% |
| | | Fay Doll | 10.000 | 5.00000000% | 0.05290107% |
| | | Randolph Middleton and Mary Middleton | 5.540 | 2.77000000% | 0.02930719% |
| | | **Tract Total:** | **200.000** | **100.00000000%** | |
| 10 | Section 35-T142N-R83W | Brennan Price | 560.000 | 100.00000000% | 2.96245982% |
| | | **Tract Total:** | **560.000** | **100.00000000%** | |

| | | | | | |
|---|---|---|---|---|---|
| 11 | Section 34-T142N-R83W | Minnkota Power Cooperative, Inc. | 480.000 | 75.00000000% | 2.53925127% |
| | | State of North Dakota GF | 160.000 | 25.00000000% | 0.84641709% |
| | | **Tract Total:** | **640.000** | **100.00000000%** | |
| 12 | Section 33-T142N-R83W | Square Butte Electric Cooperative | 3.900 | 0.60937500% | 0.02063142% |
| | | Minnkota Power Cooperative, Inc. | 625.040 | 97.66250000% | 3.30652836% |
| | | ALLETE, INC. | 11.060 | 1.72812500% | 0.05850858% |
| | | **Tract Total:** | **640.000** | **100.00000000%** | |
| 13 | Section 32-T142N-R83W | Minnkota Power Cooperative, Inc. | 545.830 | 85.28593750% | 2.88749900% |
| | | Darlene Voegele | 37.470 | 5.85468750% | 0.19822030% |
| | | BNI Coal, Ltd. | 56.700 | 8.85937500% | 0.29994906% |
| | | **Tract Total:** | **640.000** | **100.00000000%** | |
| 14 | Section 31-T142N-R83W | Brian Reinke | 109.658 | 16.93612158% | 0.58010253% |
| | | Benjamin Reinke | 173.626 | 26.81565454% | 0.91850009% |
| | | Elizabeth Wagendorf | 173.626 | 26.81565454% | 0.91850009% |
| | | Darlene Voegele | 149.640 | 23.11113857% | 0.79161158% |
| | | BNI Coal, Ltd. | 40.930 | 6.32143078% | 0.21652407% |
| | | **Tract Total:** | **647.480** | **100.00000000%** | |
| 15 | Section 36-T142N-R84W | State of North Dakota Board of University and School Lands | 320.000 | 100.00000000% | 1.69283418% |
| | | **Tract Total:** | **320.000** | **100.00000000%** | |
| 16 | Section 35-T142N-R84W | Michael P. Dresser | 80.000 | 100.00000000% | 0.42320855% |
| | | **Tract Total:** | **80.000** | **100.00000000%** | |

| | | | | | |
|---|---|---|---|---|---|
| 17 | Section 2-T141N-R84W | City of Center Park District | 46.050 | 10.68544645% | 0.24360942% |
| | | Barry A. Berger and Carrie Berger | 286.460 | 66.47020605% | 1.51540400% |
| | | Dwight Wrangham and Linda Wrangham | 3.000 | 0.69612029% | 0.01587032% |
| | | BNI Coal, Ltd. | 95.450 | 22.14822721% | 0.50494070% |
| | | **Tract Total:** | **430.960** | **100.00000000%** | |

| | | | | | |
|---|---|---|---|---|---|
| 18 | Section 1-T141N-R84W | Jolene Berger | 627.320 | 97.93917442% | 3.31858981% |
| | | Travis Klatt and Jessica Klatt | 8.310 | 1.29738338% | 0.04396079% |
| | | Gary Leinius | 4.890 | 0.76344220% | 0.02586862% |
| | | **Tract Total:** | **640.520** | **100.00000000%** | |
| 19 | Section 6-T141N-R83W | Brian Reinke | 19.577 | 3.02274377% | 0.10356336% |
| | | Benjamin Reinke | 30.997 | 4.78601096% | 0.16397532% |
| | | Elizabeth Wagendorf | 30.997 | 4.78601096% | 0.16397532% |
| | | Jolene Berger | 245.840 | 37.95877403% | 1.30051986% |
| | | Gary Leinius | 320.240 | 49.44646028% | 1.69410381% |
| | | **Tract Total:** | **647.650** | **100.00000000%** | |
| 20 | Section 5-T141N-R83W | Minnkota Power Cooperative, Inc. | 641.12000000 | 99.92518703% | 3.39159328% |
| | | Square Butte Electric Cooperative | 0.48000000 | 0.07481297% | 0.00253925% |
| | | **Tract Total:** | **641.600** | **100.00000000%** | |
| 21 | Section 4-T141N-R83W | Square Butte Electric Cooperative | 3.820 | 0.59499704% | 0.02020821% |
| | | Minnkota Power Cooperative, Inc. | 638.200 | 99.40500296% | 3.37614617% |
| | | **Tract Total:** | **642.020** | **100.00000000%** | |
| 22 | Section 3-T141N-R83W | Minnkota Power Cooperative, Inc. | 7.720 | 1.20256714% | 0.04083962% |
| | | Alan Schwalbe | 634.240 | 98.79743286% | 3.35519734% |
| | | **Tract Total:** | **641.960** | **100.00000000%** | |
| 23 | Section 2-T141N-R83W | Carl Schwalbe | 321.520 | 50.00000000% | 1.70087514% |
| | | Rolland Schwalbe | 321.520 | 50.00000000% | 1.70087514% |
| | | **Tract Total:** | **643.040** | **100.00000000%** | |
| 24 | Section 1-T141N-R83W | Carl Schwalbe | 40.000 | 50.00000000% | 0.21160427% |

| | | | | | |
|---|---|---|---|---|---|
| | | Rolland Schwalbe | 40.000 | 50.00000000% | 0.21160427% |
| | | **Tract Total:** | **80.000** | **100.00000000%** | |
| 25 | Section 12-T141N-R83W | Richard A. Schwalbe and Lila M. Schwalbe | 160.000 | 100.00000000% | 0.84641709% |
| | | **Tract Total:** | **160.000** | **100.00000000%** | |

| | | | | | |
|---|---|---|---|---|---|
| 26 | Section 11-T141N-R83W | Alan Schwalbe | 480.000 | 80.00000000% | 2.53925127% |
| | | Julie Hatzenbihler | 15.000 | 2.50000000% | 0.07935160% |
| | | Rodney J. Hatzenbihler | 15.000 | 2.50000000% | 0.07935160% |
| | | Nancy Henke | 15.000 | 2.50000000% | 0.07935160% |
| | | Bonnie Schwab | 15.000 | 2.50000000% | 0.07935160% |
| | | Peggy Gobar | 15.000 | 2.50000000% | 0.07935160% |
| | | Annette Hatzenbihler | 15.000 | 2.50000000% | 0.07935160% |
| | | Brent Hatzenbihler | 15.000 | 2.50000000% | 0.07935160% |
| | | Randy Hatzenbihler | 15.000 | 2.50000000% | 0.07935160% |
| | | **Tract Total:** | **600.000** | **100.00000000%** | |
| 27 | Section 10-T141N-R83W | Alan Schwalbe | 237.840 | 37.16250000% | 1.25819900% |
| | | Minnkota Power Cooperative, Inc. | 2.160 | 0.33750000% | 0.01142663% |
| | | Delmar Hagerott | 400.000 | 62.50000000% | 2.11604273% |
| | | **Tract Total:** | **640.000** | **100.00000000%** | |
| 28 | Section 9-T141N-R83W | Minnkota Power Cooperative, Inc. | 640.000 | 100.00000000% | 3.38566836% |
| | | **Tract Total:** | **640.000** | **100.00000000%** | |
| 29 | Section 8-T141N-R83W | BNI Coal, Ltd. | 161.000 | 25.15625000% | 0.85170720% |
| | | Minnkota Power Cooperative, Inc. | 160.000 | 25.00000000% | 0.84641709% |
| | | Five D's, LLP | 319.000 | 49.84375000% | 1.68754407% |
| | | **Tract Total:** | **640.000** | **100.00000000%** | |
| 30 | Section 7-T141N-R83W | Janet K. Dohrmann and L. J. Dohrmann, Trustees of the Janet and L. J. Dohrmann Revocable Trust | 328.460 | 50.65231471% | 1.73758848% |
| | | Gary Leinius | 320.000 | 49.34768529% | 1.69283418% |
| | | **Tract Total:** | **648.460** | **100.00000000%** | |
| 31 | Section 12-T141N-R84W | Jolene Berger | 160.00000000 | 25.00000000% | 0.84641709% |

| | | | |
|---|---|---|---|
| Brian Dresser | 320.00000000 | 50.00000000% | 1.69283418% |
| Frances Fuchs | 160.00000000 | 25.00000000% | 0.84641709% |
| **Tract Total:** | **640.000** | **100.00000000%** | |

| | | | | | |
|---|---|---|---|---|---|
| 32 | Section 13-T141N-R84W | BNI Coal, Ltd. | 280.000 | 100.00000000% | 1.48122991% |
| | | **Tract Total:** | **280.000** | **100.00000000%** | |
| 33 | Section 18-T141N-R83W | Dohrmann, as Trustees of The Janet and L.J. Dohrmann Revocable Trust | 123.820 | 19.12100809% | 0.65502103% |
| | | Wayne Reuther | 33.957 | 5.24378693% | 0.17963439% |
| | | Kent Reuther | 33.957 | 5.24378693% | 0.17963439% |
| | | Keith Reuther | 33.957 | 5.24378693% | 0.17963439% |
| | | Karen Shulz | 33.957 | 5.24378693% | 0.17963439% |
| | | Jerald Reuther | 33.957 | 5.24378693% | 0.17963439% |
| | | Martha Reuther | 33.957 | 5.24378693% | 0.17963439% |
| | | Larry F. Schmidt and Virginia Schmidt | 318.000 | 49.10741862% | 1.68225397% |
| | | BNI Coal, Ltd. | 2.000 | 0.30885169% | 0.01058021% |
| | | **Tract Total:** | **647.560** | **100.00000000%** | |
| 34 | Section 17-T141N-R83W | Five D's LLP | 320.000 | 50.00000000% | 1.69283418% |
| | | Jerald O. Reuther | 79.698 | 12.45286458% | 0.42161270% |
| | | Wayne A. Reuther | 53.333 | 8.33333333% | 0.28213903% |
| | | Karen L. Reuther | 26.667 | 4.16666667% | 0.14106952% |
| | | Jeanette M. Reuther | 0.302 | 0.04713542% | 0.00159585% |
| | | Larry F. Schmidt and Virginia Schmidt | 160.000 | 25.00000000% | 0.84641709% |
| | | **Tract Total:** | **640.000** | **100.00000000%** | |
| 35 | Section 16-T141N-R83W | Larry F. Schmidt and Virginia Schmidt | 160.000 | 25.00000000% | 0.84641709% |
| | | BNI Coal, Ltd. | 160.000 | 25.00000000% | 0.84641709% |
| | | State of North Dakota - Dept. of Trust Lands Attn: Commissioner of University and School Lands | 320.000 | 50.00000000% | 1.69283418% |
| | | **Tract Total:** | **640.000** | **100.00000000%** | |
| 36 | Section 15-T141N-R83W | Delmar Hagerott | 240.000 | 100.00000000% | 1.26962564% |

| | | | | | |
|---|---|---|---|---|---|
| | | **Tract Total:** | **240.000** | **100.00000000%** | |
| 37 | Section 14-T141N-R83W | Alan Schwalbe | 190.000 | 100.00000000% | 1.00512029% |
| | | **Tract Total:** | **190.000** | **100.00000000%** | |

| | | | | | |
|---|---|---|---|---|---|
| 38 | Section 21-T141N-R83W | Douglas D. Doll and Deberra K. Doll | 100.000 | 22.72727273% | 0.52901068% |
| | | James D. Pazdernik and Bonita Pazdernik | 100.000 | 22.72727273% | 0.52901068% |
| | | Doll Farm Enterprises | 160.000 | 36.36363636% | 0.84641709% |
| | | Delmar Hagerott | 80.000 | 18.18181818% | 0.42320855% |
| | | **Tract Total:** | **440.000** | **100.00000000%** | |
| 39 | Section 20-T141N-R83W | Douglas D. Doll and Deberra K. Doll | 80.000 | 25.00000000% | 0.42320855% |
| | | James D. Pazdernik and Bonita Pazdernik | 80.000 | 25.00000000% | 0.42320855% |
| | | Dale P. Pfliger and Judy Pfliger | 80.000 | 25.00000000% | 0.42320855% |
| | | Thomas Pfliger | 80.000 | 25.00000000% | 0.42320855% |
| | | **Tract Total:** | **320.000** | **100.00000000%** | |
| 40 | Section 19-T141N-R83W | Winfrid Keller | 120.000 | 49.59497438% | 0.63481282% |
| | | Jerald Reuther | 23.684 | 9.78839478% | 0.12529089% |
| | | Wayne Reuther | 23.684 | 9.78839478% | 0.12529089% |
| | | Kent Reuther | 23.684 | 9.78839478% | 0.12529089% |
| | | Keith Reuther | 27.224 | 11.25144652% | 0.14401787% |
| | | Karen Shulz | 23.684 | 9.78839478% | 0.12529089% |
| | | **Tract Total:** | **241.960** | **100.00000000%** | |
| | | **Total Acres:** | **18903.210** | **Total Participation:** | **100.00000000%** |

**EXHIBIT C**

Tract Participation Factors

Attached to and made part of the Storage Agreement
Tundra Broom Creek - Secure Geological Storage
Oliver County, North Dakota

| Tract No. | Acres | Tract Participation Factor |
|---|---|---|
| 1 | 160.000 | 0.84641709% |
| 2 | 480.000 | 2.53925127% |
| 3 | 240.000 | 1.26962564% |
| 4 | 40.000 | 0.21160427% |
| 5 | 440.000 | 2.32764700% |
| 6 | 640.000 | 3.38566836% |
| 7 | 640.000 | 3.38566836% |
| 8 | 560.000 | 2.96245982% |
| 9 | 200.000 | 1.05802136% |
| 10 | 560.000 | 2.96245982% |
| 11 | 640.000 | 3.38566836% |
| 12 | 640.000 | 3.38566836% |
| 13 | 640.000 | 3.38566836% |
| 14 | 647.480 | 3.42523836% |
| 15 | 320.000 | 1.69283418% |
| 16 | 80.000 | 0.42320855% |
| 17 | 430.960 | 2.27982443% |
| 18 | 640.520 | 3.38841922% |
| 19 | 647.650 | 3.42613768% |
| 20 | 641.600 | 3.39413253% |
| 21 | 642.020 | 3.39635438% |
| 22 | 641.960 | 3.39603697% |
| 23 | 643.040 | 3.40175028% |
| 24 | 80.000 | 0.42320855% |
| 25 | 160.000 | 0.84641709% |
| 26 | 600.000 | 3.17406409% |
| 27 | 640.000 | 3.38566836% |
| 28 | 640.000 | 3.38566836% |
| 29 | 640.000 | 3.38566836% |
| 30 | 648.460 | 3.43042266% |
| 31 | 640.000 | 3.38566836% |
| 32 | 280.000 | 1.48122991% |
| 33 | 647.560 | 3.42566157% |
| 34 | 640.000 | 3.38566836% |
| 35 | 640.000 | 3.38566836% |
| 36 | 240.000 | 1.26962564% |
| 37 | 190.000 | 1.00512029% |
| 38 | 440.000 | 2.32764700% |
| 39 | 320.000 | 1.69283418% |
| 40 | 241.960 | 1.27999424% |
| **Total:** | **18903.210** | **100.00000000%** |

**EXHIBIT D**

Surface Use And Pore Space Lease
Attached to and made part of the Storage Agreement
Tundra Broom Creek
Oliver County, North Dakota

## SURFACE USE AND PORE SPACE LEASE

THIS SURFACE USE AND PORE SPACE LEASE **("Lease")** is made, entered into, and effective as of the _____day of _____, 2020 **("Effective Date")** by and between _____, whose address is _____ (whether one or more, **"Lessor"**), and Minnkota Power Cooperative, Inc., a Minnesota cooperative association, whose address is _____ (whether one or more, **"Lessee"**). Lessor and Lessee are sometimes referred to in this Lease individually as a "**Party**" and collectively as the **"Parties."**

1. **DEFINITIONS.** The following terms shall have the following meanings in this Lease:

**"Carbon Dioxide"** means carbon dioxide in gaseous, liquid, or supercritical fluid state together with incidental associated substances derived from the source materials, capture process and any substances added or used to enable or improve the injection process.

**"Commencement of Operations"** means the date on which Carbon Dioxide is first injected into a Reservoir for commercial operations under this Lease, provided that the performance of test injections and related activities shall not be deemed Commencement of Operations.

**"Commission"** means the North Dakota Industrial Commission.

**"Completion Notice"** means a certificate of project completion issued to Lessee by the Commission pursuant to Chapter 38-22 of the North Dakota Century Code.

**"Environmental Attributes"** means any and all credits, benefits, emissions reductions, offsets, and allowances, howsoever entitled, attributable to the Operations, including any avoided emissions and the reporting rights related to these avoided emissions, such as 26 U.S.C. §45Q Tax Credits.

**"Environmental Incentives"** means any and all credits, rebates, subsidies, payments or other incentives that relate to the use of technology incorporated into the Operations, environmental benefits of Operations, or other similar programs available from any regulated entity or any Governmental Authority.

**"Facilities"** means all facilities, structures, improvements, fixtures, equipment, and any other personal property at any time acquired or constructed by or for Lessee that are necessary or desirable in connection with any use of Reservoirs and their Formations or Operations, including without limitation wells, pipelines, roads, utilities, metering or monitoring equipment, and buildings.

**"Financing Parties"** means person or persons providing construction or permanent financing to Lessee in connection with construction, ownership, operation and maintenance of Facilities or Operations, including financial institutions, leasing companies, institutions, tax equity partners, joint venture partners and/or private lenders.

**"Formation"** means the geological formation of which any Reservoir is a part.

**"Hazardous Substance"** means any chemical, waste or other substances, expressly excluding Carbon Dioxide and Non-Native Carbon Dioxide, (a) which now or hereafter becomes defined as or included in the definition of "hazardous substances," "hazardous wastes," "hazardous materials," "extremely hazardous wastes," "restricted hazardous wastes," "toxic substances," "toxic pollutants," "pollutions," "pollutants," "regulated substances," or words of similar import under any law

pertaining to environment, health, safety or welfare, (b) which is declared to be hazardous, toxic or polluting by any Governmental Authority, (c) exposure to which now or hereafter prohibited, limited or regulated by any Governmental Authority, (d) the storage, use, handling, disposal or release of which is restricted or regulated by any Governmental Authority, or (e) for which remediation or cleanup is required by any Governmental Authority.

**"Leased Premises"** means the surface and subsurface of the land, excluding mineral rights, described in **Exhibit A** of this Lease.

**"Native Oil and Gas"** means all oil, natural gas, and other hydrocarbons present in and under the Leased Premises and not injected by Lessor, Lessee or any third party.

**"Non-Native Carbon Dioxide"** means Carbon Dioxide that is not naturally occurring in the Reservoir together with incidental associated substances, fluids, minerals, oil, and gas, excluding that which, independent of Operations, originates from an accumulation meeting the definition of a Pool. All Non-Native Carbon Dioxide will be considered personal property of the Lessee and its successor and assigns under this Agreement.

**"Operating Year"** means the calendar year or portion of the calendar year following Commencement of Operations during which Operations occur.

**"Operations"** means the transportation and injection of Carbon Dioxide into a Reservoir after Commencement of Operations, and any withdrawal of this Carbon Dioxide, as well as the withdrawal of Non-Native Carbon Dioxide, for sale or disposal in accordance with applicable law.

**"Option Money"** means 20 percent of the Initial Term Payment (as such term is defined in that certain Option to Lease between Lessor and Lessee with respect to the Leased Premises).

**"Pool"** means an underground Reservoir containing a common accumulation of Native Oil and Gas that is economically recoverable. A zone of a structure that is completely separated from any other zone in the same structure is a Pool.

**"Pore Space"** means a cavity or void, whether natural or artificially created, in a Reservoir.

**"Related Person"** means any member, partner, principal, officer, director, shareholder, predecessor-in-interest, successor-in-interest, employee, agent, heir, representative, contractor, lessee, sublessee, licensee, invitee, permittee of a Party, Financing Parties or any other person or entity that has obtained or in future obtains rights or interests from, under or through a Party (excluding the other Party itself).

**"Reservoir"** means any subsurface stratum, sand, formation, aquifer, cavity or void, whether natural or artificially created, wholly or partially within the Leased Premises, suitable for the storage or sequestration of carbon dioxide or other gaseous substances.

**"Storage Fee"** means Lessor's proportionate share of sixteen cents ($0.16) per metric ton of Carbon Dioxide ("Storage Rate") as determined by the Lessee's last meter before injection as part of Operations. For injection periods after 2026, the Storage Rate shall be adjusted to an amount equal to the product of sixteen cents ($0.16) and the inflation adjustment factor for such calendar year. The inflation adjustment factor shall be determined in the same manner as provided in 26 U.S.C. §45Q(f)(7)(B), substituting "2026" for "2008". The Storage Fee shall be: (i) calculated separately for each amalgamated area as created and established by the Commission that includes any portion of the Leased Premises; (ii) limited to the Carbon Dioxide injected in said amalgamated area in the immediately preceding Operating Year; and (iii) based on the Lessor's proportionate per net acre share of said unit. For avoidance of doubt, the Lessor shall receive a separate Storage Fee for each amalgamated area created and established by the Commission that includes any portion of the Leased Premises on a net acre basis within the Lessor's interest being the numerator and the acres in the amalgamated area being the denominator.

**"Tax Credits"** means any and all (a) investment tax credits, (b) production tax credits, (c)

credits under 26 U.S.C. §45Q credits, and (d) similar tax credits or grants under federal, state or local law relating to construction, ownership or Operations

**2. LEASE RIGHTS.** In consideration of the compensation, covenants, agreements, and conditions set forth in this Lease, Lessor grants, demises, leases and lets to Lessee the exclusive right to use all Pore Space, Reservoirs and their Formations in the Leased Premises for any purpose not previously granted or reserved by an instrument of record related to the capture, injection, storage, sequestration, sale, withdrawal or disposal of Carbon Dioxide, Non-Native Carbon Dioxide and incidental associated substances, fluids, and minerals, provided that Lessee shall have no right to use potable water from within the Leased Premises in Operations; together with the following exclusive rights:

(a) to use the Leased Premises for developing, constructing, installing, improving, maintaining, replacing, repowering, relocating, removing, abandoning in place, expanding, and operating Facilities;

(b) to lay, maintain, replace, repair, and remove roads on the Leased Premises to allow Lessee, in its sole discretion, to exercise its rights under this Lease; and

(c) to enter upon and use the Leased Premises for the purposes of conducting:

(i) any investigations, studies, surveys, and tests, including without limitation drilling and installing test wells and monitoring wells, seismic testing, and other activities as Lessee deems necessary or desirable to determine the suitability of the Leased Premises for Operations,

(ii) any inspections and monitoring of Reservoirs and Carbon Dioxide as Lessee or any governmental authority deems necessary or desirable during the term of this Lease, and

(iii) any maintenance to the Facilities that Lessee or any governmental authority deems necessary or as required by applicable law.

Lessor also hereby grants and conveys unto Lessee all other and further easements across, over, under and above the Leased Premises as reasonably necessary to provide access to and services reasonably required for Lessee's performance under the Lease. The easements granted hereunder shall run with and burden the Leased Premises for the term of this Lease. Notwithstanding the surface easements granted herein, Lessee shall provide notice to Lessor prior to accessing the surface of the Property, and if such activity requires permit then prior notice shall be in form and not be less than that required by law or rule.

Lessee may exercise its rights under this Lease in conjunction with related operations on other properties near the Leased Premises. Lessee shall have no obligation, express or implied, to begin, prosecute or continue storage operations in, upon or under the Leased Premises, or to store and/or sell or use all or any portion of the gaseous substances stored thereon. The timing, nature, manner and extent of Lessee's operations, if any, under this Lease shall be at the sole discretion of Lessee. All obligations of Lessee are expressed herein, and there shall be no covenants implied under this Lease, it being agreed that all amounts paid hereunder constitute full and adequate consideration for this Lease.

**3. INITIAL TERM.** This Lease shall commence on the Effective Date and shall continue for an initial term of twenty (20) years ("Initial Term") unless sooner terminated in accordance with the terms of this Lease. Lessee may, but is not obligated to, extend the Initial Term for up to four successive five-year periods by paying Lessor $25.00 per net acre in the Leased Premises per five-year extension on or prior to the last day of the Initial Term or expiring five-year extension period. The Initial Term together with any extensions are referred to as the "Primary Term."

**4. OPERATIONAL TERM.** Upon Commencement of Operations at any time during the Primary Term, this Lease shall continue for so long as any portion of the Leased Premises or

Lessee's Facilities are subject to a permit issued by the Commission or under the ownership or control of the State of North Dakota ("Operational Term"); *provided, however*, that all of Lessee's obligations under this Lease shall terminate upon issuance of a Completion Notice, except for payment of the Final Royalty Payment (as applicable), and Final Occupancy Fee (as applicable). If Commencement of Operations does not occur during the Primary Term, this Lease shall terminate, and Lessee shall execute a document evidencing termination of this Lease in recordable form and shall record it in the official records of the county in which the Leased Premises is located.

**5. COMPENSATION.**

(a) **Initial Term Payment.** Lessee shall pay to Lessor the greater of $50.00 per net acre in the Leased Premises ("Initial Term Payment") or a one-time flat $500.00 payment, the receipt and sufficiency of which are hereby acknowledged.

(b) **Royalty.** During the Operational Term, Lessee shall annually on or before May 31st pay to Lessor a royalty equal to the greater of a flat $100.00 payment or the Storage Fee(s) for the immediately preceding Operating Year. For the Operating Year in which Lessee provides Lessor with a Completion Notice, Lessee shall pay a pro rata share of the Storage Fee(s) ("Final Royalty Payment"), as applicable, and said payment shall be made within sixty days after the date the Completion Notice was issued.

(c) **Occupancy Fee.** Within sixty days of the anniversary of the Effective Date after which any Facilities are installed or used, Lessee shall pay Lessor, as applicable, a one-time fee of (i) $3,000.00 per net surface acre of the Leased Premises occupied by Facilities (excluding pipelines), and (ii) $1.50 for each linear foot of pipeline in place on the Leased Premises. For the year in which Lessee provides Lessor with a Completion Notice, Lessee shall pay any fees owed pursuant to this provision ("Final Occupancy Fee") within sixty days after the date the Completion Notice was issued.

Lessor and Lessee agree that the Lease shall continue as specified herein even in the absence of Operations and the payment of royalties.

**6. AMALGAMATION.** (a) Lessee, in its sole discretion, shall have the right and power, at any time (including both before and after Commencement of Operations), to pool, unitize, or amalgamate any Reservoir or portion of a Reservoir with any other lands or interests into which that Reservoir extends and document such unit in accordance with applicable law or agency order. Amalgamated units shall be of such shape and dimensions as Lessee may elect and as are approved by the Commission. Amalgamated areas may include, but are not required to include, land upon which injection or extraction wells have been completed or upon which the injection and/or withdrawal of Carbon Dioxide and Non-Native Carbon Dioxide has commenced prior to the effective date of amalgamation. In exercising its amalgamation rights under this Lease and if required by law, Lessee shall record or cause to be recorded a copy of the Commission's amalgamation order or other notice thereof in the county in which the amalgamated unit. Amalgamating in one or more instances shall, if approved by the Commission, not exhaust the rights of Lessee to amalgamate Reservoirs or portions of Reservoirs into other amalgamation areas, and Lessee shall have the recurring right to revise any amalgamated area formed under this Lease by expansion or contraction or both. Lessee may dissolve any amalgamated area at any time and document such dissolution by recording an instrument in accordance with applicable law or agency order. Lessee shall have the right to negotiate, on behalf of and as agent for Lessor, any unit agreements and operating agreements with respect to the operation of any amalgamated areas formed under this Lease.
(b) The injection and/or withdrawal of Carbon Dioxide and Non-Native Carbon Dioxide into a Reservoir from any property within a amalgamated area that includes the Leased Premises shall be treated as if Operations were occurring on the Leased Premises, except that the royalty payable to Lessor under Section 5(b) of this Lease shall be Lessor's per net acre proportionate share of the total Storage Fee for the preceding Operating year's injection of Carbon Dioxide into the amalgamated area.

**7. ENVIRONMENTAL INCENTIVES.** Unless otherwise specified, Lessee is the owner of all

Environmental Attributes and Environmental Incentives and is entitled to the benefit of all Tax Credits or any other attributes of ownership of the Facilities and Operations. Lessor shall cooperate with Lessee in obtaining, securing and transferring all Environmental Attributes and Environmental Incentives and the benefit of all Tax Credits. Lessor shall not be obligated to incur any out-of-pocket costs or expenses in connection with such actions unless reimbursed by Lessee. If any Environmental Incentives are paid directly to Lessor, Lessor shall immediately pay such amounts over to Lessee.

**8. SURRENDER OF LEASED PREMISES.** Lessee shall have the unilateral right at any time and from time to time to execute and deliver to Lessor a written notice of surrender and/or release covering all or any part of the Leased Premises for which the subsurface pore space is not being utilized for storage as set forth herein, and upon delivery of such surrender and/or release to Lessor this Lease shall terminate as to such lands, and Lessee shall be released from all further obligations and duties as to the lands so surrendered and/or released, including, without limitation, any obligation to make payments provided for herein, except obligations accrued as of the date of the surrender and/or release.

**9. FACILITIES.**

(a) Lessee shall in good faith consult with Lessor regarding the location of the Facilities, selection of the Facilities location shall be within the discretion of the Lessee with consent of the Lessor, not to be unreasonably withheld. The withholding of such consent by the Lessor regarding the location of the Facilities shall be deemed "unreasonable" if the proposed location of the Facility is located more than 500 feet from any occupied dwellings or currently used buildings existing on the Leased Premises as of the Effective Date. Notwithstanding the foregoing, in no event shall Facilities be located within 500 feet of any currently occupied dwelling or currently used building existing on the Leased Premises as of the Effective Date without Lessor's express consent. Lessee may erect fences around all or part of any aboveground Facilities (excluding roads) to separate Facilities from adjacent Lessor-controlled lands, and shall do so if Lessor so requests. Lessee shall maintain and repair at its expense any roads it constructs on the Leased Premises in reasonably safe and usable condition.

(b) Lessor and Lessee agree that all Facilities and property of whatever kind and nature constructed, placed or affixed on the rights-of-way, easements, patented or leased lands as part of Lessee's Operations, as against all parties and persons whomsoever (including without limitation any party acquiring interest in the rights-of-way, easements, patented or leased lands or any interest in or lien, claim or encumbrance against any of such Facilities), shall be deemed to be and remain the property of the Lessee, and shall not be considered to be fixtures or a part of the Leased Premises. Lessor waives, to the fullest extent permitted by applicable law, any and all rights it may have under the laws of the State of North Dakota, arising under this Lease, by statute or otherwise to any lien upon, or any right to distress or attachment upon, or any other interest in, any item constituting the Facilities or any other equipment or improvements constructed or acquired by or for Lessee and located on the leased Premises or within any easement area. Each Lessor and Lessee agree that the Lessee (or the designated assignee of Lessee or Financing Parties) is the tax owner of any such Facilities, structures, improvements, equipment and property of whatever kind and nature and all tax filings and reports will be filed in a manner consistent with this Lease. Facilities shall at all times retain the legal status of personal property as defined under Article 9 of the Uniform Commercial Code. If there is any mortgage or fixture filing against the Premises which could reasonably be construed as prospectively attaching to the Facilities as a fixture of the Premises, Lessor shall provide a disclaimer or release from such lienholder. Lessor, as fee owner, consents to the filing of a disclaimer of the Facilities as a fixture of the Premises in the Oliver County Recorder's Office, or where real estate records of Oliver County are customarily filed.

**10. SURFACE DAMAGE COMPENSATION ACT.** The compensation contemplated and paid to Lessor hereunder is compensation for, among other things, damages sustained by Lessor for the lost use of and access to Lessor's land, pore space (to the extent required under North Dakota law), and any other damages which are contemplated under Ch. 38-11.1 of the North Dakota Century Code (to the extent applicable).

**11. MINERALS, OIL AND GAS.** This Lease is not intended to grant or convey, nor does it grant or convey, any right to or obligation for Lessee to explore for or produce minerals, including Native Oil and Gas, that may exist on the Leased Premises. Lessee shall not engage in any activity or permit its Related Persons to engage in any activity that unreasonably interferes with the Lessor's or third party's (or parties') rights to the granted, leased, or reserved mineral interests. If Lessor owns hydrocarbon mineral interests in the Leased Premises and Lessee should inadvertently discover a Pool in conjunction with its efforts to explore for and develop a Reservoir for Operations, Lessee shall inform Lessor within 60 days of discovery. If Lessee determines that it will not use in conjunction with Operations a well that has encountered a Pool within the Leased Premises, Lessor shall have the option but not the obligation to buy such well at cost, provided Lessor has the ability and assumes all permits and risks and liabilities which are associated with the ownership and operation of an oil, gas or mineral well.

**12. FORCE MAJEURE.** Should Lessee be prevented from complying with any express or implied covenant of this Lease, from utilizing the Leased Premises for underground storage purposes by reason of scarcity of or an inability to obtain or to use equipment or material failure or breakdown of equipment, or by operation of force majeure (including, but not limited to, riot, insurrection, war (declared or not), mobilization, explosion, labor dispute, fire, flood, earthquake, storm, lightning, tsunami, backwater caused by flood, vandalism, act of the public enemy, terrorism, epidemic, pandemic (including COVID-19), civil disturbances, strike, labor disturbances, work slowdown or stoppage, blockades, sabotage, labor or material shortage, national emergency, and the amendment, adoption or repeal of or other change in, or the interpretation or application of, any applicable laws, orders, rules or regulations of governmental authority), then while so prevented, Lessee's obligation to comply with such covenant shall be suspended and this Lease shall be extended while and so long as Lessee is prevented by any such cause from utilizing the property for underground storage purposes and the time while Lessee is so prevented shall not be counted against Lessee, anything in this Lease to the contrary notwithstanding.

**13. DEFAULT/TERMINATION.** Lessor may not terminate the Lease for any reason whatsoever unless a Default Event has occurred and is continuing consistent with the terms of this Section 13. Any Party that fails to perform its responsibilities as listed below shall be deemed to be the "Defaulting Party," the other Party shall be deemed to be the "Non-Defaulting Party," and each event of default shall be a "Default Event." A Default Event is: (a) failure of a Party to pay any amount due and payable under this Lease, other than an amount that is subject to a good faith dispute, within thirty (30) days following receipt of written notice from Non-Defaulting Party of such failure to pay; or (b) a material violation or default of any terms of this Lease by a Party, provided the Non-Defaulting Party provides written notice of violation or default and Defaulting Party fails to substantially cure the violation or default within sixty (60) days after receipt of said notice to cure such violations or defaults. Parties acknowledge that in connection with any construction or long-term financing or other credit support provided to Lessee or its affiliates by Financing Parties, that such Financing Parties may act to cure a continuing Default Event and Lessor agrees to accept performance from any such Financing Parties so long as such Financing Parties perform in accordance with the terms of this Lease. If Lessee, its affiliates or Financing Parties, fail to substantially cure such Default Event within the applicable cure period, Lessor may terminate the Lease. Lessee may terminate the lease with thirty (30) days written notice to Lessor. Upon termination of this Lease, Lessee shall have one hundred eighty (180) days to remove, plug, and/or abandon in place all Facilities of Lessee located on the Leased Premises in accordance with applicable permit requirements or other applicable statutes, rules or regulations.

**14. ASSIGNMENT.** (a) Lessor shall not sell, transfer, assign or encumber the Facilities or any part of Operations, Lessee's title or Lessee's rights under this Lease. (b) Lessee has the right to sell,

assign, mortgage, pledge, transfer, use as collateral, or otherwise collaterally assign or convey all or any of its rights under this Lease, including, without limitation, an assignment by Lessee to Financing Parties. (c) In the event Lessee assigns its rights under this Lease, Lessee shall be relieved of all obligations with respect to the assigned portion arising after the date of assignment so long as notice of such assignment is provided to Lessor, and provided that Lessee shall not be relieved from any obligation in respect of any payment or other obligations that have not been satisfied or performed prior to such date of assignment. (d) This Lease shall be binding on and inure to the benefit of the successors and assignees. The assigning Party shall provide written notice of any assignment within sixty (60) days after such assignment has become effective; provided, however, that an assigning Party's failure to deliver written notice of assignment within such 60-day period shall not be deemed a breach of this Lease unless such failure is willful and intentional. Further, no change or division in Lessor's ownership of or interest in the Leased Premises or royalties shall enlarge the obligations or diminish the rights of Lessee or be binding on Lessee until after Lessee has been furnished with a written assignment or a true copy of the assignment with evidence that same has been recorded with the Oliver County Recorder's Office.

**15. FINANCING.** (a) Lessor acknowledges that Lessee may obtain tax equity, construction, long-term financing and other credit support from one or more Financing Parties and that Lessee intends to enter into various agreements and execute various documents relating to such financing, which documents may, among other things, assign this Lease and any related easements to a Financing Party, grant a sublease in the Leased Premises and a lease of the Facilities from such Financing Party to Lessee, grant the Financing Parties a sublease or other real property interest in Lessee's interests in and to the Leased Premises, grant a first priority security interest in Lessee's interest in the Facilities and/or this Lease and Lessee's other interests in and to the Leased Premises, including, but not limited to, any easements, rights of way or similar interests (such documents, "Financing Documents"). Lessor acknowledges notice of the foregoing and consents to the foregoing actions and Financing Documents described above.

(b) Lessor agrees, to execute, and agrees to cause any and all of Lessor's lenders to execute, such commercially reasonable subordination agreements, non-disturbance agreements, forbearance agreements, consents, estoppels, modifications of this Lease and other acknowledgements of the foregoing as Lessee or the Financing Parties may reasonably request (collectively, "Lessor Financing Consent Instruments"). Lessor acknowledges and agrees that (i) Lessee's ability to obtain financing for the construction and operation of the Facilities is dependent upon the prompt cooperation of Lessor and its lenders as contemplated by this Section 15; (ii) if Lessee is unable to close on the financing for the Facilities, the construction of the Facilities and the Commencement of Operations will not likely occur; and (iii) it is in the best interest of both Lessee and Lessor for Lessee to obtain financing from the Financing Parties as contemplated by this Section 15. Therefore, Lessor agrees to act promptly, reasonably and in good faith in connection with any request for approval and execution of all Lessor Financing Consent Instruments. The Lessor shall also reasonably cooperate with the Lessee or the Financing Party in the making of any filings required by such requesting party for regulatory compliance or in accordance with applicable laws and in the operation and maintenance of the Facilities, all solely at the expense of the Lessee.

(c) As a precondition to exercising any rights or remedies as a result of any default or alleged default by Lessee under this Lease, Lessor shall deliver a duplicate copy of the applicable notice of default to each Financing Parties concurrently with delivery of such notice to Lessee, specifying in detail the alleged default and the required remedy, provided Lessor was given notice of such Financing Parties and if no such notice of default is required to be delivered to Lessee under this Lease, Lessor may not terminate this Lease unless Lessor has delivered a notice of default to each Financing Party specifying in detail the alleged default or breach and permitting each Financing Party the opportunity to cure as provided in this Section 15(c). Each Financing Party shall have the same period after receipt of a notice of default to remedy default, or cause the same to be remedied, as is given to Lessee after Lessee's receipt of a notice

of default under this Lease, plus, in each instance, the following additional time periods: (i) ten (10) Business Days in the event of any monetary default; and (ii) sixty (60) days in the event of any non-monetary default; provided, however, that (A) such sixty (60)-day period shall be extended for an additional sixty 60 days to enable such Financing Party to complete such cure, including the time required for such Financing Party to obtain possession of the Facilities (including possession by a receiver), institute foreclosure proceedings or otherwise perfect its right to effect such cure and (B) such Financing Party shall not be required to cure those defaults which are not reasonably susceptible of being cured or performed. Lessor shall accept such performance by or at the instance of a Financing Party as if the performance had been made by Lessee.

(d) If any Lessee Default Event cannot be cured without obtaining possession of all or part of the Facilities and/or the leasehold interest created by the Lease (the "Leasehold Estate"), then any such Lessee Default Event shall nonetheless be deemed remedied if: (i) within sixty (60) days after receiving the notice of default, a Financing Party acquires possession thereof, or commences appropriate judicial or non-judicial proceedings to obtain the same; (ii) such Financing Party is prosecuting any such proceedings to completion with commercially reasonable diligence; and (iii) after gaining possession thereof, such Financing Party performs all other obligations as and when the same are due in accordance with the terms of the Lease. If a Financing Party is prohibited by any process or injunction issued by any court or by reason of any action of any court having jurisdiction over any bankruptcy or insolvency proceeding involving Lessee from commencing or prosecuting the proceedings described above, then the sixty (60)-day period specified above for commencing such proceedings shall be extended for the period of such prohibition.

(e) Financing Parties shall have no obligation or liability to the Lessor for performance of the Lessee's obligations under the Lease prior to the time the Financing Party acquires title to the Leasehold Estate. A Financing Party shall be required to perform the obligations of the Lessee under this Lease only for and during the period the Financing Party directly holds such Leasehold Estate. Any assignment pursuant to this Section 15 shall release the assignor from obligations accruing under this Lease after the date the liability is assumed by the assignee.

(f) Each Financing Party shall have the absolute right to do one, some or all of the following things: (i) assign the rights, mortgage or pledge held by Financing Party (the "Financing Party's Lien"); (ii) enforce the Financing Party's Lien; (iii) acquire title (whether by foreclosure, assignment in lieu of foreclosure or other means) to the Leasehold Estate; (iv) take possession of and operate the Facilities or any portion thereof and perform any obligations to be performed by Lessee under the Lease, or cause a receiver to be appointed to do so; (v) assign or transfer the Leasehold Estate to a third party; or (vi) exercise any rights of Lessee under this Lease. Lessor's consent shall not be required for any of the foregoing; and, upon acquisition of the Leasehold Estate by a Financing Party or any other third party who acquires the same from or on behalf of the Financing Party or any purchaser who purchases at a foreclosure sale, Lessor shall recognize the Financing Party or such other party (as the case may be) as Lessee's proper successor, and this Lease shall remain in full force and effect.

(g) If this Lease is terminated for any reason whatsoever, including a termination by Lessor on account of a Lessee Default Event, or if this Lease is rejected by a trustee of Lessee in a bankruptcy or reorganization proceeding or by Lessee as a debtor-in-possession (whether or not such rejection shall be deemed to terminate this Lease), if requested by Financing Party, Lessor shall execute a new lease (the "New Lease") for the Leased Premises with the Financing Parties (or their designee(s), if applicable) as Lessee, within thirty (30) days following the date of such request. The New Lease shall be on substantially the same terms and conditions as are in this Lease (except for any requirements or conditions satisfied by Lessee prior to the termination or rejection). Upon execution of the New Lease by Lessor, Financing Parties (or their designee, if applicable) shall pay to Lessor any and all sums owing by Lessee under this Lease that are unpaid and that would, at the time of the execution of the New Lease, be due and payable under this Lease if this Lease had not been terminated or rejected. The provisions of this Section 15(g) shall survive any termination of this Lease prior to the expiration of the Term, and any

rejection of this Lease in any bankruptcy or reorganization proceeding.

(h) Lessor consents to each Financing Party's security interest, if any, in the Facilities and waives all right of levy for rent and all claims and demands of every kind against the Facilities, such waiver to continue so long as any sum remains owing from Lessee to any Financing Parties. Lessor agrees that the Facilities shall not be subject to distraint or execution by, or to any claim of, Lessor.

**16. INDEMNIFICATION; WAIVER.** (a) Each Party shall indemnify, defend, and hold harmless the other Party and its Related Persons from and against any and all third-party suits, claims, or damages suffered or incurred by the indemnified Party and its Related Persons arising out of physical damage to property and physical injuries to any person, including death, caused by the indemnifying Party or its Related Persons except to the extent such claims arise out of the negligence or willful misconduct of the indemnified Party or its Related Persons. (b) Each Party shall indemnify, defend and hold harmless the other Party and its Related Persons from and against all suits, claims, or damages suffered or incurred by the indemnified Party and its Related Persons arising out of or relating to the existence at, on, above, below or near the Leased Premises of any Hazardous Substance, except to the extent deposited, spilled or otherwise caused by the indemnified Party or any of its contractors or agents, provided that Lessee shall not be obligated to indemnify Lessor with respect to any Hazardous Substance on the Leased Premises prior to the Effective Date.

**17. INSURANCE.** Lessee shall, at its sole cost and expense, keep and maintain in force commercial general liability insurance including broad form property damage liability, personal injury liability, and contractual liability coverage, on an "occurrence" basis, with a combined single limit, which may be effected by primary and excess coverage, of not less than Five Million Dollars ($5,000,000.00) during the primary term, except that such limit in the Primary Term shall be instead not less than One Million Dollars ($1,000,000.00) until such time as Lessee commences physical testing of any injection wells or other similar commercial activities, with such commercially reasonable deductibles as Lessee, in its discretion, may deem appropriate. Lessor shall be named as an additional insured in such policy but only to the extent of the liabilities specifically assumed by the Lessee under this Lease. The policy shall contain provisions by which the insurer waives any right of subrogation it may have against Lessor and shall be endorsed to provide that the insurer shall give Lessor thirty days written notice before any material modification or termination of coverage. Upon Lessor's request, Lessee shall promptly deliver certificates of such insurance to Lessor.

**18. MISCELLANEOUS.**

(a) **Confidentiality.** Lessor shall maintain in the strictest confidence, and shall require each of Lessor's Related Persons to hold and maintain in the strictest confidence, for the benefit of Lessee, all information pertaining to the compensation paid under this Lease, any information regarding Lessee and its business, operations on the Leased Premises or on any other lands, the capacity and suitability of the Reservoir, and any other information that is deemed proprietary or that Lessee requests or identifies to be held confidential, in each such case whether disclosed by Lessee or discovered by Lessor.

(b) **Liens.** (i) Lessee shall protect the Leased Premises from liens of every character arising from its activities on the Leased Premises, provided that Lessee may, at any time and without the consent of Lessor, encumber, hypothecate, mortgage, pledge, or collaterally assign (including by mortgage, deed of trust or personal property security instrument) all or any portion of Lessee's right, title or interest under this Lease (but not Lessor's right, title or interest in the Leased Premises), as security for the repayment of any indebtedness and/or the performance of any obligation. (ii) Lessor shall not directly or indirectly cause, create, incur, assume or allow to exist any mortgage, pledge, lien, charge, security interest, encumbrance or other claim of any nature on or with respect to the Facilities, Operations or any interest therein. Lessor shall immediately notify Lessee in writing of the existence of any such mortgage, pledge, lien, charge, security interest, encumbrance or other claim, shall promptly cause the same to be discharged and released of record without cost to Lessee, and shall indemnify the Lessee against all costs and expenses (including reasonable attorneys' fees) incurred in discharging and releasing any such

mortgage, pledge, lien, charge, security interest, encumbrance or other claim.

(c) **Warranty of Title.** Lessor represents and warrants to Lessee that Lessor is the owner in fee of the surface and subsurface pore space of the Leased Premises. Lessor hereby warrants and agrees to defend title to the Leased Premises and Lessor hereby agrees that Lessee, at its option, shall have the right to discharge any tax, mortgage, or other lien upon the Leased Premises, and in the event Lessee does so, Lessee shall be subrogated to such lien with the right to enforce the same and apply annual rental payments or any other such payments due to Lessor toward satisfying the same. At any time on or after the Effective Date, Lessee may obtain for itself and/or any Financing Party, at Lessee's expense, a policy of title insurance in a form and with exceptions acceptable to Lessee and/or such Financing Party in its sole discretion (the "Title Policies"). Lessor agrees to cooperate fully and promptly with Lessee in its efforts to obtain the Title Policies, and Lessor shall take such actions as Lessee or any Financing Party may reasonably request in connection therewith.

(d) **Conduct of Operations.** Each Party shall, at its expense, use best efforts to comply (and cause its Related Persons to comply) in all material respects with all laws applicable to its (or their) activities on the Leased Premises, provided that each Party shall have the right, in its sole discretion, to contest, by appropriate legal proceedings, the validity or applicability of any law, and the other Party shall cooperate in every reasonable way in such contest, at no out-of-pocket expense to the cooperating Party. During the Primary Term, Lessee, its agents, affiliates, servants, employees, nominees and licensees shall be entitled to: (i) apply for and obtain any necessary permits, approvals and other governmental authorizations (collectively called "Governmental Authorizations") required for the development, construction, operation and maintenance of the Project and Lessor agrees to co-operate, execute, obtain or join with Lessee in any applications or proceedings relating to the Governmental Authorizations upon Lessee's written request and at Lessee's direction, cost and expense; and (ii) apply for any approvals and permits and any zoning amendment of any area of the Leased Premises required in connection with the Project, and Lessor agrees to co-operate, execute, obtain or join with Lessee in any applications or proceedings relating to such approvals, permits and zoning amendments upon Lessee's written request and at Lessee's direction, cost and expense.

(e) **Title to Carbon Dioxide.** As between Lessor and Lessee, all right, title, interest and ownership to all Carbon Dioxide injected into any Reservoir shall belong to Lessee, as measured by corresponding Storage Fee payment to Lessor.

(f) **Hazardous Substances.** Lessee shall have no liability for any regulated hazardous substances located on the Leased Premises prior to the Effective Date or placed in, on or within the Leased Premises by Lessor or any of its Related Persons on or after the Effective Date, and nothing in this Lease shall be construed to impose upon Lessee any obligation for the removal of such regulated hazardous substances.

(g) **Interference.** Lessee shall peaceably and quietly have, hold and enjoy the Leased Premises against any person claiming by, through or under the Lessor and without disturbance by the Lessor, unless Lessee is found in default of the terms of this Lease and such default is continuing. Lessor shall not unreasonably interfere with Lessee's access to or maintenance of the Facilities or associated use of Leased Premises under this Lease; endanger the safety of Lessor, Lessee, the general public, private or personal property, or the Facilities; or install or maintain or permit to be installed or maintained vegetation, undergrowth, trees (including overhanging limbs and foliage and any trees standing which are substantially likely to fall), buildings, structures, installations, and any other obstructions which unreasonably interfere to Lessee access or use of the Facilities, Formations or Lessee's use of the Leased Premises under this Lease. Lessor shall not engage in any activity or permit its Related Persons to engage in any activity that might damage or undermine the physical integrity of any Formation or interfere with Lessee's use of the Leased Premises under this Lease, provided however that it is understood by Lessee that Lessor has no right to permit or to prohibit the exercise of any mineral rights not owned by Lessor at the time of entering into the Option to Lease between Lessor and Lessee with respect to the Leased Premises. Neither Lessee nor its agents will engage in any activity that damages existing oil, gas and

other mineral exploration and development activities occurring on the Leased Premises without first obtaining permission from the relevant mineral rights holder.

(h) **Reservations.** Lessor reserves the right to sell, lease, or otherwise dispose of any interest in the Leased Premises subject to the rights granted in this Lease and agrees that sales, leases, or other dispositions of any interest or estate in the Leased Premises shall be expressly made subject to the terms of this Lease and shall not unreasonably interfere with Lessee's rights under this Lease.

(i) **Taxes.** Lessor shall pay for all real estate taxes and other assessments levied upon the Leased Premises. Lessee shall pay any taxes, assessments, fines, fees, and other charges levied by any governmental authority against its Facilities on the Leased Premises. The Parties agree to cooperate fully to obtain any available tax refunds or abatements with respect to the Leased Premises. Lessee shall have the right to pay all taxes, assessments and other fees on behalf of Lessor and to deduct the amount so paid from other payments due to Lessor hereunder.

(j) **Amendments.** Lessee reserves the right to revise this Lease to remedy any mistakes, including correcting the names of the Parties, the legal description of the Leased Premises, or otherwise. In the event that any amendment alters the bonus and royalty payable under Section 5(a)-(b) of this Lease, the Lessee shall pay the Lessor the amount owed under the Lease as amended. Any amendments must be in writing and signed by both parties.

(k) **Remedies.** Notwithstanding anything to the contrary in this Lease, neither Party shall be liable to the other for any indirect, special, punitive, incidental or exemplary damages, whether foreseeable or not and whether arising out of or in connection with this Lease, by statute, in contract, tort, including negligence, strict liability or otherwise, and all such damages are expressly disclaimed.. This provision does not limit Lessee's obligation to indemnify Lessor for third-party suits, claims, or damages under Section 16 of this Lease.

(l) **Financial Responsibility.** Lessee will comply with all applicable law regarding financial responsibility for Carbon Dioxide storage, and will post bonds or other financial guarantees as required by the government entities.

(m) **Attorneys' Fees.** If any suit or action is filed or arbitration commenced by either Party against the other Party to enforce this Lease or otherwise with respect to the subject matter of this Lease, the prevailing party shall be entitled to recover reasonable costs and attorneys' fees incurred in investigation of related matters and in preparation for and prosecution of such suit, action, or arbitration as fixed by the arbitrator or court, and if any appeal or other form of review is taken from the decision of the arbitrator or any court, reasonable costs and attorneys' fees as fixed by the court.

(n) **Representations and Warranties.** Lessor represents and warrants to Lessee the following as of the Effective Date and covenants that throughout the Term: (i) Lessor has the full right, power and authority to grant rights, interests and license as contained in this Lease. Such grant of the right, interests and license does not violate any law, ordinance, rule or other governmental restriction applicable to the Lessor or the Leased Premises and is not inconsistent with and will not result in a breach or default under any agreement by which the Lessor is bound or that affects the Leased Premises. (ii) Neither the execution and delivery of this Lease by Lessor nor the performance by Lessor of any of its obligations under this Lease conflicts with or will result in a breach or default under any agreement or obligation to which Lessor is a party or by which Lessor or the Leased Premises is bound. (iii) All information provided by Lessor to Lessee, as it pertains to the Leased Premises' physical condition, along with Lessor's rights, interests and use of the Leased Premises, is accurate in all material respects. (iv) Lessor has no actual or constructive notice or knowledge of Hazardous Substances at, on, above, below or near the Leased Premises. (v) Each of the undersigned represents and warrants that they have the authority to execute this Lease on behalf of the Party for which they are signing.

(o) **Severability.** Should any provision of this Lease be held, in a final and unappealable decision by a court of competent jurisdiction, to be either invalid, void or unenforceable, the remaining provisions

of this Lease shall remain in full force and effect, unimpaired by the holding. If the easements or other rights under this Lease are found to be in excess of the longest duration permitted by applicable law, the term of such easements or other rights shall instead expire on the latest date permitted by applicable law.

(p) **Memorandum of Lease.** This Lease shall not be recorded in the real property records. Lessee shall cause a memorandum of this Lease to be recorded in the real property records of the county in which the Leased Premises is situated. A recorded copy of said memorandum shall be furnished to Lessor within thirty (30) days of recording.

(q) **Notices.** All notices required to be given under this Lease shall be in writing, and shall be deemed to have been given upon (a) personal delivery, (b) one (1) Business Day after being deposited with FedEx or another reliable overnight courier service, with receipt acknowledgment requested, or (c) upon receipt or refused delivery deposited in the United States mail, registered or certified mail, postage prepaid, return receipt required, and addressed to the respective Party at the addresses set forth at the beginning of this Lease, or to such other address as either Party shall from time to time designate in writing to the other Party.

(r) **No Waiver.** The failure of either Party to insist in any one or more instances upon strict performance of any of the provisions of this Lease or to take advantage of any of its rights hereunder shall not be construed as a waiver of any such provision or the relinquishment of any such rights, but the same shall continue and remain in full force and effect.

(s) **Estoppels.** Either party hereto (the "Receiving Party"), without charge, at any time and from time to time, within ten (10) Business Days after receipt of a written request by the other party hereto (the "Requesting Party"), shall deliver a written statement, duly executed, certifying to such Requesting Party, or any other person, firm or entity specified by such Requesting Party: (i) that this Lease is unmodified and in full force and effect, or if there has been any modification, that the same is in full force and effect as so modified and identifying the particulars of such modification; (ii) whether or not, to the knowledge of the Receiving Party, there are then existing any offsets or defenses in favor of such Receiving Party against enforcement of any of the terms, covenants and conditions of this Lease and, if so, specifying the particulars of same and also whether or not, to the knowledge of such Receiving Party, the Requesting Party has observed and performed all of the terms, covenants and conditions on its part to be observed and performed, and if not, specifying the particulars of same; and (iii) such other information as may be reasonably requested by the Requesting Party. Any written instrument given hereunder may be relied upon by the recipient.

(t) **Counterparts.** This Lease may be executed in any number of counterparts, each of which, when executed and delivered, shall be an original, but all of which shall collectively constitute one and the same instrument.

(u) **Governing Law.** This Lease shall be governed, interpreted, and enforced in accordance with the laws of the state of North Dakota.

(v) **Further Action.** Each Party will execute and deliver all documents, provide all information, and take or forbear from all actions as may be necessary or appropriate to achieve the purposes of this Lease, including without limitation executing a memorandum of easement and all documents required to obtain any necessary government approvals.

(w) **Entire Agreement.** This Lease, into which the attached **Exhibit A** is incorporated by reference, contains the entire agreement of the Parties. There are no other conditions, agreements, representations, warranties, or understandings, express or implied.

[*Remainder of page intentionally left blank. Signature page follows.*]

IN WITNESS OF THE ABOVE, Lessor and Lessee have caused this Lease to be executed and delivered by their duly authorized representatives as of the Effective Date.

**LESSOR:**

By:_____
Print:_____

By:_____
Print:_____

**LESSEE:**

MINNKOTA POWER COOPERATIVE, INC.

By:_____
Print:_____
Its:_____

## Exhibit A

## LEGAL DESCRIPTION OF THE PROPERTY

The Leased Premises consists of the lands located in Oliver County, North Dakota that are owned by the Lessor and generally described as follows:

For purposes of calculating the royalty payable under Section 5(b) of this Lease, the Parties stipulate that the Leased Premises consists of _____ acres.

73932984.1

STATE OF NORTH DAKOTA | DISTRICT COURT

COUNTY OF BOTTINEAU | NORTHEAST JUDICIAL DISTRICT

| | |
|---|---|
| Northwest Landowners Association, Mike Dresser, Sandra Short, the Swenson Living Trust, and North Dakota Farm Bureau (intervenor),<br><br>Plaintiffs,<br><br>vs.<br><br>State of North Dakota, North Dakota Industrial Commission, Hon. Douglas Burgum in his official capacity as Governor of the State of North Dakota and as the Chairman and a member of the North Dakota Industrial Commission, and Hon. Drew Wrigley in his official capacity as Attorney General of North Dakota and as a member of the North Dakota Industrial Commission, and Hon. Doug Goehring in his official capacity as Agriculture Commissioner of North Dakota and as a member of the North Dakota Industrial Commission,<br><br>Defendants,<br><br>and,<br><br>SCS Carbon Transport LLC, SCS Permanent Carbon Storage LLC, Summit Carbon Solution, LLC, Minnkota Power Cooperative, Inc., Basin Electric Power Cooperative and Dakota Gasification Company,<br><br>Intervenor-Defendants. | Case No.: 05-2023-CV-00065<br><br>**NORTHWEST LANDOWNERS ASSOCIATION, ET. AL.'S REPLY IN SUPPORT OF NWLA MOTION FOR SUMMARY JUDGMENT AND IN OPPOSITION TO MOTIONS FILED BY MINNKOTA, BASIN ELECTRIC COOPERATIVE AND DAKOTA GASIFICATION COMPANY, SUMMIT, AND STATE OF NORTH DAKOTA** |

[¶1] Plaintiffs Northwest Landowners Association, Mike Dresser, Sandra Short, and the Swenson Living Trust, ("Landowners") submit their reply to the Responses to Motions for Summary Judgment filed by Minnkota (Index #214), Basin Electric Cooperative and Dakota Gasification (Index #206), Summit (Index #218), and State of North Dakota (Index #216).

## ARGUMENT

### I. The doctrine of correlative rights cannot be applied piecemeal and is not appropriately applied to pore space because no more pore space is being produced.

[¶2] The State and other defendants continue to argue for application of the doctrine of correlative rights but only in one direction, which defies the very definition of correlative rights. Further, the State's and others' attempts to adopt aspects of oil and gas conservation laws piecemeal is dangerous and wrong, and most importantly, does not avoid a constitutional violation here. While some of this ground has been covered, it appears a brief background on the conservation laws on which the State and others rely is necessary.

[¶3] These principles developed over time to address practical problems with oil and gas development, so they must be understood against the backdrop of historic oil and gas development in the United States.

> By most standards, the development of the American oil and gas industry is a recent phenomenon. Although oil and gas was known to exist through natural seepage as early as the seventeenth century, the modern oil and gas industry only dates back to the landmark well drilled by Colonel E.L. Drake near Titusville, Pennsylvania, in June 1859. Following the Drake well, discoveries and production expanded throughout the Appalachian Mountain region and into areas of Texas, Oklahoma, and California.
>
> Even though this was a neophyte industry, state and local governments were quick to follow up discoveries in their states by enacting regulatory measures largely designed to conserve oil and gas resources and deal with the drilling of hundreds of wells within a comparatively short period of time. The next key date in the development of oil and gas in the United States was the drilling of the Lucas Spindletop discovery well in October 1900. The discovery was significant both for the size of the field and for the use of newly developed drilling equipment and

> techniques designed to probe deeper into the earth's surface than had previously been possible.
>
> The golden age of oil started in the 1920s when new reservoirs were discovered throughout the United States and new uses were developed for crude oil and its refined products. Further state and federal governmental involvement in the oil and gas industry was triggered by the discovery of the massive East Texas field in 1930. The enormity of the reservoir combined with the depressed economic conditions of the 1930s to cause a severe drop in the price of oil. Another factor exacerbating the industry's problems was the highly fractionalized oil and gas ownership patterns in the East Texas field.
>
> Since the East Texas discovery, both the private and public sectors have been concerned with the **dual issues** of the conservation of oil and gas (more narrowly referred to as the prevention of waste) and the protection of correlative rights. The **twin goals** of achieving both conservation and the protection of correlative rights have been difficult to attain. In many instances achieving one goal has meant sacrificing the other. Individuals and corporations representing the interests of the producers and consumers of oil and gas have at different times focused their attention on competing objectives. As a result, many different approaches or avenues have been attempted as both the public and private sectors sought to achieve these sometime conflicting goals of conservation and protection of correlative rights.

1 Williams and Meyers, The Law of Pooling and Unitization, 3rd Edition § 1.01 (emphasis added).

[¶4] "The law of conservation regulation can only be understood by looking at the common-law doctrine of the rule of capture that was universally adopted by the states to define the ownership of oil and gas." 1 Williams and Meyers, The Law of Pooling and Unitization, 3rd Edition Ch. 2 (2019).

> The rule of capture provides that the owner of a tract of land acquires title to the oil and gas that is produced from wells drilled on the tract even if it can be shown that the oil or gas migrated from adjoining lands. A corollary to the rule of capture is the offset well or self-help protection rule whereby each owner can protect the oil and gas from being captured by drilling wells to prevent the migration of the hydrocarbons to adjacent wells. The concept of correlative rights in the common source of supply is also analyzed as it came to allow one owner over a common source to protect its interest against another owner who negligently injured the common source.

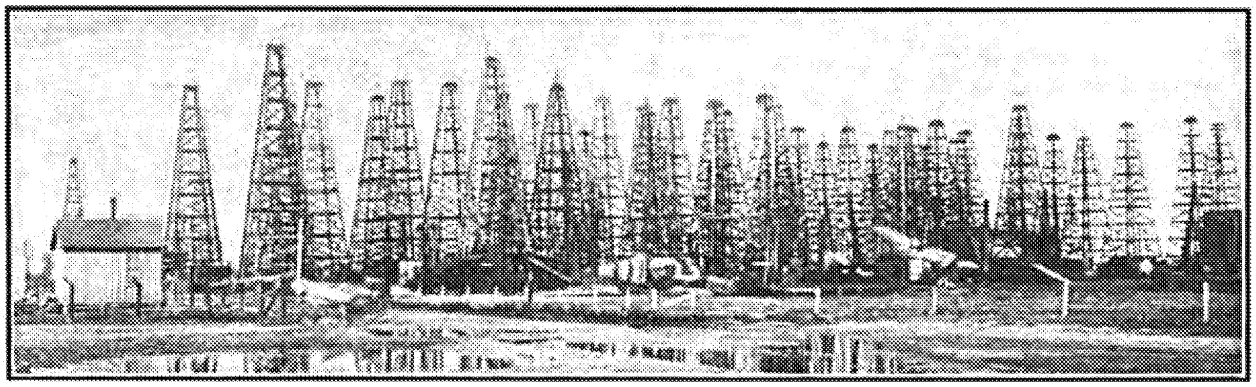
*Id.*

> The reason why pooling and unitization have been effective in conserving oil and gas and protecting correlative rights is directly related to how oil and gas are produced. There are three major sources for the natural energy needed to propel hydrocarbons from their natural state into the well bore. They are dissolved-gas drive, gas-cap drive, and water drive. Gas serves two functions in the production of oil. In the first place, when it is dissolved in the oil, it decreases the viscosity and surface tension of the oil, which thus permits the oil to flow more easily through rock. In addition, gas tends to expand, which forces the oil to the bore of the well because the bore is the point of lowest pressure. In both dissolved-gas-drive and gas-cap-drive fields, it is the pressure caused by the presence of the gas that produces the oil. As more gas is produced in the wellbore, less oil is recovered. Without conservation techniques, dissolved-gas-drive fields will only produce approximately 10 percent to 30 percent of the oil in place, while gas-drive fields are only slightly more naturally efficient, producing only 25 percent to 50 percent of the oil in place.
>
> Water-drive fields are the most naturally efficient of the three. Since water is more viscous than gas, the capillary drive of the reservoir washes the oil from the sands. Thus, if properly drilled, water-drive fields may produce 75 percent of the oil in place without having to resort to artificial means to provide the needed reservoir energy.

*Id.* at §1.02. "The concept of correlative rights in the common source of supply is also analyzed as it came to allow one owner over a common source to protect its interest against another owner who negligently injured the common source." 1 The Law of Pooling and Unitization, 3rd Edition ch. 2.

[¶5] The rule of capture essentially treated natural resources such as oil the same as the law treated wild animals; if a wild animal left your neighbor's property and entered your own property, you had a right to capture that animal. Similarly, if your oil well happened to pump oil that flowed beneath your property from your neighbor's property, you had a right to capture that oil. If your neighbor wanted to protect himself from having his oil drained by your well, his remedy was to drill his own well, and generally he would drill just off the property line so as to capture as much of that common source as possible. Of course, this incentivized the first landowner to drill an additional offset well in order to capture more of the oil, which in turn incentivized the neighbor to do the same again, and so the development went before regulation. The resulting chaotic

development is best described by old pictures of oil derricks practically stacked on top of each other.



(Picture taken from Wikimedia Commons, available at https://commons.wikimedia.org/wiki/File:Spindletop_Oil_Field_1.jpg).

[¶6] This also led to premature dissipation of the natural reservoir energy. 1 Williams and Meyers, The Law of Pooling and Unitization, 3rd Edition Ch. 2 (2019). Generally speaking, the rule of capture led to significant economic waste, inefficient development, and due to reservoir mechanics, even waste of the oil itself. It was in response to this that oil and gas conservation laws were passed to facilitate creation of spacing units, pooling, and unitization, but most important, to facilitate recovery of *more oil* from the reservoirs, and in keeping with correlative rights, ensure that each owner of the common resource received their equitable *share* of the resource (not an arbitrary royalty in a lease imposed as a form of indentured servitude on the landowner, as the NDIC is doing now).

[¶7] Defendants also rely on arguments and caselaw related to the police power of the state, and the public policy justifications for pooling and unitization to support their arguments in support of the validity of the amalgamation laws. The legal and policy arguments supporting the use of the police power for the "dual purpose" of preventing waste and protecting correlative rights in the

context of pooling and unitization are strong; but they do not apply to the purpose and effect of the amalgamation laws that take pore space. The frameworks for forced pooling and forced unitization also provide significant due process protections for the rights of property owners; something that is again entirely lacking in the amalgamation laws.

[¶8] The editors of *Williams and* Meyers explain correlative rights as follows:

> As an often-stated goal of state conservation statutes, the protection of correlative rights has played an important role in conservation agency practice and judicial review of agency action. For example, the Kansas Supreme Court described how the protection of correlative rights legislative objective affects agency action as follows:
>
> Along with the prevention of waste, the KCC [Kansas Corporation Commission] is directed to prevent the unfair or inequitable taking of natural gas from a common source of supply. This concept of equitable recovery of a common pool is known as correlative rights. Correlative rights means that each owner or producer in a common source of supply is privileged to produce that source only in a manner or amount that will not (a) injure the reservoir to the detriment of others, (b) taken an undue proportion of the obtainable oil or gas, or (c) cause undue drainage between developed leases.

1 *Williams and Meyers, The Law of Pooling and Unitization*, 3rd Edition § 2.02 (2019).

[¶9] "The rule of capture ownership regime creates two major problems: overdrilling, and premature dissipation of natural reservoir energy. Conservation regulation arose as a response to these two problems. Eventually the concept of correlative rights, giving each owner over a common source of supply a fair opportunity to produce, without waste, its just and equitable share of the reservoir was developed." 1 The Law of Pooling and Unitization, 3rd Edition, ch. 2 (emphasis added).

[¶10] An opinion from the Supreme Court of the United States, *Ohio Oil Co. v. State of Indiana*, explains the nature of correlative rights as they relate to state regulation and exercise of the police power. 177 U.S. 190 (1900). While the opinion and issues in that case related to venting of natural gas while producing oil from a common source, the discussion nonetheless illustrates well the

competing interests that justify use of the police power through conservation statutes that allow force-pooling and force-unitization. It is also significant for its commentary on what the police power does *not* allow. While defendants also cite to this case, they miss the important points:

> [A]s to gas and oil the surface proprietors within the gas field all have the right to reduce to possession the gas and oil beneath. They could not be absolutely deprived of this right which belongs to them without a taking of private property. But there is a coequal right in them all to take from a common source of supply the two substances which in the nature of things are united, though separate. It follows from the essence of their right and from the situation of the things as to which it can be exerted, that the use by one of his power to seek to convert a part of the common fund to actual possession may result in an undue proportion being attributed to one of the possessors of the right to the detriment of the others, or by waste by one or more to the annihilation of the rights of the remainder. Hence it is that the legislative power, from the peculiar nature of the right and the objects upon which it is to be exerted, can be manifested for the purpose of protecting all the collective owners, by securing a just distribution, to arise from the enjoyment, by them, of their privilege to reduce to possession, and to reach the like end by preventing waste. This necessarily implied legislative authority is borne out by the analogy suggested by things *feroe naturoe*, which it is unquestioned the legislature has the authority to forbid all from taking, in order to protect them from undue destruction, so that the right of the common owners, the public, to reduce to possession, may be ultimately efficaciously enjoyed. Viewed, then, as a statute to protect or to prevent the waste of the common property of the surface owners, the law of the state of Indiana which is here attacked because it is asserted that it devested private property without due compensation, in substance, is a statute protecting private property and preventing it from being taken by one of the common owners without regard to the enjoyment of the others.

*Ohio Oil Co. v. State of Indiana*, 177 U.S. 190, 209–10 (1900) (emphasis added).

[¶11] This commentary makes clear that the police power is used in the context of force-pooling and force-unitization to ensure an equitable allocation of this common resource and protect it from waste or wanton destruction (as in the *Indiana* case where the operator was simply venting gas it had no desire to capture and thereby depressurizing the reservoir and wasting a resource that had value to other owners of that same resource – a very different situation than seen here with CO2 sequestration and amalgamation of pore space, but such detail is lost in the defendants' arguments).

[¶12] These equitable purposes are reflected in North Dakota's law regarding force-pooling interests, "[e]ach such pooling order must be made after notice and hearing, and must be upon terms and conditions that are just and reasonable, and that afford to the owner of each tract or interest in the spacing unit the opportunity to **recover or receive, without unnecessary expense, that owner's just and equitable share.**" N.D.C.C. § 38-08-08 (emphasis added). It is the ownership interest in the spacing unit which determines that equitable share, and it is not diminished to a negligible royalty in a lease imposed as an indentured servitude on the landowner by the NDIC as with the amalgamation laws.

[¶13] The Supreme Court of North Dakota has recognized that preventing waste and protecting correlative rights is often a balancing act, but the failure to protect a landowner's correlative rights by ensuring the full just and equitable share will result in a taking.

> [W]aste prevention measures restrict the right to produce and share in production from one's property under the rule of capture; unless the state affords some compensation or protection to the rights restricted, the state will be taking property without due process of law. If the state does not protect correlative rights, then it must allow the drilling and production practices that will result in waste.

*Hanson v. Industrial Comm'n of N. Dakota*, 466 N.W.2d 587, 594 (N.D. 1991) (citing 1 B. Kramer & P. Martin, *The Law of Pooling and Unitization* § 5.01[1] (3rd ed. 1990) (emphasis added)).

[¶14] It is only through striking a balance that protects correlative rights that the police power can justify adjusting the rights of co-owners in a common source of supply. The protection for the rights restricted is set out in statute and requires a just and equitable share. N.D.C.C. § 38-08-08. Indeed, the North Dakota Supreme Court has gone a step further and ruled that the mineral interest itself includes the inherent right to a cost-free interest and therefore that also is required when force pooling occurs or it will be an unconstitutional taking.

[¶15] In *Slawson*, the Court noted that part of the mineral estate includes the landowner's royalty. 339 N.W.2d 772, 777. In order to protect the correlative rights of the mineral owner, the Commission ordered that a portion of the force-pooled owner's interest be paid as a cost-free royalty to reflect that the mineral interest inherently includes a royalty. *Id.* The Court approved, and indeed, noted that "[f]or conditions of a pooling order to be 'just and reasonable,' the order must afford an unleased mineral owner all that he is entitled to because of his ownership of the minerals. One of the things to which an owner of minerals is entitled is a cost-free portion of production. Any share less than that to which a mineral owner is entitled because of his ownership of minerals is not 'just and equitable.'" *Id.* Indeed, the Court explained:

> If the statutes were construed to require that all of the production attributable to the interests of an owner of unleased minerals be subject to appropriation by the operator until the operator has recovered all of his costs, the owner of unleased minerals would be deprived of the equal protection of the laws in that he would not be guaranteed of receiving anything for production attributable to his interest while a royalty owner under a lease would be guaranteed to receive payment for production attributable to his interest.

*Id.* at 778.

[¶16] While Defendants make repeated reference to the fact that the police power has in the past justified adjustment of private property rights and trespass claims, they fail to acknowledge the limited context in which this occurred, and the special emphasis that the law has always placed on *protecting* the landowner's correlative rights. The manner in which defendants propose to apply over a century of oil and gas law to pore space takings is ill-considered and standardless (apparently because injecting CO2 into pore space in deep reservoirs and producing oil from deep reservoirs is "similar" in some ways).[1] More importantly, the fundamental bases that justify the

[1] Minnkota's discussion of the *Fisher* and *Mosser* cases is confused. The undersigned handled both the prior *NWLA* case and the *Fisher* case. Judge Miller's orders in *Fisher* speak for themselves, but numerous of Minnkota's arguments on this line of cases are simply wrong. For example, Chapter 38-11.1 does indeed

use of conservation laws for oil and gas development, and specifically the use of force pooling and unitization, simply do not exist for CO2 sequestration and therefore the entire argument made by defendants about correlative rights is inapposite and unavailing and does not save the amalgamation statutes from this constitutional challenge.

**II. A facial challenge is the appropriate mechanism for addressing the challenged statutes.**

[¶17] In *NWLA I* the North Dakota Supreme Court rejected the defendants' construction of the "no set of circumstances" test from *Salerno* and *Larimore*. *Nw. Landowners Ass'n v. State*, 2022 ND 150, ¶ 13, 978 N.W.2d 679 (citing appellant argument and *Larimore Pub. Sch. Dist. No. 44 v. Aamodt*, 2018 ND 71, ¶ 38, 908 N.W.2d 442 and *United States v. Salerno*, 481 U.S. 739, 745, 107 S. Ct. 2095 (1987)). Although the construction of the "no set of circumstances" test argued previously by defendants in *NWLA I* has fallen into disfavor, the purpose and utility of the test was recently described by the 11th Circuit in an opinion on a 1st Amendment case:

> Next, the City's claim that the Club needs to show that the law is invalid in all circumstances misstates the law governing facial challenges. It is true that when a plaintiff raises a facial challenge to a statute, she generally "must establish that no set of circumstances exists under which the [law] would be valid." *United States v.*

---

refer to just compensation: "Owners of the surface estate and other persons should be justly compensated for injury to their persons or property and interference with the use of their property occasioned by oil and gas development." N.D.C.C. § 38-11.1-01(3). This is actually totally irrelevant, however, because Chapter 38-11.1 does not authorize the uses for which it requires compensation and does not effectuate any taking, and the compensation required is divorced from the granting of the rights for the use itself. Those cases address issues with the split estate when the rights for those uses have been previously granted by lease or granted by the courts through the implied easement. On the other hand, it is literally illegal to even sever pore space. N.D.C.C. § 47-31-05. The compensation for those rights in that context pursuant to special statute is not analogous to just compensation for the taking that is amalgamation. None of Minnkota's discussion of *Mosser* and *Fisher* is relevant, helpful, or instructive and covers ground thoroughly briefed in *NWLA I* and irrelevant here. What is relevant, however, is the Eight Circuit's recent discussion of the physical impact of injections, when it said last week that "Under North Dakota law, the Fishers are entitled to compensation for lost use of their pore space. Continental has pumped 448,805 barrels of saltwater into the Fishers' pore space. That water took up space, at least for some time. Even if the water eventually migrated into other areas of the Lodgepole, the jury still could have found that the Fishers had lost use of their pore space temporarily." *Cont'l Res., Inc. v. Fisher*, No. 23-1147, 2024 U.S. App. LEXIS 12525, at *11 (8th Cir. May 24, 2024). In other words, *even the Eighth Circuit agrees that injecting substances into pore space results in the landowner losing access to their pore space* – and it is therefore a *physical invasion* of the pore space.

> *Salerno*, 481 U.S. 739, 745, 107 S. Ct. 2095, 95 L. Ed. 2d 697 (1987) (emphasis added). "[T]his rule, known as 'the *Salerno* rule,' has been subject to a heated debate in the Supreme Court, where it has not been consistently followed." *United States v. Frandsen*, 212 F.3d 1231, 1235 n.3 (11th Cir. 2000) (collecting *cases* from the Supreme Court). The City seems to interpret *Salerno* to require that the Club prove that there is no hypothetical situation in which the Ordinance could be validly applied. Because the Club's performers are purportedly employees, and not independent contractors, under the IRCA, the City reasons that the Club's federal preemption claim fails.
>
> We are not persuaded. Even applying *Salerno's* no-set-of-circumstances test here, the question that *Salerno* requires us to answer [**49] is whether the statute fails the relevant constitutional test (in this case, the standard for federal conflict preemption discussed above). As the Tenth Circuit explained in *Doe v. City of Albuquerque, when it rejected a similar construction of the Salerno* standard, "***Salerno* is correctly understood not as a separate test applicable to facial challenges, but a description of the outcome of a facial challenge in which a statute fails to satisfy the appropriate constitutional framework**." 667 F.3d 1111, 1123 (10th Cir. 2012); *see also United States v. Supreme Court*, 839 F.3d 888, 917 (10th Cir. 2016) (applying the same Doe construction of the Salerno standard to a facial federal preemption challenge).

*Club Madonna Inc. v. City of Miami Beach*, 42 F.4th 1231, 1256 (11th Cir. 2022) (emphasis added).

[¶18] Understood in this context, the standard illustrates why the amalgamation statutes must fall under a facial challenge rather than an as-applied challenge. Defendants make numerous arguments to the effect that, because the amalgamation statutes do not effectuate a taking upon enactment, they are not susceptible to a facial challenge and must be challenged through an order from the NDIC actually amalgamating private property. This is incorrect.

[¶19] Any order from the NDIC that applies the language of N.D.C.C. § 38-22-10 will be unconstitutional because *it must be*. That section states: "If a storage operator does not obtain the consent of all persons who own the storage reservoir's pore space, the commission may require that the pore space owned by nonconsenting owners be included in a storage facility and subject to geologic storage." N.D.C.C. § 38-22-10; *see also* N.D.C.C. § 38-25-08. The only thing the

NDIC can do to apply this language is order that all "nonconsenting owners be included in a storage facility and subject to geologic storage." And the moment it does, it has violated the North Dakota and United States Constitutions in several ways.

[¶20] It has taken that nonconsenting landowner's pore space and given the use of it to a third party for their carbon dioxide sequestration business. N.D.C.C. § 38-22-10; *see also* N.D.C.C. § 38-25-08 (natural gas storage). That landowner no longer has the right or ability to choose whether this company is the right company, or this project is the right project, or this time is the right time – those decisions are all swept away along with the landowners' right to exclude when any order under the amalgamation laws is issued. "In *Sorum*, [the Court] held that if legislation requires an unconstitutional act (a prohibited gift in that case), the statute does not avoid a facial challenge 'merely because the statute includes constitutional applications along with potentially unconstitutional applications.'" *Nw. Landowners Ass'n v. State*, 2022 ND 150, ¶ 14, 978 N.W.2d 679. Here, the only thing the NDIC can do to put N.D.C.C. §§ 38-22-10 & 38-25-08 into effect is require the unconstitutional act of taking the right to exclude away from private property owners without payment of just compensation, without just compensation being made *before* the taking as required by Art. I, §16 of the ND Constitution, without determination of the just compensation by a jury, as required by Art. I, §16, and without the other due process afforded by the ND Constitution and a judicial proceeding under Chapter 32-15 of the Century Code.

[¶21] The procedural and due process violations here are also uniquely inherent in the text of Art. I, §16 because that constitutional provision several specific procedural and substantive requirements for due process that must be afforded to any owner before a taking occurs (just compensation determined and paid *before* a taking, no increase to tax base as public benefit, etc.). Chapter 32-15 is the chapter of the Century Code that sets out the additional requirements for the

use of eminent domain, and this chapter again sets the baseline for due process – and therefore any taking that fails to follow the requirements of Art. I, §16 and Chapter 32-15 (except the quick-take actions specifically excluded by the Constitution and Century Code) is *per se* violative of due process.[2] These violations all exist at all times that N.D.C.C. § 38-22-10 or N.D.C.C. § 38-25-08 are effectuated. They are susceptible to attack by facial challenge and should be struck down.

**III. By definition there are no administrative remedies to exhaust in a facial challenge.**

[¶22] To recap, NWLA argues that § 38-22-10 and § 38-25-08 are unconstitutional because they allow operators to physically invade the pore space owned by nonconsenting landowners; that equitable compensation under § 38-22-08(14) does not comport with the prescription in the constitution requiring just compensation and just compensation must be determined by a jury before a taking to comport with due process; that § 38-22-03(7) is an unconstitutional delegation of legislative power; and that § 32-15-06 and § 24-05-09 constitute an unconstitutional taking because they allow entry and limit compensation to something less than just compensation in violation of Art. I, § 16.

[¶23] Administrative agencies have adjudicatory and rulemaking functions. For a court to have jurisdiction over issues within the province of an agency, one must either exhaust administrative remedies or the challenge must be exempt from this requirement. "Whether the exhaustion of remedies requirement applies in each case depends on a mixed bundle of considerations, including,

---

[2] Cf. *City of W. Fargo v. McAllister*, 2022 ND 94, ¶ 8, 974 N.W.2d 393, 397. The ND Court there explained that "Section 40-22-05, N.D.C.C., provides an **exception** to eminent domain proceedings under N.D.C.C. ch. 32-15, *i.e.*, a quick-take procedure, when the interest sought for an improvement authorized under N.D.C.C. ch. 40-22 is a 'right of way….'". *Id.* (emphasis added). The Court also explained in that case that despite the authorization for the use of quick take in Art. I, § 16, it has recognized that the provision is not self-effectuating and requires a statutory authorization in each instance. *Id.* Given these holdings, it is elementary that takings in North Dakota require a separate statutory special proceeding that complies with the North Dakota Constitution, or must comply with Chapter 32-15.

but not limited to, expertise of administrative bodies, statutory interpretation, pure questions of law, constitutional issues, discretionary authority of the courts, primary, concurrent, or exclusive jurisdiction, inadequacies of administrative bodies, etc." *Garaas as Co-Trustees of Barbara Susan Garaas Family Trust v. Petro-Hunt, L.L.C.*, 2024 ND 34, ¶ 11 (quoting *Vogel v. Marathon Oil Co.*, 2016 ND 104, ¶ 6, 879 N.W.2d 471) (emphasis added).

[¶24] Though the exhaustion requirement sometimes applies to matters within the jurisdiction of the Industrial Commission, *Garaas*, ¶ 13, the requirement "has several well-recognized exceptions, including when a legal question simply involves statutory interpretation and does not need the exercise of an agency's expertise in making factual decisions." *Garaas*, ¶ 12. This exception applies here because NWLA is making facial constitutional challenges to the statutes at issue. Just as the courts have a "primary role in statutory construction," *Medcenter One, Inc. v. North Dakota State Bd. Of Pharmacy*, 1997 ND 54, ¶ 6 (quoting the district court) (cleaned up), the courts also have the primary role in determining the constitutionality of a statute. *Marbury v. Madison*, 5 U.S. 137, 177 ("It is emphatically the province and duty of the judicial department to say what the law is.").

[¶25] That the district court rather than the agency is the proper arbiter of the constitutionality of the statutes at issue is made clear by the fact that none of the virtues of the exhaustion of remedies doctrine apply here. For example, the agency's technical substantive expertise in oil and gas production will not be an asset in construing the Takings Clause, the non-delegation doctrine, the due process clause, or any of the other issues in this case because they are all based in constitutional law—issues that the courts are uniquely equipped to decide. Relatedly, since no factual determinations are necessary here because this facial challenge is based on the pertinent laws and constitutional provisions *on their face*, an administrative record would be of no value to the Court

in deciding whether the statutes are constitutional *on their face*. The Court will be looking to the statutes, the constitution, and case law in rendering its decision.

[¶26] Cases in which the Court found that it did not have jurisdiction because of a failure to exhaust administrative remedies are easily distinguished. In *Garaas*, the Court held that the doctrine applied, but there, the primary issue was the proper royalty interest owed to the plaintiffs based on how to allocate royalties between overlapping spacing units created by the Commission's orders—and whether the appropriate allocation there was .00007757 or .0005819. Here, unlike in *Garaas*, no such factual determinations or calculations are at issue, of consequence, or helpful to the analysis of the claims at issue.

[¶27] As in *Medcenter*, "[s]ince this case is nothing more than" a determination of the constitutionality of certain statutes, "the exhaustion of administrative remedies doctrine has no application…." *Medcenter One, Inc.*, 1997 ND 54, ¶ 6.

## CONCLUSION

[¶28] The State and others attempt to apply a piecemeal version of the doctrine of correlative rights, and with the clear goal of justifying the State's attempt to take pore space rights and give them to third parties. It is a wrong-headed sea change in the law that is unnecessary. Just over the border in Montana and elsewhere, CCUS and gas storage are conducted already within the confines of the constitutions. There are paths forward using eminent domain that for constitutional takings of private property and afford the due process explicitly requires by Article I, Section 16 of the North Dakota Constitution. The other challenged laws are also unconstitutional as argued, but there too, with the precondemnation survey laws, even the United States government has no issue finding ways to conduct such surveys using the power of eminent domain *within the confines of the Constitution*. That is all the landowners ask when they ask this Court to strike down the laws challenged here.

Dated: May 28, 2024.

Respectfully submitted,

*/s/ Derrick Braaten*

Derrick Braaten (ND #06394)
derrick@braatenlawfirm.com
**BRAATEN LAW FIRM**
109 North 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911

*Attorneys for Plaintiffs Northwest Landowners Association, Mike Dresser, Sandra Short, the Swenson Living Trust*

**NORTH DAKOTA INDUSTRIAL COMMISSION**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case No(s). 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

---

## DECLARATION OF SERVICE

---

[¶1] I hereby certify that true and correct copies of the following documents:

- **Written Comments of Intervenors The Swenson Living Trust, Michael Bauman, Glenn and Lisa Gerving, Michael and Bonnie Haupt, John M. Jochim, Kevin and Kimberly Kraft, Charmayne Liebelt, Kirk and Linda Maize and Allen Maize, Paul and Christy Metz, JoLene Rust, and Gary and Cassie Smith;**
- **Attachment A – Declarations of Landowners with attachments;**
- **Attachment B – NWLA Briefing in *Northwest Landowners Association, et al. v. State of North Dakota, et al.*, Case No. 05-2023-CV-00065; and**
- **Declaration of Service.**

were, on the 10th day of June, 2024 sent via electronic mail to the following:

North Dakota Industrial Commission
slforsberg@nd.gov

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on this 10th day of June, 2024 at Bismarck, North Dakota.

Desirae Zaste

| | |
|---|---|
| **From:** | MEDA SCHULTZ |
| **To:** | Forsberg, Sara L. |
| **Cc:** | MEDA SCHULTZ |
| **Subject:** | Summit Carbon Solutions Storage #1, LLC, Case #30869-30872 – (Against) |
| **Date:** | Monday, June 10, 2024 1:15:22 PM |
| **Attachments:** | Opposed - Summit Carbon Solutions #1.pdf<br>Opposed - Summit Carbon Solutions #2.pdf |

You don't often get email from medajo@comcast.net. Learn why this is important

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Good morning,
Please find attached two files describing my opposition to Summit Carbon Solutions Storage #1, LLC's and SCSS #2, LLC's proposal to sequester carbon within North Dakota's land.
I appreciate your team's attention to this matter. Please include my opposition to the count on this matter.
Respectfully,
Meda Schultz

June 10, 2024

North Dakota Industrial Commission
Dept. of Mineral Resources
Oil and Gas Division
1016 East Calgary Avenue
Bismarck, ND 58505

**Ref: Summit Carbon Solutions Storage #2, LLC, Case #30873-30876 – (Against)**

Via email: slforsberg@nd.gov

M. Chairman and Members of the Committee:

I write today in opposition to the approval of the application for permit before you from Summit Carbon Solutions Storage #2, LLC (Summit).

My name is Meda J. Schultz, and I am a mineral owner in the property detailed in Summit's application for permit. Approval of this project will have a direct negative impact on the value of my property, making future exploration and development of those mineral interests more difficult, costly, and very possibly unfeasible. Furthermore, by allowing this project to proceed as described, the affected surface- and mineral-owners involved may incur additional risk associated with any related consequences of carbon sequestration, and/or dispersions or other incidents, either planned or unplanned.

If allowed to proceed as proposed, Summit would be allowed to declare without challenge that minerals do not exist in the pore space and/or are of such little value as to not warrant compensation. This provides an opportunity, and in fact encourages, Summit to do just that, thereby taking property without just compensation to the surface- and mineral-owner.

This proposal establishes a condition in direct opposition to North Dakota 47-31-08, which states, "In the relationship between a severed mineral owner and a pore space estate, this chapter does not change or alter the common law as of April 9, 2009, as it relates to the rights belonging to, or the dominance of, the mineral estate."

As of this writing I know of no agreement in existence, past or present, allowing for extraction of the minerals detailed in my deed without my prior agreement and without equitable compensation. Therefore, I retain those minerals and the pore space in which they are contained. North Dakota law requiring compensation to the surface owner for the voided pore space below it does not preclude compensation to the mineral owner for the assets represented by that ownership.

To move forward, Summit Carbon Solutions must first be required to negotiate with me, a mineral-owner, a fair price for the severance and/or use of my property and any consequential impacts to my interest. Granting a permit without required, negotiated, compensation allows Summit Carbon solutions to **TAKE** my and others' property without just compensation, an outcome that is not in the North Dakota public's best interest.

I say **NO.** I call on you to **DENY** this permit.

Meda Schultz | 21804 SE 248th St. | Maple Valley, WA 98038 | 425-584-7384 | medajo@comcast.net

**From:** eric@pipersdream.com
**To:** Forsberg, Sara L.
**Subject:** Summit Carbon Solutions Storage permitting meeting June 11 & 12, 2024
**Date:** Monday, June 10, 2024 10:32:17 AM
**Attachments:** 240609_Summit_Carbon_Solution_Storage_N1_LLC_Ltr_of_Opposition.pdf
240609_Summit_Carbon_Solution_Storage_N2_LLC_Ltr_of_Opposition.pdf

---

You don't often get email from eric@pipersdream.com. Learn why this is important

******* CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

To Chairman and Members of the Industrial Committee,

Please submit my two letter in opposition to the Summit Carbon Solutions Storage permitting of their $CO_2$ permits.

Thank you

Eric

Eric Schultz
Project Manager/Engineer
Piper's Engineering, Inc.
P.O. Box 130
311 South B Street
Glen Ullin, ND 58631
(701)348-3441 Office
(701)426-4162 Cell

Confidentiality Notice: This e-mail message is for the sole use of intended recipient(s) and may contain confidential and privileged information. Any unauthorized review, use, disclosure, distribution, or copying is prohibited. If you are not the intended recipient, please reply to the sender of this e-mail and destroy/delete all copies of this e-mail message.

June 9, 2024

North Dakota Industrial Commission
Dept. of Mineral Resources
Oil and Gas Division
1016 East Calgary Avenue
Bismarck, ND 58505

Via email: slforsberg@nd.gov (emailed on June 10, 2024)

Re: Summit Carbon Solutions Storage #2, LLC – (Against)

Case Nos. 30873-30876

Chairman and Members of the Committee:

I write today in opposition to the approval of the application for permit before you from Summit Carbon Solutions Storage #2, LLC.

My name is Eric R. Schultz, and I am a mineral owner of the property detailed in Summit Carbon Solutions (Summit) application for permit. Approval of this project will have a direct negative impact on the value of my property. Making future exploration and development of those mineral interests more difficult, costly, and very likely unfeasible.

Further, the information available from Summit Carbon is quite opaque and nonspecific. I have concerns about the safety of this proposal. I am unable to find dispersion models in the event of a leak, etc. There is limited information regarding liability and damages if this situation were to arise. Also, I believe it to be prudent to establish a long-term account and/or insurance coverage, from a reputable company like *Lloyds of London*, which would be maintained for the distant future if there is an incident to protect the owners from liability and damage claims futuristically.

If allowed to proceed as proposed, Summit would be permitted to declare without challenge that minerals do not exist in the pore space and/or are of such little value as to not warrant compensation. This provides an opportunity, and in fact, encourages Summit to do just that, thereby taking property without just compensation to the surface and mineral owner.

This proposal establishes a condition in direct opposition to North Dakota 47-31-08, which states, "In the relationship between a severed mineral owner and a pore space estate, this chapter does not change or alter the common law as of April 9, 2009, as it relates to the rights belonging to, or the dominance of, the mineral estate."

As of this writing I know of no agreement in existence, past or present, allowing for extraction of the minerals detailed in my deed without my prior agreement and without equitable compensation. Therefore, I retain those minerals and the pore space in which they are contained. North Dakota law requiring compensation to the surface owner for the voided pore space below it does not preclude compensation to the mineral owner for the assets represented by that ownership.

To move forward, Summit Carbon Solutions must first be required to negotiate with me, a mineral owner, a fair price for the severance and/or use of my property and any consequential impacts to my interest. Granting a permit without the required, negotiated, compensation allows Summit Carbon solutions to **TAKE** my and others' property without just compensation, an outcome that is not in the North Dakota public's best interest.

I say **NO.**

I call on you to **DENY** this permit.

Respectfully,

Eric R. Schultz

Eric R. Schultz | P. O. Box 13, Almont, ND 58520 | (701) 426 - 4162

| | |
|---|---|
| **From:** | rlipp@midco.net |
| **To:** | Forsberg, Sara L. |
| **Subject:** | Summit Carbon Storage Application for Storage Facility Permits/Amalgamation of Pore Space |
| **Date:** | Sunday, June 9, 2024 4:41:44 PM |
| **Attachments:** | Mine - Letter to Summit Carbon Solution Storage #1 LLC Ltr of Opposition.docx<br>Mine - Letter to Summit Carbon Solution Storage #2 LLC Ltr of Opposition.docx |

You don't often get email from rlipp@midco.net. Learn why this is important

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

To: ND State Industrial Commission,

This is regarding *the large-scale Carbon Capture and Storage project across the Midwest, with injection wells located in the Mercer and Oliver County, ND regions.* The Commission will be meeting on June 11-12, 2024, to consider the *Class VI Storage Facility Permits* including the amalgamation of pore space. Attached please find my comments regarding the permit application and draft submitted by Summit Carbon Solutions.

Brenda L. Lipp
126 Estevan Drive
Bismarck, ND 58503-0317
(701)-220-1051

Virus-free.www.avast.com

iJune 8, 2024

North Dakota Industrial Commission
Dept. of Mineral Resources
Oil and Gas Division
1016 East Calgary Avenue
Bismarck, ND 58505

Via email: slforsberg@nd.gov (emailed on June 9, 2024)

Re: Summit Carbon Solutions Storage #2, LLC – (Against)

Case Nos. 30873-30876

Chairman and Members of the Committee:

I write today in opposition to the approval of the application for permit before you from Summit Carbon Solutions Storage #2, LLC.

My name is Brenda L. Lipp, and I am a mineral owner of the property detailed in Summit Carbon Solutions (Summit) application for permit. Approval of this project will have a direct negative impact on the value of my property. Making future exploration and development of those mineral interests more difficult, costly, and very likely unfeasible.

Further, the information available from Summit Carbon is quite opaque and nonspecific. I have concerns about the safety of this proposal. I am unable to find dispersion models in the event of a leak, etc. There is limited information regarding liability and damages if this situation were to arise. Also, I believe it to be prudent to establish a long-term account and/or insurance coverage, from a reputable company like *Lloyds of London*, which would be maintained for the distant future if there is an incident to protect the owners from liability and damage claims futuristically.

If allowed to proceed as proposed, Summit would be permitted to declare without challenge that minerals do not exist in the pore space and/or are of such little value as to not warrant compensation. This provides an opportunity, and in fact, encourages Summit to do just that, thereby taking property without just compensation to the surface and mineral owner.

This proposal establishes a condition in direct opposition to North Dakota 47-31-08, which states, "In the relationship between a severed mineral owner and a pore space estate, this chapter does not change or alter the common law as of April 9, 2009, as it relates to the rights belonging to, or the dominance of, the mineral estate."

As of this writing I know of no agreement in existence, past or present, allowing for extraction of the minerals detailed in my deed without my prior agreement and without equitable compensation. Therefore, I retain those minerals and the pore space in which they are contained. North Dakota law requiring compensation to the surface owner for the voided pore space below it does not preclude compensation to the mineral owner for the assets represented by that ownership.

To move forward, Summit Carbon Solutions must first be required to negotiate with me, a mineral owner, a fair price for the severance and/or use of my property and any consequential impacts to my interest. Granting a permit without the required, negotiated, compensation allows Summit Carbon solutions to **TAKE** my and others' property without just compensation, an outcome that is not in the North Dakota public's best interest.

I say **NO.**

I call on you to **DENY** this permit.

Respectfully,

Brenda L. Lipp

**From:** MARK SCHULTZ
**To:** Forsberg, Sara L.
**Subject:** Summit Carbon Solutions Storage #1 and #2 - Against
**Date:** Saturday, June 8, 2024 2:33:35 PM
**Attachments:** Summit Carbon Solutions Storage #1 - Mark Schultz.pdf
Summit Carbon Solutions Storage #2 - Mark Schultz.pdf

---

You don't often get email from mschultz52@verizon.net. Learn why this is important

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Please find attached two letters against granting a permit for carbon capture to Summit Carbon Solutions Storage at Site #1 and Site #2. Please advise the results of the hearings on the same.

Regards,
Mark Schultz

Mark Schultz
mschultz52@verizon.net
11402 Towering Oak Way
Reston, VA 20194
(703) 439-4862

June 7, 2024

11402 Towering Oak Way
Reston, Virginia 20194

North Dakota Industrial Commission Dept. of Mineral Resources
Oil and Gas Division
1016 East Calgary Avenue
Bismarck, ND 58505

Via email: slforsberg@nd.gov

Re: Summit Carbon Solutions Storage #2, LLC – (Against)

Mr. Chairman and Members of the Committee:

I write today in opposition to the approval of the application for permit before you from Summit Carbon Solutions Storage #2, LLC.

My name is Mark Schultz, and I am a mineral owner in the property detailed in Summit Carbon Solutions (Summit) application for permit. Approval of this project will have a direct negative impact on the value of my property. Making future exploration and development of those mineral interests more difficult, costly, and very likely unfeasible.

If allowed to proceed as proposed, Summit would be permitted to declare without challenge that minerals do not exist in the pore space and/or are of such little value as to not warrant compensation. This provides an opportunity, and in fact encourages, Summit to do just that, thereby taking property without just compensation to the surface and mineral owner.

This proposal establishes a condition in direct opposition to North Dakota 47-31-08, which states, "In the relationship between a severed mineral owner and a pore space estate, this chapter does not change or alter the common law as of April 9, 2009, as it relates to the rights belonging to, or the dominance of, the mineral estate."

As of this writing I know of no agreement in existence, past or present, allowing for extraction of the minerals detailed in my deed without my prior agreement and without equitable compensation. Therefore, I retain those minerals and the pore space in which they are contained. North Dakota law requiring compensation to the surface owner for the voided pore space below it does not preclude compensation to the mineral owner for the assets represented by that ownership.

To move forward, Summit Carbon Solutions must first be required to negotiate with me, a mineral owner, a fair price for the severance and/or use of my property and any consequential impacts to my interest. Granting a permit without required, negotiated, compensation allows Summit Carbon solutions to **TAKE** my and others' property without just compensation, an outcome that is not in the North Dakota public's best interest.

I say **NO.** I call on you to **NOT** grant this permit.

Respectfully,

Mark Schultz

| | |
|---|---|
| **From:** | Knutson, Amy N. |
| **To:** | Joshua A. Swanson; Bender, Lawrence; Derrick Braaten; tthrone@thronelaw.com |
| **Cc:** | Forsberg, Sara L.; Garner, David P.; Helms, Lynn D.; desirae@braatenlawfirm.com; BHughes@fredlaw.com; METter@fredlaw.com |
| **Subject:** | Summit Carbon Storage (Case Nos. 30869-30880) |
| **Date:** | Friday, June 7, 2024 3:19:14 PM |
| **Attachments:** | 2024.6.7 - Order on Request for Telephonic Testimony.pdf<br>2024.6.7 - Order on Motion to Continue and Expedite Discovery.pdf<br>2024.6.7 - Decl of Svce & Ret of Doc.pdf |

---

Counsel,

On behalf of Hearing Officer Garner, please see attached:

1. ORDER ON MOTION FOR EXPEDITED DISCOVERY AND MOTION FOR CONTINUANCE OF HEARING; and
2. ORDER ON REQUEST FOR TELEPHONIC TESTIMONY.

**Please note for all future filings and/or correspondence in this matter to include Hearing Officer David Garner (dpgarner@nd.gov), Lynn Helms (lhelms@nd.gov), Sara Forsberg (slforsberg@nd.gov), and Amy Knutson (anknutson@nd.gov).

Amy Knutson
**Paralegal**
**Civil Litigation Division**
**North Dakota Office of Attorney General**
**500 North 9th Street**
**Bismarck, ND 58501-4509**
**Telephone: (701) 328-3640**
**Fax: (701) 328-4300**

**Confidentiality Notice:**
This electronic mail transmission is intended for the use of the individual or entity to which it is addressed and may contain confidential information belonging to the sender. If you are not the intended recipient, you are hereby notified that any disclosure, copying, distribution, or the taking of any action in reliance on the contents of this information is strictly prohibited. If you have received this transmission in error, please notify the sender immediately by e-mail and delete the original message.

BEFORE THE INDUSTRIAL COMMISSION
OF THE STATE OF NORTH DAKOTA

CASE NOS. 30869–30880

In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND

In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15,

16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.

In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND

In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18,

19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.

In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.

In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage

facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.

In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.

In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections

6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.

In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

---

**ORDER ON REQUEST FOR TELEPHONIC TESTIMONY**

---

[¶ 1] The Swenson Living Trust, Paul and Christy Metz, Michael and Bonnie Haupt, John Jochim, Gary and Cassie Smith, Michael Bauman, JoLene Rust, Glenn and Lisa Gerving, Kirk and Linda Maize and Allen Maize, Kevin and Kimberly Kraft, and Charmayne Liebelt (collectively "Intervenors") filed a Request for Telephonic Testimony for their experts, Shane Bofto, Paul Button, P. Ted Doughty, and Christopher Stockness on June 4, 2024.

[¶ 2] On June 7, 2024, Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC and Summit Carbon Storage #3, LLC ("Applicants"), filed a Request to Participate by Telephonic Means.

[¶ 3] The Intervenors' Request for Telephonic Testimony is hereby **GRANTED**.

[¶ 4] The Applicants' Request to Participate by Telephonic Means is hereby **GRANTED**.

Dated this 7th day of June, 2024.

By: David P. Garner

David P. Garner
Industrial Commission
Hearing Officer

BEFORE THE INDUSTRIAL COMMISSION
OF THE STATE OF NORTH DAKOTA

CASE NOS. 30869–30880

In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND

In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15,

16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.

In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND

In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18,

19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.

In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.

In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage

facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.

In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.

In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections

6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.

In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

---

**ORDER ON MOTION FOR EXPEDITED DISCOVERY AND MOTION FOR CONTINUANCE OF HEARING**

---

**MOTION TO CONTINUE HEARING**

[¶ 1] On February 6, 2024, Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit carbon Storage #3, LLC (collectively, "Summit"), filed with the North Dakota Industrial Commission ("Commission") applications for permits for carbon dioxide storage facilities.

[¶ 2] On April 18, 2024, the Swenson Trust ("Trust") filed its Petition to Intervene with the North Dakota Industrial Commission ("Commission"). *See* Petitions to Intervene.

[¶ 3] On April 25, 2024, the Trust filed a Motion to Continue Hearing and Request for Scheduling Conference. *See* Brief in Support of Motion to Continue Hearing and Request for Scheduling Conference.

[¶ 4] Summit filed its Response to Motion to Continue Hearing and Request for Scheduling Conference on April 25, 2024, in opposition to the request. *See* Response to Motion to Continue Hearing and Request for Scheduling Conference.

[¶ 5] The Trust offered conclusory statements regarding its need for discovery in support of its motion.

[¶ 6] Summit responded stating it will be prejudiced by continuing the hearing given all of the significant, unrecoverable costs that will be incurred should a new hearing be ordered. *Id.* at ¶ 23.

[¶ 7] Furthermore, the Trust did not contact Summit for the purpose of obtaining a stipulated agreement before seeking a continuance as required by N.D. Admin. Code § 98-02-03-07. *Id.* at ¶ 19.

[¶ 8] The Trust's Motion to Continue Hearing is hereby **DENIED**.

[¶ 9] The Request for a Scheduling Conference is hereby **DENIED.**

**MOTION FOR EXPEDITED DISCOVERY**

[¶ 10] After the Trust filed its' Petition to Intervene, it served several discovery requests upon Summit on May 2, 2024, May 6, 2024, and May 10, 2024. The Trust subsequently filed a Motion for Expedited Discovery with the Commission on May 16, 2024. *See* Motion to Expedite Discovery.

[¶ 11] Summit filed a Response to Motion to Expedite Discovery on May 28, 2024, indicating the amount of information being requested by the Trust was a large volume and would not be feasible. *See* Second Declaration of Jeff Skarre. *See* Response to Motion to Expedite Discovery.

[¶ 12] At the time of filing the Trust's Motion to Expedite Discovery, the Commission had not ruled on the Trust's Petition to Intervene. Due to the volume indicated by Skaare, it would not be possible for Summit to comply with such an order and the burden would be significant to Summit.

[¶ 13] For the foregoing reasons, the Trust's Motion to Expedite Discovery is hereby **DENIED**.

Dated this 7th day of June, 2024.

By: David P. Garner

David P. Garner
North Dakota Industrial Commission
Hearing Officer

BEFORE THE NORTH DAKOTA INDUSTRIAL COMMISSION
OF THE STATE OF NORTH DAKOTA

CASE NOS. 30869
30870
30871
30872
30873
30874
30875
30876
30877
30878
30879
30880

In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19,

20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.

In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND

In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5,

6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.

In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.

In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek

Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township. 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.

In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.

In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142

North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.

In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

---

**UNSWORN DECLARATION OF SERVICE BY ELECTRONIC MAIL AND RETENTION OF DOCUMENT**

---

[¶1] Amy Knutson states as follows:

[¶2] I am of legal age and on the 7th day of June, 2024, I served the following documents:

1. **ORDER ON MOTION FOR EXPEDITED DISCOVERY AND MOTION FOR CONTINUANCE OF HEARING; and**
2. **ORDER ON REQUEST FOR TELEPHONIC TESTIMONY.**

upon the following by electronic mail as follows:

Derrick Braaten – derrick@braatenlaw.com;
Lawrence Bender – lbender@fredlaw.com;
S. Thomas Throne – tthrone@thronelaw.com
Joshua Swanson – jswanson@vogellaw.com.

[¶3] The original document shall be retained at the North Dakota Department of Mineral Resources, 600 E. Boulevard Ave. – Dept. 405, Bismarck, North Dakota, 58505-0840.

[¶4] I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on the 7th day of June, 2024, at Bismarck, North Dakota, United States.

Amy Knutson

| | |
|---|---|
| **From:** | Hughes, Bethany |
| **To:** | Helms, Lynn D.; derrick@braatenlawfirm.com; Joshua A. Swanson |
| **Cc:** | Garner, David P.; Forsberg, Sara L.; Knutson, Amy N.; Bender, Lawrence |
| **Subject:** | Summit Carbon Solutions - NDIC Case Nos. 30869-30880 |
| **Date:** | Friday, June 7, 2024 2:31:41 PM |
| **Attachments:** | Summit - NDIC Case Nos. 30869-30880 - Request to Participate by Telephonic Means-c.pdf |

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Good afternoon,

Please find the attached documents, listed below, for filing and service with respect to the above-referenced case numbers.

1. Request to Participate by Telephonic Means; and
2. Certificate of Service.

**Bethany Hughes**
*Legal Administrative Assistant/Paralegal*
Fredrikson & Byron, P.A.
**Please note our new address:**
304 East Front Ave, Suite 400, Bismarck, ND 58504-5639
Direct: 701-221-8641 | Main: 701.221.8700 | Fax: 701-221-8750
***This is a transmission from the law firm of Fredrikson & Byron, P.A. and may contain information which is privileged, confidential, and protected by the attorney-client or attorney work product privileges. If you are not the addressee, note that any disclosure, copying, distribution, or use of the contents of this message is prohibited. If you have received this transmission in error, please destroy it and notify us immediately at our telephone number (701) 221-8700. The name and biographical data provided above are for informational purposes only and are not intended to be a signature or other indication of an intent by the sender to authenticate the contents of this electronic message.***

**BEFORE THE INDUSTRIAL COMMISSION**
**OF THE STATE OF NORTH DAKOTA**

**CASE NOS. 30869–30880**

**In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34,**

**Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission**

**may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the**

**application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## REQUEST TO PARTICIPATE BY TELEPHONIC MEANS

In accordance with the provisions of Section 43-02-03-88.2(1) of the North Dakota Administrative Code, Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC and Summit Carbon Storage #3, LLC, the applicants in the above-captioned matters (collectively, "Applicants"), hereby request that the North Dakota Industrial Commission allow telephonic

communication of Applicants' witnesses at the June 12, 2024 hearing on the above-captioned matters. Lawrence Bender, Fredrikson & Byron, P.A., 304 East Front Avenue, Suite 400, Bismarck, ND 58504, (701) 221-8700, is counsel for Applicants and will be present at the hearing.

**DATED** this 7th day of June, 2024.

FREDRIKSON & BYRON, P.A.

By _____

LAWRENCE BENDER, ND Bar #03908
304 East Front Avenue, Suite 400
Bismarck, ND 58504-5639
(701) 221-8700
lbender@fredlaw.com
*Attorneys for Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC and Summit Carbon Storage #3, LLC*

#82726428v1

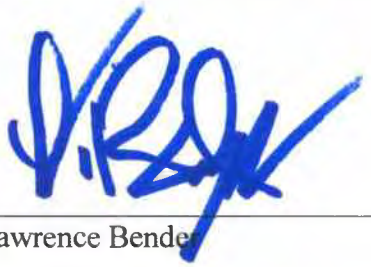
## CERTIFICATE OF SERVICE

The undersigned hereby certifies that on this 7th day of June, 2024, a true and correct copy of the foregoing document was filed electronically with the North Dakota Industrial Commission and served upon the following via electronic mail:

Lynn Helms
lhelms@nd.gov

Joshua Swanson
jswanson@vogellaw.com

Derrick Braaten
derrick@braatenlawfirm.com



Lawrence Bender

#82726428v1

| | |
|---|---|
| **From:** | Desirae Zaste |
| **To:** | -Info-Oil & Gas Division; Forsberg, Sara L.; Garner, David P.; Knutson, Amy N.; Helms, Lynn D.; Bender, Lawrence; TThrone@thronelaw.com; Joshua A. Swanson |
| **Cc:** | Derrick Braaten; Hughes, Bethany; Etter, Mary; MStalick@thronelaw.com |
| **Subject:** | Summit Carbon Storage #1, #2, and #3, LLC (Case Nos. 30869-30880) |
| **Date:** | Friday, June 7, 2024 12:00:05 PM |
| **Attachments:** | image002.png |

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Good afternoon,

Attached for filing and service is a link containing the following documents:

- **Declaration of Kurt Swenson with attachments;**
- **Declaration of Michael Bauman with attachments;**
- **Declaration of Glenn Gerving with attachments;**
- **Declaration of Michael & Bonnie Haupt with attachments;**
- **Declaration of John M. Jochim with attachments;**
- **Declaration of Kevin Kraft with attachments;**
- **Declaration of Charmayne Liebelt with attachments;**
- **Declaration of Kirk Maize with attachments;**
- **Declaration of Christy Metz with attachments;**
- **Declaration of JoLene Rust with attachments;**
- **Declaration of Gary A. Smith with attachments; and**
- **Declaration of Service.**

Declarations of Landowners

The link will expire on June 13th. Thank you.

**Desirae Zaste¦ Certified Paralegal**

**BRAATEN LAW FIRM**
109 N. 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
Fax: 701-221-5842
www.braatenlawfirm.com

**PRIVILEGED COMMUNICATION**
**This e-mail message is intended only for the named recipient(s) above and is covered by the Electronic Communications Privacy Act, 18 U.S.C. Sections 2510-2521. This e-mail is confidential and may contain information that is privileged, attorney work product or exempt from disclosure under applicable law. Recipients should not file copies of this e-mail with publicly accessible records. If you have received this message in error, please immediately notify the sender by return e-mail and delete this e-mail message from your computer. Thank you for your cooperation.**

**NORTH DAKOTA INDUSTRIAL COMMISSION**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case Nos. 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## DECLARATION OF KURT SWENSON

[¶1] I, Kurt Swenson, as trustee of The Swenson Living Trust, declare, on behalf of the Trust and based on personal knowledge, as follows :

[¶2] I have ownership interest in the following properties that lie within the boundaries of the proposed BK Fischer Storage Facility.

- Township 142 North, Range 87 West
  Section 7: Outlot B in E1/2 NW1/4 LESS Lot One
  Oliver County, ND

- Township 142 North, Range 88 West
  Section 14: W1/2 NE1/4
  Mercer County, ND

- Township 143 North, Range 88 West
  Section 27: S1/2 SE1/4
  Mercer County, ND

[¶3] To the best of my knowledge, the properties listed in ¶ 2 above are encumbered by the following easements:

- Section 7:
  i. Southwest Water Authority Easement executed by James Kusler, Johnell Kusler, and Milda Hedblom dated February 3, 2014 (90188/90189/90190).
  ii. Trent T. Martin Easement (Water Well and Tank) executed by Johnell Kusler (PR), et al. and dated May 31, 2022 (97087).
  iii. Trent T. Martin Easement (Corrected Reciprocal Access) executed by Johnell Kusler (PR), et al. and dated May 31, 2022 (97731).

- Section 14:
  i. Oliver-Mercer Electric Coop Easement executed by John Scheidt and dated April 22, 1949 (209412).
  ii. Oliver-Mercer Electric Coop Easement executed by Gladys Scheidt and dated July 3, 1990 (209427).
  iii. West River Telecommunications Coop Easement executed by Gladys Scheidt and dated June 29, 1993 (153687).

- Section 27:
    i. Oliver-Mercer Electric Coop Easement executed by Leland Erickson and dated November 6, 1974 (208123).
    ii. Southwest Water Authority Easement executed by James Kusler and dated February 3, 2014 (211517).
    iii. Roughrider Electric Coop, Inc. Right of Way Easement executed by James Kusler and dated June 19, 2014 (206136).
    iv. Southwest Water Authority Easement executed by James Kusler, dated May 22, 2015 (207510).

[¶4] I have ownership interest in the following properties that lie within the boundaries of the Review Area of the proposed BK Fischer Storage Facility:

- Township 142 North, Range 87 West
  Section 9: SW1/4
  Oliver County, ND

- Township 142 North, Range 87 West
  Section 21: W1/2
  Oliver County, ND

- Township 143 North, Range 88 West
  Section 27: N1/2 SE1/4
  Mercer County, ND

[¶5] To the best of my knowledge, the properties listed in ¶ 4 above are encumbered by the following easements:

- Section 21:
    i. Oliver-Mercer Electric Coop. Easement executed by Norman Smith and dated June 6, 1946 (91055).

- Section 27:
    i. Oliver-Mercer Electric Coop Easement executed by Leland Erickson and dated November 6, 1974 (208123).
    ii. Southwest Water Authority Easement executed by James Kusler and dated February 3, 2014 (211517).
    iii. Southwest Water Authority Easement executed by James Kusler and dated May 22, 2015 (207510).

[¶6] I have ownership interest in the following properties that lie between, and will be impacted by, the proposed Storage Facilities:

- Township 142 North, Range 87 West
  Section 21: E1/2
  Oliver County, ND

- Township 142 North, Range 87 West
  Section 22: NW1/4
  Oliver County, ND

[¶7] To the best of my knowledge, the property listed in ¶ 6 above are encumbered by the following easements:

- Section 21:
  i. Roughrider Electric Coop, Inc. Easement executed by Faye Swenson and dated July 1, 2008 (88076).
  ii. Southwest Water Authority Easement executed by Kurt Swenson, et ux. and dated April 2, 2015 (89860).
  iii. West River Telecommunications Cooperative Right-of-Way Easement executed by Donna M. Smith and dated November 18, 2015 (92299).

- Section 22:
  i. West River Telecommunications Cooperative Right-of-Way Easement executed by Donna M. Smith and dated November 18, 2015 (92299).

[¶8] I have ownership interest in the following property that lies within the boundaries of the Review Area of the proposed KJ Hintz Storage Facility:

- Township 142 North, Range 87 West
  Section 15: SE1/4
  Oliver County, ND

[¶9] To the best of my knowledge, the property listed in ¶ 8 above is encumbered by the following easements:

- Section 15:
  i. Oliver-Mercer Electric Coop. Easement executed by Ralph Smith and dated June 6, 1946 (91055).
  ii. Oliver-Mercer Electric Coop. Easement executed by Ralph E. Smith and dated November 20, 1975 (90409).
  iii. North Dakota State Water Commission Pipeline Easement executed by Jule Silbernagel, et al. and dated February 21, 2011 (86785).
  iv. Roughrider Electric Coop, Inc. Easement executed by Faye Swenson and dated August 11, 2014 (90519).

[¶10] Attached are the deeds which I believe indicate my ownership in each of the properties listed above.

[¶11] Attached are the easements currently encumbering these properties based on the information I have.

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on the 23RD day of MAY, 2024 at BEULAH ND, United States.

Kurt Swenson

97803 8/18/2023 11:21 AM Total Pages: 3
BOOK: 45 PAGE: 270 FEES: $20.00 RB WARRANTY DEED
Mickie McNulty-Eide, OLIVER COUNTY RECORDER
By Rebecca Bathke, Deputy

SOLEM LAW OFFICE
PO BOX 249

BEULAH, ND 58523

RECORDER OLIVER SEAL COUNTY STATE OF NORTH DAKOTA

# WARRANTY DEED

THIS INDENTURE, made this 16th day of June, 2023, between **JOHNELL J. KUSLER and GEOFFREY E. TAYLOR**, wife and husband, whose post office address is 1884 Hillcrest Avenue, St. Paul, Minnesota 55116 AND **MILDA L. HEDBLOM, a/k/a MILDA K. HEDBLOM and EDWIN FOGELMAN, wife and husband**, whose post office address is 1801 Summit Avenue, St. Paul, Minnesota 55105, Grantors; and **KURT M. SWENSON and FAYE B. SWENSON Trustees of the Swenson Living Trust dated May 19, 2023**, whose post office address is 5774 21st Street SW, Beulah, North Dakota 58523, Grantees.

WITNESSETH, for and in consideration of the sum of One Hundred Eighty-Four Thousand Four Hundred and Eighty-Six Dollars ($184,486.00), Grantors do hereby GRANT to said Grantees all of the following real property lying and being in the County of Oliver, and State of North Dakota and described as follows, to-wit:

**Outlot "B" located in the East Half (E½) of the Northwest Quarter (NW¼) of Section Seven (7), Township One Hundred Forty-Two (142) North, Range Eighty-Seven (87) West of the 5th P.M., Oliver County, North Dakota LESS Lot One (1) of said Outlot "B".**

**The above legal description was obtained from a previously recorded instrument.**

**The Grantors except and reserve unto themselves all of the oil, gas, coal, and all other minerals presently owned by them and located in and under the above described real property, together with the right of ingress and egress at all times for the purpose of mining, drilling, exploring, operating and developing said lands for oil, gas, coal, and all other minerals containing fissionable materials, and all other minerals, and storing, handling, transporting and marketing the same therefrom with the right to remove from said land all of the Grantees' property and improvements.**

And the said Grantors, for themselves, their successors and assigns, do covenant with the

SOLEM LAW OFFICE
109 CENTRAL AVENUE S
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail:beulaw@westriv.com

Grantees, that they are well seized in fee of the land and premises aforesaid, and have good right to sell and convey the same in manner and form aforesaid; that the same are free from all encumbrances, except easements, reservations of record, and any outstanding protective covenants; and the above granted lands and premises in the quiet and peaceable possession of said Grantees, against all persons lawfully claiming or to claim the whole or any part thereof, the said Grantors will warrant and defend.

WITNESS, the hand of the Grantors:

**I certify that the full consideration paid for the property described in this Deed is $184,486.00.**

DATED: 8-4-23

SIGNED: _____

_____
**JOHNELL J. KUSLER**

_____
**GEOFFREY E. TAYLOR**

STATE OF NORTH DAKOTA )
)
COUNTY OF MERCER )

On this 16th day of June, 2023, before me, a Notary Public in and for said County and State, personally appeared **JOHNELL J. KUSLER and GEOFFREY E. TAYLOR,** known to me to be the persons that are described in and that executed the within instrument, and acknowledged to me that they executed the same.

SCOTT T. SOLEM
NOTARY PUBLIC
State of North Dakota
My Commission Expires: October 28, 2026

_____
NOTARY PUBLIC
MERCER COUNTY, NORTH DAKOTA

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

MILDA L. HEDBLOM

EDWIN FOGELMAN

STATE OF NORTH DAKOTA )
)
COUNTY OF MERCER )

On this 16th day of June, 2023, before me, a Notary Public in and for said County and State, personally appeared **MILDA L. HEDBLOM and EDWIN FOGELMAN,** known to me to be the persons that are described in and that executed the within instrument, and acknowledged to me that they executed the same.

SCOTT T. SOLEM
NOTARY PUBLIC
State of North Dakota
My Commission Expires: October 28, 2026

NOTARY PUBLIC
MERCER COUNTY, NORTH DAKOTA

Auditor's Office
Oliver County, N.D.
transfer entered this 18th day of
August 2023
County Auditor
By Deputy

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

96824 4/11/2022 1:35 PM Total Pages: 3
BOOK: 44 PAGE: 366 FEES: $20.00 RB WARRANTY DEED
Mickie McNulty-Eide, OLIVER COUNTY RECORDER
By Rebecca Bethke, Deputy

SOLEM LAW OFFICE
PO BOX 249

BEULAH, ND 58523

RECORDER OLIVER SEAL COUNTY STATE OF NORTH DAKOTA

# WARRANTY DEED

THIS INDENTURE, Made this 11th day of March, 2022, between **JOHNELL J. KUSLER, as Personal Representative of the Estate of James O. Kusler**, whose post office address is 1884 Hillcrest Avenue, St. Paul, Minnesota 55116, **JOHNELL J. KUSLER and GEOFFREY E. TAYLOR, wife and husband**, whose post office address is 1884 Hillcrest Avenue, St. Paul, Minnesota 55116, AND **MILDA L. HEDBLOM, a/k/a MILDA K. HEDBLOM and EDWIN FOGELMAN, wife and husband**, whose post office address is 1801 Summit Avenue, St. Paul, Minnesota 55105, Grantors; and **KURT M. SWENSON and FAYE B. SWENSON**, husband and wife, whose post office address is 5774 21st Street SW, Beulah, North Dakota 58523, Grantees.

WITNESSETH, For and in consideration of the sum of Two Hundred Twenty-Three Thousand Eight Hundred Eighty Dollars ($223,880.00), Grantors do hereby GRANT to said Grantees, as joint tenants with right of survivorship and not as tenants in common, all of the following real property lying and being in the County of Oliver, and State of North Dakota and described as follows, to-wit:

**The Southwest Quarter (SW¼) of Section Nine (9), Township One Hundred Forty-Two (142) North, Range Eighty-Seven (87) West of the Fifth Principal Meridian, Oliver County, North Dakota.**

**The above legal descriptions were obtained from previously recorded instruments.**

SOLEM LAW OFFICE
109 CENTRAL AVENUE S
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

**The Grantors except and reserve unto themselves all of the oil, gas, coal, and all other minerals presently owned by them and located in and under the above described real property, together with the right of ingress and egress at all times for the purpose of mining, drilling, exploring, operating and developing said lands for oil, gas, coal, and all other minerals containing fissionable materials, and all other minerals, and storing, handling, transporting and marketing the same therefrom with the right to remove from said land all of the Grantee's property and improvements.**

And the said Grantors, for themselves, their successors and assigns, do covenant with the Grantees, that they are well seized in fee of the land and premises aforesaid, and have good right to sell and convey the same in manner and form aforesaid; that the same are free from all encumbrances, except easements, reservations of record, and any outstanding protective covenants; and the above granted lands and premises in the quiet and peaceable possession of said Grantees, against all persons lawfully claiming or to claim the whole or any part thereof, the said Grantors will warrant and defend.

WITNESS, The hand of the Grantors:

**I certify that the full consideration paid for the property described in this Deed is $223,880.00.**

DATED: 4-1-22

SIGNED: _____

Johnell J. Kusler PR

**JOHNELL J. KUSLER, Personal Representative of the Estate of JAMES O. KUSLER**

STATE OF NORTH DAKOTA )
)
COUNTY OF MERCER )

On this 11th day of March, 2022, before me, a Notary Public in and for said County and State, personally appeared **JOHNELL J. KUSLER,** as Personal Representative of the Estate of James O. Kusler, known to me to be the person that is described in and that executed the within instrument, and acknowledged to me that she executed the same.

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

SCOTT T. SOLEM, NOTARY PUBLIC
MERCER COUNTY, NORTH DAKOTA

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

JOHNELL J. KUSLER

GEOFFREY E. TAYLOR

STATE OF NORTH DAKOTA )
)
COUNTY OF MERCER )

On this 11th day of March, 2022, before me, a Notary Public in and for said County and State, personally appeared **JOHNELL J. KUSLER and GEOFFREY E. TAYLOR,** known to me to be the persons that are described in and that executed the within instrument, and acknowledged to me that they executed the same.

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

SCOTT T. SOLEM, NOTARY PUBLIC
MERCER COUNTY, NORTH DAKOTA

MILDA L. HEDBLOM

EDWIN FOGELMAN

STATE OF NORTH DAKOTA )
)
COUNTY OF MERCER )

On this 11th day of March, 2022, before me, a Notary Public in and for said County and State, personally appeared **MILDA L. HEDBLOM and EDWIN FOGELMAN,** known to me to be the persons that are described in and that executed the within instrument, and acknowledged to me that they executed the same.

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

SCOTT T. SOLEM, NOTARY PUBLIC
MERCER COUNTY, NORTH DAKOTA

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com



Auditor's Office
Oliver County, N.D.
Transfer entered this 11th day of
April 2022
County Auditor
Deputy

97715 6/26/2023 11:33 AM Total Pages: 3
BOOK: 45 PAGE: 206 FEES: $20.00 RB WARRANTY DEED
Mickie McNulty-Eide, OLIVER COUNTY RECORDER
By Rebecca Bethke, Deputy

CREATIVE PLANNING LEGAL, P.A.
5454 W 110TH STREET

OVERLAND PARK, KS 66211

RECORDER OLIVER SEAL COUNTY STATE OF NORTH DAKOTA

# WARRANTY DEED

THIS INDENTURE, made this 19th day of MAY, 2023, between Kurt M. Swenson a/k/a Kurt Swenson and FayE B. Swenson a/k/a FayE Swenson, a married couple, GRANTORS; and Kurt M. Swenson and FayE B. Swenson, Trustees of the Swenson Living Trust, dated MAY 19, 2023, and any amendments thereto, 5774 21st Street SW, Beulah, North Dakota 58523, GRANTEES.

WITNESSETH, that the Grantors, for and in consideration of the sum of Ten Dollars ($10.00) and other valuable considerations paid by the Grantees, the receipt of which is hereby acknowledged, do by these presents, GRANT, CONVEY AND WARRANT unto the Grantees all of their right, title, and interest in the following described real property, situated in the County of Oliver, State of North Dakota, described as follows, to-wit:

**A tract of land located within the North Half (N½) of Section Twenty-One (21), Township One Hundred Forty-Two (142) North, Range Eighty-Seven (87) West of the Fifth Principal Meridian, Oliver County, North Dakota more particularly described as follows:**

**Commencing at the NE corner of the NW¼ of said Section 21; thence N89°48'55"W (GPS Bearing) along the north line of the NW¼ of Section 21, 27.84 feet to the point of beginning; thence S7°06'25"E, 1971.43 feet to a point within the NE¼ of said Section 21; thence S84°19'05"W, 828.68 feet to a point within the NW¼ of said Section 21; thence N5°36'08"W, 2050.64 feet to a point on the north line of the NW¼ of said Section 21; thence S89°48'55"E, along the north line of the NW¼ of said Section 21, 780.89 feet to the point of beginning.**

**Said tract of land contains 37.03 acres, of which 4.26 acres are in the NE¼ and 32.77 acres are in the NW¼ of said Section 21.**

**- AND -**

**The Southwest Quarter (SW¼) of Section Nine (9), Township One Hundred Forty-Two (142) North, Range Eighty-Seven (87) West of the Fifth Principal Meridian, Oliver County, North Dakota.**

Grantors covenant that they are well seized in fee of the premises, which they have the right to sell and convey, and which are free from encumbrances except those of record. Further, the Grantors covenant that they will warrant and defend the premises in the quiet and peaceable possession of the Grantees.

IN WITNESS WHEREOF, the Grantors have set their hands the day and year first above written.

Kurt M. Swenson a/k/a Kurt Swenson, Grantor

FayE B. Swenson a/k/a FayE Swenson, Grantor

STATE OF NORTH DAKOTA )
) ss.
COUNTY OF Mercer )

On this 19 day of May, 2023 before me personally appeared Kurt M. Swenson a/k/a Kurt Swenson and FayE B. Swenson a/k/a FayE Swenson, a married couple, known to me to be the same persons described in and who executed the within and foregoing instrument and acknowledged to me that they executed the same as their free act and deed.

AMELIA VELEZ
Notary Public
STATE OF NORTH DAKOTA
My Commission Expires
May 9, 2027

Notary Public
My Commission Expires: May 9th, 2027

Auditor's Office
Oliver County, N.D.
transfer entered this 26 day of
June 2023
County Auditor
By Deputy

## STATEMENT OF FULL CONSIDERATION

We certify that the requirement for a report or statement of the full consideration paid does not apply because this deed is for one of the transactions exempted by N.D.C.C. § 11-18-02.2(6)(c).

Dated this 19th day of May, 2023.

Kurt M. Swenson, Grantee
Trustee

Dated this 19th day of May, 2023.

FayE B. Swenson a/k/a FayE Swenson, Grantee
Trustee

*This deed was drafted by Micheal A. Mulloy of Mulloy Law, PLLC, 101 Slate Street, Suite 7, Bismarck, North Dakota 58503 (ID #07239). Legal descriptions obtained from previously recorded documents on file with the Oliver County Recorder's Office as Document Numbers 85508 and 96824.*

222209

Delinquent Taxes and Special Assessments, or Installments of Special Assessments Paid and Transfer Entered this 01 day of June, 2021

Mercer County Auditor

By: Deputy Auditor/Clerk

**STATE OF NORTH DAKOTA**
**COUNTY OF MERCER**

**OFFICE OF COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 6/1/2021 at 11:47 AM, and was duly recorded as Book 174 DEED on Page 553 Fee: $20.00

County Recorder Brenda L. Cook

By Deputy Shawn L. Senger

Return To: KELSCH RUFF KRANDA NAGLE & LUDWIG, 103 COLLINS MANDAN, ND 58554-3104

# WARRANTY DEED

**THIS INDENTURE,** Made this 3rd day of May, 2021, between Rory Schuh, married person, Rick Schuh, married person, Rich Schuh, married person, and Sandy Seim, married person, Grantors, and Brush Creek Land Company, LLC, Grantee, whose post office address is 5774 -21st Street SW, Beulah, ND 58523.

**WITNESSETH,** For and in consideration of the sum of $85,000 Dollars and other good and valuable consideration, Grantors do hereby GRANT to the Grantee, all of the following real property lying and being in the County of Mercer, and State of North Dakota, and described as follows, to-wit:

**Township 142, Range 88 West, Mercer County, North Dakota**

Section 14: W½ NE¼

Reserving unto Seller 100% of all oil, gas, coal, chemical substances, metallic and uranium ores and other minerals now owned by Sellers of record.

And the Grantors for themselves, their heirs, executors and administrators, do covenant with the Grantee that they are well seized in fee of the land and premises aforesaid and have good right to sell and convey the same in manner and form aforesaid; that the same are free from all incumbrances whatsoever, except future assessments for special improvements and real estate taxes and installments of special assessments, if any, for the year 2021 and subsequent, and the above granted lands and premises in the quiet and peaceable possession of the Grantee, against all persons lawfully claiming or to claim the whole or any part thereof, the Grantors will warrant and defend.

**WITNESS, The hands of the Grantors:**

In presence of

Rory Schuh

RORY SCHUH, Grantor

STATE OF NORTH DAKOTA )
) ss.
COUNTY OF MORTON )

On this 22nd day of April, 2021, before me personally appeared Rory Schuh, the person who is described in, and who executed the within and foregoing instrument, and severally acknowledged that he executed the same.

EMILIE J SAYLER
Notary Public
State of North Dakota
My Commission Expires Nov. 3, 2024

Notary Public

RICK SCHUH, Grantor

STATE OF NORTH DAKOTA )
) ss.
COUNTY OF Morton )

On this 30th day of April, 2021, before me personally appeared Rick Schuh, the person who is described in, and who executed the within and foregoing instrument, and severally acknowledged that he executed the same.

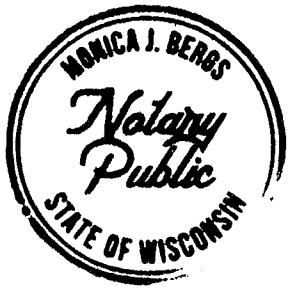
Notary Public

EMILIE J SAYLER
Notary Public
State of North Dakota
My Commission Expires Nov. 3, 2024

RICH SCHUH, Grantor

STATE OF NORTH DAKOTA )
State of Wisconsin ) ss.
COUNTY OF La Crosse )

On this 20th day of April, 2021, before me personally appeared Rich Schuh, the person who is described in, and who executed the within and foregoing instrument, and severally acknowledged that he executed the same.




Notary Public

My commission expires 5/18/2024

SANDY SEIM, Grantor

STATE OF MINNESOTA )
) ss.
COUNTY OF Anoka )

On this 21st day of April, 2021, before me personally appeared Sandy Seim, the person who is described in, and who executed the within and foregoing instrument, and severally acknowledged that he executed the same.

Notary Public

I certify that the full consideration paid for the above-described property is $85,000.00.

Grantee or Agent _____ Date: 6-1-2021

The legal description was obtained from a previously recorded instrument.

This Deed was prepared by Arlen M. Ruff, Kelsch, Ruff, Kranda, Nagle & Ludwig, 103 Collins Avenue, PO Box 1266, Mandan ND 58554-7266.

Delinquent Taxes, Special Assessments, or Installments of Special Assessments Paid and Transfer Entered this 15 day of June, 2023.

Carmen Reed
Mercer County Auditor
By:
Deputy Auditor/Clerk

226288

STATE OF NORTH DAKOTA
COUNTY OF MERCER

OFFICE OF
COUNTY RECORDER

I hereby certify that the within instrument was filed in this office for record this 6/15/2023 at 10:45 AM, and was duly recorded as Book 179 DEED on Page 681 Fee: $20.00

County Recorder Shannan Senger
By Deputy Amber Gabert
Return To: SOLEM LAW OFFICE - BEULAH, PO BOX 249
BEULAH, ND 58523
Chg.

MORTGAGEE
MORTGAGOR
INDEXED ✓

COUNTY RECORDER SEAL MERCER COUNTY, N. DAK

# WARRANTY DEED

THIS INDENTURE, made this 12th day of June, 2023, between **BRUSH CREEK LAND COMPANY, LLC**, whose post office address is 5774 21st Street SW, Beulah, North Dakota 58523, Grantor; and **KURT M. SWENSON and FAYE B. SWENSON, Trustees, or their successors in interest, of the Swenson Living Trust dated May 19, 2023, and any amendments thereto,** whose post office address is 5774 21st Street SW, Beulah, North Dakota 58523, Grantees.

WITNESSETH, for and in consideration of the sum of One Hundred Five Thousand Ninety-Seven and 30/100 Dollars ($105,097.30), Grantors do hereby GRANT to said Grantees, as joint tenants with right of survivorship and not as tenants in common, all of the following real property lying and being in the County of Mercer, and State of North Dakota and described as follows, to-wit:

**Township 142, Range 88 West, Mercer County, North Dakota**

**Section 14: W½NE¼**

And the said Grantor, for itself, its successors and assigns, does covenant with the Grantees, that it is well seized in fee of the land and premises aforesaid, and has good right to sell and convey the same in manner and form aforesaid; that the same are free from all encumbrances, except easements, reservations of record, and any outstanding protective covenants; and the above granted lands and premises in the quiet and peaceable possession of said Grantees, against all persons lawfully claiming or to claim the whole or any part thereof, the said Grantor will warrant and defend.

SOLEM LAW OFFICE
109 CENTRAL AVENUE S
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail:beulaw@westriv.com

WITNESS, the hand of the Grantor:

**BRUSH CREEK LAND COMPANY, LLC**
**By: Eric Klindworth**
**Its: President**

STATE OF NORTH DAKOTA )
)
COUNTY OF MERCER )

On this 12th day of June, 2023, before me, a Notary Public in and for said County and State, personally appeared **ERIC KLINDWORTH,** known to me to be the person that is described in and that executed the within instrument, and acknowledged to me that he executed the same.

SUSAN NEUBERGER
NOTARY PUBLIC
State of North Dakota
My Commission Expires: November 14, 2026

NOTARY PUBLIC
MERCER COUNTY, NORTH DAKOTA

**I certify that the full consideration paid for the property described in this Deed is $105,097.30.**

DATED: 6-12-23

SIGNED: _____

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

98147 3/11/2024 11:39 AM Total Pages: 2
BOOK: 45 PAGE: 476 FEES: $20.00 RB WARRANTY DEED
Mickie McNulty-Eide, OLIVER COUNTY RECORDER
By Rebecca Bothke, Deputy

CREATIVE PLANNING LEGAL, P.A.
5454 W 110TH STREET

Overland Park, KS 66211

# WARRANTY DEED

THIS INDENTURE, made this 12th day of FEBRUARY, 2024, between Kurt M. Swenson and FayE Swenson, a married couple, GRANTORS; and Kurt M. Swenson and FayE B. Swenson, Trustees of the Swenson Living Trust, dated May 19, 2023, and any amendments thereto, 5774 21st Street SW, Beulah, North Dakota 58523, GRANTEES.

WITNESSETH, that the Grantors, for and in consideration of the sum of Ten Dollars ($10.00) and other valuable considerations paid by the Grantees, the receipt of which is hereby acknowledged, do by these presents, GRANT, CONVEY AND WARRANT unto the Grantees all of their right, title, and interest in the following described real property, situated in the County of Oliver, State of North Dakota, described as follows, to-wit:

**An undivided one-half (½) interest in the Southeast Quarter (SE¼) of Section Fifteen (15), Township One Hundred Forty-Two (142), Range Eighty-Seven (87), Oliver County, North Dakota.**

Grantors covenant that they are well seized in fee of the premises, which they have the right to sell and convey, and which are free from encumbrances except those of record. Further, the Grantors covenant that they will warrant and defend the premises in the quiet and peaceable possession of the Grantees.

IN WITNESS WHEREOF, the Grantors have set their hands the day and year first above written.

Kurt M. Swenson, Grantor

FayE Swenson, Grantor

STATE OF NORTH DAKOTA )
) ss.
COUNTY OF MERCER )

AMELIA VELEZ
Notary Public
STATE OF NORTH DAKOTA
My Commission Expires
May 9, 2027

On this 12 day of FEBRUARY, 2024 before me personally appeared Kurt M. Swenson and FayE Swenson, a married couple, known to me to be the same persons described in and who executed the within and foregoing instrument and acknowledged to me that they executed the same as their free act and deed.

Amelia Velez
Notary Public
My Commission Expires: May 9 2027

**STATEMENT OF FULL CONSIDERATION**

We certify that the requirement for a report or statement of the full consideration paid does not apply because this deed is for one of the transactions exempted by N.D.C.C. § 11-18-02.2(6)(c).

Dated this 12th day of FEBRUARY, 2024.

Kurt M. Swenson, Grantee
Trustee

Dated this 12th day of February, 2024.

FayE B. Swenson, Grantee
Trustee

*This deed was drafted by Micheal A. Mulloy of Mulloy Law, PLLC, 101 Slate Street, Suite 7, Bismarck, North Dakota 58503 (ID #07239). Legal description obtained from a previously recorded document on file with the Oliver County Recorder's Office as Document Number 75099.*

Auditor's Office
Oliver County, N.D.
transfer entered this 11 day of
March 2024
County Auditor
By_____Deputy

# WARRANTY DEED

THIS INDENTURE, Made this 17th day of April, 2009, between **DONNA MAE SMITH,** a single person, whose post office address is 5744 21ST Street SW, Beulah, North Dakota 58523; **TAMMIE SOMERS, f/k/a TAMMIE SMITH, and RICHARD SOMERS**, wife and husband, whose post office address is 7300 Autumn Chace Drive, Bloomington, Minnesota 55438; **JULE SILBERNAGEL, f/k/a JULE SMITH, and DEAN SILBERNAGEL,** wife and husband, whose post office address is 5419 West Wagoner Road, Glendale, Arizona 85308; and **FAYE SWENSON, f/k/a FAYE SMITH, and KURT SWENSON**, wife and husband, whose post office address is 5774 21st Street SW, Beulah, North Dakota 58523; Grantors, and **KURT SWENSON and FAYE SWENSON,** husband and wife, whose post office address is 5774 21st Street SW, Beulah, North Dakota 58523, Grantees.

WITNESSETH, For and in consideration of the sum of One Dollar ($1.00), Grantors do hereby GRANT to the Grantees, as joint tenants with right of survivorship, and not as tenants in common, all of the following real property lying and being in the County of Oliver and State of North Dakota, and described as follows, to-wit:

**A tract of land located within the North Half (N1/2) of Section Twenty-One (21), Township One Hundred Forty-Two (142) North, Range Eighty-Seven (87) West of the Fifth Principal Meridian, Oliver County, North Dakota more particularly described as follows:**

**Commencing at the NE corner of the NW1/4 of said Section 21; thence N89°48'55"W (GPS Bearing) along the north line of the NW1/4 of Section 21, 27.84 feet to the point of beginning; thence S7°06'25"E, 1971.43 feet to a point within the NE1/4 of said Section 21; thence S84°19'05"W, 828.68 feet to a point within the NW1/4 of said Section 21; thence N5°36'08"W, 2050.64 feet to a point on the north line of the NW1/4 of said Section 21; thence S89°48'55"E, along the north line of the NW1/4 of said Section 21, 780.89 feet to the point of beginning.**

**Said tract of land contains 37.03 acres, of which 4.26 acres are in the NE1/4 and 32.77 acres are in the NW1/4 of said Section 21.**

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

**This description taken from a plat drawing of Registered Land Surveyor, James H. Fletchall, LS. -2352.**

And the said Grantors, for themselves, their heirs, executors and administrators, do covenant with the Grantees that they are well seized in fee of the land and premises aforesaid and have good right to sell and convey the same in manner and form aforesaid; that the same are free from all encumbrances, except special assessments; and the above granted lands and premises in the quiet and peaceable possession of said Grantees, against all persons lawfully claiming or to claim the whole or any part thereof, the said Grantors will warrant and defend.

WITNESS, The hand of the Grantors:

I (We), the Grantee in this Deed, do hereby certify that the amount shown as consideration above is the full consideration paid for the property conveyed.

10/23/09

Agent

Donna Mae Smith

**DONNA MAE SMITH**

STATE OF NORTH DAKOTA )
)
COUNTY OF MERCER )

On this 17 day of April, 2009, before me, personally appeared **DONNA MAE SMITH,** known to me to be the person who is described in, and who executed the within and foregoing instrument, and severally acknowledged that she executed the same.

Susan T Neuberger

NOTARY PUBLIC
MERCER COUNTY, NORTH DAKOTA

SUSAN NEUBERGER
Notary Public
State of North Dakota
My commission expires Oct 28, 2012

Auditor's Office
Oliver County, N.D.
transfer entered this 30th day of
October 2009
Barbara Flemming
County Auditor
By_____Deputy

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

Tammie Somers
**TAMMIE SOMERS, f/k/a TAMMIE SMITH**

**RICHARD SOMERS**

STATE OF MINNESOTA )
)
COUNTY OF Hennepin )

On this 20th day of April, 2009, before me, personally appeared **TAMMIE SOMERS, f/k/a TAMMIE SMITH and RICHARD SOMERS,** known to me to be the persons who are described in, and who executed the within and foregoing instrument, and severally acknowledged that they executed the same.

Theresa Marie Mahlum
NOTARY PUBLIC - MINNESOTA
MY COMMISSION
EXPIRES JAN. 31, 2011

Theresa Mahl
NOTARY PUBLIC
Hennepin COUNTY, MINNESOTA

My commission expires: Jan 31, 2011

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

**JULE SILBERNAGEL, f/k/a JULE SMITH**

**DEAN SILBERNAGEL**

STATE OF ~~ARIZONA~~ NORTH DAKOTA )
)
COUNTY OF MERCER )

On this 11 day of June, 2009, before me, personally appeared **JULE SILBERNAGEL, f/k/a JULE SMITH and DEAN SILBERNAGEL,** known to me to be the persons who are described in, and who executed the within and foregoing instrument, and severally acknowledged that they executed the same.

LYNNETTE HARRISON
Notary Public
State of North Dakota
My commission expires Oct 28, 2012

LYNNETTE HARRISON NOTARY PUBLIC
MERCER COUNTY, ~~ARIZONA~~ NORTH DAKOTA

My commission expires: _____

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

FAYE SWENSON, f/k/a FAYE SMITH

KURT SWENSON

STATE OF NORTH DAKOTA )
)
COUNTY OF MERCER )

On this 23rd day of October, 2009, before me, personally appeared **FAYE SWENSON f/k/a FAYE SMITH and KURT SWENSON,** known to me to be the persons who are described in, and who executed the within and foregoing instrument, and severally acknowledged that they executed the same.

LYNNETTE HARRISON
Notary Public
State of North Dakota
My commission expires Oct 28, 2012

NOTARY PUBLIC
MERCER COUNTY, NORTH DAKOTA

OFFICE OF COUNTY RECORDER
STATE OF NORTH DAKOTA
COUNTY OF OLIVER
Filed for record this 30th day
of October A.D. 2009
at 11:30 o'clock A M.,
and recorded as document No. 85508
in book 38 of Deeds page 393-397

County Recorder Deputy

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

3

# QUIT CLAIM DEED

THIS INDENTURE, Made this 23rd day of March, 2012, by and between **TAMMIE SOMERS** f/k/a TAMMIE SMITH **and RICHARD SOMERS,** wife and husband, whose post office address is 7300 Autumn Chace Drive, Bloomington, Minnesota 55438, Grantors, and **JULE SILBERNAGEL,** whose post office address is 5419 West Wagoner Road, Glendale, Arizona 85308 and **FAYE SWENSON,** whose post office address is 5774 21st Street Sw, Beulah, North Dakota 58523, Grantees.

For and in consideration of the sum of Ten Dollars ($10.00) And Other Good and Valuable Consideration, the Grantors do hereby Quit Claim to the said Grantees, as tenants in common, all of the following real property lying and being in the County of Oliver, State of North Dakota, described as follows, to-wit:

**All of my interest in Section Twenty-One (21) and the Northwest Quarter (NW¼) of Section Twenty-Two (22), Township One Hundred Forty-Two (142) North, Range Eighty-Seven (87) West of the Fifth Principal Meridian, Oliver County, North Dakota.**

WITNESS, the hand of the Grantors:

Tammie Somers
**TAMMIE SOMERS**

**RICHARD SOMERS**

**This Deed is exempt from the filing requirements of Section 11-18-02.2, NDCC, as a Quit Claim Deed, under exception 7(i).**

**Dated:** March 27, 2012

**Signed:** agent

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

STATE OF NORTH DAKOTA )
)
COUNTY OF MERCER )

On this 23rd day of March, 2012, before me personally appeared **TAMMIE SOMERS**, known to me to be the person that is described in, and that executed the within and foregoing instrument, and acknowledged to me that she executed the same.

SUSAN NEUBERGER
Notary Public
State of North Dakota
My commission expires Oct 28, 2012

Susan K Neuberger
SUSAN NEUBERGER
NOTARY PUBLIC

STATE OF MINNESOTA )
)
COUNTY OF Hennepin )

JULIE MARIE SATTER
NOTARY PUBLIC—MINNESOTA
My Commission Expires JAN. 31, 2013

On this 27th day of March, 2012, before me personally appeared **RICHARD SOMERS**, known to me to be the person that is described in, and that executed the within and foregoing instrument, and acknowledged to me that he executed the same.

JULIE MARIE SATTER
NOTARY PUBLIC—MINNESOTA
My Commission Expires JAN. 31, 2013

Julie Marie Satter
NOTARY PUBLIC

Auditor's Office
Oliver County, N.D.
transfer entered this 18th day of
April 2012
Judith M Hintz
County Auditor
By_____Deputy

SEAL
COUNTY RECORDER
STATE OF NORTH DAKOTA
OLIVER

**OFFICE OF COUNTY RECORDER**
**STATE OF NORTH DAKOTA**
**COUNTY OF OLIVER**
**Filed for record this** 18th **day**
**of** April **A.D.** 2012
**at** 4:33 **o'clock** P **M.,**
**and recorded as document No.** 82279
**in book** 39 **of** Deeds **page** 338-339
K Willems
**County Recorder** **Deputy**

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

97715 6/26/2023 11:33 AM Total Pages: 3
BOOK: 45 PAGE: 206 FEES: $20.00 RB WARRANTY DEED
Mickie McNulty-Eide, OLIVER COUNTY RECORDER
By Rebecca Bethke, Deputy

CREATIVE PLANNING LEGAL, P.A.
5454 W 110TH STREET

OVERLAND PARK, KS 66211

RECORDER OLIVER SEAL COUNTY STATE OF NORTH DAKOTA

# WARRANTY DEED

THIS INDENTURE, made this 19th day of MAY, 2023, between Kurt M. Swenson a/k/a Kurt Swenson and FayE B. Swenson a/k/a FayE Swenson, a married couple, GRANTORS; and Kurt M. Swenson and FayE B. Swenson, Trustees of the Swenson Living Trust, dated MAY 19, 2023, and any amendments thereto, 5774 21st Street SW, Beulah, North Dakota 58523, GRANTEES.

WITNESSETH, that the Grantors, for and in consideration of the sum of Ten Dollars ($10.00) and other valuable considerations paid by the Grantees, the receipt of which is hereby acknowledged, do by these presents, GRANT, CONVEY AND WARRANT unto the Grantees all of their right, title, and interest in the following described real property, situated in the County of Oliver, State of North Dakota, described as follows, to-wit:

**A tract of land located within the North Half (N½) of Section Twenty-One (21), Township One Hundred Forty-Two (142) North, Range Eighty-Seven (87) West of the Fifth Principal Meridian, Oliver County, North Dakota more particularly described as follows:**

**Commencing at the NE corner of the NW¼ of said Section 21; thence N89°48'55"W (GPS Bearing) along the north line of the NW¼ of Section 21, 27.84 feet to the point of beginning; thence S7°06'25"E, 1971.43 feet to a point within the NE¼ of said Section 21; thence S84°19'05"W, 828.68 feet to a point within the NW¼ of said Section 21; thence N5°36'08"W, 2050.64 feet to a point on the north line of the NW¼ of said Section 21; thence S89°48'55"E, along the north line of the NW¼ of said Section 21, 780.89 feet to the point of beginning.**

**Said tract of land contains 37.03 acres, of which 4.26 acres are in the NE¼ and 32.77 acres are in the NW¼ of said Section 21.**

**- AND -**

**The Southwest Quarter (SW¼) of Section Nine (9), Township One Hundred Forty-Two (142) North, Range Eighty-Seven (87) West of the Fifth Principal Meridian, Oliver County, North Dakota.**

Grantors covenant that they are well seized in fee of the premises, which they have the right to sell and convey, and which are free from encumbrances except those of record. Further, the Grantors covenant that they will warrant and defend the premises in the quiet and peaceable possession of the Grantees.

IN WITNESS WHEREOF, the Grantors have set their hands the day and year first above written.

Kurt M. Swenson a/k/a Kurt Swenson, Grantor

FayE B. Swenson a/k/a FayE Swenson, Grantor

STATE OF NORTH DAKOTA )
) ss.
COUNTY OF Mercer )

On this 19 day of May, 2023 before me personally appeared Kurt M. Swenson a/k/a Kurt Swenson and FayE B. Swenson a/k/a FayE Swenson, a married couple, known to me to be the same persons described in and who executed the within and foregoing instrument and acknowledged to me that they executed the same as their free act and deed.

AMELIA VELEZ
Notary Public
STATE OF NORTH DAKOTA
My Commission Expires
May 9, 2027

Notary Public
My Commission Expires: May 9th, 2027

Auditor's Office
Oliver County, N.D.
transfer entered this 26 day of
June 2023
County Auditor
By Deputy

## STATEMENT OF FULL CONSIDERATION

We certify that the requirement for a report or statement of the full consideration paid does not apply because this deed is for one of the transactions exempted by N.D.C.C. § 11-18-02.2(6)(c).

Dated this 19th day of May, 2023.

Kurt M. Swenson, Grantee
Trustee

Dated this 19th day of May, 2023.

FayE B. Swenson a/k/a FayE Swenson, Grantee
Trustee

*This deed was drafted by Micheal A. Mulloy of Mulloy Law, PLLC, 101 Slate Street, Suite 7, Bismarck, North Dakota 58503 (ID #07239). Legal descriptions obtained from previously recorded documents on file with the Oliver County Recorder's Office as Document Numbers 85508 and 96824.*

3

# QUIT CLAIM DEED

THIS INDENTURE, Made this 23rd day of March, 2012, by and between **TAMMIE SOMERS** f/k/a TAMMIE SMITH **and RICHARD SOMERS,** wife and husband, whose post office address is 7300 Autumn Chace Drive, Bloomington, Minnesota 55438, Grantors, and **JULE SILBERNAGEL,** whose post office address is 5419 West Wagoner Road, Glendale, Arizona 85308 and **FAYE SWENSON,** whose post office address is 5774 21st Street Sw, Beulah, North Dakota 58523, Grantees.

For and in consideration of the sum of Ten Dollars ($10.00) And Other Good and Valuable Consideration, the Grantors do hereby Quit Claim to the said Grantees, as tenants in common, all of the following real property lying and being in the County of Oliver, State of North Dakota, described as follows, to-wit:

**All of my interest in Section Twenty-One (21) and the Northwest Quarter (NW¼) of Section Twenty-Two (22), Township One Hundred Forty-Two (142) North, Range Eighty-Seven (87) West of the Fifth Principal Meridian, Oliver County, North Dakota.**

WITNESS, the hand of the Grantors:

Tammie Somers
**TAMMIE SOMERS**

**RICHARD SOMERS**

**This Deed is exempt from the filing requirements of Section 11-18-02.2, NDCC, as a Quit Claim Deed, under exception 7(i).**

**Dated:** March 27, 2012

**Signed:** agent

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

STATE OF NORTH DAKOTA )
)
COUNTY OF MERCER )

On this 23rd day of March, 2012, before me personally appeared **TAMMIE SOMERS**, known to me to be the person that is described in, and that executed the within and foregoing instrument, and acknowledged to me that she executed the same.

SUSAN NEUBERGER
Notary Public
State of North Dakota
My commission expires Oct 28, 2012

Susan K Neuberger
SUSAN NEUBERGER
NOTARY PUBLIC

STATE OF MINNESOTA )
)
COUNTY OF Hennepin )

JULIE MARIE SATTER
NOTARY PUBLIC—MINNESOTA
My Commission Expires JAN. 31, 2013

On this 27th day of March, 2012, before me personally appeared **RICHARD SOMERS**, known to me to be the person that is described in, and that executed the within and foregoing instrument, and acknowledged to me that he executed the same.

JULIE MARIE SATTER
NOTARY PUBLIC—MINNESOTA
My Commission Expires JAN. 31, 2013

Julie Marie Satter
NOTARY PUBLIC

Auditor's Office
Oliver County, N.D.
transfer entered this 18th day of
April 2012
Judith M Hintz
County Auditor
By_____Deputy

SEAL
COUNTY RECORDER
STATE OF NORTH DAKOTA
OLIVER

**OFFICE OF COUNTY RECORDER**
**STATE OF NORTH DAKOTA**
**COUNTY OF OLIVER**
**Filed for record this** 18th **day**
**of** April **A.D.** 2012
**at** 4:33 **o'clock** P **M.,**
**and recorded as document No.** 82279
**in book** 39 **of** Deeds **page** 338-339
K Willems
**County Recorder** **Deputy**

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

Delinquent Taxes, Special Assessments, or Installments of Special Assessments Paid and Transfer Entered this 27 day of March, 2023.

Samantha Mellberg
Mercer County Auditor
By: Laycee Schneider
Deputy Auditor/Clerk

225879

STATE OF NORTH DAKOTA
COUNTY OF MERCER

OFFICE OF COUNTY RECORDER

I hereby certify that the within instrument was filed in this office for record this 3/27/2023 at 10:40 AM, and was duly recorded as Book 179 DEED on Page 233 Fee: $20.00

County Recorder Shannan Senger
By Deputy Amber Gabert
Return To: SOLEM LAW OFFICE - BEULAH, PO BOX 249
Chg. BEULAH, ND 58523

MORTGAGEE
MORTGAGOR
INDEXED ✓

COUNTY RECORDER SEAL MERCER COUNTY, N. DAK

# WARRANTY DEED

THIS INDENTURE, made this 15th day of March, 2023, between **JOHNELL J. KUSLER, as Personal Representative of the Estate of James O. Kusler**, whose post office address is 1884 Hillcrest Avenue, St. Paul, Minnesota 55116, **JOHNELL J. KUSLER and GEOFFREY E. TAYLOR, wife and husband**, whose post office address is 1884 Hillcrest Avenue, St. Paul, Minnesota 55116, AND **MILDA L. HEDBLOM, a/k/a MILDA K. HEDBLOM and EDWIN FOGELMAN, wife and husband**, whose post office address is 1801 Summit Avenue, St. Paul, Minnesota 55105, Grantors; and **KURT M. SWENSON and FAYE B. SWENSON**, husband and wife, whose post office address is 5774 21st Street SW, Beulah, North Dakota 58523, Grantees.

WITNESSETH, for and in consideration of the sum of Two Hundred Forty-Four Thousand Six Hundred Two Dollars ($244,602.00), Grantors do hereby GRANT to said Grantees, as joint tenants with right of survivorship and not as tenants in common, all of the following real property lying and being in the County of Mercer, and State of North Dakota and described as follows, to-wit:

**Southeast Quarter (SE1/4) of Section Twenty-Seven (27), Township One Hundred Forty-Three (143) North, Range Eighty-Eight (88) West of the Fifth Principal Meridian, Mercer County, North Dakota.**

**The above legal description was obtained from a previously recorded instrument.**

**The Grantors except and reserve unto themselves all of the oil, gas, coal, and all other minerals presently owned by them and located in and under the above described real property, together with the right of ingress and egress at all**

SOLEM LAW OFFICE
109 CENTRAL AVENUE S
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail:beulaw@westriv.com

**times for the purpose of mining, drilling, exploring, operating and developing said lands for oil, gas, coal, and all other minerals containing fissionable materials, and all other minerals, and storing, handling, transporting and marketing the same therefrom with the right to remove from said land all of the Grantees' property and improvements.**

And the said Grantors, for themselves, their successors and assigns, do covenant with the Grantees, that they are well seized in fee of the land and premises aforesaid, and have good right to sell and convey the same in manner and form aforesaid; that the same are free from all encumbrances, except easements, reservations of record, and any outstanding protective covenants; and the above granted lands and premises in the quiet and peaceable possession of said Grantees, against all persons lawfully claiming or to claim the whole or any part thereof, the said Grantors will warrant and defend.

WITNESS, the hand of the Grantors:

**I certify that the full consideration paid for the property described in this Deed is $244,602.00.**

DATED: March 15, 2023

SIGNED: _____

Johnell J Kusler PR

**JOHNELL J. KUSLER, Personal Representative of the Estate of JAMES O. KUSLER**

STATE OF North Dakota )
)
COUNTY OF Mercer )

On this 15th day of March, 2023, before me, a Notary Public in and for said County and State, personally appeared **JOHNELL J. KUSLER,** as Personal Representative of the Estate of James O. Kusler, known to me to be the person that is described in and that executed the within instrument, and acknowledged to me that she executed the same.

SCOTT SOLEM
NOTARY PUBLIC
State of North Dakota
My Commission Expires October 28, 2026

SCOTT SOLEM
NOTARY PUBLIC
State of North Dakota
My Commission Expires October 28, 2026

_____
NOTARY PUBLIC
Mercer COUNTY, North Dakota

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

JOHNELL J. KUSLER

GEOFFREY E. TAYLOR

STATE OF North Dakota )
)
COUNTY OF Mercer )

On this 15th day of March, 2023, before me, a Notary Public in and for said County and State, personally appeared **JOHNELL J. KUSLER and GEOFFREY E. TAYLOR,** known to me to be the persons that are described in and that executed the within instrument, and acknowledged to me that they executed the same.

SCOTT T. SOLEM
NOTARY PUBLIC
State of North Dakota
My Commission Expires: October 28, 2028

NOTARY PUBLIC
Mercer COUNTY, North Dakota

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

MILDA L. HEDBLOM

EDWIN FOGELMAN

STATE OF North Dakota )
)
COUNTY OF Mercer )

On this 15th day of March, 2023, before me, a Notary Public in and for said County and State, personally appeared **MILDA L. HEDBLOM and EDWIN FOGELMAN,** known to me to be the persons that are described in and that executed the within instrument, and acknowledged to me that they executed the same.

SCOTT T. SOLEM
NOTARY PUBLIC
State of North Dakota
My Commission Expires: October 28, 2026

NOTARY PUBLIC
Mercer COUNTY, North Dakota

SCOTT T. SOLEM
NOTARY PUBLIC
State of North Dakota
mission Expires: October 28, 2026

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

Delinquent Taxes and Special Assessments, or Installments of Special Assessments Paid and Transfer Entered this 13 day of June, 2023

Carmen Reed
Mercer County Auditor
By: Amy Bosch
Deputy Auditor/Clerk

**226273**

**STATE OF NORTH DAKOTA**
**COUNTY OF MERCER**

**OFFICE OF COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 6/13/2023 at 2:52 PM, and was duly recorded as Book 179 DEED on Page 655 Fee: $20.00

County Recorder Shannon J. Senger

By Deputy Amber Gebert

Return To: CREATIVE PLANNING LEGAL, PA, 5454 W. 110TH STREET
OVERLAND PARK, KS 66211

COUNTY RECORDER SEAL MERCER COUNTY, N.DAK

# WARRANTY DEED

THIS INDENTURE, made this 19th day of MAY, 2023, between Kurt M. Swenson and FayE B. Swenson, a married couple, GRANTORS; and Kurt M. Swenson and FayE B. Swenson, Trustees of the Swenson Living Trust, dated MAY 19, 2023, and any amendments thereto, 5774 21st Street SW, Beulah, North Dakota 58523, GRANTEES.

WITNESSETH, that the Grantors, for and in consideration of the sum of Ten Dollars ($10.00) and other valuable considerations paid by the Grantees, the receipt of which is hereby acknowledged, do by these presents, GRANT, CONVEY AND WARRANT unto the Grantees all of their right, title, and interest in the following described real property, situated in the County of Mercer, State of North Dakota, described as follows, to-wit:

**Southeast Quarter (SE¼) of Section Twenty-Seven (27), Township One Hundred Forty-Three (143) North, Range Eighty-Eight (88) West of the Fifth Principal Meridian, Mercer County, North Dakota.**

Grantors covenant that they are well seized in fee of the premises, which they have the right to sell and convey, and which are free from encumbrances except those of record. Further, the Grantors covenant that they will warrant and defend the premises in the quiet and peaceable possession of the Grantees.

IN WITNESS WHEREOF, the Grantors have set their hands the day and year first above written.

Kurt M. Swenson, Grantor

FayE B. Swenson, Grantor

STATE OF NORTH DAKOTA )
) ss.
COUNTY OF Mercer )

On this 19 day of May, 2023 before me personally appeared Kurt M. Swenson and FayE B. Swenson, a married couple, known to me to be the same persons described in and who executed the within and foregoing instrument and acknowledged to me that they executed the same as their free act and deed.

AMELIA VELEZ
Notary Public
STATE OF NORTH DAKOTA
My Commission Expires
May 9, 2027

Amelia Velez
Notary Public
My Commission Expires: May 9th, 2027

**STATEMENT OF FULL CONSIDERATION**

We certify that the requirement for a report or statement of the full consideration paid does not apply because this deed is for one of the transactions exempted by N.D.C.C. § 11-18-02.2(6)(c).

Dated this 19th day of MAY, 2023.

Kurt M. Swenson, Grantee
Trustee

Dated this 19th day of MAY, 2023.

FayE B. Swenson a/k/a FayE Swenson, Grantee
Trustee

*This deed was drafted by Micheal A. Mulloy of Mulloy Law, PLLC, 101 Slate Street, Suite 7, Bismarck, North Dakota 58503 (ID #07239). Legal description obtained from a previously recorded document on file with the Mercer County Recorder's Office as Document Number 225879.*

90188 6/25/2015 6:13 PM PAGE: 1 OF 1
BOOK: LL PAGE: 18 FEES: $10.00 MM EASEMENT
Kim Wilkens, OLIVER COUNTY RECORDER
By K Wilkens

RECEIVED
FEB -5 2014
SOUTHWEST WATER AUTHORITY

SOUTHWEST WATER AUTHORITY
Southwest Pipeline Project Building
West Industrial Park
4665 2nd Street SW
Dickinson, ND 58601-7231
(701) 225-0241
Toll Free: 1-888-425-0241

SOUTHWEST WATER AUTHORITY
WEST INDUSTRIAL PARK
4665 2ND STREET SW
DICKINSON, ND 58601-7231

RECORDER OLIVER SEAL COUNTY STATE OF NORTH DAKOTA

Segment 7-9E WEST CENTER SERVICE AREA
Parcel 142-87-6

## RIGHT-OF-WAY EASEMENT

**ALL PERSONS TAKE NOTICE:**

In consideration of one dollar ($1.00) and other good and valuable consideration JAMES O KUSLER 5968 19TH STREET SW BEULAH, ND 58523 hereinafter referred to as Grantor, does hereby grant, bargain, sell, transfer and convey to the Southwest Water Authority, hereinafter referred to as the Grantee, its successor and assigns, a perpetual easement with right to erect, construct, install and lay, and thereafter use, operate, inspect, repair, maintain, replace, and remove water pipelines, connections, valves and all other appurtenant facilities used in connection with the construction, operation and maintenance of the Southwest Pipeline Project, over, above, across and through the land of the Grantor, situated in Oliver County, State of North Dakota, said land being described as follows: NW1/4 SECTION 7 TOWNSHIP 142 RANGE 87 (the tract that contains 1.33 acres, more or less), together with the right of ingress and egress over the adjacent lands of the Grantor, successors and assigns for the purposes of this easement.

1. The permanent easement will be thirty (30) feet in width, fifteen (15) feet on each side of the center line of the pipeline as constructed, with an additional ten (10) feet of temporary right-of-way for a total construction easement width of forty (40) feet, twenty (20) feet on each side of the center line.

2. The Grantee covenants to maintain the easement in good repair so that no unreasonable damage will result from its use to the adjacent land of the Grantor, successors and assigns. The Grantor will receive compensation for damages to growing crops caused by the construction or operation. The Grantor will report any damages within three (3) years of the construction of the project.

The grant and other provisions of this easement shall constitute a covenant running with the land for the benefit of the Grantee, its successors and assigns.

**IN WITNESS WHEREOF,** the Grantor has executed this instrument this 3 day of February, 2014.

James O. Kusler GRANTOR _____ GRANTOR

State of North Dakota

County of Dunn

On February 3, 2014, personally appeared before me James O. Kusler

_____ whom I know personally.
X whose identity I verified on the basis of North Dakota drivers license.
_____ whose identity I verified on the oath or affirmation of _____, a credible witness to be the signor of the above and he/she acknowledged that he/she signed it.

DANIEL T. AICHELE
Notary Public
State of North Dakota
My Commission Expires Mar. 2, 2018

Notary Public Daniel T. Aichele
_____, County Dunn
My Commission Expires: Mar. 2, 2018

90189 6/25/2015 6:16 PM PAGE: 1 OF 1
BOOK: LL PAGE: 19 FEES: $10.00 MM EASEMENT
Kim Wilkens, OLIVER COUNTY RECORDER
By K Wilkens

SOUTHWEST WATER AUTHORITY
WEST INDUSTRIAL PARK
4665 2ND STREET SW
DICKINSON, ND 58601-7231

RECORDER OLIVER SEAL COUNTY STATE OF NORTH DAKOTA

**SOUTHWEST WATER AUTHORITY**
Southwest Pipeline Project Building
West Industrial Park
4665 2nd Street SW
Dickinson, ND 58601-7231
(701) 225-0241
Toll Free: 1-888-425-0241

Segment **7-9E WEST CENTER SERVICE AREA**
Parcel **142-87-6**

## RIGHT-OF-WAY EASEMENT

**ALL PERSONS TAKE NOTICE:**

In consideration of one dollar ($1.00) and other good and valuable consideration JOHNELLE J. KUSLER (OAK) 1884 HILLCREST AVENUE ST. PAUL, MN 55116 hereinafter referred to as Grantor, does hereby grant, bargain, sell, transfer and convey to the Southwest Water Authority, hereinafter referred to as the Grantee, its successor and assigns, a perpetual easement with right to erect, construct, install and lay, and thereafter use, operate, inspect, repair, maintain, replace, and remove water pipelines, connections, valves and all other appurtenant facilities used in connection with the construction, operation and maintenance of the Southwest Pipeline Project, over, above, across and through the land of the Grantor, situated in Oliver County, State of North Dakota, said land being described as follows: NW1/4 SECTION 7 TOWNSHIP 142 RANGE 87 (the tract that contains 1.59 acres, more or less), together with the right of ingress and egress over the adjacent lands of the Grantor, successors and assigns for the purposes of this easement.

1. The permanent easement will be thirty (30) feet in width, fifteen (15) feet on each side of the center line of the pipeline as constructed, with an additional ten (10) feet of temporary right-of-way for a total construction easement width of forty (40) feet, twenty (20) feet on each side of the center line.

2. The Grantee covenants to maintain the easement in good repair so that no unreasonable damage will result from its use to the adjacent land of the Grantor, successors and assigns. The Grantor will receive compensation for damages to growing crops caused by the construction or operation. The Grantor will report any damages within three (3) years of the construction of the project.

The grant and other provisions of this easement shall constitute a covenant running with the land for the benefit of the Grantee, its successors and assigns.

**IN WITNESS WHEREOF,** the Grantor has executed this instrument this 23rd day of May, 20 15

Johnelle J Kusler GRANTOR _____ ~~GRANTOR~~ (NV)

State of MINNESOTA
County of RAMSEY

NICOLE LOUISE VERRILL
NOTARY PUBLIC - MINNESOTA
MY COMMISSION EXPIRES 01/31/19

On 23RD DAY OF MAY, 20 15, personally appeared before me JOHNELLE J. KUSLER (NV)

_____ whom I know personally.
X whose identity I verified on the basis of MINNESOTA DRIVERS LISCENSE.
_____ whose identity I verified on the oath or affirmation of _____, a credible witness to be the signor of the above and he/she acknowledged that he/she signed it.

Notary Public Nicole Louise Verrill
RAMSEY, County MINNESOTA
My Commission Expires: 01/31/2019

90188 6/25/2015 6:13 PM PAGE: 1 OF 1
BOOK: LL PAGE: 18 FEES: $10.00 MM EASEMENT
Kim Wilkens, OLIVER COUNTY RECORDER
By K Wilkens

RECEIVED
FEB -5 2014
SOUTHWEST WATER AUTHORITY

SOUTHWEST WATER AUTHORITY
Southwest Pipeline Project Building
West Industrial Park
4665 2nd Street SW
Dickinson, ND 58601-7231
(701) 225-0241
Toll Free: 1-888-425-0241

SOUTHWEST WATER AUTHORITY
WEST INDUSTRIAL PARK
4665 2ND STREET SW
DICKINSON, ND 58601-7231

RECORDER OLIVER SEAL COUNTY STATE OF NORTH DAKOTA

Segment 7-9E WEST CENTER SERVICE AREA
Parcel 142-87-6

## RIGHT-OF-WAY EASEMENT

**ALL PERSONS TAKE NOTICE:**

In consideration of one dollar ($1.00) and other good and valuable consideration JAMES O KUSLER 5968 19TH STREET SW BEULAH, ND 58523 hereinafter referred to as Grantor, does hereby grant, bargain, sell, transfer and convey to the Southwest Water Authority, hereinafter referred to as the Grantee, its successor and assigns, a perpetual easement with right to erect, construct, install and lay, and thereafter use, operate, inspect, repair, maintain, replace, and remove water pipelines, connections, valves and all other appurtenant facilities used in connection with the construction, operation and maintenance of the Southwest Pipeline Project, over, above, across and through the land of the Grantor, situated in Oliver County, State of North Dakota, said land being described as follows: NW1/4 SECTION 7 TOWNSHIP 142 RANGE 87 (the tract that contains 1.33 acres, more or less), together with the right of ingress and egress over the adjacent lands of the Grantor, successors and assigns for the purposes of this easement.

1. The permanent easement will be thirty (30) feet in width, fifteen (15) feet on each side of the center line of the pipeline as constructed, with an additional ten (10) feet of temporary right-of-way for a total construction easement width of forty (40) feet, twenty (20) feet on each side of the center line.

2. The Grantee covenants to maintain the easement in good repair so that no unreasonable damage will result from its use to the adjacent land of the Grantor, successors and assigns. The Grantor will receive compensation for damages to growing crops caused by the construction or operation. The Grantor will report any damages within three (3) years of the construction of the project.

The grant and other provisions of this easement shall constitute a covenant running with the land for the benefit of the Grantee, its successors and assigns.

**IN WITNESS WHEREOF,** the Grantor has executed this instrument this 3 day of February, 2014.

James O. Kusler GRANTOR _____ GRANTOR

State of North Dakota

County of Dunn

On February 3, 2014, personally appeared before me James O. Kusler

_____ whom I know personally.
X whose identity I verified on the basis of North Dakota drivers license.
_____ whose identity I verified on the oath or affirmation of _____, a credible witness to be the signor of the above and he/she acknowledged that he/she signed it.

DANIEL T. AICHELE
Notary Public
State of North Dakota
My Commission Expires Mar. 2, 2018

Notary Public Daniel T. Aichele
_____, County Dunn
My Commission Expires: Mar. 2, 2018

90190 6/25/2015 6:19 PM PAGE: 1 OF 1
BOOK: LL PAGE: 20 FEES: $10.00 MM EASEMENT
Kim Wilkens, OLIVER COUNTY RECORDER
By K Wilkens

SOUTHWEST WATER AUTHORITY
WEST INDUSTRIAL PARK
4665 2ND STREET SW
DICKINSON, ND 58601-7231

OLIVER SEAL COUNTY STATE OF NORTH DAKOTA

**SOUTHWEST WATER AUTHORITY**
Southwest Pipeline Project Building
West Industrial Park
4665 2nd Street SW
Dickinson, ND 58601-7231
(701) 225-0241
Toll Free: 1-888-425-0241

Segment **7-9E WEST CENTER SERVICE AREA**
Parcel **142-87-6**

## RIGHT-OF-WAY EASEMENT

**ALL PERSONS TAKE NOTICE:**

In consideration of one dollar ($1.00) and other good and valuable consideration **MILDA K. HEDBLOM 1801 SUMMIT AVENUE ST. PAUL, MN 55105** hereinafter referred to as Grantor, does hereby grant, bargain, sell, transfer and convey to the Southwest Water Authority, hereinafter referred to as the Grantee, its successor and assigns, a perpetual easement with right to erect, construct, install and lay, and thereafter use, operate, inspect, repair, maintain, replace, and remove water pipelines, connections, valves and all other appurtenant facilities used in connection with the construction, operation and maintenance of the Southwest Pipeline Project, over, above, across and through the land of the Grantor, situated in **Oliver** County, State of North Dakota, said land being described as follows: **NW1/4 SECTION 7 TOWNSHIP 142 RANGE 87** (the tract that contains **1.59** acres, more or less), together with the right of ingress and egress over the adjacent lands of the Grantor, successors and assigns for the purposes of this easement.

1. The permanent easement will be thirty (30) feet in width, fifteen (15) feet on each side of the center line of the pipeline as constructed, with an additional ten (10) feet of temporary right-of-way for a total construction easement width of forty (40) feet, twenty (20) feet on each side of the center line.

2. The Grantee covenants to maintain the easement in good repair so that no unreasonable damage will result from its use to the adjacent land of the Grantor, successors and assigns. The Grantor will receive compensation for damages to growing crops caused by the construction or operation. The Grantor will report any damages within three (3) years of the construction of the project.

The grant and other provisions of this easement shall constitute a covenant running with the land for the benefit of the Grantee, its successors and assigns.

**IN WITNESS WHEREOF,** the Grantor has executed this instrument this 23 day of May, 2015.

Milda K. Hedblom GRANTOR _____ GRANTOR

State of MN

County of Ramsey

On May 23, 2015, personally appeared before me Milda K. Hedblom

_____ whom I know personally.
✓ whose identity I verified on the basis of Drivers License.
_____ whose identity I verified on the oath or affirmation of _____, a credible witness to be the signor of the above and he/she acknowledged that he/she signed it.

Notary Public _____

Ramsey, County MN

My Commission Expires: 01/31/2016

JUSTIN DAVID HOSMAN
NOTARY PUBLIC - MINNESOTA
MY COMMISSION EXPIRES 01/31/16

97087 8/5/2022 11:38 AM Total Pages: 13
BOOK: V V PAGE: 184 FEES: $65.00 RB EASEMENT
Mickie McNulty-Eide, OLIVER COUNTY RECORDER
By Rebecca Bettke, Deputy

SOLEM LAW OFFICE
PO BOX 249

BEULAH, ND 58523

RECORDER OLIVER SEAL COUNTY STATE OF NORTH DAKOTA

# WATER WELL AND WATER TANK EASEMENT

THIS INDENTURE, made and entered into this 31st day of May, 2022, by and between **JOHNELL J. KUSLER, as personal representative of the Estate of James O. Kusler,** whose post office address is 1884 Hillcrest Avenue, St. Paul, Minnesota 55116, **JOHNELL J. KUSLER,** whose post office address is 1884 Hillcrest Avenue, St. Paul, Minnesota 55116, AND **MILDA L. HEDBLOM, a/k/a MILDA K. HEDBLOM**, whose post office address is 1801 Summit Avenue, St. Paul, Minnesota 55105, hereafter **"Party of the First Part**; and **TRENT T. MARTIN and DAWN MARTIN**, husband and wife, whose post office address is 1943 62ND Avenue SW, Beulah, North Dakota 58523, hereafter **"Party of the Second Part"**.

WITNESSETH, that the Party of the First Part owns the following described parcel of land located in Oliver County, North Dakota, to-wit:

See Exhibit A attached hereto and incorporated herein by reference.

That the Party of the Second Part owns the following described parcel of land located in Oliver County, North Dakota, to-wit:

See Exhibit B attached hereto and incorporated herein by reference.

SOLEM LAW OFFICE
109 CENTRAL AVENUE S
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail:beulaw@westriv.com

That the said Party of the Second Part for and in consideration of the sum of One Dollar ($1.00) and other good and valuable consideration, the receipt of which is hereby acknowledged by the Party of the Second Part, does by these presents grant and convey until the Party of the First Part for their use and benefit upon the parcel of land identified and described in Exhibit A attached hereto and incorporated herein by reference, a Water Well and Water Tank Easement allowing the Party of the First Part, their successors and assigns, access to and use of existing water wells and water tanks located upon the above described parcel of land owned by the Party of the Second Part and described in Exhibit B, attached hereto and incorporated herein by reference. The Party of the First Part may, in the future, add one additional waterline from the existing water wells located on the Party of the Second Part's property described in Exhibit B, which said waterline may extend onto the Party of the First Part's property described in Exhibit A. The Party of the First Part, and their successors and assigns, may use this one future additional waterline for livestock purposes only and this waterline may not be used to service a residence or be sold to another party to be used to service a residence.

This Easement shall be binding and obligatory upon the heirs, administrators, personal representatives, survivors, and assigns of the parties hereto, and this easement shall continue for a term of ninety-nine (99) years or for such longer period of time as may be allowed by state law. It is further understood that the Party of the First Part shall be under no obligation to maintain any existing water wells and water tanks owned by the Party of the Second Party. Any new additional waterline to be established as herein provided by the Party

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

of the First Part shall be established at their sole expense and maintained solely by the Party of the First Part.

IN WITNESS WHEREOF, the said parties hereto set their hands and seals the day and year first above written.

WITNESS, The hands of the parties of the first part:

Johnell J Kusler PR

**JOHNELL J. KUSLER, Personal Representative of the Estate of JAMES O. KUSLER**

STATE OF NORTH DAKOTA )
)
COUNTY OF MERCER )

On this 31st day of May, 2022, before me, a Notary Public in and for said County and State, personally appeared **JOHNELL J. KUSLER, as Personal Representative of the Estate of James O. Kusler**, known to me to be the person that is described in and that executed the within instrument, and acknowledged to me that she executed the same.

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

SCOTT T. SOLEM, NOTARY PUBLIC
MERCER COUNTY, NORTH DAKOTA

Johnell J Kusler

**JOHNELL J. KUSLER**

STATE OF NORTH DAKOTA )
)
COUNTY OF MERCER )

On this 31st day of May, 2022, before me, a Notary Public in and for said County and State, personally appeared **JOHNELL J. KUSLER,** known to me to be the person that is described in and that executed the within instrument, and acknowledged to me that she executed the same.

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

SCOTT T. SOLEM, NOTARY PUBLIC
MERCER COUNTY, NORTH DAKOTA

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

**MILDA L. HEDBLOM,**
**a/k/a MILDA K. HEDBLOM**

STATE OF NORTH DAKOTA )
)
COUNTY OF MERCER )

On this 31st day of May, 2022, before me, a Notary Public in and for said County and State, personally appeared **MILDA L. HEDBLOM, a/k/a MILDA K. HEDBLOM,** known to me to be the person that is described in and that executed the within instrument, and acknowledged to me that she executed the same.

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

SCOTT T. SOLEM, NOTARY PUBLIC
MERCER COUNTY, NORTH DAKOTA

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

WITNESS, the hands of the parties of the second part:

**TRENT T. MARTIN**

**DAWN MARTIN**

STATE OF NORTH DAKOTA )
)
COUNTY OF MERCER )

On this 31st day of May, 2022, before me, a Notary Public in and for said County and State, personally appeared **TRENT T. MARTIN and DAWN MARTIN,** known to me to be the persons that are described in and that executed the within instrument, and acknowledged to me that they executed the same.

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

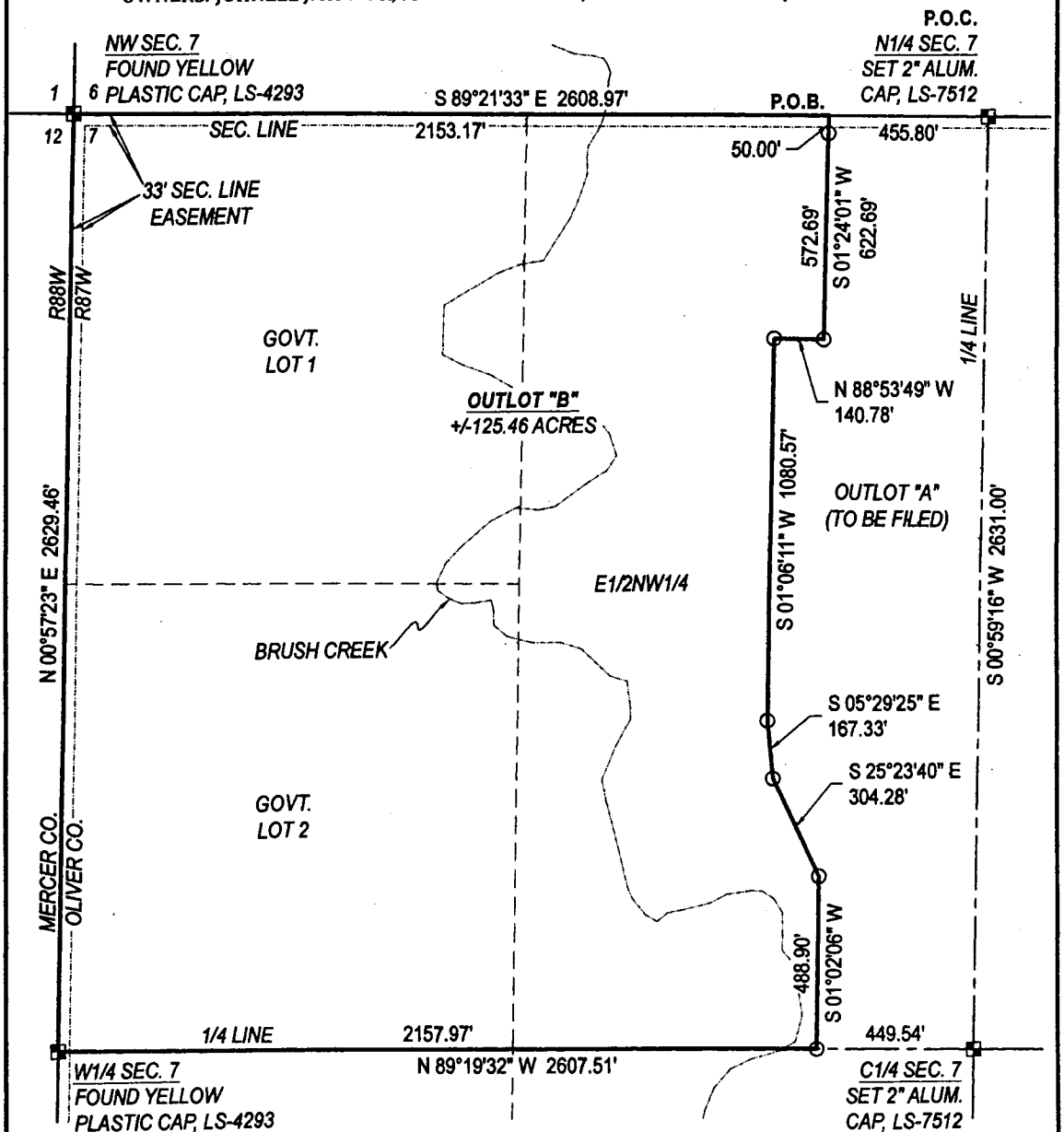
SCOTT T. SOLEM, NOTARY PUBLIC
MERCER COUNTY, NORTH DAKOTA

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

Exhibit A

# PLAT OF OUTLOT "B"

LOCATED IN GOVERNMENT LOTS 1 AND 2, AND THE E1/2NW1/4 OF SECTION 7,
TOWNSHIP 142 NORTH, RANGE 87 WEST, 5th P.M.,
OLIVER COUNTY, NORTH DAKOTA
OWNERS: JOHNELL J. KUSLER, MILDA L. HEDBLOM, AND THE ESTATE OF JAMES O. KUSLER




REGISTERED PROFESSIONAL LAND SURVEYOR
AARON HUMMERT
LS-7512
DATE 2/22/22
NORTH DAKOTA

0 400
SCALE: 1" = 400'
DATE OF FIELD SURVEY:
FEBRUARY 14 & 19, 2022

**LEGEND:**

- ■ – PLSS CORNER (AS NOTED)
- ○ – SET REBAR W/CAP LS-7512

**SURVEYOR'S NOTE:**
The basis of bearing is based on the North Dakota State Plane Coordinate System, South Zone - NAD83. The distances reported hereon are in reference to the international foot definition and are at ground per the NDDOT combination factor for Oliver County (1/CF=1.0001470216). The measurements have been determined by RTK methods using the "Trimble VRSNow" system.

| | |
|---|---|
| DRAWN BY: AH | AARON HUMMERT, PLS<br>PROFESSIONAL LAND SURVEYOR<br>1901 31st STREET NW<br>MANDAN, ND 58554<br>OFFICE: (701) 426-8624 |
| CHECKED BY: AH | |
| PROJECT #: 2022-9 | |
| DATE: 2/20/2022 | SHEET 1 OF 4 |

THE UNDERSIGNED, Owner of the within described property, in accordance with the provisions of section 57-02-39 of the North Dakota Century Code, and upon demand of the County Auditor of Oliver County, North Dakota, have caused to be made the within and foregoing plat of said land with the lots as herein described, and have caused the same to be placed on record, as provided by law.

Witness our hands and seal, this 11th day of March, 2022.

In presence of Scott T. Solem

Johnell J. Kusler

STATE OF NORTH DAKOTA )
ss
COUNTY OF MERCER )

I, SCOTT T. SOLEM, a notary public within and for said County, do hereby certify that on this 11th day of March, A.D. 2022, personally appeared before me to me well known to be the same person described in and who executed the within and foregoing instrument and acknowledged that she executed the same freely and voluntarily.

My commission expires _____, 20___

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

Notary Public

THE UNDERSIGNED, Owner of the within described property, in accordance with the provisions of section 57-02-39 of the North Dakota Century Code, and upon demand of the County Auditor of Oliver County, North Dakota, have caused to be made the within and foregoing plat of said land with the lots as herein described, and have caused the same to be placed on record, as provided by law.

Witness our hands and seal, this 11th day of March, 2022.

In presence of Scott T. Solem

Johnell J. Kusler PR

Johnell J. Kusler, Personal Representative of the Estate of James O. Kusler

STATE OF NORTH DAKOTA )
ss
COUNTY OF MERCER )

I, SCOTT T. SOLEM, a notary public within and for said County, do hereby certify that on this 11th day of March, A.D. 2022, personally appeared before me to me well known to be the same person described in and who executed the within and foregoing instrument and acknowledged that she executed the same freely and voluntarily.

My commission expires _____, 20___

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

Notary Public

| | |
|---|---|
| DRAWN BY: AH | AARON HUMMERT, PLS<br>PROFESSIONAL LAND SURVEYOR<br>1901 31st STREET NW<br>MANDAN, ND 58554<br>OFFICE: (701) 426-8624 |
| CHECKED BY: AH | |
| PROJECT #: 2022-9 | |
| DATE: 2/20/2022 | SHEET 2 OF 4 |

THE UNDERSIGNED, Owner of the within described property, in accordance with the provisions of section 57-02-39 of the North Dakota Century Code, and upon demand of the County Auditor of Oliver County, North Dakota, have caused to be made the within and foregoing plat of said land with the lots as herein described, and have caused the same to be placed on record, as provided by law.

Witness our hands and seal, this 11th day of March, 2022.

In presence of Scott T. Solem

Milda L. Hedblom

STATE OF NORTH DAKOTA )
ss
COUNTY OF MERCER )

I, SCOTT T. SOLEM, a notary public within and for said County, do hereby certify that on this 11th day of March, A.D. 2022, personally appeared before me to me well known to be the same person described in and who executed the within and foregoing instrument and acknowledged that she executed the same freely and voluntarily.

My commission expires ____, 20__

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

Notary Public

SURVEYOR'S CERTIFICATE:

I, Aaron Hummert, a North Dakota Professional Land Surveyor, do hereby certify that this survey was performed by me or under my direct supervision at the request of Johnell J. Kusler, that said survey is true and complete as shown, and that the monuments found and set are of the character and occupy the positions shown thereon. This survey does not represent a complete title search.

REGISTERED PROFESSIONAL LAND SURVEYOR
AARON HUMMERT
LS-7512
DATE 2/22/22
NORTH DAKOTA

AARON HUMMERT, PLS
NORTH DAKOTA REGISTRATION NO. LS-7512

Subscribed and sworn to before me this 22nd day of February, 2022.

AUSTIN EVANS
Notary Public
State of North Dakota
My Commission Expires 11/04/2025

Notary Public

CERTIFICATE OF APPROVAL:

The within and foregoing plat is hereby approved:

Dated: ____ day of ____, 20__.

Chairman

96910 5/6/2022 10:45 AM Total Pages: 4
BOOK: E PAGE: 60 FEES: $20.00 RB Plats
Mickie McNulty-Eide, OLIVER COUNTY RECORDER
By Rebecca Bohlke, Deputy

OLIVER COUNTY RECORDER SEAL STATE OF NORTH DAKOTA

SOLEM LAW OFFICE
PO BOX 249

BEULAH, ND 58523

| | |
|---|---|
| DRAWN BY: AH | AARON HUMMERT, PLS<br>PROFESSIONAL LAND SURVEYOR<br>1901 31st STREET NW<br>MANDAN, ND 58554<br>OFFICE: (701) 426-8624 |
| CHECKED BY: AH | |
| PROJECT #2022-9 | |
| DATE: 2/20/2022 | SHEET 3 OF 4 |

# PLAT OF OUTLOT "B" - ATTACHED DESCRIPTION

LOCATED IN GOVERNMENT LOTS 1 AND 2, AND THE E1/2NW1/4 OF SECTION 7,
TOWNSHIP 142 NORTH, RANGE 87 WEST, 5th P.M.,
OLIVER COUNTY, NORTH DAKOTA

DESCRIPTION:

A tract of land located in Government Lots 1 and 2, and the East Half of the Northwest Quarter (E1/2NW1/4) of Section 7, Township 142 North, Range 87 West of the 5th Principal Meridian, Oliver County, North Dakota, and is more particularly described as follows:

COMMENCING at the north quarter corner of said Section 7; thence on the north line of said Section 7, N89°21'33"W a distance of 455.80 feet to the POINT OF BEGINNING.

From said POINT OF BEGINNING; thence S01°24'01"W a distance of 622.69 feet; thence N88°53'49"W a distance of 140.78 feet; thence S01°06'11"W a distance of 1080.57 feet; thence S05°29'25"E a distance of 167.33 feet; thence S25°23'40"E a distance of 304.28 feet; thence S01°02'06"W a distance of 488.90 feet to the east/west quarter line of said Section 7; thence on said east/west quarter line, N89°19'32"W a distance of 2157.97 feet to the west quarter corner of said Section 7; thence on the west line of said Section 7, N00°57'23"E a distance of 2629.46 feet to the northwest corner of said Section 7; thence on the north line of said Section 7, S89°21'33"E a distance of 2153.17 feet to the POINT OF BEGINNING.

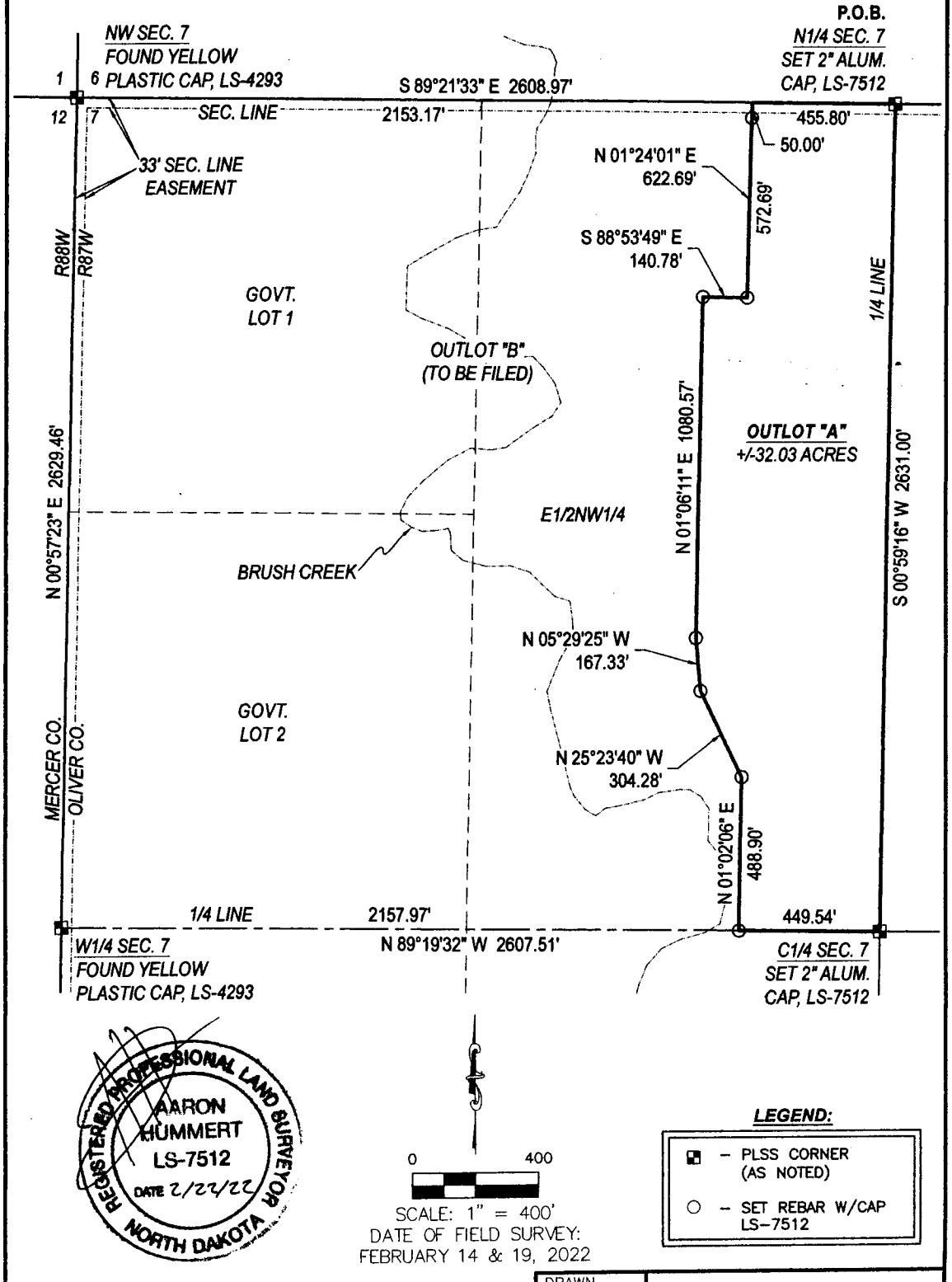
Said tract of land contains 125.46 acres more or less and is subject to any previous easements, agreements, conveyances, and surveys.

| | |
|---|---|
| DRAWN BY: AH | AARON HUMMERT, PLS<br>PROFESSIONAL LAND SURVEYOR<br>1901 31st STREET NW<br>MANDAN, ND 58554<br>OFFICE: (701) 426-8624 |
| CHECKED BY: AH | |
| PROJECT #: 2022-9 | |
| DATE: 2/20/2022 | SHEET 4 OF 4 |

Exhibit B

# PLAT OF OUTLOT "A"

LOCATED IN THE E1/2NW1/4 OF SECTION 7,
TOWNSHIP 142 NORTH, RANGE 87 WEST, 5th P.M.,
OLIVER COUNTY, NORTH DAKOTA
OWNERS: JOHNELL J. KUSLER, MILDA L. HEDBLOM, AND THE ESTATE OF JAMES O. KUSLER




REGISTERED PROFESSIONAL LAND SURVEYOR
AARON HUMMERT
LS-7512
DATE 2/22/22
NORTH DAKOTA

0 400
SCALE: 1" = 400'
DATE OF FIELD SURVEY:
FEBRUARY 14 & 19, 2022

**LEGEND:**

- ■ – PLSS CORNER (AS NOTED)
- ○ – SET REBAR W/CAP LS–7512

**SURVEYOR'S NOTE:**

The basis of bearing is based on the North Dakota State Plane Coordinate System, South Zone - NAD83. The distances reported hereon are in reference to the international foot definition and are at ground per the NDDOT combination factor for Oliver County (1/CF=1.0001470216). The measurements have been determined by RTK methods using the "Trimble VRSNow" system.

| | |
|---|---|
| DRAWN BY: AH | |
| CHECKED BY: AH | |
| PROJECT #: 2022–9 | |
| DATE: 2/20/2022 | |


AARON HUMMERT, PLS
PROFESSIONAL LAND SURVEYOR
1901 31st STREET NW
MANDAN, ND 58554
OFFICE: (701) 426-8624


SHEET 1 OF 4

THE UNDERSIGNED, Owner of the within described property, in accordance with the provisions of section 57-02-39 of the North Dakota Century Code, and upon demand of the County Auditor of Oliver County, North Dakota, have caused to be made the within and foregoing plat of said land with the lots as herein described, and have caused the same to be placed on record, as provided by law.

Witness our hands and seal, this 11th day of March, 20 22.

In presence of Scott T. Solem

Johnell J. Kusler

STATE OF NORTH DAKOTA )
ss
COUNTY OF MERCER )

I, SCOTT T. SOLEM, a notary public within and for said County, do hereby certify that on this 11th day of March, A.D. 20 22, personally appeared before me to me well known to be the same person described in and who executed the within and foregoing instrument and acknowledged that she executed the same freely and voluntarily.

My commission expires _____, 20___

SCOTT T. SOLEM, 20___
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

Notary Public

THE UNDERSIGNED, Owner of the within described property, in accordance with the provisions of section 57-02-39 of the North Dakota Century Code, and upon demand of the County Auditor of Oliver County, North Dakota, have caused to be made the within and foregoing plat of said land with the lots as herein described, and have caused the same to be placed on record, as provided by law.

Witness our hands and seal, this 11th day of March, 20 22.

In presence of Scott T. Solem

Johnell J. Kusler PR

Johnell J. Kusler, Personal Representative of the Estate of James O. Kusler

STATE OF NORTH DAKOTA )
ss
COUNTY OF MERCER )

I, SCOTT T. SOLEM, a notary public within and for said County, do hereby certify that on this 11th day of March, A.D. 2022, personally appeared before me to me well known to be the same person described in and who executed the within and foregoing instrument and acknowledged that she executed the same freely and voluntarily.

My commission expires _____, 20___

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

Notary Public

| | |
|---|---|
| DRAWN BY: AH | AARON HUMMERT, PLS<br>PROFESSIONAL LAND SURVEYOR<br>1901 31st STREET NW<br>MANDAN, ND 58554<br>OFFICE: (701) 426-8624 |
| CHECKED BY: AH | |
| PROJECT #: 2022-9 | |
| DATE: 2/20/2022 | SHEET 2 OF 4 |

THE UNDERSIGNED, Owner of the within described property, in accordance with the provisions of section 57-02-39 of the North Dakota Century Code, and upon demand of the County Auditor of Oliver County, North Dakota, have caused to be made the within and foregoing plat of said land with the lots as herein described, and have caused the same to be placed on record, as provided by law.

Witness our hands and seal, this 11th day of March, 2022.

In presence of Scott T. Solem

Milda L. Hedblom

STATE OF NORTH DAKOTA )
SS
COUNTY OF MERCER )

I, SCOTT T. SOLEM, a notary public within and for said County, do hereby certify that on this 11th day of March, A.D. 2022, personally appeared before me to me well known to be the same person described in and who executed the within and foregoing instrument and acknowledged that she executed the same freely and voluntarily.

My commission expires _____, 20___

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

Notary Public

SURVEYOR'S CERTIFICATE:

I, Aaron Hummert, a North Dakota Professional Land Surveyor, do hereby certify that this survey was performed by me or under my direct supervision at the request of Johnell J. Kusler, that said survey is true and complete as shown, and that the monuments found and set are of the character and occupy the positions shown thereon. This survey does not represent a complete title search.

AARON HUMMERT, PLS
NORTH DAKOTA REGISTRATION NO. LS-7512

REGISTERED PROFESSIONAL LAND SURVEYOR
AARON HUMMERT
LS-7512
DATE 2/22/22
NORTH DAKOTA

Subscribed and sworn to before me this 22nd day of 22, 2022.

AUSTIN EVANS
Notary Public
State of North Dakota
My Commission Expires 11/04/2025

Notary Public

CERTIFICATE OF APPROVAL:

The within and foregoing plat is hereby approved:

Dated: _____ day of _____, 20___.

Chairman

96898 4/26/2022 1:17 PM Total Pages: 4
BOOK: E PAGE: 59 FEES: $20.00 RB Plats
Mickie McNulty-Eide, OLIVER COUNTY RECORDER
By Rebecca Bethke, Deputy

SOLEM LAW OFFICE
PO BOX 249

BEULAH, ND 58523

OLIVER COUNTY RECORDER SEAL STATE OF NORTH DAKOTA

| | |
|---|---|
| DRAWN BY: AH | AARON HUMMERT, PLS<br>PROFESSIONAL LAND SURVEYOR<br>1901 31st STREET NW<br>MANDAN, ND 58554<br>OFFICE: (701) 426-8624 |
| CHECKED BY: AH | |
| PROJECT #: 2022-9 | |
| DATE: 2/20/2022 | SHEET 3 OF 4 |

# PLAT OF OUTLOT "A" - ATTACHED DESCRIPTION

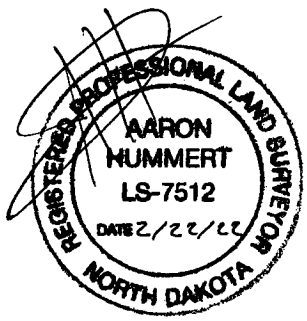
LOCATED IN THE E1/2NW1/4 OF SECTION 7,
TOWNSHIP 142 NORTH, RANGE 87 WEST, 5th P.M.,
OLIVER COUNTY, NORTH DAKOTA

DESCRIPTION:

A tract of land located in the East Half of the Northwest Quarter (E1/2NW1/4) of Section 7, Township 142 North, Range 87 West of the 5th Principal Meridian, Oliver County, North Dakota, and is more particularly described as follows:

BEGINNING at the north quarter corner of said Section 7; thence on the north/south quarter line of said Section 7, S00°59'16"W a distance of 2631.00 feet to the center quarter corner of said Section 7; thence on the east/west quarter line of said Section 7, N89°19'32"W a distance of 449.54 feet; thence N01°02'06"E a distance of 488.90 feet; thence N25°23'40"W a distance of 304.28 feet; thence N05°29'25"W a distance of 167.33 feet; thence N01°06'11"E a distance of 1080.57 feet; thence S88°53'49"E a distance of 140.78 feet; thence N01°24'01"E a distance of 622.69 feet to the north line of said Section 7; thence on said north line, S89°21'33"E a distance of 455.80 feet to the POINT OF BEGINNING.

Said tract of land contains 32.03 acres more or less and is subject to any previous easements, agreements, conveyances, and surveys.




| | |
|---|---|
| DRAWN BY: AH | AARON HUMMERT, PLS<br>PROFESSIONAL LAND SURVEYOR<br>1901 31st STREET NW<br>MANDAN, ND 58554<br>OFFICE: (701) 426-8624 |
| CHECKED BY: AH | |
| PROJECT #: 2022-9 | |
| DATE: 2/20/2022 | SHEET 4 OF 4 |

97731 7/6/2023 10:13 AM Total Pages: 13
BOOK: XX PAGE: 178 FEES: $65.00 RB EASEMENT
Mickie McNulty-Eide, OLIVER COUNTY RECORDER
By Rebecca Bethke, Deputy

SOLEM LAW OFFICE
PO BOX 249

BEULAH, ND 58523

RECORDER OLIVER SEAL COUNTY STATE OF NORTH DAKOTA

# CORRECTED
# RECIPROCAL ACCESS EASEMENT

THIS INDENTURE, made and entered into this 31st day of May, 2022, by and between **JOHNELL J. KUSLER, as personal representative of the Estate of James O. Kusler,** whose post office address is 1884 Hillcrest Avenue, St. Paul, Minnesota 55116, **JOHNELL J. KUSLER**, whose post office address is 1884 Hillcrest Avenue, St. Paul, Minnesota 55116, AND **MILDA L. HEDBLOM, a/k/a MILDA K. HEDBLOM,** whose post office address is 1801 Summit Avenue, St. Paul, Minnesota 55105, hereafter "Party of the First Part"; and **TRENT T. MARTIN and DAWN MARTIN**, husband and wife, whose post office address is 1943 62ND Avenue SW, Beulah, North Dakota 58523, hereafter "Party of the Second Part".

WITNESSETH, that the said Party of the First Part and the said Party of the Second Part, for and in consideration of the sum of One Dollar ($1.00) and other good and valuable consideration, the receipt of which is hereby acknowledged by each party, due by these presents grant and convey unto each other, their heirs, successors, and assigns for their use a Reciprocal Access Easement for purposes of ingress and egress allowing each party, their heirs, successors, and assigns to cross the land of each other specifically identified herein on

SOLEM LAW OFFICE
109 CENTRAL AVENUE S
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail:beulaw@westriv.com

existing roads and trails.

The Party of the First Part owns the following described parcel of land located in Oliver County, North Dakota, to-wit:

See Exhibit A attached hereto and incorporated herein by reference.

The Party of the Second Part owns the following described parcel of land located in Oliver County, North Dakota, to-wit:

See Exhibit B attached hereto and incorporated herein by reference.

It is understood that this Reciprocal Access Agreement is being granted by the parties herein to each other for ingress and egress access purposes allowing each party to cross the land of the other to access their own parcels and that this Reciprocal Access Easement shall be binding and obligatory upon the heirs, administrators, personal representatives, survivors, and assigns of the parties hereto, and shall continue for a term of ninety-nine (99) years or for such longer time as may be allowed by state law. It is further understood that neither party is obligated to the other to maintain the trails and roads located upon the parcels described herein.

IN WITNESS WHEREOF, the said parties have hereunto set their hands and seals the day and year first above written.

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

WITNESS, the hands of the Parties of the First Part:

**JOHNELL J. KUSLER, Personal Representative of the Estate of JAMES O. KUSLER**

STATE OF NORTH DAKOTA )
)
COUNTY OF MERCER )

On this 31st day of May, 2022, before me, a Notary Public in and for said County and State, personally appeared **JOHNELL J. KUSLER,** as Personal Representative of the Estate of James O. Kusler, known to me to be the person that is described in and that executed the within instrument, and acknowledged to me that she executed the same.

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

SCOTT T. SOLEM, NOTARY PUBLIC
MERCER COUNTY, NORTH DAKOTA

**JOHNELL J. KUSLER**

STATE OF NORTH DAKOTA )
)
COUNTY OF MERCER )

On this 31st day of May, 2022, before me, a Notary Public in and for said County and State, personally appeared **JOHNELL J. KUSLER,** known to me to be the person that is described in and that executed the within instrument, and acknowledged to me that she executed the same.

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

SCOTT T. SOLEM, NOTARY PUBLIC
MERCER COUNTY, NORTH DAKOTA

**MILDA L. HEDBLOM,**
**a/k/a MILDA K. HEDBLOM**

STATE OF NORTH DAKOTA )
)
COUNTY OF MERCER )

On this 31st day of May, 2022, before me, a Notary Public in and for said County and State, personally appeared **MILDA L. HEDBLOM, a/k/a MILDA K. HEDBLOM,** known to me to be the person that is described in and that executed the within instrument, and acknowledged to me that she executed the same.

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

SCOTT T. SOLEM, NOTARY PUBLIC
MERCER COUNTY, NORTH DAKOTA

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

WITNESS, the hands of the Party of the Second Part:

**TRENT T. MARTIN**

**DAWN MARTIN**

STATE OF NORTH DAKOTA )
)
COUNTY OF MERCER )

On this 31st day of May, 2022, before me, a Notary Public in and for said County and State, personally appeared **TRENT T. MARTIN and DAWN MARTIN,** known to me to be the persons that are described in and that executed the within instrument, and acknowledged to me that they executed the same.

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

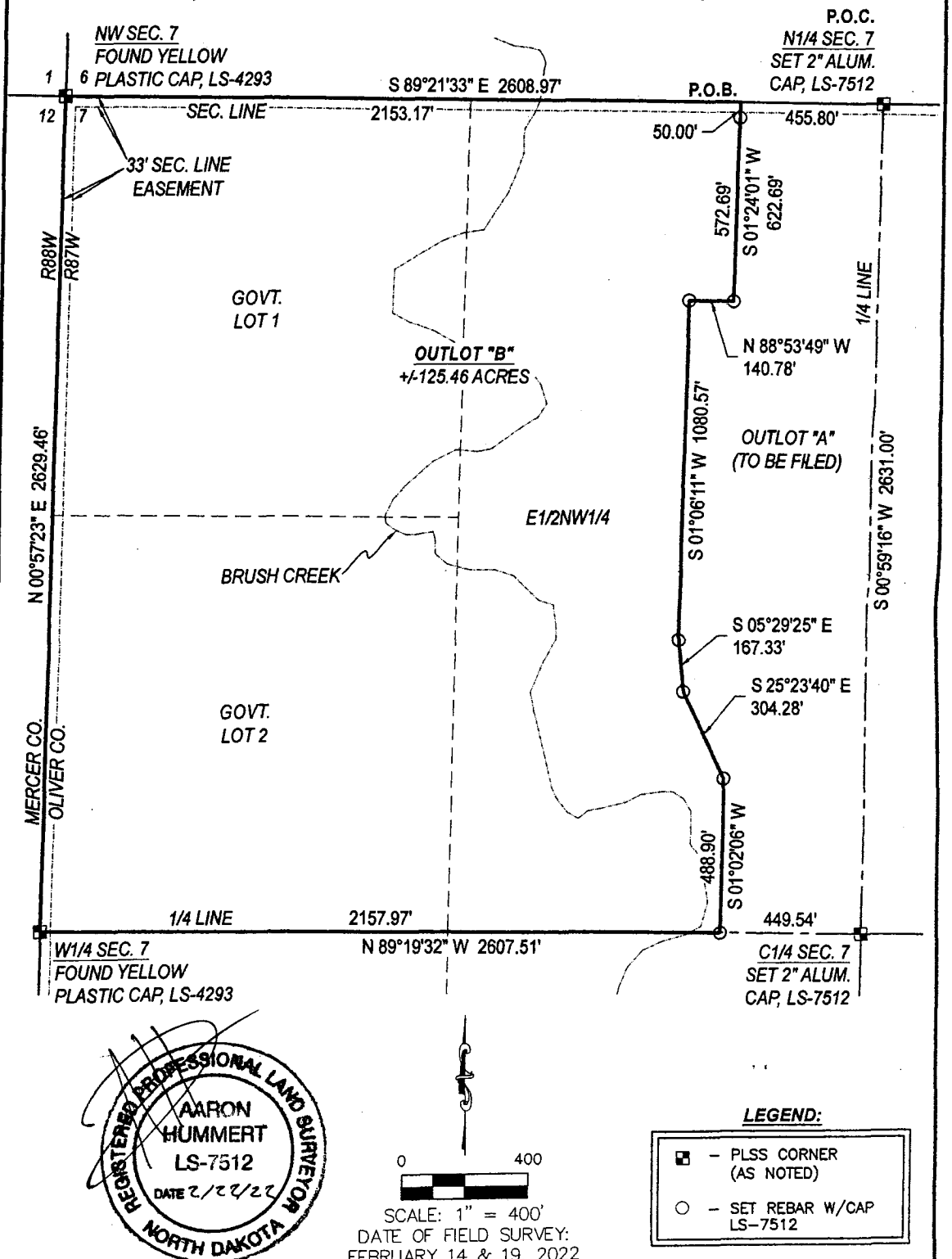
SCOTT T. SOLEM, NOTARY PUBLIC
MERCER COUNTY, NORTH DAKOTA

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

Exhibit A

# PLAT OF OUTLOT "B"

LOCATED IN GOVERNMENT LOTS 1 AND 2, AND THE E1/2NW1/4 OF SECTION 7,
TOWNSHIP 142 NORTH, RANGE 87 WEST, 5th P.M.,
OLIVER COUNTY, NORTH DAKOTA
OWNERS: JOHNELL J. KUSLER, MILDA L. HEDBLOM, AND THE ESTATE OF JAMES O. KUSLER




REGISTERED PROFESSIONAL LAND SURVEYOR
AARON HUMMERT
LS-7512
DATE 2/22/22
NORTH DAKOTA

0 400
SCALE: 1" = 400'
DATE OF FIELD SURVEY:
FEBRUARY 14 & 19, 2022

**LEGEND:**

- ■ – PLSS CORNER (AS NOTED)
- ○ – SET REBAR W/CAP LS–7512

**SURVEYOR'S NOTE:**
The basis of bearing is based on the North Dakota State Plane Coordinate System, South Zone - NAD83. The distances reported hereon are in reference to the international foot definition and are at ground per the NDDOT combination factor for Oliver County (1/CF=1.0001470216). The measurements have been determined by RTK methods using the "Trimble VRSNow" system.

| | |
|---|---|
| DRAWN BY: AH | |
| CHECKED BY: AH | |
| PROJECT #: 2022–9 | |
| DATE: 2/20/2022 | |


AARON HUMMERT, PLS
PROFESSIONAL LAND SURVEYOR
1901 31st STREET NW
MANDAN, ND 58554
OFFICE: (701) 426-8624


SHEET 1 OF 4

THE UNDERSIGNED, Owner of the within described property, in accordance with the provisions of section 57-02-39 of the North Dakota Century Code, and upon demand of the County Auditor of Oliver County, North Dakota, have caused to be made the within and foregoing plat of said land with the lots as herein described, and have caused the same to be placed on record, as provided by law.

Witness our hands and seal, this 11th day of March, 2022.

In presence of Scott T. Solem

Johnell J. Kusler

STATE OF NORTH DAKOTA )
ss
COUNTY OF MERCER )

I, SCOTT T. SOLEM, a notary public within and for said County, do hereby certify that on this 11th day of March, A.D. 2022, personally appeared before me to me well known to be the same person described in and who executed the within and foregoing instrument and acknowledged that she executed the same freely and voluntarily.

My commission expires _____, 20___

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

Notary Public

THE UNDERSIGNED, Owner of the within described property, in accordance with the provisions of section 57-02-39 of the North Dakota Century Code, and upon demand of the County Auditor of Oliver County, North Dakota, have caused to be made the within and foregoing plat of said land with the lots as herein described, and have caused the same to be placed on record, as provided by law.

Witness our hands and seal, this 11th day of March, 2022.

In presence of Scott T. Solem

Johnell J. Kusler PR

Johnell J. Kusler, Personal Representative of the Estate of James O. Kusler

STATE OF NORTH DAKOTA )
ss
COUNTY OF MERCER )

I, SCOTT T. SOLEM, a notary public within and for said County, do hereby certify that on this 11th day of March, A.D. 2022, personally appeared before me to me well known to be the same person described in and who executed the within and foregoing instrument and acknowledged that she executed the same freely and voluntarily.

My commission expires _____, 20___

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

Notary Public

| | |
|---|---|
| DRAWN BY: AH | AARON HUMMERT, PLS<br>PROFESSIONAL LAND SURVEYOR<br>1901 31st STREET NW<br>MANDAN, ND 58554<br>OFFICE: (701) 426-8624 |
| CHECKED BY: AH | |
| PROJECT #: 2022-9 | |
| DATE: 2/20/2022 | SHEET 2 OF 4 |

THE UNDERSIGNED, Owner of the within described property, in accordance with the provisions of section 57-02-39 of the North Dakota Century Code, and upon demand of the County Auditor of Oliver County, North Dakota, have caused to be made the within and foregoing plat of said land with the lots as herein described, and have caused the same to be placed on record, as provided by law.

Witness our hands and seal, this 11th day of March, 2022.

In presence of Scott T. Solem

Milda L. Hedblom

STATE OF NORTH DAKOTA )
ss
COUNTY OF MERCER )

I, SCOTT T. SOLEM, a notary public within and for said County, do hereby certify that on this 11th day of March, A.D. 2022, personally appeared before me to me well known to be the same person described in and who executed the within and foregoing instrument and acknowledged that she executed the same freely and voluntarily.

My commission expires _____, 20___

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

Notary Public

SURVEYOR'S CERTIFICATE:

I, Aaron Hummert, a North Dakota Professional Land Surveyor, do hereby certify that this survey was performed by me or under my direct supervision at the request of Johnell J. Kusler, that said survey is true and complete as shown, and that the monuments found and set are of the character and occupy the positions shown thereon. This survey does not represent a complete title search.

REGISTERED PROFESSIONAL LAND SURVEYOR
AARON HUMMERT
LS-7512
DATE 2/22/22
NORTH DAKOTA

AARON HUMMERT, PLS
NORTH DAKOTA REGISTRATION NO. LS-7512

Subscribed and sworn to before me this 22nd day of February, 2022.

AUSTIN EVANS
Notary Public
State of North Dakota
My Commission Expires 11/04/2025

Notary Public

CERTIFICATE OF APPROVAL:

The within and foregoing plat is hereby approved:

Dated: _____ day of _____, 20___.

Chairman

96910 5/6/2022 10:45 AM Total Pages: 4
BOOK: E PAGE: 60 FEES: $20.00 RB Plats
Mickie McNulty-Eide, OLIVER COUNTY RECORDER
By Rebecca Bohlke, Deputy

OLIVER COUNTY SEAL

SOLEM LAW OFFICE
PO BOX 249

BEULAH, ND 58523

| | |
|---|---|
| DRAWN BY: AH | AARON HUMMERT, PLS<br>PROFESSIONAL LAND SURVEYOR<br>1901 31st STREET NW<br>MANDAN, ND 58554<br>OFFICE: (701) 426-8624 |
| CHECKED BY: AH | |
| PROJECT 2022-9 | |
| DATE: 2/20/2022 | SHEET 3 OF 4 |

# PLAT OF OUTLOT "B" - ATTACHED DESCRIPTION

LOCATED IN GOVERNMENT LOTS 1 AND 2, AND THE E1/2NW1/4 OF SECTION 7,
TOWNSHIP 142 NORTH, RANGE 87 WEST, 5th P.M.,
OLIVER COUNTY, NORTH DAKOTA

DESCRIPTION:

A tract of land located in Government Lots 1 and 2, and the East Half of the Northwest Quarter (E1/2NW1/4) of Section 7, Township 142 North, Range 87 West of the 5th Principal Meridian, Oliver County, North Dakota, and is more particularly described as follows:

COMMENCING at the north quarter corner of said Section 7; thence on the north line of said Section 7, N89°21'33"W a distance of 455.80 feet to the POINT OF BEGINNING.

From said POINT OF BEGINNING; thence S01°24'01"W a distance of 622.69 feet; thence N88°53'49"W a distance of 140.78 feet; thence S01°06'11"W a distance of 1080.57 feet; thence S05°29'25"E a distance of 167.33 feet; thence S25°23'40"E a distance of 304.28 feet; thence S01°02'06"W a distance of 488.90 feet to the east/west quarter line of said Section 7; thence on said east/west quarter line, N89°19'32"W a distance of 2157.97 feet to the west quarter corner of said Section 7; thence on the west line of said Section 7, N00°57'23"E a distance of 2629.46 feet to the northwest corner of said Section 7; thence on the north line of said Section 7, S89°21'33"E a distance of 2153.17 feet to the POINT OF BEGINNING.

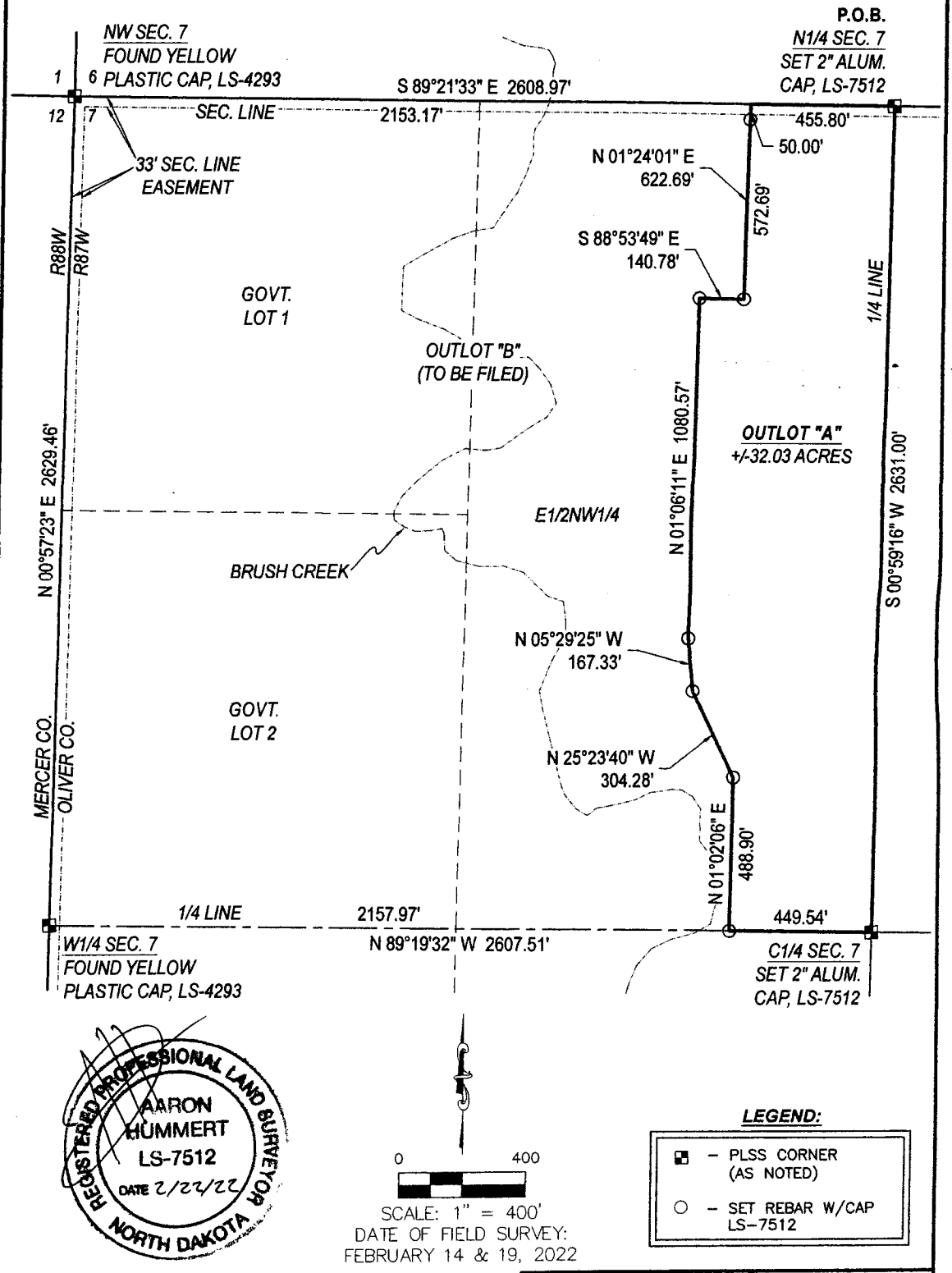
Said tract of land contains 125.46 acres more or less and is subject to any previous easements, agreements, conveyances, and surveys.

| | |
|---|---|
| DRAWN BY: AH | AARON HUMMERT, PLS<br>PROFESSIONAL LAND SURVEYOR<br>1901 31st STREET NW<br>MANDAN, ND 58554<br>OFFICE: (701) 426-8824 |
| CHECKED BY: AH | |
| PROJECT #: 2022-9 | |
| DATE: 2/20/2022 | SHEET 4 OF 4 |

Exhibit B

# PLAT OF OUTLOT "A"

LOCATED IN THE E1/2NW1/4 OF SECTION 7,
TOWNSHIP 142 NORTH, RANGE 87 WEST, 5th P.M.,
OLIVER COUNTY, NORTH DAKOTA
OWNERS: JOHNELL J. KUSLER, MILDA L. HEDBLOM, AND THE ESTATE OF JAMES O. KUSLER




REGISTERED PROFESSIONAL LAND SURVEYOR
AARON HUMMERT
LS-7512
DATE 2/22/22
NORTH DAKOTA

0 400
SCALE: 1" = 400'
DATE OF FIELD SURVEY:
FEBRUARY 14 & 19, 2022

**LEGEND:**

- ■ – PLSS CORNER (AS NOTED)
- ○ – SET REBAR W/CAP LS–7512

**SURVEYOR'S NOTE:**

The basis of bearing is based on the North Dakota State Plane Coordinate System, South Zone - NAD83. The distances reported hereon are in reference to the international foot definition and are at ground per the NDDOT combination factor for Oliver County (1/CF=1.0001470216). The measurements have been determined by RTK methods using the "Trimble VRSNow" system.

| | |
|---|---|
| DRAWN BY: AH | |
| CHECKED BY: AH | |
| PROJECT #: 2022–9 | |
| DATE: 2/20/2022 | |


AARON HUMMERT, PLS
PROFESSIONAL LAND SURVEYOR
1901 31st STREET NW
MANDAN, ND 58554
OFFICE: (701) 426-8624


SHEET 1 OF 4

THE UNDERSIGNED, Owner of the within described property, in accordance with the provisions of section 57-02-39 of the North Dakota Century Code, and upon demand of the County Auditor of Oliver County, North Dakota, have caused to be made the within and foregoing plat of said land with the lots as herein described, and have caused the same to be placed on record, as provided by law.

Witness our hands and seal, this 11th day of March, 20 22.

In presence of Scott T. Solem

Johnell J. Kusler

STATE OF NORTH DAKOTA )
ss
COUNTY OF MERCER )

I, SCOTT T. SOLEM, a notary public within and for said County, do hereby certify that on this 11th day of March, A.D. 20 22, personally appeared before me to me well known to be the same person described in and who executed the within and foregoing instrument and acknowledged that she executed the same freely and voluntarily.

My commission expires SCOTT T. SOLEM, 20
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

Notary Public

THE UNDERSIGNED, Owner of the within described property, in accordance with the provisions of section 57-02-39 of the North Dakota Century Code, and upon demand of the County Auditor of Oliver County, North Dakota, have caused to be made the within and foregoing plat of said land with the lots as herein described, and have caused the same to be placed on record, as provided by law.

Witness our hands and seal, this 11th day of March, 20 22.

In presence of Scott T. Solem

Johnell J. Kusler PR
Johnell J. Kusler, Personal Representative of the Estate of James O. Kusler

STATE OF NORTH DAKOTA )
ss
COUNTY OF MERCER )

I, SCOTT T. SOLEM, a notary public within and for said County, do hereby certify that on this 11th day of March, A.D. 2022, personally appeared before me to me well known to be the same person described in and who executed the within and foregoing instrument and acknowledged that she executed the same freely and voluntarily.

My commission expires _____, 20___

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

Notary Public

| | |
|---|---|
| DRAWN BY: AH | AARON HUMMERT, PLS<br>PROFESSIONAL LAND SURVEYOR<br>1901 31st STREET NW<br>MANDAN, ND 58554<br>OFFICE: (701) 426-8624 |
| CHECKED BY: AH | |
| PROJECT #: 2022-9 | |
| DATE: 2/20/2022 | SHEET 2 OF 4 |

THE UNDERSIGNED, Owner of the within described property, in accordance with the provisions of section 57-02-39 of the North Dakota Century Code, and upon demand of the County Auditor of Oliver County, North Dakota, have caused to be made the within and foregoing plat of said land with the lots as herein described, and have caused the same to be placed on record, as provided by law.

Witness our hands and seal, this 11th day of March, 20 22.

In presence of Scott T. Solem

Milda L. Hedblom

STATE OF NORTH DAKOTA )
ss
COUNTY OF MERCER )

I, SCOTT T. SOLEM, a notary public within and for said County, do hereby certify that on this 11th day of March, A.D. 20 22, personally appeared before me to me well known to be the same person described in and who executed the within and foregoing instrument and acknowledged that she executed the same freely and voluntarily.

My commission expires _____, 20___

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

Notary Public

SURVEYOR'S CERTIFICATE:

I, Aaron Hummert, a North Dakota Professional Land Surveyor, do hereby certify that this survey was performed by me or under my direct supervision at the request of Johnell J. Kusler, that said survey is true and complete as shown, and that the monuments found and set are of the character and occupy the positions shown thereon. This survey does not represent a complete title search.

REGISTERED PROFESSIONAL LAND SURVEYOR
AARON HUMMERT
LS-7512
DATE 2/22/22
NORTH DAKOTA

AARON HUMMERT, PLS
NORTH DAKOTA REGISTRATION NO. LS-7512

Subscribed and sworn to before me this 22nd day of 22, 20 22.

AUSTIN EVANS
Notary Public
State of North Dakota
My Commission Expires 11/04/2025

Notary Public

CERTIFICATE OF APPROVAL:

The within and foregoing plat is hereby approved:

Dated: _____ day of _____, 20___.

Chairman

96898 4/26/2022 1:17 PM Total Pages: 4
BOOK: E PAGE: 59 FEES: $20.00 RB Plats
Mickie McNulty-Eide, OLIVER COUNTY RECORDER
By Rebecca Bethke, Deputy

SOLEM LAW OFFICE
PO BOX 249

BEULAH, ND 58523

OLIVER COUNTY RECORDER SEAL STATE OF NORTH DAKOTA

| | |
|---|---|
| DRAWN BY: AH | AARON HUMMERT, PLS<br>PROFESSIONAL LAND SURVEYOR<br>1901 31st STREET NW<br>MANDAN, ND 58554<br>OFFICE: (701) 426-8624 |
| CHECKED BY: AH | |
| PROJECT #: 2022-9 | |
| DATE: 2/20/2022 | SHEET 3 OF 4 |

# PLAT OF OUTLOT "A" - ATTACHED DESCRIPTION

LOCATED IN THE E1/2NW1/4 OF SECTION 7,
TOWNSHIP 142 NORTH, RANGE 87 WEST, 5th P.M.,
OLIVER COUNTY, NORTH DAKOTA

DESCRIPTION:

A tract of land located in the East Half of the Northwest Quarter (E1/2NW1/4) of Section 7, Township 142 North, Range 87 West of the 5th Principal Meridian, Oliver County, North Dakota, and is more particularly described as follows:

BEGINNING at the north quarter corner of said Section 7; thence on the north/south quarter line of said Section 7, S00°59'16"W a distance of 2631.00 feet to the center quarter corner of said Section 7; thence on the east/west quarter line of said Section 7, N89°19'32"W a distance of 449.54 feet; thence N01°02'06"E a distance of 488.90 feet; thence N25°23'40"W a distance of 304.28 feet; thence N05°29'25"W a distance of 167.33 feet; thence N01°06'11"E a distance of 1080.57 feet; thence S88°53'49"E a distance of 140.78 feet; thence N01°24'01"E a distance of 622.69 feet to the north line of said Section 7; thence on said north line, S89°21'33"E a distance of 455.80 feet to the POINT OF BEGINNING.

Said tract of land contains 32.03 acres more or less and is subject to any previous easements, agreements, conveyances, and surveys.

| | |
|---|---|
| DRAWN BY: AH | AARON HUMMERT, PLS<br>PROFESSIONAL LAND SURVEYOR<br>1901 31st STREET NW<br>MANDAN, ND 58554<br>OFFICE: (701) 426-8624 |
| CHECKED BY: AH | |
| PROJECT #: 2022-9 | |
| DATE: 2/20/2022 | SHEET 4 OF 4 |

01082

FORM LE-189 R

RIGHT OF WAY EASEMENT

KNOW ALL MEN BY THESE PRESENTS, that we the undersigned, (Whether one or more) John Scheidt and Gladys M. Scheidt (joint tenants, and not as tenants in common, with full rights of survivorship) (unmarried) (husband and wife), for a good and valuable consideration, the receipt whereof is hereby acknowledged, do hereby grant unto Oliver-Mercer Electric Cooperative, Inc. a cooperative corporation, (hereinafter called the "Cooperative"), whose post office address is Hazen, North Dakota, and to its successors or assigns, the right to enterupon the lands of the undersigned, situated in the County of Mercer, State of North Dakota, and more particularly described as follows:

A tract of land approximately _____ acres in area, located _____ miles in a _____ direction from the town of _____, and further described as being in common tenancy in SE¼ Section 2, Township 142 Range 88
joint tenandy in S½NE¼ Section 12, Township 142 Range 88
and NE¼ Section 14, Township 142 Range 88

and to contract, operate and maintain on the above described lands, and/or in or upon all streets, roads or highways abutting said lands, an electric transmission or distribution line or system, and to cut and trim trees and shrubbery that may interfere with or threaten to endanger the operation and maintenance of said line or system.

The undersigned agree that all poles, wires, and other facilities, including any main service entrance equipment, installed on the above-described lands at the Cooperative's expense shall remain the property of the Cooperative, removable at the option of the Cooperative, upon termination of service to or on said lands.

The undersigned covenant that they are the owners of the above-desctibed lands and that the said lands are free and clear of encumberances and liens of whatsoever character except those held by the following persons:

IN WITNESS WHEREOF, the undersigned have set their hands and seals, this 22 day of April, 1949.

John Scheidt (L.S.)

Gladys M. Scheidt (L.S.)

Signed, sealed and delivered in the presence of:

Leo Goetz

_____

S8010

(1)
STATE OF NORTH DAKOTA

COUNTY OF Mercer SS.

Leo Goetz being first duly sworn says that he is one of the witnesses to the above and foregoing easements, that John Scheidt and Gladys M. Scheidt (joint tenants, and not as tenants in common, with full rights of survivorship) whose names is and/or are subscribed to the above and foregoing instruments as a party is and/or are the persons described in said easement and that they signed said instrument in my presence and that I in their presence signed my name thereto as a subscribed witness.

Leo Goetz

SUBSCRIBED and sworn to before me this 25 day of April, 1949

Frank J. Belinskey
Notary Public in and for the
County of Mercer and the State
of North Dakota

FRANK J. BELINSKEY NOTARY PUBLIC STATE OF NORTH DAKOTA

My commission expires: March 24, 1953

(1)
STATE OF NORTH DAKOTA
COUNTY OF Mercer SS.

On this 25 day of April, 1949, before me Frank J. Belinskey a Notary Public within and for the State of North Dakota, personally appeared Leo Goetz known to me to be one of the persons who subscribed his name to the above and foregoing instrument as a witness, and who acknowledged to me that he subscribed his name thereto as such witness, and who proved to me that the person who and/or whose names are subscribed to the foregoing instrument are the persons described in it.

Frank J. Belinskey
Notary Public in and for the
County of Mercer AND
State of North Dakota

FRANK J. BELINSKEY NOTARY PUBLIC STATE OF NORTH DAKOTA

My commission expires: March 24, 1953

* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

(2)
State of North Dakota

County of _____ SS.

On this _____ day of _____ 194___, before me

_____, a Notary Public in and for said County and State, personally appeared _____ and _____ known to me to be the persons _____ who _____ described in and who executed within and foregoing instrument and acknowledged to me that he executed the same.

Notary Public in and for the
County of _____ and
State of North Dakota

My commission expires: _____

MORTGAGEE
MORTGAGOR
INDEXED ✓

**STATE OF NORTH DAKOTA**
**COUNTY OF MERCER**

**209412**
**OFFICE OF**
**COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 12/9/2015 at 8:31 AM, and was duly recorded as Book 207 MISC on Page 653 Fee: $16.00

County Recorder Brenda L. Cook

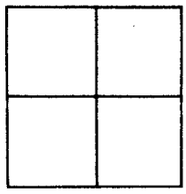
By Deputy

Return To: ROUGHRIDER ELECTRIC COOPERATIVE, INC., 800 H
HAZEN, ND 58545

# RIGHT-OF-WAY EASEMENT

Gladys Scheid (hereinafter called the "Grantor") (unmarried) (husband and wife) for a good and valuable consideration, the receipt whereof is hereby acknowledged, do hereby grant unto Oliver-Mercer Electric Cooperative, Inc., (hereinafter called "Grantee") whose post office address is Hazen, North Dakota, 58545, and to its successors or assigns, an easement for 99 years, situated in the County of Mercer, State of North Dakota, and more particularly described as follows:

Twn 142 Rge 88
Sec 14 NE¼



to construct, reconstruct, relocate, rephase, remove, repair, operate and maintain on or under the above described lands, and/or in, upon or under all streets, roads or highways abutting said lands, an electric distribution line or system; to cut, trim eradicate and control the growth by chemical means, machinery or otherwise, of trees and shrubbery located within 15 feet of the center of line of said line system, or that may interfere with or threaten to endanger the operation and maintenance of said line or system (indicating any control of the growth of other vegetation in the right-of-way which may incidentally and necessarily result from the means of control employed); and to license, permit or otherwise agree to the joint use or occupancy of the line or system by any other person, association or corporation, for electrification or communication purposes.

The undersigned Grantor agrees that all poles, wires, cables and other facilities including any main service entrance equipment installed on or below the above described lands at the Grantee's expense shall remain the property of Grantee, removable at its option upon termination of service to or on said lands.

Any damages to the surface of the right-of-way or to crops, fences, gates, drains, ditches or lines of the Grantor, caused by the Grantee in the installation, repair, maintenance, reconstruction or removal of said electric properties and appurtenances, shall be promptly repaired, replaced or paid for by the Grantee, provided a claim therefore is presented to the Grantee at its General Office within ninety (90) days after such damages occur. If the amount of said damages cannot be agreed upon, then the Grantor and Grantee shall each select an arbitrator, and these two shall select a third arbirator, and the decision and award of the arbitrators shall be final.

The undersigned Grantor convenants and agrees that no barrier of trees, shrubs, etc., and no structure or building shall be placed over underground conduits and electric lines and no construction shall be maintained or placed beneath over-the-ground electric lines and associated structures without the express written consent of the Grantee.

This Easement also includes a right-of-access to and from said real estate and Grantee's right-of-way for the purpose of connecting or reconnecting any part of the Grantee's system to or from said property with said system or to or from any other property on or coming on said system.

This Easement includes such additional rights of use and occupancy as shall be necessary for the use, maintenance, and operation of Grantee's system on said right-of-way, including but not limited to, anchors, guy wires, supporting poles or structures and the like as they were originally constructed or may thereafter be constructed.

The overall operating height of vehicles and equipment known to cultivate or traverse lands within the easement is less than _____ feet.

Dated this 3rd day of July, 19 90.

_____ Gladys M. Scheidt

STATE OF NORTH DAKOTA)
) ss
COUNTY OF MERCER)

The foregoing instrument was acknowledged before me this 3rd day of July 19 90

by Gladys M. Scheidt

My Commission Expires: May 20, 1991

Lynell Renner
Notary Public, State of North Dakota

LYNELL RENNER

MORTGAGEE
MORTGAGOR
INDEXED ✓

**209427**

**STATE OF NORTH DAKOTA**
**COUNTY OF MERCER**

**OFFICE OF**
**COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 12/9/2015 at 8:46 AM, and was duly recorded as Book 207 MISC on Page 701 Fee: $23.00

County Recorder Brenda L. Cook

By Deputy

Return To: ROUGHRIDER ELECTRIC COOPERATIVE, INC., 800 H
HAZEN, ND 58545

COUNTY RECORDER
SEAL
MERCER COUNTY, N. DAK.

MORTGAGEE
MORTGAGOR
In Computer [ ] GRANTOR ✓
WRT# [ ] GRANTEE ✓
County# [ ] INDEXED ✓

W.O.# 92-272

# West River Telephone Right-of-Way Easement

KNOW ALL MEN BY THESE PRESENT, that we the undersigned, (whether one or more) *Gladys M Scheidt*, Grantor(s), do hereby grant and convey unto *West River Telecommunications Cooperative*, a cooperative corporation (hereafter called the "Cooperative"), grantee, whose address is P.O Box 467, Hazen, North Dakota, and its respective successors, assigns, lessees and agents, an easement to survey, construct, reconstruct, operate, upgrade, maintain, relocate, replace and remove such communication systems as the grantee may from time to time require, consisting of but not limited to cables, wires, poles, splicing boxes, surface testing terminals, repeaters, repeater housings and markers,and other appurtenances, upon and over the land which the undersigned owns or in which the undersigned has any interest in the County of *Mercer*, State of *North Dakota*, and more particularly described as follows:

*S/2SE/4 2 142 88*
*NE/4 14 142 88*

***This easement is to cover this line only. Any additional future new lines will require a new easement.***

also the right of ingress and egress over and across the lands of the undersigned for the purpose of exercising the rights herein granted; to place surface markers beyond said strip, to clear and keep clear all trees, roots brush and other obstructions from the surface and subsurface of said strip of land and within seven feet thereof. The boundary of said strip shall be a line parallel to and 25 feet either side of the first cable laid, which cable shall have its location indicated by surface markers set at intervals on the land of the undersigned or on adjacent lands. The undersigned for himself, his heirs, executors, administrators, successors, and assigns, hereby covenants that no structure shall be erected on said strip.

The undersigned agrees that all poles, wire and other facilities, including telephone equipment, installed on the above described premises at the Cooperative's expense, shall remain the property of the Cooperative, removable at the option of the Cooperative.

The undersigned covenant that they are the owners of the above described lands and that the said lands are free and clear of encumbrances and liens of whatsoever character except those held by the following persons:

The term of this easement shall be for as long as needed by the grantee, and until a release of this easement is recorded, but to not extend beyond the maximum term authorized by law.

Access is hereby granted for a state or federal historical survey of the cable route, should one be required, unless checked. Access denied ☐

IN WITNESS WHEREOF, this instrument has been executed by the undersigned this the 29th day of June, 1993.

STATE OF NORTH DAKOTA )
)
COUNTY OF Mercer )

by: Gladys M Scheidt

by: _____

The foregoing instrument was acknowledged before me this 29th day of June, 1993. By Gladys M Scheidt.

My Commission Expires:

CLYDE FANDRICH
Notary Public, Mercer County, ND
My Commission Expires Feb. 24, 1999
STATE OF NORTH DAKOTA

Notary Public, County of Mercer.

Document No. 153687
OFFICE OF REGISTER OF DEEDS, COUNTY OF Mercer, North Dakota. I hereby certify that the within instrument was filed in this office for recording on the 10th day of January, A.D., 1994, at 11:38 o'clock A.M, and was duly recorded in Book 128, of Misc., on page 505.

By Kathryn Schumann Deputy Jeanette Sailer Register of Deeds

$7.00 fee

When recorded, please return to WEST RIVER TELECOMMUNICATION COOPERATIVE.

REGISTER OF DEEDS SEAL COUNTY, N.DAK.

## RIGHT-OF-WAY EASEMENT

KNOW ALL MEN BY THESE PRESENTS, that we the undersigned, (whether one or more) Leland Erickson (unmarried) (husband and wife) for a good and valuable consideration, the receipt whereof is hereby acknowledged, do hereby grant unto Oliver-Mercer Electric a cooperative corporation (hereinafter called the "Cooperative") whose post office address is Hazen, and to its successors or assigns, the right to enter upon the lands of the undersigned, situated in the County of Mercer, State of North Dakota, and more particularly described as follows:

SE¼ Sec. 27, Twp. 143, Rge. 88

and to construct, operate and maintain an electric transmission and/or distribution line or system on or under the above-described lands and/or in, upon or under all streets, raods or highways abutting said lands; to inspect and make such repairs, changes, alterations, improvements, removals from, substitutions and additions to its facilities as Cooperative may from time to time deem advisable, including, by way of example and not by way of limitation, the right to increase or decrease the number of conduits, wires, cables, handholes, manholes, connection boxes, transformers and transformer enclosures; to cut, trim and control the growth by chemical means, machinery or otherwise of trees and shrubbery located within _____ feet of the center line of said line or system, or that may interfere with or threaten to endanger the operation and maintenance of said line or system (including any control of the growth of other vegetation in the right-of-way which may incidentally and necessarily result from the means of control employed); to keep the easement clear of all buildings, structures or other obstructions; and to license, permit or otherwise agree to the joint use or occupancy of the lines, system or, if any of said system is placed underground, of the trench and related underground facilities, by any other person, association or corporation.

The undersigned agree that all poles, wires and other facilities including any main service entrance equipment, installed in, upon or under the above-described lands at the Cooperative's expense shall remain the property of the Cooperative, removable at the option of the Cooperative.

The undersigned covenant that they are the owners of the above-described lands.

IN WITNESS WHEREOF, the undersigned have set their hands and seals this 6th day of November, 1974.

Leland Erickson (L.S.)

_____ (L.S.)

Signed, sealed and delivered in the presence of:

Eldora Sailer

_____

State of North Dakota )
) ss
Mercer County )

Personally came before me this 6th day of November 1975 the above named Eldora Sailer to me known to be the person (s) who executed the foregoing instrument and acknowledged the same.

VIVIAN J. RICKERT NOTARY PUBLIC STATE OF NORTH DAKOTA

Vivian J. Rickert

Notary Public, Mercer, County, North Dakota, State.

My Commission expires 12-31-77

208123

**STATE OF NORTH DAKOTA**
**COUNTY OF MERCER**

**OFFICE OF**
**COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 8/18/2015 at 8:15 AM, and was duly recorded as Book 204 MISC on Page 729 Fee: $13.00

County Recorder Brenda L. Cook

By Deputy

Return To: ROUGHRIDER ELECTRIC COOPERATIVE, INC., 800 H
chg HAZEN, ND 58545

MORTGAGEE
MORTGAGOR
INDEXED ✓

COUNTY RECORDER SEAL MERCER COUNTY, N. DAK.

RECEIVED
FEB 5 2014

**SOUTHWEST WATER AUTHORITY**
Southwest Pipeline Project Building
West Industrial Park
4665 2nd Street SW
Dickinson, ND 58601-7231
(701) 225-0241
Toll Free: 1-888-425-0241

Segment **7-9E WEST CENTER SERVICE AREA**
Parcel **142-88-17**

## RIGHT-OF-WAY EASEMENT

**ALL PERSONS TAKE NOTICE:**

In consideration of one dollar ($1.00) and other good and valuable consideration **JAMES O KUSLER 5968 19TH STREET SW BEULAH, ND 58523** hereinafter referred to as Grantor, does hereby grant, bargain, sell, transfer and convey to the Southwest Water Authority, hereinafter referred to as the Grantee, its successor and assigns, a perpetual easement with right to erect, construct, install and lay, and thereafter use, operate, inspect, repair, maintain, replace, and remove water pipelines, connections, valves and all other appurtenant facilities used in connection with the construction, operation and maintenance of the Southwest Pipeline Project, over, above, across and through the land of the Grantor, situated in **Mercer** County, State of North Dakota, said land being described as follows: **N1/2 N1/2 LESS R/W SECTION 12 TOWNSHIP 142 RANGE 88 & SE1/4 SECTION 27 TOWNSHIP 143 RANGE 88** (the tract that contains **6.34** acres, more or less), together with the right of ingress and egress over the adjacent lands of the Grantor, successors and assigns for the purposes of this easement.

1. The permanent easement will be thirty (30) feet in width, fifteen (15) feet on each side of the center line of the pipeline as constructed, with an additional ten (10) feet of temporary right-of-way for a total construction easement width of forty (40) feet, twenty (20) feet on each side of the center line.

2. The Grantee covenants to maintain the easement in good repair so that no unreasonable damage will result from its use to the adjacent land of the Grantor, successors and assigns. The Grantor will receive compensation for damages to growing crops caused by the construction or operation. The Grantor will report any damages within three (3) years of the construction of the project.

The grant and other provisions of this easement shall constitute a covenant running with the land for the benefit of the Grantee, its successors and assigns.

**IN WITNESS WHEREOF,** the Grantor has executed this instrument this 3 day of February, 2014

James O. Kusler GRANTOR _____ GRANTOR

State of North Dakota

County of Dunn

On February 3, 2014, personally appeared before me James O. Kusler

_____ whom I know personally.
X whose identity I verified on the basis of North Dakota drivers license
_____ whose identity I verified on the oath or affirmation of _____, a credible witness to be the signor of the above and he/she acknowledged that he/she signed it.

DANIEL T. AICHELE
Notary Public
State of North Dakota
My Commission Expires Mar. 2, 2018

Notary Public Daniel T. Aichele

_____, County Dunn

My Commission Expires: Mar. 2, 2018

MORTGAGEE
MORTGAGOR
INDEXED ✓

**STATE OF NORTH DAKOTA**
**COUNTY OF MERCER**

**211517**
**OFFICE OF**
**COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 6/14/2016 at 9:26 AM, and was duly recorded as Book 213 MISC on Page 17 Fee: $13.00

County Recorder Brenda L Cook

By Deputy Kathryn Schumann

Return To: SOUTHWEST WATER AUTHORITY, WEST INDUSTRIA
4665 2ND ST SW DICKINSON, ND 58601-7231

COUNTY RECORDER
SEAL
MERCER COUNTY, N DAK.

Uploaded to BtW FTP on 2-5-14 (mc)

## RIGHT OF WAY EASEMENT

THIS AGREEMENT made and entered into this 19th day of June, 2019, between James Kusler, hereinafter called "Owner" (whether one or more) and **ROUGHRIDER ELECTRIC COOPERATIVE, INC.**, whose post office address is 800 Highway Drive, Hazen, North Dakota 58545-4737, hereinafter called "COOPERATIVE".

WITNESSETH that for valuable consideration, the receipt and sufficiency of which is hereby acknowledged, Owner grants unto Cooperative, its successors and assigns, for a term of 99 years from the date hereof, an easement to construct, reconstruct, operate and maintain an electric distribution system, overhead, underground or both including all poles, guys, anchors wires, surface terminals, and all accessories and appurtenances necessary or desirable in connection therewith, under, over, upon and across lands of Owner and/or in or upon all streets, roads or highways abutting said lands situated in Mercer County, North Dakota, and more particularly described as follows, to-wit:

A strip of land 20 feet in width, the same being 10 feet on each side of a centerline described as follows.

**Township 143 North Range 88 West**

S1/2SE1/4 of Section 27

The facilities erected hereunder shall remain the property of the Cooperative. Cooperative shall have the right to inspect, rebuild, remove, repair, improve and make such changes, alterations, substitutions and additions in and to its facilities as Cooperative may from time to time deem advisable, including the right to increase or decrease the size or capacity of its system, together with necessary accessories and appurtenances; the right to increase or decrease the size of the facilities and equipment situated upon the premises; the right to permit or otherwise agree to the joint use or occupancy of the overhead lines or the trench and related underground facilities by other persons, associations or corporations; and the right to at any time use the property described above to extend lines and facilities to serve the property of persons other than the Owner.

Any damages to the surface of the right-of-way or to crops, fences, gates, drains, ditches, or lines of the Owner, caused by the Cooperative in the installation, repair maintenance, reconstruction or removal of said electrical properties and appurtenances, shall be promptly repaired, replaced or paid for by the Cooperative, provided a claim therefore is presented to the Cooperative at its General Office within ninety (90) days after such damages occur. If the amount of said damages cannot be agreed upon, the Cooperative and the Owner shall each select an arbitrator, and these two shall select a third arbitrator, and the decision and award of the arbitrators shall be final.

Cooperative shall at all times have the right to keep the easement clear of all buildings, structures or other obstructions, trees, shrubbery, undergrowth and roots.

Owner, his successors and assigns, may use the land within the easement for any purpose not inconsistent with the rights granted, provided such use does not interfere with or endanger the Cooperative's facilities or the rights granted under this easement.

For the purpose of constructing, inspecting, maintaining or operating its facilities, Cooperative shall have the right of ingress to and egress from the easement over the lands of Owner adjacent to the easement and lying between public or private roads and the easement, such right to be exercised in such manner as shall occasion the least practicable damage and inconvenience to Owner.

Owner covenants that he is seized of and has the right to convey the said easement, rights and privileges; that Cooperative shall have quiet and peaceable possession, use and enjoyment of the aforesaid easement, rights and privileges, and that Owner shall execute such further assurances thereof as may be requested by the Cooperative.

James D. Kusler

STATE OF NORTH DAKOTA )
)ss
COUNTY OF Dunn )

On this 19th day of June, 2019, before me, a Notary Public in and for said County and State personally appeared James Kusler, known to me to be the person(s) described in and who executed the within and foregoing instrument and acknowledged to me that he/she/they executed the same.

***Notary Seal Location***

Notary Public State of North Dakota

My Commission Expires: 05/10/19

JOSH PAPE
Notary Public
State of North Dakota
My Commission Expires May 10, 2019

MORTGAGEE
MORTGAGOR
INDEXED ✓

**STATE OF NORTH DAKOTA**
**COUNTY OF MERCER**

**206136**
**OFFICE OF**
**COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 1/15/2015 at 11:12 AM, and was duly recorded a Book 200 MISC on Page 647 Fee: $13.00

County Recorder Brenda L Cook

By Deputy Kathryn Schumann

Return To: ROUGHRIDER ELECTRIC COOPERATIVE, INC., 800 H
cfg HAZEN, ND 58545

COUNTY RECORDER
SEAL
MERCER COUNTY, N. DAK.

**SOUTHWEST WATER AUTHORITY**
Southwest Pipeline Project Building
West Industrial Park
4665 2nd Street SW
Dickinson, ND 58601-7231
(701) 225-0241
Toll Free: 1-888-425-0241

Segment **7-9E WEST CENTER SERVICE AREA**
Parcel **142-88-17**

## RIGHT-OF-WAY EASEMENT

**ALL PERSONS TAKE NOTICE:**

In consideration of one dollar ($1.00) and other good and valuable consideration JOHNELLE J. KUSLER 1884 HILLCREST AVENUE ST. PAUL, MN 55116 hereinafter referred to as Grantor, does hereby grant, bargain, sell, transfer and convey to the Southwest Water Authority, hereinafter referred to as the Grantee, its successor and assigns, a perpetual easement with right to erect, construct, install and lay, and thereafter use, operate, inspect, repair, maintain, replace, and remove water pipelines, connections, valves and all other appurtenant facilities used in connection with the construction, operation and maintenance of the Southwest Pipeline Project, over, above, across and through the land of the Grantor, situated in MERCER County, State of North Dakota, said land being described as follows: E1/2 NE1/4 LESS R/W SECTION 12 TOWNSHIP 142 RANGE 88 & SE1/4 SECTION 27 TOWNSHIP 143 RANGE 88 (the tract that contains 3.35 acres, more or less), together with the right of ingress and egress over the adjacent lands of the Grantor, successors and assigns for the purposes of this easement.

1. The permanent easement will be thirty (30) feet in width, fifteen (15) feet on each side of the center line of the pipeline as constructed, with an additional ten (10) feet of temporary right-of-way for a total construction easement width of forty (40) feet, twenty (20) feet on each side of the center line.

2. The Grantee covenants to maintain the easement in good repair so that no unreasonable damage will result from its use to the adjacent land of the Grantor, successors and assigns. The Grantor will receive compensation for damages to growing crops caused by the construction or operation. The Grantor will report any damages within three (3) years of the construction of the project.

The grant and other provisions of this easement shall constitute a covenant running with the land for the benefit of the Grantee, its successors and assigns.

**IN WITNESS WHEREOF,** the Grantor has executed this instrument this 23rd day of May, 2015.

Johnell J Kusler GRANTOR _____ ~~GRANTOR~~ NV

State of MINNESOTA

County of RAMSEY

NICOLE LOUISE VERRILL
NOTARY PUBLIC - MINNESOTA
MY COMMISSION EXPIRES 01/31/19

On 23RD DAY OF MAY, 2015, personally appeared before me JOHNELL J. KUSLER NV

_____ whom I know personally.
__X__ whose identity I verified on the basis of MINNESOTA DRIVERS LISCENSE.
_____ whose identity I verified on the oath or affirmation of _____, a credible witness to be the signor of the above and he/she acknowledged that he/she signed it.

Notary Public Nicole Louise Verrill

RAMSEY, County MINNESOTA

My Commission Expires: 01/31/2019

207510

**STATE OF NORTH DAKOTA**
**COUNTY OF MERCER**

**OFFICE OF COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 6/19/2015 at 12:20 PM, and was duly recorded a Book 203 MISC on Page 599 Fee: $13.00

County Recorder Brenda L. Cook

By Deputy

Return To: SOUTHWEST WATER AUTHORITY, 4665 2ND STREET
DICKINSON, ND 58601-7231

MORTGAGEE
MORTGAGOR
INDEXED ✓

COUNTY RECORDER SEAL MERCER COUNTY, N DAK.

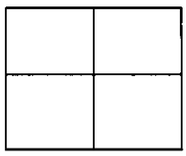
RECEIVED
MAY 28 2015
SOUTHWEST WATER AUTHORITY

uploaded to BTW AP on 5-28-15 ed

# RIGHT-OF-WAY EASEMENT

Faye Swenson (hereinafter called the "Grantor") (unmarried) (husband and wife) for a good and valuable consideration, the receipt whereof is hereby acknowledged, do hereby grant unto Roughrider Electric Cooperative, Inc. (hereinafter called "Grantee") whose post office address is Hazen, North Dakota 58545, and to its successors or assigns, an easement for 99 years, situated in the County of Oliver, State of North Dakota, and more particularly described as follows:

TOWNSHIP 142 NORTH, RANGE 87 WEST
Section 21 NE 1/4



To construct, reconstruct, relocate, rephase, remove, repair, operate and maintain on or under the above described lands, and/or in, upon or under all streets, roads or highways abutting said lands, an electric distribution line or system; to cut, trim eradicate and control the growth by chemical means, machinery or otherwise, or trees and shrubbery located within -15- feet of the center of said line system, or that may interfere with or threaten to endanger the operation and maintenance of said line system (indicating any control of the growth of other vegetation in the right-of-way which may incidentally and necessarily result from the means of control employed); and to license, permit or otherwise agree to the joint use or occupancy of the line or system by any other person, association or corporation, for electrification or communication purposes.

The undersigned Grantor agrees that all poles, wires, cables and other facilities including any main service entrance equipment installed on or below the above described lands at the Grantee's expense shall remain the property of Grantee, removable at its option upon termination of service to or on said lands.

Any damages to the surface of the right-of-way or to crops, fences, gates, drains, ditches or lines of the Grantor, caused by the Grantee in the installation, repair, maintenance, reconstruction or removal of said electric properties and appurtenances, shall be promptly repaired, replaced or paid for by the Grantee, provided a claim therefore is presented to the Grantee at its General Office within ninety (90) days after such damages occur. If the amount of said damages cannot be agreed upon, the Grantor and Grantee shall each select an arbitrator, and these two shall select a third arbitrator, and the decision and award of the arbitrators shall be final.

The undersigned Grantor convenants and agrees that no barrier of trees, shrubs, etc., and no structure or building shall be placed over underground conduits and electric lines and no construction shall be maintained or placed beneath over-the-ground electric lines and associated structures without the express written consent of the Grantee.

This Easement also includes a right-of-access to and from said real estate and Grantee's right-of-way for the purpose of connecting or reconnecting any part of the Grantee's system to or from said property with said system or to or from any other property on or coming on said system.

This Easement includes such additional rights of use and occupancy as shall be necessary for the use, maintenance, and operation of Grantee's system on said right-of-way, including but not limited to, anchors, guy wires, supporting poles or structures and the like as they were originally constructed or may thereafter be constructed.

The overall operating height of vehicles and equipment known to cultivate or traverse lands within the easement is less than _____ feet.

Dated this 1 day of July, 2008.

Faye B Swenson

RECORDER OLIVER COUNTY SEAL STATE OF NORTH DAKOTA

STATE OF NORTH DAKOTA )
)ss
COUNTY OF OLIVER )

The foregoing instrument was acknowledged before me this 1st day of July, 2008, by Faye B. Swenson.

My Commission Expires:
May 15, 2014

TIMOTHY J. VOLK
Notary Public
State of North Dakota
My Commission Expires May 15, 2014

Notary Public, State of North Dakota

88076 623 4/18/2013 10:17 AM PAGE: 1 OF 1
BOOK: HH PAGE: 3 FEES: $10.00 KW RIGHT OF WAY
Kim Wilkens, OLIVER COUNTY CLERK
By K Wilkens

ROUGHRIDER ELECTRIC COOP
2156 4TH AVE E
PO BOX 1038
DICKINSON, ND 58602

89860 5/27/2015 3:25 PM PAGE: 1 OF 1
BOOK: KK PAGE: 449 FEES: $10.00 MM EASEMENT
Kim Wilkens, OLIVER COUNTY RECORDER
By [signature]

SOUTHWEST WATER AUTHORITY
WEST INDUSTRIAL PARK
4665 2ND STREET SW
DICKINSON, ND 58601-7231

RECORDER OLIVER SEAL COUNTY STATE OF NORTH DAKOTA

**SOUTHWEST WATER AUTHORITY**
Southwest Pipeline Project Building
West Industrial Park
4665 2nd Street SW
Dickinson, ND 58601-7231
(701) 225-0241
Toll Free: 1-888-425-0241

Segment **7-9E WEST CENTER SERVICE AREA**
Parcel **142-87-16**

## RIGHT-OF-WAY EASEMENT

**ALL PERSONS TAKE NOTICE:**

In consideration of one dollar ($1.00) and other good and valuable consideration **KURT & FAYE SWENSON 5774 21ST STREET SW BEULAH, ND 58523** hereinafter referred to as Grantor, does hereby grant, bargain, sell, transfer and convey to the Southwest Water Authority, hereinafter referred to as the Grantee, its successor and assigns, a perpetual easement with right to erect, construct, install and lay, and thereafter use, operate, inspect, repair, maintain, replace, and remove water pipelines, connections, valves and all other appurtenant facilities used in connection with the construction, operation and maintenance of the Southwest Pipeline Project, over, above, across and through the land of the Grantor, situated in **Oliver** County, State of North Dakota, said land being described as follows: **NE1/4 SECTION 21 TOWNSHIP 142 RANGE 87** (the tract that contains **2.32** acres, more or less), together with the right of ingress and egress over the adjacent lands of the Grantor, successors and assigns for the purposes of this easement.

1. The permanent easement will be thirty (30) feet in width, fifteen (15) feet on each side of the center line of the pipeline as constructed, with an additional ten (10) feet of temporary right-of-way for a total construction easement width of forty (40) feet, twenty (20) feet on each side of the center line.

2. The Grantee covenants to maintain the easement in good repair so that no unreasonable damage will result from its use to the adjacent land of the Grantor, successors and assigns. The Grantor will receive compensation for damages to growing crops caused by the construction or operation. The Grantor will report any damages within three (3) years of the construction of the project.

The grant and other provisions of this easement shall constitute a covenant running with the land for the benefit of the Grantee, its successors and assigns.

**IN WITNESS WHEREOF,** the Grantor has executed this instrument this 2 day of April, 2015.

[signature] GRANTOR [signature] GRANTOR

State of NORTH DAKOTA

County of MERCER

On April 2, 2015, personally appeared before me FAYE SWENSON
KURT SWENSON

RECEIVED SOUTHWEST WATER AUTHORITY

X whom I know personally.
____ whose identity I verified on the basis of _____.
____ whose identity I verified on the oath or affirmation of _____, a credible witness to be the signor of the above and he/she acknowledged that he/she signed it.

Notary Public [signature]

_____, County MERCER

My Commission Expires: 6/16/16

ERIC BUCHHOLZ
Notary Public
State of North Dakota
My Commission Expires June 16, 2016

EXCH: BELH WO#: 2015-206-038

# *West River Telecommunications Right-of-Way Easement*

We the undersigned, (whether one or more) ***Donna M. Smith***, Grantor(s), do hereby grant and convey unto ***West River Telecommunications Cooperative***, a cooperative corporation (hereafter called the "Cooperative"), grantee, whose address is P.O. Box 467, Hazen, North Dakota, and its respective successors, assigns, lessees and agents, an easement to survey, construct, repair, operate, upgrade, maintain, relocate, replace and remove such communication systems as the grantee may from time to time require, consisting of but not limited to cables, wires, poles, splicing boxes, and other appurtenances, upon, over and under the land which the undersigned owns or in which the undersigned has any interest in the County of ***Oliver***, State of ***North Dakota***, and more particularly described as follows:

W sec

*NE/4 Sec. 22 T142N R87W*

E sec.

*NW/4 Sec. 21 T142N R87W*

also the right of ingress and egress over and across the lands of the undersigned for the purpose of exercising the rights herein granted; to place surface markers beyond said strip, to clear and keep clear all trees, roots, brush and other obstructions from the surface and subsurface of said strip of land. The boundary of said strip shall be a line parallel to and 10 feet either side of the first cable laid on the land of the undersigned. The undersigned for Grantor(s), their heirs, executors, administrators, successors, and assigns, hereby covenants that no structure shall be erected on said strip.

The undersigned agrees that all poles, wire and other facilities, including telephone equipment, installed on the above described land, shall remain the property of the Cooperative, removable at the option of the Cooperative. The undersigned agrees to this easement with the understanding the Grantor(s), their heirs, executors, administrators, successors, and assigns, may continue to have access to and use of the easement area in any manner consistent with the rights herein granted to the Cooperative, and that the Cooperative will restore the said strip to as near as reasonable to the pre-constructed condition, and that the Cooperative will erect no buildings on said strip.

The undersigned covenant that they are the owners of the above described lands and that the said lands are free and clear of encumbrances and liens of whatsoever character except those held by the following persons:

The term of this easement shall be for as long as needed by the grantee, and until a release of this easement is recorded, but to not extend beyond the maximum term authorized by law.

92299 12/24/2015 11:05 AM PAGE: 1 OF 2
BOOK: MM PAGE: 109 FEES: $13.00 KW EASEMENT
Kim Wilkens, OLIVER COUNTY RECORDER
By K Wilkens

STATE OF NORTH DAKOTA ★ COUNTY SEAL ★ OLIVER RECORDER

WEST RIVER COMMUNICATIONS
PO BOX 467

HAZEN, ND 58545

EXCH: BELH WO#: 2015-206-038

Access is hereby granted for a state or federal historical survey of the cable route, should one be required, unless checked. Access denied ☐

IN WITNESS WHEREOF, this instrument has been executed by the undersigned this the 18 day of Nov, 2015.

STATE OF North Dakota )
)
COUNTY OF Oliver. )

by: Donna Mae Smith

by: _____

On this 18 day of November, the year 2015 before me personally appeared Donna Mae Smith, known to me to be the person(s) who is described in and who executed the within instrument, and acknowledged to me that he/she (or they) executed the same.

STEVEN C. KNUDSON
Notary Public
State of North Dakota
My Commission Expires Aug. 23, 2017

Steven C Knudson
Notary Public, County of Mercer
My Commission Expires: Aug. 23, 2017

IN WITNESS WHEREOF, this instrument has been executed by the undersigned this the ___ day of _____, 2015.

STATE OF )
)
COUNTY OF )

by: _____

by: _____

On this _____ day of _____, the year _____ before me personally appeared _____, known to me to be the person(s) who is described in and who executed the within instrument, and acknowledged to me that he/she (or they) executed the same.

_____
Notary Public, County of _____
My Commission Expires:

01104

(I)

Location Number

RIGHT-OF-WAY EASEMENT

KNOW ALL MEN BY THESE PRESENTS, that the undersigned Norman Smith, for a good and valuable consideration, the receipt whereof is hereby acknowledged, does hereby grant unto the Oliver-Mercer Electric Cooperative, Inc., a corporation, whose post office address is Hazen, N. Dak., North Dakota, and to its successors or assigns, the right to enter upon the lands of the undersigned, situated in the county of Oliver, State of North Dakota and more particularly described as follows:

NW¼ Sec. 22, Sec. 21, 142-87

~~SW¼ Sec. 15, 142-87~~

(I)

and to place, construct, operate, repair, maintain, relocate and replace thereon and in or upon all streets, roads or highways abutting said lands an electric transmission or distribution line or system, and to cut and trim trees and shrubbery to the extent necessary to keep them clear of said electric line or system and to cut down from time to time all dead, weak, leaning or dangerous trees that are tall enough to strike the wires in falling.

In granting this easement it is understood that at pole locations, only a single pole and arrurtenance will be used, and that the location of the pole will be such as to form the least possible interference to farm operations so long as it does not materially increase the cost of construction.

The undersigned covenants that he is the owner of the above described lands and that the said lands are free and clear of encumbrances and liens of whatsoever character except those held by the following persons:

(S)

It is further understood that, whenever necessary, words in this instrument in the singular shall be construed to read in the plural and that words used in the masculine gender shall be construed to read in the feminine.

IN WITNESS WHEREOF, the undersigned has set his hand and seal this 26 day of June, 1946.

Signed, sealed and delivered in the presence of:

Norman Smith

Banks H. Leeb

91055 8/21/2015 10:45 AM PAGE: 1 OF 2
BOOK: 1 PAGE: 1084 FEES: $13.00 MM EASEMENT (ROUGHRID
Kim Wilkens, OLIVER COUNTY RECORDER
By Deputy

RECORDER OLIVER COUNTY SEAL STATE OF NORTH DAKOTA

(1)
STATE OF NORTH DAKOTA

COUNTY OF Mercer SS.

Banks H Sieber being first duly sworn says that he is one of the witnesses to the above and foregoing easements, that Norman Smith and whose names is and/or are subscribed to the above and foregoing instruments as a party is and/or are the persons described in said easement and that he signed said instrument in my presence and that I in their presence signed my name thereto as a subscribing witness.

Banks H Sieber

SUBSCRIBED and sworn to before me this 15 day of June 1946

R J Sailer
Notary Public in and for the County of Mercer and State of North Dakota.

R. J. SAILER NOTARY PUBLIC STATE OF NORTH DAKOTA

My commission expires May 15 1947

(1)
STATE OF NORTH DAKOTA
COUNTY OF Mercer SS.

On this 15th day of June 1946 before me R J Sailer a Notary Public within and for the State of North Dakota, personally appeared Banks H Sieber known to me to be one of the persons who subscribed his name to the above and foregoing instrument as a witness, and who acknowledged to me that he subscribed his name thereto as such witness, and who proved to me that the person who and/or whose names are subscribed to the foregoing instrument are the persons described in it.

R J Sailer
Notary Public in and for the County of Mercer and State of North Dakota.

R. J. SAILER NOTARY PUBLIC STATE OF NORTH DAKOTA

My commission expires May 15 1947

********************

(2)
STATE OF

County of SS

ROUGHRIDER ELECTRIC COOPERATIVE
800 HWY DR

HAZEN, ND 58545

On this day of 19, before me , a Notary Public in and for said County and State, personally appeared and known to me to be the persons who described in and who executed within and foregoing instrument and acknowledged to me that he executed the same.

Notary Public in and for the County of and State North Dakota.

My commission expires

## RIGHT-OF-WAY EASEMENT

KNOW ALL MEN BY THESE PRESENTS, that we the undersigned, (whether one or more) Ralph E. Smith (unmarried) (husband and wife) for a good and valuable consideration, the receipt whereof is hereby acknowledged, do hereby grant unto Oliver-Mercer Electric Cooperative, Inc. a cooperative corporation (hereinafter called the "Cooperative") whose post office address is Hazen, North Dakota, and to its successors or assigns, the right to enter upon the lands of the undersigned, situated in the County of Oliver, State of North Dakota, and more particularly described as follows:

South ½ Section 15 Township 142N Range 87W

and to construct, operate and maintain an electric transmission and/or distribution line or system on or under the above-described lands and/or in, upon or under all streets, raods or highways abutting said lands; to inspect and make such repairs, changes, alterations, improvements, removals from, substitutions and additions to its facilities as Cooperative may from time to time deem advisable, including, by way of example and not by way of limitation, the right to increase or decrease the number of conduits, wires, cables, handholes, manholes, connection boxes, transformers and transformer enclosures; to cut, trim and control the growth by chemical means, machinery or otherwise of trees and shrubbery located within 100 feet of the center line of said line or system, or that may interfere with or threaten to endanger the operation and maintenance of said line or system (including any control of the growth of other vegetation in the right-of-way which may incidentally and necessarily result from the means of control employed); to keep the easement clear of all buildings, structures or other obstructions; and to license, permit or otherwise agree to the joint use or occupancy of the lines, system or, if any of said system is placed underground, of the trench and related underground facilities, by any other person, association or corporation.

The undersigned agree that all poles, wires and other facilities including any main service entrance equipment, installed in, upon or under the above-described lands at the Cooperative's expense shall remain the property of the Cooperative, removable at the option of the Cooperative.

The undersigned covenant that they are the owners of the above-described lands.

IN WITNESS WHEREOF, the undersigned have set their hands and seals this 20th day of November, 1975.

Ralph E. Smith (L.S.)

(L.S.)

Signed, sealed and delivered in the presence of:

Leonard H. Wohlfeil

90409 7/15/2015 3:20 PM PAGE: 1 OF 1
BOOK: 1 PAGE: 36 FEES: $10.00 MM EASEMENT (ROUGHRIDER
Kim Wilkens, OLIVER COUNTY RECORDER
By MMBulty Eule Deputy

ROUGHRIDER ELECTRIC COOPERATIVE
800 HWY DR

HAZEN, ND 58545

RECORDER OLIVER COUNTY SEAL STATE OF NORTH DAKOTA

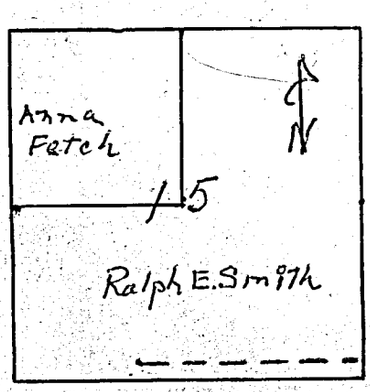
State of North Dakota )
) ss
Mercer County )

Personally came before me this 20th day of November 1975 the above named Leonard H. Wohlfeil to me known to be the person (s) who executed the foregoing instrument and acknowledged the same.

Vivian J. Rickertt

Notary Public, Mercer, County, North Dakota, State.

My Commission expires 12-31-77



VIVIAN J. RICKERTT NOTARY PUBLIC STATE OF NORTH DAKOTA

Anna Fetch
15
Ralph E. Smith

OFFICE OF COUNTY RECORDER
STATE OF NORTH DAKOTA
COUNTY OF OLIVER
Filed for record this 16 day
of Sept A.D. 2011
at 11:59 o'clock A M.,
and recorded as document No. 56785
in book FF of Misc page 619-621
B Wilkens
County Recorder Deputy

**PIPELINE EASEMENT**

North Dakota State Water Commission
County of Oliver
Parcels H-OL-141

**ALL PERSONS TAKE NOTICE:**

That the undersigned, Jule Silbernagel and Faye Swenson, as tenants in common, called the Grantor, being the owner of, or having an interest in, land situated in the County of Oliver, State of North Dakota, more fully described below, in consideration of One and No/100 Dollars ($1.00) and other valuable consideration, does hereby grant, convey, and warrant to the State of North Dakota, acting by and through the North Dakota State Water Commission, a state agency and public corporation, with its principal office at 900 East Boulevard Ave., Bismarck, North Dakota 58505, called the Grantee, and to its successors and assigns, the right, privilege, and easement to construct, maintain, operate, inspect, repair, alter, replace, change the size of or remove a pipeline, and appurtenances thereto, for the transportation of water under, across, and through:

Parcel H-OL-141
A 40 foot wide strip of land 20 feet wide on each side of the pipeline centerline lying within the SE1/4 Section 15, Township 142 North, Range 87 West of the 5th P.M.

Said tract contains 2.42 acres, more or less.

Temporary Construction Easement
An additional 20 feet of temporary right-of-way lying adjacent to the above described tract for a total construction easement width of 60 feet.

Said tract contains 1.21 acres, more or less.

together with the right to utilize additional land for a period up to three years from the date of this easement, adjacent to the above described tract, for purposes of temporary working space during initial construction of the pipeline, and the right of ingress to and egress from said strip of land across the adjacent lands of the Grantor, for the purposes specified above at the will of the Grantee.

**THE GRANTOR AND THE GRANTEE FURTHER AGREE:**

1. **Use of right-of-way by Grantor.** Grantor reserves the right to use the surface of the easement strip provided, however, that Grantor, without prior approval of Grantee, shall neither construct nor permit to be constructed any building, structure, or other improvement upon the easement strip which would interfere with Grantee's exercise of the rights conveyed by this pipeline easement, including access to the easement strip.

2. **Appurtenances.** The Grantee shall have the right to install and construct necessary appurtenances upon the surface of the easement strip. Prior to construction, the Grantee will notify the Grantor of the approximate location of such appurtenances if any, to be located on the easement strip, and shall pay to the Grantor the sum of $500 for each appurtenance located at a distance of more than 5 feet from a field boundary or fence line. Such payments shall be paid prior to construction.

3. **Damages.** The Grantee will pay to Grantor or Grantor's tenants, as their respective interests may appear, for damages caused by the operations or activities of the Grantee; provided, however, that the Grantee shall have the right, without liability for damages, to clear, and keep cleared, all trees, brush, and other obstructions from the easement strip that may, in the Grantee's judgment, interfere with the rights and privileges of the Grantee under this pipeline easement.

   If the amount of any damage which Grantor may sustain as a result of Grantee's exercise of rights hereunder cannot be mutually agreed upon, such damages shall be ascertained and

determined by three (3) disinterested person; one to be appointed by the Grantor, one by Grantee, and a third by the two so appointed, and the award of such three persons shall be final and conclusive.

4. **Restoration of surface.** The Grantee will restore the surface of the construction area to its original contour as nearly as practicable.

5. **Topsoil segregation.** When excavating the pipeline trench with a backhoe/trackhoe, the Grantee will remove the topsoil separately during the construction of the pipeline for the full width of the pipe trench to a depth of twelve (12) inches or the actual topsoil depth, whichever is less, and to be replaced at the top of the backfill over the pipe trench.

6. **Assignment and covenant by parties.** The rights of either party may be assigned in whole or in part. The terms and provisions of this easement shall constitute covenants running with the land and shall be binding upon, and inure to the benefit of, the parties hereto, their successors, assigns, personal representatives, and heirs.

7. **Grantor's title.** Grantor warrants that he is the owner of, or has an interest in, the land described in this easement, and that he has full right and authority to enter into and deliver this easement. This instrument may be executed in counterparts and each counterpart shall constitute a separate agreement between the parties thereto. Any payments pursuant to this pipeline easement shall be in proportion to the Grantor's interest in the undivided fee simple estate.

8. **Entire agreement.** This instrument contains the entire agreement of the parties and there are no other, or different, agreements or understandings between the Grantor and the Grantee, or its agents. The Grantor, in executing this pipeline easement, has not relied upon any promises, inducements, or representatives of the Grantee, or its agents, except as are set forth herein.

9. **Term of easement.** The term of this easement shall be as long as it is needed by the Grantee, or its assigns, and until a release of this easement is recorded, but shall not exceed ninety-nine (99) years pursuant to NDCC §47-05-02.1.

10. **Tenants.** The Grantor represents that the land described in this easement is (not rented) (rented to) John Smith.

Dated this 21st day of February, 20 11.

Faye Swenson
Grantor

Jule Silbernagel
Grantor

STATE OF NORTH DAKOTA)
) ss.
COUNTY OF Diver )

On this 24 day of February, 20 11, before me personally appeared Faye Swenson, known to me to be the person(s) described in and who executed the within and foregoing instrument, and acknowledged to me that he/she executed

the same.

Notary Public

(SEAL)
JAY L. PETERSON
Notary Public
State of North Dakota
My Commission Expires Jan. 13, 2015

Morton County, ND

My Commission expires:

STATE OF ARIZONA )
) ss.
COUNTY OF Maricopa )

On this 1 day of March, 20 11, before me personally appeared Jule D. Silberwagel, known to me to be the person(s) described in and who executed the within and foregoing instrument, and acknowledged to me that he/she executed the same.

Notary Public

(SEAL)
CYNTHIA A. CLARK
Notary Public - Arizona
Maricopa County
My Commission Expires
July 3, 2014

July 3, 2014 County, AZ

My Commission expires:

90190 6/25/2015 6:19 PM PAGE: 1 OF 1
BOOK: LL PAGE: 20 FEES: $10.00 MM EASEMENT
Kim Wilkens, OLIVER COUNTY RECORDER
By K Wilkens

SOUTHWEST WATER AUTHORITY
WEST INDUSTRIAL PARK
4665 2ND STREET SW
DICKINSON, ND 58601-7231

OLIVER SEAL COUNTY STATE OF NORTH DAKOTA

**SOUTHWEST WATER AUTHORITY**
Southwest Pipeline Project Building
West Industrial Park
4665 2nd Street SW
Dickinson, ND 58601-7231
(701) 225-0241
Toll Free: 1-888-425-0241

Segment **7-9E WEST CENTER SERVICE AREA**
Parcel **142-87-6**

## RIGHT-OF-WAY EASEMENT

**ALL PERSONS TAKE NOTICE:**

In consideration of one dollar ($1.00) and other good and valuable consideration **MILDA K. HEDBLOM 1801 SUMMIT AVENUE ST. PAUL, MN 55105** hereinafter referred to as Grantor, does hereby grant, bargain, sell, transfer and convey to the Southwest Water Authority, hereinafter referred to as the Grantee, its successor and assigns, a perpetual easement with right to erect, construct, install and lay, and thereafter use, operate, inspect, repair, maintain, replace, and remove water pipelines, connections, valves and all other appurtenant facilities used in connection with the construction, operation and maintenance of the Southwest Pipeline Project, over, above, across and through the land of the Grantor, situated in **Oliver** County, State of North Dakota, said land being described as follows: **NW1/4 SECTION 7 TOWNSHIP 142 RANGE 87** (the tract that contains **1.59** acres, more or less), together with the right of ingress and egress over the adjacent lands of the Grantor, successors and assigns for the purposes of this easement.

1. The permanent easement will be thirty (30) feet in width, fifteen (15) feet on each side of the center line of the pipeline as constructed, with an additional ten (10) feet of temporary right-of-way for a total construction easement width of forty (40) feet, twenty (20) feet on each side of the center line.

2. The Grantee covenants to maintain the easement in good repair so that no unreasonable damage will result from its use to the adjacent land of the Grantor, successors and assigns. The Grantor will receive compensation for damages to growing crops caused by the construction or operation. The Grantor will report any damages within three (3) years of the construction of the project.

The grant and other provisions of this easement shall constitute a covenant running with the land for the benefit of the Grantee, its successors and assigns.

**IN WITNESS WHEREOF,** the Grantor has executed this instrument this 23 day of May, 2015.

Milda K. Hedblom GRANTOR _____ GRANTOR

State of MN

County of Ramsey

On May 23, 2015, personally appeared before me Milda K. Hedblom

_____ whom I know personally.
✓ whose identity I verified on the basis of Drivers License.
_____ whose identity I verified on the oath or affirmation of _____, a credible witness to be the signor of the above and he/she acknowledged that he/she signed it.

Notary Public _____

Ramsey, County MN

My Commission Expires: 01/31/2016

JUSTIN DAVID HOSMAN
NOTARY PUBLIC - MINNESOTA
MY COMMISSION EXPIRES 01/31/16

97087 8/5/2022 11:38 AM Total Pages: 13
BOOK: V V PAGE: 184 FEES: $65.00 RB EASEMENT
Mickie McNulty-Eide, OLIVER COUNTY RECORDER
By Rebecca Bettke, Deputy

SOLEM LAW OFFICE
PO BOX 249

BEULAH, ND 58523

RECORDER OLIVER SEAL COUNTY STATE OF NORTH DAKOTA

# WATER WELL AND WATER TANK EASEMENT

THIS INDENTURE, made and entered into this 31st day of May, 2022, by and between **JOHNELL J. KUSLER, as personal representative of the Estate of James O. Kusler,** whose post office address is 1884 Hillcrest Avenue, St. Paul, Minnesota 55116, **JOHNELL J. KUSLER,** whose post office address is 1884 Hillcrest Avenue, St. Paul, Minnesota 55116, AND **MILDA L. HEDBLOM, a/k/a MILDA K. HEDBLOM**, whose post office address is 1801 Summit Avenue, St. Paul, Minnesota 55105, hereafter **"Party of the First Part**; and **TRENT T. MARTIN and DAWN MARTIN**, husband and wife, whose post office address is 1943 62ND Avenue SW, Beulah, North Dakota 58523, hereafter **"Party of the Second Part"**.

WITNESSETH, that the Party of the First Part owns the following described parcel of land located in Oliver County, North Dakota, to-wit:

See Exhibit A attached hereto and incorporated herein by reference.

That the Party of the Second Part owns the following described parcel of land located in Oliver County, North Dakota, to-wit:

See Exhibit B attached hereto and incorporated herein by reference.

SOLEM LAW OFFICE
109 CENTRAL AVENUE S
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail:beulaw@westriv.com

That the said Party of the Second Part for and in consideration of the sum of One Dollar ($1.00) and other good and valuable consideration, the receipt of which is hereby acknowledged by the Party of the Second Part, does by these presents grant and convey until the Party of the First Part for their use and benefit upon the parcel of land identified and described in Exhibit A attached hereto and incorporated herein by reference, a Water Well and Water Tank Easement allowing the Party of the First Part, their successors and assigns, access to and use of existing water wells and water tanks located upon the above described parcel of land owned by the Party of the Second Part and described in Exhibit B, attached hereto and incorporated herein by reference. The Party of the First Part may, in the future, add one additional waterline from the existing water wells located on the Party of the Second Part's property described in Exhibit B, which said waterline may extend onto the Party of the First Part's property described in Exhibit A. The Party of the First Part, and their successors and assigns, may use this one future additional waterline for livestock purposes only and this waterline may not be used to service a residence or be sold to another party to be used to service a residence.

This Easement shall be binding and obligatory upon the heirs, administrators, personal representatives, survivors, and assigns of the parties hereto, and this easement shall continue for a term of ninety-nine (99) years or for such longer period of time as may be allowed by state law. It is further understood that the Party of the First Part shall be under no obligation to maintain any existing water wells and water tanks owned by the Party of the Second Party. Any new additional waterline to be established as herein provided by the Party

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

of the First Part shall be established at their sole expense and maintained solely by the Party of the First Part.

IN WITNESS WHEREOF, the said parties hereto set their hands and seals the day and year first above written.

WITNESS, The hands of the parties of the first part:

Johnell J Kusler PR

**JOHNELL J. KUSLER, Personal Representative of the Estate of JAMES O. KUSLER**

STATE OF NORTH DAKOTA )
)
COUNTY OF MERCER )

On this 31st day of May, 2022, before me, a Notary Public in and for said County and State, personally appeared **JOHNELL J. KUSLER, as Personal Representative of the Estate of James O. Kusler**, known to me to be the person that is described in and that executed the within instrument, and acknowledged to me that she executed the same.

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

SCOTT T. SOLEM, NOTARY PUBLIC
MERCER COUNTY, NORTH DAKOTA

Johnell J Kusler

**JOHNELL J. KUSLER**

STATE OF NORTH DAKOTA )
)
COUNTY OF MERCER )

On this 31st day of May, 2022, before me, a Notary Public in and for said County and State, personally appeared **JOHNELL J. KUSLER,** known to me to be the person that is described in and that executed the within instrument, and acknowledged to me that she executed the same.

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

SCOTT T. SOLEM, NOTARY PUBLIC
MERCER COUNTY, NORTH DAKOTA

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

**MILDA L. HEDBLOM,**
**a/k/a MILDA K. HEDBLOM**

STATE OF NORTH DAKOTA )
)
COUNTY OF MERCER )

On this 31st day of May, 2022, before me, a Notary Public in and for said County and State, personally appeared **MILDA L. HEDBLOM, a/k/a MILDA K. HEDBLOM,** known to me to be the person that is described in and that executed the within instrument, and acknowledged to me that she executed the same.

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

SCOTT T. SOLEM, NOTARY PUBLIC
MERCER COUNTY, NORTH DAKOTA

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

WITNESS, the hands of the parties of the second part:

**TRENT T. MARTIN**

**DAWN MARTIN**

STATE OF NORTH DAKOTA )
)
COUNTY OF MERCER )

On this 31st day of May, 2022, before me, a Notary Public in and for said County and State, personally appeared **TRENT T. MARTIN and DAWN MARTIN,** known to me to be the persons that are described in and that executed the within instrument, and acknowledged to me that they executed the same.

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

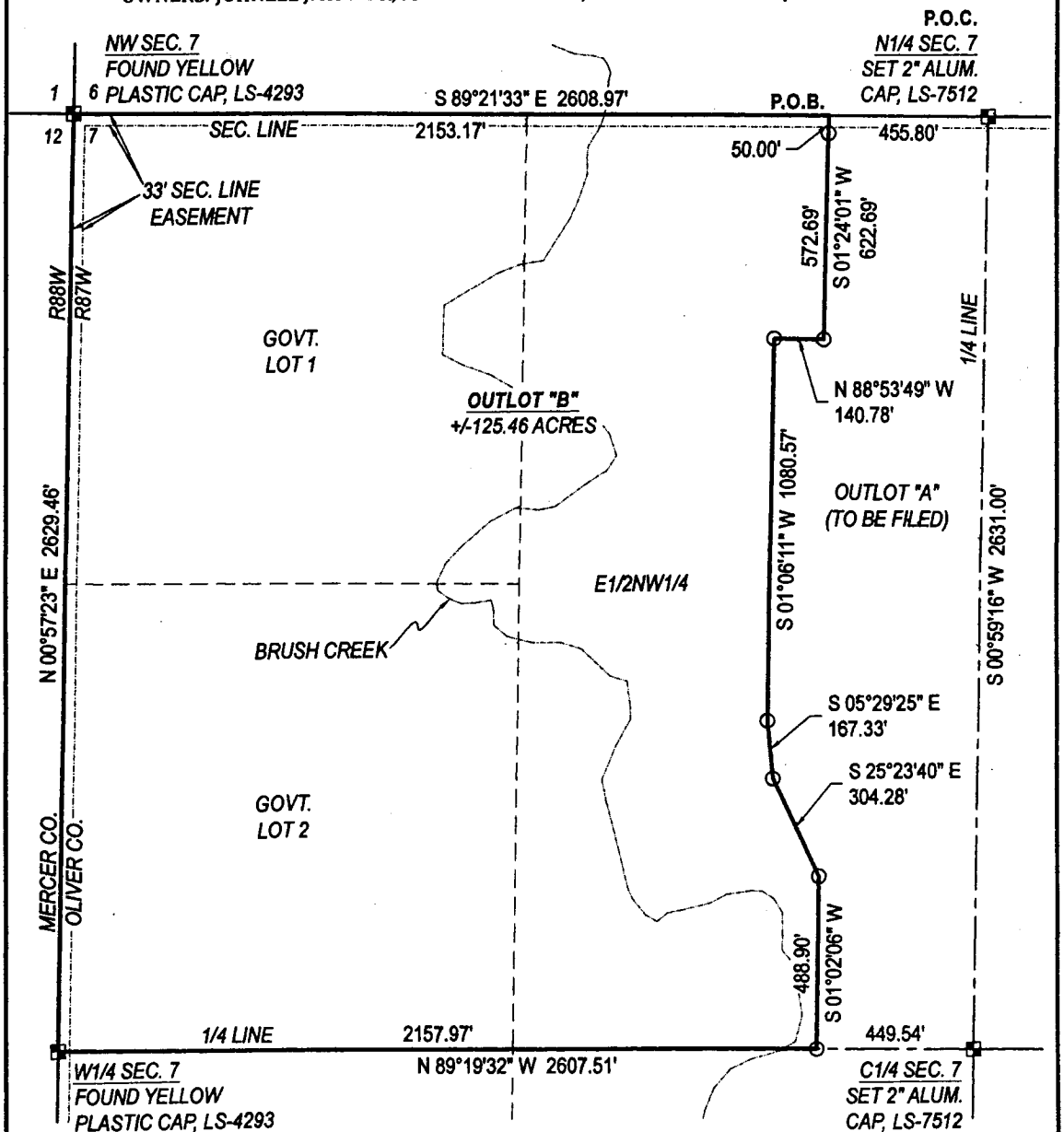
SCOTT T. SOLEM, NOTARY PUBLIC
MERCER COUNTY, NORTH DAKOTA

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

Exhibit A

# PLAT OF OUTLOT "B"

LOCATED IN GOVERNMENT LOTS 1 AND 2, AND THE E1/2NW1/4 OF SECTION 7,
TOWNSHIP 142 NORTH, RANGE 87 WEST, 5th P.M.,
OLIVER COUNTY, NORTH DAKOTA
OWNERS: JOHNELL J. KUSLER, MILDA L. HEDBLOM, AND THE ESTATE OF JAMES O. KUSLER




REGISTERED PROFESSIONAL LAND SURVEYOR
AARON HUMMERT
LS-7512
DATE 2/22/22
NORTH DAKOTA

0 400
SCALE: 1" = 400'
DATE OF FIELD SURVEY:
FEBRUARY 14 & 19, 2022

**LEGEND:**

- ■ – PLSS CORNER (AS NOTED)
- ○ – SET REBAR W/CAP LS-7512

**SURVEYOR'S NOTE:**
The basis of bearing is based on the North Dakota State Plane Coordinate System, South Zone - NAD83. The distances reported hereon are in reference to the international foot definition and are at ground per the NDDOT combination factor for Oliver County (1/CF=1.0001470216). The measurements have been determined by RTK methods using the "Trimble VRSNow" system.

| | |
|---|---|
| DRAWN BY: AH | AARON HUMMERT, PLS<br>PROFESSIONAL LAND SURVEYOR<br>1901 31st STREET NW<br>MANDAN, ND 58554<br>OFFICE: (701) 426-8624 |
| CHECKED BY: AH | |
| PROJECT #: 2022-9 | |
| DATE: 2/20/2022 | SHEET 1 OF 4 |

THE UNDERSIGNED, Owner of the within described property, in accordance with the provisions of section 57-02-39 of the North Dakota Century Code, and upon demand of the County Auditor of Oliver County, North Dakota, have caused to be made the within and foregoing plat of said land with the lots as herein described, and have caused the same to be placed on record, as provided by law.

Witness our hands and seal, this 11th day of March, 2022.

In presence of Scott T. Solem

Johnell J. Kusler

STATE OF NORTH DAKOTA )
ss
COUNTY OF MERCER )

I, SCOTT T. SOLEM, a notary public within and for said County, do hereby certify that on this 11th day of March, A.D. 2022, personally appeared before me to me well known to be the same person described in and who executed the within and foregoing instrument and acknowledged that she executed the same freely and voluntarily.

My commission expires _____, 20___

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

Notary Public

THE UNDERSIGNED, Owner of the within described property, in accordance with the provisions of section 57-02-39 of the North Dakota Century Code, and upon demand of the County Auditor of Oliver County, North Dakota, have caused to be made the within and foregoing plat of said land with the lots as herein described, and have caused the same to be placed on record, as provided by law.

Witness our hands and seal, this 11th day of March, 2022.

In presence of Scott T. Solem

Johnell J. Kusler PR

Johnell J. Kusler, Personal Representative of the Estate of James O. Kusler

STATE OF NORTH DAKOTA )
ss
COUNTY OF MERCER )

I, SCOTT T. SOLEM, a notary public within and for said County, do hereby certify that on this 11th day of March, A.D. 2022, personally appeared before me to me well known to be the same person described in and who executed the within and foregoing instrument and acknowledged that she executed the same freely and voluntarily.

My commission expires _____, 20___

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

Notary Public

| | |
|---|---|
| DRAWN BY: AH | AARON HUMMERT, PLS<br>PROFESSIONAL LAND SURVEYOR<br>1901 31st STREET NW<br>MANDAN, ND 58554<br>OFFICE: (701) 426-8624 |
| CHECKED BY: AH | |
| PROJECT #: 2022-9 | |
| DATE: 2/20/2022 | SHEET 2 OF 4 |

THE UNDERSIGNED, Owner of the within described property, in accordance with the provisions of section 57-02-39 of the North Dakota Century Code, and upon demand of the County Auditor of Oliver County, North Dakota, have caused to be made the within and foregoing plat of said land with the lots as herein described, and have caused the same to be placed on record, as provided by law.

Witness our hands and seal, this 11th day of March, 2022.

In presence of Scott T. Solem

Milda L. Hedblom

STATE OF NORTH DAKOTA )
ss
COUNTY OF MERCER )

I, SCOTT T. SOLEM, a notary public within and for said County, do hereby certify that on this 11th day of March, A.D. 2022, personally appeared before me to me well known to be the same person described in and who executed the within and foregoing instrument and acknowledged that she executed the same freely and voluntarily.

My commission expires ____, 20__

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

Notary Public

SURVEYOR'S CERTIFICATE:

I, Aaron Hummert, a North Dakota Professional Land Surveyor, do hereby certify that this survey was performed by me or under my direct supervision at the request of Johnell J. Kusler, that said survey is true and complete as shown, and that the monuments found and set are of the character and occupy the positions shown thereon. This survey does not represent a complete title search.

REGISTERED PROFESSIONAL LAND SURVEYOR
AARON HUMMERT
LS-7512
DATE 2/22/22
NORTH DAKOTA

AARON HUMMERT, PLS
NORTH DAKOTA REGISTRATION NO. LS-7512

Subscribed and sworn to before me this 22nd day of February, 2022.

AUSTIN EVANS
Notary Public
State of North Dakota
My Commission Expires 11/04/2025

Notary Public

CERTIFICATE OF APPROVAL:

The within and foregoing plat is hereby approved:

Dated: ____ day of ____, 20__.

Chairman

96910 5/6/2022 10:45 AM Total Pages: 4
BOOK: E PAGE: 60 FEES: $20.00 RB Plats
Mickie McNulty-Eide, OLIVER COUNTY RECORDER
By Rebecca Bohlke, Deputy

OLIVER COUNTY RECORDER SEAL STATE OF NORTH DAKOTA

SOLEM LAW OFFICE
PO BOX 249

BEULAH, ND 58523

| | |
|---|---|
| DRAWN BY: AH | AARON HUMMERT, PLS<br>PROFESSIONAL LAND SURVEYOR<br>1901 31st STREET NW<br>MANDAN, ND 58554<br>OFFICE: (701) 426-8624 |
| CHECKED BY: AH | |
| PROJECT #2022-9 | |
| DATE: 2/20/2022 | SHEET 3 OF 4 |

# PLAT OF OUTLOT "B" - ATTACHED DESCRIPTION

LOCATED IN GOVERNMENT LOTS 1 AND 2, AND THE E1/2NW1/4 OF SECTION 7,
TOWNSHIP 142 NORTH, RANGE 87 WEST, 5th P.M.,
OLIVER COUNTY, NORTH DAKOTA

DESCRIPTION:

A tract of land located in Government Lots 1 and 2, and the East Half of the Northwest Quarter (E1/2NW1/4) of Section 7, Township 142 North, Range 87 West of the 5th Principal Meridian, Oliver County, North Dakota, and is more particularly described as follows:

COMMENCING at the north quarter corner of said Section 7; thence on the north line of said Section 7, N89°21'33"W a distance of 455.80 feet to the POINT OF BEGINNING.

From said POINT OF BEGINNING; thence S01°24'01"W a distance of 622.69 feet; thence N88°53'49"W a distance of 140.78 feet; thence S01°06'11"W a distance of 1080.57 feet; thence S05°29'25"E a distance of 167.33 feet; thence S25°23'40"E a distance of 304.28 feet; thence S01°02'06"W a distance of 488.90 feet to the east/west quarter line of said Section 7; thence on said east/west quarter line, N89°19'32"W a distance of 2157.97 feet to the west quarter corner of said Section 7; thence on the west line of said Section 7, N00°57'23"E a distance of 2629.46 feet to the northwest corner of said Section 7; thence on the north line of said Section 7, S89°21'33"E a distance of 2153.17 feet to the POINT OF BEGINNING.

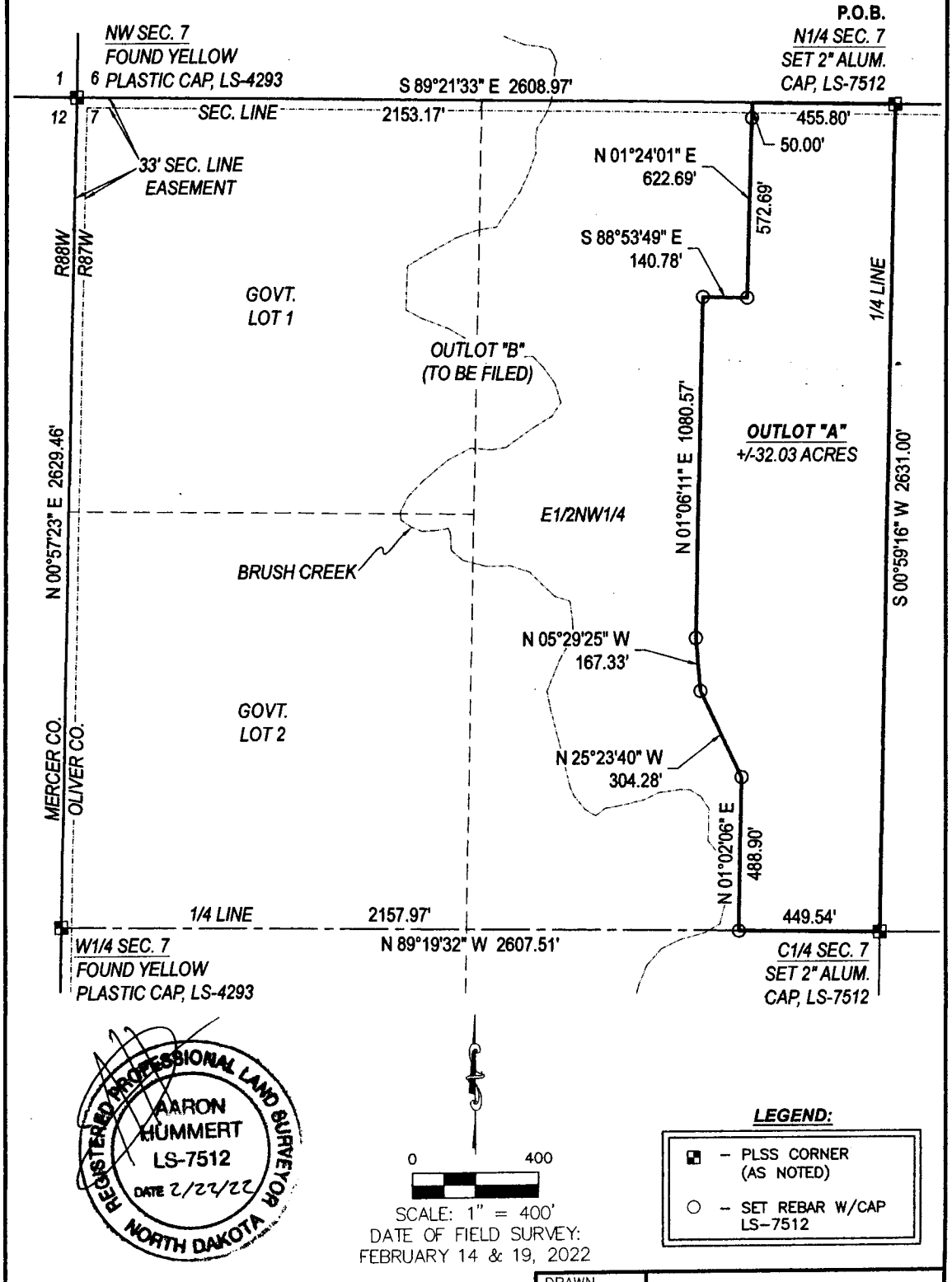
Said tract of land contains 125.46 acres more or less and is subject to any previous easements, agreements, conveyances, and surveys.

| | |
|---|---|
| DRAWN BY: AH | AARON HUMMERT, PLS<br>PROFESSIONAL LAND SURVEYOR<br>1901 31st STREET NW<br>MANDAN, ND 58554<br>OFFICE: (701) 426-8624 |
| CHECKED BY: AH | |
| PROJECT #: 2022-9 | |
| DATE: 2/20/2022 | SHEET 4 OF 4 |

Exhibit B

# PLAT OF OUTLOT "A"

LOCATED IN THE E1/2NW1/4 OF SECTION 7,
TOWNSHIP 142 NORTH, RANGE 87 WEST, 5th P.M.,
OLIVER COUNTY, NORTH DAKOTA
OWNERS: JOHNELL J. KUSLER, MILDA L. HEDBLOM, AND THE ESTATE OF JAMES O. KUSLER




REGISTERED PROFESSIONAL LAND SURVEYOR
AARON HUMMERT
LS-7512
DATE 2/22/22
NORTH DAKOTA

0 400
SCALE: 1" = 400'
DATE OF FIELD SURVEY:
FEBRUARY 14 & 19, 2022

**LEGEND:**

- ■ – PLSS CORNER (AS NOTED)
- ○ – SET REBAR W/CAP LS–7512

**SURVEYOR'S NOTE:**

The basis of bearing is based on the North Dakota State Plane Coordinate System, South Zone - NAD83. The distances reported hereon are in reference to the international foot definition and are at ground per the NDDOT combination factor for Oliver County (1/CF=1.0001470216). The measurements have been determined by RTK methods using the "Trimble VRSNow" system.

| | |
|---|---|
| DRAWN BY: AH | |
| CHECKED BY: AH | |
| PROJECT #: 2022–9 | |
| DATE: 2/20/2022 | |


AARON HUMMERT, PLS
PROFESSIONAL LAND SURVEYOR
1901 31st STREET NW
MANDAN, ND 58554
OFFICE: (701) 426-8624


SHEET 1 OF 4

THE UNDERSIGNED, Owner of the within described property, in accordance with the provisions of section 57-02-39 of the North Dakota Century Code, and upon demand of the County Auditor of Oliver County, North Dakota, have caused to be made the within and foregoing plat of said land with the lots as herein described, and have caused the same to be placed on record, as provided by law.

Witness our hands and seal, this 11th day of March, 20 22.

In presence of Scott T. Solem

Johnell J. Kusler

STATE OF NORTH DAKOTA )
ss
COUNTY OF MERCER )

I, SCOTT T. SOLEM, a notary public within and for said County, do hereby certify that on this 11th day of March, A.D. 20 22, personally appeared before me to me well known to be the same person described in and who executed the within and foregoing instrument and acknowledged that she executed the same freely and voluntarily.

My commission expires _____, 20___

SCOTT T. SOLEM, 20___
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

Notary Public

THE UNDERSIGNED, Owner of the within described property, in accordance with the provisions of section 57-02-39 of the North Dakota Century Code, and upon demand of the County Auditor of Oliver County, North Dakota, have caused to be made the within and foregoing plat of said land with the lots as herein described, and have caused the same to be placed on record, as provided by law.

Witness our hands and seal, this 11th day of March, 20 22.

In presence of Scott T. Solem

Johnell J. Kusler PR

Johnell J. Kusler, Personal Representative of the Estate of James O. Kusler

STATE OF NORTH DAKOTA )
ss
COUNTY OF MERCER )

I, SCOTT T. SOLEM, a notary public within and for said County, do hereby certify that on this 11th day of March, A.D. 2022, personally appeared before me to me well known to be the same person described in and who executed the within and foregoing instrument and acknowledged that she executed the same freely and voluntarily.

My commission expires _____, 20___

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

Notary Public

| | |
|---|---|
| DRAWN BY: AH | AARON HUMMERT, PLS<br>PROFESSIONAL LAND SURVEYOR<br>1901 31st STREET NW<br>MANDAN, ND 58554<br>OFFICE: (701) 426-8624 |
| CHECKED BY: AH | |
| PROJECT #: 2022-9 | |
| DATE: 2/20/2022 | SHEET 2 OF 4 |

THE UNDERSIGNED, Owner of the within described property, in accordance with the provisions of section 57-02-39 of the North Dakota Century Code, and upon demand of the County Auditor of Oliver County, North Dakota, have caused to be made the within and foregoing plat of said land with the lots as herein described, and have caused the same to be placed on record, as provided by law.

Witness our hands and seal, this 11th day of March, 2022.

In presence of Scott T. Solem

Milda L. Hedblom

STATE OF NORTH DAKOTA )
SS
COUNTY OF MERCER )

I, SCOTT T. SOLEM, a notary public within and for said County, do hereby certify that on this 11th day of March, A.D. 2022, personally appeared before me to me well known to be the same person described in and who executed the within and foregoing instrument and acknowledged that she executed the same freely and voluntarily.

My commission expires _____, 20___

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

Notary Public

SURVEYOR'S CERTIFICATE:

I, Aaron Hummert, a North Dakota Professional Land Surveyor, do hereby certify that this survey was performed by me or under my direct supervision at the request of Johnell J. Kusler, that said survey is true and complete as shown, and that the monuments found and set are of the character and occupy the positions shown thereon. This survey does not represent a complete title search.

AARON HUMMERT, PLS
NORTH DAKOTA REGISTRATION NO. LS-7512

REGISTERED PROFESSIONAL LAND SURVEYOR
AARON HUMMERT
LS-7512
DATE 2/22/22
NORTH DAKOTA

Subscribed and sworn to before me this 22nd day of 22, 2022.

AUSTIN EVANS
Notary Public
State of North Dakota
My Commission Expires 11/04/2025

Notary Public

CERTIFICATE OF APPROVAL:

The within and foregoing plat is hereby approved:

Dated: _____ day of _____, 20___.

Chairman

96898 4/26/2022 1:17 PM Total Pages: 4
BOOK: E PAGE: 59 FEES: $20.00 RB Plats
Mickie McNulty-Eide, OLIVER COUNTY RECORDER
By Rebecca Bethke, Deputy

SOLEM LAW OFFICE
PO BOX 249

BEULAH, ND 58523

OLIVER COUNTY RECORDER SEAL STATE OF NORTH DAKOTA

| | |
|---|---|
| DRAWN BY: AH | AARON HUMMERT, PLS<br>PROFESSIONAL LAND SURVEYOR<br>1901 31st STREET NW<br>MANDAN, ND 58554<br>OFFICE: (701) 426-8624 |
| CHECKED BY: AH | |
| PROJECT #: 2022-9 | |
| DATE: 2/20/2022 | SHEET 3 OF 4 |

# PLAT OF OUTLOT "A" - ATTACHED DESCRIPTION

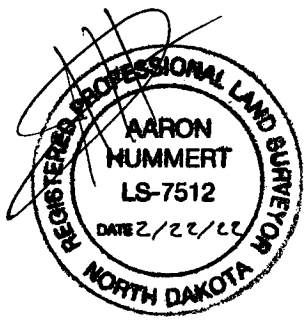
LOCATED IN THE E1/2NW1/4 OF SECTION 7,
TOWNSHIP 142 NORTH, RANGE 87 WEST, 5th P.M.,
OLIVER COUNTY, NORTH DAKOTA

DESCRIPTION:

A tract of land located in the East Half of the Northwest Quarter (E1/2NW1/4) of Section 7, Township 142 North, Range 87 West of the 5th Principal Meridian, Oliver County, North Dakota, and is more particularly described as follows:

BEGINNING at the north quarter corner of said Section 7; thence on the north/south quarter line of said Section 7, S00°59'16"W a distance of 2631.00 feet to the center quarter corner of said Section 7; thence on the east/west quarter line of said Section 7, N89°19'32"W a distance of 449.54 feet; thence N01°02'06"E a distance of 488.90 feet; thence N25°23'40"W a distance of 304.28 feet; thence N05°29'25"W a distance of 167.33 feet; thence N01°06'11"E a distance of 1080.57 feet; thence S88°53'49"E a distance of 140.78 feet; thence N01°24'01"E a distance of 622.69 feet to the north line of said Section 7; thence on said north line, S89°21'33"E a distance of 455.80 feet to the POINT OF BEGINNING.

Said tract of land contains 32.03 acres more or less and is subject to any previous easements, agreements, conveyances, and surveys.




| | |
|---|---|
| DRAWN BY: AH | AARON HUMMERT, PLS<br>PROFESSIONAL LAND SURVEYOR<br>1901 31st STREET NW<br>MANDAN, ND 58554<br>OFFICE: (701) 426-8624 |
| CHECKED BY: AH | |
| PROJECT #: 2022-9 | |
| DATE: 2/20/2022 | SHEET 4 OF 4 |

97731 7/6/2023 10:13 AM Total Pages: 13
BOOK: XX PAGE: 178 FEES: $65.00 RB EASEMENT
Mickie McNulty-Eide, OLIVER COUNTY RECORDER
By Rebecca Bethke, Deputy

SOLEM LAW OFFICE
PO BOX 249

BEULAH, ND 58523

RECORDER OLIVER SEAL COUNTY STATE OF NORTH DAKOTA

# CORRECTED
# RECIPROCAL ACCESS EASEMENT

THIS INDENTURE, made and entered into this 31st day of May, 2022, by and between **JOHNELL J. KUSLER, as personal representative of the Estate of James O. Kusler,** whose post office address is 1884 Hillcrest Avenue, St. Paul, Minnesota 55116, **JOHNELL J. KUSLER**, whose post office address is 1884 Hillcrest Avenue, St. Paul, Minnesota 55116, AND **MILDA L. HEDBLOM, a/k/a MILDA K. HEDBLOM,** whose post office address is 1801 Summit Avenue, St. Paul, Minnesota 55105, hereafter "Party of the First Part"; and **TRENT T. MARTIN and DAWN MARTIN**, husband and wife, whose post office address is 1943 62ND Avenue SW, Beulah, North Dakota 58523, hereafter "Party of the Second Part".

WITNESSETH, that the said Party of the First Part and the said Party of the Second Part, for and in consideration of the sum of One Dollar ($1.00) and other good and valuable consideration, the receipt of which is hereby acknowledged by each party, due by these presents grant and convey unto each other, their heirs, successors, and assigns for their use a Reciprocal Access Easement for purposes of ingress and egress allowing each party, their heirs, successors, and assigns to cross the land of each other specifically identified herein on

SOLEM LAW OFFICE
109 CENTRAL AVENUE S
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail:beulaw@westriv.com

existing roads and trails.

The Party of the First Part owns the following described parcel of land located in Oliver County, North Dakota, to-wit:

See Exhibit A attached hereto and incorporated herein by reference.

The Party of the Second Part owns the following described parcel of land located in Oliver County, North Dakota, to-wit:

See Exhibit B attached hereto and incorporated herein by reference.

It is understood that this Reciprocal Access Agreement is being granted by the parties herein to each other for ingress and egress access purposes allowing each party to cross the land of the other to access their own parcels and that this Reciprocal Access Easement shall be binding and obligatory upon the heirs, administrators, personal representatives, survivors, and assigns of the parties hereto, and shall continue for a term of ninety-nine (99) years or for such longer time as may be allowed by state law. It is further understood that neither party is obligated to the other to maintain the trails and roads located upon the parcels described herein.

IN WITNESS WHEREOF, the said parties have hereunto set their hands and seals the day and year first above written.

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

WITNESS, the hands of the Parties of the First Part:

**JOHNELL J. KUSLER, Personal Representative of the Estate of JAMES O. KUSLER**

STATE OF NORTH DAKOTA )
)
COUNTY OF MERCER )

On this 31st day of May, 2022, before me, a Notary Public in and for said County and State, personally appeared **JOHNELL J. KUSLER,** as Personal Representative of the Estate of James O. Kusler, known to me to be the person that is described in and that executed the within instrument, and acknowledged to me that she executed the same.

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

SCOTT T. SOLEM, NOTARY PUBLIC
MERCER COUNTY, NORTH DAKOTA

**JOHNELL J. KUSLER**

STATE OF NORTH DAKOTA )
)
COUNTY OF MERCER )

On this 31st day of May, 2022, before me, a Notary Public in and for said County and State, personally appeared **JOHNELL J. KUSLER,** known to me to be the person that is described in and that executed the within instrument, and acknowledged to me that she executed the same.

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

SCOTT T. SOLEM, NOTARY PUBLIC
MERCER COUNTY, NORTH DAKOTA

**MILDA L. HEDBLOM,**
**a/k/a MILDA K. HEDBLOM**

STATE OF NORTH DAKOTA )
)
COUNTY OF MERCER )

On this 31st day of May, 2022, before me, a Notary Public in and for said County and State, personally appeared **MILDA L. HEDBLOM, a/k/a MILDA K. HEDBLOM,** known to me to be the person that is described in and that executed the within instrument, and acknowledged to me that she executed the same.

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

SCOTT T. SOLEM, NOTARY PUBLIC
MERCER COUNTY, NORTH DAKOTA

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

WITNESS, the hands of the Party of the Second Part:

**TRENT T. MARTIN**

**DAWN MARTIN**

STATE OF NORTH DAKOTA )
)
COUNTY OF MERCER )

On this 31st day of May, 2022, before me, a Notary Public in and for said County and State, personally appeared **TRENT T. MARTIN and DAWN MARTIN,** known to me to be the persons that are described in and that executed the within instrument, and acknowledged to me that they executed the same.

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

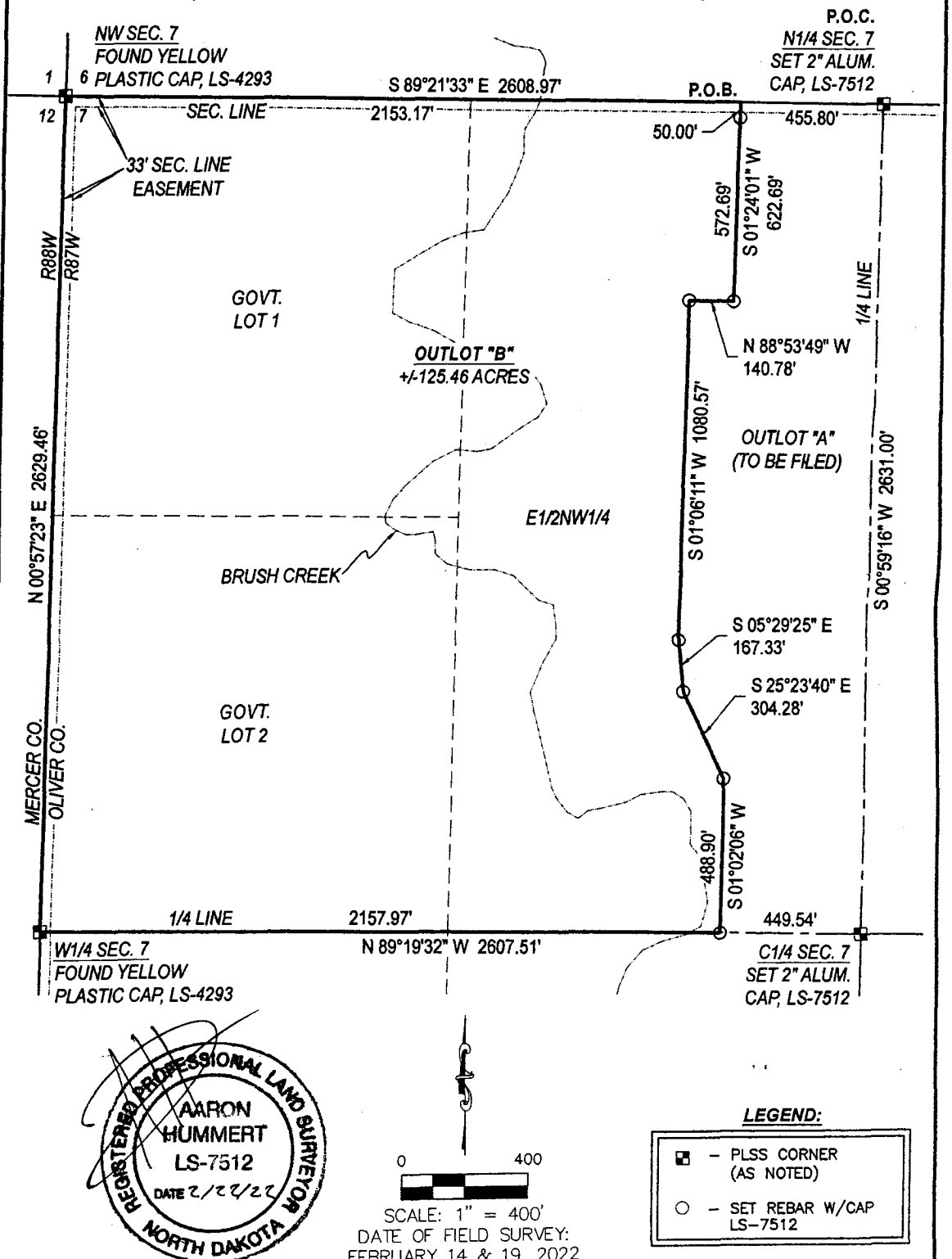
SCOTT T. SOLEM, NOTARY PUBLIC
MERCER COUNTY, NORTH DAKOTA

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

Exhibit A

# PLAT OF OUTLOT "B"

LOCATED IN GOVERNMENT LOTS 1 AND 2, AND THE E1/2NW1/4 OF SECTION 7,
TOWNSHIP 142 NORTH, RANGE 87 WEST, 5th P.M.,
OLIVER COUNTY, NORTH DAKOTA
OWNERS: JOHNELL J. KUSLER, MILDA L. HEDBLOM, AND THE ESTATE OF JAMES O. KUSLER




REGISTERED PROFESSIONAL LAND SURVEYOR
AARON HUMMERT
LS-7512
DATE 2/22/22
NORTH DAKOTA

0 400
SCALE: 1" = 400'
DATE OF FIELD SURVEY:
FEBRUARY 14 & 19, 2022

**LEGEND:**

- ■ – PLSS CORNER (AS NOTED)
- ○ – SET REBAR W/CAP LS–7512

**SURVEYOR'S NOTE:**
The basis of bearing is based on the North Dakota State Plane Coordinate System, South Zone - NAD83. The distances reported hereon are in reference to the international foot definition and are at ground per the NDDOT combination factor for Oliver County (1/CF=1.0001470216). The measurements have been determined by RTK methods using the "Trimble VRSNow" system.

| | |
|---|---|
| DRAWN BY: AH | |
| CHECKED BY: AH | |
| PROJECT #: 2022–9 | |
| DATE: 2/20/2022 | |


AARON HUMMERT, PLS
PROFESSIONAL LAND SURVEYOR
1901 31st STREET NW
MANDAN, ND 58554
OFFICE: (701) 426-8624


SHEET 1 OF 4

THE UNDERSIGNED, Owner of the within described property, in accordance with the provisions of section 57-02-39 of the North Dakota Century Code, and upon demand of the County Auditor of Oliver County, North Dakota, have caused to be made the within and foregoing plat of said land with the lots as herein described, and have caused the same to be placed on record, as provided by law.

Witness our hands and seal, this 11th day of March, 2022.

In presence of Scott T. Solem

Johnell J. Kusler

STATE OF NORTH DAKOTA )
ss
COUNTY OF MERCER )

I, SCOTT T. SOLEM, a notary public within and for said County, do hereby certify that on this 11th day of March, A.D. 2022, personally appeared before me to me well known to be the same person described in and who executed the within and foregoing instrument and acknowledged that she executed the same freely and voluntarily.

My commission expires _____, 20___

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

Notary Public

THE UNDERSIGNED, Owner of the within described property, in accordance with the provisions of section 57-02-39 of the North Dakota Century Code, and upon demand of the County Auditor of Oliver County, North Dakota, have caused to be made the within and foregoing plat of said land with the lots as herein described, and have caused the same to be placed on record, as provided by law.

Witness our hands and seal, this 11th day of March, 2022.

In presence of Scott T. Solem

Johnell J. Kusler PR

Johnell J. Kusler, Personal Representative of the Estate of James O. Kusler

STATE OF NORTH DAKOTA )
ss
COUNTY OF MERCER )

I, SCOTT T. SOLEM, a notary public within and for said County, do hereby certify that on this 11th day of March, A.D. 2022, personally appeared before me to me well known to be the same person described in and who executed the within and foregoing instrument and acknowledged that she executed the same freely and voluntarily.

My commission expires _____, 20___

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

Notary Public

| | |
|---|---|
| DRAWN BY: AH | AARON HUMMERT, PLS<br>PROFESSIONAL LAND SURVEYOR<br>1901 31st STREET NW<br>MANDAN, ND 58554<br>OFFICE: (701) 426-8624 |
| CHECKED BY: AH | |
| PROJECT #: 2022-9 | |
| DATE: 2/20/2022 | SHEET 2 OF 4 |

THE UNDERSIGNED, Owner of the within described property, in accordance with the provisions of section 57-02-39 of the North Dakota Century Code, and upon demand of the County Auditor of Oliver County, North Dakota, have caused to be made the within and foregoing plat of said land with the lots as herein described, and have caused the same to be placed on record, as provided by law.

Witness our hands and seal, this 11th day of March, 2022.

In presence of Scott T. Solem

Milda L. Hedblom

STATE OF NORTH DAKOTA )
ss
COUNTY OF MERCER )

I, SCOTT T. SOLEM, a notary public within and for said County, do hereby certify that on this 11th day of March, A.D. 2022, personally appeared before me to me well known to be the same person described in and who executed the within and foregoing instrument and acknowledged that she executed the same freely and voluntarily.

My commission expires _____, 20___

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

Notary Public

SURVEYOR'S CERTIFICATE:

I, Aaron Hummert, a North Dakota Professional Land Surveyor, do hereby certify that this survey was performed by me or under my direct supervision at the request of Johnell J. Kusler, that said survey is true and complete as shown, and that the monuments found and set are of the character and occupy the positions shown thereon. This survey does not represent a complete title search.

REGISTERED PROFESSIONAL LAND SURVEYOR
AARON HUMMERT
LS-7512
DATE 2/22/22
NORTH DAKOTA

AARON HUMMERT, PLS
NORTH DAKOTA REGISTRATION NO. LS-7512

Subscribed and sworn to before me this 22nd day of February, 2022.

AUSTIN EVANS
Notary Public
State of North Dakota
My Commission Expires 11/04/2025

Notary Public

CERTIFICATE OF APPROVAL:

The within and foregoing plat is hereby approved:

Dated: _____ day of _____, 20___.

Chairman

96910 5/6/2022 10:45 AM Total Pages: 4
BOOK: E PAGE: 60 FEES: $20.00 RB Plats
Mickie McNulty-Eide, OLIVER COUNTY RECORDER
By Rebecca Bohlke, Deputy

OLIVER COUNTY SEAL

SOLEM LAW OFFICE
PO BOX 249

BEULAH, ND 58523

| | |
|---|---|
| DRAWN BY: AH | AARON HUMMERT, PLS<br>PROFESSIONAL LAND SURVEYOR<br>1901 31st STREET NW<br>MANDAN, ND 58554<br>OFFICE: (701) 426-8624 |
| CHECKED BY: AH | |
| PROJECT 2022-9 | |
| DATE: 2/20/2022 | SHEET 3 OF 4 |

# PLAT OF OUTLOT "B" - ATTACHED DESCRIPTION

LOCATED IN GOVERNMENT LOTS 1 AND 2, AND THE E1/2NW1/4 OF SECTION 7,
TOWNSHIP 142 NORTH, RANGE 87 WEST, 5th P.M.,
OLIVER COUNTY, NORTH DAKOTA

DESCRIPTION:

A tract of land located in Government Lots 1 and 2, and the East Half of the Northwest Quarter (E1/2NW1/4) of Section 7, Township 142 North, Range 87 West of the 5th Principal Meridian, Oliver County, North Dakota, and is more particularly described as follows:

COMMENCING at the north quarter corner of said Section 7; thence on the north line of said Section 7, N89°21'33"W a distance of 455.80 feet to the POINT OF BEGINNING.

From said POINT OF BEGINNING; thence S01°24'01"W a distance of 622.69 feet; thence N88°53'49"W a distance of 140.78 feet; thence S01°06'11"W a distance of 1080.57 feet; thence S05°29'25"E a distance of 167.33 feet; thence S25°23'40"E a distance of 304.28 feet; thence S01°02'06"W a distance of 488.90 feet to the east/west quarter line of said Section 7; thence on said east/west quarter line, N89°19'32"W a distance of 2157.97 feet to the west quarter corner of said Section 7; thence on the west line of said Section 7, N00°57'23"E a distance of 2629.46 feet to the northwest corner of said Section 7; thence on the north line of said Section 7, S89°21'33"E a distance of 2153.17 feet to the POINT OF BEGINNING.

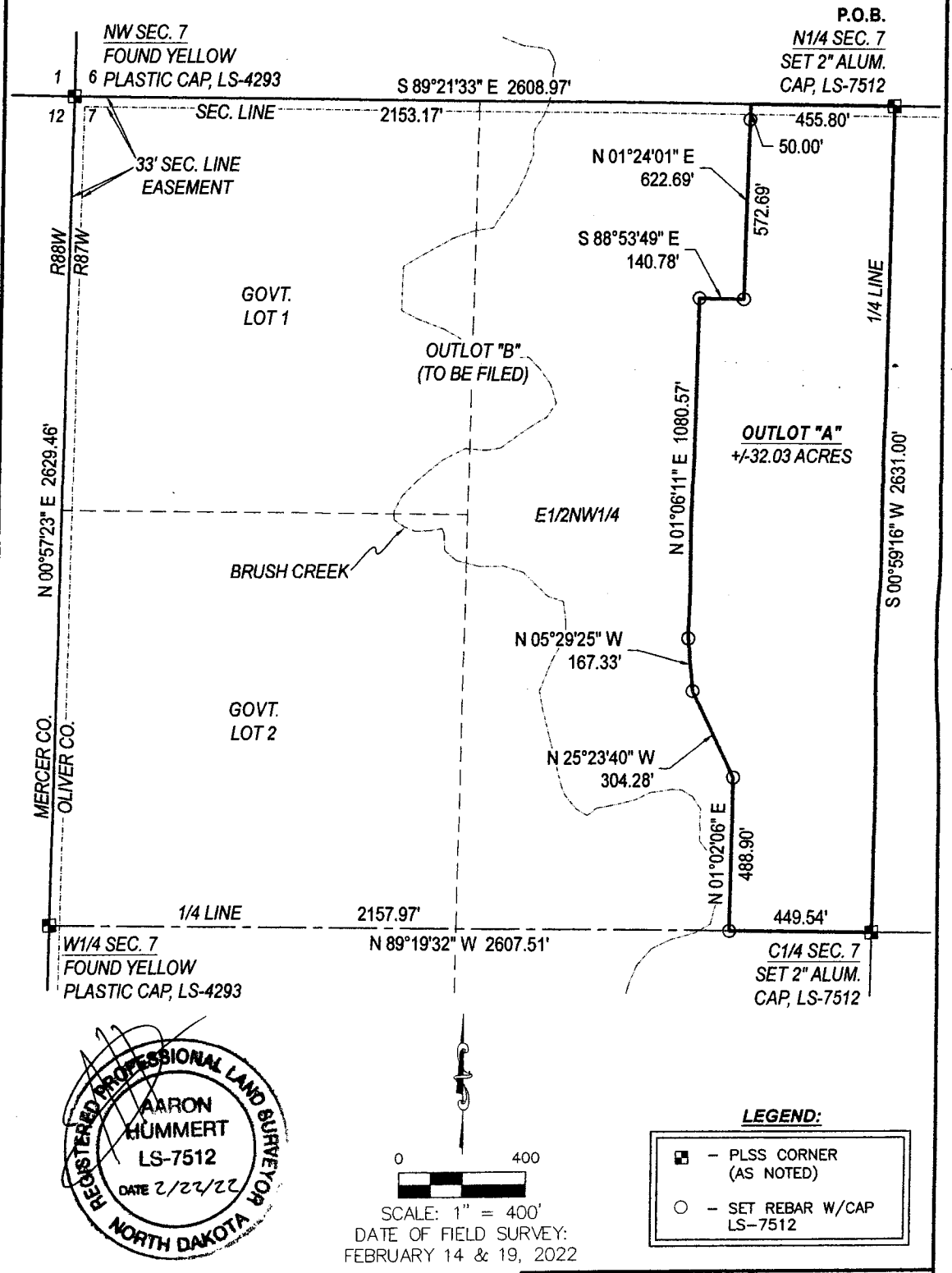
Said tract of land contains 125.46 acres more or less and is subject to any previous easements, agreements, conveyances, and surveys.

| | |
|---|---|
| DRAWN BY: AH | AARON HUMMERT, PLS<br>PROFESSIONAL LAND SURVEYOR<br>1901 31st STREET NW<br>MANDAN, ND 58554<br>OFFICE: (701) 426-8824 |
| CHECKED BY: AH | |
| PROJECT #: 2022-9 | |
| DATE: 2/20/2022 | SHEET 4 OF 4 |

Exhibit B

# PLAT OF OUTLOT "A"

LOCATED IN THE E1/2NW1/4 OF SECTION 7,
TOWNSHIP 142 NORTH, RANGE 87 WEST, 5th P.M.,
OLIVER COUNTY, NORTH DAKOTA
OWNERS: JOHNELL J. KUSLER, MILDA L. HEDBLOM, AND THE ESTATE OF JAMES O. KUSLER




REGISTERED PROFESSIONAL LAND SURVEYOR
AARON HUMMERT
LS-7512
DATE 2/22/22
NORTH DAKOTA

0 400
SCALE: 1" = 400'
DATE OF FIELD SURVEY:
FEBRUARY 14 & 19, 2022

**LEGEND:**

- ■ – PLSS CORNER (AS NOTED)
- ○ – SET REBAR W/CAP LS–7512

**SURVEYOR'S NOTE:**

The basis of bearing is based on the North Dakota State Plane Coordinate System, South Zone - NAD83. The distances reported hereon are in reference to the international foot definition and are at ground per the NDDOT combination factor for Oliver County (1/CF=1.0001470216). The measurements have been determined by RTK methods using the "Trimble VRSNow" system.

| | |
|---|---|
| DRAWN BY: AH | |
| CHECKED BY: AH | |
| PROJECT #: 2022–9 | |
| DATE: 2/20/2022 | |


AARON HUMMERT, PLS
PROFESSIONAL LAND SURVEYOR
1901 31st STREET NW
MANDAN, ND 58554
OFFICE: (701) 426-8624


SHEET 1 OF 4

THE UNDERSIGNED, Owner of the within described property, in accordance with the provisions of section 57-02-39 of the North Dakota Century Code, and upon demand of the County Auditor of Oliver County, North Dakota, have caused to be made the within and foregoing plat of said land with the lots as herein described, and have caused the same to be placed on record, as provided by law.

Witness our hands and seal, this 11th day of March, 20 22.

In presence of Scott T. Solem

Johnell J. Kusler

STATE OF NORTH DAKOTA )
ss
COUNTY OF MERCER )

I, SCOTT T. SOLEM, a notary public within and for said County, do hereby certify that on this 11th day of March, A.D. 20 22, personally appeared before me to me well known to be the same person described in and who executed the within and foregoing instrument and acknowledged that she executed the same freely and voluntarily.

My commission expires SCOTT T. SOLEM, 20
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

Notary Public

THE UNDERSIGNED, Owner of the within described property, in accordance with the provisions of section 57-02-39 of the North Dakota Century Code, and upon demand of the County Auditor of Oliver County, North Dakota, have caused to be made the within and foregoing plat of said land with the lots as herein described, and have caused the same to be placed on record, as provided by law.

Witness our hands and seal, this 11th day of March, 20 22.

In presence of Scott T. Solem

Johnell J. Kusler PR
Johnell J. Kusler, Personal Representative of the Estate of James O. Kusler

STATE OF NORTH DAKOTA )
ss
COUNTY OF MERCER )

I, SCOTT T. SOLEM, a notary public within and for said County, do hereby certify that on this 11th day of March, A.D. 2022, personally appeared before me to me well known to be the same person described in and who executed the within and foregoing instrument and acknowledged that she executed the same freely and voluntarily.

My commission expires _____, 20___

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

Notary Public

| | |
|---|---|
| DRAWN BY: AH | AARON HUMMERT, PLS<br>PROFESSIONAL LAND SURVEYOR<br>1901 31st STREET NW<br>MANDAN, ND 58554<br>OFFICE: (701) 426-8624 |
| CHECKED BY: AH | |
| PROJECT #: 2022-9 | |
| DATE: 2/20/2022 | SHEET 2 OF 4 |

THE UNDERSIGNED, Owner of the within described property, in accordance with the provisions of section 57-02-39 of the North Dakota Century Code, and upon demand of the County Auditor of Oliver County, North Dakota, have caused to be made the within and foregoing plat of said land with the lots as herein described, and have caused the same to be placed on record, as provided by law.

Witness our hands and seal, this 11th day of March, 20 22.

In presence of Scott T. Solem

Milda L. Hedblom

STATE OF NORTH DAKOTA )
ss
COUNTY OF MERCER )

I, SCOTT T. SOLEM, a notary public within and for said County, do hereby certify that on this 11th day of March, A.D. 20 22, personally appeared before me to me well known to be the same person described in and who executed the within and foregoing instrument and acknowledged that she executed the same freely and voluntarily.

My commission expires _____, 20___

SCOTT T. SOLEM
Notary Public
State of North Dakota
My Commission Expires October 28, 2022

Notary Public

SURVEYOR'S CERTIFICATE:

I, Aaron Hummert, a North Dakota Professional Land Surveyor, do hereby certify that this survey was performed by me or under my direct supervision at the request of Johnell J. Kusler, that said survey is true and complete as shown, and that the monuments found and set are of the character and occupy the positions shown thereon. This survey does not represent a complete title search.

REGISTERED PROFESSIONAL LAND SURVEYOR
AARON HUMMERT
LS-7512
DATE 2/22/22
NORTH DAKOTA

AARON HUMMERT, PLS
NORTH DAKOTA REGISTRATION NO. LS-7512

Subscribed and sworn to before me this 22nd day of 22, 20 22.

AUSTIN EVANS
Notary Public
State of North Dakota
My Commission Expires 11/04/2025

Notary Public

CERTIFICATE OF APPROVAL:

The within and foregoing plat is hereby approved:

Dated: _____ day of _____, 20___.

Chairman

96898 4/26/2022 1:17 PM Total Pages: 4
BOOK: E PAGE: 59 FEES: $20.00 RB Plats
Mickie McNulty-Eide, OLIVER COUNTY RECORDER
By Rebecca Bethke, Deputy

SOLEM LAW OFFICE
PO BOX 249

BEULAH, ND 58523

OLIVER COUNTY RECORDER SEAL STATE OF NORTH DAKOTA

| | |
|---|---|
| DRAWN BY: AH | AARON HUMMERT, PLS<br>PROFESSIONAL LAND SURVEYOR<br>1901 31st STREET NW<br>MANDAN, ND 58554<br>OFFICE: (701) 426-8624 |
| CHECKED BY: AH | |
| PROJECT #: 2022-9 | |
| DATE: 2/20/2022 | SHEET 3 OF 4 |

# PLAT OF OUTLOT "A" - ATTACHED DESCRIPTION

LOCATED IN THE E1/2NW1/4 OF SECTION 7,
TOWNSHIP 142 NORTH, RANGE 87 WEST, 5th P.M.,
OLIVER COUNTY, NORTH DAKOTA

DESCRIPTION:

A tract of land located in the East Half of the Northwest Quarter (E1/2NW1/4) of Section 7, Township 142 North, Range 87 West of the 5th Principal Meridian, Oliver County, North Dakota, and is more particularly described as follows:

BEGINNING at the north quarter corner of said Section 7; thence on the north/south quarter line of said Section 7, S00°59'16"W a distance of 2631.00 feet to the center quarter corner of said Section 7; thence on the east/west quarter line of said Section 7, N89°19'32"W a distance of 449.54 feet; thence N01°02'06"E a distance of 488.90 feet; thence N25°23'40"W a distance of 304.28 feet; thence N05°29'25"W a distance of 167.33 feet; thence N01°06'11"E a distance of 1080.57 feet; thence S88°53'49"E a distance of 140.78 feet; thence N01°24'01"E a distance of 622.69 feet to the north line of said Section 7; thence on said north line, S89°21'33"E a distance of 455.80 feet to the POINT OF BEGINNING.

Said tract of land contains 32.03 acres more or less and is subject to any previous easements, agreements, conveyances, and surveys.

| | |
|---|---|
| DRAWN BY: AH | AARON HUMMERT, PLS<br>PROFESSIONAL LAND SURVEYOR<br>1901 31st STREET NW<br>MANDAN, ND 58554<br>OFFICE: (701) 426-8624 |
| CHECKED BY: AH | |
| PROJECT #: 2022-9 | |
| DATE: 2/20/2022 | SHEET 4 OF 4 |

01082

FORM LE-189 R

RIGHT OF WAY EASEMENT

KNOW ALL MEN BY THESE PRESENTS, that we the undersigned, (Whether one or more) John Scheidt and Gladys M. Scheidt (joint tenants, and not as tenants in common, with full rights of survivorship) (unmarried) (husband and wife), for a good and valuable consideration, the receipt whereof is hereby acknowledged, do hereby grant unto Oliver-Mercer Electric Cooperative, Inc. a cooperative corporation, (hereinafter called the "Cooperative"), whose post office address is Hazen, North Dakota, and to its successors or assigns, the right to enterupon the lands of the undersigned, situated in the County of Mercer, State of North Dakota, and more particularly described as follows:

A tract of land approximately _____ acres in area, located _____ miles in a _____ direction from the town of _____, and further described as being in common tenancy in SE¼ Section 2, Township 142 Range 88
joint tenandy in S½NE¼ Section 12, Township 142 Range 88
and NE¼ Section 14, Township 142 Range 88

and to contract, operate and maintain on the above described lands, and/or in or upon all streets, roads or highways abutting said lands, an electric transmission or distribution line or system, and to cut and trim trees and shrubbery that may interfere with or threaten to endanger the operation and maintenance of said line or system.

The undersigned agree that all poles, wires, and other facilities, including any main service entrance equipment, installed on the above-described lands at the Cooperative's expense shall remain the property of the Cooperative, removable at the option of the Cooperative, upon termination of service to or on said lands.

The undersigned covenant that they are the owners of the above-desctibed lands and that the said lands are free and clear of encumberances and liens of whatsoever character except those held by the following persons:

IN WITNESS WHEREOF, the undersigned have set their hands and seals, this 22 day of April, 1949.

John Scheidt (L.S.)

Gladys M. Scheidt (L.S.)

Signed, sealed and delivered in the presence of:

Leo Goetz

_____

S8010

(1)
STATE OF NORTH DAKOTA

COUNTY OF Mercer SS.

Leo Goetz being first duly sworn says that he is one of the witnesses to the above and foregoing easements, that John Scheidt and Gladys M. Scheidt (joint tenants, and not as tenants in common, with full rights of survivorship) whose names is and/or are subscribed to the above and foregoing instruments as a party is and/or are the persons described in said easement and that they signed said instrument in my presence and that I in their presence signed my name thereto as a subscribed witness.

Leo Goetz

SUBSCRIBED and sworn to before me this 25 day of April, 1949

Frank J. Belinskey
Notary Public in and for the
County of Mercer and the State
of North Dakota

FRANK J. BELINSKEY NOTARY PUBLIC STATE OF NORTH DAKOTA

My commission expires: March 24, 1953

(1)
STATE OF NORTH DAKOTA
COUNTY OF Mercer SS.

On this 25 day of April, 1949, before me Frank J. Belinskey a Notary Public within and for the State of North Dakota, personally appeared Leo Goetz known to me to be one of the persons who subscribed his name to the above and foregoing instrument as a witness, and who acknowledged to me that he subscribed his name thereto as such witness, and who proved to me that the person who and/or whose names are subscribed to the foregoing instrument are the persons described in it.

Frank J. Belinskey
Notary Public in and for the
County of Mercer AND
State of North Dakota

FRANK J. BELINSKEY NOTARY PUBLIC STATE OF NORTH DAKOTA

My commission expires: March 24, 1953

* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

(2)
State of North Dakota

County of _____ SS.

On this _____ day of _____ 194___, before me

_____, a Notary Public in and for said County and State, personally appeared _____ and _____ known to me to be the persons _____ who _____ described in and who executed within and foregoing instrument and acknowledged to me that he executed the same.

Notary Public in and for the
County of _____ and
State of North Dakota

My commission expires: _____

MORTGAGEE
MORTGAGOR
INDEXED ✓

**STATE OF NORTH DAKOTA**
**COUNTY OF MERCER**

**209412**
**OFFICE OF**
**COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 12/9/2015 at 8:31 AM, and was duly recorded as Book 207 MISC on Page 653 Fee: $16.00

County Recorder Brenda L. Cook

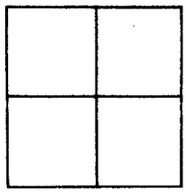
By Deputy

Return To: ROUGHRIDER ELECTRIC COOPERATIVE, INC., 800 H
HAZEN, ND 58545

# RIGHT-OF-WAY EASEMENT

Gladys Scheid (hereinafter called the "Grantor") (unmarried) (husband and wife) for a good and valuable consideration, the receipt whereof is hereby acknowledged, do hereby grant unto Oliver-Mercer Electric Cooperative, Inc., (hereinafter called "Grantee") whose post office address is Hazen, North Dakota, 58545, and to its successors or assigns, an easement for 99 years, situated in the County of Mercer, State of North Dakota, and more particularly described as follows:

Twn 142 Rge 88
Sec 14 NE¼



to construct, reconstruct, relocate, rephase, remove, repair, operate and maintain on or under the above described lands, and/or in, upon or under all streets, roads or highways abutting said lands, an electric distribution line or system; to cut, trim eradicate and control the growth by chemical means, machinery or otherwise, of trees and shrubbery located within 15 feet of the center of line of said line system, or that may interfere with or threaten to endanger the operation and maintenance of said line or system (indicating any control of the growth of other vegetation in the right-of-way which may incidentally and necessarily result from the means of control employed); and to license, permit or otherwise agree to the joint use or occupancy of the line or system by any other person, association or corporation, for electrification or communication purposes.

The undersigned Grantor agrees that all poles, wires, cables and other facilities including any main service entrance equipment installed on or below the above described lands at the Grantee's expense shall remain the property of Grantee, removable at its option upon termination of service to or on said lands.

Any damages to the surface of the right-of-way or to crops, fences, gates, drains, ditches or lines of the Grantor, caused by the Grantee in the installation, repair, maintenance, reconstruction or removal of said electric properties and appurtenances, shall be promptly repaired, replaced or paid for by the Grantee, provided a claim therefore is presented to the Grantee at its General Office within ninety (90) days after such damages occur. If the amount of said damages cannot be agreed upon, then the Grantor and Grantee shall each select an arbitrator, and these two shall select a third arbirator, and the decision and award of the arbitrators shall be final.

The undersigned Grantor convenants and agrees that no barrier of trees, shrubs, etc., and no structure or building shall be placed over underground conduits and electric lines and no construction shall be maintained or placed beneath over-the-ground electric lines and associated structures without the express written consent of the Grantee.

This Easement also includes a right-of-access to and from said real estate and Grantee's right-of-way for the purpose of connecting or reconnecting any part of the Grantee's system to or from said property with said system or to or from any other property on or coming on said system.

This Easement includes such additional rights of use and occupancy as shall be necessary for the use, maintenance, and operation of Grantee's system on said right-of-way, including but not limited to, anchors, guy wires, supporting poles or structures and the like as they were originally constructed or may thereafter be constructed.

The overall operating height of vehicles and equipment known to cultivate or traverse lands within the easement is less than _____ feet.

Dated this 3rd day of July, 19 90.

_____ Gladys M. Scheidt

STATE OF NORTH DAKOTA)
) ss
COUNTY OF MERCER)

The foregoing instrument was acknowledged before me this 3rd day of July 19 90

by Gladys M. Scheidt

My Commission Expires: May 20, 1991

Lynell Renner
Notary Public, State of North Dakota

LYNELL RENNER

MORTGAGEE
MORTGAGOR
INDEXED ✓

**209427**

**STATE OF NORTH DAKOTA**
**COUNTY OF MERCER**

**OFFICE OF**
**COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 12/9/2015 at 8:46 AM, and was duly recorded as Book 207 MISC on Page 701 Fee: $23.00

County Recorder Brenda L. Cook

By Deputy

Return To: ROUGHRIDER ELECTRIC COOPERATIVE, INC., 800 H
HAZEN, ND 58545

COUNTY RECORDER
SEAL
MERCER COUNTY, N. DAK.

MORTGAGEE
MORTGAGOR
In Computer [ ] GRANTOR ✓
WRT# [ ] GRANTEE ✓
County# [ ] INDEXED ✓

W.O.# 92-272

# West River Telephone Right-of-Way Easement

KNOW ALL MEN BY THESE PRESENT, that we the undersigned, (whether one or more) *Gladys M Scheidt*, Grantor(s), do hereby grant and convey unto *West River Telecommunications Cooperative*, a cooperative corporation (hereafter called the "Cooperative"), grantee, whose address is P.O Box 467, Hazen, North Dakota, and its respective successors, assigns, lessees and agents, an easement to survey, construct, reconstruct, operate, upgrade, maintain, relocate, replace and remove such communication systems as the grantee may from time to time require, consisting of but not limited to cables, wires, poles, splicing boxes, surface testing terminals, repeaters, repeater housings and markers,and other appurtenances, upon and over the land which the undersigned owns or in which the undersigned has any interest in the County of *Mercer*, State of *North Dakota*, and more particularly described as follows:

*S/2SE/4 2 142 88*
*NE/4 14 142 88*

***This easement is to cover this line only. Any additional future new lines will require a new easement.***

also the right of ingress and egress over and across the lands of the undersigned for the purpose of exercising the rights herein granted; to place surface markers beyond said strip, to clear and keep clear all trees, roots brush and other obstructions from the surface and subsurface of said strip of land and within seven feet thereof. The boundary of said strip shall be a line parallel to and 25 feet either side of the first cable laid, which cable shall have its location indicated by surface markers set at intervals on the land of the undersigned or on adjacent lands. The undersigned for himself, his heirs, executors, administrators, successors, and assigns, hereby covenants that no structure shall be erected on said strip.

The undersigned agrees that all poles, wire and other facilities, including telephone equipment, installed on the above described premises at the Cooperative's expense, shall remain the property of the Cooperative, removable at the option of the Cooperative.

The undersigned covenant that they are the owners of the above described lands and that the said lands are free and clear of encumbrances and liens of whatsoever character except those held by the following persons:

The term of this easement shall be for as long as needed by the grantee, and until a release of this easement is recorded, but to not extend beyond the maximum term authorized by law.

Access is hereby granted for a state or federal historical survey of the cable route, should one be required, unless checked. Access denied ☐

IN WITNESS WHEREOF, this instrument has been executed by the undersigned this the 29th day of June, 1993.

STATE OF NORTH DAKOTA )
)
COUNTY OF Mercer )

by: Gladys M Scheidt

by: _____

The foregoing instrument was acknowledged before me this 29th day of June, 1993. By Gladys M Scheidt.

My Commission Expires:

CLYDE FANDRICH
Notary Public, Mercer County, ND
My Commission Expires Feb. 24, 1999
STATE OF NORTH DAKOTA

Notary Public, County of Mercer.

Document No. 153687
OFFICE OF REGISTER OF DEEDS, COUNTY OF Mercer, North Dakota. I hereby certify that the within instrument was filed in this office for recording on the 10th day of January, A.D., 1994, at 11:38 o'clock A.M, and was duly recorded in Book 128, of Misc., on page 505.

By Kathryn Schumann Deputy Jeanette Sailer Register of Deeds

$7.00 fee

When recorded, please return to WEST RIVER TELECOMMUNICATION COOPERATIVE.

REGISTER OF DEEDS SEAL COUNTY, N.DAK.

## RIGHT-OF-WAY EASEMENT

KNOW ALL MEN BY THESE PRESENTS, that we the undersigned, (whether one or more) Leland Erickson (unmarried) (husband and wife) for a good and valuable consideration, the receipt whereof is hereby acknowledged, do hereby grant unto Oliver-Mercer Electric a cooperative corporation (hereinafter called the "Cooperative") whose post office address is Hazen, and to its successors or assigns, the right to enter upon the lands of the undersigned, situated in the County of Mercer, State of North Dakota, and more particularly described as follows:

SE¼ Sec. 27, Twp. 143, Rge. 88

and to construct, operate and maintain an electric transmission and/or distribution line or system on or under the above-described lands and/or in, upon or under all streets, raods or highways abutting said lands; to inspect and make such repairs, changes, alterations, improvements, removals from, substitutions and additions to its facilities as Cooperative may from time to time deem advisable, including, by way of example and not by way of limitation, the right to increase or decrease the number of conduits, wires, cables, handholes, manholes, connection boxes, transformers and transformer enclosures; to cut, trim and control the growth by chemical means, machinery or otherwise of trees and shrubbery located within _____ feet of the center line of said line or system, or that may interfere with or threaten to endanger the operation and maintenance of said line or system (including any control of the growth of other vegetation in the right-of-way which may incidentally and necessarily result from the means of control employed); to keep the easement clear of all buildings, structures or other obstructions; and to license, permit or otherwise agree to the joint use or occupancy of the lines, system or, if any of said system is placed underground, of the trench and related underground facilities, by any other person, association or corporation.

The undersigned agree that all poles, wires and other facilities including any main service entrance equipment, installed in, upon or under the above-described lands at the Cooperative's expense shall remain the property of the Cooperative, removable at the option of the Cooperative.

The undersigned covenant that they are the owners of the above-described lands.

IN WITNESS WHEREOF, the undersigned have set their hands and seals this 6th day of November, 1974.

Leland Erickson (L.S.)

_____ (L.S.)

Signed, sealed and delivered in the presence of:

Eldora Sailer

_____

State of North Dakota )
) ss
Mercer County )

Personally came before me this 6th day of November 1975 the above named Eldora Sailer to me known to be the person (s) who executed the foregoing instrument and acknowledged the same.

VIVIAN J. RICKERT NOTARY PUBLIC STATE OF NORTH DAKOTA

Vivian J. Rickert

Notary Public, Mercer, County, North Dakota, State.

My Commission expires 12-31-77

208123

**STATE OF NORTH DAKOTA**
**COUNTY OF MERCER**

**OFFICE OF**
**COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 8/18/2015 at 8:15 AM, and was duly recorded as Book 204 MISC on Page 729 Fee: $13.00

County Recorder Brenda L. Cook

By Deputy

Return To: ROUGHRIDER ELECTRIC COOPERATIVE, INC., 800 H
chg HAZEN, ND 58545

MORTGAGEE
MORTGAGOR
INDEXED ✓

COUNTY RECORDER SEAL MERCER COUNTY, N. DAK.

RECEIVED
FEB 5 2014

**SOUTHWEST WATER AUTHORITY**
Southwest Pipeline Project Building
West Industrial Park
4665 2nd Street SW
Dickinson, ND 58601-7231
(701) 225-0241
Toll Free: 1-888-425-0241

Segment **7-9E WEST CENTER SERVICE AREA**
Parcel **142-88-17**

## RIGHT-OF-WAY EASEMENT

**ALL PERSONS TAKE NOTICE:**

In consideration of one dollar ($1.00) and other good and valuable consideration **JAMES O KUSLER 5968 19TH STREET SW BEULAH, ND 58523** hereinafter referred to as Grantor, does hereby grant, bargain, sell, transfer and convey to the Southwest Water Authority, hereinafter referred to as the Grantee, its successor and assigns, a perpetual easement with right to erect, construct, install and lay, and thereafter use, operate, inspect, repair, maintain, replace, and remove water pipelines, connections, valves and all other appurtenant facilities used in connection with the construction, operation and maintenance of the Southwest Pipeline Project, over, above, across and through the land of the Grantor, situated in **Mercer** County, State of North Dakota, said land being described as follows: **N1/2 N1/2 LESS R/W SECTION 12 TOWNSHIP 142 RANGE 88 & SE1/4 SECTION 27 TOWNSHIP 143 RANGE 88** (the tract that contains **6.34** acres, more or less), together with the right of ingress and egress over the adjacent lands of the Grantor, successors and assigns for the purposes of this easement.

1. The permanent easement will be thirty (30) feet in width, fifteen (15) feet on each side of the center line of the pipeline as constructed, with an additional ten (10) feet of temporary right-of-way for a total construction easement width of forty (40) feet, twenty (20) feet on each side of the center line.

2. The Grantee covenants to maintain the easement in good repair so that no unreasonable damage will result from its use to the adjacent land of the Grantor, successors and assigns. The Grantor will receive compensation for damages to growing crops caused by the construction or operation. The Grantor will report any damages within three (3) years of the construction of the project.

The grant and other provisions of this easement shall constitute a covenant running with the land for the benefit of the Grantee, its successors and assigns.

**IN WITNESS WHEREOF,** the Grantor has executed this instrument this 3 day of February, 2014

James O. Kusler GRANTOR _____ GRANTOR

State of North Dakota

County of Dunn

On February 3, 2014, personally appeared before me James O. Kusler

_____ whom I know personally.
X whose identity I verified on the basis of North Dakota drivers license
_____ whose identity I verified on the oath or affirmation of _____, a credible witness to be the signor of the above and he/she acknowledged that he/she signed it.

DANIEL T. AICHELE
Notary Public
State of North Dakota
My Commission Expires Mar. 2, 2018

Notary Public Daniel T. Aichele

_____, County Dunn

My Commission Expires: Mar. 2, 2018

MORTGAGEE
MORTGAGOR
INDEXED ✓

**STATE OF NORTH DAKOTA**
**COUNTY OF MERCER**

**211517**
**OFFICE OF**
**COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 6/14/2016 at 9:26 AM, and was duly recorded as Book 213 MISC on Page 17 Fee: $13.00

County Recorder Brenda L Cook

By Deputy Kathryn Schumann

Return To: SOUTHWEST WATER AUTHORITY, WEST INDUSTRIA
4665 2ND ST SW DICKINSON, ND 58601-7231

COUNTY RECORDER
SEAL
MERCER COUNTY, N DAK.

Uploaded to BtW FTP on 2-5-14 (mc)

## RIGHT OF WAY EASEMENT

THIS AGREEMENT made and entered into this 19th day of June, 2019, between James Kusler, hereinafter called "Owner" (whether one or more) and **ROUGHRIDER ELECTRIC COOPERATIVE, INC.**, whose post office address is 800 Highway Drive, Hazen, North Dakota 58545-4737, hereinafter called "COOPERATIVE".

WITNESSETH that for valuable consideration, the receipt and sufficiency of which is hereby acknowledged, Owner grants unto Cooperative, its successors and assigns, for a term of 99 years from the date hereof, an easement to construct, reconstruct, operate and maintain an electric distribution system, overhead, underground or both including all poles, guys, anchors wires, surface terminals, and all accessories and appurtenances necessary or desirable in connection therewith, under, over, upon and across lands of Owner and/or in or upon all streets, roads or highways abutting said lands situated in Mercer County, North Dakota, and more particularly described as follows, to-wit:

A strip of land 20 feet in width, the same being 10 feet on each side of a centerline described as follows.

**Township 143 North Range 88 West**

S1/2SE1/4 of Section 27

The facilities erected hereunder shall remain the property of the Cooperative. Cooperative shall have the right to inspect, rebuild, remove, repair, improve and make such changes, alterations, substitutions and additions in and to its facilities as Cooperative may from time to time deem advisable, including the right to increase or decrease the size or capacity of its system, together with necessary accessories and appurtenances; the right to increase or decrease the size of the facilities and equipment situated upon the premises; the right to permit or otherwise agree to the joint use or occupancy of the overhead lines or the trench and related underground facilities by other persons, associations or corporations; and the right to at any time use the property described above to extend lines and facilities to serve the property of persons other than the Owner.

Any damages to the surface of the right-of-way or to crops, fences, gates, drains, ditches, or lines of the Owner, caused by the Cooperative in the installation, repair maintenance, reconstruction or removal of said electrical properties and appurtenances, shall be promptly repaired, replaced or paid for by the Cooperative, provided a claim therefore is presented to the Cooperative at its General Office within ninety (90) days after such damages occur. If the amount of said damages cannot be agreed upon, the Cooperative and the Owner shall each select an arbitrator, and these two shall select a third arbitrator, and the decision and award of the arbitrators shall be final.

Cooperative shall at all times have the right to keep the easement clear of all buildings, structures or other obstructions, trees, shrubbery, undergrowth and roots.

Owner, his successors and assigns, may use the land within the easement for any purpose not inconsistent with the rights granted, provided such use does not interfere with or endanger the Cooperative's facilities or the rights granted under this easement.

For the purpose of constructing, inspecting, maintaining or operating its facilities, Cooperative shall have the right of ingress to and egress from the easement over the lands of Owner adjacent to the easement and lying between public or private roads and the easement, such right to be exercised in such manner as shall occasion the least practicable damage and inconvenience to Owner.

Owner covenants that he is seized of and has the right to convey the said easement, rights and privileges; that Cooperative shall have quiet and peaceable possession, use and enjoyment of the aforesaid easement, rights and privileges, and that Owner shall execute such further assurances thereof as may be requested by the Cooperative.

James D. Kusler

STATE OF NORTH DAKOTA )
)ss
COUNTY OF Dunn )

On this 19th day of June, 2019, before me, a Notary Public in and for said County and State personally appeared James Kusler, known to me to be the person(s) described in and who executed the within and foregoing instrument and acknowledged to me that he/she/they executed the same.

***Notary Seal Location***

Notary Public State of North Dakota

My Commission Expires: 05/10/19

JOSH PAPE
Notary Public
State of North Dakota
My Commission Expires May 10, 2019

MORTGAGEE
MORTGAGOR
INDEXED ✓

**STATE OF NORTH DAKOTA**
**COUNTY OF MERCER**

**206136**
**OFFICE OF**
**COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 1/15/2015 at 11:12 AM, and was duly recorded a Book 200 MISC on Page 647 Fee: $13.00

County Recorder Brenda L Cook

By Deputy Kathryn Schumann

Return To: ROUGHRIDER ELECTRIC COOPERATIVE, INC., 800 H
cfg HAZEN, ND 58545

COUNTY RECORDER
SEAL
MERCER COUNTY, N. DAK.

**SOUTHWEST WATER AUTHORITY**
Southwest Pipeline Project Building
West Industrial Park
4665 2nd Street SW
Dickinson, ND 58601-7231
(701) 225-0241
Toll Free: 1-888-425-0241

Segment **7-9E WEST CENTER SERVICE AREA**
Parcel **142-88-17**

## RIGHT-OF-WAY EASEMENT

**ALL PERSONS TAKE NOTICE:**

In consideration of one dollar ($1.00) and other good and valuable consideration JOHNELLE J. KUSLER 1884 HILLCREST AVENUE ST. PAUL, MN 55116 hereinafter referred to as Grantor, does hereby grant, bargain, sell, transfer and convey to the Southwest Water Authority, hereinafter referred to as the Grantee, its successor and assigns, a perpetual easement with right to erect, construct, install and lay, and thereafter use, operate, inspect, repair, maintain, replace, and remove water pipelines, connections, valves and all other appurtenant facilities used in connection with the construction, operation and maintenance of the Southwest Pipeline Project, over, above, across and through the land of the Grantor, situated in MERCER County, State of North Dakota, said land being described as follows: E1/2 NE1/4 LESS R/W SECTION 12 TOWNSHIP 142 RANGE 88 & SE1/4 SECTION 27 TOWNSHIP 143 RANGE 88 (the tract that contains 3.35 acres, more or less), together with the right of ingress and egress over the adjacent lands of the Grantor, successors and assigns for the purposes of this easement.

1. The permanent easement will be thirty (30) feet in width, fifteen (15) feet on each side of the center line of the pipeline as constructed, with an additional ten (10) feet of temporary right-of-way for a total construction easement width of forty (40) feet, twenty (20) feet on each side of the center line.

2. The Grantee covenants to maintain the easement in good repair so that no unreasonable damage will result from its use to the adjacent land of the Grantor, successors and assigns. The Grantor will receive compensation for damages to growing crops caused by the construction or operation. The Grantor will report any damages within three (3) years of the construction of the project.

The grant and other provisions of this easement shall constitute a covenant running with the land for the benefit of the Grantee, its successors and assigns.

**IN WITNESS WHEREOF,** the Grantor has executed this instrument this 23rd day of May, 2015.

Johnell J Kusler GRANTOR _____ ~~GRANTOR~~ NV

State of MINNESOTA

County of RAMSEY

NICOLE LOUISE VERRILL
NOTARY PUBLIC - MINNESOTA
MY COMMISSION EXPIRES 01/31/19

On 23RD DAY OF MAY, 2015, personally appeared before me JOHNELL J. KUSLER NV

_____ whom I know personally.
__X__ whose identity I verified on the basis of MINNESOTA DRIVERS LISCENSE.
_____ whose identity I verified on the oath or affirmation of _____, a credible witness to be the signor of the above and he/she acknowledged that he/she signed it.

Notary Public Nicole Louise Verrill

RAMSEY, County MINNESOTA

My Commission Expires: 01/31/2019

207510

**STATE OF NORTH DAKOTA**
**COUNTY OF MERCER**

**OFFICE OF COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 6/19/2015 at 12:20 PM, and was duly recorded a Book 203 MISC on Page 599 Fee: $13.00

County Recorder Brenda L. Cook

By Deputy

Return To: SOUTHWEST WATER AUTHORITY, 4665 2ND STREET
DICKINSON, ND 58601-7231

MORTGAGEE
MORTGAGOR
INDEXED ✓

COUNTY RECORDER SEAL MERCER COUNTY, N DAK.

RECEIVED
MAY 28 2015
SOUTHWEST WATER AUTHORITY

uploaded to BTW AP on 5-28-15 ed

01104

(I)

Location Number

RIGHT-OF-WAY EASEMENT

KNOW ALL MEN BY THESE PRESENTS, that the undersigned Norman Smith, for a good and valuable consideration, the receipt whereof is hereby acknowledged, does hereby grant unto the Oliver-Mercer Electric Cooperative, Inc., a corporation, whose post office address is Hazen, N. Dak., North Dakota, and to its successors or assigns, the right to enter upon the lands of the undersigned, situated in the county of Oliver, State of North Dakota and more particularly described as follows:

NW¼ Sec. 22, Sec. 21, 142-87

~~SW¼ Sec. 15, 142-87~~

(I)

and to place, construct, operate, repair, maintain, relocate and replace thereon and in or upon all streets, roads or highways abutting said lands an electric transmission or distribution line or system, and to cut and trim trees and shrubbery to the extent necessary to keep them clear of said electric line or system and to cut down from time to time all dead, weak, leaning or dangerous trees that are tall enough to strike the wires in falling.

In granting this easement it is understood that at pole locations, only a single pole and arrurtenance will be used, and that the location of the pole will be such as to form the least possible interference to farm operations so long as it does not materially increase the cost of construction.

The undersigned covenants that he is the owner of the above described lands and that the said lands are free and clear of encumbrances and liens of whatsoever character except those held by the following persons:

(S)

It is further understood that, whenever necessary, words in this instrument in the singular shall be construed to read in the plural and that words used in the masculine gender shall be construed to read in the feminine.

IN WITNESS WHEREOF, the undersigned has set his hand and seal this 26 day of June, 1946.

Signed, sealed and delivered in the presence of:

Norman Smith

Banks H. Leeb

91055 8/21/2015 10:45 AM PAGE: 1 OF 2
BOOK: 1 PAGE: 1084 FEES: $13.00 MM EASEMENT (ROUGHRID
Kim Wilkens, OLIVER COUNTY RECORDER
By Deputy

RECORDER OLIVER COUNTY SEAL STATE OF NORTH DAKOTA

(1)
STATE OF NORTH DAKOTA

COUNTY OF Mercer SS.

Banks H Sieber being first duly sworn says that he is one of the witnesses to the above and foregoing easements, that Norman Smith and whose names is and/or are subscribed to the above and foregoing instruments as a party is and/or are the persons described in said easement and that he signed said instrument in my presence and that I in their presence signed my name thereto as a subscribing witness.

Banks H Sieber

SUBSCRIBED and sworn to before me this 15 day of June 1946

R J Sailer
Notary Public in and for the County of Mercer and State of North Dakota.

R. J. SAILER NOTARY PUBLIC STATE OF NORTH DAKOTA

My commission expires May 15 1947

(1)
STATE OF NORTH DAKOTA
COUNTY OF Mercer SS.

On this 15th day of June 1946 before me R J Sailer a Notary Public within and for the State of North Dakota, personally appeared Banks H Sieber known to me to be one of the persons who subscribed his name to the above and foregoing instrument as a witness, and who acknowledged to me that he subscribed his name thereto as such witness, and who proved to me that the person who and/or whose names are subscribed to the foregoing instrument are the persons described in it.

R J Sailer
Notary Public in and for the County of Mercer and State of North Dakota.

R. J. SAILER NOTARY PUBLIC STATE OF NORTH DAKOTA

My commission expires May 15 1947

********************

(2)
STATE OF

County of SS

ROUGHRIDER ELECTRIC COOPERATIVE
800 HWY DR

HAZEN, ND 58545

On this day of 19, before me , a Notary Public in and for said County and State, personally appeared and known to me to be the persons who described in and who executed within and foregoing instrument and acknowledged to me that he executed the same.

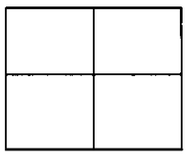
Notary Public in and for the County of and State North Dakota.

My commission expires

# RIGHT-OF-WAY EASEMENT

Faye Swenson (hereinafter called the "Grantor") (unmarried) (husband and wife) for a good and valuable consideration, the receipt whereof is hereby acknowledged, do hereby grant unto Roughrider Electric Cooperative, Inc. (hereinafter called "Grantee") whose post office address is Hazen, North Dakota 58545, and to its successors or assigns, an easement for 99 years, situated in the County of Oliver, State of North Dakota, and more particularly described as follows:

TOWNSHIP 142 NORTH, RANGE 87 WEST
Section 21 NE 1/4



To construct, reconstruct, relocate, rephase, remove, repair, operate and maintain on or under the above described lands, and/or in, upon or under all streets, roads or highways abutting said lands, an electric distribution line or system; to cut, trim eradicate and control the growth by chemical means, machinery or otherwise, or trees and shrubbery located within -15- feet of the center of said line system, or that may interfere with or threaten to endanger the operation and maintenance of said line system (indicating any control of the growth of other vegetation in the right-of-way which may incidentally and necessarily result from the means of control employed); and to license, permit or otherwise agree to the joint use or occupancy of the line or system by any other person, association or corporation, for electrification or communication purposes.

The undersigned Grantor agrees that all poles, wires, cables and other facilities including any main service entrance equipment installed on or below the above described lands at the Grantee's expense shall remain the property of Grantee, removable at its option upon termination of service to or on said lands.

Any damages to the surface of the right-of-way or to crops, fences, gates, drains, ditches or lines of the Grantor, caused by the Grantee in the installation, repair, maintenance, reconstruction or removal of said electric properties and appurtenances, shall be promptly repaired, replaced or paid for by the Grantee, provided a claim therefore is presented to the Grantee at its General Office within ninety (90) days after such damages occur. If the amount of said damages cannot be agreed upon, the Grantor and Grantee shall each select an arbitrator, and these two shall select a third arbitrator, and the decision and award of the arbitrators shall be final.

The undersigned Grantor convenants and agrees that no barrier of trees, shrubs, etc., and no structure or building shall be placed over underground conduits and electric lines and no construction shall be maintained or placed beneath over-the-ground electric lines and associated structures without the express written consent of the Grantee.

This Easement also includes a right-of-access to and from said real estate and Grantee's right-of-way for the purpose of connecting or reconnecting any part of the Grantee's system to or from said property with said system or to or from any other property on or coming on said system.

This Easement includes such additional rights of use and occupancy as shall be necessary for the use, maintenance, and operation of Grantee's system on said right-of-way, including but not limited to, anchors, guy wires, supporting poles or structures and the like as they were originally constructed or may thereafter be constructed.

The overall operating height of vehicles and equipment known to cultivate or traverse lands within the easement is less than _____ feet.

Dated this 1 day of July, 2008.

Faye B Swenson

RECORDER OLIVER COUNTY SEAL STATE OF NORTH DAKOTA

STATE OF NORTH DAKOTA )
)ss
COUNTY OF OLIVER )

The foregoing instrument was acknowledged before me this 1st day of July, 2008, by Faye B. Swenson.

My Commission Expires:
May 15, 2014

TIMOTHY J. VOLK
Notary Public
State of North Dakota
My Commission Expires May 15, 2014

Notary Public, State of North Dakota

88076 623 4/18/2013 10:17 AM PAGE: 1 OF 1
BOOK: HH PAGE: 3 FEES: $10.00 KW RIGHT OF WAY
Kim Wilkens, OLIVER COUNTY CLERK
By K Wilkens

ROUGHRIDER ELECTRIC COOP
2156 4TH AVE E
PO BOX 1038
DICKINSON, ND 58602

89860 5/27/2015 3:25 PM PAGE: 1 OF 1
BOOK: KK PAGE: 449 FEES: $10.00 MM EASEMENT
Kim Wilkens, OLIVER COUNTY RECORDER
By [signature]

SOUTHWEST WATER AUTHORITY
WEST INDUSTRIAL PARK
4665 2ND STREET SW
DICKINSON, ND 58601-7231

RECORDER OLIVER SEAL COUNTY STATE OF NORTH DAKOTA

**SOUTHWEST WATER AUTHORITY**
Southwest Pipeline Project Building
West Industrial Park
4665 2nd Street SW
Dickinson, ND 58601-7231
(701) 225-0241
Toll Free: 1-888-425-0241

Segment **7-9E WEST CENTER SERVICE AREA**
Parcel **142-87-16**

## RIGHT-OF-WAY EASEMENT

**ALL PERSONS TAKE NOTICE:**

In consideration of one dollar ($1.00) and other good and valuable consideration **KURT & FAYE SWENSON 5774 21ST STREET SW BEULAH, ND 58523** hereinafter referred to as Grantor, does hereby grant, bargain, sell, transfer and convey to the Southwest Water Authority, hereinafter referred to as the Grantee, its successor and assigns, a perpetual easement with right to erect, construct, install and lay, and thereafter use, operate, inspect, repair, maintain, replace, and remove water pipelines, connections, valves and all other appurtenant facilities used in connection with the construction, operation and maintenance of the Southwest Pipeline Project, over, above, across and through the land of the Grantor, situated in **Oliver** County, State of North Dakota, said land being described as follows: **NE1/4 SECTION 21 TOWNSHIP 142 RANGE 87** (the tract that contains **2.32** acres, more or less), together with the right of ingress and egress over the adjacent lands of the Grantor, successors and assigns for the purposes of this easement.

1. The permanent easement will be thirty (30) feet in width, fifteen (15) feet on each side of the center line of the pipeline as constructed, with an additional ten (10) feet of temporary right-of-way for a total construction easement width of forty (40) feet, twenty (20) feet on each side of the center line.

2. The Grantee covenants to maintain the easement in good repair so that no unreasonable damage will result from its use to the adjacent land of the Grantor, successors and assigns. The Grantor will receive compensation for damages to growing crops caused by the construction or operation. The Grantor will report any damages within three (3) years of the construction of the project.

The grant and other provisions of this easement shall constitute a covenant running with the land for the benefit of the Grantee, its successors and assigns.

**IN WITNESS WHEREOF,** the Grantor has executed this instrument this 2 day of April, 2015.

[signature] GRANTOR [signature] GRANTOR

State of North Dakota

County of Mercer

On April 2, 2015, personally appeared before me Faye Swenson
Kurt Swenson

RECEIVED SOUTHWEST WATER AUTHORITY

X whom I know personally.
____ whose identity I verified on the basis of _____.
____ whose identity I verified on the oath or affirmation of _____, a credible witness to be the signor of the above and he/she acknowledged that he/she signed it.

Notary Public [signature]

_____, County Mercer

My Commission Expires: 6/16/16

ERIC BUCHHOLZ
Notary Public
State of North Dakota
My Commission Expires June 16, 2016

EXCH: BELH WO#: 2015-206-038

# *West River Telecommunications Right-of-Way Easement*

We the undersigned, (whether one or more) ***Donna M. Smith***, Grantor(s), do hereby grant and convey unto ***West River Telecommunications Cooperative***, a cooperative corporation (hereafter called the "Cooperative"), grantee, whose address is P.O. Box 467, Hazen, North Dakota, and its respective successors, assigns, lessees and agents, an easement to survey, construct, repair, operate, upgrade, maintain, relocate, replace and remove such communication systems as the grantee may from time to time require, consisting of but not limited to cables, wires, poles, splicing boxes, and other appurtenances, upon, over and under the land which the undersigned owns or in which the undersigned has any interest in the County of ***Oliver***, State of ***North Dakota***, and more particularly described as follows:

W sec

*NE/4 Sec. 22 T142N R87W*

E sec.

*NW/4 Sec. 21 T142N R87W*

also the right of ingress and egress over and across the lands of the undersigned for the purpose of exercising the rights herein granted; to place surface markers beyond said strip, to clear and keep clear all trees, roots, brush and other obstructions from the surface and subsurface of said strip of land. The boundary of said strip shall be a line parallel to and 10 feet either side of the first cable laid on the land of the undersigned. The undersigned for Grantor(s), their heirs, executors, administrators, successors, and assigns, hereby covenants that no structure shall be erected on said strip.

The undersigned agrees that all poles, wire and other facilities, including telephone equipment, installed on the above described land, shall remain the property of the Cooperative, removable at the option of the Cooperative. The undersigned agrees to this easement with the understanding the Grantor(s), their heirs, executors, administrators, successors, and assigns, may continue to have access to and use of the easement area in any manner consistent with the rights herein granted to the Cooperative, and that the Cooperative will restore the said strip to as near as reasonable to the pre-constructed condition, and that the Cooperative will erect no buildings on said strip.

The undersigned covenant that they are the owners of the above described lands and that the said lands are free and clear of encumbrances and liens of whatsoever character except those held by the following persons:

The term of this easement shall be for as long as needed by the grantee, and until a release of this easement is recorded, but to not extend beyond the maximum term authorized by law.

92299 12/24/2015 11:05 AM PAGE: 1 OF 2
BOOK: MM PAGE: 109 FEES: $13.00 KW EASEMENT
Kim Wilkens, OLIVER COUNTY RECORDER
By K Wilkens

STATE OF NORTH DAKOTA ★ COUNTY SEAL ★ OLIVER RECORDER

WEST RIVER COMMUNICATIONS
PO BOX 467

HAZEN, ND 58545

EXCH: BELH WO#: 2015-206-038

Access is hereby granted for a state or federal historical survey of the cable route, should one be required, unless checked. Access denied ☐

IN WITNESS WHEREOF, this instrument has been executed by the undersigned this the 18 day of Nov, 2015.

STATE OF North Dakota )
)
COUNTY OF Oliver. )

by: Donna Mae Smith

by: _____

On this 18 day of November, the year 2015 before me personally appeared Donna Mae Smith, known to me to be the person(s) who is described in and who executed the within instrument, and acknowledged to me that he/she (or they) executed the same.

STEVEN C. KNUDSON
Notary Public
State of North Dakota
My Commission Expires Aug. 23, 2017

Steven C Knudson
Notary Public, County of Mercer
My Commission Expires: Aug. 23, 2017

IN WITNESS WHEREOF, this instrument has been executed by the undersigned this the ___ day of _____, 2015.

STATE OF )
)
COUNTY OF )

by: _____

by: _____

On this _____ day of _____, the year _____ before me personally appeared _____, known to me to be the person(s) who is described in and who executed the within instrument, and acknowledged to me that he/she (or they) executed the same.

_____
Notary Public, County of _____
My Commission Expires:

## RIGHT-OF-WAY EASEMENT

KNOW ALL MEN BY THESE PRESENTS, that we the undersigned, (whether one or more) Ralph E. Smith (unmarried) (husband and wife) for a good and valuable consideration, the receipt whereof is hereby acknowledged, do hereby grant unto Oliver-Mercer Electric Cooperative, Inc. a cooperative corporation (hereinafter called the "Cooperative") whose post office address is Hazen, North Dakota, and to its successors or assigns, the right to enter upon the lands of the undersigned, situated in the County of Oliver, State of North Dakota, and more particularly described as follows:

South ½ Section 15 Township 142N Range 87W

and to construct, operate and maintain an electric transmission and/or distribution line or system on or under the above-described lands and/or in, upon or under all streets, raods or highways abutting said lands; to inspect and make such repairs, changes, alterations, improvements, removals from, substitutions and additions to its facilities as Cooperative may from time to time deem advisable, including, by way of example and not by way of limitation, the right to increase or decrease the number of conduits, wires, cables, handholes, manholes, connection boxes, transformers and transformer enclosures; to cut, trim and control the growth by chemical means, machinery or otherwise of trees and shrubbery located within 100 feet of the center line of said line or system, or that may interfere with or threaten to endanger the operation and maintenance of said line or system (including any control of the growth of other vegetation in the right-of-way which may incidentally and necessarily result from the means of control employed); to keep the easement clear of all buildings, structures or other obstructions; and to license, permit or otherwise agree to the joint use or occupancy of the lines, system or, if any of said system is placed underground, of the trench and related underground facilities, by any other person, association or corporation.

The undersigned agree that all poles, wires and other facilities including any main service entrance equipment, installed in, upon or under the above-described lands at the Cooperative's expense shall remain the property of the Cooperative, removable at the option of the Cooperative.

The undersigned covenant that they are the owners of the above-described lands.

IN WITNESS WHEREOF, the undersigned have set their hands and seals this 20th day of November, 1975.

Ralph E. Smith (L.S.)

(L.S.)

Signed, sealed and delivered in the presence of:

Leonard H. Wohlfeil

90409 7/15/2015 3:20 PM PAGE: 1 OF 1
BOOK: 1 PAGE: 36 FEES: $10.00 MM EASEMENT (ROUGHRIDER
Kim Wilkens, OLIVER COUNTY RECORDER
By MMBulty Eule Deputy

ROUGHRIDER ELECTRIC COOPERATIVE
800 HWY DR

HAZEN, ND 58545

RECORDER OLIVER COUNTY SEAL STATE OF NORTH DAKOTA

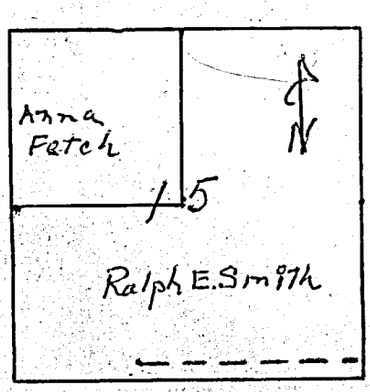
State of North Dakota )
) ss
Mercer County )

Personally came before me this 20th day of November 1975 the above named Leonard H. Wohlfeil to me known to be the person (s) who executed the foregoing instrument and acknowledged the same.

Vivian J. Rickertt

Notary Public, Mercer, County, North Dakota, State.

My Commission expires 12-31-77



VIVIAN J. RICKERTT NOTARY PUBLIC STATE OF NORTH DAKOTA

Anna Fetch
15
Ralph E. Smith

OFFICE OF COUNTY RECORDER
STATE OF NORTH DAKOTA
COUNTY OF OLIVER
Filed for record this 16 day
of Sept A.D. 2011
at 11:59 o'clock A M.,
and recorded as document No. 56785
in book FF of Misc page 619-621
B Wilkens
County Recorder Deputy

**PIPELINE EASEMENT**

North Dakota State Water Commission
County of Oliver
Parcels H-OL-141

**ALL PERSONS TAKE NOTICE:**

That the undersigned, Jule Silbernagel and Faye Swenson, as tenants in common, called the Grantor, being the owner of, or having an interest in, land situated in the County of Oliver, State of North Dakota, more fully described below, in consideration of One and No/100 Dollars ($1.00) and other valuable consideration, does hereby grant, convey, and warrant to the State of North Dakota, acting by and through the North Dakota State Water Commission, a state agency and public corporation, with its principal office at 900 East Boulevard Ave., Bismarck, North Dakota 58505, called the Grantee, and to its successors and assigns, the right, privilege, and easement to construct, maintain, operate, inspect, repair, alter, replace, change the size of or remove a pipeline, and appurtenances thereto, for the transportation of water under, across, and through:

Parcel H-OL-141
A 40 foot wide strip of land 20 feet wide on each side of the pipeline centerline lying within the SE1/4 Section 15, Township 142 North, Range 87 West of the 5th P.M.

Said tract contains 2.42 acres, more or less.

Temporary Construction Easement
An additional 20 feet of temporary right-of-way lying adjacent to the above described tract for a total construction easement width of 60 feet.

Said tract contains 1.21 acres, more or less.

together with the right to utilize additional land for a period up to three years from the date of this easement, adjacent to the above described tract, for purposes of temporary working space during initial construction of the pipeline, and the right of ingress to and egress from said strip of land across the adjacent lands of the Grantor, for the purposes specified above at the will of the Grantee.

**THE GRANTOR AND THE GRANTEE FURTHER AGREE:**

1. **Use of right-of-way by Grantor.** Grantor reserves the right to use the surface of the easement strip provided, however, that Grantor, without prior approval of Grantee, shall neither construct nor permit to be constructed any building, structure, or other improvement upon the easement strip which would interfere with Grantee's exercise of the rights conveyed by this pipeline easement, including access to the easement strip.

2. **Appurtenances.** The Grantee shall have the right to install and construct necessary appurtenances upon the surface of the easement strip. Prior to construction, the Grantee will notify the Grantor of the approximate location of such appurtenances if any, to be located on the easement strip, and shall pay to the Grantor the sum of $500 for each appurtenance located at a distance of more than 5 feet from a field boundary or fence line. Such payments shall be paid prior to construction.

3. **Damages.** The Grantee will pay to Grantor or Grantor's tenants, as their respective interests may appear, for damages caused by the operations or activities of the Grantee; provided, however, that the Grantee shall have the right, without liability for damages, to clear, and keep cleared, all trees, brush, and other obstructions from the easement strip that may, in the Grantee's judgment, interfere with the rights and privileges of the Grantee under this pipeline easement.

   If the amount of any damage which Grantor may sustain as a result of Grantee's exercise of rights hereunder cannot be mutually agreed upon, such damages shall be ascertained and

determined by three (3) disinterested person; one to be appointed by the Grantor, one by Grantee, and a third by the two so appointed, and the award of such three persons shall be final and conclusive.

4. **Restoration of surface.** The Grantee will restore the surface of the construction area to its original contour as nearly as practicable.

5. **Topsoil segregation.** When excavating the pipeline trench with a backhoe/trackhoe, the Grantee will remove the topsoil separately during the construction of the pipeline for the full width of the pipe trench to a depth of twelve (12) inches or the actual topsoil depth, whichever is less, and to be replaced at the top of the backfill over the pipe trench.

6. **Assignment and covenant by parties.** The rights of either party may be assigned in whole or in part. The terms and provisions of this easement shall constitute covenants running with the land and shall be binding upon, and inure to the benefit of, the parties hereto, their successors, assigns, personal representatives, and heirs.

7. **Grantor's title.** Grantor warrants that he is the owner of, or has an interest in, the land described in this easement, and that he has full right and authority to enter into and deliver this easement. This instrument may be executed in counterparts and each counterpart shall constitute a separate agreement between the parties thereto. Any payments pursuant to this pipeline easement shall be in proportion to the Grantor's interest in the undivided fee simple estate.

8. **Entire agreement.** This instrument contains the entire agreement of the parties and there are no other, or different, agreements or understandings between the Grantor and the Grantee, or its agents. The Grantor, in executing this pipeline easement, has not relied upon any promises, inducements, or representatives of the Grantee, or its agents, except as are set forth herein.

9. **Term of easement.** The term of this easement shall be as long as it is needed by the Grantee, or its assigns, and until a release of this easement is recorded, but shall not exceed ninety-nine (99) years pursuant to NDCC §47-05-02.1.

10. **Tenants.** The Grantor represents that the land described in this easement is (not rented) (rented to) John Smith.

Dated this 21st day of February, 20 11.

Faye Swenson
Grantor

Jule Silbernagel
Grantor

STATE OF NORTH DAKOTA)
) ss.
COUNTY OF Diver )

On this 24 day of February, 20 11, before me personally appeared Faye Swenson, known to me to be the person(s) described in and who executed the within and foregoing instrument, and acknowledged to me that he/she executed

the same.

Notary Public

(SEAL)
JAY L. PETERSON
Notary Public
State of North Dakota
My Commission Expires Jan. 13, 2015

Morton County, ND

My Commission expires:

STATE OF ARIZONA )
) ss.
COUNTY OF Maricopa )

On this 1 day of March, 20 11, before me personally appeared Jule D. Silberwagel, known to me to be the person(s) described in and who executed the within and foregoing instrument, and acknowledged to me that he/she executed the same.

Notary Public

(SEAL)
CYNTHIA A. CLARK
Notary Public - Arizona
Maricopa County
My Commission Expires
July 3, 2014

July 3, 2014 County, AZ

My Commission expires:

## RIGHT OF WAY EASEMENT

THIS AGREEMENT made and entered into this 11th day of AUGUST, 2014 between Faye Swenson, hereinafter called "Owner" (whether one or more) and **ROUGHRIDER ELECTRIC COOPERATIVE, INC.**, whose post office address is 800 Highway Drive, Hazen, North Dakota 58545-4737, hereinafter called "COOPERATIVE".

WITNESSETH that for valuable consideration, the receipt and sufficiency of which is hereby acknowledged, Owner grants unto Cooperative, its successors and assigns, for a term of 99 years from the date hereof, an easement to construct, reconstruct, operate and maintain an electric distribution system, overhead, underground or both including all poles, guys, anchors wires, surface terminals, and all accessories and appurtenances necessary or desirable in connection therewith, under, over, upon and across lands of Owner and/or in or upon all streets, roads or highways abutting said lands situated in Oliver County, North Dakota, and more particularly described as follows, to-wit:

A strip of land 20 feet in width, the same being 10 feet on each side of a centerline described as follows.

TOWNSHIP 142 NORTH, RANGE 87 WEST
Section 15

The facilities erected hereunder shall remain the property of the Cooperative. Cooperative shall have the right to inspect, rebuild, remove, repair, improve and make such changes, alterations, substitutions and additions in and to its facilities as Cooperative may from time to time deem advisable, including the right to increase or decrease the size or capacity of its system, together with necessary accessories and appurtenances; the right to increase or decrease the size of the facilities and equipment situated upon the premises; the right to permit or otherwise agree to the joint use or occupancy of the overhead lines or the trench and related underground facilities by other persons, associations or corporations; and the right to at any time use the property described above to extend lines and facilities to serve the property of persons other than the Owner.

Any damages to the surface of the right-of-way or to crops, fences, gates, drains, ditches, or lines of the Owner, caused by the Cooperative in the installation, repair maintenance, reconstruction or removal of said electrical properties and appurtenances, shall be promptly repaired, replaced or paid for by the Cooperative, provided a claim therefore is presented to the Cooperative at its General Office within ninety (90) days after such damages occur. If the amount of said damages cannot be agreed upon, the Cooperative and the Owner shall each select an arbitrator, and these two shall select a third arbitrator, and the decision and award of the arbitrators shall be final.

Cooperative shall at all times have the right to keep the easement clear of all buildings, structures or other obstructions, trees, shrubbery, undergrowth and roots.

Owner, his successors and assigns, may use the land within the easement for any purpose not inconsistent with the rights granted, provided such use does not interfere with or endanger the Cooperative's facilities or the rights granted under this easement.

For the purpose of constructing, inspecting, maintaining or operating its facilities, Cooperative shall have the right of ingress to and egress from the easement over the lands of Owner adjacent to the easement and lying between public or private roads and the easement, such right to be exercised in such manner as shall occasion the least practicable damage and inconvenience to Owner.

Owner covenants that he is seized of and has the right to convey the said easement, rights and privileges; that Cooperative shall have quiet and peaceable possession, use and enjoyment of the aforesaid easement, rights and privileges, and that Owner shall execute such further assurances thereof as may be requested by the Cooperative.

Faye Swenson

STATE OF NORTH DAKOTA )
)ss
COUNTY OF MERCER )

On this 11th day of AUGUST, 2014, before me, a Notary Public in and for said County and State personally appeared FAYE SWENSON, known to me to be the person(s) described in and who executed the within and foregoing instrument and acknowledged to me that he/she/they executed the same.

*Notary Seal Location*

90519 7/21/2015 1:56 PM PAGE: 1 OF 1
BOOK: 1 PAGE: 161 FEES: $10.00 MM EASEMENT ROUGHRIDE
Kim Wilkens, OLIVER COUNTY RECORDER
By

RECORDER SEAL OLIVER COUNTY STATE OF NORTH DAKOTA

Notary Public State of North Dakota

My Commission Expires:
6/16/16

ERIC BUCHHOLZ
Notary Public
State of North Dakota
My Commission Expires June 16, 2016

ROUGHRIDER ELECTRIC COOPERATIVE
800 HWY DR

HAZEN, ND 58545

**NORTH DAKOTA INDUSTRIAL COMMISSION**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case Nos. 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## DECLARATION OF MICHAEL BAUMAN

[¶1] I, Michael Bauman, declare the following based on personal knowledge:

[¶2] I have ownership interest in the following property that lies within the boundaries of the BK Fischer Storage Facility.

- Township 142 North, Range 88 West
  Section 24: SW1/4, less a 20-acre parcel & ROW
  Mercer County, ND

[¶3] To the best of my knowledge, the property listed in ¶ 2 above is encumbered by the following easements:

- Oliver-Mercer Electric Cooperative, Inc. Right-of-Way Easement executed by John Jochim on June 25, 1980 (209443).
- West River Telephone Right-of-Way Easement executed by John B. Jochim on April 13, 1993 (153703).
- ND Water State Water Commission Pipeline Easement executed by Rick and Valerie Bauman on August 19, 2010 (195749).
- Southwest Water Authority Right-of-Way Easement executed by Michael Bauman on October 16, 2014 (206892).

[¶4] Attached is the deed which I believe indicates my ownership in the property listed above.

[¶5] Attached are the easements currently encumbering these properties based on the information I have.

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on the 30 day of May , 2024 at Beulah, ND, United States.

Mike Bauman (May 30, 2024 14:29 EDT)

Michael Bauman

# WARRANTY DEED

This deed is made by **Rick Bauman and Valerie K. Bauman**, husband and wife, Grantors, to **Michael P. Bauman**, Grantee, whose post office address is 572 Oemler Loop, Savanna, GA 31410.

For valuable consideration, Grantors' grant and convey to Grantee the following real property (the premises) located in Mercer County, North Dakota:

Township 142 North, Range 88 West
Section 24: SW¼ less a 20 acre parcel described as follows:
Commencing at the NE corner of SW¼, thence West along the North boundary of the SW¼ a distance of 950 feet; thence South in a line parallel to the East boundary of the SW¼ a distance of 915 feet; thence East in a line parallel to the North boundary of the SW¼ a distance of 950 feet to the East boundary of the SW¼; thence North along the East boundary of the SW¼ to the point of beginning.

The legal description was obtained from ☒ a previously recorded instrument ☐ or prepared by Jeffrey T. Landon of Lange & Donovan, PLLP, PO Box 488, Hazen, ND 58545.

Grantor covenants that they are well seized in fee of the premises, which he has the right to sell and convey, and which are free from encumbrances except those of record. Further, they covenant that they will warrant and defend the premises in the quiet and peaceable possession of the Grantee.

Dated this 9th day of May, 2011.

**GRANTOR:**

Rick Bauman
Rick Bauman

Valerie K. Bauman
Valerie K. Bauman

State of North Dakota )
)ss.
County of Mercer )

On this 9th day of May, 2011, before me, a notary public, personally appeared **Rick Bauman and Valerie Bauman**, husband and wife, who acknowledged to me their execution of the foregoing instrument.

My Commission Expires: MORTGAGEE MORTGAGOR INDEXED

Laurie Lange
Notary Public
Mercer County, North Dakota

LAURIE LANGE
Notary Public
State of North Dakota
My commission expires Jan 14, 2015

☒ I certify the requirement for a report of statement of full consideration paid does not apply because this deed is for one of the transactions exempted by Subdivision (c) of Subdivision 7 of Section 11 18-02.2 NDCC.

Signed: Jeffrey T. Landon
(GRANTEE OR AGENT)

Dated: May 9, 2011

197840

STATE OF NORTH DAKOTA
COUNTY OF MERCER

OFFICE OF
COUNTY RECORDER

I hereby certify that the within instrument was filed in this office for record this 10/13/2011 at 9:40 AM, and was duly recorded as Book 151 DEED on Page 648 Fee: $10.00

County Recorder Brenda L. Cook
By Deputy Kathryn Schumann

Return To: LANGE LAW OFFICE, PO BOX 488
HAZEN, ND 58545

COUNTY RECORDER SEAL MERCER COUNTY, N. DAK.

Delinquent Taxes, Special Assessments, or Installments of Special Assessments Paid and Transfer Entered this 13th day of October, 2011.

Mercer County Auditor
By: Paula A. Roth, Clerk
Deputy Auditor

# RIGHT-OF-WAY EASEMENT

KNOW ALL MEN BY THESE PRESENTS, that we the undersigned, (whether one or more)
JOHN Jochim

(unmarried) (husband and wife) for a good and valuable consideration, the receipt whereof is hereby acknowledged, do hereby grant unto the Oliver-Mercer Electric Cooperative, Inc., a cooperative corporation (hereinafter called the "Cooperative") whose post office address is Hazen, North Dakota 58545, and to its successors or assigns, the right to enter upon the lands of the undersigned, situated in the County of Mercer, State of North Dakota, and more particularly described as follows:

S½ of NW¼ of 24

Right-of-way_____feet Township 142 Range 88 Section W½ of SW¼ of 13
Right-of-way_____feet Township ____ Range ____ Section W½ of W½ of 24
N½ of SW¼ of 24

and to construct, operate, maintain and move or relocate on the above-described lands and/or in or upon all streets, roads or highways abutting said lands, an electric transmission line or system, and to cut and trim trees and shrubbery that may interfere with or threaten to endanger the operation and maintenance of said line or system. The easement shall include only that part of the above described land located within 15 feet on each side of the proposed line.

The undersigned agree that all poles, wires and other facilities, installed on the above described lands at the Cooperative's expense shall remain the property of the Cooperative, removable at the option of the Cooperative.

The Cooperative agrees to pay a reasonable sum for any damage caused to crops or fences by the construction, operation, maintenance, or repair of said line or system. The overall operating height of vehicles and equipment known to cultivate or traverse lands within the easement, is less than fourteen (14) feet, unless otherwise noted below.

IN WITNESS WHEREOF, the undersigned have set their hands and seals this 25 day of June, 1980.

Signed, sealed and delivered in the presence of:

John Jochim

STATE OF NORTH DAKOTA )
) ss
COUNTY OF Mercer )

On this 25 day of June, 1980, before me, a Notary Public in and for said County and State, personally appeared JOHN JOCHIM known to me to be the person who described in and who executed the foregoing instrument and acknowledged to me that he executed the same.

My Commission expires: MAY 5, 1986

Notary Public in and for the County of Mercer State of North Dakota

STATE OF NORTH DAKOTA )
) ss
COUNTY OF _____ )

_____ Being first duly sworn says that he is one of the Witnesses to the above and foregoing easements, that _____ name(s) is and/or are subscribed to the above and foregoing instruments as a party is and/or are the persons described in said easement and that he signed said instrument in my presence and that I in their presence signed my name thereto as a subscribing witness.

Subscribed and sworn to before me this ____ day of _____, 19___

My Commission Expires:

_____

Notary Public in and for the County of _____ and the State of North Dakota

209443

**STATE OF NORTH DAKOTA**
**COUNTY OF MERCER**

**OFFICE OF**
**COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 12/9/2015 at 12:16 PM, and was duly recorded a Book 208 MISC on Page 31 Fee: $23.00

MORTGAGEE
MORTGAGOR
INDEXED ✓

County Recorder Brenda L. Cook

By Deputy

Return To: ROUGHRIDER ELECTRIC COOPERATIVE, INC., 800 H
HAZEN, ND 58545

COUNTY RECORDER SEAL MERCER COUNTY, N DAK.

In Computer [ ]
WRT# [ ]
County# [ ]

MORTGAGEE
MORTGAGOR
GRANTOR ✓
GRANTEE ✓
INDEXED ✓

W.O.# 92-272

# West River Telephone Right-of-Way Easement

KNOW ALL MEN BY THESE PRESENT, that we the undersigned, (whether one or more) *John B Jochim*, Grantor(s), do hereby grant and convey unto *West River Telecommunications Cooperative*, a cooperative corporation (hereafter called the "Cooperative"), grantee, whose address is P.O Box 467, Hazen, North Dakota, and its respective successors, assigns, lessees and agents, an easement to survey, construct, reconstruct, operate, upgrade, maintain, relocate, replace and remove such communication systems as the grantee may from time to time require, consisting of but not limited to cables, wires, poles, splicing boxes, surface testing terminals, repeaters, repeater housings and markers, and other appurtenances, upon and over the land which the undersigned owns or in which the undersigned has any interest in the County of *Mercer*, State of *North Dakota*, and more particularly described as follows:

*W/2 24 142 88*

also the right of ingress and egress over and across the lands of the undersigned for the purpose of exercising the rights herein granted; to place surface markers beyond said strip, to clear and keep clear all trees, roots brush and other obstructions from the surface and subsurface of said strip of land and within seven feet thereof. The boundary of said strip shall be a line parallel to and 25 feet either side of the first cable laid, which cable shall have its location indicated by surface markers set at intervals on the land of the undersigned or on adjacent lands. The undersigned for himself, his heirs, executors, administrators, successors, and assigns, hereby covenants that no structure shall be erected on said strip.

The undersigned agrees that all poles, wire and other facilities, including telephone equipment, installed on the above described premises at the Cooperative's expense, shall remain the property of the Cooperative, removable at the option of the Cooperative.

The undersigned covenant that they are the owners of the above described lands and that the said lands are free and clear of encumbrances and liens of whatsoever character except those held by the following persons:

The term of this easement shall be for as long as needed by the grantee, and until a release of this easement is recorded, but to not extend beyond the maximum term authorized by law.

Access is hereby granted for a state or federal historical survey of the cable route, should one be required, unless checked. Access denied ☐

IN WITNESS WHEREOF, this instrument has been executed by the undersigned this the 13 day of April, 1993.

STATE OF NORTH DAKOTA )
)
COUNTY OF Mercer )

by: John B. Jochim

by: _____

The foregoing instrument was acknowledged before me this 13th day of April, 1993. By John B Jochim.

My Commission Expires:

CLYDE FANDRICH
Notary Public, Mercer County, ND
My Commission Expires Feb. 24, 1999
STATE OF NORTH DAKOTA
NOTARY PUBLIC SEAL

Clyde Fandrich
Notary Public, County of Mercer

Document No. 153703
OFFICE OF REGISTER OF DEEDS, COUNTY OF Mercer, North Dakota. I hereby certify that the within instrument was filed in this office for recording on the 10th day of January, A.D., 1994, at 12:10 o'clock P M, and was duly recorded in Book 128, of Misc., on page 521.

By Kathryn Schumann, Deputy Jeanette Sailer
Register of Deeds

REGISTER OF DEEDS SEAL MERCER COUNTY, N.DAK.

$7.00 fee

When recorded, please return to WEST RIVER TELECOMMUNICATION COOPERATIVE.

**PIPELINE EASEMENT**

North Dakota State Water Commission
County of Mercer
Parcel H-MER-131

**ALL PERSONS TAKE NOTICE:**

That the undersigned, Rick Bauman and Valerie K. Bauman, whether one or more, called the Grantor, being the owner of, or having an interest in, land situated in the County of Mercer, State of North Dakota, more fully described below, in consideration of One and No/100 Dollars ($1.00) and other valuable consideration, does hereby grant, convey, and warrant to the State of North Dakota, acting by and through the North Dakota State Water Commission, a state agency and public corporation, with its principal office at 900 East Boulevard Ave., Bismarck, North Dakota 58505, called the Grantee, and to its successors and assigns, the right, privilege, and easement to construct, maintain, operate, inspect, repair, alter, replace, change the size of or remove a pipeline, and appurtenances thereto, for the transportation of water under, across, and through:

Parcel H-MER-131
A 40 foot wide strip of land 20 feet wide on each side of the pipeline centerline lying within the W1/2 SW1/4 and S1/2 SW1/4 all in Section 24, Township 142 North, Range 88 West of the 5th P.M.

Said tract contains 4.84 acres, more or less.

Temporary Construction Easement
An additional 20 feet of temporary right-of-way lying adjacent to the above described tract for a total construction easement width of 60 feet.

Said tract contains 2.42 acres, more or less.

together with the right to utilize additional land for a period up to three years from the date of this easement, adjacent to the above described tract, for purposes of temporary working space during initial construction of the pipeline, and the right of ingress to and egress from said strip of land across the adjacent lands of the Grantor, for the purposes specified above at the will of the Grantee.

**THE GRANTOR AND THE GRANTEE FURTHER AGREE:**

1. **Use of right-of-way by Grantor.** Grantor reserves the right to use the surface of the easement strip provided, however, that Grantor, without prior approval of Grantee, shall neither construct nor permit to be constructed any building, structure, or other improvement upon the easement strip which would interfere with Grantee's exercise of the rights conveyed by this pipeline easement, including access to the easement strip.

2. **Appurtenances.** The Grantee shall have the right to install and construct necessary appurtenances upon the surface of the easement strip. Prior to construction, the Grantee will notify the Grantor of the approximate location of such appurtenances if any, to be located on the easement strip, and shall pay to the Grantor the sum of $500 for each appurtenance located at a distance of more than 5 feet from a field boundary or fence line. Such payments shall be paid prior to construction.

3. **Damages.** The Grantee will pay to Grantor or Grantor's tenants, as their respective interests may appear, for damages caused by the operations or activities of the Grantee; provided, however, that the Grantee shall have the right, without liability for damages, to clear, and keep cleared, all trees, brush, and other obstructions from the easement strip that may, in the Grantee's judgment, interfere with the rights and privileges of the Grantee under this pipeline easement.

If the amount of any damage which Grantor may sustain as a result of Grantee's exercise of rights hereunder cannot be mutually agreed upon, such damages shall be ascertained and determined by three (3) disinterested person; one to be appointed by the Grantor, one by Grantee, and a third by the two so appointed, and the award of such three persons shall be final and conclusive.

4. **Restoration of surface.** The Grantee will restore the surface of the construction area to its original contour as nearly as practicable.

5. **Topsoil segregation.** When excavating the pipeline trench with a backhoe/trackhoe, the Grantee will remove the topsoil separately during the construction of the pipeline for the full width of the pipe trench to a depth of twelve (12) inches or the actual topsoil depth, whichever is less, and to be replaced at the top of the backfill over the pipe trench.

6. **Assignment and covenant by parties.** The rights of either party may be assigned in whole or in part. The terms and provisions of this easement shall constitute covenants running with the land and shall be binding upon, and inure to the benefit of, the parties hereto, their successors, assigns, personal representatives, and heirs.

7. **Grantor's title.** Grantor warrants that he is the owner of, or has an interest in, the land described in this easement, and that he has full right and authority to enter into and deliver this easement. This instrument may be executed in counterparts and each counterpart shall constitute a separate agreement between the parties thereto. Any payments pursuant to this pipeline easement shall be in proportion to the Grantor's interest in the undivided fee simple estate.

8. **Entire agreement.** This instrument contains the entire agreement of the parties and there are no other, or different, agreements or understandings between the Grantor and the Grantee, or its agents. The Grantor, in executing this pipeline easement, has not relied upon any promises, inducements, or representatives of the Grantee, or its agents, except as are set forth herein.

9. **Term of easement.** The term of this easement shall be as long as it is needed by the Grantee, or its assigns, and until a release of this easement is recorded, but shall not exceed ninety-nine (99) years pursuant to NDCC §47-05-02.1.

10. **Tenants.** The Grantor represents that the land described in this easement is (not rented) (rented to) NO.

Dated this 19th day of August, 2010.

Grantor

Grantor

STATE OF NORTH DAKOTA)
) ss.
COUNTY OF Mercer)

On this 19th day of August, 2010, before me personally appeared Rick + Valerie Baumann, known to me to be the person(s) described in and who executed the within and foregoing instrument, and acknowledged to me that he/she executed the same.

BRUCE KOPPINGER
NOTARY PUBLIC, STATE OF NORTH DAKOTA
MY COMMISSION EXPIRES AUG 12, 2014

Notary Public

Stark County, ND

My Commission expires: 8-12-2014

MORTGAGEE
MORTGAGOR
INDEXED

**195749**

**STATE OF NORTH DAKOTA**
**COUNTY OF MERCER**

**OFFICE OF**
**COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 12/6/2010 at 1:07 PM, and was duly recorded as Book 186 MISC on Page 151 Fee: $16.00

County Recorder Brenda L. Cook

By Deputy

Return To: ND STATE WATER COMMISSION, 900 E BOULEVARD A
DEPT 770 BISMARCK, ND 58505-0850

COUNTY RECORDER
SEAL
MERCER COUNTY, N. DAK.

RECEIVED
OCT 20 2014

**SOUTHWEST WATER AUTHORITY**
Southwest Pipeline Project Building
West Industrial Park
4665 2nd Street SW
Dickinson, ND 58601-7231
(701) 225-0241
Toll Free: 1-888-425-0241

Segment **7-9E WEST CENTER SERVICE AREA**
Parcel **142-88-22**

## RIGHT-OF-WAY EASEMENT

**ALL PERSONS TAKE NOTICE:**

In consideration of one dollar ($1.00) and other good and valuable consideration **MICHAEL P. BAUMAN 4717 S 197TH E AVE BROKEN ARROW, OK 74014** hereinafter referred to as Grantor, does hereby grant, bargain, sell, transfer and convey to the Southwest Water Authority, hereinafter referred to as the Grantee, its successor and assigns, a perpetual easement with right to erect, construct, install and lay, and thereafter use, operate, inspect, repair, maintain, replace, and remove water pipelines, connections, valves and all other appurtenant facilities used in connection with the construction, operation and maintenance of the Southwest Pipeline Project, over above, across and through the land of the Grantor, situated in **MERCER** County, State of North Dakota, and said land as identified in Exhibit A described as follows: **SW1/4 SW1/4 SW1/4 SW1/4 & E1/2 E1/2 E1/2 SW1/4 SECTION 24 TOWNSHIP 142 RANGE 88** (the tract that contains **1.24** acres, more or less).

1. The permanent easement will be thirty (30) feet in width, fifteen (15) feet on each side of the center line of the pipeline as constructed, with an additional ten (10) feet of temporary right-of-way for a total construction easement width of forty (40) feet, twenty (20) feet on each side of the center line.

2. The Grantee covenants to maintain the easement in good repair so that no unreasonable damage will result from its use to the adjacent land of the Grantor, successors and assigns. The Grantor will receive compensation for damages to growing crops caused by the construction or operation. The Grantor will report any damages within three (3) years of the construction of the project.

The grant and other provisions of this easement shall constitute a covenant running with the land for the benefit of the Grantee, its successors and assigns.

**IN WITNESS WHEREOF**, the Grantor has executed this instrument this 16th day of October, 2014.

Michael Bauman GRANTOR _____ GRANTOR

State of OKLAHOMA

County of TULSA

On 16th day of October, 2014, personally appeared before me Michael Bauman

_____

__ok__ whom I know personally.
_____ whose identity I verified on the basis of _____.
_____ whose identity I verified on the oath or affirmation of _____, a credible witness to be the signor of the above and he/she acknowledged that he/she signed it.

IRMA J. ARTECHE NOTARY # 12007645 EXP. 08/14/16 PUBLIC STATE OF OKLAHOMA

Notary Public Irma J. Arteche

OKLAHOMA, County TULSA

My Commission Expires: 08/14/16

206892

**STATE OF NORTH DAKOTA**
**COUNTY OF MERCER**

**OFFICE OF**
**COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 5/4/2015 at 11:54 AM, and was duly recorded as Book 202 MISC on Page 387 Fee: $13.00

MORTGAGEE
MORTGAGOR
INDEXED ✓

County Recorder Brenda L. Cook

By Deputy

Return To: SOUTHWEST WATER AUTHORITY, SOUTHWEST PIPE
WEST INDUSTRIAL PARK-4665 2ND ST SW DICKINS

COUNTY RECORDER
SEAL
MERCER COUNTY, N. D.

uploaded TO BTW FTP on 10-20-14 (m)

**NORTH DAKOTA INDUSTRIAL COMMISSION**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case Nos. 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## DECLARATION OF GLENN GERVING

[¶1] I, Glenn Gerving, declare the following statements based on personal knowledge:

[¶2] I have ownership interest in the following properties that lie within the boundaries of the proposed TB Leingang Storage Facility.

- Township 141 North, Range 88 West
  Section 13: South fifty-four (54) acres of the South Half of the South Half (S1/2 S1/2)
  Mercer County, ND

- Township 141 North, Range 88 West
  Section 24: S1/2 SW1/4; S1/2 SW1/4 NW1/4
  Mercer County, ND

[¶3] To the best of my knowledge, the properties listed in ¶ 2 above are encumbered by the following easements:

- Section 13:
  i. Southwest Water Authority Right-of-Way Easement executed by Dean and Tania Gerving on June 22, 2015 (207742).

- Section 24:
  i. Southwest Water Authority Right-of-Way Easement executed by Glenn and Lisa Gerving on May 8, 2015 (207178).

[¶4] I have ownership interest in the following properties that lie within the boundaries of the Review Area of the proposed TB Leingang Storage Facility:

- Township 142 North, Range 87 West
  Section 34: E1/2 SE1/4
  Oliver County, ND

- Township 142 North, Range 87 West
  Section 35: S1/2 SW1/4
  Oliver County, ND

[¶5] Attached are the deeds which I believe indicate my ownership in each of the properties listed above.

[¶6] Attached are the easements currently encumbering these properties based on the information I have.

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on the 30 day of May, 2024 at Glen Ullin, ND, United States.

Glenn Gerving

STATE OF NORTH DAKOTA
COUNTY OF MERCER

217088
OFFICE OF
COUNTY RECORDER

I hereby certify that the within instrument was filed in this office for record this 12/19/2018 at 11:20 AM, and was duly recorded Book 169 DEED on Page 347 Fee: $20.00

County Recorder Brenda L. Cook
By ~~Deputy~~ Clerk Heather L. Vigesaa
Return To: GLENN GERVING, PO BOX 607
GLEN ULLIN, ND 58631-0607

Deputy Auditor

Taxes and Special Assessments paid and TRANSFER ACCEPTED this 19th day of December 2018.
Shawna Brost
Mercer County Auditor
By: Amber Gabert
Date

MORTGAGEE
MORTGAGOR
INDEXED ✓

COUNTY RECORDER SEAL MERCER COUNTY, N.DAK

**********

**QUIT CLAIM DEED**

**********

**THIS INDENTURE made this 24 day of October, 2018, between Dean Gerving, 2506 LaCorte Place, Bismarck, ND 58503, formerly of 607 9th Avenue SW, Mandan, ND 58554, Grantor; and Glenn Gerving, P.O. Box 607, Glen Ullin, ND 58631-0607, Grantee;**

**For and in consideration of One Dollar and other good and valuable consideration, Grantor does hereby QUIT CLAIM to Grantee, an undivided one-half (1/2) interest in all those tracts or parcels of land lying and being in the County of Mercer, and State of North Dakota, and described as follows, to wit:**

**The South fifty-three (53) acres of the South Half of the South Half (S1/2S1/2) of Section Thirteen (13), in Township One Hundred Forty-One (141) North, Range Eighty-Eight (88) West of the Fifth Principal Meridian, LESS a tract of land deeded to the State of North Dakota for the use of the State Highway Deptment described as follows:**

**All that portion of the South fifty-four (54) acres of the South Half of the South Half (S 1/2 S 1/2) of Section Thirteen (13), Township One Hundred Forty-One (141) North, Range Eighty-Eight (88) West, lying within a strip of land 100.00 feet wide, located on the Easterly side of and measured at right angles to the following described highway center line, as surveyed and staked: Beginning at a point 154.58 feet East of the Southwwest corner of said Section Thirteen (13), thence from a tangent bearing North 0.09' West running along a 0.30' curve to the left 446.7 feet, more or less, until said stip crosses the North Line of said South 54 acres, also including all that portion lying Westerly of the above described strip except all that portion lying within 33 feet of the section line, tract contains 1.92 acres, more or less.**

**The North one hundred six (106) acres of the South Half of the South Half (S 1/2 S 1/2) of Section Thirteen (13) in Township One Hundred**

**Forty-One (141) North, Range Eighty-Eight (88) West of the Fifth Principal Meridian in Mercer County, North Dakota, subject to all conveyances of record and to all existing easements and rights-of-way.**

**The South fifty-three (53) acres of the North one hundred six (106) acres of the South Half (S 1/2) AND the South fifty-four (54) acres of the North Half of the South Half (N 1/2 S 1/2) of Section Thirteen (13), in Township One Hundred Forty-one (141) North, Range Eighty-Eight (88) West of the Fifth Principal Meridian in Mercer County, North Dakota, subject to all conveyances of record and to all existing easements and rights-of-way.**

**These descriptions were obtained from a previously recorded instrument, namely that Warranty Deed dated March 12, 2007, recorded as Document No. 184674.**

**WITNESS, The hand of the Grantor:**

Dean Gerving

**Dean Gerving**

**STATE OF NORTH DAKOTA )**
**)ss.**
**COUNTY OF** Morton **)**

**On this** 17th **day of** December **, 2018, before me personally appeared Dean Gerving, a single person, known to me to be the same person described in and who executed the within and foregoing instrument, and acknowledged to me that he executed the same.**

SHANE A HELLMAN
Notary Public
State of North Dakota
My Commission Expires July 28, 2021

**Notary Public**
**State of North Dakota**
**My Commission Expires:** July 28, 2021

**I hereby certify that the transaction which is the subject matter of this conveyance is exempt from a statement of full consideration thereof, as it is made by Quit Claim Deed.**

12-19-18
**Date**

James Gerving
**Grantee or Agent**

WARRANTY DEED

THIS INDENTURE, Made this 11th day of January, 2006, between Lynn Flemmer, a single man, grantor, whether one or more and Glenn Gerving and Lisa Gerving, husband and wife, as joint tenants, as to an undivided one-half (1/2) interest and Dean Gerving and Tania Gerving, husband and wife, as joint tenants, as to the other one-half (1/2) interest, grantees, whose postoffice addresses are P.O. Box 607, Glen Ullin, North Dakota 58631 and 607 9th Avenue SW, Mandan, North Dakota 58554, respectively,

WITNNESSETH, For and in consideration of the sum of one dollar ($1.00) and other good and valuable consideration in money or monies worth - - - - - - - - - - - Dollars, grantor does hereby GRANT to the grantees all of the following real property lying and being in the County of Mercer and State of North Dakota, and described as follows, to-wit:

Township 141, Range 88
Mercer County, ND
Sec. 24: SW¼ and SW¼
of the NW¼

Reserving and excepting all minerals owned by the grantor.

[illegible] the property described in this deed is 75,000.00
Dean Gerving 1/11/06

And the said grantor for himself and his heirs, executors and administrators, does covenant with the grantees that he is well-seized in fee of the land and premises aforesaid and has good right to sell and convey the same in manner and form aforesaid; that the same are free from all incumbrances, except installments of special assessments or assessments for special improvements which have not been certified to the County Auditor for collection, easements,

rights of ways, mineral deeds, mineral leases and mineral reservations, and the above granted lands and premises in the quiet and peaceable possession of said grantees, against all persons lawfully claiming or to claim the whole or any part thereof, the said grantor will warrant and defend.

WITNESS, The hand of the grantor:

Lynn Flemmer

STATE OF NORTH DAKOTA )
)ss
COUNTY OF MERCER )

On this 11 day of January, 2006, before me, personally appeared Lynn Flemmer, a single person, known to me to be the person who is described in, and who executed the within and foregoing instrument, and severally acknowledged that he executed the same.

Bethanie Christmann
Notary Public
Mercer County, North Dakota

My Commission Expires:

BETHANIE CHRISTMANN
Notary Public
State of North Dakota
My Commission Expires April 2, 2008

181870

STATE OF NORTH DAKOTA
COUNTY OF MERCER

OFFICE OF
COUNTY RECORDER

I hereby certify that within instrument was filed in this office for record this 01/17/2006 at 09:37 AM and was duly recorded in Book 137 DEEDS on Page 0533. Fee: $13.00

County Recorder Brenda L. Cook

By Deputy Kathryn Shumann

Return To: HALPERN LAW OFFICE PO BOX 606
GLEN ULLIN, ND 58631

COUNTY RECORDER
SEAL
MERCER COUNTY, N. DAK.

MORTGAGEE
MORTGAGOR
INDEXED

Taxes and Special Assessments paid and
TRANSFER ACCEPTED this 17th day of
January, 2006.

Monte J. Eckhardt Mercer County Auditor

By: Pamela L. Drath Clerk ~~Deputy~~

# WARRANTY DEED

THIS INDENTURE, Made this 11 day of May, 2006, between Glenn Gerving and Lisa Gerving, husband and wife and Dean Gerving and Tania Gerving, husband and wife, grantor, whether one or more, and Glenn Gerving and Lisa Gerving, husband and wife, grantees, whose post office address is P.O. Box 607, Glen Ullin, ND 58631-0607.

WITNESSETH, For and in consideration of the sum of one dollar ($1.00) and other good and valuable consideration in money or monies worth - - - - - - - - - - - - - - - - - - - - - - - - - - - - -Dollars, grantor does hereby GRANT to the grantees, as joint tenants and not as tenants in common, all of the following real property lying and being in the County of Mercer and State of North Dakota, and described as follows, to-wit:

1. N½NE¼ of Sec. 13,Twp. 145N, Rng. 89W
2. S½SW¼ of Sec. 24, Twp. 141N, Rng. 88W
3. S½SW¼NW¼ of Sec. 24, Twp. 141N, Rng. 88W

And the said grantor for himself, his heirs, executors and administrators, does covenant with the grantees that he is well seized in fee of the land and premises aforesaid and has good right to sell and convey the same in manner and form aforesaid; that the same are free from all incumbrances, except installments of special assessments or assessments for special improvements which have not been certified to the County Auditor for collection, easements, rights of ways, zoning ordinances and amendments, EPA issues, mineral reservations, mineral leases and mineral deeds and any limitations of record, and the above granted lands and premises in the quiet and

peaceable possession of said grantees, against all persons lawfully claiming or to claim the whole or any part thereof, the said grantor will warrant and defend.

WITNESS, The hand of the grantor:

Glenn Gerving

Lisa Gerving

Dean Gerving

Tania Gerving

STATE OF NORTH DAKOTA )
:)ss
COUNTY OF MORTON )

On this 1st day of May, 2006, before me, personally appeared Glenn Gerving and Lisa Gerving, husband and wife and Dean Gerving and Tania Gerving, husband and wife, known to me to be the persons who are described in, and who executed the within and foregoing instrument, and severally acknowledged that they executed the same.

Mike L. Halpern, Notary Public
Morton County, North Dakota

My Commission Expires:

June 26, 2008

I certify that the requirement for a report or statement of full consideration paid does not apply because this deed is for one of the transactions exempted by subdivision e of subsection 8 of section 4 of Senate Bill 2323 (1993).

Signed: Mike L. Halpern Date: 5/1/06
Grantee or Agent

182609

MORTGAGEE
MORTGAGOR
INDEXED ✓

STATE OF NORTH DAKOTA
COUNTY OF MERCER

OFFICE OF
COUNTY RECORDER

I hereby certify that within instrument was filed in this office for record this 06/02/2006 at 09:28 AM and was duly recorded in Book 138 DEEDS on Page 0439. Fee: $16.00

County Recorder Brenda L. Cook

By Deputy _____

Return To: BANK OF GLEN ULLIN PO BOX 99
GLEN ULLIN, ND 58631-0099

COUNTY RECORDER SEAL MERCER COUNTY, N. DAK.

Delinquent Taxes, Special Assessments, or Installments of Special Assessments Paid and Transfer Entered this 2nd day of June, 2006.

Monte G. Erhardt
Mercer County Auditor

By Pamela K. Wrath Clerk
~~Deputy Auditor~~

**SOUTHWEST WATER AUTHORITY**
Southwest Pipeline Project Building
West Industrial Park
4665 2nd Street SW
Dickinson, ND 58601-7231
(701) 225-0241
Toll Free: 1-888-425-0241

Segment **7-9E WEST CENTER SERVICE AREA**
Parcel **141-88-27**

## RIGHT-OF-WAY EASEMENT

**ALL PERSONS TAKE NOTICE:**

In consideration of one dollar ($1.00) and other good and valuable consideration **GLENN & LISA GERVING PO BOX 607 GLEN ULLIN, ND 58631** hereinafter referred to as Grantor, does hereby grant, bargain, sell, transfer and convey to the Southwest Water Authority, hereinafter referred to as the Grantee, its successor and assigns, a perpetual easement with right to erect, construct, install and lay, and thereafter use, operate, inspect, repair, maintain, replace, and remove water pipelines, connections, valves and all other appurtenant facilities used in connection with the construction, operation and maintenance of the Southwest Pipeline Project, over, above, across and through the land of the Grantor, situated in **Mercer** County, State of North Dakota, said land being described as follows: **S1/2 SW1/4 LESS R/W & S1/2 SW1/4 NW1/4 LESS R/W SECTION 24 TOWNSHIP 141 RANGE 88** (the tract that contains **4.04** acres, more or less), together with the right of ingress and egress over the adjacent lands of the Grantor, successors and assigns for the purposes of this easement.

1. The permanent easement will be thirty (30) feet in width, fifteen (15) feet on each side of the center line of the pipeline as constructed, with an additional ten (10) feet of temporary right-of-way for a total construction easement width of forty (40) feet, twenty (20) feet on each side of the center line.

2. The Grantee covenants to maintain the easement in good repair so that no unreasonable damage will result from its use to the adjacent land of the Grantor, successors and assigns. The Grantor will receive compensation for damages to growing crops caused by the construction or operation. The Grantor will report any damages within three (3) years of the construction of the project.

The grant and other provisions of this easement shall constitute a covenant running with the land for the benefit of the Grantee, its successors and assigns.

**IN WITNESS WHEREOF,** the Grantor has executed this instrument this 8TH day of MAY, 2015.

Glen Gerving GRANTOR Lisa M. Gerving GRANTOR

State of ND

County of MORTON

On 8TH MAY, 2015, personally appeared before me LISA GERVING
GLEN GERVING

X whom I know personally.
_____ whose identity I verified on the basis of _____.
_____ whose identity I verified on the oath or affirmation of _____, a credible witness to be the signor of the above and he/she acknowledged that he/she signed it.

LARRY WAGNER
Notary Public
State of North Dakota
My Commission Expires Nov. 5, 2020

Notary Public Larry Wagner
MORTON, County ND
My Commission Expires: NOV 5, 2020

MORTGAGEE
MORTGAGOR
INDEXED ✓

207178

**STATE OF NORTH DAKOTA**
**COUNTY OF MERCER**

**OFFICE OF**
**COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 5/22/2015 at 12:41 PM, and was duly recorded a Book 203 MISC on Page 209 Fee: $13.00

County Recorder Brenda L. Cook

By Deputy

Return To: SOUTHWEST WATER AUTHORITY, WEST INDUSTRIA
4665 2ND ST SW DICKINSON, ND 58601-7231

COUNTY RECORDER SEAL MERCER COUNTY, N DAK.

RECEIVED
MAY 11 2015
SOUTHWEST WATER AUTHORITY

BTW AP on S14-15

# WARRANTY DEED

THIS INDENTURE, Made this 11 day of May, 2006, between Glenn Gerving and Lisa Gerving, husband and wife and Dean Gerving and Tania Gerving, husband and wife, grantor, whether one or more, and Glenn Gerving and Lisa Gerving, husband and wife, grantees, whose post office address is P.O. Box 607, Glen Ullin, ND 58631-0607.

WITNESSETH, For and in consideration of the sum of one dollar ($1.00) and other good and valuable consideration in money or monies worth - - - - - - - - - - - - - - - - - - - - - - - - - - - - -Dollars, grantor does hereby GRANT to the grantees, as joint tenants and not as tenants in common, all of the following real property lying and being in the County of Mercer and State of North Dakota, and described as follows, to-wit:

1. N½NE¼ of Sec. 13,Twp. 145N, Rng. 89W
2. S½SW¼ of Sec. 24, Twp. 141N, Rng. 88W
3. S½SW¼NW¼ of Sec. 24, Twp. 141N, Rng. 88W

And the said grantor for himself, his heirs, executors and administrators, does covenant with the grantees that he is well seized in fee of the land and premises aforesaid and has good right to sell and convey the same in manner and form aforesaid; that the same are free from all incumbrances, except installments of special assessments or assessments for special improvements which have not been certified to the County Auditor for collection, easements, rights of ways, zoning ordinances and amendments, EPA issues, mineral reservations, mineral leases and mineral deeds and any limitations of record, and the above granted lands and premises in the quiet and

peaceable possession of said grantees, against all persons lawfully claiming or to claim the whole or any part thereof, the said grantor will warrant and defend.

WITNESS, The hand of the grantor:

Glenn Gerving

Lisa Gerving

Dean Gerving

Tania Gerving

STATE OF NORTH DAKOTA )
:)ss
COUNTY OF MORTON )

On this 1st day of May, 2006, before me, personally appeared Glenn Gerving and Lisa Gerving, husband and wife and Dean Gerving and Tania Gerving, husband and wife, known to me to be the persons who are described in, and who executed the within and foregoing instrument, and severally acknowledged that they executed the same.

Mike L. Halpern, Notary Public
Morton County, North Dakota

My Commission Expires:

June 26, 2008

I certify that the requirement for a report or statement of full consideration paid does not apply because this deed is for one of the transactions exempted by subdivision e of subsection 8 of section 4 of Senate Bill 2323 (1993).

Signed: Mike L. Halpern Date: 5/1/06
Grantee or Agent

182609

MORTGAGEE
MORTGAGOR
INDEXED ✓

STATE OF NORTH DAKOTA
COUNTY OF MERCER

OFFICE OF
COUNTY RECORDER

I hereby certify that within instrument was filed in this office for record this 06/02/2006 at 09:28 AM and was duly recorded in Book 138 DEEDS on Page 0439. Fee: $16.00

County Recorder Brenda L. Cook

By Deputy _____

Return To: BANK OF GLEN ULLIN PO BOX 99
GLEN ULLIN, ND 58631-0099

COUNTY RECORDER SEAL MERCER COUNTY, N. DAK.

Delinquent Taxes, Special Assessments, or Installments of Special Assessments Paid and Transfer Entered this 2nd day of June, 2006.

Monte G. Erhardt
Mercer County Auditor

By Pamela K. Wrath Clerk
~~Deputy Auditor~~

96516 12/21/2021 11:47 AM Total Pages: 3
BOOK: 44 PAGE: 235 FEES: $20.00 RB WARRANTY DEED
Mickie McNulty-Eide, OLIVER COUNTY RECORDER
By Rebecca Bathke Deputy

RECORDER OLIVER SEAL COUNTY STATE OF NORTH DAKOTA

THE TITLE TEAM
324 NORTH 3RD STREET
ATTN: KELLY BEHM
BISMARCK, ND 58501

# TRUSTEE'S WARRANTY DEED M159382

**THIS INDENTURE** Made this 15th day of December, 2021, between **Darren D. Senger and Francis M. Senger, Successor Trustees of the Senger Family Joint Asset Trust dated June 26, 2009, and any amendments thereto**, grantors, whether one or more, to **Glenn Gerving and Lisa Gerving**, grantees, whose post office address is PO Box 607 Glen Ullin ND 58631.

**WITNESSETH** for and in consideration of the sum of $10.00 and more consideration, grantors do hereby GRANT to the grantees, as joint tenants and not as tenants in common, all of the following real property lying and being in the County of Oliver, State of North Dakota, and described as follows, to-wit:

The E½SE¼ of Section 34, and the S½SW¼ of Section 35, all in Township 142 North, Range 87 West of the 5th P.M., Oliver County, North Dakota.

Reserving unto the Grantors 100% of whatever mineral interests (rights and royalties) currently owned by the Grantors or determined at a later date, including but not limited to oil, coal, gas, uranium and hydrocarbons owned as of record today.

Subject to easements, rights of way, restrictions and mineral severances and reservations of record.

I certify that the full consideration paid for the property described in this deed is $432,000.-.

Date: 12-15-21 (Sgd.) [signature]
Grantee or Agent

And the said grantors for themselves, their heirs, executors and administrators, do covenant with the grantees that they are well seized in fee of the land and premises aforesaid and have good right to sell and convey the same in manner and form aforesaid; that the same are free from encumbrances, except installments of special assessments or assessments for special improvements which have not been certified to the County Auditor for collection, and the above granted lands and premises in the quiet and peaceable possession of said grantees, against all persons lawfully claiming or to claim the whole or any part thereof, the said grantors will warrant and defend.

**Senger Family Joint Asset Trust dated June 26, 2009, and any amendments thereto**

**BY:** _____

**Francis M. Senger, Successor Trustee**

STATE OF Oregon )
) ss.
COUNTY OF Deschutes )

The foregoing instrument was acknowledged before me this 13th day of Dec, 2021, by Francis M. Senger, Successor Trustee of the Senger Family Joint Asset Trust dated June 26, 2009, and any amendments thereto.

(SEAL)

Rachel Ann Gheen
Notary Public,
Deschutes County, Oregon

My Commission Expires: Sept 12, 2025

OFFICIAL STAMP
RACHEL ANN GHEEN
NOTARY PUBLIC - OREGON
COMMISSION NO. 1016750
MY COMMISSION EXPIRES SEPTEMBER 12, 2025

**WITNESS** the hand of the grantors:

**Senger Family Joint Asset Trust dated June 26, 2009, and any amendments thereto**

**BY:** _____
**Darren D. Senger, Successor Trustee**

STATE OF California )
) ss.
COUNTY OF Santa Clara )

The foregoing instrument was acknowledged before me this 15 day of December, 2021, by Darren D. Senger, Successor Trustee of the Senger Family Joint Asset Trust dated June 26, 2009, and any amendments thereto.

(SEAL)

_____
Notary Public,
Santa Clara County, San Jose, California

My Commission Expires: Jan 26, 2025

TANIA LAL SHARMA
COMM. # 2343551
NOTARY PUBLIC - CALIFORNIA
SANTA CLARA COUNTY
MY COMM. EXP. JANUARY 26, 2025

Auditor's Office
Oliver County, N.D.
transfer entered this 21st day of
December 2021
_____
County Auditor
By _____ Deputy

**SOUTHWEST WATER AUTHORITY**
Southwest Pipeline Project Building
West Industrial Park
4665 2nd Street SW
Dickinson, ND 58601-7231
(701) 225-0241
Toll Free: 1-888-425-0241

Segment 7-9E WEST CENTER SERVICE AREA
Parcel **141-88-15**

## RIGHT-OF-WAY EASEMENT

**ALL PERSONS TAKE NOTICE:**

In consideration of one dollar ($1.00) and other good and valuable consideration **DEAN & TANIA GERVING 6743 PRAIRIE SAGE PL BISMARCK, ND 58503** hereinafter referred to as Grantor, does hereby grant, bargain, sell, transfer and convey to the Southwest Water Authority, hereinafter referred to as the Grantee, its successor and assigns, a perpetual easement with right to erect, construct, install and lay, and thereafter use, operate, inspect, repair, maintain, replace, and remove water pipelines, connections, valves and all other appurtenant facilities used in connection with the construction, operation and maintenance of the Southwest Pipeline Project, over, above, across and through the land of the Grantor, situated in **Mercer** County, State of North Dakota, said land being described as follows: **S1/2 S1/2 SW1/4 LESS R/W, FRAC N1/2 S1/2 SW1/4 LESS R/W SECTION 13 & N1/2 SW1/4 NW1/4 LESS R/W, N1/2 SW1/4 LESS R/W SECTION 24 TOWNSHIP 141 RANGE 88** (the tract that contains **3.88** acres, more or less), together with the right of ingress and egress over the adjacent lands of the Grantor, successors and assigns for the purposes of this easement.

1. The permanent easement will be thirty (30) feet in width, fifteen (15) feet on each side of the center line of the pipeline as constructed, with an additional ten (10) feet of temporary right-of-way for a total construction easement width of forty (40) feet, twenty (20) feet on each side of the center line.

2. The Grantee covenants to maintain the easement in good repair so that no unreasonable damage will result from its use to the adjacent land of the Grantor, successors and assigns. The Grantor will receive compensation for damages to growing crops caused by the construction or operation. The Grantor will report any damages within three (3) years of the construction of the project.

The grant and other provisions of this easement shall constitute a covenant running with the land for the benefit of the Grantee, its successors and assigns.

**IN WITNESS WHEREOF,** the Grantor has executed this instrument this 22 day of June, 2015.

Dean Gerving GRANTOR Tania Gerving GRANTOR

State of ND

County of Morton

On 22 of June, 2015, personally appeared before me Dean Gerving
Tania Gerving

✓ whom I know personally.
_____ whose identity I verified on the basis of _____.
_____ whose identity I verified on the oath or affirmation of _____, a credible witness to be the signor of the above and he/she acknowledged that he/she signed it.

ARTHUR J. HELLMAN
Notary Public
State of North Dakota
My Commission Expires May 20, 2016.

Notary Public Arthur J. Hellman
_____, County Morton

My Commission Expires: _____

207742

**STATE OF NORTH DAKOTA**
**COUNTY OF MERCER**

**OFFICE OF COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 7/16/2015 at 1:43 PM, and was duly recorded as Book 204 MISC on Page 101 Fee: $13.00

County Recorder Brenda K. Cook

By Deputy chg

Return To: SOUTHWEST WATER AUTHORITY, WEST INDUSTRIA
4665 2ND STREET SW DICKINSON, ND 58601-7231

MORTGAGEE
MORTGAGOR
INDEXED ✓

COUNTY RECORDER SEAL MERCER COUNTY, N DAK.

RECEIVED
JUN 24 2015
SOUTHWEST WATER AUTHORITY

Uploaded to BTW RP on 6-24-15 (m)

**SOUTHWEST WATER AUTHORITY**
Southwest Pipeline Project Building
West Industrial Park
4665 2nd Street SW
Dickinson, ND 58601-7231
(701) 225-0241
Toll Free: 1-888-425-0241

Segment **7-9E WEST CENTER SERVICE AREA**
Parcel **141-88-27**

## RIGHT-OF-WAY EASEMENT

**ALL PERSONS TAKE NOTICE:**

In consideration of one dollar ($1.00) and other good and valuable consideration **GLENN & LISA GERVING PO BOX 607 GLEN ULLIN, ND 58631** hereinafter referred to as Grantor, does hereby grant, bargain, sell, transfer and convey to the Southwest Water Authority, hereinafter referred to as the Grantee, its successor and assigns, a perpetual easement with right to erect, construct, install and lay, and thereafter use, operate, inspect, repair, maintain, replace, and remove water pipelines, connections, valves and all other appurtenant facilities used in connection with the construction, operation and maintenance of the Southwest Pipeline Project, over, above, across and through the land of the Grantor, situated in **Mercer** County, State of North Dakota, said land being described as follows: **S1/2 SW1/4 LESS R/W & S1/2 SW1/4 NW1/4 LESS R/W SECTION 24 TOWNSHIP 141 RANGE 88** (the tract that contains **4.04** acres, more or less), together with the right of ingress and egress over the adjacent lands of the Grantor, successors and assigns for the purposes of this easement.

1. The permanent easement will be thirty (30) feet in width, fifteen (15) feet on each side of the center line of the pipeline as constructed, with an additional ten (10) feet of temporary right-of-way for a total construction easement width of forty (40) feet, twenty (20) feet on each side of the center line.

2. The Grantee covenants to maintain the easement in good repair so that no unreasonable damage will result from its use to the adjacent land of the Grantor, successors and assigns. The Grantor will receive compensation for damages to growing crops caused by the construction or operation. The Grantor will report any damages within three (3) years of the construction of the project.

The grant and other provisions of this easement shall constitute a covenant running with the land for the benefit of the Grantee, its successors and assigns.

**IN WITNESS WHEREOF,** the Grantor has executed this instrument this 8TH day of MAY, 2015.

Glen Gerving GRANTOR Lisa M. Gerving GRANTOR

State of ND

County of MORTON

On 8TH MAY, 2015, personally appeared before me LISA GERVING
GLEN GERVING

X whom I know personally.
_____ whose identity I verified on the basis of _____.
_____ whose identity I verified on the oath or affirmation of _____, a credible witness to be the signor of the above and he/she acknowledged that he/she signed it.

LARRY WAGNER
Notary Public
State of North Dakota
My Commission Expires Nov. 5, 2020

Notary Public Larry Wagner
MORTON, County ND
My Commission Expires: NOV 5, 2020

MORTGAGEE
MORTGAGOR
INDEXED ✓

207178

**STATE OF NORTH DAKOTA**
**COUNTY OF MERCER**

**OFFICE OF**
**COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 5/22/2015 at 12:41 PM, and was duly recorded a Book 203 MISC on Page 209 Fee: $13.00

County Recorder Brenda L. Cook

By Deputy

Return To: SOUTHWEST WATER AUTHORITY, WEST INDUSTRIA
4665 2ND ST SW DICKINSON, ND 58601-7231

COUNTY RECORDER SEAL MERCER COUNTY, N DAK.

RECEIVED
MAY 11 2015
SOUTHWEST WATER AUTHORITY

BTW AP on S14-15

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## DECLARATION OF MICHAEL & BONNIE HAUPT

[¶1] We, Michael and Bonnie Haupt, declare the following based on personal knowledge:

[¶2] We have ownership interest in the following properties that lie within the boundaries of the Review Area of the proposed TB Leingang Storage Facility.

- Township 141 North, Range 88 West
  Section 27: SW1/4
  Mercer County, ND

- Township 141 North, Range 88 West
  Section 35: SE1/4
  Mercer County, ND

[¶3] To the best of our knowledge, the properties listed in ¶ 2 above are encumbered by the following easements:

- Section 27:
  i. Oliver-Mercer Electric Cooperative, Inc. Right-of-Way Easement executed by John and Frances Bechhold on March 23, 1945.

  ii. Glen Ullin Energy Center, LLC Wind Project Easement Agreement executed by Michael and Bonnie Haupt effective as of July 10, 2018

- Section 35:
  i. Mercer Co. Indenture executed by Michael and Elizabeth Bode on October 12, 1933.

  ii. State of North Dakota Indenture executed by Michael and Elizabeth Bode on July 14, 1959.

  iii. West River Telecommunications Right-of-Way Easement executed by Milton Flemmer on April 29, 1996.

  iv. Southwest Water Authority Potable Water Easement executed by Michael and Bonnie Haupt on July 14, 2015.

  v. Oliver-Mercer Electric Cooperative, Inc. Right-of-Way Easement executed by Michael and Elizabeth Bode in July, 1949.

vi. Northwest Bell Telephone Company Right-of-Way Easement executed by Milton Flemmer on July 11, 1969.

vii. Dakota Access, LLC Easement Agreement executed by Bonnie and Michael Haupt on March 4, 2016.

[¶4] Attached are the deeds which we believe indicate our ownership in each of the properties listed above.

[¶5] Attached are the easements currently encumbering these properties based on the information we have.

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on the 3 day of June , 2024 at Bismarck, ND, United States.

Mike Haupt
Mike Haupt (Jun 3, 2024 14:12 CDT)
Michael Haupt

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on the 3 day of June , 2024 at Bismarck, ND, United States.

Bonnie Haupt
Bonnie Haupt (Jun 3, 2024 14:09 CDT)
Bonnie Haupt

# WARRANTY DEED

THIS INDENTURE, Made this 13th day of May, 1998, between **LARRY L SCHNAIDT and SANDRA M SCHNAIDT,** husband and wife, whose post office address is 413 7th Street Northwest, Beulah, North Dakota 58523, Grantor, and **MICHAEL HAUPT and BONNIE HAUPT,** husband and wife, whose post office address is 5631 Apple Creek Drive, Bismarck, North Dakota 58504, Grantee

WITNESSETH, For and in consideration of the sum of Ten Dollars ($10 00) and Other Good and Valuable Consideration, Grantor does hereby GRANT to Grantee, as joint tenants with right of survivorship, and not as tenants in common, the real property lying and being in the County of Mercer and State of North Dakota, described as follows, to-wit

**The Southwest Quarter (SW 1/4) of Section Twenty-Seven (27), Township One Hundred Forty-One (141) North, Range Eighty-Eight (88) West of the Fifth Principal Meridian, Mercer County, North Dakota**

And the said Grantor, for themselves, their survivors and assigns, do covenant with the Grantee that they are well seized in fee of the land and premises aforesaid and have good right to sell and convey the same in manner and form aforesaid, that the same are free from all encumbrances, except mineral reservations and easements of record, and the above granted lands and premises in the quiet and peaceable possession of said Grantee, against all persons lawfully claiming or to claim the whole or any part thereof, the said Grantor will warrant and defend

WITNESS, The hand of the Grantor

Larry L Schnaidt

**LARRY L SCHNAIDT**

Sandra M. Schnaidt

**SANDRA M. SCHNAIDT**

ALEXANDER & SOLEM
ATTORNEYS AT LAW
133 WEST MAIN ST
PO BOX 249
BEULAH, ND 58523
PH (701) 873-5555
FAX (701) 873-4958

STATE OF NORTH DAKOTA )
)
COUNTY OF MERCER )

On this 13th day of May, 1998, before me, personally appeared **LARRY L SCHNAIDT and SANDRA M. SCHNAIDT**, husband and wife, known to me to be the persons who are described in, and who executed the within and foregoing instrument, and severally acknowledged that they executed the same

SCOTT T SOLEM
NOTARY PUBLIC
MERCER COUNTY, NORTH DAKOTA

My commission expires October 28, 2000

**This Deed is exempt from the filing requirements of Section 11-18-02.2, N D C C , under exception 6(c), as Grantor and Grantee are relatives**

**Date:** Sandra M Schnaidt
5/26/98

DOCUMENT NO. 165928

MORTGAGEE
MORTGAGOR
GRANTOR ✓
GRANTEE ✓
INDEXED ✓

DELINQUENT TAXES SPECIAL ASSESSMENTS OR INSTALLMENTS OF SPECIAL ASSESSMENTS PAID AND 9th DAY OF 98

Lessa Ketterak
COUNTY AUDITOR OF MERCER COUNTY, N DAK.
BY Sandra K Bohrer DEPUTY

STATE OF NORTH DAKOTA OFFICE OF
COUNTY OF MERCER REGISTER OF DEEDS
I certify that within instrument was
filed for record this 9th
Dec 1998 at 9:29 o'clock A.
is duly recorded in Book 122 - Deeds
593
Jeanette Sailer
Register of Deeds

ALEXANDER & SOLEM
ATTORNEYS AT LAW
133 WEST MAIN ST
P.O BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958

$10.00 chg Alexander Law Office
Box 219
Beulah, ND 58523

# WARRANTY DEED

THIS INDENTURE, Made this 19th day of May, 1998, between **MILTON FLEMMER, a/k/a MILTON H FLEMMER and ANITA FLEMMER, a/k/a ANITA B. FLEMMER,** husband and wife, whose post office address is P O Box 147, Beulah, North Dakota 58523, Grantor, and **BONNIE HAUPT and MICHAEL HAUPT,** her husband, whose post office address is 5631 Apple Creek Drive, Bismarck, North Dakota 58504, Grantee

WITNESSETH, For and in consideration of the sum of Ten Dollars ($10 00) and Other Good and Valuable Consideration, Grantor does hereby GRANT to Grantee, as joint tenants with right of survivorship, and not as tenants in common, the real property lying and being in the County of Mercer and State of North Dakota, described as follows, to-wit

**The Southeast Quarter (SE 1/4) of Section Thirty-Five (35), Township One Hundred Forty-One (141) North, Range Eighty-Eight (88) West of the Fifth Principal Meridian, Mercer County, North Dakota.**

**Provided, however, that the Grantor, Milton H Flemmer, reserves unto himself, a life estate in and to the property, with full rights of possession, use, and income, during his lifetime, and upon his death, the remainder shall pass to the Grantee, BONNIE HAUPT and MICHAEL HAUPT, her husband**

And the said Grantor, for themselves, their survivors and assigns, do covenant with the Grantee that they are well seized in fee of the land and premises aforesaid and have good right to sell and convey the same in manner and form aforesaid, that the same are free from all encumbrances, except mineral reservations and easements of record, and the above granted lands and premises in the quiet and peaceable possession of said Grantee, against all persons lawfully claiming or to claim the whole or any part thereof, the said Grantor will warrant and defend

ALEXANDER & SOLEM
ATTORNEYS AT LAW
133 WEST MAIN ST
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958

WITNESS, The hand of the Grantor

Anita Flemmer

**ANITA B. FLEMMER, as ATTORNEY-IN-FACT for MILTON FLEMMER, a/k/a MILTON H. FLEMMER**

Anita Flemmer

**ANITA FLEMMER, a/k/a ANITA B FLEMMER**

DELINQUENT TAXES, SPECIAL ASSESSMENTS, OR INSTALLMENTS OF SPECIAL ASSESSMENTS PAID AND TRANSFER ENTERED THIS 25th DAY OF [illegible] 19 98

Dean Kettenack
COUNTY AUDITOR OF MERCER COUNTY N DAK
BY Sandra L Bohrer DEPUTY

STATE OF NORTH DAKOTA )
)
COUNTY OF MERCER )

On this 19th day of May, 1998, before me, personally appeared **ANITA FLEMMER a/k/a ANITA B. FLEMMER, Individually and as ATTORNEY-IN-FACT FOR MILTON FLEMMER, a/k/a MILTON H. FLEMMER,** her husband, known to me to be the persons who are described in, and who executed the within and foregoing instrument, and severally acknowledged that they executed the same

SCOTT T SOLEM
NOTARY PUBLIC
MERCER COUNTY, NORTH DAKOTA

My commission expires October 28, 2000

**This Deed is exempt from the filing requirements of Section 11-18-02 2, N.D.C C , under exception 6(c), as Grantor and Grantee are relatives.**

**Date.** 5-20-98

Anita Flemmer

165421

STATE OF NORTH DAKOTA
COUNTY OF MERCER
I hereby certify that within instrument was filed in this office for record this 25th day of Sept 1998 at 9 17 o'clock A M and was duly recorded in book 122 Deeds on page 319.
Jeanette Sauer, Register of Deeds
Kathryn Schumann, Deputy

$10.00 chg Alexander & Solem Law Offices Box 249 Beulah, ND 58523

ALEXANDER & SOLEM
ATTORNEYS AT LAW
133 WEST MAIN ST
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-6355
FAX (701) 873-4259

Location Number _____

# RIGHT-OF-WAY EASEMENT

KNOW ALL MEN BY THESE PRESENTS, that the undersigned John Beehhold and Frances Beehheld, his wife for a good and valuable consideration, the receipt whereof is hereby acknowledged, does hereby grant unto the

Oliver-Mercer Electric Cooperative, Inc.,

a corporation, whose post office address is Hazen, N. Dak., North Dakota, and to its successors or assigns, the right to enter upon the lands of the undersigned, situated in the county of Mercer, State of North Dakota and more particularly described as follows:

NE¼, S½, of Sec. 27; NW¼, NE¼SW¼ of Sec 34, all in Twp 141 Rge 88.

and to place, construct, operate, repair, maintain, relocate and replace thereon and in or upon all streets, roads or highways abutting said lands an electric transmission or distribution line or system, and to cut and trim trees and shrubbery to the extent necessary to keep them clear of said electric line or system and to cut down from time to time all dead, weak, leaning or dangerous trees that are tall enough to strike the wires in falling.

In granting this easement it is understood that at pole locations, only a single pole and arrurtenance will be used, and that the location of the pole will be such as to form the least possible interference to farm operations, so long as it does not materially increase the cost of construction.

The undersigned covenants that he is the owner of the above described lands and that the said lands are free and clear of encumbrances and liens of whatsoever character except those held by the following persons:

none

It is further understood that, whenever necessary, words in this instrument in the singular shall be construed to read in the plural and that words used in the masculine gender shall be construed to read in the feminine.

IN WITNESS WHEREOF, the undersigned have set their hand s and seals this 23rd day of March, 19 45.

Signed, sealed and delivered in the presence of:

John Beckhold

Frances Beckhold

39 check description

(1)

STATE OF NORTH DAKOTA )
) SS
COUNTY OF Mercer )

On this 2nd day of March 1945 before me a Notary Public in and for said County and State, personally appeared John Bechhold and Frances Bechhold, his wife known to me to be the persons who are described in and who executed the within and foregoing instrument and acknowledged to me that they executed the same.

Notary Public in and for the
County of Mercer and State of
North Dakota.

My commission expires May 15, 1947.

MORTGAGEE
MORTGAGOR
INDEXED ✓

**STATE OF NORTH DAKOTA**
**COUNTY OF MERCER**

**208963**
**OFFICE OF**
**COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 10/28/2015 at 12:07 PM, and was duly recorded Book 207 MISC on Page 13 Fee: $16.00

County Recorder Brenda L Cook

By Deputy Kathryn Schumann

Return To: ROUGHRIDER ELECTRIC COOPERATIVE, INC., 800 H
chg HAZEN, ND 58545

COUNTY RECORDER
SEAL
MERCER COUNTY, N. DAK.

216378

**STATE OF NORTH DAKOTA** **OFFICE OF**
**COUNTY OF MERCER** **COUNTY RECORDER**

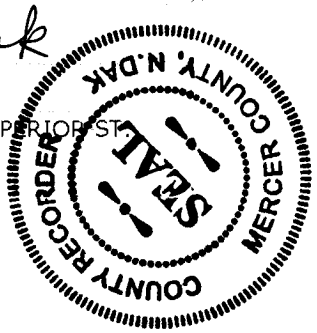
I hereby certify that the within instrument was filed in this office for record this 8/13/2018 at 9:39 AM, and was duly recorded as Book 221 MISC on Page 227 Fee: $20.00

County Recorder Brenda L. Cook

By Deputy

Return To: ALLETE CLEAN ENERGY, 30 WEST SUPERIOR ST., SUITE 200 DULUTH, MN 55802-2093

**MORTGAGEE**
**MORTGAGOR**
**INDEXED** ✓




THIS INSTRUMENT PREPARED BY
AND SHOULD BE RETURNED TO:

Margaret A. Thickens
Glen Ullin Energy Center, LLC
30 West Superior Street, Suite 200
Duluth, MN 55802-2093

**MEMORANDUM OF WIND PROJECT OPTION AGREEMENT**

THIS MEMORANDUM OF WIND PROJECT OPTION AGREEMENT (this "Memorandum") is made, dated and effective as of July 10, 2018 (the "Effective Date"), between Michael Haupt and Bonnie Haupt, husband and wife ("Owner"), and Glen Ullin Energy Center, LLC, a Delaware limited liability company ("Grantee"), in light of the following facts and circumstances:

RECITALS:

WHEREAS, Owner and Grantee have entered a Wind Project Option Agreement dated as of the Effective Date with respect to property more specifically described herein for wind energy purposes (as it may be hereinafter amended, restated or supplemented from time to time, the "Option Agreement"); and

WHEREAS, Owner and Grantee desire to set forth certain terms and conditions of the Option Agreement in a manner suitable for recording in the Public Records of Mercer County, North Dakota, in order to provide record notice of the Option Agreement and Grantee's rights in and to the land subject to the Option Agreement, as provided herein.

NOW, THEREFORE, in consideration of mutual covenants contained in the Option Agreement and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties hereto agree and stipulate as follows:

1. Terms of Option Agreement Incorporated. All of the terms, conditions, provisions and covenants of the Option Agreement are hereby incorporated into this Memorandum by

reference as though fully set forth herein, and the Option Agreement and this Memorandum shall be deemed to constitute a single instrument or document. Should there be any inconsistency between the terms of this Memorandum and the Option Agreement, the terms of the Option Agreement shall prevail.

2. Description of Property. The land subject to the Option Agreement is described on Exhibit A attached hereto, and by this reference made a part hereof (the "Property").

3. Grant of Option. Owner grants and conveys and warrants to Grantee an option for an easement for the purposes described in the Option Agreement and, if exercised the Wind Project Easement Agreement ("Easement Agreement") attached to the Option Agreement.

4. Term of Option Agreement. The term of the Option Agreement shall be Five (5) years (the "Option Term"), unless earlier terminated by Grantee. Grantee may terminate this Option at any time upon thirty (30) days' written notice to Owner.

5. Names and Addresses of Parties. The names and addresses of the parties to the Option Agreement are as follows:

| OWNER: | GRANTEE: |
|---|---|
| Michael & Bonnie Haupt<br>5631 Apple Creek Drive<br>Bismarck, ND 58504 | Glen Ullin Energy Center, LLC<br>30 W. Superior St.<br>Duluth, MN 55802 |

6. Successors and Assigns. The terms of this Memorandum and the Option Agreement are covenants running with the land and inure to the benefit of, and are binding upon, the parties and their respective successors and assigns, including all subsequent owners of all or any portion of the Property. References to Owner and Grantee include their respective successors and assigns. References to the Option Agreement includes any amendments thereto.

7. Miscellaneous. This Memorandum is executed for the purpose of recording in the Public Records of Mercer County, North Dakota, in order to provide public record notice of the Option Agreement. The entire Option Agreement is hereby incorporated into this Memorandum by reference. Notwithstanding anything to the contrary contained herein, the provisions of this Memorandum do not in any way alter, amend, supplement, change or affect the terms, covenants or conditions of the Option Agreement, all of which terms, covenants and conditions shall remain in full force and effect. In the event of any conflict between the terms of this Memorandum and the Option Agreement, the terms of the Option Agreement shall prevail. This instrument may for convenience be executed in any number of original counterparts, each of which shall be an original and all of which taken together shall constitute one instrument.

IN WITNESS WHEREOF, Owner and Grantee, acting through its duly authorized representative, have made and entered into this Memorandum as of the Effective Date.

OWNER SIGNATURE PAGE TO MEMORANDUM OF WIND PROJECT OPTION AGREEMENT

OWNER:

Michael Haupt

Michael Haupt

OWNER:

Bonnie Haupt

Bonnie Haupt

State of North Dakota )

County of Burleigh )

On this 10 day of July, in the year 2018 before me personally appeared Michael Haupt & Bonnie Haupt, known to me (or proved to me on oath of _____) to be the person who is described in and who executed the within instrument, and acknowledged to me that the person (or they) executed the same.

WITNESS MY HAND AND OFFICIAL SEAL.

Signature Linda M. Reis [SEAL]

LINDA M REIS
Notary Public
STATE OF NORTH DAKOTA
My Commission Expires
March 25, 2022

GRANTEE SIGNATURE PAGE TO MEMORANDUM OF WIND PROJECT OPTION AGREEMENT

GRANTEE:

Glen Ullin Energy Center, LLC,
a Delaware limited liability company

By: _____

Name: Allan S. Rudeck Jr.

Title: President

State of Minnesota )

County of St. Louis )

On this 16th day of July, in the year 2018 before me personally appeared Allan S. Rudeck Jr., known to me (or proved to me on oath of _____) to be the President of the limited liability company that is described in and that executed the within instrument, and acknowledged to me that such limited liability company executed the same.

WITNESS MY HAND AND OFFICIAL SEAL.

Signature _____ [SEAL]

CASSEE VALENTINE BRADSHAW
NOTARY PUBLIC - MINNESOTA
My Commission Expires Jan 31, 2019

**EXHIBIT A**

**The Property**

SW ¼ of Section 27, T141N, R88W
Mercer County, North Dakota, 5th Principal Meridian

QUIT-CLAIM DEED—CC-147

Document No. 45781

THIS INDENTURE, Made this 10 day of Oct. in the year of our Lord one thousand nine hundred and Thirty three, between Michael Bode and Elizabeth Bode, his wife

of the County of Mercer and State of North Dakota parties of the first part, and Mercer County

of the County of Mercer and State of North Dakota part of the second part,

WITNESSETH, That the said part of the first part, for and in consideration of the sum of ($500.00) Five Hundred and no/100 DOLLARS, to in hand paid by the said part of the second part, the receipt whereof is hereby acknowledged, do by these presents GRANT, BARGAIN, SELL, REMISE, RELEASE and QUIT-CLAIM unto the said part of the second part, and to heirs and assigns, FOREVER, all the following described lot, piece or parcel of land situate in the County of Mercer and State of North Dakota, and known and described as follows, to-wit: Parcel #45.

All that portion of the SE¼ of Sec. 35 Twp. 141N. Range 88W. lying within a strip of land. Said strip being 90 ft wide, lying 45 ft on each side of the following described center line. Beginning on the North line of said SE¼ Sec. 35 at a point 1553.7 ft. from the NE Corner thereof, ~~of~~ said point being on the center line of the State Highway as surveyed and staked over and across said SE¼, Sec. 35, thence running southerly along a 4° curve to the right 602.1 ft, thence S 10°51'W. 433.1 ft. thence along a 3° curve to the left 372.8 ft thence S 0°20' E 1244.3 ft to the south line of said SE¼ Sec. 35 exceptiing all that portion lying within 33 ft. of a section line.
Tract contains 5.41 acres, more or less and is shown on plat as shaded area.

TO HAVE AND TO HOLD, The above quit-claimed premises, together with all the hereditaments and appurtenances thereunto belonging or in anywise appertaining, to the said part of the second part, heirs and assigns, FOREVER

IN TESTIMONY WHEREOF, The said part of the first part ha hereunto set hand and seal the day and year first above written.

Signed, Sealed and Delivered in presence of
F. O. GENT
C. W. KNATHACK
Witnesses

MICHAEL BODE (SEAL)
ELIZABETH BODE (SEAL)
(SEAL)

STATE OF NORTH DAKOTA, County of Mercer } ss.

On this 12th day of October in the year one thousand nine hundred and Thirty-three, before me C. W. Kanthack a Notary Public in and for said County and State, personally appeared Michael Bode and Elizabeth, his wife known to me to be the person who are described in, and who esecuted the foregoing and within instrument and acknowledged to me that he executed the same.

Seal affixed

C. W. Kanthack
Notary Public, Mercer County,
My Commission expires July 7th 1935

~~Delinquent taxes paid and~~ transfer entered this 10th day of March 1934

Paul Leupp
Auditor

OFFICE OF REGISTER OF DEEDS
STATE OF NORTH DAKOTA, County of Mercer.

I hereby certify that the within Deed was filed in this office for record on the 10th day of March A. D. 1934, at 10:00 o'clock and was duly recorded in Book 26 of Deeds on page 263

R. D. Seal affixed

By Deputy. H. J. Giffey
Register of Deeds.

DOCUMENT NO. 79029

Project No. S 422 (10) Parcel No. 1A

WARRANTY DEED
(State Highway Department)

THIS INDENTURE, Made this 14 day of July in the year of our Lord one thousand nine hundred and Fifty-nine, between Michael Bode & Elizabeth Bode (H & W), whose postoffice address is Glen Ullin, N. Dak., Rte. # 1, parties of the first part, and the State of North Dakota, for the use and benefit of the State Highway Department, whose postoffice address is Bismarck, State of North Dakota, party of the second part;

WITNESSETH, That the said parties of the first part, for and in consideration of the sum of Three Hundred Fifty & 00/100- - - - - Dollars ($350.00/100), to them in hand paid by said party of the second part, the receipt whereof is hereby acknowledged, do by these presents GRANT, BARGAIN, SELL and CONVEY unto the said party of the second part, it_ successors and assigns, FOREVER, all that tract or parcel of land lying and being in the County of Mercer, State of North Dakota, and described as follows, to-wit:

All that portion of the SE¼ of Sec. 35, Twp. 141 N., Rge. 88 W., 5th P. M., lying within a strip of land 200 ft. wide, lying 100 ft, on each side of the following described highway centerline as surveyed and staked over and across said SE¼:

Beginning at a point 40.0 ft. west of the northeast corner of the NW¼ of Sec. 4, Twp. 140 N., Rge. 88 W., 5th P. M., thence running north 1200.0 ft. more or less, until said strip ends, excepting all that portion previously acquired for public right of way and all that portion lying within 33 feet of the second line.

Highway

Tract contains 2.94 acres, more or less, and is shown on plat as shaded area.

Excepting and reserving to the grantors, herein, their successors and assigns, all oil, oil rights, natural gas, natural gas rights and other fluid minerals that may be within or under the parcel of land herein described without however, the right ever to drill, dig or mine through the surface of said land therefore or otherwise in such manner as to endanger the safety of any highway that may be constructed on the lands hereby conveyed.

TO HAVE AND TO HOLD THE SAME, Together with all hereditaments and appurtenances thereunto belonging or in anywise appertaining, to the said party of the second part, its successors and assignsm FOREVER, And the said Michael Bode & Elizabeth Bode ( H & W), said parties of the first part, for themselves, their heirs, executors and administrators, do covenant with the said party of the second part, its successors and assigns, that they are well seized in fee of the land and premises aforesaid, and have good right to sell and convey the same in manner and form aforesaid; that the same are free from all encumberances, whatsoever, and the above bargained and granted land and premises in the quiet and peaceable possession of said party of the second part, its successors and assigns, against all persons lawfully claiming or to claim the whole or any part thereof, the said parties of the first part will warrant and defend.

IN WITNESS WHEREOF, The said parties of the first part hereunto set their hands the day and year first above written.

Signed and Delivered in Presence of

Michael Bode

Elizabeth Bode

STATE OF NORTH DAKOTA, )
)
County of Mercer )

On this 14 day of July, A. D., 1959, before me personally appeared Michael Bode & Elizabeth Bode ( H & W), known to me to be the same persons described in and who executed the within and foregoing instrument, and severally acknowledged to me that they executed the same.

(NOTARIAL SEAL)

J. A. McCann
J.A. McCANN, Notary Public.
Burleigh Co., N. Dak.

My Commission Expires: Aug. 25, 1962.

STATE OF NORTH DAKOTA,)
) SS. OFFICE OF REGISTER OF DEEDS.
COUNTY OF MERCER. )

I hereby certify that the within instrument was filed in this office for record this 29th day of July 1959, at 3:20 o'clock P. M., and was duly recorded in Book 49-Deeds, on Page 430.

(OFFICIAL SEAL)

Emanuel Suess
Register of Deeds.

Delinquent taxes paid and transfer entered this 29 day of July, 1959.
George H. Sagehorn , Auditor of Mercer Co., N.D.
By John Pulles, Dep.

# *West River Telecommunications Right-of-Way Easement*

In Computer [ ]
WRT# [ ]
County# [ ]

W.O.# 96-111

We the undersigned, (whether one or more) ***Milton H Flemmer***, Grantor(s), do hereby grant and convey unto ***West River Telecommunications Cooperative***, a cooperative corporation (hereafter called the "Cooperative"), grantee, whose address is P.O. Box 467, Hazen, North Dakota, and its respective successors, assigns, lessees and agents, an easement to survey, construct, repair, operate, upgrade, maintain, relocate, replace and remove such communication systems as the grantee may from time to time require, consisting of but not limited to cables, wires, poles, splicing boxes, and other appurtenances, upon, over and under the land which the undersigned owns or in which the undersigned has any interest in the County of ***Mercer***, State of ***North Dakota***, and more particularly described as follows:

***E/2 of Section 35, Township 141, Range 88 Less ND Highway ROW***

also the right of ingress and egress over and across the lands of the undersigned for the purpose of exercising the rights herein granted; to place surface markers beyond said strip, to clear and keep clear all trees, roots brush and other obstructions from the surface and subsurface of said strip of land. The boundary of said strip shall be a line parallel to and 25 feet either side of the first cable laid on the land of the undersigned or on adjacent lands. The undersigned for himself, his heirs, executors, administrators, successors, and assigns, hereby covenants that no structure shall be erected on said strip.

The undersigned agrees that all poles, wire and other facilities, including telephone equipment, installed on the above described premises at the Cooperative's expense, shall remain the property of the Cooperative, removable at the option of the Cooperative. The undersigned agrees to this easement with the understanding the Grantor, his heirs, executors, administrators, successors, and assigns, may continue to have access to and use of the easement area in any manner consistent with the rights herein granted to the Cooperative, and that the Cooperative will restore the said strip to as near as reasonable to the pre-plowed condition, and that the Cooperative will erect no buildings on said strip.

The undersigned covenant that they are the owners of the above described lands and that the said lands are free and clear of encumbrances and liens of whatsoever character except those held by the following persons:

The term of this easement shall be for as long as needed by the grantee, and until a release of this easement is recorded, but to not extend beyond the maximum term authorized by law.

Access is hereby granted for a state or federal historical survey of the cable route, should one be required, unless checked. Access denied ☐

IN WITNESS WHEREOF, this instrument has been executed by the undersigned this the 29 day of April, 1996.

STATE OF NORTH DAKOTA )
)
COUNTY OF Mercer )

by: _____

by: _____

The foregoing instrument was acknowledged before me this 29th day of April, 1996.
By Milton H Flemmer.
My Commission Expires:

_____
Notary Public, County of Mercer

Document No. 161439

OFFICE OF REGISTER OF DEEDS, COUNTY OF Mercer, North Dakota. I hereby certify that the within instrument was filed in this office for recording on the 29th day of January, A.D., 1996, at 9:22 o'clock A.M, and was duly recorded in Book 139, of Misc., on page 397.

By Kathryn Schumann, *7.00 pd.

Deputy Jeanette Sailer
Register of Deeds

REGISTER OF DEEDS SEAL MERCER COUNTY, N.DAK.

When recorded, please return to WEST RIVER TELECOMMUNICATION COOPERATIVE, Box 467, Hazen, ND 58545 701-748-2211

CLYDE FANDRICH
Notary Public, Mercer County, ND
My Commission Expires Feb. 24, 1999
STATE OF NORTH DAKOTA
NOTARY PUBLIC SEAL

MORTGAGEE
MORTGAGOR
GRANTOR ✓
GRANTEE ✓
INDEXED ✓

**EASEMENT: Potable Water Pipeline** 

Michael L. and Bonnie L. Haupt, 5631 Apple Creek Drive, Bismarck ND, 58504 (GRANTOR), in consideration of $1.00, conveys to Southwest Water Authority, 4665 2nd Street Southwest, Dickinson ND 58601-7231 (GRANTEE), an easement to construct, operate, maintain and remove one 4-inch diameter poly Potable Water Pipeline with the right of ingress and egress, over certain land hereafter referred to as the "easement area", which is a strip of land 33.0 feet wide, 16.5 feet on each side of the following described centerline:

SE4 of Section 35, T141N, R88W, Mercer County

Commencing at the Southeast Section corner of said Section 35; thence N88°59'43"W along the south section line of said Section 35, a distance of 1519.95 feet to the Point of Beginning; thence N00°22'55"E, a distance of 883.28 feet; thence N10°54'15"E, a distance of 49.62 feet; thence N19°34'06"E, a distance of 93.19 feet; thence N12°28'11"E, a distance of 50.86 feet; thence N26°53'07"W, a distance of 84.38 feet; thence N12°42'49"W, a distance of 55.64 feet; thence N00°07'44"W, a distance of 121.45 feet; thence N00°41'06"E, a distance of 1318.50 feet to the east/west quarter line of said Section 35 and thus terminating, said ending point being located N89°00'25"W along said quarter line, a distance of 1542.10 feet from the East Quarter Corner of said Section 35. The centerline is 2,656.92 feet or 161.03 rods long, and the easement area contains 2.01 acres, more or less. The easement area is further described and illustrated in Exhibits "A1-A2" which are attached to and are a part of this easement.

1. The Potable Water Pipeline shall be built only on the centerline as described above. GRANTEE may also temporarily use an additional 17.0 feet of right-of-way on the working side of the Potable Water Pipeline as a construction right-of-way. This construction right-of-way shall be subject to the topsoil reservation and reclamation provisions of this easement and must be abandoned upon the completion of construction and reclamation.

2. The top of the Potable Water Pipeline must be buried at least 72 inches below the ground's surface.

3. GRANTEE may install the following described appurtenance(s) upon the surface or at a depth less than 72 inches; (NA). For this/these additional appurtenance(s), GRANTEE has paid (NA) as further consideration. GRANTEE shall, when necessary, protect all above-ground appurtenances with a fence adequate to prevent livestock access and shall paint all above ground structures, except wire fences, anchors, guy wires, steel towers, and wood poles, with earth tone colors.

4. If construction of the Potable Water Pipeline within the easement area, is not completed within two (2) years after GRANTOR signs this easement, this easement automatically terminates.

5. For the initial construction of the Potable Water Pipeline, GRANTEE shall pay for labor and new materials for any fences or other improvements owned by the GRANTOR, that are moved or damaged by construction, operation, maintenance, or removal of the Potable Water Pipeline, and shall notify the surface GRANTOR of the construction schedule at least one week before construction within the easement area.

6. GRANTEE, or its agent, shall have a legible copy of this easement with them on-site for reference during construction, operation, maintenance or reclamation and shall present the copy upon GRANTOR's request.

7. This easement is subject to all of the GRANTOR's existing rights and privileges.

8. If, prior to or during construction, archeological or paleontological items are discovered or such items are disturbed, GRANTEE shall cease construction activities immediately. GRANTEE shall then promptly notify GRANTOR and must not resume construction until written approval is given by GRANTOR.

9. GRANTEE shall, prior to construction, maintenance or removal, reserve the top 12 inches of soil from areas subject to topsoil and subsoil mixing. The reserved soil must be stockpiled to minimize wind and water erosion. Upon completion of construction, maintenance, or removal, GRANTEE shall promptly reclaim the disturbed area. The disturbed area must be re-contoured to conform to the adjacent natural topography, rocks exposed by excavation must be hauled off the property or piled on one common pile within the easement area. The reserved soil must be evenly re-spread over the disturbed area, and the entire disturbed area must be re-vegetated with a mixture of native perennial grasses on the native grassland and alfalfa on the hayland, as shown in Exhibit "B". Reclamation is not complete until the activities described in this section are complete and the GRANTOR has approved completion in writing to GRANTEE.

10. GRANTEE shall implement reasonable measures to prevent accelerated erosion. If an erosion problem develops, GRANTEE shall promptly take the necessary actions to correct it and shall repair any erosion damage.

11. GRANTEE shall not discharge oil, gas liquids, salt water, or any other hazardous liquids or toxic substances onto the right-of-way or land adjacent to the right-of-way. All discharges of oil, gas liquids, salt water, or other hazardous liquids or toxic substances shall be stopped as soon as possible after discovery and acted upon immediately to halt movement of such discharges. Any such discharges shall be reported immediately to the GRANTOR. The GRANTEE shall then restore the affected area as closely as possible to its original condition.

12. GRANTEE shall control all noxious weeds in the easement area.

13. GRANTEE may cut or trim trees and shrubs, but only to the extent they interfere with or endanger the construction, operation, maintenance, or removal of the Potable Water Pipeline.

14. GRANTEE shall maintain the natural water flow and drainage.

15. GRANTEE shall take necessary precautions to prevent fires. In the event of a fire caused by the GRANTEE or its agent, GRANTEE shall compensate the GRANTOR and GRANTOR's surface lessee(s) for any losses due to the fire.

16. GRANTEE shall conduct all activities associated with the Potable Water Pipeline in a manner that avoids the degradation of air, land, and water quality and that protects the area's visual resources.

17. GRANTOR reserves the right to use the easement area and to allow others to use the easement area for purposes compatible with GRANTEE's use. If someone other than GRANTOR uses the easement area in a manner inconsistent with GRANTEE's use, GRANTOR is not liable or responsible.

18. Through this easement, GRANTEE is not acquiring any subsurface mineral interest. If any subsurface mineral interest is excluded from mining or development because of the presence of this easement or the Potable Water Pipeline, or if the location of the easement or Potable Water Pipeline interferes with the mining or development of subsurface mineral interests outside of the easement area, GRANTOR will give GRANTEE at least sixty days' written notice of the conflict between this easement and GRANTOR's right to mine and develop subsurface interests. At the end of the sixty-day period, GRANTEE must either pay GRANTOR the amount of lost royalties for the damages suffered because of GRANTOR's inability to mine or develop subsurface mineral interests, or GRANTEE must agree to relocate the easement and the Potable Water Pipeline. If GRANTEE selects relocation, this easement will be revised to describe the easement's new location and GRANTEE will move all structures and other physical features of the easement to the new location. Relocation does not entitle GRANTOR to additional compensation, but GRANTEE must bear all relocation costs. GRANTEE must promptly complete relocation.

19. Any fixtures, structures, installations or facilities constructed or installed by GRANTEE, are the property of GRANTEE and may be removed by GRANTEE at any time.

20. GRANTEE shall remove all improvements from the easement area if the easement is abandoned or terminated, unless authorized to do otherwise in writing by GRANTOR.

21. This easement shall be a covenant running with the land and shall be binding on the heirs, successors, agents, and assigns of the parties.

22. This easement is subject to all existing easements and does not supersede any rights previously granted.

23. GRANTOR neither warrants nor agrees to defend title to the easement area.

Dated this 14th day of July, 2015, at Bismarck, North Dakota.

GRANTOR:
MICHAEL L. AND BONNIE L. HAUPT

Michael L. Haupt
Michael L. Haupt

Bonnie L. Haupt
Bonnie L. Haupt

STATE OF NORTH DAKOTA)
) ss.
COUNTY OF BURLEIGH )

On this 14th day of July, 2015, before me personally appeared Michael L. Haupt and Bonnie L. Haupt, to be the persons who executed this instrument and acknowledged to me that they executed the same.

(SEAL)

DEBRA K. JACOBS
Notary Public
State of North Dakota
My Commission Expires August 2, 2019

Debra K. Jacobs
Notary Public

GRANTEE:

SOUTHWEST WATER AUTHORITY

Mary Massad
(signature) On Behalf of Southwest Water Authority

STATE OF North Dakota )
) ss.
COUNTY OF Stark )

On this 27th day of July, 2015, before me personally appeared Mary Massad, Manager/CEO (title), acting on behalf of Southwest Water Authority, known to me to be the person who executed this instrument and acknowledged to me that he executed the same.

(SEAL)

MISTI M CONZEMIUS
NOTARY PUBLIC, STATE OF NORTH DAKOTA
MY COMMISSION EXPIRES JAN 9, 2019

Misti M. Conzemius
Notary Public

**EASEMENT: Potable Water Pipeline**

**Exhibit "B"**

## Native Grass Seeding Specifications

| Species | lbs. PLS*/acre |
|---|---|
| Western wheatgrass | 8 |
| Slender wheatgrass | 5 |
| Green needlegrass | 4 |
| Side-oats grama | 2 |
| | 19 |

*PLS - Pure Live Seed (based on 50 PLS/sq. feet)

1. The seed bed should be firmly packed (footprints left in the soil should be less than 1/2 inch deep).

2. An early spring seeding (before May 24th) is preferred. A dormant fall seeding (after October 20th) is acceptable.

3. A cover crop of oats at 10 lbs. PLS/acre must be seeded on the disturbed area.

4. A drill designed specifically for native grass seeding will give the best seeding results. The seed should be planted at a depth of 1/2 to 1 inch. Precaution must be taken not to plant the seed too deeply in the soil or poor germination will result.

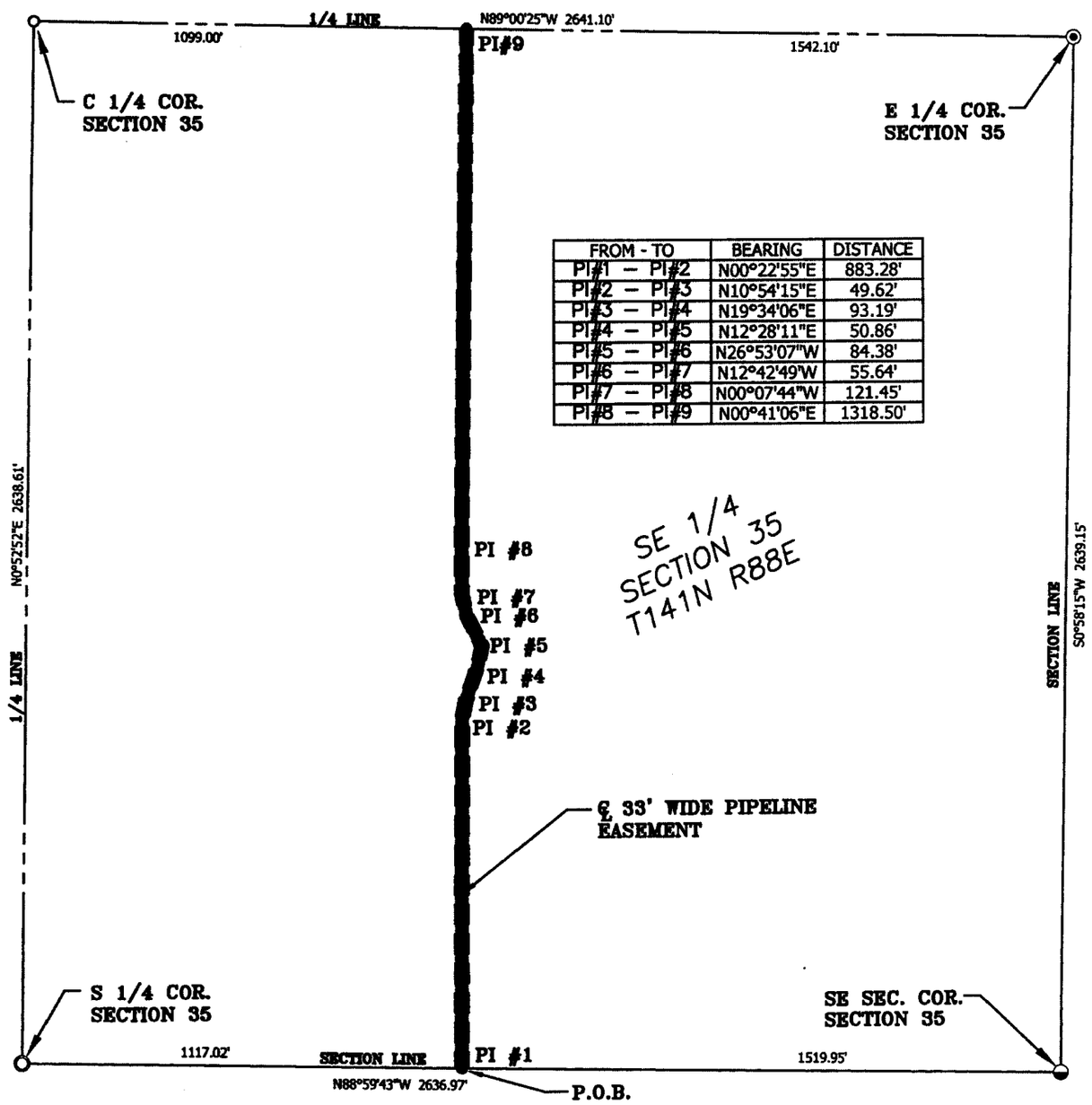
5. On areas where equipment cannot be used, broadcast seed and rake or drag to cover seed. Where seed is broadcast, double the seeding rate.

6. Use only North Dakota certified seed.

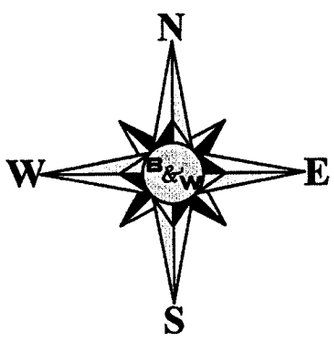
**Caution:** Be sure to clean out the drill before seeding to avoid any contamination with smooth brome grass or crested wheatgrass that may remain in the drill from previous use on private land. These are invasive grasses in native prairie and are not allowed on school trust lands. Contamination with or use of crested wheatgrass or smooth brome will result in the applicant being required to spray out the grass and reseed with the above native grass seed mixture. Sweet clover and alfalfa are also not allowed – only the above native grass seed mixture may be used for revegetation on school trust land.

Alfalfa-Hayland Seeding: Rate 8 lbs. PLS per Acre

# PIPELINE EASEMENT FOR SOUTHWEST PIPELINE PROJECT (S.W.P.P.) IN THE SOUTHEAST QUARTER (SE 1/4) OF SECTION 35, T 141 N, R 88 W OF THE 5TH P.M., MERCER COUNTY, NORTH DAKOTA (NORTH DAKOTA STATE WATER COMMISSION PROJECT 1736)




| FROM - TO | BEARING | DISTANCE |
|---|---|---|
| PI#1 – PI#2 | N00°22'55"E | 883.28' |
| PI#2 – PI#3 | N10°54'15"E | 49.62' |
| PI#3 – PI#4 | N19°34'06"E | 93.19' |
| PI#4 – PI#5 | N12°28'11"E | 50.86' |
| PI#5 – PI#6 | N26°53'07"W | 84.38' |
| PI#6 – PI#7 | N12°42'49"W | 55.64' |
| PI#7 – PI#8 | N00°07'44"W | 121.45' |
| PI#8 – PI#9 | N00°41'06"E | 1318.50' |




GRAPHIC SCALE

400 0 200 400

( IN FEET )
1 inch = 400 ft.

## LEGEND

- FOUND 1–1/2 INCH ALUM D.O.T. 3047
- FOUND .2 INCH ALUM CAP STAMPED 2491 INT. ENG.
- FOUND 5/8" RBR NO CAP
- COMPUTED CORNER POINT
- COMPUTED EASEMENT POINT



PREPARED BY:

BARTLETT & WEST | AECOM

Bartlett & West, Inc.

AECOM Technical Services, Inc.

# PIPELINE EASEMENT FOR SOUTHWEST PIPELINE PROJECT (S.W.P.P.) IN THE SOUTHEAST QUARTER (SE 1/4) OF SECTION 35, T 141 N, R 88 W OF THE 5TH P.M., MERCER COUNTY, NORTH DAKOTA (NORTH DAKOTA STATE WATER COMMISSION PROJECT 1736)

## SURVEYOR'S CERTIFICATE

I, Bruce P. Zelmer, a Professional Land Surveyor in and for the State of North Dakota, do hereby certify that at the request of the Michael Haupt, did complete a survey for the purpose of establishing the permanent pipeline easement located in Southeast Quarter (SE 1/4) of Section 35, Township 141 North, Range 88 West of the 5th P.M., Mercer County, North Dakota, said easement being comprised of a strip of land 33 feet in width, lying 16.5 feet on each side of the following described centerline:

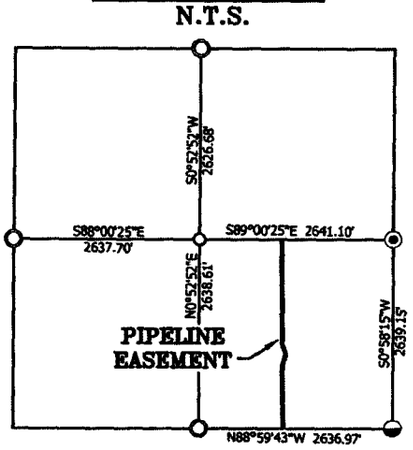
LEGAL DESCRIPTION OF PERMANENT EASEMENT: Commencing at the Southeast Section corner of said Section 35; thence N88°59'43"W along the south section line of said Section 35, a distance of 1519.95 feet to the Point of Beginning; thence N00°22'55"E, a distance of 883.28 feet; thence N10°54'15"E, a distance of 49.62 feet; thence N19°34'06"E, a distance of 93.19 feet; thence N12°28'11"E, a distance of 50.86 feet; thence N26°53'07"W, a distance of 84.38 feet; thence N12°42'49"W, a distance of 55.64 feet; thence N00°07'44"W, a distance of 121.45 feet; thence N00°41'06"E, a distance of 1318.50 feet to the east/west quarter line of said Section 35 and thus terminating, said ending point being located N89°00'25"W along said quarter line, a distance of 1542.10 feet from the East Quarter Corner of said Section 35 and containing 2.01 acres, more or less.

This Certificate is to the best of my knowledge and belief a true description of said survey. I hereby certify that I have executed this document this 11TH day of JANUARY 2017.

Bruce P. Zelmer, L.S. # 3756

BRUCE P. ZELMER
REGISTERED LAND SURVEYOR
L.S. 3756
NORTH DAKOTA

## LOCATION MAP
N.T.S.




SECTION 35
T 141 N, R 88 W

**PIPELINE TO BE INSTALLED**

3" CLASS 160 PVC

**BASIS OF BEARINGS**

ALL BEARINGS SHOWN ARE GRID BEARINGS BASED ON THE NORTH DAKOTA STATE PLANE COORDINATE SYSTEM, NAD 83, SOUTH ZONE.



PREPARED BY:

BARTLETT & WEST | AECOM

Bartlett & West, Inc.

AECOM Technical Services, Inc.

MORTGAGEE
MORTGAGOR
INDEXED ✓

213518

**STATE OF NORTH DAKOTA** **OFFICE OF**
**COUNTY OF MERCER** **COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 3/9/2017 at 9:18 AM, and was duly recorded as Book 216 MISC on Page 301 Fee: $38.00

County Recorder Brenda L Cook

By Deputy Kathryn Schumann

Return To: SOUTHWEST WATER AUTHORITY, 4665 2ND STREET
DICKINSON, ND 58601-7231

01592

FORM LE-189 R

RIGHT OF WAY EASEMENT

KNOW ALL MEN BY THESE PRESENTS, that we the undersigned, (Whether one or more) Mike Bade + Elizabeth Bade

~~(unmarried)~~ (husband and wife), for a good and valuable consideration, the receipt whereof is hereby acknowledged, do hereby grant unto Oliver Mercer Electric Cooperative, Inc., a cooperative corporation (hereinafter called the "Cooperative"), whose post office address is Hazen, North Dakota, and to its successors or assigns, the right to enter upon the lands of the undersigned, situated in the County of Mercer, State of North Dakota, and more particularly described as follows:

A tract of land approximately ---------- acres in area, located ----------miles in a ---------- direction from the town of ----------, and further described as being in the

E½ Section 36 Township 144 Range 88

----------Section----------Township----------Range----------

----------Section----------Township----------Range----------

----------Section----------Township----------Range----------

and to contract, operate and maintain on the above described lands, and/or in or upon all streets, roads or highways abutting said lands, an electric transmission or distribution line or system, and to cut and trim trees and shrubbery that may interfere with or threaten to endanger the operation and maintenance of said line or system.

The undersigned agree that all poles, wires, and other facilities, including any main service entrance equipment , installed on the above-described lands at the Cooperative's expense shall remain the property of the Cooperative, removable at the option of the Cooperative, upon the termination of service to or on said lands.

The undersigned covenant that they are the owners of the above described lands and that the said lands are free and clear of encumberances and liens of whatsoever character except those held by the following persons:

IN WITNESS WHEREOF, the undersigned have set their hands and seals this 26 day of July 19 44

Mike Bade (L.S.)

Elizabeth Bade (L.S.)

Signed, sealed and delivered in the presence of:

Henry Lentz

---

(1)
STATE OF NORTH DAKOTA
COUNTY OF Mercer SS.

Henry Lantz being first duly sworn says that he is one of the witnesses to the above and foregoing easement that Mike Bode and Elizabeth Bode (husband and wife) whose names is and/or are subscribed to the above and foregoing instruments as a party is and/or are the persons described in said easement and that The y signed said instrument in my presence and that I in their presence signed my name thereto as a subscribing witness.

Henry Lantz

SUBSCRIBED and sworn to before me this 2 day of August 1949.

Frank J. Belinskey
Notary Public in and for the
County of Mercer and
State of North Dakota.

FRANK J. BELINSKEY NOTARY PUBLIC STATE OF NORTH DAKOTA

My commission expires March 24, 1953.

(1)
STATE OF NORTH DAKOTA
COUNTY OF Mercer SS.

On this 2 day of Aug. 1949 before me Frank J. Belinskey a Notary Public within and for the State of North Dakota, personally appeared Henry Lantz known to me to be one of the persons who subscribed his name to the above and foregoing instrument as a witness, and who acknowledged to me that he subscribed his name thereto as such witness, and who proved to me that the person who and/or whose names are subscribed to the foregoing instrument are the persons described in it.

Frank J. Belinskey
Notary Public in and for the
County of Mercer and
State of North Dakota.

FRANK J. BELINSKEY NOTARY PUBLIC STATE OF NORTH DAKOTA

My commission expires March 24, 1953.

(2)
STATE OF NORTH DAKOTA
COUNTY OF _____ SS.

On this _____ day of _____ 19___, before me _____, a Notary Public in and for said County and State, personally appeared _____ and _____ known to me to be the persons _____ described in and who executed within and foregoing instrument and acknowledged to me that he executed the same.

_____
Notary Public in and for the
County of _____ and
State of North Dakota.

My commission expires _____.

Henry Lantz

MORTGAGEE
MORTGAGOR
INDEXED ✓

**STATE OF NORTH DAKOTA** **208969**
**COUNTY OF MERCER** **OFFICE OF COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 10/28/2015 at 12:13 PM, and was duly recorded Book 207 MISC on Page 37 Fee: $16.00

County Recorder Brenda L Cook

By Deputy Kathryn Schumann

Return To: ROUGHRIDER ELECTRIC COOPERATIVE, INC., 800 H
chg HAZEN, ND 58545

COUNTY RECORDER
SEAL
MERCER COUNTY, N DAK.

34306

NDE-117

# RIGHT OF WAY EASEMENT

KNOW ALL MEN BY THESE PRESENTS, that for and in consideration of a good and valuable consideration, the receipt whereof is hereby acknowledged, Milton H Plummer and _____, his wife, for themselves, their heirs and assigns, hereby grant to Northwestern Bell Telephone Company, a corporation, and its successors and assigns, a perpetual easement and right of way to construct, operate, maintain, replace and enlarge buried or underground telephone and communications lines, cables, wires and conduits, manholes, drains and splicing boxes, surface testing terminals, markers and other appurtenances under, through, across and upon the following described property in the County of Mercer and State of N.D., to wit:

E½ Sec. 35 T-141N R88W.

consisting of that strip of land one foot wider (6 inches on each side) than that amount of land required by the telephone cable and its associated plant which the Telephone Company shall bury or place underground in or on the real property described above, in, along or near the following route across the property described above:

communication line to be buried in a north to south direction adjacent to and west of hwy.

together with the right of ingress and egress for the purpose of exercising the rights herein granted and the right to clear and keep cleared all trees, roots, branches and other obstructions within seven feet of any telephone plant placed in or on this right of way.

The undersigned, for themselves, their heirs and assigns, hereby covenant that they have good and lawful right to grant this easement and right of way and that no structure shall be erected or permitted on or over the telephone plant to be put in or on the property described above.

WITNESS their hands and seal this 11 day of July, 1969.

Witness C R Nygaard. Signed Milton H Plummer

Witness _____ Signed _____

STATE OF _____)
) SS
COUNTY OF _____)

On this _____ day of _____, 19____, before me a _____ within and for said County, personally appeared _____ to me known to be the person _____ described in, and who executed the foregoing instrument, and acknowledged that _____ he _____ executed the same as _____ free act and deed.

_____

Notary Public _____ County, Minn.

My commission expires _____, 19__

STATE OF North Dakota)
) SS
COUNTY OF Mercer)

On this 11th day of July, 1969, appeared before me C. B. Nygaard to me personally known to be the person whose name is subscribed to this instrument as a subscribing witness, who being first duly sworn, says that Milton H. Flemmer whose name ___ ~~are~~/is subscribed to the instrument as party ___ of the first part ~~are~~/is the person ___ described in it, that such persons executed it in his presence and that the witness subscribed his name thereto as a witness,

(NOTARIAL SEAL)

Anton C Beer

My commission expires _____ _____ County, North Dakota

ANTON C. BEER
Notary Public
Notary Public, Morton Co., N. Dak.
My Commission Expires Jan. 21, 1971

DOCUMENT NO. 92496

STATE OF NORTH DAKOTA, COUNTY OF MERCER. } ss. OFFICE OF REGISTER OF DEEDS

I hereby certify that the within instrument was filed in this office for record this 5th day of September, 1969 at 10:30 o'clock A M., and was duly recorded in Book 44 of Misc. on Page 293

Fred Reuer
Register of Deeds.

By Irma Reinhalt, Deputy

REGISTER OF DEEDS * SEAL * Mercer County, N. Dak.

For Telephone Company Use Only

Name of Exchange Glen Ullin

Job Order # _____

Project. or Est. # 9042

L. S. # _____

R/W Secured By C. B. Nygaard

# EASEMENT AGREEMENT

This easement agreement ("Agreement"), dated the 4 day of March, 2016, is between **Bonnie Haupt and Michael Haupt, her husband, as joint tenants with right of survivorship, and not as tenants in common**, whose mailing address is 531 Apple Creek Drive, Bismarck, ND 58504, (hereinafter referred to as "Grantor", whether one or more), and Dakota Access, LLC, whose mailing address is 1300 Main Street, Houston, Texas 77002, and its successors and assigns (such entity and its successors and assigns are collectively referred to as the "Grantee").

For the consideration of TEN AND No/100 Dollars ($10.00) and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Grantor hereby sells and conveys unto Grantee:

(i) a ninety-nine year fifty foot (50') wide non-exclusive pipeline easement ("Pipeline Easement"), as more particularly described below,

(ii) a temporary construction easement one hundred feet (100') in width and any such additional areas indicated on the Exhibit A more particularly described below ("Temporary Construction Easement"), and

(iii) an easement for access to and from the Pipeline Easement and the Temporary Construction Easement ("Access Easement") as specifically indicated on the attached Exhibit A.

The Pipeline Easement, the Temporary Construction Easement, and the Access Easement (collectively, the "Easements" or "right-of-way") are being sold and conveyed from Grantor to Grantee for the purposes of constructing, maintaining, repairing, and removing at will one steel crude oil transmission pipeline not to exceed thirty inches (30") in diameter, which is more particularly described as follows:

All that certain lot, tract or parcel of land, containing 147.88 acres of land, more or less, being all of the SE¼ of Section 35, Township 141 North, Range 88 West, Mercer County, North Dakota, more particularly described in Warranty Deed dated May 19, 1998 from Milton Flemmer, a/k/a Milton H. Flemmer and Anita Flemmer, a/k/a Anita B. Flemmer, husband and wife, to Bonnie Haupt and Michael Haupt, her husband, as joint tenants with right of survivorship, and not as tenants in common, recorded under Document No. 165421, Deed Records, Mercer County, North Dakota, less and except any conveyances heretofore made.

Exhibit A attached hereto is an image of all or part of the Grantor's Property showing the approximate location of the Pipeline Easement, Temporary Construction Easement, and Access Easement. The precise location of the Temporary Construction Easement or "workspace" will be in an area immediately adjacent to the planned or actual Pipeline Easement and shall not exceed one hundred feet (100') in width exclusive of the Pipeline Easement, and any additional areas indicated on Exhibit A, if any.

Within one hundred eighty (180) days following the completion of construction of the pipeline, Grantee shall supplement Exhibit A with a new Exhibit A-1 that will:

(i) show the definite location of the installed pipeline as determined by an as-built survey, and

(ii) provide the legal description of the definite location of the Pipeline Easement and the Access Easement based on a public land survey corner as defined by N.D.C.C. § 47-20.1-02(7).

Grantor hereby agrees that Grantee shall have the right to and is hereby authorized, with or without the joinder of Grantor, to file Exhibit A-1 by affidavit, to amend this Agreement to include such new Exhibit A-1 or to attach such new Exhibit A-1 to this Agreement, and to record or re-record such affidavit, amendment or Agreement with the new Exhibit A-1. Grantee shall provide Grantor with a copy of the recorded affidavit, amendment or re-recorded Agreement.

Except for pipeline markers and cathodic protection test leads, all other pipeline fittings, cathodic protection equipment, pig launchers and traps, and any other equipment, facilities, or appurtenances that are located above-ground must be consented to in writing by the Grantor. Grantee agrees to place such markers and test leads at property lines, fence lines, points of inflection, or foreign pipeline crossings when practicable to do so.

The rights of the parties to this Easement shall be subject to the following terms and conditions:

## SECTION 1. GENERAL

1.1 Grantee shall have the right to select the exact location of the Pipeline Easement and the location of the pipeline within the Pipeline Easement, such that the centerline of the pipeline may not, in all instances, lie in the middle of the Pipeline Easement as it is approximately shown in Exhibit A; but regardless of the location of the pipeline, the Pipeline Easement shall not exceed fifty feet (50') in width. Generally, the boundary of the pipeline easement will be located within twenty-five feet (25') of the pipeline centerline as it is approximately shown in Exhibit A, unless otherwise agreed to in writing by Grantor which, such agreement will not be unreasonably withheld.

1.2 The Temporary Construction Easement or workspace will be used to construct the single pipeline and any appurtenant facilities in, over, through, across, under, and along the Pipeline Easement area, subject to the limitations on above-ground appurtenances and facilities indicated above. The term of this Temporary Construction Easement shall be for a period to extend eighteen (18) months from the date of construction commencement on Grantor's property, except that if Grantee has conducted any operations or construction which have disturbed the surface of Grantor's land, then Grantee will remain obligated to fulfill all reclamation and remediation as described herein, and will remain liable for damages and indemnification as described herein and will have access to and the ability to reclaim and remediate any such disturbance until such time as the land is reclaimed or remediated. The Grantee will notify the Grantor of the date construction will begin in writing 30 days prior to the date of construction commencement. However, if Grantee has completed its use of this Temporary Construction Easement prior to the end of the eighteen (18) month period, then the Temporary Construction Easement shall immediately terminate.

1.3 Grantee's Easement is subject to Grantor's existing rights and privileges. Grantor reserves the right to use and enjoy Grantee's Right-of-Way and to allow Grantor's invitees, employees, and agents to use any part of it so long as such use does not unreasonably interfere with Grantee's rights as specified in this Easement. Subject to those rights, Grantee shall allow any surface use of the Right-of-Way by the Grantor(s), their permittees, and lessees so long as such use does not interfere with Grantee's rights and no permanent or temporary structure(s), above or below ground are located within 25 feet of the pipeline centerline. Grantor may use the Right-of-Way for any and all purposes not inconsistent with the purposes set forth in this Easement. Without limiting the foregoing, Grantor's uses may include but shall not be limited to using the Right-of-Way for agricultural and open spaces. Grantor is permitted, after review by Grantee, to construct any and all streets and roadways, at any angle of not less than forty five (45) degrees to Grantee's pipeline, across the Right-of-Way which do not damage, destroy or alter the operation of the pipeline and its appurtenant facilities. Grantor may also construct and/or install water, sewer, gas, electric, cable TV, telephone or other utility lines across the Right-of-Way at any angle of not less than forty five (45) degrees to Grantee's pipeline, provided that all of Grantee's required and applicable spacing's, including depth separation limits of at least 24-inches and other protective requirements as established by statue, regulation or industry best practice are met by Grantor. The use of the Right-of-Way by Grantor shall be regulated by all appropriate ordinances, regulations, resolutions or laws of the governmental entity with authority over the Right-of-Way. Grantor must notify Grantee in writing before streets, roadways, utilities or other encroachments are installed. Grantor may not use any part of the Right-of-Way if such use may damage, destroy, injure, and/or interfere with the Grantee's use of the Right-of-Way for the purposes for which the permanent easement is being sought by Grantee. Grantor is not permitted to conduct any of the following activities on the Right-of-Way without the written permission of Grantee: (1) construct any temporary or permanent building or site improvements; (2) drill or operate any well; (3) remove soil or change the grade or slope;

(4) impound surface water; or (5) plant trees or landscaping. Grantor further agrees that no above or below ground obstruction that may interfere with the purposes for which this Easement is being acquired may be placed, erected, installed or permitted upon the Right-of-Way without the written permission of Grantee. In the event the terms of this paragraph are violated, such violation shall be eliminated within thirty days of receipt of written notice from Grantee or Grantee shall have the immediate right to correct or eliminate such violation at the sole expense of Grantor. Grantor shall promptly reimburse Grantee for any expense related thereto. Grantor further agrees that it will not interfere with the purposes for which the Easement is conveyed. Any improvements, whether above or below ground, installed by Grantor subsequent to the date that Grantee acquires possession of the Right-of-Way, may be removed by Grantee without liability to Grantor for damages if Grantee first gives written notice to Grantor and Grantor does not remove the improvement within thirty days.

1.4 If Grantee has not commenced construction of its pipeline on this easement within two (2) years of receipt of all permits necessary for construction of the pipeline in North Dakota, then the easement will become void.

1.5 Prior to construction of the pipeline, Grantee shall contact Grantor to review the timing of construction and discuss site-specific issues and implementation of mitigation and rehabilitation measures in accordance with this Pipeline Easement. Grantee shall review the location of any above-ground structures, other than pipeline markers and cathodic protection test leads, that will be located on the premises and to which Grantor has consented prior to installing such above-ground structures.

1.6 The Easement Agreement may not be recorded without the written consent of both Grantor and Grantee. Grantor and Grantee agree to execute a memorandum version of the Easement Agreement, to be prepared by Grantee, which shall include a plat depicting the location of the Right-of Way and shall be recorded immediately upon execution.

## SECTION 2. WEED CONTROL

2.1 Prior to construction activities, Grantee will document, to the best of its ability and as reasonably able to depending upon time of year of construction and assuming the plants germinate and grow during the year of construction, all noxious and invasive weeds along the pipeline or access road easements including those identified by the North Dakota Department of Agriculture, and county and city weed boards, including the following: Russian knapweed (*Acroptilon repens*), absinth wormwood (*Artemisia absinthium*), musk thistle (*Carduus nutans*), diffuse knapweed (*Centaurea diffusa*), yellow toadflax (*Linaria vulgaris*), spotted knapweed (*Centaurea maculosa*), Canada thistle (*Cirsium arvense*), leafy spurge (*Euphorbia esula*), dalmatian toadflax (*Linaria dalmatica*), purple loosestrife (*Lythrum salicaria*), and saltcedar (*Tamarix chinensis*), black henbane (*Hyoscyamus niger*), common burdock (*Arcticum minus*), houndstongue (*Hieracium cynoglossoides*), halogeton (*Halogeton glomeratus*), baby's breath (*Gypsophila paniculata*), common tansy (*Tanacetum vulgare*), houndstongue (*Hieracium cynoglossoides*), cheatgrass (*Bromus tectorum*), and Japanese brome (*Bromus japonicas*). Grantee does not warrant or guarantee its documentation will be an all-inclusive list or identification of all noxious and invasive weeds that could be located within the pipeline and road easements.

2.2 Grantee will be liable for the introduction of any noxious or invasive weeds caused by Grantee onto Grantor's property and will indemnify Grantor for any violations, enforcement actions, and mitigation requirements imposed by any entity under N.D.C.C. ch. 4.1-47.

2.3 Grantee shall control, to the best of its ability, all noxious weeds resulting from Grantee's activities in the easement areas, and will take steps to control the introduction and spread of weeds, including but not limited to the following:

a. The equipment will be inspected by Grantee or its contractor to verify that it is adequately clean of soil and debris capable of transporting weed propagules prior to commencing work on the project.

b. Areas of noxious and invasive weed infestation along the right-of-way or in other construction areas will be marked by Grantee with staking, flagging, and/or signs prior to clearing activities. To the extent reasonably practicable, all viable propagules (roots, seed, and stems) from noxious and invasive weeds will be destroyed by herbicide application or physical destruction prior to the construction activity.

c. Cleared vegetation and segregated topsoil from areas of weed infestation will be placed adjacent to the areas from which they were removed.

d. Signs will be posted to identify the stockpiles or reaches of stockpiles containing noxious weed material or material from the species listed in Section 2.1. During reclamation, the materials will be returned to the areas from which they were obtained.

e. Materials used for erosion control (e.g., hay bales or straw mulch) will be certified as weed-free.

2.4 Prior to re-seeding, Grantee will control all weeds in the right-of-way by cultivation, disking or herbicide applications. After seeding is completed, Grantee will monitor for and maintain the rights-of-way to control any identified noxious or invasive weeds resulting from Grantee's activities prior to seed maturation for a minimum of two (2) years following construction activities, unless otherwise agreed to by Grantor.

## SECTION 3. SOIL RESERVATION

3.1 All topsoil in pasture land, range land, grassland, and crop land will be stripped to the first layer of color change as determined by a qualified individual and segregated from subsoils (except as indicated in subsection b below).

a. Except as stated in section 3.1(b), all topsoil will be stripped to the first layer of color change as determined by a qualified individual, and color change is to be understood in the context of the Munsell soil color chart colors.

b. For the specific locations where the first color change of soil is less than 8-inches and as agreed to by Grantor and Grantee in writing and prior to construction commencement, Grantee agrees to strip topsoil and subsoil together to a depth of eight inches (8") and to segregate and preserve this topsoil and subsoil together. Mixing of subsoil with topsoil will be allowed only for the soil types specified in section 3.1(b)(i-v), and only as specified in this section, unless otherwise agreed to in writing by Grantor. If the soil types listed in this section are present on Grantor's land, Grantee will conduct a pre-construction meeting or phone call with Grantor to determine whether topsoil and subsoil should be mixed as indicated above.

i. Dunn County Saline Mapping Units
   1) E0454B – Daglum-Rhoades complex, 0 to 6 percent slopes
   2) E0502A – Vanda silty clay, 0 to 2 percent slopes
   3) E0515B – Rhoades-Daglum complex, 0 to 6 percent slopes
   4) E0557B – Dogtooth-Janesburg silt loams, saline, 0 to 6 percent slopes
   5) E-559B – Dogtooth-Janesburg silt loams, 0 to 6 percent slopes
   6) E0561D – Dogtooth-Janesburg complex, 6 to 15 percent slopes
   7) E0563B – Janesburg-Dogtooth silt loams, 0 to 2 percent slopes
   8) E0701F – Dogtooth-Janesburg-Cabba complex, 0 to 3 percent slopes
   9) E0727A – Barkof-Janesburg complex, 0 to 3 percent slopes
   10) E0727B – Barkoff-Janesburg complex, 0 to 3 percent slopes

11) E-0727C – Barkoff-Janesburg complex 6 to 9 percent slopes
12) E1009A – Moreau-Barkoff silty clays, 0 to 3 percent slopes
13) E1009B – Moreau-Barkoff silty clays, 3 to 6 percent slopes
14) E1009C – Moreau-Barkoff silty clays, 6 to 9 percent slopes
15) E3021F – Dogtooth-Janesburg-Brandenburg complex, 9 to 35 percent slopes
16) E3247 – Lambert-Vanda high precipitation-Rhoades, barren complex, 0 to 9 percent slopes
17) E4005A – Harriet loam, 0 to 2 percent slopes, occasionally flooded
18) E4180A – Korell-Daglum-Fluvaquents complex, channeled, 0 to 2 percent slopes, frequently flooded
19) E4279A – Heil silty clay loam, 0 to 1 percent slopes
20) E4767A – Regan silt loam, saline, 0 to 2 percent slopes, occasionally flooded
21) L0502A – Vanda silty clay loam, 0 to 2 percent slopes
22) L0516B – Gerda-Maltese complex, 0 to 6 percent slopes
23) L0935B – Abor silty clay, 3 to 6 percent slopes
24) L0937C Abor-Yawdim silty clays, 6 to 9 percent slopes
25) L2307F – Rhame-Bullock-Kremlin complex, 9 to 35 percent slopes
26) L2311E – Scairt-Maltese-Boxwell complex, 2 to 25 percent slopes
27) L2313D – Boxwell-Scairt-Maltese complex, 6 to 15 percent slopes
28) L4009A – Harriet loam, low precipitation, 0 to 2 percent slopes, occasionally flooded

ii. McKenzie County Saline Mapping Units

1) E0447B – Daglum-Belfield complex, 0 to 6 percent slopes
2) E0454B – Daglum-Rhoades complex, 0 to 6 percent slopes
3) E0515B – Rhoades-Daglum complex, 0 to 6 percent slopes
4) E0559B – Dogtooth-Janesburg silt loams, 0 to 6 percent slopes
5) E0561D – Dogtooth-Janesburg complex, 6 to 15 percent slopes
6) E0563B – Janesburg-Dogtooth silt loams, 0 to 6 percent slopes
7) E0617B – Belfield-Salvage-Daglum complex, 2 to 6 percent slopes
8) E0701F – Dogtooth-Janesburg-Cabba complex, 6 to 35 percent slopes
9) E1228B – Desart-Janesburg-Ekalaka complex, 0 to 6 percent slopes
10) E3013D – Bradenburg-Searing-Dogtooth complex, 6 to 15 percent slopes (only Dogtooth Saline)
11) E3013F – Bradenburg-Cabba-Dogtooth complex, 15 to 70 percent slopes (only Dogtooth Saline)
12) E3247C – Lambert-Vada, high precipitation-Rhoades, barren complex, 0 to 9 percent slopes (only Vanda Saline)
13) E4005A – Harriet loam, 0 to 2 percent slopes, occasionally flooded
14) E4729A – Heil silty clay loam, 0 to 1 percent slopes
15) E4767A – Regan silt loam, saline, 0 to 2 percent slopes, occasionally flooded
16) L2311E – Scairt-Maltese-Boxwell complex, 2 to 25 percent slopes
17) L2313D – Boxwell-Scairt-Maltese complex, 6 to 15 percent slopes (only Scairt Saline)

18) L3015D – Gerda-Kirby complex, 2 to 15 percent slopes
19) L3247C – Patent, occasionally flooded-Vanda-Gerda, barren complex, 0 to 9 percent slopes
20) L3251B – Kremlin-Ethridge-Gerda complex 0 to 6 percent slopes (only Gerda Saline)
21) L4009A – Harriet loam, low precipitation, 0 to 2 percent slopes, occasionally flooded

iii. Mercer County Saline Mapping Units
1) E0415A – Belfield-Daglum compelx, 0 to 2 percent slopes
2) E0454B – Daglum-Rhoades complex, 0 to 6 percent slopes
3) E0454C – Daglum-Rhoades complex, 6 to 9 percent slopes
4) E0515B – Rhoades-Daglum complex, 0 to 6 percent slopes
5) E0515C – Rhoades-Daglum complex, 6 to 9 percent slopes
6) E0617B – Belfield-Salvage-Daglum complex, 2 to 6 percent slopes
7) E0701F – Dogtooth-Janesburg-Cabba complex, 6 to 35 percent slopes
8) E3247C – Lambert-Vanda, high precipitation-Rhoades, barren complex, 0 to 9 percent slopes
9) E4005A – Harriet loam, 0 to 2 percent slopes, occasionally flooded
10) E4101A – Belfield-Korell loams, 0 to 2 percent slopes, rarely flooded
11) E4181A – Korell-Rhoades-Daglum complex, 0 to 2 percent slopes, rarely flooded (only Rhoades-Daglum Saline)
12) E4729A – Heil silty clay loam, 0 to 1 percent slopes

iv. Morton County Saline Mapping Units
1) E0415A – Belfield-Daglum complex, 0 to 2 percent slopes
2) E0454B – Daglum-Rhoades complex, 0 to 6 percent slopes
3) E0454C – Daglum-Rhoades complex, 6 to 9 percent slopes
4) E0457C – Rhoades-Daglum-Ekalaka fine sandy loams, 0 to 9 percent slopes
5) E0515B – Rhoades-Daglum complex, 0 to 6 percent slopes
6) E0541C – Rhoades-Rhoades, barren-Daglum complex, 0 to 9 percent slopes
7) E0559B – Dogtooth-Janesburg silt loams, 0 to 6 percent slopes
8) E0701F – Dogtooth-Janesburg-Cabba complex, 6 to 35 percent slopes
9) E1227B – Desart-Ekalaka-Telfer complex, 0 to 6 percent slopes
10) E1239B – Ekalaka-Lakota fine sandy loams, 0 to 6 percent slopes
11) E1243C – Lakota-Ekalaka-Sham, high precipitation, gullied, occasionally flooded complex, 0 to 9 percent slopes
12) E1263D – Evridge-Whitebird fine sandy loams, 6 to 15 percent slopes
13) E4005A – Harriet loam, 0 to 2 percent slopes, occasionally flooded
14) E4181A – Korell-Rhoades-Daglum complex, 0 to 2 percent slopes, rarely flooded (only Rhoades-Daglum Saline)
15) E4729A – Heil silty clay loam, 0 to 1 percent slopes

v. Williams County Saline Mapping Units
1) 1871 – Vallers loam, saline, 0 to 1 percent slopes
2) 2270 – Harriet and Stirum soils, 0 to 2 percent slopes
3) 2345 – Daglum-Rhoades comples, 0 to 6 percent slopes

4) C23A – Vallers, saline-Parnell complex, 0 to 1 percent slopes
5) C75A – Vallers loam, saline, 0 to 1 percent slopes
6) C526B – Daglum-Rhoades silt loams, 2 to 6 percent slopes
7) C580A – Harriet-Regan-Stirum complex, 0 to 2 percent slopes, occasionally flooded
8) E4005A – Harriet loam, 0 to 2 percent slopes, occasionally flooded

c. No subsoil will be placed on top of topsoil except as necessary for stripping and mixing of the soils listed in subsection b above.

d. Soils in mapping units identified by the NRCS Web Soil Survey as containing saline, sodic, or saline/sodic series components will not be mixed with non-saline, non-sodic, or non-saline/sodic series components.

## SECTION 4. RESTORATION, REVEGETATION, AND EROSION CONTROL

4.1 Reseeding and stand establishment for native prairie will be considered successful when the following criteria are met:

a. All construction easement areas have been restored to a minimum of 70 percent cover as compared to similarly situated and undisturbed adjacent land. The percent cover will be determined utilizing standard vegetation sampling techniques.

4.2 If these criteria are not met within five years of the date of reseeding, Grantor may give notice to Grantee that success has not been achieved and Grantor and Grantee will work cooperatively together to develop an alternate reseeding plan, of which Grantee will be responsible for any reasonable expenses incurred therefor. At any time when Grantee believes it has met the above-described criteria, it will notify Grantor and Grantor will have Grantor's third party inspectors verify Grantee's compliance.

4.3 For any permanent herbaceous plantings (hay land, pasture land, and native prairie), Grantor's property will be seeded in strict compliance with the specifications contained in the NRCS Herbaceous Vegetation Establishment Guide ("Guide") available at http://efotg.sc.egov.usda.gov/references/public/ND/Herbaceous_Veg_Est_Guide.pdf (last updated April, 2015). Any areas where soil reclamation is not completed such that Grantee is able to comply with the planting deadlines contained in the Guide, Grantee will have erosion control measures applied as specified in Section 4.6 and will have an annual cover crop planted so that proper seeding can take place in the spring of the following year. The cover crop will be drilled cross-wise or zig-zag on the slopes. The cover crop seed mix shall be as follows:

a. June: Two bushels of spring small grains per acre.

b. July and August: Thirty pounds of Sudan grass per acre.

c. September and October: Two bushels of winter wheat or winter rye per acre.

4.4 Soil productivity levels will be measured with reference to re-vegetation success. Re-vegetation on hay land, pasture land, and native prairie shall be considered successful if the density and cover of non-nuisance, desirable plant species is equal to or greater than similarly situated and undisturbed adjacent land. On cropland, re-vegetation shall be considered successful if crop yields are equal to adjacent undisturbed portions of the same field. On hay land, the land will be re-vegetated with similar vegetation as compared to the undisturbed land within the same hay field, which could include an adapted variety of alfalfa at the rate of 5.5 PLS lb./acre, and a cover crop such as oats will be used as necessary to establish the alfalfa on the hay land, or as otherwise agreed to by Grantor. On native prairie, the land will be re-vegetated pursuant to the specifications contained in the Guide hereto with the seed mix specified in Section 9.5 of the Dakota Access, LLC Environmental Construction Plan unless a different, reasonable seed mix is attached hereto as an addendum.

4.5 Grantee will remove stones measuring 3 inches in diameter and larger from the top twelve (12) inches of topsoil. Said stones will be removed from the Premises entirely or moved to a location on the Premises consented to by Grantor in writing.

4.6 Erosion will be controlled according to a Storm Water Pollution Prevention Plan in its final approved form as filed with or approved by the North Dakota Public Service Commission. Following soil replacement, slopes having a length and steepness of slope (LS) factor of 1.0 or greater, as defined by NRCS, or a slope of 5% or greater, will have a blanket mulch, erosion nets or erosion control blankets, and straw wattles applied following soil reclamation. Slopes that are to be planted to permanent vegetative cover with an LS factor of 1.0 or higher that will not be seeded to grass/forbs within 30 days after soil replacement or that are not seeded to grass/forbs before June 1 (unless a different date is agreed to in writing by Grantor), will have a straw mulch cover of two tons per acre applied and anchored according to NRCS specifications for the Mulching-484 conservation practice found in Section IV of the NRCS Field Office Technical Guide (http://efotg.sc.egov.usda.gov/), followed by planting of temporary cover crops as listed in section 4.3. If detrimental erosion is occurring or likely to occur on the Premises, Grantee agrees to consult in good faith with Grantor or Grantor's inspector or other agent to address and mitigate the erosion.

## SECTION 5. SOIL COMPACTION

5.1 Grantee will test for and mitigate compaction. The Grantee will test topsoil and subsoil for compaction at regular intervals in lands disturbed by construction activities. The Grantee will conduct tests on the same soil type under similar moisture conditions in undisturbed and adjacent areas to approximate preconstruction conditions. The Grantee will use penetrometers or other appropriate devices to conduct tests. If compaction has a deleterious impact on productivity or revegetation success, Grantee will plow compacted areas in dry conditions with a paraplow or other deep tillage implement to achieve compaction equal to that on adjacent undisturbed lands. Grantee will plow the subsoil in dry conditions before replacing the segregated topsoil.

## SECTION 6. CONSTRUCTION REQUIREMENTS

6.1 Temporary Fencing. In areas where temporary fencing is necessary to keep livestock out of the easement areas (*i.e.* non-cultivated pasture land), Grantee shall install temporary fencing around the total easement areas (temporary, additional, and permanent) before commencement of construction, which fences shall remain until the entire easement area has been reclaimed. At the conclusion of reclamation activities, temporary fencing shall become the property of Grantor. Before construction of any fence by Grantee, Grantee will consult with Grantor as to the location of the fence and any gates along the easement areas. If Grantor chooses, Grantor may notify Grantee in writing that Grantor will install this fencing, and provide an estimate for one of the types of fences described below. Grantee will reimburse Grantor for the cost of the estimate, unless Grantee believes the estimate is unreasonable, in which case Grantee will obtain a reasonable estimate and reimburse that amount to Grantor.

a. Unless otherwise agreed to in writing by Grantor and as long as Grantor supplies power to the fence, any fence installed by Grantee under this section will be reasonably similar to the two-wire power fence described in the NRCS spec sheet, which requires use of smooth, single-strand, 12.5 gauge high-tensile strength (170,000 psi, minimum), type III galvanized or better wire and a top wire (hot wire) at least 26 inches above ground line and the bottom wire (ground wire) 8 to 12 inches below the top wire. The bottom (ground) wire will be connected either directly to the negative side of the energizer or to the same grounding rod(s) as the energizer. In situations where the earth provides an adequate ground to complete the circuit, both wires may be energized. Tension on each wire shall be sufficient to maintain proper wire spacing between line posts. In-line strainers will be installed on each wire to maintain correct tension on each wire between all brace corners and gate assemblies. Tension springs may be used on each wire to maintain proper tension. In the absence of power, Grantee shall install a basic three strand barbed-wire fence using typical industry practices.

12½ guage red-brand barbed wire 3-4-2016
Minimum 5½ foot steel t-post

6.2 Open Trench. Except where Grantee has installed temporary fencing, Grantee will limit the amount of time any trench is open on Grantor's property to twenty one (21) days from the time the trench is opened. Grantee is strictly liable for any cattle or other livestock killed or injured as a result of an open trench on the Subject Property.

6.3 Cover of Pipeline. Grantee shall install the pipeline with a minimum of forty-eight inches (48") of cover from the top of the pipe.

6.4 Integrity of Land and Services. Grantee shall unless otherwise negotiated with Grantor and agreed to in writing:

a. Provide reasonable passage and land access for agricultural equipment during construction and servicing of the pipeline, and in no case shall Grantee entirely prevent access to any parcel of Grantor's land as a result of Grantee's construction activities;

b. Supply temporary service in the event water or utility lines are interrupted and provide said temporary service before planned interruption or immediately after any interruption if the interruption is unplanned;

c. Provide confirmation to Grantor that Grantee has contacted North Dakota One Call prior to any trenching activities;

d. Install temporary gates at fence crossings at Grantor's reasonable request;

e. Immediately provide temporary water to livestock where temporary fencing has removed livestock from their normal water supply;

f. Immediately repair or replace any fences damaged by Grantee;

g. Grantee agrees to provide training to its staff and contractors on the content of this Easement Agreement sufficient to ensure that Grantee's staff and contractors are aware of the provisions of the Easement Agreement as necessary for Grantee to fully comply with the Easement Agreement. Grantee will ensure that, to the extent necessary for Grantee to comply with this Easement Agreement, it will make its staff and contractors aware of the terms of the Easement Agreement.

## SECTION 7. DRAINAGE AND SURFACE CONTOUR

7.1 Grantee shall restore soils to pre-construction grade as reasonably practicable. Without limiting the foregoing statement, Grantee will ensure no ruts or ridges greater than four inches deep or high remain after post-construction grading.

7.2 Grantee shall repair and restore all surface drainage system functionality to pre-construction condition. Grantee shall cooperate with Grantor to accommodate planned surface drainage systems to the extent that plans are affected by the existence of Grantee's pipeline. Final contours of reconstructed surface drainage systems will be replaced so as to result in the same drainage slope and profile as existed prior to disturbance. Soil settling may occur for an extended period of time after disturbance within reconstructed surface drainage systems. All soil settling in the reconstructed drainage-way will be repaired so that no water will be backed up or retained in the drainage.

7.3 Grantee will excavate the trench so that the pipeline may be laid over or under drain tile with a minimum clearance of 12 inches. If drain tiles are cut during trenching, Grantee will: identify the location of the damaged tile at the trench and at both sides of the construction right-of-way; install a temporary flume to maintain drainage; cap the ends to prevent clogging drains with dirt or debris and; keep plugs in place until the damaged tile is repaired.

7.4 Before backfilling, Grantee will determine whether any drain tiles crossed during trenching were damaged during construction. Grantee will use a sewer rod or pipe snake to probe open ends of tiles and will repair any damaged tiles by inserting a competent support

around the tile to prevent settling. If damage is extensive, broken tile will be removed and replaced with new tile. Drain tiles damaged during construction must be repaired to their pre-construction condition. Grantee will backfill around drain tiles in lifts and compact each lift.

## SECTION 8. WATER WELLS AND SURFACE WATERS

8.1 In the event blasting is required, Grantee shall conduct pre-construction and post-construction certified water quality testing and yield testing and/or sampling of any water well registered with the North Dakota State Engineer or any other water well within 300 feet of the construction right-of-way. Regardless of blasting, Grantee will also conduct certified water quality and reasonable water quantity testing on any other surface waters such as dugouts, ponds, and creeks identified by Grantor and located within 150 feet of the construction right-of-way. Grantee shall analyze any damaged well or water supply system or surface water and perform necessary repairs and/or modifications to return it to its former capacity and quality. In the event that a private well or water supply system or surface water is damaged beyond repair due to Grantee's activities, Grantee will provide a temporary water source and will also replace the well or water source with one of equal or greater quality and quantity (and flow rate). The results of water quality and yield test reports shall be provided to Grantor free of charge. Grantee will also be responsible for any damage to groundwater caused by its operations.

## SECTION 9. INDEMNIFICATION

9.1 Grantee hereby agrees to indemnify and hold Grantor harmless from and against any claim or liability or loss from personal injury or property damage resulting from or arising out of the use of the Easements by Grantee, its servants, agents or invitees, excepting, however, such claims, liabilities or damages as may be due to or caused by the acts of Grantor, or its servants, agents or invitees. Grantee will hold Grantor harmless from any claim or liability or loss caused by trespassers or other third parties who are not the agents or invitees of Grantor. GRANTEE SHALL ALSO INDEMNIFY, DEFEND AND HOLD HARMLESS GRANTOR, GRANTOR'S HEIRS, SUCCESSORS, ASSIGNS, TRANSFEREES, EMPLOYEES, AGENTS, LESSEES, CONTRACTORS, SUBCONTRACTORS, AS WELL AS TRUSTEES, BENEFICIARIES, RELATIVES, PARTNERS, OFFICERS, DIRECTORS AND RELATED OR AFFILIATED ENTITIES FROM AND AGAINST ANY LOSS, LIABILITY, COST, EXPENSE OR CLAIM ARISING FROM THE INCURRING OF COSTS OF REQUIRED REPAIRS, CLEAN UP, OR DETOXIFICATION AND REMOVAL UNDER ANY HAZARDOUS MATERIAL LAW WHICH MAY RESULT FROM GRANTEE'S ACTS OR OMISSIONS ON GRANTOR'S LANDS, OR GRANTOR'S OPERATIONS THEREON. SPECIFICALLY EXCLUDED FROM THE FOREGOING INDEMNITEES IS ANY CLAIM FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES UNLESS CAUSED BY GRANTEE'S GROSS NEGLIGENCE, OR ANY CLAIM FOR THE DISCOVERY OF ADVERSE ENVIRONMENTAL CONDITIONS NOT CAUSED BY GRANTEE. IT IS FURTHER EXPRESSLY AGREED AND UNDERSTOOD THAT THE ABOVE INDEMNITY IS NOT INTENDED TO PROTECT GRANTOR FROM GRANTOR'S OWN NEGLIGENCE OR WILLFUL MISCONDUCT. THE OBLIGATIONS OF GRANTEE HEREUNDER SHALL SURVIVE THE TERMINATION OF THE PIPELINE RIGHT-OF-WAY FOR A PERIOD OF TIME EQUAL TO THE STATUTE OF LIMITATIONS APPLICABLE TO THE RESPECTIVE OBLIGATION.

9.2 Grantee will prevent the filing of Construction Liens, Well and Pipeline Construction Liens, and all other liens resulting from its activities on the lands described above. If any liens are filed on the above-described lands because of Grantee's activities, Grantee shall, at its own expense, bond around the lien or provide other security which provides clear title to Grantor within 30 days of recordation of any lien.

## SECTION 10. SUBSURFACE AND MINERAL INTERESTS

10.1 Grantor reserves all subsurface and surface aggregate or mineral interests. These interests include, but are not limited to, oil, gas, coal, pore space, cement materials, potash, sodium sulfate, sand and gravel, scoria, road material, building stone, chemical substances, metallic ores, uranium ores, or colloidal or other clays that are on and under the Right-of-Way; provided,

however, that Grantor shall not be permitted to drill or operate equipment for the production or development of minerals on the Right-of-Way, but it will be permitted to extract the oil and other minerals from and under the Right-of-Way by directional drilling and other means, so long as such activities do not damage, destroy, injure, and/or interfere with the Grantee's use of the Right-of-Way for the purposes for which the permanent easement is being sought by Grantee.

10.2 Grantee acknowledges that Grantor intends to conduct gravel mining activities adjacent to the Pipeline Easement, and that coal mining might be conducted in the future. Grantee agrees that Grantor may complete its mining activities on all of Grantor's property excluding the area at and from the boundaries of the Pipeline Easement; provided, however, in connection with mining activities on lands adjacent to the Pipeline Easement, Grantor shall maintain a 3:1 slope for thirty-five feet (35') from the boundary lines of the Pipeline Easement, as measured horizontally from the boundary lines of the Pipeline Easement. Upon the commencement of gravel or coal mining up to the thirty-five foot (35') setback from the boundary lines of the Pipeline Easement, Grantee shall pay Grantor for the reasonable prevailing value of the gravel or coal reserves minus the cost of mining the gravel. If a coal reserve is stranded and becomes uneconomical to mine because of the pipeline, Grantee will pay for all of the uneconomical coal minus the cost of mining the coal. Grantor shall have no liability to Grantee for damage to or interference with the pipeline and other facilities of Grantee within the Pipeline Easement, or for disruption of services provided by Grantee with respect to loss of lateral support for the pipeline, if Grantor excavates to and maintains a 3:1 slope over the thirty-five (35) foot area adjacent to the boundaries of the Pipeline Easement. If, prior to commencing mining activities in an area or areas adjacent to the Pipeline Easement, Grantor and Grantee, determine, due to soil stability or otherwise, that it may be desirable to maintain a sloped buffer zone greater than thirty-five feet (35') from the boundary lines of the Pipeline Easement, Grantor shall provide Grantee with written evidence of Grantor's calculation of the amount of recoverable reserves. Within thirty (30) days of receipt of such written evidence, Grantee shall pay to Grantor an additional amount for the minable reserves over the thirty-five (35') mining set back equal to the reasonable prevailing value of the gravel or coal reserves less the costs of mining the reserves that will be rendered un-minable as a result of the expanded, sloped buffer zone, and in that event, Grantor shall maintain an expanded sloped buffer zone for such distance and at such slope as Grantor and Grantee may agree. If Grantee elects not to pay Grantor for the additional value of the gravel or coal reserves that would be rendered un-minable as a result of the expanded, sloped buffer zone, then Grantor shall be obligated to maintain only a 3:1 sloped buffer zone over the thirty-five (35) foot area adjacent to the boundary lines of the Pipeline Easement and Grantor shall have no liability to Grantee for damage to or interference with the pipeline and other facilities of Grantee within the Pipeline Easement, or for disruption of services provided by Grantee with respect to loss of lateral support for the facilities, if Grantor excavates to and maintains a 3:1 slope over the thirty-five (35) foot area adjacent to the boundaries of the Pipeline Easement. In the alternative, Grantor can request that Grantee remove and relocate the pipeline at Grantor's sole cost and expense, to a location on the lands that has been mined and reclaimed. If Grantee elects to remove and relocate the pipeline, Grantee shall not be required to do so until Grantee has received permission and all consents and permissions to abandon the old pipeline and construct the new pipeline. Grantor shall grant Grantee a new easement and Grantee shall pay the entire actual cost and expense of the removal and relocation, including but not limited to the cost to Grantee of permits, materials, installation, surveying, inspection, x-ray, environmental studies, regulatory filings, attorneys' fees, and other expenses or overhead that may be required.

## SECTION 11. GENERAL ENVIRONMENTAL PROTECTIONS

11.1 Grantee shall not discharge oil, gas liquids, salt water, or any other hazardous liquids or toxic substances (including substances with toxic characteristics even if such substances are excluded from the definition of hazardous waste under federal statutes) onto the Right-of-Way or on land adjacent to the Right-of-Way. Grantee shall act immediately to halt movement of all discharges of oil, gas liquids, salt water, or other hazardous liquids or toxic substances after discovery. Grantee shall report any and all discharges of oil, gas liquids, salt water, or other hazardous liquids or toxic substances immediately to the Grantor and to the appropriate regulatory agencies and shall restore the affected area as closely as possible to its original condition.

11.2 Grantee shall take necessary precautions to prevent fires. Grantee will provide local fire departments with reasonable information and maps of temporary access roads along the Right-of-Way to facilitate access in the event of an emergency. In the event a fire is caused by Grantee, Grantee shall compensate the Grantor, or its lessees for all losses including forage, crop, buildings, animals, and any other losses.

11.3 Grantee may cut, trim or remove trees, brush and shrubs to keep the Right-of-Way clear of all obstructions that may, injure, endanger or interfere with the construction, operation or maintenance of the pipeline. Grantee shall consult with Grantor prior to cutting or trimming any trees, brush or shrubs located in the Temporary Construction Easement to determine if any reasonable alternatives exist. In non-cultivated uplands, the entire permanent easement may be maintained by the Grantee in an herbaceous state. In wetlands, a corridor centered on the pipeline and up to 30 feet wide may be maintained by the Grantee in a herbaceous state. In addition, trees within 15 feet of the pipeline centerline in wetlands that are greater than 15 feet in height may be selectively cut and removed. Should it be necessary to remove a tree or shrub off the right-of-way in order for Grantee to construct the pipeline, at the request of Grantor, Grantee will plant or compensate landowner to plant replacement trees on a 2:1 ratio in areas outside the Right-of-Way reasonably satisfactory to Grantor in accordance with the State of North Dakota's Tree and Shrub Mitigation Specifications.

## SECTION 12. NO WARRANTY

12.1 Grantor neither warrants nor agrees to defend title to the Right-of-Way, and disclaims any warranty against encumbrances. Grantor asserts, however, that to the best of Grantor's knowledge, Grantor is unaware of any title defects or adverse claims against Grantor's property interest. Grantor further agrees to notify Grantee in writing within thirty (30) days if Grantor learns of any title defects or adverse claims to the Right-of-Way within the term of the Easement Agreement.

## SECTION 13. DAMAGES

13.1 Grantee agrees to pay for damage to crops, pasture, timber, livestock, fences, drain tiles, water supply pipelines, or any other structures, utilities, and improvements that may result from Grantee's exercise of its rights under this Agreement. In lieu of paying for the cost of repairing damaged improvements, Grantee shall have the right to repair such damage caused by Grantee. The amount to be paid for damage to crops and other improvements and/or the repairs requested to be performed by Grantee shall be mutually agreed upon by Grantor and Grantee based on current market rates. If Grantor and Grantee cannot mutually agree on damage compensation, then Grantor reserves any rights associated with seeking proper compensation, including legal action.

13.2 Grantor and Grantee shall negotiate in good faith when determining damages not already paid for in advance. Grantee specifically agrees that, if soil productivity or re-vegetation has not been achieved as required by Section 4 of this Agreement by the expiration of any negotiated period of advance damages then Grantor shall be entitled to additional damage payments for each subsequent year, made on an annual basis, until soil productivity is restored or re-vegetation is successful. If advance damages are agreed upon, they will be indicated on the attached Exhibit B.

## SECTION 14. COMPENSATION

14.1 In consideration for this easement, Grantee will pay to Grantor an amount per rod as specified on Exhibit B.

14.2 Any payment to be made to Grantor under this Agreement may be made or mailed to Grantor at the address shown above, or to _____, at this address_____, who is hereby appointed agent and authorized to receive and receipt for same, and who is also appointed the true and lawful attorney in fact for the undersigned. The agency and power of attorney granted by Grantor to its agent hereunder shall not be deemed revoked until written notice from Grantor has been received by Grantee.

## SECTION 15. EXECUTION REQUIRED

15.1 The Easement Agreement shall be valid and enforceable upon execution by Grantor and Grantee, and may be executed in counterparts, each of which shall be considered an original for all purposes, but all of which together constitute one and the same instrument.

## SECTION 16. CORPORATE SUCCESSION

16.1 All the terms and provisions of the Easement Agreement shall be binding upon, shall inure to the benefit of and shall be enforceable by the respective representatives, successors and assigns of the Parties.

## SECTION 17. ASSIGNMENT

17.1 This Easement shall inure to and be applicable to Grantor and Grantee and their respective heirs, representatives, successors and assigns. Except for any assignment to Grantee's parent, subsidiary or affiliated entities, Grantee shall not assign this Easement to any other party without the prior written consent of Grantor, with Grantor's consent not to be unreasonably withheld, provided, however, that in the event of any assignment by Grantee or any successive Grantee, the assignor shall remain fully responsible for all obligations, responsibilities and liabilities of Grantee under this Easement (including, but not limited to, requirements as to indemnity and insurance).

## SECTION 18. COMPLIANCE

18.1 In addition to any requirements contained in this Easement, Grantee shall comply with the construction procedures and mitigation measures described in its application and supplements (including responses to staff data requests) to the North Dakota Public Service Commission for its permit in Docket No. PU-14-842, and as identified in the pertinent Environmental Plan, and any final Order of the North Dakota Public Service Commission.

## SECTION 19. COVENANTS RUNNING WITH THE LAND

19.1 By signing this Agreement and accepting the payment and other consideration described in this Agreement, Grantor shall be deemed to have agreed to be bound by the covenants applicable to Grantee hereunder, and the easement and related rights granted to Grantee herein create easements and covenants running with Grantor's land.

## SECTION 20. MISCELLANEOUS

20.1 Grantor acknowledges that Grantee has made no representations, promises, agreements, guarantees, or inducements to Grantor that are not expressly set forth in this Agreement and any simultaneously executed agreements, and that this Agreement is intended to reflect the entire agreement between the parties. The easement and related rights granted in this Agreement may be assigned, from time to time, in whole, by Grantee, and shall apply to each of the Pipeline Facilities installed by Grantee. This Agreement shall be governed by the law of the State in which the land is situated. Grantor's spouse, if not a titleholder, executes this Agreement for the purpose of subordinating all spousal rights to the easement and related rights granted to Grantee in this Agreement. No guns or firearms will be allowed in the Premises by Grantee or its agents or employees, and Grantee will not remove any cultural artifacts without Grantor's consent. Words and phrases herein shall be construed as in the singular or plural number, and as masculine, feminine or neuter gender according to the context. From and after the transfer by any Grantee to a successor Grantee, Grantor shall look solely to the successor Grantee in connection with matters arising after the date of the transfer. If any provision of this Agreement is adjudicated as being unenforceable, the balance of this Agreement shall remain in full force and effect.

## SECTION 21. ARMS-LENGTH NEGOTIATION

21.1 The Easement Agreement has been prepared by the joint efforts of Grantor and Grantee and shall be considered the product of collective, arms-length negotiation.

## SECTION 22. CONFLICT WITH LAWS OR REGULATIONS

22.1 If Grantee is unable, in whole or in part, by reason of any law, regulation, or order enacted or issued by any state or federal agency or court to carry out any of its obligations under this agreement, then such obligation, or any part thereof, shall be suspended.

## SECTION 23. INSURANCE

23.1 Grantee shall maintain in effect at all times comprehensive general liability insurance covering operations on the property of Grantor in an amount not less than Five Million Dollars ($5,000,000) per occurrence and Ten Million Dollars ($10,000,000) in the aggregate and provide Grantor reasonable evidence of the maintenance of such insurance.

## SECTION 24. ABANDONMENT OF PIPELINE

24.1 Grantee agrees that commencing five (5) years following the installation of the pipeline, in the event of the complete non-use of said pipeline by Grantee, its successors or assigns, for a continuous period of two (2) consecutive years this Easement and right of way shall be considered abandoned and Grantee shall furnish at its expense, upon receipt of written request from Grantor, a release of the Easement and right of way, in which event Grantee shall have the right to abandon the pipeline in place or remove said pipeline. "Use" of the pipeline as defined herein shall be defined as being the time period in which Grantee, or its assigns, carries the pipeline on its books. Upon final abandonment of said pipelines, Grantee shall comply with any rule or regulation concerning the condition the pipeline including, but not limited to (i) remediating any contaminants related to the pipeline according to all federal, state, county, township, or other applicable ordinances, rules, and regulations, (ii) removing all liquids from the pipeline, (iii) pipeline shall be severed at the ends and capped to seal the entire pipeline, (iv) all above ground pipeline related appurtenances will be removed from the property, and (v) restore the surface to its original condition as near as practical according to the requirements herein. Grantee shall remain responsible for any hazardous or dangerous condition resulting from the pipeline if it is abandoned in place. If Grantor needs abandoned pipeline removed in order to allow or accommodate full use and enjoyment of property, such as for construction of buildings, then upon Grantor's request, Grantee shall remove at minimum the portion of pipeline impacting such use and enjoyment. Any such removal requests must be made within 2 years of such pipeline abandonment.

EXECUTED this 4 day of March, 2016

GRANTOR:

Bonnie Haupt

Bonnie Haupt

**ACKNOWLEDGMENT**

State of NORTH DAKOTA )
)ss
County of Burleigh )

BEFORE ME, the undersigned authority, on this day personally appeared Bonnie Haupt, known to me to be the person(s) whose name is subscribed to the foregoing instrument and acknowledged to me that he/she/they executed the same for the purposes and consideration therein expressed.

IN TESTIMONY WHEREOF, I have hereunto set my hand and official seal this 4th day of March, 2016.

Notary Public

My Commission Expires:_____

DERRICK BRAATEN
Notary Public
State of North Dakota
My Commission Expires July 23, 2020

EXECUTED this 4 day of March, 2016

GRANTOR:

Michael Haupt

Michael Haupt

**ACKNOWLEDGMENT**

State of NORTH DAKOTA )
)ss
County of Burleigh )

BEFORE ME, the undersigned authority, on this day personally appeared Michael Haupt, known to me to be the person(s) whose name is subscribed to the foregoing instrument and acknowledged to me that he/she/they executed the same for the purposes and consideration therein expressed.

IN TESTIMONY WHEREOF, I have hereunto set my hand and official seal this 4th day of March, 2016.

Notary Public

My Commission Expires:_____

DERRICK BRAATEN
Notary Public
State of North Dakota
My Commission Expires July 23, 2020

# EXHIBIT B

## *DAKOTA ACCESS, LLC CALCULATION WORKSHEET*

***Tract Number(s):*** ND-ME-056.000 ***Property Sketch Rev.:*** Rev. 0

***Landowner(s):***

| | | | |
|---|---|---|---|
| Michael Haupt | | | |
| Bonnie Haupt | | | |

***CL Legal:*** 35 (*Section*) T141N (*Township*) R88W (*Range*)

***Permanent Easement and Right of Way Payment (ROW)***

| | | | | | | |
|---|---|---|---|---|---|---|
| *Permanent Easement* | 3.25 | Acres | X | $2,000.00 | = | $6,500.00 |
| *Temp. Workspace/Temp Access Road* | 5.94 | Acres | X | $1,000.00 | = | $5,940.00 |
| | | | **TOTAL ROW COMPENSATION** | | | **$12,440.00** |

***Crop Damages***

| | | | | | |
|---|---|---|---|---|---|
| Crops | Acres | 4.71 | X | $/Ac | $800.00 |
| | | 1st Year | 100% | = | $3,768.00 |
| | | 2nd Year | 80% | = | $3,014.40 |
| | | 3rd Year | 60% | = | $2,260.80 |
| | | **TOTAL CROP DAMAGES** | | | **$9,043.20** |

***Pasture Damages***

| | | | | | |
|---|---|---|---|---|---|
| Pasture | Acres | 4.48 | X | $/Ac | $650.00 |
| | | 1st Year | 100% | = | $2,912.00 |
| | | 2nd Year | 80% | = | $2,329.60 |
| | | 3rd Year | 60% | = | $1,747.20 |
| | | **TOTAL PASTURE DAMAGES** | | | **$6,988.80** |

**Other Damages/Compensation/Reimbursements to be Calculated:**

Describe:

Calculate: X per =

**TOTAL DAMAGES:**

| | | |
|---|---|---|
| Describe: | ROW damages | $82,970.50 |
| | Administrative Fee | $1,714.50 |
| | | |
| | | |
| | **TOTAL REIMBURSEMENTS:** | **$84,685.00** |

***Total Compensation:*** **$113,157.00**

***UNDIVIDED INTEREST OWNERSHIP:***

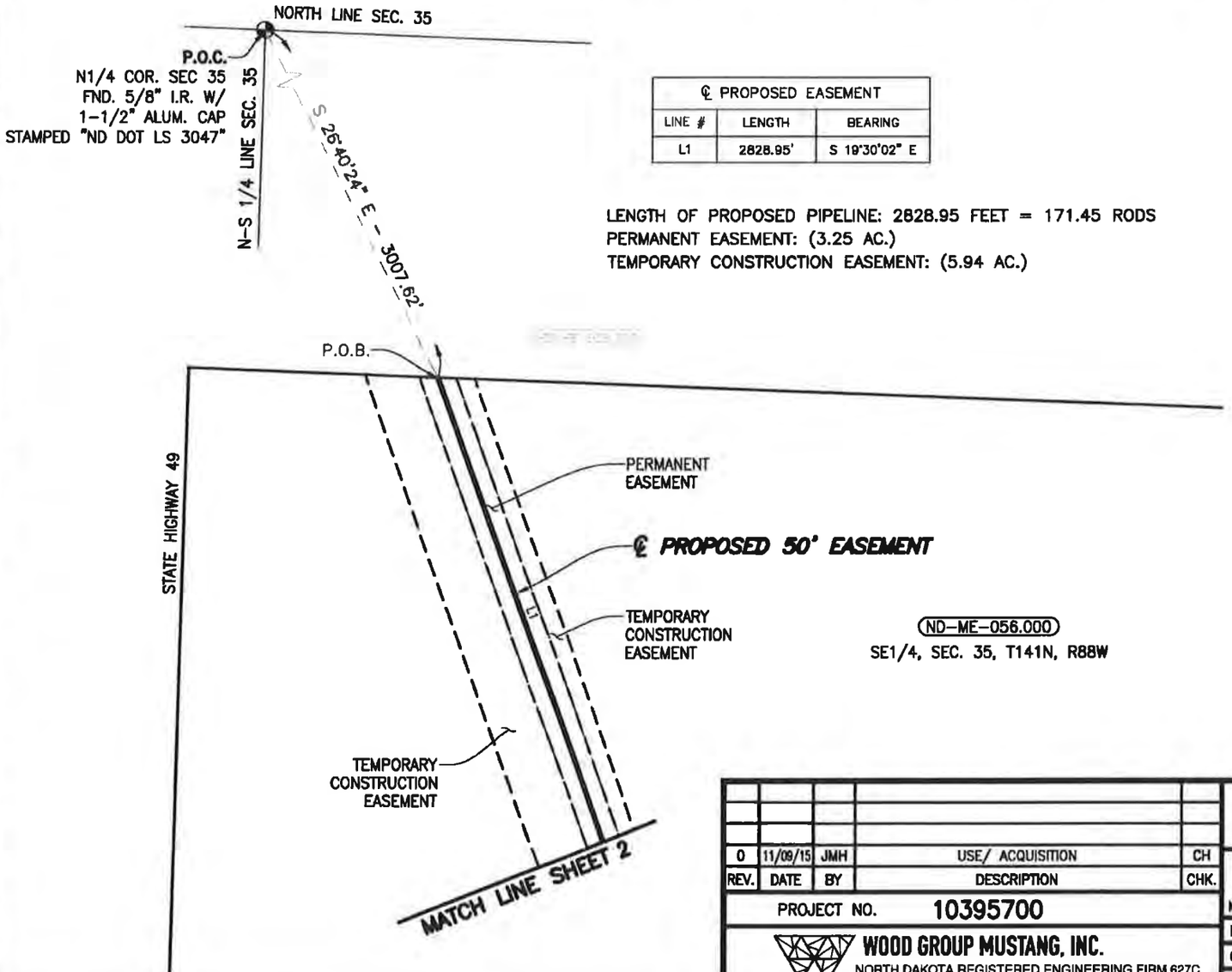
| | | | | |
|---|---|---|---|---|
| Michael Haupt | Bonnie Haupt | 100% | = | $113,157.00 |
| | | | = | $0.00 |
| | | | = | $0.00 |
| | | | = | |
| | | | = | |
| Total Undivided Interest: | | **100%** | = | **$113,157.00** |

***LANDOWNER:*** DATE:

FILE: R:\Projects\103957\DISCIPLINE\CAD\DRAWINGS\94-PROPERTY_PLAT\NORTH DAKOTA\MERCER COUNTY\HAUPT-ND-ME-056.000.WR.dwg PLOT DATE: 11/9/2015 BY: HUMBERSON, JEREMY

# MERCER COUNTY, NORTH DAKOTA

## SECTION 35, TOWNSHIP 141 NORTH, RANGE 88 WEST OF THE 5TH P.M.




| ℄ PROPOSED EASEMENT | | |
|---|---|---|
| LINE # | LENGTH | BEARING |
| L1 | 2828.95' | S 19°30'02" E |

LENGTH OF PROPOSED PIPELINE: 2828.95 FEET = 171.45 RODS
PERMANENT EASEMENT: (3.25 AC.)
TEMPORARY CONSTRUCTION EASEMENT: (5.94 AC.)

SCALE: 1" = 200'

200' 100' 0 200'

LEGEND

- P.O.C. – POINT OF COMMENCEMENT
- P.O.B. – POINT OF BEGINNING
- P.O.T. – POINT OF TERMINATION
- P.E. – PERMANENT EASEMENT
- T.C.E. – TEMPORARY CONSTRUCTION EASEMENT
- – SECTION OR QUARTER CORNER
- – FOUND MONUMENT

NOTES:

1. THIS DRAWING IS NOT TO BE CONSTRUED AS A BOUNDARY SURVEY. BOUNDARY LINES SHOWN IN THEIR APPROXIMATE LOCATION PER DEEDS/TITLE COMMITMENTS.
2. BASIS OF BEARING: NAD 83, UTM ZONE 14, GRID NORTH, USSF DETERMINED THROUGH THE USE OF OPUS SOLUTIONS AND TIED TO THE SURVEY USING GPS RTK METHODS OF SURVEY COMMON TO THE INDUSTRY.

(ND-ME-056.000)
SE1/4, SEC. 35, T141N, R88W



| REV. | DATE | BY | DESCRIPTION | CHK. |
|---|---|---|---|---|
| 0 | 11/09/15 | JMH | USE/ ACQUISITION | CH |

PROJECT NO. 10395700

WOOD GROUP MUSTANG, INC.
NORTH DAKOTA REGISTERED ENGINEERING FIRM 627C

DAKOTA ACCESS, LLC

PROPOSED ℄ 50-FOOT EASEMENT

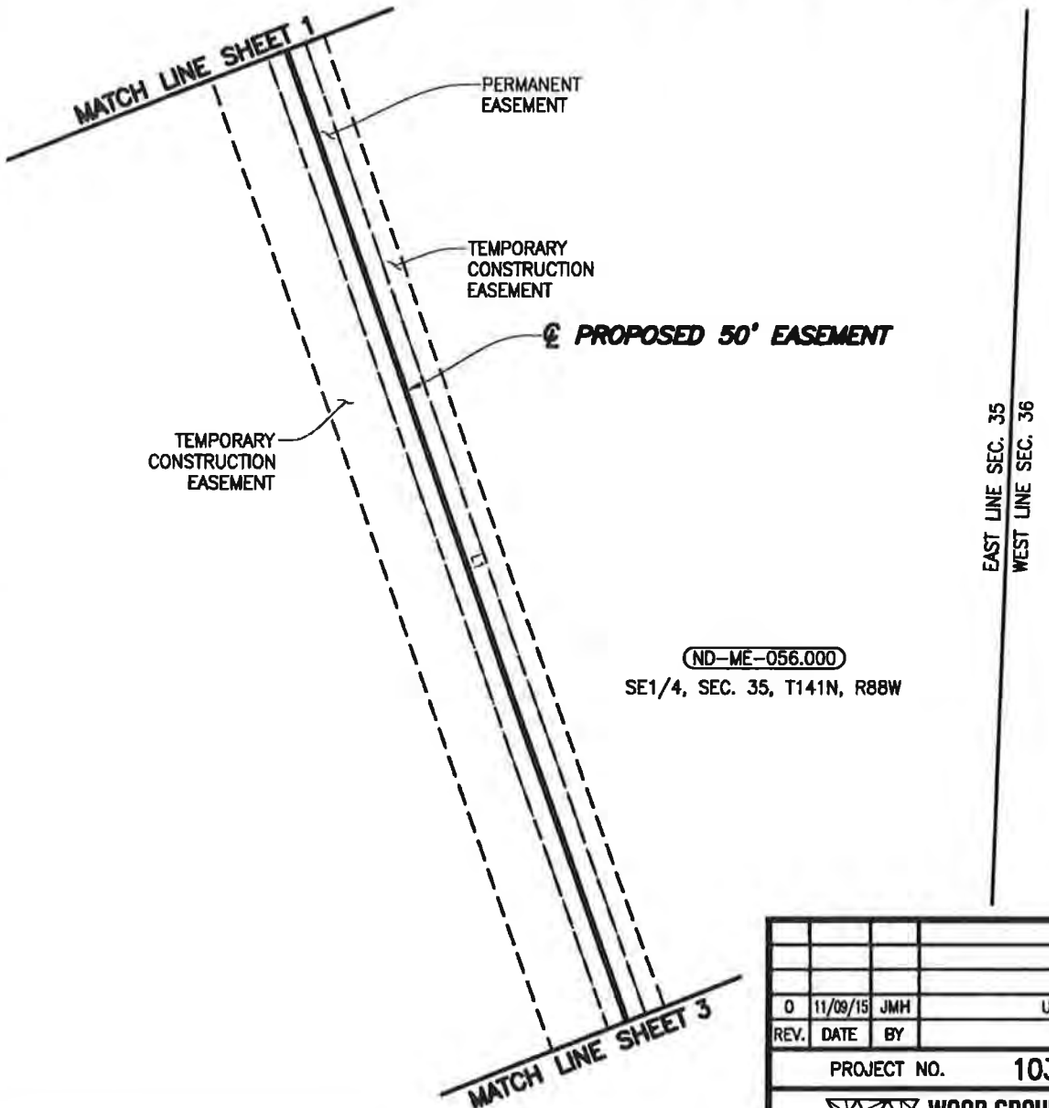
SE1/4, SEC. 35, T141N, R88W, EXCEPT HIGHWAY
MERCER COUNTY NORTH DAKOTA

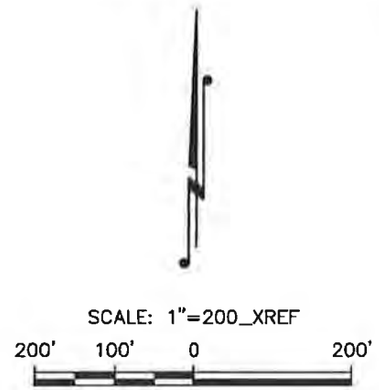
| DRAWN BY: JMH | DATE: 11/05/15 | DWG. NO. HAUPT-ND-ME-056.000.WR | REV. 0 |
|---|---|---|---|
| CHECKED BY: DH | DATE: 11/05/15 | | |
| SCALE: 1" = 200' | APP.: CH | | |

FILE: R:\Projects\103957\DISCIPLINE\CAD\DRAWINGS\94-PROPERTY_PLAT\NORTH DAKOTA\MERCER COUNTY\HAUPT-ND-ME-056.000.WR.dwg PLOT DATE: 11/9/2015 BY: HUMBERSON, JEREMY

# MERCER COUNTY, NORTH DAKOTA

## SECTION 35, TOWNSHIP 141 NORTH, RANGE 88 WEST OF THE 5TH P.M.




SHEET 2 OF 4

| REV. | DATE | BY | DESCRIPTION | CHK. |
|---|---|---|---|---|
| 0 | 11/09/15 | JMH | USE/ ACQUISITION | CH |

PROJECT NO. 10395700

WOOD GROUP MUSTANG, INC.
NORTH DAKOTA REGISTERED ENGINEERING FIRM 627C

DAKOTA ACCESS, LLC

PROPOSED ℄ 50-FOOT EASEMENT

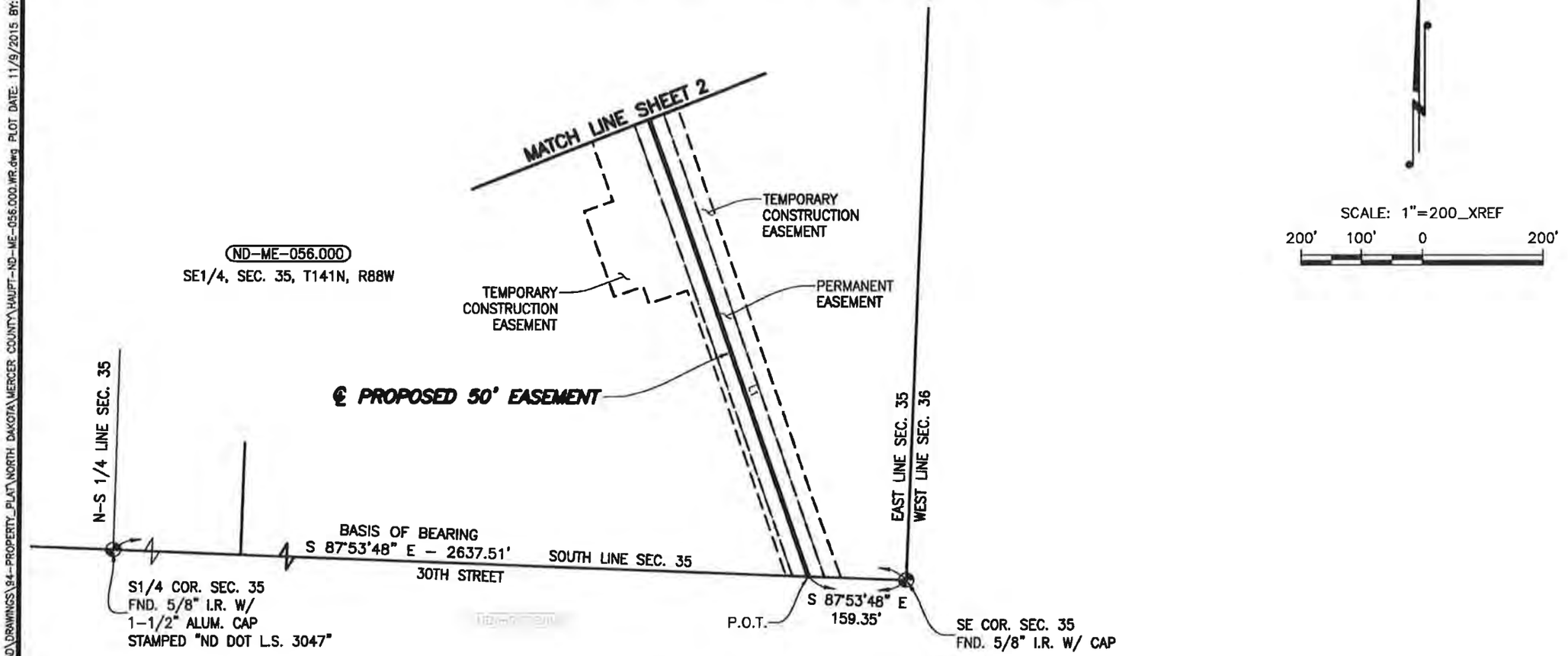
SE1/4, SEC. 35, T141N, R88W, EXCEPT HIGHWAY

MERCER COUNTY NORTH DAKOTA

| | | | |
|---|---|---|---|
| DRAWN BY: JMH | DATE: 11/05/15 | DWG. NO. HAUPT-ND-ME-056.000.WR | REV. 0 |
| CHECKED BY: DH | DATE: 11/05/15 | | |
| SCALE: 1"=200_XREF | APP.: CH | | |

# MERCER COUNTY, NORTH DAKOTA

## SECTION 35, TOWNSHIP 141 NORTH, RANGE 88 WEST OF THE 5TH P.M.



SHEET 3 OF 4

| REV. | DATE | BY | DESCRIPTION | CHK. |
|---|---|---|---|---|
| 0 | 11/09/15 | JMH | USE/ ACQUISITION | CH |

PROJECT NO. 10395700

WOOD GROUP MUSTANG, INC.
NORTH DAKOTA REGISTERED ENGINEERING FIRM 627C

DAKOTA ACCESS, LLC

PROPOSED ℄ 50-FOOT EASEMENT

SE1/4, SEC. 35, T141N, R88W, EXCEPT HIGHWAY

MERCER COUNTY NORTH DAKOTA

| | | | |
|---|---|---|---|
| DRAWN BY: JMH | DATE: 11/05/15 | DWG. NO. HAUPT-ND-ME-056.000.WR | REV. 0 |
| CHECKED BY: DH | DATE: 11/05/15 | | |
| SCALE: 1"=200_XREF | APP.: CH | | |

FILE: R:\Projects\10395700\DISCIPLINE\CAD\DRAWINGS\04-PROPERTY_PLAT\NORTH DAKOTA\MERCER COUNTY\HAUPT-ND-ME-056.000.WR.dwg PLOT DATE: 11/9/2015 BY: HUMBERSON, JEREMY

# MERCER COUNTY, NORTH DAKOTA

## SECTION 35, TOWNSHIP 141 NORTH, RANGE 88 WEST OF THE 5TH P.M.

Commencing at a 5/8 inch iron rod with a 1 1/2 inch cap stamped "ND DOT LS 3047" found at the North Quarter corner of Section 35; thence, S 26°40'24" E 3007.62 feet to the Point of Beginning. Thence, S 19°30'02" E 2828.95 feet along the center line of the permanent easement to the Point of Termination in the south line of Section 35 from which a 5/8 inch Iron Rod with Cap at the Southeast Section corner of Section 35 bears S 87°53'48 E 159.35 feet. Said Permanent Pipeline Easement contains 3.25 Acres more or less.



| REV. | DATE | BY | DESCRIPTION | CHK. |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| 0 | 11/09/15 | JMH | USE/ ACQUISITION | CH |

PROJECT NO. 10395700

**WOOD GROUP MUSTANG, INC.**
NORTH DAKOTA REGISTERED ENGINEERING FIRM 627C

DAKOTA ACCESS, LLC

PROPOSED ℄ 50-FOOT EASEMENT

SE1/4, SEC. 35, T141N, R88W, EXCEPT HIGHWAY

MERCER COUNTY NORTH DAKOTA

| | | | |
|---|---|---|---|
| DRAWN BY: JMH | DATE: 11/05/15 | DWG. NO. HAUPT-ND-ME-056.000.WR | REV. 0 |
| CHECKED BY: DH | DATE: 11/05/15 | | |
| SCALE: N.T.S. | APP.: CH | | |

FILE: R:\Projects\10395?\DISCIPLINES\CAD\DRAWINGS\94-PROPERTY_PLAT\NORTH DAKOTA\MERCER COUNTY\HAUPT-ND-ME-056.000.WR.dwg PLOT DATE: 11/9/2015 BY: HUMBERSON, JEREMY

[Space Above this Line for Recording Office Use Only]

# MEMORANDUM OF EASEMENT AGREEMENT

THIS MEMORANDUM OF EASEMENT AGREEMENT is to provide notice of that certain EASEMENT AGREEMENT ("Easement") dated 4 March, 2016, by and between Bonnie Haupt and Michael Haupt, her husband, as joint tenants with right of survivorship, and not as tenants in common, whose mailing address is 531 Apple Creek Drive, Bismarck, ND 58504, (hereinafter referred to as "Grantor," whether one or more), and Dakota Access, LLC, whose address is 1300 Main Street, Houston, Texas 77002 (hereinafter referred to as "Grantee").

PLEASE TAKE NOTICE AS FOLLOWS:

1. Capitalized terms contained herein and not otherwise defined herein shall have the meanings given to such terms in the Easement Agreement.

2. The Easement Agreement grants to Grantee a Right-of-Way for the purposes constructing, maintaining, repairing, and removing at will one steel crude oil transmission pipeline not to exceed thirty inches (30") in diameter together with all fittings, cathodic protection equipment, pipeline markers, and all other equipment, facilities, and appurtenances used or useful in connection with the foregoing pipeline (collectively "Pipeline Facilities"), along routes convenient for Grantee's operations, on, over, under, across and/or through certain land in the following tracts ("the Premises") located in Mercer County, State of North Dakota:

Township 141 North, Range 88 West
Section 35: SE¼

("Subject Lands") and more specifically described or depicted on the plat or survey attached as Exhibit A to this Memorandum of Easement Agreement.

3. The Easement Agreement grants to Grantee a 99-year easement for the Right-of-Way described and depicted in Exhibit A, as well as the right to use, on a temporary basis, workspace adjacent to the Right-of-Way so as to allow Grantee to exercise any of the rights granted to Grantee in the Easement Agreement.

4. This Memorandum of Easement Agreement is placed of record in the county in which the Subject Lands are located for the purpose of placing all persons on notice of the existence of the Easement Agreement.

5. An executed copy of the Easement Agreement with all exhibits attached is on file in the office of the Grantee at the above-referenced address.

6. The terms and conditions of the Easement Agreement are incorporated by reference into this Memorandum of Easement Agreement as if fully set forth herein.

7. This Memorandum of Easement Agreement is executed by Grantee as of the date of the acknowledgment of the signature below, but is effective for all purposes as of the date of the Easement Agreement.

EXECUTED this 4 day of March, 2016

GRANTOR:

Bonnie Haupt

Bonnie Haupt

**ACKNOWLEDGMENT**

State of NORTH DAKOTA )
)ss
County of Burleigh )

BEFORE ME, the undersigned authority, on this day personally appeared Bonnie Haupt, known to me to be the person(s) whose name is subscribed to the foregoing instrument and acknowledged to me that he/she/they executed the same for the purposes and consideration therein expressed.

IN TESTIMONY WHEREOF, I have hereunto set my hand and official seal this 4th day of March, 2016.

DERRICK BRAATEN
Notary Public
State of North Dakota
My Commission Expires July 23, 2020

Notary Public

My Commission Expires:_____

EXECUTED this 4 day of March, 2016

GRANTOR:

Michael Haupt

Michael Haupt

**ACKNOWLEDGMENT**

State of NORTH DAKOTA )
)ss
County of Burleigh )

BEFORE ME, the undersigned authority, on this day personally appeared Michael Haupt, known to me to be the person(s) whose name is subscribed to the foregoing instrument and acknowledged to me that he/she/they executed the same for the purposes and consideration therein expressed.

IN TESTIMONY WHEREOF, I have hereunto set my hand and official seal this 4th day of March, 2016.

DERRICK BRAATEN
Notary Public
State of North Dakota
My Commission Expires July 23, 2020

Notary Public

My Commission Expires:_____

EXECUTED this _____ day of _____, 2016

GRANTEE:

Dakota Access, LLC

_____

By: Robert Rose
Title: Vice President of Land and Right of Way

**ACKNOWLEDGMENT**

State of _____ )
)ss
County of _____ )

BEFORE ME, the undersigned authority, on this day personally appeared Robert Rose in his capacity as Vice President of Land and Right-of-Way of Dakota Access, LLC, known to me to be the person(s) whose name is subscribed to the foregoing instrument and acknowledged to me that he/she/they executed the same for the purposes and consideration therein expressed.

IN TESTIMONY WHEREOF, I have hereunto set my hand and official seal this ____ day of _____, 2016.

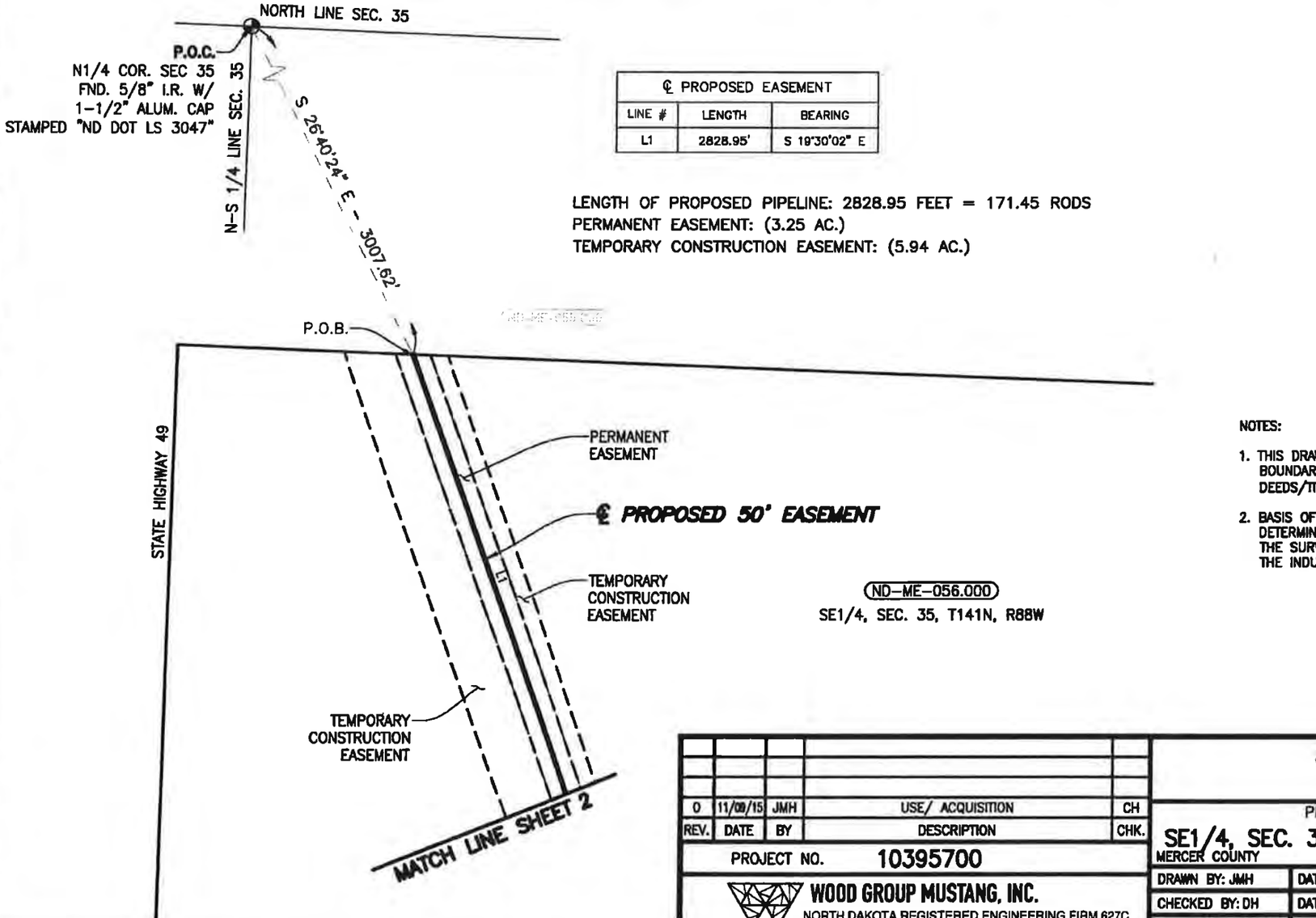
_____

Notary Public
My Commission expires _____

57839353_1.DOC

# MERCER COUNTY, NORTH DAKOTA

## SECTION 35, TOWNSHIP 141 NORTH, RANGE 88 WEST OF THE 5TH P.M.




| ℄ PROPOSED EASEMENT | | |
|---|---|---|
| LINE # | LENGTH | BEARING |
| L1 | 2828.95' | S 19°30'02" E |

LENGTH OF PROPOSED PIPELINE: 2828.95 FEET = 171.45 RODS
PERMANENT EASEMENT: (3.25 AC.)
TEMPORARY CONSTRUCTION EASEMENT: (5.94 AC.)

SCALE: 1" = 200'

200' 100' 0 200'

LEGEND

- P.O.C. – POINT OF COMMENCEMENT
- P.O.B. – POINT OF BEGINNING
- P.O.T. – POINT OF TERMINATION
- P.E. – PERMANENT EASEMENT
- T.C.E. – TEMPORARY CONSTRUCTION EASEMENT
- ⊕ – SECTION OR QUARTER CORNER
- ● – FOUND MONUMENT

NOTES:

1. THIS DRAWING IS NOT TO BE CONSTRUED AS A BOUNDARY SURVEY. BOUNDARY LINES SHOWN IN THEIR APPROXIMATE LOCATION PER DEEDS/TITLE COMMITMENTS.
2. BASIS OF BEARING: NAD 83, UTM ZONE 14, GRID NORTH, USSF DETERMINED THROUGH THE USE OF OPUS SOLUTIONS AND TIED TO THE SURVEY USING GPS RTK METHODS OF SURVEY COMMON TO THE INDUSTRY.

(ND-ME-056.000)
SE1/4, SEC. 35, T141N, R88W



| REV. | DATE | BY | DESCRIPTION | CHK. |
|---|---|---|---|---|
| 0 | 11/09/15 | JMH | USE/ ACQUISITION | CH |

PROJECT NO. 10395700

WOOD GROUP MUSTANG, INC.
NORTH DAKOTA REGISTERED ENGINEERING FIRM 627C

DAKOTA ACCESS, LLC

PROPOSED ℄ 50-FOOT EASEMENT

SE1/4, SEC. 35, T141N, R88W, EXCEPT HIGHWAY

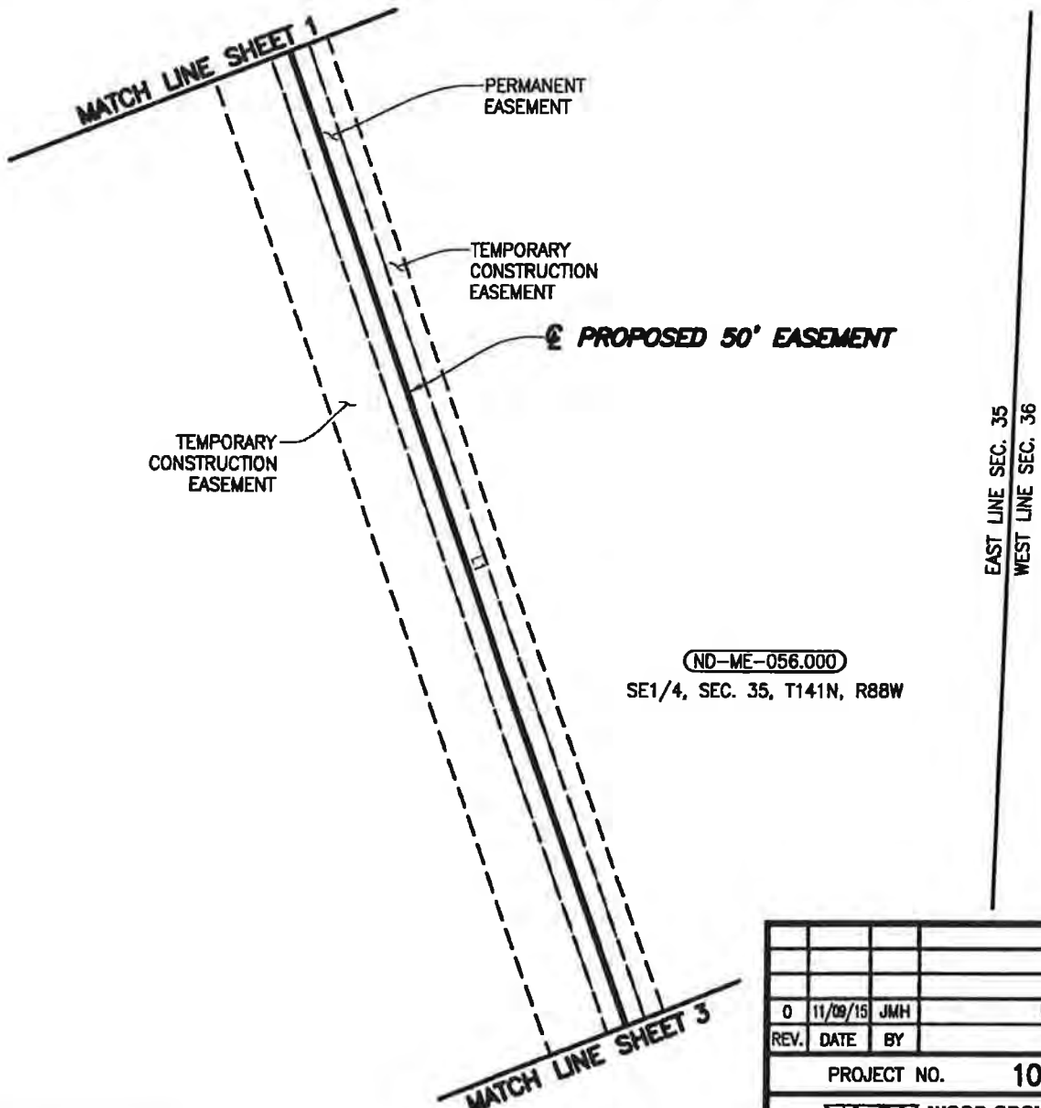
MERCER COUNTY NORTH DAKOTA

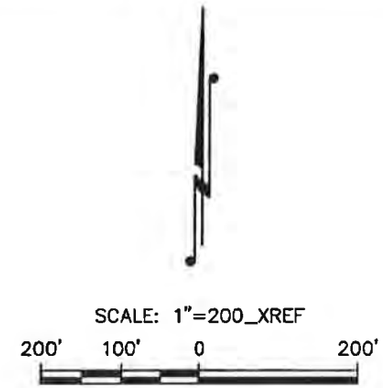
| DRAWN BY: JMH | DATE: 11/05/15 | DWG. NO. HAUPT-ND-ME-056.000.WR | REV. 0 |
|---|---|---|---|
| CHECKED BY: DH | DATE: 11/05/15 | | |
| SCALE: 1" = 200' | APP.: CH | | |

FILE: R:\Projects\10395700\DISCIPLINE\CAD\DRAWINGS\94-PROPERTY_PLAT\NORTH DAKOTA\MERCER COUNTY\HAUPT-ND-ME-056.000.WR.dwg PLOT DATE: 11/9/2015 BY: HUMBERSON, JEREMY

# MERCER COUNTY, NORTH DAKOTA

## SECTION 35, TOWNSHIP 141 NORTH, RANGE 88 WEST OF THE 5TH P.M.




SHEET 2 OF 4

| REV. | DATE | BY | DESCRIPTION | CHK. |
|---|---|---|---|---|
| 0 | 11/09/15 | JMH | USE/ ACQUISITION | CH |

PROJECT NO. 10395700

WOOD GROUP MUSTANG, INC.
NORTH DAKOTA REGISTERED ENGINEERING FIRM 627C

DAKOTA ACCESS, LLC

PROPOSED ℄ 50-FOOT EASEMENT

SE1/4, SEC. 35, T141N, R88W, EXCEPT HIGHWAY

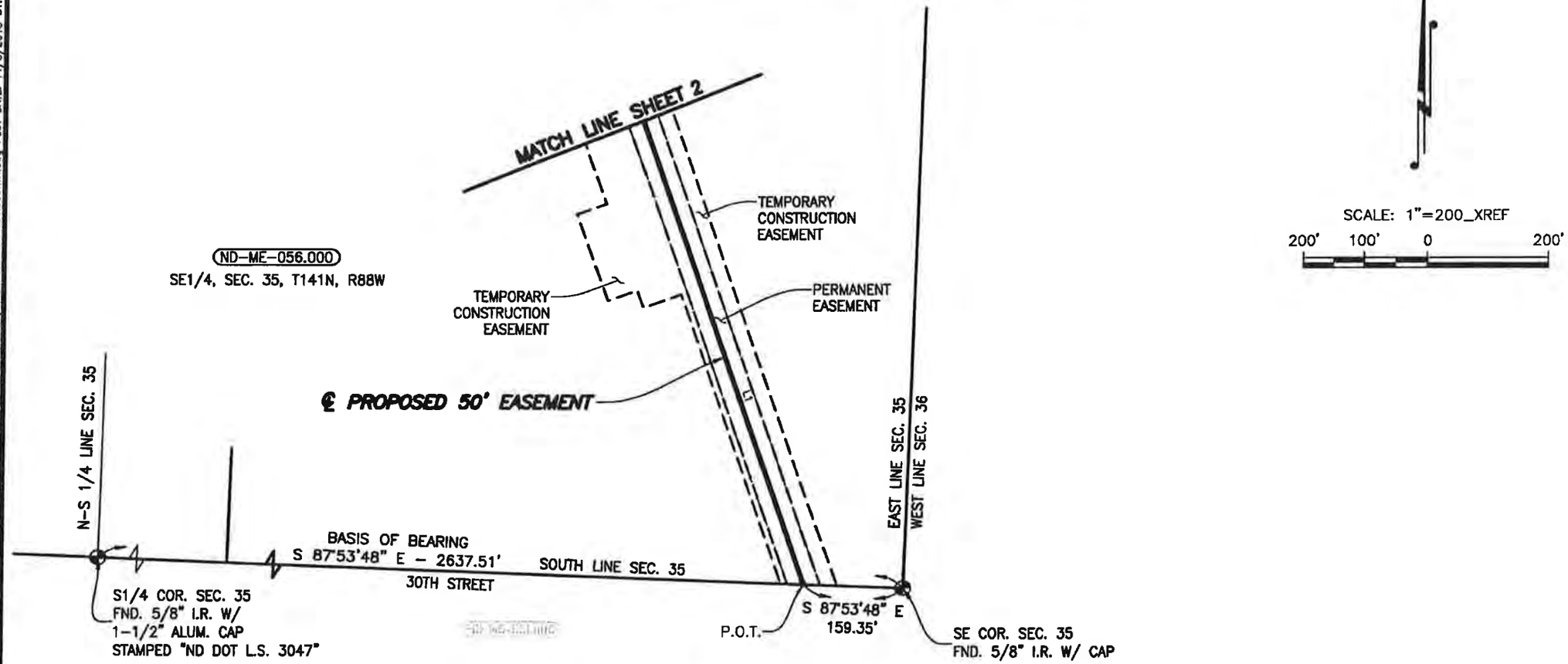
MERCER COUNTY NORTH DAKOTA

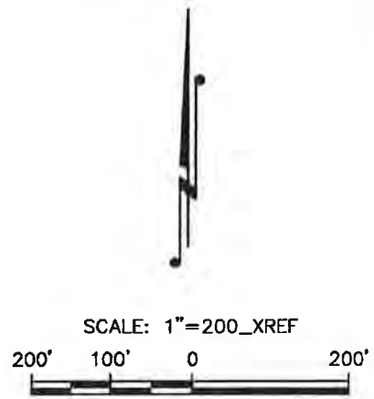
| | | | |
|---|---|---|---|
| DRAWN BY: JMH | DATE: 11/05/15 | DWG. NO. HAUPT-ND-ME-056.000.WR | REV. 0 |
| CHECKED BY: DH | DATE: 11/05/15 | | |
| SCALE: 1"=200_XREF | APP.: CH | | |

FILE: R:\Projects\103957\DISCIPLINE\CAD\DRAWINGS\94-PROPERTY_PLAT\NORTH DAKOTA\MERCER COUNTY\HAUPT-ND-ME-056.000.WR.dwg PLOT DATE: 11/9/2015 BY: HUMBERSON, JEREMY

# MERCER COUNTY, NORTH DAKOTA

## SECTION 35, TOWNSHIP 141 NORTH, RANGE 88 WEST OF THE 5TH P.M.




SHEET 3 OF 4

| REV. | DATE | BY | DESCRIPTION | CHK. |
|---|---|---|---|---|
| 0 | 11/09/15 | JMH | USE/ ACQUISITION | CH |

PROJECT NO. 10395700

WOOD GROUP MUSTANG, INC.
NORTH DAKOTA REGISTERED ENGINEERING FIRM 627C

DAKOTA ACCESS, LLC

PROPOSED ℄ 50-FOOT EASEMENT

SE1/4, SEC. 35, T141N, R88W, EXCEPT HIGHWAY

MERCER COUNTY NORTH DAKOTA

| | | | |
|---|---|---|---|
| DRAWN BY: JMH | DATE: 11/05/15 | DWG. NO. HAUPT-ND-ME-056.000.WR | REV. 0 |
| CHECKED BY: DH | DATE: 11/05/15 | | |
| SCALE: 1"=200_XREF | APP.: CH | | |

FILE: R:\Projects\103957\DISCIPLINE\CAD\DRAWINGS\94-PROPERTY_PLAT\NORTH DAKOTA\MERCER COUNTY\HAUPT-ND-ME-056.000.WR.dwg PLOT DATE: 11/9/2015 BY: HUMBERSON, JEREMY

# MERCER COUNTY, NORTH DAKOTA

## SECTION 35, TOWNSHIP 141 NORTH, RANGE 88 WEST OF THE 5TH P.M.

Commencing at a 5/8 inch iron rod with a 1 1/2 inch cap stamped "ND DOT LS 3047" found at the North Quarter corner of Section 35; thence, S 26°40'24" E 3007.62 feet to the Point of Beginning. Thence, S 19°30'02" E 2828.95 feet along the center line of the permanent easement to the Point of Termination in the south line of Section 35 from which a 5/8 inch Iron Rod with Cap at the Southeast Section corner of Section 35 bears S 87°53'48 E 159.35 feet. Said Permanent Pipeline Easement contains 3.25 Acres more or less.



| REV. | DATE | BY | DESCRIPTION | CHK. |
|---|---|---|---|---|
| 0 | 11/09/15 | JMH | USE/ ACQUISITION | CH |

PROJECT NO. 10395700

WOOD GROUP MUSTANG, INC.
NORTH DAKOTA REGISTERED ENGINEERING FIRM 627C

DAKOTA ACCESS, LLC

PROPOSED ℄ 50-FOOT EASEMENT

SE1/4, SEC. 35, T141N, R88W, EXCEPT HIGHWAY

MERCER COUNTY NORTH DAKOTA

| | | | |
|---|---|---|---|
| DRAWN BY: JMH | DATE: 11/05/15 | DWG. NO. HAUPT-ND-ME-056.000.WR | REV. 0 |
| CHECKED BY: DH | DATE: 11/05/15 | | |
| SCALE: N.T.S. | APP.: CH | | |

FILE: R:\Projects\103957\DISCIPLINES\CAD\DRAWINGS\04-PROPERTY_PLAT\NORTH DAKOTA\MERCER COUNTY\HAUPT-ND-ME-056.000.WR.dwg PLOT DATE: 11/9/2015 BY: HUMBERSON, JEREMY

**NORTH DAKOTA INDUSTRIAL COMMISSION**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case Nos. 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## DECLARATION OF JOHN M. JOCHIM

[¶1] I, John M. Jochim, declare the following based on personal knowledge:

[¶2] I have ownership interest in the following property that lies within the boundaries of the proposed BK Fischer Storage Facility.

- Township 142 North, Range 88 West
  Section 24: NW1/4
  Mercer County, ND

[¶3] The property listed in ¶ 2 above is encumbered by the following easements:

- Oliver Mercer Electric Cooperative Right-of-Way Easement executed by John Jochim on June 25, 1980 (209443).
- West River Telephone Right-of-Way Easement executed by John B. Jochim on April 13, 1993 (153703)
- West River Telecommunications Right-of-Way Easement executed by John M. Jochim on May 29, 2009 (191999).
- ND State Water Commission Pipeline Easement executed by John M. Jochim on July 1, 2010 (195955).

[¶4] Attached are the deeds which I believe indicate my ownership in each of the properties listed above.

[¶5] Attached are the easements currently encumbering these properties based on the information I have.

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on the 23 day of May, 2024 at West Fargo, ND, United States.

John M. Jochim

# WARRANTY DEED

THIS INDENTURE, made this 30 day of Apr. 2001, between **John Jochim a/k/a John B. Jochim and Violet Jochim**, husband and wife, grantor, whether one or more, and **John M. Jochim,** grantee, whose post office address is 371 6th Ave. North. Castleton, ND 58012.

WITNESSETH, for and in consideration of the sum of Ten Dollars and other valuable consideration, grantor does hereby GRANT to the grantee, all of the following real property lying and being in the County of MERCER and State of North Dakota, and described as follows, to-wit:

TOWNSHIP 142 NORTH, RANGE 88 WEST
Section 24: NW/4

Subject to prior mineral reservations and conveyances and reserving to grantor, John B. Jochim, a life estate in the premises conveyed.

And the said grantor for himself, his heirs, executors and administrators, does covenant with the grantee that he is well seized in fee of the land and premises aforesaid and has good right to sell and convey the same in manner and form aforesaid; that the same are free from all encumbrances, except installments of special assessments or assessments for special improvements which have not been certified to the County Auditor for collection; and the above granted lands and premises in the quiet and peaceable possession of said grantees, against all persons lawfully claiming or to claim the whole or any part thereof, the said grantor will warrant and defend.

WITNESS, the hand of the grantor:

John Jochim

Violet Jochim

I certify that the requirement for a report or statement of full consideration paid does not apply because this deed is for one of the transactions exempted by Subdivision "c" of Section 6 of Section 11-18-02.2 NDCC.

Signed: _____ Dated: 5-1-01
(grantee/agent)

STATE OF NORTH DAKOTA )
) ss
COUNTY OF MERCER )

The foregoing instrument was acknowledged before me this 30 day of April, 2001, by John Jochim and Violet Jochim, husband and wife.

Deborah S. Prock
Notary Public
State of North Dakota

My Commission Expires:

DEBORAH S. PROCK
Notary Public, Mercer County, ND
My Commission Expires Mar. 11, 2003
STATE OF NORTH DAKOTA
NOTARY PUBLIC SEAL

*The description was prepared by: Gregory L. Lange, of Richardson, Lange & Donovan, PLLP, P.O. Box 488, Hazen, ND 58545, Ph, 701-748-2206 or obtained from a previously recorded instrument.*

DOCUMENT NO. 170569

MORTGAGEE
MORTGAGOR
INDEXED ✓

STATE OF NORTH DAKOTA
COUNTY OF MERCER

OFFICE OF
REGISTER OF DEEDS

I hereby certify that within instrument was filed in this office for record this 2nd day of May 20 01 at 9:35 o'clock A. M and was duly recorded in Book 127-Deeds on Page 7

Jeanette Sailer,
Register of Deeds

By Kathryn Schumann
Deputy

REGISTER OF DEEDS SEAL MERCER COUNTY, N.DAK.

DELINQUENT TAXES, SPECIAL ASSESSMENTS, OR INSTALLMENTS OF SPECIAL ASSESSMENTS PAID AND TRANSFER ENTERED THIS 2nd DAY OF May 2001

Michelle R Sailer
COUNTY AUDITOR OF MERCER COUNTY, N. DAK.

BY Sandra Baker DEPUTY

$10.00 Chg. Richardson Law Office
P.O. Box 488
Hazen, ND 58545

# RIGHT-OF-WAY EASEMENT

KNOW ALL MEN BY THESE PRESENTS, that we the undersigned, (whether one or more)
JOHN Jochim

(unmarried) (husband and wife) for a good and valuable consideration, the receipt whereof is hereby acknowledged, do hereby grant unto the Oliver-Mercer Electric Cooperative, Inc., a cooperative corporation (hereinafter called the "Cooperative") whose post office address is Hazen, North Dakota 58545, and to its successors or assigns, the right to enter upon the lands of the undersigned, situated in the County of Mercer, State of North Dakota, and more particularly described as follows:

S½ of NW¼ of 24

Right-of-way_____feet Township 142 Range 88 Section W½ of SW¼ of 13
Right-of-way_____feet Township ____ Range ____ Section W½ of W½ of 24
N½ of SW¼ of 24

and to construct, operate, maintain and move or relocate on the above-described lands and/or in or upon all streets, roads or highways abutting said lands, an electric transmission line or system, and to cut and trim trees and shrubbery that may interfere with or threaten to endanger the operation and maintenance of said line or system. The easement shall include only that part of the above described land located within 15 feet on each side of the proposed line.

The undersigned agree that all poles, wires and other facilities, installed on the above described lands at the Cooperative's expense shall remain the property of the Cooperative, removable at the option of the Cooperative.

The Cooperative agrees to pay a reasonable sum for any damage caused to crops or fences by the construction, operation, maintenance, or repair of said line or system. The overall operating height of vehicles and equipment known to cultivate or traverse lands within the easement, is less than fourteen (14) feet, unless otherwise noted below.

IN WITNESS WHEREOF, the undersigned have set their hands and seals this 25 day of June, 1980.

Signed, sealed and delivered in the presence of:

John Jochim

STATE OF NORTH DAKOTA )
) ss
COUNTY OF Mercer )

On this 25 day of June, 1980, before me, a Notary Public in and for said County and State, personally appeared JOHN JOCHIM known to me to be the person who described in and who executed the foregoing instrument and acknowledged to me that he executed the same.

My Commission expires: MAY 5, 1986

Notary Public in and for the County of Mercer State of North Dakota

STATE OF NORTH DAKOTA )
) ss
COUNTY OF _____ )

_____ Being first duly sworn says that he is one of the Witnesses to the above and foregoing easements, that _____ name(s) is and/or are subscribed to the above and foregoing instruments as a party is and/or are the persons described in said easement and that he signed said instrument in my presence and that I in their presence signed my name thereto as a subscribing witness.

Subscribed and sworn to before me this ____ day of _____, 19___

My Commission Expires:

_____

Notary Public in and for the County of _____ and the State of North Dakota

209443

**STATE OF NORTH DAKOTA**
**COUNTY OF MERCER**

**OFFICE OF**
**COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 12/9/2015 at 12:16 PM, and was duly recorded a Book 208 MISC on Page 31 Fee: $23.00

MORTGAGEE
MORTGAGOR
INDEXED ✓

County Recorder Brenda L. Cook

By Deputy

Return To: ROUGHRIDER ELECTRIC COOPERATIVE, INC., 800 H
HAZEN, ND 58545

COUNTY RECORDER SEAL MERCER COUNTY, N DAK.

EXCH: BELH WO#: 29-2680-002

## *West River Telecommunications Right-of-Way Easement*

We the undersigned, (whether one or more) **John M. Jochim,** Grantor(s), do hereby grant and convey unto ***West River Telecommunications Cooperative***, a cooperative corporation (hereafter called the "Cooperative"), grantee, whose address is P.O. Box 467, Hazen, North Dakota, and its respective successors, assigns, lessees and agents, an easement to survey, construct, repair, operate, upgrade, maintain, relocate, replace and remove such communication systems as the grantee may from time to time require, consisting of but not limited to cables, wires, poles, splicing boxes, and other appurtenances, upon, over and under the land which the undersigned owns or in which the undersigned has any interest in the County of ***Mercer***, State of ***North Dakota***, and more particularly described as follows:

***NW/4NW/4 Sec. 24 T142N R88W***

also the right of ingress and egress over and across the lands of the undersigned for the purpose of exercising the rights herein granted; to place surface markers beyond said strip, to clear and keep clear all trees, roots, brush and other obstructions from the surface and subsurface of said strip of land. The boundary of said strip shall be a line parallel to and 10 feet either side of the first cable laid on the land of the undersigned. The undersigned for Grantor(s), their heirs, executors, administrators, successors, and assigns, hereby covenants that no structure shall be erected on said strip.

The undersigned agrees that all poles, wire and other facilities, including telephone equipment, installed on the above described land, shall remain the property of the Cooperative, removable at the option of the Cooperative. The undersigned agrees to this easement with the understanding the Grantor(s), their heirs, executors, administrators, successors, and assigns, may continue to have access to and use of the easement area in any manner consistent with the rights herein granted to the Cooperative, and that the Cooperative will restore the said strip to as near as reasonable to the pre-constructed condition, and that the Cooperative will erect no buildings on said strip.

The undersigned covenant that they are the owners of the above described lands and that the said lands are free and clear of encumbrances and liens of whatsoever character except those held by the following persons:

The term of this easement shall be for as long as needed by the grantee, and until a release of this easement is recorded, but to not extend beyond the maximum term authorized by law.

EXCH: BELH WO#: 29-2680-002

Access is hereby granted for a state or federal historical survey of the cable route, should one be required, unless checked. Access denied ☐

IN WITNESS WHEREOF, this instrument has been executed by the undersigned this the 29th day of May, 2009.

STATE OF )
)
COUNTY OF )

by: John Jochim

by: _____

On this 29 day of May, the year 09 before me personally appeared John Jochim, known to me to be the person(s) who is described in and who executed the within instrument, and acknowledged to me that he/she (or they) executed the same.

AMY HARTZE
Notary Public
State of North Dakota
My Commission Expires Mar. 9, 2012

Amy Hartze
Notary Public, County of Oliver
My Commission Expires: 3/9/2012

IN WITNESS WHEREOF, this instrument has been executed by the undersigned this the ___day of _____, 2009.

STATE OF )
)
COUNTY OF )

by: _____

by: _____

On this _____ day of _____, the year _____ before me personally appeared _____, known to me to be the person(s) who is described in and who executed the within instrument, and acknowledged to me that he/she (or they) executed the same.

Notary Public, County of _____
My Commission Expires:

rev 01/09 Tracking No 29-2680-002

MORTGAGEE
MORTGAGOR
INDEXED ✓

191999
STATE OF NORTH DAKOTA
COUNTY OF MERCER
OFFICE OF
COUNTY RECORDER
I hereby certify that the within instrument was filed in this office for record this 6/3/2009 at 9:37 AM, and was duly recorded as Book 180 MISC on Page 193 Fee: $13.00

County Recorder Brenda L. Cook

By Deputy
Return To: WRT, PO BOX 467
HAZEN, ND 58545

COUNTY RECORDER
SEAL
MERCER COUNTY, N. DAK.

In Computer [ ]
WRT# [ ]
County# [ ]

MORTGAGEE
MORTGAGOR
GRANTOR ✓
GRANTEE ✓
INDEXED ✓

W.O.# 92-272

# West River Telephone Right-of-Way Easement

KNOW ALL MEN BY THESE PRESENT, that we the undersigned, (whether one or more) *John B Jochim*, Grantor(s), do hereby grant and convey unto *West River Telecommunications Cooperative*, a cooperative corporation (hereafter called the "Cooperative"), grantee, whose address is P.O Box 467, Hazen, North Dakota, and its respective successors, assigns, lessees and agents, an easement to survey, construct, reconstruct, operate, upgrade, maintain, relocate, replace and remove such communication systems as the grantee may from time to time require, consisting of but not limited to cables, wires, poles, splicing boxes, surface testing terminals, repeaters, repeater housings and markers, and other appurtenances, upon and over the land which the undersigned owns or in which the undersigned has any interest in the County of *Mercer*, State of *North Dakota*, and more particularly described as follows:

*W/2 24 142 88*

also the right of ingress and egress over and across the lands of the undersigned for the purpose of exercising the rights herein granted; to place surface markers beyond said strip, to clear and keep clear all trees, roots brush and other obstructions from the surface and subsurface of said strip of land and within seven feet thereof. The boundary of said strip shall be a line parallel to and 25 feet either side of the first cable laid, which cable shall have its location indicated by surface markers set at intervals on the land of the undersigned or on adjacent lands. The undersigned for himself, his heirs, executors, administrators, successors, and assigns, hereby covenants that no structure shall be erected on said strip.

The undersigned agrees that all poles, wire and other facilities, including telephone equipment, installed on the above described premises at the Cooperative's expense, shall remain the property of the Cooperative, removable at the option of the Cooperative.

The undersigned covenant that they are the owners of the above described lands and that the said lands are free and clear of encumbrances and liens of whatsoever character except those held by the following persons:

The term of this easement shall be for as long as needed by the grantee, and until a release of this easement is recorded, but to not extend beyond the maximum term authorized by law.

Access is hereby granted for a state or federal historical survey of the cable route, should one be required, unless checked. Access denied ☐

IN WITNESS WHEREOF, this instrument has been executed by the undersigned this the 13 day of April, 1993.

STATE OF NORTH DAKOTA )
)
COUNTY OF Mercer )

by: John B. Jochim

by: _____

The foregoing instrument was acknowledged before me this 13th day of April, 1993. By John B Jochim.

My Commission Expires:

CLYDE FANDRICH
Notary Public, Mercer County, ND
My Commission Expires Feb. 24, 1999
STATE OF NORTH DAKOTA
NOTARY PUBLIC SEAL

Clyde Fandrich
Notary Public, County of Mercer

Document No. 153703
OFFICE OF REGISTER OF DEEDS, COUNTY OF Mercer, North Dakota. I hereby certify that the within instrument was filed in this office for recording on the 10th day of January, A.D., 1994, at 12:10 o'clock P M, and was duly recorded in Book 128, of Misc., on page 521.

By Kathryn Schumann, Deputy Jeanette Sailer
Register of Deeds

REGISTER OF DEEDS SEAL MERCER COUNTY, N.DAK.

$7.00 fee

When recorded, please return to WEST RIVER TELECOMMUNICATION COOPERATIVE.

**PIPELINE EASEMENT**

North Dakota State Water Commission
County of Mercer
Parcel H-MER-130

**ALL PERSONS TAKE NOTICE:**

That the undersigned, John Jochim, whether one or more, called the Grantor, being the owner of, or having an interest in, land situated in the County of Mercer, State of North Dakota, more fully described below, in consideration of One and No/100 Dollars ($1.00) and other valuable consideration, does hereby grant, convey, and warrant to the State of North Dakota, acting by and through the North Dakota State Water Commission, a state agency and public corporation, with its principal office at 900 East Boulevard Ave., Bismarck, North Dakota 58505, called the Grantee, and to its successors and assigns, the right, privilege, and easement to construct, maintain, operate, inspect, repair, alter, replace, change the size of or remove a pipeline, and appurtenances thereto, for the transportation of water under, across, and through:

Parcel H-MER-130
A 40 foot wide strip of land 20 feet wide on each side of the pipeline centerline lying within the W1/2 NW1/4 Section 24, Township 142 North, Range 88 West of the 5th P.M.

Said tract contains 2.42 acres, more or less.

Temporary Construction Easement
An additional 20 feet of temporary right-of-way lying adjacent to the above described tract for a total construction easement width of 60 feet.

Said tract contains 1.21 acres, more or less.

together with the right to utilize additional land for a period up to three years from the date of this easement, adjacent to the above described tract, for purposes of temporary working space during initial construction of the pipeline, and the right of ingress to and egress from said strip of land across the adjacent lands of the Grantor, for the purposes specified above at the will of the Grantee.

**THE GRANTOR AND THE GRANTEE FURTHER AGREE:**

1. **Use of right-of-way by Grantor.** Grantor reserves the right to use the surface of the easement strip provided, however, that Grantor, without prior approval of Grantee, shall neither construct nor permit to be constructed any building, structure, or other improvement upon the easement strip which would interfere with Grantee's exercise of the rights conveyed by this pipeline easement, including access to the easement strip.

2. **Appurtenances.** The Grantee shall have the right to install and construct necessary appurtenances upon the surface of the easement strip. Prior to construction, the Grantee will notify the Grantor of the approximate location of such appurtenances if any, to be located on the easement strip, and shall pay to the Grantor the sum of $500 for each appurtenance located at a distance of more than 5 feet from a field boundary or fence line. Such payments shall be paid prior to construction.

3. **Damages.** The Grantee will pay to Grantor or Grantor's tenants, as their respective interests may appear, for damages caused by the operations or activities of the Grantee; provided, however, that the Grantee shall have the right, without liability for damages, to clear, and keep cleared, all trees, brush, and other obstructions from the easement strip that may, in the Grantee's judgment, interfere with the rights and privileges of the Grantee under this pipeline easement.

   If the amount of any damage which Grantor may sustain as a result of Grantee's exercise of rights hereunder cannot be mutually agreed upon, such damages shall be ascertained and determined by three (3) disinterested person; one to be appointed by the Grantor, one by

Grantee, and a third by the two so appointed, and the award of such three persons shall be final and conclusive.

4. **Restoration of surface.** The Grantee will restore the surface of the construction area to its original contour as nearly as practicable.

5. **Topsoil segregation.** When excavating the pipeline trench with a backhoe/trackhoe, the Grantee will remove the topsoil separately during the construction of the pipeline for the full width of the pipe trench to a depth of twelve (12) inches or the actual topsoil depth, whichever is less, and to be replaced at the top of the backfill over the pipe trench.

6. **Assignment and covenant by parties.** The rights of either party may be assigned in whole or in part. The terms and provisions of this easement shall constitute covenants running with the land and shall be binding upon, and inure to the benefit of, the parties hereto, their successors, assigns, personal representatives, and heirs.

7. **Grantor's title.** Grantor warrants that he is the owner of, or has an interest in, the land described in this easement, and that he has full right and authority to enter into and deliver this easement. This instrument may be executed in counterparts and each counterpart shall constitute a separate agreement between the parties thereto. Any payments pursuant to this pipeline easement shall be in proportion to the Grantor's interest in the undivided fee simple estate.

8. **Entire agreement.** This instrument contains the entire agreement of the parties and there are no other, or different, agreements or understandings between the Grantor and the Grantee, or its agents. The Grantor, in executing this pipeline easement, has not relied upon any promises, inducements, or representatives of the Grantee, or its agents, except as are set forth herein.

9. **Term of easement.** The term of this easement shall be as long as it is needed by the Grantee, or its assigns, and until a release of this easement is recorded, but shall not exceed ninety-nine (99) years pursuant to NDCC §47-05-02.1.

10. **Tenants.** The Grantor represents that the land described in this easement is (not rented) (rented to) _____.

Dated this 1 day of July, 20 10.

John M Jochim
Grantor

Grantor

STATE OF NORTH DAKOTA)
) ss.
COUNTY OF CASS)

On this 1st day of July, 20 10, before me personally appeared John Maurice Jochim, known to me to be the person(s) described in and who executed the within and foregoing instrument, and acknowledged to me that he/she executed the same.

Notary Public

(SEAL)

3/3/16 County, ND
My Commission expires:

RYAN KUCKER
Notary Public
State of North Dakota
My Commission Expires March 3, 2016

195955

**STATE OF NORTH DAKOTA**
**COUNTY OF MERCER**

**OFFICE OF**
**COUNTY RECORDER**

MORTGAGEE
MORTGAGOR
INDEXED ✓

I hereby certify that the within instrument was filed in this office for record this 12/27/2010 at 11:45 AM, and was duly recorded a Book 186 MISC on Page 371 Fee: $16.00

County Recorder Brenda L. Cook

By Deputy

Return To: ND STATE WATER COMMISSION, 900 E BOULEVARD A
DEPT 770 BISMARCK, ND 58505-0850

COUNTY RECORDER SEAL MERCER COUNTY, N. DAK.

**NORTH DAKOTA INDUSTRIAL COMMISSION**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case Nos. 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## DECLARATION OF KEVIN KRAFT

[¶1] I, Kevin Kraft, declare the following based on personal knowledge:

[¶2] I have ownership interest in the following properties that lie within the boundaries of the Review Area of the proposed TB Leingang Storage Facility.

- Township 142 North, Range 87 West
  Section 27: A tract of land located in the S1/2
  Oliver County, ND

  more particularly described as follows:

  Commencing at the Southeast corner of said Section 27; thence N 89°59'36" W a distance of 2070.02 feet to the point of beginning; thence continuing N 89° 59'36" W a distance of 824.50 feet; thence N 0°40'27" E a distance of 2642.32 feet to the mid-section line; thence along the mid-section line S 89°54'53" E a distance of 824.50 feet; thence S 0°40'27" W a distance of 2641.19 feet to the point of beginning. Said tract contains 50.00 acres more or less.

- Township 142 North, Range 87 West
  Section 27: SE1/4 LESS AND EXCEPT a tract of land previously conveyed
  Oliver County, ND

[¶3] To the best of my knowledge, the properties listed in ¶ 2 above are encumbered by the following easements:

- Oliver Mercer Electric Cooperative Right-of-Way Easement executed by Mike and Mary Keller on April 9, 1949.
- Roughrider Electric Cooperative, Inc. Right of Way Easement executed by Kevin Kraft on February 24, 2016.
- Greg Skalsky Right-of-Way Easement granted by Kevin Kraft on July 29, 2022.
- Southwest Water Authority Right-of-Way Easement executed by Kevin Kraft on February 6, 2014.

[¶4] Attached are the deeds which I believe indicate my ownership in each of the properties listed above.

[¶5] Attached are the easements currently encumbering these properties based on the information I have.

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on the 24 day of May, 2024 at Beulah, ND, United States.

Kevin Kraft

Kevin Kraft

**WARRANTY DEED**

THIS INDENTURE, Made this 28th day of September, 2001, between **JOSEPH A. KELLER and ELAINE M. KELLER**, husband and wife, whose post office address is P.O. Box 542, Beulah, North Dakota 58523, Grantors, and **KEVIN KRAFT**, a single person, whose post office address is 5651 23rd Street SW, Beulah, North Dakota 58523, Grantee.

WITNESSETH, For and in consideration of the sum of Sixty-Nine Thousand Nine Hundred Dollars ($69,900.00) And Other Good and Valuable Consideration, Grantors do hereby GRANT to the Grantee, all of the following real property lying and being in the County of Oliver and State of North Dakota, and described as follows, to-wit:

**A tract of land located in the South Half (S1/2), Section Twenty-Seven (27), Township One Hundred Forty-Two (142) North, Range Eighty-Seven (87) West, Fifth Principle Meridian, Oliver County, North Dakota and more particularly described as follows:**

**Commencing at the Southeast corner of Section 27 thence N 89°59'36"W a distance of 2070.02 feet to the Point of beginning; thence continuing N 89°59'36"W a distance of 824.50 feet; thence N 0°40'27E a distance of 2642.32 feet to the mid-section line; thence along the mid-section line S 89°54'53"E a distance of 824.50 feet; thence S 0°40'27"W a distance of 2641.19 feet to the Point of Beginning.**

**Said tract contains 50.00 acres more of less.**

**The above legal description was obtained from a plat drawn by Roy Jensen, a North Dakota Registered Land Surveyor - LS. 4654.**

And the said Grantors, for themselves, their heirs, executors and administrators, does covenant with the Grantee that they are well seized in fee of the land and premises aforesaid and has good right to sell and convey the same in manner and form aforesaid; that

Auditor's Office
Oliver County, N.D.
transfer entered this 23rd day of
January 2002
Barbara Lemm
County Auditor
By _____ Deputy

ALEXANDER & SOLEM
ATTORNEYS AT LAW
133 WEST MAIN ST.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

the same are free from all encumbrances, except installments of special assessments or assessments for special improvements which have not been certified to the County Auditor for collection, and easements of record, if any, and the above granted lands and premises in the quiet and peaceable possession of said Grantee, against all persons lawfully claiming or to claim the whole or any part thereof, the said Grantors will warrant and defend.

WITNESS, The hand of the Grantors:

I (We), the Grantor in this Deed, do hereby certify that the amount shown as consideration above is the full consideration paid for the property conveyed.

Kevin Kraft

Joseph A. Keller
JOSEPH A. KELLER

Elaine M. Keller
ELAINE M. KELLER

STATE OF NORTH DAKOTA )
)
COUNTY OF Mercer )

On this 28th day of September, 2001, before me, personally appeared **JOSEPH A. KELLER and ELAINE M. KELLER**, husband and wife, known to me to be the persons who are described in, and who executed the within and foregoing instrument, and severally acknowledged that they executed the same.

Monica Mamer
NOTARY PUBLIC
Mercer COUNTY, NORTH DAKOTA

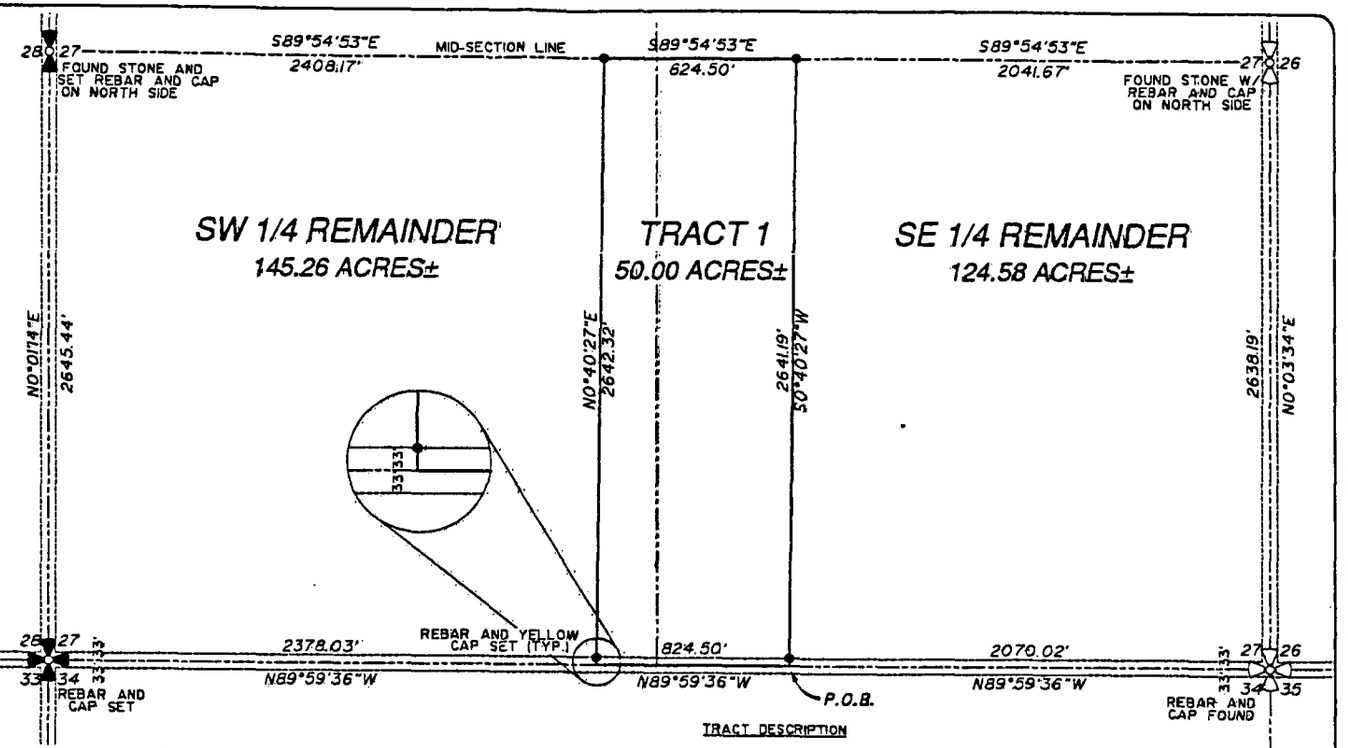
My commission expires: June 20, 2002

MONICA MAMER
Notary Public, STATE OF NORTH DAKOTA
My Commission Expires JUNE 20, 2002

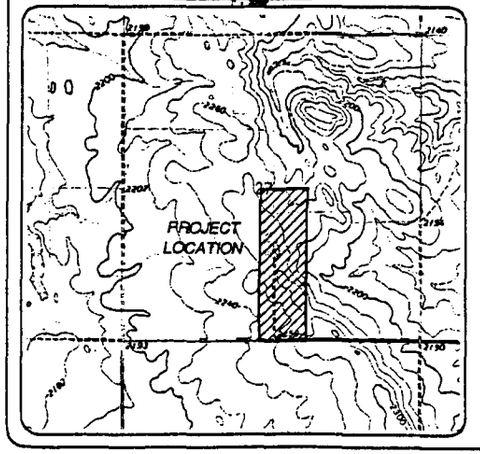
ALEXANDER & SOLEM
ATTORNEYS AT LAW
133 WEST MAIN ST.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

# PARCEL PLAT

S1/2
SEC. 27, T142N, R87W, 5th P.M.
OLIVER COUNTY, NORTH DAKOTA




VICINITY MAP




I, Troy Jensen, Registered land Surveyor No. 4654 in the State of North Dakota, do hereby certify that at the request of the landowner, I made the survey and plat of Tract 1, Located in the S 1/2, Sec. 27, T142N, R87W, 5th P.M., Oliver County, North Dakota.

Dated This 27TH day, AUGUST, 20 01

Troy Jensen
Troy Jensen, RLS 4654
Interstate Engineering Inc.
Beulah, ND

TROY JENSEN
REGISTERED LAND SURVEYOR
LS. - 4654
NORTH DAKOTA

State of Montana
County of Richland

On this 27 day of August 20 01 before me, the undersigned a Notary Public for the State of Montana, personally appeared Troy Jensen, known to me to be the person that executed the same.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal the day and year in the certificate first above written.

Stacy Torgerson-Brown
Notary Public for the State of Montana
Residing at Sidney, Montana
My commission expires June 15, 2003

TRACT DESCRIPTION

A TRACT OF LAND LOCATED IN THE SOUTH HALF (S1/2), SECTION TWENTY SEVEN (SEC. 27), TOWNSHIP ONE HUNDRED FORTY TWO NORTH (T142N), RANGE EIGHTY SEVEN WEST (R87W), FIFTH PRINCIPLE MERIDIAN (5th P.M.), OLIVER COUNTY, NORTH DAKOTA AND MORE PARTICULARLY DESCRIBED AS FOLLOWS:

Commencing at the Southeast corner of Section 27 thence N89°59'36"W a distance of 2070.02 feet to the Point of beginning; thence continuing N89°59'36"W a distance of 824.50 feet; thence N0°40'27"E a distance of 2642.32 feet to the mid-section line; thence along the mid-section line S89°54'53"E a distance of 824.50 feet; thence S0°40'27"W a distance of 2641.19 feet to the Point of Beginning.

Said tract contains 50.00 Acres more or less.

Basis of bearing is from GPS observations of the Section Corners.

LEGEND

1/4 SECTION CORNER - SET
1/4 SECTION CORNER - FOUND
SECTION CORNER - SET
SECTION CORNER - FOUND
REBAR WITH YELLOW CAP - SET
REBAR OR PIPE - FOUND

SCALE

500 0 500 1000
scale 1" = 500 feet

Interstate engineering, Inc.
Engineering - Surveying - Planning
P.O. Box 648 Sidney, Montana 406-433-5617

PARCEL PLAT
SEC. 27, T142N, R87W, 5th P.M.
OLIVER COUNTY, NORTH DAKOTA
Drawn By T.S.J. Project No. 801-8-30
Checked By T.S.J. Date AUG. 2001

SHEET NO.

OFFICE OF COUNTY RECORDER
STATE OF NORTH DAKOTA
COUNTY OF OLIVER
Filed for record this 23 day of January A.D. 2002 at 1:20 o'clock P M., and recorded as document No. 80054 in book 35 of Deeds page 465-467
Kwiekum
County Recorder
Deputy Fee $29.00

467

**WARRANTY DEED**

THIS INDENTURE, made this 13th day of August, 2013, between **Joseph A. Keller and Elaine M. Keller**, husband and wife, Grantors, and **Kevin Kraft**, whose address is 5651 23rd Street SW, Beulah, ND 58523, Grantee.

WITNESSETH, for and in consideration of the sum of Ten and no/100 and other good and valuable consideration ($10.00 & OGVC), Grantors do hereby grant to the Grantee all of the following real property lying and being in the County of **OLIVER**, State of North Dakota, and described as follows, to-wit:

> The Southeast Quarter (SE¼) of Section Twenty-Seven (27), Township One Hundred Forty-Two (142), Range Eighty-Seven (87), Oliver County, North Dakota, LESS AND EXCEPT a tract of land previously conveyed, described as follows:
>
> A tract of land located in the South Half (S½) of Section Twenty-Seven (27), Township One Hundred Forty-Two (142) North, Range Eighty-Seven (87) West of the Fifth Principal Meridian, Oliver County, North Dakota, and more particularly described as follows:
>
> Commencing at the Southeast corner of said Section 27; thence N 89°59'36" W a distance of 2070.02 feet to the point of beginning; thence continuing N 89°59'36" W a distance of 824.50 feet; thence N 0°40'27" E a distance of 2642.32 feet to the mid-section line; thence along the mid-section line S 89°54'53" E a distance of 824.50 feet; thence S 0°40'27" W a distance of 2641.19 feet to the point of beginning.
> Said tract contains 50.00 acres more or less.
>
> The above description taken from a previously recorded instrument.
>
> Grantors hereby reserve to themselves as joint tenants Ninety percent (90%) of all minerals presently owned by them. It is the intention of Grantors to convey to Grantee Ten percent (10%) of all minerals presently owned by Grantors.

And the said Grantors for themselves, their heirs, executors and administrators, do covenant with the Grantee that they are well seized in fee of the land and premises aforesaid and have a good right to sell and convey the same in manner and form aforesaid; that the same are free from all encumbrances, except installments of special assessments or assessments for special improvements which have not been certified to the County Auditor for collection and the above granted lands and premises in the quiet and peaceable possession of said Grantee, against all persons lawfully claiming or to claim the whole or any part thereof, the said Grantors will warrant and defend.

WITNESS, the hand of the Grantors:

Joseph A. Keller

Joseph A. Keller

Elaine M. Keller

Elaine M. Keller

STATE OF NORTH DAKOTA )
)ss
COUNTY OF OLIVER )

On this 13th day of August, 2013, before me, personally appeared **Joseph A. Keller and Elaine M. Keller**, husband and wife, known to me to be the persons who are described in, and who executed the within and foregoing instrument, and severally acknowledged to me that they executed the same.

Ann Mahoney
Notary Public

ANN MAHONEY
Notary Public
State of North Dakota
My Commission Expires Feb. 13, 2015

I certify that the full consideration paid or to be paid for the property described in this deed is $28,125.00.

Signed: Kevin Kraft Date: 8-13-13
Grantee/~~Agent~~

The legal description was prepared by Mahoney & Mahoney Law Office, P.O. Box 355, Center, ND 58530, or obtained from a previously recorded instrument.

Auditor's Office
Oliver County, N.D.
transfer entered this 13th day of
August 2013
Judith M. Wiatz
County Auditor
By_____Deputy

88385 8/13/2013 3:08 PM PAGE: 1 OF 2
BOOK: 39 PAGE: 716 FEES: $13.00 MM WARRANTY DEED
Kim Wilkens, OLIVER COUNTY CLERK
By M M Kelly, Ex Deputy

KRAFT, KEVIN
5651 23RD STREET SW

BEULAH, ND 58523

RECORDER OLIVER SEAL COUNTY STATE OF NORTH DAKOTA

07
220

01111

FORM LE-189 R

RIGHT OF WAY EASEMENT

KNOW ALL MEN BY THESE PRESENTS, that we the undersigned, (Whether one or more) Mike Keller & Mary Keller (unmarried) (husband and wife), for a good and valuable consideration, the receipt whereof is hereby acknowledged, do hereby grant unto Oliver-Mercer Electric Cooperative, Inc. a cooperative corporation, (hereinafter called the "Cooperative"), whose post office address is Hazen, North Dakota, and to its successors or assigns, the right to enterupon the lands of the undersigned, situated in the County of Oliver, State of North Dakota, and more particularly described as follows:

A tract of land approximately _____ acres in area, located _____ miles in a _____ direction from the town of _____, and further described as being in

NE¼, SW¼ and NW¼ Section 26, Township 142 Range 87

NE¼ and S½ Section 27, Township 142 Range 87

____ Section ____, Township _____ Range _____

and to contract, operate and maintain on the above described lands, and/or in or upon all streets, roads or highways abutting said lands, an electric transmission or distribution line or system, and to cut and trim trees and shrubbery that may interfere with or threaten to endanger the operation and maintenance of said line or system.

The undersigned agree that all poles, wires, and other facilities, including any main service entrance equipment, installed on the above-described lands at the Cooperative's expense shall remain the property of the Cooperative, removable at the option of the Cooperative, upon termination of service to or on said lands.

The undersigned covenant that they are the owners of the above-desctibed lands and that the said lands are free and clear of encumberances and liens of whatsoever character except those held by the following persons:

IN WITNESS WHEREOF, the undersigned have set their hands and seals this 9 day of April, 1949.

Mike Keller (L.S.)

Mary Keller (L.S.)

Signed, sealed and delivered in the presence of:

91027 8/20/2015 4:18 PM PAGE: 1 OF 2
BOOK: 1 PAGE: 1028 FEES: $13.00 MM EASEMENT (ROUGHRID
Kim Wilkens, OLIVER COUNTY RECORDER
By _____ Deputy

ROUGHRIDER ELECTRIC COOPERATIVE
800 HWY DR
HAZEN, ND 58545

STATE OF NORTH DAKOTA COUNTY OF RECORDED

(1)
STATE OF NORTH DAKOTA

COUNTY OF _____ SS.

_____ being first duly sworn says that he is one of the witnesses to the above and foregoing easements, that _____ and _____ whose names is and/or are subscribed to the above and foregoing instruments as a party is and/or are the persons described in said easement and that he signed said instrument in my presence and that I in their presence signed my name thereto as a subscribed witness.

SUBSCRIBED and sworn to before me this ____day of_____, 194__

_____
Notary Public in and for the
County of_____ and the State
of North Dakota

My commission expires: _____

(1)
STATE OF NORTH DAKOTA
COUNTY OF _____ SS.

On this _____ day of _____, 194___ , before me _____ a Notary Public within and for the State of North Dakota, personally appeared _____ known to me to be one of the persons who subscribed his name to the above and foregoing instrument as a witness, and who acknowledged to me that he subscribed his name thereto as such witness, and who proved to me that the person who and/or whose names are subscribed to the foregoing instrument are the persons described in it.

_____
Notary Public in and for the
County of _____ AND
State of North Dakota

My commission expires:_____

* * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *

(2)
State of North Dakota

County of Mercer SS.

On this 9 day of April 1949, before me _____, a Notary Public in and for said County and State, personally appeared Mike Keller and Mary Keller known to me to be the persons who executed within and foregoing instrument and acknowledged to me that they executed the same.

NOTARY PUBLIC STATE OF NORTH DAKOTA

_____
Notary Public in and for the
County of Mercer and
State of North Dakota

NOTARY PUBLIC, MERCER COUNTY, N.D.
MY COMMISSION EXPIRES JULY 8, 1951

My commission expires: _____

# RIGHT OF WAY EASEMENT

THIS AGREEMENT made and entered into this 29th day of February, 2016, between Kevin Kraft of 5651 23rd St SW, Beulah, ND 58523, hereinafter called "Owner" (whether one or more) and ROUGHRIDER ELECTRIC COOPERATIVE, INC., whose post office address is 800 Highway Drive, Hazen, North Dakota 58545-4737, hereinafter called "COOPERATIVE".

WITNESSETH that for valuable consideration, the receipt and sufficiency of which is hereby acknowledged, Owner grants unto Cooperative, its successors and assigns, for a term of 99 years from the date hereof, an easement to construct, reconstruct, operate and maintain an electric distribution system, overhead, underground or both including all poles, guys, anchors wires, surface terminals, and all accessories and appurtenances necessary or desirable in connection therewith, under, over, upon and across lands of Owner and/or in or upon all streets, roads or highways abutting said lands situated in Oliver County, North Dakota, and more particularly described as follows, to-wit:

A parcel of land in the S1/2 of Section 27, Township 142 North, Range 87 West of the Fifth Principal Meridian, 20 feet in width, 10 feet on each side of a centerline described as follows:

Beginning at the east line of the southeast quarter of Section 27, Township 142 North, Range 87 West, at a point which bears N0°56'07"E a distance of 37.91 feet from the southeast corner of Section 27, Township 142N, Range 87W; thence N89°07'40"W a distance of 2894.69 feet more or less; to the POINT OF TERMINATION at a point which bears N89°58'50"E a distance of 2377.36 feet from the southwest corner of Section 27, Township 142N, Range 87W.

In Section 27, Township 142 North, Range 87 West of the Fifth Principal Meridian described as follows:

The facilities erected hereunder shall remain the property of the Cooperative. Cooperative shall have the right to inspect, rebuild, remove, repair, improve and make such changes, alterations, substitutions and additions in and to its facilities as Cooperative may from time to time deem advisable, including the right to increase or decrease the size or capacity of its system, together with necessary accessories and appurtenances; the right to increase or decrease the size of the facilities and equipment situated upon the premises; the right to permit or otherwise agree to the joint use or occupancy of the overhead lines or the trench and related underground facilities by other persons, associations or corporations; and the right to at any time use the property described above to extend lines and facilities to serve the property of persons other than the Owner.

Any damages to the surface of the right-of-way or to crops, fences, gates, drains, ditches, or lines of the Owner, caused by the Cooperative in the installation, repair maintenance, reconstruction or removal of said electrical properties and appurtenances, shall be promptly repaired, replaced or paid for by the Cooperative, provided a claim therefore is presented to the Cooperative at its General Office within ninety (90) days after such damages occur. If the amount of said damages cannot be agreed upon, the Cooperative and the Owner shall each select an arbitrator, and these two shall select a third arbitrator, and the decision and award of the arbitrators shall be final.

Cooperative shall at all times have the right to keep the easement clear of all buildings, structures or other obstructions, trees, shrubbery, undergrowth and roots.

Owner, his successors and assigns, may use the land within the easement for any purpose not inconsistent with the rights granted, provided such use does not interfere with or endanger the Cooperative's facilities or the rights granted under this easement.

For the purpose of constructing, inspecting, maintaining or operating its facilities, Cooperative shall have the right of ingress to and egress from the easement over the lands of Owner adjacent to the easement and lying between public or private roads and the easement, such right to be exercised in such manner as shall occasion the least practicable damage and inconvenience to Owner.

Owner covenants that he is seized of and has the right to convey the said easement, rights and privileges; that Cooperative shall have quiet and peaceable possession, use and enjoyment of the aforesaid easement, rights and privileges, and that Owner shall execute such further assurances thereof as may be requested by the Cooperative.

Kevin C. Kraft

Kevin Kraft

STATE OF NORTH DAKOTA)
)ss
COUNTY OF Oliver )

On this 24th day of February, 2016, before me, a Notary Public in and for said County and State personally appeared Kevin Kraft, known to me to be the person(s) described in and who executed the within and foregoing instrument and acknowledged to me that he/she/they executed the same.

*Notary Seal Location*

JOHN JANGULA
Notary Public
State of North Dakota
My Commission Expires May 15, 2021

Notary Public State of North Dakota

My Commission Expires: May 15, 2021

92449 3/15/2016 3:35 PM PAGE: 1 OF 2
BOOK: MM PAGE: 280 FEES: $13.00 MM EASEMENT
Kim Wilkens, OLIVER COUNTY RECORDER
By Linda Deputy

MOUNTAIN PLAINS LLC
JOSH MUEHLER, FIELD MANAGER
PO BOX 487
BISMARCK, ND 58502

STATE OF NORTH DAKOTA ☆ OLIVER COUNTY RECORDER SEAL

97094 8/10/2022 2:23 PM Total Pages: 1
BOOK: V V PAGE: 217 FEES: $20.00 RB RIGHT OF WAY
Mickie McNulty-Eide, OLIVER COUNTY RECORDER
By Rebecca Bethke, Deputy

RECORDER OLIVER SEAL COUNTY STATE OF NORTH DAKOTA

GREG SKALSKY
5654 23RD STREET SW

BEULAH, ND 58523

## RIGHT-OF-WAY EASEMENT

**ALL PERSONS TAKE NOTICE:**

In consideration of one dollar ($1.00) and other good and valuable consideration paid to Kevin Kraft 5651 23 St. SW Beulah ND 58523 hereinafter referred to as Grantor, by Greg Skalsky 5654 23 St. SW Beulah, ND 58523 does hereby grant, bargain, sell, transfer and convey unto the Grantee, its successor and assigns, a perpetual easement with right to erect, construct, install and lay, and thereafter use, operate, inspect, repair, maintain, replace, and remove water pipelines, connections, valves and all other appurtenant facilities used in connection with the construction, operation and maintenance of the of a water service line, over, above, across and through the land of the Grantor, situated in Oliver County, State of North Dakota, said land being described as follow South half section 27 township 142 North Range 87 west the South west corner of plot.

1. The easement shall be thirty (30) feet in width, fifteen (15) feet on each side of the center line of the pipeline as constructed.

2. The Grantee covenants to maintain the easement in good repair so that no unreasonable damage will result from its use to the adjacent land of the Grantor, his successors and assigns. The Grantee will pay for damages to growing crops caused by the activity or operation of the Grantee.

The grant and other provisions of this easement shall constitute a covenant running with the land for the benefit of the Grantee, its successors and assigns.

**IN WITNESS WHEREOF,** the Grantor has executed this instrument this 29 day of July, 2022.

Kevin E. Kraft GRANTOR K E Kraft GRANTOR

State of North Dakota )

County of Oliver )

Subscribed and sworn before me this 29th day of July, 2022.

JOSEPH SILVERIA
Notary Public
State of North Dakota
My Commission Expires Nov 7, 2023

Notary Public

North Dakota, County Burleigh

My Commission Expires: Nov 7th, 2023

COPY

**SOUTHWEST WATER AUTHORITY**
Southwest Pipeline Project Building
West Industrial Park
4665 2nd Street SW
Dickinson, ND 58601-7231
(701) 225-0241
Toll Free: 1-888-425-0241

Segment **7-9E WEST CENTER SERVICE AREA**
Parcel **142-87-21**

## RIGHT-OF-WAY EASEMENT

**ALL PERSONS TAKE NOTICE:**

In consideration of one dollar ($1.00) and other good and valuable consideration **KEVIN KRAFT 5651 23RD STREET SW BEULAH, ND 58523** hereinafter referred to as Grantor, does hereby grant, bargain, sell, transfer and convey to the Southwest Water Authority, hereinafter referred to as the Grantee, its successor and assigns, a perpetual easement with right to erect, construct, install and lay, and thereafter use, operate, inspect, repair, maintain, replace, and remove water pipelines, connections, valves and all other appurtenant facilities used in connection with the construction, operation and maintenance of the Southwest Pipeline Project, over, above, across and through the land of the Grantor, situated in **Oliver** County, State of North Dakota, said land being described as follows: **HOUSE AND 2 ACRES IN SE1/4 & SE1/4 SECTION 27 TOWNSHIP 142 RANGE 87** (the tract that contains **2.40** acres, more or less), together with the right of ingress and egress over the adjacent lands of the Grantor, successors and assigns for the purposes of this easement.

1. The permanent easement will be thirty (30) feet in width, fifteen (15) feet on each side of the center line of the pipeline as constructed, with an additional ten (10) feet of temporary right-of-way for a total construction easement width of forty (40) feet, twenty (20) feet on each side of the center line.

2. The Grantee covenants to maintain the easement in good repair so that no unreasonable damage will result from its use to the adjacent land of the Grantor, successors and assigns. The Grantor will receive compensation for damages to growing crops caused by the construction or operation. The Grantor will report any damages within three (3) years of the construction of the project.

The grant and other provisions of this easement shall constitute a covenant running with the land for the benefit of the Grantee, its successors and assigns.

**IN WITNESS WHEREOF,** the Grantor has executed this instrument this 6 day of February, 2014.

Kevin E. Kraft GRANTOR _____ GRANTOR

State of North Dakota

County of Oliver

On Feb 6, 2014, personally appeared before me Kevin E. Kraft

X whom I know personally.
_____ whose identity I verified on the basis of _____.
_____ whose identity I verified on the oath or affirmation of _____, a credible witness to be the signor of the above and he/she acknowledged that he/she signed it.

MELISSA WEIDNER
Notary Public
State of North Dakota
My commission expires Oct 3, 2019

Notary Public Melissa Weidner

Mercer, County ND

My Commission Expires: 10-3-19

**NORTH DAKOTA INDUSTRIAL COMMISSION**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case Nos. 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## DECLARATION OF CHARMAYNE LIEBELT

[¶1] I, Charmayne Liebelt, declare the following based on personal knowledge:

[¶2] I have ownership interest in the following property that lies within the boundaries of the proposed KJ Hintz Storage Facility.

- Township 143 North, Range 86 West
  Section 32: S1/2 SW1/4
  Oliver County, ND

[¶3] Attached are the deeds which I believe indicate my ownership in the property listed above.

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on the 3 day of June, 2024 at Aberdeen (City), SD (State), United States.

Charmayne Liebelt
Charmayne Liebelt (Jun 3, 2024 14:04 CDT)

Charmayne Liebelt

PR DEED $20.00 **3089206**
Page: 1 of 3
Lisa A. Guenther, Dunn County Recorder 8/1/2019 2:42 PM
By P. Hendricks, Deputy

RECORDER OF DUNN COUNTY
SEAL
STATE OF NORTH DAKOTA

# PERSONAL REPRESENTATIVE DEED OF DISTRIBUTION

THIS INDENTURE, Made this 3rd day of July, 2019, by and between CHARLOTTE A. LIEBELT, of PO Box 1832, Aberdeen, South Dakota 57402-1832, personal representative of the estate of Jonathan W.A. Liebelt, deceased, as Grantor, and CHARMAYNE LIEBELT, of PO Box 188, Aberdeen, South Dakota 57402-0188, and JONATHAN C. B. LIEBELT, of PO Box 2124, Aberdeen, South Dakota 57402-2124, as Grantees.

WITNESSETH:

WHEREAS, The Grantor is the duly appointed and acting personal representative of the estate of Jonathan W.A. Liebelt, deceased, whose date of death is June 26, 1999; and

WHEREAS, The Grantees are entitled to the following described property by virtue of the Last Will and Testament of Jonathan W.A. Liebelt, and the Disclaimer executed by Charlotte A. Liebelt, his wife.

NOW, THEREFORE, Grantor, as the personal representative of the estate of said decedent, does by this instrument, grant, convey, deed and set over to the Grantees named above, all of the right, title and interest of said decedent and his said estate in and to the following described real property situate in the State of North Dakota, to-wit:

**Dunn County, North Dakota:**

Township 145, Range 93
Section 26: SE¼
Section 35: NE¼

**Mercer County, North Dakota:**

Township 143, Range 88
Section 14: SE¼

Township 144, Range 87
Section 19: S½SE¼SW¼

Township 144, Range 88
Section 34: N½ (except portion north of road)

Township 143, Range 88
Section 24: NW¼

Lots Ten (10), Eleven (11), and Twelve (12), of Block Twelve (12), Original Townsite; and Fractional Lot One (1), Chaffee Parcel Addition to Beulah

**Oliver County, North Dakota:** Township 143, Range 86
Section 32: S½SW¼

Township 143, Range 87
Section 6: All

WITNESS, The hand of the Grantor:

_____
CHARLOTTE A. LIEBELT, Personal Representative of the Jonathan W.A. Liebelt Estate

STATE OF SOUTH DAKOTA )
) ss.
COUNTY OF Brown )

On this 3rd day of July, 2019, Charlotte A. Liebelt, being personally known to me, personally appeared before me and acknowledged that she executed the above Deed as personal representative of the estate of Jonathan W.A. Liebelt.

_____
Notary Public

I certify that the requirement for a report or statement of full consideration paid does not apply because this deed is for one of the transactions exempted by subdivision d of subsection 6, NDCC Section 11-18-02.2.

Grantee or Agent: _____ Date: 7-3-2019

This Deed was prepared by Arlen M. Ruff, of Kelsch, Ruff, Kranda, Nagle & Ludwig, 103 Collins Avenue, PO Box 1266, Mandan ND 58554-7266.

DUNN COUNTY OFFICIAL SEAL STATE OF NORTH DAKOTA

AUDITOR'S OFFICE
Dunn County, N. Dak.
Transfer entered this 1st
day of August 2019
Tracey Odegard
County Auditor
Deputy

3089206
Page: 3 of 3
$20.00
Lisa A. Guenther, Dunn County Recorder 8/1/2019 2:42 PM
PR DEED
By

FILED
OCT 21 1999
M. L. [illegible]
BROWN COUNTY Clerk of Court

STATE OF SOUTH DAKOTA ) IN CIRCUIT COURT
COUNTY OF BROWN ) FIFTH JUDICIAL CIRCUIT

* * * * * * * * * * * * *

In the Matter of the Estate of JONATHAN W. A. LIEBELT, Deceased. * PRO. 99-151

**LETTERS OF PERSONAL REPRESENTATIVE**

* * * * * * * * * * * * *

On October 21st, 1999, Charlotte A. Liebelt was appointed by this Court and qualified as Personal Representative of the estate of Jonathan W. A. Liebelt.

These Letters are issued as evidence of the appointment, qualification, and authority of Charlotte A. Liebelt to do and perform all acts authorized by law.

Issued October 21st, 1999.

BY THE COURT:

(COURT SEAL)

Clerk of the Circuit Court

By Jolene J. Legge Deputy

State of South Dakota )
County of Brown ) ss
I, Maria B. Zastrow, Clerk of the Circuit Court, do hereby certify that the within and foregoing is a full, true and complete copy of the original instrument, as the same appears on file in this office. The same is in full force and effect.
Dated this 18th day of July, 2019
Maria B. Zastrow
Maria B. Zastrow, Clerk of Courts, Brown County
By [illegible] Deputy

MORTGAGEE
MORTGAGOR
INDEXED ✓

Delinquent Taxes, Special Assessments, or Installments of Special Assessments Paid and Transfer Entered this 15th day of August, 2019.

Shana Brost
Mercer County Auditor
By: Amber Gabert
~~Deputy Auditor~~/Clerk

**STATE OF NORTH DAKOTA**
**COUNTY OF MERCER**

**218290**
**OFFICE OF**
**COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 8/15/2019 at 9:27 AM, and was duly recorded as Book 171 DEED on Page 3 Fee: $20.00

County Recorder Brenda L. Cook
By Deputy Heather A. Vigesaa
Return To: KELSCH, RUFF, KRANDA, NAGLE & LUDWIG, 103 COLL
PO BOX 1266 MANDAN, ND 58554-7266

COUNTY RECORDER SEAL MERCER COUNTY, N.DAK.

**94841** 8/21/2019 1:57 PM PAGE: **1** OF **4**
BOOK: ~~42~~ PAGE: 613 FEES: $20.00 RS PR Deed
Mickie McNulty-Eide, OLIVER COUNTY RECORDER
By ~~Rebecca Dishon~~ Deputy

RECORDER OLIVER SEAL COUNTY STATE OF NORTH DAKOTA

KELSCH, RUFF, KRANDA, NAGLE & LUDWIG
103 COLLINS AVENUE
PO BOX 1266
MANDAN, ND 58554

QUIT CLAIM DEED $20.00 **3089577** Page: 1 of 2
Lisa A. Guenther, Dunn County Recorder 9/10/2019 1:54 PM
By Shanna Sherlin, Deputy

RECORDER OF DUNN COUNTY SEAL STATE OF NORTH DAKOTA

# QUIT CLAIM DEED

THIS INDENTURE, Made this 5 day of September, 2019, between JONATHAN C. B. LIEBELT, a married person dealing in his sole and separate property, of PO Box 2124, Aberdeen, South Dakota 57402-2124, hereinafter "Grantor", and CHARMAYNE LIEBELT, of PO Box 188, Aberdeen, South Dakota 57402-0188, hereinafter "Grantee":

WITNESSETH, That Grantor, for and in consideration of the sum of One Dollar ($1.00) and other good and valuable consideration, in hand paid by Grantee, the receipt whereof is hereby acknowledged, does by these presents, BARGAIN, SELL, REMISE, RELEASE and QUIT-CLAIM unto Grantee, and to her heirs and assigns, FOREVER, all the right, title and interest in and to the following described lots, pieces or parcels of land situated in the State of North Dakota, and known and described as follows, to-wit:

**Dunn County, North Dakota:**

Township 145, Range 93
Section 26: SE¼
Section 35: NE¼

**Mercer County, North Dakota:**

Township 143, Range 88
Section 14: SE¼

Township 144, Range 87
Section 19: S½SE¼SW¼

Township 144, Range 88
Section 34: N½ (except portion north of road)

Township 143, Range 88
Section 24: NW¼

Lots Ten (10), Eleven (11), and Twelve (12), of Block Twelve (12), Original Townsite; and Fractional Lot One (1), Chaffee Parcel Addition to Beulah

**Oliver County, North Dakota:** Township 143, Range 86
Section 32: S½SW¼

Township 143, Range 87
Section 6: All

TO HAVE AND TO HOLD the above quit-claimed premises, together with all the hereditaments and appurtenances thereunto belonging or in anywise appertaining, to Grantee, her heirs and assigns, FOREVER

IN TESTIMONY WHEREOF, Grantor has hereunto set his hand and seal the day and year first above written.

JONATHAN C. B. LIEBELT

STATE OF SOUTH DAKOTA )
) ss.
COUNTY OF Brown )

On this 5th day of September, 2019, before me, a notary public, in and for said County and State, personally appeared Jonathan C. B. Liebelt, a married person dealing in his sole and separate property, known to me to be the person who is described in, and who executed the foregoing and within instrument and acknowledged to me that he executed the same.

RITA R. SCHILLE NOTARY Seal PUBLIC STATE OF SOUTH DAKOTA

Notary Public

I certify that the requirement for a report or statement of full consideration paid does not apply because this deed is for one of the transactions exempted by subdivision h of subsection 6, NDCC Section 11-18-02.2.

Grantee or Agent: _____ Date 09/05/2019

This Deed was prepared by Arlen M. Ruff, of Kelsch, Ruff, Kranda, Nagle & Ludwig, 103 Collins Avenue, PO Box 1266, Mandan ND 58554-7266.

DUNN COUNTY OFFICIAL SEAL STATE OF NORTH DAKOTA

AUDITOR'S OFFICE
Dunn County, N. Dak.
Transfer entered this 10th
day of September 2019
Tracey Odegal
County Auditor
Deputy

MORTGAGEE
MORTGAGOR
INDEXED ✓

Delinquent Taxes, Special Assessments, or Installments of Special Assessments Paid and Transfer Entered this 24th day of September, 2019.

Shana Brost
Mercer County Auditor
By: Amber Gobert
~~Deputy Auditor~~/Clerk

**218482**

**STATE OF NORTH DAKOTA** **OFFICE OF**
**COUNTY OF MERCER** **COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 9/24/2019 at 9:21 AM, and was duly recorded as Book 171 DEED on Page 173 Fee: $20.00

County Recorder Brenda L. Cook
By Deputy Heather A. Vigesaa
Return To: KELSCH, RUFF, KRANDA, NAGLE & LUDWIG, 103 COL
PO BOX 1266 MANDAN, ND 58554-7266

SEAL MERCER COUNTY, N.DAK

**94914** 10/3/2019 2:44 PM PAGE: **1** OF **3**
BOOK: 42 PAGE: 658 FEES: $20.00 RS QUIT CLAIM DEED
Mickie McNulty-Eide, OLIVER COUNTY RECORDER
By Rebecca Saxton, Deputy

RECORDER OLIVER SEAL COUNTY STATE OF NORTH DAKOTA

KELSCH, RUFF, KRANDA, NAGEL & LUDWIG
103 COLLINS AVE
PO BOX 1266
MANDAN, ND 58554

**NORTH DAKOTA INDUSTRIAL COMMISSION**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case Nos. 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## DECLARATION OF KIRK MAIZE

[¶1] I, Kirk Maize, declare the following statements based on personal knowledge:

[¶2] I have ownership interest in the following property that lies within the boundaries of the proposed TB Leingang Storage Facility.

- Township 141 North, Range 87 West
  Section 20: S1/2 SE1/4
  Oliver County, ND

[¶3] To the best of my knowledge, the property listed in ¶ 2 above is encumbered by the following easements:

- Minnesota Power Wind Project Easement Agreement executed by Kirk and Linda Maize on September 30, 2013 (88510).
- Southwest Water Authority Right-of-Way Easement executed by Kirk and Linda Maize on November 7, 2014 (89766).
- West River Telecommunications Right-of-Way Easement executed by Kirk and Linda Maize on May 2, 2017 (93550).

[¶4] Attached are the deeds which I believe indicate my ownership in the property listed above.

[¶5] Attached are the easements currently encumbering the property based on the information I have.

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on the 4th day of June, 2024 at Beulah, ND, United States.

Kirk Maize

Kirk Maize

94931 10/14/2019 11:35 AM PAGE: 1 OF 2
BOOK: 42 PAGE: 682 FEES: $20.00 RS WARRANTY DEED
Mickie McNulty-Eide, OLIVER COUNTY RECORDER
By Rebecca Nighton, Deputy

SOLEM LAW OFFICE
PO BOX 249

BEULAH, ND 58523

RECORDER OLIVER SEAL COUNTY STATE OF NORTH DAKOTA

# WARRANTY DEED

THIS INDENTURE, Made this 7th day of October, 2019, by and between **KIRK E. MAIZE, a/k/a KIRK MAIZE, and LINDA L. MAIZE, a/k/a LINDA MAIZE, husband and wife,** whose address is 5851 28th Street SW, Beulah, North Dakota 58523, Grantors, and **ALLEN MAIZE,** whose address is 510 3rd Avenue SE, Mandan, North Dakota 58554, Grantee.

WITNESSETH, For and in consideration of the sum of One Dollar ($1.00) and other good and valuable consideration, Grantors do hereby GRANT to the Grantee, all of the following real property lying and being in the County of Oliver and State of North Dakota, and described as follows, to-wit:

> **The South Half of the Southeast Quarter (S½SE¼) of Section Twenty (20), Township One Hundred Forty-One (141) North, Range Eighty-Seven (87) West of the Fifth Principal Meridian, Oliver County, North Dakota.**
>
> **The Grantors hereby except and reserve unto themselves jointly a life estate interest in and to the above described property for their lifetimes, and upon their deaths, the remainder interest shall pass to Allen Maize.**

SOLEM LAW OFFICE
109 CENTRAL AVENUE S
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail:beulaw@westriv.com

And the said Grantors, for themselves, their heirs, executors and administrators, do covenant with the Grantee, that they are well seized in fee of the land and premises aforesaid and have good right to sell and convey the same in manner and form aforesaid; that the same are free from all encumbrances, except mineral reservations and exceptions of record, and the above granted lands and premises in the quiet and peaceable possession of said Grantee, against all persons lawfully claiming or to claim the whole or any part thereof, the said Grantors will warrant and defend.

WITNESS, The hand of the Grantors:

I certify that the requirement for a report or statement of full consideration paid does not apply because this deed is for one of the transactions exempted by Subdivision c of Section 6 of NDCC 11-18-02.2.

**KIRK E. MAIZE**

**LINDA L. MAIZE**

DATED: Oct. 7, 2019

SIGNED: Agent

STATE OF NORTH DAKOTA )
)
COUNTY OF MERCER )

On this 7th day of October, 2019, before me, personally appeared **KIRK E. MAIZE and LINDA L. MAIZE,** known to me to be the persons who are described in, and who executed the within and foregoing instrument, and severally acknowledged that they executed the same.

**SUSAN NEUBERGER**
**Notary Public**
**State of North Dakota**
**My Commission Expires October 28, 2022**

NOTARY PUBLIC
MERCER COUNTY, NORTH DAKOTA

SOLEM LAW OFFICE
109 CENTRAL AVE S.
P.O. BOX 249
BEULAH, ND 58523
PH. (701) 873-5555
FAX (701) 873-4958
e-mail: beulaw@westriv.com

Auditor's Office
Oliver County, N.D.
transfer entered this 14th day of
October 2019
Judith Dmitz
County Auditor
By Linda Nelson Deputy

DOCUMENT NO. 73910

WARRANTY DEED

THIS INDENTURE, Made this 11th day of February, 1992, between ROWENE J. SKALSKY, Personal Representative of the Estate of John Rausch, Deceased, Grantor, whether one or more, and KIRK E. MAIZE and LINDA MAIZE, husband and wife, Grantee, whether one or more, whose post office address is Beulah, North Dakota 58523.

WITNESSETH, For and in consideration of the sum of One Dollar ($1.00), and other good and valuable consideration, Grantor does hereby GRANT to the Grantee, as joint tenants and not as tenants in common, all of the following real property lying and being in the County of Oliver, State of North Dakota, and described as follows, to-wit:

The South Half of the Southeast Quarter ($S\frac{1}{2}SE\frac{1}{4}$) of Section Twenty (20), Township One Hundred Forty-One (141) North, Range Eighty-Seven (87) West of the Fifth Principal Meridian.

EXCEPTING AND RESERVING unto the Estate of John Rausch, Deceased, all right, title and interest in and to any interest now owned by the decedent in and to all of the oil, gas, coal and other minerals, of any nature whatsoever, which may be found on or underlying said lands, together with the right of ingress and egress at all times for the purpose of mining, drilling, exploring, operating and developing said lands for said minerals and storing, handling, transporting and marketing the same therefrom;

FURTHER SUBJECT to all prior valid mineral reservations, conveyances, easements and leases now of record.

This deed is in fulfillment of a Contract for Deed dated February 17, 1984.

And the Grantor, as Personal Representative of the Estate of John Rausch, Deceased, does covenant with the Grantee that said decedent and said estate are well seized in fee of the land and premises aforesaid and have good right to sell and convey the same in manner and form aforesaid; that the same are free from all encumbrances, except installments of special assessments or assessments for special improvements which have not been certified to the County Treasurer for collection, and the above granted lands and premises in the quiet and peaceable possession of the Grantee, against all persons lawfully claiming or to claim the whole or any part thereof, the Grantor will warrant and defend.

WITNESS, the hand of the Grantor:

Rowene J. Skalsky

Rowene J. Skalsky, Personal Representative of the Estate of John Rausch, Deceased

STATE OF NORTH DAKOTA )
) ss.
COUNTY OF MORTON )

On this 11th day of February, 1992, before me personally appeared ROWENE J. SKALSKY, known to me to be the Personal Representative of the Estate of John Rausch, Deceased, and known to me to be the person described in, and who executed the within and foregoing instrument, and acknowledged that she executed the same as such Personal Representative.

Notary Public
State of North Dakota
My commission expires: 5/18/97

(SEAL)

I certify that the full consideration paid or to be paid for the property described in this deed is $45,000.

Signed: _____ Date: 3/4/92
Grantee or Agent

Auditor's Office
Oliver County, N.D.
transfer entered this 5 day of March 1992
Leland Ogden
County Auditor
By _____ Deputy

OFFICE OF REGISTER OF DEEDS
STATE OF NORTH DAKOTA
COUNTY OF OLIVER

Filed for record this 5 day of March A.D. 1992 at 9:34 o'clock A M.
and recorded as document No. 73910 in book 32 of Deeds page 109-110

Bernice C. Bornemann, Register of Deed
LaVerne Rabe, Deputy
fee $7.00

REGISTER OF DEEDS STATE OF NORTH DAKOTA SEAL OLIVER COUNTY



6.23

88510 10/3/2013 2:01 PM PAGE: 1 OF 5
BOOK: II PAGE: 676 FEES: $32.00 MM MEMORANDUM OF EASEI
Kim Wilkens, OLIVER COUNTY RECORDER
By Deputy

MINNESOTA POWER
ATTN: JILL HELMER
30 WEST SUPERIOR STREET
DULUTH, MN 55802

**MEMORANDUM OF EASEMENTS**

This Memorandum of Easements evidences a Wind Project Easement Agreement dated Sept. 30, 2013 by and between **Kirk E. Maize and Linda Maize, husband and wife** ("Owner"), as owner(s) of the real property described on attached **Exhibit A** ("Owner's Property") and Minnesota Power a division of ALLETE, Inc., a Minnesota corporation ("Minnesota Power" or "Developer") (the "Easement Agreement"). Capitalized terms used herein are given the same meaning as in the Easement Agreement.

The Easement Agreement provides, among other things, that for and in consideration of the payments therein provided for, and upon the terms, conditions, covenants, and provisions set forth at length therein, that Owner grants to Minnesota Power the following irrevocable and exclusive easements, covering all or portions of the Owner's Property, in connection with the development, construction, and operation of a wind energy project (individually each an "Easement" and collectively the "Easements"):

1. Turbine Site Easement
2. Access Easement
3. Collection Easement
4. Construction Easement
5. Wind Non-Obstruction Easement
6. Noise Easement
7. Overhang Easement
8. Met Tower Site Easement
9. Met Tower Access Easement

Attached as **Exhibit B** is a preliminary Easement Plan showing the approximate planned location of all Wind Project Improvements and Easements located on the Owner's Property. Within 180 days after completion of construction, Developer will deliver a final as-built Easement Plan to Owner showing the exact locations of all Wind Project Improvements as constructed on Owner's Property and all Easements. Such as-built Easement Plan (Exhibit C) will replace the attached Exhibit B and Developer may record Exhibit C in the public records.

The Easements are granted subject to Owner's retained right to use the affected portions of the Owner's Property for agricultural purposes that do not interfere with the Easements or the other rights granted to Developer in the Easement Agreement.

The Easement Agreement also provides as follows:

> "Owner grants Developer an irrevocable, exclusive easement for the right and privilege to use, maintain and capture the free and unobstructed flow of wind currents over and across the Owner's Property."
>
> And
>
> "Owner shall not engage in any activity on Owner's Property that might interfere with wind speed or wind direction over any portion of the Wind Project; cause a decrease in the output or efficiency of any Turbine or accuracy of any meteorological equipment; or otherwise interfere with Developer's operation of the Wind Project or exercise of any rights or the Easements granted in this Agreement"

Unless earlier terminated as provided therein, the Easement Agreement runs through November 30, 2064.

The Easements and any rights or obligations in the Easement Agreement run with the Owner's Property affected and are binding on, and inure to the benefit of, Owner and Developer and their respective mortgagees, successors and assigns, heirs, personal representatives, tenants, or persons claiming through them

Reference is hereby made to the Easement Agreement as to all remaining terms thereof. This Memorandum of Easements is prepared, signed, and acknowledged solely for recording purposes and does not modify, increase, decrease, or in any other way affect the rights, duties, and obligations of Owner or Minnesota Power under the Easement Agreement.

IN WITNESS WHEREOF, the parties hereto have executed this Memorandum of Easements effective the date set forth above:

OWNER:

**Kirk E. Maize**

**Linda Maize**

MINNESOTA POWER:

By: Bradley W. Oachs

Its: Chief Operating Officer

STATE OF North Dakota )
) SS.
COUNTY OF Mercer )

The foregoing instrument was acknowledged before me this 13th day of September, 2013, by **Kirk E. Maize and Linda Maize, husband and wife.**

Notarial Stamp or Seal

SCOTT MONROE
Notary Public
State of North Dakota
My Commission Expires April 24, 2014

Notary Public

STATE OF MINNESOTA )
) SS.
COUNTY OF ST. LOUIS )

The foregoing instrument was acknowledged before me this 30 day of Sept, 2013, by Bradley W. Oachs the Chief Operating Officer of Minnesota Power, a division of ALLETE, Inc., a Minnesota corporation, on behalf of the company.

Notarial Stamp or Seal

JILL S. HELMER
NOTARY PUBLIC - MINNESOTA
My Commission Expires Jan. 31, 2018

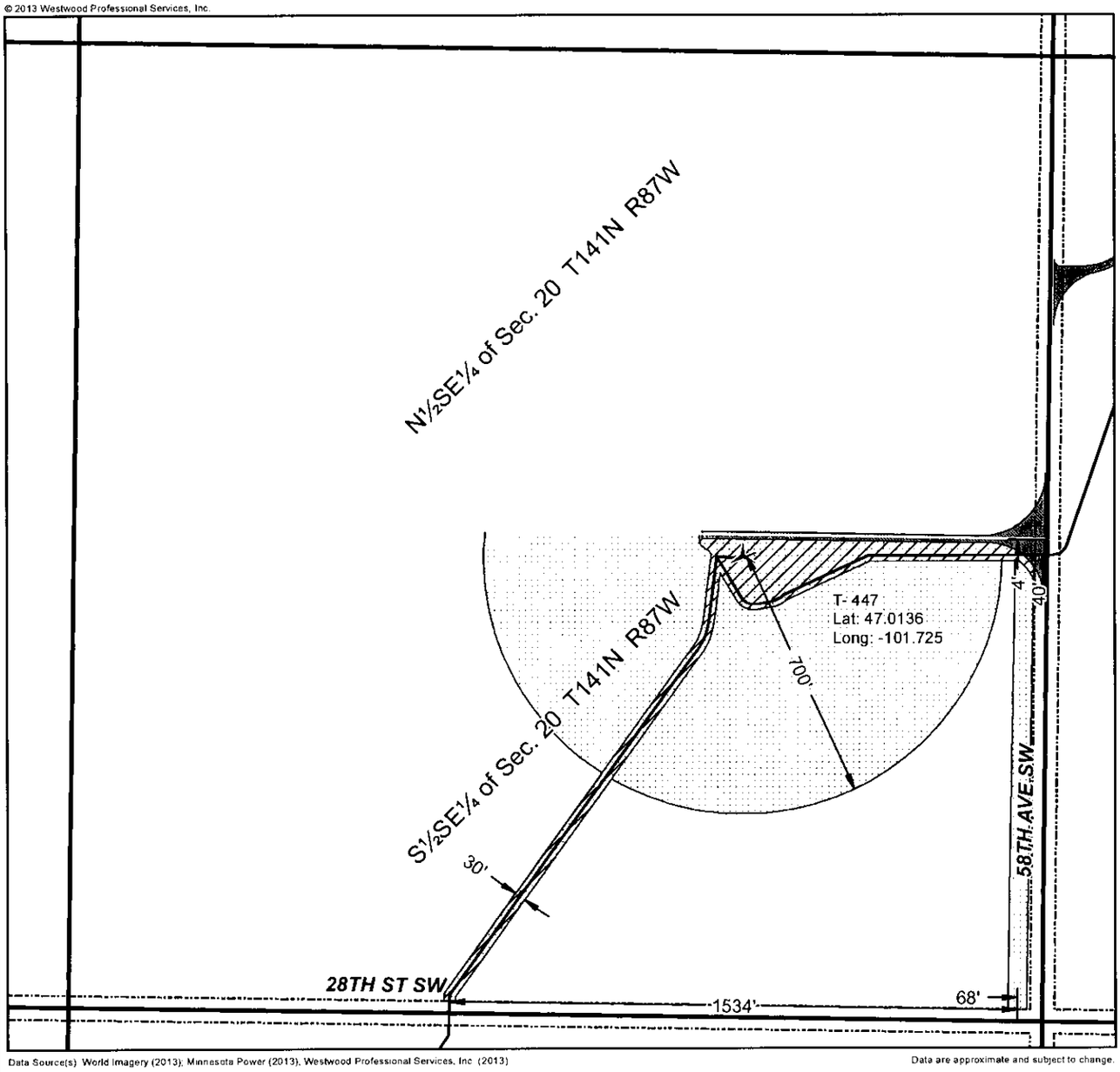
Notary Public

**THIS INSTRUMENT DRAFTED BY:**
Minnesota Power
30 W. Superior St.
Duluth, MN 55802

**EXHIBIT A**

**S½SE¼ of Section 20 T141N R87W**
**Oliver County, North Dakota, 5th Principal Meridian**

© 2013 Westwood Professional Services, Inc.




Data Source(s): World Imagery (2013); Minnesota Power (2013); Westwood Professional Services, Inc (2013)

Data are approximate and subject to change.

**Legend**

- Turbine
- Underground Collection Line
- Turbine Access Road
- Wind Project Improvement Easement
- Construction Easement
- Parcel & Lot Boundary
- ROW Limit
- 1/4 Section Line

| S½SE¼ of Sec. 20 T141N R87W | |
|---|---|
| Wind Project Improvement Easement | 3.12 Acres |

N

0 400 Feet

B4 - 43.2
Rev. A

Westwood

Westwood Professional Services, Inc.
7699 Anagram Drive
Eden Prairie, MN 55344

PHONE 952-937-5150
FAX 952-937-5822
TOLL FREE 1-888-937-5150

www.westwoodps.com

# Bison 4

Oliver County, ND

## Exhibit B - Easement Plan

Map Document: P:\0001265.00\GIS\130820\Bison4_Easement\Plan_SelectedQSecs_BW_130820_Pg43-2.mxd 8/20/2013 10:58:45 AM

89766 5/26/2015 2:34 PM PAGE: 1 OF 1
BOOK: KK PAGE: 355 FEES: $10.00 MM EASEMENT
Kim Wilkens, OLIVER COUNTY RECORDER
By MMMulty-Indr Deputy

SOUTHWEST WATER AUTHORITY
WEST INDUSTRIAL PARK
4665 2ND STREET SW
DICKINSON, ND 58601-7231

RECORDER OLIVER SEAL COUNTY STATE OF NORTH DAKOTA

**SOUTHWEST WATER AUTHORITY**
Southwest Pipeline Project Building
West Industrial Park
4665 2nd Street SW
Dickinson, ND 58601-7231
(701) 225-0241
Toll Free: 1-888-425-0241

Segment **7-9E WEST CENTER SERVICE AREA**
Parcel **141-87-15**

## RIGHT-OF-WAY EASEMENT

**ALL PERSONS TAKE NOTICE:**

In consideration of one dollar ($1.00) and other good and valuable consideration **KIRK MAIZE & Linda Maize 5851 28TH STREET SW BEULAH, ND 58523** hereinafter referred to as Grantor, does hereby grant, bargain, sell, transfer and convey to the Southwest Water Authority, hereinafter referred to as the Grantee, its successor and assigns, a perpetual easement with right to erect, construct, install and lay, and thereafter use, operate, inspect, repair, maintain, replace, and remove water pipelines, connections, valves and all other appurtenant facilities used in connection with the construction, operation and maintenance of the Southwest Pipeline Project, over, above, across and through the land of the Grantor, situated in **Oliver** County, State of North Dakota, said land being described as follows: **S1/2 SE1/4 SECTION 20 TOWNSHIP 141 RANGE 87** (the tract that contains **3.72** acres, more or less), together with the right of ingress and egress over the adjacent lands of the Grantor, successors and assigns for the purposes of this easement.

1. The permanent easement will be thirty (30) feet in width, fifteen (15) feet on each side of the center line of the pipeline as constructed, with an additional ten (10) feet of temporary right-of-way for a total construction easement width of forty (40) feet, twenty (20) feet on each side of the center line.

2. The Grantee covenants to maintain the easement in good repair so that no unreasonable damage will result from its use to the adjacent land of the Grantor, successors and assigns. The Grantor will receive compensation for damages to growing crops caused by the construction or operation. The Grantor will report any damages within three (3) years of the construction of the project.

The grant and other provisions of this easement shall constitute a covenant running with the land for the benefit of the Grantee, its successors and assigns.

**IN WITNESS WHEREOF,** the Grantor has executed this instrument this 7th day of November, 2014.

Kirk Maize GRANTOR Linda Maize GRANTOR

State of NORTH DAKOTA

County of MERCER

On November 7, 2014, personally appeared before me KIRK MAIZE
LINDA MAIZE

X whom I know personally.
_____ whose identity I verified on the basis of _____.
_____ whose identity I verified on the oath or affirmation of _____, a credible witness to be the signor of the above and he/she acknowledged that he/she signed it.

SUSAN NEUBERGER
Notary Public
State of North Dakota
My Commission Expires October 28, 2018

Notary Public Susan Neuberger
SUSAN NEUBERGER
State of North Dakota County of Mercer

My Commission Expires: _____

EXCH: BELH WO#: 2017-281-003

# *West River Telecommunications Right-of-Way Easement*

We the undersigned, (whether one or more) ***Kirk Maize and Linda Maize***, Grantor(s), do hereby grant and convey unto ***West River Telecommunications Cooperative***, a cooperative corporation (hereafter called the "Cooperative"), grantee, whose address is P.O. Box 467, Hazen, North Dakota, and its respective successors, assigns, lessees and agents, an easement to survey, construct, repair, operate, upgrade, maintain, relocate, replace and remove such communication systems as the grantee may from time to time require, consisting of but not limited to cables, wires, poles, splicing boxes, and other appurtenances, upon, over and under the land which the undersigned owns or in which the undersigned has any interest in the County of ***Oliver***, State of ***North Dakota***, and more particularly described as follows:

***SE/4 Sec. 20 T141N R87W***

also the right of ingress and egress over and across the lands of the undersigned for the purpose of exercising the rights herein granted; to place surface markers beyond said strip, to clear and keep clear all trees, roots, brush and other obstructions from the surface and subsurface of said strip of land. The boundary of said strip shall be a line parallel to and 10 feet either side of the first cable laid on the land of the undersigned. The undersigned for Grantor(s), their heirs, executors, administrators, successors, and assigns, hereby covenants that no structure shall be erected on said strip.

The undersigned agrees that all poles, wire and other facilities, including telephone equipment, installed on the above described land, shall remain the property of the Cooperative, removable at the option of the Cooperative. The undersigned agrees to this easement with the understanding the Grantor(s), their heirs, executors, administrators, successors, and assigns, may continue to have access to and use of the easement area in any manner consistent with the rights herein granted to the Cooperative, and that the Cooperative will restore the said strip to as near as reasonable to the pre-constructed condition, and that the Cooperative will erect no buildings on said strip.

The undersigned covenant that they are the owners of the above described lands and that the said lands are free and clear of encumbrances and liens of whatsoever character except those held by the following persons:

The term of this easement shall be for as long as needed by the grantee, and until a release of this easement is recorded, but to not extend beyond the maximum term authorized by law.

**93550** 6/22/2017 11:55 AM PAGE: **1** OF **2**
BOOK: OO PAGE: 200 FEES: $13.00 KW EASEMENT
Kim Wilkens, OLIVER COUNTY RECORDER
By K Wilkens

RECORDER OLIVER SEAL COUNTY STATE OF NORTH DAKOTA

WEST RIVER TELECOMMUNICATIONS
PO BOX 467

HAZEN, ND 58545

EXCH: BELH WO#: 2017-281-003

Access is hereby granted for a state or federal historical survey of the cable route, should one be required, unless checked. Access denied ☐

IN WITNESS WHEREOF, this instrument has been executed by the undersigned this the 2 day of May, 2017.

STATE OF North Dakota )
)
COUNTY OF ~~SK~~ OLIVER )

by: Linda Maize

by: Kirk Maize

On this 2 day of May, the year 2017 before me personally appeared Linda maize, Kirk maize, known to me to be the person(s) who is described in and who executed the within instrument, and acknowledged to me that he/she (or they) executed the same.

STEVEN C. KNUDSON
Notary Public
State of North Dakota
My Commission Expires Aug. 23, 2017

Steven C Knudson
Notary Public, County of Mercer
My Commission Expires: Aug. 23, 2017

IN WITNESS WHEREOF, this instrument has been executed by the undersigned this the ___day of _____, 2017.

STATE OF )
)
COUNTY OF )

by: _____

by: _____

On this _____ day of _____, the year _____ before me personally appeared _____, known to me to be the person(s) who is described in and who executed the within instrument, and acknowledged to me that he/she (or they) executed the same.

_____
Notary Public, County of _____
My Commission Expires:

**NORTH DAKOTA INDUSTRIAL COMMISSION**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case Nos. 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## DECLARATION OF CHRISTY METZ

[¶1] I, Christy Metz, declare the following based on personal knowledge:

[¶2] I have ownership interest in the following property that lies within the boundaries of the TB Leingang Storage Facility.

- Township 141 North, Range 87 West
  Section 4: Auditor's Lot 1, parcel in N1/2 SE1/4
  Oliver County, ND

[¶3] The property listed in ¶ 2 above is encumbered by the following easements:

- Oliver-Mercer Electric Cooperative, Inc. Right-of-Way Easement executed by Anna Skalsky on July 20, 1949 (91532).
- Roughrider Electric Cooperative, Inc. Right-of-Way Easement executed by Paul and Christie Metz on April 25, 2016 (92777).
- Southwest Water Authority Right-of-Way Easement.

[¶4] Attached are the deeds which I believe indicate my ownership in each of the properties listed above.

[¶5] Attached are the easements currently encumbering these properties based on the information I have.

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on the 06 day of 03 , 2024 at Beulahh, ND, United States.

Christy Metz
Christy Metz (Jun 3, 2024 17:44 CDT)

Christy Metz

## WARRANTY DEED

This deed is made by David L. Skalsky and Carol J. Skalsky, husband and wife, whose post office address is 7311 Badger Dr., Bismarck, ND 58503, and Leonard Hueske and Mary Hueske, husband and wife, whose post office address is P.O. Box 311, Richardton, ND 58652, **Grantors,** to Paul R. Metz and Christie E. Metz, husband and wife, as joint tenants, whose post office address is 2451 57th Ave SW, Beulah, ND 58523, **Grantees.**

For valuable consideration, Grantors grant and convey to Grantees the following real property located in Oliver County, North Dakota:

Auditor's Lot 1, a parcel of land in the N½ of the SE¼ of Section 4 Township 141 North Range 87 West of the Fifth Principal Meridian, Oliver County, North Dakota, more particularly described as follows:

Commencing at the East ¼ Corner said Section 4; thence S.00°03'34"E., 774.60', along the East Line of Said Section 4, to the Point of Beginning; thence continuing along the said East line S.00°03'34"E., 58.66'; thence N.63°25'13"W., 803.38'; thence S.01°13'58"E., 416.27'; thence S.74°08'23"W., 204.26'; thence N.61°33'16"W., 577.21'; thence N.60°45'05"W., 404.12'; thence N.01°56'26"W., 407.78'; thence N.89°47'04"E., 1045.86', thence S.01°48'11"E., 412.49'; thence S.63°30'12"E., 805.92', to the Point of Beginning and containing 18.88 acres more or less.

Subject to prior mineral reservations and conveyances, and other limitations of record.

This deed is given in full satisfaction of that Contract for Deed between the parties dated December 10, 2009, recorded in Book 38 of Deeds, pages 485-493.

The legal description was obtained from ☒ a previously recorded instrument ☐ or prepared by Steven G. Podoll of Lange & Donovan, PLLP, PO Box 488, Hazen, ND 58545.

Grantors covenant that they are well seized in fee of the premises, which they have the right to sell and convey, and which are free from encumbrances except those of record, and excepting installments of special assessments or assessments for special improvements which have not been certified to the County Auditor for collection. Further, they covenant that they will warrant and defend the premises in the quiet and peaceable possession of the Grantees.

Dated this 12th day of November, 2013.

GRANTORS:

David L. Skalsky

Carol J. Skalsky

State of North Dakota )
)ss.
County of Morton )

On this 12th day of November, 2013, before me, a notary public, personally appeared David L. Skalsky and Carol J. Skalsky, husband and wife, who acknowledged to me their execution of the foregoing instrument.

MCKENZIE CLOOTEN
Notary Public
State of North Dakota
My Commission Expires March 5, 2015

Notary Public

My Commission Expires: March 5, 2015

**GRANTORS:**

Leonard Hueske

Mary Hueske

State of North Dakota )
)ss.
County of Stark )

On this 12 day of November, 2013, before me, a notary public, personally appeared Leonard Hueske and Mary Hueske, husband and wife, who acknowledged to me their execution of the foregoing instrument.

SUSAN J. HOFF
Notary Public
State of North Dakota
My Commission Expires Mar. 8, 2019

Notary Public

My Commission Expires: 3/8/19

☐ I certify the requirement for a report of statement of full consideration paid does not apply because this deed is for one of the transactions exempted by Subdivision ___ of Subsection 7 of Section 11-18-02.2 NDCC.

☐ I certify that a report of the full consideration paid for the property described in this deed has been filed with the North Dakota State Board of Equalization.

☒ I certify that the full consideration paid for the property described in the deed is $ 107,000.00 .

(Check and complete one paragraph above.)

Signed: _____
(GRANTEE OR AGENT)

Dated: 11-15-13

88676 11/25/2013 3:25 PM PAGE: 1 OF 3
BOOK: 40 PAGE: 87 FEES: $16.00 MM WARRANTY DEED
Kim Wilkens, OLIVER COUNTY RECORDER
By Linda Nelson Deputy

MERCER COUNTY ABSTRACT
PO BOX 1003
614 4TH AVE, NE
HAZEN, ND 58545

RECORDER OLIVER COUNTY SEAL STATE OF NORTH DAKOTA

Auditor's Office
Oliver County, N.D.
transfer entered this 25th day of
November 2013
Judith Hintz
County Auditor
By Linda Nelson Deputy

95093 1/21/2020 8:29 AM PAGE: 1 OF 4
BOOK: RR PAGE: 11 FEES: $20.00 RS ASSIGNMENT
Mickie McNulty-Eide, OLIVER COUNTY RECORDER
By Rebecca Sheldon Deputy

RECORDER OLIVER SEAL COUNTY STATE OF NORTH DAKOTA

VISIONET SYSTEMS
183 INDUSTRY DRIVE

PITTSBURGH, PA 15275

File Number: OS3300-19043751

After Recording, Send To:

TITLE 365
345 Rouser Road, Bldg 5, Ste 300
Coraopolis, PA 15108

**PROPERTY APPRAISAL (TAX/APN) PARCEL IDENTIFICATION NUMBER 01016002 and 01016001**

## QUITCLAIM DEED

**Paul R. Metz** and **Christine E. Metz who erroneously took title as Christie E. Metz**, husband and wife, hereinafter grantors, whose tax-mailing address is **2451 57th Avenue Southwest, Beulah, ND 58523**, for $1.00 (One Dollar and Zero Cents) in consideration paid, grant and quitclaim to **Paul R. Metz** and **Christine E. Metz**, husband and wife as joint tenants, hereinafter grantees, whose tax mailing address is **2451 57th Avenue Southwest, Beulah, ND 58523**, with quitclaim covenants, all right, title, interest and claim to the following land in the following real property:

**The land hereinafter referred to is situated in the City of Beulah, County of Oliver, State of ND, and is described as follows: Auditor's Lot 1, a parcel of land in the N ½ of the SE ¼ of Section 4 Township 141 North, Range 87 West of the Fifth Principal Meridian, Oliver County, North Dakota, more particularly described as follows: Commencing at the East ¼ corner said Section 4; thence S. 00° 03' 34" E, 774.60', along the East Line of said Section 4, to the point of beginning; thence continuing along the said East line S.00° 03' 34" E., 58.66'; thence N. 63° 25' 13" W., 803.38'; thence S. 01° 13' 58" E., 416.27'; thence S. 74° 08' 23" W., 204.26'; thence N. 61° 33' 16" W, 577.21'; thence N. 60° 45' 05" W., 404.12'; thence N. 01° 56' 26" W., 407.78'; thence N. 89° 47' 04" E., 1045.86', thence S. 01° 48' 11" E., 412.49'; thence S. 63° 30' 12" E., 805,92', to the point of beginning and containing 18.88 acres more or less. Being the same**

**property conveyed from David L. Skalsky and Carol J. Skalsky, husband and wife and Leonard Hueske and Mary Hueske, husband and wife to Paul R. Metz and Christie E. Metz, husband and wife as joint tenants by deed dated November 12, 2013 and recorded November 25, 2013 in Instrument Number 88676 in Book 40 Page 87, of Official Records. APN: 01016002 APN: 01016001**
**Property Address is: 2451 57th Avenue Southwest, Beulah, ND 58523**

Prior instrument reference: **88676**

The real property described above is conveyed subject to and with the benefit of: All easements, covenants, conditions and restrictions of record; in so far as in force applicable.

The real property described above is conveyed subject to the following: All easements, covenants, conditions and restrictions of record; All legal highways; Zoning, building and other laws, ordinances and regulations; Real estate taxes and assessments not yet due and payable; Rights of tenants in possession.

TO HAVE AND TO HOLD the same together with all and singular the appurtenances thereunto belonging or in anywise appertaining, and all the estate, right, title interest, lien equity and claim whatsoever of the said grantors, either in law or equity, to the only proper use, benefit and behalf of the grantees forever.

Executed by the undersigned on January 10, 2020:

**Paul R. Metz**

STATE OF North Dakota
COUNTY OF Oliver

The foregoing instrument was acknowledged before me on January 10, 2020 by **Paul R. Metz** who is personally known to me or has produced his Drivers License as identification, and furthermore, the aforementioned person has acknowledged that his/her signature was his/her free and voluntary act for the purposes set forth in this instrument.

Notary Public

BRENDA D ALEMAN
Notary Public
STATE OF NORTH DAKOTA
My Commission Expires
July 03, 2021

Executed by the undersigned on January 10, 2020:

Christine E. Metz
**Christine E. Metz**

STATE OF North Dakota
COUNTY OF Oliver

The foregoing instrument was acknowledged before me on January 10, 2020 by **Christine E. Metz** who is personally known to me or has produced her Drivers License as identification, and furthermore, the aforementioned person has acknowledged that his/her signature was his/her free and voluntary act for the purposes set forth in this instrument.

BRENDA D ALEMAN
Notary Public
STATE OF NORTH DAKOTA
My Commission Expires
July 03, 2021

Notary Public

The grantees hereby certifies that the full consideration paid for the property described above is $1.00.

Signature of Grantee

Paul R. Metz
Paul R. Metz

Signature of Grantee

Christine E. Metz
Christine E. Metz

This instrument prepared by:
Jay A. Rosenberg, Esq., Rosenberg LPA, Attorneys At Law, 3805 Edwards Road, Suite 550, Cincinnati, Ohio 45209 (513) 247-9605 Fax: (866) 611-0170.

01522

FORM LE-189 R

RIGHT OF WAY EASEMENT

KNOW ALL MEN BY THESE PRESENTS, that we the undersigned, (Whether one or more) Anna Skalsky

Widow (unmarried) (~~husband and wife~~), for a good and valuable consideration, the receipt whereof is hereby acknowledged, do hereby grant unto Oliver Mercer Electric Cooperative, Inc., a cooperative corporation, (hereinafter called the "Cooperative"), whose post office address is Hazen, North Dakota, and to its successors or assigns, the right to enter upon the lands of the undersigned, situated in the County of Oliver, State of North Dakota, and more particularly described as follows:

A tract of land approximately ---------- acres in area, located ----------miles in a ---------- direction from the town of ----------, and further described as being in the

SW4 Section 3 Township 141 Range 87

S½NE4 & N½SE4 Section 4 Township 141 Range 87

---------- Section ---------- Township ---------- Range ----------

---------- Section ---------- Township ---------- Range ----------

and to contract, operate and maintain on the above described lands, and/or in or upon all streets, roads or highways abutting said lands, an electric transmission or distribution line or system, and to cut and trim trees and shrubbery that may interfere with or threaten to endanger the operation and maintenance of said line or system.

The undersigned agree that all poles, wires, and other facilities, including any main service entrance equipment , installed on the above described lands at the Cooperative's expense shall remain the property of the Cooperative, removable at the option of the Cooperative, upon the termination of service to or on said lands.

The undersigned covenant that they are the owners of the above described lands and that the said lands are free and clear of encumberances and liens of whatsoever character except those held by the following persons:

IN WITNESS WHEREOF, the undersigned have set their hands and seals this 20 day of July 1949.

---------- (L.S.)

Mrs Anna Skalsky (L.S.)

Signed, sealed and delivered in the presence of:

Harold Henke

91532 10/8/2015 4:13 PM PAGES 1 OF 1 EASEMENT
BOOK: LL PAGE: 466 FEES: $13.00
Kim Wilkens, OLIVER COUNTY RECORDER
By

RECORDER OLIVER COUNTY NORTH DAKOTA SEAL

(1)
STATE OF NORTH DAKOTA
COUNTY OF Oliver SS.

Harold Henke being first duly sworn says that he is one of the witnesses to the above and foregoing easements, that

Anna Skalsky ( a widow) and

whose names is and/or are subscribed to the above and foregoing instruments as a party is and/or are the persons described in said easement and that she signed said instrument in my presence and that I in their presence signed name thereto as a subscribing witness.

Harold Henke

SUBSCRIBED and sworn to before me this 21 day of July 1949.

Frank J Belinskey

Notary Public in and for the
County of Mercer and
State of North Dakota.

FRANK J. BELINSKEY NOTARY PUBLIC STATE OF NORTH DAKOTA

My commission expires March 24, 1953

(1)
STATE OF NORTH DAKOTA
COUNTY OF Oliver SS.

On this 21 day of July 1949 before me Frank J. Belinskey a Notary Public within and for the State of North Dakota, personally appeared

Harold Henke known to me to be one of the persons who subscribed his name to the above and foregoing instrument as a witness, and who acknowledged to me that he subscribed his name thereto as such witness, and who proved to me that the person who and/or whose names are subscribed to the foregoing instrument are the persons described in it.

Frank J Belinskey

Notary Public in and for the
County of Mercer and
State of North Dakota.

FRANK J. BELINSKEY NOTARY PUBLIC STATE OF NORTH DAKOTA

My commission expires March 24, 1953

My commission expires _____.

STATE OF NORTH DAKOTA
COUNTY OF _____ SS.

On this _____ day of _____ 19___, before me _____

_____, a Notary Public in and for said County and State,

personally appeared _____ and _____
known to me to be the persons _____ who _____ described in and who executed within and foregoing instrument and acknowledged to me that he executed the same.

_____

Notary Public in and for the
County of _____ and
State of North Dakota.

My commission expires _____.

ROUGHRIDER ELECTRIC COOPERATIVE
800 HWY DR

HAZEN, ND 58545

# RIGHT OF WAY EASEMENT

THIS AGREEMENT made and entered into this 25th day of April, 2016, between Paul Metz and Christie Metz of 2451 57th Ave SW, Beulah, ND 58523, hereinafter called "Owner" (whether one or more) and ROUGHRIDER ELECTRIC COOPERATIVE, INC., whose post office address is 800 Highway Drive, Hazen, North Dakota 58545-4737, hereinafter called "COOPERATIVE".

WITNESSETH that for valuable consideration, the receipt and sufficiency of which is hereby acknowledged, Owner grants unto Cooperative, its successors and assigns, for a term of 99 years from the date hereof, an easement to construct, reconstruct, operate and maintain an electric distribution system, overhead, underground or both including all poles, guys, anchors wires, surface terminals, and all accessories and appurtenances necessary or desirable in connection therewith, under, over, upon and across lands of Owner and/or in or upon all streets, roads or highways abutting said lands situated in Oliver County, North Dakota, and more particularly described as follows, to-wit:

A parcel of land in the SE1/4 of Section 4, Township 141 North, Range 87 West of the Fifth Principal Meridian, 20 feet in width, 10 feet on each side of a centerline described as follows:

Beginning at the north line of Lot "A" in Section 4, Township 141 North, Range 87 West at a point which bears S3°54'37"W a distance of 755.50 feet from the east quarter corner of Section 4, Township 141N, Range 87W; thence S0°49'11"W a distance of 58.39 feet more or less; to the POINT OF TERMINATION at the south line of Lot "A" in Section 4, Township 141N, Range 87W at a point which bears N0°27'54"W a distance of 1809.76 feet from the southeast corner of Section 4, Township 141N, Range 87W.

In Section 4, Township 141 North, Range 87 West of the Fifth Principal Meridian described as follows:

The facilities erected hereunder shall remain the property of the Cooperative. Cooperative shall have the right to inspect, rebuild, remove, repair, improve and make such changes, alterations, substitutions and additions in and to its facilities as Cooperative may from time to time deem advisable, including the right to increase or decrease the size or capacity of its system, together with necessary accessories and appurtenances; the right to increase or decrease the size of the facilities and equipment situated upon the premises; the right to permit or otherwise agree to the joint use or occupancy of the overhead lines or the trench and related underground facilities by other persons, associations or corporations; and the right to at any time use the property described above to extend lines and facilities to serve the property of persons other than the Owner.

Any damages to the surface of the right-of-way or to crops, fences, gates, drains, ditches, or lines of the Owner, caused by the Cooperative in the installation, repair maintenance, reconstruction or removal of said electrical properties and appurtenances, shall be promptly repaired, replaced or paid for by the Cooperative, provided a claim therefore is presented to the Cooperative at its General Office within ninety (90) days after such damages occur. If the amount of said damages cannot be agreed upon, the Cooperative and the Owner shall each select an arbitrator, and these two shall select a third arbitrator, and the decision and award of the arbitrators shall be final.

Cooperative shall at all times have the right to keep the easement clear of all buildings, structures or other obstructions, trees, shrubbery, undergrowth and roots.

Owner, his successors and assigns, may use the land within the easement for any purpose not inconsistent with the rights granted, provided such use does not interfere with or endanger the Cooperative's facilities or the rights granted under this easement.

For the purpose of constructing, inspecting, maintaining or operating its facilities, Cooperative shall have the right of ingress to and egress from the easement over the lands of Owner adjacent to the easement and lying between public or private roads and the easement, such right to be exercised in such manner as shall occasion the least practicable damage and inconvenience to Owner.

92777 8/2/2016 3:20 PM PAGE: 1 OF 2
BOOK: MM PAGE: 714 FEES: $13.00 KW EASEMENT
Kim Wilkens, OLIVER COUNTY RECORDER
By MM Multy - Ed Deputy

STATE OF NORTH DAKOTA ★ RECORDER OLIVER COUNTY SEAL

**Owner covenants that he is seized of and has the right to convey the said easement, rights and privileges; that Cooperative shall have quiet and peaceable possession, use and enjoyment of the aforesaid easement, rights and privileges, and that Owner shall execute such further assurances thereof as may be requested by the Cooperative.**

Paul Metz

Christie Metz

**STATE OF NORTH DAKOTA)**
**)ss**
**COUNTY OF Olivec )**

**On this** 25th **day of** April, **20** 16, **before me, a Notary Public in and for said County and State personally appeared** Paul + Christie Metz, **known to me to be the person(s) described in and who executed the within and foregoing instrument and acknowledged to me that he/she/they executed the same.**

***Notary Seal Location***

JOHN JANGULA
Notary Public
State of North Dakota
My Commission Expires May 15, 2021

**Notary Public State of North Dakota**

**My Commission Expires:** May 15, 2021

MOUNTAIN PLAINS LLC
JOSH MUEHLER, FIELD MANAGER
PO BOX 487
BISMARCK, ND 58502

# NOTICE OF RURAL WATER LINES
# AND EASEMENTS FOR RURAL WATER LINES

Take notice that the Southwest Water Authority, with offices at 4665 2nd Street SW, West Industrial Park, Dickinson, North Dakota 58601, a political subdivision created by the North Dakota Legislature in 1991 to provide water to southwestern North Dakota, has executed water service agreements requiring water users to grant easements on lands which they own, and has obtained easements for water pipelines, and has installed water delivery facilities on certain lands in Oliver County.

Maps, easements, and water service agreements for these facilities are located at the Southwest Water Authority office and are available for inspection during normal office hours.

Said easements or facilities are located on the following described lands and are shown on the maps attached hereto.

89527 2/12/2015 11:42 AM PAGE: 1 OF 13
BOOK: KK PAGE: 145 FEES: $165.00 MM NOTICE OF RURAL WA
Kim Wilkens, OLIVER COUNTY RECORDER
By MMNulty Eule Deputy

Dated this 29th day of January, 2015.

Larry Bares

Larry Bares
Chairman of the Board
Southwest Water Authority

RECORDER OLIVER COUNTY SEAL STATE OF NORTH DAKOTA

Subscribed and sworn to me this 29th day of January, 2015.

Roger A. Kolling
Notary Public
Burleigh County, North Dakota

ROGER A. KOLLING
Notary Public
State of North Dakota
My Commission Expires Sept. 2, 2016

My Commission Expires:

ND STATE WATER COMMISSION
ROGER KOLLING
900 E BOULEVARD AVE, DEPT 770
BISMARCK, ND 58505-0850

# Easements Obtained in Oliver County

### Township 141 North - Range 87 West 5th P.M.

| | |
|---|---|
| Section 1 | S½ NW¼ and NW¼ NW¼, N½ SW¼ and SE¼ SW¼, S½ SE¼ |
| Section 2 | NE¼ NE¼ |
| Section 3 | S½ SW¼ and NW¼ SW¼, SW¼ SE¼ |
| Section 4 | E½ NE¼, NE¼ SE¼ |
| Section 10 | N½ NE¼ |
| Section 12 | NE¼ NE¼ |

### Township 142 North - Range 84 West 5th P.M.

| | |
|---|---|
| Section 2 | NW¼ NW¼, SW¼ SW¼ |
| Section 3 | E½ NE¼, E½ SE¼ |
| Section 4 | W½ NW¼, W½ SW¼ |
| Section 5 | E½ SE¼ |
| Section 7 | SW¼ SW¼ |
| Section 8 | N½ NE¼ |
| Section 9 | W½ NW¼, W½ SW¼ |
| Section 10 | E½ NE¼, S½ SW¼, E½ SE¼ and SW¼ SE¼ |
| Section 11 | N½ NW¼, N½ NE¼, S½ SW¼, SW¼ SE¼ |
| Section 12 | NW¼ NW¼ |
| Section 14 | NE¼ NW¼ |
| Section 15 | E½ NE¼ and SW¼ NE¼, NE¼ SE¼ |
| Section 16 | W½ NW¼, W½ SW¼ |
| Section 17 | NE¼ NE¼ |
| Section 18 | S½ SE¼ |
| Section 19 | N½ NE¼ and SE¼ NE¼, E½ SE¼ |
| Section 20 | NW¼ NW¼ |
| Section 21 | NW¼ NW¼ |
| Section 29 | NW¼ NW¼ |
| Section 30 | NE¼ NE¼ |

### Township 142 North - Range 85 West 5th P.M.

| | |
|---|---|
| Section 2 | S½ NW¼, SW¼ NE¼, S½ SW¼, SW¼ SE¼ |
| Section 3 | E½ NE¼, E½ SE¼ |
| Section 4 | SE¼ NE¼, E½ SE¼ |
| Section 8 | SE¼ NE¼, E½ SE¼ |
| Section 9 | NE¼ NE¼ |
| Section 10 | N½ NW¼, N½ NE¼ and SE¼ NE¼, E½ SE¼ |
| Section 12 | SE¼ NW¼, NE¼ SW¼, W½ SE¼ and SE¼ SE¼ |
| Section 13 | E½ NE¼, E½ SE¼ and SW¼ SE¼ |
| Section 14 | N½ NW¼, N½ NE¼, NW¼ SW¼ |
| Section 15 | E½ NE¼, E½ SE¼ |
| Section 16 | SW¼ NW¼, NW¼ SW¼ |
| Section 17 | E½ NE¼, E½ SE¼ |
| Section 18 | SE¼ NW¼, E½ SW¼ |
| Section 19 | NE¼ NW¼ |
| Section 20 | NE¼ NE¼ |
| Section 21 | W½ NW¼, W½ SW¼ |
| Section 22 | NE¼ NE¼ |
| Section 23 | NW¼ NW¼, S½ SW¼, SW¼ SE¼ |
| Section 24 | NW¼ NW¼, N½ NE¼ |

### Township 142 North - Range 85 West 5th P.M. (continued)

| | |
|---|---|
| Section 26 | NE¼ NW¼, N½ NE¼, SW¼ SW¼ |
| Section 27 | S½ SW¼, S½ SE¼ |
| Section 28 | N½ NW¼ and SW¼ NW¼, N½ NE¼, SE¼ SE¼ |
| Section 34 | NE¼ SE¼ |
| Section 35 | NW¼ SW¼ |

### Township 142 North - Range 86 West 5th P.M.

| | |
|---|---|
| Section 1 | SW¼ SW¼ |
| Section 2 | E½ NE¼, E½ SE¼ |
| Section 3 | SE¼ SW¼ |
| Section 10 | N½ NW¼, N½ NE¼ |
| Section 11 | N½ NW¼, N½ NE¼ and SE¼ NE¼, E½ SE¼ |
| Section 12 | NW¼ NW¼ |
| Section 13 | SW¼ NW¼, W½ SW¼ |
| Section 14 | E½ NE¼, SE¼ SE¼ |
| Section 16 | SW¼ SW¼ |
| Section 20 | SE¼ SE¼ |
| Section 21 | NW¼ NW¼, S½ SW¼, S½ SE¼ and NE¼ SE¼ |
| Section 22 | W½ NW¼ and NE¼ NW¼, W½ SW¼ |
| Section 23 | NE¼ NE¼ |
| Section 24 | W½ NW¼, NE¼ NE¼, S½ SW¼ and NW¼ SW¼, S½ SE¼ |
| Section 25 | E½ NE¼ |
| Section 27 | W½ NW¼ |
| Section 29 | E½ NE¼ and SW¼ NE¼ |

### Township 142 North - Range 87 West 5th P.M.

| | |
|---|---|
| Section 5 | NW¼ NW¼ |
| Section 6 | NE¼ NE¼ |
| Section 22 | NE¼ SE¼ |
| Section 23 | W½ NW¼, W½ SW¼ |
| Section 26 | W½ NW¼, W½ SW¼ and SE¼ SW¼ |
| Section 27 | S½ SW¼, S½ SE¼ and NW¼ SE¼ |
| Section 28 | S½ SE¼ |
| Section 33 | E½ NE¼, E½ SE¼ |
| Section 34 | NW¼ SW¼ |
| Section 35 | E½ NW¼, N½ NE¼ |
| Section 36 | W½ NW¼, W½ SW¼ |

### Township 143 North - Range 83 West 5th P.M.

| | |
|---|---|
| Section 18 | S½ SW¼ and NW¼ SW¼ |
| Section 19 | NE¼ NW¼ |

**Township 143 North - Range 84 West 5th P.M.**

Section 14 W½ NW¼, W½ SW¼
Section 18 S½ SW¼, SW¼ SE¼
Section 22 W½ SW¼, SE¼ SE¼
Section 23 N½ NW¼ and SW¼ NW¼, N½ NE¼, W½ SW¼
Section 24 N½ NW¼, N½ NE¼
Section 26 NW¼ NW¼
Section 27 N½ NW¼, N½ NE¼ and SE¼ NE¼, E½ SE¼
Section 28 SW¼ SW¼
Section 29 SE¼ SE¼
Section 32 E½ SW¼, E½ SE¼ and SW¼ SE¼
Section 33 W½ NW¼, W½ SW¼
Section 34 E½ NE¼ and SW¼ NE¼, E½ SE¼
Section 35 SW¼ SW¼

**Township 143 North - Range 85 West 5th P.M.**

Section 1 S½ SW¼ and NW¼ SW¼, SW¼ SE¼
Section 2 W½ NW¼, SE¼ NE¼, W½ SW¼, E½ SE¼
Section 3 SE¼ NE¼
Section 4 SW¼ NW¼, N½ SW¼ and SW¼ SW¼, N½ SE¼
Section 5 S½ NE¼
Section 8 SE¼ SE¼
Section 9 W½ NW¼, W½ SW¼ and SE¼ SW¼, S½ SE¼
Section 11 N½ NW¼ and SW¼ NW¼, N½ NE¼, W½ SW¼
Section 13 S½ SW¼ and NW¼ SW¼, S½ SE¼
Section 14 N½ NW¼, N½ NE¼ and SE¼ NE¼, E½ SE¼
Section 15 N½ NW¼ and SW¼ NW¼, N½ NE¼ and SE¼ NE¼, E½ SE¼
Section 16 NE¼ NE¼
Section 22 E½ NE¼, E½ SE¼
Section 27 SW¼ NW¼, E½ NE¼, S½ SW¼ and NW¼ SW¼, S½ SE¼ and NE¼ SE¼
Section 28 N½ NE¼ and SE¼ NE¼, SE¼ SW¼, SE¼ SE¼
Section 30 SE¼ SE¼
Section 31 NE¼ NE¼
Section 32 N½ NW¼, N½ NE¼
Section 33 N½ NW¼, N½ NE¼
Section 34 NW¼ NW¼, E½ NE¼, SE¼ SW¼, S½ SE¼ and NE¼ SE¼,
Section 35 NW¼ NW¼, SW¼ SW¼

**Township 143 North - Range 86 West 5th P.M.**

Section 26 SE¼ SE¼
Section 35 E½ NE¼, E½ SE¼

**Township 143 North - Range 87 West 5th P.M.**

Section 27 SW¼ SW¼
Section 28 S½ SW¼, S½ SE¼
Section 29 NW¼ NW¼, S½ SW¼, S½ SE¼
Section 30 E½ NE¼, S½ SW¼ and NW¼ SW¼, S½ SE¼ and NE¼ SE¼
Section 31 E½ NE¼, NE¼ SE¼
Section 32 W½ SW¼
Section 33 NE¼ NW¼, NE¼ NE¼
Section 34 W½ NW¼

Proud Sponsor of Children's Miracle Network Hospitals Foundation
Sears Hearing Aid Centers
What will your miracle sound like?
Miracle Ear Center at Sears
1-29 & 13th Ave. S. West Acres RSC Fargo, ND 58103 (701) 277-1478 1-800-279-1569
2800 S. Columbia Rd Columbia Mall Grand Forks, ND 58201 (701) 772-5313 1-888-721-6041
2400 10th St. SW Dakota Square Minot, ND 58701 (701) 852-1897 1-800-272-7628
2700 State St. Gateway Mall Bismarck, ND 58501 (701) 222-2484 1-888-313-0832
Miracle Ear - Dickinson
669 12th St. West • Dickinson, ND 58601 • (701) 483-3588 • 1-866-396-8388

# MAP OF T 141 N R 87 W

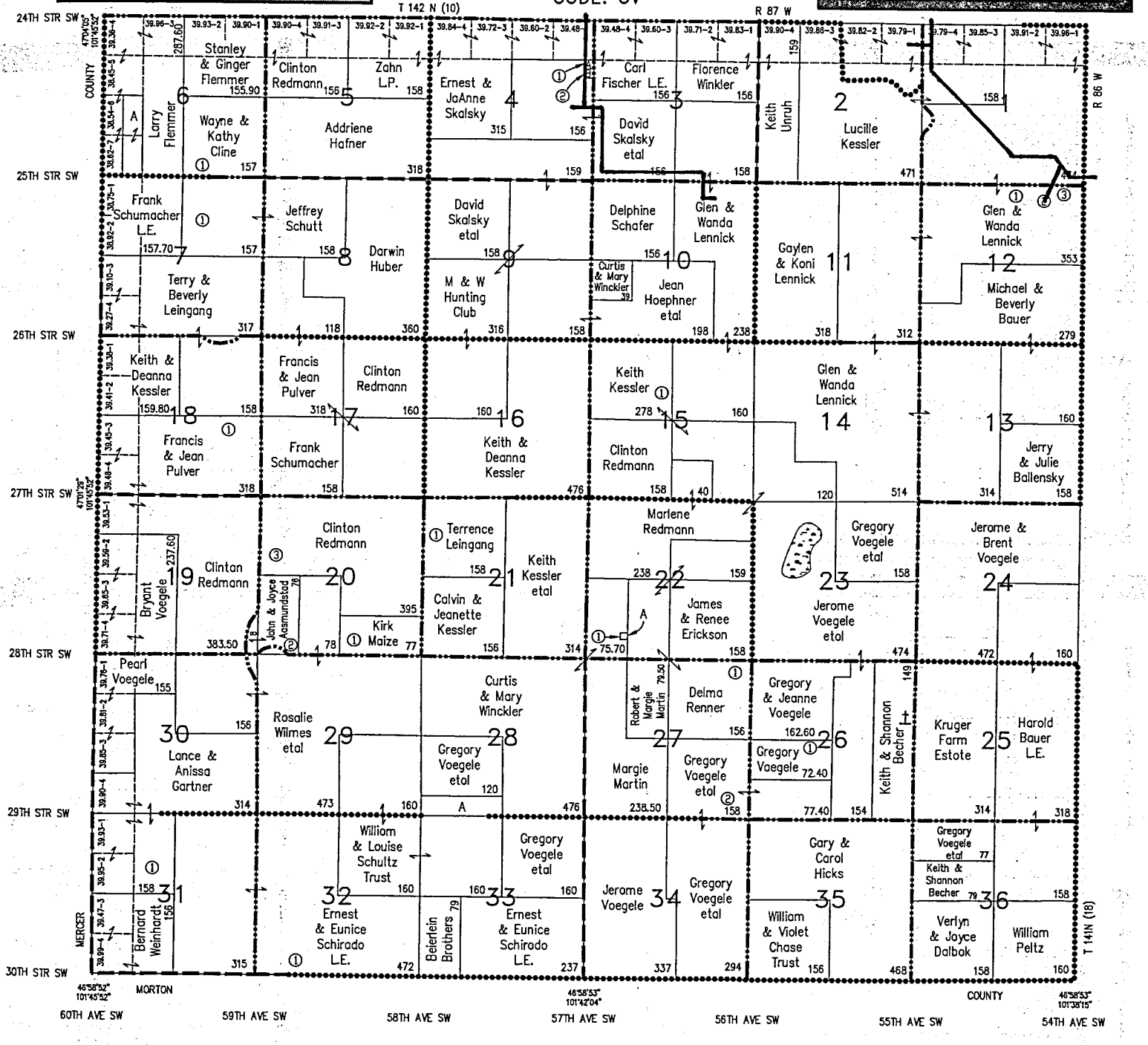
TOWNSHIP: 141 N
OLIVER COUNTY

MIDLAND ATLAS COMPANY LLC COPYRIGHT 2007

RANGE: 87 W
NORTH DAKOTA

INTERSTATE ENGINEERING
P.O. Box 742
117 Highway 49 North
Beulah, ND 58523-0742
P: 701-873-2266
F: 701-873-2627
C: 701-426-7139
Email: steved@iengi.com
www.iengi.com
Steve Dorval, P.E.
Professionals you need, people you trust
Offices in: North Dakota • Montana • Minnesota • South Dakota

CODE: CV




SEE LETTERED SMALL TRACTS DIRECTORY FOLLOWING TOWNSHIP MAPS

Copyrighted by and reprinted with the permission of Midland Atlas Company, Williston, North Dakota.

Sponsored by Children's Miracle Network Hospitals
Children's Miracle Network Hospitals
Sears Hearing Aid Centers
What will your miracle sound like?
Miracle Ear Center at Sears
I-29 & 13th Ave. S. West Acres RSC Fargo, ND 58103 (701) 277-1478 1-800-279-1569
2800 S. Columbia Rd Columbia Mall Grand Forks, ND 58201 (701) 772-5313 1-888-721-6041
2400 10th St. SW Dakota Square Minot, ND 58701 (701) 852-1597 1-800-272-7628
2700 State St. Gateway Mall Bismarck, ND 58501 (701) 222-2484 1-888-313-6832
Miracle Ear - Dickinson
669 12th St. West • Dickinson, ND 58601 • (701) 483-3588 • 1-866-396-8388

# MAP OF T 142 N R 84 W

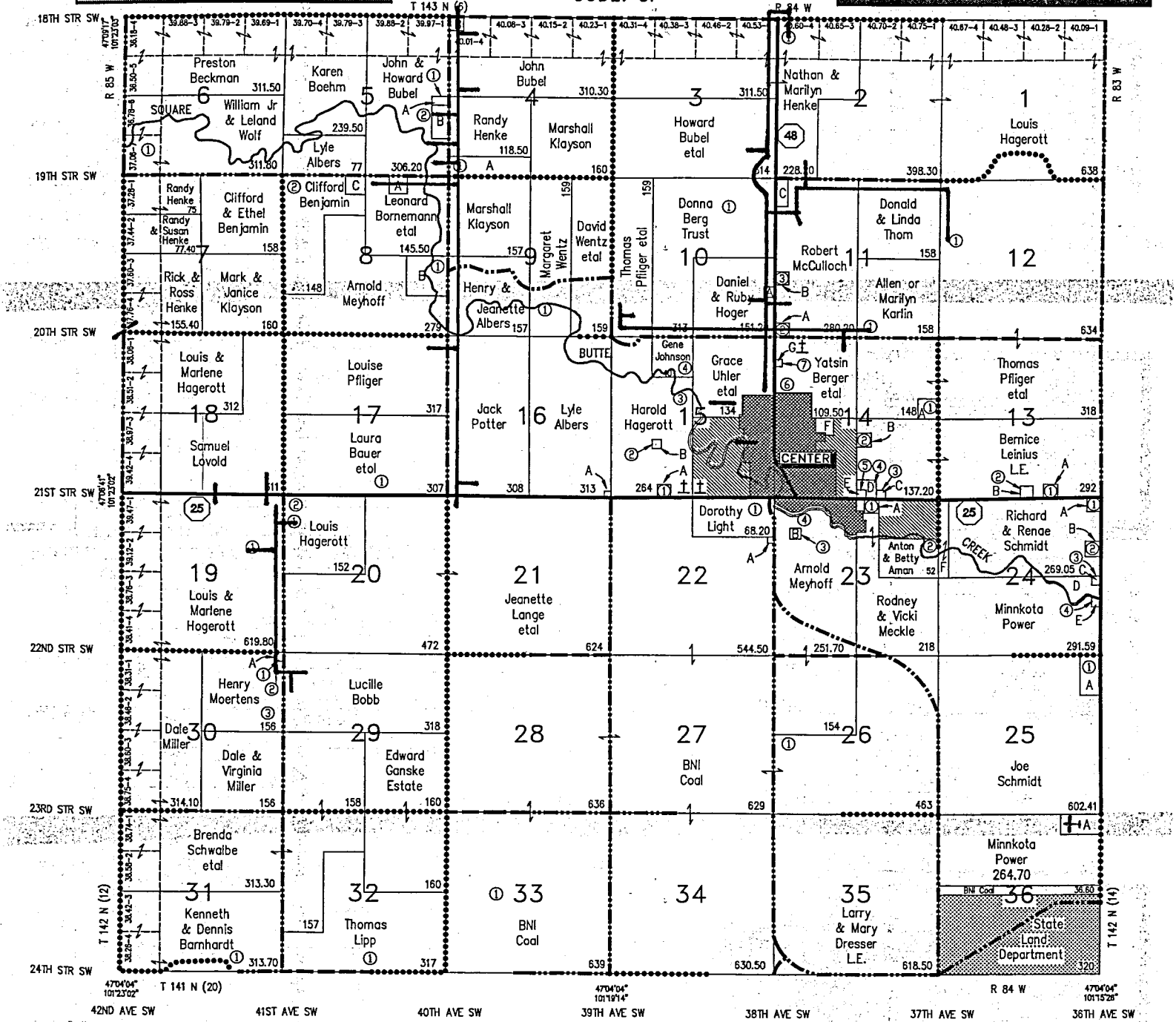
TOWNSHIP: 142 N
OLIVER COUNTY

MIDLAND ATLAS COMPANY LLC COPYRIGHT 2007

RANGE: 84 W
NORTH DAKOTA

INTERSTATE ENGINEERING
P.O. Box 742
117 Highway 49 North
Beulah, ND 58523-0742
P: 701-873-2266
F: 701-873-2627
C: 701-426-7139
Steve Dorval, P.E.
Email: steved@ienginc.com
www.ienginc.com
Professionals you need, people you trust
Offices in: North Dakota • Montana • Minnesota • South Dakota

CODE: CP




Copyrighted by and reprinted with the permission of Midland Atlas Company, Williston, North Dakota.

Proud Sponsor of Children's Miracle Network Hearing Aid Center
Sears Hearing Aid Centers
What will your miracle sound like?
Miracle Ear Center at Sears
I-29 & 13th Ave. S. West Acres RSC Fargo, ND 58103 (701) 277-1478 1-800-279-1569
2800 S. Columbia Rd Columbia Mall Grand Forks, ND 58201 (701) 772-5313 1-888-721-6941
2400 10th St. SW Dakota Square Minot, ND 58701 (701) 852-1897 1-800-272-7628
2700 State St. Gateway Mall Bismarck, ND 58501 (701) 222-2484 1-888-313-0832
Miracle Ear - Dickinson
669 12th St. West • Dickinson, ND 58601 • (701) 483-3588 • 1-866-396-8388

# MAP OF T 142 N R 85 W

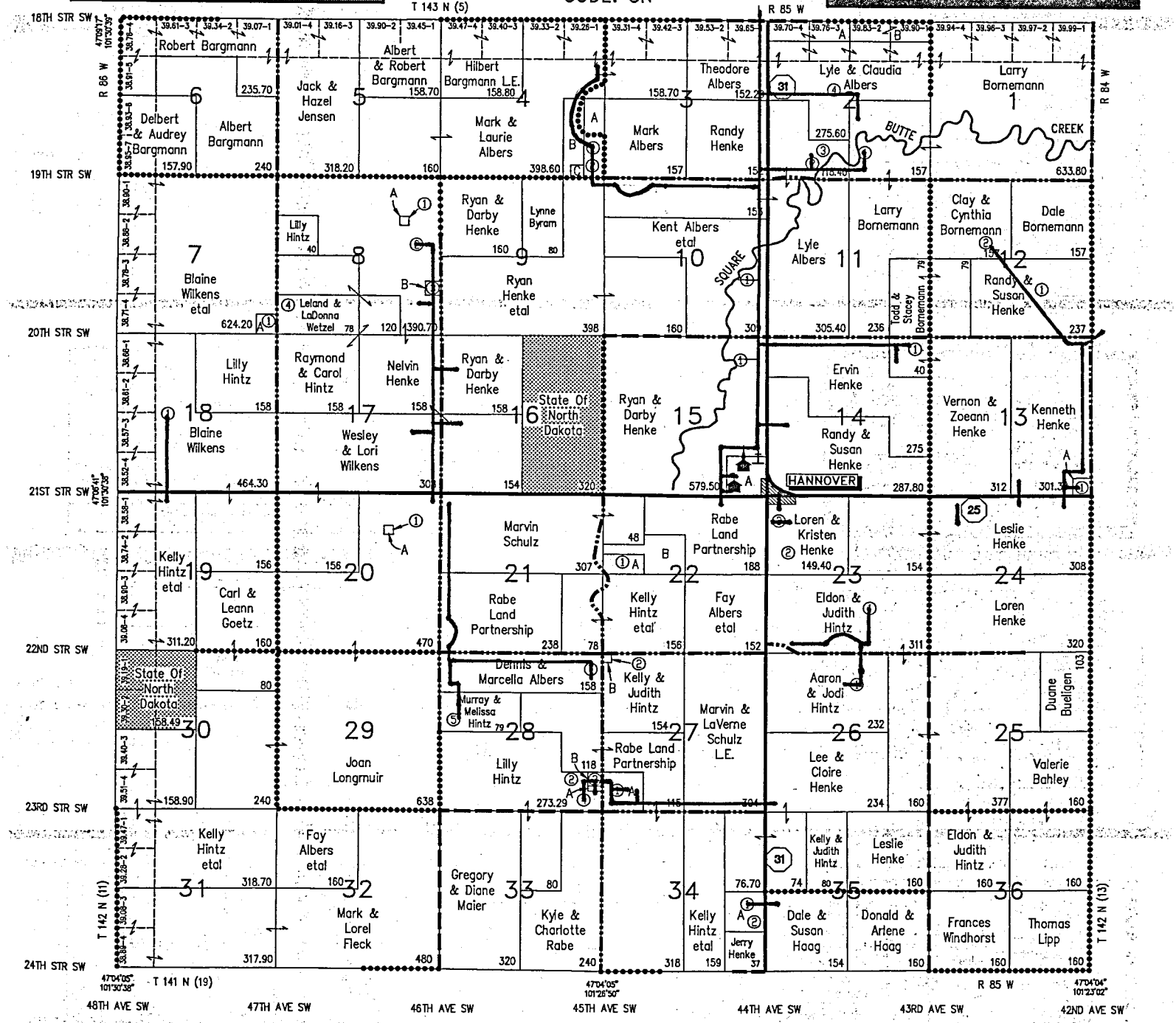
TOWNSHIP: 142 N
OLIVER COUNTY

MIDLAND ATLAS COMPANY LLC COPYRIGHT 2007

RANGE: 85 W
NORTH DAKOTA

CODE: CN

INTERSTATE ENGINEERING
P.O. Box 742
117 Highway 49 North
Beulah, ND 58523-0742
P: 701-873-2266
F: 701-873-2627
C: 701-426-7139
Steve Dorval, P.E.
Email: steved@interstateengineering.com
www.interstateengineering.com
Professionals you need, people you trust
Offices in: North Dakota • Montana • Minnesota • South Dakota




SEE LETTERED SMALL TRACTS DIRECTORY FOLLOWING TOWNSHIP MAPS

Copyrighted by and reprinted with the permission of Midland Atlas Company, Williston, North Dakota.

Proud Sponsor of Miracle Ear Children's Foundation
Miracle Ear Sears Hearing Aid Centers
What will your miracle sound like?
Miracle Ear Center at Sears
I-29 & 13th Ave. S. West Acres RSC Fargo, ND 58103 (701) 277-1478 1-800-279-1569
2800 S. Columbia Rd Columbia Mall Grand Forks, ND 58201 (701) 772-5313 1-888-721-6041
2400 10th St. SW Dakota Square Minot, ND 58701 (701) 852-1897 1-800-272-7628
2700 State St. Gateway Mall Bismarck, ND 58501 (701) 222-2484 1-888-313-0832
Miracle Ear - Dickinson
669 12th St. West • Dickinson, ND 58601 • (701) 483-3588 • 1-866-396-8388

# MAP OF T 142 N R 86 W

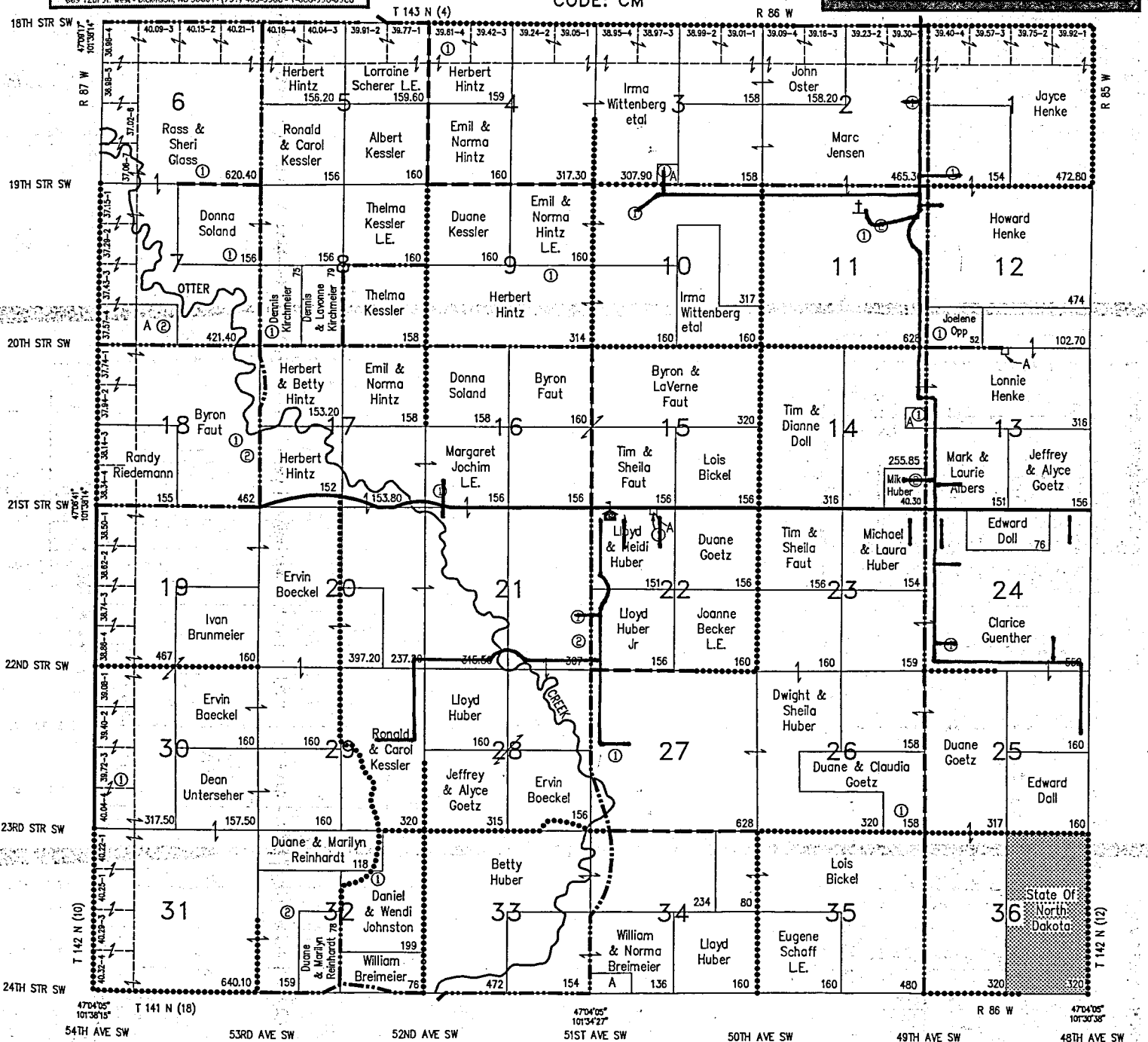
TOWNSHIP: 142 N
OLIVER COUNTY

MIDLAND ATLAS COMPANY LLC COPYRIGHT 2007

RANGE: 86 W
NORTH DAKOTA

INTERSTATE ENGINEERING
P.O. Box 742
117 Highway 49 North
Beulah, ND 58523-0742
P: 701-873-2266
F: 701-873-2627
C: 701-426-7139
Email: steved@iengi.com
www.iengi.com
Steve Dorval, P.E.
Professionals you need, people you trust
Offices in: North Dakota • Montana • Minnesota • South Dakota

CODE: CM




SEE LETTERED SMALL TRACTS DIRECTORY FOLLOWING TOWNSHIP MAPS

Copyrighted by and reprinted with the permission of Midland Atlas Company, Williston, North Dakota.

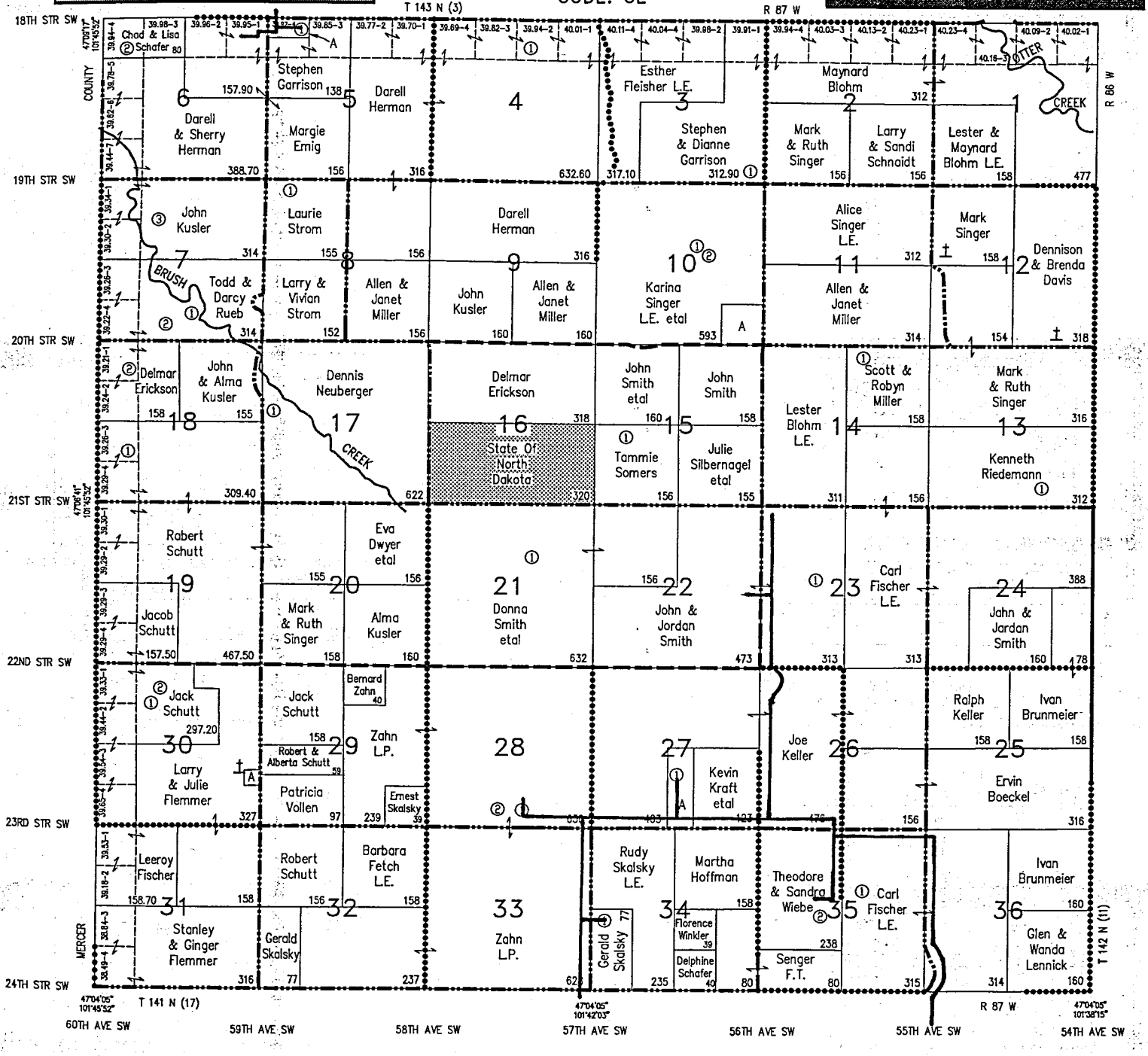
Proud Sponsors of Children's Miracle Network Children's Foundation
Sears Hearing Aid Centers
What will your miracle sound like?
Miracle Ear Center at Sears
I-29 & 13th Ave. S, West Acres RSC, Fargo, ND 58103, (701) 277-1478, 1-800-279-1569
2800 S. Columbia Rd, Columbia Mall, Grand Forks, ND 58201, (701) 772-5313, 1-888-721-6041
2400 10th St. SW, Dakota Square, Minot, ND 58701, (701) 852-1837, 1-800-272-7628
2700 State St, Gateway Mall, Bismarck, ND 58501, (701) 222-2484, 1-888-313-0832
Miracle Ear - Dickinson
669 12th St. West • Dickinson, ND 58601 • (701) 483-3588 • 1-866-396-8388

# MAP OF T 142 N R 87 W

TOWNSHIP: 142 N
OLIVER COUNTY
MIDLAND ATLAS COMPANY LLC COPYRIGHT 2007
RANGE: 87 W
NORTH DAKOTA

CODE: CL

INTERSTATE ENGINEERING
P.O. Box 742
117 Highway 49 North
Beulah, ND 58523-0742
P: 701-873-2266
F: 701-873-2627
C: 701-426-7139
Email: steved@ienginc.com
www.ienginc.com
Steve Dorval, P.E.
Professionals you need, people you trust
Offices in: North Dakota • Montana • Minnesota • South Dakota




SEE LETTERED SMALL TRACTS DIRECTORY FOLLOWING TOWNSHIP MAPS

Copyrighted by and reprinted with the permission of Midland Atlas Company, Williston, North Dakota.

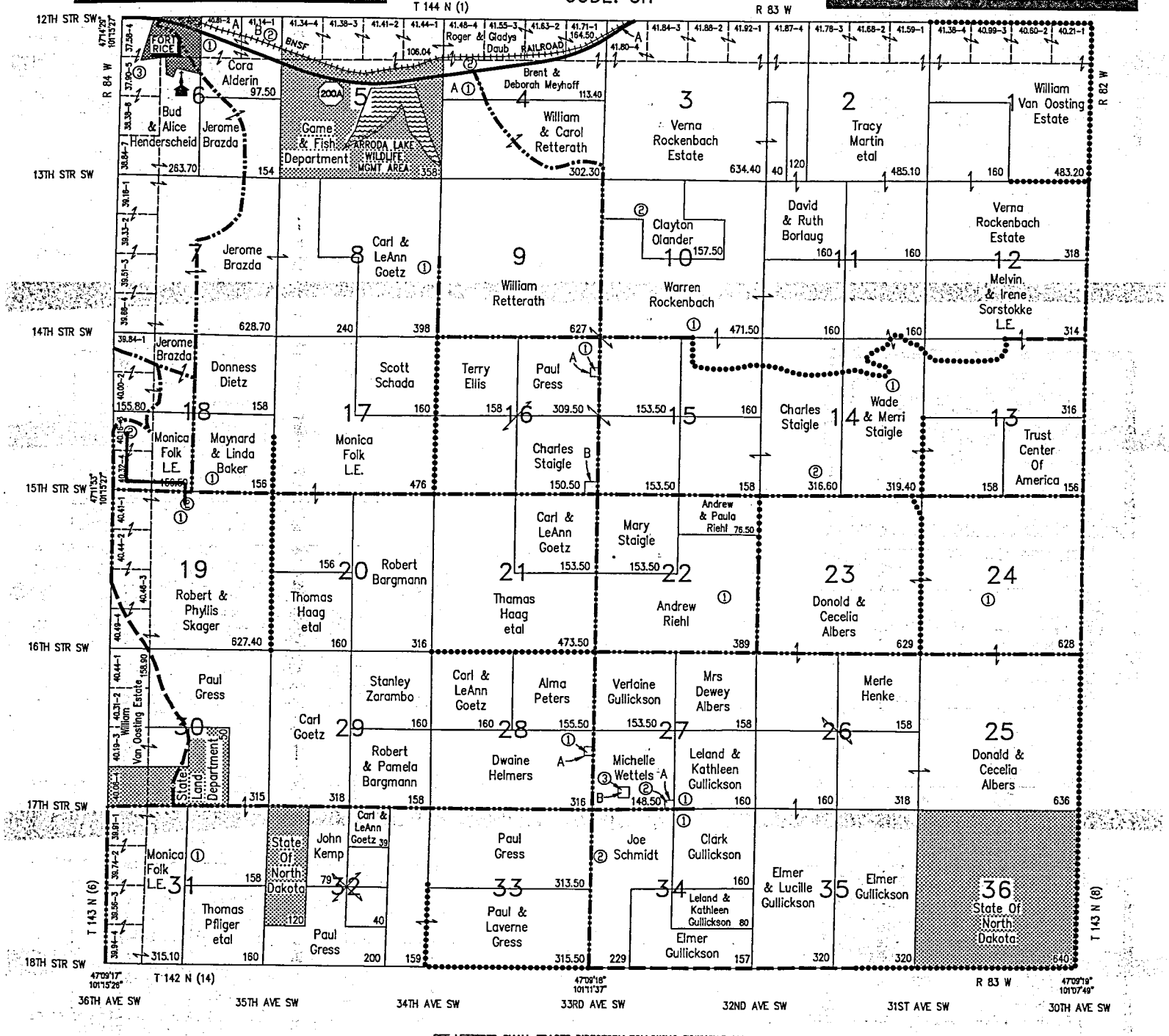
Proud Sponsor of
Ch-Lute-OS FOUNDATION
Sears Hearing Aid Centers
What will your miracle sound like?
Miracle Ear Center at Sears
1-29 & 13th Ave. S. West Acres RSC Fargo, ND 58103 (701) 277-1475 1-800-279-1569
2800 S. Columbia Rd Columbia Mall Grand Forks, ND 58201 (701) 772-5313 1-888-721-6041
2409 10th St. SW Dakota Square Minot, ND 58701 (701) 852-1897 1-800-272-7628
2700 State St. Gateway Mall Bismarck, ND 58501 (701) 222-2484 1-888-313-0832
Miracle Ear - Dickinson
669 12th St. West • Dickinson, ND 58601 • (701) 483-3588 • 1-866-396-8388

# MAP OF T 143 N R 83 W

TOWNSHIP: 143 N
OLIVER COUNTY
MIDLAND ATLAS COMPANY LLC COPYRIGHT 2007
RANGE: 83 W
NORTH DAKOTA

CODE: CH

INTERSTATE ENGINEERING
P.O. Box 742
117 Highway 49 North
Beulah, ND 58523-0742
P: 701-873-2266
F: 701-873-2627
C: 701-426-7139
Steve Dorval, P.E.
Email: steved@ienginc.com
www.ienginc.com
Professionals you need, people you trust
Offices in: North Dakota • Montana • Minnesota • South Dakota




Copyrighted by and reprinted with the permission of Midland Atlas Company, Williston, North Dakota.

Proud Sponsor of Children's Miracle Network Hospitals
Miracle Ear
Sears Hearing Aid Centers
What will your miracle sound like?
Miracle Ear Center at Sears
I-29 & 13th Ave. S. West Acres RSC Fargo, ND 58103 (701) 277-1478 1-800-279-1563
2800 S. Columbia Rd Columbia Mall Grand Forks, ND 58201 (701) 772-5313 1-888-721-6041
2400 10th St. SW Dakota Square Minot, ND 58701 (701) 852-1897 1-800-272-7628
2700 State St. Gateway Mall Bismarck, ND 58501 (701) 222-2484 1-888-313-6832
Miracle Ear - Dickinson
669 12th St. West • Dickinson, ND 58601 • (701) 483-3588 • 1-866-396-8368

# MAP OF T 143 N R 84 W

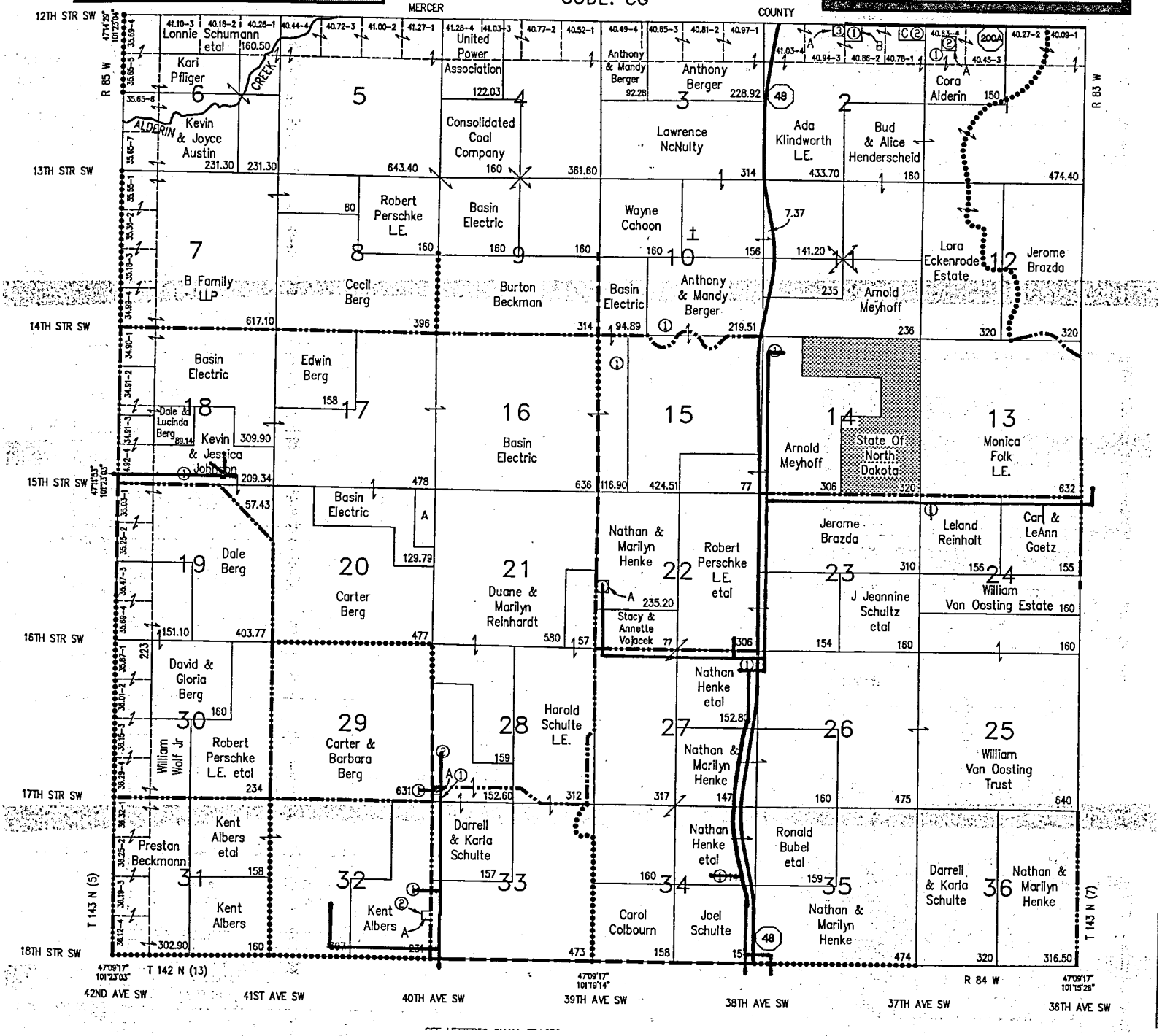
TOWNSHIP: 143 N
OLIVER COUNTY

MIDLAND ATLAS COMPANY LLC COPYRIGHT 2007

RANGE: 84 W
NORTH DAKOTA

CODE: CG

INTERSTATE ENGINEERING
P.O. Box 742
117 Highway 49 North
Beulah, ND 58523-0742
P: 701-873-2266
F: 701-873-2627
C: 701-426-7139
Steve Dorval, P.E.
Email: steved@ienginc.com
www.ienginc.com
Professionals you need, people you trust
Offices in: North Dakota • Montana • Minnesota • South Dakota




Copyrighted by and reprinted with the permission of Midland Atlas Company, Williston, North Dakota.

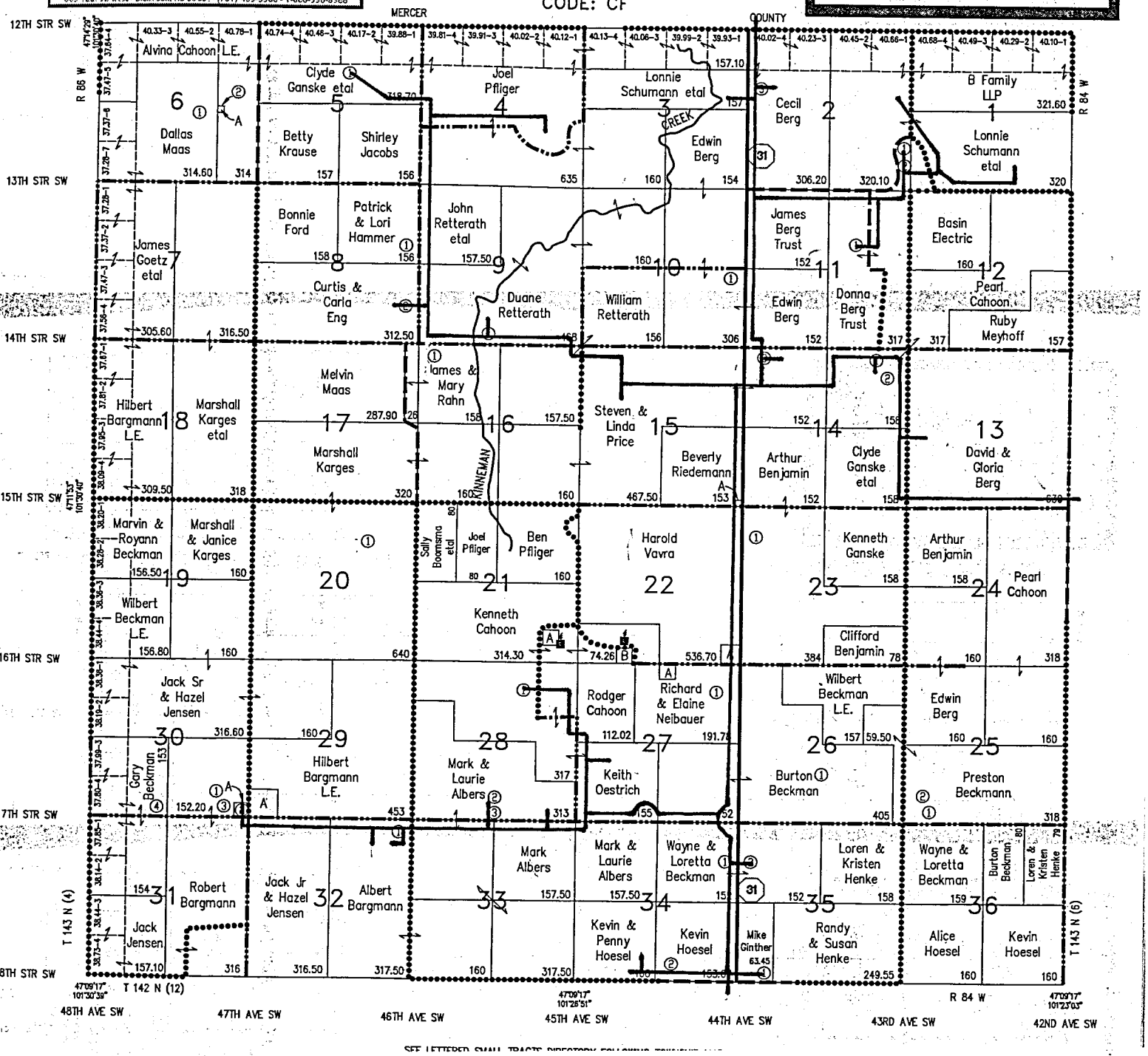
Proud Sponsor of Children's Miracle Network Hospitals
Children's Miracle Network Hospitals
Sears Hearing Aid Centers
What will your miracle sound like?
Miracle Ear Center at Sears
1-29 & 13th Ave. S. West Acres RSC Fargo, ND 58103 (701) 277-1478 1-800-279-1569
2800 S. Columbia Rd Columbia Mall Grand Forks, ND 58201 (701) 772-5313 1-888-721-6041
2400 10th St. SW Dakota Square Minot, ND 58701 (701) 852-1897
2700 State St. Gateway Mall Bismarck, ND 58501 (701) 222-2484 1-888-313-0832
Miracle Ear - Dickinson
669 12th St. West • Dickinson, ND 58601 • (701) 483-3588 • 1-866-396-8388

# MAP OF T 143 N R 85 W

TOWNSHIP: 143 N
OLIVER COUNTY
MIDLAND ATLAS COMPANY LLC COPYRIGHT 2007
RANGE: 85 W
NORTH DAKOTA

CODE: CF

INTERSTATE ENGINEERING
P.O. Box 742
117 Highway 49 North
Beulah, ND 58523-0742
P: 701-873-2266
F: 701-873-2627
C: 701-426-7139
Steve Dorval, P.E.
Email: steved@interstateeng.com
www.interstateeng.com
Professionals you need, people you trust
Offices in: North Dakota • Montana • Minnesota • South Dakota




SEE LETTERED SMALL TRACTS DIRECTORY FOLLOWING TOWNSHIP

Copyrighted by and reprinted with the permission of Midland Atlas Company, Williston, North Dakota.

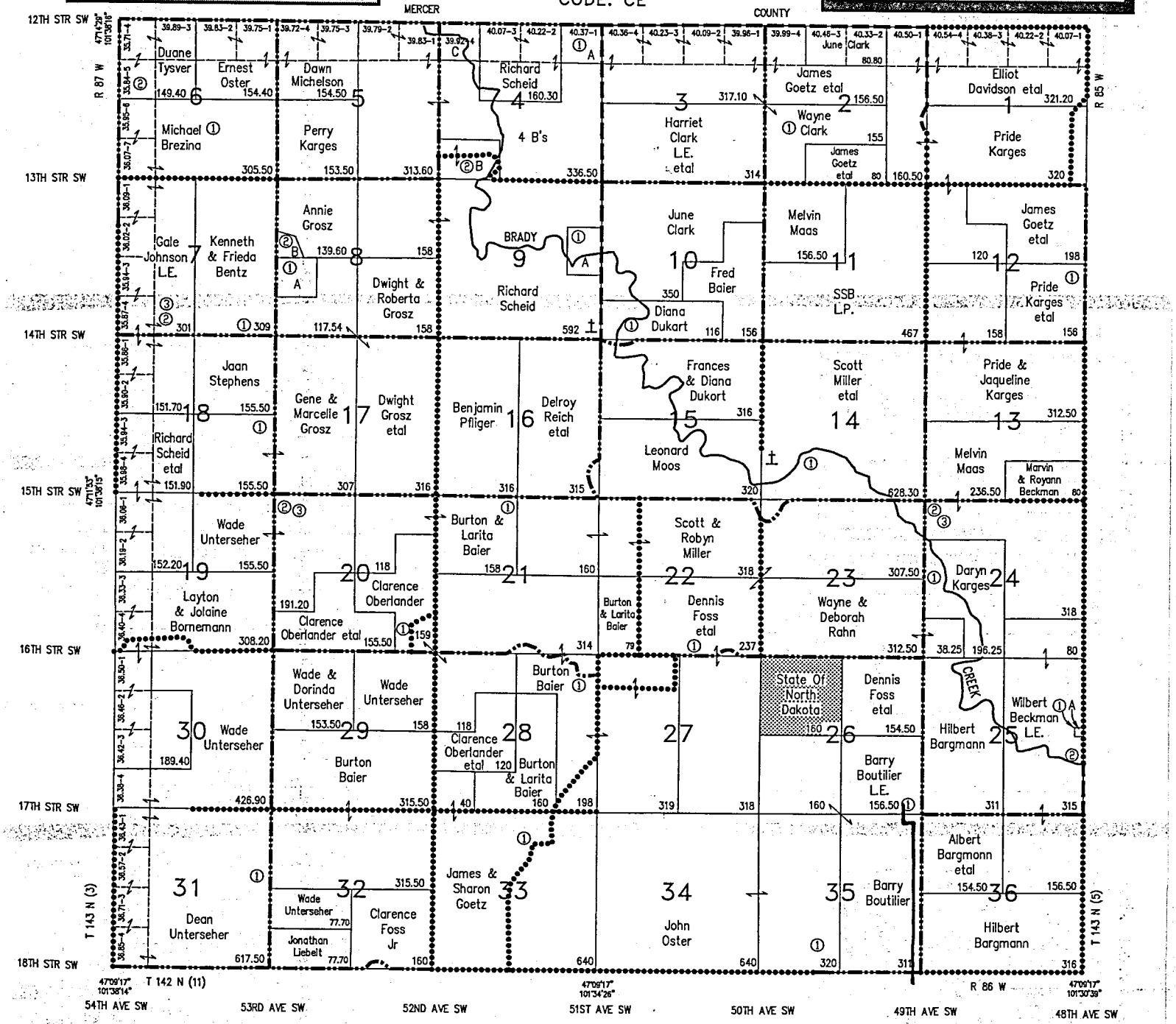
Proud Sponsor of Children's Miracle Network Hospitals FOUNDATION
Sears Hearing Aid Centers
What will your miracle sound like?
Miracle Ear Center at Sears
I-29 & 13th Ave. S. West Acres RSC Fargo, ND 58103 (701) 277-1478 1-800-279-1569
2800 S. Columbia Rd Columbia Mall Grand Forks, ND 58201 (701) 772-5313 1-888-721-6941
2400 10th St. SW Dakota Square Minot, ND 58701 (701) 852-1897 1-800-272-7628
2700 State St. Gateway Mall Bismarck, ND 58501 (701) 222-2484 1-888-313-0832
Miracle Ear - Dickinson
669 12th St. West • Dickinson, ND 58601 • (701) 483-3588 • 1-866-396-8388

# MAP OF T 143 N R 86 W

TOWNSHIP: 143 N
OLIVER COUNTY
MIDLAND ATLAS COMPANY LLC COPYRIGHT 2007
RANGE: 86 W
NORTH DAKOTA

INTERSTATE ENGINEERING
P.O. Box 742
117 Highway 49 North
Beulah, ND 58523-0742
P: 701-873-2266
F: 701-873-2627
C 701-426-7139
Steve Dorval, P.E.
Email: steved@ienginc.com
www.ienginc.com
Professionals you need, people you trust
Offices in: North Dakota • Montana • Minnesota • South Dakota

CODE: CE




SEE LETTERED SMALL TRACTS DIRECTORY FOLLOWING TOWNSHIP MAPS

Copyrighted by and reprinted with the permission of Midland Atlas Company, Williston, North Dakota.

Proud Sponsor of Children's Miracle Network Hospitals
Miracle-Ear
Sears Hearing Aid Centers
What will your miracle sound like?
Miracle Ear Center at Sears
1-29 & 13th Ave. S. West Acres RSC Fargo, ND 58103 (701) 277-1478 1-800-279-1569
2800 S. Columbia Rd Columbia Mall Grand Forks, ND 58201 (701) 772-5313 1-888-721-6041
2400 10th St. SW Dakota Square Minot, ND 58701 (701) 852-1597 1-800-272-7628
2700 State St. Gateway Mall Bismarck, ND 58501 (701) 222-2484 1-888-313-6832
Miracle Ear - Dickinson
669 12th St. West • Dickinson, ND 58601 • (701) 483-3588 • 1-866-396-8388

# MAP OF T 143 N R 87 W

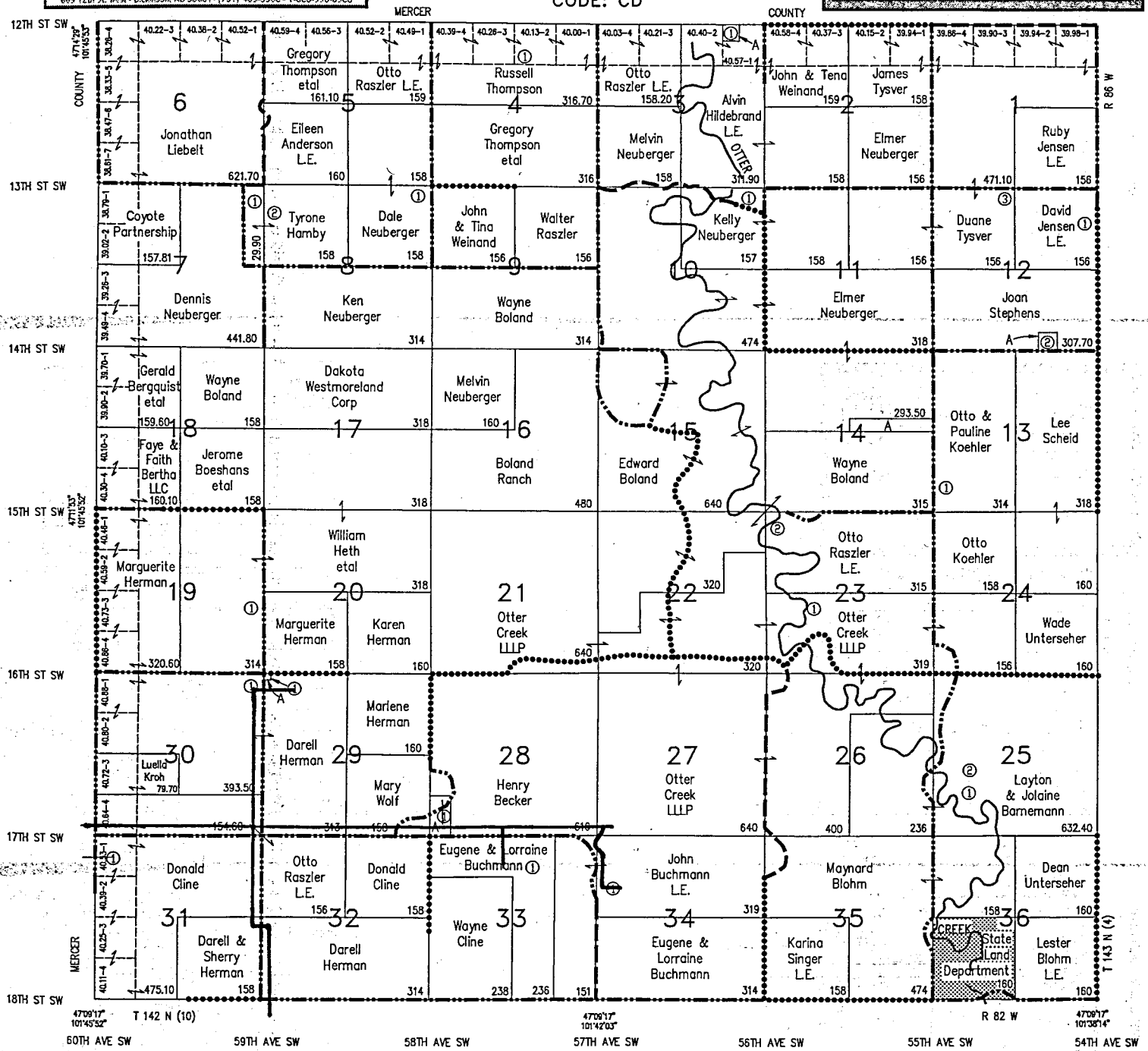
TOWNSHIP: 143 N
OLIVER COUNTY

MIDLAND ATLAS COMPANY LLC COPYRIGHT 2007

RANGE: 87 W
NORTH DAKOTA

CODE: CD

INTERSTATE ENGINEERING
P.O. Box 742
117 Highway 49 North
Beulah, ND 58523-0742
P: 701-873-2266
F: 701-873-2627
C: 701-426-7139
Steve Dorval, P.E.
Email: steved@ienginc.com
www.ienginc.com
Professionals you need, people you trust
Offices in: North Dakota • Montana • Minnesota • South Dakota




SEE LETTERED SMALL TRACTS DIRECTORY FOLLOWING TOWNSHIP MAPS

Copyrighted by and reprinted with the permission of Midland Atlas Company, Williston, North Dakota.

**NORTH DAKOTA INDUSTRIAL COMMISSION**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case Nos. 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## DECLARATION OF JOLENE RUST

[¶1] I, Jolene Rust, declare the following based on personal knowledge:

[¶2] I have ownership interest in the following property that lies within the boundaries of the proposed BK Fischer Storage Facility.

- Township 142 North, Range 88 West
  Section 13: SW1/4
  Mercer County, ND

[¶3] To the best of my knowledge, the property listed in ¶ 2 above is encumbered by the following easements:

- Oliver Mercer Electric Cooperative Right-of-Way Easement executed by John Jochim on June 25, 1980.
- West River Telecommunications Right-of-Way Easement executed by Jolene M. Rust on June 1, 2009.
- Roughrider Electric Cooperative, Inc. Right of Way Easement executed by Jolene Rust on June 1, 2009.
- ND State Water Commission Pipeline Easement executed by Jolene Rust on July 1, 2010.
- Southwest Water Authority Right-of-Way Easement executed by Jolene Rust on March 28, 2014.
- Badlands Cellular of North Dakota d/b/a Verizon Wireless Land Lease Agreement executed by Jolene Rust on November 14, 2008.

[¶4] Attached is the deed which I believe indicates my ownership in the property listed above.

[¶5] Attached are the easements currently encumbering that property based on the information I have.

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on the 23 day of May, 2024 at Turtle Lake, ND, United States.

Jolene Rust

# WARRANTY DEED

THIS INDENTURE, made this 30 day of April, 2001, between **John Jochim a/k/a John B. Jochim and Violet Jochim**, husband and wife, grantor, whether one or more, and **Jolene M. Rust,** grantee, whose post office address is 115 W. Railroad Ave., Mercer, ND 58559.

WITNESSETH, for and in consideration of the sum of Ten Dollars and other valuable consideration, grantor does hereby GRANT to the grantee, all of the following real property lying and being in the County of MERCER and State of North Dakota, and described as follows, to-wit:

TOWNSHIP 142 NORTH, RANGE 88 WEST
Section 13: SW/4

Subject to prior mineral reservations and conveyances and reserving to grantor, John B. Jochim, a life estate in the premises conveyed.

And the said grantor for himself, his heirs, executors and administrators, does covenant with the grantee that he is well seized in fee of the land and premises aforesaid and has good right to sell and convey the same in manner and form aforesaid; that the same are free from all encumbrances, except installments of special assessments or assessments for special improvements which have not been certified to the County Auditor for collection; and the above granted lands and premises in the quiet and peaceable possession of said grantees, against all persons lawfully claiming or to claim the whole or any part thereof, the said grantor will warrant and defend.

WITNESS, the hand of the grantor:

John B. Jochim
John Jochim

Violet J. Jochim
Violet Jochim

I certify that the requirement for a report or statement of full consideration paid does not apply because this deed is for one of the transactions exempted by Subdivision "c" of Section 6 of Section 11-18-02.2 NDCC.

Signed: Greg Lange (grantee/agent) Dated: 5-1-01

STATE OF NORTH DAKOTA )
) ss
COUNTY OF MERCER )

The foregoing instrument was acknowledged before me this 30 day of April, 2001, by John Jochim and Violet Jochim, husband and wife.

Deborah S. Prock
Notary Public
State of North Dakota

My Commission Expires:

DEBORAH S. PROCK
Notary Public, Mercer County, ND
My Commission Expires Mar. 11, 2003
STATE OF NORTH DAKOTA
NOTARY PUBLIC SEAL

*The description was prepared by: Gregory L. Lange, of Richardson, Lange & Donovan, PLLP, P.O. Box 488, Hazen, ND 58545, Ph, 701-748-2206 or obtained from a previously recorded instrument.*

DOCUMENT NO. 170568

MORTGAGEE
MORTGAGOR
INDEXED ✓

STATE OF NORTH DAKOTA
COUNTY OF MERCER

OFFICE OF
REGISTER OF DEEDS

I hereby certify that within instrument was filed in this office for record this 2nd day of May 20 01 at 9:33 o'clock A M and was duly recorded in Book 127 Misc on Page 5

Jeanette Sailer
Register of Deeds

By Kathryn Schumacher
Deputy

SEAL
MERCER COUNTY, N. DAK.

DELINQUENT TAXES, SPECIAL ASSESSMENTS, OR INSTALLMENTS OF SPECIAL ASSESSMENTS PAID AND TRANSFER ENTERED THIS 2nd DAY OF May, 2001

Michelle R Sailer
COUNTY AUDITOR OF MERCER COUNTY, N. DAK.

BY Sandra F Bohrer DEPUTY

$10.00 Chg. Richardson Law Office
P.O. Box 488
Hazen, ND 58545

# RIGHT-OF-WAY EASEMENT

KNOW ALL MEN BY THESE PRESENTS, that we the undersigned, (whether one or more)
JOHN Jochim

(unmarried) (husband and wife) for a good and valuable consideration, the receipt whereof is hereby acknowledged, do hereby grant unto the Oliver-Mercer Electric Cooperative, Inc., a cooperative corporation (hereinafter called the "Cooperative") whose post office address is Hazen, North Dakota 58545, and to its successors or assigns, the right to enter upon the lands of the undersigned, situated in the County of Mercer, State of North Dakota, and more particularly described as follows:

S½ of NW¼ of 24

Right-of-way_____feet Township 142 Range 88 Section W½ of SW¼ of 13
Right-of-way_____feet Township ____ Range ____ Section W½ of W½ of 24
N½ of SW¼ of 24

and to construct, operate, maintain and move or relocate on the above-described lands and/or in or upon all streets, roads or highways abutting said lands, an electric transmission line or system, and to cut and trim trees and shrubbery that may interfere with or threaten to endanger the operation and maintenance of said line or system. The easement shall include only that part of the above described land located within 15 feet on each side of the proposed line.

The undersigned agree that all poles, wires and other facilities, installed on the above described lands at the Cooperative's expense shall remain the property of the Cooperative, removable at the option of the Cooperative.

The Cooperative agrees to pay a reasonable sum for any damage caused to crops or fences by the construction, operation, maintenance, or repair of said line or system. The overall operating height of vehicles and equipment known to cultivate or traverse lands within the easement, is less than fourteen (14) feet, unless otherwise noted below.

IN WITNESS WHEREOF, the undersigned have set their hands and seals this 25 day of June, 1980.

Signed, sealed and delivered in the presence of:

John Jochim

STATE OF NORTH DAKOTA )
) ss
COUNTY OF Mercer )

On this 25 day of June, 1980, before me, a Notary Public in and for said County and State, personally appeared JOHN JOCHIM known to me to be the person who described in and who executed the foregoing instrument and acknowledged to me that he executed the same.

My Commission expires: MAY 5, 1986

Notary Public in and for the County of Mercer State of North Dakota

STATE OF NORTH DAKOTA )
) ss
COUNTY OF _____ )

_____ Being first duly sworn says that he is one of the Witnesses to the above and foregoing easements, that _____ name(s) is and/or are subscribed to the above and foregoing instruments as a party is and/or are the persons described in said easement and that he signed said instrument in my presence and that I in their presence signed my name thereto as a subscribing witness.

Subscribed and sworn to before me this ____ day of _____, 19___

My Commission Expires:

_____

Notary Public in and for the County of _____ and the State of North Dakota

209443

**STATE OF NORTH DAKOTA**
**COUNTY OF MERCER**

**OFFICE OF**
**COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 12/9/2015 at 12:16 PM, and was duly recorded a Book 208 MISC on Page 31 Fee: $23.00

MORTGAGEE
MORTGAGOR
INDEXED ✓

County Recorder Brenda L. Cook

By Deputy

Return To: ROUGHRIDER ELECTRIC COOPERATIVE, INC., 800 H
HAZEN, ND 58545

COUNTY RECORDER SEAL MERCER COUNTY, N DAK.

EXCH: BELH WO#: 29-2680-001

## *West River Telecommunications Right-of-Way Easement*

We the undersigned, (whether one or more) **Jolene M. Rust,** Grantor(s), do hereby grant and convey unto ***West River Telecommunications Cooperative***, a cooperative corporation (hereafter called the "Cooperative"), grantee, whose address is P.O. Box 467, Hazen, North Dakota, and its respective successors, assigns, lessees and agents, an easement to survey, construct, repair, operate, upgrade, maintain, relocate, replace and remove such communication systems as the grantee may from time to time require, consisting of but not limited to cables, wires, poles, splicing boxes, and other appurtenances, upon, over and under the land which the undersigned owns or in which the undersigned has any interest in the County of ***Mercer***, State of ***North Dakota***, and more particularly described as follows:

***SW/4 Sec. 13 T142N R88W***

also the right of ingress and egress over and across the lands of the undersigned for the purpose of exercising the rights herein granted; to place surface markers beyond said strip, to clear and keep clear all trees, roots, brush and other obstructions from the surface and subsurface of said strip of land. The boundary of said strip shall be a line parallel to and 10 feet either side of the first cable laid on the land of the undersigned. The undersigned for Grantor(s), their heirs, executors, administrators, successors, and assigns, hereby covenants that no structure shall be erected on said strip.

The undersigned agrees that all poles, wire and other facilities, including telephone equipment, installed on the above described land, shall remain the property of the Cooperative, removable at the option of the Cooperative. The undersigned agrees to this easement with the understanding the Grantor(s), their heirs, executors, administrators, successors, and assigns, may continue to have access to and use of the easement area in any manner consistent with the rights herein granted to the Cooperative, and that the Cooperative will restore the said strip to as near as reasonable to the pre-constructed condition, and that the Cooperative will erect no buildings on said strip.

The undersigned covenant that they are the owners of the above described lands and that the said lands are free and clear of encumbrances and liens of whatsoever character except those held by the following persons:

The term of this easement shall be for as long as needed by the grantee, and until a release of this easement is recorded, but to not extend beyond the maximum term authorized by law.

EXCH: BELH WO#: 29-2680-001

Access is hereby granted for a state or federal historical survey of the cable route, should one be required, unless checked. Access denied ☐

IN WITNESS WHEREOF, this instrument has been executed by the undersigned this the 1 day of June, 2009.

STATE OF North Dakota )
)
COUNTY OF McLean )

by: Jolene Rust

by: _____

On this 1 day of June, the year 2009 before me personally appeared Jolene Rust, known to me to be the person(s) who is described in and who executed the within instrument, and acknowledged to me that he/she (or they) executed the same.

Steven Knudson

STEVEN C. KNUDSON
Notary Public
State of North Dakota
My Commission Expires Aug. 23, 2011

Notary Public, County of Mercer
My Commission Expires: Aug. 23, 2011

IN WITNESS WHEREOF, this instrument has been executed by the undersigned this the ___day of _____, 2009.

STATE OF )
)
COUNTY OF )

by: _____

by: _____

On this _____ day of _____, the year _____ before me personally appeared _____, known to me to be the person(s) who is described in and who executed the within instrument, and acknowledged to me that he/she (or they) executed the same.

_____

Notary Public, County of _____
My Commission Expires:

rev 01/09 Tracking No 29-2680-001

MORTGAGEE
MORTGAGOR
INDEXED ✓

191998
STATE OF NORTH DAKOTA
COUNTY OF MERCER
OFFICE OF
COUNTY RECORDER
I hereby certify that the within instrument was filed in this office for record this 6/3/2009 at 9:36 AM, and was duly recorded as Book 180 MISC on Page 191 Fee: $13.00

County Recorder Brenda L. Cook

By Deputy
Return To: WRT, PO BOX 467
Chg HAZEN, ND 58545

COUNTY RECORDER SEAL MERCER COUNTY, N. DAK.

## RIGHT OF WAY EASEMENT

THIS AGREEMENT made and entered into this 1st day of June, 2009, between **JOLENE RUST**, hereinafter called "Owner" (whether one or more) and **ROUGHRIDER ELECTRIC COOPERATIVE, INC.**, whose post office address is 800 Highway Drive, Hazen, North Dakota 58545-4737, hereinafter called "COOPERATIVE".

WITNESSETH that for valuable consideration, the receipt and sufficiency of which is hereby acknowledged, Owner grants unto Cooperative, its successors and assigns, for a term of 99 years from the date hereof, an easement to construct, reconstruct, operate and maintain an electric distribution system, overhead, underground or both including all poles, guys, anchors wires, surface terminals, and all accessories and appurtenances necessary or desirable in connection therewith, under, over, upon and across lands of Owner and/or in or upon all streets, roads or highways abutting said lands situated in Mercer County, North Dakota, and more particularly described as follows, to-wit:

A strip of land 20 feet in width, the same being 10 feet on each side of a centerline described as follows.

TOWNSHIP 142 NORTH, RANGE 88 WEST
Section 13: SW/4

The facilities erected hereunder shall remain the property of the Cooperative. Cooperative shall have the right to inspect, rebuild, remove, repair, improve and make such changes, alterations, substitutions and additions in and to its facilities as Cooperative may from time to time deem advisable, including the right to increase or decrease the size or capacity of its system, together with necessary accessories and appurtenances; the right to increase or decrease the size of the facilities and equipment situated upon the premises; the right to permit or otherwise agree to the joint use or occupancy of the overhead lines or the trench and related underground facilities by other persons, associations or corporations; and the right to at any time use the property described above to extend lines and facilities to serve the property of persons other than the Owner.

Any damages to the surface of the right-of-way or to crops, fences, gates, drains, ditches, or lines of the Owner, caused by the Cooperative in the installation, repair maintenance, reconstruction or removal of said electrical properties and appurtenances, shall be promptly repaired, replaced or paid for by the Cooperative, provided a claim therefore is presented to the Cooperative at its General Office within ninety (90) days after such damages occur If the amount of said damages cannot be agreed upon, the Cooperative and the Owner shall each select an arbitrator, and these two shall select a third arbitrator, and the decision and award of the arbitrators shall be final.

Cooperative shall at all times have the right to keep the easement clear of all buildings, structures or other obstructions, trees, shrubbery, undergrowth and roots.

Owner, his successors and assigns, may use the land within the easement for any purpose not inconsistent with the rights granted, provided such use does not interfere with or endanger the Cooperative's facilities or the rights granted under this easement.

For the purpose of constructing, inspecting, maintaining or operating its facilities, Cooperative shall have the right of ingress to and egress from the easement over the lands of Owner adjacent to the easement and lying between public or private roads and the easement, such right to be exercised in such manner as shall occasion the least practicable damage and inconvenience to Owner.

Owner covenants that he is seized of and has the right to convey the said easement, rights and privileges; that Cooperative shall have quiet and peaceable possession, use and enjoyment of the aforesaid easement, rights and privileges, and that Owner shall execute such further assurances thereof as may be requested by the Cooperative.

Jolene Rust

STATE OF NORTH DAKOTA )
)ss
COUNTY OF Mclean )

On this 1st day of June, 2009, before me, a Notary Public in and for said County and State personally appeared Jolene Rust, known to me to be the person(s) described in and who executed the within and foregoing instrument and acknowledged to me that he/she/they executed the same.

*Notary Seal Location*

ALLEN WAGNER
Notary Public
State of North Dakota
My Commission Expires Aug. 23, 2010

Allen Wagner
Notary Public State of North Dakota

My Commission Expires: Aug 23, 2010

**192522**

**STATE OF NORTH DAKOTA**
**COUNTY OF MERCER**

**OFFICE OF**
**COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 8/21/2009 at 9:35 AM, and was duly recorded as Book 180 MISC on Page 642 Fee: $10.00

County Recorder Brenda L Cook

By Deputy

Return To: ROUGHRIDER ELECTRIC COOPERATIVE, INC , 800 HI
HAZEN, ND 58545

COUNTY RECORDER SEAL MERCER COUNTY, N. DAK.

MORTGAGEE
MORTGAGOR
INDEXED

**PIPELINE EASEMENT**

North Dakota State Water Commission
County of Mercer
Parcel H-MER-129

**ALL PERSONS TAKE NOTICE:**

That the undersigned, Jolene Rust, whether one or more, called the Grantor, being the owner of, or having an interest in, land situated in the County of Mercer, State of North Dakota, more fully described below, in consideration of One and No/100 Dollars ($1.00) and other valuable consideration, does hereby grant, convey, and warrant to the State of North Dakota, acting by and through the North Dakota State Water Commission, a state agency and public corporation, with its principal office at 900 East Boulevard Ave., Bismarck, North Dakota 58505, called the Grantee, and to its successors and assigns, the right, privilege, and easement to construct, maintain, operate, inspect, repair, alter, replace, change the size of or remove a pipeline, and appurtenances thereto, for the transportation of water under, across, and through:

Parcel H-MER-129
A 40 foot wide strip of land 20 feet wide on each side of the pipeline centerline lying within the W1/2 SW1/4 Section 13, Township 142 North, Range 88 West of the 5th P.M.

Said tract contains 2.42 acres, more or less.

Temporary Construction Easement
An additional 20 feet of temporary right-of-way lying adjacent to the above described tract for a total construction easement width of 60 feet.

Said tract contains 1.21 acres, more or less.

together with the right to utilize additional land for a period up to three years from the date of this easement, adjacent to the above described tract, for purposes of temporary working space during initial construction of the pipeline, and the right of ingress to and egress from said strip of land across the adjacent lands of the Grantor, for the purposes specified above at the will of the Grantee.

**THE GRANTOR AND THE GRANTEE FURTHER AGREE:**

1. **Use of right-of-way by Grantor.** Grantor reserves the right to use the surface of the easement strip provided, however, that Grantor, without prior approval of Grantee, shall neither construct nor permit to be constructed any building, structure, or other improvement upon the easement strip which would interfere with Grantee's exercise of the rights conveyed by this pipeline easement, including access to the easement strip.

2. **Appurtenances.** The Grantee shall have the right to install and construct necessary appurtenances upon the surface of the easement strip. Prior to construction, the Grantee will notify the Grantor of the approximate location of such appurtenances if any, to be located on the easement strip, and shall pay to the Grantor the sum of $500 for each appurtenance located at a distance of more than 5 feet from a field boundary or fence line. Such payments shall be paid prior to construction.

3. **Damages.** The Grantee will pay to Grantor or Grantor's tenants, as their respective interests may appear, for damages caused by the operations or activities of the Grantee; provided, however, that the Grantee shall have the right, without liability for damages, to clear, and keep cleared, all trees, brush, and other obstructions from the easement strip that may, in the Grantee's judgment, interfere with the rights and privileges of the Grantee under this pipeline easement.

   If the amount of any damage which Grantor may sustain as a result of Grantee's exercise of rights hereunder cannot be mutually agreed upon, such damages shall be ascertained and determined by three (3) disinterested person; one to be appointed by the Grantor, one by

Grantee, and a third by the two so appointed, and the award of such three persons shall be final and conclusive.

4. **Restoration of surface.** The Grantee will restore the surface of the construction area to its original contour as nearly as practicable.

5. **Topsoil segregation.** When excavating the pipeline trench with a backhoe/trackhoe, the Grantee will remove the topsoil separately during the construction of the pipeline for the full width of the pipe trench to a depth of twelve (12) inches or the actual topsoil depth, whichever is less, and to be replaced at the top of the backfill over the pipe trench.

6. **Assignment and covenant by parties.** The rights of either party may be assigned in whole or in part. The terms and provisions of this easement shall constitute covenants running with the land and shall be binding upon, and inure to the benefit of, the parties hereto, their successors, assigns, personal representatives, and heirs.

7. **Grantor's title.** Grantor warrants that he is the owner of, or has an interest in, the land described in this easement, and that he has full right and authority to enter into and deliver this easement. This instrument may be executed in counterparts and each counterpart shall constitute a separate agreement between the parties thereto. Any payments pursuant to this pipeline easement shall be in proportion to the Grantor's interest in the undivided fee simple estate.

8. **Entire agreement.** This instrument contains the entire agreement of the parties and there are no other, or different, agreements or understandings between the Grantor and the Grantee, or its agents. The Grantor, in executing this pipeline easement, has not relied upon any promises, inducements, or representatives of the Grantee, or its agents, except as are set forth herein.

9. **Term of easement.** The term of this easement shall be as long as it is needed by the Grantee, or its assigns, and until a release of this easement is recorded, but shall not exceed ninety-nine (99) years pursuant to NDCC §47-05-02.1.

10. **Tenants.** The Grantor represents that the land described in this easement is (not rented) (rented to) Rick Bauman.

Dated this 1 day of July, 2010.

Solene Rust
Grantor

Grantor

STATE OF NORTH DAKOTA)
) ss.
COUNTY OF McLean )

On this 1st day of July, 2010, before me personally appeared Solene Rust, known to me to be the person(s) described in and who executed the within and foregoing instrument, and acknowledged to me that he/she executed the same.

BEVERLY M NEUMILLER
Notary Public
State of North Dakota
My commission expires July 7, 2011

(SEAL)

Beverly M Neumiller
Notary Public

July 7, 2011 County, ND
My Commission expires:

195748

**STATE OF NORTH DAKOTA**
**COUNTY OF MERCER**

**OFFICE OF**
**COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 12/6/2010 at 1:06 PM, and was duly recorded as Book 186 MISC on Page 147 Fee: $16.00

County Recorder Brenda L. Cook

By Deputy

Return To: ND STATE WATER COMMISSION, 900 E BOULEVARD A
DEPT 770 BISMARCK, ND 58505-0850

MORTGAGEE
MORTGAGOR
INDEXED ✓

COUNTY RECORDER
SEAL
MERCER COUNTY, N. DAK.

JUL 2010

**SOUTHWEST WATER AUTHORITY**
Southwest Pipeline Project Building
West Industrial Park
4665 2nd Street SW
Dickinson, ND 58601-7231
(701) 225-0241
Toll Free: 1-888-425-0241

Segment **7-9E WEST CENTER SERVICE AREA**
Parcel **142-88-18**

## RIGHT-OF-WAY EASEMENT

**ALL PERSONS TAKE NOTICE:**

In consideration of one dollar ($1.00) and other good and valuable consideration **JOLENE RUST PO BOX 86 MERCER, ND 58559** hereinafter referred to as Grantor, does hereby grant, bargain, sell, transfer and convey to the Southwest Water Authority, hereinafter referred to as the Grantee, its successor and assigns, a perpetual easement with right to erect, construct, install and lay, and thereafter use, operate, inspect, repair, maintain, replace, and remove water pipelines, connections, valves and all other appurtenant facilities used in connection with the construction, operation and maintenance of the Southwest Pipeline Project, over, above, across and through the land of the Grantor, situated in **Mercer** County, State of North Dakota, said land being described as follows: **SW1/4 LESS R/W SECTION 13 TOWNSHIP 142 RANGE 88** (the tract that contains **0.18** acres, more or less), together with the right of ingress and egress over the adjacent lands of the Grantor, successors and assigns for the purposes of this easement.

1. The permanent easement will be thirty (30) feet in width, fifteen (15) feet on each side of the center line of the pipeline as constructed, with an additional ten (10) feet of temporary right-of-way for a total construction easement width of forty (40) feet, twenty (20) feet on each side of the center line.

2. The Grantee covenants to maintain the easement in good repair so that no unreasonable damage will result from its use to the adjacent land of the Grantor, successors and assigns. The Grantor will receive compensation for damages to growing crops caused by the construction or operation. The Grantor will report any damages within three (3) years of the construction of the project.

The grant and other provisions of this easement shall constitute a covenant running with the land for the benefit of the Grantee, its successors and assigns.

**IN WITNESS WHEREOF,** the Grantor has executed this instrument this 28 day of March, 2014.

_____ GRANTOR Jolene Rust GRANTOR

State of North Dakota

County of Sheridan

On March 28, 2014, personally appeared before me DeEtta Schindler

_____

____ whom I know personally.
X whose identity I verified on the basis of D.L.
_____ whose identity I verified on the oath or affirmation of _____, a credible witness to be the signor of the above and he/she acknowledged that he/she signed it.

DEETTA SCHINDLER
Notary Public
State of North Dakota
My commission expires June 9, 2018

Notary Public DeEtta Schindler
Sheridan, County _____
My Commission Expires: June 9, 2018

APR - 1 2014

MORTGAGEE
MORTGAGOR
INDEXED ✓

**STATE OF NORTH DAKOTA**
**COUNTY OF MERCER**

**206890**
**OFFICE OF**
**COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 5/4/2015 at 11:52 AM, and was duly recorded as Book 202 MISC on Page 383 Fee: $13.00

County Recorder Brenda L. Cook

By Deputy

Return To: SOUTHWEST WATER AUTHORITY, SOUTHWEST PIPE WEST INDUSTRIAL PARK-4665 2ND AVE SW Beulah, ND 58523

COUNTY RECORDER
SEAL
MERCER COUNTY, N. DAK.

uploaded to BTWPP on 4-2-14 (nc)

DRAFTED BY
AND RETURN TO:
Moss & Barnett (JDL)
4800 Wells Fargo Building
90 South Seventh Street
Minneapolis, MN 55402-4129
(Site Name: ND04 Medicine Butte)
(Prepared by Carin M. Kanstrup, Telephone No. (612) 877-5342)

(Space above this line for Recorder's use.)

## MEMORANDUM OF LAND LEASE AGREEMENT

THIS MEMORANDUM OF LAND LEASE AGREEMENT is made this 14th day of November, 2008, between Jolene M. Rust and Ryan J. Rust, wife and husband, with a mailing address of 115 West Railroad Street, Mercer, North Dakota 58559, hereinafter referred to as ("LESSOR"), and Badlands Cellular of North Dakota Limited Partnership d/b/a Verizon Wireless, with its address for notice located at 180 Washington Valley Road, Bedminster, New Jersey 07921, hereinafter referred to as ("LESSEE"). LESSOR and LESSEE are at times collectively referred to hereinafter as the "Parties" or individually as the "Party".

1. LESSOR and LESSEE entered into a Land Lease Agreement (the "Agreement") on Nov. 14, 2008, for an initial term of five (5) years, commencing on the Commencement Date. The Agreement shall automatically be extended for four (4) additional five (5) year terms unless LESSEE terminates it at the end of the then current term by giving LESSOR written notice of the intent to terminate at least six (6) months prior to the end of the then current term. If at the end of the fourth (4th) five (5) year extension term the Agreement has not been terminated by either Party by giving to the other written notice of an intention to terminate it at least three (3) months prior to the end of such term, the Agreement shall continue in force upon the same covenants, terms and conditions for a further term of five (5) years and for five (5) year terms thereafter until terminated by either Party by giving to the other written notice of its intention to so terminate at least three (3) months prior to the end of such term.

2. Pursuant to the Agreement, LESSOR leased to LESSEE a portion of that certain parcel of property (the entirety of LESSOR's property is referred to hereinafter as the "Property") located near the intersection of Mercer County Road 34 and North Dakota Highway 49, in the City of Beulah, County of Mercer, State of North Dakota, and being legally described on Exhibit "A", together with the non-exclusive right for ingress and egress, seven (7) days a week, twenty-four (24) hours a day, on foot or motor vehicle, including trucks, and for the installation and maintenance of utility wires, poles, cables, conduits, and pipes over, under, or along a right-of-way extending from the nearest public right-of-way, North Dakota Highway 49, to the demised premises. The demised premises and right-of-way are referred to as the "Premises." In the event any public utility is unable to use the aforementioned right-of-way, LESSOR has agreed to grant an additional right-of-way either to the LESSEE or to the public utility at no cost to the LESSEE.

3. The Agreement shall commence based upon the date LESSEE commences installation of the equipment on the Premises.

4. LESSEE has the right of first refusal to purchase the Premises during the initial term and all renewal terms of the Agreement.

5. The terms, covenants and provisions of the Agreement, the terms of which are hereby incorporated by reference into this Memorandum, shall extend to and be binding upon the respective executors, administrators, heirs, successors and assigns of LESSOR and LESSEE.

IN WITNESS WHEREOF, hereunto and to a duplicate hereof, LESSOR and LESSEE have caused this Memorandum to be duly executed on the date written herein below.

**LESSOR:**

Jolene M. Rust

Jolene M. Rust

Ryan J. Rust

Ryan J. Rust

Date: 8-26-08

**LESSEE:**

Badlands Cellular of North Dakota Limited Partnership
d/b/a Verizon Wireless
By: CommNet Cellular Inc.
Its Managing Agent

By: Beth Ann Drohan

Beth Ann Drohan
Its: Midwest Area Vice President – Network

Date: 11/1/08

## ACKNOWLEDGMENTS
## LESSOR ACKNOWLEDGMENT

STATE OF NORTH DAKOTA )
) ss.
COUNTY OF McLean )

On this 26 day of August in the year 2008 before me personally appeared Jolene M. Rust and Ryan J. Rust, wife and husband, known to me (or proved to me on the oath of Jolene M. Rust & Ryan J Rust) to be the persons who are described in and who executed the within and foregoing instrument, and acknowledged to me that they executed the same.

Linda Huelsman
Signature of Person Taking Acknowledgment

LINDA HUELSMAN
Notary Public
State of North Dakota
My commission expires Jun 17, 2011

Notary Public
Title or Rank

Serial Number, if any

## LESSEE ACKNOWLEDGMENT

STATE OF ILLINOIS )
) ss.
COUNTY OF COOK )

On this 14th day of November, 2008, before me, the undersigned, a Notary Public in and for the State of Illinois, duly commissioned and sworn, personally appeared Beth Ann Drohan, to me known to be the Midwest Area Vice President - Network of CommNet Cellular Inc., the Managing Agent of Badlands Cellular of North Dakota Limited Partnership d/b/a Verizon Wireless, that executed the foregoing instrument, and acknowledged said instrument to be the free and voluntary act and deed of Badlands Cellular of North Dakota Limited Partnership d/b/a Verizon Wireless, for the uses and purposes therein mentioned, and on oath stated that she is authorized to execute the said instrument.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal the day and year first above written.

"OFFICIAL SEAL"
LATONYA N ELLIS
NOTARY PUBLIC STATE OF ILLINOIS
COMMISSION EXPIRES 02/03/09

La Tonya Ellis
Print or Type Name: LaTonya Ellis
Notary Public in and for the State of Illinois
My appointment expires: 2-3-09

**Exhibit "A"**

**(Legal Description)**



The Southwest Quarter (SW1/4) of Section 13, Township 142 North, Range 88 West, Mercer County, North Dakota.

MORTGAGEE
MORTGAGOR
INDEXED ✓

**190926**

**STATE OF NORTH DAKOTA**
**COUNTY OF MERCER**

**OFFICE OF**
**COUNTY RECORDER**

I hereby certify that the within instrument was filed in this office for record this 12/18/2008 at 12:33 PM, and was duly recorded as Book 178 MISC on Page 445 Fee: $19.00

County Recorder Brenda L. Cook

By Deputy

Return To: MOSS & BARNETT, WELLS FARGO CENTER
90 S 7TH ST - STE 4800 MINNEAPOLIS, MN 55402-4

COUNTY RECORDER SEAL MERCER COUNTY, N DAK.

**NORTH DAKOTA INDUSTRIAL COMMISSION**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case Nos. 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## DECLARATION OF GARY A. SMITH

[¶1] I, Gary A. Smith, declare, based on personal knowledge, as follows:

[¶2] I have ownership interest in the following property that lies within the boundaries of the Review Area of the proposed KJ Hintz Storage Facility.

- Township 142 North, Range 87 West
  Section 15: NE1/4
  Oliver County, ND

[¶3] To the best of my knowledge, the property listed in ¶ 2 above is encumbered by the following easements:

- Oliver-Mercer Electric Cooperative, Inc. Right-of-Way Easement executed by Ralph Smith on June 6, 1946 (91050).

- Roughrider Electric Cooperative, Inc. Right-of-Way Easement executed by Faye Swenson on August 11, 2014 (90519).

[¶4] I have ownership interest in the following properties that lie within the boundaries of the Review Area of the proposed BK Fischer Storage Facility:

- Township 142 North, Range 87 West
  Section 20: NE1/4
  Oliver County, ND

- Township 142 North, Range 87 West
  Section 23: W1/2
  Oliver County, ND

[¶5] To the best of my knowledge, the properties listed in ¶ 4 above are encumbered by the following easements:

- Section 20:
  i. Oliver-Mercer Electric Cooperative, Inc. Right-of-Way Easement executed by George Fetch and Mrs. George Fetch on October 20, 1950 (91054).

  ii. ND State Water Commission Pipeline Easement granted by John and Jordan Smith on March 25, 2011 (86782).

- Section 23:
    i. ND State Water Commission Pipeline Easement granted by John and Jordan Smith on April 8, 2011 (86783).

    ii. Southwest Water Authority Right-of-Way Easement executed by Jennifer Rudolph on May 26, 2015 (90466).

    iii. Roughrider Electric Cooperative, Inc. Right-of-Way Easement executed by Gary Smith on February 25, 2016 (92455).

[¶6] I have ownership interest in the following properties that lie between, and will be impacted by, the proposed Storage Facilities:

- Township 142 North, Range 87 West
  Section 15: NW1/4
  Oliver County, ND

- Township 142 North, Range 87 West
  Section 22: SE1/4
  Oliver County, ND

- Township 142 North, Range 87 West
  Section 22: LOT A, within the SE1/4
  Oliver County, ND

  described as follows;
  COMMENCING at the East Quarter Corner of Section 22;
  THENCE S 00°00'00" W, along the east line of Section 22, a distance of 120.00', to the true point of beginning;
  THENCE S 00°00'00" W, along said line, a distance of 660.00';
  THENCE S 90°00'00" W, a distance of 660.00';
  THENCE N 00°00'00" E, a distance of 660.00';
  THENCE N 90°00'00" E, a distance of 660.00', back to the point of beginning.
  This parcel contains 10.0 acres, more or less.

[¶7] To the best of my knowledge, the properties listed in ¶ 6 above are encumbered by the following easements:

- Section 15:
    i. Roughrider Electric Cooperative, Inc. Right-of-Way Easement executed by Faye Swenson on August 11, 2014 (90519).

- Section 22:
    i. Oliver-Mercer Electric Cooperative, Inc. Right-of-Way Easement executed by S.H. Tjaden and Hannah Tjaden on April 23, 1945 (91056).

    ii. Southwest Water Authority Right-of-Way Easement executed by Jennifer Rudolph on May 26, 2015 (90466).

[¶8] Attached are the deeds which I believe indicate my ownership in each of the properties listed above.

[¶9] Attached are the easements currently encumbering these properties based on the information I have.

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on the 3 day of June , 2024 at 7:18, ND, United States.

Gary A. Smith
Gary A. Smith (Jun 3, 2024 19:20 CDT)

Gary A. Smith

96760 3/14/2022 12:54 PM Total Pages: 2
BOOK: 49 PAGE: 330 FEES: $20.00 RB PR . DEED
Mickie McNulty-Eide, OLIVER COUNTY RECORDER
By Rebecca Bethke, Deputy

LINDELL LAW OFFICE
PO BOX 427

WASHBURN, ND 58577

RECORDER OLIVER SEAL COUNTY STATE OF NORTH DAKOTA

# PERSONAL REPRESENTATIVE'S DEED OF DISTRIBUTION

THIS INDENTURE, Made this 4th day of March, 2022, by and between GARY A. SMITH, Personal Representative of the Estate of JOHN A. SMITH, deceased, hereinafter referred to as Grantor, and GARY A. SMITH, whose postoffice address is 2144 56th Avenue SW, Beulah, ND 58523, and JENNIFER L. SMITH, whose postoffice address is 5400 Kayley Drive, Bismarck, ND 58504, hereinafter referred to as Grantees, WITNESSETH:

1. That the Grantor is the duly appointed and acting Personal Representative of the Estate of JOHN A. SMITH, deceased, who died on October 12, 2020.

2. That the Grantees are entitled to distribution of certain real property, hereinafter described, from the estate of the decedent.

NOW, THEREFORE, Grantor does hereby grant, convey, transfer and distribute all of the right, title and interest of said decedent and said estate to the Grantees in the following proportions:

To: GARY A. SMITH - An undivided one-half (½) interest
JENNIFER L. SMITH - An undivided one-half (½) interest

in and to the following described real property situated in Oliver County, North Dakota, to-wit:

All of the decedent's interest in the following:

TOWNSHIP 142 NORTH, RANGE 87 WEST:
Section 15: NE¼ and NW¼
Section 20: NE¼

Subject to all existing easements and rights of way, prior mineral reservations and to all exceptions, conditions, or limitations expressed in Government Patents or in deeds of record.

together with all hereditaments and appurtenances thereunto belonging or in anywise appertaining, to the above named person, and her heirs, successors or assigns, forever.

Dated this 4th day of March, 2022.

Gary A. Smith

Gary A. Smith, Personal Representative of the Estate of John A. Smith, deceased

STATE OF NORTH DAKOTA )
(ss
COUNTY OF MCLEAN )

On this 4th day of March, 2022, before me personally appeared GARY A. SMITH, known to me to be the Personal Representative described in and who executed the within instrument and acknowledged to me that he executed the same as such Personal Representative.

DAVID A LINDELL
Notary Public
State of North Dakota
My commission expires Nov 30, 2025

(SEAL)

Notary Public

My commission expires:

I certify that the requirement for a report or statement of full consideration paid does not apply because this deed is for one of the transactions exempted by N.D.C.C. Section 11-18-02.2(6)( d ).

3-4-22

Grantee or Agent Date

Auditor's Office
Oliver County, N.D.
transfer entered this 14th day of
March 2022
County Auditor
By Deputy

95919 5/4/2021 9:49 AM PAGE: 1OF 2
BOOK: 43 PAGE: 603 FEES: $20.00 RB QUIT CLAIM DEED
Mickie McNulty-Eide, OLIVER COUNTY RECORDER
By Rebecca Rathro, Deputy

GARY SMITH
1006 CANNON LANE

WASHBURN, ND 58577

QUIT CLAIM DEED (Joint Tenants)

THIS INDENTURE, made this 3rd day of May, in the year of our Lord two thousand twenty one between JENNIFER L. SMITH f/k/a JENNIFER L. RUDOLPH, single, whose post office address is 5400 Kayley Drive, Bismarck, ND 58504, party of the first part, and GARY A. SMITH and CASSIE SMITH, husband and wife, as joint tenants and not as tenants in common, with the right of survivorship, whose postoffice address is 1006 Cannon Lane, Washburn, ND 58577, parties of the second part:

WITNESSETH, That the said party of the first part, for and in consideration of the sum of One Dollar and other valuable consideration, to her in hand paid by said parties of the second part, the receipt whereof is hereby acknowledged, do SELL, REMISE, RELEASE and QUIT CLAIM to the said parties of the second part, their heirs and assigns, the survivor of said parties of the second part, and the heirs, successors and assigns of such survivor, FOREVER, all right, title, interest, claim or demand in and to the tract or parcel of land lying and being in the County of Oliver and State of North Dakota, and described as follows, to-wit:

TOWNSHIP 142 NORTH, RANGE 87 WEST;
Section 22: SE¼

Subject to all existing easements and rights of way, prior mineral reservations and to all exceptions, conditions, or limitations expressed in Government Patents or in deeds of record.

TO HAVE AND TO HOLD The above Quitclaimed premises, together with all the hereditaments and appurtenances thereunto belonging or in anywise appertaining to the said parties of the second part, their assigns, the survivor of said parties of the second part, and the heirs, successors and assigns of such survivor, FOREVER.

05/03/2021 MON 10:44 FAX 701 463 3761 Lindell Law Office 001/001
RECEIVED 05/03/2021 10:19AM 17012508094 PETSMART

IN WITNESS WHEREOF, the said party of the first part hereunto sets her hand the day and year first above written.

Jennifer L. Smith f/k/a Jennifer L. Rudolph

STATE OF NORTH DAKOTA )
(ss
COUNTY OF BURLEIGH )

On this 3rd day of May, 2021, before me personally appeared JENNIFER L. SMITH f/k/a JENNIFER L. RUDOLPH, single, known to me to be the same person described in and who executed the within and foregoing instrument, and severally acknowledged to me that she executed the same.

WYATT JOHNSON
Notary Public
State of North Dakota
My Commission Expires Oct. 24, 2023

Notary Public
My commission expires: 10-24-23

I certify that the requirement for a report or statement of full consideration paid does not apply because this deed is for one of the transactions exempted N.D.C.C. Section 11-18-02.2(6) subdivision h.

Grantee or Agent 4-24-23
Date

Auditor's Office
Oliver County, N.D.
Transfer entered this 4th day of
May 2021
County Auditor
By _____ Deputy

05/03/2021 MON 10:37 FAX 701 462 3761 Lindell Law Office 003/003
RECEIVED 05/03/2021 10:11AM 17012508094
PETSMART

WARRANTY DEED

THIS INDENTURE, Made this 30th day of September, in the year of our Lord two thousand fourteen, between JOHN A. SMITH, single, whose postoffice address is 2144 56th Avenue SW, Beulah, ND 58523, party of the first part, and GARY A. SMITH, whose postoffice address is 6800 81st Street NE, Bismarck, ND 58503, and JENNIFER L. RUDOLPH, whose post office address is 5400 Kayley Drive, Bismarck, ND 58504, parties of the second part;

WITNESSETH, That the said party of the first part, for and in consideration of the sum of ONE DOLLAR AND OTHER VALUABLE CONSIDERATION to him in hand paid by said parties of the second part, the receipt whereof is hereby acknowledged, does by these presents GRANT, BARGAIN, SELL AND CONVEY unto the said party of the second part, their heirs and assigns, FOREVER, all the tract or parcel of land lying and being in the County of Oliver and State of North Dakota, and described as follows, to-wit:

All of the Grantor's interest in the following:

TOWNSHIP 142 NORTH, RANGE 87 WEST:
Section 22: SW¼ and E½
Section 23: W½
Section 24: E½SW¼; W½SE¼

Subject to all existing easements and rights of way, prior mineral reservations and to all exceptions, conditions, or limitations expressed in Government Patents or in deeds of record.

GRANTOR RESERVES UNTO HIMSELF, A LIFE ESTATE IN THE ABOVE DESCRIBED PROPERTY. THIS LIFE ESTATE SHALL INCLUDE THE RIGHT TO EXECUTE MINERAL LEASES AND RECEIVE ANY ROYALTIES PRODUCED FROM THIS REAL ESTATE DURING THE LIFE OF THE GRANTOR.

TO HAVE AND TO HOLD THE SAME, Together with all the hereditaments and appurtenances thereunto belonging or in anywise appertaining, to the said parties of the second part, their heirs and assigns FOREVER. And the said JOHN A. SMITH, single, said party of the first part, for himself, his heirs and assigns, that he is well seized in fee of the land and premises aforesaid, and has good right to sell and convey the same in manner and form aforesaid; that the same are free from all incumbrances,

and the above bargained and granted land and premises in the quiet and peaceable possession of said parties of the second part, their heirs and assigns, against all persons lawfully claiming or to claim the whole or any part thereof, the said party of the first part will warrant and defend.

IN WITNESS WHEREOF, The said party of the first part hereunto sets his hand the day and year first above written.

John A. Smith

STATE OF NORTH DAKOTA )
(ss
COUNTY OF MCLEAN )

On this 30th day of September, 2014, before me personally appeared JOHN A. SMITH, single, known to me to be the same person described in and who executed the within and foregoing instrument, and severally acknowledged to me that he executed the same.

(SEAL) DAVID A LINDELL
Notary Public
State of North Dakota
My commission expires Nov 30, 2017

Notary Public

My commission expires:

I certify that the requirement for a report or statement of full consideration paid does not apply because this deed is for one of the transactions exempted by N.D.C.C. Section 11-18-02.2(7)(c).

Grantee or Agent 9-30-14
Date

89244 10/1/2014 1:14 PM PAGE: 1 OF 2
BOOK: 40 PAGE: 334 FEES: $13.00 MM WARRANTY DEED
Kim Wilkens, OLIVER COUNTY RECORDER
By MM Kelty-Eide Deputy

LINDELL LAW OFFICE
PO BOX 427

WASHBURN, ND 58577

RECORDER OLIVER COUNTY SEAL STATE OF NORTH DAKOTA

Auditor's Office
Oliver County, N.D.
transfer entered this 1st day of
October 20 14
County Auditor
BY Deputy

97435 2/2/2023 11:33 AM Total Pages: 3
BOOK: 45 PAGE: 22 FEES: $20.00 RB QUIT CLAIM DEED
Mickie McNulty-Eide, OLIVER COUNTY RECORDER
By Rebecca Bethke, Deputy

UNION BANK
PO Box 789
BEULAH, ND 58523

RECORDER OLIVER SEAL COUNTY STATE OF NORTH DAKOTA

# QUIT CLAIM DEED

THIS INDENTURE, Made this 27 day of January, 2023, between Kreativ Homes LLC, a North Dakota limited liability company, Grantor and Gary A. Smith and Cassandra Smith, husband and wife, as Grantees, whose post office address is 2143 56th Ave SW Beulah ND 58523

WITNESSETH, for and in consideration of the sum of Ten Dollars ($10.00), grantor does hereby GRANT, CONVEY AND QUIT CLAIM to the said Grantees as joint tenants with rights of survivorship all all of the following real property lying and being in the County of Oliver, State of North Dakota, and described as follows, to-wit:

**SEE EXHIBIT A - LEGAL DESCRIPTION**

The legal description was prepared by Bismarck Title Company, 207 South Washington St., Bismarck, ND 58504 or obtained from a previously recorded instrument.

I certify that the requirement for a report or statement of full consideration paid does not apply because this deed is for one of the transactions exempted by Subdivision H of Section 6 of NDCC 11-18-02.2.

Grantee or Agent

IN TESTIMONY WHEREOF, the grantor has caused these presents to be executed in its company name by its Authorized Agent.

Kreativ Homes LLC

BY: _____, Agent
Sally Goldammer
Authorized Agent

STATE OF ND

COUNTY OF Burleigh

On this 23 day of November, 2022, before me, personally appeared Sally Goldammer, known to me to be the Authorized Agent of the Limited Liability Company that is described in, and that she executed the foregoing instrument, and she acknowledged that such Limited Liability Company executed the same.

(Seal)

HEIDI J BERGLAND
Notary Public
State of North Dakota
My Commission Expires Oct 10, 2026

Heidi J Bergland
Notary Public
My Commission Expires: _____

File No.: **73506**

## EXHIBIT A

LOT A WITHIN THE SE¼ OF SECTION 22, TOWNSHIP 142 NORTH, RANGE 87 WEST OF THE FIFTH PRINCIPAL MERIDIAN, OLIVER COUNTY, NORTH DAKOTA, MORE FULLY DEPICTED IN PLAT FILED FOR RECORD DECEMBER 21, 2020 IN BOOK E, PAGE 51 AS DOCUMENT NO. 95657; DESCRIBED AS COMMENCING AT THE EAST QUARTER CORNER OF SECTION 22; THENCE SOUTH 00 DEG., 00 MIN., 00 SEC., WEST, ALONG THE EAST LINE OF SECTION 22 A DISTANCE OF 120.00 FEET, TO THE TRUE POINT OF BEGINNING; THENCE SOUTH 00 DEG., 00 MIN., 00 SEC., WEST, ALONG SAID LINE, A DISTANCE OF 660.00 FEET; THENCE SOUTH 90 DEG., 00 MIN., 00 SEC., WEST, A DISTANCE OF 660 FEET; THENCE NORTH 00 DEG., 00 MIN., 00 SEC., EAST, A DISTANCE OF 660.00 FEET; THENCE NORTH 90 DEG., 00 MIN., 00 SEC. EAST, A DISTANCE OF 660.00 FEET, BACK TO THE POINT OF BEGINNING.

Auditor's Office
Oliver County, N.D.
transfer entered this 2 day of
February 2023
County Auditor
By_____Deputy

96113 7/23/2021 11:35 AM PAGE: 1 OF 3
BOOK: 43 PAGE: 699 FEES: $20.00 RB QUIT CLAIM DEED
Mickie McNulty-Eide, OLIVER COUNTY RECORDER
By Rebecca Bethke, Deputy

CASSANDRA SMITH
1400 NEW ENERGY DR #110

BEULAH, ND 58523

RECORDER OLIVER SEAL COUNTY STATE OF NORTH DAKOTA

# QUIT CLAIM DEED (Joint Tenants)

THIS INDENTURE, made this 23 day of July, in the year of our Lord two thousand twenty one between JORDAN B. SMITH, single, whose postoffice address is 15219 French Drive North, Hugo, MN 55038 and GARY A. SMITH and CASSIE SMITH, husband and wife, whose post office address is 1006 Cannon Lane, Washburn, ND 58577, parties of the first part, and GARY A. SMITH and CASSIE SMITH, husband and wife, as joint tenants and not as tenants in common, with the right of survivorship, whose postoffice address is 1006 Cannon Lane, Washburn, ND 58577, parties of the second part;

WITNESSETH, That the said parties of the first part, for and in consideration of the sum of One Dollar and other valuable consideration, to them in hand paid by said parties of the second part, the receipt whereof is hereby acknowledged, do SELL, REMISE, RELEASE and QUIT CLAIM to the said parties of the second part, their heirs and assigns, the survivor of said parties of the second part, and the heirs, successors and assigns of such survivor, FOREVER, all right, title, interest, claim or demand in and to the tract or parcel of land lying and being in the County of Oliver and State of North Dakota, and described as follows, to-wit:

All of the Grantors interest in the following:

TOWNSHIP 142 NORTH, RANGE 87 WEST:
Section 22: Lot A within the SE¼ described as follows;
Commencing at the East Quarter Corner of Section 22;
THENCE S00°00'00"W, along the east line of Section 22, a distance of 120 feet, to the true point of beginning;
THENCE S00°00'00"W, along said line, a distance of 660 feet;
THENCE S90°00'00"W, a distance of 660 feet;
THENCE N00°00'00"E, a distance of 660 feet;
THENCE N90°00'00"E, a distance of 660 feet, back to the point of beginning.

Subject to all existing easements and rights of way, prior mineral reservations and to all exceptions, conditions, or limitations expressed in Government Patents or in deeds of record.

TO HAVE AND TO HOLD The above Quitclaimed premises, together with all the hereditaments and appurtenances thereunto belonging or in anywise appertaining to the said parties of the second part, their assigns, the survivor of said parties of the second part, and the heirs, successors and assigns of such survivor, FOREVER.

IN WITNESS WHEREOF, the said parties of the first part hereunto sets his hand the day and year first above written.

Jordan B. Smith

STATE OF MINNESOTA )
(ss
COUNTY OF Swift )

On this 14th day of July, 2021, before me personally appeared JORDAN B. SMITH, single, known to me to be the same person described in and who executed the within and foregoing instrument, and severally acknowledged to me that he executed the same.

KERRY L. WILCOX
NOTARY PUBLIC-MINNESOTA
My Comm. Exp. Jan. 31, 2026

Notary Public
My commission expires:

Auditor's Office
Oliver County, N.D.
transfer entered this 23rd day of
July 2021
County Auditor
By Deputy

IN WITNESS WHEREOF, the said parties of the first part hereunto set their hands the day and year first above written.

Gary A. Smith

Cassie Smith

STATE OF NORTH DAKOTA )
(ss
COUNTY OF MCLEAN)

On this 23 day of July, 2021, before me personally appeared GARY A. SMITH and CASSIE SMITH, husband and wife, known to me to be the same persons described in and who executed the within and foregoing instrument, and severally acknowledged to me that they executed the same.

CASSIE L LEIDHOLM
Notary Public
State of North Dakota
My commission expires Apr 14, 2025

Notary Public
My commission expires:

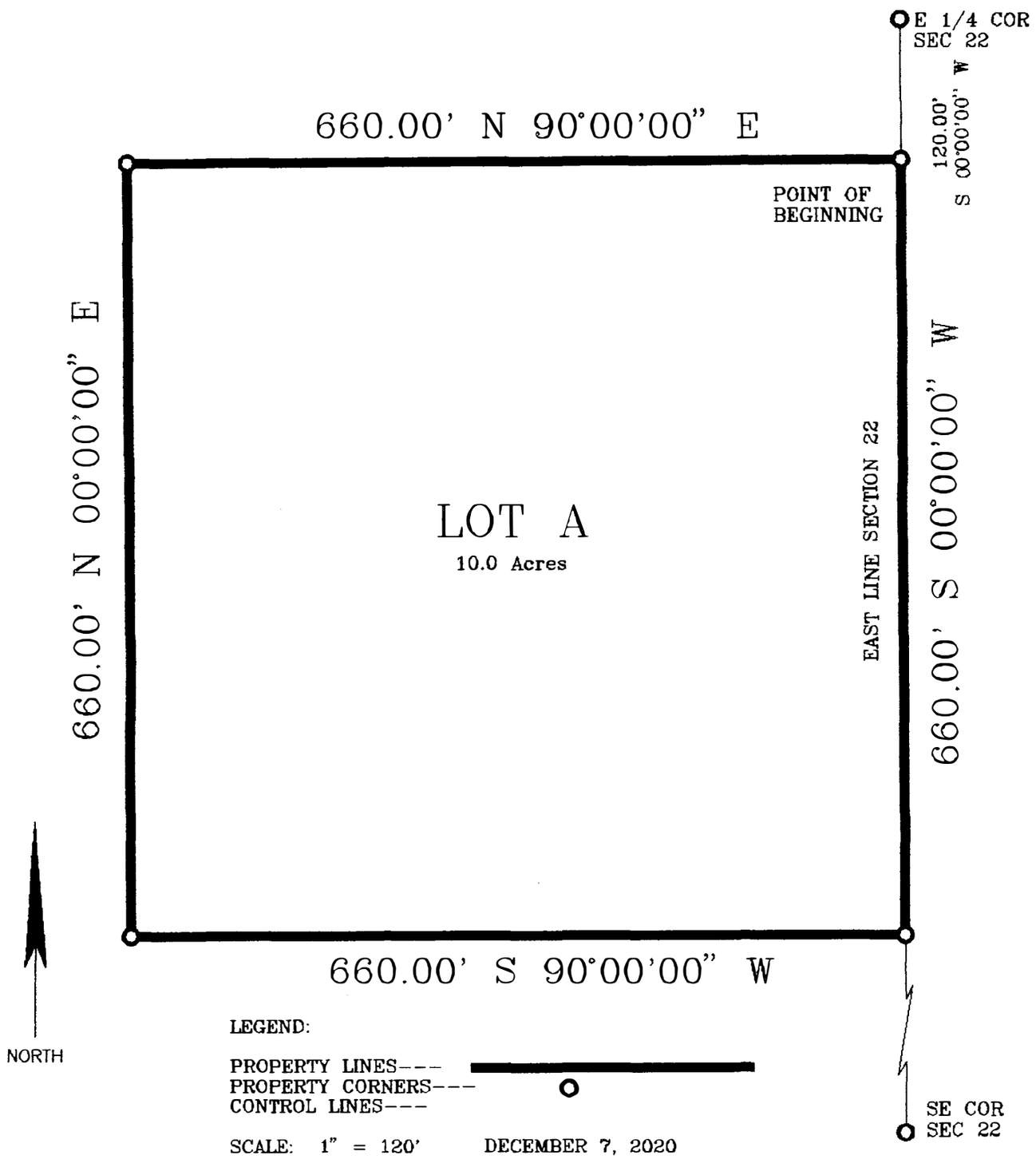
I certify that the requirement for a report or statement of full consideration paid does not apply because this deed is for one of the transactions exempted N.D.C.C. Section 11-18-02.2(6) subdivision h.

Grantee or Agent 7/23/21
Date

# PLAT OF

**LOT A, within the SE¼ of Section 22, Township 142 North, Range 87 West, Oliver County, North Dakota.**

**Present Owner:** Gary Smith




# DESCRIPTION

**LOT A, within the SE¼ of Section 22, Township 142 North, Range 87 West, Oliver County, North Dakota.**
**described as follows;**
**COMMENCING at the East Quarter Corner of Section 22;**
**THENCE S 00°00'00" W, along the east line of Section 22, a distance of 120.00', to the true point of beginning;**
**THENCE S 00°00'00" W, along said line, a distance of 660.00';**
**THENCE S 90°00'00" W, a distance of 660.00';**
**THENCE N 00°00'00" E, a distance of 660.00';**
**THENCE N 90°00'00" E, a distance of 660.00', back to the point of beginning.**

**This parcel contains 10.0 acres, more or less.**
**This parcel is subject to all recorded easements and rights of way.**
**Basis of bearings is assumed.**

THE UNDERSIGNED, Owners of the within described property, in accordance with the provisions of Sec. 57-02-39, North Dakota Century Code, and upon demand of the County Auditor of _____ County, North Dakota, have caused to be made the within and foregoing plat of said land with the lots as herein described, and have caused the same to be placed on record, as provided by law.

Witness our hands and seal, this _____ day of _____, 20_____.
In presence of _____} _____
_____}_____
}
}

STATE OF NORTH DAKOTA, }
SS.
COUNTY OF _____}

I, _____, a _____
within and for said County, do hereby certify that on this _____ day of _____
A.D., 20_____, personally appeared before me _____
_____, to me well known to be the same person____ described in and who executed the within and foregoing instrument and acknowledged that ___he___ executed the same freely and voluntarily.

My commission expires _____, 20____, Notary Public, _____ County, N.D.

I, JOHN R. WICKLUND, do hereby certify that, at the request of GARY SMITH, I made the within and foregoing plat and description of the land herein described and that the lots, distances, area, and locations as indicated on said plat and contained in said description are true and correct to my best knowledge and belief.

JOHN R. WICKLUND REGISTERED LAND SURVEYOR NORTH DAKOTA

John R. Wicklund

Subscribed and sworn to before me this 8 day of December, A.D. 2020.

BRANDIE LANG
Notary Public
State of North Dakota
My Commission Expires Nov 15, 2022

Brandie Lang
NOTARY

My commission expires Nov. 15, 2022, Notary Public, Burleigh County, N.D.

## CERTIFICATE OF APPROVAL

The within and foregoing plat is hereby approved.
Dated _____, 20_____.

City Engineer of (or) _____
_____ of _____County, N.D.

**Plat of**

**Section _____, Township _____, Range _____**

**********

95657 12/21/2020 1:24 PM PAGE: 1 OF 2
BOOK: PAGE: FEES: $20.00 RB Plats
Mickie McNulty-Eide, OLIVER COUNTY RECORDER
By Rebecca Bethke, Deputy

I hereby ... this office
On ... rded on
At ___ CASSANDRA SMITH
Pag 1006 CANNON LANE
____ WASHBURN, ND 58577

RECORDER OLIVER SEAL COUNTY STATE OF NORTH DAKOTA

By _____ Deputy
**********

WARRANTY DEED

THIS INDENTURE, Made this 30th day of September, in the year of our Lord two thousand fourteen, between JOHN A. SMITH, single, whose postoffice address is 2144 56th Avenue SW, Beulah, ND 58523, party of the first part, and GARY A. SMITH, whose postoffice address is 6800 81st Street NE, Bismarck, ND 58503, and JENNIFER L. RUDOLPH, whose post office address is 5400 Kayley Drive, Bismarck, ND 58504, parties of the second part;

WITNESSETH, That the said party of the first part, for and in consideration of the sum of ONE DOLLAR AND OTHER VALUABLE CONSIDERATION to him in hand paid by said parties of the second part, the receipt whereof is hereby acknowledged, does by these presents GRANT, BARGAIN, SELL AND CONVEY unto the said party of the second part, their heirs and assigns, FOREVER, all the tract or parcel of land lying and being in the County of Oliver and State of North Dakota, and described as follows, to-wit:

All of the Grantor's interest in the following:

TOWNSHIP 142 NORTH, RANGE 87 WEST:
Section 22: SW¼ and E½
Section 23: W½
Section 24: E½SW¼; W½SE¼

Subject to all existing easements and rights of way, prior mineral reservations and to all exceptions, conditions, or limitations expressed in Government Patents or in deeds of record.

GRANTOR RESERVES UNTO HIMSELF, A LIFE ESTATE IN THE ABOVE DESCRIBED PROPERTY. THIS LIFE ESTATE SHALL INCLUDE THE RIGHT TO EXECUTE MINERAL LEASES AND RECEIVE ANY ROYALTIES PRODUCED FROM THIS REAL ESTATE DURING THE LIFE OF THE GRANTOR.

TO HAVE AND TO HOLD THE SAME, Together with all the hereditaments and appurtenances thereunto belonging or in anywise appertaining, to the said parties of the second part, their heirs and assigns FOREVER. And the said JOHN A. SMITH, single, said party of the first part, for himself, his heirs and assigns, that he is well seized in fee of the land and premises aforesaid, and has good right to sell and convey the same in manner and form aforesaid; that the same are free from all incumbrances,

and the above bargained and granted land and premises in the quiet and peaceable possession of said parties of the second part, their heirs and assigns, against all persons lawfully claiming or to claim the whole or any part thereof, the said party of the first part will warrant and defend.

IN WITNESS WHEREOF, The said party of the first part hereunto sets his hand the day and year first above written.

John A. Smith

STATE OF NORTH DAKOTA )
(ss
COUNTY OF MCLEAN )

On this 30th day of September, 2014, before me personally appeared JOHN A. SMITH, single, known to me to be the same person described in and who executed the within and foregoing instrument, and severally acknowledged to me that he executed the same.

(SEAL) DAVID A LINDELL
Notary Public
State of North Dakota
My commission expires Nov 30, 2017

Notary Public

My commission expires:

I certify that the requirement for a report or statement of full consideration paid does not apply because this deed is for one of the transactions exempted by N.D.C.C. Section 11-18-02.2(7)(c).

Grantee or Agent 9-30-14
Date

89244 10/1/2014 1:14 PM PAGE: 1 OF 2
BOOK: 40 PAGE: 334 FEES: $13.00 MM WARRANTY DEED
Kim Wilkens, OLIVER COUNTY RECORDER
By MM Kelty-Eide Deputy

LINDELL LAW OFFICE
PO BOX 427

WASHBURN, ND 58577

RECORDER OLIVER COUNTY SEAL STATE OF NORTH DAKOTA

Auditor's Office
Oliver County, N.D.
transfer entered this 1st day of
October 20 14
County Auditor
BY Deputy

97546 3/31/2023 11:30 AM Total Pages: 9
BOOK: 45 PAGE: 75 FEES: $65.00 RB STIPULATION AND CROS
Mickie McNulty-Eide OLIVER COUNTY RECORDER
By Rebecca Bohlke, Deputy

PEARCE & DURICK
314 E THAYER AVE
PO BOX 400
BISMARCK, ND 58502

RECORDER OLIVER SEAL COUNTY STATE OF NORTH DAKOTA

## STIPULATION AND CROSS CONVEYANCE

This Stipulation and Cross-Conveyance is entered into among **JORDAN B. SMITH**, an unmarried single person whose address is 15219 French Dr. N, Hugo, MN 55038, **GARY A. SMITH** and **CASSIE SMITH**, husband and wife, whose address is 2143 56th Avenue SW, Beulah, ND 58523, and **JENNIFER L. RUDOLPH, A/K/A JENNIFER L. SMITH**, an unmarried single person whose address is 5400 Kayley Drive, Bismarck, ND 58504, hereinafter referred to as "**PARTIES.**"

WHEREAS, Jordan B. Smith, Gary Smith, and Jennifer L. Rudolph, whether individually, as tenants in common, as joint tenants, or a combination thereof, are the owners of several tracts of property, some of which are surface interests and some of which include both surface and mineral interests, located in Oliver County, North Dakota, to wit:

**TOWNSHIP 142 NORTH, RANGE 87 WEST:**

**Section 22:** SW¼; NE¼;

SE¼, less Lot A within the SE¼ of Section 22, Township 142 North, Range 87 West of the Fifth Principal Meridian, Oliver County, North Dakota, more fully depicted in Plat Filed For Record December 21, 2020 in Book E, Page 51 as **Document No. 95657;**

Lot A within the SE/4 described as follows:

Commencing at the East Quarter Corner of Section 22;

THENCE S 00°00'00"W, along the east line of Section 22, a distance of 120 feet, to the true point of beginning:

THENCE S 00°00'00'W, along said line, a distance of 660 feet;

THENCE S 90°00'00"W, a distance of 660 feet; THENCE N 00°00'00"E. a distance of 660 feet;

THENCE N 90°00'00"E, a distance of 660 feet, back to the point of beginning.

Subject to all existing easements and rights of way, prior mineral reservations and to all exceptions, conditions, or limitations expressed in Government Patents or in deeds of record.

The legal description was obtained from a previously recorded document (hereafter, ***"SE1/4 of Section 22"***).

**Section 23:** W½

**Section 24:** E½SW¼; W½SE¼

**All subject to existing easements, leases, rights-of-way, restrictive covenants, and mineral conveyances and reservations of record.**

("Property").

AND WHEREAS, the Parties desire to change the ownership of certain tracts of land so as to effectuate their intended ownership interests;

NOW, THEREFORE, in consideration of the sum of Ten Dollars ($10.00) and other good and valuable consideration, including the mutual agreement of the Parties, the receipt and sufficiency of which are hereby acknowledged, the Parties do stipulate, cross-convey, grant, bargain, and sell, each and to the other, to the extent required in order to achieve the following ownership in the Property:

(1) **GARY A. SMITH** and **JENNIFER L. RUDOLPH**, as Tenants in Common:

**Township 142 North, Range 87 West 5th P.M.**

Section 22: SE¼ less Lot A within the SE¼ of Section 22, Township 142 North, Range 87 West of the Fifth Principal Meridian, Oliver County, North Dakota, more fully depicted in Plat Filed For Record December 21, 2020 in Book E, Page 51 as Document No. 95657; Described as commencing at the East Quarter Corner of Section 22; Thence South 00 Deg., 00 Min., 00 Sec., West, Along the East Line of Section 22 a Distance of 120.00 Feet, to the True Point of Beginning; Thence South 00 Deg., 00 Min., 00 Sec., West, Along Said Line, a Distance of 660.00 Feet; Thence South 90 Deg., 00 Min., 00 Sec., West, a Distance of 660 Feet; Thence North 00 Deg., 00 Min., 00 Sec., East, a Distance of 660.00 Feet; Thence North 90 Deg., 00 Min., 00 Sec. East a Distance of 660.00 Feet, Back to the Point of Beginning.

The legal description was obtained from a previously recorded document.

Section 23: W½

(2) **Jordan B. Smith**:

**Township 142 North, Range 87 West 5th P.M.**

Section 22: SW¼; NE¼

Section 24: E½SW¼; W½SE¼

This Stipulation and Cross-Conveyance shall be binding upon the Parties, their heirs, devisees, personal representatives, successors and assigns.

This Stipulation and Cross-Conveyance has been executed by the Parties as of the dates of their respective acknowledgements.

**[REMAINDER OF PAGE LEFT BLANK INTENTIONALLY]**

**[SIGNATURE PAGES FOLLOW]**

Dated this ___ day of 3/7/23____, 2023

JORDAN B. SMITH

STATE OF MINNESOTA )
) ss.
COUNTY OF Swift )

On this 7th day of March____, 2023, before me personally appeared **JORDAN B. SMITH**, known to me to be the person who is described in and who executed the within instrument, and acknowledged to me that he executed the same.

TIMOTHY RYAN OLSON
NOTARY PUBLIC - MINNESOTA
My Comm. Exp. Jan. 31, 2026

Notary Public

Dated this 27 day of March, 2023

Gary A. Smith
GARY A. SMITH

Cassie Smith
CASSIE SMITH

STATE OF NORTH DAKOTA )
) ss.
COUNTY OF BURLEIGH )

On this 27 day of MARCH, 2023, before me personally appeared **GARY A. SMITH** and **CASSIE SMITH**, husband and wife, known to me to be the persons who are described in and who executed the within instrument, and acknowledged to me that they executed the same.

ANNETTE KIRSCHENHEITER
Notary Public
State of North Dakota
My Commission Expires April 18, 2024

Annette Kirschenheiter
Notary Public

Dated this 27 day of March, 2023

JENNIFER L. RUDOLPH
A/K/A JENNIFER L. SMITH

STATE OF NORTH DAKOTA )
) ss.
COUNTY OF BURLEIGH )

On this 27 day of MARCH, 2023, before me personally appeared **JENNIFER L. RUDOLPH A/K/A JENNIFER L. SMITH**, known to me to be the person who is described in and who executed the within instrument, and acknowledged to me that she executed the same.

Notary Public

ANNETTE KIRSCHENHEITER
Notary Public
State of North Dakota
My Commission Expires April 18, 2024

**STATEMENT OF CONSIDERATION**

I certify that the requirement for a report or statement of full consideration paid does not apply because this deed is for one of the transactions exempted by subdivisions (c) of subsection 6 of 11-18-02.2, N.D.C.C.

Date: 03/27/2023

Gary A. Smith / Agent

**STATEMENT OF CONSIDERATION**

I certify that the requirement for a report or statement of full consideration paid does not apply because this deed is for one of the transactions exempted by subdivisions (c) of subsection 6 of 11-18-02.2, N.D.C.C.

Date: 3/7/23 Jordan B. Smith

Jordan B. Smith / Agent

State of Minnesota

County of Swift

On this 7th day of March, 2023, before me personally appeared Jordan B Smith, known to me to be the person who is described in and who executed the within instrument and acknowledged to me that he executed the same.

TIMOTHY RYAN OLSON
NOTARY PUBLIC-MINNESOTA
My Comm. Exp. Jan. 31, 2026

TRO 3-7-23
notary public

**STATEMENT OF CONSIDERATION**

I certify that the requirement for a report or statement of full consideration paid does not apply because this deed is for one of the transactions exempted by subdivisions (c) of subsection 6 of 11-18-02.2, N.D.C.C.

Date: 3/27/2023 _____

Jennifer L. Rudolph a/k/a Jennifer L. Smith / Agent

Auditor's Office
Oliver County, N.D.
transfer entered this 29 day of
March 2023
_____
County Auditor
By_____Deputy

WARRANTY DEED

THIS INDENTURE, Made this 30th day of September, in the year of our Lord two thousand fourteen, between JOHN A. SMITH, single, whose postoffice address is 2144 56th Avenue SW, Beulah, ND 58523, party of the first part, and GARY A. SMITH, whose postoffice address is 6800 81st Street NE, Bismarck, ND 58503, and JENNIFER L. RUDOLPH, whose post office address is 5400 Kayley Drive, Bismarck, ND 58504, parties of the second part;

WITNESSETH, That the said party of the first part, for and in consideration of the sum of ONE DOLLAR AND OTHER VALUABLE CONSIDERATION to him in hand paid by said parties of the second part, the receipt whereof is hereby acknowledged, does by these presents GRANT, BARGAIN, SELL AND CONVEY unto the said party of the second part, their heirs and assigns, FOREVER, all the tract or parcel of land lying and being in the County of Oliver and State of North Dakota, and described as follows, to-wit:

All of the Grantor's interest in the following:

TOWNSHIP 142 NORTH, RANGE 87 WEST:
Section 22: SW¼ and E½
Section 23: W½
Section 24: E½SW¼; W½SE¼

Subject to all existing easements and rights of way, prior mineral reservations and to all exceptions, conditions, or limitations expressed in Government Patents or in deeds of record.

GRANTOR RESERVES UNTO HIMSELF, A LIFE ESTATE IN THE ABOVE DESCRIBED PROPERTY. THIS LIFE ESTATE SHALL INCLUDE THE RIGHT TO EXECUTE MINERAL LEASES AND RECEIVE ANY ROYALTIES PRODUCED FROM THIS REAL ESTATE DURING THE LIFE OF THE GRANTOR.

TO HAVE AND TO HOLD THE SAME, Together with all the hereditaments and appurtenances thereunto belonging or in anywise appertaining, to the said parties of the second part, their heirs and assigns FOREVER. And the said JOHN A. SMITH, single, said party of the first part, for himself, his heirs and assigns, that he is well seized in fee of the land and premises aforesaid, and has good right to sell and convey the same in manner and form aforesaid; that the same are free from all incumbrances,

and the above bargained and granted land and premises in the quiet and peaceable possession of said parties of the second part, their heirs and assigns, against all persons lawfully claiming or to claim the whole or any part thereof, the said party of the first part will warrant and defend.

IN WITNESS WHEREOF, The said party of the first part hereunto sets his hand the day and year first above written.

John A. Smith

STATE OF NORTH DAKOTA )
(ss
COUNTY OF MCLEAN )

On this 30th day of September, 2014, before me personally appeared JOHN A. SMITH, single, known to me to be the same person described in and who executed the within and foregoing instrument, and severally acknowledged to me that he executed the same.

(SEAL) DAVID A LINDELL
Notary Public
State of North Dakota
My commission expires Nov 30, 2017

Notary Public

My commission expires:

I certify that the requirement for a report or statement of full consideration paid does not apply because this deed is for one of the transactions exempted by N.D.C.C. Section 11-18-02.2(7)(c).

Grantee or Agent 9-30-14
Date

89244 10/1/2014 1:14 PM PAGE: 1 OF 2
BOOK: 40 PAGE: 334 FEES: $13.00 MM WARRANTY DEED
Kim Wilkens, OLIVER COUNTY RECORDER
By MM Kelty-Eide Deputy

LINDELL LAW OFFICE
PO BOX 427

WASHBURN, ND 58577

RECORDER OLIVER COUNTY SEAL STATE OF NORTH DAKOTA

Auditor's Office
Oliver County, N.D.
transfer entered this 1st day of
October 20 14
County Auditor
BY Deputy

OK
220

01098

Location Number

RIGHT-OF-WAY EASEMENT

KNOW ALL MEN BY THESE PRESENTS, that the undersigned Ralph Smith (single) for a good and valuable consideration, the receipt whereof is hereby acknowledged, does hereby grant unto the Oliver-Mercer Electric Cooperative, Inc. a corporation, whose post office address is Hazen, N. Dak., North Dakota, and to its successors or assigns, the right to enter upon the lands of the undersigned, situated in the county of Oliver, State of North Dakota and more particularly described as follows:

Sec. 15, 142-87

Shoulder of SE+NE¼ 9pm.

and to place, construct, operate, repair, maintain, relocate and replace thereon and in or upon all streets, roads or highways abutting said lands an electric transmission or distribution line or system, and to cut and trim trees and shrubbery to the extent necessary to keep them clear of said electric line or system and to cut down from time to time all dead, weak, leaning or dangerous trees that are tall enough to strike the wires in falling.

In granting this easement it is understood that at pole locations, only a single pole and arrurtenance will be used, and that the location of the pole will be such as to form the least possible interference to farm operations, so long as it does not materially increase the cost of construction.

The undersigned covenants that he is the owner of the above described lands and that the said lands are free and clear of encumbrances and liens of whatsoever character except those held by the following persons:

It is further understood that, whenever necessary, words in this instrument in the singular shall be construed to read in the plural and that words used in the masculine gender shall be construed to read in the feminine.

IN WITNESS WHEREOF, the undersigned has a set his hand and seal this 16 day of June, 1946.

Signed, sealed and delivered in the presence of:

Ralph Smith ✓

Banks H. Siefer

Ralph E. Smith

STATE OF NORTH DAKOTA
OLIVER COUNTY
SEAL
RECORDER

91050 8/21/2015 10:30 AM PAGE: 1 OF 2
BOOK: 1 PAGE: 1074 FEES: $13.00 MM EASEMENT (ROUGHRID)
Kim Wilkens, OLIVER COUNTY RECORDER
By MMRulty Ed Deputy

5

(1)
STATE OF NORTH DAKOTA

COUNTY OF Mercer SS.

Bank H Sieber being first duly sworn says that he is one of the witnesses to the above and foregoing easements, that Ralph Smith and whose names is and/or are subscribed to the above and foregoing instruments as a party is and/or are the persons described in said easement and that he signed said instrument in my presence and that I in their presence signed my name thereto as a subscribing witness.

Bank H Sieber

SUBSCRIBED and sworn to before me this 15 day of June 1946.

R J Sailer

Notary Public in and for the County of Mercer and State of North Dakota.

My commission expires May 15, 1947

(1)
STATE OF NORTH DAKOTA
COUNTY OF Mercer SS.

On this 15 day of June 1946 before me R J Sailer a Notary Public within and for the State of North Dakota, personally appeared Bank H Sieber known to me to be one of the persons who subscribed his name to the above and foregoing instrument as a witness, and who acknowledged to me that he subscribed his name thereto as such witness, and who proved to me that the person who and/or whose names are subscribed to the foregoing instrument are the persons described

R J Sailer

Notary Public in and for the County of Mercer and State of North Dakota.

My commission expires May 15 1947

**********

(2)
STATE OF

County of SS.

On this day of 19 , before me a Notary Public in and for said County and State, personally appeared

known to me to be the persons who described in and who executed within and foregoing instrument and acknowledged to me that he executed the same.

Notary Public in and for the County of and State North Dakota.

My commission expires

ROUGHRIDER ELECTRIC COOPERATIVE
800 HWY DR

HAZEN, ND 58545

## RIGHT OF WAY EASEMENT

THIS AGREEMENT made and entered into this 11th day of AUGUST, 2014 between Faye Swenson, hereinafter called "Owner" (whether one or more) and **ROUGHRIDER ELECTRIC COOPERATIVE, INC.**, whose post office address is 800 Highway Drive, Hazen, North Dakota 58545-4737, hereinafter called "COOPERATIVE".

WITNESSETH that for valuable consideration, the receipt and sufficiency of which is hereby acknowledged, Owner grants unto Cooperative, its successors and assigns, for a term of 99 years from the date hereof, an easement to construct, reconstruct, operate and maintain an electric distribution system, overhead, underground or both including all poles, guys, anchors wires, surface terminals, and all accessories and appurtenances necessary or desirable in connection therewith, under, over, upon and across lands of Owner and/or in or upon all streets, roads or highways abutting said lands situated in Oliver County, North Dakota, and more particularly described as follows, to-wit:

A strip of land 20 feet in width, the same being 10 feet on each side of a centerline described as follows.

TOWNSHIP 142 NORTH, RANGE 87 WEST
Section 15

The facilities erected hereunder shall remain the property of the Cooperative. Cooperative shall have the right to inspect, rebuild, remove, repair, improve and make such changes, alterations, substitutions and additions in and to its facilities as Cooperative may from time to time deem advisable, including the right to increase or decrease the size or capacity of its system, together with necessary accessories and appurtenances; the right to increase or decrease the size of the facilities and equipment situated upon the premises; the right to permit or otherwise agree to the joint use or occupancy of the overhead lines or the trench and related underground facilities by other persons, associations or corporations; and the right to at any time use the property described above to extend lines and facilities to serve the property of persons other than the Owner.

Any damages to the surface of the right-of-way or to crops, fences, gates, drains, ditches, or lines of the Owner, caused by the Cooperative in the installation, repair maintenance, reconstruction or removal of said electrical properties and appurtenances, shall be promptly repaired, replaced or paid for by the Cooperative, provided a claim therefore is presented to the Cooperative at its General Office within ninety (90) days after such damages occur. If the amount of said damages cannot be agreed upon, the Cooperative and the Owner shall each select an arbitrator, and these two shall select a third arbitrator, and the decision and award of the arbitrators shall be final.

Cooperative shall at all times have the right to keep the easement clear of all buildings, structures or other obstructions, trees, shrubbery, undergrowth and roots.

Owner, his successors and assigns, may use the land within the easement for any purpose not inconsistent with the rights granted, provided such use does not interfere with or endanger the Cooperative's facilities or the rights granted under this easement.

For the purpose of constructing, inspecting, maintaining or operating its facilities, Cooperative shall have the right of ingress to and egress from the easement over the lands of Owner adjacent to the easement and lying between public or private roads and the easement, such right to be exercised in such manner as shall occasion the least practicable damage and inconvenience to Owner.

Owner covenants that he is seized of and has the right to convey the said easement, rights and privileges; that Cooperative shall have quiet and peaceable possession, use and enjoyment of the aforesaid easement, rights and privileges, and that Owner shall execute such further assurances thereof as may be requested by the Cooperative.

Faye Swenson

STATE OF NORTH DAKOTA )
)ss
COUNTY OF MERCER )

On this 11th day of AUGUST, 2014, before me, a Notary Public in and for said County and State personally appeared FAYE SWENSON, known to me to be the person(s) described in and who executed the within and foregoing instrument and acknowledged to me that he/she/they executed the same.

*Notary Seal Location*

90519 7/21/2015 1:56 PM PAGE: 1 OF 1
BOOK: 1 PAGE: 161 FEES: $10.00 MM EASEMENT ROUGHRIDE
Kim Wilkens, OLIVER COUNTY RECORDER
By

RECORDER SEAL OLIVER COUNTY STATE OF NORTH DAKOTA

Notary Public State of North Dakota

My Commission Expires:
6/16/16

ERIC BUCHHOLZ
Notary Public
State of North Dakota
My Commission Expires June 16, 2016

ROUGHRIDER ELECTRIC COOPERATIVE
800 HWY DR

HAZEN, ND 58545

Ofto

01102

FORM LE-189 R

RIGHT OF WAY EASEMENT

KNOW ALL MEN BY THESE PRESENTS, that we the undersigned, (Whether one or more) George Fetch and Mrs. George Fetch

(~~unmarried~~) (husband and wife), for a good and valuable consideration, the receipt whereof is hereby acknowledged, do hereby grant unto Oliver Mercer Electric Cooperative, Inc., a cooperative corporation, (hereinafter called the "Cooperative"), whose post office address is Hazen, North Dakota, and to its successors or assigns, the right to enter upon the lands of the undersigned, situated in the County of Oliver, State of North Dakota, and more particularly described as follows:

A tract of land approximately ---------- acres in area, located ----------miles in a ---------- direction from the town of ----------, and further described as being in the

NE 1/4 Section 20 Township 142 Range 87

Section Township Range

Section Township Range

Section Township Range

and to contract, operate and maintain on the above described lands, and/or in or upon all streets, roads or highways abutting said lands, an electric transmission or distribution line or system, and to cut and trim trees and shrubbery that may interfere with or threaten to endanger the operation and maintenance of said line or system.

The undersigned agree that all poles, wires, and other facilities, including any main service entrance equipment, installed on the above-described lands at the Cooperative's expense shall remain the property of the Cooperative, removable at the option of the Cooperative, upon the termination of service to or on said lands.

The undersigned covenant that they are the owners of the above described lands and that the said lands are free and clear of encumberances and liens of whatsoever character except those held by the following persons:

IN WITNESS WHEREOF, the undersigned have set their hands and seals this 20 day of Oct 1950.

X George Fetch (L.S.)

X Mrs George Fetch (L.S.)

Signed, sealed and delivered in the presence of: Dpm.

Dane P. Maddock

SEAL OLIVER COUNTY NORTH DAKOTA

91054 8/21/2015 10:42 AM PAGE: 1 OF 2
BOOK: 1 PAGE: 1082 FEES: $13.00 MM EASEMENT (ROUGHRID
Kim Wilkens, OLIVER COUNTY RECORDER
By MM Nulty Eng Deputy

(1)
STATE OF NORTH DAKOTA
COUNTY OF Mercer SS.

Dore P. Maddock being first duly sworn says that he is one of the witnesses to the above and foregoing easements, that

George Fetch and Mrs. George Fetch

whose names is and/or are subscribed to the above and foregoing instruments as a party is and/or are the persons described in said easement and that he signed said instrument in my presence and that I in their presence signed my name thereto as a subscribing witness.

Dore P. Maddock.

SUBSCRIBED and sworn to before me this 20th day of October 1950.

Frank J. Belinskey
Notary Public in and for the
County of Mercer and
State of North Dakota.

FRANK J. BELINSKEY NOTARY PUBLIC STATE OF NORTH DAKOTA

My commission expires March 24, 1953

My commission expires _____.

(1)
STATE OF NORTH DAKOTA
COUNTY OF Mercer SS.

On this 20th day of October 1950 before me Frank J. Belinskey a Notary Public within and for the State of North Dakota, personally appeared

Dore P. Maddock known to me to be one of the persons who subscribed his name to the above and foregoing instrument as a witness, and who acknowledged to me that he subscribed his name thereto as such witness, and who proved to me that the person who and/or whose names are subscribed to the foregoing instrument are the persons described in it.

Frank J. Belinskey
Notary Public in and for the
County of Mercer and
State of North Dakota.

FRANK J. BELINSKEY NOTARY PUBLIC STATE OF NORTH DAKOTA

My commission expires March 24, 1953

My commission expires _____.

(2)
STATE OF NORTH DAKOTA
COUNTY OF _____ SS.

On this _____ day of _____ 19___, before me _____

_____, a Notary Public in and for said County and State,

personally appeared _____ and _____
known to me to be the persons _____ who _____ described in and who executed within and foregoing instrument and acknowledged to me that he executed the same.

_____
Notary Public in and for the
County of _____ and
State of North Dakota.

My commission expires _____.

ROUGHRIDER ELECTRIC COOPERATIVE
800 HWY DR

HAZEN, ND 58545

OFFICE OF COUNTY RECORDER
STATE OF NORTH DAKOTA
COUNTY OF OLIVER
Filed for record this 16 day
of Sept A.D. 2011
at 11:45 o'clock M.,
and recorded as document No. 86779
in book FE of Misc page 601-603
[signature]
County Recorder Deputy 16 —

**PIPELINE EASEMENT**

North Dakota State Water Commission
County of Oliver
Parcel H-OL-138

**ALL PERSONS TAKE NOTICE:**

That the undersigned, Eva Dwyer, whether one or more, called the Grantor, being the owner of, or having an interest in, land situated in the County of Oliver, State of North Dakota, more fully described below, in consideration of One and No/100 Dollars ($1.00) and other valuable consideration, does hereby grant, convey, and warrant to the State of North Dakota, acting by and through the North Dakota State Water Commission, a state agency and public corporation, with its principal office at 900 East Boulevard Ave., Bismarck, North Dakota 58505, called the Grantee, and to its successors and assigns, the right, privilege, and easement to construct, maintain, operate, inspect, repair, alter, replace, change the size of or remove a pipeline, and appurtenances thereto, for the transportation of water under, across, and through:

Parcel H-OL-138
A 40 foot wide strip of land 20 feet wide on each side of the pipeline centerline lying within the NE1/4 Section 20, Township 142 North, Range 87 West of the 5th P.M.

Said tract contains 2.42 acres, more or less.

Temporary Construction Easement
An additional 20 feet of temporary right-of-way lying adjacent to the above described tract for a total construction easement width of 60 feet.

Said tract contains 1.21 acres, more or less.

together with the right to utilize additional land for a period up to three years from the date of this easement, adjacent to the above described tract, for purposes of temporary working space during initial construction of the pipeline, and the right of ingress to and egress from said strip of land across the adjacent lands of the Grantor, for the purposes specified above at the will of the Grantee.

**THE GRANTOR AND THE GRANTEE FURTHER AGREE:**

1. **Use of right-of-way by Grantor.** Grantor reserves the right to use the surface of the easement strip provided, however, that Grantor, without prior approval of Grantee, shall neither construct nor permit to be constructed any building, structure, or other improvement upon the easement strip which would interfere with Grantee's exercise of the rights conveyed by this pipeline easement, including access to the easement strip.

2. **Appurtenances.** The Grantee shall have the right to install and construct necessary appurtenances upon the surface of the easement strip. Prior to construction, the Grantee will notify the Grantor of the approximate location of such appurtenances if any, to be located on the easement strip, and shall pay to the Grantor the sum of $500 for each appurtenance located at a distance of more than 5 feet from a field boundary or fence line. Such payments shall be paid prior to construction.

3. **Damages.** The Grantee will pay to Grantor or Grantor's tenants, as their respective interests may appear, for damages caused by the operations or activities of the Grantee; provided, however, that the Grantee shall have the right, without liability for damages, to clear, and keep cleared, all trees, brush, and other obstructions from the easement strip that may, in the Grantee's judgment, interfere with the rights and privileges of the Grantee under this pipeline easement.

   If the amount of any damage which Grantor may sustain as a result of Grantee's exercise of rights hereunder cannot be mutually agreed upon, such damages shall be ascertained and

determined by three (3) disinterested person; one to be appointed by the Grantor, one by Grantee, and a third by the two so appointed, and the award of such three persons shall be final and conclusive.

4. **Restoration of surface.** The Grantee will restore the surface of the construction area to its original contour as nearly as practicable.

5. **Topsoil segregation.** When excavating the pipeline trench with a backhoe/trackhoe, the Grantee will remove the topsoil separately during the construction of the pipeline for the full width of the pipe trench to a depth of twelve (12) inches or the actual topsoil depth, whichever is less, and to be replaced at the top of the backfill over the pipe trench.

6. **Assignment and covenant by parties.** The rights of either party may be assigned in whole or in part. The terms and provisions of this easement shall constitute covenants running with the land and shall be binding upon, and inure to the benefit of, the parties hereto, their successors, assigns, personal representatives, and heirs.

7. **Grantor's title.** Grantor warrants that he is the owner of, or has an interest in, the land described in this easement, and that he has full right and authority to enter into and deliver this easement. This instrument may be executed in counterparts and each counterpart shall constitute a separate agreement between the parties thereto. Any payments pursuant to this pipeline easement shall be in proportion to the Grantor's interest in the undivided fee simple estate.

8. **Entire agreement.** This instrument contains the entire agreement of the parties and there are no other, or different, agreements or understandings between the Grantor and the Grantee, or its agents. The Grantor, in executing this pipeline easement, has not relied upon any promises, inducements, or representatives of the Grantee, or its agents, except as are set forth herein.

9. **Term of easement.** The term of this easement shall be as long as it is needed by the Grantee, or its assigns, and until a release of this easement is recorded, but shall not exceed ninety-nine (99) years pursuant to NDCC §47-05-02.1.

10. **Tenants.** The Grantor represents that the land described in this easement is (not rented) (rented to) _____.

Dated this 23rd day of May, 2011.

Donald A. Stetz
Grantor

Eva Dewyer
Grantor

STATE OF NORTH DAKOTA)
) ss.
COUNTY OF Williams )

On this 31 day of May, 2011, before me personally appeared Donald A. Heth, known to me to be the person(s) described in and who executed the within and foregoing instrument, and acknowledged to me that he/she executed the same.

Kim Schilke
Notary Public

(SEAL)

KIM SCHILKE
Notary Public
State of North Dakota
My Commission Expires October 20, 2012

10-20-2012 County, ND
My Commission expires:

STATE OF NORTH DAKOTA)
) ss.
COUNTY OF Williams )

On this 23rd day of May, 2011, before me personally appeared Eva M. Dwyer, known to me to be the person(s) described in and who executed the within and foregoing instrument, and acknowledged to me that he/she executed the same.

Marri Hammer
Notary Public

(SEAL)

MARRI HAMMER
Notary Public
State of North Dakota
My Commission Expires Aug. 10, 2012

_____ County, ND
My Commission expires:

OFFICE OF COUNTY RECORDER
STATE OF NORTH DAKOTA
COUNTY OF OLIVER
Filed for record this 16 day
Sept A.D. 2011
11:50 o'clock A M.,
Recorded as document No. 56780
Bk FF of Misc page 604-606
B Mitchell
County Recorder Deputy

**PIPELINE EASEMENT**

North Dakota State Water Commission
County of Oliver
Parcel H-OL-138

**ALL PERSONS TAKE NOTICE:**

That the undersigned, Bernice I. Mischel, whether one or more, called the Grantor, being the owner of, or having an interest in, land situated in the County of Oliver, State of North Dakota, more fully described below, in consideration of One and No/100 Dollars ($1.00) and other valuable consideration, does hereby grant, convey, and warrant to the State of North Dakota, acting by and through the North Dakota State Water Commission, a state agency and public corporation, with its principal office at 900 East Boulevard Ave., Bismarck, North Dakota 58505, called the Grantee, and to its successors and assigns, the right, privilege, and easement to construct, maintain, operate, inspect, repair, alter, replace, change the size of or remove a pipeline, and appurtenances thereto, for the transportation of water under, across, and through:

Parcel H-OL-138
A 40 foot wide strip of land 20 feet wide on each side of the pipeline centerline lying within the NE1/4 Section 20, Township 142 North, Range 87 West of the 5th P.M.

Said tract contains 2.42 acres, more or less.

Temporary Construction Easement
An additional 20 feet of temporary right-of-way lying adjacent to the above described tract for a total construction easement width of 60 feet.

Said tract contains 1.21 acres, more or less.

together with the right to utilize additional land for a period up to three years from the date of this easement, adjacent to the above described tract, for purposes of temporary working space during initial construction of the pipeline, and the right of ingress to and egress from said strip of land across the adjacent lands of the Grantor, for the purposes specified above at the will of the Grantee.

**THE GRANTOR AND THE GRANTEE FURTHER AGREE:**

1. **Use of right-of-way by Grantor.** Grantor reserves the right to use the surface of the easement strip provided, however, that Grantor, without prior approval of Grantee, shall neither construct nor permit to be constructed any building, structure, or other improvement upon the easement strip which would interfere with Grantee's exercise of the rights conveyed by this pipeline easement, including access to the easement strip.

2. **Appurtenances.** The Grantee shall have the right to install and construct necessary appurtenances upon the surface of the easement strip. Prior to construction, the Grantee will notify the Grantor of the approximate location of such appurtenances if any, to be located on the easement strip, and shall pay to the Grantor the sum of $500 for each appurtenance located at a distance of more than 5 feet from a field boundary or fence line. Such payments shall be paid prior to construction.

3. **Damages.** The Grantee will pay to Grantor or Grantor's tenants, as their respective interests may appear, for damages caused by the operations or activities of the Grantee; provided, however, that the Grantee shall have the right, without liability for damages, to clear, and keep cleared, all trees, brush, and other obstructions from the easement strip that may, in the Grantee's judgment, interfere with the rights and privileges of the Grantee under this pipeline easement.

   If the amount of any damage which Grantor may sustain as a result of Grantee's exercise of rights hereunder cannot be mutually agreed upon, such damages shall be ascertained and determined by three (3) disinterested person; one to be appointed by the Grantor, one by

Grantee, and a third by the two so appointed, and the award of such three persons shall be final and conclusive.

4. **Restoration of surface.** The Grantee will restore the surface of the construction area to its original contour as nearly as practicable.

5. **Topsoil segregation.** When excavating the pipeline trench with a backhoe/trackhoe, the Grantee will remove the topsoil separately during the construction of the pipeline for the full width of the pipe trench to a depth of twelve (12) inches or the actual topsoil depth, whichever is less, and to be replaced at the top of the backfill over the pipe trench.

6. **Assignment and covenant by parties.** The rights of either party may be assigned in whole or in part. The terms and provisions of this easement shall constitute covenants running with the land and shall be binding upon, and inure to the benefit of, the parties hereto, their successors, assigns, personal representatives, and heirs.

7. **Grantor's title.** Grantor warrants that he is the owner of, or has an interest in, the land described in this easement, and that he has full right and authority to enter into and deliver this easement. This instrument may be executed in counterparts and each counterpart shall constitute a separate agreement between the parties thereto. Any payments pursuant to this pipeline easement shall be in proportion to the Grantor's interest in the undivided fee simple estate.

8. **Entire agreement.** This instrument contains the entire agreement of the parties and there are no other, or different, agreements or understandings between the Grantor and the Grantee, or its agents. The Grantor, in executing this pipeline easement, has not relied upon any promises, inducements, or representatives of the Grantee, or its agents, except as are set forth herein.

9. **Term of easement.** The term of this easement shall be as long as it is needed by the Grantee, or its assigns, and until a release of this easement is recorded, but shall not exceed ninety-nine (99) years pursuant to NDCC §47-05-02.1.

10. **Tenants.** The Grantor represents that the land described in this easement is (not rented) (rented to) _____.

Dated this 8 day of July, 2011.

Bernice A. Muschel
Grantor

STATE OF MONTANA )
) ss.
COUNTY OF Dawson )

On this 8th day of July, 2011, before me personally appeared Bernice I. Mischel, known to me to be the person(s) described in and who executed the within and foregoing instrument, and acknowledged to me that he/she executed the same.

SARAH KAYS
NOTARY PUBLIC for the
State of Montana
Residing at Glendive, Montana
My Commission Expires
March 15, 2012

(SEAL)

Sarah Kays
Notary Public

Dawson County, MT
My Commission expires: March 15, 2012

OFFICE OF COUNTY RECORDER
STATE OF NORTH DAKOTA
COUNTY OF OLIVER
Filed for record this 16 day
of Oct A.D. 2011
at 11:55 o'clock A M.,
and recorded as document No. 86781
in book EF of Misc page 607-609
K Wilkens
County Recorder Deputy 16

**PIPELINE EASEMENT**

North Dakota State Water Commission
County of Oliver
Parcels H-OL-138

**ALL PERSONS TAKE NOTICE:**

That the undersigned, Rose M. Heth, called the Grantor, being the owner of, or having an interest in, land situated in the County of Oliver, State of North Dakota, more fully described below, in consideration of One and No/100 Dollars ($1.00) and other valuable consideration, does hereby grant, convey, and warrant to the State of North Dakota, acting by and through the North Dakota State Water Commission, a state agency and public corporation, with its principal office at 900 East Boulevard Ave., Bismarck, North Dakota 58505, called the Grantee, and to its successors and assigns, the right, privilege, and easement to construct, maintain, operate, inspect, repair, alter, replace, change the size of or remove a pipeline, and appurtenances thereto, for the transportation of water under, across, and through:

Parcel H-OL-138
A 40 foot wide strip of land 20 feet wide on each side of the pipeline centerline lying within the NE1/4 Section 20, Township 142 North, Range 87 West of the 5th P.M.

Said tract contains 2.42 acres, more or less.

Temporary Construction Easement
An additional 20 feet of temporary right-of-way lying adjacent to the above described tract for a total construction easement width of 60 feet.

Said tract contains 1.21 acres, more or less.

together with the right to utilize additional land for a period up to three years from the date of this easement, adjacent to the above described tract, for purposes of temporary working space during initial construction of the pipeline, and the right of ingress to and egress from said strip of land across the adjacent lands of the Grantor, for the purposes specified above at the will of the Grantee.

**THE GRANTOR AND THE GRANTEE FURTHER AGREE:**

1. **Use of right-of-way by Grantor.** Grantor reserves the right to use the surface of the easement strip provided, however, that Grantor, without prior approval of Grantee, shall neither construct nor permit to be constructed any building, structure, or other improvement upon the easement strip which would interfere with Grantee's exercise of the rights conveyed by this pipeline easement, including access to the easement strip.

2. **Appurtenances.** The Grantee shall have the right to install and construct necessary appurtenances upon the surface of the easement strip. Prior to construction, the Grantee will notify the Grantor of the approximate location of such appurtenances if any, to be located on the easement strip, and shall pay to the Grantor the sum of $500 for each appurtenance located at a distance of more than 5 feet from a field boundary or fence line. Such payments shall be paid prior to construction.

3. **Damages.** The Grantee will pay to Grantor or Grantor's tenants, as their respective interests may appear, for damages caused by the operations or activities of the Grantee; provided, however, that the Grantee shall have the right, without liability for damages, to clear, and keep cleared, all trees, brush, and other obstructions from the easement strip that may, in the Grantee's judgment, interfere with the rights and privileges of the Grantee under this pipeline easement.

   If the amount of any damage which Grantor may sustain as a result of Grantee's exercise of rights hereunder cannot be mutually agreed upon, such damages shall be ascertained and determined by three (3) disinterested person; one to be appointed by the Grantor, one by

Grantee, and a third by the two so appointed, and the award of such three persons shall be final and conclusive.

4. **Restoration of surface.** The Grantee will restore the surface of the construction area to its original contour as nearly as practicable.

5. **Topsoil segregation.** When excavating the pipeline trench with a backhoe/trackhoe, the Grantee will remove the topsoil separately during the construction of the pipeline for the full width of the pipe trench to a depth of twelve (12) inches or the actual topsoil depth, whichever is less, and to be replaced at the top of the backfill over the pipe trench.

6. **Assignment and covenant by parties.** The rights of either party may be assigned in whole or in part. The terms and provisions of this easement shall constitute covenants running with the land and shall be binding upon, and inure to the benefit of, the parties hereto, their successors, assigns, personal representatives, and heirs.

7. **Grantor's title.** Grantor warrants that he is the owner of, or has an interest in, the land described in this easement, and that he has full right and authority to enter into and deliver this easement. This instrument may be executed in counterparts and each counterpart shall constitute a separate agreement between the parties thereto. Any payments pursuant to this pipeline easement shall be in proportion to the Grantor's interest in the undivided fee simple estate.

8. **Entire agreement.** This instrument contains the entire agreement of the parties and there are no other, or different, agreements or understandings between the Grantor and the Grantee, or its agents. The Grantor, in executing this pipeline easement, has not relied upon any promises, inducements, or representatives of the Grantee, or its agents, except as are set forth herein.

9. **Term of easement.** The term of this easement shall be as long as it is needed by the Grantee, or its assigns, and until a release of this easement is recorded, but shall not exceed ninety-nine (99) years pursuant to NDCC §47-05-02.1.

10. **Tenants.** The Grantor represents that the land described in this easement is (~~not rented~~) (rented to) Lionell Doll & Lance Doll Thru 12-31-2012.

Dated this 15T day of April, 2011.

Rose M. Heth by:
W. Heth, Dpoa
Grantor William Heth

Rose M. Heth by:
Heth, Dpoa
Grantor Miles Heth

STATE OF NORTH DAKOTA)
) ss.
COUNTY OF Stark )

On this 1 day of April, 2011, before me personally appeared William Hetn and Myles Hetn, known to me to be the person(s) described in and who executed the within and foregoing instrument, and acknowledged to me that he/she executed the same.

Scott Karsky
Notary Public

(SEAL)
Scott Karsky
Notary Public
State of North Dakota
My Commission Expires Feb. 18, 2016

~~February 18~~ Stark County, ND

My Commission expires:
February 18 2011

OFFICE OF COUNTY RECORDER
STATE OF NORTH DAKOTA
COUNTY OF OLIVER
Filed for record this 14 day
of Sept A.D. 2011
at 11:56 o'clock A M.,
and recorded as document No. 56282
in book FF of Misc page 610-613
D Wilkins
County Recorder Deputy 16

**PIPELINE EASEMENT**

North Dakota State Water Commission
County of Oliver
Parcels H-OL-138

**ALL PERSONS TAKE NOTICE:**

That the undersigned, John Smith and Jordan Smith, called the Grantor, being the owner of, or having an interest in, land situated in the County of Oliver, State of North Dakota, more fully described below, in consideration of One and No/100 Dollars ($1.00) and other valuable consideration, does hereby grant, convey, and warrant to the State of North Dakota, acting by and through the North Dakota State Water Commission, a state agency and public corporation, with its principal office at 900 East Boulevard Ave., Bismarck, North Dakota 58505, called the Grantee, and to its successors and assigns, the right, privilege, and easement to construct, maintain, operate, inspect, repair, alter, replace, change the size of or remove a pipeline, and appurtenances thereto, for the transportation of water under, across, and through:

Parcel H-OL-138
A 40 foot wide strip of land 20 feet wide on each side of the pipeline centerline lying within the NE1/4 Section 20, Township 142 North, Range 87 West of the 5th P.M.

Said tract contains 2.42 acres, more or less.

Temporary Construction Easement
An additional 20 feet of temporary right-of-way lying adjacent to the above described tract for a total construction easement width of 60 feet.

Said tract contains 1.21 acres, more or less.

together with the right to utilize additional land for a period up to three years from the date of this easement, adjacent to the above described tract, for purposes of temporary working space during initial construction of the pipeline, and the right of ingress to and egress from said strip of land across the adjacent lands of the Grantor, for the purposes specified above at the will of the Grantee.

**THE GRANTOR AND THE GRANTEE FURTHER AGREE:**

1. **Use of right-of-way by Grantor.** Grantor reserves the right to use the surface of the easement strip provided, however, that Grantor, without prior approval of Grantee, shall neither construct nor permit to be constructed any building, structure, or other improvement upon the easement strip which would interfere with Grantee's exercise of the rights conveyed by this pipeline easement, including access to the easement strip.

2. **Appurtenances.** The Grantee shall have the right to install and construct necessary appurtenances upon the surface of the easement strip. Prior to construction, the Grantee will notify the Grantor of the approximate location of such appurtenances if any, to be located on the easement strip, and shall pay to the Grantor the sum of $500 for each appurtenance located at a distance of more than 5 feet from a field boundary or fence line. Such payments shall be paid prior to construction.

3. **Damages.** The Grantee will pay to Grantor or Grantor's tenants, as their respective interests may appear, for damages caused by the operations or activities of the Grantee; provided, however, that the Grantee shall have the right, without liability for damages, to clear, and keep cleared, all trees, brush, and other obstructions from the easement strip that may, in the Grantee's judgment, interfere with the rights and privileges of the Grantee under this pipeline easement.

   If the amount of any damage which Grantor may sustain as a result of Grantee's exercise of rights hereunder cannot be mutually agreed upon, such damages shall be ascertained and determined by three (3) disinterested person; one to be appointed by the Grantor, one by

Grantee, and a third by the two so appointed, and the award of such three persons shall be final and conclusive.

4. **Restoration of surface.** The Grantee will restore the surface of the construction area to its original contour as nearly as practicable.

5. **Topsoil segregation.** When excavating the pipeline trench with a backhoe/trackhoe, the Grantee will remove the topsoil separately during the construction of the pipeline for the full width of the pipe trench to a depth of twelve (12) inches or the actual topsoil depth, whichever is less, and to be replaced at the top of the backfill over the pipe trench.

6. **Assignment and covenant by parties.** The rights of either party may be assigned in whole or in part. The terms and provisions of this easement shall constitute covenants running with the land and shall be binding upon, and inure to the benefit of, the parties hereto, their successors, assigns, personal representatives, and heirs.

7. **Grantor's title.** Grantor warrants that he is the owner of, or has an interest in, the land described in this easement, and that he has full right and authority to enter into and deliver this easement. This instrument may be executed in counterparts and each counterpart shall constitute a separate agreement between the parties thereto. Any payments pursuant to this pipeline easement shall be in proportion to the Grantor's interest in the undivided fee simple estate.

8. **Entire agreement.** This instrument contains the entire agreement of the parties and there are no other, or different, agreements or understandings between the Grantor and the Grantee, or its agents. The Grantor, in executing this pipeline easement, has not relied upon any promises, inducements, or representatives of the Grantee, or its agents, except as are set forth herein.

9. **Term of easement.** The term of this easement shall be as long as it is needed by the Grantee, or its assigns, and until a release of this easement is recorded, but shall not exceed ninety-nine (99) years pursuant to NDCC §47-05-02.1.

10. **Tenants.** The Grantor represents that the land described in this easement is (not rented) (rented to) Lionel & Lance Doll.

Dated this 25th day of March, 2011.

John Smith
Grantor

Grantor

STATE OF NORTH DAKOTA)
) ss.
COUNTY OF Oliver )

On this 25th day of March, 2011, before me personally appeared John Smith, known to me to be the person(s) described in and who executed the within and foregoing instrument, and acknowledged to me that he/she executed the same.

Notary Public

(SEAL)

Morton County, ND
My Commission expires:

JAY L. PETERSON
Notary Public
State of North Dakota
My Commission Expires Jan. 13, 2015

STATE OF MINNESOTA )
) ss.
COUNTY OF _____)

On this 8 day of April, 2011, before me personally appeared Jordan Smith, known to me to be the person(s) described in and who executed the within and foregoing instrument, and acknowledged to me that he/she executed the same.

Notary Public

(SEAL)

Swift
Jan 31 2012 County, MN
My Commission expires:

MARY S. ERICKSON
NOTARY PUBLIC-MINNESOTA
My Comm. Exp. Jan. 31, 2012

OFFICE OF COUNTY RECORDER
STATE OF NORTH DAKOTA
COUNTY OF OLIVER
Filed for record this 16 day
of Sept A.D. 2011
at 11:57 o'clock A M.,
and recorded as document No. 86783
in book FF of Misc page 613-615
D Williams
County Recorder Deputy

**PIPELINE EASEMENT**

North Dakota State Water Commission
County of Oliver
Parcels H-OL-142, H-OL-144

**ALL PERSONS TAKE NOTICE:**

That the undersigned, John Smith and Jordan Smith, whether one or more, called the Grantor, being the owner of, or having an interest in, land situated in the County of Oliver, State of North Dakota, more fully described below, in consideration of One and No/100 Dollars ($1.00) and other valuable consideration, does hereby grant, convey, and warrant to the State of North Dakota, acting by and through the North Dakota State Water Commission, a state agency and public corporation, with its principal office at 900 East Boulevard Ave., Bismarck, North Dakota 58505, called the Grantee, and to its successors and assigns, the right, privilege, and easement to construct, maintain, operate, inspect, repair, alter, replace, change the size of or remove a pipeline, and appurtenances thereto, for the transportation of water under, across, and through:

Parcel H-OL-142
A 40 foot wide strip of land 20 feet wide on each side of the pipeline centerline lying within the North 200 feet of the East 200 feet of the NE1/4 Section 22, Township 142 North, Range 87 West of the 5th P.M.

Said tract contains 0.18 acres, more or less.

Temporary Construction Easement
An additional 20 feet of temporary right-of-way lying adjacent to the above described tract for a total construction easement width of 60 feet.

Said tract contains 0.10 acres, more or less.

Parcel H-OL-144
A 40 foot wide strip of land 20 feet wide on each side of the pipeline centerline lying within the NW1/4 Section 23, Township 142 North, Range 87 West of the 5th P.M.

Said tract contains 2.42 acres, more or less.

Temporary Construction Easement
An additional 20 feet of temporary right-of-way lying adjacent to the above described tract for a total construction easement width of 60 feet.

Said tract contains 1.21 acres, more or less.

together with the right to utilize additional land for a period up to three years from the date of this easement, adjacent to the above described tract, for purposes of temporary working space during initial construction of the pipeline, and the right of ingress to and egress from said strip of land across the adjacent lands of the Grantor, for the purposes specified above at the will of the Grantee.

**THE GRANTOR AND THE GRANTEE FURTHER AGREE:**

1. **Use of right-of-way by Grantor.** Grantor reserves the right to use the surface of the easement strip provided, however, that Grantor, without prior approval of Grantee, shall neither construct nor permit to be constructed any building, structure, or other improvement upon the easement strip which would interfere with Grantee's exercise of the rights conveyed by this pipeline easement, including access to the easement strip.

2. **Appurtenances.** The Grantee shall have the right to install and construct necessary appurtenances upon the surface of the easement strip. Prior to construction, the Grantee will notify the Grantor of the approximate location of such appurtenances if any, to be located on the easement strip, and shall pay to the Grantor the sum of $500 for each appurtenance located at a distance of more than 5 feet from a field boundary or fence line. Such payments shall be paid prior to construction.

3. **Damages.** The Grantee will pay to Grantor or Grantor's tenants, as their respective interests may appear, for damages caused by the operations or activities of the Grantee; provided, however, that the Grantee shall have the right, without liability for damages, to clear, and keep cleared, all trees, brush, and other obstructions from the easement strip that may, in the Grantee's judgment, interfere with the rights and privileges of the Grantee under this pipeline easement.

   If the amount of any damage which Grantor may sustain as a result of Grantee's exercise of rights hereunder cannot be mutually agreed upon, such damages shall be ascertained and determined by three (3) disinterested person; one to be appointed by the Grantor, one by Grantee, and a third by the two so appointed, and the award of such three persons shall be final and conclusive.

4. **Restoration of surface.** The Grantee will restore the surface of the construction area to its original contour as nearly as practicable.

5. **Topsoil segregation.** When excavating the pipeline trench with a backhoe/trackhoe, the Grantee will remove the topsoil separately during the construction of the pipeline for the full width of the pipe trench to a depth of twelve (12) inches or the actual topsoil depth, whichever is less, and to be replaced at the top of the backfill over the pipe trench.

6. **Assignment and covenant by parties.** The rights of either party may be assigned in whole or in part. The terms and provisions of this easement shall constitute covenants running with the land and shall be binding upon, and inure to the benefit of, the parties hereto, their successors, assigns, personal representatives, and heirs.

7. **Grantor's title.** Grantor warrants that he is the owner of, or has an interest in, the land described in this easement, and that he has full right and authority to enter into and deliver this easement. This instrument may be executed in counterparts and each counterpart shall constitute a separate agreement between the parties thereto. Any payments pursuant to this pipeline easement shall be in proportion to the Grantor's interest in the undivided fee simple estate.

8. **Entire agreement.** This instrument contains the entire agreement of the parties and there are no other, or different, agreements or understandings between the Grantor and the Grantee, or its agents. The Grantor, in executing this pipeline easement, has not relied upon any promises, inducements, or representatives of the Grantee, or its agents, except as are set forth herein.

9. **Term of easement.** The term of this easement shall be as long as it is needed by the Grantee, or its assigns, and until a release of this easement is recorded, but shall not exceed ninety-nine (99) years pursuant to NDCC §47-05-02.1.

10. **Tenants.** The Grantor represents that the land described in this easement is (not rented) (rented to) _____.

Dated this 8 day of April, 2011.

Grantor

Grantor

STATE OF NORTH DAKOTA)
) ss.
COUNTY OF Oliver )

On this 25th day of March, 2011, before me personally appeared John Smith, known to me to be the person(s) described in and who executed the within and foregoing instrument, and acknowledged to me that he/she executed the same.

Notary Public

(SEAL)
JAY L. PETERSON
Notary Public
State of North Dakota
My Commission Expires Jan. 13, 2015

Morton County, ND
My Commission expires:

STATE OF MINNESOTA )
) ss.
COUNTY OF _____)

On this 8 day of April, 2011, before me personally appeared _____, known to me to be the person(s) described in and who executed the within and foregoing instrument, and acknowledged to me that he/she executed the same.

Notary Public

(SEAL)

Swift County, MN
My Commission expires:
1-31-12

MARY S. ERICKSON
NOTARY PUBLIC-MINNESOTA
My Comm. Exp. Jan. 31, 2012

90465 7/17/2015 10:16 AM PAGE: 1 OF 1
BOOK: LL PAGE: 266 FEES: $10.00 MM EASEMENT
Kim Wilkens, OLIVER COUNTY RECORDER
By MM Nelty E. Deputy

SOUTHWEST WATER AUTHORITY
WEST INDUSTRIAL PARK
4665 2ND STREET SW
DICKINSON, ND 58601-7231

STATE OF NORTH DAKOTA ★ RECORDER ★ OLIVER COUNTY SEAL


**SOUTHWEST WATER AUTHORITY**
Southwest Pipeline Project Building
West Industrial Park
4665 2nd Street SW
Dickinson, ND 58601-7231
(701) 225-0241
Toll Free: 1-888-425-0241


Segment **7-9E WEST CENTER SERVICE AREA**
Parcel **142-87-18**

## RIGHT-OF-WAY EASEMENT

### ALL PERSONS TAKE NOTICE:

In consideration of one dollar ($1.00) and other good and valuable consideration **JORDAN B. SMITH 36497 320TH ST. BENSON, MN 56215** hereinafter referred to as Grantor, does hereby grant, bargain, sell, transfer and convey to the Southwest Water Authority, hereinafter referred to as the Grantee, its successor and assigns, a perpetual easement with right to erect, construct, install and lay, and thereafter use, operate, inspect, repair, maintain, replace, and remove water pipelines, connections, valves and all other appurtenant facilities used in connection with the construction, operation and maintenance of the Southwest Pipeline Project, over, above, across and through the land of the Grantor, situated in **Oliver** County, State of North Dakota, said land being described as follows: **SE1/4 SECTION 22 & NW1/4, SW1/4 SECTION 23 TOWNSHIP 142 RANGE 87** (the tract that contains **6.38** acres, more or less), together with the right of ingress and egress over the adjacent lands of the Grantor, successors and assigns for the purposes of this easement.

1. The permanent easement will be thirty (30) feet in width, fifteen (15) feet on each side of the center line of the pipeline as constructed, with an additional ten (10) feet of temporary right-of-way for a total construction easement width of forty (40) feet, twenty (20) feet on each side of the center line.

2. The Grantee covenants to maintain the easement in good repair so that no unreasonable damage will result from its use to the adjacent land of the Grantor, successors and assigns. The Grantor will receive compensation for damages to growing crops caused by the construction or operation. The Grantor will report any damages within three (3) years of the construction of the project.

The grant and other provisions of this easement shall constitute a covenant running with the land for the benefit of the Grantee, its successors and assigns.

**IN WITNESS WHEREOF,** the Grantor has executed this instrument this 29 day of May, 2015.

[signature] GRANTOR _____ GRANTOR

State of Minnesota

County of Swift

On May 29, 2015, personally appeared before me Jordan Smith

_____ whom I know personally.
✓ whose identity I verified on the basis of Drivers License.
_____ whose identity I verified on the oath or affirmation of _____, a credible witness to be the signor of the above and he/she acknowledged that he/she signed it.

HEIDI CHRISTINA SVINGEN
Notary Public
Minnesota
My Comm. Expires
Jan 31, 2018

Notary Public [signature]
Swift, County
My Commission Expires: 1/31/18

RECEIVED JUN - 2 2015 SOUTHWEST WATER AUTHORITY

90466 7/17/2015 10:19 AM PAGE: 1 OF 1
BOOK: LL PAGE: 267 FEES: $10.00 MM EASEMENT
Kim Wilkens, OLIVER COUNTY RECORDER
By MMMulty Ed Deputy

SOUTHWEST WATER AUTHORITY
WEST INDUSTRIAL PARK
4665 2ND STREET SW
DICKINSON, ND 58601-7231

STATE OF NORTH DAKOTA COUNTY OF OLIVER RECORDER SEAL

**SOUTHWEST WATER AUTHORITY**
Southwest Pipeline Project Building
West Industrial Park
4665 2nd Street SW
Dickinson, ND 58601-7231
(701) 225-0241
Toll Free: 1-888-425-0241

Segment **7-9E WEST CENTER SERVICE AREA**
Parcel **142-87-18**

## RIGHT-OF-WAY EASEMENT

## ALL PERSONS TAKE NOTICE:

In considerationof one dollar ($1.00) and other good and valuable consideration **JENNIFER RUDOLPH 5400 KAYLEY DR BISMARCK, ND 58504** hereinafter referred to as Grantor, does hereby grant, bargain, sell, transfer and convey to the Southwest Water Authority, hereinafter referred to as the Grantee, its successor and assigns, a perpetual easement with right to erect, construct, install and lay, and thereafter use, operate, inspect, repair, maintain, replace, and remove water pipelines, connections, valves and all other appurtenant facilities used in connection with the construction, operation and maintenance of the Southwest Pipeline Project, over, above, across and through the land of the Grantor, situated in **Oliver** County, State of North Dakota, said land being described as follows: **SE1/4 SECTION 22 & NW1/4, SW1/4 SECTION 23 TOWNSHIP 142 RANGE 87** (the tract that contains **6.38** acres, more or less), together with the right of ingress and egress over the adjacent lands of the Grantor, successors and assigns for the purposes of this easement.

1. The permanent easement will be thirty (30) feet in width, fifteen (15) feet on each side of the center line of the pipeline as constructed, with an additional ten (10) feet of temporary right-of-way for a total construction easement width of forty (40) feet, twenty (20) feet on each side of the center line.

2. The Grantee covenants to maintain the easement in good repair so that no unreasonable damage will result from its use to the adjacent land of the Grantor, successors and assigns. The Grantor will receive compensation for damages to growing crops caused by the construction or operation. The Grantor will report any damages within three (3) years of the construction of the project.

The grant and other provisions of this easement shall constitute a covenant running with the land for the benefit of the Grantee, its successors and assigns.

**IN WITNESS WHEREOF,** the Grantor has executed this instrument this 26th day of May, 2015.

_____ GRANTOR _____ GRANTOR

State of North Dakota

County of Burleigh

On May 26th, 2015, personally appeared before me Jennifer Rudolph

_____ whom I know personally.
__X__ whose identity I verified on the basis of ND Drivers License.
_____ whose identity I verified on the oath or affirmation of _____, a credible witness to be the signor of the above and he/she acknowledged that he/she signed it.

RICHARD KELLER
Notary Public
State of North Dakota
My Commission Expires October 19, 2016

Notary Public _____

Burleigh, County ND

My Commission Expires: 10/19/16

# RIGHT OF WAY EASEMENT

THIS AGREEMENT made and entered into this 25th day of February, 2016, between Jennifer Rudolph of 5400 Kayley Drive, Bismarck, ND 58504, hereinafter called "Owner" (whether one or more) and ROUGHRIDER ELECTRIC COOPERATIVE, INC., whose post office address is 800 Highway Drive, Hazen, North Dakota 58545-4737, hereinafter called "COOPERATIVE".

WITNESSETH that for valuable consideration, the receipt and sufficiency of which is hereby acknowledged, Owner grants unto Cooperative, its successors and assigns, for a term of 99 years from the date hereof, an easement to construct, reconstruct, operate and maintain an electric distribution system, overhead, underground or both including all poles, guys, anchors wires, surface terminals, and all accessories and appurtenances necessary or desirable in connection therewith, under, over, upon and across lands of Owner and/or in or upon all streets, roads or highways abutting said lands situated in Oliver County, North Dakota, and more particularly described as follows, to-wit:

A parcel of land in the W1/2 of Section 23, Township 142 North, Range 87 West of the Fifth Principal Meridian, 20 feet in width, 10 feet on each side of a centerline described as follows:

Beginning at the east line of the northwest corner of Section 23, Township 142 North, Range 87 West, at a point which bears S87°41'07"E a distance of 2634.65 feet from the northwest corner of Section 23, Township 142N, Range 87W; thence N89°21'16"W a distance of 2599.21 feet; thence S0°56'27"W a distance of 5192.35 feet more or less; to the POINT OF TERMINATION at the south line of the southwest quarter of Section 23, Township 142N, Range 87W, at a point which bears N1°48'17"E a distance of 2637.57 feet from the west quarter of Section 26, Township 142N, Range 87W.

In Section 23, Township 142 North, Range 87 West of the Fifth Principal Meridian described as follows:

The facilities erected hereunder shall remain the property of the Cooperative. Cooperative shall have the right to inspect, rebuild, remove, repair, improve and make such changes, alterations, substitutions and additions in and to its facilities as Cooperative may from time to time deem advisable, including the right to increase or decrease the size or capacity of its system, together with necessary accessories and appurtenances; the right to increase or decrease the size of the facilities and equipment situated upon the premises; the right to permit or otherwise agree to the joint use or occupancy of the overhead lines or the trench and related underground facilities by other persons, associations or corporations; and the right to at any time use the property described above to extend lines and facilities to serve the property of persons other than the Owner.

Any damages to the surface of the right-of-way or to crops, fences, gates, drains, ditches, or lines of the Owner, caused by the Cooperative in the installation, repair maintenance, reconstruction or removal of said electrical properties and appurtenances, shall be promptly repaired, replaced or paid for by the Cooperative, provided a claim therefore is presented to the Cooperative at its General Office within ninety (90) days after such damages occur. If the amount of said damages cannot be agreed upon, the Cooperative and the Owner shall each select an arbitrator, and these two shall select a third arbitrator, and the decision and award of the arbitrators shall be final.

Cooperative shall at all times have the right to keep the easement clear of all buildings, structures or other obstructions, trees, shrubbery, undergrowth and roots.

Owner, his successors and assigns, may use the land within the easement for any purpose not inconsistent with the rights granted, provided such use does not interfere with or endanger the Cooperative's facilities or the rights granted under this easement.

For the purpose of constructing, inspecting, maintaining or operating its facilities, Cooperative shall have the right of ingress to and egress from the easement over the lands of Owner adjacent to the easement and lying between public or private roads and the easement, such right to be exercised in such manner as shall occasion the least practicable damage and inconvenience to Owner.

Owner covenants that he is seized of and has the right to convey the said easement, rights and privileges; that Cooperative shall have quiet and peaceable possession, use and enjoyment of the aforesaid easement, rights and privileges, and that Owner shall execute such further assurances thereof as may be requested by the Cooperative.

Jennifer Rudolph

STATE OF NORTH DAKOTA)
)ss
COUNTY OF Burleigh )

On this 25th day of February, 20 16, before me, a Notary Public in and for said County and State personally appeared Jennifer Rudolph, known to me to be the person(s) described in and who executed the within and foregoing instrument and acknowledged to me that he/she/they executed the same.

*Notary Seal Location*

JOHN JANGULA
Notary Public
State of North Dakota
My Commission Expires May 15, 2021

Notary Public State of North Dakota

My Commission Expires: May 15, 2021

92454 3/15/2016 3:50 PM PAGE: 1 OF 2
BOOK: MM PAGE: 290 FEES: $13.00 MM EASEMENT
Kim Wilkens, OLIVER COUNTY RECORDER
By Deputy

MOUNTAIN PLAINS LLC
JOSH MUEHLER, FIELD MANAGER
PO BOX 487
BISMARCK, ND 58502

OLIVER COUNTY RECORDER SEAL STATE OF NORTH DAKOTA

# RIGHT OF WAY EASEMENT

THIS AGREEMENT made and entered into this 25th day of February, 2016, between Gary Smith of 6800 81st Street NE, Bismarck, ND 58503, hereinafter called "Owner" (whether one or more) and ROUGHRIDER ELECTRIC COOPERATIVE, INC., whose post office address is 800 Highway Drive, Hazen, North Dakota 58545-4737, hereinafter called "COOPERATIVE".

WITNESSETH that for valuable consideration, the receipt and sufficiency of which is hereby acknowledged, Owner grants unto Cooperative, its successors and assigns, for a term of 99 years from the date hereof, an easement to construct, reconstruct, operate and maintain an electric distribution system, overhead, underground or both including all poles, guys, anchors wires, surface terminals, and all accessories and appurtenances necessary or desirable in connection therewith, under, over, upon and across lands of Owner and/or in or upon all streets, roads or highways abutting said lands situated in Oliver County, North Dakota, and more particularly described as follows, to-wit:

A parcel of land in the W1/2 of Section 23, Township 142 North, Range 87 West of the Fifth Principal Meridian, 20 feet in width, 10 feet on each side of a centerline described as follows:

Beginning at the east line of the northwest corner of Section 23, Township 142 North, Range 87 West, at a point which bears S87°41'07"E a distance of 2634.65 feet from the northwest corner of Section 23, Township 142N, Range 87W; thence N89°21'16"W a distance of 2599.21 feet; thence S0°56'27"W a distance of 5192.35 feet more or less; to the POINT OF TERMINATION at the south line of the southwest quarter of Section 23, Township 142N, Range 87W, at a point which bears N1°48'17"E a distance of 2637.57 feet from the west quarter of Section 26, Township 142N, Range 87W.

In Section 23, Township 142 North, Range 87 West of the Fifth Principal Meridian described as follows:

The facilities erected hereunder shall remain the property of the Cooperative. Cooperative shall have the right to inspect, rebuild, remove, repair, improve and make such changes, alterations, substitutions and additions in and to its facilities as Cooperative may from time to time deem advisable, including the right to increase or decrease the size or capacity of its system, together with necessary accessories and appurtenances; the right to increase or decrease the size of the facilities and equipment situated upon the premises; the right to permit or otherwise agree to the joint use or occupancy of the overhead lines or the trench and related underground facilities by other persons, associations or corporations; and the right to at any time use the property described above to extend lines and facilities to serve the property of persons other than the Owner.

Any damages to the surface of the right-of-way or to crops, fences, gates, drains, ditches, or lines of the Owner, caused by the Cooperative in the installation, repair maintenance, reconstruction or removal of said electrical properties and appurtenances, shall be promptly repaired, replaced or paid for by the Cooperative, provided a claim therefore is presented to the Cooperative at its General Office within ninety (90) days after such damages occur. If the amount of said damages cannot be agreed upon, the Cooperative and the Owner shall each select an arbitrator, and these two shall select a third arbitrator, and the decision and award of the arbitrators shall be final.

Cooperative shall at all times have the right to keep the easement clear of all buildings, structures or other obstructions, trees, shrubbery, undergrowth and roots.

Owner, his successors and assigns, may use the land within the easement for any purpose not inconsistent with the rights granted, provided such use does not interfere with or endanger the Cooperative's facilities or the rights granted under this easement.

For the purpose of constructing, inspecting, maintaining or operating its facilities, Cooperative shall have the right of ingress to and egress from the easement over the lands of Owner adjacent to the easement and lying between public or private roads and the easement, such right to be exercised in such manner as shall occasion the least practicable damage and inconvenience to Owner.

Owner covenants that he is seized of and has the right to convey the said easement, rights and privileges; that Cooperative shall have quiet and peaceable possession, use and enjoyment of the aforesaid easement, rights and privileges, and that Owner shall execute such further assurances thereof as may be requested by the Cooperative.

Gary A. Smith

Gary Smith

STATE OF NORTH DAKOTA)
)ss
COUNTY OF Burleigh )

On this 25th day of February, 2016, before me, a Notary Public in and for said County and State personally appeared Gary Smith, known to me to be the person(s) described in and who executed the within and foregoing instrument and acknowledged to me that he/she/they executed the same.

*Notary Seal Location*

JOHN JANGULA
Notary Public
State of North Dakota
My Commission Expires May 15, 2021

Notary Public State of North Dakota

My Commission Expires: May 15, 2021

92455 3/15/2016 3:53 PM PAGE: 1 OF 2
BOOK: MM PAGE: 292 FEES: $13.00 MM EASEMENT
Kim Wilkens, OLIVER COUNTY RECORDER
By MM Mueller Deputy

MOUNTAIN PLAINS LLC
JOSH MUEHLER, FIELD MANAGER
PO BOX 487
BISMARCK, ND 58502

OLIVER COUNTY RECORDER SEAL STATE OF NORTH DAKOTA

01103

Location Number

RIGHT-OF-WAY EASEMENT

KNOW ALL MEN BY THESE PRESENTS, that the undersigned S. H. Tjaden and Hannah Tjaden (wife) for a good and valuable consideration, the receipt whereof is hereby acknowledged, does hereby grant unto the Oliver-Mercer Electric Cooperative, Inc. a corporation, whose post office address is Hazen, N. Dak., North Dakota, and to its successors or assigns, the right to enter upon the lands of the undersigned, situated in the county of Oliver, State of North Dakota and more particularly described as follows:

SE¼ Sec. 22 Township 142-87

and to place, construct, operate, repair, maintain, relocate and replace thereon and in or upon all streets, roads or highways abutting said lands an electric transmission or distribution line or system, and to cut and trim trees and shrubbery to the extent necessary to keep them clear of said electric line or system and to cut down from time to time all dead, weak, leaning or dangerous trees that are tall enough to strike the wires in falling.

In granting this easement it is understood that at pole locations, only a single pole and arrurtenance will be used, and that the location of the pole will be such as to form the least possible interference to farm operations, so long as it does not materially increase the cost of construction.

The undersigned covenants that he is the owner of the above described lands and that the said lands are free and clear of encumbrances and liens of whatsoever character except those held by the following persons:

None

It is further understood that, whenever necessary, words in this instrument in the singular shall be construed to read in the plural and that words used in the masculine gender shall be construed to read in the feminine.

IN WITNESS WHEREOF, the undersigned have set their hands and seals this 23 day of April, 19 45.

Signed, sealed and delivered in the presence of:

Edna Machacek

S. H. Tjaden

Hannah Tjaden

91056 8/21/2015 10:48 AM PAGE: 1 OF 2
BOOK: 1 PAGE: 1086 FEES: $13.00 MM EASEMENT (ROUGHRID
Kim Wilkens, OLIVER COUNTY RECORDER
By MMulty-Ea Deputy

STATE OF NORTH DAKOTA COUNTY OF OLIVER RECORDER SEAL

6010

(1)
STATE OF NORTH DAKOTA

COUNTY OF Oliver SS.

Edna Michaels being first duly sworn says that he is one of the witnesses to the above and foregoing easements, that S. H. Tjaden and Hannah Tjaden whose names is and/or are subscribed to the above and foregoing instruments as a party is and/or are the persons described in said easement and that they signed said instrument in my presence and that I in their presence signed my name thereto as a subscribing witness.

Edna Michaels

SUBSCRIBED and sworn to before me this 21 day of May 1945

Clara W. Wilcox
Notary Public in and for the County of Oliver and State of North Dakota.

My commission expires

NOTARY PUBLIC, OLIVER CO., N. DAK.
My Commission Expires March 5, 1949.

(1)
STATE OF NORTH DAKOTA
COUNTY OF Oliver SS.

On this 21 day of May 1945 before me Clara W. Wilcox a Notary Public within and for the State of North Dakota, personally appeared Edna Michaels known to me to be one of the persons who subscribed his name to the above and foregoing instrument as a witness, and who acknowledged to me that he subscribed his name thereto as such witness, and who proved to me that the person who and/or whose names are subscribed to the foregoing instrument are the persons described in it.

ROUGHRIDER ELECTRIC COOPERATIVE
800 HWY DR

HAZEN, ND 58545

Clara W. Wilcox
Notary Public in and for the County of Oliver and State of North Dakota.

My commission expires

NOTARY PUBLIC, OLIVER CO., N. DAK.
My Commission Expires March 5, 1949.

**********

(2)
STATE OF

County of SS.

On this day of 19, before me , a Notary Public in and for said County and State, personally appeared and known to me to be the persons who described in and who executed within and foregoing instrument and acknowledged to me that he executed the same.

Notary Public in and for the County of and State North Dakota.

My commission expires .

**NORTH DAKOTA INDUSTRIAL COMMISSION**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case No(s). 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

---

## DECLARATION OF SERVICE

---

[¶1] I hereby certify that true and correct copies of the following documents:

- **Declaration of Kurt Swenson with attachments;**
- **Declaration of Michael Bauman with attachments;**
- **Declaration of Glenn Gerving with attachments;**
- **Declaration of Michael & Bonnie Haupt with attachments;**
- **Declaration of John M. Jochim with attachments;**
- **Declaration of Kevin Kraft with attachments;**
- **Declaration of Charmayne Liebelt with attachments;**
- **Declaration of Kirk Maize with attachments;**
- **Declaration of Christy Metz with attachments;**
- **Declaration of JoLene Rust with attachments;**
- **Declaration of Gary A. Smith with attachments; and**
- **Declaration of Service.**

were, on the 7th day of June, 2024 sent via electronic mail to the following:

North Dakota Industrial Commission
oilandgasinfo@nd.gov
slforsberg@nd.gov

Lynn Helms
lhelms@nd.gov

Lawrence Bender
Attorney at Law
lbender@fredlaw.com

S. Thomas Throne
Attorney at Law
TThrone@thronelaw.com

Joshua Swanson
Attorney for Intervenor Minnkota
jswanson@vogellaw.com

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on this 7th day of June, 2024 at Bismarck, North Dakota.

Desirae Zaste

Received
JUN 6 2024
ND Oil & Gas Division

Good Morning:

You are making a decision on Liquids, regardless of whether they are owned or operated by a public utility. Could you please explain what is the FACILITY IN THIS CASE – Summit Solutions or the place of burial of Carbon/CO2? How are reports compiled if it is the earth where Carbon/CO2 is buried? If Summit Solutions is only burying Carbon/CO2 for 10 years, does that mean the sequester of Carbon/CO2 will end in 10 years? How much capacity is available now and will the pump stations be used to send the Carbon/CO2 to places that will use it and pay for it? Who gets the payment for future use of Carbon/CO2 if it can be brought up from the earth after burying it but it is supposed to be "permanently buried"? Does the money go to the investors only? Will ND other than the land owners receive money? Other pipelines pay taxes, will Summit Solutions pay taxes on the land with the pipeline on it and/or where it is buried?

80% of the projects to have attempted to commercialize carbon capture and sequestration technology have ended in failure. Why use taxpayers-your and my- money for a technology that has such a poor track record? At this time there is no proof that carbon will stay buried. I have heard it will adhere to the wall of the cavity and never be able to be brought up.

Does it take more pressure to move Carbon/CO2 through a 24" pipe than through an 18" pipe?

One of my concerns is the FAULT lines. We have had 13 earthquakes in ND. 3 of them were in Eastern ND and the rest were along the FAULT lines in Western ND. Earthquakes are caused by the sudden slip of a fault in the upper few hundred kilometers of the earth. So far the earthquakes have been very minor. But we are burying lots of Carbon/CO2 in an area near the fault lines? St. Helena erupted because of too much Carbon/CO2 in one area and it finally heated up.

I have listed the earthquakes:
Oliver and Mercer County to Sheridan had an earthquake in the 1900's. Makoti Fault is in Dunn and **Mercer** counties.
Goodrich had an earthquake on 11.15.2008 with a Magnitude of 2.6 and Depth of 11.2 miles.
Grenora had an earthquake on 1.03.2009 with a Magnitude of 1.5 and Depth of 8.3 miles.
Ft. Berthold SW, Dunn County, (which is next to **Mercer** County) had an earthquake on 8.03.2009 with a Magnitude of 1.9 and Depth of 3.1 miles
Yellowstone and Missouri River, McKenzie County had an earthquake on 3.21.2010 with a Magnitude of 2.5 and Depth of 3.1 miles
Boxelder Creek had an earthquake on 6.14.2010 with a Magnitude of 1.4 and Depth of 3 miles
SE of Williston in Dunn County which is next to **Mercer** County had an earthquake 9.28.2012 with a III Intensity of 3.3 and Depth of .04 miles

**AND we are dumping Carbon/CO2 in or near these fault lines. I have drawn a fault line in the near area of where Carbon/CO2 is being buried.**

According to the newest map I just picked up, **Mercer County** is not very far from **Lake Sacajawea**.... Do you really believe that by burying the vast amount of Carbon/CO2 in a couple of counties that it will not meander to other areas and there is a possibility of it going north along the fault lines. Would it reach Lake Sacajawea???

The state's disposal wells inject saltwater into the Inyan Kara, which absorbs the liquid like a sponge. So we are already dumping saltwater into the earth in ND. How much can ND absorb in the earth without us getting a backlash from Mother Earth? We are messing with an order that God created. We have the best air in the USA. I know people who come back from AZ and other states just to stay in ND and breathe in our clean air. Our livestock and horses are at a premium because they say there is something different about ND's grass. The farmers are trying hard to produce more food every day. It will be a lot harder or impossible if Carbon/CO2 is buried for 10 years at the volume required by Summit Solutions.....And since Science already said Carbon/CO2 should not be buried, that we need Carbon/CO2 to live, I wonder how many children will not be born, how much less food there will be, or how many people will miss out on heart transplants, liver transplants, etc. due to the lack of Carbon for Dry Ice. Just a few examples.

You may not be on the Mineral Resource & Gas and Industrial Commission in 10 years but the decision you make regarding the burial of Carbon/CO2 will be with us for a very long time. If you vote Yes to bury it, then less food, less babies, less animals because grass will be less, etc. And now that we know investors include CHINA, Burgum and Hoeven???? Really??? More investigation of China should be done and stopped.

We are not here for ourselves as much as we are for our/your children and trying to make you realize how dangerous this pipeline of Carbon/CO2 being pressured at the width of 24 Inches because Summit Carbon Solutions wants it that huge. It is dangerous and I learned that the Military are preparing CO2 for **bombs**... Mark my words, You will be making the worst decision ever made by the Mineral Resource & Gas and the Industrial Commission if you allow this pipeline and burial of Carbon/CO2. I believe you are smart people and I want you to use some common sense.

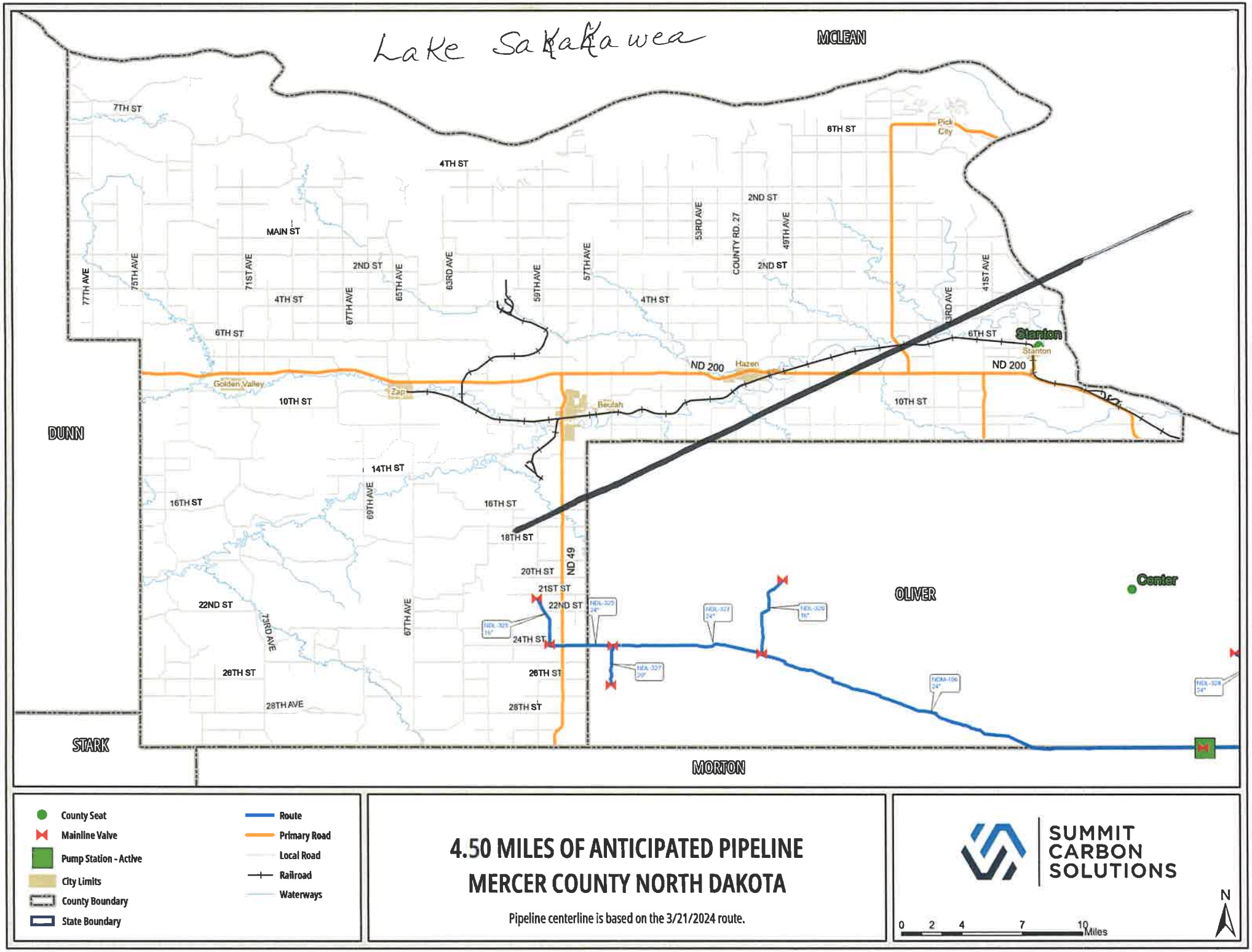
Who will be responsible for any damage??? I do not believe Summit Carbon Solutions and investers would be doing this if they were not getting much money for the project. They may be gone in 10 years but the destruction they are bringing to ND and us being called a DUMP State does not sit well with me. Thank you for listening but I also hope you remember some of what I have shared today and look into the FACTS of burying Carbon/CO2 close to a fault line.

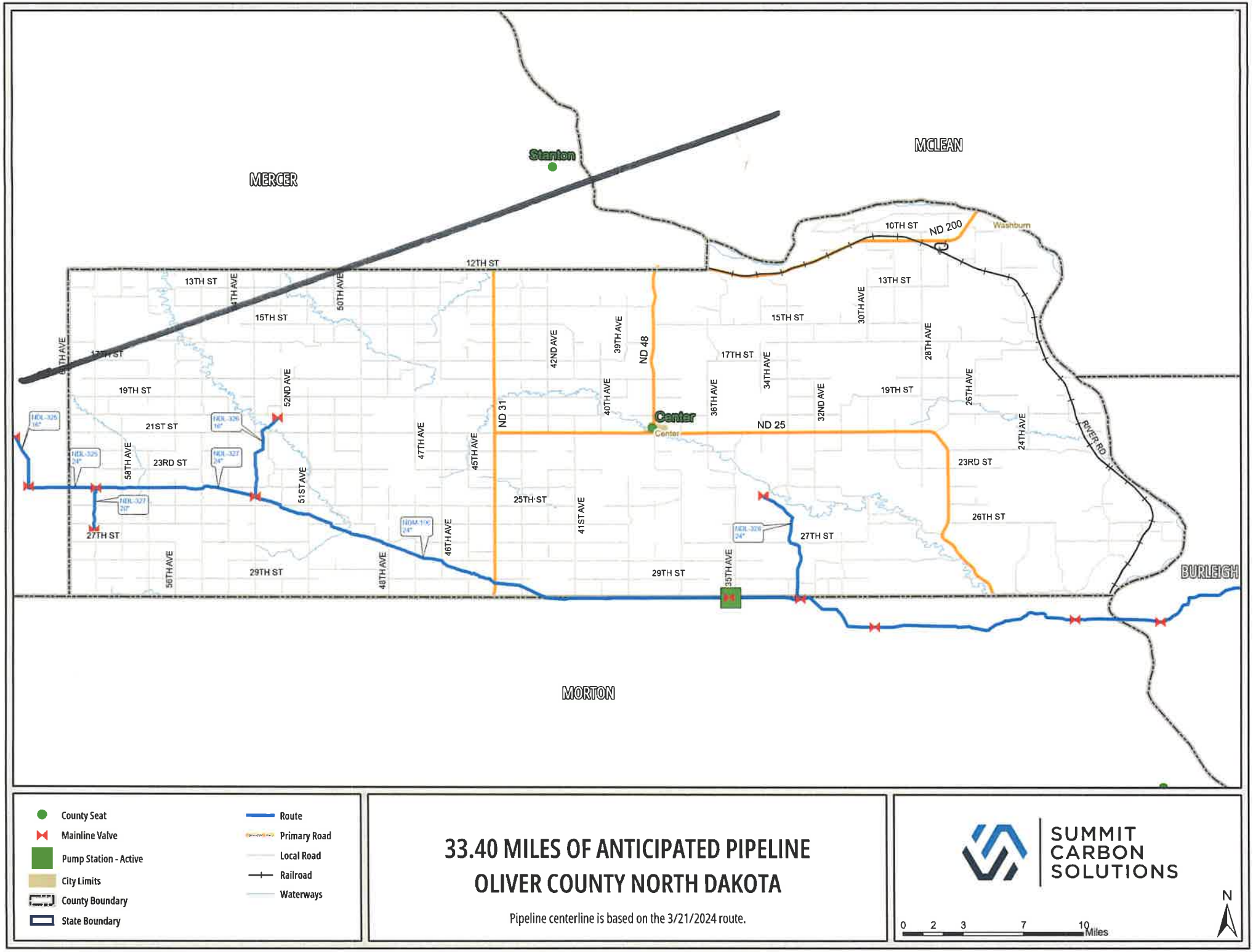
See the attachments for fault lines as best I can read from the Geological Survey information I looked up.

Sincerely,

Linda Hagen Mathern
928 N 32nd St
Bismarck, ND 58501

701-391-2005


Lake Sakakawea
MCLEAN
DUNN
STARK
MORTON
OLIVER
7TH ST
4TH ST
6TH ST
2ND ST
MAIN ST
10TH ST
14TH ST
16TH ST
18TH ST
20TH ST
21ST ST
22ND ST
24TH ST
26TH ST
28TH AVE
77TH AVE
75TH AVE
73RD AVE
71ST AVE
69TH AVE
67TH AVE
65TH AVE
63RD AVE
59TH AVE
57TH AVE
53RD AVE
49TH AVE
41ST AVE
COUNTY RD 27
ND 49
ND 200
Golden Valley
Zap
Beulah
Hazen
Pick City
Stanton
Center
NDA-325 16"
NDA-325 24"
NDA-327 24"
NDA-326 16"
NDA-327 20"
NDA-106 24"
NDA-328 24"
County Seat
Mainline Valve
Pump Station - Active
City Limits
County Boundary
State Boundary
Route
Primary Road
Local Road
Railroad
Waterways
4.50 MILES OF ANTICIPATED PIPELINE
MERCER COUNTY NORTH DAKOTA
Pipeline centerline is based on the 3/21/2024 route.
SUMMIT CARBON SOLUTIONS
N
0 2 4 7 10 Miles




County Seat
Mainline Valve
Pump Station - Active
City Limits
County Boundary
State Boundary

Route
Primary Road
Local Road
Railroad
Waterways

# 33.40 MILES OF ANTICIPATED PIPELINE
# OLIVER COUNTY NORTH DAKOTA

Pipeline centerline is based on the 3/21/2024 route.

SUMMIT CARBON SOLUTIONS

N

0 2 3 7 10 Miles

| | |
|---|---|
| **From:** | Morgan Stalick |
| **To:** | Forsberg, Sara L.; Kneavel, Ashley M. |
| **Cc:** | S. Thomas Throne; Bender, Lawrence; TGludt@fredlaw.com; Helms, Lynn D.; derrick@braatenlawfirm.com; Joshua A. Swanson |
| **Subject:** | Entry of Appearance in 30869-30880 |
| **Date:** | Thursday, June 6, 2024 4:24:42 PM |
| **Attachments:** | image001.png<br>EntryOfAppearance.pdf |

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Attached is the Entry of Appearance for Tom in Case Nos. 30869 through 30880:

In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND.

In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.

In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline

in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.

In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.

In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.

In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.

In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142

North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.

In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.

In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

Please let me know if you need anything else. Thanks,

*Morgan K. Stalick*
mstalick@thronelaw.com

THRONE LAW OFFICE, P.C.
www.thronelaw.com
PO Drawer 6590
201 North Connor Street, Suite 250
Sheridan, WY 82801
(307) 672-5858 (OFFICE)
(307) 674-6104 (FAX)
*Natural Resource Lawyers for the Rockies*

**BEFORE THE INDUSTRIAL COMMISSION**

**OF THE STATE OF NORTH DAKOTA**

| | |
|---|---|
| In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND. | **CASE NO. 30869** |
| In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation. | **Case No. 30870** |
| In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, | **Case No. 30871** |

Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation. **Case No. 30872**

In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND. **Case No. 30873**

In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation. **Case No. 30874**

In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.

**Case No. 30875**

In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

**Case No. 30876**

In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.

**Case No. 30877**

In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.

**Case No. 30878**

In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.

**Case No. 30879**

In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

**Case No. 30880**

## ENTRY OF APPEARANCE

S. Thomas Throne, of Throne Law Office, P.C., P.O. Drawer 6590, Sheridan, WY 82801, hereby enters an appearance in the above captioned matter as counsel on behalf of Summit Carbon Storage #1, Summit Carbon Storage #2, and Summit Carbon Storage #3.

Dated this 6th day of June 2024.

Respectfully Submitted,

S. Thomas Throne, ND Bar ID# 06679
Throne Law Office, P.C.
P.O. Drawer 6590
Sheridan, WY 82801
(307) 672-5858 Telephone
(307) 674-6104 Facsimile

Attorney for Summit Carbon Storage #1,
Summit Carbon Storage #2, and
Summit Carbon Storage #3

## CERTIFICATE OF SERVICE

I hereby certify that on this 6th day of June 2024, a true and correct copy of the above and foregoing *Entry of Appearance* was emailed to the following:

Lawrence Bender
*lbender@fredlaw.com*

Lynn Helms
*lhelms@nd.gov*

Derrick Braaten
*derrick@braatenlawfirm.com*

Joshua Swanson
*jswanson@vogellaw.com*

S. Thomas Throne

| | |
|---|---|
| **From:** | Desirae Zaste |
| **To:** | -Info-Oil & Gas Division; Forsberg, Sara L.; Garner, David P.; Knutson, Amy N.; Helms, Lynn D.; Bender, Lawrence; Joshua A. Swanson |
| **Cc:** | Derrick Braaten; BHughes@fredlaw.com; Etter, Mary |
| **Subject:** | Summit Carbon Storage #1, #2, and #3, LLC (Case Nos. 30869-30880) |
| **Date:** | Thursday, June 6, 2024 12:52:54 PM |
| **Attachments:** | 240606 Declaration of Service.pdf<br>Declaration of Bofto - signed.pdf<br>Declaration of Button - signed.pdf<br>Declaration of Doughty - signed.pdf<br>Declaration of Stockness - signed.pdf<br>Request for Telephonic Testimony.pdf |

---

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Good afternoon,

Attached for filing and service are the following documents:

- **Intervenor Landowners' Request for Telephonic Testimony;**
- **Declaration of Telephone Communication of Shane Bofto;**
- **Declaration of Telephone Communication of Paul Button;**
- **Declaration of Telephone Communication of P. Ted Doughty;**
- **Declaration of Telephone Communication of Chris Stockness; and**
- **Declaration of Service.**

Thank you.

**Desirae Zaste¦ Certified Paralegal**

**BRAATEN LAW FIRM**
109 N. 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
Fax: 701-221-5842
www.braatenlawfirm.com

**PRIVILEGED COMMUNICATION**
**This e-mail message is intended only for the named recipient(s) above and is covered by the Electronic Communications Privacy Act, 18 U.S.C. Sections 2510-2521. This e-mail is confidential and may contain information that is privileged, attorney work product or exempt from disclosure under applicable law. Recipients should not file copies of this e-mail with publicly accessible records. If you have received this message in error, please immediately notify the sender by return e-mail and delete this e-mail message from your computer. Thank you for your cooperation.**

**NORTH DAKOTA INDUSTRIAL COMMISSION**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case Nos. 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## INTERVENOR LANDOWNERS' REQUEST FOR TELEPHONIC TESTIMONY

[¶1] Intervenor's The Swenson Living Trust, Paul and Christy Metz, Michael and Bonnie Haupt, John Jochim, Gary and Cassie Smith, Michael Bauman, JoLene Rust, Glenn and Lisa Gerving, Kirk and Linda Maize and Allen Maize, Kevin and Kimberly Kraft, and Charmayne Liebelt (hereinafter "Landowners") by and through their undersigned counsel and pursuant to N.D.A.C. § 43-02-03-88.2, hereby submit their request for telephonic testimony in the above-captioned cases during the hearings currently scheduled for Tuesday, June 11, 2024 and Wednesday, June 12, 2024 for the following experts:

- Shane Bofto of HydroSolutions, Inc. Shane is a Senior Chemical - Environmental Engineer with HydroSolutions. His phone number is 406-591-1023. *See* Unsworn Declaration of Telephonic Communication of Shane Bofto.
- Paul Button of Button Petroleum Management LLC. Paul is a specialist in reservoir engineering and geology. His phone number is 406-860-5752. *See* Unsworn Declaration of Telephonic Communication of Paul Button.
- P. Ted Doughty of PTD Geoscience, LLC. Ted is a geologist and President of PTD Geoscience, LLC. His phone number is 509-638-3729. *See* Unsworn Declaration of Telephonic Communication of P. Ted Doughty.
- Christopher Stockness of Shenehon Company. Chris is an experienced appraiser and Managing Director of the real estate division at Shenehon Company. His phone number is 612-767-9434. *See* Unsworn Declaration of Chris Stockness.

[¶2] Counsel and representative for Landowners is Derrick Braaten of Braaten Law Firm, who will be present at the hearing.

Dated June 6, 2024.

*/s/ Derrick Braaten*

Derrick Braaten (ND #06394)
**BRAATEN LAW FIRM**
109 North 4th Street, Suite 100
Bismarck, ND 58501
701-221-2911
derrick@braatenlawfirm.com

*Attorneys for Intervenors the Swenson Living Trust, Bauman, Gerving, Haupt, Jochim, Kraft, Liebelt, Maize, Metz, Rust, and Smith*

**NORTH DAKOTA INDUSTRIAL COMMISSION**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case Nos. 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## DECLARATION OF TELEPHONE COMMUNICATION OF SHANE BOFTO

[¶1] I, Shane Bofto of HydroSolutions, Inc., do hereby confirm that I presented testimony under oath in North Dakota Industrial Commission Case Numbers 30869-30880, on June 11, 2024 and June 12, 2024.

[¶2] My testimony was presented by telephone from 406-591-1023, HydroSolutions, 1500 Poly Drive, Suite 103, Billings, Montana.

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on the 5th day of June, 2024 at Billings, Montana, United States.

Shane Bofto

Shane Bofto (Jun 5, 2024 06:28 MDT)

Shane Bofto

# Declaration of Bofto

Final Audit Report 2024-06-05

| | |
|---|---|
| Created: | 2024-06-05 |
| By: | Steven Price (steven@braatenlawfirm.com) |
| Status: | Signed |
| Transaction ID: | CBJCHBCAABAA-ADiC5w_4da7KUeJuqdoYQiAaB_782P1 |

## "Declaration of Bofto" History

Document created by Steven Price (steven@braatenlawfirm.com)
2024-06-05 - 12:25:37 PM GMT

Document emailed to Shane Bofto (shaneb@hydrosi.com) for signature
2024-06-05 - 12:25:40 PM GMT

Email viewed by Shane Bofto (shaneb@hydrosi.com)
2024-06-05 - 12:27:15 PM GMT

Document e-signed by Shane Bofto (shaneb@hydrosi.com)
Signature Date: 2024-06-05 - 12:28:07 PM GMT - Time Source: server

Agreement completed.
2024-06-05 - 12:28:07 PM GMT

**NORTH DAKOTA INDUSTRIAL COMMISSION**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case Nos. 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## DECLARATION OF TELEPHONE COMMUNICATION OF PAUL BUTTON

[¶1] I, Paul Button of Button Petroleum Management LLC, do hereby confirm that I presented testimony under oath in North Dakota Industrial Commission Case Numbers 30869-30880, on June 11, 2024 and June 12, 2024.

[¶2] My testimony was presented by telephone from 406-860-5752, Button Petroleum Management LLC, 1119 S. Ophir Street, Butte, Montana.

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on the 4th day of June, 2024 at Butte, Montana, United States.

Paul Button

Paul Button (Jun 4, 2024 16:13 MDT)

Paul Button

# Declaration of Button

Final Audit Report 2024-06-04

| | |
|---|---|
| Created: | 2024-06-04 |
| By: | Steven Price (steven@braatenlawfirm.com) |
| Status: | Signed |
| Transaction ID: | CBJCHBCAABAAO5qOYttrZwfYn99REyt9uIxTbzEsetbP |

## "Declaration of Button" History

Document created by Steven Price (steven@braatenlawfirm.com)
2024-06-04 - 8:13:23 PM GMT

Document emailed to Paul Button (pmbutton@outlook.com) for signature
2024-06-04 - 8:13:27 PM GMT

Email viewed by Paul Button (pmbutton@outlook.com)
2024-06-04 - 10:13:14 PM GMT

Document e-signed by Paul Button (pmbutton@outlook.com)
Signature Date: 2024-06-04 - 10:13:35 PM GMT - Time Source: server

Agreement completed.
2024-06-04 - 10:13:35 PM GMT

**NORTH DAKOTA INDUSTRIAL COMMISSION**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case Nos. 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## DECLARATION OF TELEPHONE COMMUNICATION OF P. TED DOUGHTY

[¶1] I, P. Ted Doughty of PTD Geoscience, LLC, do hereby confirm that I presented testimony under oath in North Dakota Industrial Commission Case Numbers 30869-30880, on June 11, 2024 and June 12, 2024.

[¶2] My testimony was presented by telephone from 509-638-3729, PTD Geoscience, LLC, 1427 Avenue F, Billings, Montana.

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on the 6 day of June, 2024 at Billings, Montana, United States.

Ted Doughty
Ted Doughty (Jun 6, 2024 10:21 MDT)

P. Ted Doughty

# Declaration of Doughty

Final Audit Report 2024-06-06

| | |
|---|---|
| Created: | 2024-06-06 |
| By: | Steven Price (steven@braatenlawfirm.com) |
| Status: | Signed |
| Transaction ID: | CBJCHBCAABAAjcPP4Av1XoWmKIhmuQwYTHYtVhYbdmXP |

## "Declaration of Doughty" History

Document created by Steven Price (steven@braatenlawfirm.com)
2024-06-06 - 1:31:35 PM GMT

Document emailed to Ted Doughty (teddoughty@prisemgeoconsulting.com) for signature
2024-06-06 - 1:31:39 PM GMT

Email viewed by Ted Doughty (teddoughty@prisemgeoconsulting.com)
2024-06-06 - 4:20:42 PM GMT

Document e-signed by Ted Doughty (teddoughty@prisemgeoconsulting.com)
Signature Date: 2024-06-06 - 4:21:08 PM GMT - Time Source: server

Agreement completed.
2024-06-06 - 4:21:08 PM GMT

**NORTH DAKOTA INDUSTRIAL COMMISSION**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case Nos. 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## DECLARATION OF TELEPHONE COMMUNICATION OF CHRIS STOCKNESS

[¶1] I, Chris Stockness of Shenehon Company, do hereby confirm that I presented testimony under oath in North Dakota Industrial Commission Case Numbers 30869-30880, on June 11, 2024 and June 12, 2024.

[¶2] My testimony was presented by telephone from 612-767-9434, Shenehon Company, 88 South 10th Street, Suite 400, Minneapolis, Minnesota.

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on the 5th day of June, 2024 at Minneapolis, Minnesota, United States.

Chris Stockness

Chris Stockness (Jun 5, 2024 12:29 CDT)

Chris Stockness

# Declaration of Stockness

Final Audit Report 2024-06-05

| | |
|---|---|
| Created: | 2024-06-05 |
| By: | Steven Price (steven@braatenlawfirm.com) |
| Status: | Signed |
| Transaction ID: | CBJCHBCAABAA0nYy1v8uXPI8gFMszljdYB362uG9OsFT |

## "Declaration of Stockness" History

Document created by Steven Price (steven@braatenlawfirm.com)
2024-06-05 - 5:14:13 PM GMT

Document emailed to Chris Stockness (cstockness@shenehon.com) for signature
2024-06-05 - 5:14:20 PM GMT

Email viewed by Chris Stockness (cstockness@shenehon.com)
2024-06-05 - 5:28:47 PM GMT

Document e-signed by Chris Stockness (cstockness@shenehon.com)
Signature Date: 2024-06-05 - 5:29:28 PM GMT - Time Source: server

Agreement completed.
2024-06-05 - 5:29:28 PM GMT

Adobe Acrobat Sign

**NORTH DAKOTA INDUSTRIAL COMMISSION**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case No(s). 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

---

## DECLARATION OF SERVICE

---

[¶1] I hereby certify that true and correct copies of the following documents:

- **Intervenor Landowners' Request for Telephonic Testimony;**
- **Declaration of Telephone Communication of Shane Bofto;**
- **Declaration of Telephone Communication of Paul Button;**
- **Declaration of Telephone Communication of P. Ted Doughty;**
- **Declaration of Telephone Communication of Chris Stockness; and**
- **Declaration of Service.**

were, on the 6th day of June, 2024 sent via electronic mail to the following:

North Dakota Industrial Commission
oilandgasinfo@nd.gov
slforsberg@nd.gov

Lynn Helms
lhelms@nd.gov

Lawrence Bender
Attorney at Law
lbender@fredlaw.com

Joshua Swanson
Attorney for Intervenor Minnkota
jswanson@vogellaw.com

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on this 6th day of June, 2024 at Bismarck, North Dakota.

Desirae Zaste

| | |
|---|---|
| **From:** | Knutson, Amy N. |
| **To:** | Joshua A. Swanson; Bender, Lawrence; Derrick Braaten |
| **Cc:** | Forsberg, Sara L.; Garner, David P.; Helms, Lynn D.; desirae@braatenlawfirm.com; BHughes@fredlaw.com; MEtter@fredlaw.com |
| **Subject:** | Summit Carbon Storage (Case Nos. 30869-30880) |
| **Date:** | Monday, June 3, 2024 4:27:12 PM |
| **Attachments:** | 2024.6.3 - Order on Petition to Intervene for Minnkota.pdf<br>2024.6.3 - DOS.pdf |

---

Counsel,

On behalf of Hearing Officer Garner, please see attached:

1. ORDER ON PETITION TO INTERVENE FOR MINNKOTA POWER COOPERATIVE, INC.

**Please note for all future filings and/or correspondence in this matter to include Hearing Officer David Garner (dpgarner@nd.gov), Lynn Helms (lhelms@nd.gov), Sara Forsberg (slforsberg@nd.gov), and Amy Knutson (anknutson@nd.gov).

Thank you.

Amy Knutson
**Paralegal**
**Civil Litigation Division**
**North Dakota Office of Attorney General**
**500 North 9th Street**
**Bismarck, ND 58501-4509**
**Telephone: (701) 328-3640**
**Fax: (701) 328-4300**

**Confidentiality Notice:**
This electronic mail transmission is intended for the use of the individual or entity to which it is addressed and may contain confidential information belonging to the sender. If you are not the intended recipient, you are hereby notified that any disclosure, copying, distribution, or the taking of any action in reliance on the contents of this information is strictly prohibited. If you have received this transmission in error, please notify the sender immediately by e-mail and delete the original message.

BEFORE THE NORTH DAKOTA INDUSTRIAL COMMISSION

OF THE STATE OF NORTH DAKOTA

CASE NOS 30869
30870
30871
30872
30873
30874
30875
30876
30877
30878
30879
30880

In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation

In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation

In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1,

11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation

In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation

In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND

In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission

may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation

In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation

In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver

Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary

In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND

In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation

In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation

In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary

---

**ORDER ON PETITION TO INTERVENE FOR MINNKOTA POWER COOPERATIVE, INC**

---

[¶1] On February 6, 2024, Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit carbon Storage #3, LLC (collectively, "Summit"), filed with the North Dakota

Industrial Commission ("Commission") applications for permits for carbon dioxide storage facilities.

[¶2] On May 20, 2024, Minnkota Power Cooperative, Inc. ("Minnkota") filed a Petition to Intervene asserting certain correlative rights may be impacted by the outcome of the proceedings in the above-described cases. Minnkota has not asserted an ownership interest in any of the subject lands. Minnkota Power Cooperative Inc.'s, Petition to Intervene, ¶ 9.

[¶3] On May 28, 2024, Summit filed a Consolidated Response to Petitions to Intervene which did not include an objection to Minnkota's intervention. Consolidated Response to Petitions to Intervene.

[¶4] Based on the assertion of certain correlative rights by Minnkota, the Petition to Intervene is hereby **GRANTED.** The Commission notes, however, that at the hearing Minnkota must demonstrate the existence of the above-described correlative rights. If they are unable to do so, the Commission will not take the Summit Carbon Storage Facilities' impact on Minnkota's rights under consideration.

DATED: June 3, 2024.

David P. Garner
North Dakota Industrial Commission
Hearing Officer

**BEFORE THE NORTH DAKOTA INDUSTRIAL COMMISSION**
**OF THE STATE OF NORTH DAKOTA**

CASE NOS 30869
30870
30871
30872
30873
30874
30875
30876
30877
30878
30879
30880

In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation

In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation

In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19,

20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation

In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation

In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND

In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5,

6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation

In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation

In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary

In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek

Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND

In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation

In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142

North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation

In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary

---

**UNSWORN DECLARATION OF SERVICE BY ELECTRONIC MAIL AND RETENTION OF DOCUMENT**

---

[¶1] Amy Knutson states as follows

[¶2] I am of legal age and on the 31st day of May, 2024, I served the following documents

**1 ORDER ON PETITION TO INTERVENE FOR MINNKOTA POWER COOPERATIVE, INC**

upon the following by electronic mail as follows

Derrick Braaten – derrick@braatenlaw com,
Lawrence Bender – lbender@fredlaw com,
Joshua Swanson – jswanson@vogellaw com

[¶3] The original document shall be retained at the North Dakota Department of Mineral Resources, 600 E Boulevard Ave – Dept 405, Bismarck, North Dakota, 58505-0840

[¶4] I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on the 3rd day of June, 2024, at Bismarck, North Dakota, United States.

Amy Knutson

| | |
|---|---|
| **From:** | Knutson, Amy N. |
| **To:** | Joshua A. Swanson; Bender, Lawrence; Derrick Braaten |
| **Cc:** | Forsberg, Sara L.; Garner, David P.; Helms, Lynn D.; desirae@braatenlawfirm.com; BHughes@fredlaw.com; METter@fredlaw.com |
| **Subject:** | Summit Carbon Storage (Case Nos. 30869-30880) |
| **Date:** | Friday, May 31, 2024 1:25:21 PM |
| **Attachments:** | 2024.5.31 - Order on Pet. to Interevene Metz.pdf<br>2024.5.31 - Order on Pet. to Interevene Haupt.pdf<br>2024.5.31 - Order on Pet. to Interevene Jochim.pdf<br>2024.5.31 - Order on Pet. to Interevene Smith.pdf<br>2024.5.31 - Order on Pet. to Interevene Bauman.pdf<br>2024.5.31 - Order on Pet. to Interevene Rust.pdf<br>2024.5.31 - Order on Pet. to Interevene Gerving.pdf<br>2024.5.31 - Order on Pet. to Interevene for Maize.pdf<br>2024.5.31 - Order on Pet. to Interevene Kraft.pdf<br>2024.5.31 - Order on Pet. to Interevene Liebelt.pdf<br>2024.5.31 - Order on Pet. to Interevene - Trust.pdf<br>2024.5.31 - DOS & Ret of Doc Order on Pet to Intervene.pdf |

---

Counsel,

On behalf of Hearing Officer Garner, please see attached:

1. ORDER ON PETITION TO INTERVENE FOR PAUL AND CHRISTY METZ;
2. ORDER ON PETITION TO INTERVENE FOR MICHAEL AND BONNIE HAUPT;
3. ORDER ON PETITION TO INTERVENE FOR JOHN JOCHIM;
4. ORDER ON PETITION TO INTERVENE FOR GARY AND CASSIE SMITH;
5. ORDER ON PETITION TO INTERVENE FOR MICHAEL BAUMAN;
6. ORDER ON PETITION TO INTERVENE FOR JOLENE M. RUST;
7. ORDER ON PETITION TO INTERVENE FOR GLENN AND LISA GERVING;
8. ORDER ON PETITION TO INTERVENE FOR KIRK AND LINDA MAIZE AND ALLEN MAIZE;
9. ORDER ON PETITION TO INTERVENE FOR KEVIN AND KIMBERLY KRAFT;
10. ORDER ON PETITION TO INTERVENE FOR CHARMAYNE LIEBELT; and
11. ORDER ON PETITION TO INTERVENE FOR SWENSON TRUST.

**Please note for all future filings and/or correspondence in this matter to include Hearing Officer David Garner (dpgarner@nd.gov), Lynn Helms (lhelms@nd.gov), Sara Forsberg (slforsberg@nd.gov), and Amy Knutson (anknutson@nd.gov).

Thank you

Amy Knutson
**Paralegal**
**Civil Litigation Division**
**North Dakota Office of Attorney General**
**500 North 9th Street**
**Bismarck, ND 58501-4509**
**Telephone: (701) 328-3640**
**Fax: (701) 328-4300**

**Confidentiality Notice:**
This electronic mail transmission is intended for the use of the individual or entity to which it is addressed and may contain confidential information belonging to the sender. If you are not the intended recipient, you are hereby notified that any disclosure, copying, distribution, or the taking of any action in reliance on the contents of this information is strictly prohibited. If you have received this transmission in error, please notify the sender immediately by e-mail and delete the original message.

BEFORE THE NORTH DAKOTA INDUSTRIAL COMMISSION

OF THE STATE OF NORTH DAKOTA

CASE NOS. 30869
30870
30871
30872
30873
30874
30875
30876
30877
30878
30879
30880

In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1,

11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.

In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND

In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission

may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.

In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.

In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver

Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township. 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.

In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.

In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.

In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

---

## ORDER ON PETITION TO INTERVENE FOR PAUL AND CHRISTY METZ

---

[¶1] On February 6, 2024, Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit carbon Storage #3, LLC (collectively, "Summit"), filed with the North Dakota Industrial Commission ("Commission") applications for permits for carbon dioxide storage facilities.

[¶2] On May 15, 2024, Paul and Christy Metz ("Metz") filed a Petition to Intervene stating they own interests in property ("Metz Lands") legally described as follows:

a. Auditor's Lot 1, a parcel of land in the N½ of the SE¼ of Section 4 Township 141 North Range 87 West of the Fifth Principal Meridian, Oliver County, North Dakota, more particularly described as follows:
Commencing at the East ¼ Corner said Section 4; thence S.00'03'34"E., 774.60', along the East Line of Said Section 4, to the Point of Beginning; thence continuing along the said East line S.00'03'34"E., 58.66'; thence N.63'25'13"W., 803.38'; thence S.01'13'58"E., 416.27'; thence S.74'08'23"W., 204.26'; thence N.61'33'16"W.; 577.21'; thence N.60'45'05"W., 404.12'; thence N.01'56'26"W., 407.78'; thence N.89'47'04"E., 1045.86', thence S.01'48'11"E., 412.49'; thence S.63'30'12"E., 805.92', to the Point of Beginning and containing 18.88 acres more or less.

Petition to Intervene (Metz), ¶ 3.

[¶3] On May 28, 2024, Summit filed a Consolidated Response to Petitions to Intervene in which it stated, "Summit does not object to the remaining Petitioners intervention on the limited basis set forth above." Consolidated Response to Petitions to Intervene, ¶ 22.

[¶4] Based on the Metz's ownership of the Metz Lands, the Petition to Intervene is hereby **GRANTED** but limited to intervention in this matter as it relates to Summit Carbon Storage #1, LLC, Case Nos. 30869-30872.

[¶5] The Commission will not consider Metz's position insofar as it falls outside of consideration of Summit Carbon Storage #1, LLC, Case Nos. 30869-30872.

DATED: May 31, 2024.

David P. Garner
North Dakota Industrial Commission
Hearing Officer

BEFORE THE NORTH DAKOTA INDUSTRIAL COMMISSION

OF THE STATE OF NORTH DAKOTA

CASE NOS. 30869
30870
30871
30872
30873
30874
30875
30876
30877
30878
30879
30880

In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1,

11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.

In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND

In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission

may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.

In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.

In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver

Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township. 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.

In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.

In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.

In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

---

**ORDER ON PETITION TO INTERVENE FOR MICHAEL AND BONNIE HAUPT**

---

[¶1] On February 6, 2024, Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit carbon Storage #3, LLC (collectively, "Summit"), filed with the North Dakota Industrial Commission ("Commission") applications for permits for carbon dioxide storage facilities.

[¶2] On May 15, 2024, Michael and Bonnie Haupt ("Haupt") filed a Petition to Intervene stating they own interests in property ("Haupt Lands") legally described as follows:

a. The Southeast Quarter (SE 1/4) of Section Thirty-Five (35), Township One Hundred Forty-One (141) North, Range Eighty-Eight (88) West of the Fifth Principal Meridian, Mercer County, North Dakota.
b. The Southwest Quarter (SW 1/4) of Section Twenty-Seven (27), Township One Hundred Forty-One (141) North, Range Eighty-Eight (88) West of the Fifth Principal Meridian, Mercer County, North Dakota.

Petition to Intervene (Haupt), ¶ 3.

[¶3] On May 28, 2024, Summit filed a Consolidated Response to Petitions to Intervene in which it stated, "Summit does not object to the remaining Petitioners intervention on the limited basis set forth above." Consolidated Response to Petitions to Intervene, ¶ 22.

[¶4] Based on the Haupt's ownership of the Haupt Lands, the Petition to Intervene is hereby **GRANTED** but limited to intervention in this matter as it relates to Summit Carbon Storage #1, LLC, Case Nos. 30869-30872.

[¶5] The Commission will not consider Haupt's position insofar as it falls outside of consideration of Summit Carbon Storage #1, LLC, Case Nos. 30869-30872.

DATED: May 31, 2024.

David P. Garner
North Dakota Industrial Commission
Hearing Officer

BEFORE THE NORTH DAKOTA INDUSTRIAL COMMISSION

OF THE STATE OF NORTH DAKOTA

CASE NOS. 30869
30870
30871
30872
30873
30874
30875
30876
30877
30878
30879
30880

In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1,

11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.

In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND

In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission

may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.

In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.

In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver

Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township. 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.

In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.

In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.

In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

---

## ORDER ON PETITION TO INTERVENE FOR JOHN JOCHIM

---

[¶1] On February 6, 2024, Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit carbon Storage #3, LLC (collectively, "Summit"), filed with the North Dakota Industrial Commission ("Commission") applications for permits for carbon dioxide storage facilities.

[¶2] On May 15, 2024, John Jochim ("Jochim") filed a Petition to Intervene stating he owns interests in property ("Jochim Lands") legally described as follows:

a. Township 142 North, Range 88 West, Mercer County, North Dakota
Section 24: NW1/4

Petition to Intervene (Jochim), ¶ 3.

[¶3] On May 28, 2024, Summit filed a Consolidated Response to Petitions to Intervene in which it stated, "Summit does not object to the remaining Petitioners intervention on the limited basis set forth above." Consolidated Response to Petitions to Intervene, ¶ 22.

[¶4] Based on Jochim's ownership of the Bauman Lands, the Petition to Intervene is hereby **GRANTED** but limited to intervention in this matter as it relates to Summit Carbon Storage #2, LLC, Case Nos. 30873-30876.

[¶5] The Commission will not consider Jochim's position insofar as it falls outside of consideration of Summit Carbon Storage #2, LLC, Case Nos. 30873-30876.

DATED: May 31, 2024.

David P. Garner
North Dakota Industrial Commission
Hearing Officer

BEFORE THE NORTH DAKOTA INDUSTRIAL COMMISSION

OF THE STATE OF NORTH DAKOTA

CASE NOS. 30869
30870
30871
30872
30873
30874
30875
30876
30877
30878
30879
30880

In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1,

11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.

In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND

In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission

may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.

In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.

In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver

Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township. 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.

In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.

In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.

In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

---

## ORDER ON PETITION TO INTERVENE FOR GARY AND CASSIE SMITH

---

[¶1] On February 6, 2024, Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit carbon Storage #3, LLC (collectively, "Summit"), filed with the North Dakota Industrial Commission ("Commission") applications for permits for carbon dioxide storage facilities.

[¶2] On May 16, 2024, Gary and Cassie Smith ("Smith") filed a Petition to Intervene stating they own interests in property ("Smith Lands") legally described as follows:

a. Township 142 North, Range 87 West: Section 23: W1/2, Oliver County, North Dakota.
b. Township 142 North, Range 87 West: Section 20: NE1/4,Oliver County, North Dakota.
c. LOT A, within the SE¼ of Section 22, Township 142 North, Range 87 West, Oliver County, North Dakota described as follows: COMMENCING at the East Quarter Corner of Section 22; THENCE S 00°00'00" W, along the east line of Section 22, a distance of 120.00', to the true point of beginning; THENCE S 00°00'00" W, along said line, a distance of 660.00'; THENCE S 90°00'00" W, a distance of 660.00'; THENCE N 00°00'00" E, a distance of 660.00'; THENCE N 90°00'00" E, a distance of 660.00', back to the point of beginning. This parcel contains 10.0 acres, more or less.
d. Township 142 North, Range 87 West: Section 22: SE1/4, Oliver County, North Dakota.
e. Township 142 North, Range 87 West: Section 15: NE1/4 and NW1/4, Oliver County, North Dakota.

Petition to Intervene (Smith), ¶ 3.

[¶3] On May 28, 2024, Summit filed a Consolidated Response to Petitions to Intervene in which it stated, "Summit does not object to the remaining Petitioners intervention on the limited basis set forth above." Consolidated Response to Petitions to Intervene, ¶ 22.

[¶4] Based on Smith's ownership of the Smith Lands, the Petition to Intervene is hereby **GRANTED** but limited to intervention in this matter as it relates to Summit Carbon Storage #2, LLC, Case Nos. 30873-30876.

[¶5] The Commission will not consider Smith's position insofar as it falls outside of consideration of Summit Carbon Storage #2, LLC, Case Nos. 30873-30876.

DATED: May 31, 2024.

David P. Garner
North Dakota Industrial Commission
Hearing Officer

BEFORE THE NORTH DAKOTA INDUSTRIAL COMMISSION

OF THE STATE OF NORTH DAKOTA

CASE NOS. 30869
30870
30871
30872
30873
30874
30875
30876
30877
30878
30879
30880

In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1,

11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.

In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND

In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission

may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.

In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.

In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver

Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township. 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.

In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.

In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.

In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

---

**ORDER ON PETITION TO INTERVENE FOR MICHAEL BAUMAN**

---

[¶1] On February 6, 2024, Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit carbon Storage #3, LLC (collectively, "Summit"), filed with the North Dakota Industrial Commission ("Commission") applications for permits for carbon dioxide storage facilities.

[¶2] On May 16, 2024, Michael Bauman ("Bauman") filed a Petition to Intervene stating he owns interests in property ("Bauman Lands") legally described as follows:

a. Township 142 North, Range 88 West Section 24: SW¼ less a 20 acre parcel described as follows: Commencing at the NE comer of SW¼, thence West along the North boundary of the SW¼ a distance of 950 feet; thence South in a line parallel to the East boundary of the SW 1/4 a distance of 915 feet; thence East in a line parallel to the North boundary of the SW¼ a distance of 950 feet to the East boundary of the SW¼; thence North along the East boundary of the SW¼ to the point of beginning, Mercer County, North Dakota.

Petition to Intervene (Bauman), ¶ 3.

[¶3] On May 28, 2024, Summit filed a Consolidated Response to Petitions to Intervene in which it stated, "Summit does not object to the remaining Petitioners intervention on the limited basis set forth above." Consolidated Response to Petitions to Intervene, ¶ 22.

[¶4] Based on the Bauman's ownership of the Bauman Lands, the Petition to Intervene is hereby **GRANTED** but limited to intervention in this matter as it relates to Summit Carbon Storage #2, LLC, Case Nos. 30873-30876.

[¶5] The Commission will not consider Bauman's position insofar as it falls outside of consideration of Summit Carbon Storage #2, LLC, Case Nos. 30873-30876.

DATED: May 31, 2024.

David P. Garner
North Dakota Industrial Commission
Hearing Officer

BEFORE THE NORTH DAKOTA INDUSTRIAL COMMISSION

OF THE STATE OF NORTH DAKOTA

CASE NOS. 30869
30870
30871
30872
30873
30874
30875
30876
30877
30878
30879
30880

In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1,

11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.

In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND

In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission

may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.

In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.

In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver

Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township. 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.

In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.

In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.

In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

---

**ORDER ON PETITION TO INTERVENE FOR JOLENE RUST**

---

[¶1] On February 6, 2024, Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit carbon Storage #3, LLC (collectively, "Summit"), filed with the North Dakota Industrial Commission ("Commission") applications for permits for carbon dioxide storage facilities.

[¶2] On May 16, 2024, Jolene Rust ("Rust") filed a Petition to Intervene stating she owns interests in property ("Rust Lands") legally described as follows:

a. Township 142 North, Range 88 West, Mercer County, North Dakota Section 13: SW¼

Petition to Intervene (Rust), ¶ 3.

[¶3] On May 28, 2024, Summit filed a Consolidated Response to Petitions to Intervene in which it stated, "Summit does not object to the remaining Petitioners intervention on the limited basis set forth above." Consolidated Response to Petitions to Intervene, ¶ 22.

[¶4] Based on Rust's ownership of the Rust Lands, the Petition to Intervene is hereby **GRANTED** but limited to intervention in this matter as it relates to Summit Carbon Storage #2, LLC, Case Nos. 30873-30876.

[¶5] The Commission will not consider Rust's position insofar as it falls outside of consideration of Summit Carbon Storage #2, LLC, Case Nos. 30873-30876.

DATED: May 31, 2024.

David P. Garner
North Dakota Industrial Commission
Hearing Officer

BEFORE THE NORTH DAKOTA INDUSTRIAL COMMISSION

OF THE STATE OF NORTH DAKOTA

CASE NOS. 30869
30870
30871
30872
30873
30874
30875
30876
30877
30878
30879
30880

In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1,

11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.

In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND

In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission

may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.

In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.

In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver

Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township. 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.

In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.

In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.

In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

---

## ORDER ON PETITION TO INTERVENE FOR GLENN AND LISA GERVING

---

[¶1] On February 6, 2024, Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit carbon Storage #3, LLC (collectively, "Summit"), filed with the North Dakota Industrial Commission ("Commission") applications for permits for carbon dioxide storage facilities.

[¶2] On May 16, 2024, Glenn and Lisa Gerving ("Gerving") filed a Petition to Intervene stating they own interests in property ("Gerving Lands") legally described as follows:

a. The South fifty-three (53) acres of the South Half of the South Half (S1/2 S1/2) of Section Thirteen (13), in Township One Hundred Forty-One (141) North, Range Eighty-Eight (88) West of the Fifth Principal Meridian, LESS a tract of land deeded to the State of North Dakota for the use of the State Highway Department described as follows: All that portion of the South fifty-four (54) acres of the South Half of the South Half (S 1/2 S 1/2) of Section Thirteen (13), Township One Hundred Forty-One (141) North, Range Eighty-Eight (88) West, lying within a strip of land 100.00 feet wide, located on the Easterly side of and measured at right angles to the following described highway center line, as surveyed and staked: Beginning at a point 154.58 feet East of the Southwest corner of said Section Thirteen (13), thence from a tangent bearing North 0.09' West running along a 0.30' curve to the left 446.7 feet, more or less, until said strip crosses the North Line of said South 54 acres, also including all that portion lying Westerly of the above described strip except all that portion lying within 33 feet of the section line, tract contains 1.92 acres, more or less, Mercer County, North Dakota.
b. S1/2 SW1/4 of Sec. 24, Township. 141N, Range 88W, Mercer County, North Dakota.
c. S1/2 SW1/4 NW1/4 of Sec. 24, Township 141N, Range. 88W, Mercer County, North Dakota.
d. The E1/2 SE1/4 of Section 34 in Township 142N, Range 87W, Oliver County, North Dakota.
e. The S1/2 SW1/4 of Section 35 in Township 142N, Range 87W, Oliver County, North Dakota.

Petition to Intervene (Gerving), ¶ 3.

[¶3] On May 28, 2024, Summit filed a Consolidated Response to Petitions to Intervene in which it stated, "Summit does not object to the remaining Petitioners intervention on the limited basis set forth above." Consolidated Response to Petitions to Intervene, ¶ 22.

[¶4] Based on the Gerving's ownership of the Gerving Lands, the Petition to Intervene is hereby **GRANTED** but limited to intervention in this matter as it relates to Summit Carbon Storage #1, LLC, Case Nos. 30869-30872.

[¶5] The Commission will not consider Gerving's position insofar as it falls outside of consideration of Summit Carbon Storage #1, LLC, Case Nos. 30869-30872.

DATED: May 31, 2024.

David P. Garner
North Dakota Industrial Commission
Hearing Officer

BEFORE THE NORTH DAKOTA INDUSTRIAL COMMISSION

OF THE STATE OF NORTH DAKOTA

CASE NOS. 30869
30870
30871
30872
30873
30874
30875
30876
30877
30878
30879
30880

In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1,

11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.

In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND

In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission

may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.

In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.

In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver

Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township. 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.

In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.

In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.

In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

---

**ORDER ON PETITION TO INTERVENE FOR KIRK AND LINDA MAIZE AND ALLEN MAIZE**

---

[¶1] On February 6, 2024, Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit carbon Storage #3, LLC (collectively, "Summit"), filed with the North Dakota

Industrial Commission ("Commission") applications for permits for carbon dioxide storage facilities.

[¶2] On May 16, 2024, Kirk and Linda Maize and Allen Maize (collectively "Maize") filed a Petition to Intervene stating they own interests in property ("Maize Lands") legally described as follows:

a. South Half (S/2) of the Southeast Quarter (SE/4) of Section 20, Township 141 North, Range 87 West of the Fifth Principal Meridian, in Oliver County, ND.

Petition to Intervene (Maize), ¶ 3.

[¶3] On May 28, 2024, Summit filed a Consolidated Response to Petitions to Intervene in which it stated, "Summit does not object to the remaining Petitioners intervention on the limited basis set forth above." Consolidated Response to Petitions to Intervene, ¶ 22.

[¶4] Based on the Maize's ownership of the Maize Lands, the Petition to Intervene is hereby **GRANTED** but limited to intervention in this matter as it relates to Summit Carbon Storage #1, LLC, Case Nos. 30869-30872.

[¶5] The Commission will not consider Maize's position insofar as it falls outside of consideration of Summit Carbon Storage #1, LLC, Case Nos. 30869-30872.

DATED: May 31, 2024.

David P. Garner
North Dakota Industrial Commission
Hearing Officer

BEFORE THE NORTH DAKOTA INDUSTRIAL COMMISSION

OF THE STATE OF NORTH DAKOTA

CASE NOS. 30869
30870
30871
30872
30873
30874
30875
30876
30877
30878
30879
30880

In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1,

11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.

In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND

In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission

may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.

In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.

In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver

Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township. 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.

In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.

In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.

In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

---

## ORDER ON PETITION TO INTERVENE FOR KEVIN AND IMBERLY KRAFT

---

[¶1] On February 6, 2024, Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit carbon Storage #3, LLC (collectively, "Summit"), filed with the North Dakota Industrial Commission ("Commission") applications for permits for carbon dioxide storage facilities.

[¶2] On May 22, 2024, Kevin and Kimberly Kraft ("Kraft") filed a Petition to Intervene stating they own interests in property ("Kraft Lands") legally described as follows:

a. Township 142 North, Range 87 West Section 27: A tract of land located in the S1/2 Oliver County, ND
more particularly described as follows:
Commencing at the Southeast corner of said Section 27; thence N 89°59'36" W a distance of 2070.02 feet to the point of beginning; thence continuing N 89° 59'36" W a distance of 824.50 feet; thence N 0°40'27" E a distance of 2642.32 feet to the mid-section line; thence along the mid-section line S 89°54'53" E a distance of 824.50 feet; thence S 0°40'27" W a distance of 2641.19 feet to the point of beginning. Said tract contains 50.00 acres more or less.

Petition to Intervene (Kraft), ¶ 3.

[¶3] On May 28, 2024, Summit filed a Consolidated Response to Petitions to Intervene in which it stated, "Summit does not object to the remaining Petitioners intervention on the limited basis set forth above." Consolidated Response to Petitions to Intervene, ¶ 22.

[¶4] Based on the Kraft's ownership of the Kraft Lands, the Petition to Intervene is hereby **GRANTED** but limited to whether the Kraft Lands are located within any of the lands covered by the Carbon Storage Facilities.

[¶5] The Commission will not consider the Kraft's position insofar as it falls outside of consideration of any of the lands covered by the Carbon Storage Facilities.

DATED: May 31, 2024.

David P. Garner
North Dakota Industrial Commission
Hearing Officer

BEFORE THE NORTH DAKOTA INDUSTRIAL COMMISSION

OF THE STATE OF NORTH DAKOTA

CASE NOS. 30869
30870
30871
30872
30873
30874
30875
30876
30877
30878
30879
30880

In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1,

11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.

In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND

In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission

may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.

In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.

In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver

Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township. 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.

In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.

In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.

In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

---

## ORDER ON PETITION TO INTERVENE FOR GARY AND CASSIE SMITH

---

[¶1] On February 6, 2024, Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit carbon Storage #3, LLC (collectively, "Summit"), filed with the North Dakota Industrial Commission ("Commission") applications for permits for carbon dioxide storage facilities.

[¶2] On May 24, 2024, Charmayne Liebelt ("Liebelt") filed a Petition to Intervene stating he owns interests in property ("Liebelt Lands") legally described as follows:

a. S1/2SW1/4 of Section 32, Township 143 North, Range 86 West of the Fifth Principal Meridian, in Oliver County, ND

Petition to Intervene (Liebelt), ¶ 3.

[¶3] On May 28, 2024, Summit filed a Consolidated Response to Petitions to Intervene in which it stated, "Summit does not object to the remaining Petitioners intervention on the limited basis set forth above." Consolidated Response to Petitions to Intervene, ¶ 22.

[¶4] Based on the Liebelt's ownership of the Liebelt Lands, the Petition to Intervene is hereby **GRANTED** but limited to intervention in this matter as it relates to Summit Carbon Storage #3, LLC, Case Nos. 30877-30880.

[¶5] The Commission will not consider Liebelt's position insofar as it falls outside of consideration of Summit Carbon Storage #3, LLC, Case Nos. 30877-30880.

DATED: May 31, 2024.

David P. Garner
North Dakota Industrial Commission
Hearing Officer

BEFORE THE NORTH DAKOTA INDUSTRIAL COMMISSION

OF THE STATE OF NORTH DAKOTA

CASE NOS. 30869
30870
30871
30872
30873
30874
30875
30876
30877
30878
30879
30880

In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1,

11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.

In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND

In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission

may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.

In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.

In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver

Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township. 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.

In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.

In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.

In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

---

**ORDER ON PETITION TO INTERVENE FOR SWENSON TRUST**

---

[¶1] On February 6, 2024, Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit carbon Storage #3, LLC (collectively, "Summit"), filed with the North Dakota Industrial Commission ("Commission") applications for permits for carbon dioxide storage facilities.

[¶2] On April 18, 2024, The Swenson Living Trust ("Trust") filed a Petition to Intervene stating the Trust owns interests in property (the "Trust Lands") legally described as follows:

a. W1/2 NE1/4 of Section 14, Township 142 North, Range 88 West, Mercer County, ND;
b. SE1/4 of Section 27, Township 143 North, Range 88 West, Mercer County, ND;
c. Outlot B, E1/2 of NW ¼ of Section 7, Township 142 North, Range 87 West, Oliver County, ND;
d. NW1/4 of Section 22, Township 142 North, Range 87 West, Oliver County, ND;
e. SE1/4 of Section 15, Township 142 North, Range 87 West, Oliver County, ND;
f. Section 21, Township 142 North, Range 87 West, Oliver County, ND;

Petition to Intervene, ¶ 3.

[¶3] On May 28, 2024, Summit filed a Consolidated Response to Petitions to Intervene in which it states the Petitions to Intervene filed by the Trust in the above-captioned cases Trust owns approximately 827.17 acres in the vicinity of the proposed carbon dioxide storage facility locations referenced in the caption above, but only 359.4 acres are located within the horizontal boundaries of the storage facility proposed by Summit Carbon Storage #2, LLC and/or the one-half mile notice area surrounding the storage facility proposed by Summit Carbon Storage #2, LLC. The Trust does not own any interests within the horizontal boundaries of the storage facilities proposed by Summit Carbon Storage #1, LLC or Summit Carbon Storage #3, LLC. Consolidated Response to Petitions to Intervene, ¶3.

[¶4] Summit also argues that the Trust should not be allowed to intervene because N.D.C.C. § 28-32-01(9) defines a "party" as each "each person named or admitted as a party or properly seeking and entitled as of right to be admitted as a party" and that the trust doesn't qualify under this definition. Summit states that the Trust is not a "person," under the Administrative Agencies Practice Act. N.D.C.C. § 28-32-01(10) defines a person as "an individual, association, partnership, corporation, limited liability company, the [North Dakota ethics commission], a state governmental agency or governmental subdivision, or an agency of such governmental

subdivision. N.D.C.C. § 38-22-03, however, states the commission has authority over all persons and property necessary to administer and enforce this chapter and its objectives.

[¶5] Based on the foregoing, the Commission will allow intervention if the intervenor demonstrates a property interest in the subject matter. As such, the Commission does not believe the Trust is precluded from intervening in this matter.

[¶6] Based on the Trusts ownership of the Trust Lands the Petition to Intervene is hereby **GRANTED** but limited to intervention in this matter as it relates to Summit Carbon Storage #2, LLC, Case Nos. 30873-30876.

[¶7] The Commission will not consider the Trusts' position insofar as it falls outside of consideration of Summit Carbon Storage #2, LLC, Case Nos. 30873-30876.

DATED: May 31, 2024.

David P. Garner
North Dakota Industrial Commission
Hearing Officer

**BEFORE THE NORTH DAKOTA INDUSTRIAL COMMISSION**
**OF THE STATE OF NORTH DAKOTA**

In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation

In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation

In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19,

CASE NOS 30869
30870
30871
30872
30873
30874
30875
30876
30877
30878
30879
30880

20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation

In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation

In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND

In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5,

6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation

In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation

In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary

In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek

Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND

In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation

In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142

North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation

In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary

---

**UNSWORN DECLARATION OF SERVICE BY ELECTRONIC MAIL AND RETENTION OF DOCUMENT**

---

[¶1] Amy Knutson states as follows

[¶2] I am of legal age and on the 31st day of May, 2024, I served the following documents

**ORDER ON PETITION TO INTERVENE FOR PAUL AND CHRISTY METZ,**
**ORDER ON PETITION TO INTERVENE FOR MICHAEL AND BONNIE HAUPT,**
**ORDER ON PETITION TO INTERVENE FOR JOHN JOCHIM,**
**ORDER ON PETITION TO INTERVENE FOR GARY AND CASSIE SMITH,**
**ORDER ON PETITION TO INTERVENE FOR MICHAEL BAUMAN,**
**ORDER ON PETITION TO INTERVENE FOR JOLENE M RUST,**
**ORDER ON PETITION TO INTERVENE FOR GLENN AND LISA GERVING,**
**ORDER ON PETITION TO INTERVENE FOR KIRK AND LINDA MAIZE AND ALLEN MAIZE,**
**ORDER ON PETITION TO INTERVENE FOR KEVIN AND KIMBERLY KRAFT,**
**ORDER ON PETITION TO INTERVENE FOR CHARMAYNE LIEBELT, and**
**ORDER ON PETITION TO INTERVENE FOR SWENSON TRUST**

upon the following by electronic mail as follows:

Derrick Braaten – derrick@braatenlaw.com;
Lawrence Bender – lbender@fredlaw.com;
Joshua Swanson – jswanson@vogellaw.com.

[¶3] The original document shall be retained at the North Dakota Department of Mineral Resources, 600 E. Boulevard Ave. – Dept. 405, Bismarck, North Dakota, 58505-0840.

[¶4] I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on the 31st day of May, 2024, at Bismarck, North Dakota, United States.

Amy Knutson

**From:** Forsberg, Sara L.
**To:** Kneavel, Ashley M.
**Subject:** FW: Summit Carbon Solutions #1 and #2 - Comments
**Date:** Thursday, May 30, 2024 1:07:39 PM
**Attachments:** Summit Carbon Solutions #1 5-30-24.pdf
Summit Carbon Solutions #2 5-30-24.pdf

---

**From:** VICTORIE BROWN <victorie2121@gmail.com>
**Sent:** Thursday, May 30, 2024 11:24 AM
**To:** Forsberg, Sara L. <slforsberg@nd.gov>
**Subject:** Summit Carbon Solutions #1 and #2 - Comments

You don't often get email from victorie2121@gmail.com. Learn why this is important

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Good morning,

I have attached my comments regarding the above referenced projects. I appreciate your team's assistance with getting me the correct email address.

Respectfully,

Victorie Brown

May 30, 2024

PO Box 370
Solomons, MD 20688

North Dakota Industrial Commission
Dept. of Mineral Resources
Oil and Gas Division
1016 East Calgary Avenue
Bismarck, ND 58505

**Ref: Summit Carbon Solutions Storage #2, LLC – (Against)**

Via email: slforsberg@nd.gov

M. Chairman and Members of the Committee:

I write today in opposition to the approval of the application for permit before you from Summit Carbon Solutions Storage #2, LLC.

My name is Victorie Brown, and I am a mineral owner in the property detailed in Summit Carbon Solutions (Summit) application for permit. Approval of this project will have a direct negative impact on the value of my property. Making future exploration and development of those mineral interests more difficult, costly, and very likely unfeasible.

If allowed to proceed as proposed, Summit would be permitted to declare without challenge that minerals do not exist in the pore space and/or are of such little value as to not warrant compensation. This provides an opportunity, and in fact encourages, Summit to do just that, thereby taking property without just compensation to the surface and mineral owner.

This proposal establishes a condition in direct opposition to North Dakota 47-31-08, which states, "In the relationship between a severed mineral owner and a pore space estate, this chapter does not change or alter the common law as of April 9, 2009, as it relates to the rights belonging to, or the dominance of, the mineral estate."

As of this writing I know of no agreement in existence, past or present, allowing for extraction of the minerals detailed in my deed without my prior agreement and without equitable compensation. Therefore, I retain those minerals and the pore space in which they are contained. North Dakota law requiring compensation to the surface owner for the voided pore space below it does not preclude compensation to the mineral owner for the assets represented by that ownership.

To move forward, Summit Carbon Solutions must first be required to negotiate with me, a mineral owner, a fair price for the severance and/or use of my property and any consequential impacts to my interest. Granting a permit without required, negotiated, compensation allows Summit Carbon solutions to **TAKE** my and others' property without just compensation, an outcome that is not in the North Dakota public's best interest.

I say **NO.**

I call on you to **NOT** grant this permit.

Respectfully,

Victorie Brown

| | |
|---|---|
| **From:** | Joshua A. Swanson |
| **To:** | Garner, David P.; Lawrence Bender - Fredrikson & Byron, P.A. (lbender@fredlaw.com); Derrick Braaten; Tracy A. Ottum; -Info-Oil & Gas Division |
| **Cc:** | Helms, Lynn D.; Forsberg, Sara L.; Knutson, Amy N.; Shannon Mikula |
| **Subject:** | SCS Carbon Transport - NDIC Case Nos. 30869-30880 |
| **Date:** | Tuesday, May 28, 2024 10:03:27 PM |
| **Attachments:** | Outlook-A black an<br>Minnkota proposed Order.pdf<br>Minnkota Declaration of Service.pdf |

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Mr. Garner,

Please find attached Minnkota Power Cooperative, Inc.'s, proposed order granting its petition to intervene, along with a declaration of service, in Case Nos. 30869-30880.

If you have any issues opening the attachments, please let us know. Thank you,

VOGEL Law Firm

Joshua A. Swanson | Attorney
T: 701.237.6983 | F: 701.356.6395
vogellaw.com | jswanson@vogellaw.com

---

**From:** Garner, David P. <dpgarner@nd.gov>
**Sent:** Thursday, May 23, 2024 3:39 PM
**To:** Joshua A. Swanson <jswanson@vogellaw.com>; Lawrence Bender - Fredrikson & Byron, P.A. (lbender@fredlaw.com) <lbender@fredlaw.com>; Derrick Braaten <derrick@braatenlawfirm.com>
**Cc:** Helms, Lynn D. <lhelms@nd.gov>; Forsberg, Sara L. <slforsberg@nd.gov>; Knutson, Amy N. <anknutson@nd.gov>
**Subject:** SCS Carbon Transport - NDIC Case Nos. 30869-30880

Counsel – Please submit proposed orders for each of the petitions and/or responses you have filed or intend to file in this matter. Thank you.

**David P. Garner**
Assistant Attorney General
ND Office of the Attorney General
Division of Natural Resources and Native American Affairs
500 N 9th Street
Bismarck, ND 58501-4509
(701) 328-3640

You don't often get email from metter@fredlaw.com. Learn why this is important

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

BEFORE THE INDUSTRIAL COMMISSION
OF THE STATE OF NORTH DAKOTA

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND.**<br><br>**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**<br><br>**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North,** | Case Nos. 30869 - 30880<br><br>**(PROPOSED) ORDER GRANTING MINNKOTA POWER COOPERATIVE, INC.'S, PETITION TO INTERVENE** |

| | |
|---|---|
| **Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.** | |
| **In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.** | |
| **In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.** | |
| **In re application of Summit Carbon Storage #2, LLC to consider the amalgamation of the storage reservoir pore space, in which the** | |

**Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35 and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geological storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Brook Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of**

**Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 26, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3,**

| | |
|---|---|
| **LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND in the Broom Creek Formation.**<br><br>**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.** | |

ORDER OF THE COMMISSION

THE COMMISSION FINDS:

(1) This cause is set for hearing beginning at 9:00 a.m. on Tuesday June 11, 2024, and continuing if necessary starting at 9:00 a.m. on Wednesday June 12, 2024.

(2) On May 20, 2024, the petitioner and proposed intervenor, Minnkota Power Cooperative, Inc. (“Minnkota”), made application to the Commission for an order allowing its intervention in Case Nos. 30869 – 30880.

(3) Pursuant to N.D.C.C. § 28-32-28, and as explained herein, the Commission grants Minnkota's petition to intervene in the above-captioned proceedings to promote the interests of justice as Minnkota has demonstrated that its legal rights, duties, privileges, immunities, or other legal interests may be substantially affected by the proceedings in this matter.

(4) Specifically, Minnkota holds three geologic storage facility permits issued as the result of Orders from the Commission for the amalgamation of pore space in the Minnkota Center MRYS Broom Creek Storage Facility #1 in Oliver County, North Dakota, and the amalgamation of pore space in the Minnkota Center MRYS Deadwood Storage Facility #1 in Oliver County. Minnkota, through its subsidiary DCC West Project LLC, also holds a storage facility permit that provides redundancy and operating flexibility for Project Tundra, the "DCC West Broom Creek Storage Facility #1," that was approved by the Commission on October 4, 2023. See Case Nos. 29029 – 29034, and 30122 – 30125.

(5) In Order No. 31584 (Case No. 29030), the Commission approved Minnkota's application for an order determining the amalgamation of pore space within portions of Sections 35 and 36, Township 142 North, Range 84 West, Sections 19, 20, 21, 22, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 142 North, Range 83 West, Sections 1, 2, 12, and 13, Township 141 North, Range 84 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 15, 16, 17, 18, 19, 20, and 21, Township 141 North, Range 83 West, Oliver County, in the Broom Creek Formation for the Minnkota Center MRYS Broom Creek Storage Facility #1, which encompasses 18,903 acres in Oliver County. Minnkota's application to the Commission for the amalgamation of storage reservoir pore space for Broom Creek Storage Facility #1 was made pursuant to a Geologic Storage Agreement that was signed, ratified, or approved by surface owners owning at least sixty percent of the pore space interest within these lands under N.D.C.C. § 38-22-10. See Order No. 31584 at ¶ 2.

(6) In Order No. 31587 (Case No. 29033), the Commission approved Minnkota's application for an order determining the amalgamation of pore space within portions of Sections 35 and 36, Township 142 North, Range 84 West, Sections 19, 20, 21, 22, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 142 North, Range 83 West, Sections 1, 2, 12, and 13, Township 141 North, Range 84 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 15, 16, 17, 18, 19, 20, and 21, Township 141 North, Range 83 West, Oliver County, in the Deadwood Formation, for the Minnkota Center MRYS Deadwood Storage Facility #1, and while a different formation than Broom Creek, also encompasses 18,903 acres in Oliver County. Minnkota's application to the Commission for the amalgamation of storage reservoir pore space for its Deadwood Storage Facility #1 was made pursuant to a Geologic Storage Agreement that was signed, ratified, or approved by surface owners owning at least sixty percent of the pore space interest within these lands under N.D.C.C. § 38-22-10. See Order No. 31587 at ¶ 2.

(7) In Order No. 32806 (Case No. 30122), the Commission approved Minnkota's application for DCC West Broom Creek Storage Facility #1 for an order determining the amalgamation of pore space within portions of Township 141 North, Range 84 West, Section 2-11, 14-21, 29-32, Township 141 North, Range 85 West, Sections 1-4, 9-16, 22-27, and 36, Township 142 North, Range 84 West, Sections19-21 and 28-34, and Township 142 North, Range

85 West, Sections 24, 25, 33, 34, 35 and 36, Oliver County, in the Broom Creek formation. This third additional storage facility will primarily serve the Milton R. Young Station. To the extent there is additional storage capacity available, Minnkota notes that it may entertain requests from third parties for storage services for the purpose of geologic sequestration of carbon dioxide. It encompasses 29,903 acres in Oliver County.

(8) The Commission's Orders for the Broom Creek and Deadwood formations, and the Minnkota Center MRYS Deadwood Storage Facility #1 and Minnkota Center MRYS Broom Creek Storage Facility #1, are part of Minnkota's Project Tundra. Project Tundra is a large-scale, capital-intensive carbon sequestration and storage project designed to capture up to four million metric tons of the carbon dioxide produced by the MRYS. Minnkota has been leading this project for the past nine years and has, along with its partners, the State of North Dakota, and the Department of Energy, devoted significant resources towards its advancement and seeing it to fruition, including investing $90,000,000 in the project, which may be affected by these proceedings.

(9) The location of Project Tundra is immediately adjacent to the east of Summit Carbon Storage, LLC, #1, #2, and #3's proposed injection sites, and encompasses property in Township 142 North, Ranges 82, 83, and 84 West, and Township 141 North, Ranges 82, 83, and 84 West.

(10) Minnkota seeks to intervene because its interest in Project Tundra, the related permits issued by the Commission for the same, and its correlative rights in the pore space compromising Project Tundra, are the subject of and may be substantially affected by the outcome of the proceedings on Summit Carbon Storage #1, #2, and #3 LLC's applications and proposed project. Minnkota thus seeks to protect its interest and significant investments in Project Tundra as they may be impacted by Summit Carbon Storage, LLC's #1, #2, and #3 pending applications.

(11) Considering the foregoing, Minnkota has demonstrated that its legal rights, duties, privileges, immunities, and other legal interests may be substantially affected by these proceedings, and its petition to intervene is granted pursuant to N.D.C.C. § 28-32-28.

IT IS THEREFORE ORDERED:

(1) For the reasons stated herein, Minnkota's Petition to Intervene is hereby GRANTED.

Dated this ____ day of May, 2024.

INDUSTRIAL COMMISSION
STATE OF NORTH DAKOTA

/s/ Doug Burgum, Governor

/s/ Drew H. Wrigley, Attorney General

/s/ Doug Goehring, Agricultural Commissioner

BEFORE THE INDUSTRIAL COMMISSION
OF THE STATE OF NORTH DAKOTA

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND.**<br><br>**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**<br><br>**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North,** | Case Nos. 30869 - 30880<br><br>**DECLARATION OF SERVICE** |

| | |
|---|---|
| **Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.** | |
| **In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.** | |
| **In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.** | |
| **In re application of Summit Carbon Storage #2, LLC to consider the amalgamation of the storage reservoir pore space, in which the** | |

**Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35 and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geological storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Brook Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of**

**Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 26, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3,**

| | |
|---|---|
| **LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND in the Broom Creek Formation.**<br><br>**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.** | |

[¶1] I hereby certify that true and correct copies of the following documents:

- **Proposed Order Granting Minnkota Power Cooperative, Inc.'s, Petition to Intervene in Case Nos. 30869 - 30880; and**

- **Declaration of Service**

were, on this 28th day of May, 2024, sent via e-mail to the following:

| | |
|---|---|
| Lynn D. Helms<br>lhelms@nd.gov | David P. Garner<br>dpgarner@nd.gov |
| Lawrence Bender<br>lbender@fredlaw.com | Sara L. Forsberg<br>slforsberg@nd.gov |
| North Dakota Industrial Commission<br>oilandgasinfo@nd.gov | Derrek Braaten<br>derrick@braatenlawfirm.com |
| Amy N. Knutson<br>anknutson@nd.gov | |

I declare, under penalty of perjury, that the foregoing is true and correct.

Dated this 28th day of May, 2024.

**VOGEL LAW FIRM**

by: */s/ Joshua A. Swanson*
Joshua A. Swanson (#06788)
218 NP Avenue
PO Box 1389
Fargo, ND 58107-1389
Telephone: 701.237.6983
Email: jswanson@vogellaw.com
Attorneys for Intervenor, Minnkota Power Cooperative, Inc.

| | |
|---|---|
| **From:** | Hughes, Bethany |
| **To:** | Helms, Lynn D.; Derrick Braaten |
| **Cc:** | Bender, Lawrence; Forsberg, Sara L.; Kneavel, Ashley M. |
| **Subject:** | Summit Carbon Solutions - NDIC Case Nos. 30869–30880 |
| **Date:** | Tuesday, May 28, 2024 3:59:39 PM |
| **Attachments:** | Summit - NDIC Case Nos. 30869 to 30880 - Summit"s Response to Motion to Expedite Discovery(82616938.1)-c.pdf<br>Summit - NDIC Case Nos. 30869 to 30880 - Consolidated Response to Petitions to Intervene(82616940.1)-c.pdf<br>Summit - NDIC Case Nos. 30869 to 30880 - Skaare Declaration ISO (Part2)(82615976.1)-c.pdf<br>Summit - NDIC Case Nos. 30869 to 30880 - Proposed Order on Petitions to Intervene and Motion for Expedited Discovery(82617176.1)-c.pdf<br>Summit - COS - NDIC Case Nos. 30869-30880 - Response to Motion to Expedite Discovery, Consolidated Response to Petitions to Intervene, Second Declaration of J. -c.pdf<br>Summit - NDIC Case Nos. 30869 to 30880 - Proposed Order on Petitions to Intervene and Motion to Expedite Discovery(82589838.1)-c.docx |

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Good afternoon,

Please find the attached documents, listed below, for filing and service with respect to the above-referenced case numbers.

1. Response to Motion to Expedite Discovery;
2. Consolidated Response to Petitions to Intervene;
3. Second Declaration of Jeff Skaare;
4. Proposed Order on Petitions to Intervene and Motion for Expedited Discovery; and
5. Certificate of Service.

Also enclosed for your convenience is a Word copy of the Proposed Order on Petitions to Intervene and Motion for Expedited Discovery.

Thanks,

**Bethany Hughes**
*Legal Administrative Assistant/Paralegal*
Fredrikson & Byron, P.A.
**Please note our new address:**
304 East Front Ave, Suite 400, Bismarck, ND 58504-5639
Direct: 701-221-8641 | Main: 701.221.8700 | Fax: 701-221-8750
***This is a transmission from the law firm of Fredrikson & Byron, P.A. and may contain information which is privileged, confidential, and protected by the attorney-client or attorney work product privileges. If you are not the addressee, note that any disclosure, copying, distribution, or use of the contents of this message is prohibited. If you have received this transmission in error, please destroy it and notify us immediately at our telephone number (701) 221-8700. The name and biographical data provided above are for informational purposes only and are not intended to be a signature or other indication of an intent by the sender to authenticate the contents of this electronic message.****

**BEFORE THE INDUSTRIAL COMMISSION**
**OF THE STATE OF NORTH DAKOTA**

**CASE NOS. 30869–30880**

**In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1,**

**11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by**

**nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of**

**carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the**

**geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## RESPONSE TO MOTION TO EXPEDITE DISCOVERY

[¶ 1] Applicants Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC (collectively, "Summit") submit this brief in response to the motion to expedite discovery filed with the North Dakota Industrial Commission ("Commission") by the Swenson Living Trust (the "Trust"). For the reasons explained below, the Commission should deny the Trust's motion.

## FACTS

[¶ 2] On April 18, 2024, the Trust filed a petition to intervene with the Commission. The Commission has not yet ruled on the petition. Therefore, the Trust is not yet a party to this case.

[¶ 3] Nevertheless, the Trust served Summit with a set of discovery requests on May 2, 2024, a second set of discovery requests on May 6, 2024, and a third set of discovery requests on May 10, 2024. None of these discovery requests were valid given that the Trust is not yet a party to this case. Had they been valid, Summit would have had 30 days to respond to them under the North Dakota Rules of Civil Procedure.

[¶ 4] The Trust's invalid discovery requests ask for an immense amount of information from Summit. The following are just a few examples of the types of requests for production the Trust is asking Summit to comply with:

> **REQUEST NO. 4:** Please produce all the input files, field and analytical data , and the model geochemical database used to run any modelling or analysis of critical threshold pressures or areal extent of review or impact and pressure buildup, or which was used to do any kind of analysis related to EPA Method 1 or EPA Method 2 or Analytical Solution for Leakage in Multilayered Aquifers – ASLMA, or any risk-based area-of-review analysis.
>
> **REQUEST NO. 5:** Please produce the following data and files as referenced by Summit in its application in NDIC Case No. 30873: Geophysical Logs that penetrate injection and confining zones, Seismic survey data and core sample measurements, Acoustic impedance, total porosity, effective porosity, permeability, facies, and SLB's Petrel was used to interpolate structural surfaces for zones.
>
> **REQUEST NO. 8:** Please produce all electronic files and data provided to the North Dakota Industrial Commission or its Department of Mineral Resources or Oil and Gas Division in association with or related to the applications in NDIC Case Nos. 30869-30880.Please produce the general ledger detail (or account activity report) for the account for Drain #11 starting January 1, 2011 through present, on an annual basis (i.e. January 1,

2011 to December 31, 2011, and January 1, 2012 to December 31, 2012, etc.).

Summit estimates that it would likely have to collect, review, and produce thousands of pages of documents and dozens of gigabytes of data to comply with the Trust's discovery requests. *See* Second Declaration of Jeff Skare ("2d Skaare Decl."), ¶ 31. It would not be feasible for Summit to respond to those requests by May 29, 2024. *Id.*

[¶ 5] On May 16, 2024, the Trust filed a motion asking the Commission to order Summit to provide expedited responses to the Trust's three sets of discovery requests. The Trust desires Summit to respond to the Trust's first set of discovery requests by May 23, 2024, and to the Trust's second and third sets of discovery requests by May 29, 2024.

## ARGUMENT

[¶ 6] As explained more fully below, the Commission should deny the Trust's motion for at least three reasons. First, the discovery requests that the Trust served on Summit are invalid. Second, the Trust's discovery requests are incapable of being made valid. Third, the Trust's proposed expedited deadlines to respond to the Trust's discovery requests are unreasonable.

### I. The Trust's discovery requests are invalid.

[¶ 7] The first and most obvious reason the Commission should deny the Trust's motion for expedited responses to the Trust' discovery requests is that the requests are invalid.

[¶ 8] The current case is an adjudicative proceeding. *See* N.D.C.C. § 28-32-33(1). "In an adjudicative proceeding, discovery may be obtained in accordance with the North Dakota Rules of Civil Procedure." N.D.C.C. § 28-32-33(1). Those rules only allow parties to serve discovery requests. *See, e.g.*, N.D.R.Civ.P. 26(b)(1)(A) ("Parties may obtain discovery ...") (emphasis added); N.D.R.Civ.P. 33(a)(1) ("A party may serve written interrogatories ...") (emphasis added); N.D.R.Civ.P. 34(a)(1) ("A party may serve ... a request ... to produce ... any designated

documents or electronically stored information ...") (emphasis added). Although the Trust has filed a petition to intervene with the Commission, for the reasons set forth in paragraphs 12–18 of Summit's Response to Motion to Continue Hearing and Request for Scheduling Conference, the Trust is not a party to any of the above-captioned cases.

[¶ 9] Summit has no obligation whatsoever to respond to the Trust's discovery requests given that said requests are invalid. Because Summit does not have an obligation to provide any responses to the Trust's discovery requests, the Commission certainly should not order Summit to provide expedited responses.

**II. The Trust's discovery requests are incapable of being made valid.**

[¶ 10] The second reason the Commission should deny the Trust's motion for expedited responses to the Trust' discovery requests is that the Trust's discovery requests are incapable of being made valid. Again, only parties may serve discovery requests. *See* N.D.R.Civ.P. 26(b)(1)(A); N.D.R.Civ.P. 33(a)(1); N.D.R.Civ.P. 34(a)(1). And the Trust is incapable of becoming a party to this case. As a result, the Trust's discovery requests cannot be made valid.

[¶ 11] The Trust is not a separate legal entity that is capable of being a party to a case. *See Western Life Tr. v. State*, 536 N.W.2d 709, 712 (N.D. 1995) ("A trust generally is not a separate legal entity, and cannot sue or be sued in its own name."); *Ray Malooly Tr. v. Juhl*, 186 S.W.3d 568, 570 (Tex. 2006) ("[T]he term 'trust' refers not to a separate legal entity but rather to the fiduciary relationship governing the trustee with respect to the trust property."). Even if the Trust theoretically was a separate legal entity capable of becoming a party, it is not one of the entities that the Legislature permitted to become a party to an adjudicative proceeding such as the one at hand. Only a "person" can become a party. *See* N.D.C.C. § 28-32-01(9). Unlike partnerships,

corporations, and limited liability companies, trusts are not included within the statutory definition of the word "person." *See* N.D.C.C. § 28-32-01(10).

[¶ 12] The Trust's discovery requests can never be made valid since the Trust can never become a party to this case. Because they cannot be made valid, the Commission should not order Summit to provide expedited responses to them.

**III. The Trust's proposed deadlines are unreasonable.**

[¶ 13] The third reason the Commission should deny the Trust's motion is that the Trust's proposed deadlines are patently unreasonable.

[¶ 14] As explained above, Summit currently has no obligation to respond to any of the Trust's three sets of discovery requests. Summit's obligation to respond will only arise if and when the Commission grants the Trust's petition to intervene. And the earliest the Commission could grant the Trust's petition is theoretically the date that this brief was filed, *i.e.*, May 28, 2024. *See* N.D.A.C. § 98-02-02-08(1).

[¶ 15] In its motion for expedited responses, the Trust is asking the Commission to order Summit to respond to the Trust's first set of discovery requests by May 23, 2024, and the Trust's second and third sets of discovery requests by May 29, 2024. Assuming that the Commission grants both the Trust's motion and its petition to intervene the date that Summit files this brief, Summit will have zero days to respond to the Trust's first set of discovery requests and one day to respond to the Trust's second and third set of discovery requests.

[¶ 16] This amount of time is unreasonable. It is not possible for Summit to comply with the first deadline and practically impossible to comply with the second deadline. 2d Skaare Decl., ¶ 31. The Trust's discovery requests will likely require Summit locate, review, and produce

thousands of pages of documents and dozens of gigabytes of data to comply with the Trust's discovery requests, by no later than tomorrow, May 29, 2024. *Id.*

[¶ 17] In its brief in support of its motion, the Trust claims that the Commission granting the Trust's motion would only "minimally" expedite the discovery process. The Trust explains:

> Under the timeline requested by Swenson Trust, [Summit] will have twenty-one days … in which to do so for the first set of discovery. [Summit] will have twenty-three days to respond to the second set of discovery and nineteen days to respond to the third set of discovery. Accordingly, [Summit] will still have the benefit of the majority of typical timeframe in which to respond. Because this timeline does not substantially deviate from the normal progression of discovery, this factor supports Swenson Trusts motion.

Br. Supp. Mot. Expedite Discovery, 14–15. These assertions are incorrect. Summit will not have 21 days to respond to the first set of discovery requests, 23 days to respond to the second set of discovery requests, or 19 days to respond to the third set of discovery requests. The Trust inexplicably fails to account for the fact that most, if not all, of these days will have passed in the time it will take for the Commission to rule on the Trust's motion.

[¶ 18] Again, all the discovery requests with which Summit has been served are invalid because the Trust is not yet a party to this case. Summit still does not have an obligation to respond to them. Therefore, the time that Summit has to respond to them has not yet started running. And it will only start running if and when the Commission grants the Trust's petitions to intervene. The Trust's motion, if granted, would leave Summit little or no time to respond to the Trust's discovery, and the Trust offers no compelling justification for such an absurd outcome.

## CONCLUSION

[¶ 19] For the foregoing reasons, the Commission should deny the Trust's motion to expedite discovery.

Dated this 28th day of May, 2024.

By:

Lawrence Bender (#03908)
lbender@fredlaw.com
**FREDRIKSON & BYRON, P.A.**
304 East Front Avenue, Suite 400
Bismarck, ND 58504
(701) 221-8700
*Attorneys for Summit Carbon Storage #1, LLC*

**BEFORE THE INDUSTRIAL COMMISSION**
**OF THE STATE OF NORTH DAKOTA**

**CASE NOS. 30869–30880**

**In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1,**

**11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by**

**nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of**

**carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the**

**geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## CONSOLIDATED RESPONSE TO PETITIONS TO INTERVENE

[¶ 1] Applicants Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC (collectively, "Summit"), by and through their counsel, Lawrence Bender, Fredrikson & Byron, P.A., 304 East Front Avenue, Suite 400, Bismarck, ND 58504-5639, hereby submit this consolidated response to the petitions to intervene filed with the North Dakota Industrial Commission ("Commission") by the Swenson Living Trust ( "Trust"), Paul and Christy Metz ("Metz"), Michael and Bonnie Haupt ("Haupt"), John Jochim ("Jochim"), Gary A. and Cassie Smith ("Smith"), Michael Bauman ("Bauman"), JoLene M. Rust ("Rust"),

Glenn and Lisa Gerving ("Gerving"), Kirk and Linda Maize and Allen Maize ("Maize"), Kevin and Kimber Kraft ("Kraft"), and Charmayne Liebelt ("Liebelt") (collectively, "Petitioners").

[¶ 2] For the reasons set forth herein, the Commission should deny the Trust's petition to intervene. As for the remaining Petitioners, Summit does not object to their intervention in the above-captioned cases so long as the intervention is (1) granted to each Petitioner only for those of the above-captioned cases in which each Petitioner can demonstrate that he, she, or it owns affected acreage; and (2) granted to each Petitioner for the limited purposes specified in the petitions, namely, "responding to SCS' Applications and participating in any oral argument or hearings on the application and . . . to be heard before the final determination." Summit does object, however, to any attempts by the remaining Petitioners to unnecessarily burden Summit and the Commission and delay the hearing currently scheduled for the above-captioned cases on June 11th and 12th, 2024 ("Hearing"), as the Trust has done.

## RELEVANT FACTUAL BACKGROUND

[¶ 3] The Petitions to Intervene filed by the Trust in the above-captioned cases indicate the Trust owns approximately 827.17 acres in the vicinity of the proposed carbon dioxide storage facility locations referenced in the caption above, but only 359.4 acres are located within the horizontal boundaries of the storage facility proposed by Summit Carbon Storage #2, LLC and/or the one-half mile notice area surrounding the storage facility proposed by Summit Carbon Storage #2, LLC. Second Declaration of Jeff Skaare ("2d Skaare Decl."), ¶¶ 2–5. The Trust does not own any interests within the horizontal boundaries of the storage facilities proposed by Summit Carbon Storage #1, LLC or Summit Carbon Storage #3, LLC. *Id.* ¶ 6.

[¶ 4] The Petitions to Intervene filed by Metz in the above-captioned cases indicate Metz owns approximately 18.88 acres located within the horizontal boundaries of the storage facility

proposed by Summit Carbon Storage #1, LLC. *Id.* ¶ 12. Metz does not own any interests within the horizontal boundaries of the storage facilities proposed by Summit Carbon Storage #2, LLC or Summit Carbon Storage #3, LLC. *Id.* ¶ 13.

[¶ 5] The Petitions to Intervene filed by Haupt in the above-captioned cases indicate Haupt owns approximately 320.00 acres in the vicinity of the proposed carbon dioxide storage facility locations referenced in the caption above, but only 160.00 acres are located within the horizontal boundaries of the storage facility proposed by Summit Carbon Storage #1, LLC and/or the one-half mile notice area surrounding the storage facility proposed by Summit Carbon Storage #1, LLC. *Id.* ¶¶ 7–8. Haupt does not own any interests within the horizontal boundaries of the storage facilities proposed by Summit Carbon Storage #2, LLC or Summit Carbon Storage #3, LLC. *Id.* ¶ 9.

[¶ 6] The Petitions to Intervene filed by Jochim in the above-captioned cases indicate Jochim owns approximately 160.00 acres located within the horizontal boundaries of the storage facility proposed by Summit Carbon Storage #2, LLC. *Id.* ¶ 10. Jochim does not own any interests within the horizontal boundaries of the storage facilities proposed by Summit Carbon Storage #1, LLC or Summit Carbon Storage #3, LLC. *Id.* ¶ 11.

[¶ 7] The Petitions to Intervene filed by Smith in the above-captioned cases indicate Smith owns approximately 360.00 acres in the vicinity of the proposed carbon dioxide storage facility locations referenced in the caption above, but only 15.00 acres are located within the horizontal boundaries of the storage facility proposed by Summit Carbon Storage #2, LLC and/or the one-half mile notice area surrounding the storage facility proposed by Summit Carbon Storage #2, LLC. *Id.* ¶¶ 23–24. Smith does not own any interests within the horizontal boundaries of the

storage facilities proposed by Summit Carbon Storage #1, LLC or Summit Carbon Storage #3, LLC. *Id.* ¶ 3.

[¶ 8] The Petitions to Intervene filed by Bauman in the above-captioned cases indicate Bauman owns approximately 140.00 acres located within the horizontal boundaries of the storage facility proposed by Summit Carbon Storage #2, LLC. *Id.* ¶ 21. Bauman does not own any interests within the horizontal boundaries of the storage facilities proposed by Summit Carbon Storage #1, LLC or Summit Carbon Storage #3, LLC. *Id.* ¶ 22.

[¶ 9] The Petitions to Intervene filed by Rust in the above-captioned cases indicate Rust owns approximately 160.00 acres located within the horizontal boundaries of the storage facility proposed by Summit Carbon Storage #2, LLC. *Id.* ¶ 19. Rust does not own any interests within the horizontal boundaries of the storage facilities proposed by Summit Carbon Storage #1, LLC or Summit Carbon Storage #3, LLC. *Id.* ¶ 20.

[¶ 10] The Petitions to Intervene filed by Gerving in the above-captioned cases indicate Gerving owns approximately 393.50 acres in the vicinity of the proposed carbon dioxide storage facility locations referenced in the caption above, but all 393.50 acres are located within the horizontal boundaries of the storage facility proposed by Summit Carbon Storage #1, LLC and/or the one-half mile notice area surrounding the storage facility proposed by Summit Carbon Storage #1, LLC. *Id.* ¶¶ 16–17. Gerving does not own any interests within the horizontal boundaries of the storage facilities proposed by Summit Carbon Storage #2, LLC or Summit Carbon Storage #3, LLC. *Id.* ¶ 18.

[¶ 11] The Petitions to Intervene filed by Maize in the above-captioned cases indicate Maize owns approximately 80.00 acres located within the horizontal boundaries of the storage facility proposed by Summit Carbon Storage #1, LLC. *Id.* ¶ 14. Maize does not own any interests

within the horizontal boundaries of the storage facilities proposed by Summit Carbon Storage #2, LLC or Summit Carbon Storage #3, LLC. *Id.* ¶ 15.

[¶ 12] The Petitions to Intervene filed by Kraft in the above-captioned cases indicate Kraft owns approximately 174.58 acres in the vicinity of the proposed carbon dioxide storage facility locations referenced in the caption above, but only none of the acreage is located within the horizontal boundaries and/or the one-half mile notice area surrounding the storage facility locations referenced in the caption above. *Id.* ¶¶ 26–27. Kraft does not own any interests within the horizontal boundaries of the storage facilities proposed by Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, or Summit Carbon Storage #3, LLC, or the one-half mile hearing notice areas surrounding such facilities. *Id.* ¶ 28.

[¶ 13] The Petitions to Intervene filed by Liebelt in the above-captioned cases indicate Liebelt owns approximately 80.00 acres located within the horizontal boundaries of the storage facility proposed by Summit Carbon Storage #3, LLC. *Id.* ¶ 29. Liebelt does not own any interests within the horizontal boundaries of the storage facilities proposed by Summit Carbon Storage #1, LLC or Summit Carbon Storage #2, LLC. *Id.* ¶ 30.

## LEGAL STANDARD

[¶ 14] N.D.C.C. § 28-32-28 governs intervention in administrative proceedings, and provides as follows:

> An administrative agency may grant intervention in an adjudicative proceeding to promote the interests of justice if intervention will not impair the orderly and prompt conduct of the proceeding and if the petitioning intervenor demonstrates that the petitioner's legal rights, duties, privileges, immunities, or other legal interests may be substantially affected by the proceeding or that the petitioner qualifies as an intervenor under any provision of statute or rule. The agency may impose conditions and limitations upon intervention. The agency shall give reasonable notice of the intervention to all parties. An administrative agency may adopt rules relating to intervention in an adjudicative proceeding.

The Commission should not grant intervention to the Petitioners unless it finds they have met the foregoing criteria. The Commission may impose conditions and limitations upon intervention by some or all of the Petitioners as it deems appropriate.

## ARGUMENT

[¶ 15] As indicated above, the Trust's Petitions to Intervene should be denied. First, the motion should be denied because it is procedurally defective. Such motions can only be made by "parties," and the Trust is not a "party" as that term is defined by the Administrative Agencies Practice Act. Such motions can also only be made after the moving party has conferred with the non-moving party(s) in an attempt to obtain a stipulated continuance, which the Trust has not done in this case.

[¶ 16] Second, the motion should be denied because the Trust has not shown good cause for a continuance. The Hearing is imminent and postponing the Hearing at this time would be prejudicial to Summit. The Trust claims that it needs to conduct discovery, and that it will be unable to do so in the time remaining until the Hearing but offers no support for this claim beyond conclusory assertions. As a result, the Trust has failed to show good cause and, under N.D.A.C. § 98-02-03-07 the Commission may not approve the requested continuance.

### I. The Trust's Petitions to Intervene should be denied.

[¶ 17] The Commission should deny the Trust's petitions to intervene because it cannot become a party, it does not own acreage that would be affected by all the above-captioned cases, and its purpose for intervening is to impair the orderly and prompt conduct of the proceedings in these cases.

#### A. The Trust cannot become a party as a matter of law.

[¶ 18] N.D.C.C. § 28-32-01(9) defines a "party" as "each person named or admitted as a party or properly seeking and entitled as of right to be admitted as a party." The Trust is not a

"person," under the Administrative Agencies Practice Act. N.D.C.C. § 28-32-01(10) defines a person as "an individual, association, partnership, corporation, limited liability company, the [North Dakota ethics commission], a state governmental agency or governmental subdivision, or an agency of such governmental subdivision." Trusts are not considered persons for purposes of agency proceedings, just as they are not considered persons for purposes of judicial proceedings. "A trust generally is not a separate legal entity, and cannot sue or be sued in its own name." *Western Life Trust v. State*, 536 N.W.2d 709, 712 (N.D. 1995) (concluding that appeal by the Western Life Trust must be dismissed because the trust was "not a proper party and lacks capacity to sue"). Because the Trust is not a "person," it cannot become a "party" by intervention or otherwise. *See* N.D.C.C. § 28-32-01(9) (defining a "party" as "each person named or admitted as a party or properly seeking and entitled as of right to be admitted as a party" (emphasis added)).

**B. The Trust only holds interests in lands comprising the storage facility at issue in NDIC Case Nos. 30873 through 30876.**

[¶ 19] In its Petitions to Intervene the Trust asserts that it holds property in the lands comprising Summit's proposed storage facilities and, as a result, "[t]he legal rights, privileges, and other interests of the Trust will be substantially affected by the [Commission's] findings and conclusions in [the above-captioned cases]." Summit does not dispute these assertions as to NDIC Case Nos. 30873 through 30876, and as such Summit does not dispute the Trust has demonstrated that its legal rights, duties, privileges, immunities, or other legal interests may be substantially affected by proceedings in those cases. *See* 2d Skaare Decl., ¶¶ 2–5. But the Trust does not hold any property in the lands comprising the storage facilities proposed in the other eight cases captioned above, and as such the Trust cannot demonstrate that its legal rights, duties, privileges, immunities, or other legal interests may be substantially affected by proceedings in those cases. *See id.* ¶ 6.

### C. The Trust's intervention would impair the orderly and prompt conduct of the proceedings in the above-captioned cases.

[¶ 20] The Trust's Petitions to Intervene do not address whether the Trust's intervention would "impair the orderly and prompt conduct of the proceeding[s]." Despite not yet being granted intervention, the Trust has already filed two motions seeking to continue the hearing and to rewrite discovery deadlines, respectively. All of the Trust's efforts to date have been directed at impairing the "prompt" holding of the hearing and the "orderly" conduct of discovery, respectively. Notwithstanding the defects identified above, this alone would warrant denial of the Trust's Petitions to Intervene under N.D.C.C. § 28-32-28.

## II. Summit does not object to granting the remaining Petitioners intervention for limited purposes.

[¶ 21] All the Petitions to Intervene filed by the Petitioners say essentially the same thing, namely that they are "for the purpose of responding to SCS' Applications and participating in any oral argument or hearings on the application and the right to be heard before the final determination as it relates to Landowners and the legality of the relief requested and which may be provided in these proceedings." Though the Trust has attempted to go well beyond this modest statement of purpose, the other Petitioners have not. So long as the remaining Petitioners do engage in the same dilatory tactics as the Trust, Summit has no objection to their intervention for the purpose of participating in the Hearing, as to those cases in which the remaining Petitioners can demonstrate they have an interest consistent with the factual background set forth above (Summit nonetheless reserves the right to object to any attempts to delay proceedings at the Hearing itself).

## CONCLUSION

[¶ 22] For the foregoing reasons, Summit respectfully requests the Commission deny the Trust's Petitions to Intervene. Summit does not object to the remaining Petitioners intervention on the limited basis set forth above. Summit would also note that it does not object to the Trustee

of the Trust intervening on the limited basis set forth above as to the other Petitioners, in the event that the Trust's Petitions to Intervene are denied.

Dated this 28th day of May, 2024.

By: _____

Lawrence Bender (#03908)
lbender@fredlaw.com
**FREDRIKSON & BYRON, P.A.**
304 East Front Avenue, Suite 400
Bismarck, ND 58504
(701) 221-8700
*Attorneys for Summit Carbon Storage #1, LLC*

**BEFORE THE INDUSTRIAL COMMISSION**
**OF THE STATE OF NORTH DAKOTA**

**CASE NOS. 30869–30880**

**In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1,**

**11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by**

**nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of**

**carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the**

**geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## SECOND DECLARATION OF JEFF SKAARE

STATE OF NORTH DAKOTA )
) ss:
COUNTY OF BURLEIGH )

Jeffrey L. Skaare, being first duly sworn upon oath, states and alleges as follows:

[¶ 1] I am Director of Land, Legal and Regulatory Affairs at Summit Carbon Solutions, LLC. The above-named applicants Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC (collectively, "Applicants") are wholly-owned subsidiaries of Summit Carbon Solutions LLC. In my capacity as Director of Land, Legal and Regulatory Affairs at Summit Carbon Solutions, LLC, I am familiar with and have personal knowledge of the facts set forth below.

**The Swenson Living Trust ("Trust")**

[¶ 2] In my prior Declaration in Support, I stated that:

> *"the Swenson Living Trust ("Trust"), the Trust owns approximately 676.43 acres in the vicinity of the proposed storage facility locations...."*

[¶ 3] It has come to my attention that there was an error in that calculation, and I would like to correct that error here. The appropriate statement should read:

> *"the Swenson Living Trust ("Trust"), the Trust owns approximately 827.17 acres in the vicinity of the proposed storage facility locations...".*

[¶ 4] The remainder of my statement that "*only 359.4 acres are located within the horizontal boundaries of the Summit Carbon Storage #2 storage facility or within the one-half (½) mile notice area of the Summit Carbon Storage #2 storage facility*" is correct, and I would add the following details.

[¶ 5] Of the 359.40 acre referenced above, 279.40 acres are located inside the **Summit Carbon Storage #2, LLC** storage facility boundary **("SCS2 - Unit")**; 80.00 acres are located within the **Summit Carbon Storage #2, LLC** hearing notification area ("**SCS2 - HNA**"); and 467.77 acres are outside ("Out") of the horizontal boundaries of **Summit Carbon Storage #2**. *See* Table 1 – Trust below.

| Legal Description | Interest | Acres | In SCS2 Unit | In-SCS2 HNA | Out | Leased |
|---|---|---|---|---|---|---|
| Township 142 North, Range 87 West<br>Section 7: Outlot B, less Lot 1 of Outlot B | 100% | 119.40 | 119.40 | 0.00 | 0.00 | Yes |
| Township 142 North, Range 88 West<br>Section 14: W½NE¼ | 100% | 80.00 | 80.00 | 0.00 | 0.00 | No |
| Township 143 North, Range 88 West<br>Section 27: SE¼ | 100% | 160.00 | 80.00 | 80.00 | 0.00 | No |
| Township 142 North, Range 87 West<br>Section 22: NW¼ | 25% | 40.00 | 0.00 | 0.00 | 40.00 | No |
| Township 142 North, Range 87 West<br>Section 15: SE¼ | 50% | 80.00 | 0.00 | 0.00 | 80.00 | No |
| Township 142 North, Range 87 West<br>Section 21: a 37.03-acre tract | 100% | 37.03 | 0.00 | 0.00 | 37.03 | No |
| Township 142 North, Range 87 West<br>Section 21: All, less a 37.03-acre tract | 25% | 150.74 | 0.00 | 0.00 | 150.74 | No |
| Township 142 North, Range 87 West<br>Section 9: SW¼ | 100% | 160.00 | 0.00 | 0.00 | 160.00 | Yes |
| **Total Acres** | | **827.17** | **279.40** | **80.00** | **467.77** | |

*Table 1 – Trust*

[¶ 6] The Trust does **not** own any interests within the horizontal boundaries of the **Summit Carbon Storage #1, LLC** or **Summit Carbon Storage #3, LLC** storage facilities, nor within the one-half (½) mile hearing notice areas of such facilities.

**Michael and Bonnie Haupt ("Haupt")**

[¶ 7] Haupt owns approximately 320.00 acres in the vicinity of the **Summit Carbon Storage #1, LLC** storage facility boundary **("SCS1 - Unit")**. *See* Table 2 – Haupt below.

[¶ 8] Of the 320.00 acre referenced above, 160.00 acres are within the **Summit Carbon Storage #1, LLC** hearing notification area ("**SCS1 - HNA**"); and **160.00** acres are outside ("Out") of the horizontal boundaries of **Summit Carbon Storage #1, LLC; Summit Carbon Storage #2, LLC;** and **Summit Carbon Storage #3, LLC**. *See* Table 1 below.

| Legal Description | Interest | Acres | In-Unit | In-SCS1 HNA | Out | Leased |
|---|---|---|---|---|---|---|
| Township 141 North, Range 88 West Section 27: SW¼ | 100% | 160.00 | 0.00 | 160.00 | 0.00 | No |
| Township 141 North, Range 88 West Section 35: SW¼ | 100% | 160.00 | 0.00 | 0.00 | 160.00 | No |
| **Total Acres** | | **320.00** | **0.00** | **160.00** | **160.00** | |

*Table 2 – Haupt*

[¶ 9] Haupt does **not** own any interests within the horizontal boundaries of the Summit Carbon Storage #2, LLC or Summit Carbon Storage #3, LLC storage facilities, nor within the one-half (½) mile hearing notice areas of such facilities.

**John Jochim ("Jochim")**

[¶ 10] Jochim owns approximately 160.00 acres located inside the **Summit Carbon Storage #2, LLC** storage facility boundary **("SCS2 - Unit")**. *See* Table 3 – Jochim below.

| Legal Description | Interest | Acres | In-SCS2 Unit | In-SCS2 HNA | Out | Leased |
|---|---|---|---|---|---|---|
| Township 142 North, Range 88 West Section 24: NW¼ | 100% | 160.00 | 160.00 | 0.00 | 0.00 | No |
| **Total Acres** | | **160.00** | **160.00** | **0.00** | **0.00** | |

*Table 3 – Jochim*

[¶ 11] Jochim does **not** own any interests within the horizontal boundaries of the **Summit Carbon Storage #1, LLC** or **Summit Carbon Storage #3, LLC** storage facilities, nor within the one-half (½) mile hearing notice areas of such facilities.

**Paul and Christy Metz ("Metz")**

[¶ 12] Metz owns approximately 18.88 acres located inside the **Summit Carbon Storage #1, LLC** storage facility boundary **("SCS1 - Unit")**. *See* Table 4 – Metz below.

| Legal Description | Interest | Acres | In-SCS1 Unit | In-SCS1 HNA | Out | Leased |
|---|---|---|---|---|---|---|
| Township 141 North, Range 87 West Section 4: Auditors Lot 1 in the N½SE¼ more fully described in a Plat recorded as Document No. 88058 at the Oliver County, North Dakota Recorder's Office | 100% | 18.88 | 18.88 | 0.00 | 0.00 | No |
| **Total Acres** | | **18.88** | **18.88** | **0.00** | **0.00** | |

*Table 4 – Metz*

[¶ 13] Metz does **not** own any interests within the horizontal boundaries of the **Summit Carbon Storage #2, LLC** or **Summit Carbon Storage #3, LLC** storage facilities, nor within the one-half (½) mile hearing notice areas of such facilities.

**Kirk and Linda Maize and Allen Maize ("Maize")**

[¶ 14] Maize owns approximately 80.00 acres located inside the **Summit Carbon Storage #1, LLC** storage facility boundary **("SCS1 - Unit")**. *See* Table 5 – Metz below.

| Legal Description | Interest | Acres | In-SCS1 | In-HNA | Out | Leased |
|---|---|---|---|---|---|---|
| Township 141 North, Range 87 West Section 20: S½SE¼ | 100% | 80.00 | 80.00 | 0.00 | 0.00 | No |
| **Total Acres** | | **80.00** | **80.00** | **0.00** | **0.00** | |

*Table 5 – Maize*

[¶ 15] Maize does **not** own any interests within the horizontal boundaries of the **Summit Carbon Storage #2, LLC** or **Summit Carbon Storage #3, LLC** storage facilities, nor within the one-half (½) mile hearing notice areas of such facilities.

**Glenn and Lisa Gerving ("Gerving")**

[¶ 16] Gerving owns approximately 393.50 acres in the vicinity of the **Summit Carbon Storage #1, LLC** storage facility boundary **("SCS1 - Unit")**.

[¶ 17] Of the 393.50 acre referenced above, 233.50 acres are located inside the **Summit Carbon Storage #1, LLC** storage facility boundary **("SCS1 - Unit")**; and 160.00 acres are located within the **Summit Carbon Storage #1, LLC** hearing notification area **("SCS1 - HNA")**. *See* Table 6 – Gerving below.

| **Legal Description** | **Interest** | **Acres** | **In-SCS1** | **In-SCS1 HNA** | **Out** | **Leased** |
|---|---|---|---|---|---|---|
| Township 141 North, Range 88 West Section 13: S½, less the North 53 acres | 50% | 133.50 | 133.50 | 0.00 | 0.00 | No |
| Township 141 North, Range 88 West Section 24: S½SW¼NW¼, S½SW¼ | 100% | 100.00 | 100.00 | 0.00 | 0.00 | No |
| Township 142 North, Range 87 West Section 34: E½SE¼ | 100% | 80.00 | 0.00 | 80.00 | 0.00 | No |
| Township 142 North, Range 87 West Section 35: S½SW¼ | 100% | 80.00 | 0.00 | 80.00 | 0.00 | No |
| **Total Acres** | | **393.50** | **233.5** | **160.00** | **0.00** | |

*Table 6 – Gerving*

[¶ 18] Gerving does **not** own any interests within the horizontal boundaries of the **Summit Carbon Storage #2, LLC** or **Summit Carbon Storage #3, LLC** storage facilities, nor within the one-half (½) mile hearing notice areas of such facilities.

**JoLene Rust ("Rust")**

[¶ 19] Rust owns approximately 160.00 acres located inside the **Summit Carbon Storage #2, LLC** storage facility boundary **("SCS2 - Unit")**. *See* Table 7 – Rust below.

| Legal Description | Interest | Acres | In-SCS2 Unit | In-SCS2 HNA | Out | Leased |
|---|---|---|---|---|---|---|
| Township 142 North, Range 88 West Section 13: SW¼ | 100% | 160.00 | 160.00 | 0.00 | 0.00 | No |
| **Total Acres** | | **160.00** | **160.00** | **0.00** | **0.00** | |

*Table 7 – Rust*

[¶ 20] Rust does **not** own any interests within the horizontal boundaries of the **Summit Carbon Storage #1, LLC** or **Summit Carbon Storage #3, LLC** storage facilities, nor within the one-half (½) mile hearing notice areas of such facilities.

**Michael Bauman ("Bauman")**

[¶ 21] Bauman owns approximately 140.00 acres located inside the **Summit Carbon Storage #2, LLC** storage facility boundary **("SCS2 - Unit")**. *See* Table 8 – Bauman below.

| Legal Description | Interest | Acres | In-SCS2 Unit | In-SCS2 HNA | Out | Leased |
|---|---|---|---|---|---|---|
| Township 142 North, Range 88 West Section 13: SW¼ | 100% | 160.00 | 160.00 | 0.00 | 0.00 | No |
| **Total Acres** | | **160.00** | **160.00** | **0.00** | **0.00** | |

*Table 8 – Bauman*

[¶ 22] Bauman does **not** own any interests within the horizontal boundaries of the **Summit Carbon Storage #1, LLC** or **Summit Carbon Storage #3, LLC** storage facilities, nor within the one-half (½) mile hearing notice areas of such facilities.

**Gary and Cassie Smith ("Smith")**

[¶ 23] Smith owns approximately 360.00 acres in the vicinity of the **Summit Carbon Storage #2, LLC** storage facility boundary **("SCS2 - Unit")**.

[¶ 24] Of the 360.00 acre referenced above, 15.00 acres are located within the **Summit Carbon Storage #2, LLC** hearing notification area ("**SCS2 - HNA**") and the remaining interest is outside of **all** storage facility boundaries. *See* Table 9 – Smith below.

| Legal Description | Interest | Acres | In-Unit | In-SCS2 HNA | Out | Leased |
|---|---|---|---|---|---|---|
| Township 142 North, Range 87 West Section 15: NE¼ | 50.00% | 80.00 | 0.00 | 0.00 | 80.00 | No |
| Township 142 North, Range 87 West Section 15: NW¼ | 12.50% | 20.00 | 0.00 | 0.00 | 20.00 | No |
| Township 142 North, Range 87 West Section 20: NE¼ | 9.375% | 15.00 | 0.00 | 15.00 | 0.00 | No |
| Township 142 North, Range 87 West Section 22: Lot A within SE¼ containing 10 acres, more or less | 100.00% | 10.00 | 0.00 | 0.00 | 10.00 | No |
| Township 142 North, Range 87 West Section 22: SE¼ less Lot A | 50.00% | 75.00 | 0.00 | 0.00 | 75.00 | No |
| Township 142 North, Range 87 West Section 23: W½ | 50.00% | 160.00 | 0.00 | 0.00 | 160.00 | No |
| **Total Acres** | | **360.00** | **0.00** | **15.00** | **345.00** | |

*Table 9 – Smith*

[¶ 25] Smith does **not** own any interests within the horizontal boundaries of the **Summit Carbon Storage #1, LLC** or **Summit Carbon Storage #3, LLC** storage facilities, nor within the one-half (½) mile hearing notice areas of such facilities.

**Kevin and Kimberly Kraft ("Kraft")**

[¶ 26] Kraft owns approximately 174.58 acres in the vicinity of the **Summit Carbon Storage #1, LLC** storage facility boundary **("SCS1 - Unit")**.

[¶ 27] All 174.85 acres referenced above, is outside of **all** storage facility boundaries. *See* Table 10 – Kraft below.

| Legal Description | Interest | Acres | In-Unit | In-HNA | Out | Leased |
|---|---|---|---|---|---|---|
| Township 142 North, Range 87 West Section 27: A tract of land in the S½ more fully described in a Parcel Plat recorded January 23, 2002 as Document No. 80055 at the Oliver County, North Dakota Recorder's Office | 100% | 174.58 | 0.00 | 0.00 | 174.58 | No |
| **Total Acres** | | **174.58** | **0.00** | **0.00** | **174.58** | |

*Table 10 – Kraft*

[¶ 28] Kraft does **not** own any interests within the horizontal boundaries of the **Summit Carbon Storage #1, LLC; Summit Carbon Storage #2, LLC** or **Summit Carbon Storage #3, LLC** storage facilities, nor within the one-half (½) mile hearing notice areas of such facilities.

**Charmayne Liebelt ("Leibelt")**

[¶ 29] Leibelt owns approximately 80.00 acres located inside the **Summit Carbon Storage #3, LLC** storage facility boundary **("SCS3 - Unit")**. *See* Table 11 – Liebelt below.

| Legal Description | Interest | Acres | In-SCS3 Unit | In-SCS3 HNA | Out | Leased |
|---|---|---|---|---|---|---|
| Township 143 North, Range 86 West Section 32: S½SW¼ | 100% | 80.00 | 80.00 | 0.00 | 0.00 | No |
| **Total Acres** | | **80.00** | **80.00** | **0.00** | **0.00** | |

*Table 11 – Liebelt*

[¶ 30] Liebelt does **not** own any interests within the horizontal boundaries of the **Summit Carbon Storage #1, LLC** or **Summit Carbon Storage #2, LLC** storage facilities, nor within the one-half (½) mile hearing notice areas of such facilities.

[¶ 31] That in order to comply with the three sets of discovery requests attached to the Trust's motion to expedite discovery, Summit would need to collect, review, and produce thousands of pages of documents and dozens of gigabytes of data. It would not be feasible for Summit to respond to the Trust's discovery request by May 29, 2024.

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on the 28th day of May, 2024, at Bismarck, North Dakota, USA.

By:

Jeffrey L. Skaare

#82334071v1

**BEFORE THE INDUSTRIAL COMMISSION**
**OF THE STATE OF NORTH DAKOTA**

**CASE NOS. 30869–30880**

**In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1,**

**11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by**

**nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of**

**carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the**

**geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## ORDER ON PETITIONS TO INTERVENE AND MOTION FOR EXPEDITED DISCOVERY

[¶ 1] Before the North Dakota Industrial Commission ("Commission") are petitions to intervene filed by the Swenson Living Trust ( "Trust"), Paul and Christy Metz ("Metz"), Michael and Bonnie Haupt ("Haupt"), John Jochim ("Jochim"), Gary A. and Cassie Smith ("Smith"), Michael Bauman ("Bauman"), JoLene M. Rust ("Rust"), Glenn and Lisa Gerving ("Gerving"), Kirk and Linda Maize and Allen Maize ("Maize"), Kevin and Kimber Kraft ("Kraft"), and Charmayne Liebelt ("Liebelt") (collectively, "Petitioners"). Also before the Commission are a

motion to continue the hearing and a motion to expedite discovery filed by the Trust. Applicants Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC (collectively, "Summit") have filed a consolidated response to the petitions to intervene filed by the Petitioners and a response to the motion to expedite discovery filed by the Trust.

[¶ 2] Having considered the briefing and materials filed by the Petitioners and Summit, and the record in the above-captioned cases, the Commission rules as follows:

a. The Trust's Petitions to Intervene are DENIED. The denial of the Trust's Petitions to Intervene does not prejudice the Trustee of the Trust from filing Petitions to Intervene hereafter, which the Commission will consider;

b. The remaining Petitioner's Petitions to Intervene are GRANTED for the limited purpose of "responding to SCS' Applications and participating in any oral argument or hearings on the application and the right to be heard before the final determination as it relates to Landowners and the legality of the relief requested and which may be provided in these proceedings." The Commission will not continue or extend the currently scheduled hearing dates or any other deadlines in the above-captioned action, nor will the Commission allow intervention to "impair the orderly and prompt conduct of the proceeding[s]";

c. Because the Trust's Petitions to Intervene have been denied, the Trust's motion to expedite discovery and motion to continue the hearing are DENIED as moot. The Commission further notes that had the Trust's Petitions to Intervene been granted, the motion to expedite discovery and

motion to continue the hearing would still have been denied for the reasons set forth in Summit's responses thereto.

Dated this _____ day of _____, 2024.

By: _____
David P. Garner
Hearing Officer

**BEFORE THE INDUSTRIAL COMMISSION**
**OF THE STATE OF NORTH DAKOTA**

**CASE NOS. 30869–30880**

**In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1,**

**11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by**

**nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of**

**carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the**

**geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## CERTIFICATE OF SERVICE

[¶ 1] I, the undersigned, hereby certify that a true and correct copy of the following documents:

1. Response to Motion to Expedite Discovery;
2. Consolidated Response to Petitions to Intervene;
3. Second Declaration of Jeff Skaare; and
4. Proposed Order on Petitions to Intervene and Motion for Expedited Discovery

were, on May 28, 2024, filed electronically with the North Dakota Industrial Commission and served upon the following therewith:

Lynn Helms
lhelms@nd.gov

Derrick Braaten
derrick@braatenlawfirm.com

Dated this 28th day of May, 2024.

By: _____

Lawrence Bender (#03908)
lbender@fredlaw.com
**FREDRIKSON & BYRON, P.A.**
304 East Front Avenue, Suite 400
Bismarck, ND 58504
(701) 221-8700
*Attorneys for Summit Carbon Storage #1, LLC*

| | |
|---|---|
| **From:** | Desirae Zaste |
| **To:** | -Info-Oil & Gas Division; Forsberg, Sara L.; Helms, Lynn D.; Bender, Lawrence |
| **Cc:** | Derrick Braaten |
| **Subject:** | Summit Carbon Solutions #1, #2, #3; Case Nos. 30869-30880 |
| **Date:** | Tuesday, May 28, 2024 2:55:49 PM |
| **Attachments:** | 240528 Declaration of Service.pdf<br>Proposed Order.pdf |

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Good afternoon,

Attached for filing and service are the following documents:

- **Order for Continuance of Hearing (Proposed); and**
- **Declaration of Service.**

**Desirae Zaste¦ Certified Paralegal**

**BRAATEN LAW FIRM**
109 N. 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
Fax: 701-221-5842
www.braatenlawfirm.com

**PRIVILEGED COMMUNICATION**
**This e-mail message is intended only for the named recipient(s) above and is covered by the Electronic Communications Privacy Act, 18 U.S.C. Sections 2510-2521. This e-mail is confidential and may contain information that is privileged, attorney work product or exempt from disclosure under applicable law. Recipients should not file copies of this e-mail with publicly accessible records. If you have received this message in error, please immediately notify the sender by return e-mail and delete this e-mail message from your computer. Thank you for your cooperation.**

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case No(s). 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

---

**ORDER FOR CONTINUANCE OF HEARING**

---

(1) On April 16, 2024, The Swenson Living Trust, by and through its trustees, received notice with the hearing scheduled for June 11-12, 2024.

(2) On April 25, 2024, Swenson Trust through its trustees filed a motion to continue hearing.

(3) On April 30, 2024, Lawrence Bender responded on behalf of Applicants Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC (collectively, "Summit").

(4) Therefore, it is ORDERED that the Motion to Continue is hereby GRANTED. The hearing on June 11-12, 2024 will be rescheduled for a later date following a prehearing conference with the parties.

(5) A prehearing and discovery conference will be scheduled sometime within the next 15 days to allow the parties to discuss the status of the electronic and written discovery exchange and the timing of the deposition, and to discuss any other matters related to the hearing. Further prehearing conferences may also be scheduled.

Date: _____ By: Hearing Officer David Garner

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case No(s). 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

---

## DECLARATION OF SERVICE

---

[¶1] I hereby certify that true and correct copies of the following documents:

- **Order for Continuance of Hearing (Proposed); and**
- **Declaration of Service.**

were, on the 28th day of May, 2024 sent via electronic mail to the following:

North Dakota Industrial Commission
oilandgasinfo@nd.gov
slforsberg@nd.gov

Lynn Helms
lhelms@nd.gov

Lawrence Bender
Attorney at Law
lbender@fredlaw.com

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on this 28th day of May 2024 at Bismarck, North Dakota.

Desirae Zaste

| | |
|---|---|
| **From:** | Desirae Zaste |
| **To:** | -Info-Oil & Gas Division; Forsberg, Sara L. |
| **Cc:** | Derrick Braaten; Helms, Lynn D.; Bender, Lawrence |
| **Subject:** | Summit Carbon Solutions #1, #2, #3; Case Nos. 30869-30880 |
| **Date:** | Friday, May 24, 2024 12:49:39 PM |
| **Attachments:** | 240524 Declaration of Service.pdf<br>Proposed Order.pdf |

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Good afternoon,

Attached for filing and service are the following documents:

- **Order (Proposed); and**
- **Declaration of Service.**

**Desirae Zaste¦ Certified Paralegal**

**BRAATEN LAW FIRM**
109 N. 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
Fax: 701-221-5842
www.braatenlawfirm.com

**PRIVILEGED COMMUNICATION**
**This e-mail message is intended only for the named recipient(s) above and is covered by the Electronic Communications Privacy Act, 18 U.S.C. Sections 2510-2521. This e-mail is confidential and may contain information that is privileged, attorney work product or exempt from disclosure under applicable law. Recipients should not file copies of this e-mail with publicly accessible records. If you have received this message in error, please immediately notify the sender by return e-mail and delete this e-mail message from your computer. Thank you for your cooperation.**

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case No(s). 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

---

**ORDER**

---

(1) On April 18, 2024, The Swenson Living Trust, by and through its trustees, filed a petition to intervene in this matter.

(2) On May 15, 2024, additional petitions to intervene were filed for the following landowners:

a. Michael and Bonnie Haupt,
b. John Jochim, and
c. Paul and Christy Metz.

(3) On May 16, 2024 additional petitions to intervene were filed for the following landowners:

a. Kirk and Linda Maize and Allen Maize,
b. Glenn and Lisa Gerving,
c. JoLene Rust,
d. Michael Bauman, and
e. Gary and Cassie Smith.

(4) On May 22, 2024 additional petitions to intervene were filed for the following landowner:

a. Kevin and Kimberly Kraft.

(5) On May 24, 2024 additional petitions to intervene were filed for the following landowner:

a. Charmayne Liebolt[1].

(6) On April 25, 2024, Swenson Trust through its trustees filed a motion to continue hearing.

(7) On April 30, 2024, Lawrence Bender responded on behalf of Applicants Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC (collectively, "Summit"). In that response Mr. Bender acknowledged that "Summit does not dispute these assertions as to NDIC Case Nos. 30873 through 30876, and as such Summit does not dispute the Trust has demonstrated that its legal rights, duties, privileges, immunities, or other legal interests may be substantially affected by proceedings in those cases." Response to Motion to Continue Hearing and Request for Scheduling Conference, ¶16.

[1] All landowners represented by Braaten Law Firm will hereafter be referred to collectively as "Landowners."

(8) Although Applicants contend that certain of the purported intervenors do not own interests in all three storage facilities and therefore should only be entitled to intervene as of right in the one of three facilities in which it owns interests, given that the Commission has combined all of these cases for hearing and they will be heard together, and further given that at least some of the filings from Applicants indicate that pressure differentials will impact all of the purported intervenors property, it is appropriate to grant intervention for the combined proceedings for these purported intervenors.

(9) Therefore, it is ORDERED that the Petitions to Intervene for the following Landowners are hereby GRANTED:

a. The Swenson Living Trust *by and through its trustees Kurt and FayE Swenson*,
a. Michael and Bonnie Haupt,
b. John Jochim,
c. Paul and Christy Metz,
d. Kirk and Linda Maize and Allen Maize,
e. Glenn and Lisa Gerving,
f. JoLene Rust,
g. Michael Bauman,
h. Gary and Cassie Smith,
i. Kevin and Kimberly Kraft, and
j. Charmayne Liebelt.

(10) Swenson Trust also issued discovery in this matter and a notice of deposition as follows:

a. Landowners Interrogatories and Requests for Production of Documents to Applicants (Set 1); served on May 2, 2024,
b. Landowners Interrogatories and Requests for Production of Documents to Applicants (Set 2); served on May 6, 2024,
c. Landowners Notice of 30(b)(6) Deposition of Summit Carbon Solutions; served on May 9, 2024, and
d. Landowners Interrogatories and Requests for Production of Documents to Applicants (Set 3); served on May 10, 2024.

(11) In order to facilitate the full review of the applications, Landowners seek to obtain the computer data and models used by Applicants to create the application materials and assess the requirements for the applications. These requests are appropriate given the guidance for such

permitting proceedings indicates that the "permit application submittal include all necessary information for the UIC Program Director to evaluate the AoR delineation results and replicate the computational modeling exercise if he or she elects to do so, as well as all model input and output data and files. This may include providing inputs for the UIC Program Director to use in their verification modeling effort."[2]

(12) This same guidance "recommends that the permit application submittal include the following in support of the AoR delineation:"

> - The conceptual site model and all supporting data on which the model is based, including the description of geologic stratigraphy and any relevant geologic features. See Box 3-1 of this guidance document for more information;
> - Attributes of the code used to create the computational model, including the code name, name of developing organization, a full accounting of or reference to the model governing equations, scientific basis, and any simplifying assumptions;
> - A description of the model domain, i.e., the model's lateral and vertical extents, geologic layer thickness, and grid cell sizes, as presented on maps and cross-sections….[3]

(13) Landowners are entitled to obtain the models and model data requested in their discovery on an expedited basis. This data should be readily available to Applicants in a form that can be quickly exported and transferred electronically to Landowners.

(14) Applicants Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC are hereby ORDERED to respond to the discovery requests issued by Landowners by May 29, 2024. Applicants are also HEREBY ORDERED to prepare witnesses for and attend the deposition of the Applicants pursuant to the Notice of 30(b)(6)

---

[2] *UIC Program Class VI Well Area of Review Evaluation and Corrective Action Guidance*, p.48, available at https://www.epa.gov/sites/default/files/2015-07/documents/epa816r13005.pdf. (emphasis added).

[3] *Id.*

Deposition issued on May 9, 2024, and pursuant to the requirements and restrictions of N.D.R.Civ.P. 30(b)(6) specifically and the ND Rules of Civil Procedure generally. The Commission is not taking a position on admissibility or discoverability with respect to any particular items in the discovery requests or deposition notice, but cautions Applicants that the data listed above in Class VI guidance should be provided promptly to allow Landowners to run and analyze all computer models used by Applicants to generate and create the application materials.

(15) A prehearing and discovery conference will be scheduled sometime on May 30 or 31 to allow the parties to discuss the status of the electronic and written discovery exchange and the timing of the deposition, and to discuss any other matters related to the hearing. Further prehearing conferences may also be scheduled.

Date: By: Hearing Officer David Garner

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case No(s). 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

---

## DECLARATION OF SERVICE

---

[¶1] I hereby certify that true and correct copies of the following documents:

- **Order (Proposed); and**
- **Declaration of Service.**

were, on the 24th day of May, 2024 sent via electronic mail to the following:

North Dakota Industrial Commission
oilandgasinfo@nd.gov
slforsberg@nd.gov

Lynn Helms
lhelms@nd.gov

Lawrence Bender
Attorney at Law
lbender@fredlaw.com

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on this 24th day of May 2024 at Bismarck, North Dakota.

Desirae Zaste

| | |
|---|---|
| **From:** | Desirae Zaste |
| **To:** | -Info-Oil & Gas Division; Forsberg, Sara L. |
| **Cc:** | Derrick Braaten; Helms, Lynn D.; Bender, Lawrence |
| **Subject:** | Summit Carbon Solutions #2 LLC; NDIC Case Nos. 30873-30876 |
| **Date:** | Friday, May 24, 2024 12:31:41 PM |
| **Attachments:** | Petition to Intervene-30873-30876.pdf<br>240524 Declaration of Service-30873-30876.pdf |

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Good afternoon,

Attached for filing and service are the following documents:

- **Petition to Intervene; and**
- **Declaration of Service.**

**Desirae Zaste¦ Certified Paralegal**

**BRAATEN LAW FIRM**
109 N. 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
Fax: 701-221-5842
www.braatenlawfirm.com

**PRIVILEGED COMMUNICATION**
**This e-mail message is intended only for the named recipient(s) above and is covered by the Electronic Communications Privacy Act, 18 U.S.C. Sections 2510-2521. This e-mail is confidential and may contain information that is privileged, attorney work product or exempt from disclosure under applicable law. Recipients should not file copies of this e-mail with publicly accessible records. If you have received this message in error, please immediately notify the sender by return e-mail and delete this e-mail message from your computer. Thank you for your cooperation.**

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**Case No(s). 30873**
**30874**
**30875**
**30876**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

---

**PETITION TO INTERVENE**

---

Pursuant to N.D.C.C. § 28-32-28, Charmayne Liebelt ("Landowner") hereby petitions to intervene in the above-captioned proceedings. In support of this petition, Landowner states and alleges as follows:

[¶1] On February 6, 2024, Summit Carbon Storage #2, LLC ("SCS") filed an Application for a Permit ("Application") asking the North Dakota Industrial Commission ("NDIC") to grant its application. *See* Case Nos. 30873, 30874, 30875, and 30876.

[¶2] Landowner has property located within the area encompassed by SCS' Applications and it owns real property that will be impacted by SCS's proposed sequestration as referenced in Case Nos. Case Nos. 30873, 30874, 30875, and 30876. Specifically, Landowner owns property that is within one of the proposed storage facilities and impacted by all of them.

[¶3] Landowner owns interests in property legally described as follows:

a. S1/2SW1/4 of Section 32, Township 143 North, Range 86 West of the Fifth Principal Meridian, in Oliver County, ND.

[¶4] The legal rights, privileges, and other legal interests of Landowner will be substantially affected by the NDIC's findings and conclusions in this proceeding as they relate to the Applications and other findings that will alter and take away property and other legal rights of Landowner. Landowner files this petition for the purpose of responding in opposition to the Applications.

[¶5] For these reasons Landowner petitions for leave to intervene in this proceeding for the purpose of responding to SCS' Applications and participating in any oral argument or hearings on the application and the right to be heard before the final determination as it relates to Landowner and the legality of the relief requested and which may be provided in these proceedings.

Dated this 24th day of May, 2024.

**BRAATEN LAW FIRM**

*/s/ Derrick Braaten*

Derrick Braaten (ND #06394)
109 North 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
derrick@braatenlawfirm.com

*Attorneys for Landowner*

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**Case No(s). 30873**
**30874**
**30875**
**30876**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

---

## DECLARATION OF SERVICE

---

[¶1] I hereby certify that true and correct copies of the following documents:

- **Petition to Intervene; and**

- **Declaration of Service.**

were, on the 24th day of May, 2024 sent via electronic mail to the following:

North Dakota Industrial Commission
oilandgasinfo@nd.gov
slforsberg@nd.gov

Lynn Helms
lhelms@nd.gov

Lawrence Bender
Attorney at Law
lbender@fredlaw.com

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on this 24th day of May, 2024 at Bismarck, North Dakota.

Desirae Zaste

| | |
|---|---|
| **From:** | Desirae Zaste |
| **To:** | -Info-Oil & Gas Division; Forsberg, Sara L. |
| **Cc:** | Derrick Braaten; Helms, Lynn D.; Bender, Lawrence |
| **Subject:** | Summit Carbon Solutions #2 LLC; NDIC Case Nos. 30873-30876 |
| **Date:** | Wednesday, May 22, 2024 9:30:53 AM |
| **Attachments:** | Petition to Intervene-30873-30876.pdf<br>240522 Declaration of Service-30873-30876.pdf |

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Good morning,

Attached for filing and service are the following documents:

- **Petition to Intervene; and**
- **Declaration of Service.**

**Desirae Zaste¦ Certified Paralegal**

**BRAATEN LAW FIRM**
109 N. 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
Fax: 701-221-5842
www.braatenlawfirm.com

**PRIVILEGED COMMUNICATION**
**This e-mail message is intended only for the named recipient(s) above and is covered by the Electronic Communications Privacy Act, 18 U.S.C. Sections 2510-2521. This e-mail is confidential and may contain information that is privileged, attorney work product or exempt from disclosure under applicable law. Recipients should not file copies of this e-mail with publicly accessible records. If you have received this message in error, please immediately notify the sender by return e-mail and delete this e-mail message from your computer. Thank you for your cooperation.**

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**Case Nos. 30873**
**30874**
**30875**
**30876**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

---

**PETITION TO INTERVENE**

---

Pursuant to N.D.C.C. § 28-32-28, Kevin and Kimberly Kraft ("Landowners") hereby petition to intervene in the above-captioned proceedings. In support of this petition, Landowners state and allege as follows:

[¶1] On February 6, 2024, Summit Carbon Storage #2, LLC ("SCS") filed an Application for a Permit ("Application") asking the North Dakota Industrial Commission ("NDIC") to grant its application. *See* Case Nos. 30873, 30874, 30875, and 30876.

[¶2] Landowners have property located within the area encompassed by SCS' Applications and it owns real property that will be impacted by SCS's proposed sequestration as referenced in Case Nos. 30873, 30874, 30875, and 30876. Specifically, Landowners own property directly between the storage facilities in the area of review where pore space will be impacted and used by the proposed storage facilities despite those lands not being listed as part of the storage facilities.

[¶3] Landowners own interests in property legally described as follows:

a. Township 142 North, Range 87 West

Section 27: A tract of land located in the S1/2

Oliver County, ND

more particularly described as follows:

Commencing at the Southeast corner of said Section 27; thence N 89°59'36" W a distance of 2070.02 feet to the point of beginning; thence continuing N 89° 59'36" W a distance of 824.50 feet; thence N 0°40'27" E a distance of 2642.32 feet to the mid-section line; thence along the mid-section line S 89°54'53" E a distance of 824.50 feet; thence S 0°40'27" W a distance of 2641.19 feet to the point of beginning. Said tract contains 50.00 acres more or less.

b. Township 142 North, Range 87 West

Section 27: SE1/4 LESS AND EXCEPT a tract of land previously conveyed

Oliver County, ND

[¶4] The legal rights, privileges, and other legal interests of Landowners will be substantially affected by the NDIC's findings and conclusions in this proceeding as they relate to the Applications and other findings that will alter and take away property and other legal rights of Landowners. Landowners file this petition for the purpose of responding in opposition to the Applications.

[¶5] For these reasons Landowners petition for leave to intervene in this proceeding for the purpose of responding to SCS' Applications and participating in any oral argument or hearings on the application and the right to be heard before the final determination as it relates to Landowners and the legality of the relief requested and which may be provided in these proceedings.

Dated this 22nd day of May, 2024.

**BRAATEN LAW FIRM**

*/s/ Derrick Braaten*

Derrick Braaten (ND #06394)
109 North 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
derrick@braatenlawfirm.com

*Attorneys for Landowners*

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**Case No(s). 30873**
**30874**
**30875**
**30876**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

---

## DECLARATION OF SERVICE

---

[¶1] I hereby certify that true and correct copies of the following documents:

- **Petition to Intervene; and**

- **Declaration of Service.**

were, on the 22nd day of May, 2024 sent via electronic mail to the following:

North Dakota Industrial Commission
oilandgasinfo@nd.gov
slforsberg@nd.gov

Lynn Helms
lhelms@nd.gov

Lawrence Bender
Attorney at Law
lbender@fredlaw.com

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on this 22nd day of May, 2024 at Bismarck, North Dakota.

Desirae Zaste

| | |
|---|---|
| **From:** | Joshua A. Swanson |
| **To:** | Helms, Lynn D.; -Info-Oil & Gas Division; Forsberg, Sara L.; "Bender, Lawrence" |
| **Cc:** | Shannon Mikula; Gerad Paul; Tracy A. Ottum |
| **Subject:** | Minnkota Power Cooperative, Inc."s, Petition to Intervene in Case Nos. 30869 - 30880 |
| **Date:** | Monday, May 20, 2024 3:22:29 PM |
| **Attachments:** | image003.png<br>image004.png<br>image005.png<br>image006.png<br>VOGEL-#5427429-v1-Petition_to_Intervene_(5_20_24).PDF<br>VOGEL-#5427456-v1-Declaration_of_Service.PDF |

---

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Dear Director Helms and the Industrial Commission,
Please find enclosed Minnkota Power Cooperative, Inc.'s, Petition to Intervene in Case Nos. 30869 – 30880 (Summit Carbon Storage #1, #2, and #3's applications to the Commission), and Declaration of Service.
If you have any issue opening the attachments, please let me know.

Thank you.

**Joshua A. Swanson** | Shareholder
218 NP Avenue | P.O. Box 1389 | Fargo, ND 58102
T: 701.237.6983 | F: 701.356.6395 | TF: 866.771.9930
vogellaw.com | jswanson@vogellaw.com

**This is a transmission from the Vogel Law Firm, Ltd. and may contain information which is privileged, confidential, and protected by the attorney-client or attorney work product privileges. If you are not the addressee, any disclosure, copying, distribution, or use of the contents of this message is prohibited. If you have received this transmission in error, please destroy it and immediately notify the sender by return email.**

BEFORE THE INDUSTRIAL COMMISSION
OF THE STATE OF NORTH DAKOTA

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND.**<br><br>**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**<br><br>**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North,** | Case Nos. 30869 - 30880<br><br>**MINNKOTA POWER COOPERATIVE, INC.'S, PETITION TO INTERVENE** |

**Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage #2, LLC to consider the amalgamation of the storage reservoir pore space, in which the**

**Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35 and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geological storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Brook Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of**

**Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 26, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3,**

| | |
|---|---|
| **LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND in the Broom Creek Formation.**<br><br>**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.** | |

[¶1] Pursuant to N.D.C.C. § 28-32-28, Minnkota Power Cooperative, Inc. ("Minnkota"), hereby petitions the Commission to intervene in the above-captioned proceedings. In support of this petition, Minnkota states and avers the following as stated herein.

[¶2] Minnkota holds three geologic storage facility permits issued as the result of Orders from the Commission for the amalgamation of pore space in the Minnkota Center MRYS Broom Creek

Storage Facility #1 in Oliver County, North Dakota, and the amalgamation of pore space in the Minnkota Center MRYS Deadwood Storage Facility #1 in Oliver County. Minnkota, through its subsidiary DCC West Project LLC, also holds a storage facility permit that provides redundancy and operating flexibility for Project Tundra, the "DCC West Broom Creek Storage Facility #1," that was approved by the Commission on October 4, 2023. See Case Nos. 29029 – 29034, and 30122 – 30125.

[¶3] In Order No. 31584 (Case No. 29030), the Commission approved Minnkota's application for an order determining the amalgamation of pore space within portions of Sections 35 and 36, Township 142 North, Range 84 West, Sections 19, 20, 21, 22, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 142 North, Range 83 West, Sections 1, 2, 12, and 13, Township 141 North, Range 84 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 15, 16, 17, 18, 19, 20, and 21, Township 141 North, Range 83 West, Oliver County, in the Broom Creek Formation for the Minnkota Center MRYS Broom Creek Storage Facility #1, and encompasses 18,903 acres in Oliver County. Minnkota's application to the Commission for the amalgamation of storage reservoir pore space for Broom Creek Storage Facility #1 was made pursuant to a Geologic Storage Agreement that was signed, ratified, or approved by surface owners owning at least sixty percent of the pore space interest within these lands under N.D.C.C. § 38-22-10. See Order No. 31584 at ¶ 2.

[¶4] In Order No. 31587 (Case No. 29033), the Commission approved Minnkota's application for an order determining the amalgamation of pore space within portions of Sections 35 and 36, Township 142 North, Range 84 West, Sections 19, 20, 21, 22, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 142 North, Range 83 West, Sections 1, 2, 12, and 13, Township 141 North, Range 84 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 14, 15, 16, 17, 18, 19, 20, and 21,

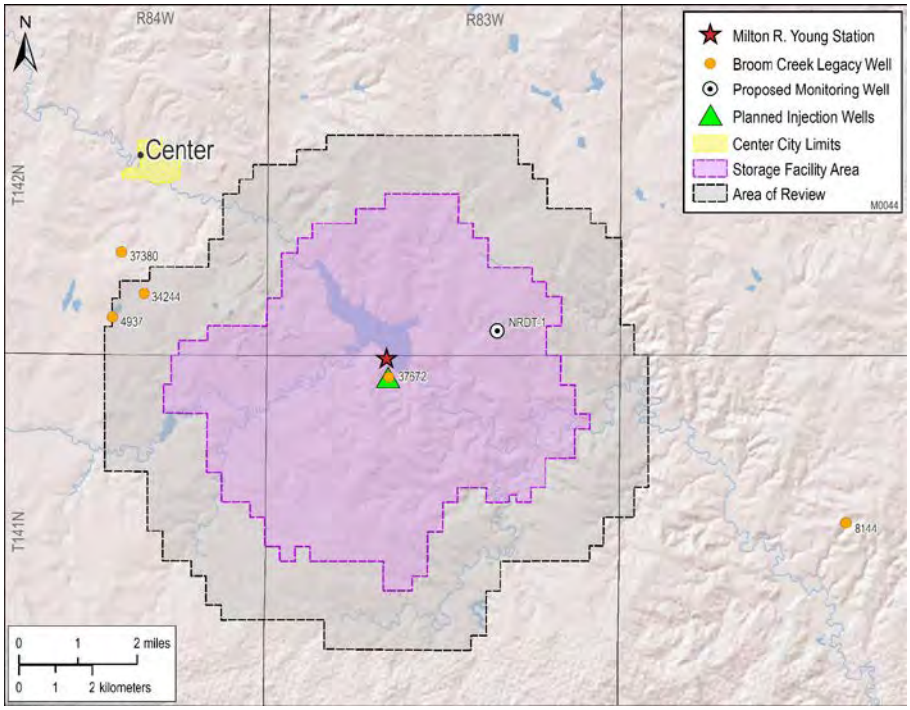
Township 141 North, Range 83 West, Oliver County, in the Deadwood Formation, for the Minnkota Center MRYS Deadwood Storage Facility #1, and while a different formation than Broom Creek, also encompasses 18,903 acres in Oliver County. Minnkota's application to the Commission for the amalgamation of storage reservoir pore space for its Deadwood Storage Facility #1 was made pursuant to a Geologic Storage Agreement that was signed, ratified, or approved by surface owners owning at least sixty percent of the pore space interest within these lands under N.D.C.C. § 38-22-10. See Order No. 31587 at ¶ 2.

[¶5] In Order No. 32806 (Case No. 30122), the Commission approved Minnkota's application for DCC West Broom Creek Storage Facility #1 for an order determining the amalgamation of pore space within portions of Township 141 North, Range 84 West, Section 2-11, 14-21, 29-32, Township 141 North, Range 85 West, Sections 1-4, 9-16, 22-27, and 36, Township 142 North, Range 84 West, Sections19-21 and 28-34, and Township 142 North, Range 85 West, Sections 24, 25, 33, 34, 35 and 36, Oliver County, in the Broom Creek formation. This third additional storage facility will primarily serve the Milton R. Young Station. To the extent there is additional storage capacity available, Minnkota may entertain requests from third parties for storage services for the purpose of geologic sequestration of carbon dioxide. It encompasses 29,903 acres in Oliver County.

[¶6] The Commission's Orders for the Broom Creek and Deadwood formations, and the Minnkota Center MRYS Deadwood Storage Facility #1 and Minnkota Center MRYS Broom Creek Storage Facility #1, are part of Minnkota's Project Tundra. As the Commission is aware, Project Tundra is a large-scale, capital-intensive carbon sequestration and storage project designed to capture up to four million metric tons of the carbon dioxide produced by the MRYS. As the Commission also knows, Minnkota has been leading this project for the past nine years and has,

along with its partners, the State of North Dakota, and the Department of Energy, devoted significant resources towards its advancement and seeing it to fruition, including investing $90,000,000 in the project.

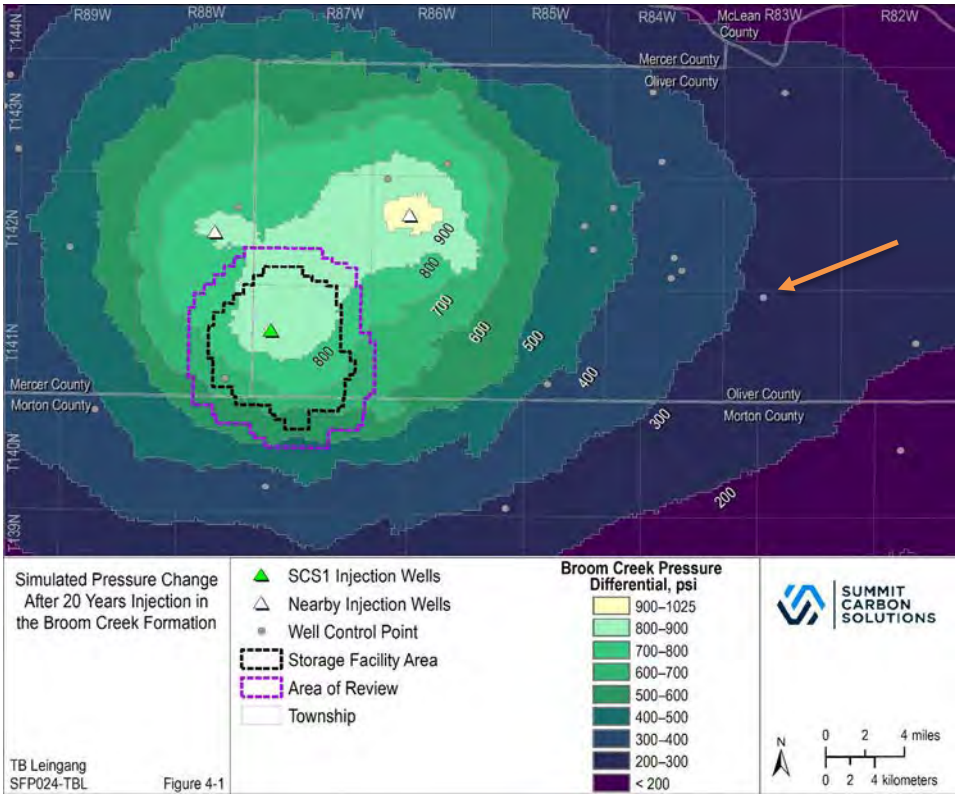
[¶7] The location of Project Tundra is immediately adjacent to the east of Summit Carbon Storage, LLC, #1, #2, and #3's proposed injection sites. The following Figure 1 is from Minnkota's application to the Commission showing its injection site, and the J-LOC 1, BNI 1, and Herbert Dresser wells. Minnkota owns the J-LOC 1 well.




This encompasses property in Township 142 North, Ranges 82, 83, and 84 West, and Township 141 North, Ranges 82, 83, and 84 West.

[¶8] Summit Carbon Storage's Figure 4-1, as identified in its applications to the Commission, while showing these three wells in Township 142, Range 84, omits Minnkota's injection site at the Milton R. Young Station (part of Project Tundra already approved by the Commission) that is next door to the injection wells proposed by Summit Carbon Storage. The J-LOC 1 and BNI 1

wells are mentioned in at least five places in Summit's Application in Case No. 30869. See p. 168, 245, 247, 252, and 538. Summit's Figure 4-1 is reproduced here:




The orange arrow, added by Minnkota for the purpose of this Petition, shows the location of Minnkota's injection well at the Milton R. Young Station in Township 141 North, Range 83 West, which has been approved by the Commission.

[¶9] Minnkota seeks to intervene because its interest in Project Tundra, the related permits issued by the Commission for the same, and its correlative rights in the pore space compromising Project Tundra, are the subject of and may be impacted by the outcome of the proceedings on Summit Carbon Storage's applications and proposed project. Minnkota thus seeks to protect its interest and significant investments in Project Tundra as they may be impacted by Summit Carbon Storage, LLC's #1, #2, and #3 pending applications.

[¶10] Minnkota further seeks to intervene because The Swenson Living Trust petitioned to intervene in these same applications on April 18, 2024. The Swenson Living Trust is a party to a lawsuit in North Dakota State District Court – *Northwest Landowners Association et al. v. State of North Dakota et al.*, Case No. 05-2023-cv-00065 – in which Minnkota is also a party. To the extent these proceedings may have any impact on that case, Minnkota seeks to intervene to ensure an accurate record as related to its interests and Project Tundra.

[¶11] Considering the foregoing, the rights, privileges, and other interests of Minnkota will be substantially affected by the Commission's proceedings herein, and Minnkota seeks to intervene to protect its interests in Project Tundra, along with the rights secured by virtue of the Commission's Orders issued in Case Nos. 29029 – 29034, and 30122 – 30125. Minnkota respectfully requests that the Commission grants its Petition to Intervene, and to be allowed to participate and offer testimony and evidence, as may be appropriate, and be heard before the Commission issues any Orders as to Summit Carbon Storage's applications.

Dated this 20th day of May, 2024.

**VOGEL LAW FIRM**

*/s/ Joshua A. Swanson*

BY: Joshua A. Swanson (#06788)
218 NP Avenue
PO Box 1389
Fargo, ND 58107-1389
Telephone: 701.237.6983
Email: jswanson@vogellaw.com
ATTORNEYS FOR INTERVENOR, MINNKOTA POWER COOPERATIVE, INC.

BEFORE THE INDUSTRIAL COMMISSION
OF THE STATE OF NORTH DAKOTA

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND.**<br><br>**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**<br><br>**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North,** | Case Nos. 30869 - 30880<br><br>**DECLARATION OF SERVICE** |

**Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage #2, LLC to consider the amalgamation of the storage reservoir pore space, in which the**

**Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35 and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geological storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Brook Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of**

**Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 26, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3,**

| | |
|---|---|
| **LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND in the Broom Creek Formation.**<br><br>**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.** | |

[¶1] I hereby certify that true and correct copies of the following documents:

- **MINNKOTA POWER COOPERATIVE, INC.'S, PETITION TO INTERVENE in Case Nos. 30869 - 30880; and**
- **Declaration of Service**

were, on this 20th day of May, 2024, sent via e-mail to the following:

| | |
|---|---|
| Lynn D. Helms<br>lhelms@nd.gov | Sara L. Forsberg<br>slforsberg@nd.gov |
| Lawrence Bender<br>lbender@fredlaw.com | North Dakota Industrial Commission<br>oilandgasinfo@nd.gov |

A copy of the above-identified documents was also sent, via Certified Mail, to the following:

Summit Carbon Storage #1, #2, and #3, LLC
2321 N. LOOP DRIVE, SUITE 221
AMES, IA 50010

I declare, under penalty of perjury, that the foregoing is true and correct.

Dated this 20th day of May, 2024.

**VOGEL LAW FIRM**

/s/ *Joshua A. Swanson*

BY: Joshua A. Swanson (#06788)
218 NP Avenue
PO Box 1389
Fargo, ND 58107-1389
Telephone: 701.237.6983
Email: jswanson@vogellaw.com
ATTORNEYS FOR INTERVENOR, MINNKOTA POWER COOPERATIVE, INC.

| | |
|---|---|
| **From:** | Etter, Mary |
| **To:** | Garner, David P. |
| **Cc:** | Bender, Lawrence; Helms, Lynn D.; Derrick Braaten; Forsberg, Sara L. |
| **Subject:** | SCS Carbon Transport - NDIC Case Nos. 30869-30880 |
| **Date:** | Friday, May 17, 2024 3:09:31 PM |
| **Attachments:** | SCS - Ltr to D. Garner RE Response to Motion for Expedited Discovery & Petitions to Intervene(82523028.1)-c.pdf |

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Good afternoon Dave,

Please see the attached letter from Lawrence Bender regarding the above-referenced cases. If you have any questions, please contact Lawrence.

Thank you,
Mary

***Mary Etter***
*Legal Administrative Assistant to Jason R.S. Cassady,*
*Justin G. Hughes, and Spencer D. Ptacek*
Fredrikson & Byron, P.A.
304 East Front Ave, Suite 400 | Bismarck, ND 58504-5639
Direct: 701.221.8642 | Main: 701.221.8700| metter@fredlaw.com
www.fredlaw.com

Fredrikson

*Fredrikson's Bismarck office has moved, please note our new address.*

***This is a transmission from the law firm of Fredrikson & Byron, P.A. and may contain information which is privileged, confidential, and protected by the attorney-client or attorney work product privileges. If you are not the addressee, note that any disclosure, copying, distribution, or use of the contents of this message is prohibited. If you have received this transmission in error, please destroy it and notify us immediately at our telephone number (701) 221-8700.***

Fredrikson

**Fredrikson & Byron, P.A.**
Attorneys and Advisors

304 East Front Avenue, Suite 400
Bismarck, ND 58504-5639
Main: 701.221.8700
fredlaw.com

May 17, 2024

***VIA E-MAIL***

State of North Dakota
Office of Attorney General
Attn: Mr. David Garner
500 North Ninth Street
Bismarck, ND 58501-4509

**RE: NDIC Case Nos. 30869–30880**

Dear Mr. Garner:

This letter concerns Mr. Braaten's e-mail dated May 9, 2024, numerous petitions to intervene filed by Mr. Braaten's clients, and a motion to expedite discovery filed on May 16, 2024 by the Swenson Living Trust, all related to proceedings on the applications filed by Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC (collectively, "Summit") in NDIC Case Nos. 30869–30880.

Mr. Braaten's May 9, 2024 e-mail and May 16, 2024 motion to expedite discovery all concern efforts by at least one of his clients to obtain discovery from Summit in NDIC Case Nos. 30869–30880. As of the date of this letter, however, Mr. Braaten does not represent anyone entitled to conduct discovery in these cases. *See* N.D.A.C. § 98-02-02-06(1). None of the petitions to intervene have been granted. The petitions to intervene should be denied for, among other reasons, the reasons stated in Summit's Response to the Swenson's Living Trust's Motion to Continue Hearing and Request for Scheduling Conference, and neither the Swenson Living Trust nor the other petitioners should be considered parties in NDIC Case Nos. 30869–30880.

Notwithstanding the foregoing, Summit intends to respond to the motion to expedite discovery filed by the Swenson Living Trust on or before May 28, 2024. *See* N.D.A.C. § 98-02-02-08, *see also* N.D.A.C. § 968-02-02-04. Summit will file a separate, consolidated response to the petitions to intervene filed by all of Mr. Braaten's clients within the same timeframe.

Should you have any questions, please advise.

Sincerely,

LAWRENCE BENDER

LB/tjg
#82494737v1

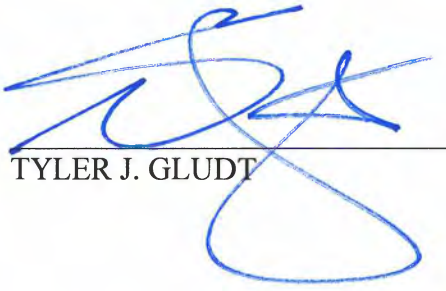
cc: Summit Carbon Solutions, LLC

## CERTIFICATE OF SERVICE

The undersigned hereby certifies that on this 17th day of May, 2024, a true and correct copy of the foregoing document was forwarded via electronic mail to the following:

Lynn Helms
lhelms@nd.gov

Derrick Braaten
derrick@braatenlawfirm.com



TYLER J. GLUDT

| | |
|---|---|
| **From:** | Desirae Zaste |
| **To:** | -Info-Oil & Gas Division; Forsberg, Sara L. |
| **Cc:** | Derrick Braaten; Helms, Lynn D.; Bender, Lawrence |
| **Subject:** | Summit Carbon Solutions #2 LLC; NDIC Case Nos. 30873-30876 |
| **Date:** | Thursday, May 16, 2024 5:07:34 PM |
| **Attachments:** | Petition to Intervene-30873-30876.pdf<br>240516 Declaration of Service-30873-30876.pdf |

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Good afternoon,

Attached for filing and service are the following documents:

- **Petition to Intervene; and**
- **Declaration of Service.**

**Desirae Zaste¦ Certified Paralegal**

**BRAATEN LAW FIRM**
109 N. 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
Fax: 701-221-5842
www.braatenlawfirm.com

**PRIVILEGED COMMUNICATION**
**This e-mail message is intended only for the named recipient(s) above and is covered by the Electronic Communications Privacy Act, 18 U.S.C. Sections 2510-2521. This e-mail is confidential and may contain information that is privileged, attorney work product or exempt from disclosure under applicable law. Recipients should not file copies of this e-mail with publicly accessible records. If you have received this message in error, please immediately notify the sender by return e-mail and delete this e-mail message from your computer. Thank you for your cooperation.**

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an**

**Case Nos. 30873**
**30874**
**30875**
**30876**

**order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

---

## PETITION TO INTERVENE

---

Pursuant to N.D.C.C. § 28-32-28, Gary A. Smith and Cassie Smith ("Landowners") hereby petition to intervene in the above-captioned proceedings. In support of this petition, Landowners state and alleges as follows:

[¶1] On February 6, 2024, Summit Carbon Storage #2, LLC ("SCS") filed an Application for a Permit ("Application") asking the North Dakota Industrial Commission ("NDIC") to grant its application. *See* Case Nos. 30873, 30874, 30875, and 30876.

[¶2] Landowners have property located within the area encompassed by SCS' Applications and it owns real property that will be impacted by SCS's proposed sequestration as referenced in Case Nos. 30873, 30874, 30875, and 30876. Specifically, Landowners own property that is within the proposed storage facilities, and also own property directly between the storage facilities where pore space will be impacted and used by the proposed storage facilities despite those lands not being listed as part of the storage facilities.

[¶3] Landowners are an owner and owner of fractional interest as a tenant in common in the property legally described as follows:

a. Township 142 North, Range 87 West: Section 23: W1/2, Oliver County, North Dakota.

b. Township 142 North, Range 87 West: Section 20: NE1/4,Oliver County, North Dakota.

c. LOT A, within the SE¼ of Section 22, Township 142 North, Range 87 West, Oliver County, North Dakota described as follows: COMMENCING at the East Quarter Corner of Section 22; THENCE S 00°00'00" W, along the east line of Section 22, a distance of 120.00', to the true point of beginning; THENCE S 00°00'00" W, along said line, a distance of 660.00'; THENCE S 90°00'00" W, a distance of 660.00'; THENCE N 00°00'00" E, a distance of 660.00'; THENCE N 90°00'00" E, a distance of 660.00', back to the point of beginning. This parcel contains 10.0 acres, more or less.

d. Township 142 North, Range 87 West: Section 22: SE1/4, Oliver County, North Dakota.

e. Township 142 North, Range 87 West: Section 15: NE1/4 and NW1/4, Oliver County, North Dakota.

[¶4] The legal rights, privileges, and other legal interests of Landowners will be substantially affected by the NDIC's findings and conclusions in this proceeding as they relate to the Applications and other findings that will alter and take away property and other legal rights of Landowners. Landowners file this petition for the purpose of responding in opposition to the Applications.

[¶5] For these reasons Landowners petition for leave to intervene in this proceeding for the purpose of responding to SCS' Applications and participating in any oral argument or hearings on the application and the right to be heard before the final determination as it relates to Landowners and the legality of the relief requested and which may be provided in these proceedings.

Dated this 16th day of May, 2024.

**BRAATEN LAW FIRM**

*/s/ Derrick Braaten*
Derrick Braaten (ND #06394)
109 North 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
derrick@braatenlawfirm.com

*Attorneys for Landowners*

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an**

**Case No(s). 30873**
**30874**
**30875**
**30876**

**order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

---

## DECLARATION OF SERVICE

---

[¶1] I hereby certify that true and correct copies of the following documents:

- **Petition to Intervene; and**
- **Declaration of Service.**

were, on the 16th day of May, 2024 sent via electronic mail to the following:

North Dakota Industrial Commission
oilandgasinfo@nd.gov
slforsberg@nd.gov

Lynn Helms
lhelms@nd.gov

Lawrence Bender
Attorney at Law
lbender@fredlaw.com

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on this 16th day of May, 2024 at Bismarck, North Dakota.

Desirae Zaste

| | |
|---|---|
| **From:** | Desirae Zaste |
| **To:** | -Info-Oil & Gas Division; Forsberg, Sara L. |
| **Cc:** | Derrick Braaten; Helms, Lynn D.; Bender, Lawrence |
| **Subject:** | Summit Carbon Solutions #2 LLC; NDIC Case Nos. 30873-30876 |
| **Date:** | Thursday, May 16, 2024 5:00:19 PM |
| **Attachments:** | Petition to Intervene-30873-30876.pdf<br>240516 Declaration of Service-30873-30876.pdf |

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Good afternoon,

Attached for filing and service are the following documents:

- **Petition to Intervene; and**
- **Declaration of Service.**

**Desirae Zaste¦ Certified Paralegal**

**BRAATEN LAW FIRM**
109 N. 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
Fax: 701-221-5842
www.braatenlawfirm.com

**PRIVILEGED COMMUNICATION**
**This e-mail message is intended only for the named recipient(s) above and is covered by the Electronic Communications Privacy Act, 18 U.S.C. Sections 2510-2521. This e-mail is confidential and may contain information that is privileged, attorney work product or exempt from disclosure under applicable law. Recipients should not file copies of this e-mail with publicly accessible records. If you have received this message in error, please immediately notify the sender by return e-mail and delete this e-mail message from your computer. Thank you for your cooperation.**

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an**

**Case Nos. 30873**
**30874**
**30875**
**30876**

**order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

---

## PETITION TO INTERVENE

---

Pursuant to N.D.C.C. § 28-32-28, Michael Bauman ("Landowner") hereby petitions to intervene in the above-captioned proceedings. In support of this petition, Landowner states and alleges as follows:

[¶1] On February 6, 2024, Summit Carbon Storage #2, LLC ("SCS") filed an Application for a Permit ("Application") asking the North Dakota Industrial Commission ("NDIC") to grant its application. *See* Case Nos. 30873, 30874, 30875, and 30876.

[¶2] Landowner has property located within the area encompassed by SCS' Applications and it owns real property that will be impacted by SCS's proposed sequestration as referenced in Case Nos. 30873, 30874, 30875, and 30876. Specifically, Landowner owns property that is within one of the proposed storage facilities and impacted by all of them.

[¶3] Landowner owns interests in property legally described as follows:

a. Township 142 North, Range 88 West Section 24: SW¼ **less** a 20 acre parcel described as follows: Commencing at the NE comer of SW¼, thence West along the North boundary of the SW¼ a distance of 950 feet; thence South in a line parallel to the East boundary of the SW 1/4 a distance of 915 feet; thence East in a line parallel to the North boundary of the SW¼ a distance of 950 feet to the East boundary of the SW¼; thence North along the East boundary of the SW¼ to the point of beginning, Mercer County, North Dakota.

[¶4] The legal rights, privileges, and other legal interests of Landowner will be substantially affected by the NDIC's findings and conclusions in this proceeding as they relate to the Applications and other findings that will alter and take away property and other legal rights of Landowners. Landowner files this petition for the purpose of responding in opposition to the Applications.

[¶5] For these reasons Landowner petitions for leave to intervene in this proceeding for the purpose of responding to SCS' Applications and participating in any oral argument or

hearings on the application and the right to be heard before the final determination as it relates to Landowner and the legality of the relief requested and which may be provided in these proceedings.

Dated this 16th day of May, 2024.

**BRAATEN LAW FIRM**

*/s/ Derrick Braaten*

Derrick Braaten (ND #06394)
109 North 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
derrick@braatenlawfirm.com

*Attorneys for Landowner*

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an**

**Case No(s). 30873**
**30874**
**30875**
**30876**

**order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

---

## DECLARATION OF SERVICE

---

[¶1] I hereby certify that true and correct copies of the following documents:

- **Petition to Intervene; and**
- **Declaration of Service.**

were, on the 16th day of May, 2024 sent via electronic mail to the following:

North Dakota Industrial Commission
oilandgasinfo@nd.gov
slforsberg@nd.gov

Lynn Helms
lhelms@nd.gov

Lawrence Bender
Attorney at Law
lbender@fredlaw.com

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on this 16th day of May, 2024 at Bismarck, North Dakota.

Desirae Zaste

| | |
|---|---|
| **From:** | Desirae Zaste |
| **To:** | -Info-Oil & Gas Division; Forsberg, Sara L. |
| **Cc:** | Derrick Braaten; Helms, Lynn D.; Bender, Lawrence |
| **Subject:** | Summit Carbon Solutions #2 LLC; NDIC Case Nos. 30873-30876 |
| **Date:** | Thursday, May 16, 2024 4:52:15 PM |
| **Attachments:** | Petition to Intervene-30873-30876.pdf<br>240516 Declaration of Service-30873-30876.pdf |

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Good afternoon,

Attached for filing and service are the following documents:

- **Petition to Intervene; and**
- **Declaration of Service.**

**Desirae Zaste¦ Certified Paralegal**

**BRAATEN LAW FIRM**
109 N. 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
Fax: 701-221-5842
www.braatenlawfirm.com

**PRIVILEGED COMMUNICATION**
**This e-mail message is intended only for the named recipient(s) above and is covered by the Electronic Communications Privacy Act, 18 U.S.C. Sections 2510-2521. This e-mail is confidential and may contain information that is privileged, attorney work product or exempt from disclosure under applicable law. Recipients should not file copies of this e-mail with publicly accessible records. If you have received this message in error, please immediately notify the sender by return e-mail and delete this e-mail message from your computer. Thank you for your cooperation.**

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an**

**Case Nos. 30873**
**30874**
**30875**
**30876**

**order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

---

## PETITION TO INTERVENE

---

Pursuant to N.D.C.C. § 28-32-28, JoLene M. Rust ("Landowner") hereby petitions to intervene in the above-captioned proceedings. In support of this petition, Landowner states and alleges as follows:

[¶1] On February 6, 2024, Summit Carbon Storage #2, LLC ("SCS") filed an Application for a Permit ("Application") asking the North Dakota Industrial Commission ("NDIC") to grant its application. *See* Case Nos. 30873, 30874, 30875, and 30876.

[¶2] Landowner has property located within the area encompassed by SCS' Applications and it owns real property that will be impacted by SCS's proposed sequestration as referenced in Case Nos. 30873, 30874, 30875, and 30876. Specifically, Landowner owns property that is within one of the proposed storage facilities and impacted by all of them.

[¶3] Landowner owns interests in property legally described as follows:

a. Township 142 North, Range 88 West, Mercer County, North Dakota
Section 13: SW¼

[¶4] The legal rights, privileges, and other legal interests of Landowner will be substantially affected by the NDIC's findings and conclusions in this proceeding as they relate to the Applications and other findings that will alter and take away property and other legal rights of Landowner. Landowner files this petition for the purpose of responding in opposition to the Applications.

[¶5] For these reasons Landowner petitions for leave to intervene in this proceeding for the purpose of responding to SCS' Applications and participating in any oral argument or hearings on the application and the right to be heard before the final determination as it relates to Landowner and the legality of the relief requested and which may be provided in these proceedings.

Dated this 16th day of May, 2024.

**BRAATEN LAW FIRM**

*/s/ Derrick Braaten*

Derrick Braaten (ND #06394)
109 North 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
derrick@braatenlawfirm.com

*Attorneys for Landowner*

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an**

**Case No(s). 30873**
**30874**
**30875**
**30876**

**order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

---

## DECLARATION OF SERVICE

---

[¶1] I hereby certify that true and correct copies of the following documents:

- **Petition to Intervene; and**
- **Declaration of Service.**

were, on the 16th day of May, 2024 sent via electronic mail to the following:

North Dakota Industrial Commission
oilandgasinfo@nd.gov
slforsberg@nd.gov

Lynn Helms
lhelms@nd.gov

Lawrence Bender
Attorney at Law
lbender@fredlaw.com

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on this 16th day of May, 2024 at Bismarck, North Dakota.

Desirae Zaste

| | |
|---|---|
| **From:** | Desirae Zaste |
| **To:** | -Info-Oil & Gas Division; Forsberg, Sara L. |
| **Cc:** | Derrick Braaten; Helms, Lynn D.; Bender, Lawrence |
| **Subject:** | Summit Carbon Solutions #2 LLC; NDIC Case Nos. 30873-30876 |
| **Date:** | Thursday, May 16, 2024 4:41:49 PM |
| **Attachments:** | 240516 Declaration of Service-30873-30876.pdf<br>Petition to Intervene-30873-30876.pdf |

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Good afternoon,

Attached for filing and service are the following documents:

- **Petition to Intervene; and**
- **Declaration of Service.**

**Desirae Zaste¦ Certified Paralegal**

**BRAATEN LAW FIRM**
109 N. 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
Fax: 701-221-5842
www.braatenlawfirm.com

**PRIVILEGED COMMUNICATION**
**This e-mail message is intended only for the named recipient(s) above and is covered by the Electronic Communications Privacy Act, 18 U.S.C. Sections 2510-2521. This e-mail is confidential and may contain information that is privileged, attorney work product or exempt from disclosure under applicable law. Recipients should not file copies of this e-mail with publicly accessible records. If you have received this message in error, please immediately notify the sender by return e-mail and delete this e-mail message from your computer. Thank you for your cooperation.**

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an**

**Case Nos. 30873**
**30874**
**30875**
**30876**

**order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

---

## PETITION TO INTERVENE

---

Pursuant to N.D.C.C. § 28-32-28, Glenn and Lisa Gerving ("Landowners") hereby petition to intervene in the above-captioned proceedings. In support of this petition, Landowners state and allege as follows:

[¶1] On February 6, 2024, Summit Carbon Storage #2, LLC ("SCS") filed an Application for a Permit ("Application") asking the North Dakota Industrial Commission ("NDIC") to grant its application. *See* Case Nos. 30873, 30874, 30875, and 30876.

[¶2] Landowners have property located within the area encompassed by SCS' Applications and it owns real property that will be impacted by SCS's proposed sequestration as referenced in Case Nos. 30873, 30874, 30875, and 30876. Specifically, Landowners own property that is within the proposed storage facilities, and also own property directly between the storage facilities where pore space will be impacted and used by the proposed storage facilities despite those lands not being listed as part of the storage facilities.

[¶3] Landowners own interests in property legally described as follows:

a. The South fifty-three (53) acres of the South Half of the South Half (S1/2 S1/2) of Section Thirteen (13), in Township One Hundred Forty-One (141) North, Range Eighty-Eight (88) West of the Fifth Principal Meridian, LESS a tract of land deeded to the State of North Dakota for the use of the State Highway Department described as follows:
All that portion of the South fifty-four (54) acres of the South Half of the South Half (S 1/2 S 1/2) of Section Thirteen (13), Township One Hundred Forty-One (141) North, Range Eighty-Eight (88) West, lying within a strip of land 100.00 feet wide, located on the Easterly side of and measured at right angles to the following described highway center line, as surveyed and staked: Beginning at a point 154.58 feet East of the Southwest corner of said Section Thirteen (13), thence from a tangent bearing North 0.09' West running along a 0.30' curve to the left 446.7 feet, more or less, until said strip crosses the North Line of said

South 54 acres, also including all that portion lying Westerly of the above described strip except all that portion lying within 33 feet of the section line, tract contains 1.92 acres, more or less, Mercer County, North Dakota.

b. S1/2 SW1/4 of Sec. 24, Township. 141N, Range 88W, Mercer County, North Dakota.

c. S1/2 SW1/4 NW1/4 of Sec. 24, Township 141N, Range. 88W, Mercer County, North Dakota.

d. The E1/2 SE1/4 of Section 34 in Township 142N, Range 87W, Oliver County, North Dakota.

e. The S1/2 SW1/4 of Section 35 in Township 142N, Range 87W, Oliver County, North Dakota.

[¶4] The legal rights, privileges, and other legal interests of Landowners will be substantially affected by the NDIC's findings and conclusions in this proceeding as they relate to the Applications and other findings that will alter and take away property and other legal rights of Landowners. Landowners file this petition for the purpose of responding in opposition to the Applications.

[¶5] For these reasons Landowners petition for leave to intervene in this proceeding for the purpose of responding to SCS' Applications and participating in any oral argument or hearings on the application and the right to be heard before the final determination as it relates to Landowners and the legality of the relief requested and which may be provided in these proceedings.

Dated this 16th day of May, 2024.

**BRAATEN LAW FIRM**

*/s/ Derrick Braaten*

Derrick Braaten (ND #06394)
109 North 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
derrick@braatenlawfirm.com

*Attorneys for Landowners*

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an**

**Case No(s). 30873**
**30874**
**30875**
**30876**

**order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

---

## DECLARATION OF SERVICE

---

[¶1] I hereby certify that true and correct copies of the following documents:

- **Petition to Intervene; and**
- **Declaration of Service.**

were, on the 16th day of May, 2024 sent via electronic mail to the following:

North Dakota Industrial Commission
oilandgasinfo@nd.gov
slforsberg@nd.gov

Lynn Helms
lhelms@nd.gov

Lawrence Bender
Attorney at Law
lbender@fredlaw.com

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on this 16th day of May, 2024 at Bismarck, North Dakota.

Desirae Zaste

| | |
|---|---|
| **From:** | Desirae Zaste |
| **To:** | -Info-Oil & Gas Division; Forsberg, Sara L. |
| **Cc:** | Derrick Braaten; Helms, Lynn D.; Bender, Lawrence |
| **Subject:** | Summit Carbon Solutions #2 LLC; NDIC Case Nos. 30873-30876 |
| **Date:** | Thursday, May 16, 2024 4:20:12 PM |
| **Attachments:** | Petition to Intervene-30873-30876.pdf<br>240516 Declaration of Service-30873-30876.pdf |

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Good afternoon,

Attached for filing and service are the following documents:

- **Petition to Intervene; and**
- **Declaration of Service.**

**Desirae Zaste¦ Certified Paralegal**

**BRAATEN LAW FIRM**
109 N. 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
Fax: 701-221-5842
www.braatenlawfirm.com

**PRIVILEGED COMMUNICATION**
**This e-mail message is intended only for the named recipient(s) above and is covered by the Electronic Communications Privacy Act, 18 U.S.C. Sections 2510-2521. This e-mail is confidential and may contain information that is privileged, attorney work product or exempt from disclosure under applicable law. Recipients should not file copies of this e-mail with publicly accessible records. If you have received this message in error, please immediately notify the sender by return e-mail and delete this e-mail message from your computer. Thank you for your cooperation.**

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an**

**Case No(s). 30873**
**30874**
**30875**
**30876**

**order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

---

## PETITION TO INTERVENE

---

Pursuant to N.D.C.C. § 28-32-28, Kirk and Linda Maize and Allen Maize ("Landowners") hereby petition to intervene in the above-captioned proceedings. In support of this petition, Landowners state and allege as follows:

[¶1] On February 6, 2024, Summit Carbon Storage #2, LLC ("SCS") filed an Application for a Permit ("Application") asking the North Dakota Industrial Commission ("NDIC") to grant its application. *See* Case Nos. 30873, 30874, 30875, and 30876.

[¶2] Landowners have property located within the area encompassed by SCS' Applications and it owns real property that will be impacted by SCS's proposed sequestration as referenced in Case Nos. Case Nos. 30873, 30874, 30875, and 30876. Specifically, Landowner owns property that is within one of the proposed storage facilities and impacted by all of them.

[¶3] Landowners own interests in property legally described as follows:

a. South Half (S/2) of the Southeast Quarter (SE/4) of Section 20, Township 141 North, Range 87 West of the Fifth Principal Meridian, in Oliver County, ND.

[¶4] The legal rights, privileges, and other legal interests of Landowners will be substantially affected by the NDIC's findings and conclusions in this proceeding as they relate to the Applications and other findings that will alter and take away property and other legal rights of Landowners. Landowners file this petition for the purpose of responding in opposition to the Applications.

[¶5] For these reasons Landowners petition for leave to intervene in this proceeding for the purpose of responding to SCS' Applications and participating in any oral argument or hearings on the application and the right to be heard before the final determination as it relates to Landowners and the legality of the relief requested and which may be provided in these proceedings.

Dated this 16th day of May, 2024.

**BRAATEN LAW FIRM**

*/s/ Derrick Braaten*

Derrick Braaten (ND #06394)
109 North 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
derrick@braatenlawfirm.com

*Attorneys for Landowners*

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an**

**Case No(s). 30873**
**30874**
**30875**
**30876**

**order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

---

## DECLARATION OF SERVICE

---

[¶1] I hereby certify that true and correct copies of the following documents:

- **Petition to Intervene; and**
- **Declaration of Service.**

were, on the 16th day of May, 2024 sent via electronic mail to the following:

North Dakota Industrial Commission
oilandgasinfo@nd.gov
slforsberg@nd.gov

Lynn Helms
lhelms@nd.gov

Lawrence Bender
Attorney at Law
lbender@fredlaw.com

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on this 16th day of May, 2024 at Bismarck, North Dakota.

Desirae Zaste

**From:** Desirae Zaste
**To:** Forsberg, Sara L.; -Info-Oil & Gas Division
**Cc:** Derrick Braaten; Bender, Lawrence; Helms, Lynn D.
**Subject:** Summit Carbon Solutions, LLC #1, #2, and #3, Case Nos. 30869-30880
**Date:** Thursday, May 16, 2024 3:48:08 PM
**Attachments:** Brief to Expedite Discovery.pdf
Declaration of DB in Support of Motion to Expedite Discovery.pdf
Declaration of Paul Button in Support of Motion to Expedite Discovery - signed.pdf
Ex. A-240502 Interr & RFP Set 1.pdf
Ex. B-240506 Interr & RFP (Set 2).pdf
Ex. C-240507 Bender ltr from DB re interr set 1.pdf
Ex. D-240509 SCS 30b6.pdf
Ex. E - Email to Dave Garner.pdf
Ex. F-240510 Interr & RFP (Set 3).pdf
Ex. G - 240515 ORR to NDIC from DB re files.pdf
Ex. H-Button, Paul CV.pdf
Motion to Expedite Discovery.pdf
240516 Declaration of Service.pdf

---

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Good afternoon,

Attached for filing and service are the following documents:

- **Motion to Expedite Discovery;**
- **Brief in Support of Motion to Expedite Discovery;**
- **Declaration of Derrick Braaten in Support of Motion to Expedite Discovery;**
- **Exhibit A - Landowners Interrogatories and Request for Production of Documents to Applications (Set 1);**
- **Exhibit B - Landowners Interrogatories and Request for Production of Documents to Applications (Set 2);**
- **Exhibit C - Correspondence sent to Lawrence Bender, attorney for Summit;**
- **Exhibit D - Landowners Notice of 30(b)(6) Deposition of Summit Carbon Solutions;**
- **Exhibit E - Email sent to Hearing Officer Dave Garner;**
- **Exhibit F - Landowners Interrogatories and Request for Production of Documents to Applications (Set 3);**
- **Exhibit G – Request for open records sent to the North Dakota Industrial Commission, Oil and Gas Division;**
- **Declaration of Paul Button of Motion to Expedite Discovery;**
- **Exhibit H – Curriculum Vitae; and**
- **Declaration of Service.**

**Desirae Zaste¦ Certified Paralegal**

**BRAATEN LAW FIRM**
109 N. 4th Street, Suite 100
Bismarck, ND 58501

Phone: 701-221-2911
Fax: 701-221-5842
www.braatenlawfirm.com

**PRIVILEGED COMMUNICATION**
**This e-mail message is intended only for the named recipient(s) above and is covered by the Electronic Communications Privacy Act, 18 U.S.C. Sections 2510-2521. This e-mail is confidential and may contain information that is privileged, attorney work product or exempt from disclosure under applicable law. Recipients should not file copies of this e-mail with publicly accessible records. If you have received this message in error, please immediately notify the sender by return e-mail and delete this e-mail message from your computer. Thank you for your cooperation.**

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case No(s). 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## MOTION TO EXPEDITE DISCOVERY

Landowner, The Swenson Living Trust, by and through its undersigned counsel, hereby moves to expedite discovery in the above-captioned matter and to hold a discovery and prehearing conference. This Motion is supported by the Brief in Support and Declarations filed herewith.

DATED this 16th day of May, 2024.

**BRAATEN LAW FIRM**

*/s/ Derrick Braaten*
Derrick Braaten (ND #06394)
109 North 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
derrick@braatenlawfirm.com

*Attorneys for Intervenor The Swenson Living Trust*

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case No(s). 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |
| **In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.** | |

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## BRIEF IN SUPPORT OF MOTION TO EXPEDITE DISCOVERY

Landowner The Swenson Living Trust ("Swenson Trust"), by and through its undersigned counsel, submits the following Brief in Support of its Motion to Expedite Discovery.

Swenson Trust is a North Dakoka landowner that owns 359.4 acres in or within one-half mile of a proposed carbon storage facility that is the subject of the June 11-12, 2024 hearing. Applicants do not dispute that Swenson Trust's legal rights may be "substantially affected" by these proceedings. *See* Applicant's Resp. to Swenson Trust's Mot. to Cont. Hearing and Req. for Sched. Conf., at 10-11.

Swenson Trust received notice of the hearing on April 16, 2024—less than two months before the hearing is to take place. *See* Braaten Decl. ¶ 3. Underground carbon sequestration permitting is complex. Analyzing a facility to understand its potential impact requires detailed information and electronic data, specialized expertise, and sufficient time to analyze the information and data. Due to this complexity, the current schedule does not allow for Swenson Trust to obtain and analyze the information necessary to adequately represent its interests at the hearing. *See* Button Decl., ¶ 6. Therefore, Swenson Trust filed a motion to continue the hearing which is pending before the Commission.

In the event Swenson Trust's motion to continue the hearing is not granted, the Commission should order Applicants to respond to Swenson Trust's discovery requests on an expedited basis. Specifically, Swenson Trust's experts need the information by May 23, 2024 for the first set of discovery attached as Exhibit A and by May 29, 2024 for the second and third sets of discovery attached as Exhibits B and F to have time to analyze it before the June 11-12, 2024 hearing. *See*

Button Decl., ¶ 6. Anything less than continuing the hearing or requiring expedited discovery responses would irreparably injure Swenson Trust and be a violation of procedural due process.

## BACKGROUND

Swenson Trust received notice of the hearing on April 16, 2024 with the hearing scheduled for June 11-12, 2024. *See* Declaration of Derrick Braaten, ¶3. Swenson Trust filed its Petition to Intervene on April 18, 2024. *Id.*, ¶4. Swenson Trust filed its Motion to Continue Hearing and Request for Scheduling Conference on April 25, 2024. *Id.*, ¶5. Summit Carbon Solutions ("SCS") filed its Response to Motion to Continue Hearing and Request for Scheduling Conference on April 30, 2024. *Id.,* ¶6. The petition to intervene and motion to continue are still pending. *Id.,* ¶7.

Swenson Trust served Summit with Landowners Interrogatories and Request for Production of Documents to Applications (Set 1) on May 2, 2024. *See* Exhibit A, attached to the Decl. of Derrick Braaten, ¶8. On May 6, 2024, Swenson Trust served Summit with Landowners Interrogatories and Request for Production of Documents to Applications (Set 2). *See* Exhibit B, attached to the Decl. of Derrick Braaten, ¶9. Correspondence was sent to Lawrence Bender, attorney for Summit on May 7, 2024 to address clerical errors in the discovery served on May 2, 2024. *See* Exhibit C, attached to the Decl. of Derrick Braaten, ¶10. Landowners Notice of 30(b)(6) Deposition of Summit Carbon Solutions was served upon Summit on May 9, 2024 noticing Summit Carbon Solutions 30(b)(6) deposition for June 6, 2024. *See* Exhibit D, attached to the Decl. of Derrick Braaten, ¶11. On May 9, 2024, the undersigned sent an email to Hearing Officer Dave Garner, asking for a response to the petition to intervene and motion to continue. *See* Exhibit E, attached to the Decl. of Derrick Braaten, ¶12. On May 10, 2024, Swenson Trust served Summit with Landowners Interrogatories and Request for Production of Documents to Applications (Set 3). *See* Exhibit F, attached to the Decl. of Derrick Braaten, ¶13. On May 15, 2024, an open records

request was sent to the North Dakota Industrial Commission, Oil and Gas Division. *See* Exhibit G, attached to the Decl. of Derrick Braaten, ¶14.

## STANDARD

Hearing officers have broad discretion in scheduling, granting continuances, and controlling discovery in adjudicative proceedings. *Berger v. North Dakota Dept. Of Transp.*, 2011 ND 55, ¶ 7, 795 N.W.2d 707, ¶ 7 (rejecting plaintiff's claim that he was entitled to have his hearing held at its originally scheduled time). Section 28-32-33, N.D.C.C., provides that discovery may be obtained in an adjudicative proceeding in accordance with the North Dakota Rules of Civil Procedure. This section also grants authority to the hearing officer to issue discovery orders. Rule 34 of the North Dakota Rules of Civil Procedure governs how a party may request and obtain documents from another party. The default rule is that a party to whom a request for production is directed has 30 days in which to respond after being served. But as is relevant here, a shorter time may be ordered by the court (or here, the hearing examiner). Rule 34(b)(2)(A). In other words, under § 28-32-33, N.D.C.C., the hearing officer/examiner is authorized to expedite responses to discovery requests.

> The Administrative Agencies Practice Act expressly directs that, in all adjudicative proceedings, "[t]he administrative agency shall designate the time and place for the hearing." N.D.C.C. § 28-32-21(1)(c). Furthermore, **the hearing officer has broad discretion to regulate the course of the administrative proceeding**. N.D.C.C. § 28-32-35; Medical Arts Clinic, P.C. v. Franciscan Initiatives, Inc., 531 N.W.2d 289, 300 (N.D. 1995); Knudson v. Director, North Dakota Dep't of Transp., 530 N.W.2d 313, 316 (N.D. 1995). [***6] A hearing officer in an adjudicative administrative proceeding functions in a quasi-judicial capacity, and shares the broad discretion accorded to judicial officers. See Medical Arts Clinic, at 297, 300; Loran v. Iszler, 373 N.W.2d 870, 876 (N.D. 1985). Thus, it has been recognized that hearing officers have discretion to control procedural matters such as discovery and admission of evidence. See, e.g., State ex rel. Workforce Safety & Ins. v. Altru Health Sys., 2007 ND 38, ¶ 11, 729 N.W.2d 113; May v. Sprynczynatyk, 2005 ND 76, ¶ 24, 695 N.W.2d 196. Trial courts have broad discretion over the progress and conduct of a trial or hearing, including scheduling and the determination whether to continue a trial or hearing. See Hartleib v. Simes,

> 2009 ND 205, ¶ 15, 776 N.W.2d 217; State v. Ripley, 2009 ND 105, ¶ 12, 766 N.W.2d 465; State v. Schmidkunz, 2006 ND 192, ¶ 22, 721 N.W.2d 387; Peterson v. Zerr, 443 N.W.2d 293, 297 n.3 (N.D. 1989). A hearing officer conducting an adjudicative administrative proceeding has the same scope of discretion in conducting the hearing, including scheduling and continuances. See Medical Arts Clinic, at 297, 300.

*Berger v. N.D. DOT*, 2011 ND 55, ¶ 7, 795 N.W.2d 707, 710 (emphasis added).

The hearing officer should apply a "good cause" standard of review in granting Swenson Trust's motion This standard is appropriate here because N.D.R.Civ.P. 34 is modeled after the corresponding federal rule, "good cause" is the standard applied by federal courts in interpreting the rule, *see Mullane v. Almon ,* 339 F.R.D 659, 662-664 (N.D. Fla. 2021), and North Dakota courts look to federal court interpretations of corresponding federal rules in construing the North Dakota Rules of Civil Procedure. *PHI Financial Services v. Johnston Law Office, P.C.*, 2016 ND 114, ¶ 11, 881 N.W.2d 216, ¶ 11 (using federal case law applying Fed.R.Civ.P. 37(a)(i) to construe N.D.R.Civ.P. 37(a)(i)).

Further support for applying a "good cause" standard is the fact that North Dakota courts and agencies apply it in other contexts that involve the exercise of discretion. *See Burleigh County Social Service Board v. Rath*, 2023 ND 12, ¶ 6, 985 N.W.2d 725, ¶ 6 (reviewing the district court's granting of an extension under the good cause standard in the context of Rule 6(b)(i)); *see* Order on Sinclair Oil & Gas Co. and Missouri River Royalty Corp.'s Motion to Compel and Reopen Discovery, Case No. 28637 (considering whether good cause existed to reopen discovery after discovery had closed). Thus, if Swenson Trust demonstrates good cause for requesting expedited discovery responses, then the motion should be granted. *See Mullane v. Almon*, 339 F.R.D. 659, 662-664.

Procedural fairness is required at an administrative hearing. *Schlittenhart v. North Dakota Dept. of Transp.*, 2015 ND 179, ¶ 27, 865 N.W.2d 825, ¶ 27 (noting that the Court reviews

administrative proceedings to "ensure procedural fairness"). "Procedural due process requires fundamental fairness, which, at a minimum, necessitates notice and a meaningful opportunity for a hearing appropriate to the nature of the case." *Id.* (quoting *In re G.R.H.*, 2006 ND 56, ¶ N.W.2d 587).

An agency overseeing an adjudicative proceeding that involves an opportunity to comment and a hearing must present "the data underlying its proposed action *before* the close of the comment and hearing period." *National Wildlife Federation v. Marsh*, 568 F.Supp. 985, 994 (D. D.C. 1983) (emphasis in original). This is because the right to comment or be heard cannot be meaningful "when one is not apprised of the issues and positions to which the argument is relevant." *Id.* at 993 (quoting *U.S. Lines v. Federal Maritime Commission*, 584 F.2d 519, 540 (D.C.Cir. 1978)). In other words, an exchange of views and dialogue is only possible if the public is adequately informed, and "without such dialogue any notion of real public participation is necessarily an illusion." *Id.; see also Chemical Mfrs. Ass'n v. U.S. E.P.A.*, 870 F.2d 177, 200 ("[F]airness requires that the agency afford interested parties an opportunity to challenge the underlying factual data relied on by the agency.").

Section 28-32-29, N.D.C.C., authorizes an agency to conduct a prehearing conference. The only conditions for doing so are giving reasonable notice to all parties and interested persons and conducting the conference in a way that does not substantially prejudice or infringe on the rights of any party. § 28-32-29, N.D.C.C.

## ANALYSIS

It is the express policy of North Dakota to conduct procedures relating to the geologic storage of carbon dioxide "in a manner fair to all interests." § 38-22-01, N.D.C.C. Fairness requires, at a minimum, that interested parties be afforded access to all information and data

necessary to adequately represent their interests with sufficient time to fully analyze it. The engineering complexities of carbon sequestration facilities combined with the expeditious nature of administrative hearings require that Swenson Trust receive expedited responses to its discovery requests.

## I. Good cause exists to order expedited responses to Swenson Trust's discovery requests.

North Dakota courts are guided by federal precedent in interpreting the North Dakota Rules of Civil Procedure. Federal courts apply a "good cause" standard when reviewing motions to expedite discovery. The commission should grant Swenson Trust's motion because the factors comprising the good cause analysis weigh in its favor: Specifically, (A) the hearing is occurring on an expedited basis in comparison to the timeframe contemplated by the North Dakota Rules of Civil Procedure; (B) the requested discovery is narrowly tailored to the purpose for seeking expedition; (C) the request is being made to be able to adequately prepare for the hearing; (D) the burden on the Applicants is minimal because all of the information is readily available to it and part of the applications; (E) the information cannot be obtained more efficiently from some other source; (F) the discovery process will only minimally be expedited; and (G) there is no possibility the case will be disposed of prior to the hearing.

### A. The hearing is occurring on an expedited basis in comparison to the timeframe contemplated by the North Dakota Rules of Civil Procedure.

The hearing is scheduled to occur within two months of Swenson Trust receiving notice of it. The fact that the hearing is occurring more expeditiously than a typical case in a district court cuts in favor of granting Swenson Trust's motion. A hearing on a preliminary injunction is analogous to an administrative proceeding because like a hearing on a preliminary injunction, an administrative hearing occurs well in advance of when a typical trial would occur. "Because of the

expedited nature of injunctive proceedings, expedited discovery is more likely to be appropriate....” *Mullane*, 339 F.R.D. at 665.

In both contexts, the North Dakota Rules of Civil Procedure apply, but the rules themselves contemplate a lengthier discovery process. In other words, they are an imperfect fit, and an expedited process is more likely to be required. This is especially so here, where the facts require expert analysis that takes several days to perform. *See* Button Declar., ¶ 6.

**B. The requested discovery is narrowly tailored to the purpose of seeking expedition.**

Swenson Trust has served three sets of discovery requests and noticed a deposition of the Applicants. The information requested in the discovery is critical to its ability to present evidence at the hearing and requires time to analyze. The fact that Swenson Trust “seeks only limited discovery narrowly tailored to serve [its] purpose for seeking expedition” weighs in favor of granting the motion. *Mullane*, 339 F.R.D at 664 (citation omitted). In contrast to the plaintiff in *Mullane*, Swenson Trust has “narrowly tailored” its requests to information which is needed on an expedited basis, and therefore this factor supports the showing of good cause.

**C. Swenson Trust requires expedited discovery to sufficiently prepare for the hearing.**

The reasons for seeking expedited discovery should also be considered. *Mullane,* 339 F.R.D. at 664. Swenson Trust requires the expedited discovery to participate and present evidence at the hearing. Under § 28-32-35, N.D.C.C., the person presiding over the hearing is required to afford parties and others allowed to participate an opportunity to present evidence and argument. The right to present evidence implies a right to obtain the information required to present the evidence before the hearing. The reason for seeking expedited discovery is simply to be able to fully participate at the hearing. This supports Swenson Trust’s motion.

**D. The burden on the Applicants is minimal because all of the information is readily available and is part of the applications.**

The information sought is readily available to the Applicants and is narrowly tailored to what is needed and is literally part of the applications itself. The diagrams and calculations provided in the applications were not created out of thin air, and were created using these models as the applications itself indicates. *See* Section 3.1 of the applications. Thus, this minimal burden supports the showing of good cause. *See Mullane*, 339 F.R.D at 667. Indeed, everything necessary for Swenson Trust to evaluate the carbon storage facility would have already been provided to the Commission as part of the application process. Therefore, it should already be organized and compiled in a format conducive to transferring. As shown in the attached requests, Swenson Trust is only seeking expedited responses to fifteen interrogatories and twenty-eight requests for production, responses to which are necessary to participate in the hearing. *See* Exhs. A, B, and F.. As the Commission can see, the requests are narrowly tailored and only encompass information that the Applicants would have submitted in the application process. Therefore, producing the material on an expedited basis would not result in an "unnecessary burden." *See Mullane*, 339 F.R.D at 667. Indeed, any minimal burden on the Applicants from transferring this information is greatly outweighed by Swenson Trust's need for the material.

**E. The discovery process will only minimally be expedited.**

Swenson Trust served its first set of discovery on May 2, 2024. *See* Braaten Decl. ¶ 8. Typically, the Applicants would have thirty days within which to respond. Rule 34, N.D.R.Civ.P. Under the timeline requested by Swenson Trust, the Applicants will have twenty-one days, or three weeks in which to do so for the first set of discovery. Applicants will have twenty-three days to respond to the second set of discovery and nineteen days to respond to the third set of discovery. Accordingly, the Applicants will still have the benefit of the majority of typical timeframe in which

to respond. Because this timeline does not substantially deviate from the normal progression of discovery, this factor supports Swenson Trusts motion. *See Mullane*, 339 F.R.D at 667-68.

**F. The information cannot be obtained more efficiently from some other source.**

Courts also consider whether the information can be obtained more efficiently from some other source. *Mullane*, 339 F.R.D. at 663. This simply is not possible here. Therefore, this factor also supports a showing of good cause.

**G. There is no possibility the case will be disposed of prior to the hearing.**

Finally, courts consider whether producing the discovery on an expedited basis would be a waste—specifically, whether there is a motion to dismiss pending that could dispose of the proceedings. *Mullane*, 339 F.R.D. at 668. But here, there is no such possibility that the case will be dismissed before the hearing, so there is no risk the production would be a waste. Therefore, this factor too supports Swenson Trust's showing of good cause.

**II. The commission should exercise its authority under 28-32-29, N.D.C.C. to hold a prehearing conference to discuss a discovery plan.**

The commission has the authority to hold a prehearing conference under § 28-32-29, N.D.C.C. Swenson Trust requests that the commission exercise such authority so the Commission and the parties can discuss a discovery plan in this matter.

## CONCLUSION

The complexities of carbon storage in conjunction with the timeline for the hearing require that the hearing be continued. If the hearing is not continued, then there is good cause for ordering the Applicants to respond to Swenson Trust's discovery requests by May 23, 2024 for the first set of discovery (Exh. A) and by May 29, 2024 for the second and third sets of discovery (Exhs. B and F). Swenson Trust will be prejudiced in making its case before the commission if the information

is received on a date any later than that. Therefore, the Commission should either continue the hearing or grant the instant motion.

DATED this 16th day of May, 2024.

**BRAATEN LAW FIRM**

*/s/ Derrick Braaten*

Derrick Braaten (ND #06394)
109 North 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
derrick@braatenlawfirm.com

*Attorneys for Intervenor The Swenson Living Trust*

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case No(s). 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**DECLARATION OF DERRICK BRAATEN IN SUPPORT OF MOTION TO EXPEDITE DISCOVERY**

1. I am an attorney for The Swenson Living Trust ("Swenson Trust"), in the above-captioned matter.
2. I represent the Swenson Trust in matters involving the applications submitted by Summit Carbon Solutions #1, LLC, Summit Carbon Solutions #2, and Summit Carbon Solutions #3, LLC ("SCS").
3. Swenson Trust received notice on April 16, 2024 with the hearing scheduled for June 11-12, 2024.
4. Swenson Trust filed its Petition to Intervene on April 18, 2024.
5. Swenson Trust filed its Motion to Continue Hearing and Request for Scheduling Conference on April 25, 2024.
6. Summit Carbon Solutions ("SCS") filed its Response to Motion to Continue Hearing and Request for Scheduling Conference on April 30, 2024.
7. The petition to intervene and motion to continue are still pending.
8. Attached hereto as Exhibit A is a true and correct copy of Landowners Interrogatories and Request for Production of Documents to Applications (Set 1) served on May 2, 2024.
9. Attached hereto as Exhibit B is a true and correct copy of Landowners Interrogatories and Request for Production of Documents to Applications (Set 2) served on May 6, 2024.

10. Attached hereto as Exhibit C is a true and correct copy of correspondence sent to Lawrence Bender, attorney for Summit on May 7, 2024 to address clerical errors in the discovery served on May 2, 2024.
11. Attached hereto as Exhibit D is a true and correct copy of Landowners Notice of 30(b)(6) Deposition of Summit Carbon Solutions which was served upon Summit on May 9, 2024 noticing Summit Carbon Solutions 30(b)(6) deposition for June 6, 2024.
12. Attached hereto as Exhibit E is a true and correct copy of an email sent to Hearing Officer Dave Garner on May 9, 2024.
13. Attached hereto as Exhibit F is a true and correct copy of Landowners Interrogatories and Request for Production of Documents to Applications (Set 3) served on May 10, 2024.
14. Attached hereto as Exhibit G is a true and correct copy of a request for open records sent to the North Dakota Industrial Commission, Oil and Gas Division, on May 15, 2024.
15. In order for Swenson Trust's experts to provide reports and/or expert testimony, the experts need the documentation by May 23, 2024 and May 29, 2024.

**I declare under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.**

Executed this 16th day of May, 2024 in Bismarck, North Dakota.

**Derrick Braaten**

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case No(s). 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## LANDOWNERS INTERROGATORIES AND REQUEST FOR PRODUCTION OF DOCUMENTS TO APPLICANTS (SET 1)

PLEASE TAKE NOTICE, that The Swenson Living Trust, ("Landowners"), hereby require Applicants, Summit Carbon Storage #1, LLC, Summit Carbon Storage #2 , and Summit Carbon Storage #3, LLC ("SCS" or "Summit"), to answer the following interrogatories, signed and under oath, and produce and permit Landowners to inspect and copy documents responsive to the document requests contained herein in accordance with Rules 33 and 34 of the North Dakota Rules of Civil Procedure. Your answers must be in writing and signed by someone authorized to sign on behalf of, and whose signature binds, Summit. Documents should be made available at the office of Braaten Law Firm, 109 N. 4th St., Suite 100, Bismarck, North Dakota, or copies of said documents may be forwarded to Landowners attorneys (in native, electronic format). A copy of the answers and responses, together with your objections, if any, must be served within thirty (30) days from the date of service, or within such other time as the court may allow, or parties agree.

### INSTRUCTIONS

1. These interrogatories and requests for production are deemed to be continuing in nature and should you, your counsel, or anyone representing your interest become aware of or acquire any additional knowledge or documents which affect the accuracy or completeness of any answers herein, or which relate to the matters into which these requests for production inquire, it is hereby demanded that such knowledge and documents be immediately transferred to the undersigned attorney by way of supplemental answers and responses to the full extent required by Rule 26(e), N.D.R.Civ.P.

2. In answering these interrogatories and requests for production, you are required to furnish all information and responsive documents in the possession of you, your attorney, accountants, advisors, or other persons directly employed by you.

3. Your attention is directed to Rule 34 of the North Dakota Rules of Civil Procedure, which provides that any party who produces documents for inspection "must produce documents as they are kept in the usual course of business or must organize and label them to correspond to the categories in the request." If the requested documents are stored only on software or otherwise are "computer based information," regardless of whether you produce as kept in the usual course of business or by category, you are directed to produce the raw data along with codes and programs necessary for translating it into usable form, or produce the information in a finished, usable form. In either case, all necessary glossaries, keys, indices, metadata, and software necessary for interpretation of the material should be produced unless software is proprietary in nature, in which case native format should be produced with an indication of the software types required to view and process the data.

4. **Produce electronic records in their native format.** Without limiting the generality of the foregoing, Word documents should be produced in .docx or .doc format, emails should be produced in Outlook or .eml format, ArcGIS shapefiles should be produced in .shp, .shx and .dbf formats (and when available .prj, .xml, .sbn, and .sbx), and Excel spreadsheets should be produced in .xlsx, .xls, or .csv format. To the maximum extent feasible, file structures should be maintained, especially when a data or document database is linked to an ArcGIS map, website, or other such file.

5. In responding to the requests for production, for each document or any portion thereof which you have withheld based on privilege, describe the factual basis for your claim of

privilege in sufficient detail to permit adjudication of the validity of that claim, including the following:

a. A brief description of the type of document or communication;

b. The date of the document or communication;

c. The name, title and job description of the transmitter of the document or communication;

d. The name, title, and job description of the person to whom the document or communication was addressed;

e. The name, title, and job description of each person who has received or had access to the document or communication;

f. A brief description of the subject matter of the document or communication; and

g. The nature of the privilege claim.

6. In responding to the Requests for Production, for each document or any portion thereof which has been lost, discarded or destroyed, identify such document as completely as possible, providing as much of the following information as possible:

a. The type of document;

b. Its date;

c. The date or approximate date it was lost, discarded, or destroyed;

d. The reason(s) for disposing of the document (if discarded or destroyed);

e. The identity of all person(s) authorizing or having knowledge of the circumstances surrounding the disposal of the document;

f. The identity of the person(s) who lost, discarded or destroyed the document; and

g. The identity of all persons having knowledge of the contents thereof.

7. Each interrogatory and request for production (as well as these instructions) may contain one or more terms that are defined below. You should construe each defined term

according to the meaning of that word as set forth below. All other words should be construed consistent with customary usage given the context in which the words appear such that, in each instance, you should construe any word to bring that word within the scope of the discovery request in which it appears. Consistent with the above, the singular usage of a word shall be considered to include within its meaning the plural, and vice versa; the conjunctive shall be considered to include within its meaning the disjunctive, and vice versa; and the feminine shall be considered to include within its meaning the masculine, and vice versa.

## DEFINITIONS

As used in these Interrogatories and Request for Production of Documents, the following terms shall have the meanings and definitions as indicated:

1. "SCS" or "Summit" means the applicants in NDIC Case Nos. 30870, 30871, 30872 (for "Summit Carbon Storage #1, LLC,"); 30873, 30874, 30875, 30876 (for "Summit Carbon Storage #2,") and 30877, 30878, 30879, 30880 (for "Summit Carbon Storage #3, LLC,") and each of those entities' authorized agents.

2. "Landowner" means The Swenson Living Trust.

3. "Storage Reservoir" means the reservoir and formation into which Summit intends to inject CO2 within the Areas of Review as well as the confining layers, as defined and depicted by Summit's applications herein (*see e.g.* Figure 1-1, NDIC Case No. 30869) including but not limited to the Storage Reservoir as defined by Section 1.15 of the Storage Agreement included with Summit's applications in NDIC Case No. 30869, and <u>includes</u> the confining layers/zones, to wit:

> the Pore Space and confining subsurface strata underlying the Facility Area described as the Opeche/Spearfish (Upper Confining Zone), Broom Creek (Injection Zone), and Amsden (Lower Confining Zone) Formation(s) and which are defined as identified by the well logging suite performed at one stratigraphic well,

the Milton Flemmer 1 well (NDIC File No. 38594) located in the NW¼ of the NE¼, Section 35, Township 141 North, Range 88 West, Mercer County, North Dakota. The Storage Reservoir is defined as the stratigraphic interval from below the top of the Opeche/Spearfish Formation found at a depth of 5,587 feet below the Kelly Bushing, to above the base of the Amsden Formation, found at a depth of 6,421 feet below the Kelly Bushing, as identified by the Array Induction Gamma log run in the Milton Flemmer 1 well. The logging suite included triple combo (gamma ray [GR], density porosity, and resistivity), caliper, spectral GR, combinable magnetic resonance (CMR), elemental capture spectroscopy (ESC), dipole sonic including four-arm caliper and inclinometer, and an image log. Further, the acquired logs were used to pick formation top depths and interpret lithology, petrophysical properties, and time-to-depth shifting of seismic data obtained from three 3D seismic surveys and one 5-mile long 2D seismic line covering an area totaling 208 miles in and around the Milton Flemmer 1 stratigraphic well. Formation top depths were picked from the top of the Pierre Formation to the base of the Amsden Formation. The average depth of the top of the Opeche/Spearfish Formation (Upper Confining Zone) across the storage facility area is 5,464 total vertical depth (TVD). The average depth of the base of the Amsden Formation (Lower Confining Summit Carbon Storage #1, LLC – Broom Creek 5 Zone) across the storage facility area is 6,270 feet TVD. The average thickness of the Storage Reservoir across the storage facility area is 806 feet.

4. "Communication" means any oral or written utterance, notation, or statement of any nature, by and to whomever, including, but not limited to, correspondence, text messages, chat messages, emails, letters, and any other oral or written conversations, dialogues, discussions, interviews, or consultations, between or among two or more persons.

5. "Document" means all documents or electronically stored information discoverable under N.D.R.Civ.P. 34 - including writings, drawings, graphs, charts, photographs, sound recordings, images, and other data or data compilations - stored in any medium from which information can be obtained either directly or, if necessary, after translation by you into a reasonably usable form. Documents and electronically stored information encompasses and includes all file formats in which electronically stored information is or can be stored or saved, and always includes the native file format if one exists.

6. "ESI" or "electronically stored information" means all electronically stored information discoverable under N.D.R.Civ.P. 34 - including writings, databases, shapefiles, electronic or computer files, graphs, charts, photographs, sound recordings, images, and other data or data compilations - stored in any medium from which information can be obtained either directly or, if necessary, after translation by you into a reasonably usable form. ESI encompasses and includes all file formats in which electronically stored information is or can be stored or saved, and always includes the native file format if one exists.

7. "Identification," "identify," or "identity," when used in reference to (a) a natural person, requires you to state his or her full name and residential and business addresses; (b) a corporation, requires you to state its full corporate name and any names under which it does business, its state of incorporation, the address of its principal place of business, and the addresses of all of its offices in the State of North Dakota; (c) a business, requires you to state the full name or style under which the business is conducted, its business address or addresses, the types of businesses in which it is engaged, the geographic area in which it conducts those businesses, and the identity of the person or persons who own, operate, and control the business; (d) a document, requires you to state the number of pages and the nature of the document (e.g., letter or memorandum), and if not apparent on the face of the document or ESI, its title, its date, the name or names of its authors and recipients, and its present location and custodian; (e) a communication, requires you, if any part of the communication was written, to identify the document or documents which refer to or evidence the communication, and, to the extent that the communication was non-written, to identify the persons participating in the communication and to state the date, manner, place, and substance of the communication.

8. "Person" means any individual acting in any capacity as well as any entity or organization, including divisions, departments, and other units of the organization, and shall include such organizations as public or private corporations, partnerships, joint ventures, voluntary or unincorporated associations, sole proprietorships, trusts, estates, governmental agencies, commissions, bureaus, or departments.

9. "Representative" means any agent, employee, servant, officer, director, attorney, or other person acting or purporting to act on behalf of the person in question.

10. "You," "your," or "yourself" refer to "SCS" or "Summit", each of its agents, representatives, and attorneys, and each person acting or purporting to act on its behalf.

## INTERROGATORIES

**INTERROGATORY NO. 1:** Identify the petroleum engineers or reservoir engineers who made any material contribution to Summit's applications or the materials provided in support of Summit's applications in NDIC Case Nos. 30869-30880.

**INTERROGATORY NO. 2:** Identify the geologists who made any material contribution to Summit's applications or the materials provided in support of Summit's applications in NDIC Case Nos. 30869-30880.

**INTERROGATORY NO. 3:** List any other individuals not listed in Interrogatories 1 and 2 who made any material contribution to Summit's applications or the materials provided in support of Summit's applications in NDIC Case Nos. 30869-30880.Identify each and every person whom you expect to call or may call as a witness at trial.

**INTERROGATORY NO. 4:** Identify all witnesses Summit plans to testify in support of Summit's applications in NDIC Case Nos. 30869-30880.

**INTERROGATORY NO. 5:** Identify all exhibits Summit plans to offer in support of Summit's applications in NDIC Case Nos. 30869-30880.

## REQUESTS FOR PRODUCTION

**REQUEST NO. 1:** Please produce the underlying data and electronic files necessary to run the model used to create the images of the pressure differentials contained in Figures 3-14(a-d) in Summit's application in NDIC Case No. 30869.

**REQUEST NO. 2:** Please produce all the input files, field and analytical data , and the model geochemical database used to evaluate the CO2 effects on the upper and lower confining layers, including but not limited to all inputs and data files used to run the United States Geological Survey's USGS's Phreeqc geochemical model.

**REQUEST NO. 3:** Please produce all the input files, field and analytical data , and the model geochemical database used to run Computer Modelling Group Ltd.'s GEM model and software or any similar model or software used for the same purposes.

**REQUEST NO. 4:** Please produce all the input files, field and analytical data , and the model geochemical database used to run any modelling or analysis of critical threshold pressures or areal extent of review or impact and pressure buildup, or which was used to do any kind of analysis related to EPA Method 1 or EPA Method 2 or Analytical Solution for Leakage in Multilayered Aquifers – ASLMA, or any risk-based area-of-review analysis.

**REQUEST NO. 5:** Please produce the following data and files as referenced by Summit in its application in NDIC Case No. 30873: Geophysical Logs that penetrate injection and confining zones, Seismic survey data and core sample measurements, Acoustic impedance, total porosity, effective porosity, permeability, facies, and SLB's Petrel was used to interpolate structural surfaces for zones.

**REQUEST NO. 6:** Please produce all the input files, field and analytical data, and the model geochemical database used to evaluate the CO2 effects on the upper and lower confining layers, including but not limited to all inputs and data files used to run Computer Modelling Group Ltd.'s GEM model and software or any similar model or software used for the same purposes.

**REQUEST NO. 7:** Please produce all data from any parameter referenced or described in Table 2-1: Model Parameters for Multiphase Fluid Modeling of Geologic Sequestration as that table appears in EPA Guidance - AOR Evaluation and Corrective Action Guidance (Guidance page 11) as found here: AOR Evaluation and Corrective Action Guidance - https://www.epa.gov/sites/default/files/2015-07/documents/epa816r13005.pdf.

**REQUEST NO. 8:** Please produce all electronic files and data provided to the North Dakota Industrial Commission or its Department of Mineral Resources or Oil and Gas Division in association with or related to the applications in NDIC Case Nos. 30869-30880.Please produce the general ledger detail (or account activity report) for the account for Drain #11 starting January 1, 2011 through present, on an annual basis (i.e. January 1, 2011 to December 31, 2011, and January 1, 2012 to December 31, 2012, etc.).

**REQUEST NO. 9:** Please produce all 3D numerical reservoir simulation model data decks, output files and graphing files of the Storage Reservoir in original electronic format. Without limiting the foregoing, such files may commonly be stored in Slumberger Eclipse format, CMG (Canadian Modeling Group) Imex format, or other similar format. The purpose of this request is to obtain the simulation model of the proposed storage facilities and associated reservoir, along with input and output files in Summit's possession for this simulation model.

**REQUEST NO. 10:** Please produce structure maps of the injection zone top, structure maps for major sub zones, and/or structure maps of confining zones for the Storage Reservoir and the confining zones as defined therein. Such maps include those created based upon formation tops

from well logs, 3D seismic reflectors, and interpretation of geologic deposition environment to give a representation of the elevation change across the target reservoir.

**REQUEST NO. 11:** Please produce all gross and net thickness isopach maps for the Storage Reservoir.

**REQUEST NO. 12:** Please produce pore volume (PV) maps and hydrocarbon pore volume (HCPV) maps of the Storage Reservoir, regardless of when compiled and regardless of whether created by Summit.

**REQUEST NO. 13:** Please produce all well logs (raw data plus processed and interpreted copies) from anywhere in or near the Storage Reservoir. Specially please produce the well logs in .las or other digital format, including any and all well logs utilized by Summit in developing its applications herein.

**REQUEST NO. 14:** Please produce any databases, spreadsheets, or other documents containing porosity, permeability, saturation, and other rock properties such as (minerology, geomechanical properties etc) for the Storage Reservoir in original electronic format and, if available, in Excel spreadsheet format.

**REQUEST NO. 15:** Please produce water chemistry and any other liquid or solid sampling data for water or other substances in the Storage Reservoir. Please include any gas solubility testing that was performed on the water samples for CO2 or injected gas stream.

**REQUEST NO. 16:** Please produce all spreadsheets, databases, and other documents or compilations containing reservoir pressure data for the Storage Reservoir, including but not limited to all bottom hole pressure data, surface pressure data, and fluid level measurements. If a spreadsheet is not available, then please produce all Documents containing this information.

**REQUEST NO. 17:** Please produce all relative permeability data for the Storage Reservoir, including core test information. If multiple cores have been tested, please produce all test data.

**REQUEST NO. 18:** Please produce all capillary pressure data for all cores tested in the Storage Reservoir.

**REQUEST NO. 19:** Please produce all routine core analysis data for the Storage Reservoir.

**REQUEST NO. 20:** Please produce all spreadsheets of reservoir temperature data in the Storage Reservoir, including spreadsheets indexing reservoir temperature data to well name and API number. If this information is not available in spreadsheet format, then please produce all Documents containing this information.

**REQUEST NO. 21:** Please produce all written interpretations of micro-seismic data obtained from the Storage Reservoir.

Dated this 2nd day of May, 2024.

**BRAATEN LAW FIRM**

*/s/ Derrick Braaten*

Derrick Braaten (ND #06394)
derrick@braatenlawfirm.com
109 North 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
Fax: 701-221-5842

*Attorneys for the Swenson Living Trust*

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case No(s). 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## LANDOWNERS INTERROGATORIES AND REQUEST FOR PRODUCTION OF DOCUMENTS TO APPLICANTS (SET 2)

PLEASE TAKE NOTICE, that The Swenson Living Trust, ("Landowners"), hereby require Applicants, Summit Carbon Storage #1, LLC, Summit Carbon Storage #2 , and Summit Carbon Storage #3, LLC ("SCS" or "Summit"), to answer the following interrogatories, signed and under oath, and produce and permit Landowners to inspect and copy documents responsive to the document requests contained herein in accordance with Rules 33 and 34 of the North Dakota Rules of Civil Procedure. Your answers must be in writing and signed by someone authorized to sign on behalf of, and whose signature binds, Summit. Documents should be made available at the office of Braaten Law Firm, 109 N. 4th St., Suite 100, Bismarck, North Dakota, or copies of said documents may be forwarded to Landowners attorneys (in native, electronic format). A copy of the answers and responses, together with your objections, if any, must be served within thirty (30) days from the date of service, or within such other time as the Commission may allow, or parties agree.

### INSTRUCTIONS

1. These interrogatories and requests for production are deemed to be continuing in nature and should you, your counsel, or anyone representing your interest become aware of or acquire any additional knowledge or documents which affect the accuracy or completeness of any answers herein, or which relate to the matters into which these requests for production inquire, it is hereby demanded that such knowledge and documents be immediately transferred to the undersigned attorney by way of supplemental answers and responses to the full extent required by Rule 26(e), N.D.R.Civ.P.

2. In answering these interrogatories and requests for production, you are required to furnish all information and responsive documents in the possession of you, your attorney, accountants, advisors, or other persons directly employed by you.

3. Your attention is directed to Rule 34 of the North Dakota Rules of Civil Procedure, which provides that any party who produces documents for inspection "must produce documents as they are kept in the usual course of business or must organize and label them to correspond to the categories in the request." If the requested documents are stored only on software or otherwise are "computer based information," regardless of whether you produce as kept in the usual course of business or by category, you are directed to produce the raw data along with codes and programs necessary for translating it into usable form, or produce the information in a finished, usable form. In either case, all necessary glossaries, keys, indices, metadata, and software necessary for interpretation of the material should be produced unless software is proprietary in nature, in which case native format should be produced with an indication of the software types required to view and process the data.

4. **Produce electronic records in their native format.** Without limiting the generality of the foregoing, Word documents should be produced in .docx or .doc format, emails should be produced in .msg (Outlook) or .eml format, ArcGIS shapefiles should be produced in .shp, .shx and .dbf formats (and when available .prj, .xml, .sbn, and .sbx), and Excel spreadsheets should be produced in .xlsx, .xls, or .csv format. To the maximum extent feasible, file structures should be maintained, especially when a data or document database is linked to an ArcGIS map, website, or other such file.

5. In responding to the requests for production, for each document or any portion thereof which you have withheld based on privilege, describe the factual basis for your claim of

privilege in sufficient detail to permit adjudication of the validity of that claim, including the following:

a. A brief description of the type of document or communication;

b. The date of the document or communication;

c. The name, title and job description of the transmitter of the document or communication;

d. The name, title, and job description of the person to whom the document or communication was addressed;

e. The name, title, and job description of each person who has received or had access to the document or communication;

f. A brief description of the subject matter of the document or communication; and

g. The nature of the privilege claim.

6. In responding to the Requests for Production, for each document or any portion thereof which has been lost, discarded or destroyed, identify such document as completely as possible, providing as much of the following information as possible:

a. The type of document;

b. Its date;

c. The date or approximate date it was lost, discarded, or destroyed;

d. The reason(s) for disposing of the document (if discarded or destroyed);

e. The identity of all person(s) authorizing or having knowledge of the circumstances surrounding the disposal of the document;

f. The identity of the person(s) who lost, discarded or destroyed the document; and

g. The identity of all persons having knowledge of the contents thereof.

7. Each interrogatory and request for production (as well as these instructions) may contain one or more terms that are defined below. You should construe each defined term

according to the meaning of that word as set forth below. All other words should be construed consistent with customary usage given the context in which the words appear such that, in each instance, you should construe any word to bring that word within the scope of the discovery request in which it appears. Consistent with the above, the singular usage of a word shall be considered to include within its meaning the plural, and vice versa; the conjunctive shall be considered to include within its meaning the disjunctive, and vice versa; and the feminine shall be considered to include within its meaning the masculine, and vice versa.

## DEFINITIONS

As used in these Interrogatories and Request for Production of Documents, the following terms shall have the meanings and definitions as indicated:

1. "SCS" or "Summit" means the applicants in NDIC Case Nos. 30869, 30870, 30871, 30872 (for "Summit Carbon Storage #1, LLC,"); 30873, 30874, 30875, 30876 (for "Summit Carbon Storage #2,") and 30877, 30878, 30879, 30880 (for "Summit Carbon Storage #3, LLC,") and each of those entities' authorized agents.

2. "Landowner" means The Swenson Living Trust.

3. "Storage Reservoir" means the reservoir and formation into which Summit intends to inject CO2 and the confining zones within the Areas of Review as defined and depicted by Summit's applications herein (*see e.g.* Figure 1-1, NDIC Case No. 30869) including but not limited to the Storage Reservoir as defined by Section 1.15 of the Storage Agreement included with Summit's applications in NDIC Case No. 30869, to wit:

> the Pore Space and confining subsurface strata underlying the Facility Area described as the Opeche/Spearfish (Upper Confining Zone), Broom Creek (Injection Zone), and Amsden (Lower Confining Zone) Formation(s) and which are defined as identified by the well logging suite performed at one stratigraphic well, the Milton Flemmer 1 well (NDIC File No. 38594) located in the NW¼ of the NE¼, Section 35, Township 141 North, Range 88 West, Mercer County, North Dakota.

> The Storage Reservoir is defined as the stratigraphic interval from below the top of the Opeche/Spearfish Formation found at a depth of 5,587 feet below the Kelly Bushing, to above the base of the Amsden Formation, found at a depth of 6,421 feet below the Kelly Bushing, as identified by the Array Induction Gamma log run in the Milton Flemmer 1 well. The logging suite included triple combo (gamma ray [GR], density porosity, and resistivity), caliper, spectral GR, combinable magnetic resonance (CMR), elemental capture spectroscopy (ESC), dipole sonic including four-arm caliper and inclinometer, and an image log. Further, the acquired logs were used to pick formation top depths and interpret lithology, petrophysical properties, and time-to-depth shifting of seismic data obtained from three 3D seismic surveys and one 5-mile long 2D seismic line covering an area totaling 208 miles in and around the Milton Flemmer 1 stratigraphic well. Formation top depths were picked from the top of the Pierre Formation to the base of the Amsden Formation. The average depth of the top of the Opeche/Spearfish Formation (Upper Confining Zone) across the storage facility area is 5,464 total vertical depth (TVD). The average depth of the base of the Amsden Formation (Lower Confining Summit Carbon Storage #1, LLC – Broom Creek 5 Zone) across the storage facility area is 6,270 feet TVD. The average thickness of the Storage Reservoir across the storage facility area is 806 feet.

4. "Communication" means any oral or written utterance, notation, or statement of any nature, by and to whomever, including, but not limited to, correspondence, text messages, chat messages, emails, letters, and any other oral or written conversations, dialogues, discussions, interviews, or consultations, between or among two or more persons.

5. "Document" means all documents or electronically stored information discoverable under N.D.R.Civ.P. 34 - including writings, drawings, graphs, charts, photographs, sound recordings, images, and other data or data compilations - stored in any medium from which information can be obtained either directly or, if necessary, after translation by you into a reasonably usable form. Documents and electronically stored information encompasses and includes all file formats in which electronically stored information is or can be stored or saved, and always includes the native file format if one exists.

6. "ESI" or "electronically stored information" means all electronically stored information discoverable under N.D.R.Civ.P. 34 - including writings, databases, shapefiles,

electronic or computer files, graphs, charts, photographs, sound recordings, images, and other data or data compilations - stored in any medium from which information can be obtained either directly or, if necessary, after translation by you into a reasonably usable form. ESI encompasses and includes all file formats in which electronically stored information is or can be stored or saved, and always includes the native file format if one exists.

7. "Identification," "identify," or "identity," when used in reference to (a) a natural person, requires you to state his or her full name and residential and business addresses; (b) a corporation, requires you to state its full corporate name and any names under which it does business, its state of incorporation, the address of its principal place of business, and the addresses of all of its offices in the State of North Dakota; (c) a business, requires you to state the full name or style under which the business is conducted, its business address or addresses, the types of businesses in which it is engaged, the geographic area in which it conducts those businesses, and the identity of the person or persons who own, operate, and control the business; (d) a document, requires you to state the number of pages and the nature of the document (e.g., letter or memorandum), and if not apparent on the face of the document or ESI, its title, its date, the name or names of its authors and recipients, and its present location and custodian; (e) a communication, requires you, if any part of the communication was written, to identify the document or documents which refer to or evidence the communication, and, to the extent that the communication was non-written, to identify the persons participating in the communication and to state the date, manner, place, and substance of the communication.

8. "Person" means any individual acting in any capacity as well as any entity or organization, including divisions, departments, and other units of the organization, and shall include such organizations as public or private corporations, partnerships, joint ventures, voluntary

or unincorporated associations, sole proprietorships, trusts, estates, governmental agencies, commissions, bureaus, or departments.

9. "Representative" means any agent, employee, servant, officer, director, attorney, or other person acting or purporting to act on behalf of the person in question.

10. "Summit's applications" means all of Summit's applications and documents and other materials in support in NDIC Case Nos. 30869, 30870, 30871, 30872; 30873, 30874, 30875, 30876; 30877, 30878, 30879, 30880.

11. "You," "your," or "yourself" refer to "SCS" or "Summit", and its authorized agents.

## INTERROGATORIES

**INTERROGATORY NO. 1:** Identify all software programs necessary to open or run or execute any electronic files that are themselves responsive to or which contain data and information responsive to any of Landowners written interrogatories or requests for production of documents. Please exclude from your answer any software programs needed to open files with the following extensions: .doc, .docx, .pdf, .xlsx, .csv, .eml, .msg, as well as common audio-visual file types that can be opened with freely-available software such as .jpg/.jpeg, .tiff, and .mp4 files.

**INTERROGATORY NO. 2:** State whether Summit possesses documents related to any exchange of valuable consideration (including but not limited to monetary compensation even if nominal) for the right to use or damage the pore space of a property.

**INTERROGATORY NO. 3:** Describe how Summit determined the amounts it paid to property owners for use of or damage to their pore space for its activities related to Summit's applications.

**INTERROGATORY NO. 4:** State the amounts that Summit has paid to property owners for use of or damage to pore space for injections of CO2.

**INTERROGATORY NO. 5:** State how Summit determines if a property owner has been "equitably compensated" as that phrase is used in N.D.C.C. § 38-22-08(14), and what criteria it uses to make this determination.

**INTERROGATORY NO. 6:** Identify the factual basis in Summit's applications or the materials submitted in support of Summit's applications that might support or that Summit will use to support a finding that property owners have been "equitably compensated" as that phrase is used in N.D.C.C. § 38-22-08(14).

**INTERROGATORY NO. 7:** Identify the factual basis in any documents or information sources other than Summit's applications that might support or that Summit will use to support a finding that property owners have been "equitably compensated" as that phrase is used in N.D.C.C. § 38-22-08(14).

**INTERROGATORY NO. 8:** Identify the sections of Summit's applications that support a finding that "[t]hat the proposed storage facility will not adversely affect surface waters or formations containing fresh water" as is stated at N.D.C.C. § 38-22-08(7). If Summit claims that any documents or information outside of Summit's applications support such a finding, identify those documents and information.

**INTERROGATORY NO. 9:** Identify the source of any carbon dioxide that will be injected pursuant to Summit's applications that is created or produced or originates in North Dakota.

## REQUESTS FOR PRODUCTION

**REQUEST NO. 1:** Please produce all agreements for use of or damage to the pore space of any property that are in your possession.

**REQUEST NO. 2:** Without limiting the generality of Request No. 1, please produce all agreements that might support or that Summit will use to support a finding "[t]hat the storage operator has obtained the consent of persons who own at least sixty percent of the storage reservoir's pore space" as required by N.D.C.C. § 38-22-08(5).

**REQUEST NO. 3:** Without limiting the generality of Request No. 1, produce all agreements that might support or that Summit will use to support a finding that "all nonconsenting pore space owners are or will be equitably compensated" as stated in N.D.C.C. § 38-22-08(14).

**REQUEST NO. 4:** Please produce all documents containing data or information indicating or indicative of market values for any rights associated with the use of or damage to a property's pore space.

**REQUEST NO. 5:** Without limiting the generality of the foregoing requests, please produce all agreements for use of or damage to any surface estate necessary for Summit to complete construction of the facilities described in Summit's applications, including but not limited to its injections wells (but for clarification not those agreements necessary for the interstate transmission line subject to siting proceedings before the ND Public Service Commission).

**REQUEST NO. 6:** Please produce all correspondence related to Summit's applications between Summit and the North Dakota Industrial Commission and its Department of Mineral Resources and its Oil and Gas Division (collectively "NDIC") and any authorized agents of the NDIC, and all correspondence between your authorized agents and the NDIC (including any individuals copied on or submitting Summit's applications) related to Summit's applications.

Dated this 6th day of May, 2024

**BRAATEN LAW FIRM**

*/s/ Derrick Braaten*

Derrick Braaten (ND #06394)
derrick@braatenlawfirm.com
109 North 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911

*Attorneys for the Swenson Living Trust*

BRAATEN
Law Firm

May 7, 2024

**Via Email Only**

Lawrence Bender
304 East Front Avenue, Suite 400
Bismarck, ND 58504-5639
lbender@fredlaw.com

**Re: Summit Carbon Solutions – NDIC Case Nos. 30869-30880**

Lawrence:

I am writing to address clerical errors in the discovery served on May 2, 2024.

Case number 30869 was inadvertently left out of the definitions in paragraph 1. The definition should read as follows:

1. "SCS" or "Summit" means the applicants in NDIC Case Nos. 30869, 30870, 30871, 30872 (for "Summit Carbon Storage #1, LLC,"); 30873, 30874, 30875, 30876 (for "Summit Carbon Storage #2,") and 30877, 30878, 30879, 30880 (for "Summit Carbon Storage #3, LLC,") and each of those entities' authorized agents.

There was also a clerical error in Request No. 8. It should read as follows:

**REQUEST NO. 8:** Please produce all electronic files and data provided to the North Dakota Industrial Commission or its Department of Mineral Resources or Oil and Gas Division in association with or related to the applications in NDIC Case Nos. 30869-30880.

Please let me know if you have any questions or need any further clarification.

Derrick Braaten

DB/dnz

cc: Clients

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

**In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**Case No(s). 30869**
**30870**
**30871**
**30872**
**30873**
**30874**
**30875**
**30876**
**30877**
**30878**
**30879**
**30880**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**LANDOWNERS NOTICE OF 30(b)(6) DEPOSITION OF SUMMIT CARBON SOLUTIONS**

**TO:** Summit Carbon Solutions, by and through its attorney, Lawrence Bender, Fredrickson & Byron, P.A., 1133 College Drive, Suite 1000, Bismarck, North Dakota, 58501:

[¶1] PLEASE TAKE NOTICE that, pursuant to N.D.C.C. § 28-32-33 and Rule 30(b)(6) of the North Dakota Rules of Civil Procedure, Intervenor The Swenson Living Trust ("Landowners" or "Swenson Trust") will take the deposition upon oral examination of Summit Carbon Solutions ("SCS" or "$CO_2$ injector") through one or more of its officers, directors, managing agents, or other representatives who shall be designated to testify on the $CO_2$ injector's behalf regarding all information known or reasonably available to the $CO_2$ injector with respect to the subject matters identified in Exhibit A.

[¶2] The deposition shall commence on June 6, 2024 at 9:00 a.m. (Central Time), and continue thereafter until complete, at the offices of Braaten Law Firm, 100 N. 4th St., Ste. 100, Bismarck, North Dakota 58501. The deposition shall be conducted before a court reporter, or other officer authorized by law to administer oaths, and shall be recorded by stenographic means and supplementally recorded by video. The deposition will be taken for the purposes of discovery, for use at hearings, or for other purposes as permitted under the North Dakota Rules of Civil Procedure and N.D.C.C. ch. 28-32.

Dated this 9th day of May, 2024.

**BRAATEN LAW FIRM**

*/s/ Derrick Braaten*

Derrick Braaten (ND #06394)
109 North 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
derrick@braatenlawfirm.com

*Attorneys for Intervenor*
*The Swenson Living Trust*

**EXHIBIT A TO NOTICE OF DEPOSITION OF SUMMIT CARBON SOLUTIONS**

**DEFINITIONS**

As used in this Notice, the following terms shall have the meanings and definitions as indicated:

1. "SCS" or "Summit" means the applicants in NDIC Case Nos. 30869, 30870, 30871, 30872 (for "Summit Carbon Storage #1, LLC,"); 30873, 30874, 30875, 30876 (for "Summit Carbon Storage #2,") and 30877, 30878, 30879, 30880 (for "Summit Carbon Storage #3, LLC,"). and each of those entities' authorized agents.

2. "Landowner" means The Swenson Living Trust.

3. "Storage Reservoir" means the reservoir and formation into which Summit intends to inject CO2 and the confining zones within the Areas of Review, as defined and depicted by Summit's applications herein (*see e.g.* Figure 1-1, NDIC Case No. 30869) including but not limited to the Storage Reservoir as defined by Section 1.15 of the Storage Agreement included with Summit's applications in NDIC Case No. 30869, and includes the confining layers/zones, to wit:

> the Pore Space and confining subsurface strata underlying the Facility Area described as the Opeche/Spearfish (Upper Confining Zone), Broom Creek (Injection Zone), and Amsden (Lower Confining Zone) Formation(s) and which are defined as identified by the well logging suite performed at one stratigraphic well, the Milton Flemmer 1 well (NDIC File No. 38594) located in the NW¼ of the NE¼, Section 35, Township 141 North, Range 88 West, Mercer County, North Dakota. The Storage Reservoir is defined as the stratigraphic interval from below the top of the Opeche/Spearfish Formation found at a depth of 5,587 feet below the Kelly Bushing, to above the base of the Amsden Formation, found at a depth of 6,421 feet below the Kelly Bushing, as identified by the Array Induction Gamma log run in the Milton Flemmer 1 well. The logging suite included triple combo (gamma ray [GR], density porosity, and resistivity), caliper, spectral GR, combinable magnetic resonance (CMR), elemental capture spectroscopy (ESC), dipole sonic including four-arm caliper and inclinometer, and an image log. Further, the acquired logs were used to pick formation top depths and interpret lithology, petrophysical properties, and time-to-depth shifting of seismic data obtained from three 3D seismic surveys and one 5-mile long 2D seismic line covering an area totaling 208 miles in and around the Milton Flemmer 1 stratigraphic well. Formation top depths

were picked from the top of the Pierre Formation to the base of the Amsden Formation. The average depth of the top of the Opeche/Spearfish Formation (Upper Confining Zone) across the storage facility area is 5,464 total vertical depth (TVD). The average depth of the base of the Amsden Formation (Lower Confining Summit Carbon Storage #1, LLC – Broom Creek 5 Zone) across the storage facility area is 6,270 feet TVD. The average thickness of the Storage Reservoir across the storage facility area is 806 feet.

4. "Communication" means any oral or written utterance, notation, or statement of any nature, by and to whomever, including, but not limited to, correspondence, text messages, chat messages, emails, letters, and any other oral or written conversations, dialogues, discussions, interviews, or consultations, between or among two or more persons.

5. "Document" means all documents or electronically stored information discoverable under N.D.R.Civ.P. 34 - including writings, drawings, graphs, charts, photographs, sound recordings, images, and other data or data compilations - stored in any medium from which information can be obtained either directly or, if necessary, after translation by you into a reasonably usable form. Documents and electronically stored information encompasses and includes all file formats in which electronically stored information is or can be stored or saved, and always includes the native file format if one exists.

6. "ESI" or "electronically stored information" means all electronically stored information discoverable under N.D.R.Civ.P. 34 - including writings, databases, shapefiles, electronic or computer files, graphs, charts, photographs, sound recordings, images, and other data or data compilations - stored in any medium from which information can be obtained either directly or, if necessary, after translation by you into a reasonably usable form. ESI encompasses and includes all file formats in which electronically stored information is or can be stored or saved, and always includes the native file format if one exists.

7. "Identification," "identify," or "identity," when used in reference to (a) a natural person, requires you to state his or her full name and residential and business addresses; (b) a corporation, requires you to state its full corporate name and any names under which it does business, its state of incorporation, the address of its principal place of business, and the addresses of all of its offices in the State of North Dakota; (c) a business, requires you to state the full name or style under which the business is conducted, its business address or addresses, the types of businesses in which it is engaged, the geographic area in which it conducts those businesses, and the identity of the person or persons who own, operate, and control the business; (d) a document, requires you to state the number of pages and the nature of the document (e.g., letter or memorandum), and if not apparent on the face of the document or ESI, its title, its date, the name or names of its authors and recipients, and its present location and custodian; (e) a communication, requires you, if any part of the communication was written, to identify the document or documents which refer to or evidence the communication, and, to the extent that the communication was non-written, to identify the persons participating in the communication and to state the date, manner, place, and substance of the communication.

8. "Person" means any individual acting in any capacity as well as any entity or organization, including divisions, departments, and other units of the organization, and shall include such organizations as public or private corporations, partnerships, joint ventures, voluntary or unincorporated associations, sole proprietorships, trusts, estates, governmental agencies, commissions, bureaus, or departments.

9. "Representative" means any agent, employee, servant, officer, director, attorney, or other person acting or purporting to act on behalf of the person in question.

10. "You," "your," or "yourself" refer to "SCS" or "Summit", and each of its authorized agents.

## TOPICS FOR EXAMINATION

In accordance with N.D.R.Civ.P. 30(b)(6), The Swenson Living Trust designates the following topics and matters for examination.

I. Summit's applications and the information contained in and created or submitted in support of the applications and conclusions drawn therefrom in NDIC Case Nos. 30869, 30870, 30871, 30872 (for "Summit Carbon Storage #1, LLC,"); 30873, 30874, 30875, 30876 (for "Summit Carbon Storage #2,") and 30877, 30878, 30879, 30880 (for "Summit Carbon Storage #3, LLC,") (all applications hereafter referred to collectively as "Summit's applications").
   a. Summit's applications include all documents submitted to the North Dakota Industrial Commission including its Department of Mineral Resources and its Oil and Gas Division (collectively "NDIC") as part of or in support of or in relation to Summit's applications, and all correspondence between Summit and NDIC whether in writing and whether electronic or physical, and whether written or oral. This topic and the scope of Summit's applications as used herein includes all data files, spreadsheets, databases, and models (including loading files necessary to make data files useable with any model) and all of the information, data, documents, calculations, and non-attorney work product that was created in support of Summit's applications or which was necessary to create or is materially supportive of Summit's applications.
      i. Without limiting the generality of the foregoing, this topic includes the following models and associated data:
         1. The data and interpretations and inputs for the geologic model created with SLB's Petrel software (Schlumberger, 2020).
         2. The data and inputs and model referred to in Section 3.1 of the applications as follows:
            a. "The geologic model and properties served as inputs for numerical simulations of CO2 injection using Computer Modelling Group Ltd.'s (CMG's) GEM software (Computer Modelling Group Ltd., 2021). Numerical simulations of CO2 injection were conducted to assess potential CO2 injection rate, disposition of injected CO2, wellhead pressure (WHP), bottomhole pressure (BHP), and pressure changes in the storage reservoir throughout the expected injection time frame and postinjection period. Results of the numerical simulations were then used to determine the

project's area of review (AOR) pursuant to North Dakota's geologic CO2 storage regulations."

3. United States Geological Survey's PHREEQC geochemical model and both the data files and data inputs used to run this model and bases for using the chosen inputs.
4. The data and load files and data decks for the SLB Petrel model that was run for Summit's applications.
5. Computer Modelling Group Ltd.'s GEM model and both the data files and data inputs used to run this model and bases for using the chosen inputs.
6. 3D numerical reservoir simulation model data decks, output files and graphing files of the Storage Reservoir in original electronic format. Without limiting the foregoing, such files may commonly be stored in Schlumberger SEclipse format, CMG (Canadian Modeling Group) Imex format, or other similar format.
7. Input files, field and analytical data, and the model geochemical database (and the sources of the foregoing) used to run any modelling or analysis of critical threshold pressures or areal extent of review or impact and pressure buildup, or which was used to do any kind of analysis related to EPA Method 1 or EPA Method 2 or Analytical Solution for Leakage in Multilayered Aquifers – ASLMA, or any risk-based area-of-review analysis.

ii. These models also include the conclusions drawn from the models and the data inputs used, particularly as those conclusions were used to support Summit's applications as referenced in these topics.

iii. The identity of the person most familiar with the workflows described in Section 3.2.3 of Summit's application in NDIC Case No. 30869 and how it was performed for purposes of Summit's applications and the identity of the person who wrote this passage.

iv. The meaning and context and details of how the various processes and functions described in Section 3.2.3 of Summit's applications and how they were actually performed and the models and calculations used to support them.

b. The factual documentation and information that might support or that Summit will use to support a finding "[t]hat the storage operator has obtained the consent of persons who own at least sixty percent of the storage reservoir's pore space" as required by N.D.C.C. § 38-22-08(5).

c. The factual documentation and information that might support or that Summit will use to support any finding in this proceeding "[t]hat the proposed storage facility will not adversely affect surface waters or formations containing fresh water" as is stated at N.D.C.C. § 38-22-08(7).

d. The factual documentation and information that might support or that Summit will use to support any finding in this proceeding that "[t]hat the storage facility will not

endanger human health nor unduly endanger the environment" as is stated at N.D.C.C. § 38-22-08(10).

e. The factual documentation and information that might support or that Summit will use to support any finding in this proceeding "[t]hat the horizontal and vertical boundaries of the storage reservoir are defined [and] include buffer areas to ensure that the storage facility is operated safely and as contemplated" as is stated at N.D.C.C. § 38-22-08(12).
f. The factual documentation and information related to or that might support or that Summit will use to support any finding in this proceeding that "all nonconsenting pore space owners are or will be equitably compensated" as that phrase is used in N.D.C.C. § 38-22-08(14) and any documentation, information, data sets, comparable sales, comparable transactions, appraisals, market reports, financial reports, or other documents related to or referencing compensation paid to nonconsenting pore space owners.
    i. This subtopic I.b. includes all amounts paid by Summit to any individual or entity for use of or damages to pore space or property rights associated with or related to its storage facility that is the subject of Summit's application and the Storage Reservoir, and all agreements for such use or damages or payments.
    ii. This subtopic I.b. includes all reports and agreements in Summit's possession indicating any amount of compensation paid for any kind of use of or damage to pore space or property for CO2 sequestration. If Summit has in its possession any agreement with any property owner for use of property or damage to property arising from use of pore space or property for storage or sequestration of CO2 it is included in this topic.

**From:** Derrick Braaten
**To:** dpgarner@nd.gov
**Cc:** Lawrence Bender (lbender@fredlaw.com); Desirae Zaste; Lynn D. Helms
**Subject:** NDIC Case Nos. 30869-30880
**Date:** Thursday, May 9, 2024 3:22:08 PM
**Attachments:** 1-240502 Interr & RFP Set 1.pdf
240507 Bender ltr from DB re interr set 1.pdf

---

Mr. Garner:

I represent the Swenson Living Trust, a proposed intervenor in NDIC Case Nos. 30869-30880. I also represent several other landowners who intend to intervene and we will be filing those petitions in the near future. I called and left a voicemail last Friday asking to speak with you and Mr. Bender regarding the extremely abbreviated schedule in this matter. The hearing has been scheduled for June 11-12, and we have submitted a motion requesting additional time to allow us to respond and prepare for a hearing. We are going to do our best to prepare if that motion is not granted, but I am very concerned that it will require a very abbreviated discovery schedule. I have scheduled a deposition for June 6, but I need to obtain the data decks, load files, and other data that was used to run the models developed for the application, and I need to do that with sufficient time to allow my team of experts to both run the models (which can take days depending on the data and how it is set up) and then analyze the results. We need to do all of this before the deposition. I have scheduled that for June 6 and this means I will likely not be able to get a transcript back before our hearing, but I wanted to give us as much time as possible to facilitate the exchange of information. If I can get some of the data decks from the NDIC, I would like to explore that as well.

I would also like to discuss logistics if we could. I have a number of landowners and it would be my preference to stipulate in advance to some of the information regarding their land ownership, deeds, etc. to avoid having to call them to walk through that at the hearing. I can make them available for examination if Mr. Bender wishes, but I'd rather not spend several hours of our time walking through deeds, etc. I also will need some very quick turnaround on the data to get this done in time, so will be asking to expedite the discovery process. I am also concerned that if the NDIC intends to grant out petitions to intervene, we are being significantly prejudiced right now because they have not been granted, and that takes more time away from us as we are trying to prepare. I have served discovery and a deposition notice, but without having our intervention granted I suspect Mr. Bender is free to ignore those. I do apologize for my directness here in addressing the tribunal, but I would ask that the intervention be granted retroactively such that our discovery requests and deposition notice do not need to be re-served, which would reset the time to respond.

I am also planning to get a motion filed tomorrow or Monday formally asking for this relief in the form of expedited discovery and an immediate discovery conference to set deadlines. I have served two rounds of discovery and in the first I focused solely on the data my experts requested in order to conduct their analysis. If there is any way to expedite that data above others I would appreciate that, and also point out that the data I am seeking for my experts is literally a part of the applications here, and I think due process requires that I obtain that in a timely manner for this to be a fair hearing. If there is anything I can do to facilitate this please let me know, and as I said, I am working as fast as I can on a motion to expedite and will have it filed tomorrow or Monday. I have attached a copy of the discovery we served and a letter clarifying some errors we made – this is the data we are

seeking that is part of the application and which our experts require in order to assess the application. If the NDIC is able to assist with sharing any of this data itself I would ask that you please consider that and I will facilitate any way I can.

I look forward to hearing from you and would appreciate if we can get a conference call set up to discuss all of this as soon as possible.

Sincerely,

**Derrick Braaten**

**BRAATEN LAW FIRM**
109 N. 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
Fax: 701-221-5842
www.braatenlawfirm.com

**PRIVILEGED COMMUNICATION**
**This e-mail message is intended only for the named recipient(s) above and is covered by the Electronic Communications Privacy Act, 18 U.S.C. Sections 2510-2521. This e-mail is confidential and may contain information that is privileged, attorney work product or exempt from disclosure under applicable law. Recipients should not file copies of this e-mail with publicly accessible records. If you have received this message in error, please immediately notify the sender by return e-mail and delete this e-mail message from your computer. Thank you for your cooperation.**

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case No(s). 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |
| **In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.** | |

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## LANDOWNERS INTERROGATORIES AND REQUEST FOR PRODUCTION OF DOCUMENTS TO APPLICANTS (SET 3)

PLEASE TAKE NOTICE, that The Swenson Living Trust, ("Landowners"), hereby require Applicants, Summit Carbon Storage #1, LLC, Summit Carbon Storage #2 , and Summit Carbon Storage #3, LLC ("SCS" or "Summit"), to answer the following interrogatories, signed and under oath, and produce and permit Landowners to inspect and copy documents responsive to the document requests contained herein in accordance with Rules 33 and 34 of the North Dakota Rules of Civil Procedure. Your answers must be in writing and signed by someone authorized to sign on behalf of, and whose signature binds, Summit. Documents should be made available at the office of Braaten Law Firm, 109 N. 4th St., Suite 100, Bismarck, North Dakota, or copies of said documents may be forwarded to Landowners attorneys (in native, electronic format). A copy of the answers and responses, together with your objections, if any, must be served within thirty (30) days from the date of service, or within such other time as the Commission may allow, or parties agree.

### INSTRUCTIONS

1. These interrogatories and requests for production are deemed to be continuing in nature and should you, your counsel, or anyone representing your interest become aware of or acquire any additional knowledge or documents which affect the accuracy or completeness of any answers herein, or which relate to the matters into which these requests for production inquire, it is hereby demanded that such knowledge and documents be immediately transferred to the undersigned attorney by way of supplemental answers and responses to the full extent required by Rule 26(e), N.D.R.Civ.P.

2. In answering these interrogatories and requests for production, you are required to furnish all information and responsive documents in the possession of you, your attorney, accountants, advisors, or other persons directly employed by you.

3. Your attention is directed to Rule 34 of the North Dakota Rules of Civil Procedure, which provides that any party who produces documents for inspection "must produce documents as they are kept in the usual course of business or must organize and label them to correspond to the categories in the request." If the requested documents are stored only on software or otherwise are "computer based information," regardless of whether you produce as kept in the usual course of business or by category, you are directed to produce the raw data along with codes and programs necessary for translating it into usable form, or produce the information in a finished, usable form. In either case, all necessary glossaries, keys, indices, metadata, and software necessary for interpretation of the material should be produced unless software is proprietary in nature, in which case native format should be produced with an indication of the software types required to view and process the data.

4. **Produce electronic records in their native format.** Without limiting the generality of the foregoing, Word documents should be produced in .docx or .doc format, emails should be produced in .msg (Outlook) or .eml format, ArcGIS shapefiles should be produced in .shp, .shx and .dbf formats (and when available .prj, .xml, .sbn, and .sbx), and Excel spreadsheets should be produced in .xlsx, .xls, or .csv format. To the maximum extent feasible, file structures should be maintained, especially when a data or document database is linked to an ArcGIS map, website, or other such file.

5. In responding to the requests for production, for each document or any portion thereof which you have withheld based on privilege, describe the factual basis for your claim of

privilege in sufficient detail to permit adjudication of the validity of that claim, including the following:

a. A brief description of the type of document or communication;

b. The date of the document or communication;

c. The name, title and job description of the transmitter of the document or communication;

d. The name, title, and job description of the person to whom the document or communication was addressed;

e. The name, title, and job description of each person who has received or had access to the document or communication;

f. A brief description of the subject matter of the document or communication; and

g. The nature of the privilege claim.

6. In responding to the Requests for Production, for each document or any portion thereof which has been lost, discarded or destroyed, identify such document as completely as possible, providing as much of the following information as possible:

a. The type of document;

b. Its date;

c. The date or approximate date it was lost, discarded, or destroyed;

d. The reason(s) for disposing of the document (if discarded or destroyed);

e. The identity of all person(s) authorizing or having knowledge of the circumstances surrounding the disposal of the document;

f. The identity of the person(s) who lost, discarded or destroyed the document; and

g. The identity of all persons having knowledge of the contents thereof.

7. Each interrogatory and request for production (as well as these instructions) may contain one or more terms that are defined below. You should construe each defined term

according to the meaning of that word as set forth below. All other words should be construed consistent with customary usage given the context in which the words appear such that, in each instance, you should construe any word to bring that word within the scope of the discovery request in which it appears. Consistent with the above, the singular usage of a word shall be considered to include within its meaning the plural, and vice versa; the conjunctive shall be considered to include within its meaning the disjunctive, and vice versa; and the feminine shall be considered to include within its meaning the masculine, and vice versa.

## DEFINITIONS

As used in these Interrogatories and Request for Production of Documents, the following terms shall have the meanings and definitions as indicated:

1. "SCS" or "Summit" means the applicants in NDIC Case Nos. 30869, 30870, 30871, 30872 (for "Summit Carbon Storage #1, LLC,"); 30873, 30874, 30875, 30876 (for "Summit Carbon Storage #2,") and 30877, 30878, 30879, 30880 (for "Summit Carbon Storage #3, LLC,") and each of those entities' authorized agents.

2. "Landowner" means The Swenson Living Trust.

3. "Storage Reservoir" means the reservoir and formation into which Summit intends to inject CO2 and the confining zones within the Areas of Review as defined and depicted by Summit's applications herein (*see e.g.* Figure 1-1, NDIC Case No. 30869) including but not limited to the Storage Reservoir as defined by Section 1.15 of the Storage Agreement included with Summit's applications in NDIC Case No. 30869, to wit:

> the Pore Space and confining subsurface strata underlying the Facility Area described as the Opeche/Spearfish (Upper Confining Zone), Broom Creek (Injection Zone), and Amsden (Lower Confining Zone) Formation(s) and which are defined as identified by the well logging suite performed at one stratigraphic well, the Milton Flemmer 1 well (NDIC File No. 38594) located in the NW¼ of the NE¼, Section 35, Township 141 North, Range 88 West, Mercer County, North Dakota.

> The Storage Reservoir is defined as the stratigraphic interval from below the top of the Opeche/Spearfish Formation found at a depth of 5,587 feet below the Kelly Bushing, to above the base of the Amsden Formation, found at a depth of 6,421 feet below the Kelly Bushing, as identified by the Array Induction Gamma log run in the Milton Flemmer 1 well. The logging suite included triple combo (gamma ray [GR], density porosity, and resistivity), caliper, spectral GR, combinable magnetic resonance (CMR), elemental capture spectroscopy (ESC), dipole sonic including four-arm caliper and inclinometer, and an image log. Further, the acquired logs were used to pick formation top depths and interpret lithology, petrophysical properties, and time-to-depth shifting of seismic data obtained from three 3D seismic surveys and one 5-mile long 2D seismic line covering an area totaling 208 miles in and around the Milton Flemmer 1 stratigraphic well. Formation top depths were picked from the top of the Pierre Formation to the base of the Amsden Formation. The average depth of the top of the Opeche/Spearfish Formation (Upper Confining Zone) across the storage facility area is 5,464 total vertical depth (TVD). The average depth of the base of the Amsden Formation (Lower Confining Summit Carbon Storage #1, LLC – Broom Creek 5 Zone) across the storage facility area is 6,270 feet TVD. The average thickness of the Storage Reservoir across the storage facility area is 806 feet.

4. "Communication" means any oral or written utterance, notation, or statement of any nature, by and to whomever, including, but not limited to, correspondence, text messages, chat messages, emails, letters, and any other oral or written conversations, dialogues, discussions, interviews, or consultations, between or among two or more persons.

5. "Document" means all documents or electronically stored information discoverable under N.D.R.Civ.P. 34 - including writings, drawings, graphs, charts, photographs, sound recordings, images, and other data or data compilations - stored in any medium from which information can be obtained either directly or, if necessary, after translation by you into a reasonably usable form. Documents and electronically stored information encompasses and includes all file formats in which electronically stored information is or can be stored or saved, and always includes the native file format if one exists.

6. "ESI" or "electronically stored information" means all electronically stored information discoverable under N.D.R.Civ.P. 34 - including writings, databases, shapefiles,

electronic or computer files, graphs, charts, photographs, sound recordings, images, and other data or data compilations - stored in any medium from which information can be obtained either directly or, if necessary, after translation by you into a reasonably usable form. ESI encompasses and includes all file formats in which electronically stored information is or can be stored or saved, and always includes the native file format if one exists.

7. "Identification," "identify," or "identity," when used in reference to (a) a natural person, requires you to state his or her full name and residential and business addresses; (b) a corporation, requires you to state its full corporate name and any names under which it does business, its state of incorporation, the address of its principal place of business, and the addresses of all of its offices in the State of North Dakota; (c) a business, requires you to state the full name or style under which the business is conducted, its business address or addresses, the types of businesses in which it is engaged, the geographic area in which it conducts those businesses, and the identity of the person or persons who own, operate, and control the business; (d) a document, requires you to state the number of pages and the nature of the document (e.g., letter or memorandum), and if not apparent on the face of the document or ESI, its title, its date, the name or names of its authors and recipients, and its present location and custodian; (e) a communication, requires you, if any part of the communication was written, to identify the document or documents which refer to or evidence the communication, and, to the extent that the communication was non-written, to identify the persons participating in the communication and to state the date, manner, place, and substance of the communication.

8. "Person" means any individual acting in any capacity as well as any entity or organization, including divisions, departments, and other units of the organization, and shall include such organizations as public or private corporations, partnerships, joint ventures, voluntary

or unincorporated associations, sole proprietorships, trusts, estates, governmental agencies, commissions, bureaus, or departments.

9. "Representative" means any agent, employee, servant, officer, director, attorney, or other person acting or purporting to act on behalf of the person in question.

10. "Summit's applications" means all of Summit's applications and documents and other materials in support in NDIC Case Nos. 30869, 30870, 30871, 30872; 30873, 30874, 30875, 30876; 30877, 30878, 30879, 30880.

11. "You," "your," or "yourself" refer to "SCS" or "Summit", and its authorized agents.

## INTERROGATORIES

**INTERROGATORY NO. 1:** For any installed CO2 pressure relief devices or CO2 vent systems or other mechanical devices designed for relieving pressure from a pipe, at any of the surface facilities constructed for purposes of Summit's applications, please provide the following:

a. Rated capacity of each device or system;

b. Quantity of each device or system;

c. Discharge pipe size(s);

d. Discharge pipe outlet(s) direction (vertical or horizontal); and

e. If horizontal, state direction of discharge.

## REQUESTS FOR PRODUCTION

**REQUEST FOR PRODUCTION NO. 1:** Please produce any above-ground vapor dispersion modeling results such as from any engineered pressure relief systems, including all data and input files and load files. Without limiting the generality of the forgoing, specifically provide

all data inputs for the following: weather conditions modeled, topography assumptions modeled, flow rate of CO2 over time, total quantity of CO2 released and total time of release modeled, and predicted CO2 concentrations at any public receptors such as roads, buildings, and dwellings.

Dated this 10th day of May, 2024

**BRAATEN LAW FIRM**

*/s/ Derrick Braaten*

Derrick Braaten (ND #06394)
derrick@braatenlawfirm.com
109 North 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911

*Attorneys for the Swenson Living Trust*

BRAATEN
Law Firm

May 15, 2024

**Via Email Only**

North Dakota Industrial Commission
Department of Mineral Resources
Oil & Gas Division
600 E. Blvd. Ave. Dept. 405
Bismarck, ND 58505-0840
oilandgasinfo@nd.gov

**Re: Records Request**

I am writing to request a copy of records from your office, pursuant to N.D.C.C. § 44-04-18. Please provide the following data electronic files and/or load files submitted to the Oil and Gas Division by applicants Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC:

- All the input files, field and analytical data, and the model geochemical database used to evaluate the CO2 effects on the upper and lower confining layers, including but not limited to all inputs and data files used to run the United States Geological Survey's USGS's PHREEQC model.
- All the input files, field and analytical data , and the model geochemical database used to run Computer Modelling Group Ltd.'s GEM model and software or any similar model or software used for the same purposes.
- Geophysical Logs that penetrate injection and confining zones, seismic survey data and core sample measurements, all measurements and data for acoustic impedance, total porosity, effective porosity, permeability, and facies.
- All the input files, field and analytical data, and the model, including but not limited to all inputs and data files used to run SLB's Petrel model in any manner related to Summit's applications.
- All 3D numerical reservoir simulation model data decks, output files and graphing files of the Storage Reservoir in original electronic format. Without limiting the foregoing, such files may commonly be stored in Slumberger Eclipse or Petrel format, CMG (Canadian Modeling Group) Imex format, or other similar format.

To the maximum extent possible, I request that you provide all records to me in electronic format by emailing them to my paralegal Desirae Zaste at desirae@braatenlawfirm.com. If it is necessary to mail responsive records, they may be sent to me at the address below.

You have my pre-authorization to bill up to $300.00 to fulfill this records request. If you have any questions about anything in this letter, do not hesitate to contact me. Thank you for your assistance.

Sincerely,

Derrick Braaten

DB/dnz

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case No(s). 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**DECLARATION OF PAUL BUTTON IN SUPPORT OF MOTION TO EXPEDITE DISCOVERY**

1. I am a Petroleum Engineer with experience modeling and operating oil and gas reservoirs, and I currently reside in Butte, Montana.
2. Attached hereto as Exhibit H is a true and correct copy of my Curriculum Vitae.
3. I have worked with CMG the owner of the GEM software many times in the past and typically you can get a copy within a week of requesting a quote.
4. For GEM, the data decks are easily exportable if you have the .dat file and any included files that are called on it can be rerun pretty easily.
5. Runtime is not only based on the model size (number of cells) but also how quickly the solutions converge for each time step. In my experience, a model that is having convergence problems can take days to run. Introducing a new fluid, CO2, into the reservoir is most likely going to create convergence problems but it is hard to determine what the run time is until we get ahold of the model and either run it or look at the existing output files to see what the run time is and the computer processing power that was used to run the model.
6. I am familiar with Schlumberger's software.
7. In order to allow adequate time, I estimate that the geologist and I and the expert reviewing the PHREEQC model would need to receive the electronic data for the GEM, SLB Petrel, PHREEQC, and other computer models by May 23, 2024 in order to run and analyze the models and prepare for the hearing on June 11-12.

**I declare under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.**

Executed this 16th day of May, 2024 in Butte, Montana.

Paul Button
Paul Button (May 16, 2024 14:23 MDT)

Paul Button

# Declaration of Paul Button in Support of Motion to Expedite Discovery

Final Audit Report 2024-05-16

| | |
|---|---|
| Created: | 2024-05-16 |
| By: | Desirae Zaste (desirae@braatenlawfirm.com) |
| Status: | Signed |
| Transaction ID: | CBJCHBCAABAASogLity6_H2UShw4uLWj18PzkAsRSU3A |

## "Declaration of Paul Button in Support of Motion to Expedite Discovery" History

Document created by Desirae Zaste (desirae@braatenlawfirm.com)
2024-05-16 - 7:32:40 PM GMT

Document emailed to pmbutton@outlook.com for signature
2024-05-16 - 7:33:04 PM GMT

Email viewed by pmbutton@outlook.com
2024-05-16 - 8:23:20 PM GMT

Signer pmbutton@outlook.com entered name at signing as Paul Button
2024-05-16 - 8:23:55 PM GMT

Document e-signed by Paul Button (pmbutton@outlook.com)
Signature Date: 2024-05-16 - 8:23:57 PM GMT - Time Source: server

Agreement completed.
2024-05-16 - 8:23:57 PM GMT

Adobe Acrobat Sign

Paul Button
1119 S Ophir St
Butte, Mt 59701
(406) 860-5752 (cell)
paul@terrastor.com

# Paul Button

## SUMMARY OF QUALIFICATIONS

**Petroleum Engineer** with diversified experience in reservoir and production engineering. Responsibilities include reservoir modeling, geologic engineering, rate transient analysis, property valuation, well completion optimization, detailed reservoir characterization, waterflood management, and EOR management.

## EMPLOYMENT HISTORY

**TerraStor Energy Corporation** **2021-Present**

**Chief Technology Officer** **Butte, MT**

Perform geologic search for Compressed Air Energy Storage (CAES) sites. Determine electricity grid connectivity around geologic sites to determine if interconnection is possible. Liaison with consulting engineers and OEM providers on compression, turbo expansion, heat exchange and cavern design.

**Poplar Resources** **2019-Present**

**Sr Vice President Resource Development** **Billings, MT**

Supervise technical and operational staff on the implementation and monitoring of gas oil gravity drainage project at Poplar Dome.

Develop EOR development plan, schedule implementation operations, budget and monitoring of results.

**Button Petroleum Management** **2016-2022**

**Consulting Reservoir Engineer** **Billings, MT**

Consulting Reservoir Engineer that has performed field valuations and recovery forecasts on conventional and un-conventional fields at client's request.

- Constructed development plan for multiple water flood fields including economic model. Work with geology and land to determine unitization area and criteria.
- Conducted optimal spacing study for unconventional Bakken & Three Forks development. Reviewed multiple spacing tests and well performance to determine most economic development scenario for each reservoir in the client's subject land position.
- EOR review and valuation of field for acquisition. Included full reserve review and CO2 requirement review.
- Reservoir Simulation and EOR recovery project design and planning.
- Expert Witness and Advise on cases for Braaten Law Firm

**SM Energy** **2005 - 2016**

***Senior Reservoir Engineer*** ***Billings, MT***

Multi-disciplined team leader for Wyoming asset team, developing conventional, unconventional, and EOR reserves. Responsibilities include development planning, exploration evaluation, EOR project screening, and A&D evaluation.

- Multi discipline team lead responsible for the acquisition of 160,000 acres of stacked pay un-conventional resources in the Powder River Basin. Primary reservoir evaluator for over $300 MM in acquisitions and

over $200 MM in appraisal drilling in the Frontier and Niobrara. Responsible for identifying key play drivers, developing optimal depletion plan, and maximizing net asset value. Key evaluation engineer on basin wide exploration effort focus on Muddy and Mowry.

- Lead reservoir engineer on team that developed the Niobrara and Codell resource plays in Laramie Co, Wyoming. Worked intricately with asset team to design innovative completion design to maximize recovery from Niobrara. Team drilled first long lateral (+9,000' lateral) which was key to economic exploitation of the Codell and Niobrara.
- Lead role in EOR evaluation of Wind River and Bighorn Basin Tensleep fields. Developed screening criteria and determined recovery potential on several legacy assets. Determined technical feasibility of miscible CO2 but determined resource size was economically unfeasible.
- Primary reservoir engineer Nance Petroleum's early development of Elm Coulee Field Richland Co, MT. Instrumental in asset team's effort to improve recovery through spacing optimization, wellbore design and completion design.

**Kinder Morgan** **2003 - 2005**

***Reservoir Engineer*** ***Midland, TX***

Multi-disciplined team member in Yates field, a highly fractured carbonate reservoir with 400 million barrels reaming reserves. Responsibilities include improving reservoir understanding, optimizing contact movement to improve reserve development, and providing analysis on EOR projects.

- Selected 40 horizontal well locations for drilling in early 2004. Prepared economic justification for each well, selected target interval within reservoir, developed detailed well plan, and provided production and reserve forecast for the program.
- Prepared detailed review of Surfactant and Thermal EOR projects that included review of production response, economic performance, and Texas EOR Severance Tax fillings.

**MARATHON OIL COMPANY** **1998 - 2003**

***Reservoir Engineer*** ***Midland, TX***

Multi-disciplined team member in Yates field, a highly fractured carbonate reservoir with 400 million barrels reaming reserves. Responsibilities include improving reservoir understanding, optimizing contact movement to improve reserve development from double displacement gas injection, and providing analysis on EOR projects.

- Improve reservoir understanding for diversified team by proving simulation support that led to the optimization of the Double Displacement Process. Built and ran a variety of simulation models that led to increased understanding of oil drainage and mobilization. Recommendations resulted in improved oil rate and increased asset value.
- Recommended termination of 60 MMCFD of nitrogen injection to control reservoir pressure growth and moderate contact movement to maximize oil mobilization. Project included simulation, material balance, and economic analysis as well as contract negotiation. Resulted in a $25 million improvement in asset net present value.
- Performed reserve evaluation of an immiscible $CO_2$ project. Determined that a potential 25 million barrels of reserves are probable. Analysis involved compositional modeling, equation of state tuning, coordinating PVT lab work, and economic analysis.

- Coordinated $80 million dollar capital and expense budget for three years. Responsible for presenting to senior management, tracking expenditures, and making recommendations on projects for local management's approval.

- Project engineer responsible for testing and developing innovative, low cost completion methods in Yates field. Successfully modeled completion performance of both vertical and horizontal completions and recommended changes in our completion practices that improved the well production efficiency. Published an SPE paper on the modeling work and presented it at a convention in Villahermosa, Mexico.

## EDUCATION

***Bachelor of Science in Petroleum Engineering (B.S.P.E.)*** **December 1997**

Montana Tech of the University of Montana, Butte, Montana

## SPECIAL SKILLS

Reservoir Simulation… Rate Transient Analysis… Aries… PHDWin…Spotfire… Excel… Word… Power Point…

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

| | |
|---|---|
| **In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND** | **Case No(s). 30869<br>30870<br>30871<br>30872<br>30873<br>30874<br>30875<br>30876<br>30877<br>30878<br>30879<br>30880** |

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

---

## DECLARATION OF SERVICE

---

[¶1] I hereby certify that true and correct copies of the following documents:

- **Motion to Expedite Discovery;**
- **Brief in Support of Motion to Expedite Discovery;**
- **Declaration of Derrick Braaten in Support of Motion to Expedite Discovery;**
- **Exhibit A - Landowners Interrogatories and Request for Production of Documents to Applications (Set 1);**
- **Exhibit B - Landowners Interrogatories and Request for Production of Documents to Applications (Set 2);**
- **Exhibit C - Correspondence sent to Lawrence Bender, attorney for Summit;**
- **Exhibit D - Landowners Notice of 30(b)(6) Deposition of Summit Carbon Solutions;**
- **Exhibit E - Email sent to Hearing Officer Dave Garner;**
- **Exhibit F - Landowners Interrogatories and Request for Production of Documents to Applications (Set 3);**
- **Exhibit G – Request for open records sent to the North Dakota Industrial Commission, Oil and Gas Division;**
- **Declaration of Paul Button of Motion to Expedite Discovery;**
- **Exhibit H – Curriculum Vitae; and**
- **Declaration of Service.**

were, on the 16th day of May, 2024 sent via electronic mail to the following:

North Dakota Industrial Commission
oilandgasinfo@nd.gov
slforsberg@nd.gov

Lynn Helms
lhelms@nd.gov

Lawrence Bender
Attorney at Law
lbender@fredlaw.com

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on this 16th day of May 2024 at Bismarck, North Dakota.

Desirae Zaste

| | |
|---|---|
| **From:** | Desirae Zaste |
| **To:** | -Info-Oil & Gas Division; Forsberg, Sara L. |
| **Cc:** | Derrick Braaten; Helms, Lynn D.; Bender, Lawrence |
| **Subject:** | Summit Carbon Solutions #2 LLC; NDIC Case Nos. 30873-30876 |
| **Date:** | Wednesday, May 15, 2024 4:31:40 PM |
| **Attachments:** | 240515 Declaration of Service-30873-30876.pdf<br>Petition to Intervene-30873-30876.pdf |

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Good afternoon,

Attached for filing and service are the following documents:

- **Petition to Intervene; and**
- **Declaration of Service.**

**Desirae Zaste¦ Certified Paralegal**

**BRAATEN LAW FIRM**
109 N. 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
Fax: 701-221-5842
www.braatenlawfirm.com

**PRIVILEGED COMMUNICATION**
**This e-mail message is intended only for the named recipient(s) above and is covered by the Electronic Communications Privacy Act, 18 U.S.C. Sections 2510-2521. This e-mail is confidential and may contain information that is privileged, attorney work product or exempt from disclosure under applicable law. Recipients should not file copies of this e-mail with publicly accessible records. If you have received this message in error, please immediately notify the sender by return e-mail and delete this e-mail message from your computer. Thank you for your cooperation.**

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an**

**Case Nos. 30873**
**30874**
**30875**
**30876**

**order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

---

## PETITION TO INTERVENE

---

Pursuant to N.D.C.C. § 28-32-28, John Jochim ("Landowner") hereby petitions to intervene in the above-captioned proceedings. In support of this petition, Landowner states and alleges as follows:

[¶1] On February 6, 2024, Summit Carbon Storage #2, LLC ("SCS") filed an Application for a Permit ("Application") asking the North Dakota Industrial Commission ("NDIC") to grant its application. *See* Case Nos. 30873, 30874, 30875, and 30876.

[¶2] Landowner has property located within the area encompassed by SCS' Applications and it owns real property that will be impacted by SCS's proposed sequestration as referenced in Case Nos. 30873, 30874, 30875, and 30876. Specifically, Landowner owns property that is within the proposed storage facilities.

[¶3] Landowner owns interests in property legally described as follows:

a. Township 142 North, Range 88 West, Mercer County, North Dakota
Section 24: NW¼

[¶4] The legal rights, privileges, and other legal interests of Landowner will be substantially affected by the NDIC's findings and conclusions in this proceeding as they relate to the Applications and other findings that will alter and take away property and other legal rights of Landowner. Landowner files this petition for the purpose of responding in opposition to the Applications.

[¶5] For these reasons Landowner petitions for leave to intervene in this proceeding for the purpose of responding to SCS' Applications and participating in any oral argument or hearings on the application and the right to be heard before the final determination as it relates to Landowner and the legality of the relief requested and which may be provided in these proceedings.

Dated this 15th day of May, 2024.

**BRAATEN LAW FIRM**

*/s/ Derrick Braaten*

Derrick Braaten (ND #06394)
109 North 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
derrick@braatenlawfirm.com

*Attorneys for Landowner*

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an**

**Case No(s). 30873**
**30874**
**30875**
**30876**

**order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

---

## DECLARATION OF SERVICE

---

[¶1] I hereby certify that true and correct copies of the following documents:

- **Petition to Intervene; and**
- **Declaration of Service.**

were, on the 15th day of May, 2024 sent via electronic mail to the following:

North Dakota Industrial Commission
oilandgasinfo@nd.gov
slforsberg@nd.gov

Lynn Helms
lhelms@nd.gov

Lawrence Bender
Attorney at Law
lbender@fredlaw.com

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on this 15th day of May, 2024 at Bismarck, North Dakota.

Desirae Zaste

| | |
|---|---|
| **From:** | Desirae Zaste |
| **To:** | -Info-Oil & Gas Division; Forsberg, Sara L. |
| **Cc:** | Derrick Braaten; Helms, Lynn D.; Bender, Lawrence |
| **Subject:** | Summit Carbon Solutions #2 LLC; NDIC Case Nos. 30873-30876 |
| **Date:** | Wednesday, May 15, 2024 3:58:44 PM |
| **Attachments:** | 240515 Declaration of Service-30873-30876.pdf<br>Petition to Intervene-30873-30876.pdf |

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Good afternoon,

Attached for filing and service are the following documents:

- **Petition to Intervene; and**
- **Declaration of Service.**

**Desirae Zaste¦ Certified Paralegal**

**BRAATEN LAW FIRM**
109 N. 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
Fax: 701-221-5842
www.braatenlawfirm.com

**PRIVILEGED COMMUNICATION**
**This e-mail message is intended only for the named recipient(s) above and is covered by the Electronic Communications Privacy Act, 18 U.S.C. Sections 2510-2521. This e-mail is confidential and may contain information that is privileged, attorney work product or exempt from disclosure under applicable law. Recipients should not file copies of this e-mail with publicly accessible records. If you have received this message in error, please immediately notify the sender by return e-mail and delete this e-mail message from your computer. Thank you for your cooperation.**

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an**

**Case Nos. 30873**
**30874**
**30875**
**30876**

**order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

---

## PETITION TO INTERVENE

---

Pursuant to N.D.C.C. § 28-32-28, Paul and Christy Metz ("Landowners") hereby petition to intervene in the above-captioned proceedings. In support of this petition, Landowners state and allege as follows:

[¶1] On February 6, 2024, Summit Carbon Storage #2, LLC ("SCS") filed an Application for a Permit ("Application") asking the North Dakota Industrial Commission ("NDIC") to grant its application. *See* Case Nos. 30873, 30874, 30875, and 30876.

[¶2] Landowners have property located within the area encompassed by SCS' Applications and it owns real property that will be impacted by SCS's proposed sequestration as referenced in Case Nos. 30873, 30874, 30875, and 30876. Specifically, Landowners own property that is within the proposed storage facilities.

[¶3] Landowners own interests in property legally described as follows:

a. Auditor's Lot 1, a parcel of land in the N½ of the SE¼ of Section 4 Township 141 North Range 87 West of the Fifth Principal Meridian, Oliver County, North Dakota, more particularly described as follows:

Commencing at the East ¼ Corner said Section 4; thence S.00'03'34"E., 774.60', along the East Line of Said Section 4, to the Point of Beginning; thence continuing along the said East line S.00'03'34"E., 58.66'; thence N.63'25'13"W., 803.38'; thence S.01'13'58"E., 416.27'; thence S.74'08'23"W., 204.26'; thence N.61'33'16"W.; 577.21'; thence N.60'45'05"W., 404.12'; thence N.01'56'26"W., 407.78'; thence N.89'47'04"E., 1045.86', thence S.01'48'11"E., 412.49'; thence S.63'30'12"E., 805.92', to the Point of Beginning and containing 18.88 acres more or less.

[¶4] The legal rights, privileges, and other legal interests of Landowners will be substantially affected by the NDIC's findings and conclusions in this proceeding as they relate to the Applications and other findings that will alter and take away property and other legal rights

of Landowners. Landowners file this petition for the purpose of responding in opposition to the Applications.

[¶5] For these reasons Landowners petition for leave to intervene in this proceeding for the purpose of responding to SCS' Applications and participating in any oral argument or hearings on the application and the right to be heard before the final determination as it relates to Landowners and the legality of the relief requested and which may be provided in these proceedings.

Dated this 15th day of May, 2024.

**BRAATEN LAW FIRM**

*/s/ Derrick Braaten*
Derrick Braaten (ND #06394)
109 North 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
derrick@braatenlawfirm.com

*Attorneys for Landowners*

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an**

**Case No(s). 30873**
**30874**
**30875**
**30876**

**order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

---

## DECLARATION OF SERVICE

---

[¶1] I hereby certify that true and correct copies of the following documents:

- **Petition to Intervene; and**
- **Declaration of Service.**

were, on the 15th day of May, 2024 sent via electronic mail to the following:

North Dakota Industrial Commission
oilandgasinfo@nd.gov
slforsberg@nd.gov

Lynn Helms
lhelms@nd.gov

Lawrence Bender
Attorney at Law
lbender@fredlaw.com

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on this 15th day of May, 2024 at Bismarck, North Dakota.

Desirae Zaste

| | |
|---|---|
| **From:** | Desirae Zaste |
| **To:** | -Info-Oil & Gas Division; Forsberg, Sara L. |
| **Cc:** | Derrick Braaten; Helms, Lynn D.; Bender, Lawrence |
| **Subject:** | Summit Carbon Solutions #2 LLC; NDIC Case Nos. 30873-30876 |
| **Date:** | Wednesday, May 15, 2024 3:41:33 PM |
| **Attachments:** | 240515 Declaration of Service-30873-30876.pdf<br>Petition to Intervene-30873-30876.pdf |

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Good afternoon,

Attached for filing and service are the following documents:

- **Petition to Intervene; and**
- **Declaration of Service.**

**Desirae Zaste¦ Certified Paralegal**

**BRAATEN LAW FIRM**
109 N. 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
Fax: 701-221-5842
www.braatenlawfirm.com

**PRIVILEGED COMMUNICATION**
**This e-mail message is intended only for the named recipient(s) above and is covered by the Electronic Communications Privacy Act, 18 U.S.C. Sections 2510-2521. This e-mail is confidential and may contain information that is privileged, attorney work product or exempt from disclosure under applicable law. Recipients should not file copies of this e-mail with publicly accessible records. If you have received this message in error, please immediately notify the sender by return e-mail and delete this e-mail message from your computer. Thank you for your cooperation.**

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an**

**Case Nos. 30873**
**30874**
**30875**
**30876**

**order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

---

## PETITION TO INTERVENE

---

Pursuant to N.D.C.C. § 28-32-28, Michael and Bonnie Haupt ("Landowners") hereby petition to intervene in the above-captioned proceedings. In support of this petition, Landowners state and allege as follows:

[¶1] On February 6, 2024, Summit Carbon Storage #2, LLC ("SCS") filed an Application for a Permit ("Application") asking the North Dakota Industrial Commission ("NDIC") to grant its application. *See* Case Nos. 30873, 30874, 30875, and 30876.

[¶2] Landowners have property located within the area encompassed by SCS' Applications and it owns real property that will be impacted by SCS's proposed sequestration as referenced in Case Nos. 30873, 30874, 30875, and 30876. Specifically, Landowners own property directly between the storage facilities where pore space will be impacted and used by the proposed storage facilities despite those lands not being listed as part of the storage facilities.

[¶3] Landowners own interests in property legally described as follows:

a. The Southeast Quarter (SE 1/4) of Section Thirty-Five (35), Township One Hundred Forty-One (141) North, Range Eighty-Eight (88) West of the Fifth Principal Meridian, Mercer County, North Dakota.

b. The Southwest Quarter (SW 1/4) of Section Twenty-Seven (27), Township One Hundred Forty-One (141) North, Range Eighty-Eight (88) West of the Fifth Principal Meridian, Mercer County, North Dakota.

[¶4] The legal rights, privileges, and other legal interests of Landowners will be substantially affected by the NDIC's findings and conclusions in this proceeding as they relate to the Applications and other findings that will alter and take away property and other legal rights of Landowners. Landowners file this petition for the purpose of responding in opposition to the Applications.

[¶5] For these reasons Landowners petition for leave to intervene in this proceeding for the purpose of responding to SCS' Applications and participating in any oral argument or

hearings on the application and the right to be heard before the final determination as it relates to Landowners and the legality of the relief requested and which may be provided in these proceedings.

Dated this 15th day of May, 2024.

**BRAATEN LAW FIRM**

*/s/ Derrick Braaten*

Derrick Braaten (ND #06394)
109 North 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
derrick@braatenlawfirm.com

*Attorneys for Landowners*

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an**

**Case No(s). 30873**
**30874**
**30875**
**30876**

**order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

---

## DECLARATION OF SERVICE

---

[¶1] I hereby certify that true and correct copies of the following documents:

- **Petition to Intervene; and**
- **Declaration of Service.**

were, on the 15th day of May, 2024 sent via electronic mail to the following:

North Dakota Industrial Commission
oilandgasinfo@nd.gov
slforsberg@nd.gov

Lynn Helms
lhelms@nd.gov

Lawrence Bender
Attorney at Law
lbender@fredlaw.com

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on this 15th day of May, 2024 at Bismarck, North Dakota.

Desirae Zaste

| | |
|---|---|
| **From:** | Meidinger, Lorna B. |
| **To:** | Forsberg, Sara L. |
| **Cc:** | Clark, Andrew; Peterson, Bill |
| **Subject:** | RE: NDIC Notice of Hearing - Summit Carbon Solutions #1 LLC; Summit Carbon Solutions #2 LLC; and Summit Carbon Solutions #3 LLC |
| **Date:** | Wednesday, May 15, 2024 1:29:04 PM |
| **Attachments:** | 24-9060_Survey.pdf<br>24-9061_Survey.pdf<br>24-9062_Survey.pdf<br>image002.png<br>image003.png |

Good afternoon Sarah,

We do have comments regarding these cases and I have attached a letter for each of Summit Carbon Solutions #1-3.

Respectfully,

Lorna Meidinger
Lead Historic Preservationist
State Historical Society of North Dakota
612 E Boulevard Ave
Bismarck, ND 58505
701.328.2089

---

**From:** Peterson, Bill <billpeterson@nd.gov>
**Sent:** Tuesday, April 16, 2024 3:04 PM
**To:** Clark, Andrew <andrewclark@nd.gov>; Meidinger, Lorna B. <lbmeidinger@nd.gov>; Patton, Margaret M. <mmpatton@nd.gov>; Robinson, Andrew J. <andrewrobinson@nd.gov>; Steckler, Lisa L. <lsteckler@nd.gov>
**Subject:** FW: NDIC Notice of Hearing - Summit Carbon Solutions #1 LLC; Summit Carbon Solutions #2 LLC; and Summit Carbon Solutions #3 LLC

Bill Peterson, PhD
Director and ND SHPO
State Historical Society of North Dakota
612 E. Boulevard Ave
Bismarck, ND 58505
701.328.2724
billpeterson@nd.gov
history.nd.gov statemuseum.nd.gov

HISTORY FOR everyone.

**From:** Forsberg, Sara L. <slforsberg@nd.gov>
**Sent:** Tuesday, April 16, 2024 1:28 PM
**Subject:** NDIC Notice of Hearing - Summit Carbon Solutions #1 LLC; Summit Carbon Solutions #2 LLC; and Summit Carbon Solutions #3 LLC

The attached hearing notice is sent pursuant to North Dakota Administrative Code Section 43-05-01-08(5). The fact sheet, storage facility permit application, and draft permit are available for download at:

Class VI - Geologic Sequestration Wells | Department of Mineral Resources, North Dakota (nd.gov)

Thank you,


Sara Forsberg
Legal Assistant, Oil and Gas Division

701.328.8020 • slforsberg@nd.gov • www.dmr.nd.gov

NORTH Dakota | Mineral Resources
Be Legendary.

701.328.8020 • 600 E Boulevard Ave Dept. 474 • Bismarck, ND 58505

May 15, 2024

Lynn Helms
ND Dept. Mineral Resources
600 E Boulevard Ave – Dept 474
Bismarck, ND 58505-0614

**SHSND Ref.: 24-9061 Summit Carbon Solutions #2 in portions of 56 Sections in Mercer and Oliver Counties, North Dakota**

Dear Director Helms,

We reviewed SHSND Ref.: 24-9061 for Case Numbers 30873, 30874, 30875, 30876 and have a few comments. Seismic testing can adversely affect certain types of sensitive cultural sites and our office should be contacted regarding areas to avoid prior to any of this type of testing.

While we know a Class III (pedestrian survey) of cultural resources is underway for the pipeline, we are not able to verify at this time if that survey includes all of the injection wells, monitoring wells, and any of new ground disturbance for associated access to these wells. We recommend each of those sites be surveyed and the survey must follow "North Dakota SHPO Guidelines Manual for Cultural Resource Inventory Projects," which is available at https://www.history.nd.gov/hp/hpforms.html.

Thank you for the opportunity to review this project to date. We look forward to review of the Class III survey for archaeological resources. If you have any questions please contact Lorna Meidinger, Lead Historic Preservation Specialist at (701) 328-2089 or lbmeidinger@nd.gov.

Sincerely,

*for* William D. Peterson, PhD
Director, State Historical Society of North Dakota

24-9061

RECEIVED
MAY - 6 2024
MINERAL RESOURCES

This is Gary Boeckel
I am Not for the
Storage for Carbon
North Dakota is Not
a State to store let
all the other State Build
there own our
Roads will Be Ruined
the tax Payers will
have to fix the
Roads

**Gary Boeckel**
4648 11th St. S.W.
Stanton, ND 58571


Gary Boeckel


**GARY BOECKEL**
4648 11TH ST. SW
STANTON, ND 58571


BISMARCK ND 585
2 MAY 2024 PM 1 L

Department of Mineral
Oil & gas Division
Calgary Ave Bismarck ND 58505

April 28, 2024

RECEIVED
MAY - 3 2024
MINERAL RESOURCES

Department of Mineral Resources
Oil and Gas Division
1016 East Calgary Avenue
Bismarck, North Dakota 58505

To the Commission:

I am responding to a Notice of Hearing from Summit Carbon Storage.

I am very **STRONGLY OPPOSED** to this proposed carbon dioxide storage facility. I feel that this could negatively affect the land and environment and minerals.

Summit Carbon Storage has a bad reputation as far as respect to land owners such as going onto property without owner's consent doing tests and surveys. This to me is indicative of future abuse and disregard for owners.

North Dakota does not need to be a storage facility for garbage from other states.

Respectfully submitted.

Fay Horn fka Fay Hill
211 2nd Ave.
Washburn ND 58577
701-527-7375
Available 24 hours a day, 7 days a week

Fay Horn

| | |
|---|---|
| **From:** | Etter, Mary |
| **To:** | Helms, Lynn D.; Derrick Braaten |
| **Cc:** | Bender, Lawrence; Forsberg, Sara L.; Kneavel, Ashley M. |
| **Subject:** | Summit Carbon Solutions - NDIC Case Nos. 30869–30880 |
| **Date:** | Tuesday, April 30, 2024 2:11:59 PM |
| **Attachments:** | Summit Carbon Solutions - Response to Motion to Continue & Request for Scheduling Conf.-c.pdf<br>Summit Carbon Storage - Declaration of L. Bender ISO Response in Opposition to Motion to Continue(82337775.1)-c.pdf<br>Summit Carbon Storage - Declaration of J. Skaare ISO Response in Opposition to Motion to Continue(82337018.1)-c.pdf<br>Summit Carbon Solutions - COS - Response and Declarations-c.pdf |

You don't often get email from metter@fredlaw.com. Learn why this is important

******* CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Good afternoon,

Please find the attached documents, listed below, for filing and service with respect to the above-referenced case numbers.

1. Response to Motion to Continue Hearing and Request for Scheduling Conference;
2. Declaration of Lawrence Bender in Support of Summit's Response to Motion for Continuance;
3. Declaration of Jeff Skaare in Support of Summit's Response to Motion for Continuance; and
4. Certificate of Service.

Thank you,
Mary

***Mary Etter***
*Legal Administrative Assistant to Jason R.S. Cassady,*
*Justin G. Hughes, and Spencer D. Ptacek*
Fredrikson & Byron, P.A.
304 East Front Ave, Suite 400 | Bismarck, ND 58504-5639
Direct: 701.221.8642 | Main: 701.221.8700| metter@fredlaw.com
www.fredlaw.com

Fredrikson

*Fredrikson's Bismarck office has moved, please note our new address.*

***This is a transmission from the law firm of Fredrikson & Byron, P.A. and may contain information which is privileged, confidential, and protected by the attorney-client or attorney work product privileges. If you are not the addressee, note that any disclosure, copying, distribution, or use of the contents of this message is prohibited. If you have received this transmission in error, please destroy it and notify us immediately at our telephone number (701) 221-8700.***

**BEFORE THE INDUSTRIAL COMMISSION**
**OF THE STATE OF NORTH DAKOTA**

**CASE NOS. 30869–30880**

**In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1,**

**11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by**

**nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of**

**carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the**

**geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## RESPONSE TO MOTION TO CONTINUE HEARING AND REQUEST FOR SCHEDULING CONFERENCE

[¶ 1] Applicants Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC (collectively, "Summit"), by and through their counsel, Lawrence Bender, Fredrikson & Byron, P.A., 304 East Front Avenue, Suite 400, Bismarck, ND 58504-5639, hereby submit this brief in response to the motion to continue filed with the North Dakota Industrial Commission ("Commission") by the Swenson Living Trust (the "Trust") on April 25th, 2024. For the reasons set forth herein, the Commission should deny the Trust's motion

and proceed with the hearing currently scheduled for the above-captioned cases on June 11th and 12th, 2024 (the "Hearing").

## RELEVANT FACTUAL BACKGROUND

[¶ 2] The Petitions to Intervene filed by the Trust in the above-captioned cases indicate the Trust owns approximately 676.43 acres in the vicinity of the proposed carbon dioxide storage facility locations referenced in the caption above, but only 359.4 acres are located within the horizontal boundaries of the storage facility proposed by Summit Carbon Storage #2, LLC and/or the one-half mile notice area surrounding the storage facility proposed by Summit Carbon Storage #2, LLC. Declaration of Jeff Skarre in Support of Summit's Response to Motion for Continuance ("Skaare Decl."), ¶ 2. The Trust does not own any interests within the horizontal boundaries of the storage facilities proposed by Summit Carbon Storage #1, LLC or Summit Carbon Storage #3, LLC. *Id.* ¶ 3.

[¶ 3] On June 9, 2023, Summit submitted initial draft applications to the Commission seeking permits related to the three proposed carbon dioxide storage facilities described in the caption, above. *Id.* ¶ 4. On February 8, 2024, the Commission notified Summit that each of the applications were complete and had been sent to the North Dakota Department of Environmental Quality for review. *Id.* ¶ 5.

[¶ 4] Summit Carbon Solutions, LLC has been in contact with Kurt Swenson, Trustee of the Trust, since August of 2021 and has had multiple meetings with Mr. Swenson since that time regarding the storage facility proposed by Summit Carbon Solutions #2, LLC. *Id.* ¶ 6. Summit Carbon Solutions, LLC sent Formal Option and Lease offers to the Trust via certified mail on July 7, 2023, and again on March 25, 2024. *Id.* Summit Carbon Solutions, LLC also sent a meeting invitation to all surface owners within the proposed storage facility boundaries and within

the one-half mile hearing notice area for an open house meeting at the Beulah Civic Center on April 3, 2024. *Id.* ¶ 7. Kurt and Faye Swenson were both in attendance at this open house. *Id.*

[¶ 5] On April 16, 2024, Summit deposited notice of the Hearing with the U.S. Postal Service via certified mail, addressed to each of the persons required to receive notice under N.D.C.C. § 38-22-06(3)–(8) and N.D.A.C. § 43-05-01-08(1). *Id.* ¶ 8. The Trust acknowledged receipt of the hearing notice on April 18, 2024. *Id.* ¶ 9.

[¶ 6] Service of notice of the Hearing required in 2,615 certified mailings, at $9.68 per mailing, for a total cost to Summit of $25,313.20, with additional processing costs charged by Summit's third-party document handler in the amount of $575.30. *Id.* ¶ 10. The foregoing does not include the additional expense incurred by Summit for mailing supplies, for printing, or for labor by Summit's own administrative staff. *Id.*

[¶ 7] Summit is not aware of any discovery requests, deposition notices, or expert disclosures served by the Trust in connection with the above-captioned cases. Declaration of Lawrence Bender in Support of Summit's Response to Motion for Continuance ("Bender Decl.") ¶ 2. Summit is not aware of any attempt by the Trust to contact Summit regarding the requested continuance prior to filing the present motion. *Id.* ¶ 3.

## LEGAL STANDARD

[¶ 8] The Trust's motion does not specify the authority under which it seeks a continuance. Neither N.D.C.C. ch. 38-22 nor the Commission's regulations thereunder in N.D.A.C. ch. 43-05-01 provide any authority for continuing a hearing on Summit's applications. N.D.C.C. ch. 28-32 likewise does not address continuances. To Summit's knowledge, the only relevant provision specifying a basis and procedure for requesting and granting continuances of administrative hearings is set forth in the Office of Administrative Hearings Uniform Rule of

Administrative Procedure for Adjudicative Proceedings. Specifically, N.D.A.C. § 98-02-03-07 provides as follows:

> A party seeking a continuance shall first contact the other parties for the purpose of obtaining a stipulated agreement. If the party seeking the continuance is unable to secure a stipulated agreement then that party shall submit a written request for continuance to the hearing officer, with copies served upon the parties of record. These requirements may be waived by the hearing officer if circumstances arise to make compliance unreasonable. The hearing officer may not approve a continuance except for good cause shown. The hearing officer may order a continuance upon the hearing officer's own motion.

The Commission should not approve a continuance of the hearing unless it finds the Trust has met the foregoing criteria.

## ARGUMENT

[¶ 9] The Trust's motion for a continuance should be denied for several reasons. First, the motion should be denied because it is procedurally defective. Such motions can only be made by "parties," and the Trust is not a "party" as that term is defined by the Administrative Agencies Practice Act. Such motions can also only be made after the moving party has conferred with the non-moving party(s) in an attempt to obtain a stipulated continuance, which the Trust has not done in this case.

[¶ 10] Second, the motion should be denied because the Trust has not shown good cause for a continuance. The Hearing is imminent and postponing the Hearing at this time would be prejudicial to Summit. The Trust claims that it needs to conduct discovery, and that it will be unable to do so in the time remaining until the Hearing but offers no support for this claim beyond conclusory assertions. As a result, the Trust has failed to show good cause and, under N.D.A.C. § 98-02-03-07 the Commission may not approve the requested continuance.

## I. The Trust's motion for continuance is procedurally defective.

[¶ 11] The Commission should deny the Trust's motion for continuance because, notwithstanding the merits of the request, which are discussed below, the Trust has not complied with the requirements for making such a request. First, the Trust has not shown that it is a "party" entitled to make such a request. Second, the Trust did not first contact Summit for the purpose of obtaining a stipulated agreement to continue the Hearing before requesting a continuance from the Commission.

### A. The Trust is not a "party" entitled to seek a continuance of the Hearing.

[¶ 12] N.D.A.C. § 98-02-03-07 allows a "party" to seek a continuance of a hearing in an adjudicative proceeding. N.D.C.C. § 28-32-01(9) defines a "party" as "each person named or admitted as a party or properly seeking and entitled as of right to be admitted as a party." Thus, to be qualified to request a continuance of the Hearing, the Trust must be either a "person named or admitted as a party" or a person "properly seeking and entitled as of right to be admitted as a party."

[¶ 13] The Trust is not a "person," as that term is defined by the Administrative Agencies Practice Act. N.D.C.C. § 28-32-01(10) defines a person as "an individual, association, partnership, corporation, limited liability company, the [North Dakota ethics commission], a state governmental agency or governmental subdivision, or an agency of such governmental subdivision." Trusts are not considered persons for purposes of agency proceedings, just as they are not considered persons for purposes of judicial proceedings. "A trust generally is not a separate legal entity, and cannot sue or be sued in its own name." *Western Life Trust v. State*, 536 N.W.2d 709, 712 (N.D. 1995) (concluding that appeal by the Western Life Trust must be dismissed because the trust was "not a proper party and lacks capacity to sue").

[¶ 14] The Trust was also not "named" as a party in any of the above-captioned cases; only Summit, the applicant, is named as a party. In recognition of this fact, the Trust filed Petitions to Intervene in the above-captioned cases on April 18, 2024. To Summit's knowledge, those petitions have not yet been granted by the Commission. Thus, the Trust has not been "admitted" as a party in any of the above-captioned cases.

[¶ 15] The Trust is not "properly seeking" and "entitled as of right" to be admitted as a party in the above-captioned cases. Intervention in adjudicative proceedings is governed by N.D.C.C. § 28-32-28, which reads as follows:

> An administrative agency may grant intervention in an adjudicative proceeding to promote the interests of justice if intervention will not impair the orderly and prompt conduct of the proceeding and if the petitioning intervenor demonstrates that the petitioner's legal rights, duties, privileges, immunities, or other legal interests may be substantially affected by the proceeding or that the petitioner qualifies as an intervenor under any provision of statute or rule. The agency may impose conditions and limitations upon intervention. The agency shall give reasonable notice of the intervention to all parties. An administrative agency may adopt rules relating to intervention in an adjudicative proceeding.

A nonparty "properly" seeking to be admitted as a party to an adjudicative proceeding must comply with the foregoing. As a result, not only must the would-be intervenor demonstrate that its "legal rights, duties, privileges, immunities, or other legal interests may be substantially affected by the proceeding," but the proposed intervention must also not "impair the orderly and prompt conduct of the proceeding."

[¶ 16] In its Petitions to Intervene the Trust asserts that it owns property in the lands comprising Summit's proposed storage facilities and, as a result, "[t]he legal rights, privileges, and other interests of the Trust will be substantially affected by the [Commission's] findings and conclusions in [the above-captioned cases]." Summit does not dispute these assertions as to NDIC Case Nos. 30873 through 30876, and as such Summit does not dispute the Trust has demonstrated that its legal rights, duties, privileges, immunities, or other legal interests may be substantially

affected by proceedings in those cases. *See* Skaare Decl., ¶ 2. But the Trust does not own any property in the lands comprising the storage facilities proposed in the other eight cases captioned above, and as such the Trust cannot demonstrate that its legal rights, duties, privileges, immunities, or other legal interests may be substantially affected by proceedings in those cases. *See id.* ¶ 3.

[¶ 17] The Petitions to Intervene do not address whether the Trust's intervention would "impair the orderly and prompt conduct of the proceeding[s]." The reason for this omission is apparent now that the Trust has filed its motion for continuance, by which the Trust seeks to postpone the Hearing to an indefinite date in the future. Though not disclosed in the Petitions to Intervene, the Trust's intervention in the above-captioned cases would plainly impair the orderly and prompt conduct thereof.

[¶ 18] Based on the foregoing, the Trust is not a "person" "named," "admitted," or "properly seeking and entitled as of right to be admitted" in the above-captioned cases. As such, the Trust is not a "party," to the above-captioned cases and cannot properly request a continuance of the Hearing. Also based on the foregoing, the Trust's Petitions to Intervene should be denied or, at most, be granted on the condition that the Hearing will not be postponed.[1]

**B. The Trust did not contact Summit for the purpose of obtaining a stipulated agreement before seeking a continuance.**

[¶ 19] A party seeking a continuance "shall first contact the other parties for the purpose of obtaining a stipulated agreement." N.D.A.C. § 98-02-03-07. Only after the party is unsuccessful at obtaining a stipulated agreement may the party then submit a written request for

[1] Summit notes that, per the Petition to Intervene, the Trust sought intervention "for the purpose of responding to [Summit's] Applications and participating in any oral argument or hearings." The Petitions made no mention of the need for discovery, depositions, or analyses by undisclosed experts. Accordingly, granting the Petitions on the condition that the Hearing will not be postponed would be entirely consistent therewith. Doing so would presumably moot the present motion to continue.

continuance. *Id.* The motion for continuance gives no indication that the Trust attempted to contact Summit about a continuance prior to making its motion, nor is Summit aware of any such attempt. Bender Decl., ¶ 3. Because the Trust failed to contact Summit for the purpose of obtaining a stipulated agreement, the Trust is not yet entitled to request a continuance under N.D.A.C. § 98-02-03-07. As a result, its motion must be denied.

**II. The Trust has failed to show good cause for the requested continuance.**

[¶ 20] In addition to the procedural defects discussed above, the Commission should deny the Trust's motion for continuance because it fails on the merits. N.D.A.C. § 98-02-03-07 provides that the Commission "may not approve a continuance except for good cause shown." The Trust has not shown good cause for a continuance. It offers only conclusory assertions about the need for discovery that preclude any meaningful assessment by Summit and the Commission, and it neglects to account for the prejudice that Summit would suffer if the Hearing were continued.

[¶ 21] In a prior case the Commission considered whether good cause existed to reopen fact discovery after the deadline to complete fact discovery had closed. *See* Order on Sinclair Oil & Gas Co. and Missouri River Royalty Corp.'s Motion to Compel and Reopen Discovery, Case No. 28637. The Commission noted that good cause for extending discovery deadlines can generally be shown if the party seeking relief can show that the deadlines cannot reasonably be met despite the party's diligence. *Id.* at 3. The Commission considered six factors in that case to determine whether good cause existed: (1) whether the hearing was imminent; (2) whether the request is opposed; (3) whether the non-moving party would be prejudiced; (4) whether the moving party was diligent in obtaining discovery within the guidelines established by the Commission; (5) the foreseeability of the need for additional discovery in light of the time allotted by the Commission; and (6) the likelihood that the discovery will lead to relevant evidence. *Id.* at 3–4. Though the Trust's motion is not one to reopen discovery that has closed, a consideration of the

"good cause" factors relied on by the Commission in Case No. 28637 demonstrates why good cause is lacking from the present motion.

**A. The Hearing is imminent.**

[¶ 22] The Hearing is approximately six weeks away and was just under seven weeks away when the Trust filed its motion to continue. Notice of the Hearing has been properly made by Summit. *See* Skaare Decl., ¶¶ 8–10. The Commission has opened the public notice and comment period, which will conclude on June 10th, 2024, one day before the Hearing. As such, the Hearing is imminent, and the first factor weighs against a continuance. *See* Order on Sinclair Oil & Gas Co. and Missouri River Royalty Corp.'s Motion to Compel and Reopen Discovery, Case No. 28637, p. 4 (characterizing a hearing scheduled to take place approximately four weeks after the subject motion as "imminent").

**B. Summit opposes and would be prejudiced by a continuance.**

[¶ 23] Summit opposes the Trust's request for a continuance. Summit has already paid over $25,000 to provide the required notice of the Hearing. *See* Skaare Decl., ¶ 10. Postponing the Hearing would force Summit to once again incur significant, unrecoverable costs to provide notice of a new hearing date. Also, Summit personnel, including witnesses, corporate representatives, and in-house legal counsel, have already made travel and other plans to be available for the Hearing as scheduled. *Id.* ¶ 11. Postponing the hearing would negate these scheduling efforts. As such, the second and third factors weigh against a continuance.

**C. The Trust has not demonstrated that it was diligent, that the need for discovery was previously unforeseeable, or that discovery would lead to relevant evidence.**

[¶ 24] The fourth, fifth, and sixth "good cause" factors require, as an initial matter, detailed information about the discovery sought by the moving party. The Trust's counsel asserts that "[w]ith the hearing less than 60 days away, this does not allow adequate time to conduct

discovery, depositions, or to allow time for expert reports or resolve any discovery disputes in this matter." Declaration of Derrick Braaten in Support of Motion to Continue Hearing and Request for Scheduling Conference ("Braaten Decl."), ¶ 5. Conclusory statements like these, when unsupported by specific factual detail, are ordinarily not considered competent evidence. *Cf., e.g., Spratt v. MDU Res. Grp., Inc.,* 2011 ND 94, ¶ 7, 797 N.W.2d 328 (explaining that a party resisting summary judgment must "set forth specific facts by presenting competent, admissible evidence" and "may not simply rely upon . . . unsupported, conclusory allegations"). Summit is not aware of any discovery requests served by the Trust in the above-captioned cases. Bender Decl., ¶ 2. Without knowing what discovery the Trust wishes to conduct, neither Summit nor the Commission can determine whether such discovery would lead to relevant evidence, whether the Trust has been diligent, whether the continuance requested is commensurate with the Trust's anticipated discovery, etc. As a result, the fourth, fifth, and sixth factors weigh neither for nor against a continuance.

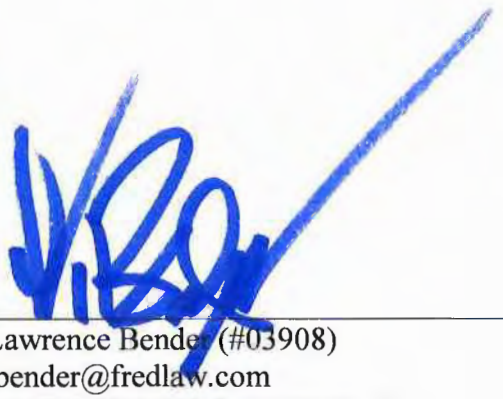
**D. The "good cause" factors do not support a continuance.**

[¶ 25] Based on the foregoing, none of the "good cause" factors weigh in favor of the continuance the Trust seeks. Three factors weigh against a continuance, and the other three factors should not be given any weight because they cannot be meaningfully assessed. Accordingly, because the Trust has not shown good cause, the Commission must deny the motion for continuance.

## CONCLUSION

[¶ 26] For the foregoing reasons, Summit respectfully requests the Commission deny the Trust's motion for continuance. While Summit does not oppose the scheduling conference requested by the Trust, Summit believes such a conference is unnecessary, and Summit presumes that denial of the motion for continuance will moot the Trust's request for a scheduling conference.

Dated this 30th day of April, 2024.

By: 

Lawrence Bender (#03908)
lbender@fredlaw.com
**FREDRIKSON & BYRON, P.A.**
304 East Front Avenue, Suite 400
Bismarck, ND 58504
(701) 221-8700
*Attorneys for Summit Carbon Storage #1, LLC*

**BEFORE THE INDUSTRIAL COMMISSION**
**OF THE STATE OF NORTH DAKOTA**

**CASE NOS. 30869–30880**

**In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1,**

**11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by**

**nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of**

**carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the**

**geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## DECLARATION OF LAWRENCE BENDER IN SUPPORT OF SUMMIT'S RESPONSE TO MOTION FOR CONTINUANCE

STATE OF NORTH DAKOTA )
) ss:
COUNTY OF BURLEIGH )

Lawrence Bender, being first duly sworn upon oath, states and alleges as follows:

[¶ 1] I am counsel for the above-named applicants Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC (collectively,

"Applicants"). In that capacity I am familiar with and have personal knowledge of the facts set forth below.

[¶ 2] I am not aware of any discovery requests, deposition notices, or expert disclosures served by the Swenson Living Trust ("Trust") in connection with the above-captioned cases.

[¶ 3] I am not aware of any attempt by the Trust to contact Applicants regarding a continuance of the hearing scheduled for June 11-12, 2024, prior to the Trust's filing of its motion for a continuance.

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on the 30th day of April, 2024, at Bismarck, North Dakota, USA.

By: _____

Lawrence Bender (#03908)
lbender@fredlaw.com
**FREDRIKSON & BYRON, P.A.**
304 East Front Avenue, Suite 400
Bismarck, ND 58504
(701) 221-8700

#82328879v1

**BEFORE THE INDUSTRIAL COMMISSION**
**OF THE STATE OF NORTH DAKOTA**

**CASE NOS. 30869–30880**

**In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1,**

**11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by**

**nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of**

**carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the**

**geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## DECLARATION OF JEFF SKAARE IN SUPPORT OF SUMMIT'S RESPONSE TO MOTION FOR CONTINUANCE

STATE OF NORTH DAKOTA )
) ss:
COUNTY OF BURLEIGH )

Jeff Skaare, being first duly sworn upon oath, states and alleges as follows:

[¶ 1] I am Director of Land, Legal and Regulatory Affairs at Summit Carbon Solutions, LLC. The above-named applicants Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC (collectively, "Applicants") are wholly-owned

subsidiaries of Summit Carbon Solutions LLC. In my capacity as Director of Land, Legal and Regulatory Affairs at Summit Carbon Solutions, LLC I am familiar with and have personal knowledge of the facts set forth below.

[¶ 2] According to the lands listed in the Petition to Intervene filed by the Swenson Living Trust ("Trust"), the Trust owns approximately 676.43 acres in the vicinity of the proposed storage facility locations, but only 359.4 acres are located within the horizontal boundaries of the Summit Carbon Storage #2 storage facility or within the one-half (½) mile notice area of the Summit Carbon Storage #2 storage facility.

[¶ 3] The Trust does not own any interests within the horizontal boundaries of the Summit Carbon Storage #1 or Summit Carbon Storage #3 storage facilities, nor within the one-half (½) mile hearing notice areas of such facilities.

[¶ 4] On June 9, 2023, the Applicants submitted initial draft applications to the North Dakota Industrial Commission ("Commission") seeking permits related to the three proposed carbon dioxide storage facilities described in the above-captioned matters.

[¶ 5] On February 8, 2024, the Commission notified the Applicants that each of their respective applications were complete and had been sent to the North Dakota Department of Environmental Quality for review.

[¶ 6] Summit Carbon Solutions, LLC has been in contact with Kurt Swenson, Trustee of the Trust since August of 2021 and has held multiple meetings with him. Formal Option and Lease offers were sent to the Trust via certified mail on July 7, 2023; and were sent again via certified mail on March 25, 2024.

[¶ 7] Summit Carbon Solutions, LLC sent a meeting invitation to all surface owners within the proposed storage facility boundaries and within the one-half (½) mile hearing notice

area for an open house meeting at the Beulah Civic Center on April 3, 2024. Trustees, Kurt and Faye Swenson were both in attendance at this open house.

[¶ 8] On April 16, 2024, Summit Carbon Solutions, LLC and Applicants deposited notice of the hearing date set by the Commission for the above-captioned cases with the U.S. Postal Service via certified mail, addressed to each of the persons required to receive notice under N.D.C.C. § 38-22-06(3)–(8) and N.D.A.C. § 43-05-01-08(1).

[¶ 9] The Trust acknowledged receipt of the hearing notice on April 18, 2024, signed for by F. Swenson.

[¶ 10] Service of notice required in 2,615 certified mailings, at $9.68 per mailing, for a total cost to Summit of $25,313.20. Summit hired Presort Plus to support it mailing efforts and incurred processing costs in the amount of $575.30. Summit also incurred printing costs, costs to obtain mailing supplies, and labor costs for Summit's administrative staff who assisted in preparing the above-referenced mailings.

[¶ 11] I have overseen and confirmed arrangements for Summit personnel, including witnesses, corporate representatives, and in-house legal counsel, to be available for the June 11-12, 2024, hearing in the above-captioned cases.

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on the 30th day of April, 2024, at Bismarck, North Dakota, USA.

By: _____
Jeff Skaare

#82334071v1

**BEFORE THE INDUSTRIAL COMMISSION**
**OF THE STATE OF NORTH DAKOTA**

**CASE NOS. 30869–30880**

**In re application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1,**

**11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by**

**nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of**

**carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

**In re application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND.**

**In re application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the**

**geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31 , 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

## CERTIFICATE OF SERVICE

[¶ 1] I, the undersigned, hereby certify that a true and correct copy of the following documents:

1. Response to Motion to Continue Hearing and Request for Scheduling Conference;
2. Declaration of Lawrence Bender in Support of Summit's Response to Motion for Continuance; and
3. Declaration of Jeff Skaare in Support of Summit's Response to Motion for Continuance

were, on April 30, 2024, filed electronically with the North Dakota Industrial Commission and served upon the following therewith:

Lynn Helms
lhelms@nd.gov

Derrick Braaten
derrick@braatenlawfirm.com

Dated this 30th day of April, 2024.

By: _____

Lawrence Bender (#03908)
lbender@fredlaw.com
**FREDRIKSON & BYRON, P.A.**
304 East Front Avenue, Suite 400
Bismarck, ND 58504
(701) 221-8700
*Attorneys for Summit Carbon Storage #1, LLC*

| | |
|---|---|
| **From:** | Entzi-Odden, Lyn |
| **To:** | Helms, Lynn D. |
| **Cc:** | Forsberg, Sara L.; -Info-Oil & Gas Division; derrick@braatenlawfirm.com; Jay Volk; Bender, Lawrence; Gludt, Tyler; Hughes, Bethany; Etter, Mary; Nagel, Kimberly; desirae@braatenlawfirm.com |
| **Subject:** | RE: L. Helms Letter RE Cases 30869 - 30880 |
| **Date:** | Friday, April 26, 2024 4:25:29 PM |
| **Attachments:** | image001.png<br>L Helms letter revised.pdf |

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Director Helms,

Please see the attached letter which correctly reflects Tuesday, **April** 30, 2024, not May 30, 2024. Our apologies for the discrepancy.

Fredrikson

**Lyn Entzi-Odden**
**Office Administrator / Executive Legal Assistant**
304 East Front Avenue | Suite 400 | Bismarck, ND 58501
Ph: 701.221.8741|lodden@fredlaw.com
***Fredrikson's Bismarck office has moved, please note our new address.***

**This is a transmission from the law firm of Fredrikson & Byron, P.A. and may contain information which is privileged, confidential, and protected by the attorney-client or attorney work product privileges. If you are not the addressee, note that any disclosure, copying, distribution, or use of the contents of this message is prohibited. If you have received this transmission in error, please destroy it and notify us immediately at our telephone number (701) 221-8700. The name and biographical data provided above are for informational purposes only and are not intended to be a signature or other indication of an intent by the sender to authenticate the contents of this electronic message.**

**From:** Entzi-Odden, Lyn
**Sent:** Friday, April 26, 2024 4:03 PM
**To:** lhelms@nd.gov
**Cc:** Forsberg, Sara L.. <slforsberg@nd.gov>; oilandgasinfo@nd.gov; derrick@braatenlawfirm.com; Jay Volk <jvolk@summitcarbon.com>; Bender, Lawrence <LBender@fredlaw.com>; Gludt, Tyler <TGludt@fredlaw.com>; Hughes, Bethany <BHughes@fredlaw.com>; Etter, Mary <METter@fredlaw.com>; Nagel, Kimberly <KNagel@fredlaw.com>; desirae@braatenlawfirm.com
**Subject:** L. Helms Letter RE Cases 30869 - 30880

Director Helms,

Please see the attached letter with regard to the captioned matters.

Fredrikson

**Lyn Entzi-Odden**
**Office Administrator / Executive Legal Assistant**
304 East Front Avenue | Suite 400 | Bismarck, ND 58501

Ph: 701.221.8741|lodden@fredlaw.com

*Fredrikson's Bismarck office has moved, please note our new address.*

**This is a transmission from the law firm of Fredrikson & Byron, P.A. and may contain information which is privileged, confidential, and protected by the attorney-client or attorney work product privileges. If you are not the addressee, note that any disclosure, copying, distribution, or use of the contents of this message is prohibited. If you have received this transmission in error, please destroy it and notify us immediately at our telephone number (701) 221-8700. The name and biographical data provided above are for informational purposes only and are not intended to be a signature or other indication of an intent by the sender to authenticate the contents of this electronic message.**

Fredrikson

**Fredrikson & Byron, P.A.**
Attorneys and Advisors

304 East Front Avenue, Suite 400
Bismarck, ND 58504-5639
Main: 701.221.8700
fredlaw.com

April 26, 2024

***VIA E-MAIL***

Mr. Lynn Helms, Director
Department of Mineral Resources
1016 East Calgary Avenue
Bismarck, ND 58503-5512

**RE: Case Nos. 30869, 30870, 30871, 30872, 30873, 30874, 30875, 30876, 30877, 30878, 30879, 30880**

Dear Mr. Helms:

Please be advised that the applicants in the above-referenced cases will provide a response to the request to intervene and the request for a continuance filed by Mr. Derrick Braaten on behalf of his client, Kurt Swenson, not later than 5:00 p.m. on Tuesday, April 30, 2024.

Should you have any questions, please advise.

Sincerely,

LAWRENCE BENDER

LB/tjg
#82317541v1

cc: Mr. Derrick Braaten (via e-mail)

| | |
|---|---|
| **From:** | Entzi-Odden, Lyn |
| **To:** | Helms, Lynn D. |
| **Cc:** | Forsberg, Sara L.; -Info-Oil & Gas Division; derrick@braatenlawfirm.com; Jay Volk; Bender, Lawrence; Gludt, Tyler; Hughes, Bethany; Etter, Mary; Nagel, Kimberly; desirae@braatenlawfirm.com |
| **Subject:** | L. Helms Letter RE Cases 30869 - 30880 |
| **Date:** | Friday, April 26, 2024 4:05:22 PM |
| **Attachments:** | image001.png<br>L Helms letter 30869-30880.pdf |

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Director Helms,

Please see the attached letter with regard to the captioned matters.

Fredrikson

**Lyn Entzi-Odden**
**Office Administrator / Executive Legal Assistant**
304 East Front Avenue | Suite 400 | Bismarck, ND 58501
Ph: 701.221.8741|lodden@fredlaw.com
***Fredrikson's Bismarck office has moved, please note our new address.***

**This is a transmission from the law firm of Fredrikson & Byron, P.A. and may contain information which is privileged, confidential, and protected by the attorney-client or attorney work product privileges. If you are not the addressee, note that any disclosure, copying, distribution, or use of the contents of this message is prohibited. If you have received this transmission in error, please destroy it and notify us immediately at our telephone number (701) 221-8700. The name and biographical data provided above are for informational purposes only and are not intended to be a signature or other indication of an intent by the sender to authenticate the contents of this electronic message.**

Fredrikson

**Fredrikson & Byron, P.A.**
Attorneys and Advisors

304 East Front Avenue, Suite 400
Bismarck, ND 58504-5639
Main: 701.221.8700
fredlaw.com

April 26, 2024

***VIA E-MAIL***

Mr. Lynn Helms, Director
Department of Mineral Resources
1016 East Calgary Avenue
Bismarck, ND 58503-5512

**RE: Case Nos. 30869, 30870, 30871, 30872, 30873, 30874, 30875, 30876, 30877, 30878, 30879, 30880**

Dear Mr. Helms:

Please be advised that the applicants in the above-referenced cases will provide a response to the request to intervene and the request for a continuance filed by Mr. Derrick Braaten on behalf of his client, Kurt Swenson, not later than 5:00 p.m. on Tuesday, May 30, 2024.

Should you have any questions, please advise.

Sincerely,

LAWRENCE BENDER

LB/tjg
#82317541v1

cc: Mr. Derrick Braaten (via e-mail)

| | |
|---|---|
| **From:** | Desirae Zaste |
| **To:** | -Info-Oil & Gas Division; Forsberg, Sara L.; Helms, Lynn D.; jvolk@summitcarbon.com; Bender, Lawrence |
| **Cc:** | Derrick Braaten |
| **Subject:** | Summit Carbon Solutions #2 LLC; NDIC Case Nos. 30873-30876 |
| **Date:** | Thursday, April 25, 2024 4:14:15 PM |
| **Attachments:** | Brief to Continue-30873-30876.pdf<br>Declaration of DB in support of Mot to Continue-30873-30876.pdf<br>Motion to Continue-30873-30876.pdf<br>240425 Declaration of Service-30873-30876.pdf |

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Good afternoon,

Attached for filing and service is a copy of the following documents:

- **Motion to Continue Hearing and Request for Scheduling Conference;**
- **Brief in Support of Motion to Continue Hearing and Request for Scheduling Conference;**
- **Declaration of Derrick Braaten in Support of Motion to Continue Hearing and Request for Scheduling Conference; and**
- **Declaration of Service.**

Thank you.

**DESIRAE ZASTE** ¦ Certified Paralegal

desirae@braatenlawfirm.com

**BRAATEN LAW FIRM**
109 N. 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
Fax: 701-221-5842
www.braatenlawfirm.com

**PRIVILEGED COMMUNICATION**
**This e-mail message is intended only for the named recipient(s) above and is covered by the Electronic Communications Privacy Act, 18 U.S.C. Sections 2510-2521. This e-mail is confidential and may contain information that is privileged, attorney work product or exempt from disclosure under applicable law. Recipients should not file copies of this e-mail with publicly accessible records. If you have received this message in error, please immediately notify the sender by return e-mail and delete this e-mail message from your computer. Thank you for your cooperation.**

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the**

**Case No(s). 30873**
**30874**
**30875**
**30876**

**amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

---

## MOTION TO CONTINUE HEARING AND REQUEST FOR SCHEDULING CONFERENCE

---

Intervenor The Swenson Living Trust, by and through its undersigned counsel, hereby moves to continue the hearing in the above-captioned matter, currently scheduled for June 11-12, 2024. The Swenson Living Trust requests this matter be rescheduled for a time on or after September 12, 2024. The Swenson Living Trust also requests that a Scheduling Conference be

scheduled in this matter. This Motion is supported by the Brief in Support and the Declaration of Derrick Braaten.

DATED this 25th day of April, 2024.

**BRAATEN LAW FIRM**

*/s/ Derrick Braaten*

Derrick Braaten (ND #06394)
109 North 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
derrick@braatenlawfirm.com

*Attorneys for Intervenor The Swenson Living Trust*

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the**

**Case No(s). 30873**
**30874**
**30875**
**30876**

**amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

---

## BRIEF IN SUPPORT OF MOTION TO CONTINUE HEARING AND REQUEST FOR SCHEDULING CONFERENCE

---

Intervenor The Swenson Living Trust ("Swenson Trust"), by and through its undersigned counsel, submits the following Brief in Support of its Motion to Continue Hearing and Request for Scheduling Conference.

Swenson Trust is requesting this matter be rescheduled from June 11-12, 2024 to a date on or after September 12, 2024 to allow time to conduct discovery, depositions, and to allow time for experts to review materials and analyze the evidence presented in this matter. Swenson Trust will need time to properly conduct discovery and obtain documents, electronic shapefiles, and other data from the applicant. Swenson Trust also requests that a scheduling conference be scheduled in this matter within the next fourteen days to discuss an appropriate schedule.

Swenson Trust received notice on April 16, 2024 with the hearing scheduled for June 11-12, 2024. This is less than 60 days from the date of the hearing. This does not allow adequate time to conduct discovery or resolve discovery disputes in the event it is necessary to resolve the disputes.

Under North Dakota law, Swenson Trust must be afforded a fair hearing. *See* N.D.C.C. § 28-32-46(4). To deny Swenson Trust a continuance based upon the rules and procedure of the administrative agency and require a hearing in less than 60 days will deny Swenson Trust its right to a fair hearing and to procedural and substantive due process. Applicants in these types of adjudicative proceedings have as much time as necessary to prepare applications and witnesses prior to hearings, and indeed this applicant has had the benefit of months of pre-review from the Commission staff. While Swenson Trust has responded quickly and has attempted to serve discovery and hire consultants to review, analyze, and assess the impacts it would have on Swenson Trust's property, it is not possible to have time to adequately conduct discovery and allow experts time to analyze the data and develop their opinions and assessments.

Swenson Trust requests a scheduling conference be scheduled within the next fourteen days to discuss an appropriate schedule and that a continuance be granted and the hearing be rescheduled for a time after September 12, 2024.

DATED this 25th day of April, 2024.

**BRAATEN LAW FIRM**

*/s/ Derrick Braaten*

Derrick Braaten (ND #06394)
109 North 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911

derrick@braatenlawfirm.com

*Attorneys for Intervenor The Swenson Living Trust*

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the**

**Case No(s). 30873**
**30874**
**30875**
**30876**

**amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

---

## DECLARATION OF DERRICK BRAATEN IN SUPPORT OF MOTION TO CONTINUE HEARING AND REQUEST FOR SCHEDULING CONFERENCE

---

1. I am an attorney for The Swenson Living Trust ("Swenson Trust"), in the above-captioned matter.

2. I represent the Swenson Trust in matters involving the application submitted by Summit Carbon Solutions #2, LLC ("SCS").
3. This matter involves a decision of granting SCS' applications regarding carbon dioxide.
4. The hearing on SCS' applications has been scheduled for June 11-12, 2024. Swenson Trust received notice on April 16, 2024.
5. With the hearing less than 60 days away, this does not allow adequate time to conduct discovery, depositions, or to allow time for expert reports or resolve any discovery disputes in this matter.
6. Swenson Trust requests that a scheduling conference be scheduled within the next fourteen days to discuss an appropriate schedule and that a continuance of the June 11-12, 2024 hearing be granted.

**I declare under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.**

Executed this 25th day of April, 2024 in Bismarck, North Dakota.

**Derrick Braaten**

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an**

**Case No(s). 30873**
**30874**
**30875**
**30876**

**order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

---

## DECLARATION OF SERVICE

---

[¶1] I hereby certify that true and correct copies of the following documents:

- **Motion to Continue Hearing and Request for Scheduling Conference;**
- **Brief in Support of Motion to Continue Hearing and Request for Scheduling Conference;**

- **Declaration of Derrick Braaten in Support of Motion to Continue Hearing and Request for Scheduling Conference; and**
- **Declaration of Service.**

were, on the 25th day of April, 2024 sent via electronic mail to the following:

North Dakota Industrial Commission
oilandgasinfo@nd.gov
slforsberg@nd.gov

Lynn Helms
lhelms@nd.gov

Jay Volk
jvolk@summitcarbon.com

Lawrence Bender
Attorney at Law
lbender@fredlaw.com

and by mailing it, enclosed in an envelope, by First-Class mail, postage prepaid, and by depositing it in the United States Mail at Bismarck, North Dakota to:

Summit Carbon Storage #2, LLC
2321 North Loop Drive, Suite #221
Ames, IA 50010

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on this 25th day of April, 2024 at Bismarck, North Dakota.

Desirae Zaste

| | |
|---|---|
| **From:** | Desirae Zaste |
| **To:** | -Info-Oil & Gas Division; Forsberg, Sara L.; Helms, Lynn D.; jvolk@summitcarbon.com; Bender, Lawrence |
| **Cc:** | Derrick Braaten |
| **Subject:** | Summit Carbon Solutions #2 LLC; NDIC Case Nos. 30873-30876 |
| **Date:** | Thursday, April 18, 2024 11:53:11 AM |
| **Attachments:** | Petition to Intervene-30873-30876.pdf<br>240418 Declaration of Service-30873-30876.pdf |

***** **CAUTION:** This email originated from an outside source. Do not click links or open attachments unless you know they are safe. *****

Good morning,

Attached for filing and service is a copy of the following documents:

· **Petition to Intervene; and**

· **Declaration of Service.**

Thank you.

**DESIRAE ZASTE** ¦ Certified Paralegal

desirae@braatenlawfirm.com

**BRAATEN LAW FIRM**
109 N. 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
Fax: 701-221-5842
www.braatenlawfirm.com

**PRIVILEGED COMMUNICATION**
**This e-mail message is intended only for the named recipient(s) above and is covered by the Electronic Communications Privacy Act, 18 U.S.C. Sections 2510-2521. This e-mail is confidential and may contain information that is privileged, attorney work product or exempt from disclosure under applicable law. Recipients should not file copies of this e-mail with publicly accessible records. If you have received this message in error, please immediately notify the sender by return e-mail and delete this e-mail message from your computer. Thank you for your cooperation.**

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an**

**Case No(s). 30873**
**30874**
**30875**
**30876**

**order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

---

## PETITION TO INTERVENE

---

Pursuant to N.D.C.C. § 28-32-28, The Swenson Living Trust ("the Trust"), hereby petitions to intervene in the above-captioned proceedings. In support of this petition, the Trust states and alleges as follows:

[¶1] On February 6, 2024, Summit Carbon Storage #2, LLC ("SCS") filed an Application for a Permit ("Application") asking the North Dakota Industrial Commission ("NDIC") to grant its application. *See* Case Nos. 30873, 30874, 30875, and 30876.

[¶2] The Trust has property located within the area encompassed by SCS' Applications and it owns real property that will be impacted by SCS's proposed sequestration as referenced in Case Nos. 30873, 30874, 30875, and 30876. Specifically, the Trust owns property that is within the proposed storage facilities, and also owns property directly between the storage facilities where pore space will be impacted and used by the proposed storage facilities despite those lands not being listed as part of the storage facilities.

[¶3] The Trust owns interests in property legally described as follows:

a. W1/2 NE1/4 of Section 14, Township 142 North, Range 88 West, Mercer County, ND;

b. SE1/4 of Section 27, Township 143 North, Range 88 West, Mercer County, ND;

c. Outlot B, E1/2 of NW ¼ of Section 7, Township 142 North, Range 87 West, Oliver County, ND;

d. NW1/4 of Section 22, Township 142 North, Range 87 West, Oliver County, ND;

e. SE1/4 of Section 15, Township 142 North, Range 87 West, Oliver County, ND;

f. Section 21, Township 142 North, Range 87 West, Oliver County, ND;

g. SW1/4 of Section 9, Township 142 North, Range 87 West, Oliver County, ND.

[¶4] The legal rights, privileges, and other legal interests of the Trust will be substantially affected by the NDIC's findings and conclusions in this proceeding as they relate to the

Applications and other findings that will alter and take away property and other legal rights of the Trust. The Trust files this petition for the purpose of responding in opposition to the Applications.

[¶5] For these reasons the Trust petitions for leave to intervene in this proceeding for the purpose of responding to SCS' Applications and participating in any oral argument or hearings on the application and the right to be heard before the final determination as it relates to the Trust and the legality of the relief requested and which may be provided in these proceedings.

Dated this 18th day of April, 2024.

**BRAATEN LAW FIRM**

*/s/ Derrick Braaten*
Derrick Braaten (ND #06394)
109 North 4th Street, Suite 100
Bismarck, ND 58501
Phone: 701-221-2911
derrick@braatenlawfirm.com

*Attorneys for*
*The Swenson Living Trust*

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

**In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND**

**In re application of Summit Carbon Storage # 2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.**

**In re application of Summit Carbon Storage # 2, LLC to consider the application of Summit Carbon Storage #2, LLC for an**

**Case No(s). 30873**
**30874**
**30875**
**30876**

**order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.**

**In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.**

---

## DECLARATION OF SERVICE

---

[¶1] I hereby certify that true and correct copies of the following documents:

- **Petition to Intervene; and**
- **Declaration of Service.**

were, on the 18th day of April, 2024 sent via electronic mail to the following:

North Dakota Industrial Commission
oilandgasinfo@nd.gov
slforsberg@nd.gov

Lynn Helms
lhelms@nd.gov

Jay Volk
jvolk@summitcarbon.com

Lawrence Bender
Attorney at Law
lbender@fredlaw.com

and by mailing it, enclosed in an envelope, by First-Class mail, postage prepaid, and by depositing it in the United States Mail at Bismarck, North Dakota to:

Summit Carbon Storage #2, LLC
2321 North Loop Drive, Suite #221
Ames, IA 50010

I declare, under penalty of perjury under the law of North Dakota, that the foregoing is true and correct.

Signed on this 18th day of April, 2024 at Bismarck, North Dakota.

Desirae Zaste

Case No.: 30873
Date Established: April 15, 2024

# DRAFT STORAGE FACILITY PERMIT

## STORAGE FACILITY FOR CARBON SEQUESTRATION UNDER THE NORTH DAKOTA UNDERGROUND INJECTION CONTROL PROGRAM

In compliance with North Dakota Century Code (NDCC) Chapter 38-22 (Carbon Dioxide Underground Storage) and North Dakota Administrative Code (NDAC) Chapter 43-05-01 (Geologic Storage of Carbon Dioxide), Summit Carbon Storage #2, LLC has applied for a carbon dioxide storage facility permit. A draft permit does not grant the authorization to inject. This is a document prepared under NDAC Section 43-05-01-07.2 indicating the Commission's tentative decision to issue a storage facility permit. Before preparing the draft permit, the Commission through the Department of Mineral Resources Oil and Gas Division, consulted with the Department of Environmental Quality, and has determined the storage facility permit application to be complete. The draft permit contains permit conditions required under NDAC Sections 43-05-01-07.3 and 43-05-01-07.4. A fact sheet is included and contains the following information:

1. A brief description of the type of facility or activity which is the subject of the draft permit.
2. The quantity and quality of the carbon dioxide which is proposed to be injected and stored.
3. A brief summary of the basis for the draft permit conditions, including references to applicable statutory or regulatory provisions.
4. The reasons why any requested variances or alternatives to required standards do or do not appear justified.
5. A description of the procedures for reaching a final decision of the draft permit, including:
    a. The beginning and ending dates of the comment period.
    b. The address where comments will be received.
    c. The date, time, and location of the storage facility permit hearing.
    d. Any other procedures by which the public may participate in the final decision.
6. The name and telephone number of a person to contact for additional information.

This draft permit has been established on April 15, 2024, and shall remain in effect until a storage facility permit is granted under NDAC Section 43-05-01-05, unless amended or terminated by the Department of Mineral Resources Oil and Gas Division (Commission).

Tamara Madche, Geologist
Department of Mineral Resources
Oil and Gas Division
Date: April 15, 2024

## I. APPLICANT

Summit Carbon Storage #2, LLC
2321 North Loop Drive, Suite #221
Ames, IA 50010

## II. PERMIT CONDITIONS (NDAC Section 43-05-01-07.3)

1. The storage operator shall comply with all conditions of the permit. Any noncompliance with the permit constitutes a violation and is grounds for enforcement action, including permit termination, revocation, or modification pursuant to section 43-05-01-12.

2. In an administrative action, it shall not be a defense that it would have been necessary for the storage operator to halt or reduce the permitted activity in order to maintain compliance with the conditions of the permit.

3. The storage operator shall take all reasonable steps to minimize or correct any adverse impact on the environment resulting from noncompliance with the storage facility permit.

4. The storage operator shall develop and implement an emergency and remedial response plan pursuant to section 43-05-01-13.

5. The storage operator shall at all times properly operate and maintain all storage facilities which are installed or used by the storage operator to achieve compliance with the conditions of the storage facility permit. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls, including appropriate quality assurance procedures. This provision requires the operation of backup or auxiliary facilities or similar systems only when necessary to achieve compliance with the conditions of the storage facility permit.

6. The permit may be modified, revoked and reissued, or terminated pursuant to section 43-05-01-12. The filing of a request by the storage operator for a permit modification, revocation and reissuance, or termination, or a notification of planned changes or anticipated noncompliance, does not stay any permit condition.

7. The injection well permit or the permit to operate an injection well does not convey any property rights of any sort or any exclusive privilege.

8. The storage operator shall furnish to the Commission, within a time specified by the Commission, any information which the Commission may request to determine whether cause exists for modifying, revoking and reissuing, or terminating the permit, or to determine compliance with the permit. The storage operator shall also

furnish to the Commission, upon request, copies of records required to be kept by the storage facility permit.

9. The storage operator shall allow the Commission, or an authorized representative, upon the presentation of credentials and other documents as may be required by law, to:

    a. Enter upon the storage facility premises where records must be kept under the conditions of the permit;
    b. At reasonable times, have access to and copy any records that must be kept under the conditions of the permit;
    c. At reasonable times, inspect any facilities, equipment, including monitoring and control equipment, practices, or operations regulated or required under the permit; and
    d. At reasonable times, sample or monitor for the purposes of assuring permit compliance, any substances, or parameters at any location.

10. The storage operator shall prepare, maintain, and comply with a testing and monitoring plan pursuant to section 43-05-01-11.4.

11. The storage operator shall comply with the reporting requirements provided in section 43-05-01-18.

12. The storage operator must obtain an injection well permit under section 43-05-01-10 and injection wells must meet the construction and completion requirements in section 43-05-01-11.

13. The storage operator shall prepare, maintain, and comply with a plugging plan pursuant to section 43-05-01-11.5.

14. The storage operator shall establish mechanical integrity prior to commencing injection and maintain mechanical integrity pursuant to section 43-05-01-11.1.

15. The storage operator shall implement the worker safety plan pursuant to section 43-05-01-13.

16. The storage operator shall comply with leak detection and reporting requirements pursuant to section 43-05-01-14.

17. The storage operator shall conduct a corrosion monitoring and prevention program pursuant to section 43-05-01-15.

18. The storage operator shall prepare, maintain, and comply with the area of review and corrective action plan pursuant to section 43-05-01-05.1.

19. The storage operator shall maintain financial responsibility pursuant to section 43-

05-01-09.1.

20. The storage operator shall maintain and comply with post-injection site care and facility closure plan pursuant to section 43-05-01-19.

## III. CASE SPECIFIC PERMIT CONDITIONS

1. NDAC Section 43-05-01-11.4, subsection 1, subdivision b; The operator shall notify the Commission within 24 hours of failure or malfunction of any surface or bottom hole gauges in the BK Fischer 1 (File No. 40124 – NENE 22-142N-88W) and BK Fischer 2 (File No. 40125 – NENE 22-142N-88W) injectors and the Archie Erickson 2 (File No. 38622 – SWSW 12-142N-88W) monitor well.

2. NDAC Section 43-05-01-11, subsection 14 and NDAC Section 43-05-01-11.4, subsection 1, subdivision c; The operator shall run an ultrasonic or other log capable of evaluating internal and external pipe condition to establish a baseline for corrosion monitoring for the BK Fischer 1, BK Fischer 2 and Archie Erickson 2 wells. The operator shall run logs with the same capabilities for the BK Fischer 1 and BK Fischer 2 wells on a 5 year schedule, unless analysis of corrosion coupons or subsequent logging necessitates a more frequent schedule.

3. NDAC Section 43-05-01-11.4, subsection 1, subdivision d and NDAC Section 43-05-01-13, subsection 2; The storage operator shall notify the Commission within 24 hours of any release of carbon dioxide from the storage facility, flow lines, or of carbon dioxide detected above the upper confining zone. Where the Commission or the storage operator obtains evidence that the injected carbon dioxide stream and associated pressure front may endanger an underground source of drinking water, the storage operator shall cease injection immediately, implement the emergency and remedial plan approved by the Commission, and take all steps reasonably necessary to identify and characterize any release.

4. NDAC 43-05-01-11.1 subsections 3 and 5 and NDAC 43-05-01-11.4, subsection 1, subdivision e; External mechanical integrity shall be continuously monitored with the proposed fiber optic lines for the BK Fischer 1, BK Fischer 2 and Archie Erickson 2 wells. The Commission must be notified within 24 hours should a fiber optic line fail. The Commission must be notified prior to severing the line above the confining zone if such an action becomes necessary for remedial work or monitoring activities.

5. NDAC 43-05-01-11.4, subsection 1, subdivision h, paragraph 1; Surface air and soil gas monitoring is required to be implemented as planned by the operator in Section 5.2 (Surface Facilities Leak Detection Plan) and Section 5.7.1 (Soil Gas Monitoring) of its permit.

6. NDAC 43-05-01-10, subsection 9, subdivision c, NDAC 43-05-01-11, subsection

15, and NDAC 43-05-01-11.1, subsection 2; The operator shall notify the Commission at least 48 hours in advance to witness a mechanical integrity test of the tubing-casing annulus for the injection wells and casing annulus for the monitor well. The packer must be set within 100' of the upper most perforation and in the 25CR-80 casing for the BK Fischer 1 and BK Fischer 2 injectors and 13CR-80 casing for the Archie Erickson 2 monitor should tubing and packer be installed. Dependent on evaluation, the operator shall run the same test on a 5 year schedule for the BK Fischer 1, BK Fischer 2 and Archie Erickson 2 wells.

7. NDAC 43-05-01-11, subsections 3 and 5; The operator shall continuously monitor the surface casing-long string casing annulus with proposed fiber optic lines, and a gauge not to exceed 300 psi. The Commission must be notified of any pressure that needs to be bled off.

8. NDAC 43-05-01-05, subsection 1; Any other information that the Commission requires the storage facility permit to include. The operator shall implement a data sharing plan that provides for real-time sharing of data between Summit Carbon Storage #2, LLC, Summit Carbon Storage #1, LLC, Summit Carbon Storage #3, LLC and SCS Carbon Transport LLC operations. If a discrepancy in the shared data is observed, the party observing the data discrepancy shall notify all other parties, take action to determine the cause, and record the instance. Copies of such records must be filed with the Commission upon request.

9. NDAC 43-05-01-17, subsection 1; The storage operator must pay fees based upon the carbon dioxide source and the amount of carbon dioxide injected for storage. The Commission must make a determination on the contribution to the energy and agriculture production economy of North Dakota of each additional carbon dioxide source, before it is approved to be stored. If the Commission deems a carbon dioxide source does not contribute to the energy and agricultural production economy of North Dakota, the fees will be determined by hearing.

10. NDAC 43-05-01-11.3, subsection 3; The operator shall fill the annulus between the tubing and the long string casing with a noncorrosive fluid approved by the Commission. The storage operator shall maintain on the annulus a pressure that exceeds the operating injection pressure, unless the Commission determines that such a requirement might harm the integrity of the well or endanger the underground sources of drinking water. Section 5.4 (Wellbore Mechanical Integrity Testing) proposes a nitrogen cushion of 300 psi minimum to maintain constant positive pressure on the well annulus in each injector. Section 11.0 (Injection Well and Storage Operations) proposes a maximum operating injection pressure of 2100 psi.

# Fact Sheet

## 1. Description of Facility

Summit Carbon Storage #2, LLC (SCS #2) is a wholly owned subsidiary of SCS Permanent Carbon Storage LLC (SCS PCS) which is a wholly owned subsidiary of Summit Carbon Solutions, LLC (SCS). SCS, under the wholly owned subsidiary SCS Carbon Transport LLC, intends to construct, own, and operate a carbon dioxide transmission pipeline, the Midwest Carbon Express (MCE) pipeline. The MCE pipeline will receive carbon dioxide from over 30 anthropogenic sources, including biofuels from ethanol facilities and other industries across the Midwest, including Iowa, Minnesota, Nebraska, South Dakota, and North Dakota. The MCE pipeline will be capable of transporting up to 18 million metric tons per year, to North Dakota to be stored in three storage facilities located in Mercer, Morton, and Oliver Counties, near the city of Beulah, North Dakota, owned by SCS #2, Summit Carbon Storage #1, LLC (SCS #1) and Summit Carbon Storage #3, LLC (SCS #3). SCS #1 and SCS #3 are wholly owned subsidiaries of SCS PCS. All three storage facilities are intended to operate in tandem with each other.

## 2. Quantity and Quality of Carbon Dioxide Stream

The storage facility was modeled to receive a maximum of 98.3 million metric tons over a 20-year injection period, equating to approximately 4.92 million metric tons annually. The combined maximum modeled storage volume across all three storage facilities is 352 million metric tons over 20 years.

The commingled carbon dioxide stream being transported by the MCE pipeline at the time of this application is anticipated to average at least 98.25% carbon dioxide, <1.44% nitrogen, with trace quantities of oxygen, water, hydrocarbons, hydrogen sulfide, sulfur, and glycol, equaling less than 0.31% combined.

The MCE pipeline and storage facility have been conservatively designed to accommodate a carbon dioxide stream that is 95% carbon dioxide, 2% oxygen, and 3% nitrogen. SCS #2 is proposing that the carbon dioxide stream must be between 95% and 99.9% carbon dioxide to be accepted into the MCE pipeline to allow flexibility to receive carbon dioxide from a variety of industrial sources.

## 3. Summary of Basis of Draft Permit Conditions

The case specific permit conditions are unique to this storage facility, and not indicative of conditions for other storage facility permits. The conditions take into consideration the equipment proposed for this storage facility. Regulatory provisions for these conditions are all cited from NDAC Chapter 43-05-01 (Geologic Storage of Carbon Dioxide).

## 4. Reasons for Variances or Alternatives

Draft Permit Section III. Case Specific Conditions are referenced below by number from aforementioned section.

4. NDAC 43-05-01-11.4, subsection 1, subdivision e, requires a demonstration of external mechanical integrity at least once per year until the injection well is plugged. NDAC 43-05-01-11.1, subsection 3 requires the storage operator to, at least annually, determine the absence of significant fluid movement outside the casing by running an approved tracer survey or temperature log or noise log. The proposed fiber optic lines shall provide continuous temperature logs for the length of the injection wellbores.

10. NDAC 43-05-01-11.3, subsection 3; The operator shall fill the annulus between the tubing and the long string casing with a noncorrosive fluid approved by the Commission. The storage operator shall maintain on the annulus a pressure that exceeds the operating injection pressure, unless the Commission determines that such a requirement might harm the integrity of the well or endanger the underground sources of drinking water. The proposed nitrogen cushion of 300 psi minimum to maintain constant positive pressure on the well annulus in each injector will provide corrosion protection without risking the creation of a micro annulus by debonding of the long string casing-cement sheath during the operational life of the well. The Commission finds a micro annulus would harm external mechanical integrity and provide a potential pathway for endangerment of USDWs.

## 5. Procedures Required for Final Decision

**The beginning and ending dates of the comment period:**
April 15, 2024 to 5:00 P.M. CDT June 10, 2024

**The address where comments will be received:**
Oil and Gas Division, 1016 East Calgary Avenue, Bismarck, North Dakota 58503-5512 or slforsberg@nd.gov

**Date, time, and location of the storage facility permit hearing:**
June 11-12, 2024 9:00 A.M. CDT at 1000 East Calgary Avenue, Bismarck, North Dakota 58503

**Any other procedures by which the public may participate in the final decision:**
At the hearing, the Commission will receive testimony and exhibits of interested parties.

## 6. Contact for Additional Information

Draft Permit Information: Tamara Madche – tjmadche@nd.gov – 701-328-8020
Hearing Information: Sara Forsberg – slforsberg@nd.gov – 701-328-8020

SUMMIT CARBON SOLUTIONS

February 6, 2024

Tammy Madche
North Dakota Department of Mineral Resources
1000 East Calgary Avenue
Bismarck, ND 58502

**RE: SUMMIT CARBON STORAGE #2, LLC SFP AND CLASS VI APPLICATION**

Dear Mrs. Madche,

Summit Carbon Storage #2, LLC (SCS2) respectfully submits for the review and consideration of the Department of Mineral Resources – Oil & Gas Division, one application for carbon dioxide storage facility permits for the injection site called the BK Fischer; which is located in Mercer County, North Dakota. This application was prepared pursuant to and in accordance with Chapter 38-22 of the North Dakota Century Code and Chapter 43-05-01 of the North Dakota Administrative Code.

The storage facility permit application, associated simulation data and the Permit Application Certification – Broom Creek, has been sent electronically.

Please contact me with any questions.

Sincerely,

Jay M. Volk, PhD
Sequestrations – Director of Health, Safety & Environmental

Enclosure
Cc: Lawrence Bender, lbender@fredlaw.com (w/o enclosure)

**Permit Application Certification**
**-Broom Creek-**

BEFORE ME, the undersigned authority, personally appeared Wade Boeshans, Executive Vice President of Summit Carbon Solutions, LLC the ultimate parent company of the wholly owned subsidiary, **Summit Carbon Storage #2, LLC**, a Delaware Limited Liability Company whose office is located at 2321 North Loop Drive, Suite #221, Ames, IA, 50010 who being duly sworn, upon oath stated and certified that:

1. I, Wade Boeshans, am over eighteen years of age. I have personal knowledge of the information and facts stated by me in the Certification and that they are true and correct. I have never been convicted of any felony or of any crime involving moral turpitude and am fully competent to make these representations.
2. I hold the position of Executive Vice President for Summit Carbon Solutions, LLC. As required in accordance with North Dakota Administrative Code § 43-05-01-07.1 and by virtue of my position with Summit Carbon Solutions, LLC, I am authorized to make these representations on behalf of **Summit Carbon Storage #2, LLC**.
3. Attached hereto is the storage facility permit application requesting permits under Chapter 38-22 of the North Dakota Century Code, and in accordance with Article 43-05 of the North Dakota Administrative Code, for the establishment of carbon dioxide storage facilities located in Oliver, Mercer and Morton County's, North Dakota. Further, enclosed is the accompanying Class VI drilling permit information for two (2) carbon dioxide injection wells and one (1) monitoring well.
4. Based upon information and reports provided by individuals immediately responsible for compiling and preparing the enclosed permit applications and supporting information, I have personal knowledge and am familiar with the information being submitted in the enclosed documents and attachments to the permit applications. Based upon information and belief, the information contained herein is true, accurate and complete.
5. I affirm under penalty of perjury that the representation contained in the affidavit are true, to the best of my knowledge, information, and belief. I understand that there are significant penalties for submitting false information, including the possibility of a fine and imprisonment.
6. By my signature below, I hereby submit the enclosed applications and supporting documents and information on behalf of **Summit Carbon Storage #2, LLC**.

Executed this 6 day of February, 2024

Wade Boeshans

STATE OF NORTH DAKOTA )
) SS
COUNTY OF BURLEIGH )

Subscribed and sworn to before me this 6 day of February, 2024

(SEAL)

AMANDA HOFFER
Notary Public
State of North Dakota
My Commission Expires September 11, 2024

Notary Public

BK FISCHER/ARCHIE ERICKSON 2

# SUMMIT CARBON STORAGE #2, LLC – CARBON DIOXIDE GEOLOGIC STORAGE FACILITY PERMIT

North Dakota $CO_2$ Storage Facility Permit Application

*Prepared for*:

Richard Suggs
Tammy Madche

Department of Mineral Resources
Oil and Gas Division
600 East Boulevard Avenue
Department 474
Bismarck, ND 58505-0614

*Prepared by*:

Summit Carbon Storage #2, LLC
2321 North Loop Drive, Suite 221
Ames, IA 50010-8218

Energy & Environmental Research Center
University of North Dakota
15 North 23rd Street, Stop 9018
Grand Forks, ND 58202-9018

February 2024

# TABLE OF CONTENTS

LIST OF ACRONYMS ..... v

PROJECT SUMMARY ..... PS-1

1.0 PORE SPACE ACCESS ..... 1-1

2.0 GEOLOGIC EXHIBITS ..... 2-1
- 2.1 Overview of Project Area Geology ..... 2-1
- 2.2 Data and Information Sources ..... 2-4
  - 2.2.1 Existing Data ..... 2-4
  - 2.2.2 Site-Specific Data ..... 2-6
- 2.3 Storage Reservoir ..... 2-16
  - 2.3.1 Mineralogy of the Injection Zone ..... 2-26
  - 2.3.2 Mechanism of Geologic Confinement ..... 2-31
  - 2.3.3 Geochemical Information of the Injection Zone ..... 2-31
- 2.4 Confining Zones ..... 2-31
  - 2.4.1 Upper Confining Zone ..... 2-32
  - 2.4.2 Additional Overlying Confining Zones ..... 2-39
  - 2.4.3 Lower Confining Zone ..... 2-42
  - 2.4.4 Geomechanical Information of Confining Zone ..... 2-48
- 2.5 Faults, Fractures, and Seismic Activity ..... 2-64
  - 2.5.1 Stanton Fault ..... 2-64
  - 2.5.2 Interpreted Basement Faults ..... 2-64
  - 2.5.3 Mohr-Coulomb Critical Stress Analysis of Faults ..... 2-67
  - 2.5.4 Seismic Activity ..... 2-70
- 2.6 Potential Mineral Zones ..... 2-73
- 2.7 References ..... 2-80

3.0 GEOLOGIC MODEL CONSTRUCTION AND NUMERICAL SIMULATION OF $CO_2$ INJECTION ..... 3-1
- 3.1 Introduction ..... 3-1
- 3.2 Overview of Simulation Activities ..... 3-1
  - 3.2.1 Modeling of the Injection Zone and Overlying and Underlying Seals ..... 3-1
  - 3.2.2 Structural Framework Construction ..... 3-1
  - 3.2.3 Data Analysis and Property Distribution ..... 3-2
- 3.3 Numerical Simulation of $CO_2$ Injection ..... 3-5
  - 3.3.1 Simulation Model Development ..... 3-5
  - 3.3.2 Sensitivity Analysis ..... 3-15
- 3.4 Simulation Results ..... 3-16
  - 3.4.1 Maximum Injection Pressure and Rates ..... 3-28
  - 3.4.2 Stabilized Plume and Storage Facility Area ..... 3-29
- 3.5 Delineation of the Area of Review ..... 3-30

Continued . . .

## TABLE OF CONTENTS (continued)


3.5.1 EPA Methods 1 and 2: AOR Delineation for Class VI Wells ..... 3-30
3.5.2 Risk-Based AOR Delineation ..... 3-32
3.5.3 Critical Threshold Pressure Increase Estimation ..... 3-34
3.5.4 Risk-Based AOR Calculations ..... 3-35
3.5.5 Risk-Based AOR Results ..... 3-39
3.6 References ..... 3-44

4.0 AREA OF REVIEW ..... 4-1
4.1 Area of Review Delineation ..... 4-1
4.2 Corrective Action Evaluation ..... 4-6
4.3 Reevaluation of AOR and Corrective Action Plan ..... 4-9
4.4 Protection of USDWs ..... 4-9
4.4.1 Introduction of USDW Protection ..... 4-9
4.4.2 Geology of USDW Formations ..... 4-10
4.4.3 Hydrology of USDW Formations ..... 4-13
4.4.4 Protection for USDWs ..... 4-16
4.5 References ..... 4-18

5.0 TESTING AND MONITORING PLAN ..... 5-1
5.1 $CO_2$ Stream Analysis ..... 5-9
5.1.1 $CO_2$ Stream Analysis QASP ..... 5-10
5.2 Surface Facilities Leak Detection Plan ..... 5-10
5.2.1 Data Sharing and Custody Transfer ..... 5-13
5.2.2 Surface Facility Leak Detection Plan QASP ..... 5-13
5.3 $CO_2$ Flowline Corrosion Prevention and Detection Plan ..... 5-14
5.3.1 Corrosion Prevention ..... 5-14
5.3.2 Corrosion Detection ..... 5-15
5.4 Wellbore Mechanical Integrity Testing ..... 5-16
5.4.1 Wellbore Mechanical Integrity Testing QASP ..... 5-17
5.5 Baseline Wellbore Logging and Testing Plan ..... 5-18
5.5.1 Baseline Wellbore Logging and Testing Plan QASP ..... 5-21
5.6 Wellbore Corrosion Prevention and Detection Plan ..... 5-21
5.6.1 Downhole Corrosion Prevention ..... 5-21
5.6.2 Downhole Corrosion Detection ..... 5-22
5.7 Environmental Monitoring Plan ..... 5-22
5.7.1 Soil Gas Monitoring ..... 5-22
5.7.2 Groundwater Monitoring ..... 5-26
5.7.3 Deep Subsurface Monitoring ..... 5-28
5.8 Reporting Requirements ..... 5-33
5.8.1 Surface Facilities Leak Detection Reporting ..... 5-33
5.9 Adaptive Management Approach ..... 5-33
5.10 References ..... 5-34


Continued . . .

## TABLE OF CONTENTS (continued)


6.0 POSTINJECTION SITE CARE AND FACILITY CLOSURE PLAN ..... 6-1
6.1 Predicted Postinjection Subsurface Conditions ..... 6-4
6.1.1 Pre- and Postinjection Pressure Differential ..... 6-4
6.1.2 Predicted Extent of $CO_2$ Plume ..... 6-6
6.2 Postinjection Testing and Monitoring Plan ..... 6-7
6.2.1 Mechanical Integrity Testing and Corrosion Detection ..... 6-7
6.2.2 Soil Gas and Groundwater Monitoring ..... 6-7
6.2.3 Deep Subsurface Monitoring ..... 6-8
6.3 Postinjection Site Care Plan ..... 6-9
6.3.1 Schedule for Submitting Postinjection Monitoring Results ..... 6-9
6.4 Facility Closure Plan ..... 6-9
6.4.1 Submission of Facility Closure Report, Survey, and Deed ..... 6-10

7.0 EMERGENCY AND REMEDIAL RESPONSE PLAN ..... 7-1
7.1 Background ..... 7-1
7.2 Local Resources and Infrastructure ..... 7-4
7.3 Identification of Potential Emergency Events ..... 7-4
7.3.1 Definition of an Emergency Event ..... 7-4
7.3.2 Potential Project Emergency Events and Their Detection ..... 7-10
7.4 Emergency Response Actions ..... 7-10
7.4.1 General Emergency Response Actions ..... 7-10
7.4.2 Incident-Specific Response Actions ..... 7-15
7.5 Response Personnel/Equipment and Training ..... 7-17
7.5.1 Response Personnel and Equipment ..... 7-17
7.5.2 Staff Training and Exercise Procedures ..... 7-18
7.5.3 Emergency Response Procedures ..... 7-18
7.5.4 Qualified Individual ..... 7-19
7.5.5 Local Response Team ..... 7-19
7.5.6 Company Support Team ..... 7-19
7.5.7 Preplanning Emergency Response Activities with Public Safety Answering Point, Fire, Police, and Other Public Officials ..... 7-21
7.5.8 Required Controller Actions ..... 7-21
7.6 Emergency Communications Plan ..... 7-21
7.7 ERRP Review and Updates ..... 7-24

8.0 WORKER SAFETY PLAN ..... 8-1

9.0 WELL CASING AND CEMENTING PROGRAM ..... 9-1
9.1 BK Fischer 1: Proposed Injection Well Casing and Cementing Programs ..... 9-1
9.2 BK Fischer 2: Proposed Injection Well Casing and Cementing Programs ..... 9-6


Continued . . .

## TABLE OF CONTENTS (continued)

9.3 Archie Erickson 2: As-Constructed $CO_2$ Monitoring Well Casing and Cementing Programs ..... 9-11

10.0 PLUGGING PLAN ..... 10-1
10.1 BK Fischer 1: Proposed Injection Well P&A Program ..... 10-1
10.2 BK Fischer 2: Proposed Injection Well P&A Program ..... 10-8
10.3 Archie Erickson 2: Proposed Reservoir-Monitoring Well P&A Program ..... 10-15

11.0 INJECTION WELL AND STORAGE OPERATIONS ..... 11-1
11.1 BK Fischer 1: Proposed Completion Procedure to Conduct Injection Operations ..... 11-2
11.2 BK Fischer 2: Proposed Completion Procedure to Conduct Injection Operations ..... 11-10
11.3 Archie Erickson 2: Proposed Completion Procedure for Monitoring Well Operations ..... 11-18

12.0 FINANCIAL ASSURANCE DEMONSTRATION PLAN ..... 12-1
12.1 Facility Information ..... 12-2
12.2 Approach to Financial Responsibility Cost Estimates ..... 12-2
12.2.1 Corrective Action ..... 12-2
12.2.2 Plugging of Injection Wells ..... 12-3
12.2.3 Implementation of the PISC Plan and Facility Closure Activities ..... 12-3
12.2.4 Implementation of Emergency and Remedial Response Actions ..... 12-6
12.3 Financial Instruments ..... 12-11
12.4 References ..... 12-12

WELL AND WELL FORMATION FLUID SAMPLING LAB ANALYSIS ..... Appendix A

FRESHWATER WELL FLUID SAMPLING ANALYSIS ..... Appendix B

GEOCHEMICAL INTERACTIONS ..... Appendix C

MONITORING EQUIPMENT SPECIFICATION INFORMATION ..... Appendix D

STORAGE FACILITY PERMIT REGULATORY COMPLIANCE TABLE ..... Appendix E

## LIST OF ACRONYMS

| | |
|---|---|
| 1D MEM | 1D mechanical earth model |
| AI | acoustic impedance |
| amsl | above mean sea level |
| AOR | area of review |
| API | American Petroleum Institute |
| ASLMA | Analytical Solution for Leakage in Multilayered Aquifers |
| AZMI | above-zone monitoring interval |
| bbl | oilfield barrel |
| BHP | bottomhole pressure |
| BOP | blowout preventer |
| BPV | backpressure valve |
| BTC | buttress |
| CA | contact angle |
| $CaCO_3$ | calcium carbonate |
| CCS | carbon capture and storage |
| CFR | Code of Federal Regulations |
| CI | carbon intensity |
| CIBP | cast iron bridge plug |
| CICR | cast iron cement retainer |
| CIL | casing inspection log |
| CMG | Computer Modelling Group Ltd. |
| CMR | combinable magnetic resonance |
| $CO_2$ | carbon dioxide |
| CRA | corrosion-resistant alloy |
| CRC | Company Response Crew |
| CST | Company Support Team |
| DMR-O&G | Department of Mineral Resources, Oil and Gas Division |
| DOC | dissolved organic carbon |
| DST | drill stem test |
| DTC | dipole sonic compressional slowness values (delta-T compressional) |
| DTS | distributed temperature sensing, dipole shear sonic slowness |
| DWR | Department of Water Resources |
| E | dynamic Young's moduli |
| EC | electrical conductivity |
| EDS | energy-dispersive spectrometry |
| EERC | Energy & Environmental Research Center |
| EMS | emergency management service |
| EPA | U.S. Environmental Protection Agency |

Continued . . .

## LIST OF ACRONYMS (continued)

| | |
|---|---|
| ER | electrical resistance |
| ERRP | emergency remedial response plan |
| FA | friction angle |
| FADP | financial assurance demonstration plan |
| FANG | friction angle |
| FEL | from the east line |
| FNL | from the north line |
| FSP | fault slip potential |
| GHG | greenhouse gas |
| GL | ground level |
| GR | gamma ray |
| $H_2S$ | hydrogen sulfide |
| HazMat | hazardous materials |
| HAZWOPER | hazardous waste operations and emergency response |
| HCON | hydraulic conductivity |
| HSE | health, safety, and environmental |
| HSGR | standard (total) gamma ray |
| IAM-CS | integrated assessment model for carbon storage |
| IC | Incident Commander |
| ICS | Incident Command System |
| IFT | interfacial tension |
| JFE BEAR | gastight premium connection |
| K | permeability |
| $K_{int}$ | intrinsic permeability |
| KINT | permeability |
| LCFS | low-carbon fuel standard |
| LD | lay down |
| LDS | leak detection system |
| LEPC | Local Emergency Planning Committee |
| LRT | Local Response Team |
| LTC | long-thread and coupled |
| MASP | maximum anticipated surface pressure |
| MCE | Midwest Carbon Express |
| mD | millidarcy |
| MD | measured depth |
| MDT | modular dynamics testing |
| MI | mechanical integrity |
| MICP | mercury injection capillary pressure |
| MIRU | move in and rig up |
| MIT | mechanical integrity test |
| MLVs | main line valves |
| MMI | modified Mercalli intensity |

Continued . . .

## LIST OF ACRONYMS (continued)

| | |
|---|---|
| MMt | million metric tons |
| MMtpa | million metric tons per annum |
| MMscf | million standard cubic ft |
| MVTL | Minnesota Valley Testing Laboratories |
| NAD | North American Datum |
| ND | nipple down |
| N.D.A.C. | North Dakota Administrative Code |
| N.D.C.C. | North Dakota Century Code |
| NDIC | North Dakota Industrial Commission |
| NEUT | neutron porosity |
| NFPA | National Fire Protection Association |
| NU | nipple up |
| $O_2$ | oxygen |
| OSHA | Occupational Safety and Health Administration |
| P&A | plugged and abandoned |
| PBTD | plug back total depth |
| Pce | Capillary entry pressure |
| PCOR | Plains $CO_2$ Reduction [Partnership] |
| Phi | porosity |
| PHIE | effective porosity |
| PHIT | total porosity |
| PHMSA | Pipeline and Hazardous Materials Safety Administration |
| PIG | pipeline inspection gauge |
| PISC | postinjection site care |
| PLT | production logging tool |
| PNL | pulsed-neutron log |
| POOH | pull out of hole |
| PPE | personal protective equipment |
| ppg | pounds per gallon |
| PSAP | public safety answering point |
| psig | pounds per square inch |
| P/T | pressure/temperature |
| PU | pick up |
| PV | pore volume |
| PVC | pore volume compressibility |
| QASP | quality assurance and surveillance plan |
| QI | qualified individual |
| Qtr | quarter |
| RCBL | radial cement bond log |

Continued . . .

## LIST OF ACRONYMS (continued)

| | |
|---|---|
| RD | rig down |
| RDMO | rig down and move out |
| RHOB | bulk density |
| RIH | run in hole |
| RNG | range |
| RQI | reservoir quality index |
| RU | Rig up |
| SCADA | supervisory control and data acquisition |
| scf | standard cubic ft |
| SCS | Summit Carbon Solutions, LLC |
| SCS1 | Summit Carbon Storage #1, LLC |
| SCS2 | Summit Carbon Storage #2, LLC |
| SCS3 | Summit Carbon Storage #3, LLC |
| SCS PCS | SCS Permanent Carbon Storage LLC |
| SEM | scanning electron microscopy |
| SFA | storage facility area |
| SFP | storage facility permit |
| Shmin | minimum horizontal stress |
| SHmax | maximum horizontal stress |
| SLRA | screening-level risk assessment |
| SP | spontaneous potential |
| SRT | step rate test |
| SS | specific storage |
| SSTVD | subsea true vertical depth |
| STC | short-thread and coupled |
| sx | sacks |
| TA | temporarily abandoned |
| TATD | temporarily abandoned, drilled to total depth |
| TBD | to be determined |
| TD | total depth |
| TDS | total dissolved solids |
| TIH | trip in hole |
| To | tensile strength |
| TOC | top of cement, total organic carbon |
| TOOH | trip out of hole |
| TVD | true vertical depth |
| TWP | township |
| UC | Unified Command |
| UCS | Unconfined compressive strength |
| UIC | underground injection control |
| USDW(s) | underground source of drinking water |
| USGS | U.S. Geological Survey |

Continued . . .

## LIST OF ACRONYMS (continued)

| | |
|---|---|
| USIT | ultrasonic imaging tool |
| VAM TOP | gastight premium connection |
| VBA | Visual Basic for Applications |
| VDL | variable-density log |
| WHP | wellhead pressure |
| WHT | wellhead temperature |
| WO | workover |
| WSP | Worker Safety Plan |
| XRD | x-ray diffraction |
| XRF | x-ray fluorescence |

# SUMMIT CARBON STORAGE #2, LLC
# CARBON DIOXIDE GEOLOGIC STORAGE FACILITY PERMIT APPLICATION

## PROJECT SUMMARY

**General Applicant and Project Information.** Summit Carbon Storage #2, LLC (SCS2) is a wholly owned subsidiary of SCS Permanent Carbon Storage LLC (SCS PCS), which is a wholly owned subsidiary of Summit Carbon Solutions, LLC (SCS), as shown in Figure PS-1. SCS2 is requesting consideration of this storage facility permit (SFP) application for the geologic storage of anthropogenic carbon dioxide ($CO_2$) within Mercer and Oliver counties, North Dakota.

The current mailing address for SCS2, as the storage facility operator of BK Fischer, is as follows:

Summit Carbon Storage #2, LLC
c/o Summit Carbon Solutions, LLC
Attn: Wade Boeshans
2321 North Loop Drive, Suite 221
Ames, IA 50010-8218

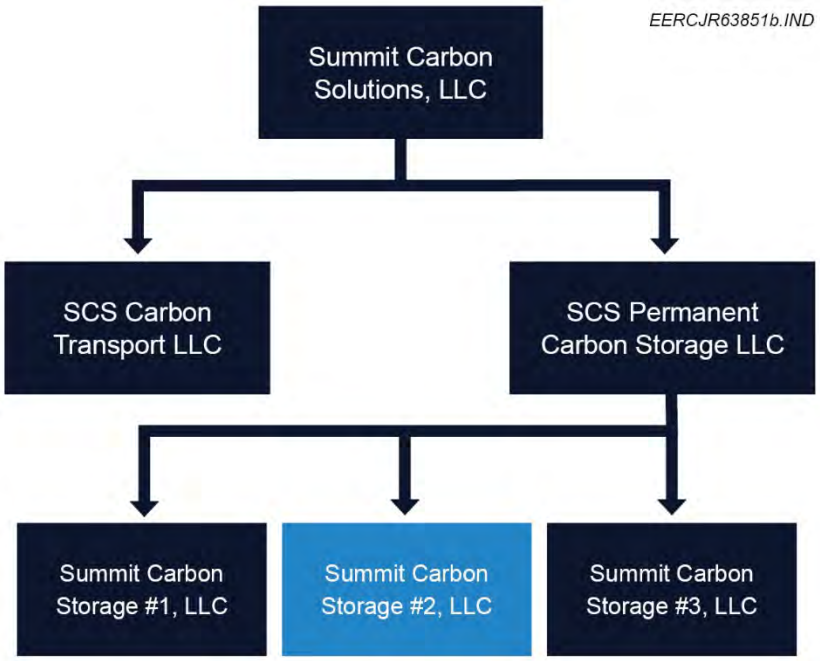



Figure PS-1. SCS2 business structure.

SCS proposes to construct, own, and operate the Midwest Carbon Express (MCE) Project (Figure PS-2), which will capture or receive $CO_2$ from over 30 anthropogenic sources (biofuel and

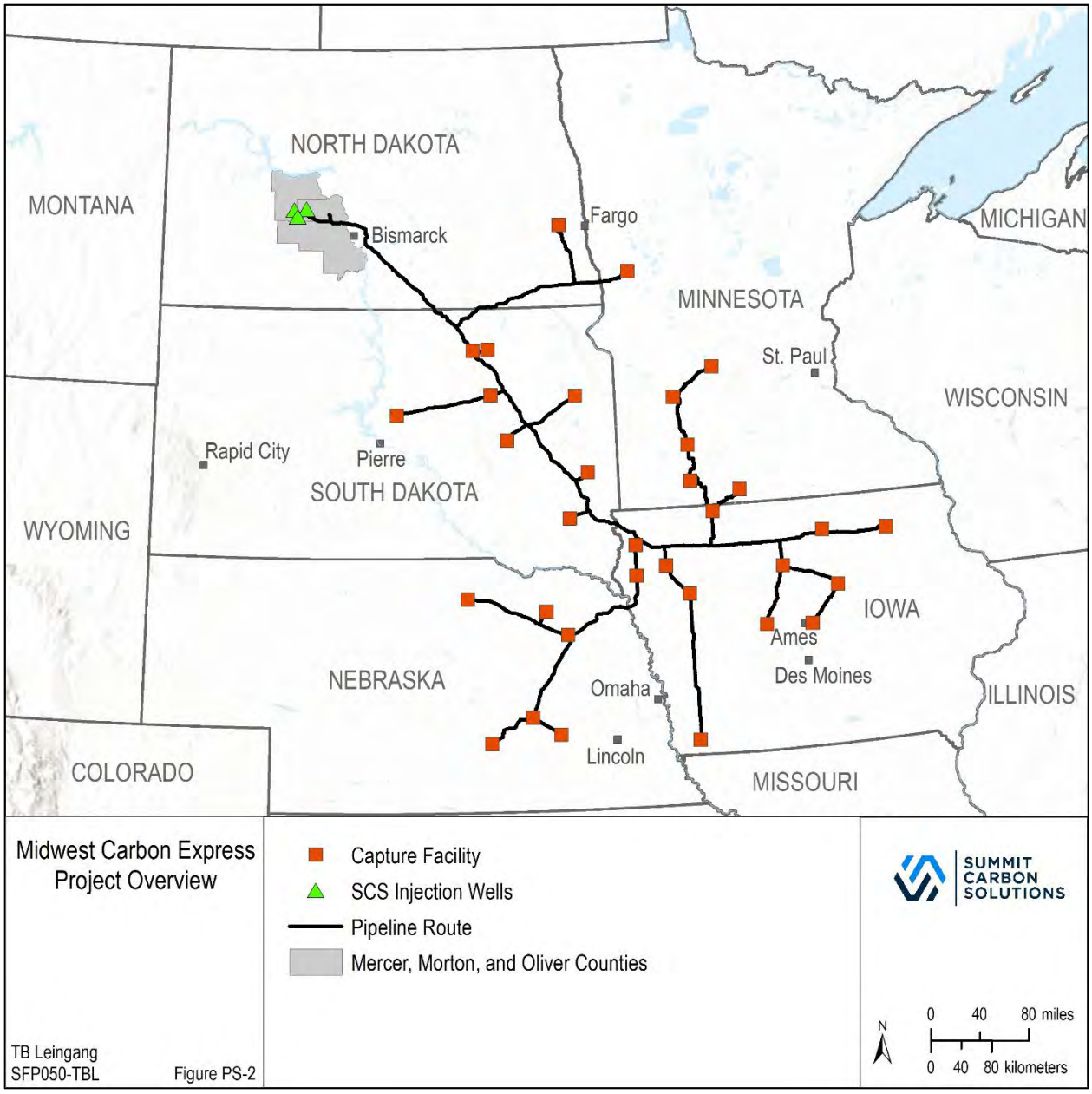



Figure PS-2. MCE Project overview map.

other industrial facilities) across the Midwest and transport the $CO_2$ via pipeline to North Dakota to be permanently stored within deep underground formations. The commingled stream composition in the MCE pipeline from all sources is anticipated to average ≥98.25% $CO_2$, with less than 1.75% trace quantities of other constituents (Table PS-1). The MCE Project is conservatively designed with a 95% $CO_2$, 2% $O_2$, and 3% $N_2$ specification; therefore, SCS2 is requesting a commercial permit for the operation of the storage facility for injection of a $CO_2$ stream that will range from 95% $CO_2$ to ≤ 99.9% $CO_2$. This commercial permit will provide flexibility to receive $CO_2$ from a variety of industrial sources.

**Table PS-1. Anticipated Average $CO_2$ Stream Composition**

| Chemical Content | System Specification |
|---|---|
| Carbon Dioxide, $CO_2$ | ≥98.25% |
| Inert, $N_2$ | ≤1.44% |
| Oxygen, $O_2$ | ≤0.31% |
| Water, $H_2O$* | ≤20 lb/MMscf |
| Total Hydrocarbons* | ≤1800 ppm by volume |
| Hydrogen Sulfide, $H_2S$* | ≤10 ppm by volume |
| Total Sulfur, S* | ≤10 ppm by volume |
| Glycol | ≤0.3 gallons/MMscf |

* Denotes trace constituents that do not make up notable percentages of stream composition.

The MCE Project will generate approximately 11,400 construction and 1100 operational jobs across the project. The MCE Project contributes to the North Dakota economy by employing workers, paying salaries and benefits, purchasing goods and services from local businesses, contributing to other household consumption, and paying taxes. Capital expenditures in North Dakota from SCS and its contractors during the construction phase will support 1934 annual jobs on average consisting of direct, indirect, and through induced contributions. Likewise, during operations, SCS will support 150 jobs in North Dakota through direct, indirect, and induced contributions. (Ernst and Young, LLP, 2022)

The MCE Project aims to reduce the carbon intensity (CI) of biofuels produced from ethanol facilities and work toward achieving climate goals while creating jobs and other economic benefits across the project. The MCE Project is being designed to transport up to 18 million metric tonnes per annum (MMtpa) of $CO_2$ via a 2000-mile greenfield pipeline system (permitted through relevant state regulatory agencies and associated processes) to North Dakota for permanent storage approximately 1 mile underground in secure geologic formations across three $CO_2$ storage facilities owned and operated by Summit Carbon Storage #1, LLC (SCS1); SCS2; and Summit Carbon Storage #3, LLC (SCS3). Within this application, SCS2 was modeled at 98.3 million metric tonnes (MMt) over 20 years while all three storage facilities were modeled over 352 MMt (124.4 TB Leingang + 98.3 BK Fischer + 129.7 KJ Hintz). The BK Fischer 1 and BK Fischer 2 were modeled at 3.07 and 1.85 MMtpa, respectfully. The captured $CO_2$ will be injected into the Broom Creek Formation, a sandstone reservoir and saline aquifer underlying the project area (Figure PS-3) and surrounding region. SCS2's proposed $CO_2$ storage facility location in North Dakota provides not only favorable and plentiful geologic storage capacity supportive of the MCE Project but also $CO_2$ storage critical to both the agriculture and energy industries in North Dakota and surrounding regions.

By efficiently utilizing North Dakota's vast pore-space resource, estimated at approximately 250 billion metric tons of potential (U.S. Department of Energy, 2015), SCS seeks to lower greenhouse gas (GHG) emissions by storing up to 18 MMtpa of $CO_2$ through the MCE Project across three $CO_2$ storage facilities owned and operated by SCS1, SCS2, and SCS3, equivalent to removing the annual $CO_2$ emissions from approximately 3.9 million vehicles. This initiative directly supports U.S. and international climate change policies, goals, and efforts. When placed into service, the MCE Project will provide the largest and single most meaningful technology-

based reduction of carbon emissions in the world. To date, more than 30 ethanol plants across the MCE Project's footprint have entered long-term $CO_2$ offtake agreements with SCS, opening new economic opportunities to sell their products in markets that pay more for lower-carbon fuels. This improved market accessibility ensures Midwestern ethanol plants' environmental and economic sustainability by significantly reducing their $CO_2$ emissions footprint and lowering the CI of ethanol-based fuels. Specifically, by participating in the MCE Project and reducing the CI of their product, ethanol producers can compete in low-carbon fuel standard (LCFS) markets for an increased margin. If ethanol facilities are unable to reduce their CI, their access to the LCFS markets will decline, thus limiting their ability to compete in these markets and risking the jobs and communities they help sustain.

The importance of $CO_2$ pipelines for the ethanol industry and the agriculture industry that relies on them, as well as other anthropogenic industrial $CO_2$ sources, is further supported by the fact that other proposed carbon capture, pipeline transportation, and geologic storage projects in the Midwest have entered similar agreements with other ethanol plants. The primary challenge for Midwestern ethanol plants and other industrial sources of $CO_2$ is the lack of suitable and economic geologic formations for storage in proximity to their sites, as well as other economic and practicable solutions for use of the $CO_2$. The MCE Project offers a solution for this proximity challenge and a service for biofuel and industrial facilities across the Midwest by connecting these facilities via a greenfield pipeline system directly to the project area (Figure PS-2) located within North Dakota.

The project area (Figure PS-3) will consist of three separate $CO_2$ SFP locations: TB Leingang, BK Fischer, and KJ Hintz (Figure PS-3). Each SFP location will be owned and operated by individual operators: SCS1, SCS2, and SCS3. Each proposed SFP's surface use area covers approximately 30,000 acres and will include up to two Broom Creek Formation injection wells, a dedicated Broom Creek Formation stratigraphic and reservoir-monitoring well, and a dedicated monitoring well(s) for the lowest underground source of drinking water (USDW). Each site will also have associated surface facility infrastructure that will accept $CO_2$ transported via a $CO_2$ flowline. SCS2 will own and operate the $CO_2$ flowline (NDL-325) beginning at PLR-26 (Figure PS-3), located in Oliver County, and consists of approximately 5.4 miles of 24/16-inch flowline between Oliver and Mercer Counties delivering $CO_2$ downstream to the BK Fischer 1 and 2 injection wells, located in Mercer County. Operating agreements between SCS1, SCS2, SCS3, SCS PCS, and Summit Carbon Transport LLC will include, but are not limited to, defining financial responsibilities, measurement and custody transfers, data access and data sharing, and general operations including leak detection and reporting, emergency response, monitoring, and maintenance of the NDL-325 as Summit Carbon Transport LLC will be operating the MCE line and respective SCS1, SCS2, and SCS3 flowlines as one system. Likewise, operating agreements will include, but are not limited to, allowing the sharing of geologic models, monitoring equipment and associated data, as well as operational data, leak detection and monitoring, and emergency response actions.

The underlying target storage reservoir for this application, the Broom Creek Formation, and more specifically, its $CO_2$ storage potential, has been the subject of numerous studies conducted by the North Dakota Geologic Survey, the U.S. Geological Survey (USGS), and the Energy &

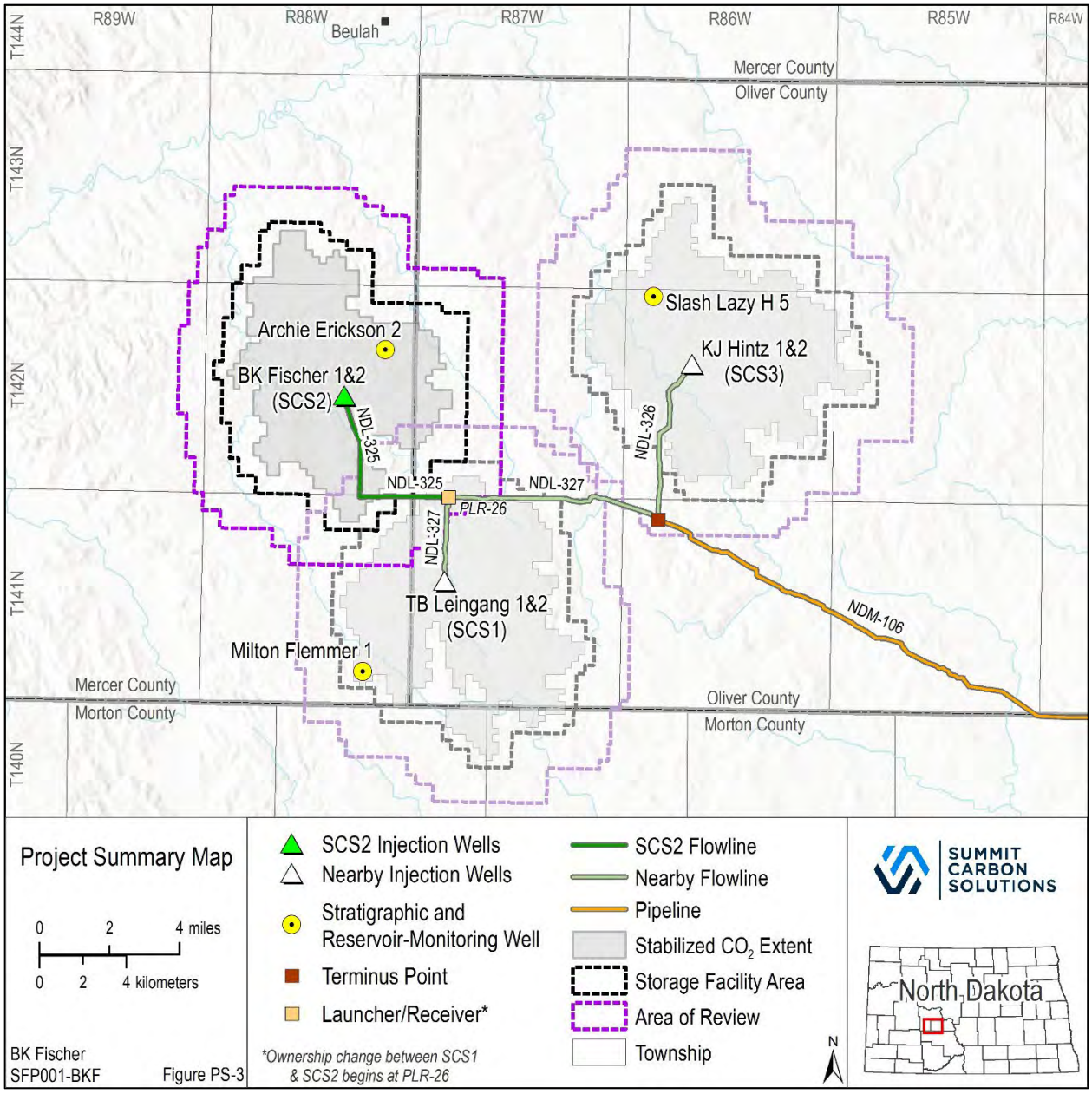



Figure PS-3. Project summary map.

Environmental Research Center (EERC). The Broom Creek Formation is an ideal storage candidate because of its superior reservoir quality, depth, impermeable upper and lower confining zones, and expansive areal extent. The suitability of these formations has been further verified by the extensive data sets collected by SCS to illustrate the long-term, safe storage of $CO_2$ within the proposed project area (Figure PS-3).

SCS collected data and completed a detailed characterization of the injection and confining zones to ensure that the injected $CO_2$ will remain permanently stored in the subsurface. Data

acquisition began by first obtaining seismic consent from >95% of landowners via surface access agreements, allowing SCS to collect seismic data. Seismic data collection commenced in October 2021 and spanned approximately six townships over 200 square miles. Thereafter, three stratigraphic wells were drilled and completed; drilling operations started in January 2022 and ended in May 2022. The Milton Flemmer 1 [North Dakota Industrial Commission (NDIC) File No. 38594, American Petroleum Institute (API) No. 33-057-00041, Mercer County] well was drilled, cored, and logged into the Deadwood Formation at approximately 12,000 ft, while Archie Erickson 2 (NDIC File No. 38622, API No. 33-057-00042, Mercer County) and Slash Lazy H 5 (NDIC File No. 38701, API No. 33-065-00021, Oliver County) were both drilled, cored, and logged through the Broom Creek Formation, at approximately 6400 and 6100 ft, respectively.

In the following SFP application, SCS2 presents a detailed evaluation of site geology and characterizations that provide the data required to conduct an in-depth evaluation of the proposed SFP. Thus, confirming the proposed SCS2 storage facility is suitable to receive and permanently store $CO_2$. This SFP application has been presented in conjunction with two other SFP applications within the project area (Figure PS-3): TB Leingang (SCS1) and KJ Hintz (SCS3).

**References**

Ernst and Young, LLP, 2022, Economic contributions of Summit Carbon Solutions: Final report prepared for Summit Carbon Solutions, April 2022, 60 p.

U.S. Department of Energy National Energy Technology Laboratory, 2015, Carbon storage atlas, 114 p., 5th ed.: www.netl.doe.gov/sites/default/files/2018-10/ATLAS-V-2015.pdf (accessed 2023).

# SECTION 1.0

# PORE SPACE ACCESS

## 1.0 PORE SPACE ACCESS

North Dakota law explicitly grants title to pore space in all strata underlying the surface of lands and waters to the owner of the overlying surface estate; i.e., the surface owner owns the pore space (North Dakota Century Code [N.D.C.C.] § 47-31-03). Prior to issuance of the storage facility permit (SFP), North Dakota law mandates the storage operator obtain the consent of landowners who own at least 60% of the pore space of the storage reservoir for geologic storage of $CO_2$ (N.D.C.C. § 38-22-08[5]). The statute also mandates that a good faith effort be made to obtain consent from all pore space owners and that all nonconsenting pore space owners are, or will be, equitably compensated (N.D.C.C. §§ 38-22-08[4], [14]). North Dakota law grants the North Dakota Industrial Commission (NDIC) the authority to require pore space owned by nonconsenting owners to be included in a storage facility and subject to geologic storage through pore space amalgamation (N.D.C.C. § 38-22-10). Amalgamation of pore space will be considered at an administrative hearing as part of the regulatory process required for consideration of the SFP application. Surface access for any potential aboveground activities is not included in pore space amalgamation.

Summit Carbon Storage #2, LLC (SCS2) has identified the owners (surface and mineral) (N.D.C.C §§ 38-22-06[3], [4]; North Dakota Administrative Code [N.D.A.C] § 43-05-01-08[1]). In addition, with the exception of coal extraction, there are no mineral lessees or operators of mineral extraction activities within the facility area or within 0.5 miles of its outside boundary. SCS2 will notify all owners of a pore space amalgamation hearing at least 45 days prior to the scheduled hearing and will provide information about the proposed $CO_2$ storage project and the details of the scheduled hearing. An affidavit of mailing will be provided to NDIC to certify that these notifications were made (N.D.C.C. §§ 38-22-06[3], [4]; N.D.A.C. §§ 43-05-01-08[1], [2]).

All owners, lessees, and operators that require notification have been identified in accordance with North Dakota law, which vests the title to the pore space in all strata underlying the surface of lands and water to the owner of the overlying surface estate (N.D.C.C. § 47-31-03). The review of pertinent county recorder records identified no severance of pore space from the surface estate or leasing of pore space to a third party prior to April 9, 2009. All surface owners and pore space owners and lessees are the same owner of record.

The map in Figure 1-1 shows the extent of the pore space that will be occupied by $CO_2$ at the cessation of injection (20 years) and over the life of the project (the stabilized $CO_2$ extent) as well as the storage facility area boundary and 0.5 miles outside of the storage facility area boundary (the hearing notification area).

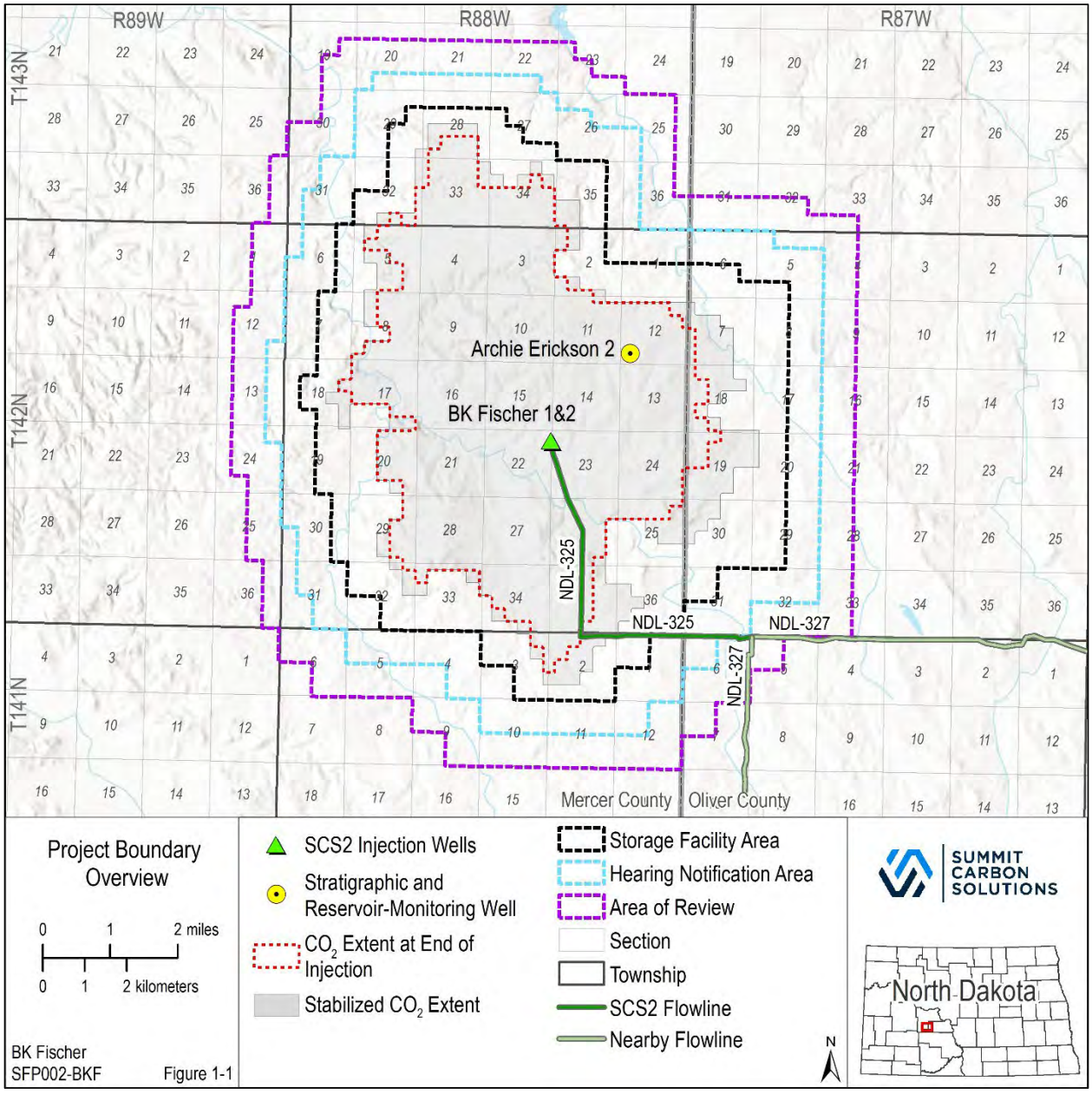



Figure 1-1. Map illustrating the pore space $CO_2$ extent at the cessation of injection (20 years), alongside the stabilized $CO_2$ extent over the life of the project. Map also depicts the storage facility area boundary, and 0.5 miles outside of the storage facility area boundary is the hearing notification area. Additionally, 0.5 miles outside the hearing notification area, the area of review boundary is depicted.

Fredrikson

**Fredrikson & Byron, P.A.**
Attorneys and Advisors

304 East Front Avenue, Suite 400
Bismarck, ND 58504-5639
Main: 701.221.8700
fredlaw.com

April 8, 2024

***HAND DELIVERED***

Mr. Mark Bohrer
Assistant Director
North Dakota Industrial Commission
Oil and Gas Division
1016 East Calgary Avenue
Bismarck, North Dakota 58503

**RE: IN THE MATTER OF A HEARING CALLED ON A MOTION OF THE COMMISSION TO CONSIDER THE APPLICATIONS OF SUMMIT CARBON STORAGE #1, LLC, SUMMIT CARBON STORAGE #2, LLC AND SUMMIT CARBON STORAGE #3, LLC FOR THE GEOLOGIC STORAGE OF CARBON DIOXIDE IN THE BROOM CREEK FORMATION**

Dear Mr. Bohrer:

Enclosed herewith for filing in the above-captioned matters, please find copies of the following storage agreements:

1. STORAGE AGREEMENT, SCS #1 BROOM CREEK – SECURE GEOLOGIC STORAGE, MERCER, MORTON, & OLIVER COUNTIES, NORTH DAKOTA;

2. STORAGE AGREEMENT, SCS #2 BROOM CREEK – SECURE GEOLOGIC STORAGE, MERCER & OLIVER COUNTIES, NORTH DAKOTA; and

3. STORAGE AGREEMENT, SCS #3 BROOM CREEK – SECURE GEOLOGIC STORAGE, OLIVER COUNTY, NORTH DAKOTA.

Should you have any questions, please advise.

Sincerely,

LAWRENCE BENDER

LB/tjg
Enclosures
#82133072v1

cc: Mr. Wade Boeshans *via e-mail* (w/enc.)

**STORAGE AGREEMENT**
**SCS #2 BROOM CREEK – SECURE GEOLOGIC STORAGE**
**MERCER & OLIVER COUNTIES, NORTH DAKOTA**

**STORAGE AGREEMENT**
**SCS #2 BROOM CREEK – SECURE GEOLOGIC STORAGE**
**MERCER & OLIVER COUNTIES, NORTH DAKOTA**

**THIS AGREEMENT** ("Agreement") is entered into as of the ___ day of _____, 20__, by the parties who have signed the original of this instrument, a counterpart thereof, ratification and joinder or other instrument agreeing to become a Party hereto.

**RECITALS:**

A. It is in the public interest to promote the geologic storage of carbon dioxide in a manner which will benefit the state and the global environment by reducing greenhouse gas emissions and in a manner which will help ensure the viability of the state's coal and power industries, to the economic benefit of North Dakota and its citizens;

B. To further geologic storage of carbon dioxide, a potentially valuable commodity, may allow for its ready availability if needed for commercial, industrial, or other uses, including enhanced recovery of oil, gas, and other minerals; and

C. For geologic storage, however, to be practical and effective it requires cooperative use of surface and subsurface property interests and the collaboration of property owners, which may require procedures that promote, in a manner fair to all interests, cooperative management, thereby ensuring the maximum use of natural resources.

**AGREEMENT:**

It is agreed as follows:

**ARTICLE 1**
**DEFINITIONS**

As used in this Agreement:

1.1 **Carbon Dioxide** means carbon dioxide in gaseous, liquid, or supercritical fluid

state together with incidental associated substances derived from the source materials, capture process and any substances added or used to enable or improve the injection process.

1.2 **Commission** means the North Dakota Industrial Commission (NDIC) acting by and through the Department of Mineral Resources.

1.3 **Effective Date** is the time and date this Agreement becomes effective as provided in Article 14.

1.4 **Facility Area** is the land described by Tracts in Exhibit "B" and shown on Exhibit "A" containing 28,844.57 acres, more or less.

1.5 **Party** is any individual, corporation, limited liability company, partnership, association, receiver, trustee, curator, executor, administrator, guardian, tutor, fiduciary, or other representative of any kind, any department, agency, or instrumentality of the state, or any governmental subdivision thereof, or any other entity capable of holding an interest in the Storage Reservoir.

1.6 **Pore Space** means a cavity or void, whether natural or artificially created, in any subsurface stratum.

1.7 **Pore Space Interest** is a right to or interest in the Pore Space in any Tract within the boundaries of the Facility Area.

1.8 **Pore Space Owner** is a Party hereto who owns Pore Space Interest.

1.9 **Storage Equipment** is any personal property, lease, easement, and well equipment, plants and other facilities and equipment for use in Storage Operations.

1.10 **Storage Expense** is all costs, expense or indebtedness incurred by the Storage Operator pursuant to this Agreement for or on account of Storage Operations.

1.11 **Storage Facility** is the unitized or amalgamated Storage Reservoir created pursuant to an order of the Commission.

1.12 **Storage Facility Participation** is the percentage shown on Exhibit "C" for allocating payments for use of the Pore Space under each Tract identified in Exhibit "B".

1.13 **Storage Operations** are all operations conducted by the Storage Operator pursuant to this Agreement or otherwise authorized by any lease covering any Pore Space Interest.

1.14 **Storage Operator** is the person or entity named in Section 4.1 of this Agreement.

1.15 **Storage Reservoir** consists of the Pore Space and confining subsurface strata underlying the Facility Area described as the Opeche/Spearfish (Upper Confining Zone), Broom Creek (Injection Zone), and Amsden (Lower Confining Zone) Formation(s) and which are defined as identified by the well logging suite performed at one stratigraphic well, the Archie Erickson 2 well (NDIC File No. 38622) located in the SW¼ of the SW¼ Section 12, Township 142 North, Range 88 West, Mercer County, North Dakota. The Storage Reservoir is defined as the stratigraphic interval from below the top of the Opeche/Spearfish Formation found at a depth of 5,587 feet below the Kelly Bushing, to above the base of the Amsden Formation, found at a depth of 6,421 feet below the Kelly Bushing, as identified by the Array Induction Gamma log run in the Milton Flemmer 1 well (NDIC File No. 38594) located in the NW¼ of the NE¼, Section 35, Township 141 North, Range 88 West, Mercer County, North Dakota. The logging suite included triple combo (gamma ray, density, porosity, and resistivity), caliper, spectral gamma ray, combinable magnetic resonance (CMR), dipole sonic including four-arm caliper and inclinometer, and image log. Further, the acquired logs were used to pick formation top depths and interpret lithology, petrophysical properties, and time-to-depth shifting of seismic data obtained from three 3D seismic surveys and one 5-mile long 2D seismic line covering an area totaling 208 miles in and

around the Archie Erickson 2 stratigraphic well. Formation top depths were picked from the top of the Pierre Formation to the top of the Amsden Formation. The average depth of the top of the Opeche/Spearfish Formation (Upper Confining Zone) across the storage facility is 5,587 feet total vertical depth (TVD). The average depth of the base of the Amsden Formation (Lower Confining Zone) across the storage facility area is 6,359 feet TVD. The average thickness of the Storage Reservoir across the storage facility is 772 feet.

1.16 **Storage Rights** are the rights to explore, develop, and operate lands within the Facility Area for the storage of Storage Substances.

1.17 **Storage Substances** are Carbon Dioxide and incidental associated substances, fluids, and minerals.

1.18 **Tract** is the land described as such and given a Tract number in Exhibit "B."

1.19 **Transfer Storage Facility** has the meaning given such term in Section 3.7 of this Agreement.

## ARTICLE 2
## EXHIBITS

2.1 **Exhibits.** The following exhibits, which are attached hereto, are incorporated herein by reference:

2.1.1 Exhibit "A" is a map that shows the boundary lines of the SCS #2 Broom Creek Facility Area and the tracts therein;

2.1.2 Exhibit "B" is a schedule that describes the acres of each Tract in the SCS #2 Broom Creek Facility Area;

2.1.3 Exhibit "C" is a schedule that shows the Storage Facility Participation of each Tract; and

2.1.4 Exhibit "D" is a form of Pore Space Lease.

2.2 **Reference to Exhibits.** When reference is made to an exhibit, it is to the exhibit as originally attached or, if revised, to the last revision.

2.3 **Exhibits Considered Correct.** Exhibits "A," "B," "C" and "D" shall be considered to be correct until revised as herein provided.

2.4 **Correcting Errors.** The shapes and descriptions of the respective Tracts have been established by using the best information available. If it subsequently appears that any Tract, mechanical miscalculation or clerical error has been made, Storage Operator, with the approval of Pore Space Owners whose interest is affected, shall correct the mistake by revising the exhibits to conform to the facts. The revision shall not include any re-evaluation of engineering or geological interpretations used in determining Storage Facility Participation. Each such revision of an exhibit made prior to thirty (30) days after the Effective Date shall be effective as of the Effective Date. Each such revision thereafter made shall be effective at 7:00 a.m. on the first day of the calendar month next following the filing for record of the revised exhibit or on such other date as may be determined by Storage Operator and set forth in the revised exhibit.

2.5 **Filing Revised Exhibits.** If an exhibit is revised, Storage Operator shall execute an appropriate instrument with the revised exhibit attached and file the same for record in the county or counties in which this Agreement or memorandum of the same is recorded and shall also file the amended changes with the Commission.

## ARTICLE 3
## CREATION AND EFFECT OF STORAGE FACILITY

3.1 **Unleased Pore Space Interests.** Any Pore Space Owner in the Storage Facility who owns a Pore Space Interest in the Storage Reservoir that is not leased for the purposes of this Agreement and during the term hereof, shall be treated as if it were subject to the Pore Space Lease attached hereto as Exhibit "D".

3.2 **Amalgamation of Pore Space.** All Pore Space Interests in and to the Tracts are hereby amalgamated and combined insofar as the respective Pore Space Interests pertain to the Storage Reservoir, so that Storage Operations may be conducted with respect to said Storage Reservoir as if all of the Pore Space Interests in the Facility Area had been included in a single lease executed by all Pore Space Owners, as lessors, in favor of Storage Operator, as lessee and as if the lease contained all of the provisions of this Agreement.

3.3 **Amendment of Leases and Other Agreements.** The provisions of the various leases, agreements, or other instruments pertaining to the respective Tracts or the storage of the Storage Substances therein, including the Pore Space Lease attached hereto as Exhibit "D", are amended to the extent necessary to make them conform to the provisions of this Agreement, but otherwise shall remain in effect.

3.4 **Continuation of Leases and Term Interests.** Injection in to any part of the Storage Reservoir, or other Storage Operations, shall be considered as injection in to or upon each Tract within said Storage Reservoir, and such injection or operations shall continue in effect as to each lease as to all lands and formations covered thereby just as if such operations were conducted on and as if a well were injecting in each Tract within said Storage Reservoir.

3.5 **Titles Unaffected by Storage.** Nothing herein shall be construed to result in the transfer of title of the Pore Space Interest of any Party hereto to any other Party or to Storage Operator.

3.6 **Injection Rights.** Storage Operator is hereby granted the right to inject into the Storage Reservoir any Storage Substances in whatever amounts Storage Operator may deem expedient for Storage Operations, together with the right to drill, use, and maintain injection wells in the Facility Area, and to use for injection purposes.

3.7 **Transfer of Storage Substances from Storage Facility.** Storage Operator may transfer from the Storage Facility any Storage Substances, in whatever amounts Storage Operator may deem expedient for Storage Operations, to any other reservoir, subsurface stratum or formation permitted by the Commission for the storage of carbon dioxide under Chapter 38-22 of the North Dakota Century Code (a "Transfer Storage Facility"), *provided that*, the Pore Space ownership between the Storage Facility and Transfer Storage Facility is common.

3.8 **Receipt of Storage Substances.** Storage Operator may accept and receive into the Storage Facility any Storage Substances, in whatever amounts Storage Operator may deem expedient for Storage Operations, being stored in any other Transfer Storage Facility, *provided that,* the Pore Space ownership between the Storage Facility and Transfer Storage Facility is common.

3.9 **Royalty Payments Upon Transfer.** The transfer or receipt of Storage Substances to or from a Transfer Storage Facility in accordance with Section 3.7 and Section 3.8 shall be disregarded for the purposes of calculating the royalty under any lease covering a Pore Space Interest (including Exhibit "D") and shall not affect the allocation of Storage Substances injected into the Storage Facility through the surface of the Facility Area in accordance with Article 6 of this Agreement.

3.10 **Cooperative Agreements.** Storage Operator may enter into cooperative agreements with respect to lands adjacent to the Facility Area for the purpose of coordinating Storage Operations. Such cooperative agreements may include, but shall not be limited to, agreements regarding the transfer and receipt of Storage Substances pursuant to Sections 3.7 and 3.8 of this Agreement.

3.11 **Border Agreements.** Storage Operator may enter into an agreement or agreements with owners of adjacent lands with respect to operations which may enhance the injection of the Storage Substances in the Storage Reservoir in the Facility Area or which may otherwise be necessary for the conduct of Storage Operations.

## ARTICLE 4
## STORAGE OPERATIONS

4.1 **Storage Operator.** Summit Carbon Storage #2, LLC is hereby designated as the initial Storage Operator. Storage Operator shall have the exclusive right to conduct Storage Operations, which shall conform to the provisions of this Agreement and any lease covering a Pore Space Interest. If there is any conflict between such agreements, this Agreement shall govern.

4.2 **Successor Operators**. The initial Storage Operator and any subsequent operator may, at any time, transfer operatorship of the Storage Facility with and upon the approval of the Commission.

4.3 **Method of Operation.** Storage Operator shall engage in Storage Operations with diligence and in accordance with good engineering and injection practices.

4.4 **Change of Method of Operation.** As permitted by the Commission nothing herein shall prevent Storage Operator from discontinuing or changing in whole or in part any method of operation which, in its opinion, is no longer in accord with good engineering or injection practices. Other methods of operation may be conducted or changes may be made by Storage Operator from time to time if determined by it to be feasible, necessary or desirable to increase the injection or storage of Storage Substances.

## ARTICLE 5
## TRACT PARTICIPATIONS

5.1 **Tract Participations.** The Storage Facility Participation of each Tract is shown in

Exhibit "C." The Storage Facility Participation of each Tract shall be based 100% upon the ratio of surface acres in each Tract to the total surface acres for all Tracts within the Facility Area.

5.2 **Relative Storage Facility Participations.** If the Facility Area is enlarged or reduced, the revised Storage Facility Participation of the Tracts remaining in the Facility Area and which were within the Facility Area prior to the enlargement or reduction shall remain in the same ratio to one another.

## ARTICLE 6
## ALLOCATION OF STORAGE SUBSTANCES

6.1 **Allocation of Tracts.** All Storage Substances injected shall be allocated to the several Tracts in accordance with the respective Storage Facility Participation effective during the period that the Storage Substances are injected. The amount of Storage Substances allocated to each tract, regardless of whether the amount is more or less than the actual injection of Storage Substances from the well or wells, if any, on such Tract, shall be deemed for all purposes to have been injected into such Tract. Storage Substances transferred or received pursuant to Sections 3.7 and 3.8 of this Agreement shall be disregarded for the purposes of this Section 6.1.

6.2 Distribution within Tracts. The Storage Substances injected and allocated to each Tract shall be distributed among, or accounted for to the Pore Space Owners who own a Pore Space Interest in such Tract in accordance with each Pore Space Owner's Storage Facility Participation effective during the period that the Storage Substances were injected. If any Pore Space Interest in a Tract hereafter becomes divided and owned in severalty as to different parts of the Tract, the owners of the divided interests, in the absence of an agreement providing for a different division, shall be compensated for the storage of the Storage Substances in proportion to the surface acreage of their respective parts of the Tract. Subject to Section 3.9, Storage

Substances transferred or received pursuant to Sections 3.7 and 3.8 of this Agreement shall be disregarded for the purposes of this Section 6.2.

## ARTICLE 7
## TITLES

7.1 **Warranty and Indemnity.** Each Pore Space Owner who, by acceptance of revenue for the injection of Storage Substances into the Storage Reservoir, shall be deemed to have warranted title to its Pore Space Interest, and, upon receipt of the proceeds thereof to the credit of such interest, shall indemnify and hold harmless the Storage Operator and other Parties from any loss due to failure, in whole or in part, of its title to any such interest.

7.2 **Injection When Title Is in Dispute.** If the title or right of any Pore Space Owner claiming the right to receive all or any portion of the proceeds for the storage of any Storage Substances allocated to a Tract is in dispute, Storage Operator shall require that the Pore Space Owner to whom the proceeds thereof are paid to furnish security for the proper accounting thereof to the rightful Pore Space Owner, if the title or right of such Pore Space Owner fails in whole or in part.

7.3 **Payments of Taxes to Protect Title.** The owner of surface rights to lands within the Facility Area is responsible for the payment of any *ad valorem* taxes on all such rights, interests or property, unless such owner and the Storage Operator otherwise agree. If any *ad valorem* taxes are not paid by or for such owner when due, Storage Operator may at any time prior to tax sale or expiration of period of redemption after tax sale, pay the tax, redeem such rights, interests or property, and discharge the tax lien. Storage Operator shall, if possible, withhold from any proceeds derived from the storage of Storage Substances otherwise due any Pore Space Owner who is a delinquent taxpayer up to an amount sufficient to defray the costs of such payment or

redemption; *provided* that such withholding to be credited to the Storage Operator. Such withholding shall be without prejudice to any other remedy available to Storage Operator.

7.4 **Pore Space Interest Titles.** If title to a Pore Space Interest fails, but the tract to which it relates is not removed from the Facility Area, the Party whose title failed shall not be entitled to share under this Agreement with respect to that interest.

## ARTICLE 8
## EASEMENTS OR USE OF SURFACE

8.1 **Grant of Easement.** Storage Operator shall have the right to use as much of the surface of the land within the Facility Area as may be reasonably necessary for Storage Operations and the injection of Storage Substances.

8.2 **Use of Water.** Storage Operator shall have and is hereby granted free use of water from the Facility Area for Storage Operations, except water from any well, lake, pond or irrigation ditch of a Pore Space Owner; notwithstanding the foregoing, Storage Operator may access any well, lake, or pond as provided in Exhibit "D".

8.3 **Surface Damages.** Storage Operator shall pay surface owners for damage to growing crops, timber, fences, improvements and structures located on the Facility Area that result from Storage Operations.

8.4 **Surface and Sub-Surface Operating Rights.** Except to the extent modified in this Agreement, Storage Operator shall have the same rights to use the surface and sub-surface and use of water and any other rights granted to Storage Operator in any lease covering Pore Space Interests. Except to the extent expanded by this Agreement or the extent that such rights are common to the effected leases, the rights granted by a lease may be exercised only on the land covered by that lease. Storage Operator will to the extent possible minimize surface impacts.

## ARTICLE 9

## ENLARGEMENT OF STORAGE FACILITY

9.1 **Enlargement of Storage Facility.** The Storage Facility may be enlarged from time to time to include acreage and formations reasonably proven to be geologically capable of storing Storage Substances. Any expansion must be approved in accordance with the rules and regulations of the Commission.

9.2 **Determination of Tract Participation.** Storage Operator, subject to Section 5.2, shall determine the Storage Facility Participation of each Tract within the Storage Facility as enlarged, and shall revise Exhibits "A", "B" and "C" accordingly and in accordance with the rules, regulations and orders of the Commission.

9.3 **Effective Date.** The effective date of any enlargement of the Storage Facility shall be effective as determined by the Commission.

## ARTICLE 10
## TRANSFER OF TITLE PARTITION

10.1 **Transfer of Title.** Any conveyance of all or part of any interest owned by any Party hereto with respect to any Tract shall be made expressly subject to this Agreement. No change of title shall be binding upon Storage Operator, or any Party hereto other than the Party so transferring, until 7:00 a.m. on the first day of the calendar month following thirty (30) days from the date of receipt by Storage Operator of a photocopy, or a certified copy, of the recorded or filed instrument evidencing such a change in ownership.

10.2 **Waiver of Rights to Partition.** Each Party hereto agrees that, during the existence of this Agreement, it will not resort to any action to partition any Tract or parcel within the Facility Area or the facilities used in the development or operation thereof, and to that extent waives the benefits or laws authorizing such partition.

## ARTICLE 11
## RELATIONSHIP OF PARTIES

11.1 **No Partnership.** The duties, obligations and liabilities arising hereunder shall be several and not joint or collective. This Agreement is not intended to create, and shall not be construed to create, an association or trust, or to impose a partnership duty, obligation or liability with regard to any one or more of the Parties hereto. Each Party hereto shall be individually responsible for its own obligations as herein provided.

11.2 **No Joint Marketing.** This Agreement is not intended to provide, and shall not be construed to provide, directly or indirectly, for any joint marketing of Storage Substances.

11.3 **Pore Space Owners Free of Costs.** This Agreement is not intended to impose, and shall not be construed to impose, upon any Pore Space Owner any obligation to pay any Storage Expense unless such Pore Space Owner is otherwise so obligated.

11.4 **Information to Pore Space Owners.** Each Pore Space Owner shall be entitled to all information in possession of Storage Operator to which such Pore Space Owner is entitled by an existing lease or a lease imposed by this Agreement.

## ARTICLE 12
## LAWS AND REGULATIONS

12.1 **Laws and Regulations.** This Agreement shall be subject to all applicable federal, state and municipal laws, rules, regulations and orders.

## ARTICLE 13
## FORCE MAJEURE

13.1 **Force Majeure.** All obligations imposed by this Agreement on each Party, except for the payment of money, shall be suspended while compliance is prevented, in whole or in part, by a labor dispute, fire, war, civil disturbance, or act of God; by federal, state or municipal laws; by any rule, regulation or order of a governmental agency; by inability to secure materials; or by any other cause or causes, whether similar or dissimilar, beyond reasonable control of the Party. No Party shall be required against their will to adjust or settle any labor dispute. Neither this Agreement nor any lease or other instrument subject hereto shall be terminated by reason of suspension of Storage Operations due to any one or more of the causes set forth in this Article.

## ARTICLE 14
## EFFECTIVE DATE

14.1 **Effective Date.** This Agreement shall become effective as determined by the Commission.

14.2 **Certificate of Effectiveness.** Storage Operator shall file for record in the county or counties in which the land affected is located a certificate stating the Effective Date of this Agreement.

## ARTICLE 15
## TERM

15.1 **Term.** Unless sooner terminated in the manner hereinafter provided or by order of the Commission, this Agreement shall remain in full force and effect until the Commission has

issued a certificate of project completion with respect to the Storage Facility in accordance with § 38-22-17 of the North Dakota Century Code.

15.2 **Termination by Storage Operator.** This Agreement may be terminated at any time by the Storage Operator with the approval of the Commission.

15.3 **Effect of Termination.** Upon termination of this Agreement all Storage Operations shall cease. Each lease and other agreement covering Pore Space within the Facility Area shall remain in force for ninety (90) days after the date on which this Agreement terminates, and for such further period as is provided by Exhibit "D" or other agreement.

15.4 **Salvaging Equipment Upon Termination.** If not otherwise granted by Exhibit "D" or other instruments affecting each Tract, Pore Space Owners hereby grant Storage Operator a period of six (6) months after the date of termination of this Agreement within which to salvage and remove Storage Equipment.

15.5 **Certificate of Termination.** Upon termination of this Agreement, Storage Operator shall file for record in the county or counties in which the land affected is located a certificate that this Agreement has terminated, stating its termination date.

## ARTICLE 16
## APPROVAL

16.1 **Original, Counterpart or Other Instrument.** A Pore Space Owner may approve this Agreement by signing the original of this instrument, a counterpart thereof, ratification or joinder or other instrument approving this instrument hereto. The signing of any such instrument shall have the same effect as if all Parties had signed the same instrument.

16.2 **Joinder in Dual Capacity.** Execution as herein provided by any Party as either a Pore Space Owner or the Storage Operator shall commit all interests owned or controlled by such Party and any additional interest thereafter acquired in the Facility Area.

16.3 **Approval by the North Dakota Industrial Commission.**

Notwithstanding anything in this Article to the contrary, all Tracts within the Facility Area shall be deemed to be qualified for participation if this Agreement is duly approved by order of the Commission.

## ARTICLE 17
## GENERAL

17.1 **Amendments Affecting Pore Space Owners.** Amendments hereto relating wholly to Pore Space Owners may be made with approval by the Commission.

17.4 **Construction.** This agreement shall be construed according to the laws of the State of North Dakota.

## ARTICLE 18
## SUCCESSORS AND ASSIGNS

18.1 **Successors and Assigns.** This Agreement shall extend to, be binding upon, and inure to the benefit of the Parties hereto and their respective heirs, devisees, legal representatives, successors and assigns and shall constitute a covenant running with the lands, leases and interests covered hereby.

[*Remainder of page intentionally left blank*. *Signature page follows*.]

Executed the date set opposite each name below but effective for all purposes as provided by Article 14.

Dated: _____, 20__

**STORAGE OPERATOR**

Summit Carbon Storage #2, LLC

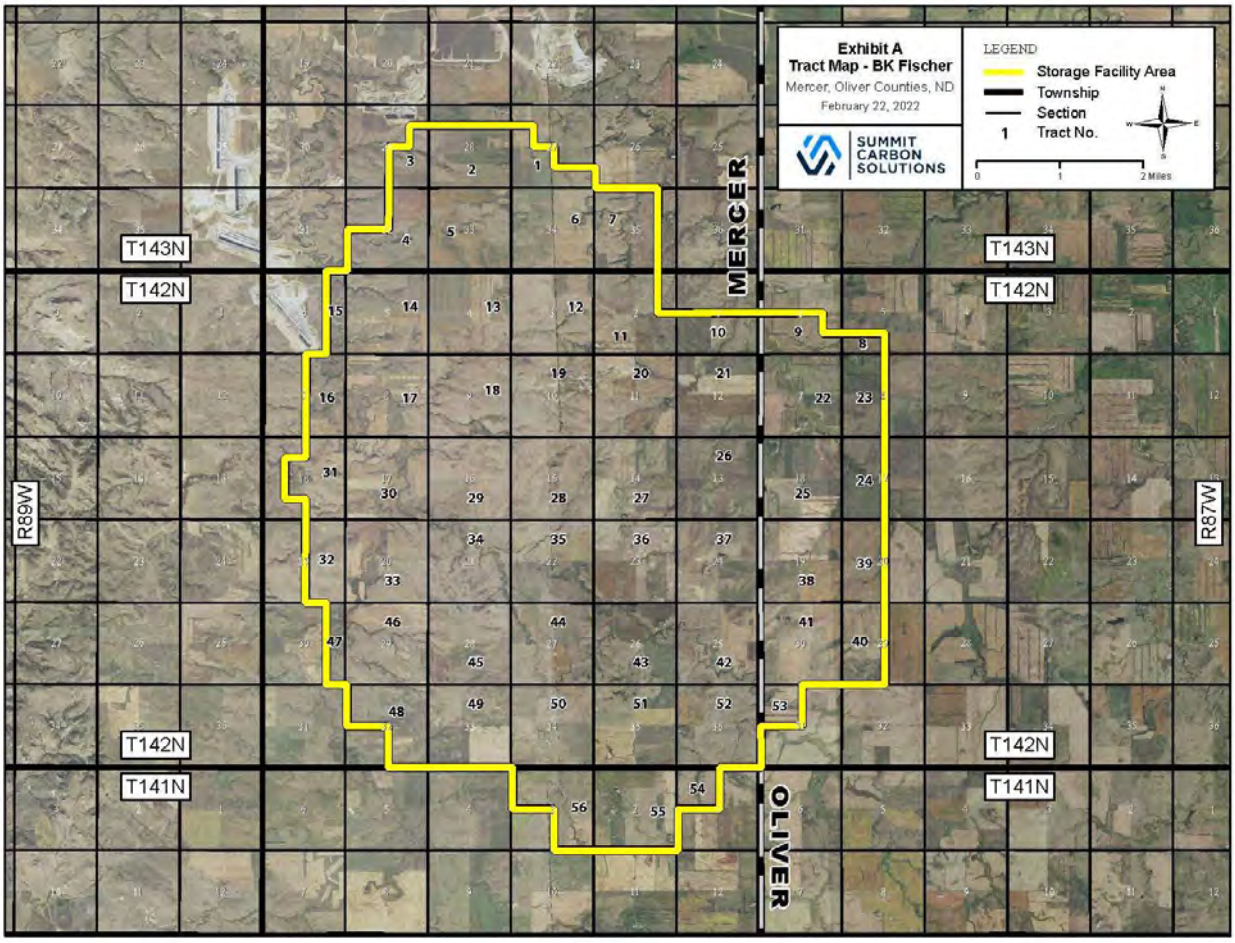
By:_____
[Name]
Its: [Title]

#81618782v1

# EXHIBIT A

Tract Map

Attached to and made part of the Storage Agreement
SCS #2 Broom Creek – Secure Geological Storage
Mercer & Oliver Counties, North Dakota



# EXHIBIT B

Tract Summary

Attached to and made part of the Storage Agreement
SCS #2 Broom Creek – Secure Geological Storage
Mercer & Oliver Counties, North Dakota

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| 1 | Section 27-T143N-R88W | 280 | Donlyn J. Erickson & Roberta Erickson, aka Roberta C. Erickson, as Joint Tenants | 40.0000 | 14.28571429% | 0.13867428% |
| | | | Linda Welk, Life Estate | 80.0000 | 28.57142857% | 0.27734856% |
| | | | Jonathan Welk, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Stacy Welk, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Jonathan Welk | 40.0000 | 14.28571429% | 0.13867428% |
| | | | Stacy Welk | 40.0000 | 14.28571429% | 0.13867428% |
| | | | Kurt M. Swenson & FayE B. Swenson, Trustees of the Swenson Living Trust, dated May 19, 2023, and any amendments thereto | 80.0000 | 28.57142857% | 0.27734856% |
| 2 | Section 28-T143N-R88W | 480 | Shane Kost & Kristi Kost, husband & wife, as Joint Tenants | 80.0000 | 16.66666667% | 0.27734856% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | Ronald E. Gunsch & Janice J. Gunsch, husband & wife, as Tenants in Common | 240.0000 | 50.00000000% | 0.83204568% |
| | | | Myron L. Vigesaa and Nancy L. Vigesaa, Trustees, or their Successors in Trust, Under the Myron L. Vigesaa Revocable Living Trust Dated the 27th Day of June, 2014, and any Amendments thereto | 40.0000 | 8.33333333% | 0.13867428% |
| | | | Nancy L. Vigesaa and Myron L. Vigesaa, Trustees, or their Successors in Trust, Under the Nancy L. Vigesaa Revocable Living Trust Dated the 27th Day of June, 2014, and any Amendments thereto | 40.0000 | 8.33333333% | 0.13867428% |
| | | | Nathan R. Vigesaa & Heather L. Vigesaa, as Joint Tenants | 80.0000 | 16.66666667% | 0.27734856% |
| 3 | Section 29-T143N-R88W | 200 | Lyle Winkler & Patricia A. Winkler, husband & wife, as Joint Tenants | 200.0000 | 100.00000000% | 0.69337140% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| 4 | Section 32-T143N-R88W | 480 | U.S. Bank, N.A., of Fargo, North Dakota, as Trustee of the Darwin H. Mueller Irrevocable Trust | 160.0000 | 33.33333333% | 0.55469712% |
| | | | State of North Dakota | 160.0000 | 33.33333333% | 0.55469712% |
| | | | Shane L. Fischer, as Trustee of the Shane L. Fischer Trust | 80.0000 | 16.66666667% | 0.27734856% |
| | | | Shane Fischer, aka Shane Leo Fischer | 80.0000 | 16.66666667% | 0.27734856% |
| 5 | Section 33-T143N-R88W | 640 | Ronald Gunsch | 317.6500 | 49.63281250% | 1.10124713% |
| | | | Ronald E. Gunsch & Janice J. Gunsch, as Joint Tenants | 2.3500 | 0.36718750% | 0.00814711% |
| | | | Ronald E. Gunsch & Janice J. Gunsch, husband & wife | 320.0000 | 50.00000000% | 1.10939425% |
| 6 | Section 34-T143N-R88W | 640 | Eric Klindworth, aka Eric H. Klindworth & Jacinta Klindworth, aka Jacinta-Jon T. Klindworth, as Joint Tenants | 160.0000 | 25.00000000% | 0.55469712% |
| | | | Ronald Gunsch | 320.0000 | 50.00000000% | 1.10939425% |
| | | | Donlyn J. Erickson & Roberta Erickson, aka Roberta C. Erickson, as Joint Tenants | 160.0000 | 25.00000000% | 0.55469712% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| 7 | Section 35-T143N-R88W | 480 | Rachel Riedemann, fka Rachel Hushka, fka Rachel Erickson | 160.0000 | 33.33333333% | 0.55469712% |
| | | | Donlyn J. Erickson & Roberta Erickson, aka Roberta C. Erickson, as Joint Tenants | 320.0000 | 66.66666667% | 1.10939425% |
| 8 | Section 05-T142N-R87W | 80 | Chad N. Schafer & Lisa L. Schafer, husband & wife, as Joint Tenants | 80.0000 | 100.00000000% | 0.27734856% |
| 9 | Section 06-T142N-R87W | 279.06 | Darell Herman & Sherry Herman, husband & wife, as Joint Tenants | 279.0600 | 100.00000000% | 0.96746112% |
| 10 | Section 01-T142N-R88W | 320 | Noel J. Helm & Betty Helm, aka Betty Jean Helm, husband & wife, as Joint Tenants, Life Estate | 320.0000 | 100.00000000% | 1.10939425% |
| | | | John T. Helm, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Jason J. Helm, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Wayne J. Helm | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Jerome L. Helm | 0.0000 | 0.00000000% | 0.00000000% |
| 11 | Section 02-T142N-R88W | 563.87 | Jason Erickson & Angela Erickson, husband & wife | 81.3600 | 14.42885772% | 0.28206349% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | Wanda Gustafson, a married person dealing in her sole & separate property, Life Estate | 162.5100 | 28.82047280% | 0.56339893% |
| | | | Lori B. Klein, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Sara L. Gustafson, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Jason T. Erickson & Angela Erickson, husband & wife, as Joint Tenants | 160.0000 | 28.37533474% | 0.55469712% |
| | | | Robb M. Moore & Heidi K. Moore, husband & wife, as Joint Tenants | 160.0000 | 28.37533474% | 0.55469712% |
| 12 | Section 03-T142N-R88W | 644.63 | Donlyn J. Erickson & Roberta Erickson, aka Roberta C. Erickson, as Joint Tenants | 322.3500 | 50.00542947% | 1.11754136% |
| | | | David A. Orth & Ronni L. Huschka | 20.2875 | 3.14715418% | 0.07033386% |
| | | | Joan Cundall | 20.2875 | 3.14715418% | 0.07033386% |
| | | | Robert H. Orth | 6.7625 | 1.04905139% | 0.02344462% |
| | | | Richard A. Orth | 6.7625 | 1.04905139% | 0.02344462% |
| | | | Kimberly Orth | 6.7625 | 1.04905139% | 0.02344462% |
| | | | Wilfred Orth | 20.2875 | 3.14715418% | 0.07033386% |
| | | | Estate of Cecelia Orth | 81.1300 | 12.58551417% | 0.28126611% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | David Hottman & Stephanie Hottman, husband & wife, as Joint Tenants | 6.1000 | 0.94627926% | 0.02114783% |
| | | | Donlyn J. Erickson & Roberta Erickson, aka Roberta C. Erickson, as Joint Tenants | 153.9000 | 23.87416037% | 0.53354930% |
| 13 | Section 04-T142N-R88W | 644.44 | Tanner Erickson & Heather Erickson, as Joint Tenants | 2.0000 | 0.31034697% | 0.00693371% |
| | | | Donlyn J. Erickson & Roberta Erickson, aka Roberta C. Erickson, as Joint Tenants | 320.2300 | 49.69120477% | 1.11019162% |
| | | | LeeRoy J. Winkler & Sharon L. Winkler, husband & wife, as Joint Tenants, Life Estate | 162.2100 | 25.17069083% | 0.56235888% |
| | | | Roberta Unruh, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Kimberly Dukart, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Amanda Ahlschlager, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Perry Winkler & Beth Winkler, husband & wife, as Joint Tenants | 160.0000 | 24.82775743% | 0.55469712% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| 14 | Section 05-T142N-R88W | 644.07 | Howard H. Winkler & Bernadette J. Winkler, husband & wife, as Joint Tenants | 162.1100 | 25.16962442% | 0.56201219% |
| | | | Nichole Lee Sailer, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Arnold V. Winkler & Sharon D. Winkler, husband & wife, as Joint Tenants | 161.9600 | 25.14633503% | 0.56149216% |
| | | | Russell D. Winkler & Tammy Winkler, husband & wife, as Joint Tenants | 160.0000 | 24.84202028% | 0.55469712% |
| | | | Perry Winkler & Beth Winkler, husband & wife, as Joint Tenants | 160.0000 | 24.84202028% | 0.55469712% |
| 15 | Section 06-T142N-R88W | 160.84 | Casey Lee Voigt and Julie Anne Voigt, Trustees of the Casey Lee Voigt Living Trust dated January 26, 2023, and any amendments thereto | 160.8400 | 100.00000000% | 0.55760928% |
| | | | Donalda Voigt, Contract for Deed Seller | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Karmen Eslinger, Contract for Deed Seller | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Shawn Voigt, Contract for Deed Seller | 0.0000 | 0.00000000% | 0.00000000% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | Kenneth Voigt, Contract for Deed Seller | 0.0000 | 0.00000000% | 0.00000000% |
| 16 | Section 07-T142N-R88W | 320 | Perry Winkler & Beth Winkler, husband & wife, Life Estate | 160.0000 | 50.00000000% | 0.55469712% |
| | | | Kacey Winkler, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Korey Winkler, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Nancy Flemmer, aka Nancy Lee Flemmer, Life Estate | 160.0000 | 50.00000000% | 0.55469712% |
| | | | Cherie Ann Fischer, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Shawn Michael Flemmer, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| 17 | Section 08-T142N-R88W | 640 | LeeRoy J. Winkler & Sharon L. Winkler, husband & wife, as Joint Tenants, Life Estate | 160.0000 | 25.00000000% | 0.55469712% |
| | | | Roberta Unruh, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Kimberly Dukart, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Amanda Ahlschlager, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | Perry Winkler & Beth Winkler, husband & wife, Life Estate | 320.0000 | 50.00000000% | 1.10939425% |
| | | | Kacey Winkler, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Korey Winkler, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Nancy Flemmer, aka Nancy Lee Flemmer, Life Estate | 160.0000 | 25.00000000% | 0.55469712% |
| | | | Cherie Ann Fischer, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Shawn Michael Flemmer, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| 18 | Section 09-T142N-R88W | 640 | James A. Swenson & Darlene A. Swenson, as Joint Tenants, Life Estate | 320.0000 | 50.00000000% | 1.10939425% |
| | | | Trent T. Martin & Dawn Martin, as Joint Tenants, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | LeeRoy J. Winkler & Sharon L. Winkler, husband & wife, as Joint Tenants, Life Estate | 160.0000 | 25.00000000% | 0.55469712% |
| | | | Roberta Unruh, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Kimberly Dukart, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | Amanda Ahlschlager, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Perry Winkler & Beth Winkler, husband & wife, Life Estate | 160.0000 | 25.00000000% | 0.55469712% |
| | | | Kacey Winkler, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Korey Winkler, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| 19 | Section 10-T142N-R88W | 640 | Donlyn J. Erickson & Roberta Erickson, aka Roberta C. Erickson, as Joint Tenants | 160.0000 | 25.00000000% | 0.55469712% |
| | | | James A. Swenson & Darlene A. Swenson, as Joint Tenants, Life Estate | 158.0000 | 24.68750000% | 0.54776341% |
| | | | Trent T. Martin & Dawn Martin, as Joint Tenants, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Trent T. Martin & Dawn Martin, as Joint Tenants | 322.0000 | 50.31250000% | 1.11632796% |
| 20 | Section 11-T142N-R88W | 640 | Fayette L. Cote & Robert V. Cote, as Trustees of the Robert V. Cote and Fayette L. Cote Trust Agreement of April 4, 2016 | 160.0000 | 25.00000000% | 0.55469712% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | James A. Swenson & Darlene A. Swenson, as Joint Tenants, Life Estate | 160.0000 | 25.00000000% | 0.55469712% |
| | | | Trent T. Martin & Dawn Martin, as Joint Tenants, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Ryan J. Flemmer | 320.0000 | 50.00000000% | 1.10939425% |
| 21 | Section 12-T142N-R88W | 640 | Johnell J. Kusler | 80.0000 | 12.50000000% | 0.27734856% |
| | | | Milda L. Hedblom | 80.0000 | 12.50000000% | 0.27734856% |
| | | | Vivian Viola Hauff, aka Vivian V. Hauff, Life Estate | 80.0000 | 12.50000000% | 0.27734856% |
| | | | Jerry L. Hauff, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Willa Jean Ann Weaver | 80.0000 | 12.50000000% | 0.27734856% |
| | | | Darwin Huber & Susan E. Huber, husband & wife, as Joint Tenants, Life Estate | 160.0000 | 25.00000000% | 0.55469712% |
| | | | Daryl D. Huber, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Darren D. Huber, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Jason T. Erickson & Angela Erickson, husband & wife, as Joint Tenants | 160.0000 | 25.00000000% | 0.55469712% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| 22 | Section 07-T142N-R87W | 637.12 | Trent T. Martin & Dawn Martin, husband & wife, as Joint Tenants | 190.8800 | 29.95981919% | 0.66175367% |
| | | | Kurt M. Swenson & FayE B. Swenson, trustees of the Swenson Living Trust dated May 19, 2023 | 120.5500 | 18.92108237% | 0.41792961% |
| | | | Joseph O. Swenson | 6.0600 | 0.95115520% | 0.02100915% |
| | | | Johnell J. Kusler & Geoffrey E. Tayler, wife and husband | 0.5750 | 0.09024987% | 0.00199344% |
| | | | Milda L. Hedblom, aka Milda K. Hedblom & Edwin Fogelman, wife and husband | 0.5750 | 0.09024987% | 0.00199344% |
| | | | Todd Rueb & Darcy Rueb, husband & wife, as Joint Tenants | 318.4800 | 49.98744350% | 1.10412462% |
| 23 | Section 08-T142N-R87W | 320 | Travis Hellickson & Amber Hellickson, as Joint Tenants | 160.0000 | 50.00000000% | 0.55469712% |
| | | | Noel Helm & Betty Helm, husband & wife | 160.0000 | 50.00000000% | 0.55469712% |
| 24 | Section 17-T142N-R87W | 320 | Jason Erickson & Angela Erickson, husband & wife as Joint Tenants | 320.0000 | 100.00000000% | 1.10939425% |
| 25 | Section 18-T142N-R87W | 637 | Johnell J. Kusler | 80.0000 | 12.55886970% | 0.27734856% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | Milda L. Hedblom | 80.0000 | 12.55886970% | 0.27734856% |
| | | | Jason Erickson & Angela Erickson, husband & wife as Joint Tenants | 158.4500 | 24.87441130% | 0.54932349% |
| | | | Robert Schutt & Alberta E. Schutt, Trustees, or their successors in trust, under the Robert Schutt and Alberta E. Schutt Living Trust, dated December 7, 2015, and any amendments thereto | 316.0500 | 49.61538462% | 1.09570016% |
| | | | Keith Schutt | 2.5000 | 0.39246468% | 0.00866714% |
| 26 | Section 13-T142N-R88W | 640 | Jason T. Erickson & Angela Erickson, husband & wife, as Joint Tenants | 318.8500 | 49.82031250% | 1.10540736% |
| | | | Roughrider Electric Cooperative, Inc. | 1.1500 | 0.17968750% | 0.00398689% |
| | | | Jolene M. Rust, aka JoLene M. Rust | 160.0000 | 25.00000000% | 0.55469712% |
| | | | Ernest J. Vollan, Life Estate | 160.0000 | 25.00000000% | 0.55469712% |
| | | | Cynthia K. Nickel, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| 27 | Section 14-T142N-R88W | 640 | Carol M. Kaelberer, Life Estate | 80.0000 | 12.50000000% | 0.27734856% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | Morgan Nagel, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Garrett Kirchmeier, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Chandler J. Kirchmeier, Remainerman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Kurt M. Swenson and FayE B. Swenson, Trustees, or their successors in interest, of the Swenson Living Trust dated May 19, 2023, and any amendments thereto | 80.0000 | 12.50000000% | 0.27734856% |
| | | | LeeRoy Fischer, aka LeeRoy J. Fischer | 320.0000 | 50.00000000% | 1.10939425% |
| | | | Fayette L. Cote & Robert V. Cote, as Trustees of the Robert V. Cote and Fayette L. Cote Trust Agreement of April 4, 2016 | 160.0000 | 25.00000000% | 0.55469712% |
| 28 | Section 15-T142N-R88W | 640 | Trent Martin & Dawn Martin, husband & wife, as Joint Tenants | 640.0000 | 100.00000000% | 2.21878849% |
| 29 | Section 16-T142N-R88W | 640 | LeeRoy J. Fischer | 320.0000 | 50.00000000% | 1.10939425% |
| | | | Perry Winkler & Beth Winkler, husband & wife, Life Estate | 160.0000 | 25.00000000% | 0.55469712% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | Kacey Winkler, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Korey Winkler, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Norman R. Winkler & Martha E. Winkler, husband & wife, as Joint Tenants | 160.0000 | 25.00000000% | 0.55469712% |
| 30 | Section 17-T142N-R88W | 640 | Doris B. Mutzenberger & James J. Mutzenberger, wife & husband, as Joint Tenants, Life Estate | 158.0000 | 24.68750000% | 0.54776341% |
| | | | Tony Mutzenberger, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Casey Mutzenberger, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Casey Mutzenberger | 2.0000 | 0.31250000% | 0.00693371% |
| | | | Tony Mutzenberger | 207.0000 | 32.34375000% | 0.71763940% |
| | | | Myron Flemmer & Evelyn Flemmer, husband & wife, Contract for Deed Seller | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Perry Winkler & Beth Winkler, as Joint Tenants | 113.0000 | 17.65625000% | 0.39175484% |
| | | | Christopher Palmer & Kayla Palmer, husband & wife, as Joint Tenants | 160.0000 | 25.00000000% | 0.55469712% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| 31 | Section 18-T142N-R88W | 400 | Perry Winkler & Beth Winkler, husband & wife, Life Estate | 80.0000 | 20.00000000% | 0.27734856% |
| | | | Kacey Winkler, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Korey Winkler, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Perry Winkler & Beth Winkler, as Joint Tenants | 120.0000 | 30.00000000% | 0.41602284% |
| | | | Shawn Unruh & Shevelle Unruh, as Joint Tenants | 20.0000 | 5.00000000% | 0.06933714% |
| | | | Austin Jensen & Destinee Jensen, aka Destiny Jensen, as Joint Tenants | 20.0000 | 5.00000000% | 0.06933714% |
| | | | Paulette White, fka Paulette Hogan | 160.0000 | 40.00000000% | 0.55469712% |
| 32 | Section 19-T142N-R88W | 320 | Steven C. Goetz, aka Steve Goetz, a single person, Life Estate | 160.0000 | 50.00000000% | 0.55469712% |
| | | | Shane J. Goetz and Samantha J. Goetz, Remaindermen | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Paul A. Schock | 160.0000 | 50.00000000% | 0.55469712% |
| 33 | Section 20-T142N-R88W | 640 | Christopher Palmer & Kayla Palmer, husband & wife, as Joint Tenants | 160.0000 | 25.00000000% | 0.55469712% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | Thomas Welk, aka Thomas C. Welk, Life Estate | 240.0000 | 37.50000000% | 0.83204568% |
| | | | Amy Dinius, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | David Welk, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Cody S. Thiel & Megan B. Thiel, husband & wife | 240.0000 | 37.50000000% | 0.83204568% |
| 34 | Section 21-T142N-R88W | 640 | Jerry Ballensky and Julie Ballensky, husband & wife, as Joint Tenants | 160.0000 | 25.00000000% | 0.55469712% |
| | | | David Fischer | 160.0000 | 25.00000000% | 0.55469712% |
| | | | Cody S. Thiel & Megan B. Thiel, husband & wife | 160.0000 | 25.00000000% | 0.55469712% |
| | | | Sheila Hildebrand & Steven B. Hildebrand, wife & husband, as Joint Tenants | 160.0000 | 25.00000000% | 0.55469712% |
| 35 | Section 22-T142N-R88W | 640 | Irene Fischer, aka Irene E. Fischer, Life Estate | 320.0000 | 50.00000000% | 1.10939425% |
| | | | Barry R. Fischer | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Brendan B. Flemmer | 297.6000 | 46.50000000% | 1.03173665% |
| | | | Jerry D. Ballensky and Julie Ballensky, husband & wife, as Joint Tenants | 22.4000 | 3.50000000% | 0.07765760% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| 36 | Section 23-T142N-R88W | 640 | Irene Fischer, aka Irene E. Fischer, Life Estate | 475.0000 | 74.21875000% | 1.64675708% |
| | | | Barry R. Fischer | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Brendan B. Flemmer | 160.0000 | 25.00000000% | 0.55469712% |
| | | | Thomas M. Fandrich & Laura Jane Fandrich, husband & wife as Joint Tenants | 5.0000 | 0.78125000% | 0.01733429% |
| 37 | Section 24-T142N-R88W | 640 | Ernest J. Vollan, Life Estate | 320.0000 | 50.00000000% | 1.10939425% |
| | | | Cynthia K. Nickel, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | John M. Jochim | 160.0000 | 25.00000000% | 0.55469712% |
| | | | Michael P. Bauman | 140.0000 | 21.87500000% | 0.48535998% |
| | | | Violet J. Jochim | 20.0000 | 3.12500000% | 0.06933714% |
| 38 | Section 19-T142N-R87W | 637.16 | Robert Schutt & Alberta E. Schutt, Trustees, or their successors in trust, under the Robert Schutt and Alberta E. Schutt Living Trust, dated December 7, 2015, and any amendments thereto | 478.5900 | 75.11300144% | 1.65920310% |
| | | | Jeffrey Schutt | 158.5700 | 24.88699856% | 0.54973952% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| 39 | Section 20-T142N-R87W | 320 | Robert Schutt & Alberta E. Schutt, Trustees, or their successors in trust, under the Robert Schutt and Alberta E. Schutt Living Trust, dated December 7, 2015, and any amendments thereto | 160.0000 | 50.00000000% | 0.55469712% |
| | | | Mark S. Singer | 160.0000 | 50.00000000% | 0.55469712% |
| 40 | Section 29-T142N-R87W | 320 | Jeffrey Schutt | 160.0000 | 50.00000000% | 0.55469712% |
| | | | Robert Schutt & Alberta E. Schutt, Trustees, or their successors in trust, under the Robert Schutt and Alberta E. Schutt Living Trust, dated December 7, 2015, and any amendments thereto | 60.0000 | 18.75000000% | 0.20801142% |
| | | | Ernest J. Vollan, Life Estate | 100.0000 | 31.25000000% | 0.34668570% |
| | | | Cynthia K. Nickel, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| 41 | Section 30-T142N-R87W | 637.96 | Rory C. Flemmer & Jennifer Flemmer, husband & wife, as Joint Tenants | 329.0000 | 51.57063139% | 1.14059596% |
| | | | Jeffrey Schutt | 301.9600 | 47.33212114% | 1.04685215% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | The North Dakota State Water Commission | 1.0000 | 0.15674964% | 0.00346686% |
| | | | Church of St. Joseph – Beulah Trustee, Inc., a nonprofit corporation, as trustee Church of St. Joseph – Beulah Trustee, Inc., a nonprofit corporation, as trustee | 6.0000 | 0.94049784% | 0.02080114% |
| 42 | Section 25-T142N-R88W | 640 | Duane Flemmer & Lori Flemmer, husband & wife, as Joint Tenants | 471.4920 | 73.67062500% | 1.63459535% |
| | | | Elsie Opp, fka Elsie Flemmer, Life Estate, Contract for Deed Seller | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Duane Flemmer, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Linda Flemmer, Contract for Deed Seller & Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Dennis Flemmer, Contract for Deed Seller & Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Ernest J. Vollan, Life Estate | 160.0000 | 25.00000000% | 0.55469712% |
| | | | Cynthia K. Nickel, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Rory C. Flemmer | 8.5080 | 1.32937500% | 0.02949602% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| 43 | Section 26-T142N-R88W | 640 | Brendan B. Flemmer | 435.9000 | 68.10937500% | 1.51120298% |
| | | | Robb M. Moore & Heidi K. Moore, husband & wife, as Joint Tenants | 44.1000 | 6.89062500% | 0.15288839% |
| | | | Darwin Huber | 54.8100 | 8.56406250% | 0.19001843% |
| | | | Cody Scott Thiel | 105.1900 | 16.43593750% | 0.36467869% |
| 44 | Section 27-T142N-R88W | 640 | Jerry D. Ballensky & Julie Ballensky, husband & wife, as Joint Tenants | 297.6000 | 46.50000000% | 1.03173665% |
| | | | Brendan B. Flemmer | 22.4000 | 3.50000000% | 0.07765760% |
| | | | Cody S. Thiel | 80.0000 | 12.50000000% | 0.27734856% |
| | | | Cody S. Thiel, aka Cody Scott Thiel & Megan B. Thiel | 80.0000 | 12.50000000% | 0.27734856% |
| | | | Sheila Hildebrand & Steven B. Hildebrand, wife & husband, as Joint Tenants | 160.0000 | 25.00000000% | 0.55469712% |
| 45 | Section 28-T142N-R88W | 640 | Cody S. Thiel, aka Cody Scott Thiel & Megan B. Thiel | 480.0000 | 75.00000000% | 1.66409137% |
| | | | Cody S. Thiel & Megan B. Thiel, as Joint Tenants | 160.0000 | 25.00000000% | 0.55469712% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| 46 | Section 29-T142N-R88W | 640 | Emil Vernon Lapp, Jr., aka Emil V. Lapp, Jr. & Donna J. Lapp, husband & wife, as Joint Tenants, Life Estate | 480.0000 | 75.00000000% | 1.66409137% |
| | | | Michael Lapp, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Cody S. Thiel, aka Cody Scott Thiel & Megan B. Thiel | 160.0000 | 25.00000000% | 0.55469712% |
| 47 | Section 30-T142N-R88W | 160 | Clark D. Pochant & Jayne D. Pochant, husband & wife, as Joint Tenants | 73.0100 | 45.63125000% | 0.25311523% |
| | | | Chance Mastel | 5.0000 | 3.12500000% | 0.01733429% |
| | | | Jessica Voegele | 1.9900 | 1.24375000% | 0.00689905% |
| | | | Thomas Welk, aka Thomas C. Welk, Life Estate | 80.0000 | 50.00000000% | 0.27734856% |
| | | | Amy Dinius, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | David Welk, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| 48 | Section 32-T142N-R88W | 480 | Walter E. Frank | 160.0000 | 33.33333333% | 0.55469712% |
| | | | Thomas Welk, aka Thomas C. Welk, Life Estate | 120.0000 | 25.00000000% | 0.41602284% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | Amy Dinius, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | David Welk, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Dwight J. Frank & Beverly A. Frank, husband & wife, Joint Tenants | 200.0000 | 41.66666667% | 0.69337140% |
| 49 | Section 33-T142N-R88W | 640 | Paul A. Schock | 320.0000 | 50.00000000% | 1.10939425% |
| | | | Steven C. Goetz, aka Steve Goetz, a single person, Life Estate | 160.0000 | 25.00000000% | 0.55469712% |
| | | | Shane J. Goetz and Samantha J. Goetz, Remaindermen | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Ruby Emter, Life Estate | 160.0000 | 25.00000000% | 0.55469712% |
| | | | Leeta Olin, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Tammy Moore, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| 50 | Section 34-T142N-R88W | 640 | Michelle M. Braun | 640.0000 | 100.00000000% | 2.21878849% |
| 51 | Section 35-T142N-R88W | 640 | Darwin Huber & Susan E. Huber, husband & wife, as Joint Tenants, Life Estate | 126.0500 | 19.69531250% | 0.43699733% |
| | | | Daryl D. Huber, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | Darren D. Huber, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Cody Scott Thiel | 33.9500 | 5.30468750% | 0.11769980% |
| | | | Brendan B. Flemmer | 320.0000 | 50.00000000% | 1.10939425% |
| | | | Delmer F. Voegele & Cassandra R. Voegele, husband & wife, as Joint Tenants, Life Estate | 160.0000 | 25.00000000% | 0.55469712% |
| 52 | Section 36-T142N-R88W | 640 | Ralph Kemmet | 300.0000 | 46.87500000% | 1.04005711% |
| | | | Duane Flemmer & Lori Flemmer, husband & wife, as Joint Tenants | 160.0000 | 25.00000000% | 0.55469712% |
| | | | Elsie Opp, fka Elsie Flemmer, Life Estate, Contract for Deed Seller | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Duane Flemmer, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Linda Flemmer, Contract for Deed Seller & Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Dennis Flemmer, Contract for Deed Seller & Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Ralph Kemmet & Dena Kemmet, as Joint Tenants | 20.0000 | 3.12500000% | 0.06933714% |
| | | | Jeffrey Schutt, aka Jeffrey J. Schutt | 160.0000 | 25.00000000% | 0.55469712% |
| 53 | Section 31-T142N-R87W | 158.71 | LeeRoy J. Fischer | 158.7100 | 100.00000000% | 0.55022488% |

| Tract No. | Land Description | Total Acres | Owner | Acres Owned | Tract Participation | Storage Facility Participation |
|---|---|---|---|---|---|---|
| | | | | | | |
| 54 | Section 01-T141N-R88W | 159.81 | Larry Flemmer, aka Larry L. Flemmer | 159.8100 | 100.00000000% | 0.55403842% |
| 55 | Section 02-T141N-R88W | 639.94 | Corey M. Voegele & Roxanne Voegele, husband & wife, as Joint Tenants | 267.7400 | 41.83829734% | 0.92821630% |
| | | | Delmer F. Voegele & Cassandra R. Voegele, husband & wife, as Joint Tenants, Life Estate | 360.0400 | 56.26152452% | 1.24820720% |
| | | | Corey Voegele | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Jack J. Kraft & Deborah Kraft, as Joint Tenants | 12.1600 | 1.90017814% | 0.04215698% |
| 56 | Section 03-T141N-R88W | 479.96 | Delmer F. Voegele & Cassandra R. Voegele, husband & wife, as Joint Tenants, Life Estate | 319.9600 | 66.66388866% | 1.10925557% |
| | | | Eric John Voegele, Remainderman | 0.0000 | 0.00000000% | 0.00000000% |
| | | | Delmer F. Voegele & Cassandra R. Voegele, husband & wife, as Joint Tenants, Life Estate | 160.0000 | 33.33611134% | 0.55469712% |
| | | | Corey Voegele | 0.0000 | 0.00000000% | 0.00000000% |
| | | | | | | |
| | **Total Acres:** | **28,844.57** | | **28,844.57** | **Total Participation:** | **100.00000000%** |

# EXHIBIT C

Tract Participation Factors

Attached to and made part of the Storage Agreement
SCS #2 Broom Creek – Secure Geological Storage
Mercer & Oliver Counties, North Dakota

| Tract No. | Land Description | Acres | Tract Participation Factor |
|---|---|---|---|
| 1 | Section 27-T143N-R88W | 280 | 0.97071997% |
| 2 | Section 28-T143N-R88W | 480 | 1.66409137% |
| 3 | Section 29-T143N-R88W | 200 | 0.69337140% |
| 4 | Section 32-T143N-R88W | 480 | 1.66409137% |
| 5 | Section 33-T143N-R88W | 640 | 2.21878849% |
| 6 | Section 34-T143N-R88W | 640 | 2.21878849% |
| 7 | Section 35-T143N-R88W | 480 | 1.66409137% |
| 8 | Section 05-T142N-R87W | 80 | 0.27734856% |
| 9 | Section 06-T142N-R87W | 279.06 | 0.96746112% |
| 10 | Section 01-T142N-R88W | 320 | 1.10939425% |
| 11 | Section 02-T142N-R88W | 563.87 | 1.95485667% |
| 12 | Section 03-T142N-R88W | 644.63 | 2.23484004% |
| 13 | Section 04-T142N-R88W | 644.44 | 2.23418134% |
| 14 | Section 05-T142N-R88W | 644.07 | 2.23289860% |
| 15 | Section 06-T142N-R88W | 160.84 | 0.55760928% |
| 16 | Section 07-T142N-R88W | 320 | 1.10939425% |
| 17 | Section 08-T142N-R88W | 640 | 2.21878849% |
| 18 | Section 09-T142N-R88W | 640 | 2.21878849% |
| 19 | Section 10-T142N-R88W | 640 | 2.21878849% |
| 20 | Section 11-T142N-R88W | 640 | 2.21878849% |
| 21 | Section 12-T142N-R88W | 640 | 2.21878849% |
| 22 | Section 07-T142N-R87W | 637.12 | 2.20880394% |
| 23 | Section 08-T142N-R87W | 320 | 1.10939425% |
| 24 | Section 17-T142N-R87W | 320 | 1.10939425% |
| 25 | Section 18-T142N-R87W | 637 | 2.20838792% |
| 26 | Section 13-T142N-R88W | 640 | 2.21878849% |
| 27 | Section 14-T142N-R88W | 640 | 2.21878849% |
| 28 | Section 15-T142N-R88W | 640 | 2.21878849% |
| 29 | Section 16-T142N-R88W | 640 | 2.21878849% |
| 30 | Section 17-T142N-R88W | 640 | 2.21878849% |
| 31 | Section 18-T142N-R88W | 400 | 1.38674281% |
| 32 | Section 19-T142N-R88W | 320 | 1.10939425% |
| 33 | Section 20-T142N-R88W | 640 | 2.21878849% |
| 34 | Section 21-T142N-R88W | 640 | 2.21878849% |
| 35 | Section 22-T142N-R88W | 640 | 2.21878849% |
| 36 | Section 23-T142N-R88W | 640 | 2.21878849% |
| 37 | Section 24-T142N-R88W | 640 | 2.21878849% |

| | | | |
|---|---|---|---|
| 38 | Section 19-T142N-R87W | 637.16 | 2.20894262% |
| 39 | Section 20-T142N-R87W | 320 | 1.10939425% |
| 40 | Section 29-T142N-R87W | 320 | 1.10939425% |
| 41 | Section 30-T142N-R87W | 637.96 | 2.21171610% |
| 42 | Section 25-T142N-R88W | 640 | 2.21878849% |
| 43 | Section 26-T142N-R88W | 640 | 2.21878849% |
| 44 | Section 27-T142N-R88W | 640 | 2.21878849% |
| 45 | Section 28-T142N-R88W | 640 | 2.21878849% |
| 46 | Section 29-T142N-R88W | 640 | 2.21878849% |
| 47 | Section 30-T142N-R88W | 160 | 0.55469712% |
| 48 | Section 32-T142N-R88W | 480 | 1.66409137% |
| 49 | Section 33-T142N-R88W | 640 | 2.21878849% |
| 50 | Section 34-T142N-R88W | 640 | 2.21878849% |
| 51 | Section 35-T142N-R88W | 640 | 2.21878849% |
| 52 | Section 36-T142N-R88W | 640 | 2.21878849% |
| 53 | Section 31-T142N-R87W | 158.71 | 0.55022488% |
| 54 | Section 01-T141N-R88W | 159.81 | 0.55403842% |
| 55 | Section 02-T141N-R88W | 639.94 | 2.21858048% |
| 56 | Section 03-T141N-R88W | 479.96 | 1.66395270% |
| **Total:** | | **28,844.57** | **100.00000000%** |

# EXHIBIT D

Form of Pore Space Lease

Attached to and made part of the Storage Agreement
SCS #2 Broom Creek – Secure Geological Storage
Mercer & Oliver Counties, North Dakota

## PORE SPACE LEASE

THIS PORE SPACE LEASE (this "Lease") is made effective as of the Effective Date (as defined below) by and between_____,
whose address is_____,
(whether one or more, "Lessor"), and Summit Carbon Storage #2, LLC, a Delaware limited liability company, whose address is 2321 N. Loop Dr., Ames, IA 50010 (whether one or more, "Lessee"). Lessor and Lessee may be individually referred to herein as a "Party" and collectively as the "Parties".

1. Leased Premises. Lessor, for good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, does hereby grant, demise, lease and let unto Lessee for Lessee's geologic storage operations and other purposes set forth herein, the lands described and incorporated herein by reference in Exhibit A attached (the "Leased Premises").

2. Term.

(a) Initial and Primary Term. This Lease shall commence on the date Lessee executes this Lease ("Effective Date") and continue for an initial term of twenty (20) years ("Initial Term") unless sooner terminated in accordance with the terms of this Lease. As consideration for the Initial Term, Lessee shall pay to Lessor TWENTY-FIVE and NO/100 DOLLARS ($25.00) per acre as a single one-time bonus payment, and an annual rental of Four and No/100 Dollars ($4.00) per acre on or before January 1 of each year of the Initial Term. The annual rental shall increase by TWO percent (2.0%) commencing on January 1, 2026 and on January 1 each year thereafter. The first year's rental has been paid in full, the receipt and sufficiency of which is hereby acknowledged by Lessor. Lessee may, at any time prior to the expiration of the Initial Term, elect to extend the Initial Term for up to an additional twenty (20) years by providing written notice to Lessor and payment of One Hundred and No/100 Dollars ($100.00) per acre (the Initial Term, together with all extensions shall be referred to herein as the "Primary Term"). For the avoidance of doubt, Lessor's consent to any such extension will not be required provided that the foregoing payment is tendered to Lessor prior to the expiration of the Initial Term. Lessee shall pay to Lessor the annual rentals when due throughout the Primary Term; *provided*, *however*, Lessee shall not be liable to Lessor for annual rentals with respect to any portion of the Leased Premises which are or become subject to Permit as set forth in Section 2(b), below.

(b) Operational Term. This Lease shall continue beyond the Primary Term for so long as any portion of the Leased Premises or Lessee's storage facilities located in, on or under the Leased Premises (including without limitation, any Reservoirs) are subject to a permit issued by the North Dakota Industrial Commission (the "Commission") (a "Permit") or under the ownership or control of the State of North Dakota; *provided*, *however*, that all of Lessee's obligations under this Lease shall terminate upon issuance of a certificate of project completion pursuant to Chapter 38-22 of the North Dakota Century Code (the "Operational Term"). If the Primary Term expires and no portion of the Leased Premises or Lessee's storage facilities located in, on or under the Leased Premises is subject to a Permit, this Lease shall terminate, and Lessee shall execute a document evidencing termination of this Lease in recordable form and shall record it in the official records of the county in which the Leased Premises is located. As consideration for the Operational Term, Lessee shall pay to Lessor the royalty set forth in Section 3, below.

3. Royalty. Lessee shall pay to Lessor its proportionate share of FIFTY cents ($0.50) per metric ton of carbon dioxide ($CO_2$) injected into the reservoirs and subsurface pore spaces (as used herein, such terms shall have the meanings set forth in Chapter 38-22 and Chapter 47-31 of the North Dakota Century Code), stratum or strata underlying the Leased Premises (collectively, "Reservoirs"), or reservoirs and subsurface pore spaces, stratum or strata unitized or amalgamated therewith. The royalty shall increase TEN percent (10.0%) on January 1, 2026 and an additional TEN percent (10.0%) every five years thereafter, as outlined on attached Exhibit B. The quantity of $CO_2$ so injected shall be measured by meters installed by Lessee. Lessor's "proportionate share" shall be determined on a net acre basis and the Parties hereby stipulate that the acreage set forth in Section 1 shall be used to calculate Lessor's proportionate share. The quantity of carbon dioxide injected into the Reservoirs or any reservoirs or subsurface pore spaces, stratum or strata unitized or amalgamated therewith shall be determined through the use of metering equipment installed and operated by Lessee at the injection site. All royalties due hereunder for carbon dioxide injected into the Reservoirs or any reservoirs or subsurface pore spaces, stratum or strata unitized or amalgamated therewith during any calendar month shall be paid to Lessor annually on or before March 31st for the prior year's injection volumes. Lessor and Lessee agree that this Lease shall continue as specified herein even in the absence of injection operations and the payment of royalties.

4. Right to Pore Space/Storage of Carbon Dioxide. Lessor grants to Lessee the exclusive right to inject and store carbon dioxide ($CO_2$) and other incidental gaseous substances into the Reservoirs, together with the right to construct, replace, inspect, repair, monitor, maintain, relocate, change the size of such surface or subsurface facilities on the Leased Premises that Lessee determines necessary or desirable for Lessee's storage operations, including, but not limited to fences, pipelines, tanks, reservoirs, electric and communication lines, roadways, underground facilities and equipment, surface facilities and equipment, buildings, structures and other such facilities and appurtenances. Lessor shall not grant any other person the right to inject or store $CO_2$ or any other incidental substances.

5. Facility Right of Ways/Compensation. Lessor grants Lessee the right of reasonable use of the surface of the Leased Premises, including without limitation, the rights of ingress and egress over the Leased Premises together with the right of way over, under and across the Leased Premises and the right from time to time to construct, replace, inspect, repair, monitor, maintain, relocate, change the size of such surface or subsurface facilities on the Leased Premises that Lessee determines necessary or desirable for Lessee's storage operations, including, but not limited to fences, pipelines, tanks, reservoirs, electric and communication lines, roadways, underground facilities and equipment, surface facilities and equipment, buildings, structures and other such facilities and appurtenances, (each a "Facility" and collectively the "Facilities"); *provided*, *however*, that (i) Lessee shall provide Lessor with notice of operations and an offer of damage, disruption and loss of production payments, as each may be applicable, prior to the installation of any such Facilities on the Leased Premises, and (ii) the agreed up terms, including the amount of damage payments to be paid to Lessor, shall be memorialized in an agreement separate from this Lease, such agreement to be consistent with the grant contained herein. Lessee shall be entitled to proceed with the installation of the Facilities while the separate agreement and amount of damage, disruption or loss is being agreed or determined. Lessee shall have the further right to fence the perimeter of any Facility on the Leased Premises and sufficiently illuminate the site for the safety and security of operations.

6. Amalgamation. Lessee, in its sole discretion, shall have the right and power, at any time and from time to time during the term of this Lease to pool, unitize, or amalgamate any reservoirs or subsurface pore spaces, stratum or strata underlying the Leased Premises with any other lands or interests into which such reservoirs or subsurface pore spaces extend and document such unit in accordance with applicable law or agency order. Amalgamated units shall be of such shape and dimensions as Lessee may elect and as are approved by the Commission. Amalgamated areas may include, but are not required to include, land upon which injection or extraction wells have been completed or upon which the injection and/or withdrawal of carbon dioxide and/or related gaseous substances has commenced prior to the effective date of amalgamation. In exercising its amalgamation rights under this Lease and if required by law, Lessee shall record or cause to be recorded a copy of the Commission's amalgamation order or other notice thereof in the county in which the amalgamated unit is located. Amalgamating in one or more instances shall, if approved by the Commission, not exhaust the rights of Lessee to amalgamate Reservoirs or portions of Reservoirs into other amalgamation areas, and Lessee shall have the recurring right to revise any amalgamated area formed under this Lease by expansion or contraction or both. Lessee may dissolve any amalgamated area at any time and document such dissolution by recording an instrument in accordance with applicable law or agency order. Lessee shall have the right to negotiate, on behalf of and as agent for Lessor, any unit, amalgamation, storage or operating agreements with respect to amalgamation of reservoir or pore space interests underlying the Leased Premises or the operation of any amalgamated areas formed under such agreements. To the extent any of the terms of such agreements conflict with the terms of this Lease, the terms of such agreements shall control, and the provisions of this Lease shall be deemed modified to conform to the terms, conditions, and provisions of any such agreements which are approved by the Commission.

7. Lessee Obligations. Lessee shall have no obligation, express or implied, to begin, prosecute or continue storage operations in, upon or under the Leased Premises, or store and/or sell or use all or any portion of the gaseous substances stored thereon. The timing, nature, manner and extent of Lessee's operations, if any, under this Lease shall be at the sole discretion of Lessee. All obligations of Lessee are expressed herein, and there shall be no covenants implied under this Lease, it being agreed that all amounts paid hereunder constitute full and adequate consideration for this Lease.

8. Ownership. Lessee shall at all times be the owner of (i) the carbon dioxide and other gaseous substances stored in the Reservoirs or any reservoirs or subsurface pore spaces, stratum or strata unitized or amalgamated therewith, and (ii) all equipment, buildings, structures, facilities and other property constructed or installed by Lessee on the Leased Premises. Lessee shall have the right, but not the obligation, at any time during this Lease to remove all or any portion of the property or fixtures placed by Lessee on the Lease Premises. Notwithstanding the foregoing, title to the storage facility and to the stored carbon dioxide or other gaseous substances shall be transferred to the State of North Dakota upon issuance of a certificate of project completion by the Commission in accordance with Chapter 38-22 of the North Dakota Century Code.

9. Minerals, Oil and Gas. This Lease is not intended to grant or convey, nor does it grant or convey, any right to or obligation for Lessee to explore for or produce minerals, including oil and gas, that may exist on or under the Leased Premises.

10. Surrender of Leased Premises. Lessee shall have the right, but not the obligation, at any time from time to time to execute and deliver to Lessor a surrender and/or release covering all or any part of the Leased Premises for which the Reservoirs are not being utilized for storage as set forth herein, and upon delivery of such surrender and/or release to Lessor this Lease shall terminate as to such lands, and Lessee shall be released from all further obligations and duties as to the lands so surrendered and/or released, including, without limitation, any obligation to make payments provided for herein, except obligations accrued as of the date of the surrender and/or release. Lessee shall be able to surrender the any and or all of the Leased Premises if not utilizing the Reservoirs located thereunder.

11. Hold Harmless and Indemnification. The Lessee agrees to defend, indemnify, and hold harmless Lessor from any claims by any person that are a direct result of the Lessee's use of the Leased Premises or Reservoirs. Notwithstanding the foregoing, such indemnity/hold harmless obligation excludes (i) any claim or cause of action, or alleged or threatened claim or cause of action, damage, judgment, interest, penalty or other loss arising or resulting from the negligence or intentional acts of Lessor or Lessor's agents, invitees, or licensees; or third parties, and (ii) any claim for exemplary, punitive, special or consequential damages claimed by Lessor. Lessee further accepts liability and indemnifies Lessor for reasonable costs, expenses and attorneys' fees incurred in establishing and litigating the indemnification coverage provided above. The legal defense provided by Lessee to the Lessor under this paragraph must be free of any conflicts of interest even if this requires Lessee to retain separate legal counsel for Lessor.

12. Hazardous Substances. Lessee shall have no liability for any regulated hazardous substances located on the Leased Premises prior to the Effective Date or placed in, on or about the Leased Premises by Lessor or any third-party on or after the Effective Date, and nothing in this Lease shall be construed to impose upon Lessee any obligation for the removal of such regulated hazardous substances. As used herein, "hazardous substances" shall have the meaning set forth in the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) and any amendments thereto, or any other local, state or federal statutes.

13. Termination. A material violation or default of any terms of this Lease by Lessee shall be grounds for termination of the Lease. Lessor shall give Lessee written notice of violation or default and Lessee shall have sixty (60) days after receipt of said notice to substantially cure such violations or defaults. If Lessee fails to substantially cure such violations or defaults within the 60-day cure period, Lessor may terminate the Lease; provided that if it is not possible to cure such violations or defaults within the 60-day cure period, Lessee shall have a reasonable longer period of time to cure such violations or defaults provided it commences cure within the initial 60-day cure period and thereafter diligently pursues such cure. Lessee may terminate the lease with thirty (30) days written notice to Lessor. Upon termination of this Lease, Lessee shall have one hundred eighty (180) days to remove all facilities and property of Lessee located on the Leased Premises. For the avoidance of doubt, Lessee shall not be required to remove any $CO_2$ or other incidental gaseous substances injected into the Reservoirs.

14. Taxes. Lessee shall pay all taxes, if any, levied against its personal property or on its improvements to the Leased Premises. Lessor shall pay for all real estate taxes and other assessments levied upon the Leased Premises. Lessee shall have the right to pay all taxes, assessments and other fees on behalf of Lessor and to deduct the amount so paid from other payments due to Lessor hereunder.

15. Conduct of Operations. In conducting its operations hereunder, Lessee shall use its best efforts to comply with all applicable laws, rules and regulations and ordinances pertaining thereto. Lessee reserves and shall have the right to challenge and/or appeal any law, ruling, regulation, order or other determination and to carry on its operations in accordance with Lessee's interpretation of the same, pending final determination.

16. Force Majeure. Should Lessee be prevented from complying with any express or implied covenant of this Lease or from utilizing the Lease Premises for underground storage purposes by reason of scarcity of or an inability to obtain or to use equipment or material or failure or breakdown of equipment, or by operation of force majeure, any federal or state law or any order, rule or regulation of governmental authority, then while so prevented, Lessee's obligation to comply with such covenant shall be suspended and the primary term of this Lease shall be extended while and so long as Lessee is prevented by any such cause from utilizing the property for underground storage purposes and the time while Lessee is so prevented shall not be counted against Lessee, anything in this Lease to the contrary notwithstanding.

17. Surface Damage Compensation. The bonus and royalty amounts contemplated and paid to Lessor hereunder is compensation for, among other things, damages sustained by Lessor for lost land value, lost use of and access to Lessor's land and lost value of improvements, if any and to the extent applicable. Subject to Lessee's obligation to compensate Lessor for the installation of any Facilities on the Leased Premises pursuant to Section 5 of this Agreement, Lessor agrees that such compensation is just and adequate for any and all such damages and all other damages which Lessor may sustain as a result of Lessee's use of the property for its storage operations.

18. Warranty of Title and Quiet Enjoyment. Lessor represents and warrants to Lessee that Lessor is the owner of the surface of the Leased Premises and the pore space located thereunder. Lessor hereby warrants and agrees to defend title to the Leased Premises and the pore space located thereunder and Lessor hereby agrees that Lessee, at its option, shall have the right to discharge any tax, mortgage, or other lien upon the Leased Premises, and in the event Lessee does so, Lessee shall be subrogated to such lien with the right to enforce the same and apply royalty payments or any other payments due to Lessor toward satisfying the same.

Lessor warrants that, except as disclosed to Lessee in writing, there are no liens, encumbrances, leases, mortgages, deeds of trust, options, or other exceptions to Lessor's fee title ownership of the Leased Premises (collectively, "Liens") which are not recorded in the public records of the County in which the Leased Premises is located. Lienholders (including tenants), whether or not their Liens are recorded, shall be Lessor's responsibility, and Lessor shall cooperate with Lessee to obtain a non-disturbance agreement from each party that holds a Lien (recorded or unrecorded) that might interfere with Lessee's rights under this Lease. A non-disturbance agreement is an agreement between Lessee and a lienholder which provides that the lienholder shall not disturb Lessee's possession or rights under the Lease or terminate this Lease so long as Lessor is not entitled to terminate this Lease under the provisions hereof.

Lessor shall have the quiet use and enjoyment of the Leased Premises in accordance with the terms of this Lease. Lessor's activities and any grant of rights Lessor makes to any person or entity, whether located on the Leased Premises or elsewhere, shall not, currently or prospectively, materially interfere with activities permitted hereunder. If Lessor has any right to select, determine, prohibit or control the location of sites for drilling, exploitation, production and/or exploration of minerals, hydrocarbons, water, gravel, or any other similar resource in, to or under the Lease Premises, then Lessor shall exercise such right so as to minimize interference with any of the foregoing.

19. Environmental Incentives and Tax Credits. Lessee shall be the owner of (i) any and all credits, benefits, emissions reductions, offsets, and allowances, howsoever entitled, attributable to Lessee's geologic storage operations, including any avoided emissions and the reporting rights related to these avoided emissions, such as 26 U.S.C. §45Q Tax Credits, and any other attributes of Lessee's ownership of the Facilities and Lessee's geologic storage operations ("Environmental Attributes"), and (ii) any and all credits, rebates, subsidies, payments or other incentives that relate to the use of technology incorporated into Lessee's geologic storage operations, environmental benefits of such operations, or other similar programs available from any regulated entity or any governmental authority ("Environmental Incentives"). Lessee is further entitled to the benefit of any

and all (a) investment tax credits, (b) production tax credits, (c) credits under 26 U.S.C. §45Q credits, and (d) similar tax credits or grants under federal, state or local law relating to Lessee's geologic storage operations ("Tax Credits"). Lessor shall (i) cooperate with Lessee in obtaining, securing and transferring all Environmental Attributes and Environmental Incentives and the benefit of all Tax Credits, and (ii) shall allow Lessee to take any actions necessary to install additional equipment on the Facilities to comply with all monitoring and reporting obligations, and allow Lessee's personnel to enter the premises and collect any data Lessee requires to satisfy its obligations required in connection with obtaining Tax Credits and Environmental Attributes. Lessor shall not be obligated to incur any out-of-pocket costs or expenses in connection with such actions unless reimbursed by Lessee. If any Environmental Incentives are paid directly to Lessor, Lessor shall immediately pay such amounts over to Lessee.

20. Assignment. The rights of either Party hereto may be assigned in whole or part. The assigning party shall provide written notice of any assignment within sixty (60) days after such assignment has become effective; *provided, however,* that an assigning party's failure to deliver written notice of assignment within such 60-day period shall not be deemed a breach of this Lease unless such failure is willful and intentional. The Lessor's consent shall not be required for an assignment by the Lessee of this Lease, whether by way of a collateral assignment to its financiers or otherwise.

21. Change of Ownership. No change of ownership in the Leased Premises shall be binding on the Lessee for purpose of making payments to Lessor hereunder until the date Lessor, or Lessor's successors or assigns, furnishes Lessee the recorded original or a certified copy of the instrument evidencing the change in ownership. The Lessor's consent shall not be required for a change in the direct or indirect control of the Lessee.

22. Notices. All notices required to be given under this Lease shall be in writing and addressed to the respective Party at the addresses set forth at the beginning of this Lease unless otherwise directed by either Party.

23. No Waiver. The failure of either Party to insist in any one or more instances upon strict performance of any of the provisions of this Lease or to take advantage of any of its rights hereunder shall not be construed as a waiver of any such provision or the relinquishment of any such rights, but the same shall continue and remain in full force and effect.

24. Notice of Lease. This Lease shall not be recorded in the real property records. Lessee shall cause a memorandum of this Lease to be recorded in the real property records of the county in which the Leased Premises are situated.

25. Confidentiality. Lessor shall maintain in the strictest confidence, for the benefit of Lessee, all information pertaining to the compensation paid under this Lease, any information regarding Lessee and its business or operations on the Leased Premises or on any other lands, the capacity and suitability of any Reservoir or reservoirs and subsurface pore spaces, stratum or strata unitized or amalgamated therewith, and any other information that is deemed proprietary or that Lessee requests or identifies to be held confidential, in each such case whether disclosed by Lessee or discovered by Lessor.

26. Counterparts. This Lease may be executed in any number of counterparts, each of which, when executed and delivered, shall be an original, but all of which shall collectively constitute one and the same instrument.

27. Severability. If any provision of this Lease is found to be invalid, illegal or unenforceable in any respect, such provision shall be deemed to be severed from this Agreement, and the validity, legality and enforceability of the remaining provisions contained herein shall not in any way be affected or impaired thereby.

28. Governing Law. This Lease shall be governed by, construed and enforced in accordance with the laws of the State of North Dakota and the Parties hereby submit to the jurisdiction of the state or federal courts located in the State of North Dakota.

29. Further Assurances. Each Party will execute and deliver all documents, provide all information, and take or forbear from all actions as may be necessary or appropriate to achieve the purposes of this Lease, including without limitation executing a memorandum of this Lease and all documents required to obtain any necessary government approvals.

30. Entire Agreement. This Lease constitutes the entire agreement between the Parties and supersedes all prior negotiations, undertakings, notices, memoranda and agreement between the Parties, whether oral or written, with respect to the subject matter hereof. This Lease may only be amended or modified by a written agreement duly executed by Lessor and Lessee.

31. Cooperation with Financiers. The Lessor hereby acknowledges and consents that Lessee may grant a collateral assignment or leasehold mortgage of Lessee's rights under this Lease to Lessee's debt financiers, it being understood that such collateral assignment or leasehold mortgage would only encumber the leasehold interest created hereunder.

32. Favored Nations. If, at any time within the twelve (12) month period following the Effective Date, Lessee enters into a pore space lease agreement with a third party landowner covering any part of Lessee's storage facility ("Third-Party Lease"), and if any of the payments specified in the Third-Party Lease would have been more favorable to Lessor had Lessor executed a lease agreement similar to the Third-Party Lease, then Lessor and Lessee will amend this Lease so that it reflects compensation terms similar to the Third-Party Lease, and Lessee will pay to Lessor the additional compensation, if any, that Lessor would have been paid had Lessor signed a lease agreement similar to the Third-Party Lease. For the purposes of this Section 32, "Lessee's storage facility" shall mean any storage facility (as such term in defined in ch. 38-22 of the North Dakota Century Code) operated by Lessee within a ten (10) mile radius of the Leased Premises which is subject to a permit is issued by the Commission pursuant to ch. 38-22 of the North Dakota Century Code.

33. Electronic Signatures. This Lease, and any amendments hereto, to the extent signed and delivered by means of electronic transmission in portable document format (pdf) or by DocuSign or similar electronic signature process, shall be treated in all manner and respects as an original contract and shall be considered to have the same binding legal effect as if it were the original signed version thereof delivered in person.

34. Insurance. Lessee shall obtain and maintain in force commercial general liability insurance covering the Facilities and Lessee's activities on the Leased Premises at all times during the term of this Lease, with a minimum occurrence and aggregate limit of one million dollars ($1,000,000). Such insurance coverage for the Facilities and Leased Premises may be provided as part of a blanket policy that covers other Facilities or properties as well. Any such policies shall include Lessor as an additional insured. Lessee, or its insurer, shall provide thirty (30) days prior written notice (except ten (10) days for nonpayment of premium) to Lessor of any cancellation. Lessee shall provide Lessor with copies of certificates of insurance evidencing this coverage upon request by Lessor.

IN WITNESS WHEREOF, the Parties have executed this Lease effective for all purposes as of the Effective Date.

**LESSOR:**

By: _____

Print: _____

By: _____

Print: _____

**LESSEE:** SUMMIT CARBON STORAGE #2, LLC

By: _____

Print: _____

Its: _____

# EXHIBIT A

## Leased Premises

## EXHIBIT B

### Royalty Escalation Provision

This Lease is subject to a Royalty Escalation. The royalty shall increase TEN percent (10.0%) on January 1, 2026, and an additional TEN percent (10.0%) every five years thereafter. For the avoidance of doubt, the royalty to be paid is calculated below:

| Date: | Royalty Rate: |
|---|---|
| Beginning January 1, 2026 | $0.550 |
| Beginning January 1, 2031 | $0.605 |
| Beginning January 1, 2036 | $0.666 |
| Beginning January 1, 2041 | $0.733 |
| Beginning January 1, 2046 | $0.806 |
| Beginning January 1, 2051 | $0.887 |
| Beginning January 1, 2056 | $0.976 |
| Beginning January 1, 2061 | $1.074 |
| Beginning January 1, 2066 | $1.181 |
| Beginning January 1, 2071 | $1.299 |
| Beginning January 1, 2076 | $1.429 |

**SUMMIT CARBON STORAGE #2, LLC**

Dated: _____

By: _____

Print: _____

Its: _____

**BK Fischer**

**UNIT LEGAL DESCRIPTION**

**OLIVER COUNTY**
**Township 142 North, Range 87 West**
Section 05: S2SW
Section 06: Lots 6 (39.62), 7 (39.44), E2SW (a/k/a SW), W2SE, SESE
Section 07: Lots 1 (39.34), 2 (39.30), 3 (39.26), 4 (39.22), E2W2, E2 (a/ka/ All)
Section 08: W2
Section 17: W2
Section 18: Lots 1 (39.21), 2 (39.24), 3 (39.26), 4 (39.29), E2W2, E2 (a/k/a All)
Section 19: Lots 1 (39.30), 2 (39.29), 3 (39.29), 4 (39.28), E2W2, E2 (a/k/a All)
Section 20: W2
Section 29: W2
Section 30: Lots 1 (39.33), 2 (39.44), 3 (39.54), 4 (39.65), E2W2, E2 (a/k/a All)
Section 31: Lots 1 (39.53), 2 (39.18), E2NW (a/k/a NW)

[Containing 4,347.01 acres]

**MERCER COUNTY**
**Township 143 North, Range 88 West**
Section 27: SWNW, SW, S2SE
Section 28: S2N2, S2
Section 29: SENE, SE
Section 32: SW, E2
Section 33: All
Section 34: All
Section 35: W2, W2E2

[Containing 3,200.00 acres]

**Township 142 North, Range 88 West**
Section 01: S2
Section 02: Lot 2 (41.36), SWNE (a/k/a W2NE), Lots 3 (41.29), 4 (41.22), S2NW (a/k/a NW), S2
Section 03: Lots 1 (41.18), 2 (41.17), 3 (41.15), 4 (41.13), S2N2, S2 (a/k/a All)
Section 04: Lots 1 (41.12), 2 (41.11), 3 (41.11), 4 (41.10), S2N2, S2 (a/k/a All)
Section 05: Lots 1 (41.07), 2 (41.04), 3 (41.00), 4 (40.96), S2N2, S2 (a/k/a All)
Section 06: Lot 1 (40.84), SENE, E2SE (a/k/a E2E2)
Section 07: E2
Section 08: All

Section 09: All
Section 10: All
Section 11: All
Section 12: All
Section 13: All
Section 14: All
Section 15: All
Section 16: All
Section 17: All
Section 18: E2, SENW, NESW
Section 19: E2
Section 20: All
Section 21: All
Section 22: All
Section 23: All
Section 24: All
Section 25: All
Section 26: All
Section 27: All
Section 28: All
Section 29: All
Section 30: E2E2
Section 32: NW, E2
Section 33: All
Section 34: All
Section 35: All
Section 36: All

[Containing 20,017.85 acres]

**Township 141 North, Range 88 West**
Section 01: Lots 3 (39.92), 4 (39.89), S2NW (a/k/a NW)
Section 02: Lots 1 (39.90), 2 (39.96), 3 (40.01), 4 (40.07), S2N2, S2 (a/k/a All)
Section 03: Lots 1 (40.07), 2 (40.02), 3 (39.96), 4 (39.91), S2N2 (a/k/a N2), SE

[Containing 1,279.71]

## UNIT LEGAL DESCRIPTION BY TRACT NUMBER

**Tract 1 – Mercer County**

Township 143 North, Range 88 West

Section 27: SWNW, SW, S2SE containing 280 acres

**Tract 2 – Mercer County**

Township 143 North, Range 88 West

Section 28: S2N2, S2 containing 480 acres

**Tract 3 – Mercer County**

Township 143 North, Range 88 West

Section 29: SENE, SE containing 200 acres

**Tract 4 – Mercer County**

Township 143 North, Range 88 West

Section 32: SW, E2 containing 480 acres

**Tract 5 – Mercer County**

Township 143 North, Range 88 West

Section 33: All containing 640 acres

**Tract 6 – Mercer County**

Township 143 North, Range 88 West

Section 34: All containing 640 acres

**Tract 7 – Mercer County**

Township 143 North, Range 88 West

Section 35: W2, W2E2 containing 480 acres

**Tract 8 – Oliver County**

Township 142 North, Range 88 West

Section 05: S2SW containing 80 acres

**Tract 9 – Oliver County**

Township 142 North, Range 87 West

Section 06: Lots 6 (39.62), 7 (39.44), E2SW, W2SE, SESE containing 279.06 acres

**Tract 10 – Mercer County**

Township 142 North, Range 88 West

Section 01: S2 containing 320 acres

**Tract 11 – Mercer County**

Township 142 North, Range 88 West

Section 02: Lots 2 (41.36), 3 (41.29), 4 (41.22), SWNE, S2NW, S2 containing 563.87 acres

**Tract 12 – Mercer County**

Township 142 North, Range 88 West

Section 03: Lots 1 (41.18), 2 (41.17), 3 (41.15), 4 (41.13), S2N2, S2 [aka All] containing 644.63 acres

**Tract 13 – Mercer County**

Township 142 North, Range 88 West

Section 04: Lots 1 (41.12), 2 (41.11), 3 (41.11), 4 (41.10), S2N2, S2 [aka All] containing 644.44 acres

**Tract 14 – Mercer County**

Township 142 North, Range 88 West

Section 05: Lots 1 (41.07), 2 (41.04), 3 (41.00), 4 (40.96), S2N2, S2 [aka All] containing 644.07 acres

**Tract 15 – Mercer County**

Township 142 North, Range 88 West

Section 06: Lot 1 (40.84), SENE, E2SE containing 160.84 acres

**Tract 16 – Mercer County**

Township 142 North, Range 88 West

Section 07: E2 containing 320 acres

**Tract 17 – Mercer County**

Township 142 North, Range 88 West

Section 08: All containing 640 acres

**Tract 18 – Mercer County**

Township 142 North, Range 88 West

Section 09: All containing 640 acres

**Tract 19 – Mercer County**

Township 142 North, Range 88 West

Section 10: All containing 640 acres

**Tract 20 – Mercer County**

Township 142 North, Range 88 West

Section 11: All containing 640 acres

**Tract 21 – Mercer County**

Township 142 North, Range 88 West

Section 12: All containing 640 acres

**Tract 22 – Oliver County**

Township 142 North, Range 87 West

Section 07: Lots 1 (39.34), 2 (39.30), 3 (39.26), 4 (39.22), E2W2, E2 [aka All] containing 637.12 acres

**Tract 23 – Oliver County**

Township 142 North, Range 87 West

Section 08: W2 containing 320 acres

**Tract 24 – Oliver County**

Township 142 North, Range 87 West

Section 17: W2 containing 320 acres

**Tract 25 – Oliver County**

Township 142 North, Range 87 West

Section 18: Lots 1 (39.21), 2 (39.24), 3 (39.26), 4 (39.29), E2W2, E2 [aka All] containing 637 acres

**Tract 26 – Mercer County**

Township 142 North, Range 88 West

Section 13: All containing 640 acres

**Tract 27 – Mercer County**

Township 142 North, Range 88 West

Section 14: All containing 640 acres

**Tract 28 – Mercer County**

Township 142 North, Range 88 West

Section 15: All containing 640 acres

**Tract 29 – Mercer County**

Township 142 North, Range 88 West

Section 16: All containing 640 acres

**Tract 30 – Mercer County**

Township 142 North, Range 88 West

Section 17: All containing 640 acres

**Tract 31 – Mercer County**

Township 142 North, Range 88 West

Section 18: E2, SENW, NESW containing 400 acres

**Tract 32 – Mercer County**

Township 142 North, Range 88 West

Section 19: E2 containing 320 acres

**Tract 33 – Mercer County**

Township 142 North, Range 88 West

Section 20: All containing 640 acres

**Tract 34 – Mercer County**

Township 142 North, Range 88 West

Section 21: All containing 640 acres

**Tract 35 – Mercer County**

Township 142 North, Range 88 West

Section 22: All containing 640 acres

**Tract 36 – Mercer County**

Township 142 North, Range 88 West

Section 23: All containing 640 acres

**Tract 37 – Mercer County**

Township 142 North, Range 88 West

Section 24: All containing 640 acres

**Tract 38 – Oliver County**

Township 142 North, Range 87 West

Section 19: Lots 1 (39.30), 2 (39.29), 3 (39.29), 4 (39.28), E2W2, E2 [aka All] containing 637.16 acres

**Tract 39 – Oliver County**

Township 142 North, Range 87 West

Section 20: W2 containing 320 acres

**Tract 40 – Oliver County**

Township 142 North, Range 87 West

Section 29: W2 containing 320 acres

**Tract 41 – Oliver County**

Township 142 North, Range 87 West

Section 30: Lots 1 (39.33), 2 (39.44), 3 (39.54), 4 (39.65), E2W2, E2 [aka All] containing 637.96 acres

**Tract 42 – Mercer County**

Township 142 North, Range 88 West

Section 25: All containing 640 acres

**Tract 43 – Mercer County**

Township 142 North, Range 88 West

Section 26: All containing 640 acres

**Tract 44 – Mercer County**

Township 142 North, Range 88 West

Section 27: All containing 640 acres

**Tract 45 – Mercer County**

Township 142 North, Range 88 West

Section 28: All containing 640 acres

**Tract 46 – Mercer County**

Township 142 North, Range 88 West

Section 29: All containing 640 acres

**Tract 47 – Mercer County**

Township 142 North, Range 88 West

Section 30: E2E2 containing 160 acres

**Tract 48 – Mercer County**

Township 142 North, Range 88 West

Section 32: NW, E2 containing 480 acres

**Tract 49 – Mercer County**

Township 142 North, Range 88 West

Section 33: All containing 640 acres

**Tract 50 – Mercer County**

Township 142 North, Range 88 West

Section 34: All containing 640 acres

**Tract 51 – Mercer County**

Township 142 North, Range 88 West

Section 35: All containing 640 acres

**Tract 52 – Mercer County**

Township 142 North, Range 88 West

Section 36: All containing 640 acres

**Tract 53 – Oliver County**

Township 142 North, Range 87 West

Section 31: Lots 1 (39.53), 2 (39.18), E2NW containing 158.71 acres

**Tract 54 – Mercer County**

Township 141 North, Range 88 West

Section 01: Lots 3 (39.92), 4 (39.89), S2NW containing 159.81 acres

**Tract 55 – Mercer County**

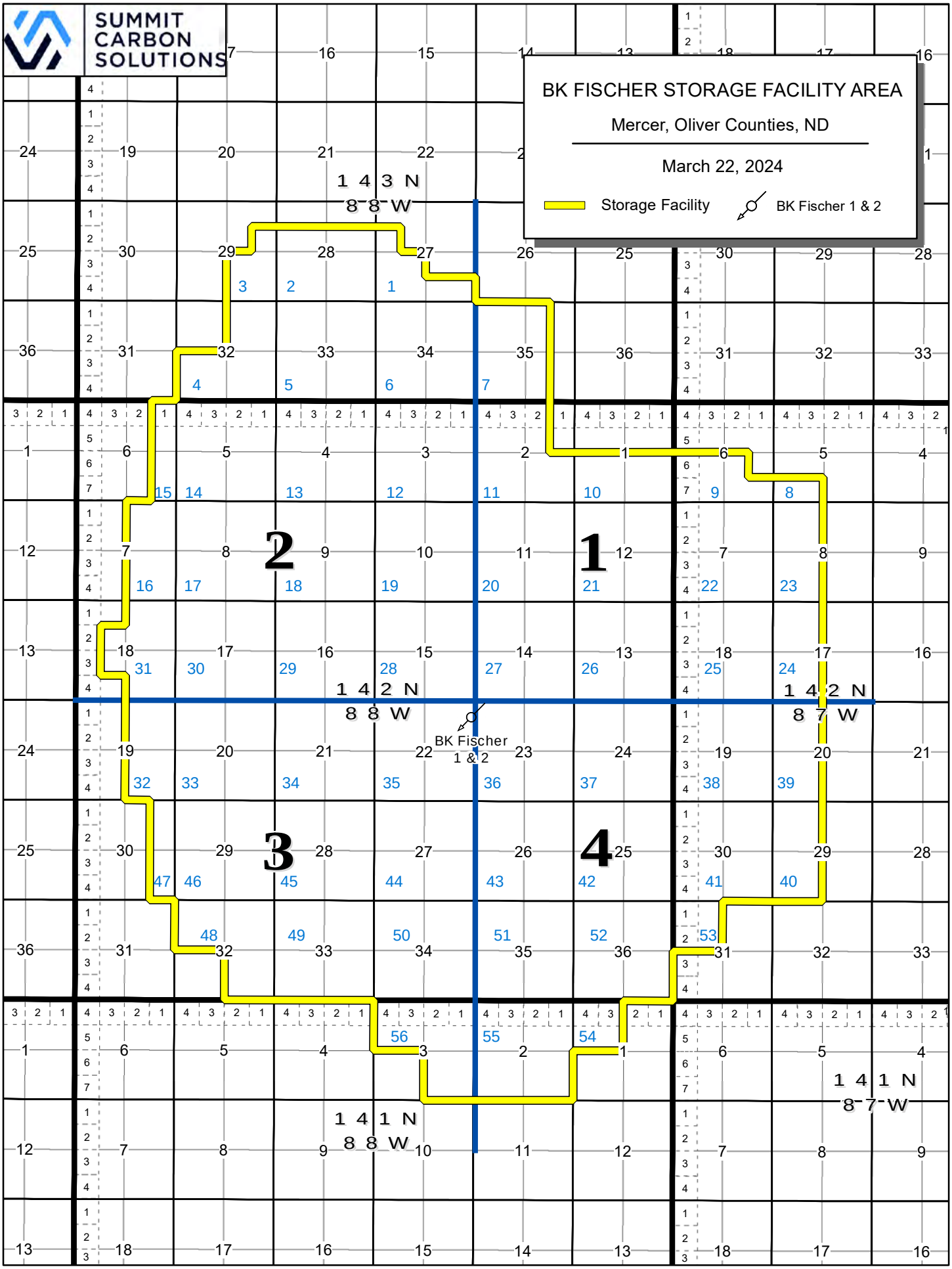
Township 141 North, Range 88 West

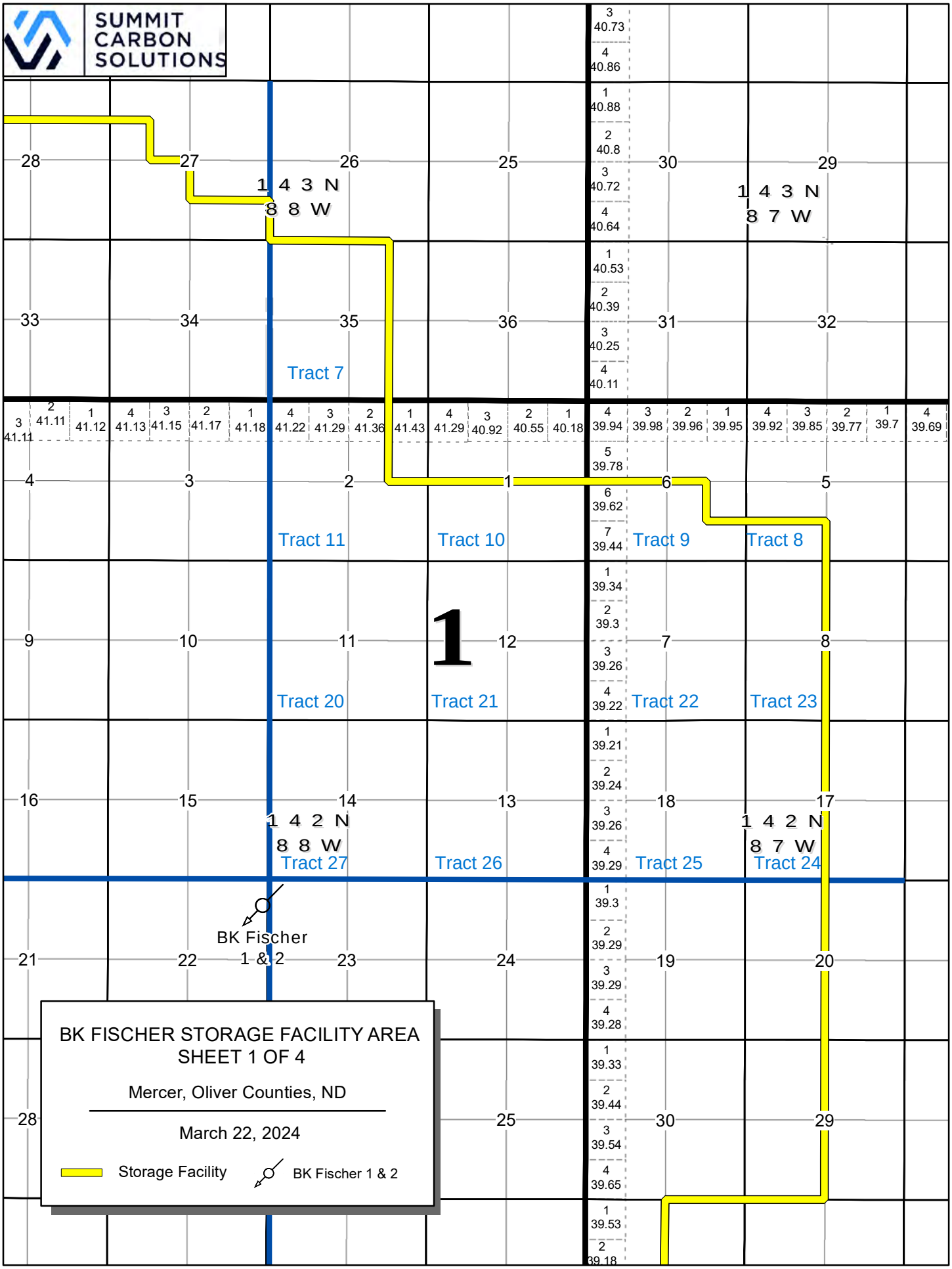
Section 02: Lots 1 (39.90), 2 (39.96), 3 (40.01), 4 (40.07), S2N2, S2 [aka All] containing 639.94 acres

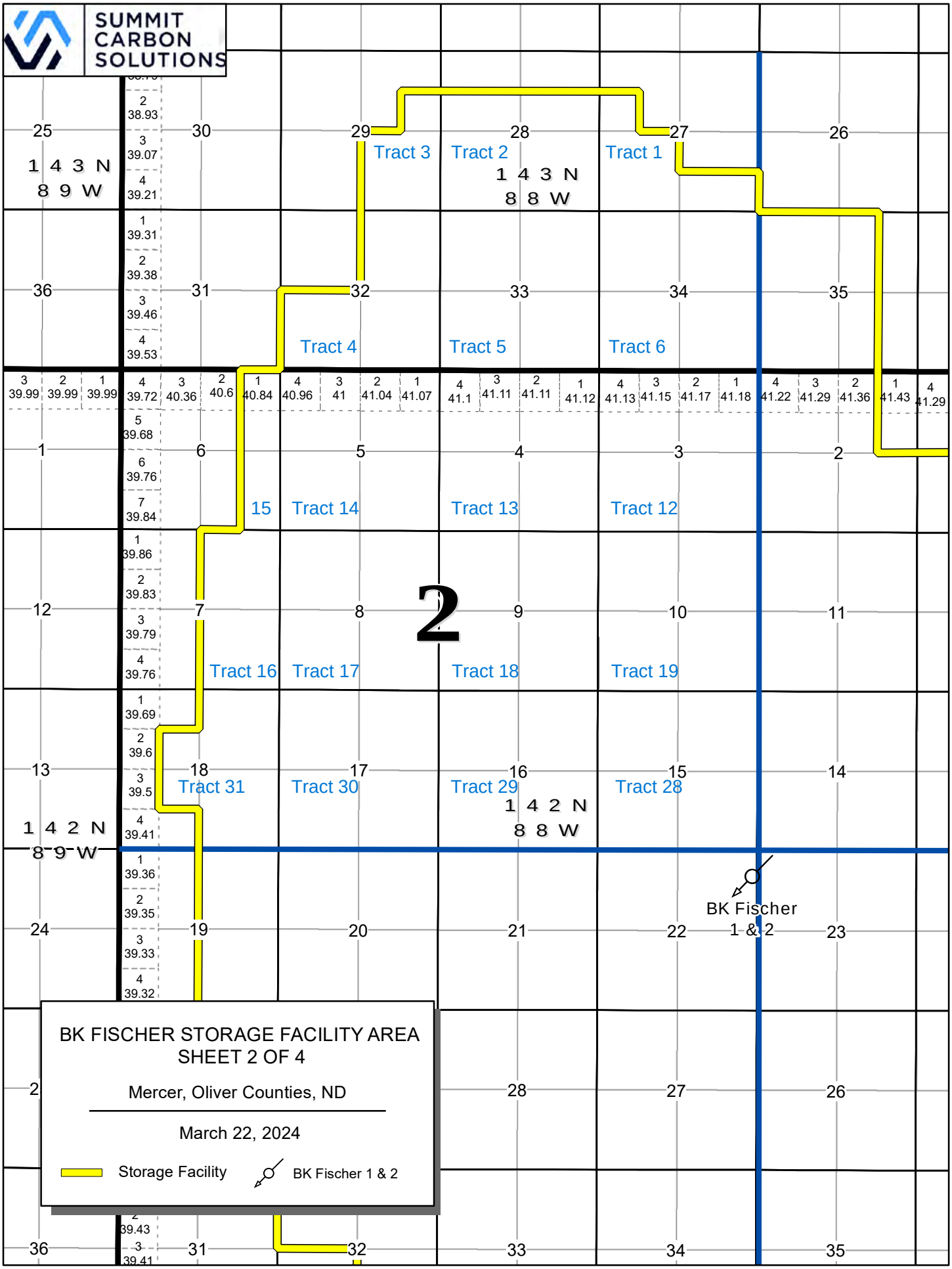
**Tract 56 – Mercer County**

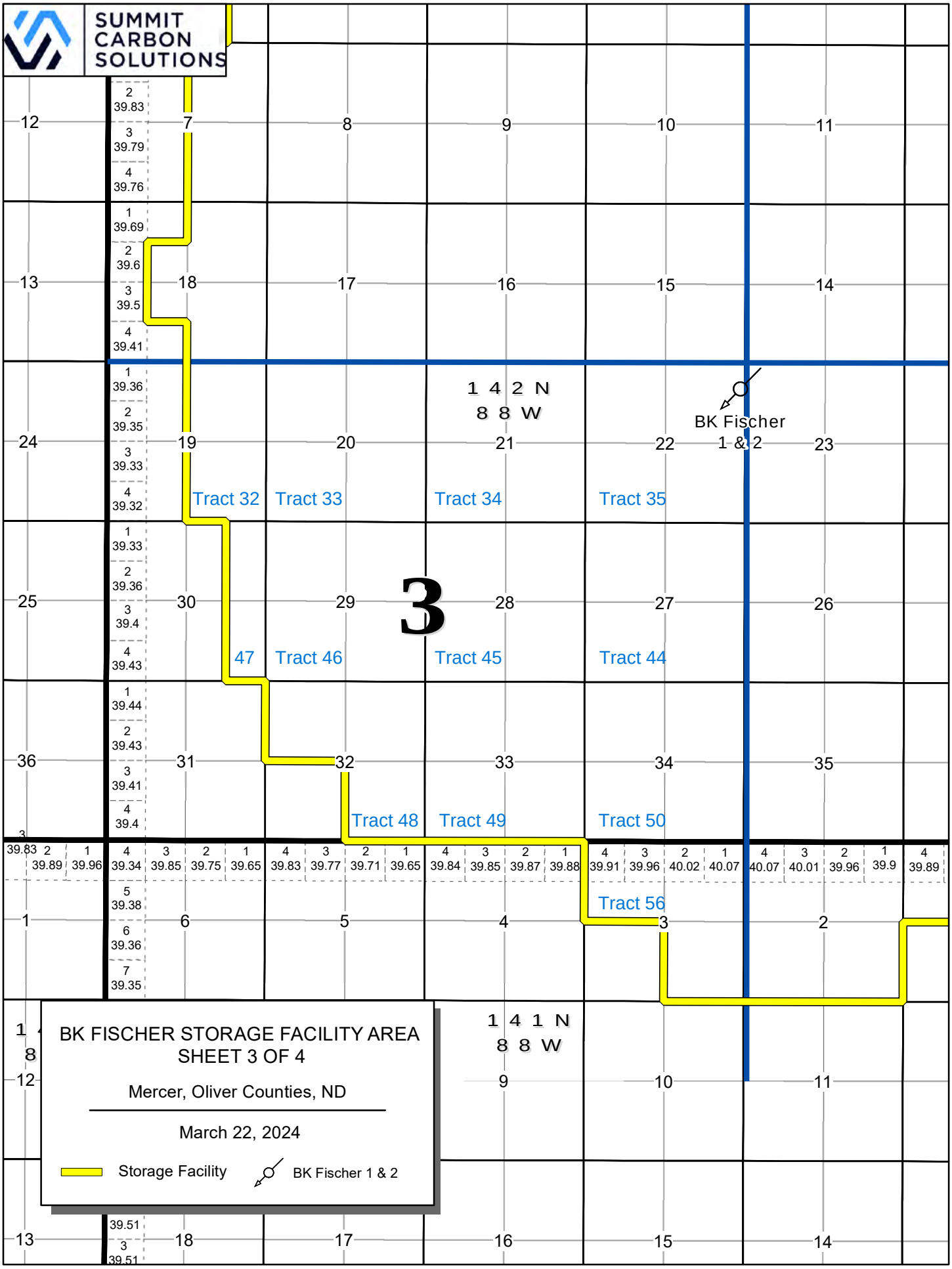
Township 141 North, Range 88 West

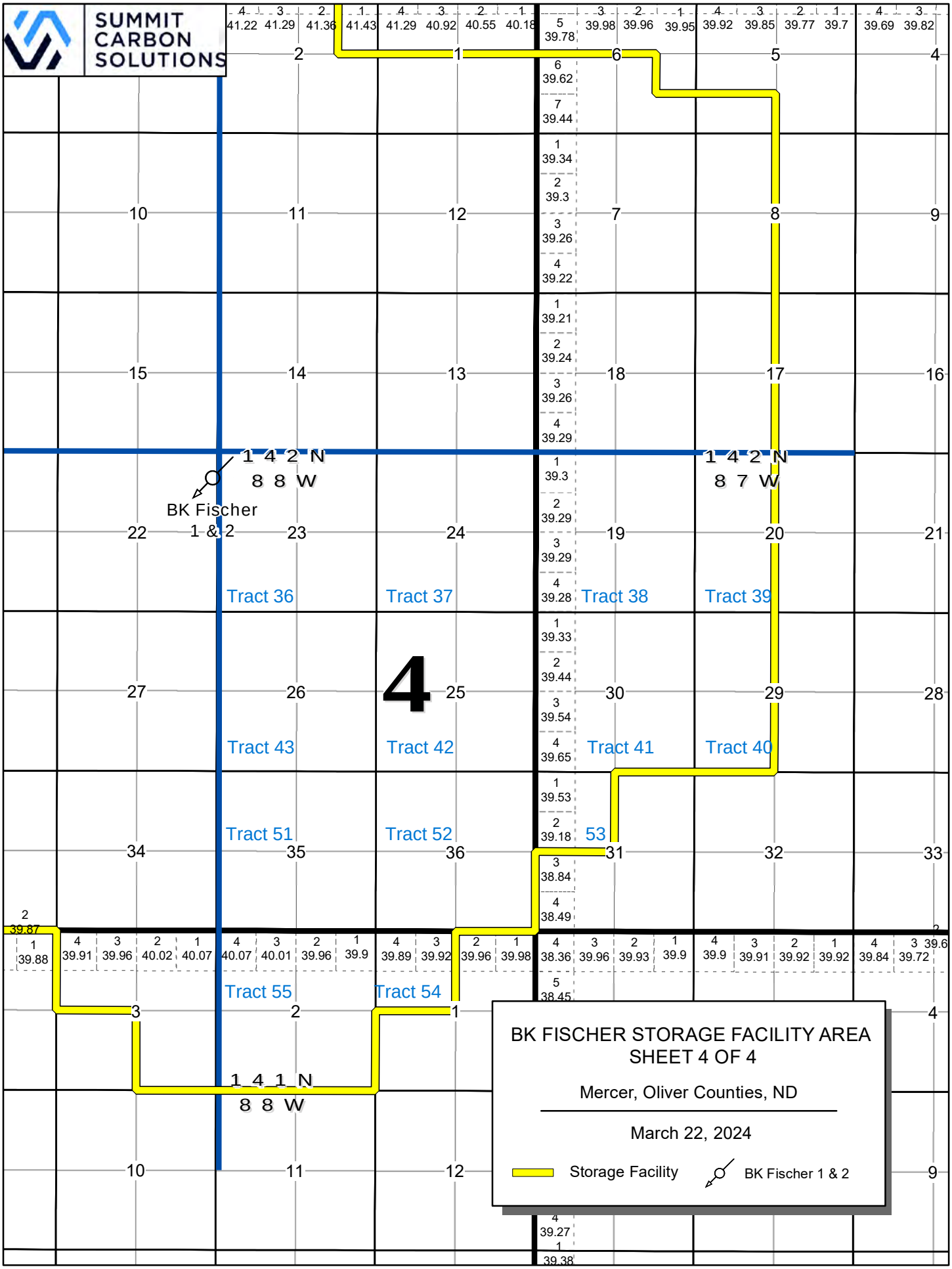
Section 03: Lots 1 (40.07), 2 (40.02), 3 (39.96), 4 (39.91), S2N2, SE containing 479.96 acres


SUMMIT CARBON SOLUTIONS
BK FISCHER STORAGE FACILITY AREA
Mercer, Oliver Counties, ND
March 22, 2024
Storage Facility
BK Fischer 1 & 2
143 N
88 W
142 N
88 W
142 N
87 W
141 N
88 W
141 N
87 W
BK Fischer
1 & 2
1
2
3
4


SUMMIT CARBON SOLUTIONS
143N 88W
143N 87W
142N 88W
142N 87W
Tract 7
Tract 11
Tract 10
Tract 9
Tract 8
Tract 20
Tract 21
Tract 22
Tract 23
Tract 27
Tract 26
Tract 25
Tract 24
BK Fischer 1 & 2
BK FISCHER STORAGE FACILITY AREA
SHEET 1 OF 4
Mercer, Oliver Counties, ND
March 22, 2024
Storage Facility
BK Fischer 1 & 2


SUMMIT CARBON SOLUTIONS
Tract 1
Tract 2
Tract 3
Tract 4
Tract 5
Tract 6
Tract 12
Tract 13
Tract 14
Tract 15
Tract 16
Tract 17
Tract 18
Tract 19
Tract 28
Tract 29
Tract 30
Tract 31
1 4 3 N 8 9 W
1 4 3 N 8 8 W
1 4 2 N 8 9 W
1 4 2 N 8 8 W
2
BK Fischer 1 & 2
BK FISCHER STORAGE FACILITY AREA
SHEET 2 OF 4
Mercer, Oliver Counties, ND
March 22, 2024
Storage Facility
BK Fischer 1 & 2


SUMMIT CARBON SOLUTIONS
142 N 88 W
141 N 88 W
BK Fischer 1 & 2
Tract 32
Tract 33
Tract 34
Tract 35
Tract 44
Tract 45
Tract 46
47
Tract 48
Tract 49
Tract 50
Tract 56
3
BK FISCHER STORAGE FACILITY AREA
SHEET 3 OF 4
Mercer, Oliver Counties, ND
March 22, 2024
Storage Facility
BK Fischer 1 & 2


SUMMIT CARBON SOLUTIONS
141 N 88 W
141 N 87 W
141 N 88 W
BK Fischer 1 & 2
Tract 36
Tract 37
Tract 38
Tract 39
Tract 43
Tract 42
Tract 41
Tract 40
Tract 51
Tract 52
53
Tract 55
Tract 54
4
BK FISCHER STORAGE FACILITY AREA
SHEET 4 OF 4
Mercer, Oliver Counties, ND
March 22, 2024
Storage Facility
BK Fischer 1 & 2

# SECTION 2.0

# GEOLOGIC EXHIBITS

# 2.0 GEOLOGIC EXHIBITS

## 2.1 Overview of Project Area Geology

The BK Fischer is situated approximately 11 miles south of Beulah, North Dakota (Figure 2-1). This project site is on the eastern flank of the Williston Basin.

Overall, the stratigraphy of the Williston Basin has been well studied, particularly the numerous oil-bearing formations. Through research conducted by the Energy & Environmental Research Center (EERC) via the Plains $CO_2$ Reduction (PCOR) Partnership, the Williston Basin has been identified as an excellent candidate for long-term $CO_2$ storage due, in part, to the thick sequence of clastic and carbonate sedimentary rocks and subtle structural character and tectonic stability of the basin (Peck and others, 2014; Glazewski and others, 2015).

The $CO_2$ storage reservoir for this project is the Broom Creek Formation, a predominantly sandstone formation 5845 ft below kelly bushing (KB) elevation at the stratigraphic and reservoir-monitoring well (Archie Erickson 2: NDIC File No. 38622) (Figure 2-2). Unconformably overlying the Broom Creek Formation is 242 ft of predominantly siltstone with interbedded dolostone and anhydrite of the undifferentiated Opeche and Spearfish Formations, hereafter referred to as the Opeche/Spearfish Formation. The Minnekahta Formation (limestone) is used to distinguish between the Spearfish Formation (above) and Opeche Formation (below); since the Minnekahta Formation is absent at Archie Erickson 2, and due to the similarity in lithology between the two formations, the Opeche and Spearfish are undifferentiated. The Opeche/Spearfish Formation serves as the primary upper confining zone (Figure 2-2). The Amsden Formation (dolostone, anhydrite, sandstone) unconformably underlies the Broom Creek Formation and serves as the lower confining zone (Figure 2-2). Together, the Opeche/Spearfish, Broom Creek, and Amsden Formations comprise the $CO_2$ storage complex for BK Fischer (Table 2-1).

Including the Opeche/Spearfish Formation, there are 1087 ft (thickness at Archie Erickson 2) of impermeable rock formations between the Broom Creek Formation and the next overlying permeable zone, the Inyan Kara Formation. An additional 2625 ft (thickness at Archie Erickson 2) of impermeable intervals separates the Inyan Kara Formation and the lowest underground source of drinking water (USDW), the Fox Hills Formation (Figure 2-2).

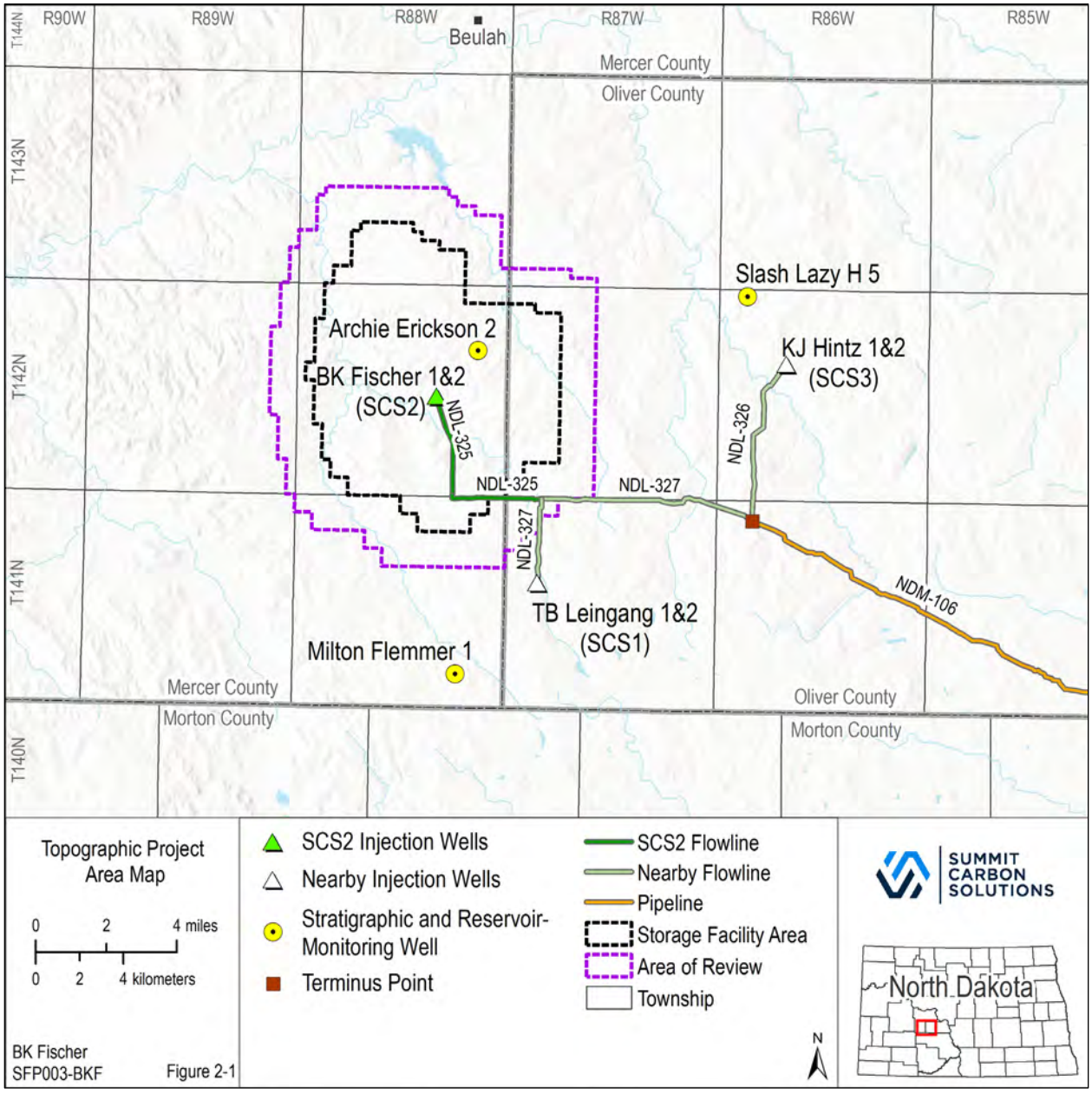



Figure 2-1. Topographic map showing well locations and BK Fischer in relation to the city of Beulah, North Dakota.

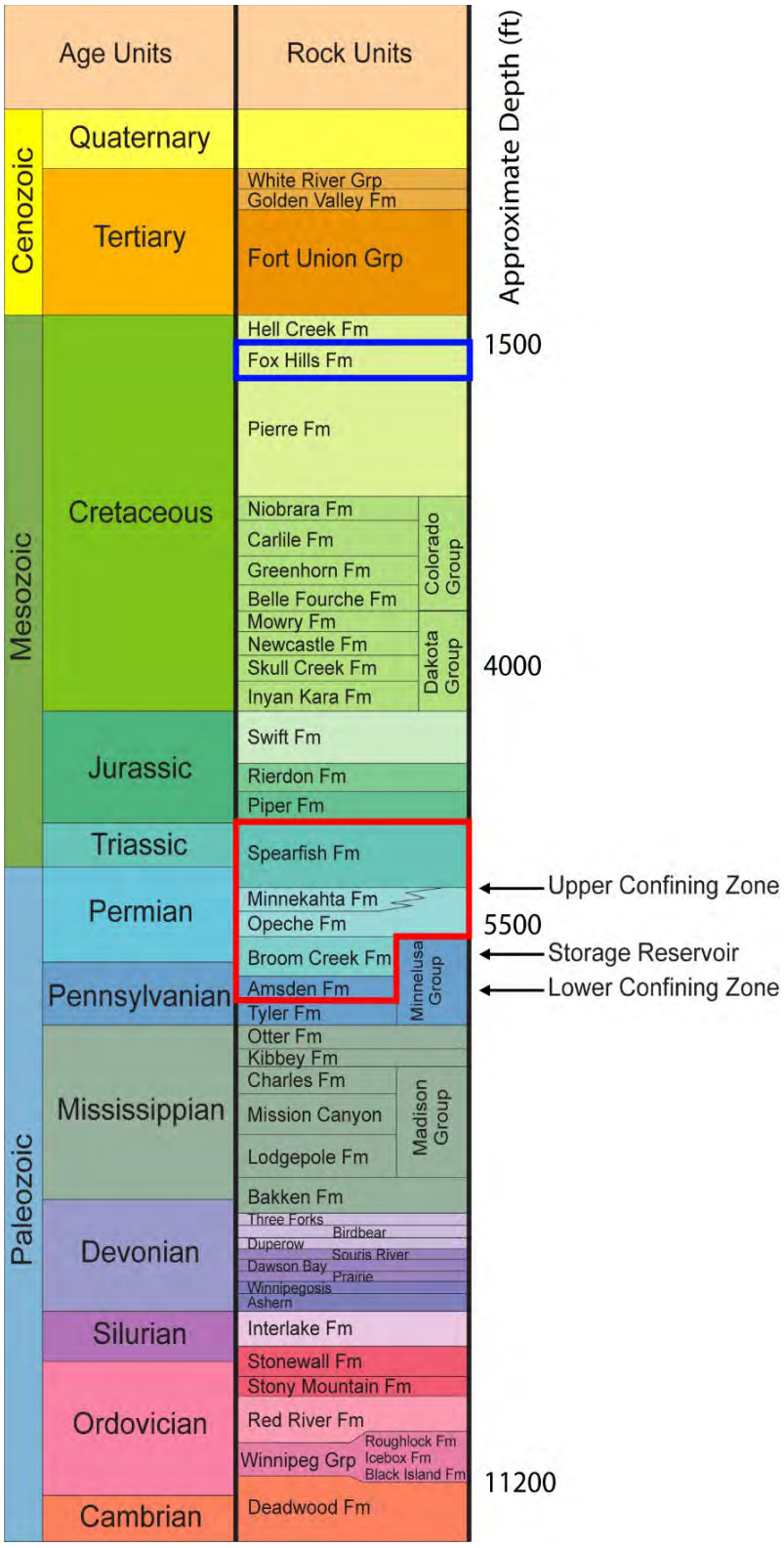



Figure 2-2. Stratigraphic column identifying the storage reservoir and confining zones (outlined in red) and the lowest USDW (outlined in blue). The Minnekahta Formation is not present at Archie Erickson 2.

**Table 2-1. Formations Comprising the BK Fischer Storage Complex (simulation model values calculated from model extent shown in Figure 2-3)**

| Formation | Purpose | Thickness at Archie Erickson 2, ft | Depth at Archie Erickson 2, MD* ft | Average Simulation Model Thickness, ft | Average Simulation Model Depth, TVD** ft | Lithology |
|---|---|---|---|---|---|---|
| Opeche/ Spearfish | Upper confining zone | 242 | 5603 | 138 | 5106 | Siltstone, dolostone, anhydrite |
| Broom Creek | Storage reservoir (i.e., injection zone) | 303 | 5845 | 280 | 5244 | Sandstone, dolostone, anhydrite, siltstone |
| Amsden | Lower confining zone | 265*** | 6148 | 257 | 5524 | Dolostone, sandstone, anhydrite |

* Measured depth (MD).
** True vertical depth.
*** Thickness estimated based on offset well information (resistivity and density logs).

## 2.2 Data and Information Sources

Several sets of data were used to characterize the injection and confining zones to establish their suitability for the storage and containment of injected $CO_2$. Data sets used for characterization included both existing data (e.g., from published literature, publicly available databases, purchased/leased digital well logs, existing 3D and 2D seismic) and site-specific data acquired specifically to characterize the storage complex.

### *2.2.1 Existing Data*

Well log data and interpreted formation top depths from 115 wellbores within the 4070-$mi^2$ (74-mi × 55-mi) area covered by the geologic model were used to characterize the depth, thickness, and extent of the subsurface geologic formations (Figure 2-3). Seismic interpretation products (seismic horizons and acoustic impedance volumes) from legacy 3D seismic data and 2D seismic data shown in Figure 2-3 were used to support generation of the 3D geologic model.

In addition to data from Archie Erickson 2, existing laboratory measurements for core samples from the Broom Creek Formation and its confining zones were available from nine additional wells: ANG 1 (ND-UIC-101), Flemmer 1 (NDIC File No. 34243), BNI 1 (NDIC File No. 34244), J-LOC 1 (NDIC File No. 37380), Liberty 1 (NDIC File No. 37672), MAG 1 (NDIC File No. 37833), Coteau 1 (NDIC File No. 38379), Milton Flemmer 1 (NDIC File No. 38594), and Slash Lazy H 5 (NDIC File No. 38701) (Figure 2-4). These measurements were compiled and used to establish relationships between measured petrophysical characteristics and estimates from well log data and were integrated with newly acquired site-specific data.

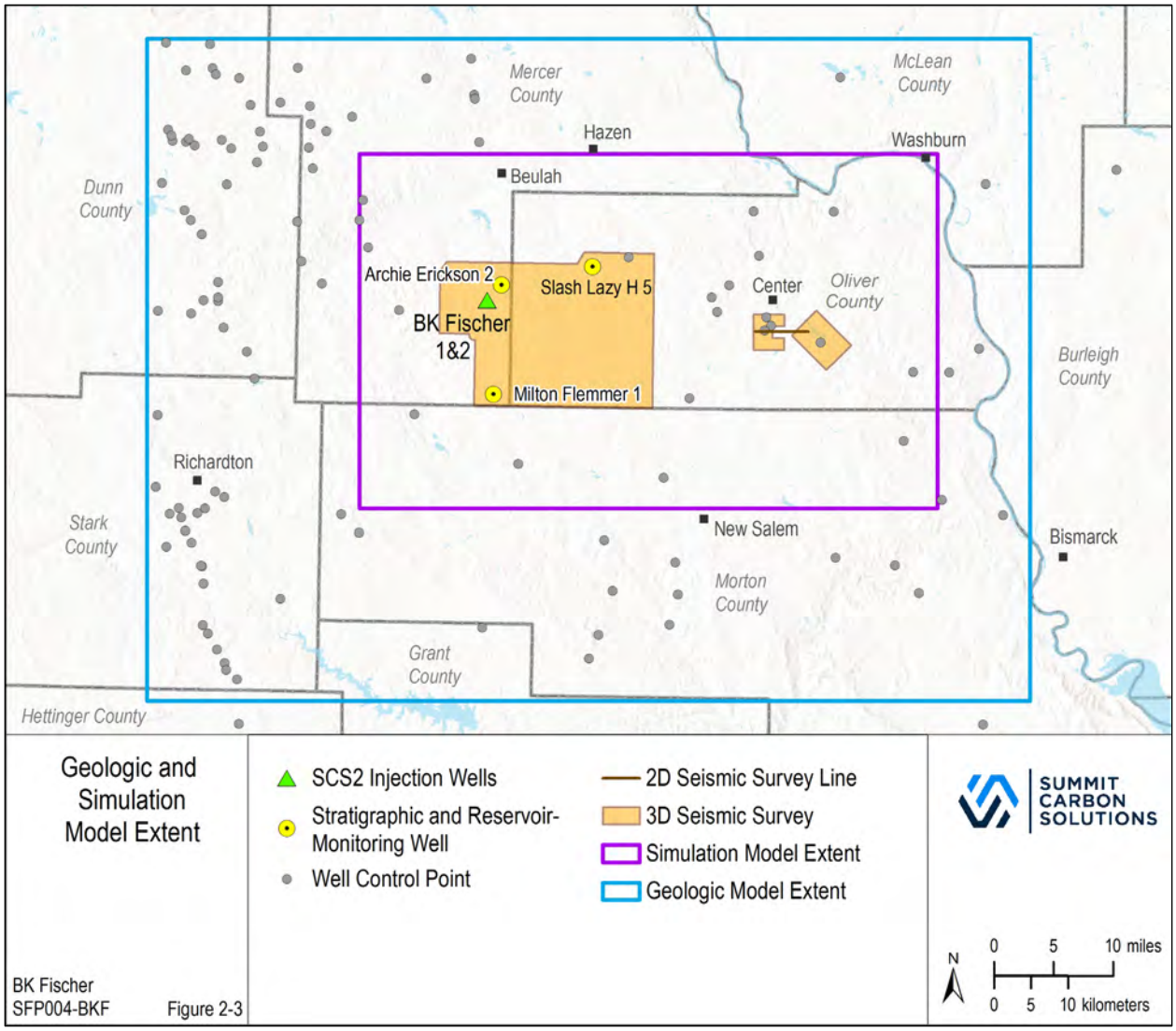



Figure 2-3. Map showing the extent of the regional geologic model, distribution of well control points, 2D and 3D seismic, and extent of the simulation model. The wells shown penetrate the storage reservoir and the upper and lower confining zones.

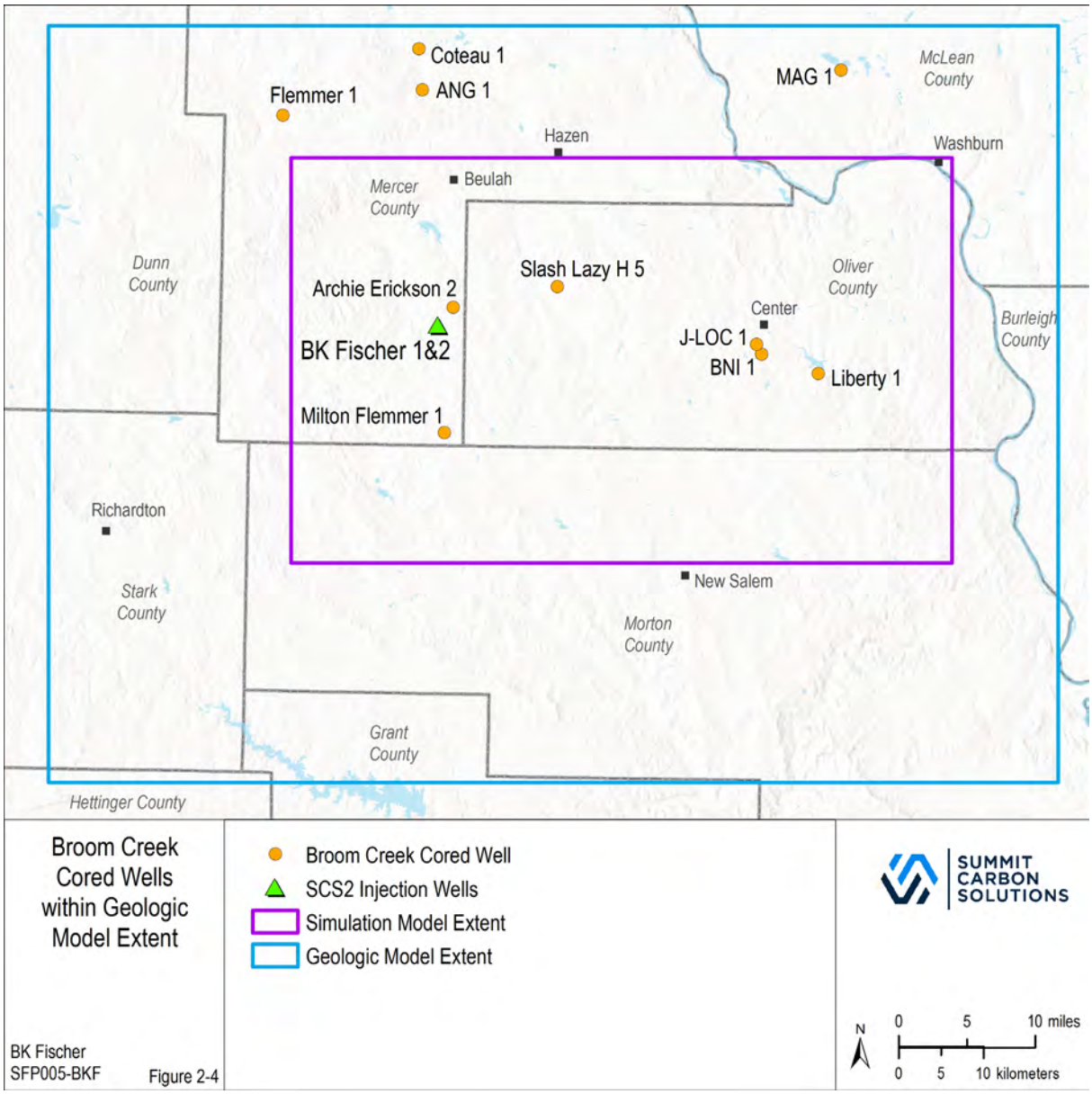



Figure 2-4. Map showing the spatial relationship between the BK Fischer and ten wells where core samples were collected from the formations comprising the storage complex.

### *2.2.2 Site-Specific Data*

Site-specific efforts to characterize the storage complex generated multiple data sets, including geophysical well logs, petrophysical data, fluid analyses, whole core, and 3D seismic data. Archie Erickson 2 was drilled to a depth of 6402 ft MD in 2022, specifically to gather subsurface geologic data to support the development of this $CO_2$ storage facility permit (SFP) application and serve as a future $CO_2$ reservoir-monitoring well. Downhole logs were acquired, and cores were collected from the associated storage complex (Opeche/Spearfish, Broom Creek, and Amsden Formations). Broom Creek Formation stress tests, a fluid sample, and temperature and pressure measurements were collected in Archie Erickson 2 (Figure 2-5).

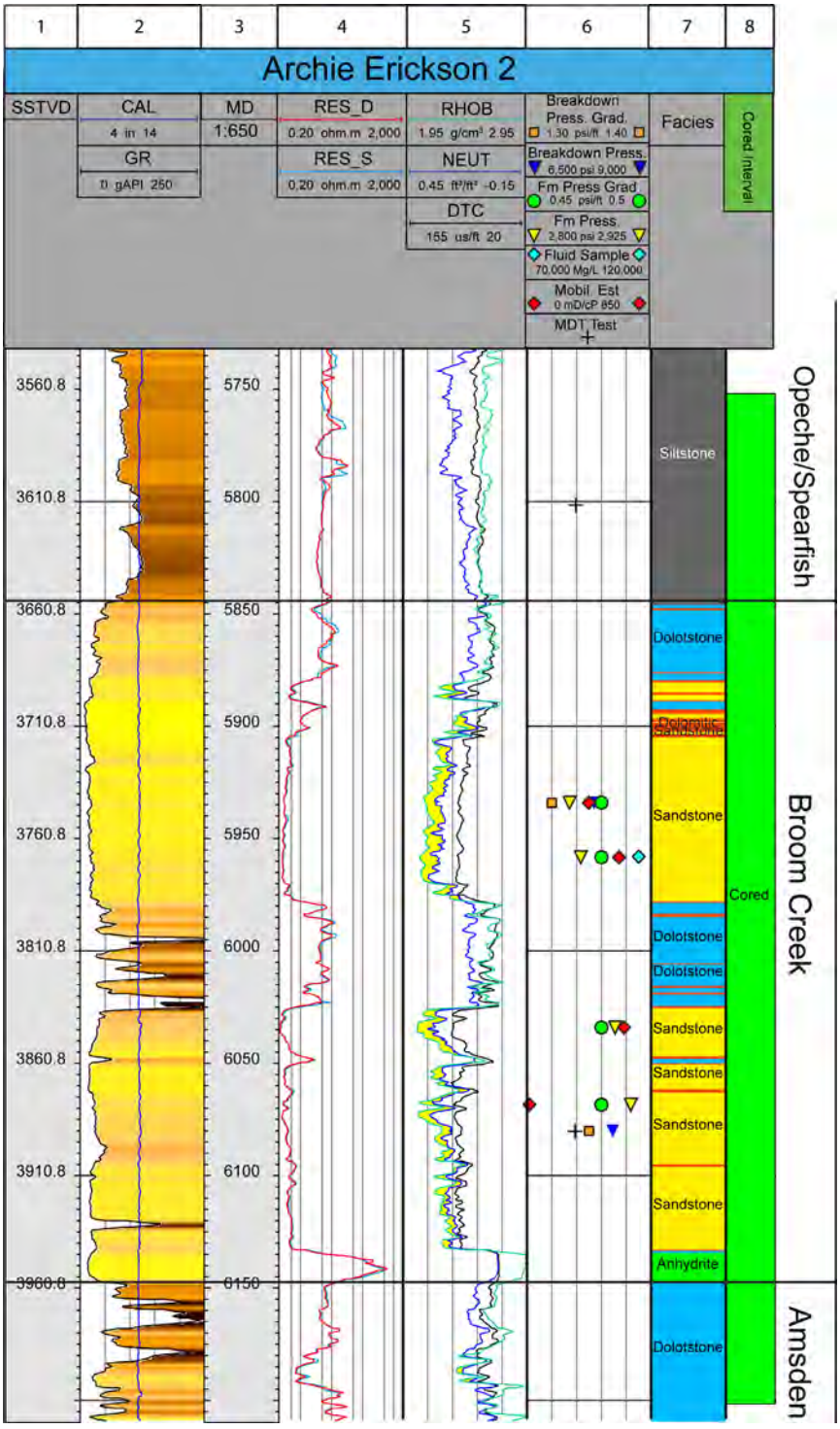



Figure 2-5. A schematic showing vertical relationship of coring and testing intervals in the Opeche/Spearfish Formation, the Broom Creek Formation, and the Amsden Formation in Archie Erickson 2. Tracks from left to right are 1) subsea true vertical depth (SSTVD); 2) gamma ray (GR or HSGR) (black) and caliper (dark blue); 3) MD; 4) resistivity – deep (red) and resistivity – shallow (light blue); 5) delta time (black), neutron porosity (NEUT) (blue), and density (green); 6) testing intervals; 7) facies; and 8) cored interval.

Site-specific and existing data were used to assess the suitability of the storage complex for safe and permanent storage of $CO_2$. Site-specific data were also used as inputs for geologic model construction (Section 3.0), numerical simulations of $CO_2$ injection (Section 3.0), geochemical simulation (Appendix C), and geomechanical information (Section 2.4). The site-specific data improved the understanding of the subsurface and directly informed the selection of monitoring technologies, development of the timing and frequency for monitoring data collection, and interpretation of monitoring data with respect to potential subsurface risks. Furthermore, these data guided and influenced the design and operation of site equipment and infrastructure.

#### *2.2.2.1 Geophysical Well Logs*

Openhole wireline geophysical well logs were acquired in Archie Erickson 2. The logging suite included triple combo (GR, density, porosity, and resistivity), caliper, spectral GR, combinable magnetic resonance (CMR), dipole sonic including four-arm caliper and inclinometer, and an image log.

The acquired well logs were used to pick formation top depths and interpret lithology, petrophysical properties, and time-to-depth shifting of seismic data. Formation top depths were picked from the Pierre Formation to the base of the Amsden Formation (Figure 2-2). The site-specific formation top depths were added to the existing data of the 115 wellbores within the 4070-$mi^2$ area covered by BK Fischer to understand the geologic extent, depth, and thickness of the subsurface geologic strata. Formation top depths of the Opeche/Spearfish, Broom Creek, and Amsden Formations were interpolated to create structural surfaces which served as inputs for the 3D geologic model construction.

#### *2.2.2.2 Core Sample Analyses*

Four hundred fifty (450) ft of 4-in whole core was recovered from the storage complex in the Archie Erickson 2: 97 ft core from the Opeche/Spearfish Formation, 303 ft core from the Broom Creek Formation, and 50 ft core from the Amsden Formation. Core was analyzed to characterize the lithologies of the Opeche/Spearfish, Broom Creek, and Amsden Formations and correlated to the well log data. A core gamma ray log was acquired and matched to wireline gamma ray-to-depth correct core depth measurements (Table 2-2a). Core analyses included porosity and permeability measurements, x-ray diffraction (XRD), x-ray fluorescence (XRF), thin-section analysis, scanning electron microscopy (SEM), interfacial tension (IFT) and contact angle (CA), geomechanics and capillary entry pressure measurements. The results were used to inform geologic modeling and predictive simulation inputs and assumptions, geochemical modeling, and geomechanical modeling.

**Table 2-2a. Core Depth Shift**

| Core No. | Start Bit Depth, ft | End Bit Depth, ft | Depth Shift, ft |
|---|---|---|---|
| Core 8 | 5752 | 5872 | 3.74 |
| Core 9 | 5872 | 5958 | 3.70 |
| Core 10 | 5958 | 6080 | 4.28 |
| Core 11 | 6080 | 6202 | 3.59 |

Core depth + depth shift = log depth.

*2.2.2.3 Formation Temperature and Pressure*

Temperature measurements from Archie Erickson 2 were used to derive a temperature gradient for the proposed injection site (Table 2-2b). In combination with depth, the temperature property was used primarily to inform predictive simulation inputs and assumptions. Temperature data were also used as inputs for geochemical modeling.

Formation pressure testing at Archie Erickson 2 was performed with the SLB (formerly Schlumberger) MDT (modular formation dynamics tester) tool. The MDT tool's formation pressure measurements from the Broom Creek Formation are included in Table 2-3. The calculated pressure gradients were used to model formation pressure profiles for use in the numerical simulations of $CO_2$ injection.

**Table 2-2b. Description of Archie Erickson 2 Temperature Measurements and Calculated Temperature Gradients**

| Formation | Sensor Depth MD, ft | Sensor Depth TVD, ft | Temperature, °F |
|---|---|---|---|
| Opeche/Spearfish | 5802.45 | 5802.37 | –* |
| Broom Creek | 5933.99 | 5933.90 | 123.86 |
| | 5958.29 | 5958.20 | 126.25 |
| | 6034.03 | 6033.92 | 128.20 |
| | 6068.39 | 6068.28 | 129.78 |
| Mean Broom Creek Temperature, °F | | | 127.02 |
| Broom Creek Temperature Gradient, °F/ft | | | 0.015** |

* Dry test. Temperature measurement is unreliable because it was impacted by tool temperature rather than fluid.

** The temperature gradient is an average of the measured temperature minus the average annual surface temperature (40°F), divided by the associated test TVD depth.

**Table 2-3. Description of Archie Erickson 2 Well Formation Pressure Measurements and Calculated Pressure Gradients**

| Formation | Sensor Depth MD, ft | Sensor Depth TVD, ft | Sensor Formation Pressure, psia |
|---|---|---|---|
| Opeche/Spearfish | 5802.45 | 5802.37 | –* |
| Broom Creek | 5933.99 | 5933.90 | 2842.83 |
| | 5958.29 | 5958.20 | 2854.14 |
| | 6034.03 | 6033.92 | 2888.71 |
| | 6068.39 | 6068.28 | 2904.57 |
| Mean Broom Creek Pressure, psi | | | 2872.56 |
| Broom Creek Pressure Gradient, psi/ft | | | 0.48* |

* Dry test. No fluid was withdrawn because of low permeability.

** The pressure gradient is an average of the sensor-measured pressures minus standard atmospheric pressure at 14.7 psi, divided by the associated test TVD depth.

#### *2.2.2.4 Microfracture In Situ Stress Tests*

Using the SLB MDT tool, microfracture in situ stress tests were performed in the Archie Erickson 2 wellbore. As shown in Figures 2-6 and 2-7, in situ reservoir stress-testing measurements provided real-time formation breakdown, instantaneous shut-in, propagation, and closure pressures.

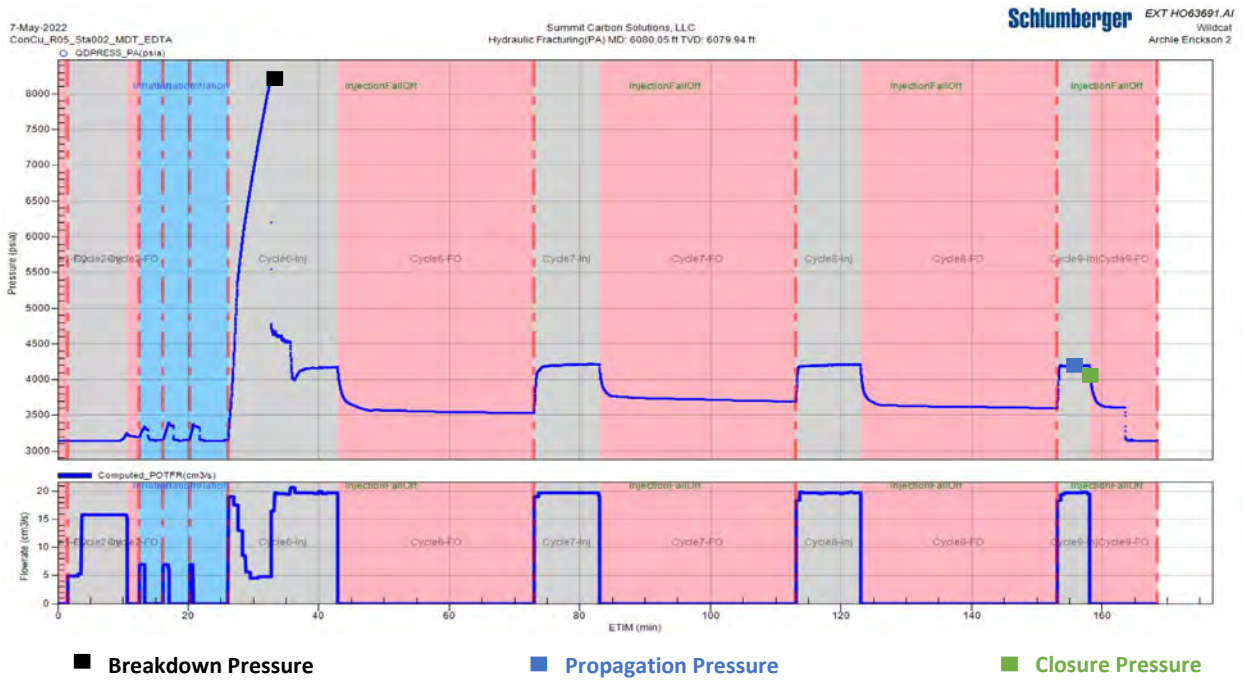



Figure 2-6. Archie Erickson 2, Broom Creek Formation MDT microfracture in situ stress pump cycle graph at 6080.05 ft MD.

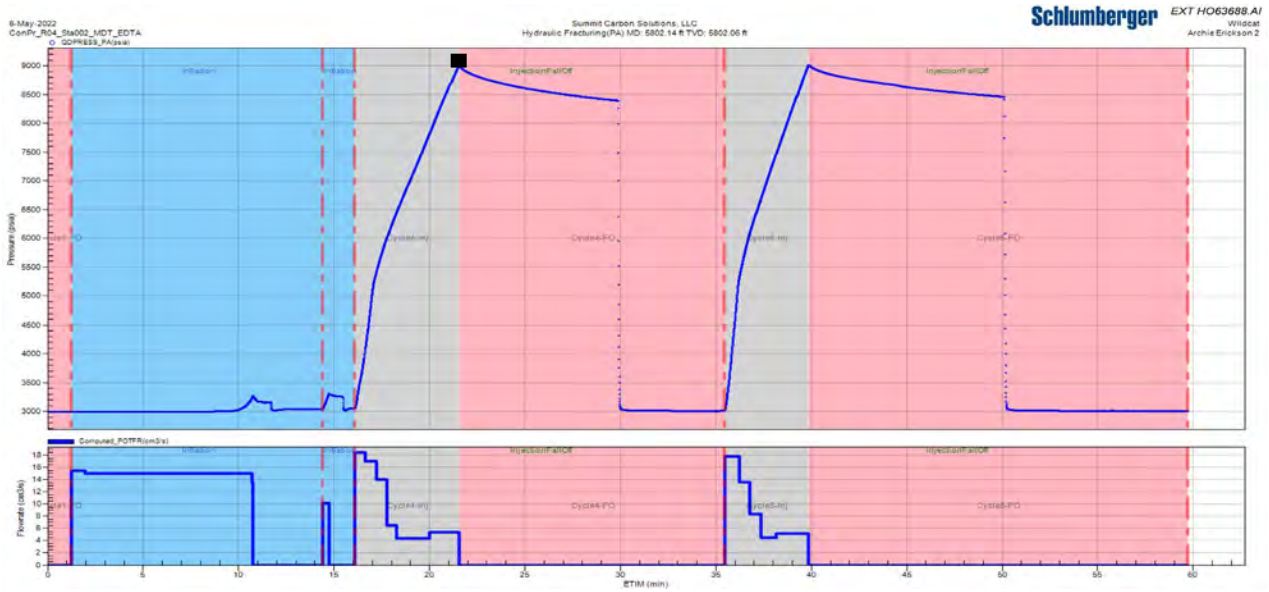



Figure 2-7. Archie Erickson 2, Opeche/Spearfish Formation MDT microfracture in situ stress pump cycle graph at 5802.14 ft MD. No clear breakdown was observed.

Microfracture in situ stress tests were performed in the Opeche/Spearfish and Broom Creek Formations (Table 2-4). The use of the dual-packer module on the MDT tool assembly to isolate the designated intervals tested a 1.5-ft section of the zone of interest. This small representative sample should be taken into consideration in the analysis of the pressures. Fracture propagation pressures determined from the microfracture test were used to calculate pressure constraints related to the maximum allowable bottomhole pressure (BHP) and a 1D mechanical earth model (1D MEM) that was generated using well log data from the Archie Erickson 2. Discussion of the 1D MEM can be found in Section 2.4.

**Table 2-4. Description of Archie Erickson 2 Microfracture In Situ Stress Tests**

| Formation | Test Depth | | Breakdown Pressure | | Propagation Pressure | | Closure Pressure (G-func) | |
|---|---|---|---|---|---|---|---|---|
| | MD, ft | TVD, ft | psia | Gradient, psi/ft* | Avg., psia | Gradient, psi/ft* | Avg., psia | Gradient, psi/ft* |
| Opeche/Spearfish | 5802.14 | 5802.06 | No observed formation breakdown. | | | | | |
| Broom Creek | 6080.05 | 6079.94 | 8226.21 | 1.35 | 4202.25 | 0.689 | 4098.43 | 0.672 |

* The pressure gradient is an average of the sensor-measured pressures minus standard atmospheric pressure at 14.7 psi, divided by the associated test TVD depth.

No breakdown pressure was observed for Archie Erickson 2 in the Opeche/Spearfish Formation at 5802.14 ft MD with applied maximum injection pressure of 9002 psi (Figure 2-7). One predominant reason included limitations with the dual-packer mechanical specifications, the maximum injection pressures were limited by the maximum differential pressure rating for the MDT tool. The inability to break down the Opeche/Spearfish Formation at the depth indicates that the formation is tight competent rock and exhibits sufficient geologic integrity to contain the injected $CO_2$.

*2.2.2.5 Fluid Sample Testing*

Fluid samples from the Inyan Kara and the Broom Creek Formations were collected from the Archie Erickson 2 wellbore via an MDT tool ("SLB Saturn 3D Radial Probe"). Results were analyzed by Minnesota Valley Testing Laboratories (MVTL), a state-certified lab. The salinity values from the Archie Erickson 2 wellbore samples are shown in Table 2-5. A more detailed fluid sample analysis report can be found in Appendix A. Fluid sample analysis results were used as inputs for geochemical modeling and dynamic reservoir simulations.

**Table 2-5. Description of Fluid Sample Test and Corresponding Total Dissolved Solids (TDS) Value**

| Formation | Well | Test Depth/Interval, ft, MD | MVTL TDS, mg/L |
|---|---|---|---|
| Inyan Kara | Archie Erickson 2 | 4731 | 3340 |
| Broom Creek | Archie Erickson 2 | 5958 | 115,000 |

In situ fluid pressure testing was performed in the Opeche/Spearfish and Broom Creek Formations with the MDT tool. This test utilized the tool's extra-large-diameter probe to test both the mobility and reservoir pressure. The MDT probe was unable to draw down reservoir fluid from the Opeche/Spearfish Formation in order to determine the reservoir pressure or to collect an in situ fluid sample, and the formation was unable to rebound (build pressure) because of low to almost zero permeability. The testing results provide further evidence of the confining properties of the Opeche/Spearfish Formation, ensuring sufficient geologic integrity to contain the injected $CO_2$ stream.

*2.2.2.6 Seismic Survey*

A 208-square-mile 3D seismic survey was conducted from November 2021 to February 2022 south of Beulah, North Dakota (Figure 2-8). The Beulah 3D seismic data provided visualization of deep geologic formations at lateral-spatial intervals as short as 82.5 ft. Additionally, seismic data from nearby 3D surveys to the east, namely, the Center 3D and Minnkota 3D, and a connecting 2D line were used to interpret and evaluate the subsurface (Figure 2-8). The seismic data were used for assessment of the geologic structure and reservoir properties.

Data products generated from the interpretation of the Beulah 3D were used as inputs for the geologic model that was used to simulate migration of the $CO_2$ plume. The Beulah 3D seismic data and the Archie Erickson 2 well logs were used to interpret surfaces for the formations of interest within the survey area. These surfaces were converted to depth using the time-to-depth relationship derived from Archie Erickson 2, Milton Flemmer 1, and Slash Lazy H 5 dipole sonic logs. The depth-converted surfaces for the storage reservoir and upper and lower confining zones were used as inputs for the geologic model. Detailed information about the structure and varying thickness of the formations away from well control was derived from these surfaces. A prestack seismic inversion was generated from the 3D seismic data and well logs from the Milton Flemmer 1, Archie Erickson 2, and Slash Lazy H 5 stratigraphic test wells. Depth-converted surfaces and poststack seismic inversion results from the Center 3D and Minnkota 3D were also used as inputs for the geologic model.

Interpretation of the 3D seismic data suggests there are no major stratigraphic pinch-outs or structural features with associated spill points (e.g., folds, domes, or fault traps) in BK Fischer. No structural features, faults, or discontinuities that would cause a concern about seal integrity in the strata above the Broom Creek Formation extending to the deepest USDW, the Fox Hills Formation, were observed in the 3D seismic data in BK Fischer.

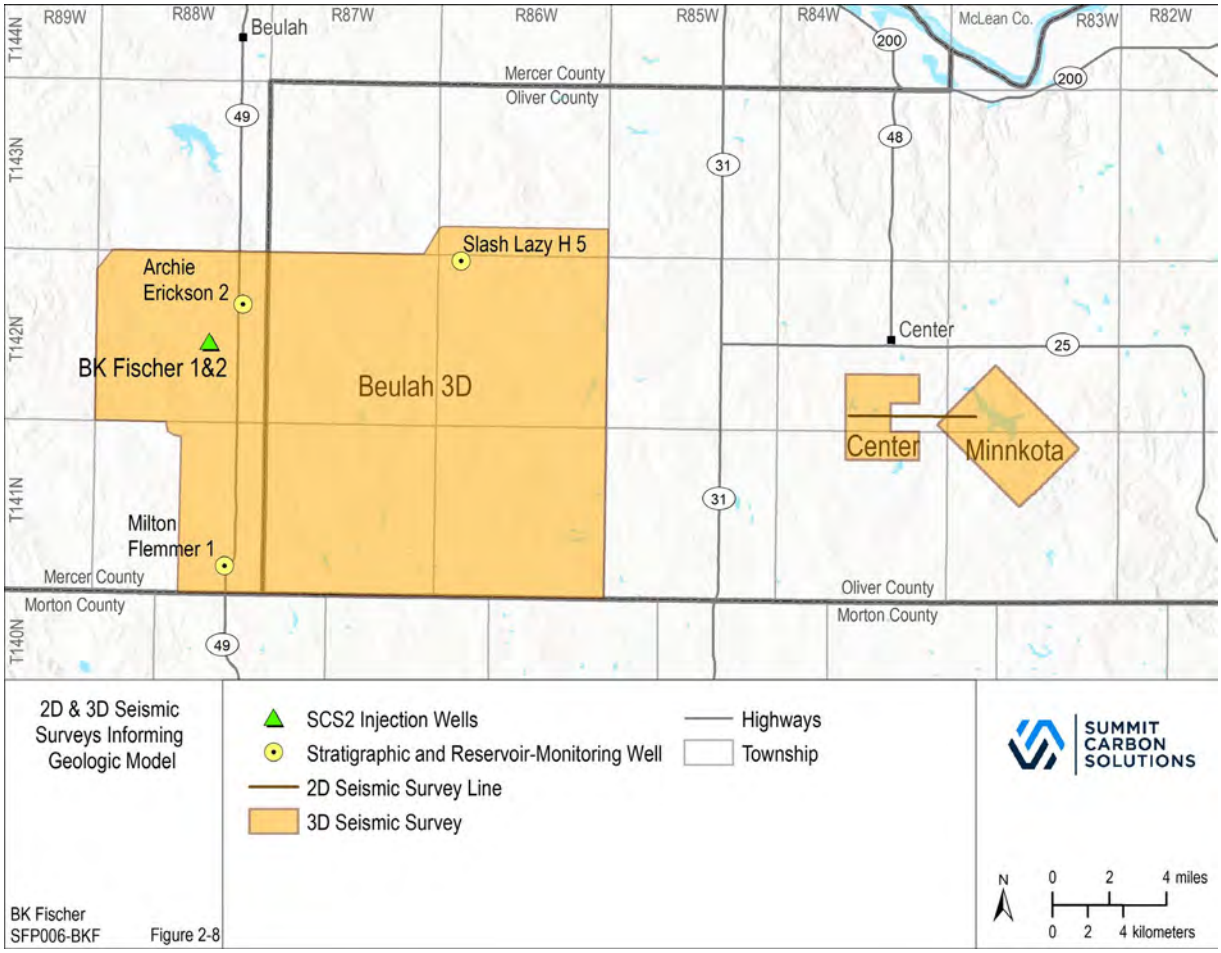



Figure 2-8. Map showing the 2D and 3D seismic surveys used to characterize BK Fischer and inform the construction of the geologic model. The 3D seismic surveys from west to east are the Beulah 3D, Center 3D, and Minnkota 3D.

## 2.3 Storage Reservoir (injection zone)

The Broom Creek Formation is laterally extensive across the simulation model area and surrounding region (Figure 2-9). The Broom Creek Formation comprises interbedded eolian/nearshore marine sandstone (permeable storage intervals) and dolostone layers (impermeable layers) with minor amounts of siltstone and anhydrite layers. The Broom Creek Formation unconformably overlies the Amsden Formation and is unconformably overlain by the Opeche/Spearfish Formation (Figure 2-2) (Murphy and others, 2009).

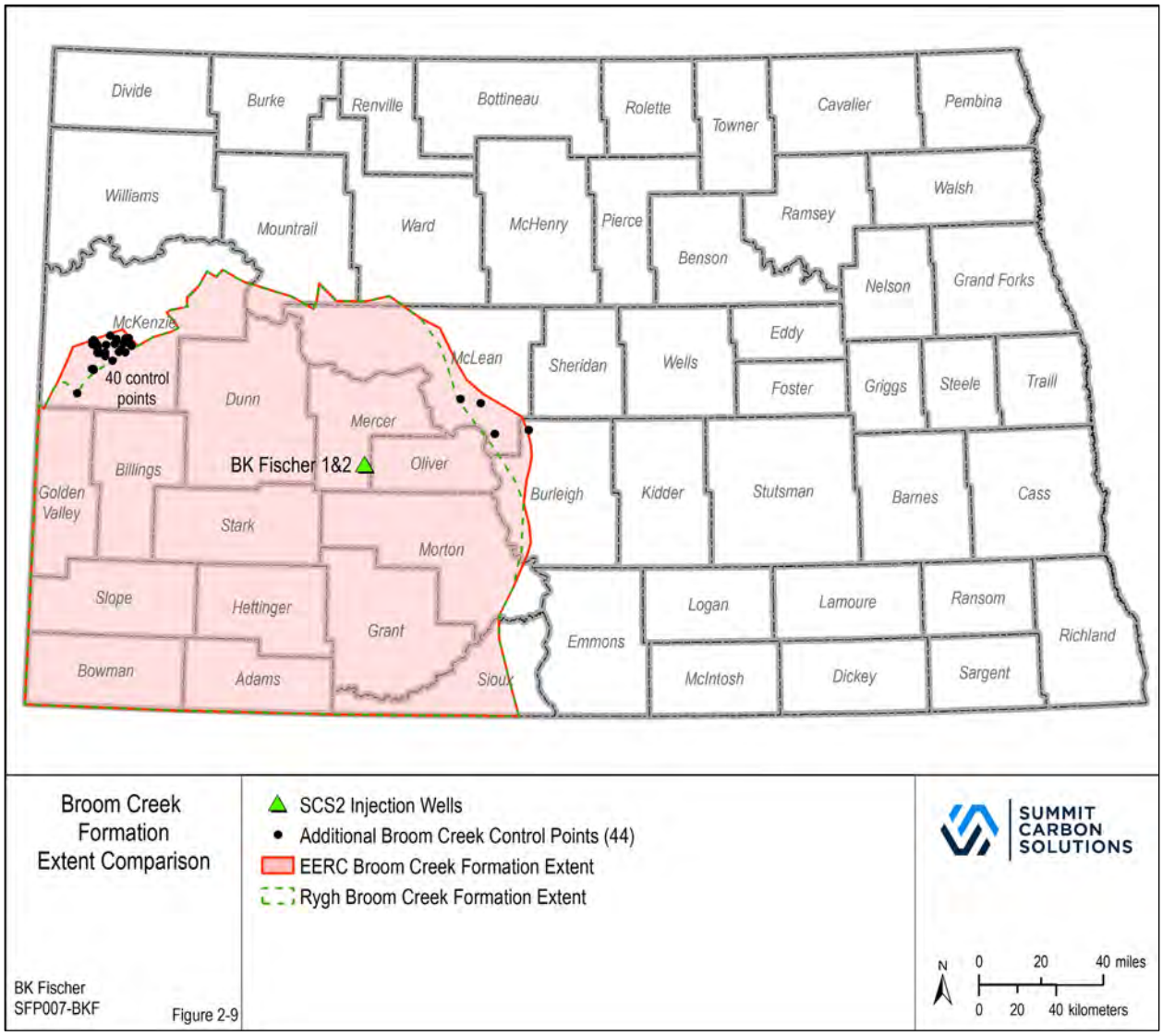



Figure 2-9. Broom Creek Formation in North Dakota. The area within the green dashed line shows the extent originally proposed by Rygh (1990), and the area outside of the green dashed line has been modified based on new well control.

The top of the Broom Creek Formation is located at a depth of 5845 ft below KB elevation at Archie Erickson 2 and the cored interval is made up of 215 ft of sandstone, 72 ft of dolostone and 16 ft of anhydrite. The thickness of the Broom Creek Formation at the Archie Erickson 2 is 303 ft. Cored wells within the extent of the simulation model show minor anhydrite and siltstone intervals are also present in the Broom Creek Formation. Across the simulation model area, the Broom Creek Formation ranges in thickness from 139 to 492 ft (Figures 2-10a and 2-10b), with an average thickness of 280 ft based on offset-well data and geologic model characteristics. The net sandstone thickness within the simulation model area ranges from 6 to 397 ft, with an average thickness of 140 ft.

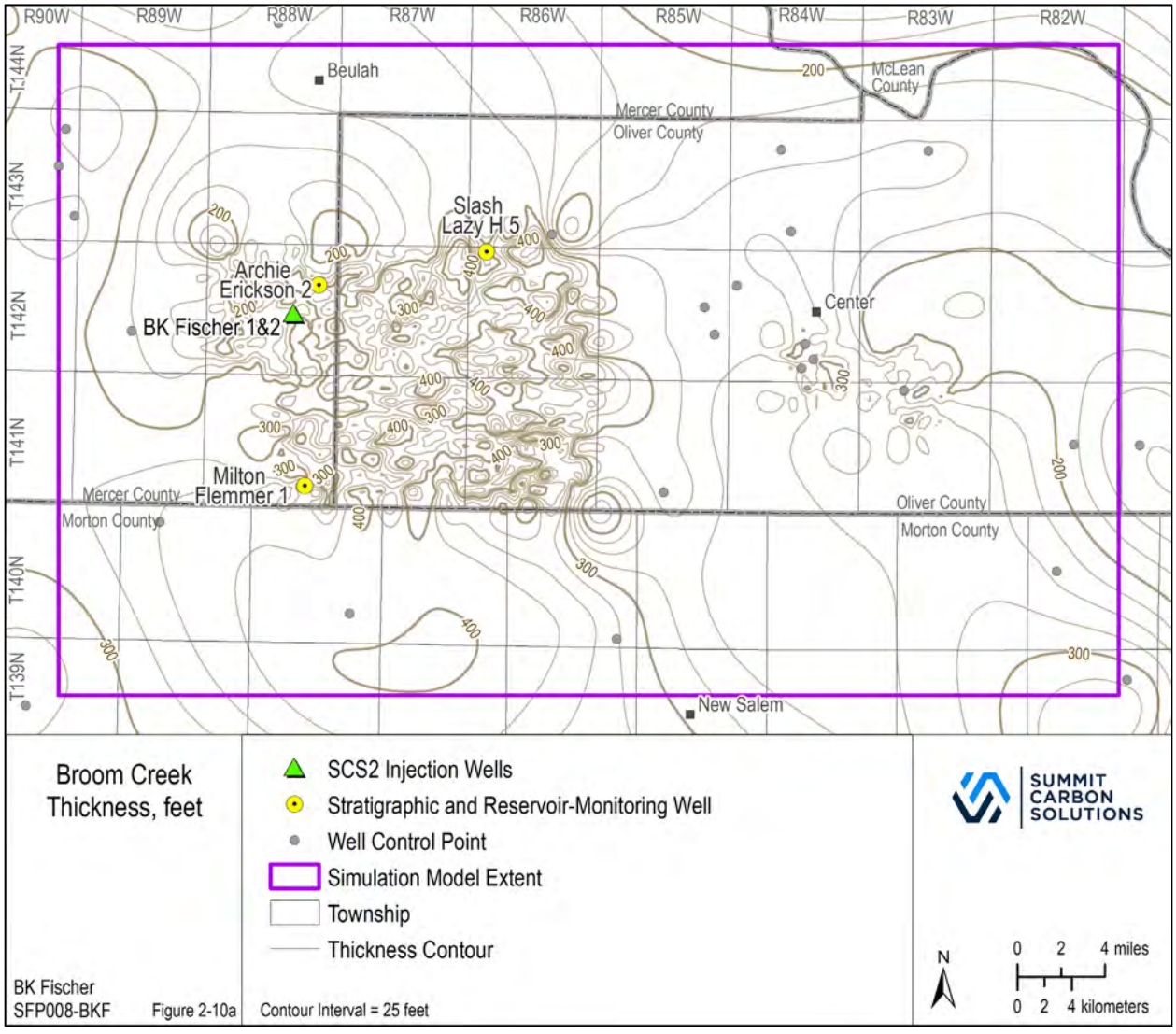



Figure 2-10a. Isopach map of the Broom Creek Formation in the simulation model area. A convergent interpolation gridding algorithm was used with well formation tops, 3D seismic, and 2D seismic in the creation of this map (thickness of the Broom Creek Formation at Archie Erickson 2 is 303 ft, see Table 2-6).

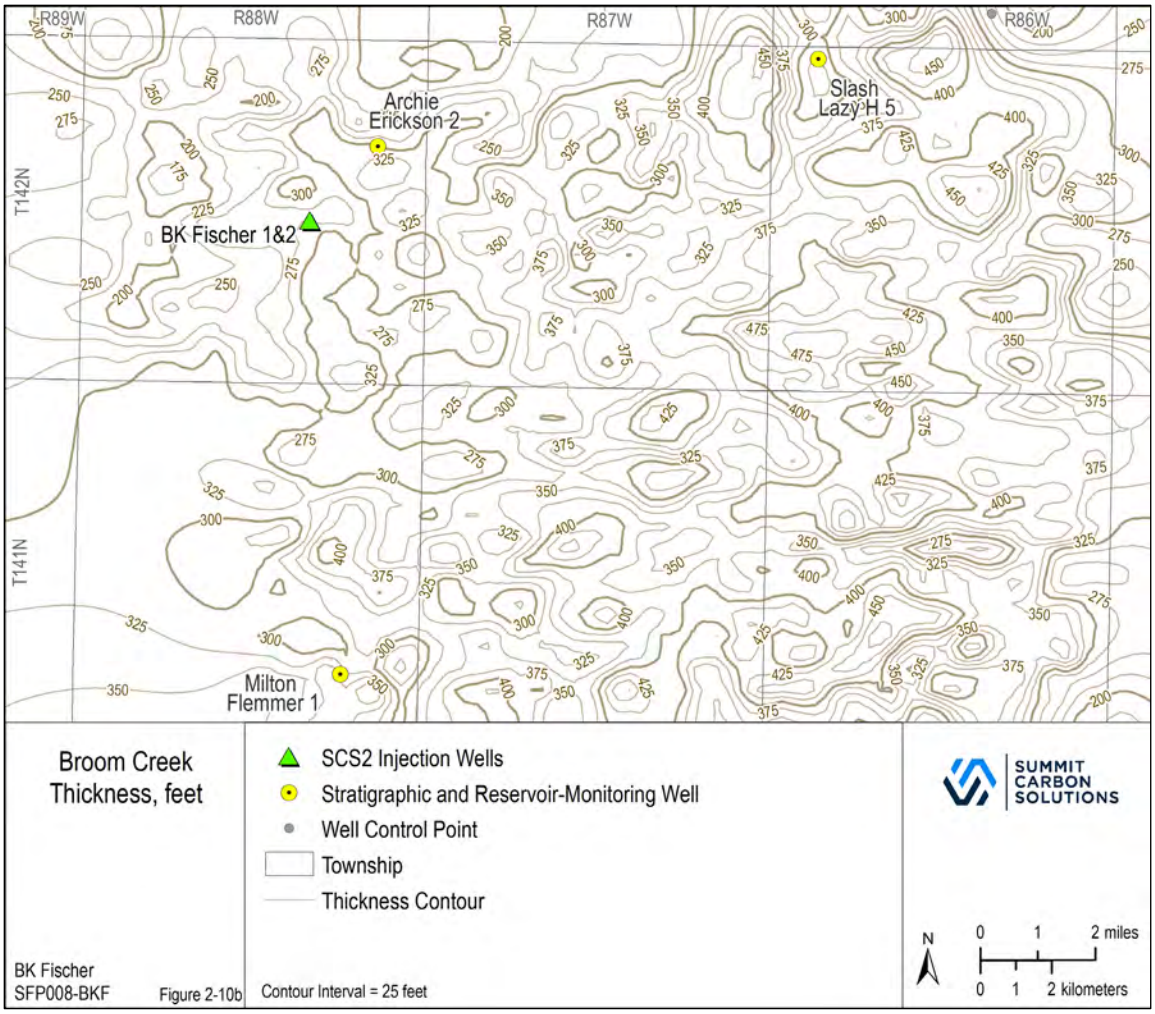



Figure 2-10b. Isopach map of the Broom Creek Formation focused around the three stratigraphic and reservoir-monitoring wells (thickness of the Broom Creek Formation at Archie Erickson 2 is 303 ft, see Table 2-6).

The top of the Broom Creek Formation was picked based on the stratigraphic transition from a relatively low GR signature of sandstone and dolostone lithologies within the Broom Creek Formation to a relatively high GR signature representing the siltstones of the Opeche/Spearfish Formation (Figure 2-11). This transition is also noted with a drop in bulk density (RHOB) and dipole sonic compressional slowness values (DTC) and an increase in neutron porosity (NEUT) and resistivity (RES_D, RES_S). The bottom of the Broom Creek Formation was placed at the base of a relatively low GR package representing a 14-ft package of anhydrite that can be correlated across much of the study area. This rock package divides the clean sandstones and dolostone lithologies of the Broom Creek Formation from the dolostone and anhydrite of the Amsden Formation. Seismic data collected as part of site characterization efforts (Figure 2-8) were used to reinforce structural correlation and thickness estimations of the storage reservoir. The combined structural correlation and seismic interpretation indicate that the formation is continuous across the area near Archie Erickson 2 (Figures 2-12 and 2-13). A structure map of the Broom Creek Formation shows no detectable features with associated spill points in the simulation model area (Figures 2-14 and 2-15).

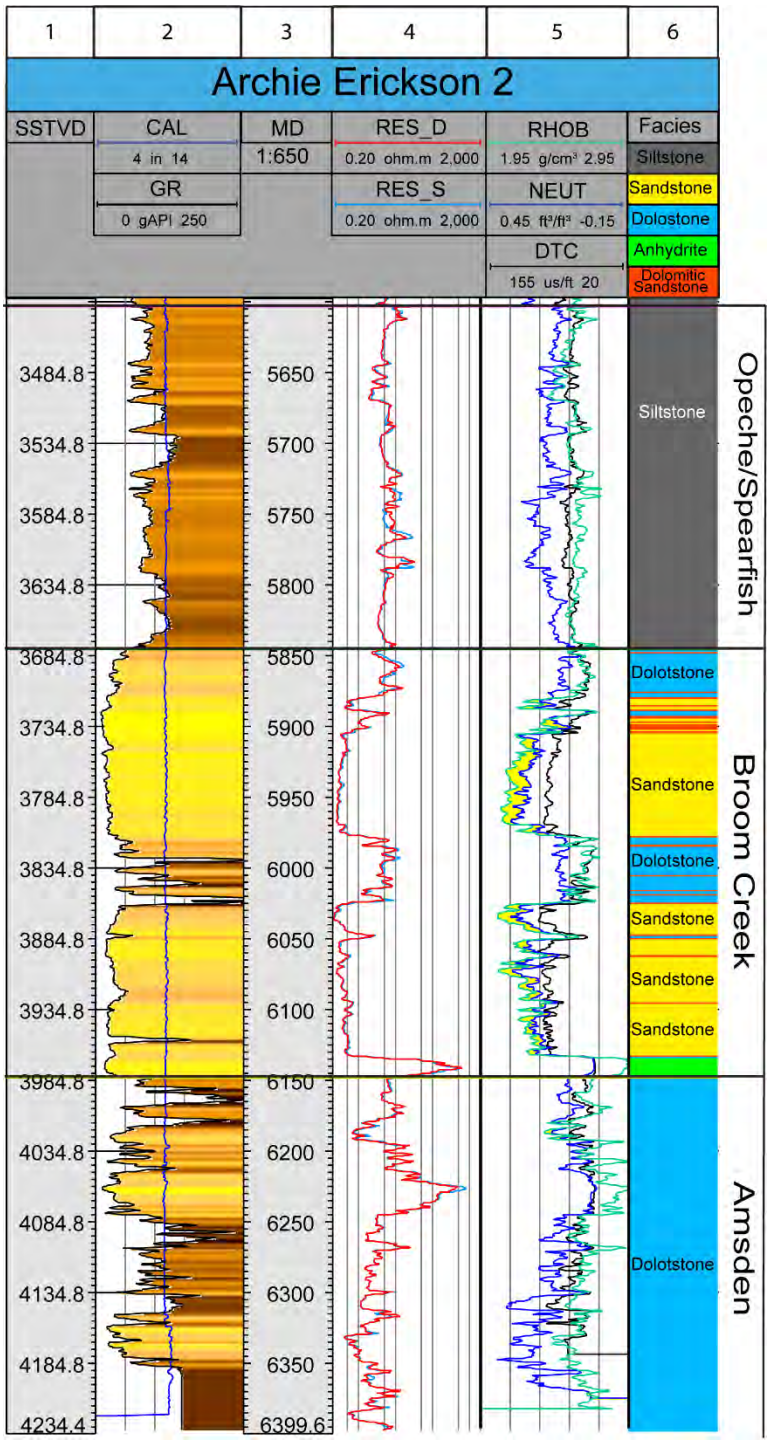



Figure 2-11. Well log display of the interpreted facies of the Opeche/Spearfish, Broom Creek, and Amsden Formations in Archie Erickson 2. Tracks from left to right are 1) SSTVD; 2) GR (black) and caliper (dark blue); 3) MD; 4) resistivity – deep (red) and resistivity – shallow (light blue); 5) delta time (black), NEUT (blue) and density (green); and 6) facies.

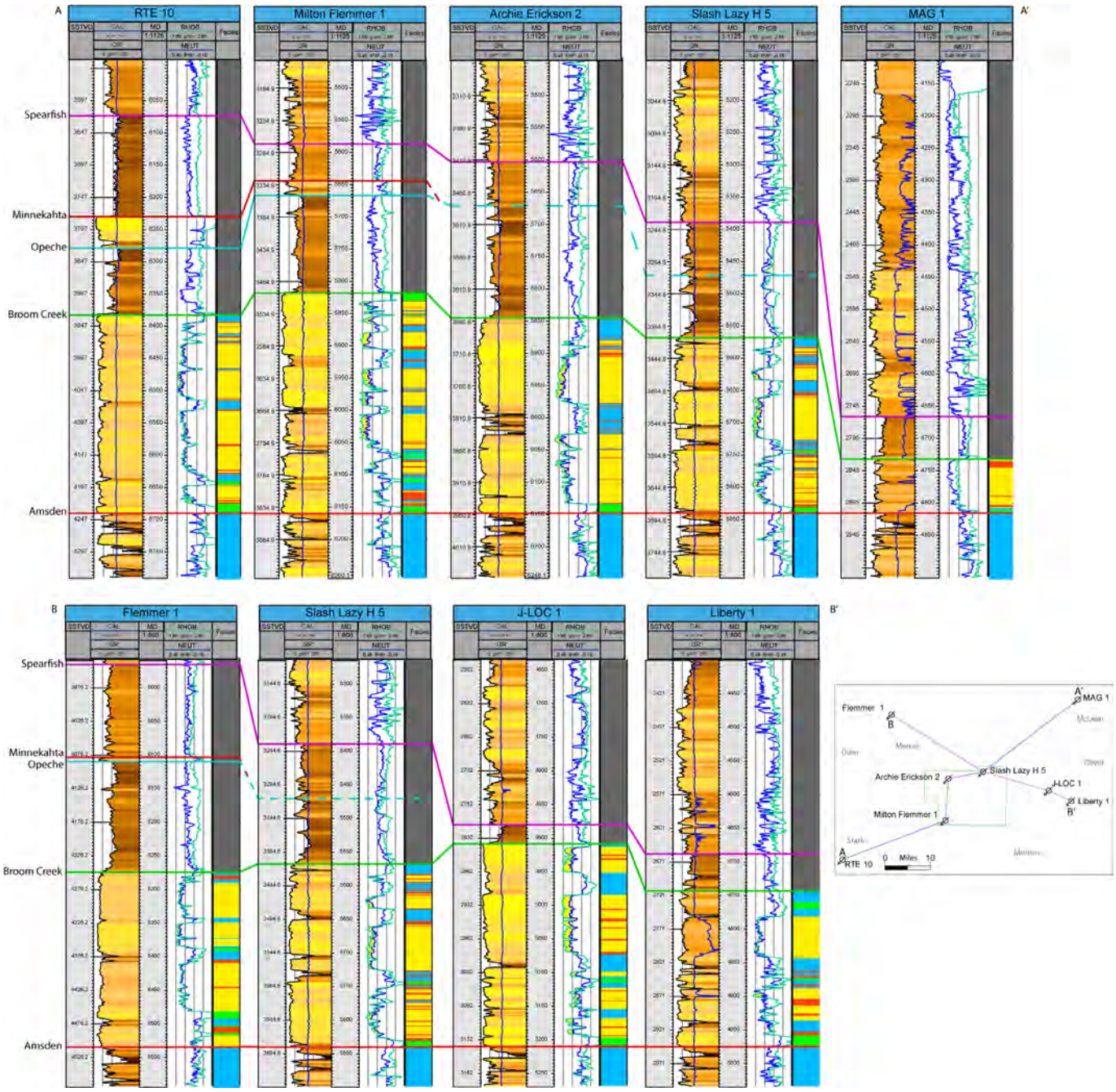



Figure 2-12. Regional well log stratigraphic cross sections of the upper confining zone and injection zone flattened on the top of the Amsden Formation. Logs displayed in tracks from left to right are 1) SSTVD; 2) GR (black) and caliper (dark blue); 3) MD; 4) NEUT (blue) and bulk density (green); and 5) facies. The different depth scales are used between A-A' and B-B' for image display purposes. Cross section is scaled in SSTVD.

Note: Wells in these cross sections are spaced evenly. These figures do not portray the relative distance between wells. Because of the spacing, the structure may appear more drastic than it actually is.

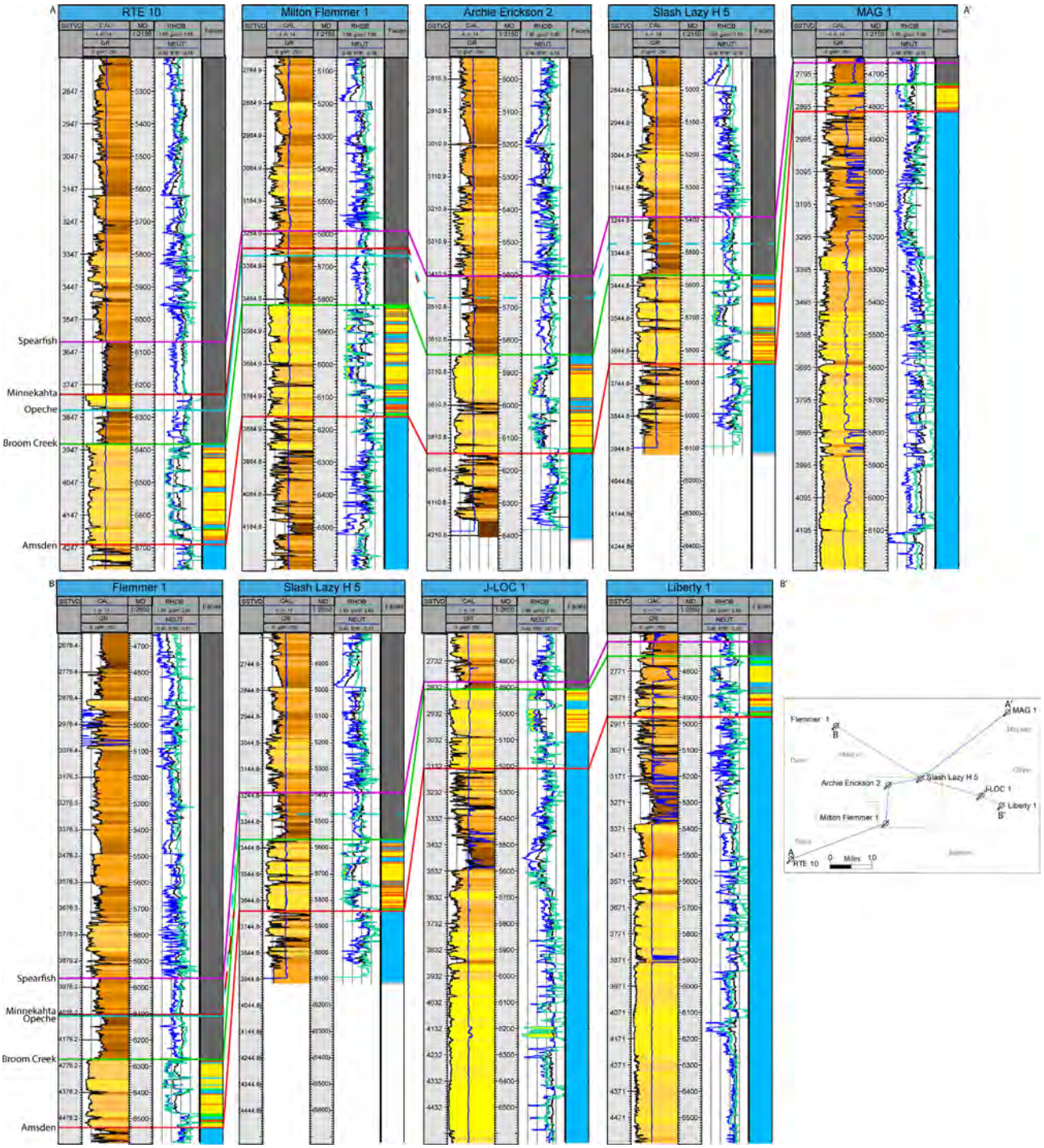



Figure 2-13. Regional well log cross sections showing the structure of the upper confining zone and injection zone. Logs displayed in tracks from left to right are 1) SSTVD, 2) GR (black) and caliper (dark blue), 3) MD, 4) NEUT (blue) and bulk density (green), and 5) facies. The different depth scales are used between A-A' and B-B' for image display purposes. Cross section is scaled in SSTVD.

Note: Wells in these cross sections are spaced evenly. These figures do not portray the relative distance between wells. Because of the spacing, the structure may appear more drastic than it actually is.

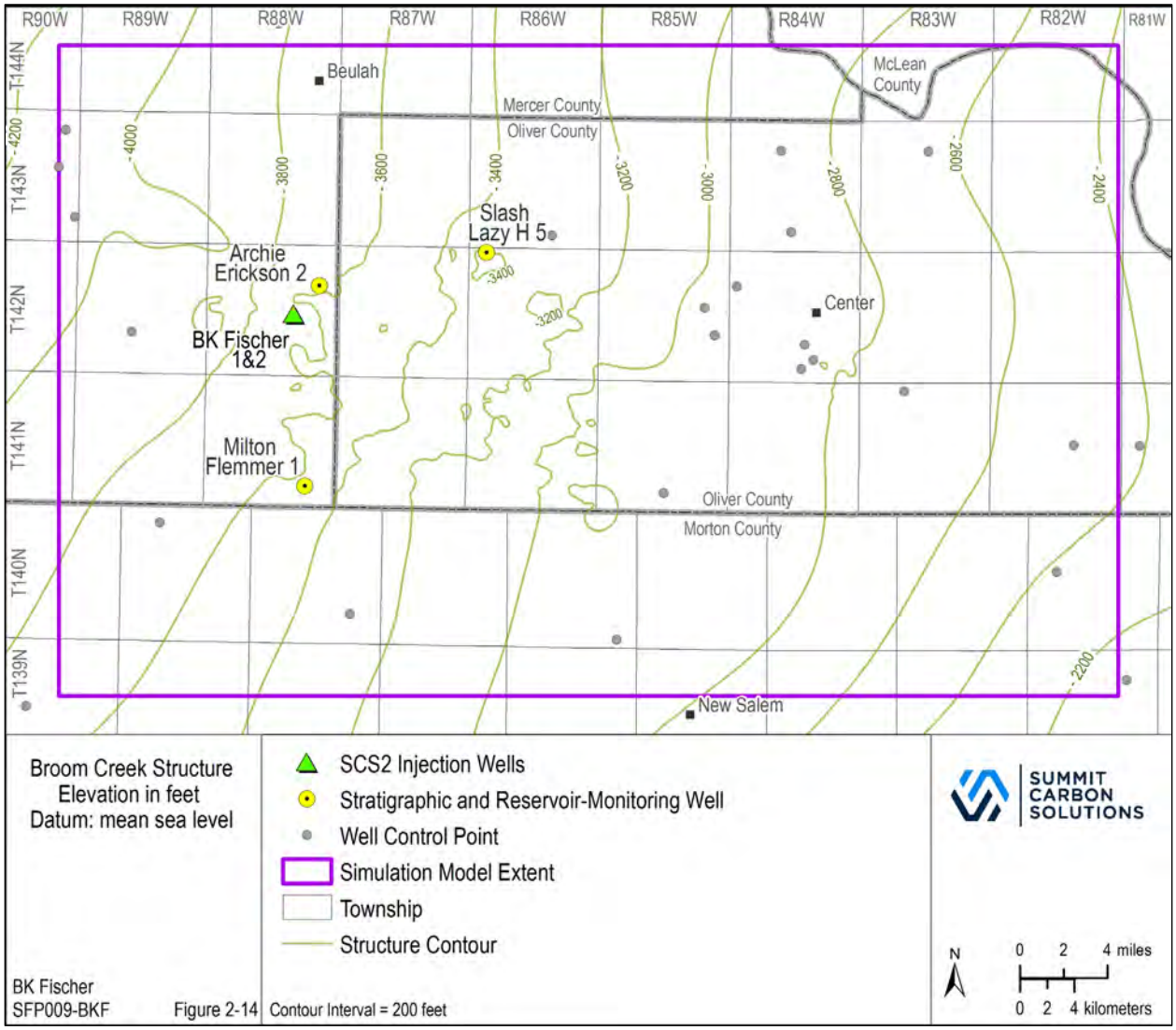



Figure 2-14. Structure map of the Broom Creek Formation in the simulation model referenced in feet below mean sea level. A convergent interpolation gridding algorithm was used with well formation tops, 3D seismic, and 2D seismic in the creation of this map.

Thirty-one (31) 1-in. diameter core plugs collected from the Broom Creek Formation were sampled and used to determine the distribution of porosity and permeability values throughout the formation (Table 2-6, Figure 2-16). The range in porosity and permeability predominantly captured the sandstone variability as this rock type was prominent in the sampling program over the dolostone.

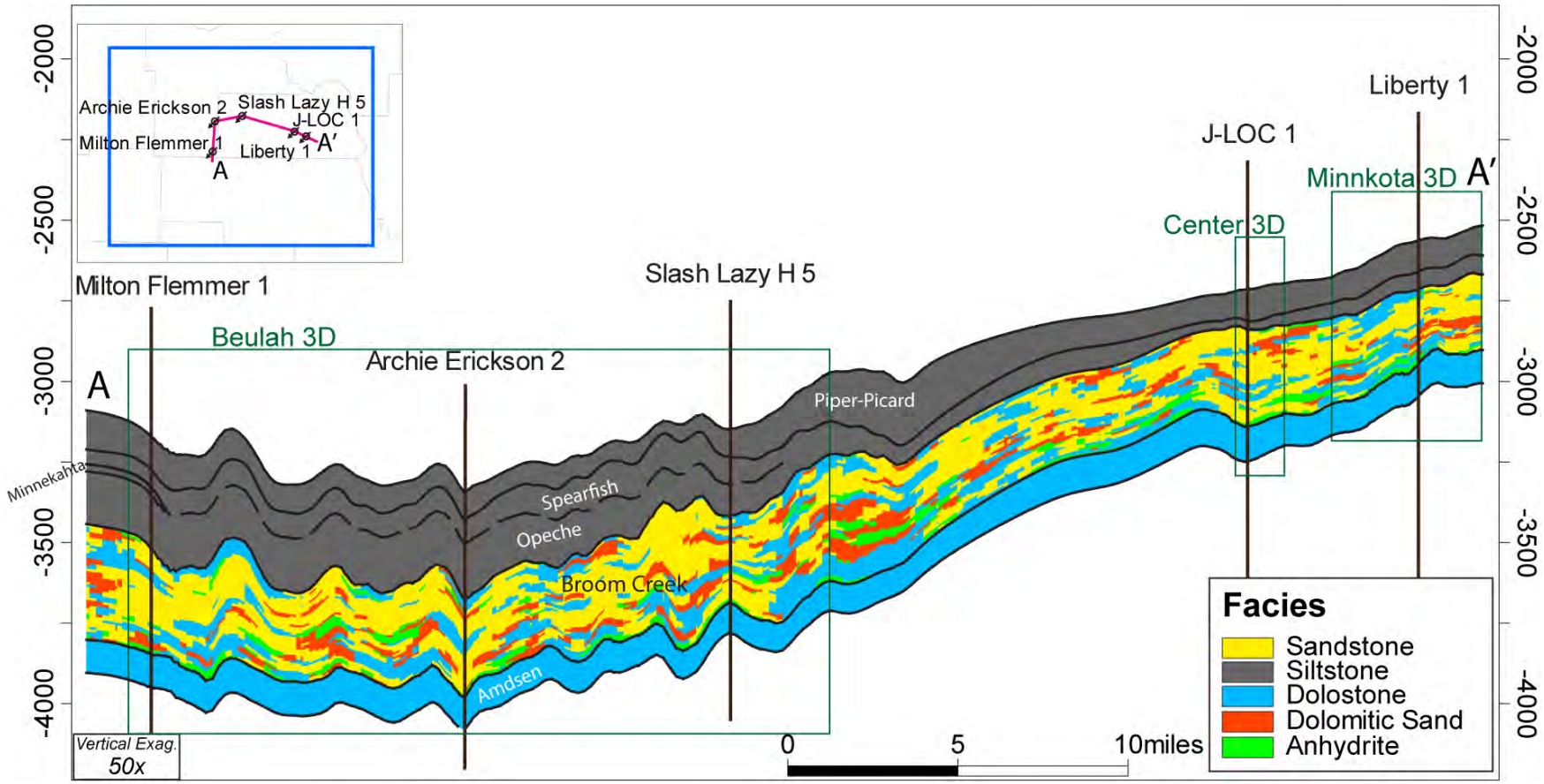



Figure 2-15. Cross section of the BK Fischer storage complex from the geologic model showing facies distribution in the Broom Creek Formation. Depths are referenced as feet below mean sea level. Geologic model extent is displayed by the blue box in the inset map in the upper-left corner.

**Table 2-6. Description of $CO_2$ Storage Reservoir (injection zone) at Archie Erickson 2**

| Injection Zone Core Derived Properties | |
|---|---|
| **Property** | **Description** |
| Formation Name | Broom Creek |
| Lithology | Sandstone, dolostone, anhydrite |
| Formation Top Depth (MD), ft | 5845 |
| Thickness, ft | 303 (sandstone 215, dolostone 72, anhydrite 16) |
| Capillary Entry Pressure (brine/$CO_2$), psi | 3.12 |

| Geologic Properties | | | |
|---|---|---|---|
| **Formation** | **Property** | **Laboratory Analysis** | **Simulation Model Property Distribution** |
| Broom Creek (sandstone) | Porosity, %* | 20.0 (2.9–29.7) | 22.2 (0.0–35.3) |
| | Permeability, mD** | 848.0481, 150.3868 (0.0222–3710) | 458.79, 136.96 (0.0–3401.2) |
| Broom Creek (dolostone) | Porosity, %* | 6.4 (0.8–13.8) | 4.4 (0.0–34.9) |
| | Permeability, mD** | 4.7060, 0.0184 (0.0–62.9) | 2.07, 0.0221 (0.0–919.6) |

* Porosity values are reported as the arithmetic mean followed by the range of values in parentheses. Values are measured at 2400 psi.

** Permeability values are reported as the arithmetic mean and geometric mean, respectively, followed by the range of values in parentheses and do not have the 2.5 permeability calibration factor applied during simulation. Values are measured at 2400 psi.

Core-derived measurements from Archie Erickson 2 were used as the foundation for the generation of porosity and permeability properties within the 3D geologic model. The 1-in.-diameter core plug sample measurements showed good agreement with the geologic model property distribution at the location of Archie Erickson 2. This agreement gave confidence to the geologic model, which is a spatially and computationally larger data set created with the extrapolation of porosity and permeability from offset well logs. The geologic model property distribution statistics shown in Table 2-6 are derived from a combination of the core plug analysis and the larger data set derived from offset well logs.

Sandstone intervals in the Broom Creek Formation are associated with low GR, low density, high porosity (neutron, density, and sonic), low resistivity because of brine salinity, and high sonic slowness measurements (Figure 2-11). The dolostone intervals in the formation are associated with an increase in GR measurements compared to the sandstone intervals, in addition to high density, low porosity (neutron, density, and sonic), high resistivity, and low sonic slowness measurements. The dolomitic sandstone intervals in the formation are the transitions between sandstone and dolostone, where the porosity begins to decrease, and density begins to increase in a transition from predominantly sandstone to dolostone (Figure 2-16).

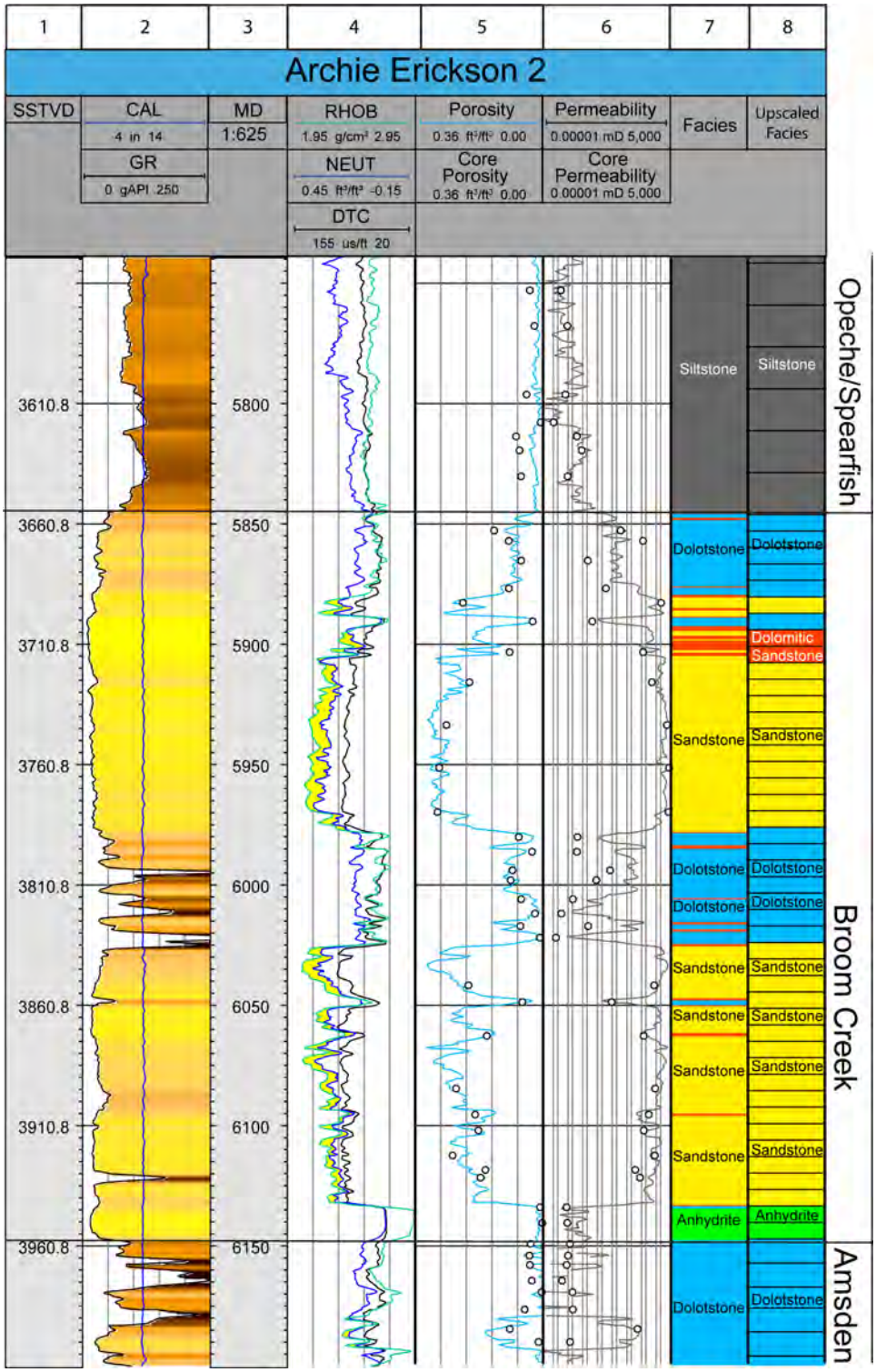



Figure 2-16. Vertical distribution of core-derived porosity and permeability values in the BK Fischer storage complex from Archie Erickson 2. Tracks from left to right are 1) SSTVD; 2) GR (black) and caliper (dark blue); 3) MD; 4) delta time (black), NEUT (blue), and bulk density (green); 5) core porosity (2400 psi) and log porosity (light blue); 6) core permeability (2400 psi) and log permeability (black); 7) facies; and 8) upscaled facies.

### *2.3.1 Mineralogy of the Injection Zone*

Powder XRD for average bulk composition analysis of 31 finely ground, homogenized samples from the Broom Creek Formation shows quartz as the most common mineral (~49%) followed by carbonate (~35%, mostly dolomite with some ankerite), sulfate (~7%, mostly anhydrite), feldspars (~5%, mostly K-feldspar), and clay minerals, ~4% (illite) **(**Figure 2-17a**)**. Minor amounts of halide and oxide/hydroxide make up the rest of the mineralogy. The major constituents of the Broom Creek Formation obtained by XRD are also shown in Table 2-7a. These data align with the average elemental composition obtained by XRF which shows higher content of silica (Si) (>60%) followed by calcium (Ca), magnesium (Mg), sulfur (S), aluminum (Al), and others **(**Figure 2-17a**)**.

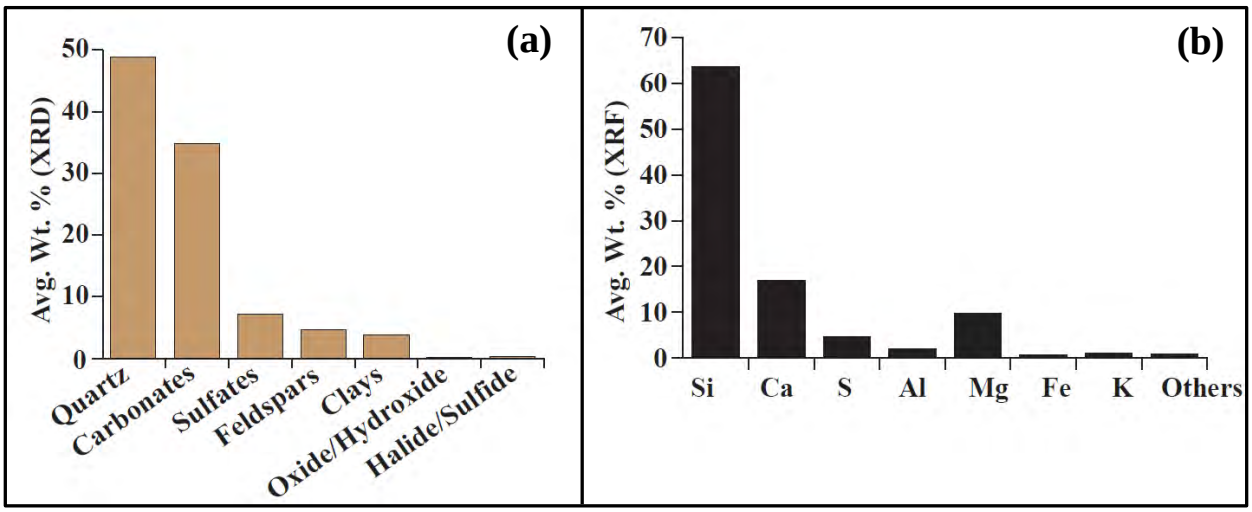



Figure 2-17a. Bar charts showing a) average mineralogy (wt%) and b) average elemental composition (wt%) of the Broom Creek Formation at Archie Erickson 2 (note elemental data by XRF were determined as oxides of the respective elements).

XRF analysis of the Broom Creek Formation (Figure 2-17b) shows a high percentage of $SiO_2$ (2%–98%), CaO (0.2%–39%), and MgO (0%–22%) that confirm the dominance of sandstone and dolomite intervals in the Broom Creek Formation. A high percentage of CaO (~27%) and MgO (~18%) at the top of the formation indicates the presence of a dolomite layer that isolates the Broom Creek Formation from the Opeche/Spearfish Formation. As the formation gets deeper, the mineralogy changes to anhydrite-rich as indicated by a higher percentage of CaO (~39%) and $SO_3$ (~49%) that separates the Broom Creek Formation from the bottom Amsden Formation. The Broom Creek Formation consists of a clay content ranging from 0% to 21% with an average of ~4%, with illite being the dominant clay type.

**Table 2-7a. XRD Analysis of the Broom Creek Formation at Archie Erickson 2. Only major constituents are shown.**

| Formation | Core Depth, ft, MD | Log Depth, ft, MD | Feldspar, wt% | Quartz, wt% | Anhydrite, wt% | Dolomite, wt% | Clay, wt% | Others, wt% | Illite/Total Clay,* wt% |
|---|---|---|---|---|---|---|---|---|---|
| Broom Creek | 5856.5 | 5852.8 | 5.90 | 11.70 | 0.00 | 72.20 | 3.80 | 6.40 | 100.00 |
| Broom Creek | 5860.8 | 5857.1 | 0.00 | 2.80 | 0.00 | 85.50 | 4.20 | 7.50 | 90.48 |
| Broom Creek | 5869 | 5865.3 | 3.10 | 3.00 | 1.60 | 87.70 | 1.70 | 2.90 | 100.00 |
| Broom Creek | 5880.5 | 5876.8 | 1.50 | 6.40 | 0.90 | 85.30 | 3.10 | 2.80 | 100.00 |
| Broom Creek | 5886.5 | 5882.8 | 5.00 | 83.10 | 0.00 | 8.20 | 1.90 | 1.80 | 100.00 |
| Broom Creek | 5894.2 | 5890.5 | 1.60 | 43.50 | 18.30 | 35.80 | 0.00 | 0.80 | NA** |
| Broom Creek | 5907 | 5903.3 | 2.10 | 65.40 | 23.20 | 6.60 | 1.20 | 1.50 | 100.00 |
| Broom Creek | 5919.5 | 5915.8 | 5.00 | 72.20 | 0.00 | 20.00 | 2.40 | 0.40 | 100.00 |
| Broom Creek | 5937.3 | 5933.6 | 3.60 | 94.60 | 0.00 | 0.00 | 0.90 | 0.90 | 100.00 |
| Broom Creek | 5946.5 | 5942.8 | 2.70 | 96.10 | 0.00 | 0.00 | 0.00 | 1.20 | NA |
| Broom Creek | 5955 | 5951.3 | 2.00 | 95.10 | 0.00 | 0.00 | 2.20 | 0.70 | 100.00 |
| Broom Creek | 5974 | 5969.7 | 2.50 | 91.00 | 3.30 | 0.00 | 1.90 | 1.30 | 100.00 |
| Broom Creek | 5984.4 | 5980.1 | 6.60 | 8.70 | 0.00 | 76.50 | 7.50 | 0.70 | 100.00 |
| Broom Creek | 5990.5 | 5986.2 | 0.00 | 1.90 | 21.20 | 66.30 | 3.20 | 7.40 | 100.00 |
| Broom Creek | 5998.2 | 5993.9 | 0.00 | 0.80 | 7.40 | 88.20 | 0.80 | 2.80 | 100.00 |
| Broom Creek | 6002.3 | 5998.0 | 10.90 | 14.70 | 0.00 | 70.70 | 2.50 | 1.20 | 100.00 |
| Broom Creek | 6010.2 | 6005.9 | 26.10 | 38.90 | 0.00 | 24.00 | 8.70 | 2.30 | 100.00 |
| Broom Creek | 6016.2 | 6011.9 | 15.20 | 24.50 | 0.00 | 34.40 | 18.40 | 7.50 | 100.00 |
| Broom Creek | 6021.4 | 6017.1 | 0.00 | 3.00 | 2.50 | 91.70 | 1.10 | 1.70 | 100.00 |
| Broom Creek | 6026.2 | 6021.9 | 16.20 | 50.60 | 0.00 | 11.00 | 21.40 | 0.80 | 100.00 |
| Broom Creek | 6046 | 6041.7 | 2.30 | 81.20 | 0.00 | 13.70 | 2.10 | 0.70 | 100.00 |
| Broom Creek | 6053 | 6048.7 | 5.70 | 53.70 | 0.00 | 39.10 | 1.40 | 0.10 | 100.00 |
| Broom Creek | 6067 | 6062.7 | 3.40 | 72.40 | 0.00 | 19.50 | 4.50 | 0.20 | 100.00 |
| Broom Creek | 6088.2 | 6084.6 | 0.70 | 83.70 | 0.00 | 11.90 | 2.90 | 0.80 | 100.00 |
| Broom Creek | 6099 | 6095.4 | 2.50 | 66.70 | 0.00 | 26.30 | 3.80 | 0.70 | 100.00 |
| Broom Creek | 6105.6 | 6102.0 | 4.80 | 73.70 | 0.00 | 18.50 | 2.40 | 0.60 | 100.00 |
| Broom Creek | 6116 | 6112.4 | 1.50 | 82.50 | 0.00 | 12.70 | 2.00 | 1.30 | 100.00 |
| Broom Creek | 6122 | 6118.4 | 3.50 | 68.40 | 0.00 | 22.70 | 4.70 | 0.70 | 100.00 |
| Broom Creek | 6125.2 | 6121.6 | 6.10 | 69.20 | 0.00 | 21.80 | 2.60 | 0.30 | 100.00 |
| Broom Creek | 6137.5 | 6133.9 | 5.20 | 54.20 | 34.90 | 0.00 | 4.10 | 1.60 | 100.00 |
| Broom Creek | 6144 | 6140.4 | 0.00 | 2.00 | 90.90 | 4.50 | 2.60 | 0.00 | 100.00 |

* Illite component of clays.

** NA; no illite component was detected by XRD.

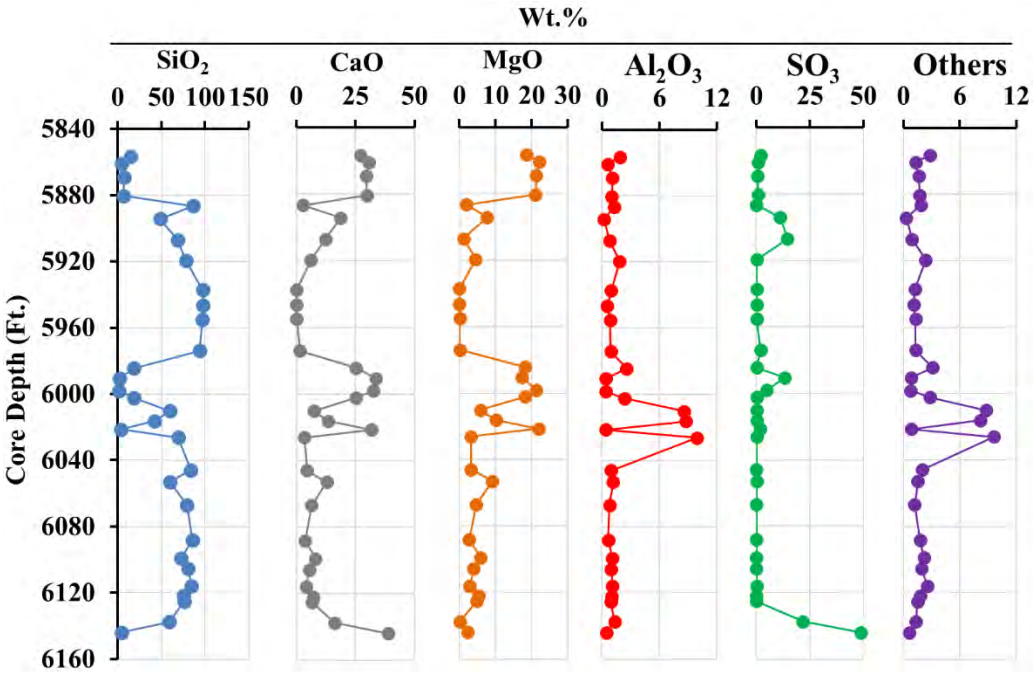



Figure 2-17b. Elemental composition by XRF as a function of depth in the Broom Creek Formation at Archie Erickson 2.

The Broom Creek Formation midsection at the core depth of 5919.5–5974 ft and KB elevation of 5915.3–5969.7 ft represents a highly porous and permeable zone averaging more than 20% total porosity, reaching as high as 30.67% total porosity at some intervals, with permeability of >1000 mD. Thin-section and SEM EDS (energy-dispersive spectroscopy micrographs of the most porous sample show isolated grains of moderately sorted, subrounded quartz and subangular feldspar grains (Figures 2-18a and c). Grain contacts are mostly tangential with intergranular spaces occasionally occupied by dolomite (Figures 2-18a and c). In contrast, the least porous sample with ultralow permeability located at the Broom Creek Formation–Amsden Formation boundary primarily consists of anhydrite (>90%) with dolomite (~5%), quartz, and illite clay (Figures 2-18b and d). Figure 2-19 shows changes in the mineralogy at the Archie Erickson 2 as a function of depth next to the core sample porosity and permeability data. The Broom Creek Formation is highlighted in gray.

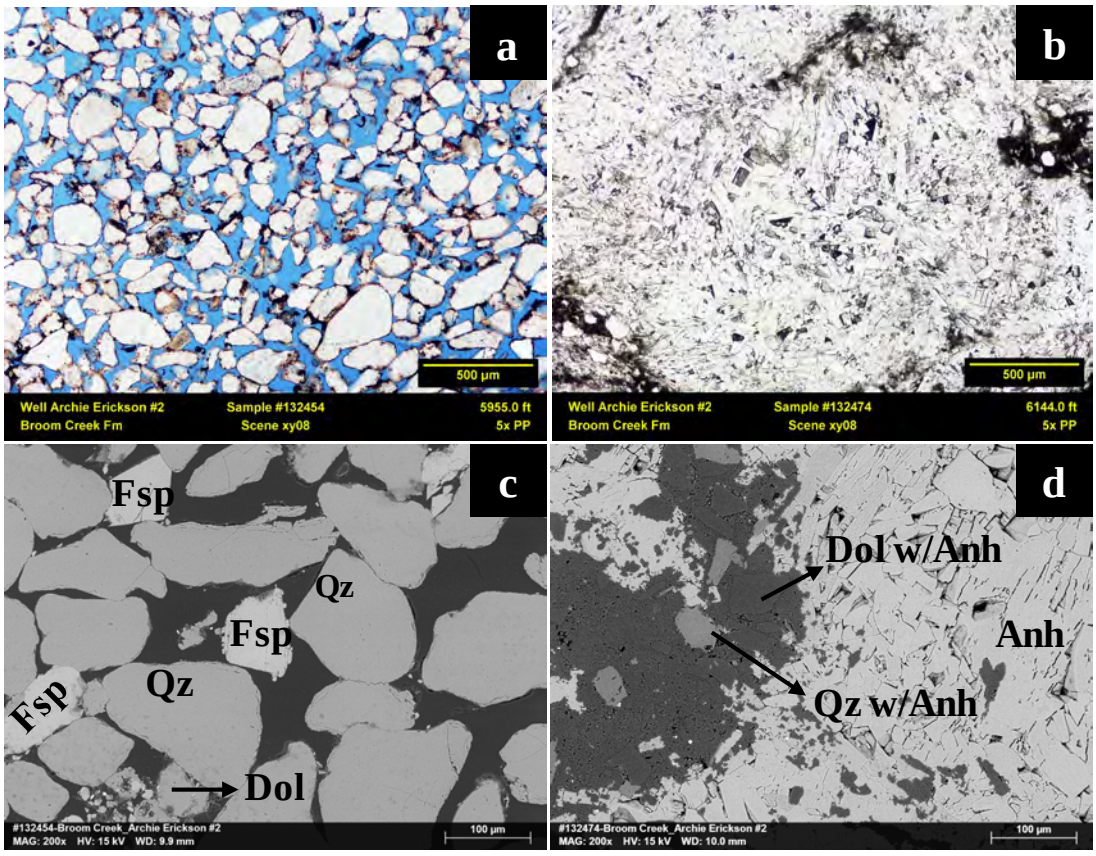



Figure 2-18. Thin section (a, b) and SEM (c, d) micrographs of the most porous (a, c) and the least porous (b, d) samples from the Broom Creek Formation at Archie Erickson 2. The most porous sample has a total porosity and permeability of 30.67% and >1000 mD, respectively, which notably reduced to 0.55% and 0.0039 mD in the least porous sample. The blue color in the thin sections a and b represents porosity.

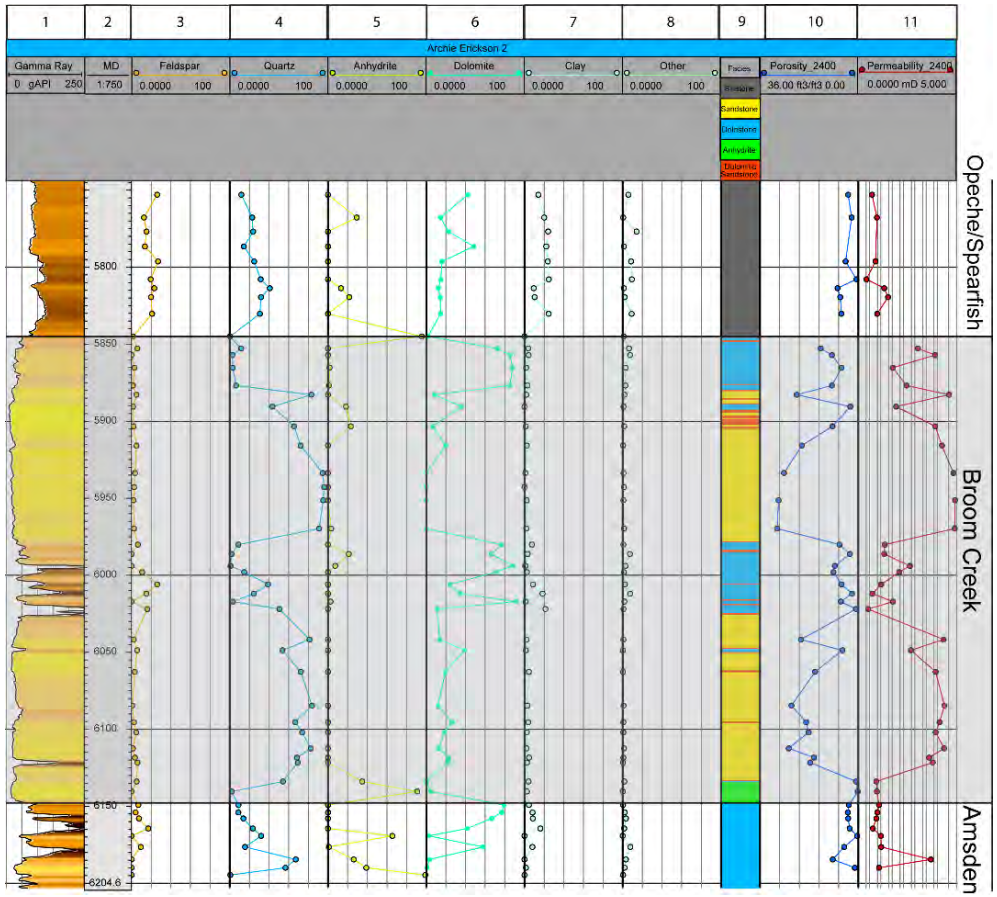



Figure 2-19. Change in the mineralogy of the target reservoir Broom Creek Formation (highlighted in gray) at Archie Erickson 2 as a function of depth based on XRD in comparison to GR, facies, core sample total porosity (%), and permeability (mD). Data gaps in the porosity and permeability plots are due to the inability to obtain testable samples as solid plugs (e.g., samples too soft/brittle). Tracks from left to right are 1) GR (black), 2) MD, 3) total feldspar (orange), 4) quartz (blue), 5) anhydrite (yellow green), 6) dolomite (green), 7) total clay (light blue), 8) other (light green), 9) facies, 10) core porosity (2400 psi) (dark blue), and 11) core permeability (2400 psi) (red).

### *2.3.2 Mechanism of Geologic Confinement*

For BK Fischer, the initial mechanism for geologic confinement of $CO_2$ injected into the Broom Creek Formation will be the upper confining formation (Opeche/Spearfish Formation), which will contain the initially buoyant $CO_2$ in the reservoir under the effects of relative permeability and capillary pressure. Lateral movement of the injected $CO_2$ will be restricted by residual gas trapping (relative permeability) and solubility trapping (dissolution of the $CO_2$ into the native formation brine), confining the $CO_2$ within the proposed storage reservoir. After injected $CO_2$ becomes dissolved in the formation brine, the brine density will increase. This higher-density brine will ultimately sink in the storage formation (convective mixing). Over a much longer period (>100 years), mineralization of the injected $CO_2$ will ensure long-term, permanent geologic confinement. Injected $CO_2$ is not expected to adsorb to any of the mineral constituents of the target formation; therefore, this process is not considered to be a viable trapping mechanism in this project.

### *2.3.3 Geochemical Information of the Injection Zone*

Geochemical simulation was performed to calculate the effects of introducing the $CO_2$ stream to the injection zone. The injection zone, the Broom Creek Formation, was investigated using the geochemical analysis option available in GEM, the compositional simulation software package from Computer Modelling Group Ltd. (CMG). For this geochemical modeling study, the injection scenario consisted of a single injection well injecting for a 20-year period with maximum bottomhole pressure (BHP) and maximum wellhead pressure (WHP) constraints of 3663 and 2100 psi, respectively. A postinjection period of 25 years was run in the model to evaluate any dynamic behavior and/or geochemical reaction after the $CO_2$ injection is stopped.

A geochemical simulation scenario was run with and without the geochemical model analysis option included, and results from the two cases were compared. The results do not show an evident difference in the $CO_2$ gas molality fraction between the two cases for volume injected and injection pressure simulation results. As a result of geochemical reactions in the reservoir, cumulative volume and injection rate have no observable difference between the geochemical and nongeochemical cases. Additionally, the simulation results showed no significant precipitation caused by the presence of $O_2$ that would affect the $CO_2$ injection volume as demonstrated by the comparison in injection rates between the case with and without geochemical modeling. Simulation results show that, during $CO_2$ injection, the supercritical $CO_2$ (free-$CO_2$ gas) remains dominant. $CO_2$ dissolution in the formation water and residual trapping of $CO_2$ slowly increased over time, while $CO_2$ mineralization is negligible. The result is a small change in simulated porosity, less than 0.01% porosity units, equating to a maximum increase in average porosity from 22.00% to 22.01% after the 20-year injection period plus 25 years of postinjection. A full description of the geochemical results for the injection zone can be found in Appendix C.

## 2.4 Confining Zones

The confining zones for the Broom Creek Formation are the overlying Opeche/Spearfish Formation and the underlying Amsden Formation (Figure 2-2, Table 2-7b). Both the overlying and underlying confining formations consist primarily of impermeable rock layers.

**Table 2-7b. Properties of Upper and Lower Confining Zones at Archie Erickson 2**

| Confining Zone Properties | Upper Confining Zone | Lower Confining Zone |
|---|---|---|
| Stratigraphic Unit | Opeche/Spearfish | Amsden |
| Lithology | Siltstone/anhydrite/ dolostone | Dolostone/ anhydrite/sandstone |
| Formation Top Depth (MD), ft | 5603 | 6148 |
| Thickness, ft | 242 | 265* |
| Capillary Entry Pressure (brine/$CO_2$), psi | 2009.6 | 278.7 |
| Depth below Lowest Identified USDW, ft | 4052 | 4597 |

| Formation | Property | Laboratory Analysis | Simulation Model Property Distribution |
|---|---|---|---|
| Opeche/Spearfish | Porosity, %** | 4.6 (0.7–7.6) | 2.1 (0.0–14.6) |
| | Permeability, mD *** | 0.0011, 0.0005 (0.0001–0.0043) | 0.1088, 0.0021 (0.00–6.37) |
| Amsden | Porosity, % ** | 3.8 (0.4–9.4) | 2.9 (0.0–35.1) |
| | Permeability, mD *** | 3.3256, 0.0022 (0.0002–26.6) | 0.7056, 0.0070 (0.00–156.05) |

* Thickness estimated based on offset well information

** Porosity values recorded at 2400-psi confining pressure. Porosity values from the model are reported as the arithmetic mean followed by the range of values in parentheses.

*** Permeability values recorded at 2400-psi confining pressure. Permeability values are reported as the arithmetic mean and geometric mean, respectively, followed by the range of values in parentheses and do not have the 2.5 permeability calibration factor applied during simulation.

### *2.4.1 Upper Confining Zone*

In BK Fischer, the upper confining zone, the Opeche/Spearfish Formation, consists of predominantly siltstone with interbedded dolostone and anhydrite (Table 2-7b). The upper confining zone is laterally extensive across the simulation model area (Figure 2-20) and is 5603 ft below the KB elevation and 242 ft thick as observed in Archie Erickson 2 (Figures 2-20 and 2-21). The contact between the underlying Broom Creek Formation and the upper confining zone is an unconformity that can be correlated across the Broom Creek Formation extent where the resistivity and GR logs show a significant change across the contact. A relatively low GR signature of sandstone and dolostone lithologies within the Broom Creek Formation changes to a relatively high GR signature representing the siltstones of the Opeche/Spearfish Formation (Figure 2-11).

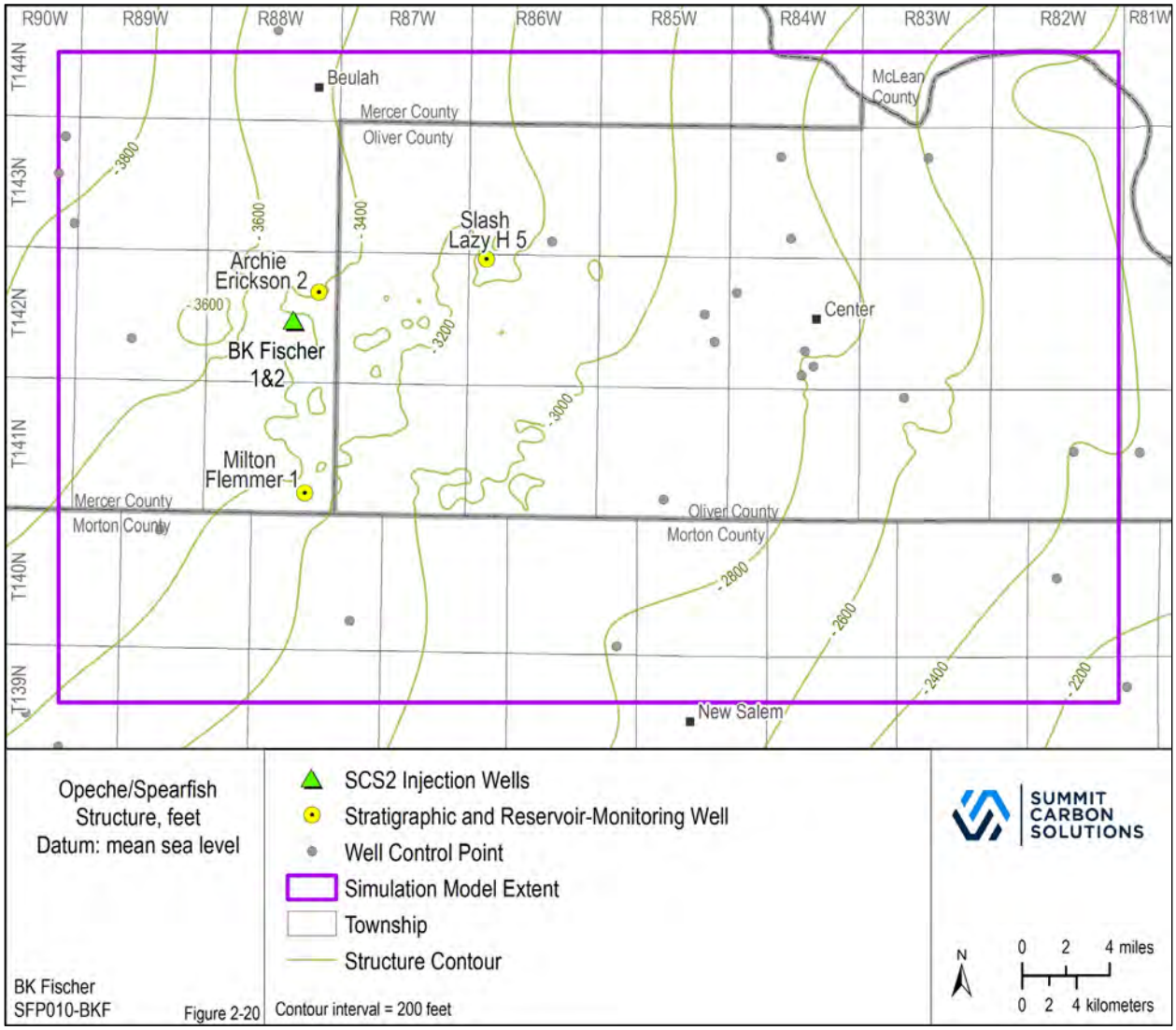



Figure 2-20. Structure map of the Opeche/Spearfish Formation across the simulation model area in feet below mean sea level. A convergent interpolation gridding algorithm was used with well formation tops, 3D seismic, and 2D seismic in creation of this map.

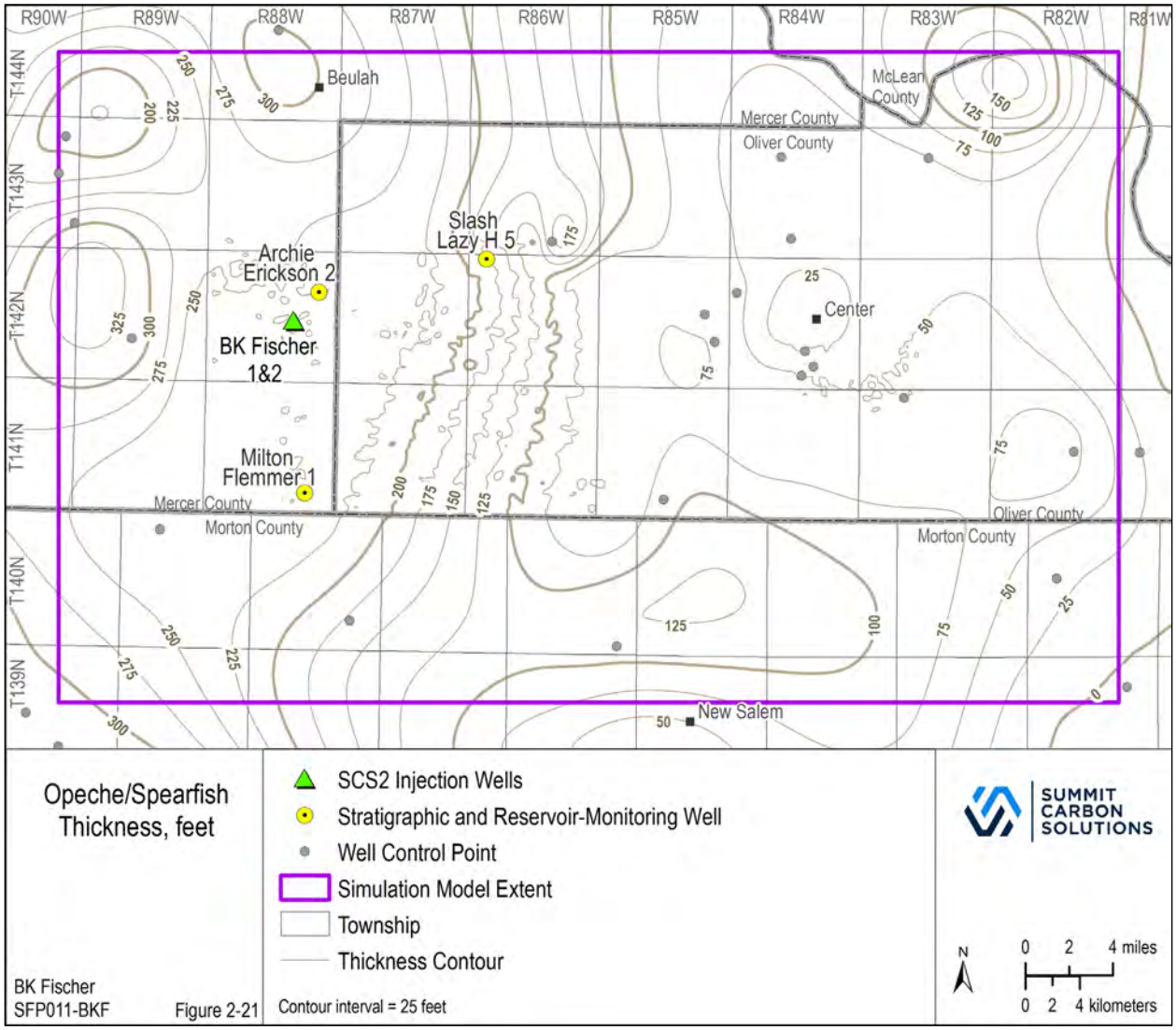



Figure 2-21. Isopach map of the Opeche/Spearfish Formation in the simulation model area. A convergent interpolation gridding algorithm was used with well formation tops, 3D seismic, and 2D seismic in creation of this map.

*2.4.1.1 Mineralogy of the Upper Confining Zone*

Powder XRD for average bulk composition analysis of 10 finely ground, homogenized samples from the Opeche/Spearfish Formation shows carbonates (~24%, mostly dolomite with some ankerite) and quartz (~23%) as the most common minerals followed by feldspar (~18%, sodium- and potassium-feldspar contributing equally), clay (~17%, mostly illite and chlorite with a minor contribution from kaolinite), and sulfates (~16%, mostly anhydrite) (Figure 2-22a). Minor amounts of oxide/hydroxide (~0.5%) and sulfide (~0.2%) minerals make up the rest of the mineralogy. The major constituents of the Opeche/Spearfish Formation obtained by XRD are also shown in Table 2-7c. XRD data aligns with the average elemental composition obtained by XRF which shows silica (Si) as the dominant element followed by calcium (Ca), sulfur (S), aluminum (Al), magnesium (Mg), iron (Fe), potassium (K), and other trace elements (Figure 2-22a).

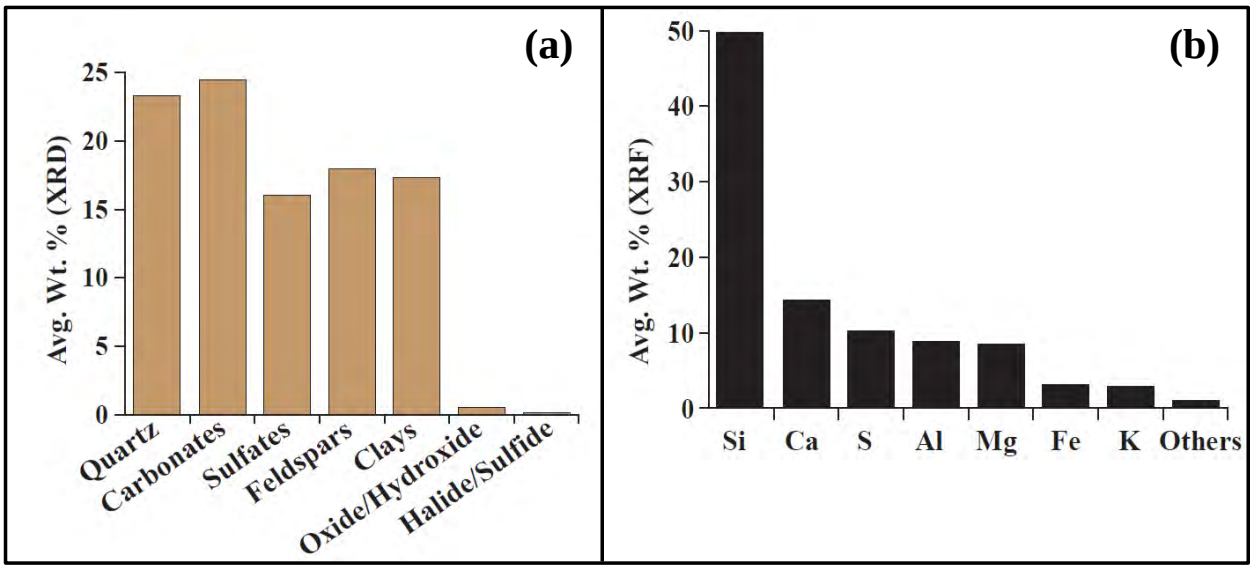



Figure 2-22a. Bar charts showing a) average mineralogy (wt%) and b) average elemental composition (wt%) of the Opeche/Spearfish Formation at Archie Erickson 2 (note: elemental data by XRF were determined as oxides of the respective elements).

XRF analysis of the Opeche/Spearfish Formation (Figure 2-22b) identifies $SiO_2$ (1-65%), CaO (5-40%), MgO (0.3-17%), and $Al_2O_3$ (0.2-11%) correlating well with the silicate, carbonate, and aluminum-rich mineralogy determined by XRD. A high percentage of CaO (~40%) and $SO_3$ (~55%) at the base of the Opeche/Spearfish Formation indicates the dominance of anhydrite separating the Opeche/Spearfish Formation from the Broom Creek Formation. The Opeche/Spearfish Formation consists of a much higher clay content compared to the Broom Creek Formation ranging from 0% to 24% with an average of ~17% with illite being the most dominant clay type.

**Table 2-7c. XRD Analysis of the Opeche/Spearfish Formation at Archie Erickson 2. Only major constituents are shown.**

| Formation | Core Depth, ft, MD | Log Depth, ft, MD | Feldspar, wt% | Quartz, wt% | Anhydrite, wt% | Dolomite, wt% | Clay, wt% | Others, wt% | Illite/Total Clay,* wt% |
|---|---|---|---|---|---|---|---|---|---|
| Opeche/Spearfish | 5756.7 | 5753.0 | 26.10 | 11.80 | 0.00 | 42.30 | 14.10 | 5.70 | 65.25 |
| Opeche/Spearfish | 5771.5 | 5767.8 | 12.70 | 22.90 | 29.30 | 14.50 | 20.10 | 0.50 | 70.15 |
| Opeche/Spearfish | 5780.6 | 5776.9 | 15.30 | 23.80 | 0.00 | 22.70 | 24.10 | 14.10 | 73.03 |
| Opeche/Spearfish | 5790.3 | 5786.6 | 13.70 | 14.40 | 0.00 | 48.50 | 22.20 | 1.20 | 69.82 |
| Opeche/Spearfish | 5800 | 5796.3 | 27.00 | 24.90 | 0.00 | 15.90 | 23.70 | 8.50 | 67.09 |
| Opeche/Spearfish | 5811.6 | 5807.9 | 19.50 | 31.50 | 0.00 | 14.90 | 24.80 | 9.30 | 85.89 |
| Opeche/Spearfish | 5817.4 | 5813.7 | 23.20 | 40.80 | 13.30 | 12.20 | 9.40 | 1.10 | 34.04 |
| Opeche/Spearfish | 5823.2 | 5819.5 | 20.00 | 31.80 | 21.70 | 14.30 | 10.30 | 1.90 | 63.11 |
| Opeche/Spearfish | 5834 | 5830.3 | 21.00 | 30.70 | 0.00 | 14.60 | 24.60 | 9.10 | 88.21 |
| Opeche/Spearfish | 5848.7 | 5845.0 | 1.50 | 0.30 | 95.50 | 1.70 | 0.00 | 1.00 | NA** |

* Illite component of clay.

** NA; no illite component was detected by XRD.

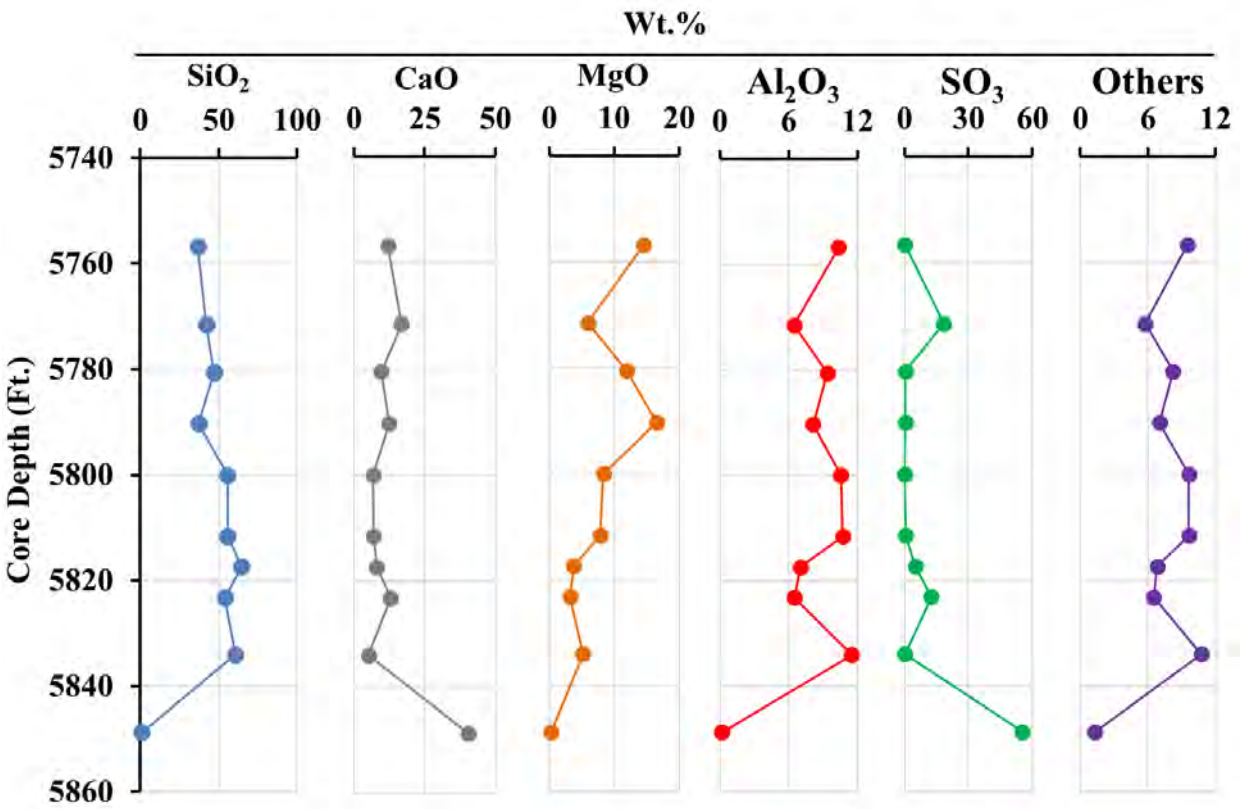



Figure 2-22b. Elemental composition by XRF as a function of depth in the Opeche/Spearfish Formation at Archie Erickson 2.

Thin-section and SEM-EDS micrographs of the most porous sample at the core depth of 5817.4 ft – KB elevation of 5813.6 ft in the Opeche/Spearfish Formation show well-compacted angular and poorly sorted quartz and feldspar grains with contacts typically separated by a clay matrix and iron oxides. This property together with the existence of long and sutured grain contacts give rise to the pore spaces that are isolated and discontinuous in the Opeche/Spearfish Formation (Figures 2-23a and 2-23c). The least porous sample, located at the Opeche/Spearfish Formation–Broom Creek Formation boundary (core depth of 6144 ft – KB elevation of 6140.4), is mostly composed of clay matrix with quartz and feldspar clasts embedded into it. Oxide minerals such as iron oxide and titanium oxide are frequently observed (Figures 2-23b and 2-23d). Figure 2-24 shows the changes in the mineralogy at the Archie Erickson 2 well as a function of depth next to the core sample porosity and permeability data. The Opeche/Spearfish Formation is highlighted in gray.

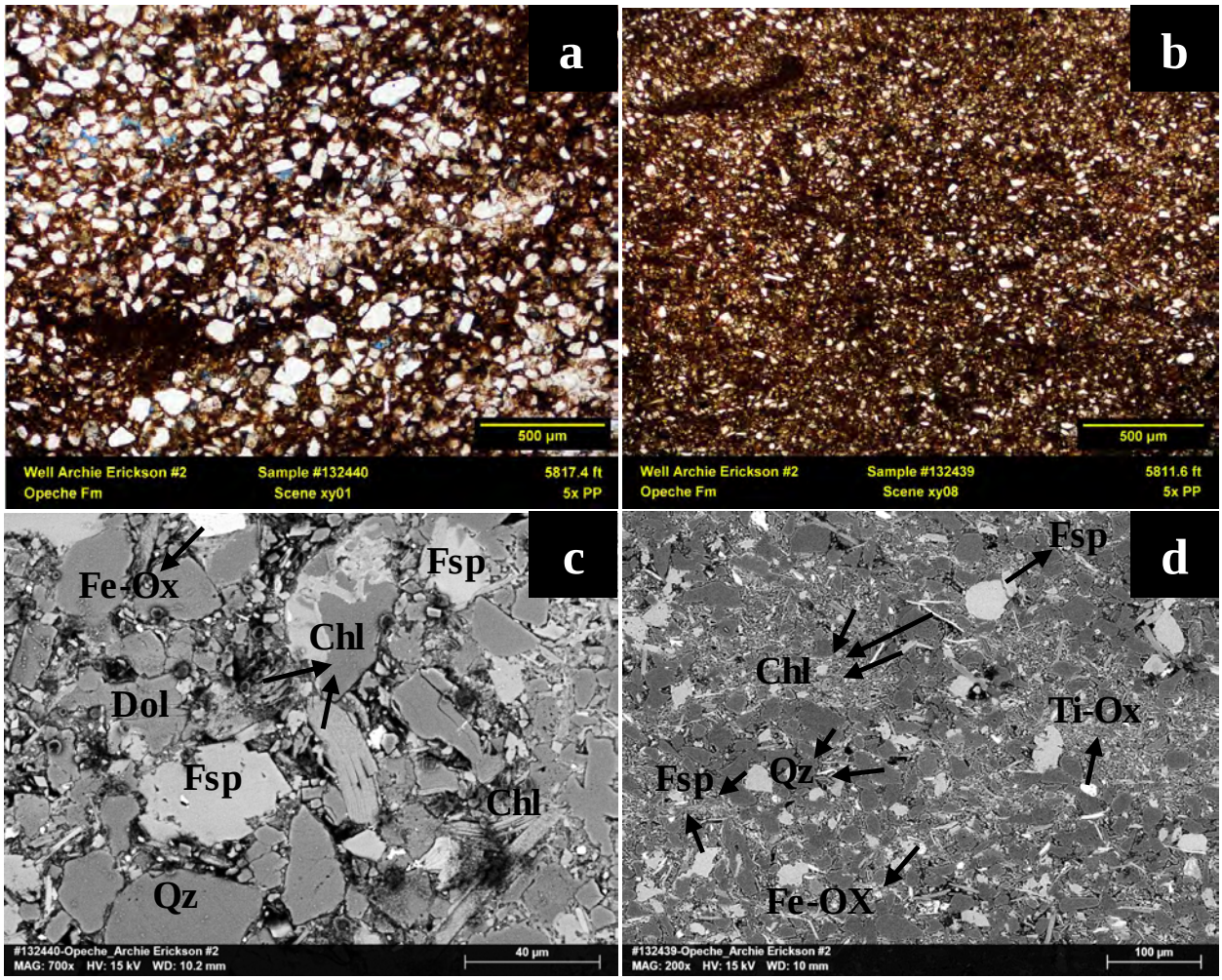



Figure 2-23. Thin section (a, b) and SEM (c, d) micrographs of the most porous (a, c) and the least porous (b, d) samples from the Opeche/Spearfish Formation at Archie Erickson 2. The most porous sample has a total porosity and permeability of 8.25% and 0.00202 mD. In the least porous sample, the porosity is notably reduced to 0.28% and permeability is 0.00225 mD. The blue color in thin section a represents porosity.

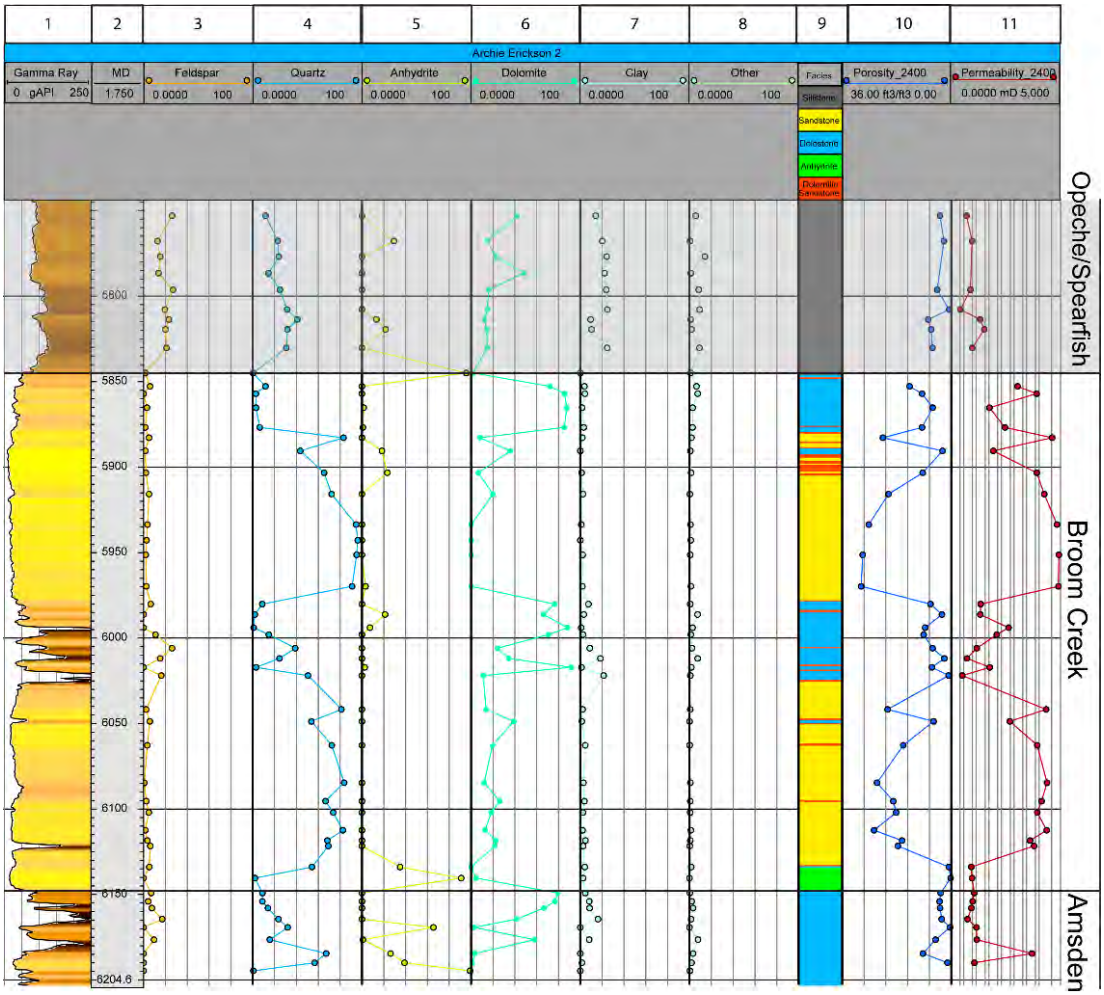



Figure 2-24. Change in the mineralogy of the upper-confining Opeche/Spearfish Formation (highlighted in gray) at Archie Erickson 2as a function of depth based on XRD in comparison to GR, facies, core sample total porosity (%), and permeability (mD). Very low total porosity and permeability with a high clay content make the Opeche/Spearfish Formation an ultralow permeable formation. Data gaps in the porosity and permeability plots are due to the inability to obtain testable samples as solid plugs (e.g., samples too soft/brittle). Tracks from left to right are 1) GR (black); 2) MD; 3) total Feldspar (orange), 4) Quartz (blue); 5) Anhydrite (yellow green); 6) Dolomite (green); 7) total Clay (light blue) 8) Other (light green); 9) Facies; 10) core porosity (2400 psi) (dark blue); 11) core permeability (2400 psi) (red).

### *2.4.1.2 Geochemical Interaction*

Geochemical simulation using the PHREEQC geochemical software was performed to calculate the potential effects of an injected multicomponent $CO_2$ stream on the Opeche/Spearfish Formation. This geochemical simulation was run for 45 years to represent 20 years of injection plus 25 years of postinjection.

Results showed geochemical processes at work. The pH at the interface between the injection zone and upper confining zone has the greatest change in value, declining from it's initial value of 6.47 to a level of 5.05 after 10 years of injection, and stabilizes at 5.03 by the end of 25 years of postinjection. K-feldspar starts to dissolve from the beginning of the simulation period while illite and quartz start to precipitate at the same time. The net change due to precipitation or dissolution at a 1-2 meter interval above the injections zone is less than 5 kg per cubic meter with little dissolution or precipitation taking place during the later years of simulation. The overall net porosity changes from dissolution and precipitation are minimal, less than 0.1% change during the life of the simulation. These results suggest that geochemical change from exposure to $CO_2$ is minor and therefore the ability of the Opeche/Spearfish Formation to maintain its sealing integrity will not be compromised by geochemical processes. A full description of the geochemical results for the upper confining zone can be found in Appendix C.

### *2.4.2 Additional Overlying Confining Zones*

Several other formations provide additional confinement above the Opeche/Spearfish Formation. Impermeable rocks above the primary seal include the Piper, Rierdon, and Swift Formations, which make up the first additional group of confining formations (Table 2-8a). At Archie Erickson 2, together with the Opeche/Spearfish Formation, these intervals are 1087 ft thick and will isolate Broom Creek Formation fluids from migrating upward to the next permeable interval, the Inyan Kara Formation (Figure 2-25). Above the Inyan Kara Formation, 2625 ft of impermeable rocks acts as an additional seal between the Inyan Kara sandstone interval and the lowermost USDW, the Fox Hills Formation (Figure 2-26). Confining layers above the Inyan Kara sandstone interval include the Skull Creek, Mowry, Belle Fourche, Greenhorn, Carlile, Niobrara, and Pierre Formations (Table 2-8a).

The formations between the Broom Creek and Inyan Kara Formations and between the Inyan Kara Formation and lowest USDW have demonstrated the ability to prevent the vertical migration of fluids throughout geologic time and are recognized as impermeable flow barriers in the Williston Basin (Downey, 1986; Downey and Dinwiddie, 1988).

**Table 2-8a. Description of Zones of Confinement above the Immediate Upper Confining Zone (data based on Archie Erickson 2)**

| Name of Formation | Lithology | Formation Top Depth MD, ft | Thickness, ft | Depth below Lowest Identified USDW, ft |
|---|---|---|---|---|
| Pierre | Mudstone | 1798 | 1480 | 0 |
| Niobrara | Mudstone | 3278 | 380 | 1480 |
| Carlile | Mudstone | 3658 | 48 | 1860 |
| Greenhorn | Mudstone | 3706 | 106 | 1908 |
| Belle Fourche | Mudstone | 3812 | 293 | 2014 |
| Mowry | Mudstone | 4105 | 78 | 2307 |
| Skull Creek | Mudstone | 4193 | 230 | 2395 |
| Swift | Mudstone | 4758 | 440 | 2960 |
| Rierdon | Mudstone | 5198 | 209 | 3400 |
| Piper (Kline Member) | Carbonate | 5407 | 103 | 3609 |
| Piper (Picard Member) | Mudstone | 5510 | 93 | 3712 |

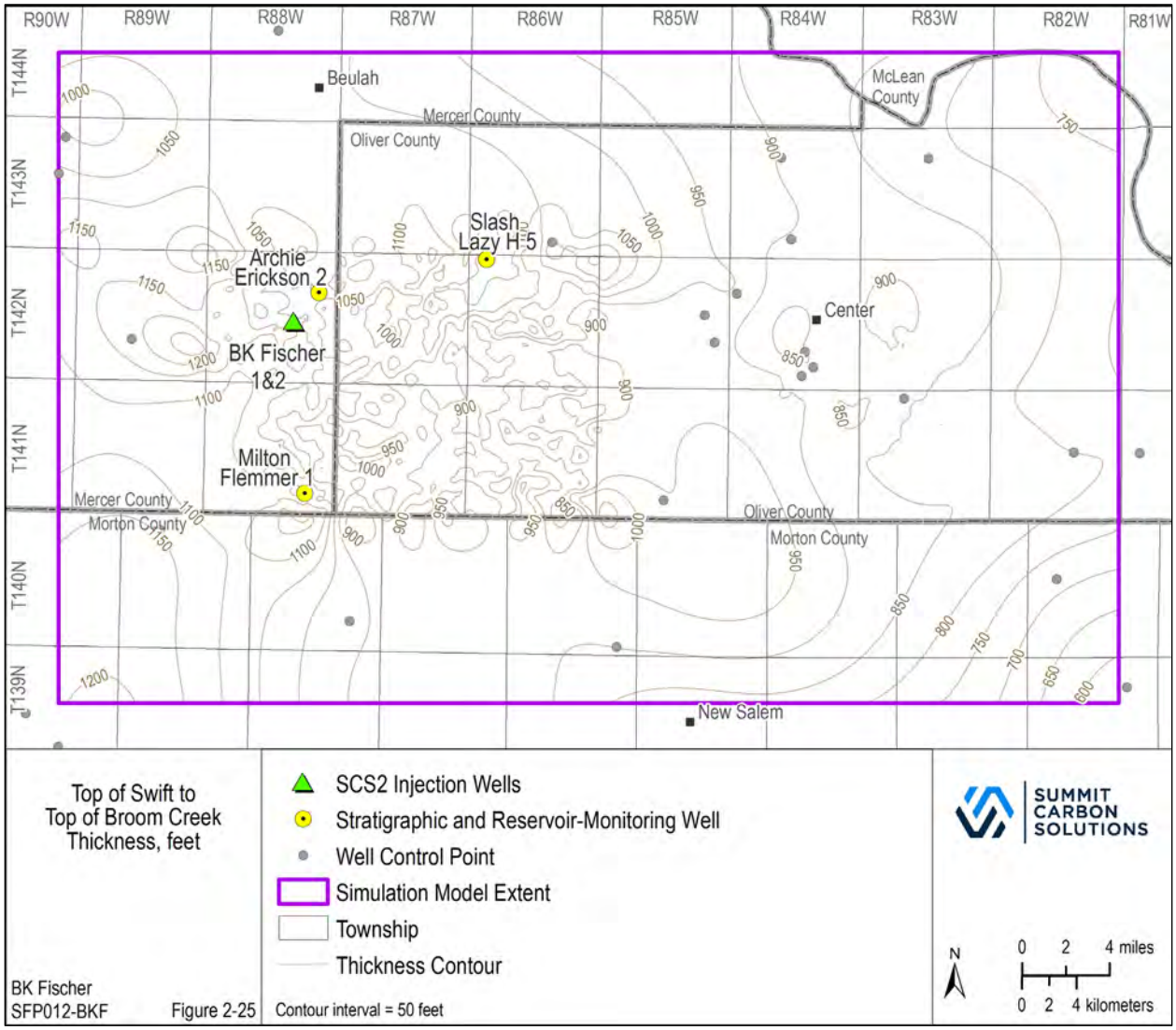



Figure 2-25. Isopach map of the interval between the top of the Broom Creek Formation and the top of the Swift Formation. This interval represents the primary and secondary confinement zones. A convergent interpolation gridding algorithm was used with well formation tops, 3D seismic, and 2D seismic in creation of this map.

Sandstones of the Inyan Kara Formation comprise the first unit with relatively high porosity and permeability stratigraphically above the injection zone and the primary sealing formation. The Inyan Kara represents the most likely candidate to act as an overlying pressure dissipation zone. Monitoring distributed temperature sensor data for the Inyan Kara Formation using the downhole fiber-optic cable provides an additional opportunity for mitigation and remediation (Section 5.0). In the unlikely event of out-of-zone migration through the primary and secondary sealing formations, $CO_2$ would become trapped in the Inyan Kara Formation. The depth to the Inyan Kara Formation at the Archie Erickson 2 well location is 4423 ft below KB elevation, and the interval itself is 335 ft thick.

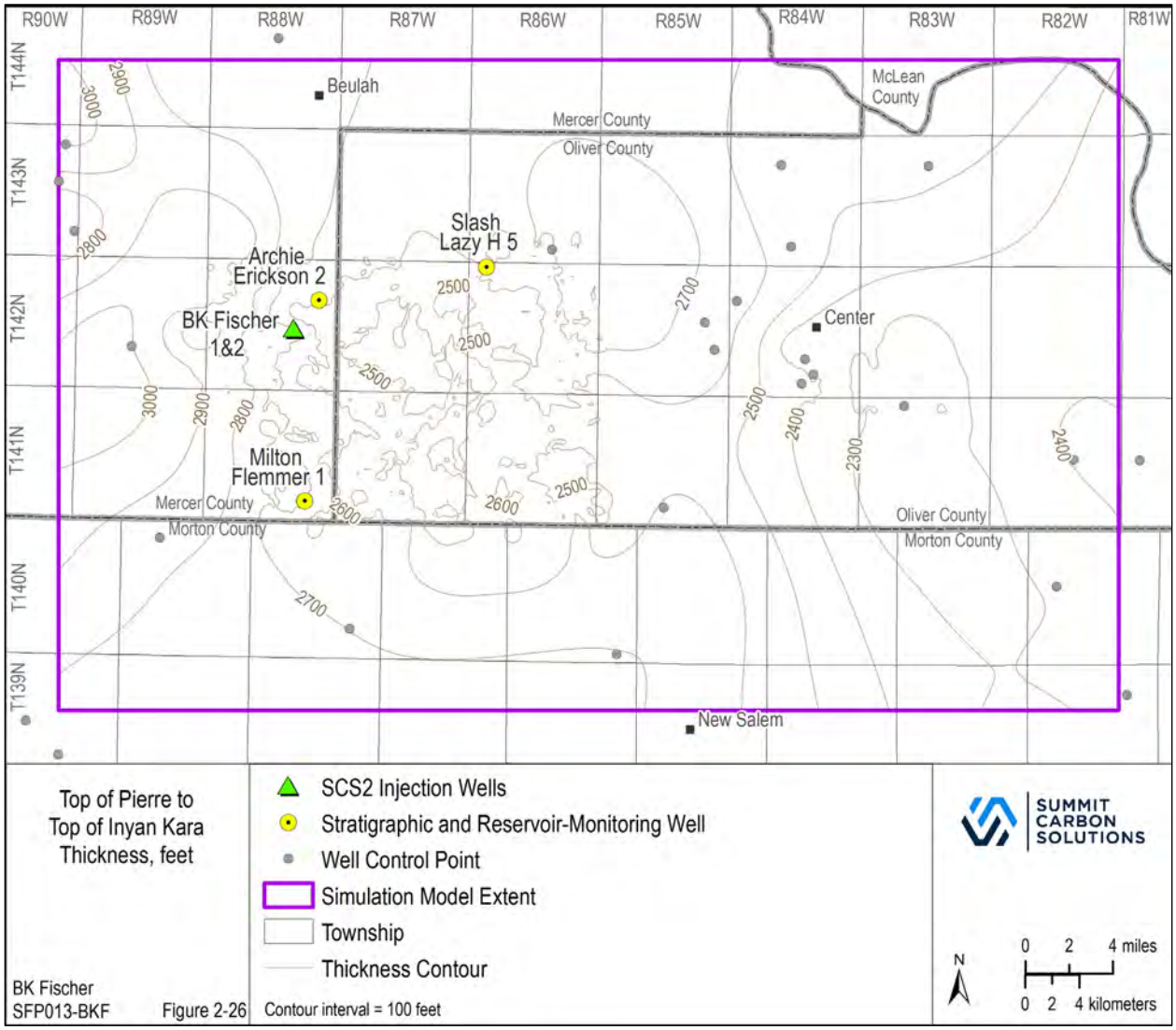



Figure 2-26. Isopach map of the interval between the top of the Inyan Kara Formation and the top of the Pierre Formation. This interval represents the tertiary confinement zone. A convergent interpolation gridding algorithm was used with well formation tops, 3D seismic, and 2D seismic in creation of this map.

### *2.4.3 Lower Confining Zone*

The lower confining zone of the storage complex is the Amsden Formation, which comprises primarily dolostone and anhydrite. The Amsden Formation does include some thin sandstone intervals on the order of 1 to 8 in. thick. The sandstone intervals in the Amsden Formation are isolated from the sandstones of the Broom Creek Formation by thick impermeable dolostone and anhydrite intervals. The top of the Amsden Formation was placed at the top of an argillaceous dolostone, which has relatively high GR character that can be correlated across the simulation model area (Figure 2-11). The Amsden Formation is 6148 ft below KB elevation and 265 ft thick at BK Fischer as determined at Archie Erickson 2 (Figures 2-27 and 2-28).

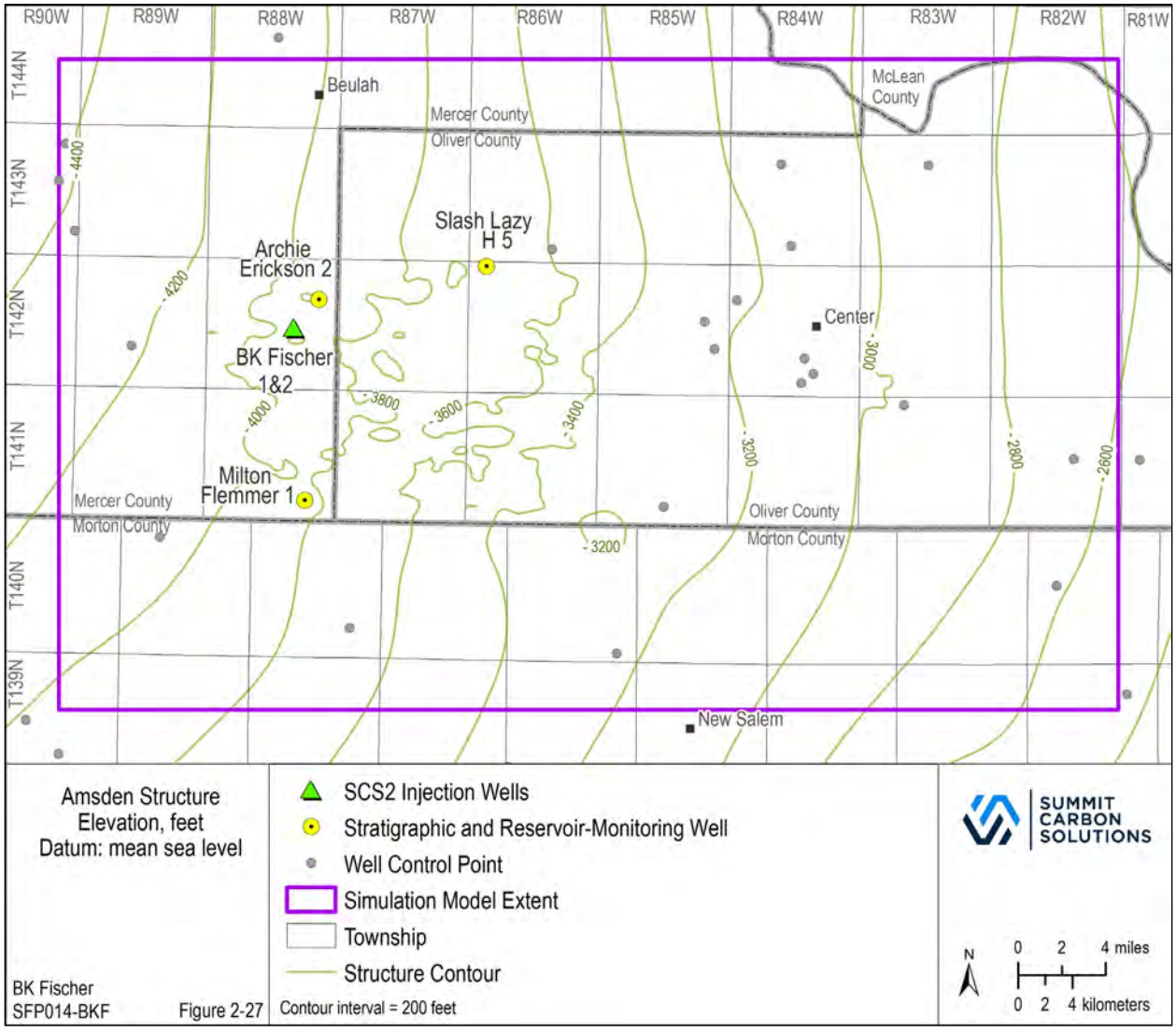



Figure 2-27. Structure map of the Amsden Formation across the simulation model area in feet below mean sea level. A convergent interpolation gridding algorithm was used with well formation tops, 3D seismic, and 2D seismic in creation of this map.

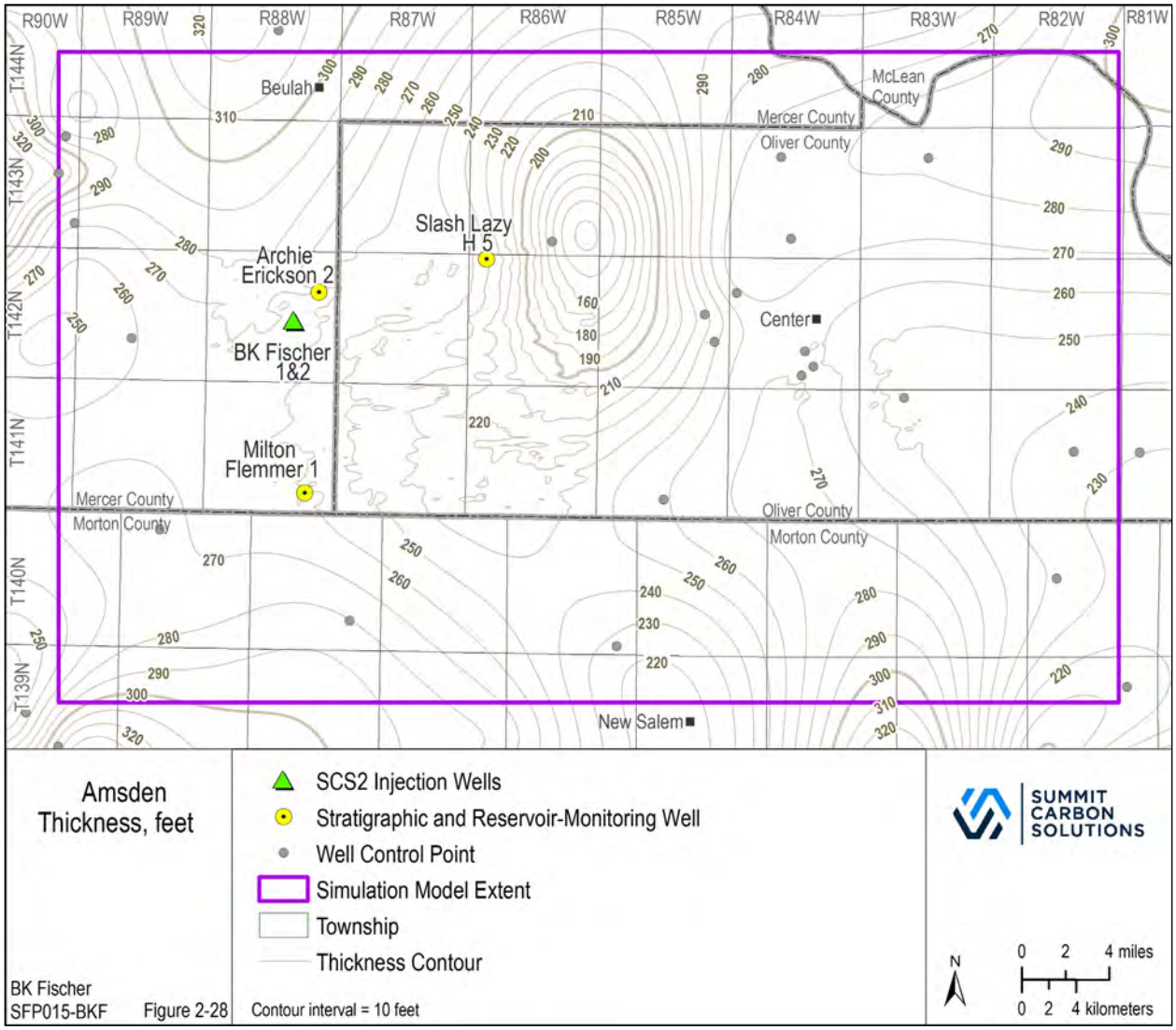



Figure 2-28. Isopach map of the Amsden Formation across the simulation model area. The convergent interpolation gridding algorithm was used with well formation tops, 3D seismic, and 2D seismic in creation of this map.

The contact between the underlying Amsden Formation and the overlying Broom Creek Formation is evident on wireline logs as there is a lithological change from the dolostone and anhydrite beds of the Amsden Formation to the porous sandstones of the Broom Creek Formation (Figure 2-11). The top of the Amsden in Archie Erickson 2 is picked at the base of a 14-ft anhydrite bed in the Broom Creek Formation which can be correlated across much of the study area. This lithologic change is also recognized in the core from Archie Erickson 2. The lithology of the cored section of the Amsden Formation from Archie Erickson 2 is predominantly dolostone and anhydrite with lesser predominant lithologies of sandstone.

*2.4.3.1 Mineralogy of the Lower Confining Zone*

Powder XRD for average bulk composition analysis of nine finely ground, homogenized samples from the Amsden Formation shows carbonate as the most dominant mineral (~37%, mostly dolomite) followed by sulfates (~26%, mostly anhydrite), and quartz (~25%). Clay minerals (illite) and feldspar (mostly K-feldspar) accounted for about 5% each with minor amounts of halide (~0.1%), oxide/hydroxide (~0.2%), and sulfide (~0.1%) **(**Figure 2-29a**)**. The major constituents of the Amsden Formation obtained by XRD are also shown in Table 2-8b. These data align with the average elemental composition obtained by XRF which shows silica (Si) as the dominant element followed by calcium (Ca), sulfur (S), magnesium (Mg), aluminum (Al), potassium (K), and other minor elements (Figure 2-29a).

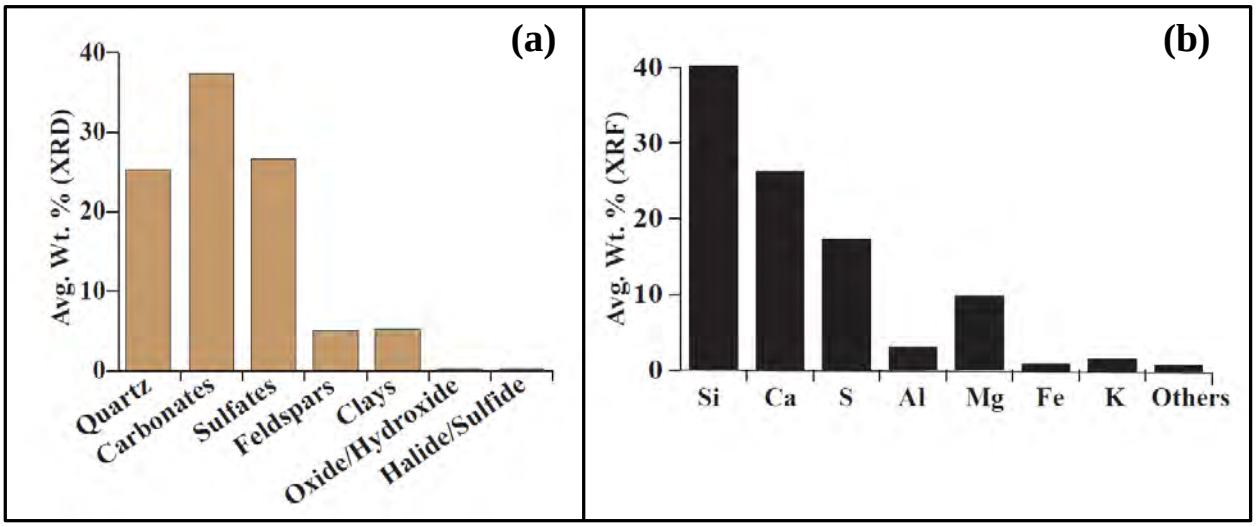



Figure 2-29a. Bar charts showing a) average mineralogy (wt%) and b) average elemental composition (wt%) of the Amsden Formation at the Archie Erickson 2 well. Elemental data by XRF were determined as oxides of the respective elements.

XRF analysis of the Amsden Formation (Figure 2-29b) shows that the contact between the Amsden and Broom Creek Formations is dominated by CaO, MgO, and $SiO_2$ indicating the dominance of dolomite and sandstone. As the formation gets deeper, the chemistry changes to more anhydrite-rich, as shown by the high percentage of CaO (~41%) and $SO_3$ (~56%). The Amsden Formation contains clay as high as 16% with an average of ~5% with illite being the dominant clay type.

Similar to the Opeche/Spearfish Formation, the higher content of anhydrite (up to 65% with an average of ~26%) and clay minerals (up to 16% with an average of ~5%) makes the Amsden Formation less porous and more impermeable compared to the target Broom Creek Formation. Thin-section and SEM-EDS micrographs of the most porous sample at the core depth of 6188.1 ft – KB elevation of 6184.5 ft show moderately sorted, fine- to medium-grained, quartz and feldspar grains with intergranular pore spaces filled by dolomite and anhydrite (Figures 2-30a and c). Porosity is mostly intergranular, long, and sutured (Figure 2-30c).

**Table 2-8b. XRD Analysis of the Amsden Formation at Archie Erickson 2. Only major constituents are shown.**

| Formation | Core Depth, ft, MD | Log Depth ft, MD | Feldspar, wt% | Quartz, wt% | Anhydrite, wt% | Dolomite, wt% | Clay, wt% | Others, wt% | Illite/Total Clay,* wt% |
|---|---|---|---|---|---|---|---|---|---|
| Amsden | 6152.7 | 6149.1 | 7.0 | 8.9 | 0.0 | 79.3 | 4.5 | 0.3 | 100.0 |
| Amsden | 6157.6 | 6154.0 | 4.2 | 8.8 | 0.0 | 76.8 | 8.2 | 2.0 | 100.0 |
| Amsden | 6161.5 | 6157.9 | 7.6 | 13.9 | 0.0 | 66.7 | 8.5 | 3.3 | 100.0 |
| Amsden | 6168 | 6164.4 | 17.1 | 23.5 | 0.0 | 41.7 | 16.2 | 1.5 | 100.0 |
| Amsden | 6172.8 | 6169.2 | 0.0 | 32.0 | 65.5 | 2.5 | 0.0 | 0.0 | NA** |
| Amsden | 6180 | 6176.4 | 9.5 | 15.6 | 0.9 | 58.1 | 8.1 | 7.8 | 100.0 |
| Amsden | 6188.1 | 6184.5 | 0.0 | 67.2 | 26.2 | 3.3 | 0.0 | 3.3 | NA |
| Amsden | 6193.5 | 6189.9 | 0.0 | 56.7 | 39.0 | 0.9 | 1.5 | 1.9 | 100.0 |
| Amsden | 6198.2 | 6194.6 | 0.0 | 0.6 | 99.0 | 0.0 | 0.0 | 0.4 | NA |

* Illite component of clay.
** NA; no illite component was detected by XRD.

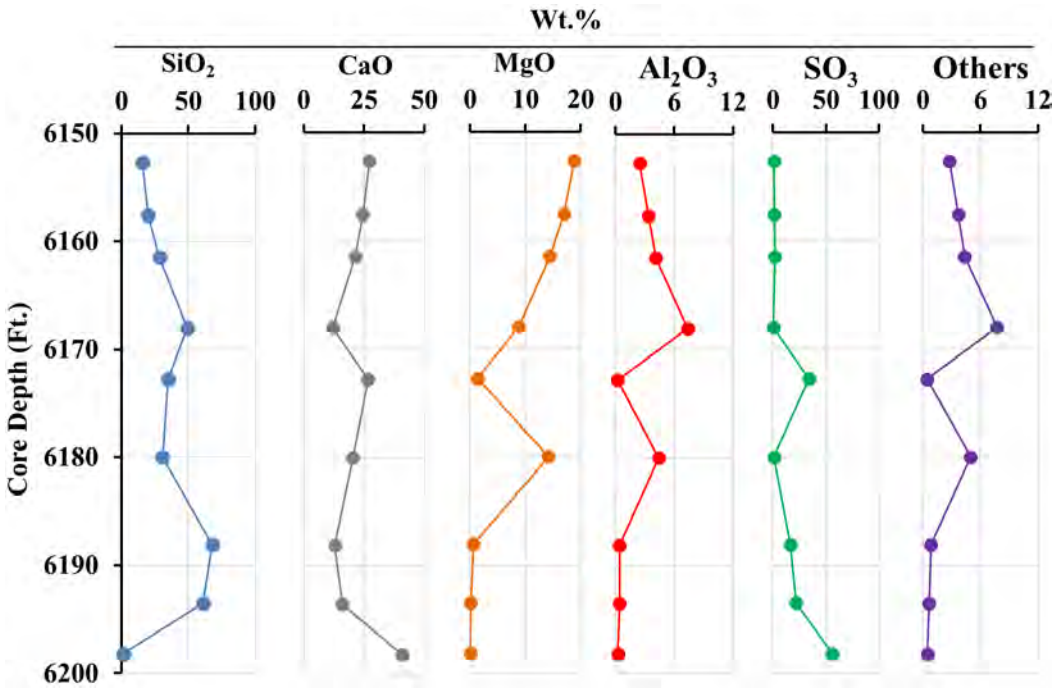



Figure 2-29b. Elemental composition by XRF as a function of depth in the Amsden Formation at Archie Erickson 2.

The least porous sample located at the bottom of the section at the core depth of 6172.8 ft – KB elevation of 6169.2 ft predominantly consists of anhydrite (~99%) with microfractures (Figures 2-30b and d). Figure 2-31 shows the changes in the mineralogy of the Amsden Formation at the Archie Erickson 2 well as a function of depth next to the core sample porosity and permeability data. Although a total porosity as high as 9.73% with a permeability of 30.2 mD was observed at the core depth of 6188.1 ft - KB elevation of 6184.5 ft (Figure 2-31**)**, it must be noted that this layer is isolated and confined between ultralow permeable layers (a clay-rich quartz dolomite layer above and an anhydrite-rich layer below).

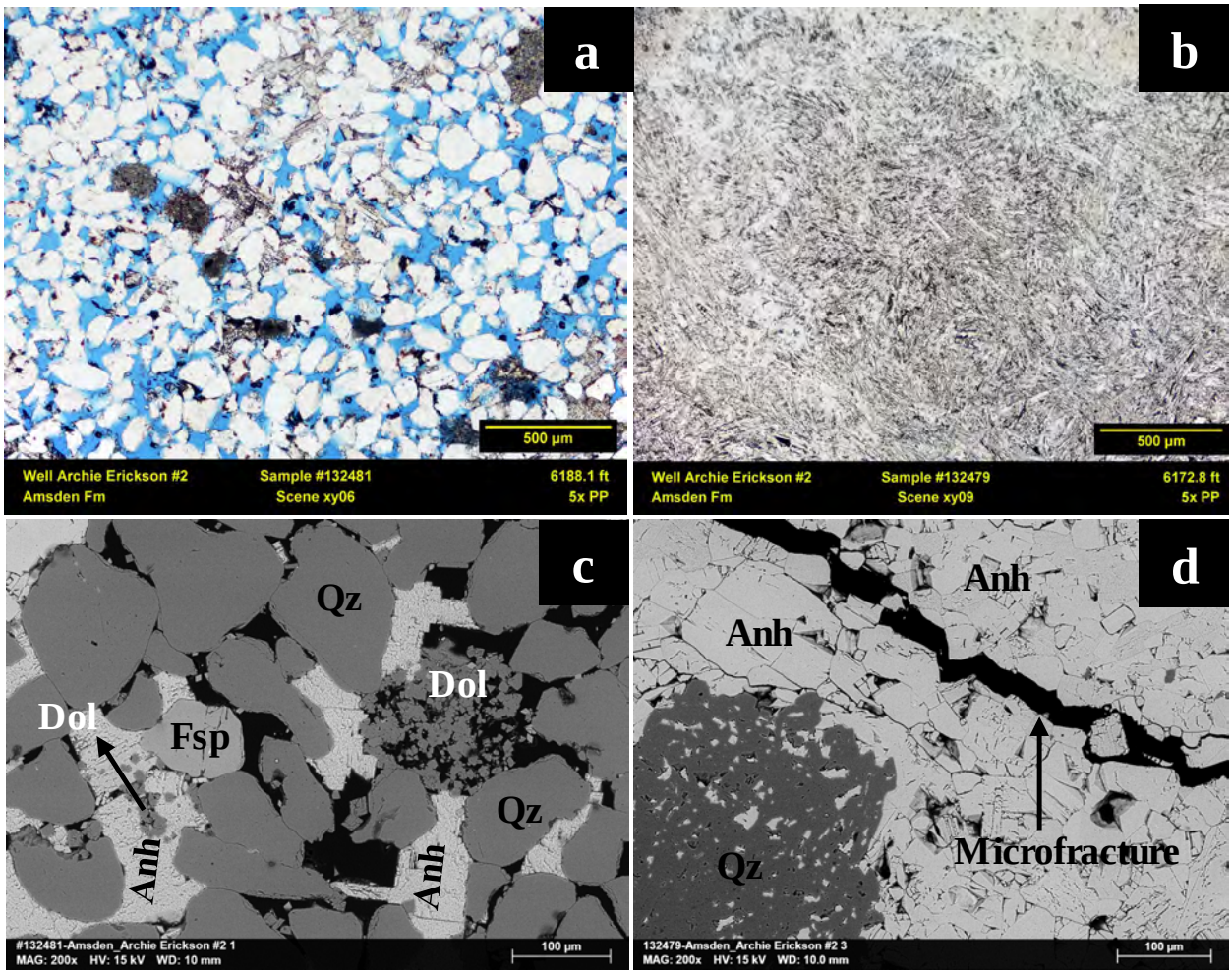



Figure 2-30. Thin section (a, b) and SEM (c, d) micrographs of the most porous sample (a, c) and the least porous (b, d) samples of the Amsden Formation at the Archie Erickson 2 well. The most porous sample of the Amsden Formation has a porosity and permeability of ~9.73% and 30.2 mD, respectively, which is notably reduced to 0.34% and 0.00291 mD, respectively, in the least porous sample. The blue color in thin section a represents porosity.

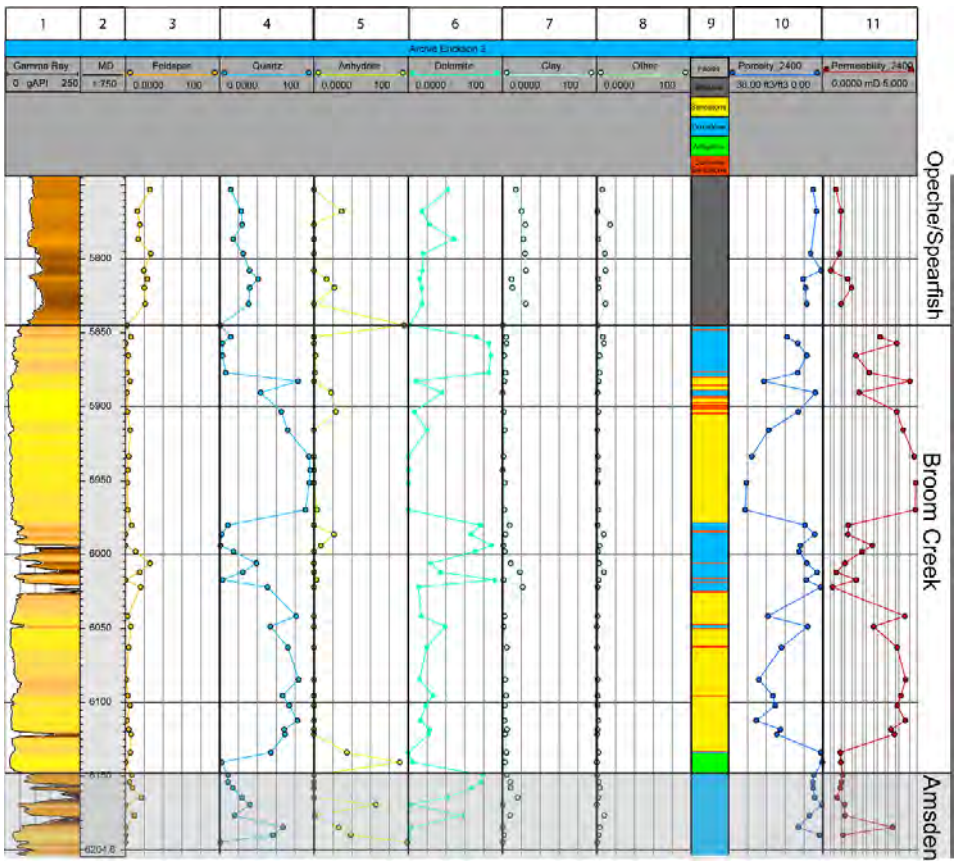



Figure 2-31. Change in the mineralogy of the lower confining Amsden Formation (highlighted in gray) at Archie Erickson 2 as a function of depth based on XRD in comparison to GR, facies, core sample total porosity (%), and permeability (mD). Data gaps in the porosity and permeability plots are due to the inability to obtain testable samples as solid plugs (e. g., samples too soft/brittle). Tracks from left to right are 1) GR (black); 2) MD; 3) total Feldspar (orange), 4) Quartz (blue); 5) Anhydrite (yellow green); 6) Dolomite (green); 7) total Clay (light blue) 8) Other (light green); 9) Facies; 10) core porosity (2400 psi) (dark blue); 11) core permeability (2400 psi) (red).

### *2.4.3.2 Geochemical Interaction*

Geochemical simulation using the PHREEQC geochemical software was performed to calculate the potential effects of an injected multicomponent $CO_2$ stream on the Amsden Formation. This simulation was run for 45 years to represent 20 years of injection plus 25 years of postinjection.

Modeling results show geochemical processes at work. The pH at the interface between the injection zone and lower confining zone has the greatest change in value, declining to a level of 5.7 after 7 years of injection, further declining to 4.8 by the end of the modeled injection period, and hits 4.5 by the end of simulation period. Progressively lower or slower pH changes occur for each cell that is more distant from the $CO_2$ interface. Albite and K-feldspar start to dissolve from the beginning of the simulation period, while quartz and illite start to precipitate. Albite and K-feldspar are the primary minerals that dissolve, and their initial fractions have almost completely dissolved. No dissolution is observed for illite and quartz. The minerals that experience dissolution

in the model are almost completely replaced by the precipitation of other minerals. The overall net porosity changes from dissolution and precipitation are minimal, less than 2% change during the life of the simulation. These results suggest that geochemical change from exposure to $CO_2$ is minor and therefore the ability of the Amsden Formation to maintain its sealing integrity will not be compromised by geochemical processes. A full description of the geochemical results for the upper confining zone can be found in Appendix C.

### *2.4.4 Geomechanical Information of Confining Zone*

#### *2.4.4.1 Fracture Analysis*

Fractures within the overlying confining zone (the Opeche/Spearfish Formation) and the underlying confining zone (Amsden Formation) were assessed during the description of the Archie Erickson 2 core. Observable fractures were categorized by attributes including morphology, orientation, aperture, and origin. Secondly, natural fractures and in situ stress were assessed through the interpretation of the image log acquired during the drilling of Archie Erickson 2 well.

#### *2.4.4.2 Core-Fracture Analysis*

The fractures observed in the Opeche/Spearfish Formation were tectonic, vertical to subvertical, mainly closed, and cemented with anhydrite where the aperture ranges between 0.1 to 1.5 inches. The Amsden Formation was determined to be a nonfractured interval. A few discontinuous closed fractures were noted. The presence of stylolites was also noted in the dolomitic intervals of the Amsden Formation.

#### *2.4.4.3 Borehole Image Fracture Analysis*

Natural fractures and in situ stresses were assessed through the interpretation of borehole image log, dipole shear sonic slowness (DTS), and DTC logs acquired during the drilling of the Archie Erickson 2 well. Borehole image logs provide a 360-degree image of the formation of interest and are oriented to provide an understanding of the general orientation of the observed features.

Fractures within Opeche/Spearfish Formation are primarily resistive fractures, mainly oriented NNE-SSW with the presence of other sets oriented ENE-WSW (Figure 2-32). They were commonly filled with anhydrite. A few conductive continuous and non-continuous fractures are highlighted. They are oriented N-S and NE-SW, respectively and they are generally filled with clay. One conductive partially resistive fracture is underlined, oriented NE-SW, and filled with quartz and clay. The fractures vary in orientation and exhibit horizontal, oblique, and vertical trends. The aperture varies from closed to millimeter-scale (Figure 2-33a, Figure 2-33b, and Figure 2-33c).

In addition, one minor fault was present in the Opeche/Spearfish Formation at the depth of 5812 ft MD, and it is located around 33 feet above the top of Broom Creek Formation. Oriented ENE-WSW and dipping to the south with a dip angle equal to 68 degrees. This minor fault shows normal faulting with an offset of 0.09 ft (Figure 2-34). The analysis of the different attributes such as the fault's depth, length, strike, dip, offset, and aperture indicate that the minor fault appears isolated and does not interact with any fracture network, and will not act as a conduit for fluid migration. No fractures were observed in the transition between the Opeche Formation and Broom Creek Formation.

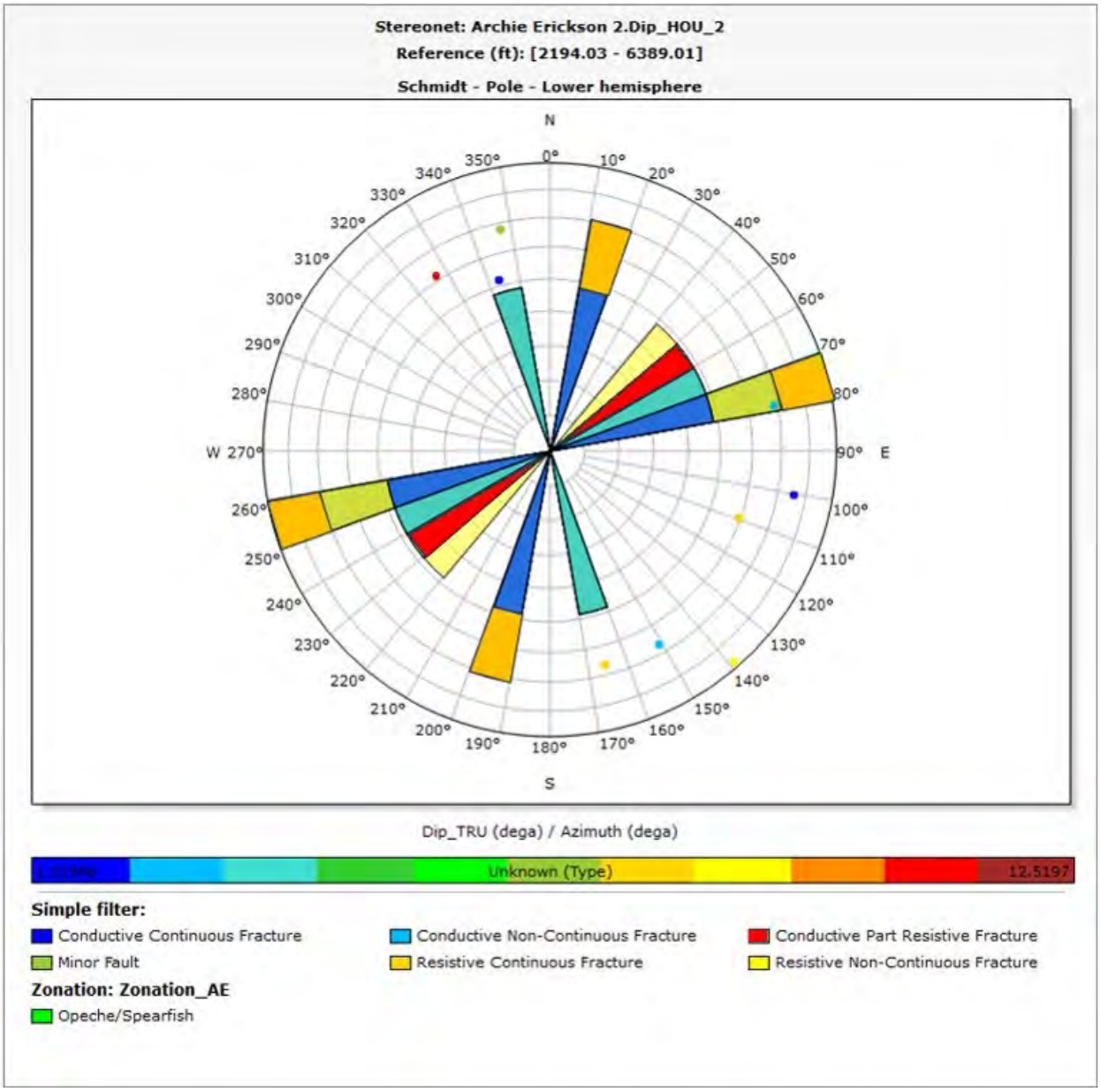



Figure 2-32. Strike orientation per type of fracture that characterizes the Opeche/Spearfish Formation: conductive continuous fractures (blue), conductive noncontinuous fractures (teal), conductive partially resistive fractures (dark green), minor faults (lime green), resistive non-continuous fractures (yellow), resistive continuous fractures (orange). Colored dots represent the dip value for corresponding type of fracture and the dip azimuth of the fracture.

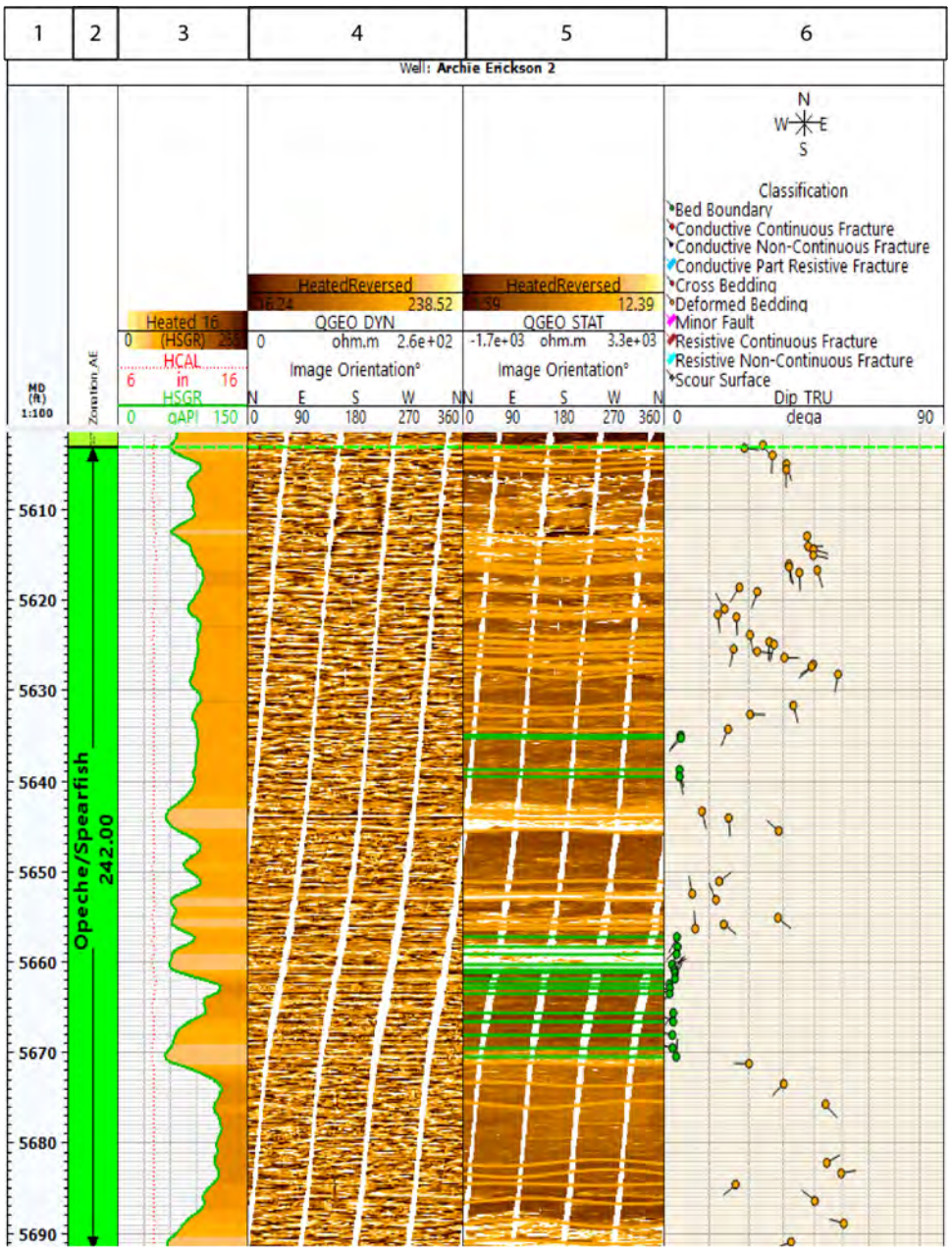



Figure 2-33a. Sedimentary and tectonic features in Opeche/Spearfish Formation observed on the borehole image log. The tracks from left to right are 1) MD; 2) formation; 3) HSGR, HCal; 4) borehole dynamic image log; 5) borehole static image log; 6) tectonic and sedimentary tadpole orientation in the interval between 5,602 and 5,691 ft MD.

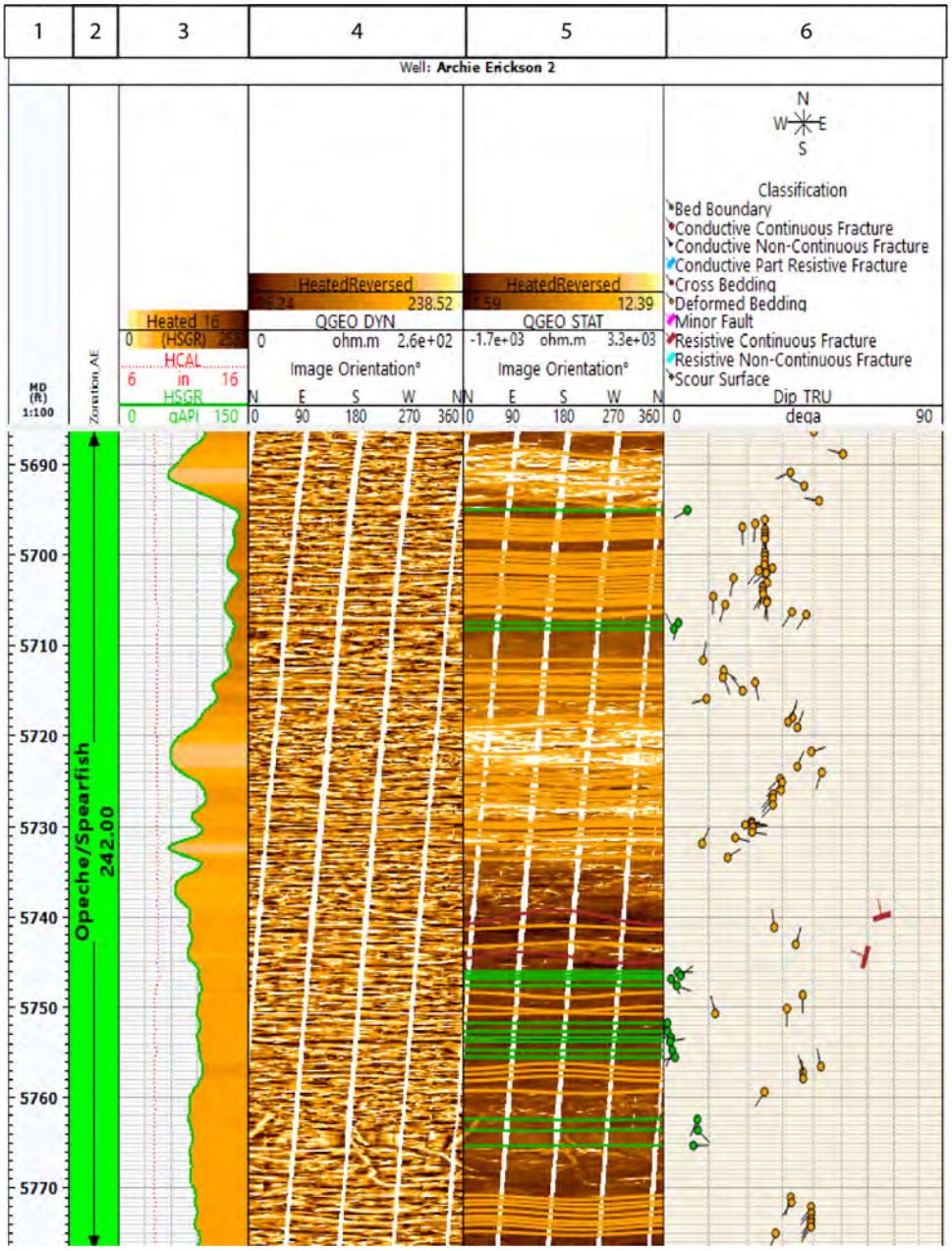



Figure 2-33b. Sedimentary and tectonic features in Opeche/Spearfish Formation observed on the borehole image log. The tracks from left to right are 1) MD; 2) formation; 3) HSGR, HCal; 4) borehole dynamic image log; 5) borehole static image log; 6) tectonic and sedimentary tadpole orientation in the interval between 5,687 and 5,776 ft MD

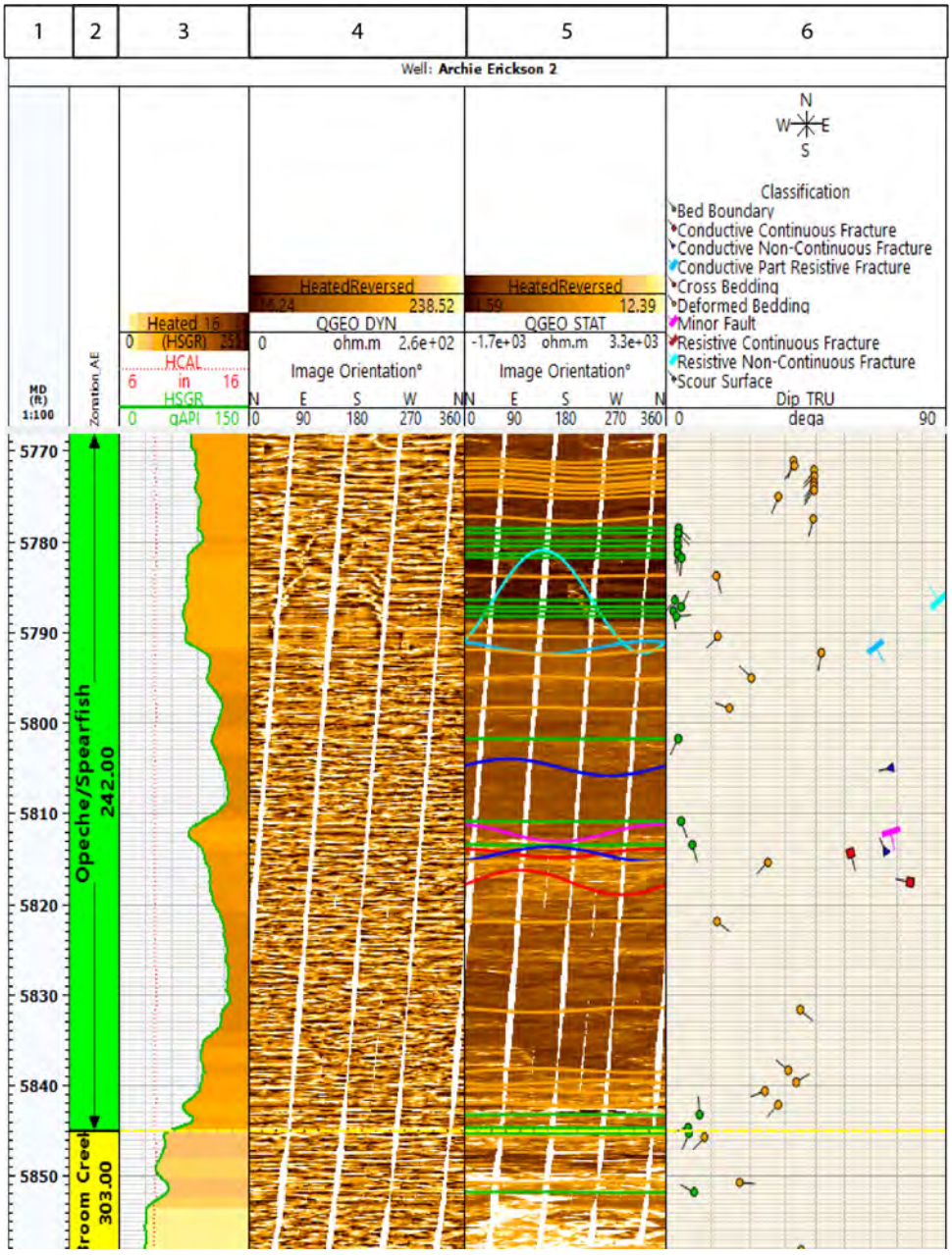



Figure 2-33c. Sedimentary and tectonic features in Opeche/Spearfish Formation observed on the borehole image log. The tracks from left to right are 1) MD; 2) formation; 3) HSGR, HCal; 4) borehole dynamic image log; 5) borehole static image log; 6) tectonic and sedimentary tadpole orientation in the interval between 5,768 and 5,858 ft MD.

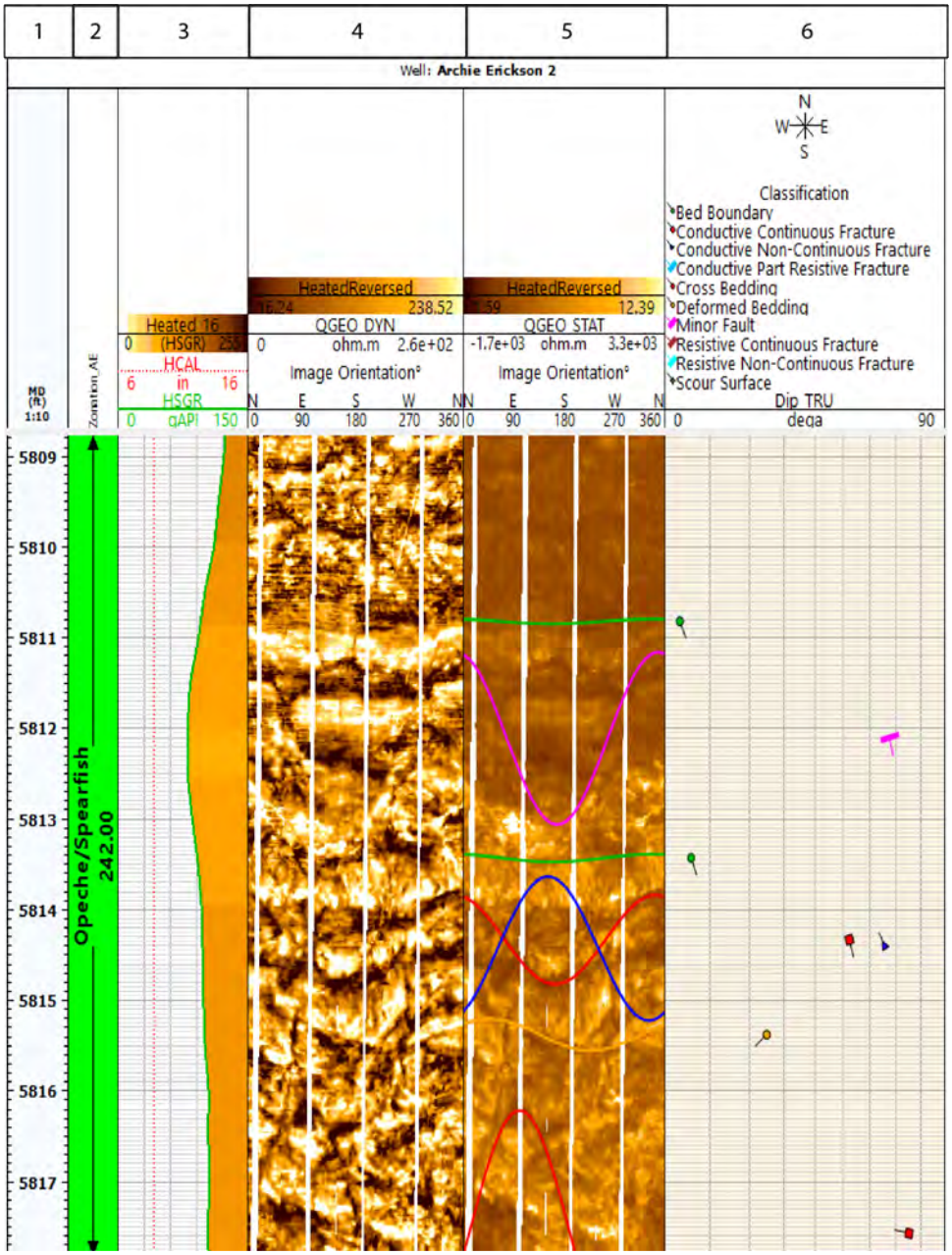



Figure 2-34. Minor fault and other sedimentary and tectonic features in Opeche/Spearfish Formation observed on the borehole image log. The tracks from left to right are 1) MD; 2) formation; 3) HSGR, HCal; 4) borehole dynamic image log; 5) borehole static image log; 6) tectonic and sedimentary tadpole orientation in the interval between 5,808.8 and 5,817.8 ft MD.

The Amsden Formation is considered to be a nonfractured interval; however, two (02) resistive non-continuous fractures and two (02) conductive non-continuous fractures are highlighted with the presence of horizontal compaction features (stylolites). The fractures are oriented NW-SE, and WNW-ESE (Figure 2-35) and filled with quartz. The fractures vary in orientation and exhibit oblique and vertical trends. The aperture varies from closed to millimeter-scale (Figures 2-36, Figure 2-37a, Figure 2-37b, and Figure 2-37c). No microfaults were found in the Amsden interval. No fractures were observed in the transition between the Broom Creek Formation and Amsden Formation.

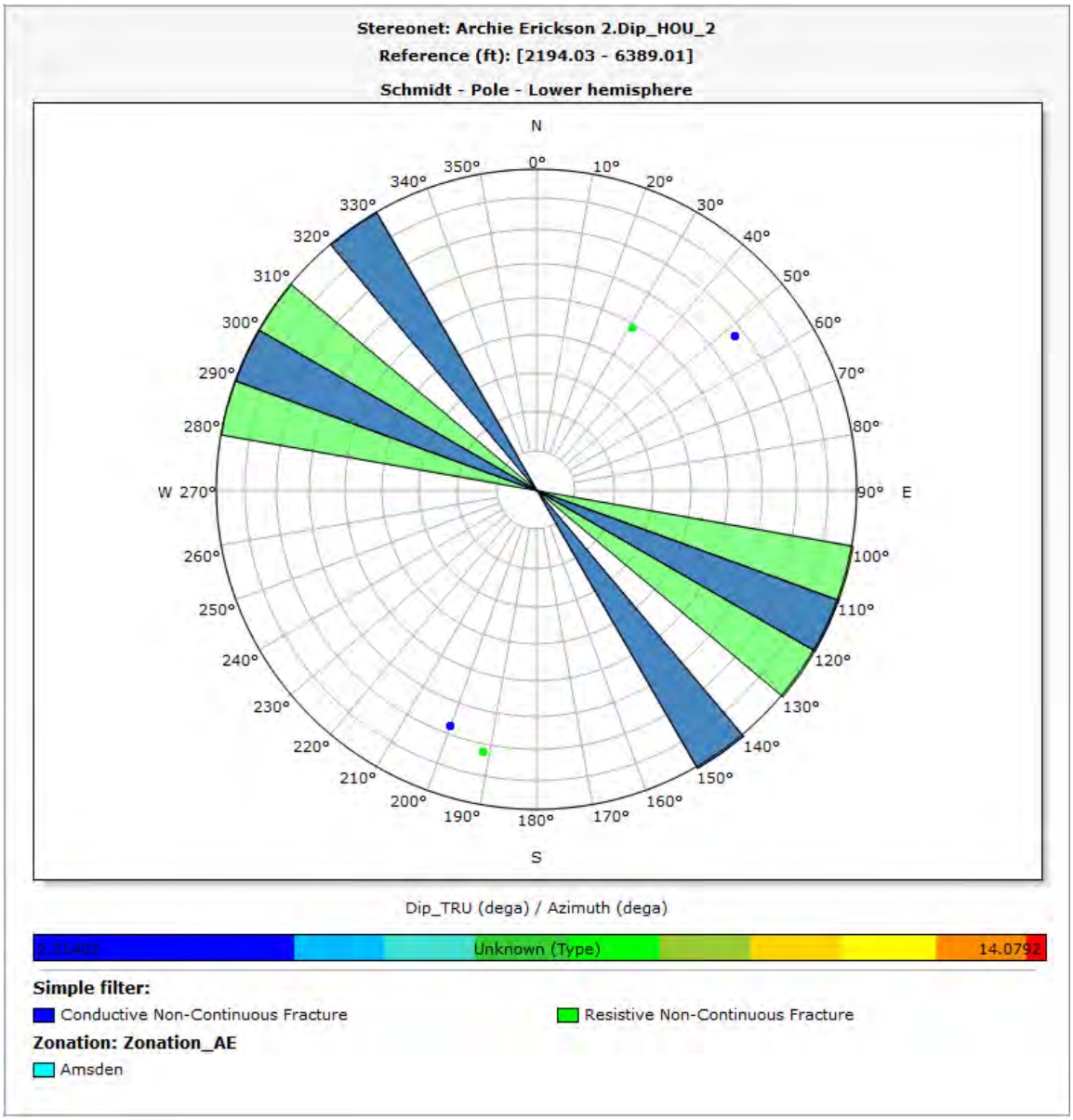



Figure 2-35. Strike orientation per type of fracture that characterizes the Amsden Formation: conductive non-continuous fractures (teal) and resistive non-continuous fractures (green). Colored dots represent the dip value for the corresponding type of fracture and the dip azimuth of the fracture.

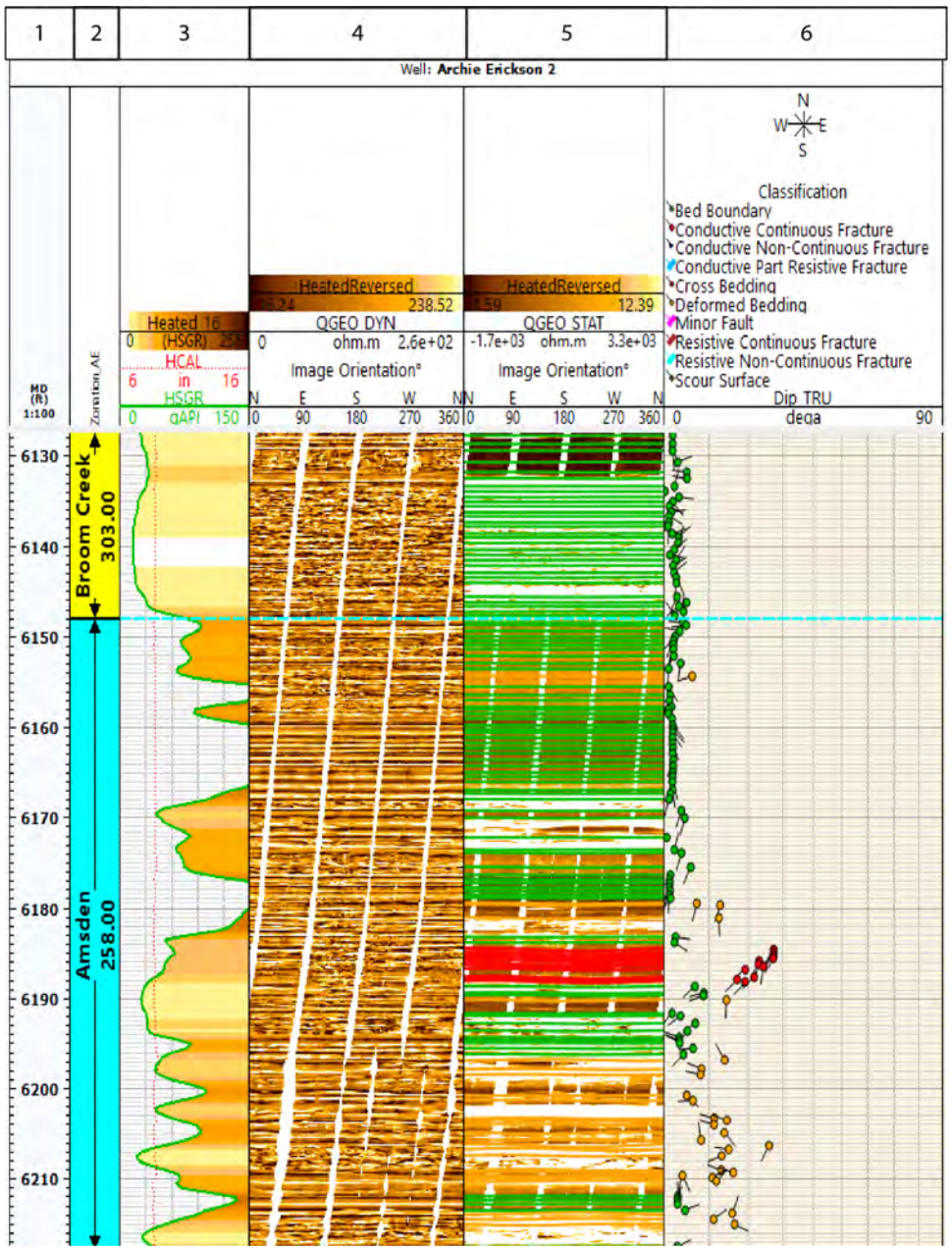



Figure 2-36. Sedimentary and tectonic features in Amsden Formation observed on the borehole image log. The tracks from left to right show 1) MD; 2) formation; 3) HSGR, HCal; 4) borehole dynamic image log; 5) borehole static image log; 6) tectonic and sedimentary tadpole orientation in the interval between 6,128 and 6,217 ft MD.

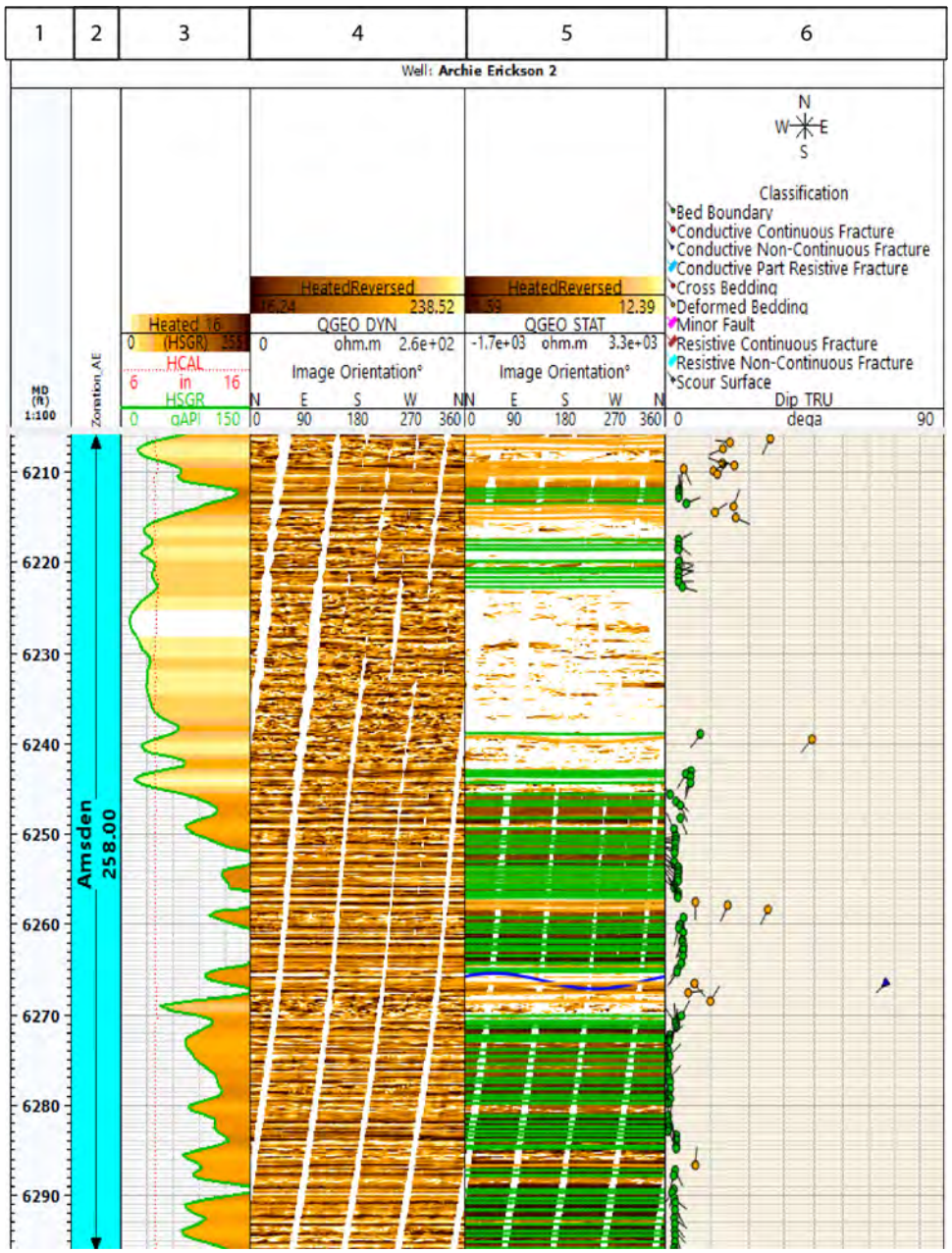



Figure 2-37a. Sedimentary and tectonic features in Amsden Formation observed on the borehole image log. The tracks from left to right show: 1) MD; 2) formation; 3) HSGR, HCal; 4) borehole dynamic image log; 5) borehole static image log; 6) tectonic and sedimentary tadpole orientation in the interval between 6,206 and 6,296 ft MD.

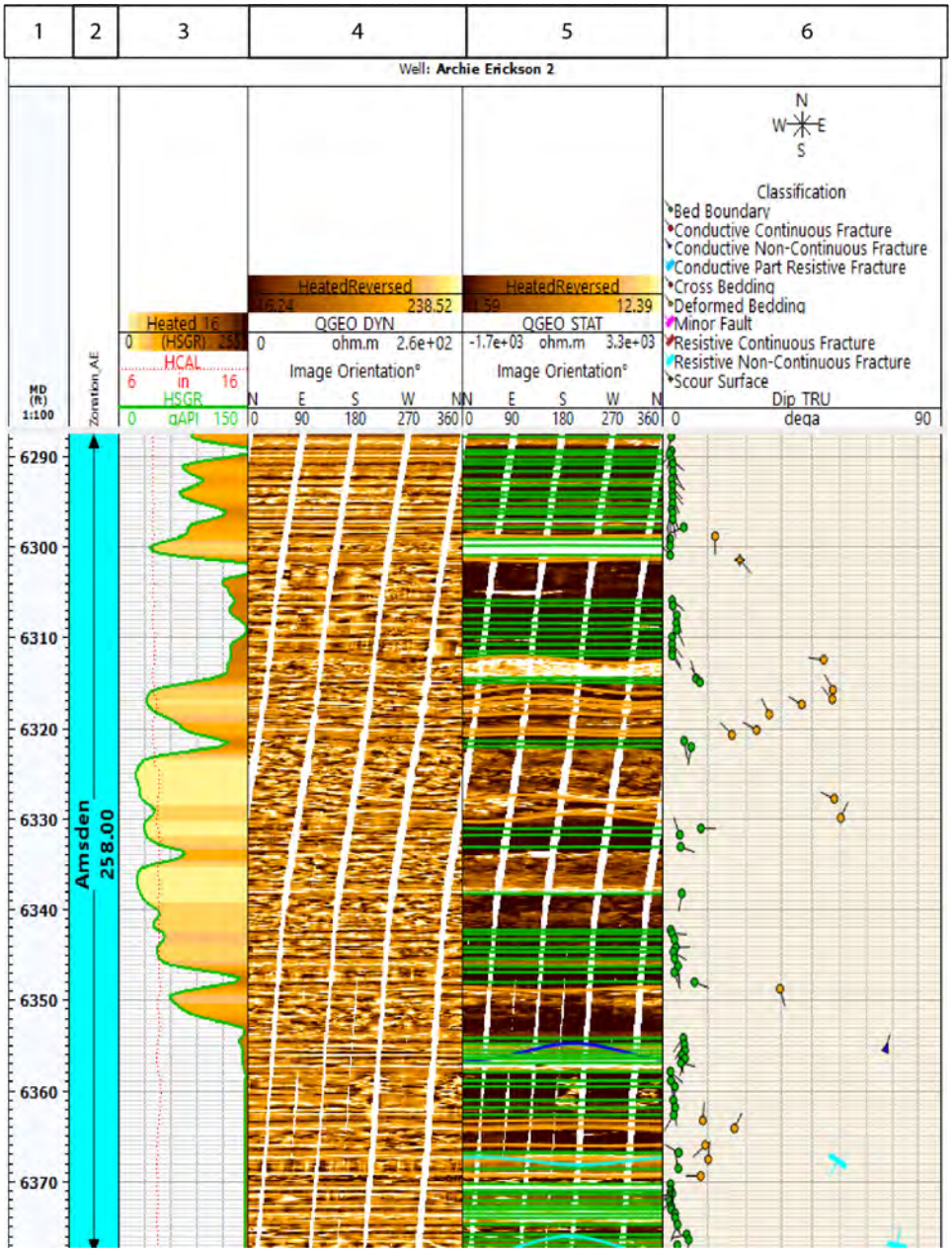



Figure 2-37b. Sedimentary and tectonic features in Amsden Formation observed on the borehole image log. The tracks from left to right show: 1) MD; 2) formation; 3) HSGR, HCal; 4) borehole dynamic image log; 5) borehole static image log; 6) tectonic and sedimentary tadpole orientation in the interval between 6,288 and 6,377 ft MD.

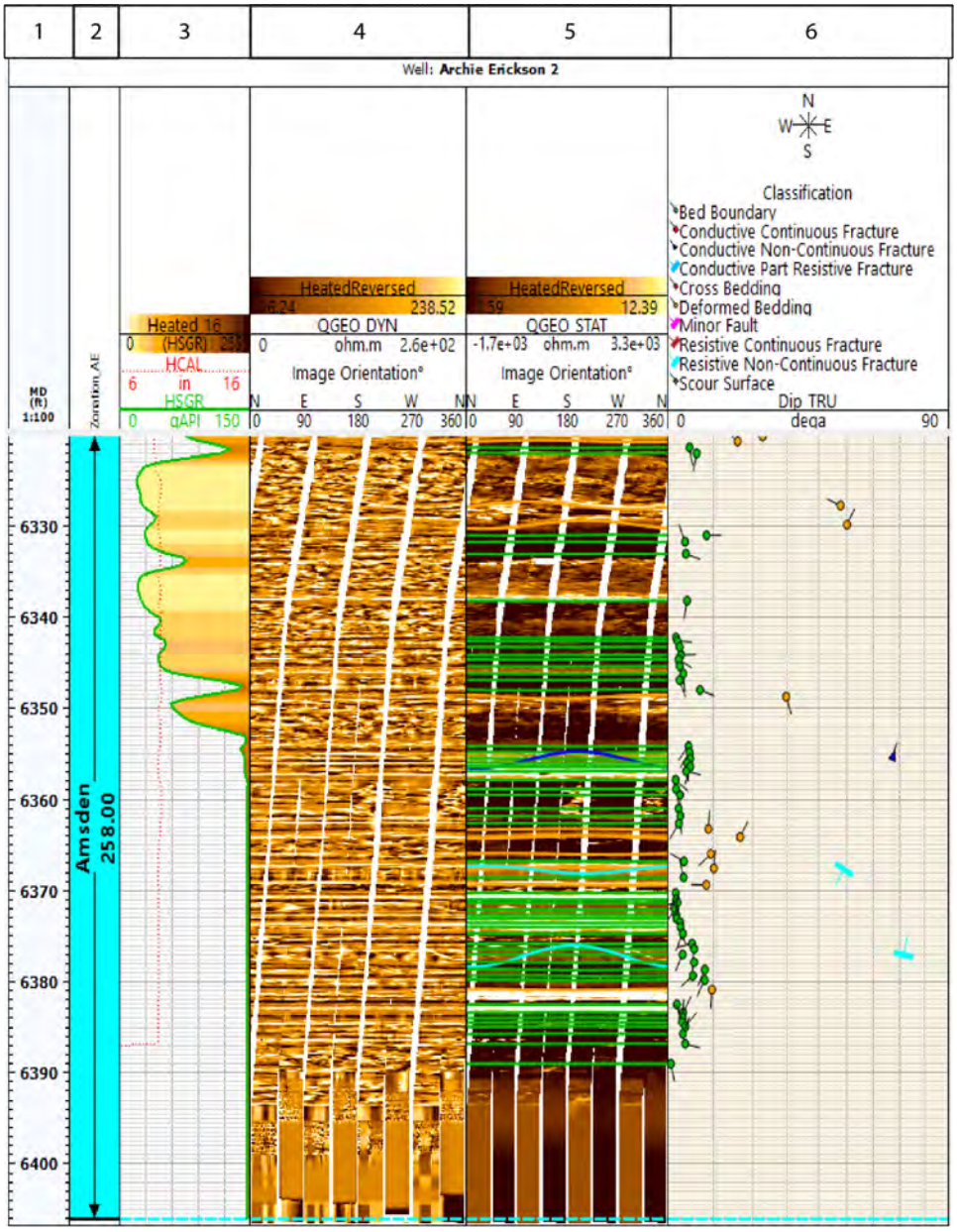



Figure 2-37c. Sedimentary and tectonic features in Amsden Formation observed on the borehole image log. The tracks from left to right show: 1) MD; 2) formation; 3) HSGR, HCal; 4) borehole dynamic image log; 5) borehole static image log; 6) tectonic and sedimentary tadpole orientation in the interval between 6,320 and 6,407 ft, MD.

Drilling-induced fractures (DIF) were identified only in the Mowry Formation and oriented NE–SW (Figure 2-38). The tensile fractures might indicate that the maximum horizontal stress (SHmax) has an orientation of N045°.

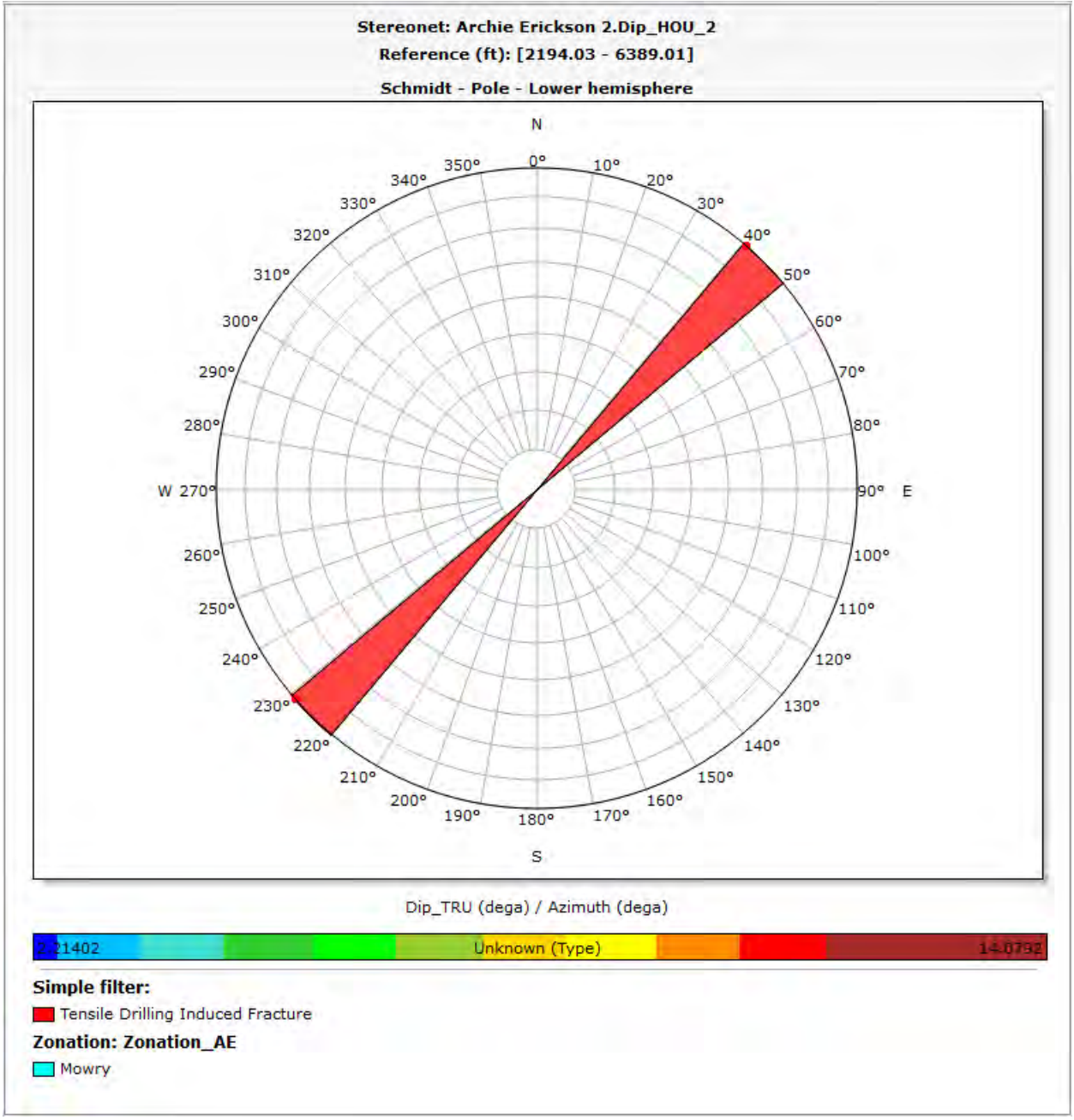



Figure 2-38. Orientation of the tensile drilling-induced fractures in Archie Erickson 2 observed in Mowry Formation showing maximum horizontal stress (SHmax) direction about N045°.

*2.4.4.4 Stress, Ductility and Rock Strength*

The dynamic elastic properties (dynamic Young's modulus and Poisson's ratio) for the Opeche/Spearfish, Broom Creek, and Amsden Formations were calculated by using DTC, DTS and density log collected from Archie Erickson 2. These dynamic elastic properties were converted to static elastic properties with calibrations of geomechanical laboratory core measurements.

A 1D MEM in the Broom Creek section was built for Archie Erickson 2 using the available wireline data such as GR logs, caliper logs, density logs (RHOB), dipole sonic logs (DTC, DTS), and image logs. The 1D MEM consists of pore pressure, the vertical in situ stress (Sv, overburden), minimum and maximum horizontal in situ stresses (Shmin, SHmax), static and dynamic Young's moduli (E), static and dynamic Poisson's ratio (ν), Bulk modulus (K), shear modulus (G), unconfined compressive strength (UCS), tensile strength (To), and friction angle (FA or FANG) (Tables 2-9 and 2-10).

**Table 2-9. Ranges and Averages of the Elastic Properties Estimated from 1D MEM in Opeche/Spearfish, Broom Creek, and Amsden Formations: Static Young's Modulus (E_Stat), Static Poisson's Ratio (ν_Stat), Static Bulk Modulus (K), Static Shear Modulus (G), Unconfined Compressive Strength (UCS), Dynamic Young's Modulus (E_Dyn), and Dynamic Poisson's ratio (ν_Dyn)**

| Formation | Stats | E_Stat, Mpsi | ν_ Stat, unitless | K, Mpsi | G, Mpsi | UCS, psi | E_Dyn, Mpsi | ν _Dyn, unitless |
|---|---|---|---|---|---|---|---|---|
| Opeche/Spearfish | Min | 2.33 | 0.22 | 0.80 | 0.36 | 5908.29 | 3.79 | 0.22 |
| | Max | 8.19 | 0.37 | 2.32 | 1.30 | 19475.52 | 8.32 | 0.37 |
| | Average | 4.08 | 0.29 | 1.28 | 0.63 | 8721.05 | 5.32 | 0.29 |
| Broom Creek | Min | 0.46 | 0.14 | 0.27 | 0.10 | 4396.49 | 1.72 | 0.14 |
| | Max | 11.03 | 0.37 | 4.70 | 2.57 | 29293.09 | 12.14 | 0.37 |
| | Average | 2.88 | 0.29 | 1.22 | 0.64 | 11951.18 | 4.76 | 0.29 |
| Amsden | Min | 1.13 | 0.17 | 0.48 | 0.19 | 4021.02 | 2.71 | 0.17 |
| | Max | 11.65 | 0.40 | 4.61 | 2.47 | 20654.50 | 12.05 | 0.40 |
| | Average | 5.98 | 0.28 | 2.12 | 1.11 | 12467.18 | 7.34 | 0.28 |

**Table 2-10. Ranges and Averages of the Vertical Stress (Sv), Pore Pressure, Shmin, and FA Estimated from 1D MEM in the Opeche/Spearfish, Broom Creek, and Amsden Formations**

| Formation | Stats | Sv, Vertical Stress, psi | Pore pressure, psi | Shmin, psi | Fang, FA, degrees |
|---|---|---|---|---|---|
| Opeche/Spearfish | Min | 5626.90 | 2555.40 | 3469.66 | 35.11 |
| | Max | 5824.43 | 2633.47 | 4403.90 | 56.15 |
| | Average | 5725.66 | 2594.34 | 3880.22 | 38.47 |
| Broom Creek | Min | 5824.43 | 2628.11 | 3102.89 | 19.76 |
| | Max | 6136.68 | 2930.65 | 4748.75 | 57.80 |
| | Average | 5981.01 | 2821.96 | 4189.43 | 37.48 |
| Amsden | Min | 6136.68 | 2815.05 | 3522.10 | 39.12 |
| | Max | 6353.15 | 2898.97 | 5270.75 | 57.80 |
| | Average | 6245.51 | 2857.01 | 4254.35 | 43.24 |

Sv is one of the three principal stresses that act upon a rock. It is defined as the stress applied by the overlaying lithostatic column, at the depth (z), and is estimated using the Plumb and others (1991) equation. Sv is calculated using the RHOB log as an input. For the pore pressure, porosity proxy logging data based on a normal compaction trendline concept were used (for hydraulic static pressure, 1.03 g/cm$^3$ = 0.44675 psi/ft = 8.6 ppg). For the Broom Creek Formation, the MDT data taken in sand bodies show pore pressure equivalent to 9.2 ppg equivalent to 0.48 psi/ft, which is slightly overpressured. The pore pressure estimation honored the MDT measurement. Dynamic to static Young's modulus function used a linear conversion where a dynamic Young's modulus log was calculated from the available sonic (DTC, DTS) and density log. For Poisson's ratio, dynamic and static parameters are assumed to be equal. The Biot factor was estimated using the formula Biot's factor =1- (K0 / $K_{mineral}$); where K0 is the bulk modulus of the porous medium and $K_{mineral}$ is the bulk modulus of solid parts of the porous medium. It is a function of mineral volumes and minerals' bulk modulus. For rock properties, Young's modulus, and Poisson's ratio, were estimated from well logs and were calibrated with the triaxial core laboratory measurements (Figure 2-39).

Unconfined compressive strength (UCS) was calculated using empirical correlations between UCS and DTC for shale, sandstone, and dolostone: the Chang (2006) method was used for shale formation, the McNally (1987) method was used for sandstone formation, and Golubev and Rabinovich (1976) was used for dolostone formation. The tensile strength was assumed to be 10% of the calculated UCS. The friction angle (FA or FANG) was estimated using an empirical correlation between the internal angle of friction and DTC: Lal's approach (1999) was used to calculate the FA in the Opeche/Spearfish and Amsden Formations, and Weingarten and Perkins (1995) in Broom Creek Formation. Horizontal stresses (Shmin and SHmax) were estimated using the poroelastic equations (Plumb et al, 2000). The orientations of Shmin and SHmax were estimated with the help of image logs (Figure 2-38). The magnitude of Shmin was calibrated by the closure pressures which were measured with a mini-frac stress test. In addition, the 1D MEM shows that the stress regime observed in the Opeche/Spearfish, Broom Creek, and Amsden Formations is normal (Sv>SHmax>Shmin). The analysis of the pore pressure measured in the Broom Creek Formation attests that it could be considered an overpressured reservoir with a gradient of 0.48 psi/ft.

Triaxial test (static elastic properties), ultrasonic velocity (dynamic elastic properties), destructive test (compressive strength) at reservoir conditions, and pore volume compressibility (PVC) for reservoir samples were conducted on ten core samples acquired from the Opeche/Spearfish, Broom Creek, and Amsden Formations in Archie Erickson 2 well. These values were used to calibrate the static and dynamic Young's modulus and Poisson's ratio generated from well logs (Table 2-11).

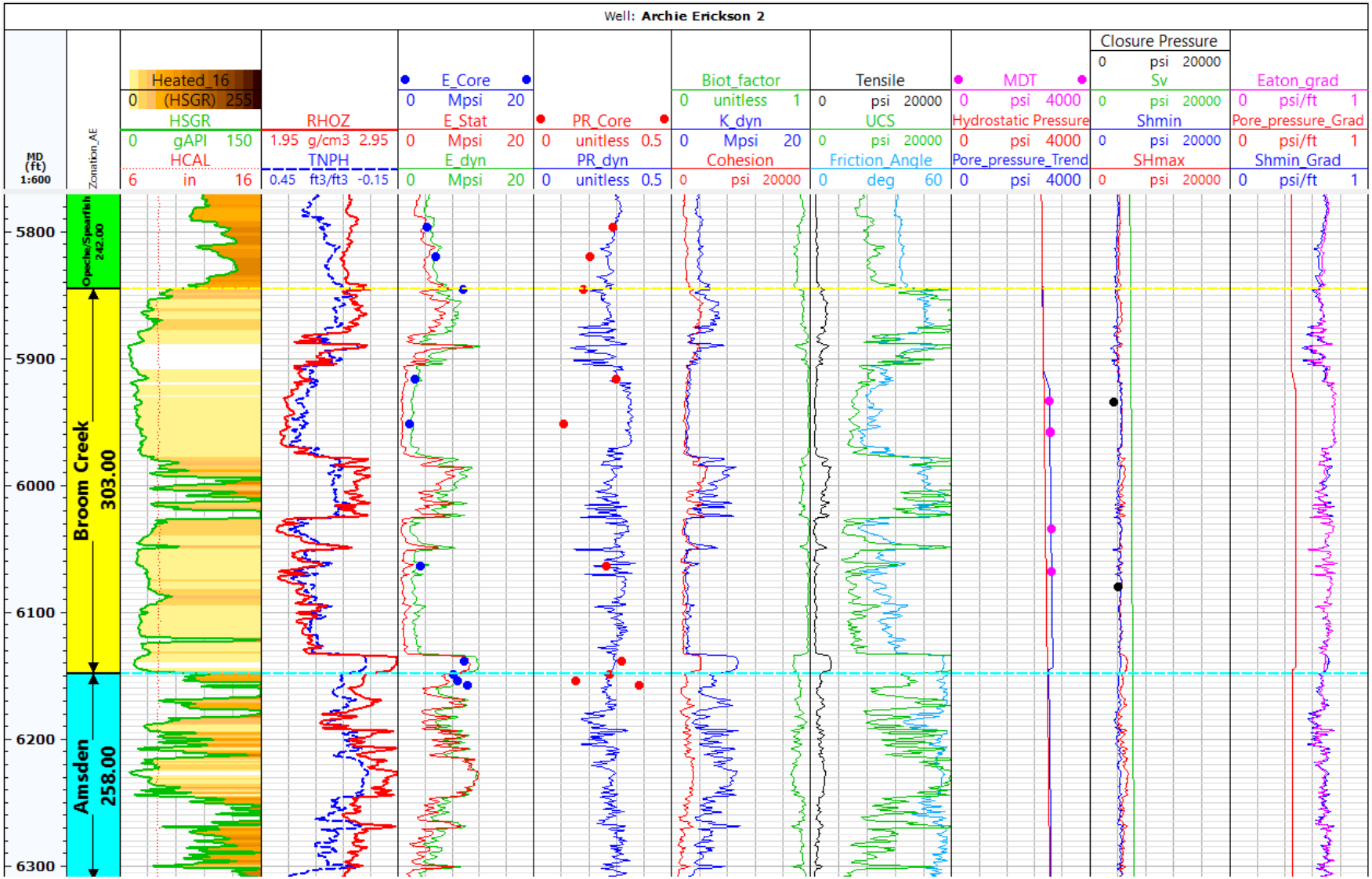



Figure 2-39. Geomechanical parameters in the Opeche/Spearfish, Broom Creek, and Amsden Formations. The tracks from left to right are 1) MD; 2) formation; 3) HSGR, HCal; 4) TNPH (neutron porosity), and RHOZ (bulk density); 5) dynamic Young's modulus (E_dyn), static Young's modulus (E_Stat) calibrated with core measurements (E_Core); 6) dynamic Poisson's ratio (PR_dyn) calibrated with core measurements (PR_Core); 7) cohesion, bulk modulus (K_dyn), and Biot's factor; 8) UCS, tensile strength, and FA; 9) pore pressure, hydropressure calibrated with MDT pressure data; 10) Sv, SHmax, and Shmin calibrated with the MDT stress test; 11) pore pressure, Shmin, and Eaton fracture gradients.

BK FISCHER/ARCHIE ERICKSON 2

**Table 2-11. Formation, Lithology, Sample Depth (MD), Vertical Stress, Pore Pressure, Effective Vertical Stress, Horizontal Stress, Static Young's Modulus, Poisson's ratio, and Compressive Strength in Opeche/Spearfish, Broom Creek, and Amsden Formations**

| Sample Information | | | | Reservoir Conditions | | | Elastic Properties | | |
|---|---|---|---|---|---|---|---|---|---|
| Formation | Lithology/ Rock type | Depth, ft*, MD | Vertical Stress, psi | Pore Pressure, psi | Effective Stress, psi | Horizontal Stress, psi | Static Young's Modulus, Mpsi | Static Poisson's Ratio, unitless | Compressive Strength,*** psi |
| Opeche/ Spearfish | Siltstone | 5800 | 5626 | 2662.2 | 2963.8 | 1185.52 | 4.28 | 0.288 | 7043 |
| Opeche/ Spearfish | Siltstone | 5823.2 | 5648.504 | 2672.8488 | 2975.6552 | 1190.26208 | 5.58 | 0.205 | 14,253 |
| Opeche/ Spearfish | Anhydrite | 5848.7 | 5673.239 | 2684.5533 | 2988.6857 | 1195.47428 | 9.69 | 0.181 | 15,023** |
| Broom Creek | Dolomitic sandstone | 5919.5 | 5741.915 | 2717.0505 | 3024.8645 | 1209.9458 | 2.59 | 0.297 | 7541 |
| Broom Creek | Sandstone | 5955 | 5776.35 | 2733.345 | 3043.005 | 1217.202 | 1.69 | 0.11 | 7738 |
| Broom Creek | Dolomitic sandstone | 6067 | 5884.99 | 2784.753 | 3100.237 | 1240.0948 | 3.32 | 0.265 | 12,428 |
| Broom Creek | Anhydrite | 6144 | 5959.68 | 2820.096 | 3139.584 | 1255.8336 | 9.78 | 0.317 | 17,708 |
| Amsden | Sandy dolostone | 6152.7 | 5968.119 | 2824.0893 | 3144.0297 | 1257.61188 | 8.10 | 0.276 | 32,550 |
| Amsden | Dolostone | 6157.6 | 5972.872 | 2826.3384 | 3146.5336 | 1258.61344 | 8.81 | 0.154 | 28,945 |
| Amsden | Dolostone | 6161.5 | 5976.655 | 2828.1285 | 3148.5265 | 1559.4106 | 10.23 | 0.383 | 24,752 |

* Sample depth corresponds to cored depth. A depth shift must be applied to align the values with log depth (See Table 2-2a).
** Sample is at the boundary between Broom Creek and Opeche/Spearfish
*** Compressive strength is equivalent to the peak failure pressure of the sample.

## 2.5 Faults, Fractures, and Seismic Activity

This section discusses local and regional faults including a regional structural feature, the Stanton Fault and interpreted basement faults. In the area of review (AOR), none of these known or suspected faults or fractures has sufficient permeability and vertical extent to allow fluid movement out of the storage reservoir. The absence of transmissive faults is supported by fluid sample analysis results from Archie Erickson 2 that suggest the injection interval, the Broom Creek Formation (115,000 mg/L), is isolated from the next permeable interval, the Inyan Kara Formation (3340 mg/L) (Appendix A).

This section also discusses the seismic history of North Dakota and the low probability that seismic activity will interfere with containment.

### *2.5.1 Stanton Fault*

The Stanton Fault is a suspected Precambrian basement fault interpreted by Sims and others (1991) using available borehole data and regional gravity and magnetic data as a northeast-southwest trending feature. The Stanton Fault as interpreted by Sims and others (1991) is ~4.3 mi from the Archie Erickson 2 stratigraphic and reservoir-monitoring well (Figure 2-40). Given the resolution of the regional gravity and magnetic data and limited amount of borehole data used to interpret this suspected fault, there is a lot of uncertainty in the lateral extent and the location of the feature. No studies describing the possible vertical extent of this feature or impact on overlying sedimentary layers have been published. The Beulah 3D survey was used to characterize the subsurface, with a primary objective of identifying structures. No basement faults were identified with the orientation of the mapped Stanton fault, which is mapped just north of the survey extent. No indication of the Stanton fault was interpreted within the Beulah 3D survey.

### *2.5.2 Interpreted Basement Faults*

Basement-rooted faults with offset apparent in the overlying rock formations were interpreted from the 3D seismic data (Figures 2-40, 2-41a, and 2-41b). Displacement along the interpreted basement faults diminishes below or within the Interlake Formation, the top of which is located over 3000 feet below the base of the Broom Creek Formation. These faults do not extend into the Broom Creek formation, or into any associated Broom Creek confining intervals.

Figures 2-41a and 2-41b show a map and cross-sectional view of the discontinuities that are interpreted as faults and fractures. The linear trends visible in Figure 2-41a and 2-41b are interpreted as basement rooted faults. The bottom of Figure 2-41a shows Section A-A' from the Beulah 3D survey where offset is visible along basement-rooted faults in the Deadwood Formation. These faults extend through the Deadwood Formation into the overlying confining interval, the Winnipeg group. Some of the interpreted faults extend into the Red River Formation with offset ultimately diminishing by the Interlake Formation. Figure 2-41b shows Section B-B', the northernmost portion of the seismic survey.

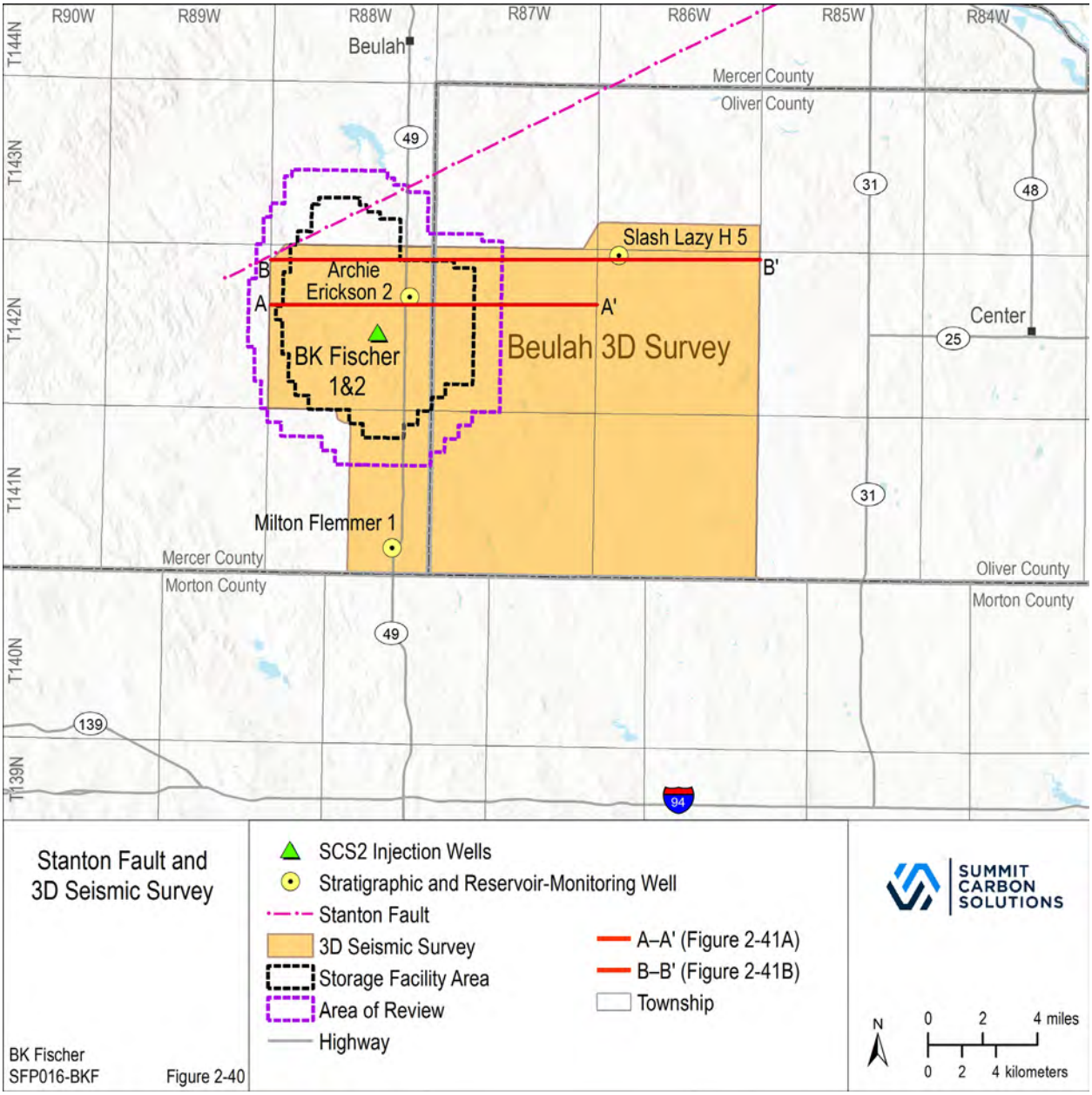



Figure 2-40. Suspected location of the Stanton Fault as interpreted by Sims and others (1991) and Anderson (2016) in relation to the Beulah 3D seismic survey extent. The red line on the map shows the location of the seismic section A-A' shown in Figure 2-41a and B-B’ shown in Figure 2-41b.

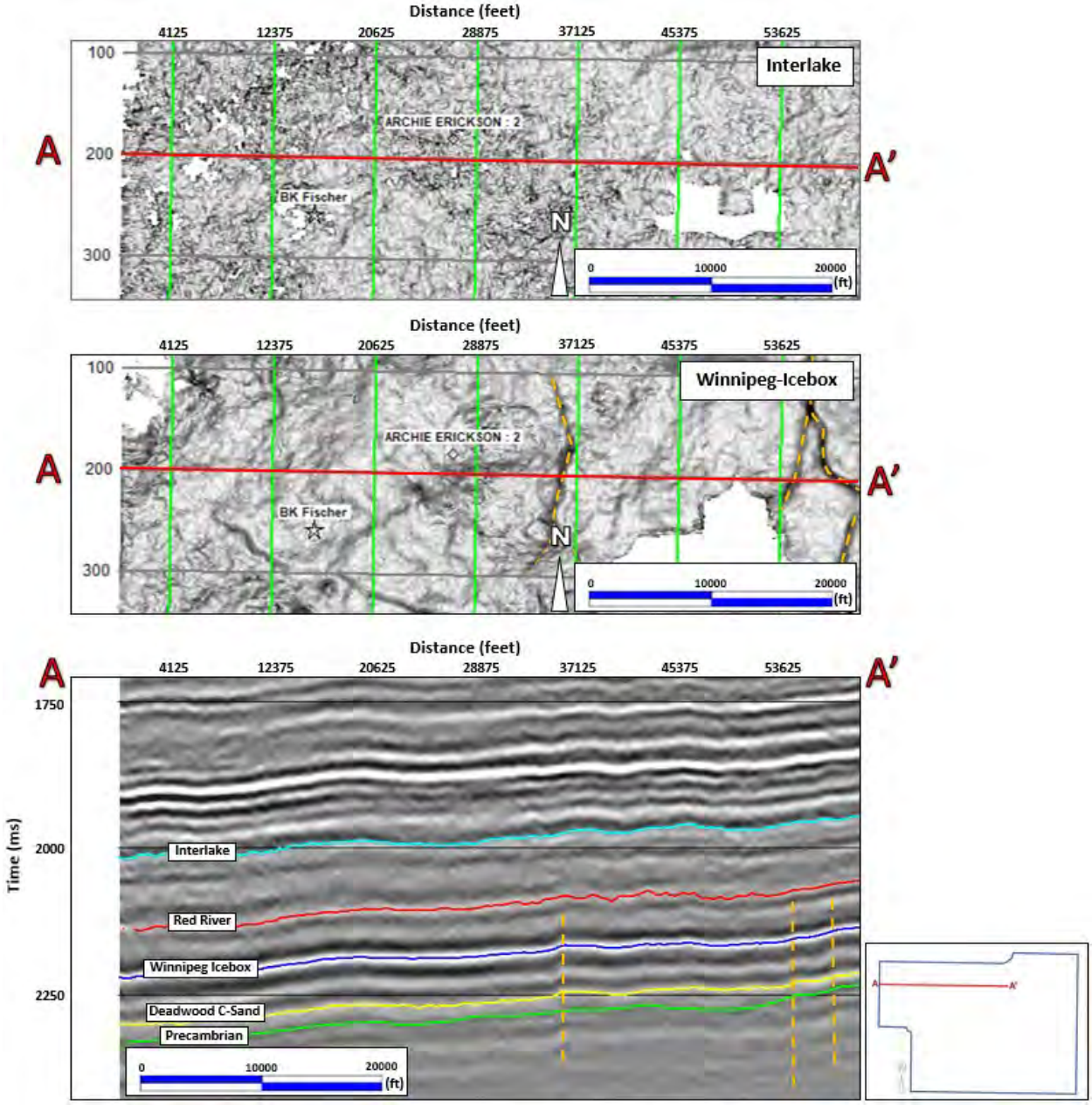



Figure 2-41a. Top: similarity attribute map taken from the Beulah 3D survey of the Interlake Formation (aqua horizon) and the Winnipeg–Icebox Formation (blue horizon). Time is displayed on the y-axis in milliseconds; distance is shown on x-axis in feet. Bottom: cross-section A-A' (location within the Beulah 3D extent shown in the inset) showing seismic amplitude data, interpreted horizons, and interpreted faults. Similarity attributes highlight discontinuities shown as black linear trends marked with dashed yellow lines in the top figure. These linear trends are interpreted as faults and fractures rooted within the Precambrian basement (green horizon). Displacement along these faults diminishes below the Interlake Formation (aqua horizon).

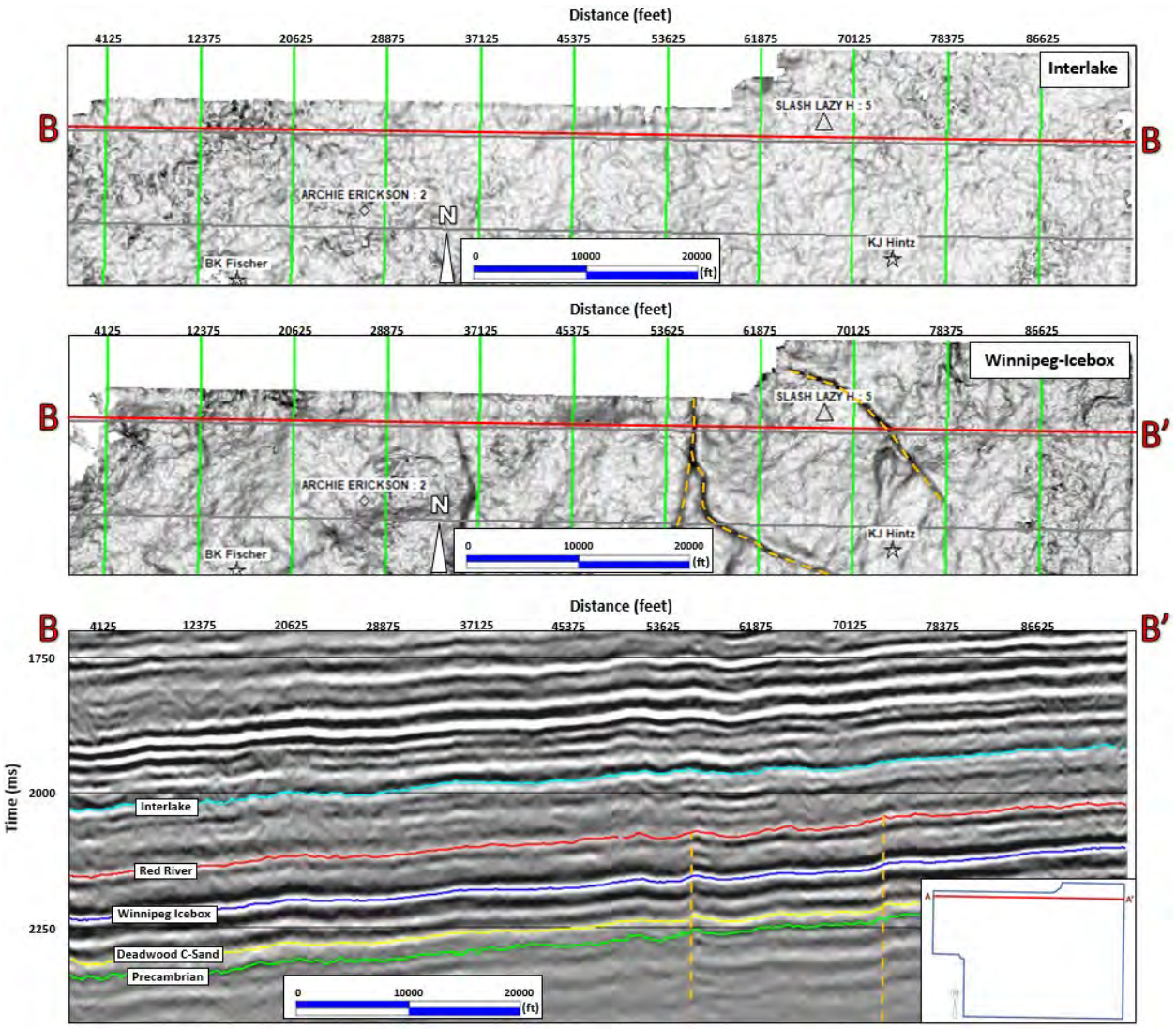



Figure 2-41b. Top: similarity attribute map taken from the Beulah 3D survey of the Interlake Formation (aqua horizon) and the Winnipeg–Icebox Formation (blue horizon). Time is displayed on the y-axis in milliseconds; distance is shown on x-axis in feet. Bottom: cross-section B-B' (location within the Beulah 3D extent shown in the inset) showing seismic amplitude data, interpreted horizons, and interpreted faults. Similarity attributes highlight discontinuities shown as black linear trends marked with dashed yellow lines in the top figure. These linear trends are interpreted as faults and fractures rooted within the Precambrian basement (green horizon). Displacement along these faults diminishes below the Interlake Formation (aqua horizon).

### *2.5.3 Mohr-Coulomb Critical Stress Analysis of Faults*

An integrated Mohr-Coulomb deterministic and probabilistic critical stress analysis study was carried out across the Beulah 3D seismic survey area. Results of the study allowed for evaluation of the risk and range of uncertainty for potential fault slippage in response to $CO_2$ injection. The analysis used the fault segments interpreted from the 3D seismic data which exhibit a range of

strikes and dips. Four injection locations were selected for this evaluation with the objective of testing a full range of fault slip stability scenarios. Three of these locations are planned SCS injection wells, Wells 1, 2, and 4 in Figure 2-42, with Well 3 being a potential location that was ultimately not selected for further development.

The Milton Flemmer 1 1D MEM was used as a basis for the boundary conditions for the Mohr-Coulomb critical stress analysis across the Beulah 3D seismic study area. SLB Techlog, Ikon RokDoc and Stanford University Fault Slip Potential (FSP) software tools were used to carry out the integrated study.

The main conclusion of this evaluation is the interpreted fault segments have a low probability of slippage in response to pore pressure increases in response to $CO_2$ injection, so long as the maximum differential pressure increase at the fault is below ~3000 psi (Figures 2-42 and 2-43). The pore pressure necessary to initiate slip on the interpreted fault segments is dominantly controlled by the geomechanical factors: fault strike, SHmax azimuth and pore pressure gradient. Additionally, the fault segments have a very low probability of slippage in response to pore pressure increases from injection in the Broom Creek Formation because of the large vertical distance between the reservoir and the interpreted fault (>3000 ft).

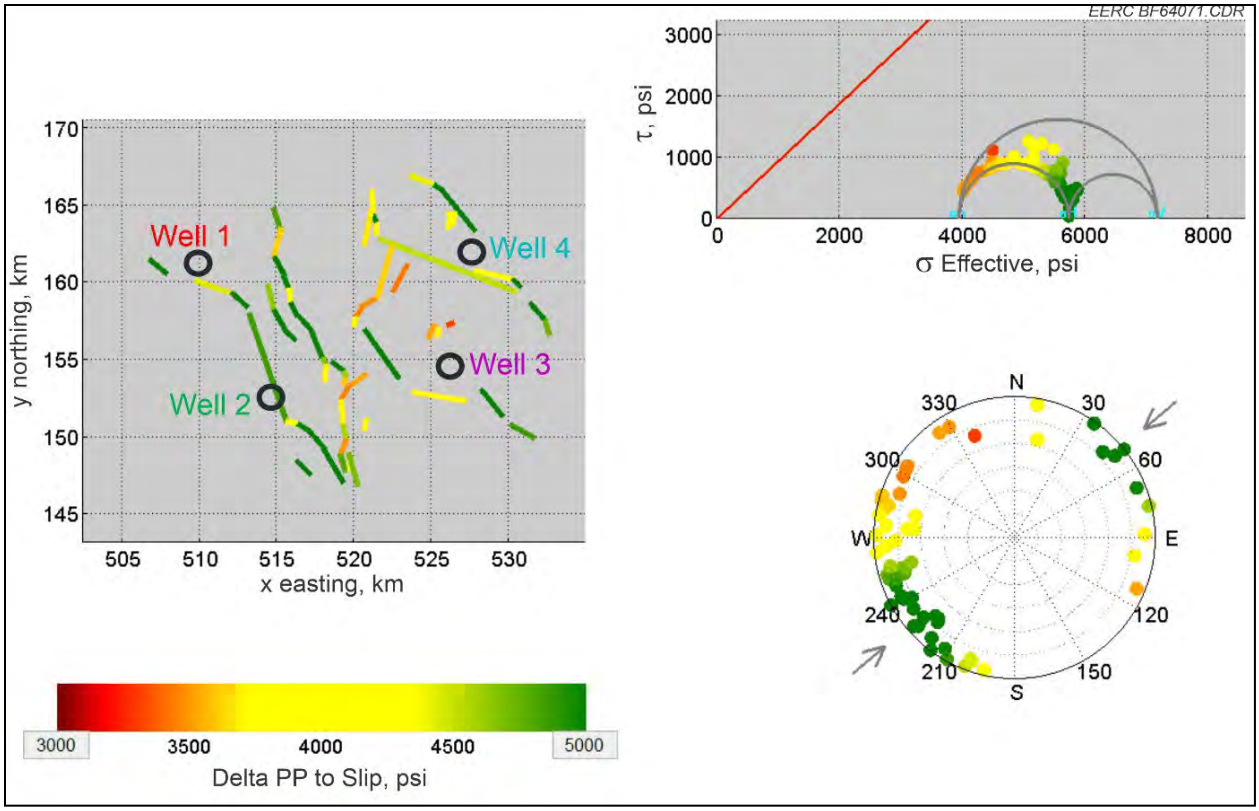



Figure 2-42. Results of the deterministic FSP analysis of the interpreted fault segments in response to pore pressure increase associated with injection at four well locations. Dominant SHmax azimuth is North 50 degrees East, indicated by the arrows in the polar plot of fault strikes and dips in the lower right of the figure.

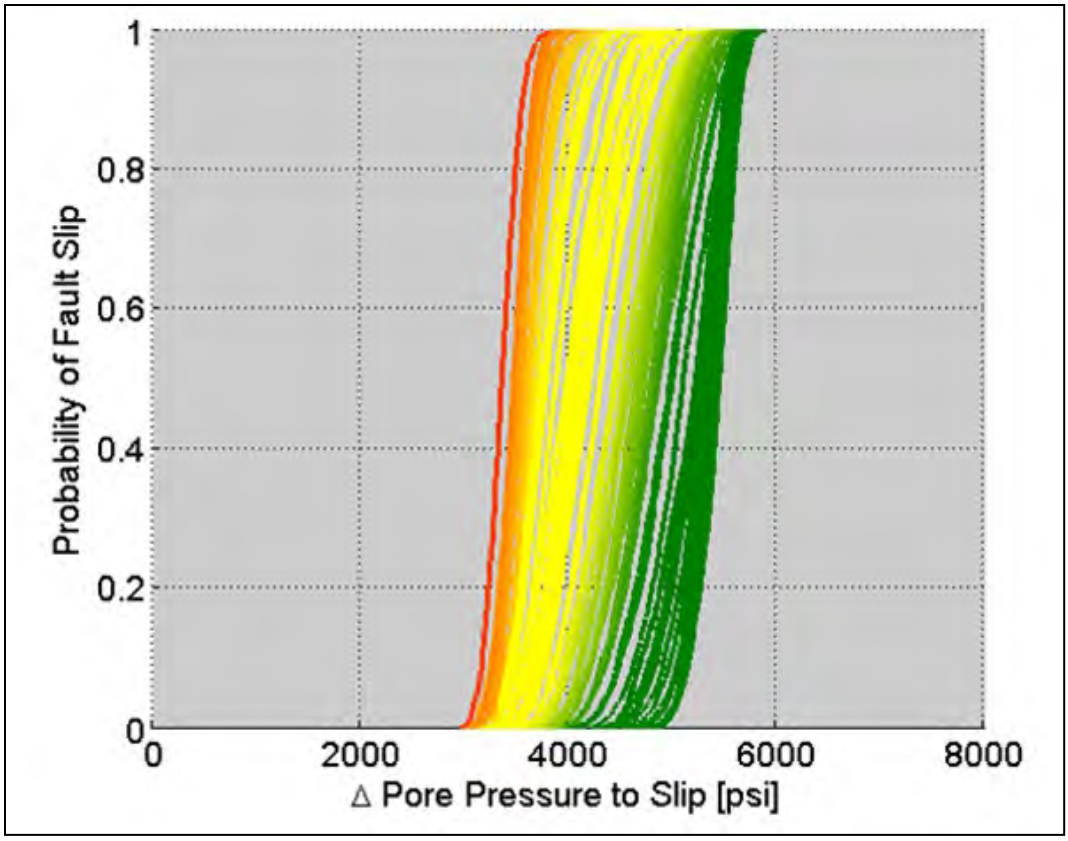



Figure 2-43. Probabilistic FSP analysis of the interpreted fault segments in response to pore pressure and four injection well locations showing a minimum of ~3000-psi pressure increase is needed to initiate slip on the most unstable interpreted faults in red vs. the more stable faults in green, where a minimum of ~5000 psi is required to initiate slip.

### *2.5.4 Seismic Activity*

The Williston Basin is a tectonically stable region of the North American Craton. Zhou and others (2008) summarize that "the Williston Basin as a whole is in an overburden compressive stress regime," which could be attributed to the general stability of the North American Craton. Interpreted structural features associated with tectonic activity in the Williston Basin in North Dakota include anticlinal and synclinal structures in the western half of the state, lineaments associated with Precambrian basement block boundaries, and faults (North Dakota Industrial Commission, 2022).

Between 1870 and 2015, 13 earthquakes have been detected within the North Dakota portion of the Williston Basin (Table 2-12) (Anderson, 2016). Of these 13 earthquakes, only three have occurred along one of the eight Precambrian basement faults interpreted by Anderson (2016) in the North Dakota portion of the Williston Basin (Figure 2-44). The earthquake recorded closest to the project area occurred in 1927, located approximately 20 miles southwest of the BK Fischer 1 injection well, near Hebron, North Dakota (Table 2-12). The magnitude of this earthquake is estimated to have been 3.2.

**Table 2-12. Summary of Earthquakes Reported to Have Occurred in North Dakota (from Anderson, 2016)**

| Map Label | Date | Magnitude | Depth, miles | Longitude | Latitude | City or Vicinity of Earthquake | Distance to BK Fischer 1, miles |
|---|---|---|---|---|---|---|---|
| A | Sept. 28, 2012 | 3.3 | 0.4* | −103.48 | 48.01 | Southeast of Williston | 99.97 |
| B | June 14, 2010 | 1.4 | 3.1 | −103.96 | 46.03 | Boxelder Creek | 126.78 |
| C | March 21, 2010 | 2.5 | 3.1 | −103.98 | 47.98 | Buford | 118.12 |
| D | Aug. 30, 2009 | 1.9 | 3.1 | −102.38 | 47.63 | Ft. Berthold southwest | 44.93 |
| E | Jan. 3, 2009 | 1.5 | 8.3 | −103.95 | 48.36 | Grenora | 132.08 |
| F | Nov. 15, 2008 | 2.6 | 11.2 | −100.04 | 47.46 | Goodrich | 87.87 |
| G | Nov. 11, 1998 | 3.5 | 3.1 | −104.03 | 48.55 | Grenora | 143.54 |
| H | March 9, 1982 | 3.3 | 11.2 | −104.03 | 48.51 | Grenora | 141.67 |
| I | July 8, 1968 | 4.4 | 20.5 | −100.74 | 46.59 | Huff | 61.98 |
| J | May 13, 1947 | 3.7** | U*** | −100.90 | 46.00 | Selfridge | 87.95 |
| K | Oct. 26, 1946 | 3.7** | U | −103.70 | 48.20 | Williston | 116.11 |
| L | April 29, 1927 | 3.2** | U | −102.10 | 46.90 | Hebron | 20.01 |
| M | Aug. 8, 1915 | 3.7** | U | −103.60 | 48.20 | Williston | 112.61 |

* Estimated depth.
** Magnitude estimated from reported modified Mercalli intensity (MMI) value.
*** Unknown.

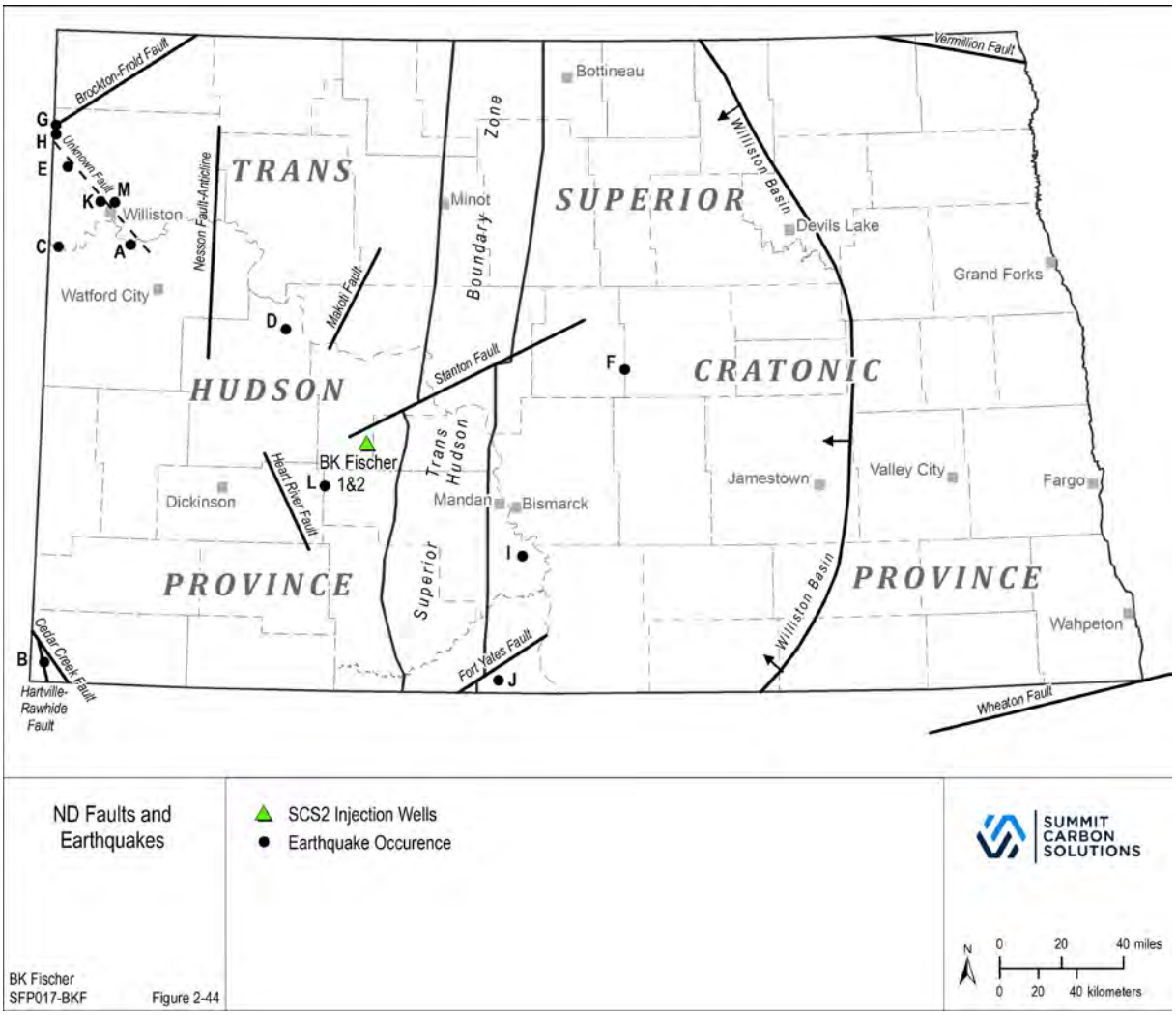



Figure 2-44. Location of major faults, tectonic boundaries, and earthquakes in North Dakota (modified from Anderson, 2016). The black dots indicate earthquake locations listed in Table 2-12.

Studies completed by the U.S. Geological Survey (USGS) indicate there is a low probability of earthquake events occurring in North Dakota that would cause damage to infrastructure, with less than two damaging earthquake events predicted to occur over a 10,000-year time period (Figure 2-45) (U.S. Geological Survey, 2019). A 1-year seismic forecast (including both induced and natural seismic events) released by USGS in 2016 determined North Dakota has very low risk (less than 1% chance) of experiencing any seismic events resulting in damage (U.S. Geological Survey, 2016). Frohlich and others (2015) states there is very little seismic activity near injection wells in the Williston Basin. They noted only two historic earthquake events in North Dakota that could be associated with nearby oil and gas activities. Additionally, no earthquakes occurring along the Stanton Fault have been reported. This indicates stable geologic conditions in the region

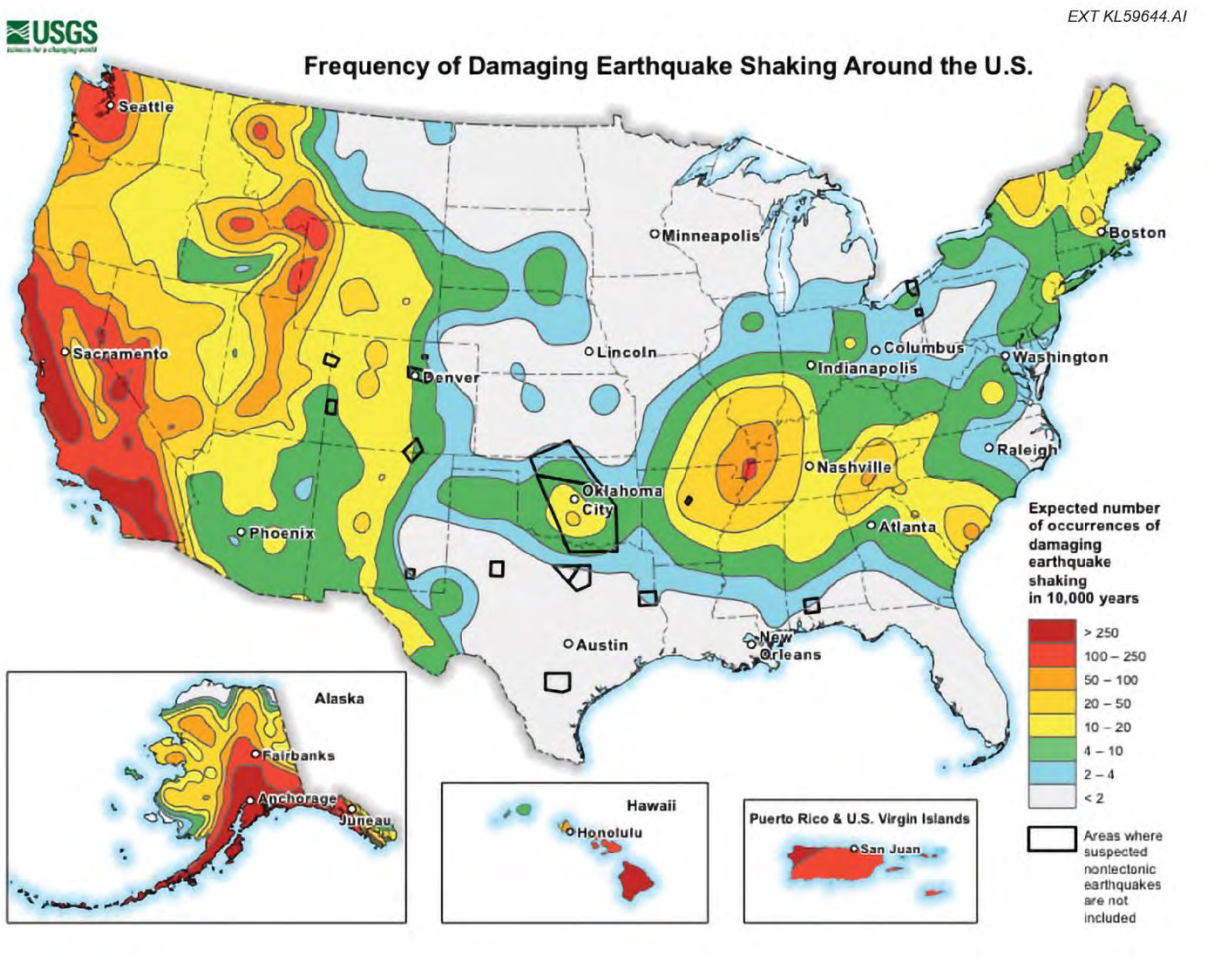



Figure 2-45. Probabilistic map showing how often scientists expect damaging earthquake shaking around the United States (U.S. Geological Survey, 2019). The map shows there is a low probability of damaging earthquake events occurring in North Dakota.

surrounding the potential injection site. The results from the USGS studies, the low risk of induced seismicity due to the basin stress regime, and the depth of the target reservoir in proximity to the basement and vertical extents of the interpreted faults suggest the probability that seismicity interfering with $CO_2$ containment is low.

## 2.6 Potential Mineral Zones

The North Dakota Geological Survey recognizes the Spearfish Formation as the only potential oil-bearing formation above the Broom Creek Formation. However, production from the Spearfish Formation is limited to the northern tier of counties in western North Dakota (Figure 2-46). There has been no exploration for, nor development of, a hydrocarbon resource from the Spearfish Formation in the storage facility area. There has been no historic hydrocarbon exploration in, or production from, formations below the Broom Creek Formation in the storage facility area. The two wells closest to the storage facility area, NDIC File Nos. 17623 and 21, drilled to the

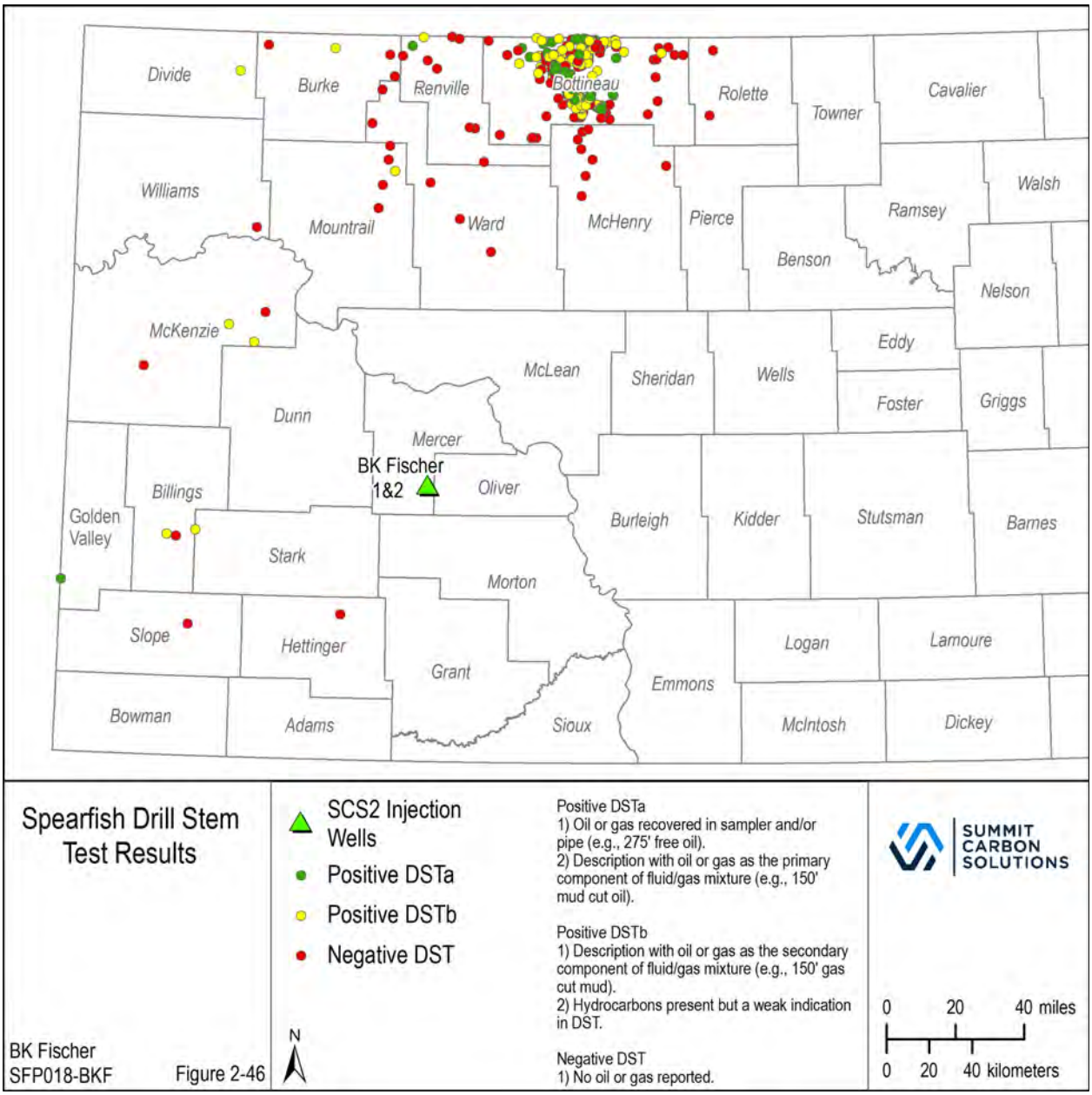



Figure 2-46. Drillstem test results indicating the presence of oil in the Spearfish Formation (modified from Stolldorf, 2020).

Deadwood Formation and the Precambrian, respectively, were dry and did not suggest the presence of hydrocarbons. Published studies suggest no economic deposits of hydrocarbons in the Bakken Formation in the storage facility area (Bergin, 2012; Theloy, 2016). The nearest hydrocarbon production well is Entze 29 1 (NDIC File No. 7616), located ~13 mi northwest (Figure 2-47a). Entze 29 1 was drilled in June 1980, and produced from the Red River Formation a cumulative total of 7799 bbl until June 1982. The well is now plugged and abandoned (P&A).

Shallow gas resources can be found in many areas of North Dakota. N.D.C.C. § 57-51-01, defines shallow gas resources as "gas produced from a zone that consists of strata or formation, including lignite or coal strata or seam, located above the depth of five thousand feet (1,524 meters) below the surface, or located more than five thousand feet (1,524 meters) below the surface but above the top of the Rierdon Formation (Jurassic), from which gas may be produced" (N.D.C.C. §§ 57-51-01[10]-[11].

In the event that hydrocarbons are discovered in commercial quantities below the Broom Creek Formation, a horizontal well could be used to produce hydrocarbons while avoiding drilling through the $CO_2$ plume, or a vertical well could be drilled using proper controls. Aside from meeting regulatory and jurisdictional requirements, should an operator decide to drill wells for hydrocarbon exploration or production, real-time Broom Creek Formation BHP data will be available while the BK Fisher 1 and BK Fisher 2 wells are in operation, which will allow prospective operators to design an appropriate well control strategy via increased drilling mud weight. Pressure increase in the Broom Creek caused by injection of $CO_2$ will relax postinjection as the area returns to its preinjection pressure profile. Any future wells drilled for hydrocarbon exploration or production that may encounter the $CO_2$ should be designed to include an intermediate casing string placed across the storage reservoir, with $CO_2$-resistant cement used to anchor the casing in place.

Active and reclaimed coal mines are near the storage facility area. Coal is mined from the Sentinel Butte Formation of the Fort Union Group of Paleocene age (the Beulah of the Beulah– Zap interval and Twin Butte coal beds) (Figure 47b). The thickness of the Beulah–Zap interval averages between 18 and 22 ft (Figure 2-48). Above the Beulah horizon are several thin beds of lignite. In ascending order, these are the Schoolhouse and Twin Butte beds. Overburden on top of the Beulah horizon ranges from 95 to 145 ft (Figure 2-49). The Twin Butte has an average thickness of about 6 ft, under 25–30 ft of overburden, where it is actively mined (Zygarlicke and others, 2019). The Beulah, Twin Butte, and other coal seams thicken and deepen to the west. The Beulah–Zap and Twin Butte seams pinch out to the east. The underlying Hagel coal seam is mined farther to the east by BNI Coal at its Center Mine, and the Falkirk Mine near Falkirk, North Dakota. Currently, no existing mine has plans to mine coal in the storage facility area during the project's operational period. The Coyote Creek Mine is the closest mine to the storage facility area. Figure 2-50 depicts the future mining area for the Coyote Creek Mine through 2040. The Beulah Mine is a mine near the storage facility area that no longer has active coal removal and is undergoing final reclamation. Figure 2-50 depicts areas that have been mined out at both the Coyote Creek Mine and the Beulah Mine.

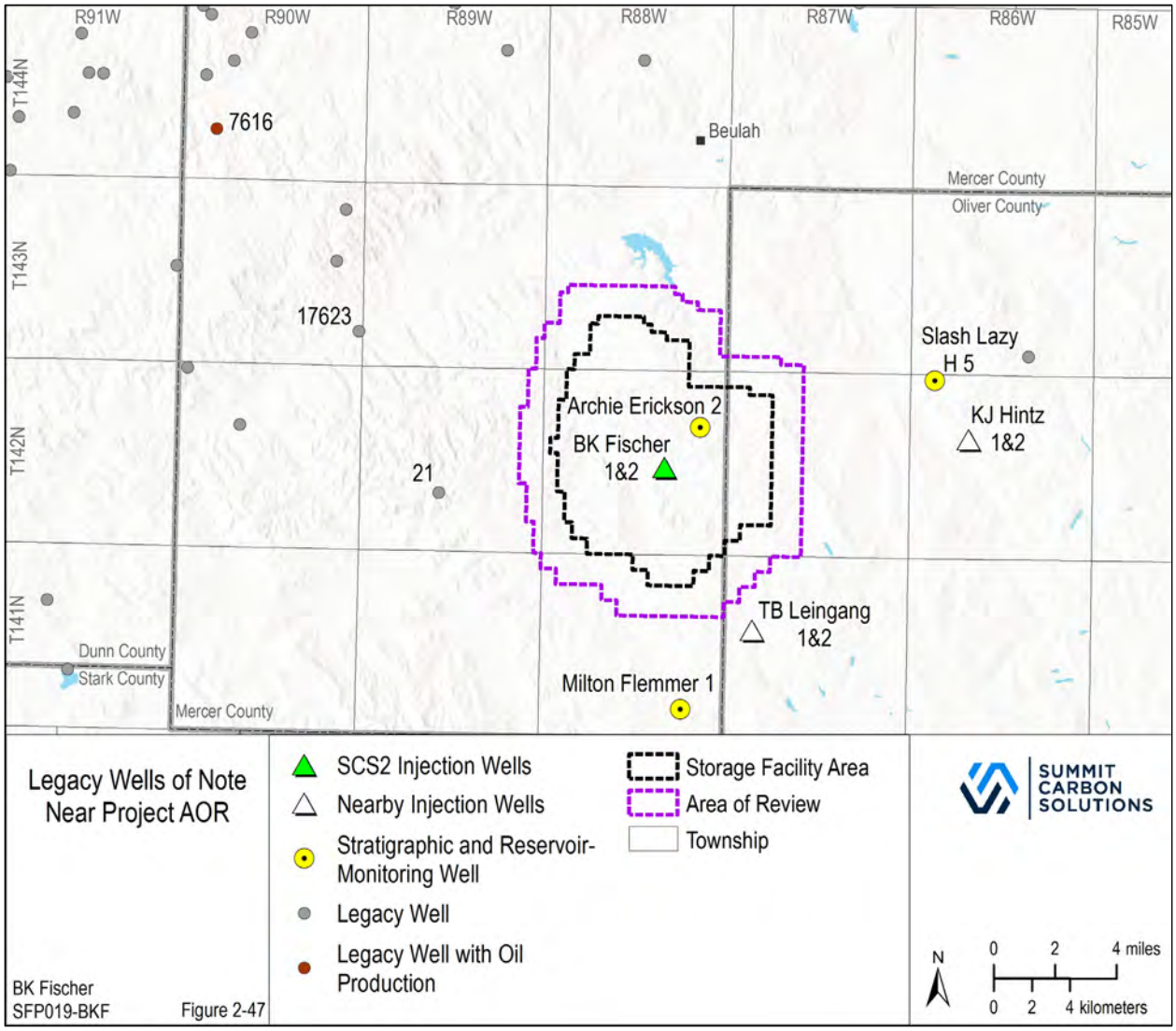



Figure 2-47a. Map showing stratigraphic wells for the project and nearest legacy wells. Gray circles indicate dry wells. The red circle indicates the closest oil and gas producing well (NDIC File No. 7616).

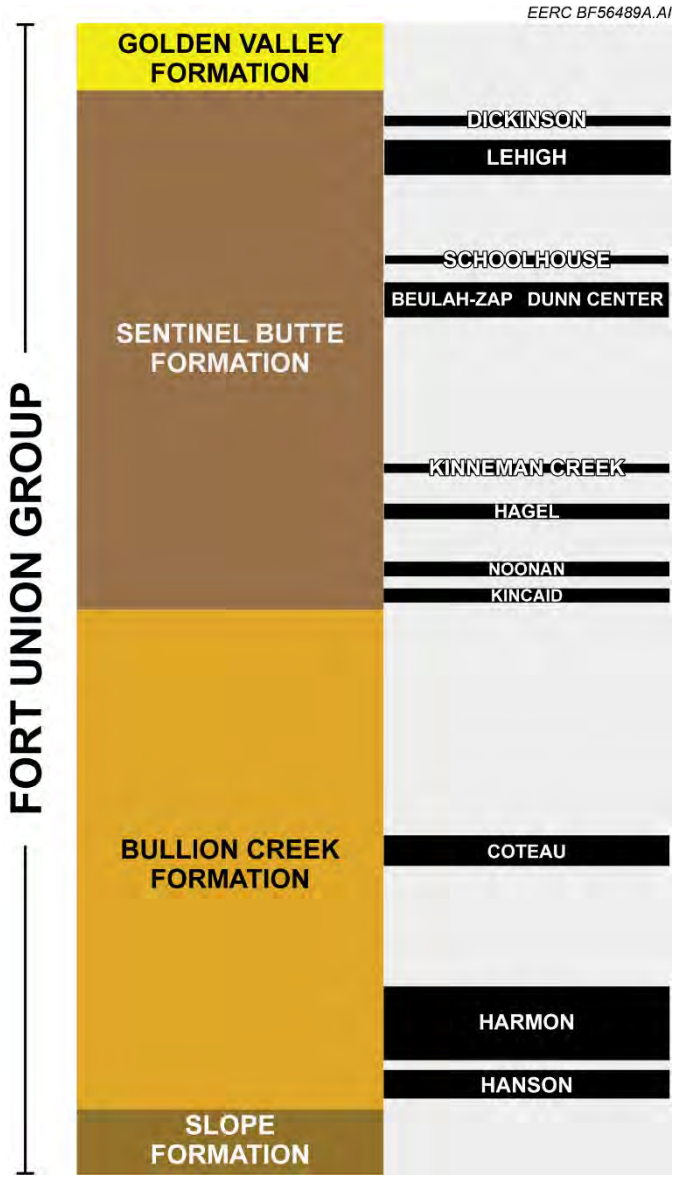



Figure 2-47b. Coal beds of the Sentinel Butte and Bullion Creek (Tongue River) Formations showing the lignite coals in western North Dakota (Zygarlicke and others, 2019).

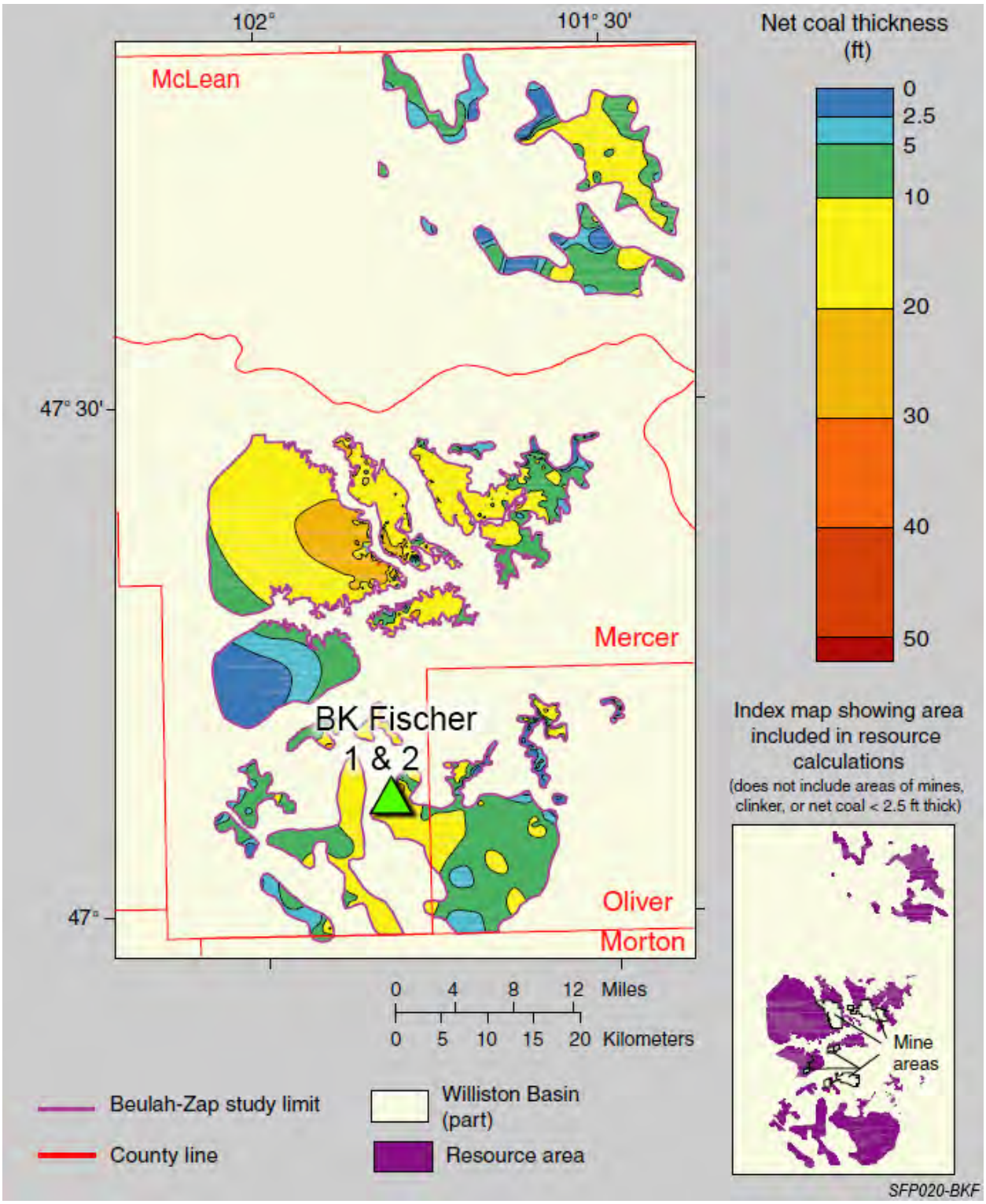



Figure 2-48. Beulah net coal isopach map and resource area (modified from Ellis and others, 1999).

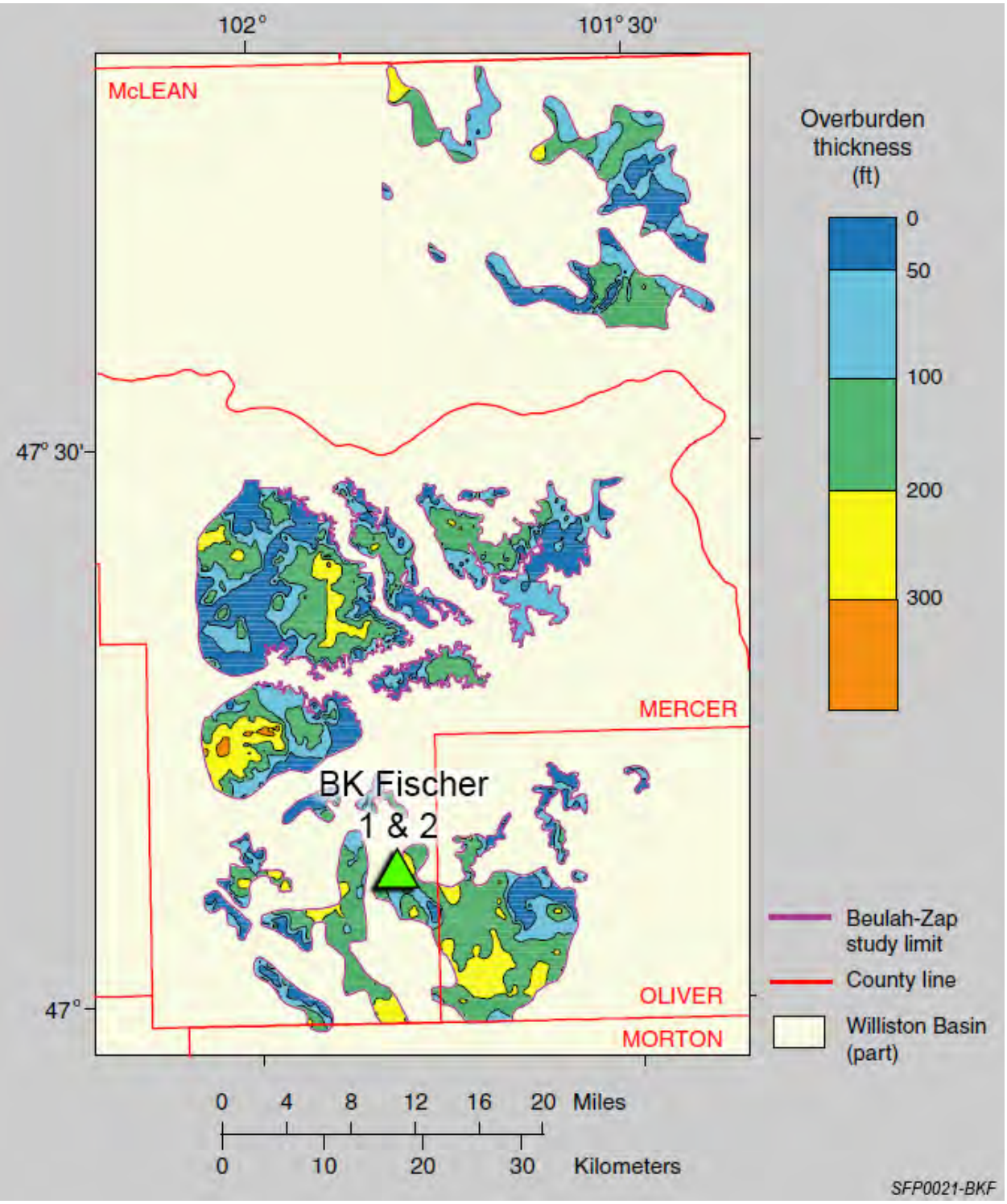



Figure 2-49. Beulah overburden isopach map (modified from Ellis and others, 1999).

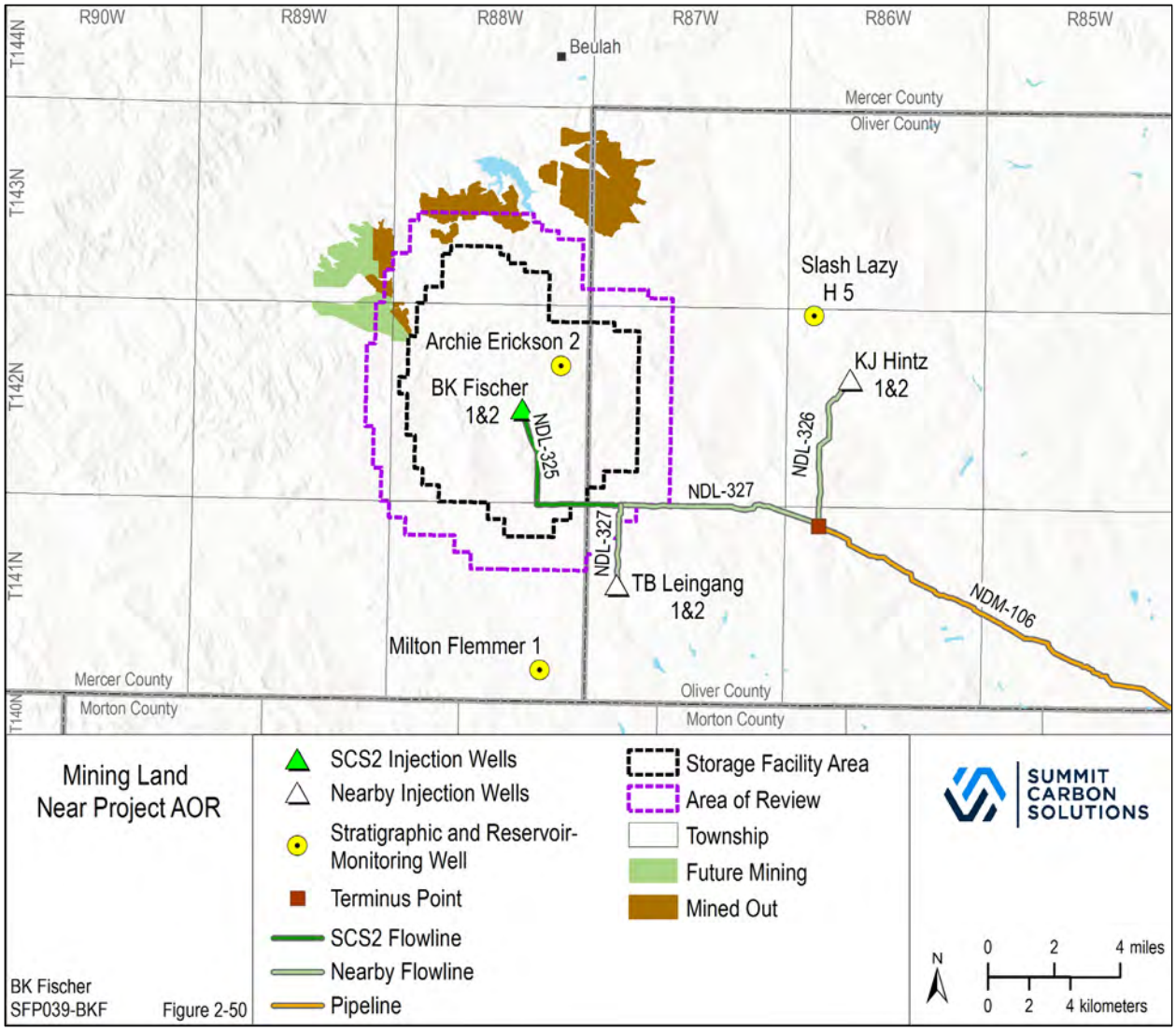



Figure 2-50. Map showing the past and future mining area for the Coyote Creek Mine and Beulah Mine through 2040.

## 2.7 References

Anderson, F.J., 2016, North Dakota earthquake catalog (1870-2015): North Dakota Geological Survey Miscellaneous Series No. 93.

Bergin, E.M., Bartberger, C.E., and Longman, M., 2012, Defining the updip eastern limit of commercial Bakken oil production, McLean and Dunn Counties, North Dakota: AAPG Annual Convention and Exhibition, Long Beach, California, April 22–25, 2012, AAPG Search and Discovery Article 20167.

Chang, C., M.D. Zoback, A. Khaksar, 2006, Empirical relations between rock strength and physical properties in sedimentary rocks. J. Petrol. Sci. Eng., 51 (3–4) (2006), pp. 223-237, 10.1016/j.petrol.2006.01.003.

Downey, J.S., 1986, Geohydrology of bedrock aquifers in the northern Great Plains in parts of Montana, North Dakota, South Dakota and Wyoming: U.S. Geological Survey Professional Paper 1402-E, 87 p.

Downey, J.S., and Dinwiddie, G.A., 1988, The regional aquifer system underlying the northern Great Plains in parts of Montana, North Dakota, South Dakota, and Wyoming—summary: U.S. Geological Survey Professional Paper 1402-A.

Ellis, M.S., Gunther, G.L., Ochs, A.M., Keighin, C.W., Goven, G.E., Schuenemeyer, J.H., Power, H.C., Stricker, G.D., and Blake, D., 1999, Coal resources, Williston Basin: U.S. Geological Survey Professional Paper 1625-A, Chapter WN.

Frohlich, C., Walter, J.I., and Gale, J.F.W., 2015, Analysis of transportable array (USArray) data shows earthquakes are scarce near injection wells in the Williston Basin, 2008–2011: Seismological Research Letters, v. 86, no. 2A, March/April.

Glazewski, K.A., Grove, M.M., Peck, W.D., Gorecki, C.D., Steadman, E.N., and Harju, J.A., 2015, Characterization of the PCOR Partnership Region: Plains $CO_2$ Reduction (PCOR) Partnership topical report for U.S. Department of Energy and multiclients, Grand Forks, North Dakota, Energy & Environmental Research Center, January.

Golubev, A.A., G.Y. Rabinovich.,1976, Resultaty primeneia appartury akusticeskogo karotasa dlja predeleina proconstych svoistv gornych porod na mestorosdeniaach tverdych isjopaemych. Prikl. Geofiz. Moskva, 73 (1976), pp. 109-116

Lal, M., 1999, Shale stability—drilling fluid interaction and shale strength: SPE Latin American and Caribbean Petroleum Engineering Conference, Caracas, Venezuela.

McNally, G.H.N., 1987, Estimation of coal measures rock strength using sonic and neutron logs: Geoexploration v 24, p 381–395.

Murphy, E.C., Nordeng, S.H., Juenker, B.J., and Hoganson, J.W., 2009, North Dakota stratigraphic column: E.C. Murphy and L.D. Helms, Eds., North Dakota Geological Survey, Bismarck, North Dakota.

North Dakota Industrial Commission, 2022, Overview of petroleum geology of the North Dakota Williston Basin: www.dmr.nd.gov/ndgs/resources/ (accessed June 2023).

Peck, W.D., Liu, G., Klenner, R.C.L., Grove, M.M., Gorecki, C.D., Steadman, E.N., and Harju, J.A., 2014, Storage capacity and regional implications for large-scale storage in the basal Cambrian system: Plains $CO_2$ Reduction (PCOR) Partnership Phase III Task 16 Deliverable D92 for U.S. Department of Energy National Energy Technology Laboratory Cooperative Agreement No. DE-FC26-05NT42592, EERC Publication 2014-EERC-05-12, Grand Forks, North Dakota, Energy & Environmental Research Center, https://edx.netl.doe.gov/dataset/storage-capacity-and-regional-implications-for-large-scale-storage-in-the-basal-cambrian-system (accessed 2022).

Plumb, R.A., Evans, K.F., and Engelder, T., 1991, Geophysical log responses and their correlation with bed-to-bed stress contrasts in Paleozoic rocks, Appalachian plateau, New York: Journal of Geophysical Research, v. 96, no. 14, p. 509–528.

Plumb, R., Edwards, S., Pidcock, G., Lee, D., and Stacey, B., 2000, The mechanical earth model concept and its application to high-risk well construction projects: Paper presented at the IADC/SPE Drilling Conference, New Orleans, Louisiana, February.

Rygh, M.E., 1990, The Broom Creek Formation (Permian), in southwestern North Dakota—depositional environments and nitrogen occurrence [Master's Thesis]: University of North Dakota, Grand Forks, North Dakota.

Sims, P.K., Peterman, Z.E., Hildenbrand, T.G., and Mahan, S.A., 1991, Precambrian basement map of the Trans-Hudson orogen and adjacent terranes, northern Great Plains, USA 2214.

Stolldorf, T.D., 2020, Spearfish production and drill stem test (DST) maps: GI-241, www.dmr.nd.gov/ndgs/documents/Publication_List/pdf/GEOINV/GI-241/Spearfish_DST_Map.jpg (accessed December 2022).

Theloy, C., Leonard, J.E., Leonard, C.O., and Ganster, P.W., 2016, Using an uncertainty assessment approach for estimating recoverable reserves from the Bakken Petroleum System in North Dakota: Presented at the AAPG 2016 Hedberg Research Conference, Santa Barbara, California.

U.S. Geological Survey, 2019, www.usgs.gov/media/images/frequency-damaging-earthquake-shaking-around-us (accessed June 2023).

U.S. Geological Survey, 2016, www.usgs.gov/news/induced-earthquakes-raise-chances-damaging-shaking-2016 (accessed June 2023).

Weingarten, J.S., T.K. Perkins, 1995, Prediction of sand production in gas wells: methods and Gulf of Mexico case studies. J. Petrol. Technol., 47 (7) (1995), pp. 596-600.

Zhou, X.J., Zeng, Z., and Belobraydic, M., 2008, Geomechanical stability assessment of Williston Basin Formations for petroleum production and $CO_2$ sequestration: Presented at the 42nd U.S. Rock Mechanics Symposium and 2nd U.S.–Canada Rock Mechanics Symposium, San Francisco, California, June 29 – July 2, 2008.

Zygarlicke, C.J., Folkedahl, B.C., Nyberg, C.M., Feole, I.K., Kurz, B.A., Theakar, N.L., Benson, S.A., Hower, J., and Eble, C., 2019, Rare-earth elements (REEs) in U.S. coal-based resources—20 sampling, characterization, and round-robin interlaboratory study: Final Report for U.S. Department of Energy National Energy Technology Laboratory Cooperative Agreement No. DE-FE0029007, EERC Publication 2019-EERC-09-08, Grand Forks, North Dakota, Energy & Environmental Research Center, September.

# SECTION 3.0

# GEOLOGIC MODEL CONSTRUCTION AND NUMERICAL SIMULATION OF $CO_2$ INJECTION

# 3.0 GEOLOGIC MODEL CONSTRUCTION AND NUMERICAL SIMULATION OF $CO_2$ INJECTION

## 3.1 Introduction

Existing and site-specific subsurface data were analyzed and interpreted (Section 2.2). The data and interpretations were used as inputs to SLB's Petrel software (Schlumberger, 2020) to construct a geologic model of the injection zone (Broom Creek Formation), the upper confining zone (Opeche/Spearfish Formation), and the lower confining zone (Amsden Formation). The geologic model encompasses a 4070-$mi^2$ (74-mi × 55-mi) area around the BK Fischer site to characterize the geologic extent, depth, and thickness of the subsurface geologic strata (Figure 2-3). Geologic properties were distributed within the 3D model, including facies, porosity, and permeability.

The geologic model and properties served as inputs for numerical simulations of $CO_2$ injection using Computer Modelling Group Ltd.'s (CMG's) GEM software (Computer Modelling Group Ltd., 2021). Numerical simulations of $CO_2$ injection were conducted to assess potential $CO_2$ injection rate, disposition of injected $CO_2$, wellhead pressure (WHP), bottomhole pressure (BHP), and pressure changes in the storage reservoir throughout the expected injection time frame and postinjection period. Results of the numerical simulations were then used to determine the project's area of review (AOR) pursuant to North Dakota's geologic $CO_2$ storage regulations.

## 3.2 Overview of Simulation Activities

### *3.2.1 Modeling of the Injection Zone and Overlying and Underlying Seals*

A geologic model was constructed to characterize the injection zone along with the upper and lower confining zones. Activities included data aggregation, structural framework creation, data analysis, and property distribution. Major inputs for the geologic model included geophysical logs from all existing wells that penetrate both the storage reservoir and associated upper and lower confining zones within the geologic model area. Major inputs for the geologic model also included seismic survey data and core sample measurements. The core sample measurement acted as control points during the distribution of the geologic properties throughout the modeled area. The geologic properties distributed throughout the model include acoustic impedance (AI), total porosity, effective porosity, permeability, and facies.

Three 3D seismic AI volumes (Figure 2-8) were upscaled and integrated into the geologic model grid using a volume-weighted method. (Figure 2-3). The volumes were used to guide the facies and petrophysical property distributions within the 3D geologic model and determine lateral heterogeneity through a variogram assessment. Horizontal variogram directions and structures were determined from the resampled 3D Beulah seismic AI volume because it covered the largest areal extent and captured multiple dune structures, producing the most reliable variogram calculation.

### *3.2.2 Structural Framework Construction*

SLB's Petrel software was used to interpolate structural surfaces for the undifferentiated Opeche/Spearfish (i.e., Spearfish, Minnekahta, Opeche), Broom Creek, and Amsden Formations. Input data included formation top depths from the online North Dakota Industrial Commission (NDIC) Department of Mineral Resources, Oil and Gas Division (DMR-O&G) database; data

collected from ten cored wells: ANG 1, Flemmer 1, BNI 1, J-LOC 1, Liberty 1, MAG 1, Coteau 1, Milton Flemmer 1, Archie Erickson 2, and Slash Lazy H 5 (Figure 2-4); three 3D seismic surveys (Figure 2-8); and one 5-mi-long 2D seismic line (Figure 2-8). The interpolated data were used to constrain the model extent in 3D space.

### *3.2.3 Data Analysis and Property Distribution*

#### *3.2.3.1 Confining Zones (Opeche/Spearfish and Amsden Formations)*

The upper confining zone (Opeche/Spearfish Formation) and the lower confining zone (Amsden Formation) were each assigned a single facies. Based on their primary lithology determined by well log analysis, the upper confining zone is assigned siltstone, and the lower confining zone is assigned dolostone. The lower Piper Formation was included in the geologic model in addition to the Opeche/Spearfish Formations because the Opeche/Spearfish Formation pinches out within the geologic model, approximately ~36 miles east of the Archie Erickson 2. The lower Piper is assigned as siltstone. AI, porosity, and permeability logs were upscaled from a well log scale to the scale of the geologic model grid to serve as control points for property distributions (Figure 2-16). The control points were used in combination with variograms, Gaussian random function simulation algorithms, and secondary trend data to distribute the properties. A 6800-ft major and minor axis length variogram model in the lateral direction and a 160-ft vertical variogram length were used within the lower Piper Formation. An 8200-ft major and 7500-ft minor axis length variogram model along an azimuth of 144° and 90-ft vertical variogram length were used for the Opeche/Spearfish Formation. A major axis length of 6500 ft and a minor axis length of 5300 ft along an azimuth of 180° in the lateral direction and 13-ft vertical variogram length were used for the Amsden Formation. Vertical variogram lengths were determined from the upscaled well logs.

#### *3.2.3.2 Injection Zone (Broom Creek Formation)*

Seismic data were resampled to the geologic model grid and used to determine lateral heterogeneity through a variogram assessment. Nonreservoir facies (dolostone, anhydrite) captured a major axis range of 8200 ft and a minor axis range of 6000 ft in the lateral direction. Reservoir facies (sandstone, dolomitic sandstone) captured a major axis range of 5000 ft and a minor axis range of 4500 ft along an azimuth of 45°. Vertical variogram lengths were determined from the upscaled well logs (Table 3-1).

**Table 3-1. Lateral and Vertical Variogram Lengths for Facies Distributions Within the Injection Zone**

| Facies | Azimuth, degrees | Major Length, ft | Minor Length, ft | Vertical Length, ft |
|---|---|---|---|---|
| Sandstone | 45 | 5000 | 4500 | 30 |
| Dolostone | 90 | 8200 | 6000 | 35 |
| Dolomitic Sandstone | 45 | 5000 | 4500 | 28 |
| Anhydrite | 90 | 8200 | 6000 | 17 |

AI from 3D seismic surveys was upscaled to the resolution of the geologic model grid to serve as control points for facies and petrophysical property distributions. Calculated AI logs, derived from available sonic and bulk density well logs in the geologic model area, were also upscaled to aid in discovering trends between well log data and seismic AI data and serve as additional control points for property distributions. After identification of a trend between the AI data and well logs, an AI property was then distributed throughout the model using the upscaled seismic AI data and upscaled AI logs as control points, the horizontal variogram parameters described above, and Gaussian random function simulation algorithms.

Facies classifications were interpreted from well log data and correlated with descriptions of core taken from the Milton Flemmer 1, Archie Erickson 2, Slash Lazy H 5, Flemmer 1, ANG 1, J-LOC 1, Liberty 1, BNI 1, MAG 1, and Coteau 1 wells. Four facies were modeled within the Broom Creek Formation: 1) sandstone, 2) dolostone, 3) dolomitic sandstone, and 4) anhydrite (Figure 2-11). Facies logs were generated from gamma ray, density, neutron porosity, sonic, and resistivity logs. Seismic facies probability volumes interpreted from the 3D Beulah seismic area were used to guide the facies distribution. Three probability volumes corresponding to the predominant facies of sandstone, dolostone, and dolomitic sandstone were resampled into the geologic model. Upscaled mineral fraction logs were also used to generate a facies trend model, which were guided by the resampled seismic probability, kriging algorithm, and variogram ranges described above. The facies logs were upscaled to the resolution of the 3D model to serve as control points for geostatistical distribution using sequential indicator simulation and guided by the facies trend model (Figure 2-15).

Prior to distributing the porosity and permeability properties, total porosity (PHIT), effective porosity (PHIE; total porosity less occupied or isolated pore space), and intrinsic permeability (KINT) well logs were calculated and compared with core porosity and permeability measurements to ensure good agreement with the ten cored wells: Milton Flemmer 1, Archie Erickson 2, Slash Lazy H 5, Flemmer 1, ANG 1, J-LOC 1, Liberty 1, BNI 1, Mag 1, and Coteau 1. The Gaussian random-function simulation algorithm was used to distribute the PHIE property using calculated PHIE well logs. The PHIE well logs were upscaled to the resolution of the 3D model, and were used as control points, and as the variogram structures described previously. The PHIE was cokriged with the AI seismic volumes and conditioned to the distributed facies (Figure 3-1). A KINT property was distributed using the same variogram structures and Gaussian random function algorithm but was paired with PHIE volume cokriging (Figure 3-2).

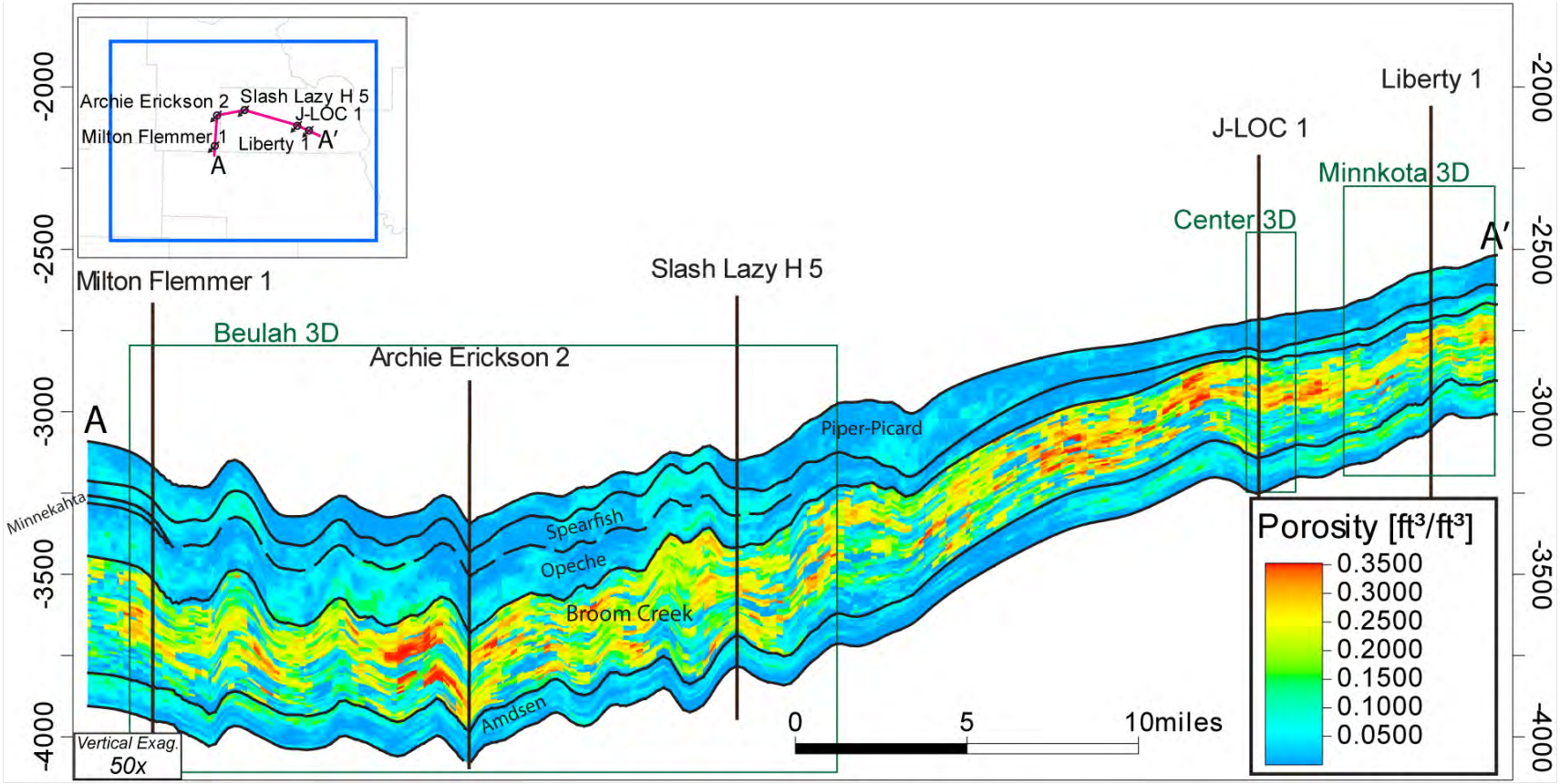



Figure 3-1. Distributed PHIE property along a roughly W-E cross section. The distributed PHIE property was used to distribute permeability throughout the model. Units on the y-axis represent feet below mean sea level (50× vertical exaggeration shown).

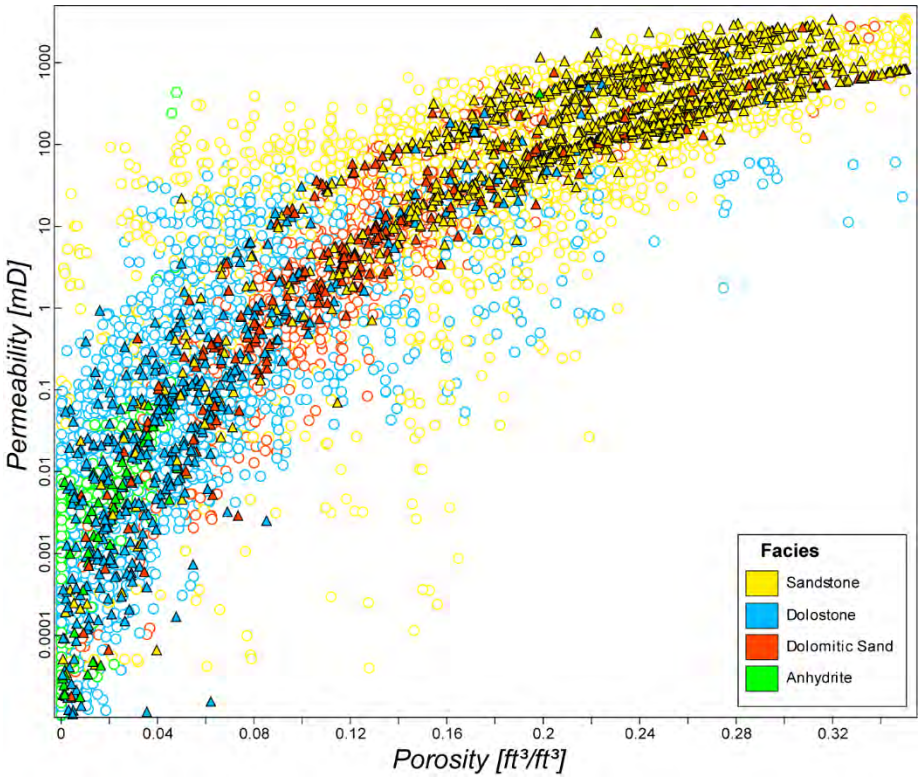



Figure 3-2. Illustration of the relationship between the modeled porosity and permeability of the Broom Creek Formation facies. Upscaled well log values are represented by triangles, while circles represent distributed values. Values are colored according to facies classification.

## 3.3 Numerical Simulation of $CO_2$ Injection

### *3.3.1 Simulation Model Development*

Numerical simulations of $CO_2$ injection into the Broom Creek Formation were conducted using the geologic model described above. Simulations were carried out using CMG's GEM, a compositional reservoir simulation module. Calculated values based on measured temperature and pressure data, along with the reference datum depth, were used to initialize the reservoir equilibrium conditions for performing numerical simulation. Figures 3-3 and 3-4 display a 3D and aerial view, respectively, of the simulation model with the permeability property and injection wells (BK Fischer 1 and 2) for BK Fischer. TB Leingang 1 and 2 and KJ Hintz 1 and 2 were also included to represent adjacent injection sites.

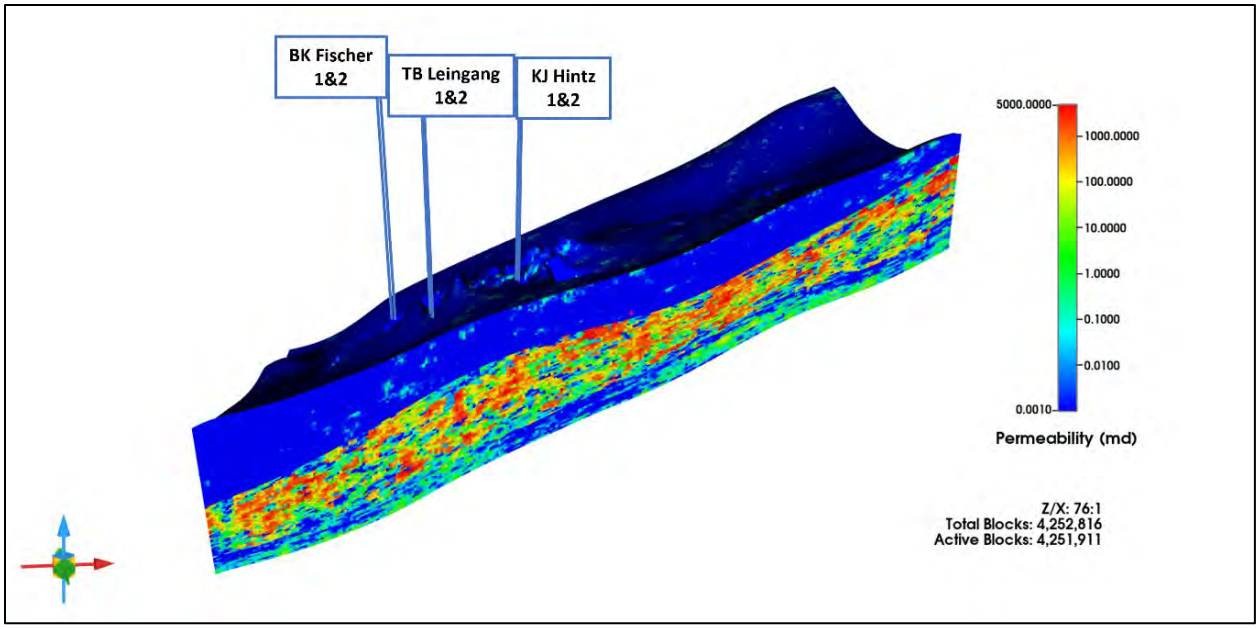



Figure 3-3. 3D view of the simulation model with the permeability property and injection wells displayed. The low-permeability layers (light blue and green) at the top and bottom of the figure should be noted. These layers represent the Opeche/Spearfish Formation (upper confining zone) and the Amsden Formation (lower confining zone). The varied permeability of the Broom Creek Formation is shown between these layers.

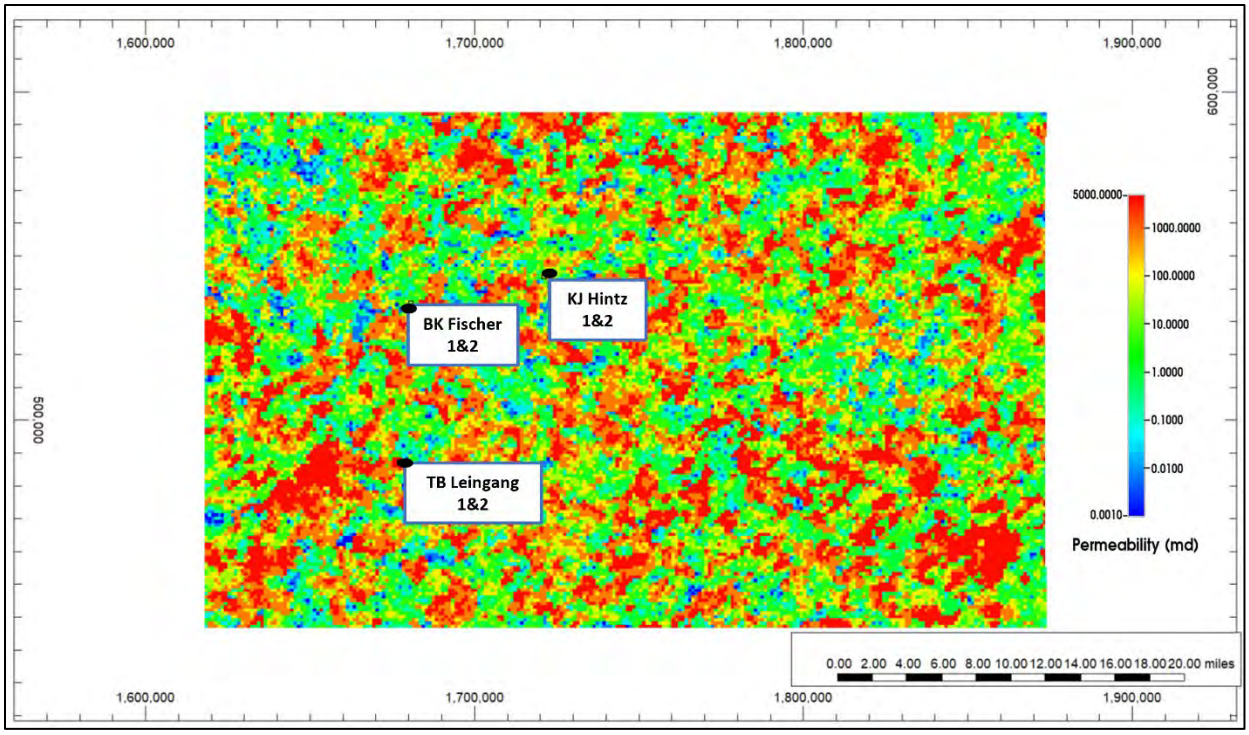



Figure 3-4. Aerial view of the simulation model with the permeability property of Broom Creek Formation (Layer 26, 5841 ft TVD at BK Fischer 1 top perforation), estimated prior to wellsite selection) and the injection wellsites displayed.

The simulation model encompasses an area of 48.5 mi by 29.7 mi. BK Fischer is located approximately 12.5 mi from the north edge of the model and approximately 11 mi from the west edge of the model. The simulation model boundaries were assigned partially closed conditions as the Broom Creek Formation pinches out in the northern and eastern parts of the modeled area. Distances from the edge of the model to the pinch-out are assumed to be 56,500 ft (~10.7 mi) to the east, 19,400 ft (~3.7 mi) to the northeast, and 184,800 ft (35 mi) to the west. Therefore, the volume modifiers are 28.25, 283, 10, 185, and 286 for East, North, Northeast, West, and South, respectively. These modifiers are multipliers to a block's bulk volume when considering rock and pore volume. A fluid sample from the Broom Creek Formation collected from Milton Flemmer 1 was analyzed by Minnesota Valley Testing Laboratories, and the measured total dissolved solids (TDS) of 105,000 mg/L was used as input for the numerical simulation. The reservoir was assumed to be 100% brine-saturated with the initial TDS as indicated from Milton Flemmer 1 TDS analysis. Table 3-2 shows the general reservoir properties extracted from the model and used for numerical simulation analysis.

**Table 3-2. Summary of Reservoir Properties in the Simulation Model**

| Formation | Pore Volume (PV) Weighted Average Permeability, mD | Average Porosity, %* | Initial Pressure, $P_i$, psi | Salinity, mg/L | Boundary Condition |
|---|---|---|---|---|---|
| Opeche/Spearfish | 0.019 | 3.8 | 2741 (at 5882 ft, TVD**) | | Partially closed |
| Broom Creek | 1105.5 | 21.3 | | 105,000 | |
| Amsden | 6.67 | 6.7 | | | |

* Porosity and permeability values are reported as PV weighted mean. Permeability averages were calculated after a 2.5 multiplier was applied.

** True vertical depth.

Numerical simulations of $CO_2$ injection performed allowed $CO_2$ to dissolve into the native formation brine. Mercury injection capillary pressure (MICP) data for the Opeche/Spearfish, Broom Creek, and Amsden Formations were used to generate relative permeability and the capillary pressure curves for the five representative facies in the simulation model (sandstone, siltstone, dolostone, dolomitic sandstone, and anhydrite) (Figures 3-5 through 3-9). Samples tested within the Opeche/Spearfish, Broom Creek, and Amsden Formations included all five facies.

Capillary pressure curves calculated from MICP data were modified to the model scale based on the permeability and porosity values of the simulation model for the five representative facies and used in the numerical simulations. These modified capillary pressure curves are also shown in Figures 3-5 through 3-9. The capillary entry pressure values applied in the model were determined by deriving a ratio between the reservoir quality index of core samples of the modeled region from MICP data and modeled properties to scale the capillary entry pressure value derived from core testing (Table 3-3). The capillary pressure curves for siltstone and anhydrite were also modified based on the simulation model domain. This resulted in two different ratios derived first from MICP data (same MICP sample for both facies) and second from the porosity and permeability properties for each of these facies in the model. These results demonstrated that there are two different capillary pressure curves for siltstone and anhydrite facies, Figures 3-6 and 3-9. It is worth noting that the relative permeability and capillary data selection are based on a broader data selection from the modeled region. All site-specific data in the modeled region, collected from Milton Flemmer 1, Archie Erickson 2, Slash Lazy H 5, and J-LOC 1, are screened, and the data from the most representative samples that are close to the reservoir properties are selected in dynamic flow simulations.

The calculated temperature and pressure based on reported temperature and pressure gradients derived from data recorded in the Milton Flemmer 1 wellbore were used to initialize the numerical simulation model for the proposed injection site. In combination with depth, a temperature gradient of 0.017°F/ft was used to calculate subsurface temperatures throughout the simulation model area. A pressure reading recorded from the Broom Creek Formation was used to derive a pore pressure gradient of 0.466 psi/ft.

A fracture gradient of 0.691 psi/ft was calculated from a microfracture in situ stress test using a SLB MDT (modular dynamics testing) tool (Figure 2-6, Table 2-4). The calculated maximum BHP constraints of 3633 and 3624 psi for BK Fischer 1 and BK Fischer 2, respectively, were derived by multiplying the fracture gradient by the depth of the top perforation in the injection

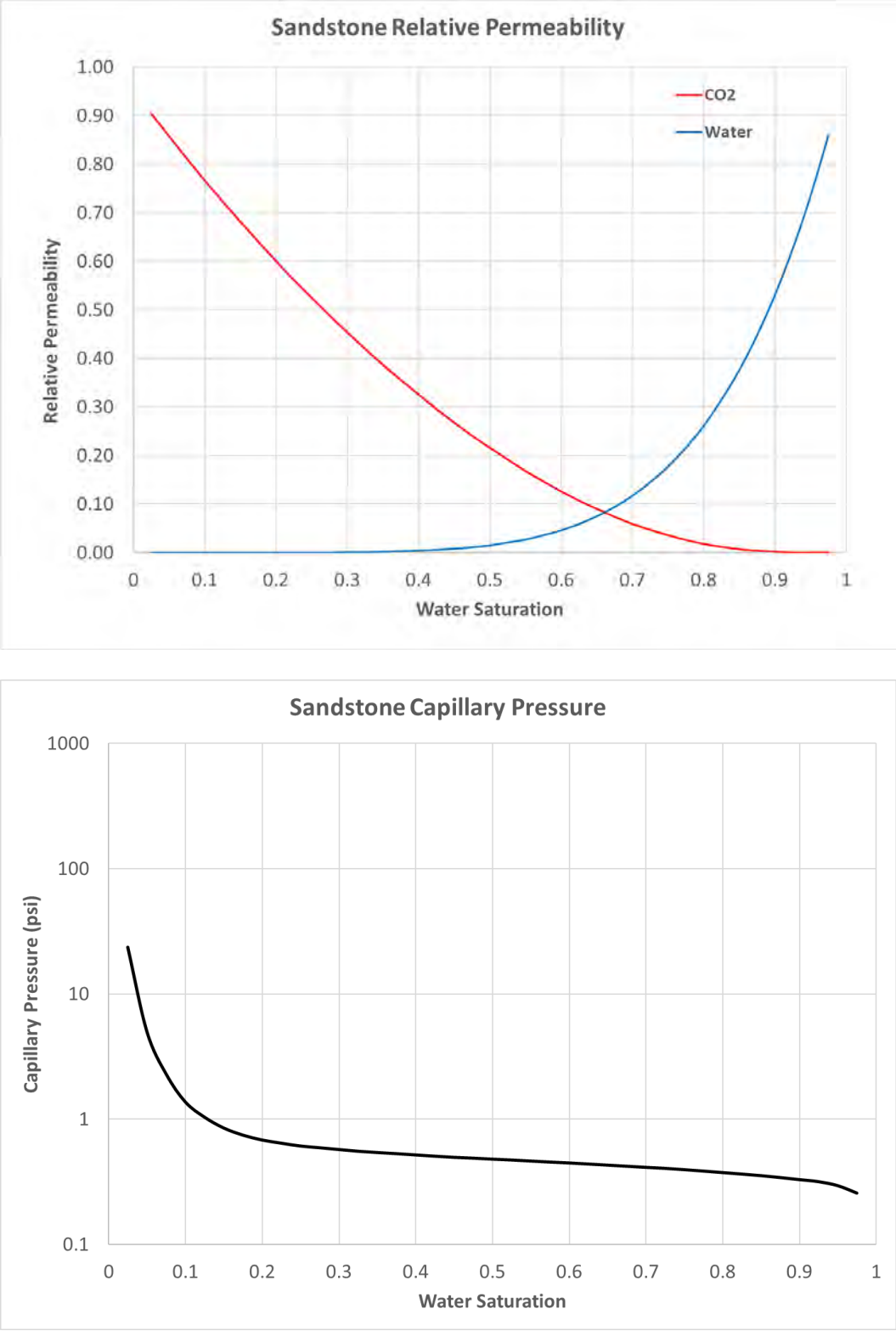



Figure 3-5. Relative permeability (top) and capillary pressure curves (bottom) for the sandstone facies of the Broom Creek Formation.

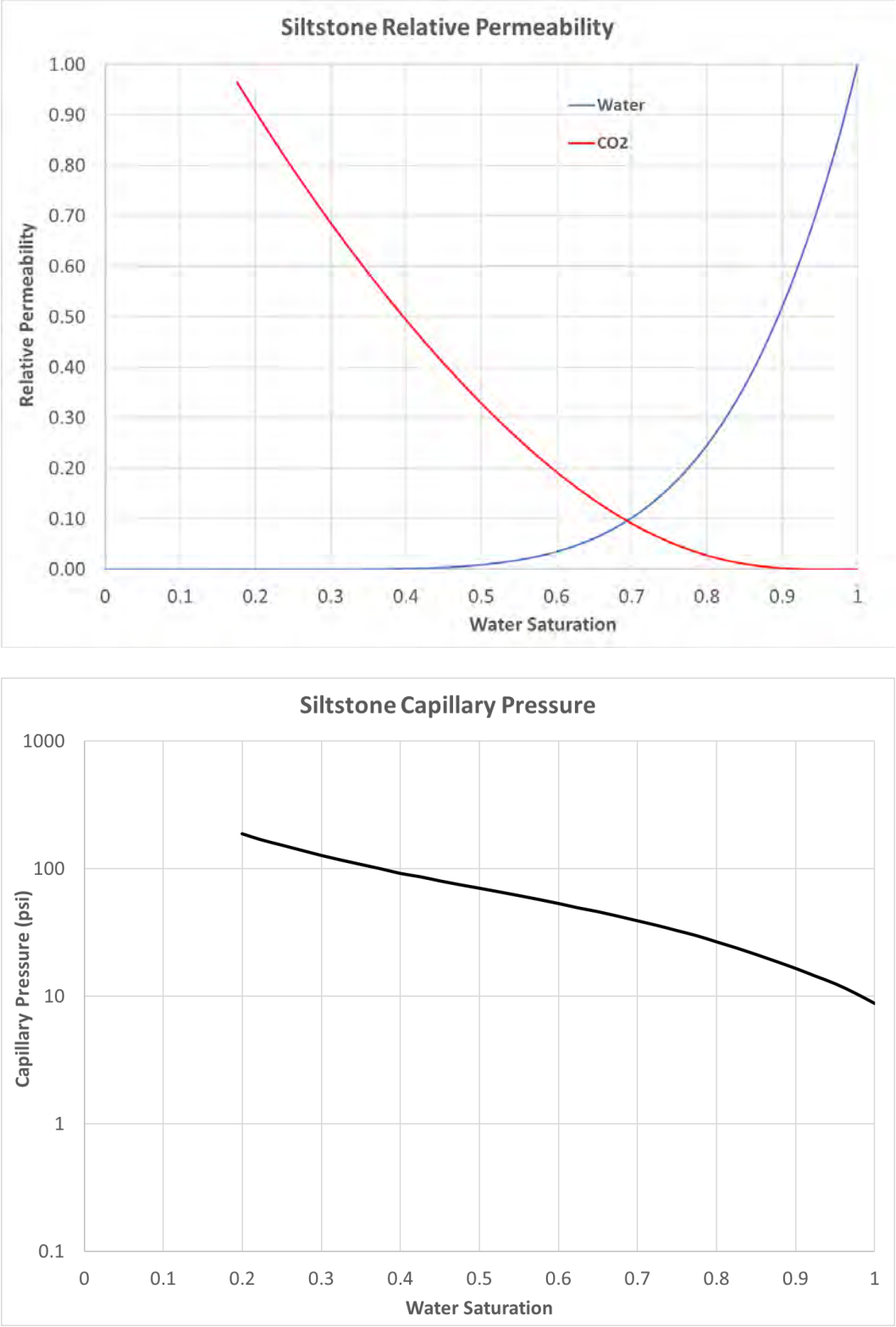



Figure 3-6. Relative permeability (top) and capillary pressure curves (bottom) for the siltstone facies of the Opeche/Spearfish Formation.

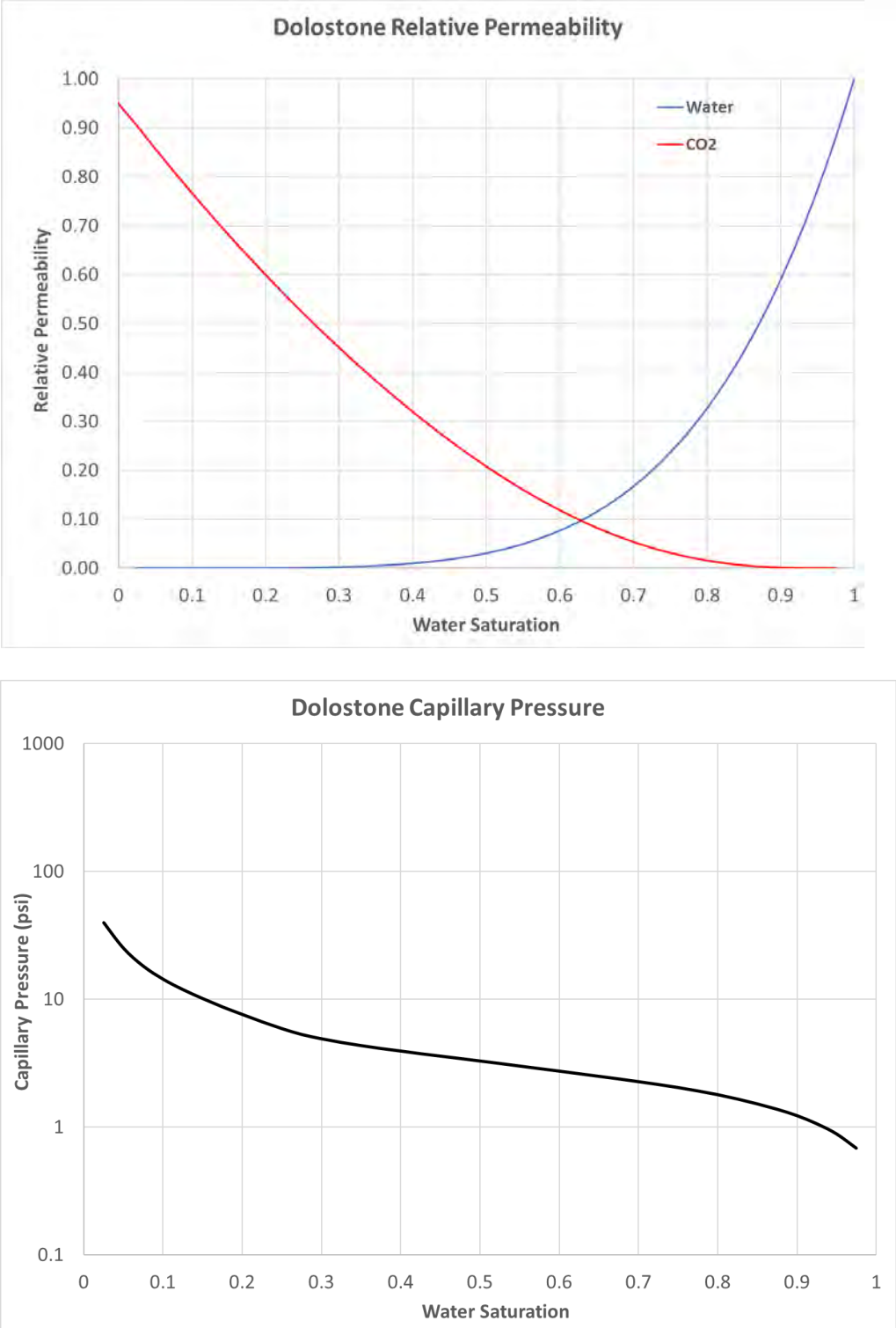



Figure 3-7. Relative permeability (top) and capillary pressure curves (bottom) for the dolostone facies of the Broom Creek and Amsden Formations.

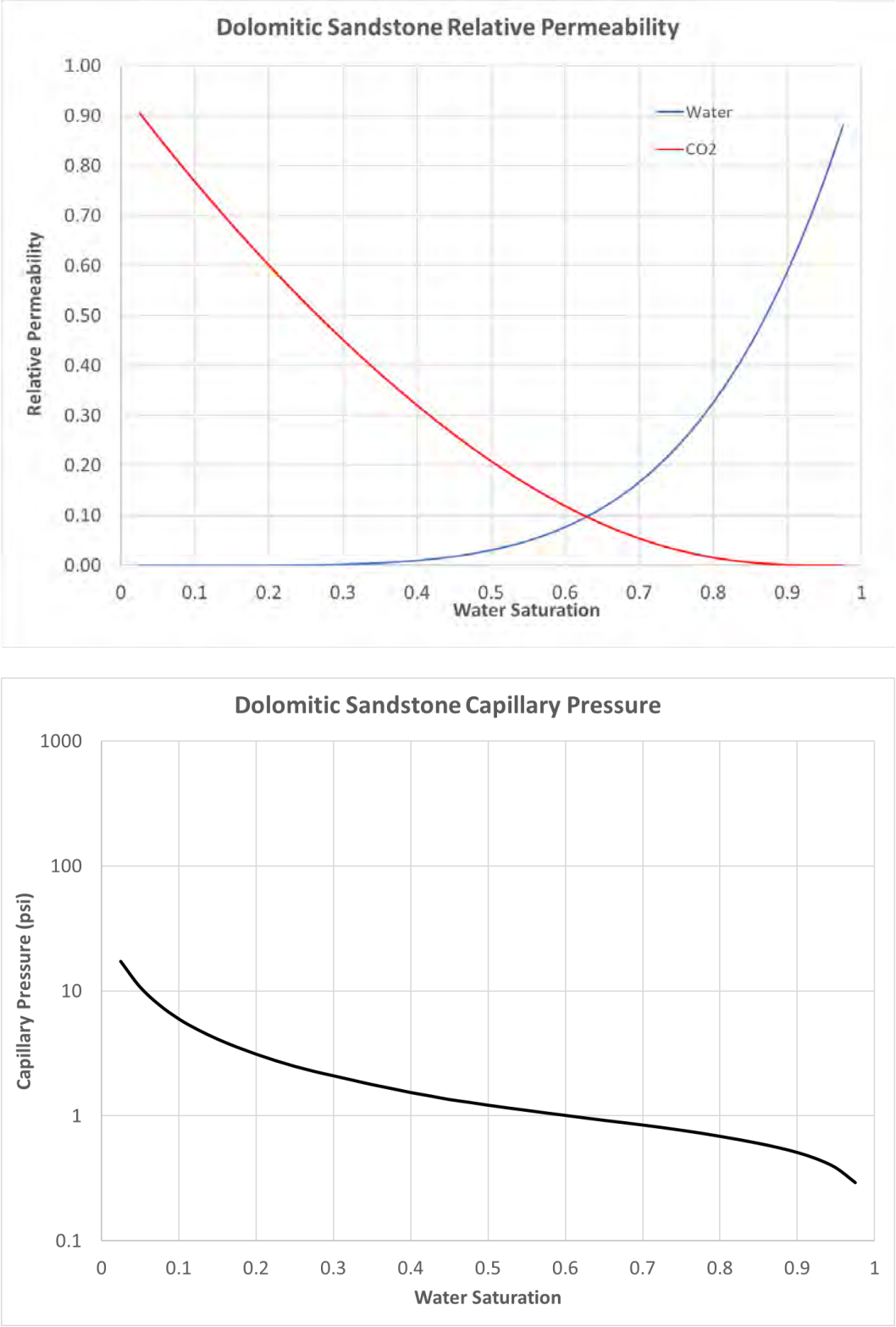
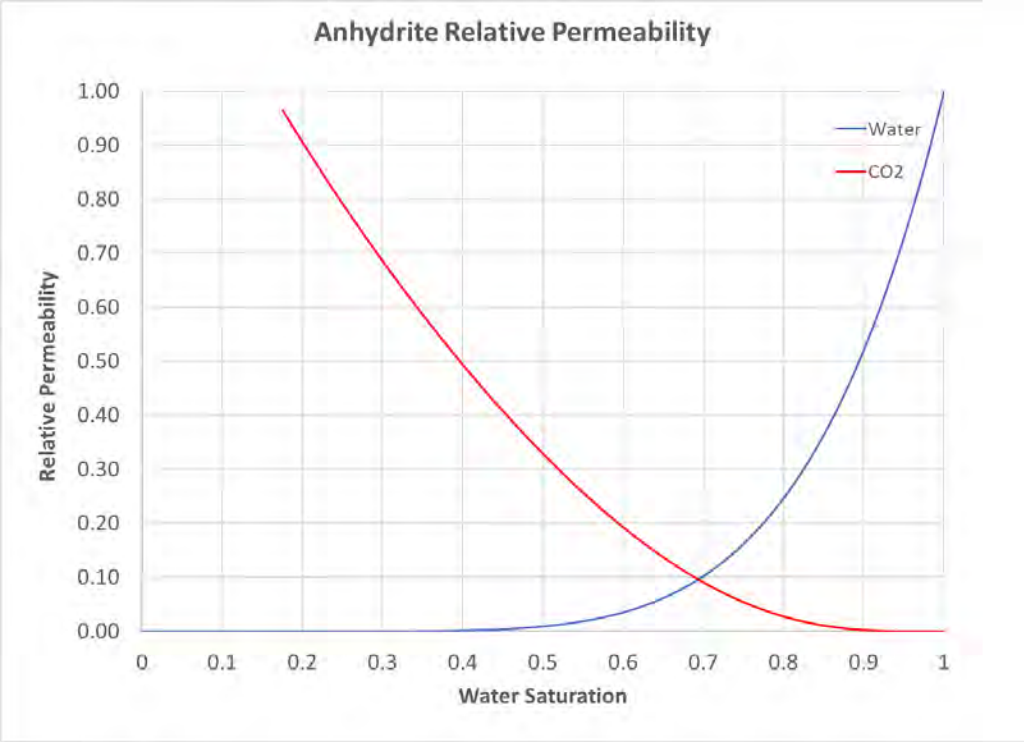



Figure 3-8. Relative permeability (top) and capillary pressure curves (bottom) for the dolomitic sandstone facies of the Broom Creek and Amsden Formations.



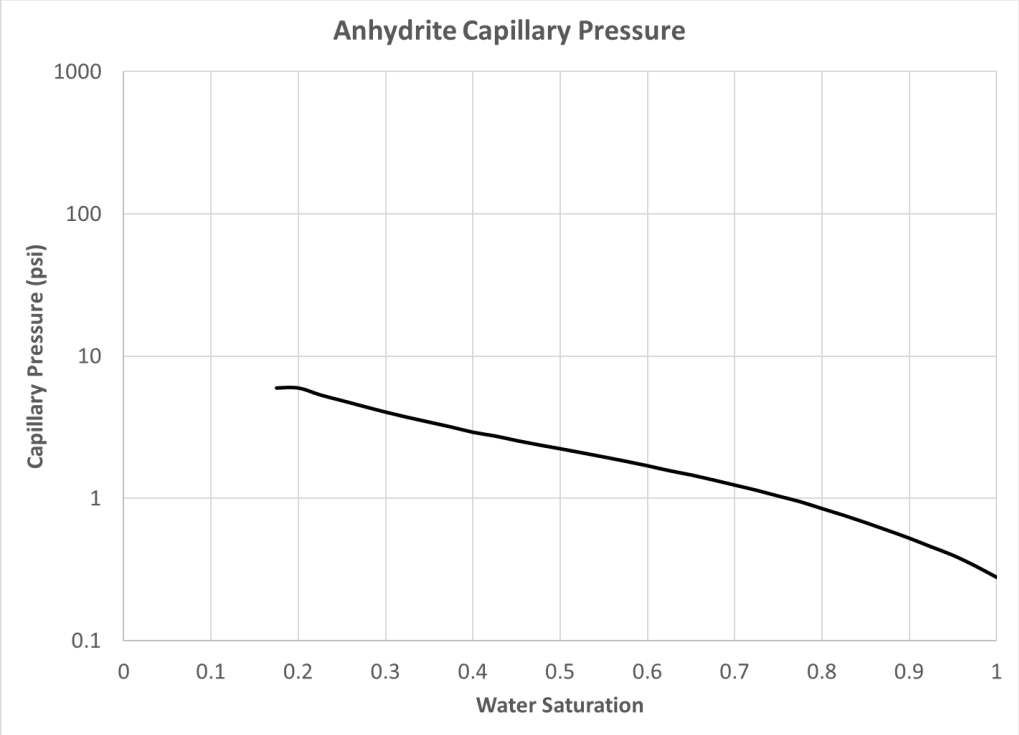




Figure 3-9. Relative permeability (top) and capillary pressure curves (bottom) for the anhydrite facies of the Broom Creek and Amsden Formations.

**Table 3-3. Core and Model Properties (Porosity [Phi], Permeability [K], and Reservoir Quality Index [RQI] Showing the Multiplication Factor Used to Calculate Capillary Entry Pressure (Pce) Used in the Simulation Model**

| | Core | | | | | Model | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Phi, fraction | K, mD | Pce A/Hg, psi | Pce B/$CO_2$, psi | RQI | Phi, fraction | K, mD | Pce B/$CO_2$, psi | RQI | Multiplication Factor |
| Sandstone Sample | 0.267 | 1147 | 3.04 | 0.2006 | 2.058 | 0.238 | 1379.000 | 0.173 | 2.393 | 0.860 |
| Siltstone Sample | 0.017 | 0.00002 | 2630 | 168.1 | 0.001 | 0.048 | 0.016 | 9.987 | 0.018 | 0.059 |
| Dolostone Sample | 0.048 | 0.00478 | 274 | 18.08 | 0.010 | 0.086 | 13.430 | 0.458 | 0.391 | 0.025 |
| Dolomitic-Sands Sample | 0.087 | 0.00683 | 400 | 25.6 | 0.009 | 0.155 | 272.100 | 0.171 | 1.315 | 0.007 |
| Anhydrite Sample | 0.017 | 0.00002 | 2630 | 168.1 | 0.001 | 0.028 | 9.842 | 0.308 | 0.589 | 0.002 |



BK FISCHER/ARCHIE ERICKSON 2

zone of the model (5841 ft TVD for BK Fischer 1 and 5828 ft TVD for BK Fischer 2), and then multiplying this product by 90% as a safety factor. These values were used as the injection constraint in the numerical simulation of the expected injection scenario. The top perforations were placed within the uppermost sandstone of the Broom Creek just below the capping anhydrite, which will act as a barrier to $CO_2$ flow because of the anhydrite's low porosity and permeability. Perforation depths for the BK Fischer 1 and BK Fischer 2 were calculated prior to final injection site selection, and are based on expected ground-level elevation.

The simulation model permeability was tuned globally by applying a permeability multiplier to match the reservoir properties estimated from the well-testing data in the Broom Creek Formation near the Milton Flemmer 1 well. The permeability multiplier was calculated based on the area of study during the injectivity test, the radius of investigation, and the permeability thickness (transmissibility) values from the pressure transient analysis. Ultimately, a global multiplier of 2.5 was applied before numerical simulations to provide a more conservative input for simulation.

The $CO_2$ stream used to conduct numerical simulations of $CO_2$ injection was composed of 98.25% (by volume) $CO_2$ and 1.75% trace quantities of other constituents, including 1.44% nitrogen ($N_2$), 0.31% oxygen ($O_2$), and 0.001% hydrogen sulfide ($H_2S$). This is the anticipated average $CO_2$ injection stream based on compositional studies of $CO_2$ from potential sources. Other constituents such as sulfur, hydrocarbons, glycol, amine, aldehydes, $NO_x$, and $NH_3$ may also be present but in a negligible amount that would impact neither fluid flow dynamics nor geochemical reactions in the storage formation and were not included.

Approximately 6 mi southeast from BK Fischer is the injection site identified for TB Leingang and approximately 10 mi northeast is KJ Hintz, as shown in Figures 2-1 and 3-4. BK Fischer is included in the numerical model and simulated injecting simultaneously with TB Leingang and KJ Hintz. BK Fischer consists of two Broom Creek injection wells (BK Fischer 1 and 2), which are proposed to inject at the maximum allowable BHP (90% of the product when multiplying the fracture gradient by top perforation depth) with a secondary maximum allowable WHP constraint of 2100 psi for a total 20-year $CO_2$ injection period. The well constraints and wellbore model inputs for the simulation model are shown in Table 3-4. The wells (TB Leingang 1 and 2 and KJ Hintz 1 and 2) at nearby sites are also operated under the same conditions with their corresponding maximum BHPs and WHP (2100 psi).

Results using the 7-in. tubing simulation case are presented in this section and used for purposes of boundary delineations (storage facility area, AOR), as the resulting areal extent of these boundaries was greater and, therefore, represents a more conservative scenario.

### *3.3.2 Sensitivity Analysis*

Because the availability of data for this study included well logs, core sample data, and rock–fluid properties, the need for typical sensitivity studies of influential reservoir parameters has been reduced. A preliminary sensitivity analysis of the wellbore model parameters suggested that, at the given injection volume rates and BHP conditions, the wellhead temperature (WHT) played a prominent role in determining WHP response. Sensitivity simulations of different WHTs indicated that injection at a higher WHT would require a higher WHP. For evaluating the expected injection design, a WHT value of 60°F was chosen to most closely represent the expected operational temperature.

**Table 3-4. Well Constraints and Wellbore Model in the Simulation Model***

| Well Constraint, maximum BHP | Secondary Well Constraint, WHP | Tubing Size | Wellhead Temp. | Downhole Temperature** |
|---|---|---|---|---|
| 3663 psi (TB Leingang 1) | 2100 psi (TB Leingang 1 and 2) | 7 in. | 60°F | 136.4°F at 5668 ft TVD (TB Leingang 1) |
| 3669 psi (TB Leingang 2) | | | | 136.5°F at 5678 ft TVD (TB Leingang 2) |
| 3633psi (BK Fischer 1) | 2100 psi (BK Fischer 1 and 2) | | | 127.6°F at 5841 ft TVD (BK Fischer 1) |
| 3624 psi (BK Fischer 2) | | | | 127.4°F at 5828 ft TVD (BK Fischer 2) |
| 3828 psi (KJ Hintz 1) | 2100 psi (KJ Hintz 1 and 2) | | | 116°F at 5426 ft TVD (KJ Hintz 1) |
| 3808 psi (KJ Hintz 2) | | | | 115.5°F at 5397 ft TVD (KJ Hintz 2) |

* A WHT temperature of 60°F was used for wellbore modeling, and an average ambient surface temperature of 40°F was used for reservoir modeling.

** The formula used to calculate downhole/reservoir temperature in both wellbore and reservoir modeling is Depth × Reservoir Temperature Gradient + 40ºF = Downhole/Reservoir Temperature.

## 3.4 Simulation Results

The maximum WHP constraint of 2100 psi was one of the constraints on the injection wells for the entire 20 years of simulated injection. The maximum BHP constraint of 3633 psi for BK Fischer 1 and 3624 psi for BK Fischer 2 (equal to 90% of the product when multiplying the fracture gradient by top perforation depth) was approached near years 13 and 5 of injection, respectively (Figure 3-10), translating to a cumulative combined 98.3 MMt of $CO_2$ injected into the Broom Creek Formation by BK Fischer 1 and 2 (Figure 3-11). Simulations of $CO_2$ injection with the given well constraints, listed in Table 3-4, predicted the injection rate would decline from a maximum initial injection rate of approximately 4.02 MMt/yr per well to a final rate of approximately 2.19 and 0.73 MMt/yr per well (with a 20-year combined average of approximately 3.07 and 1.85 MMt/yr per injection well, respectively) (Figure 3-12).

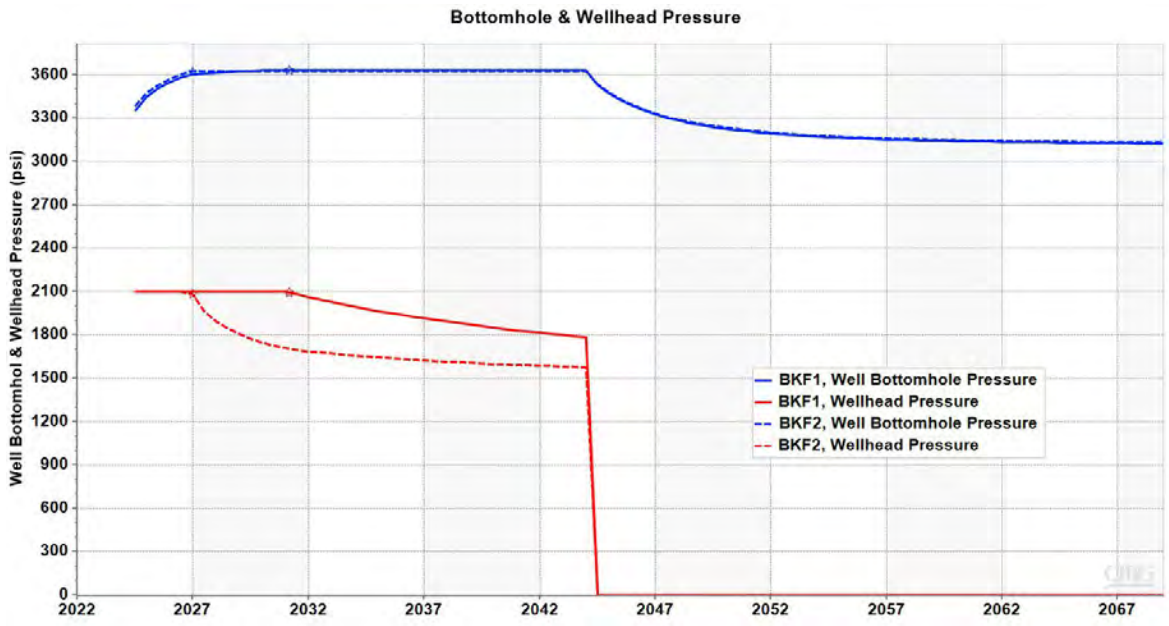



Figure 3-10. Predicted WHP and BHP responses.

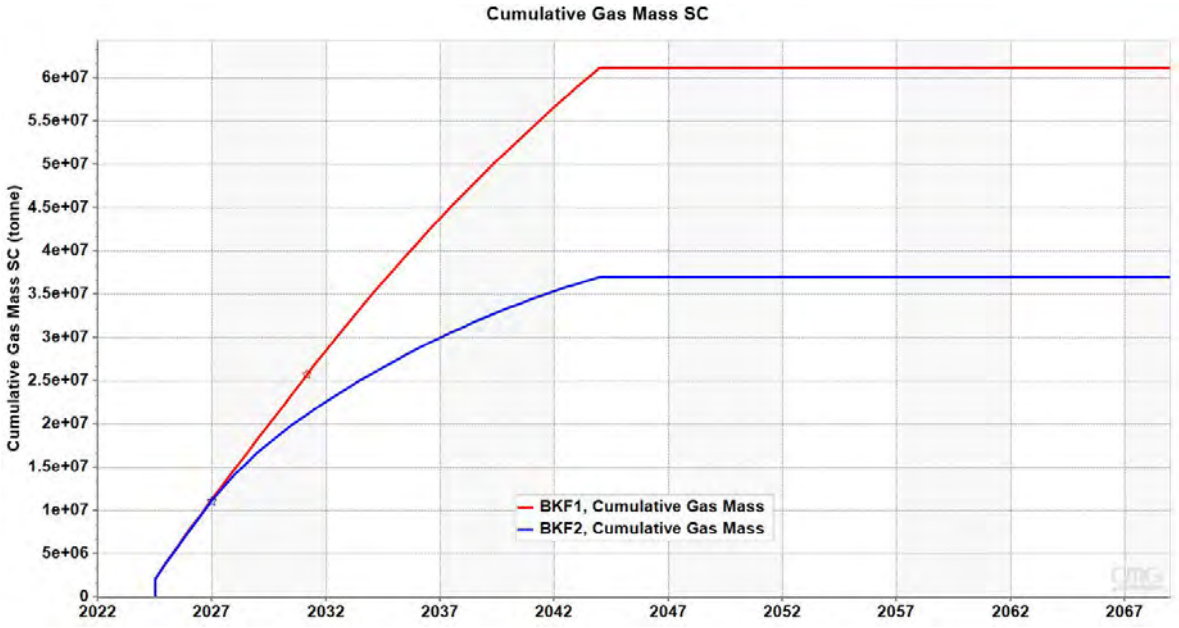



Figure 3-11. Cumulative injected gas mass over 20 years of injection with well pressure constraints.

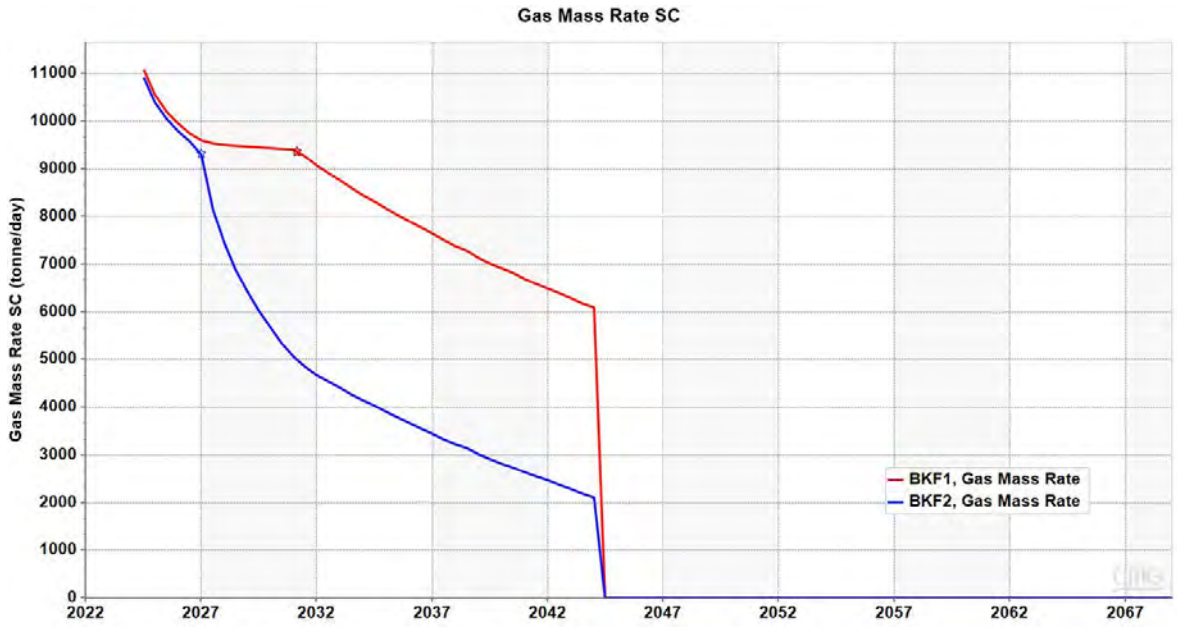



Figure 3-12. Predicted mass injection rate over 20 years of injection with well pressure constraints.

WHP and BHP responses depend on several factors, including predicted injection rate, injection tubing parameters (tubing internal radius and relative roughness), and surface injection temperature. For the designed tubing size of 7 in., the wells are operated at the maximum WHP of 2100 psi during the 20-year injection period (Figure 3-10).

During and after injection, supercritical $CO_2$ (free-phase $CO_2$) accounts for the majority of $CO_2$ observed in the modeled pore space. Throughout the injection operation, a portion of the free-phase $CO_2$ is trapped in the pore space through a process known as residual trapping. Residual trapping can occur as a function of low $CO_2$ saturation and inability to flow under the effects of relative permeability. $CO_2$ also dissolves into the formation brine throughout injection operations (and continues afterward), although the rate of dissolution slows over time. The free-phase $CO_2$ transitions to either residually trapped or dissolved $CO_2$ during the postinjection period, resulting in a decline in the mass of free-phase $CO_2$. The relative portions of supercritical, trapped, and dissolved $CO_2$ can be tracked throughout the duration of the simulation (Figure 3-13).

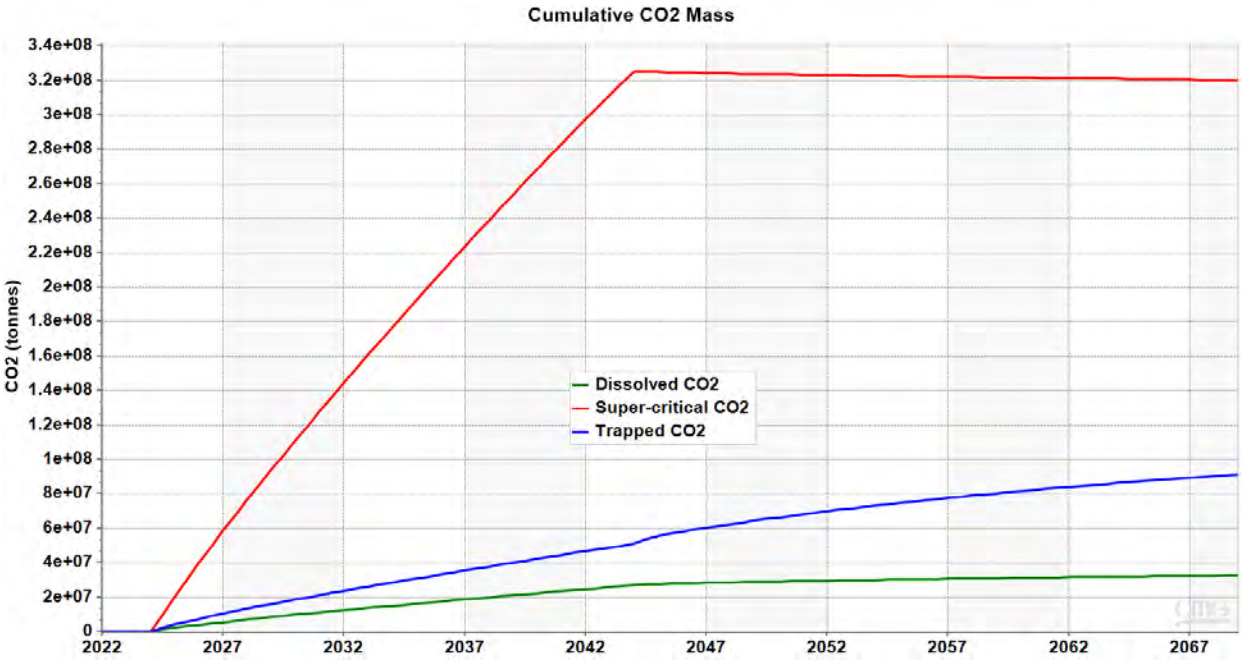



Figure 3-13. Simulated total supercritical free-phase $CO_2$, trapped $CO_2$, and dissolved $CO_2$ in brine, for the three adjacent project sites (comprising six injection wells, namely TB Leingang 1 and 2, BK Fischer 1 and 2, and KJ Hintz 1 and 2).

The pressure fronts (Figures 3-14a–d) show the distribution of average pressure increase throughout the Broom Creek Formation after 5, 10, and 20 years of injection as well as 10 years postinjection. A maximum increase of approximately 1024 psi was estimated in the near-wellbore area at the end of the 20-year injection period (Figure 3-14c).

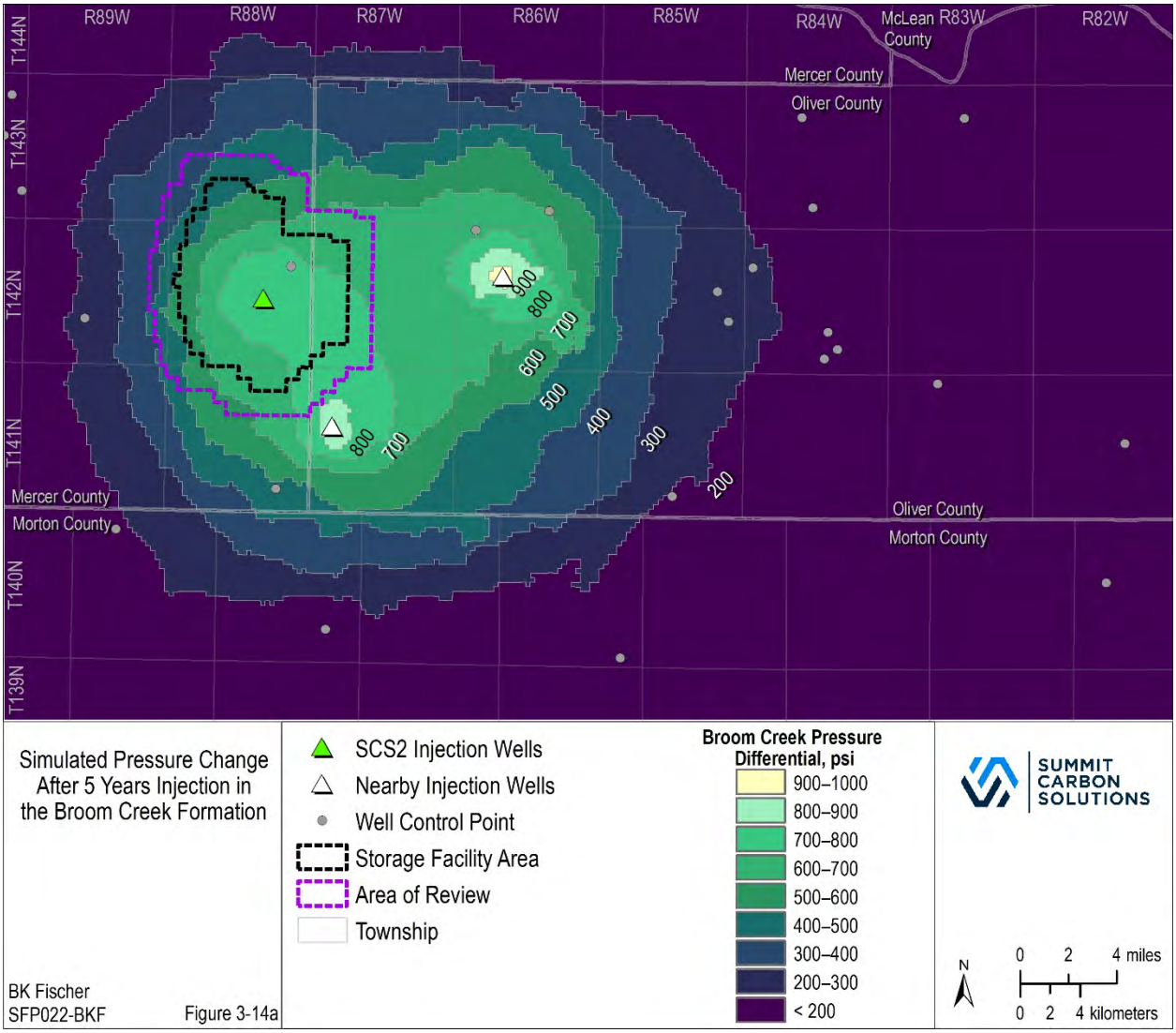



Figure 3-14a. Average pressure increase within the Broom Creek Formation after 5 years of simulated $CO_2$ injection operation.

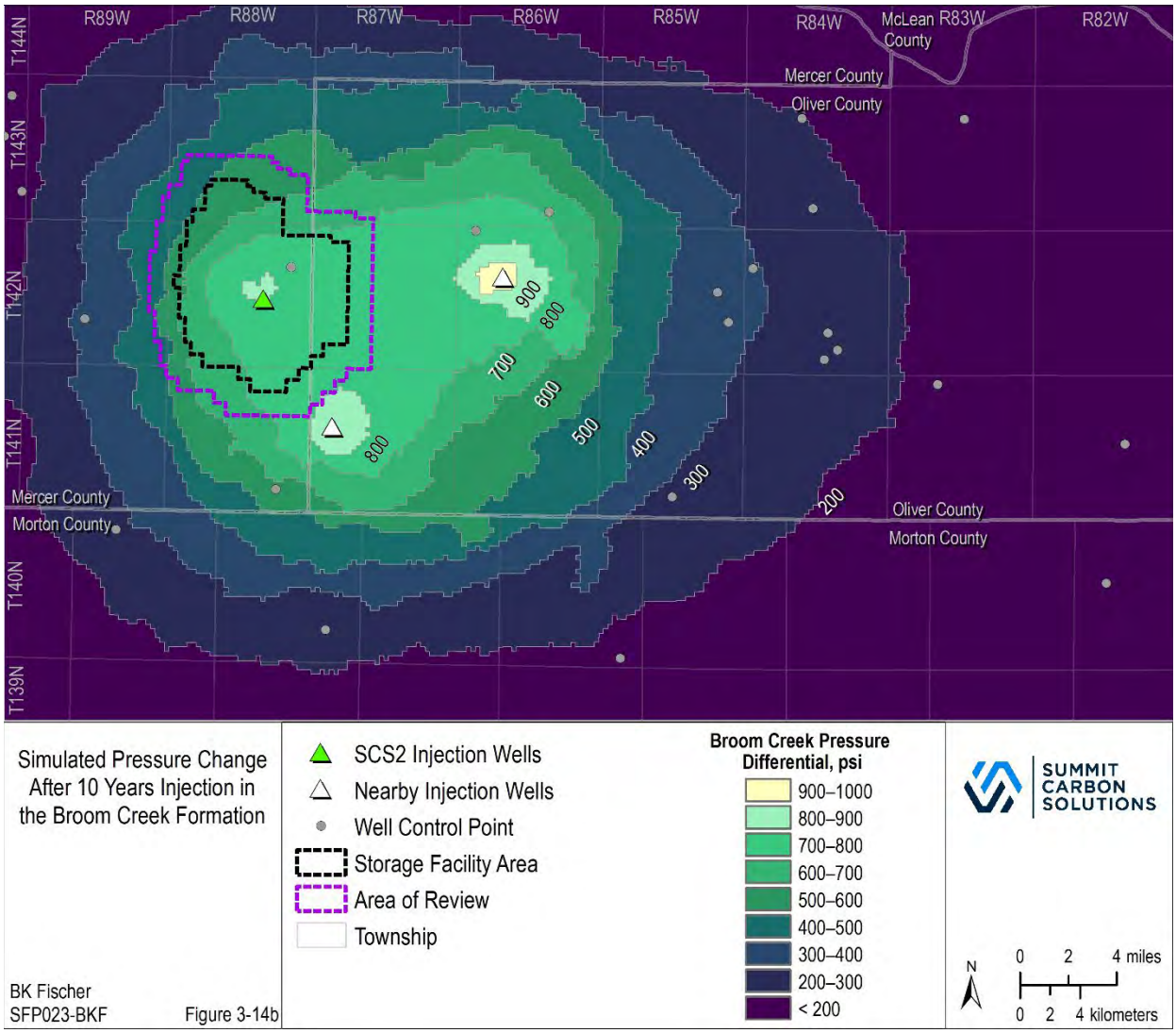



Figure 3-14b. Average pressure increase within the Broom Creek Formation after 10 years of simulated $CO_2$ injection operation.

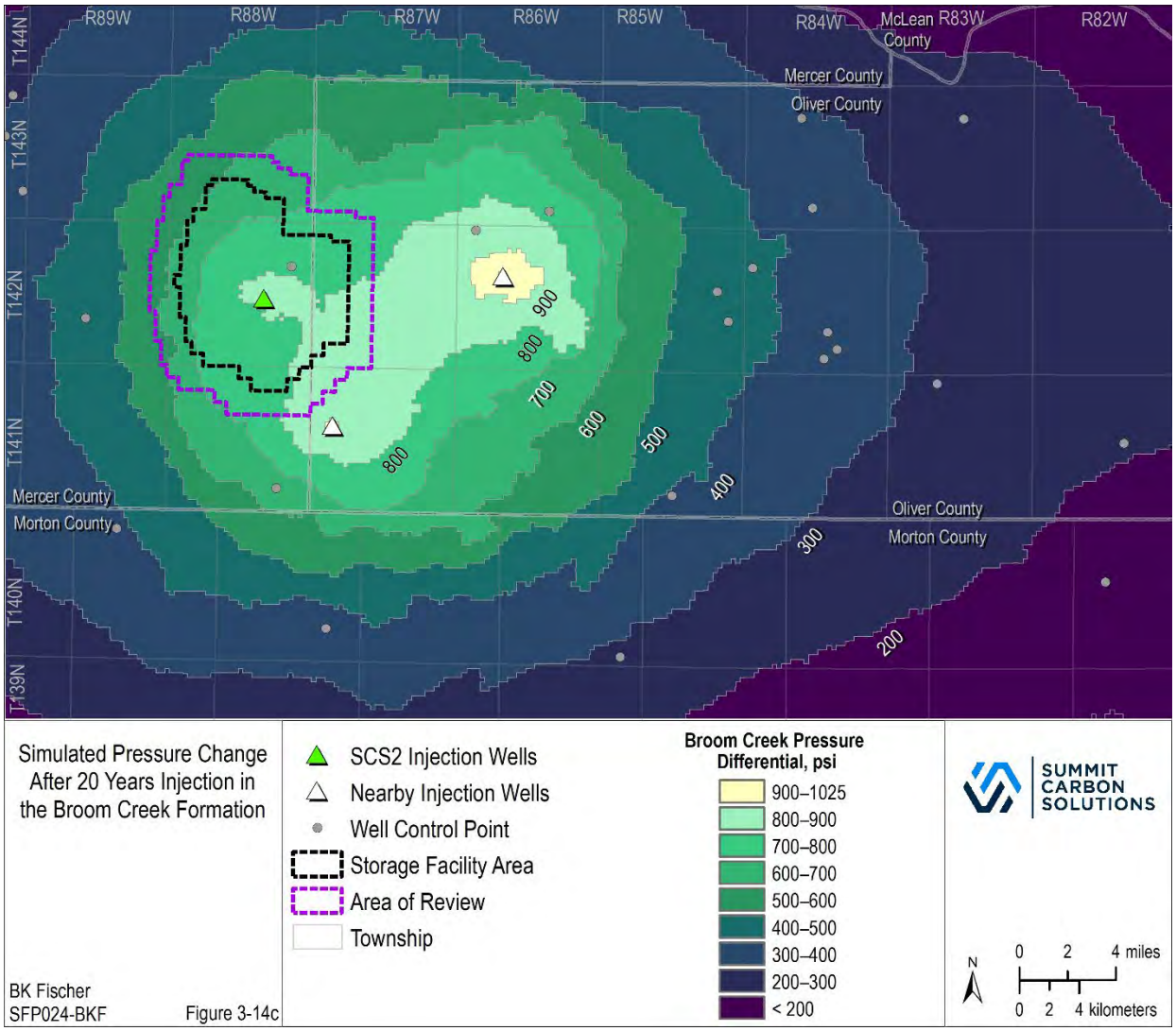



Figure 3-14c. Average pressure increase within the Broom Creek Formation after 20 years of simulated $CO_2$ injection operation (end of injection operation).

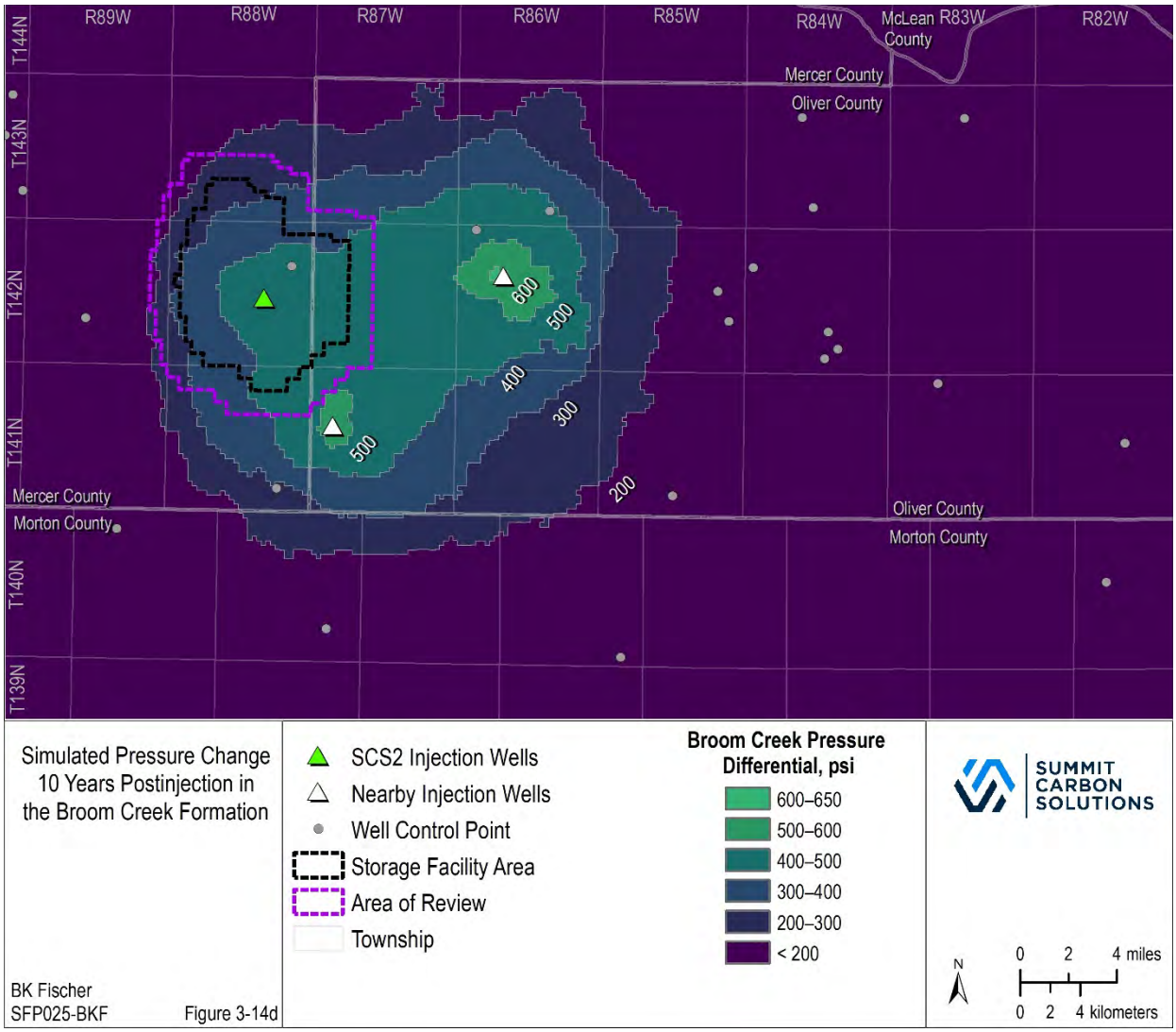



Figure 3-14d. Predicted decrease in pressure in the storage reservoir over a 10-year period following the cessation of $CO_2$ injection.

Long-term $CO_2$ migration potential was also investigated through numerical simulation efforts. The slow lateral migration of the plume is caused by the effects of buoyancy where the free-phase $CO_2$ injected into the formation rises to the bottom of the upper confining zone or lower-permeability layers present in the Broom Creek Formation and then outward. This process results in a higher concentration of $CO_2$ at the center which gradually spreads out toward the model edges where the $CO_2$ saturation is lower. Trapped $CO_2$ saturations, employed in the model to represent fractions of $CO_2$ trapped in small pores as immobile supercritical fluids, ultimately immobilize the $CO_2$ plume and limit the plume's lateral migration and spreading. Figures 3-15a–c show the $CO_2$ saturation at the end of injection in west-to-east and north-to-south cross-sectional views.

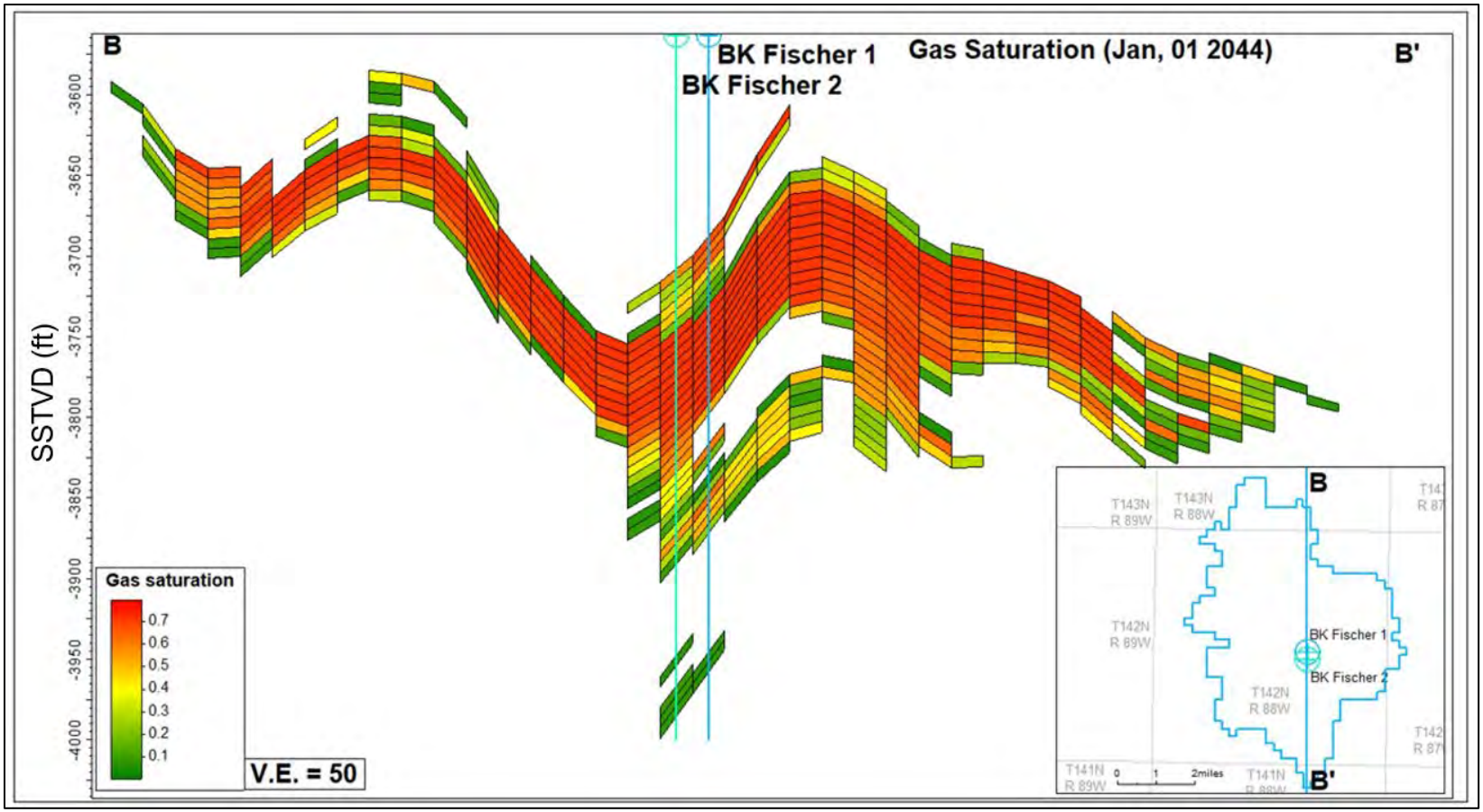



Figure 3-15a. North-to-south (I-layer 57) cross section showing the $CO_2$ plume at the end of injection. White cells or "empty" intervals contain $CO_2$ saturation that is less than 5%. 50× vertical exaggeration is shown**.**

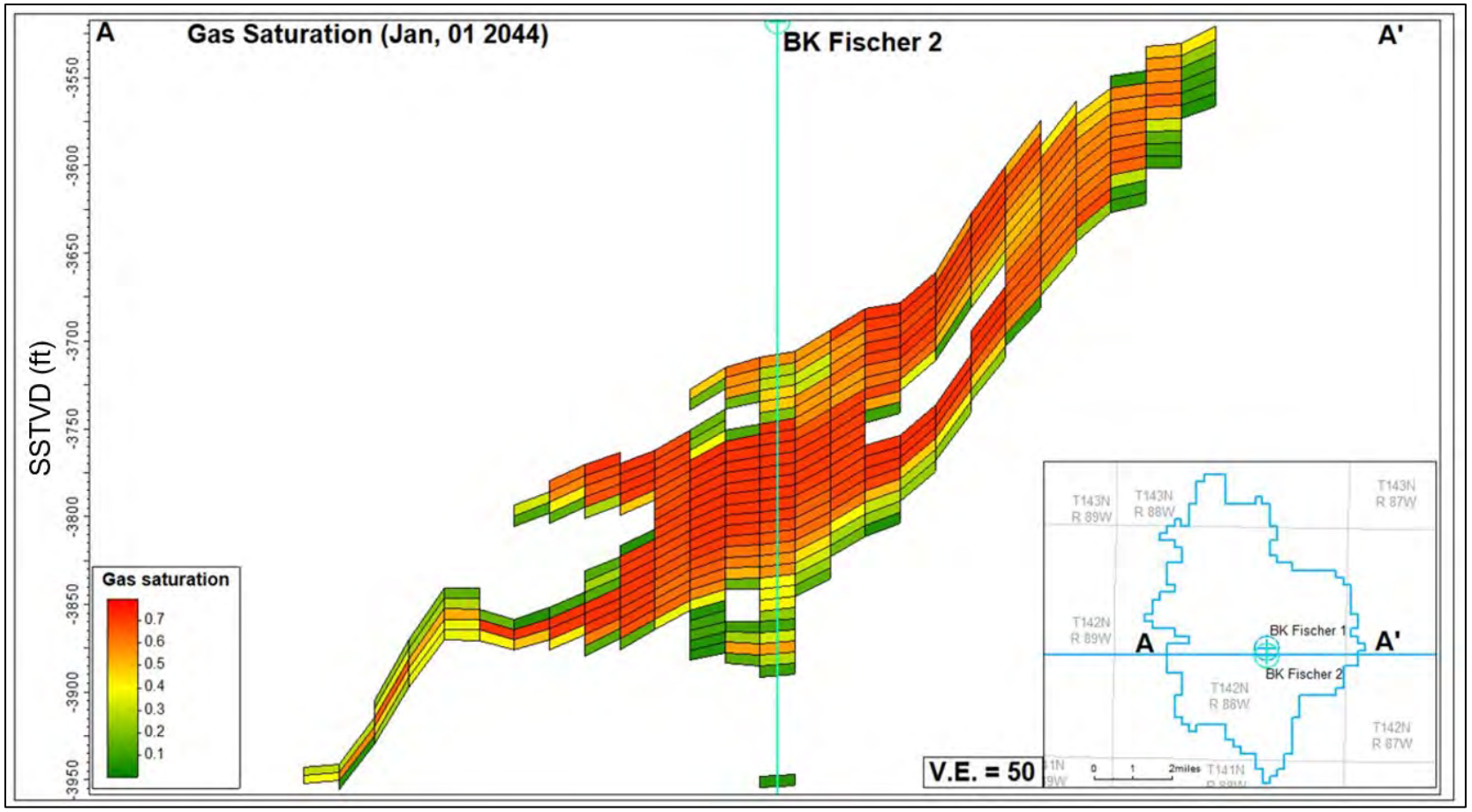



Figure 3-15b. West-to-east (J-layer 92) cross section showing the $CO_2$ plume at the end of injection. White cells or "empty" intervals contain $CO_2$ saturation that is less than 5%. 50× vertical exaggeration is shown.

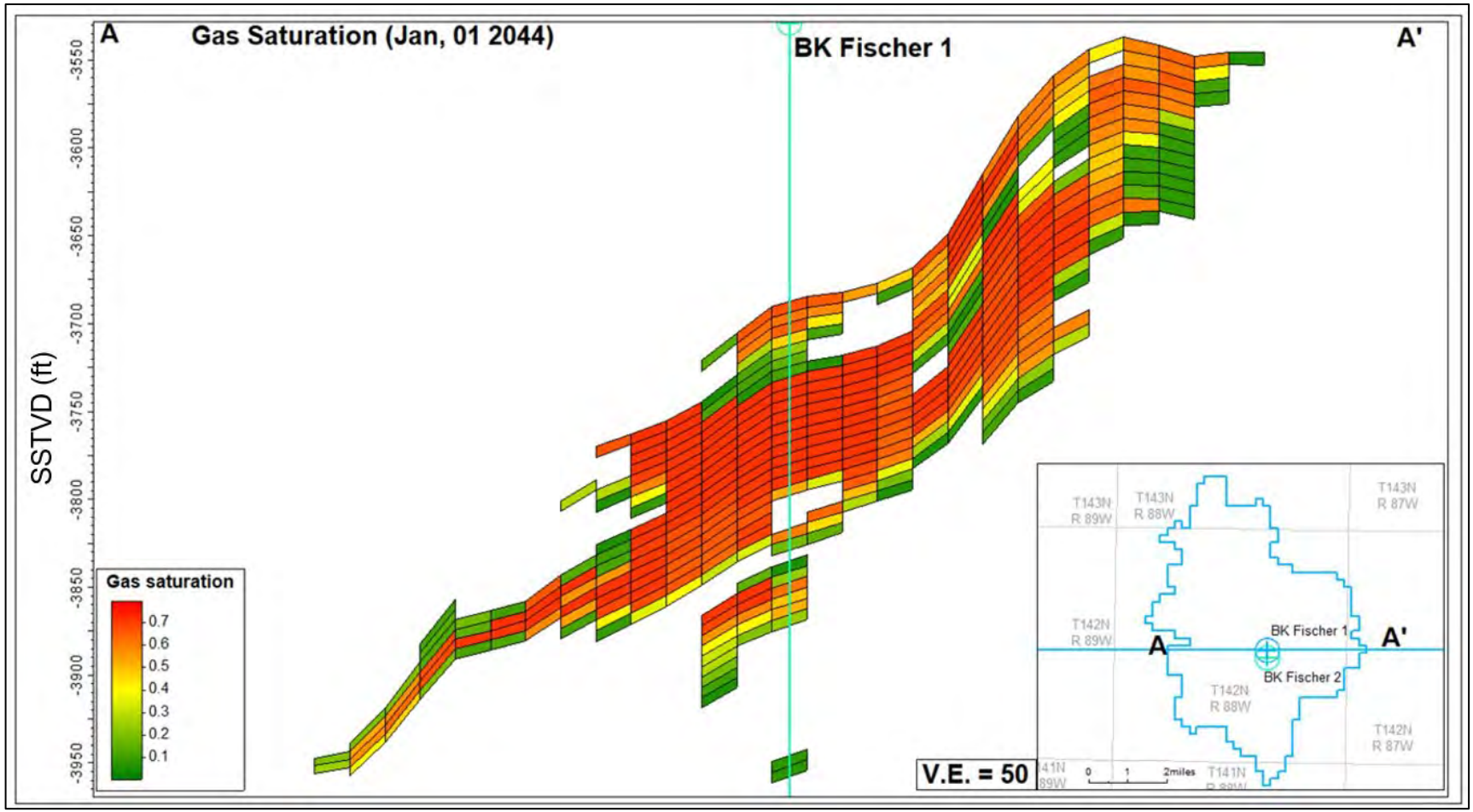



Figure 3-15c. West-to-east (J-layer 93) cross section showing the $CO_2$ plume at the end of injection. White cells or "empty" intervals contain $CO_2$ saturation that is less than 5%. 50× vertical exaggeration is shown.

### *3.4.1 Maximum Injection Pressure and Rates*

An additional case was run to determine if a well would ultimately be limited by the maximum WHP of 2100 psi or maximum calculated downhole pressure of 90% of the fracture propagation pressure at the perforated depth (3633 psi [BK Fischer 1] and 3624 psi [BK Fischer 2]). The estimated fracture propagation pressure gradient of 0.691 psi/ft was used for the calculated maximum BHP as the only injection constraint to evaluate maximum storage potential for each injection well.

When a single injection well reaches the maximum BHP condition of 3633 or 3624 psi in the simulation, the corresponding predicted average WHPs are reaching approximately 5700 and 5220 psi, respectively, for BK Fischer 1 and BK Fischer 2 (Figure 3-16). The predicted maximum daily injection rate could reach approximately 46,800 and 32,400 tonnes/day, respectively, for BK Fischer 1 and BK Fischer 2.

A total volume of 194.2 and 184.0 MMt of gas was injected over 20 years, respectively, resulting in the calculated daily averaged maximum gas injection rate of 26,603 and 25,205 tonnes/day (the total volume divided by 20 years × 365 days) respectively, for BK Fischer 1 and BK Fischer 2 (see Table 11-1).

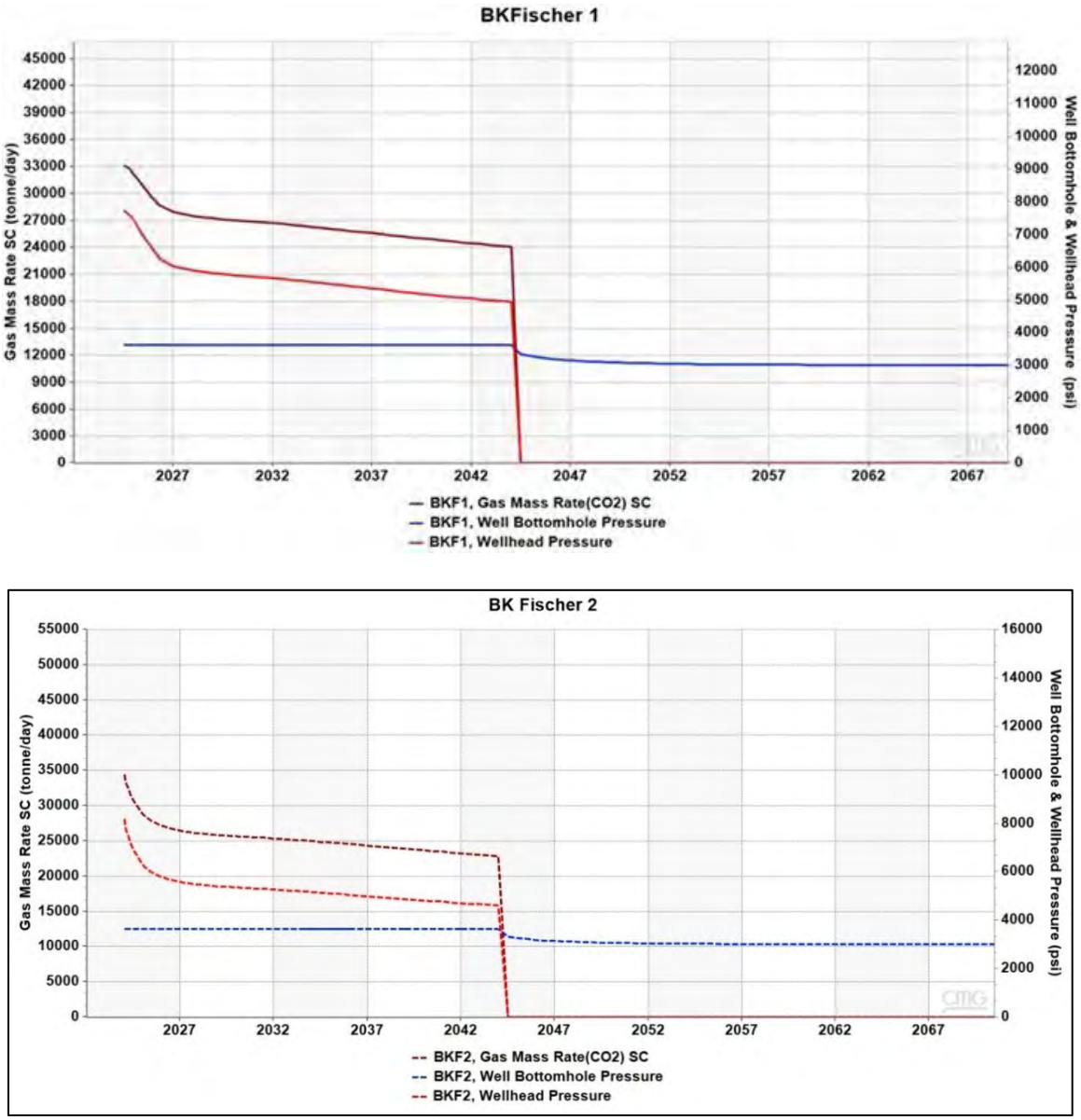



Figure 3-16. Maximum pressure and gas rate response when the well was operated at max BHP only (without any WHP limits) for BK Fischer 1 (top) and BK Fischer 2 (bottom). The BK Fischer 1 image is presented using a one-year timestep to correct for numerical convergence artifacts. The BK Fischer 2 image is presented using a six month timestep.

### *3.4.2 Stabilized Plume and Storage Facility Area*

Movement of the injected $CO_2$ plume is driven by the potential energy found in the buoyant force of the injected $CO_2$. As the plume spreads out within the reservoir and $CO_2$ is trapped residually through the effects of relative permeability and dissolution, the potential energy of the buoyant $CO_2$ is gradually lost. Eventually, the buoyant force of the $CO_2$ is no longer able to overcome the capillary entry pressure of the surrounding reservoir rock. At this point, the $CO_2$ plume ceases to move within the subsurface and becomes stabilized. The extent of the stabilized plume is important

for determining the project's AOR and the corresponding scale and scope of the project's monitoring plans.

Plume stabilization can be visualized at the microscale as $CO_2$ being unable to exit its current pore space and enter the neighboring pore space, but at the macroscale, these interactions cannot be measured. Instead, plume stabilization may be estimated using the tools available to predict the $CO_2$ plume's extent.

For this permit, the $CO_2$ plume was assessed in 1-year time steps until the rate of total areal extent change slowed to less than 0.2 square mi per 1-year time step to define the stabilized plume extent boundary and the associated buffers and boundaries. This estimate is anticipated to be regularly updated during the $CO_2$ storage operation as data collected from the site are used to update predictions made about the behavior of the injected $CO_2$.

## 3.5 Delineation of the Area of Review

The North Dakota Administrative Code (N.D.A.C.) defines an AOR as the region surrounding the geologic sequestration project [storage project] where underground sources of drinking water [USDWs] may be endangered by the [$CO_2$] injection activity (N.D.A.C. § 43-05-01-01[4]). The primary endangerment risk is the potential for vertical migration of $CO_2$ and/or formation fluids from the storage reservoir into a USDW. At a minimum, the AOR includes the areal extent of the $CO_2$ plume within the storage reservoir.

However, the $CO_2$ plume has an associated pressure front where $CO_2$ injection increases the formation pressure above initial (preinjection) conditions. Generally, the pressure front is larger in areal extent than the $CO_2$ plume. Therefore, the AOR encompasses both the areal extent of the $CO_2$ plume within the storage reservoir and the extent of the reservoir fluid pressure increase sufficient to drive formation fluids (e.g., brine) into a USDW, assuming pathways for this migration (e.g., legacy oil and gas wells or fractures) are present. Because the pressure front is larger in areal extent than the $CO_2$ plume, AOR delineation focuses on the pressure front.

The minimum pressure increase in the reservoir that results in a sustained flow of brine upward from the storage reservoir into an overlying drinking water aquifer is referred to as the "critical threshold pressure increase" and resultant pressure as the "critical threshold pressure." Therefore, the AOR is the areal extent of the storage reservoir that exceeds the critical pressure threshold. U.S. Environmental Protection Agency (EPA) guidance for AOR delineation under the underground injection control (UIC) program for Class VI wells provides several methods for estimating the critical threshold pressure increase and resulting critical threshold pressure.

In this document, "storage reservoir" refers to the Broom Creek Formation (the injection zone), "potential thief zone" refers to the Inyan Kara Formation, and "lowest USDW" refers to the Fox Hills Formation.

### *3.5.1 EPA Methods 1 and 2: AOR Delineation for Class VI Wells*

EPA guidance for AOR evaluation includes several computational methods for estimating the pressure buildup in the storage reservoir in response to $CO_2$ injection and the resultant areal extent of pressure buildup above a "critical threshold pressure" that could potentially drive higher-salinity

formation fluids from the storage reservoir up an open conduit to the lowest USDW (U.S. Environmental Protection Agency, 2013). The following equations and analytical approach define the EPA methods used to delineate AOR. Each method can be applied both at a single location (e.g., the BK Fischer 1 simulation well) using site-specific data or for each vertical stack of grid cells in a geocellular model, considering the varying stratigraphic thickness between storage reservoir and lowest USDW.

EPA Method 1 (*pressure front based on bringing the injection zone and USDW to equivalent hydraulic heads*) is presented as a method for determining whether a storage reservoir is in hydrostatic equilibrium with the lowest USDW (U.S. Environmental Protection Agency, 2013). Under Method 1, the maximum pressure increase that may be sustained in the injection zone (critical threshold pressure increase) is given by Equation 1:

$$\Delta P_{i,f} = P_u + \rho_i g\ (z_u - z_i) - P_i \qquad \text{[Eq. 1]}$$

Where:

$P_u$ is the initial fluid pressure in the USDW (Pa).
$\rho_i$ is the storage reservoir fluid density (kg/m$^3$).
$g$ is the acceleration due to gravity (m/s$^2$).
$z_u$ is the representative elevation of the USDW (m amsl*).
$z_i$ is the representative elevation of the injection zone (m amsl).
$P_i$ is the initial pressure in the injection zone (Pa).
$\Delta P_{i,f}$ is the critical threshold pressure increase (Pa).
(* amsl = above mean sea level)

Equation 1 assumes that the hypothetical open borehole is perforated exclusively within the injection zone and USDW. If $\Delta P_{i,f} = 0$, then the reservoir and USDW are in hydrostatic equilibrium; if $\Delta P_{i,f} > 0$, then the reservoir is underpressured relative to the USDW; and if $\Delta P_{i,f} < 0$, then the reservoir is overpressured relative to the USDW.

In scenarios where the storage reservoir and USDW are in hydrostatic equilibrium ($\Delta P_{i,f} = 0$), EPA Method 2 (*pressure front based on displacing fluid initially present in the borehole*) can be used to calculate the critical pressure threshold. Method 2 was originally presented by Nicot and others (2008) and Bandilla and others (2012). Method 2 calculates the critical threshold pressure increase ($\Delta P_c$), which is the fluid pressure increase sufficient to drive formation fluids into the lowermost USDW. This $\Delta P_c$ is determined using Equations 2 and 3, assuming 1) hydrostatic conditions, 2) initially linear densities in the borehole, and 3) constant density once the injection zone fluid is lifted to the top of the borehole (i.e., uniform density approach):

$$\Delta P_C = \frac{1}{2}\ g\ \xi\ (z_u - z_i)^2 \qquad \text{[Eq. 2]}$$

Where $\xi$ is a linear coefficient determined by:

$$\xi = \frac{\rho_i - \rho_u}{z_u - z_i} \qquad \text{[Eq. 3]}$$

Where:

$\Delta P_C$ is the critical threshold pressure increase (Pa).
$g$ is the acceleration of gravity (m/s$^2$).
$z_u$ is the elevation of the base of the lowermost USDW (m amsl).
$z_i$ is the elevation of the top of the injections zone (m amsl).
$\rho_i$ is the fluid density in the injection zone (kg/m$^3$).
$\rho_u$ is the fluid density in the USDW (kg/m$^3$).

### *3.5.2 Risk-Based AOR Delineation*

The methods described by EPA (2013) for estimating the AOR under the Class VI rule (40 U.S. Code of Federal Regulations [CFR] 146.81 et seq.) were developed assuming that the storage reservoirs would be in hydrostatic equilibrium with overlying aquifers. However, in the state of North Dakota, and potentially elsewhere around the United States, candidate storage reservoirs are already overpressured relative to overlying aquifers and thus subject to potential vertical formation fluid migration from the storage reservoir to the lowermost USDW, even prior to the planned storage project. Consequently, applying EPA (2013) methods to these geologic situations essentially results in an infinite AOR, which makes regulatory compliance infeasible.

Several researchers have recognized the need for alternative methods for estimating the AOR for locations that are already overpressured relative to overlying aquifers. For example, Birkholzer and others (2014) described the unnecessary conservatism in EPA's definition of critical pressure, which could lead to a heavy burden on storage facility permit (SFP) applicants. As an alternative, Burton-Kelly and others (2021) proposed a risk-based reinterpretation of this framework that would allow for a reduction in the AOR while ensuring protection of drinking water resources.

A computational framework for estimating a risk-based AOR was proposed by Oldenburg and others (2014, 2016), who compared formation fluid leakage through a hypothetical open flow path in the baseline scenario (no $CO_2$ injection) to the incrementally larger leakage that would occur in the $CO_2$ injection case. The modeling for the risk-based AOR used semianalytical solutions to single-phase flow equations to model reservoir pressurization and vertical migration through leaky wells. These semianalytical solutions were extensions of earlier work for formation fluid leakage through abandoned wellbores by Raven and others (1990) and Avci (1994), which were creatively solved, coded, and compiled in FORTRAN under the name ASLMA (Analytical Solution for Leakage in Multilayered Aquifers) and extensively described by Cihan and others (2011, 2012) (hereafter "ASLMA Model").

White and others (2020) outlined a similar risk-based approach for evaluating the AOR using the National Risk Assessment Partnership (NRAP) Integrated Assessment Model for Carbon Storage (NRAP-IAM-CS). However, NRAP-IAM-CS and the subsequent open-sourced version (NRAP-Open-IAM) are constrained to the assumption that the storage reservoir is in hydrostatic equilibrium with overlying aquifers and, therefore, may not accurately estimate the AOR for storage projects located in regions where the storage reservoir is overpressured relative to overlying aquifers.

Building a geologic model in a commercial-grade software platform (like Petrel; Schlumberger, 2020) and running fluid flow simulations using numerical reservoir simulation in a

commercial-grade software platform (like CMG's compositional simulator, GEM) provide the "gold standard" for estimating pressure buildup in response to $CO_2$ injection (e.g., Bosshart and others, 2018). However, these numerical reservoir simulations are typically limited to the storage reservoir and primary seal formation (cap rock) and do not include the geologic units overlying the cap rock because of the computational burden of conducting such a complex simulation. In addition, geologic modeling of the overlying units may add a substantial amount of time and effort during prefeasibility-phase projects that are unwarranted given the amount of uncertainty that may be present if only a few nearby wells can be used for characterization activities. Earlier studies (e.g., Nicot and others, 2008; Birkholzer and others, 2009; Bandilla and others, 2012; Cihan and others, 2011, 2012) have shown that far-field fluid pressure changes outside of the $CO_2$ plume domain can be reasonably described by a single-phase flow calculation by representing $CO_2$ injection as an equivalent-volume injection of brine (Oldenburg and others, 2014).

The semianalytical solutions embedded within the ASLMA Model have been shown to compare with the numerical model, TOUGH2-ECO2-N, and provided accurate results for pressures beyond the $CO_2$ plume zone (Birkholzer and others, 2009; Cihan and others, 2011, 2012). Therefore, the proposed workflow for delineating a risk-based AOR uses the ASLMA Model to examine pressure buildup in the storage reservoir and resultant effects of this buildup on the vertical migration of formation fluid via (single) hypothetical leaky wellbores located at progressively greater distances from the injection well (Figure 3-17).

An important distinction between EPA Methods 1 and 2, which both calculate a critical pressure threshold (either $\Delta P_{i,f}$ for Method 1 or $\Delta P_c$ for Method 2) and the risk-based AOR approach is that the risk-based approach 1) calculates and maps the potential incremental flow of formation fluids from the storage reservoir to the USDW that could occur and then 2) delineates the areal extent beyond which no significant leakage would occur. Therefore, the region beyond which no significant leakage would occur does not present an endangerment to the USDW; hence, the region inside of this areal extent is the risk-based AOR.

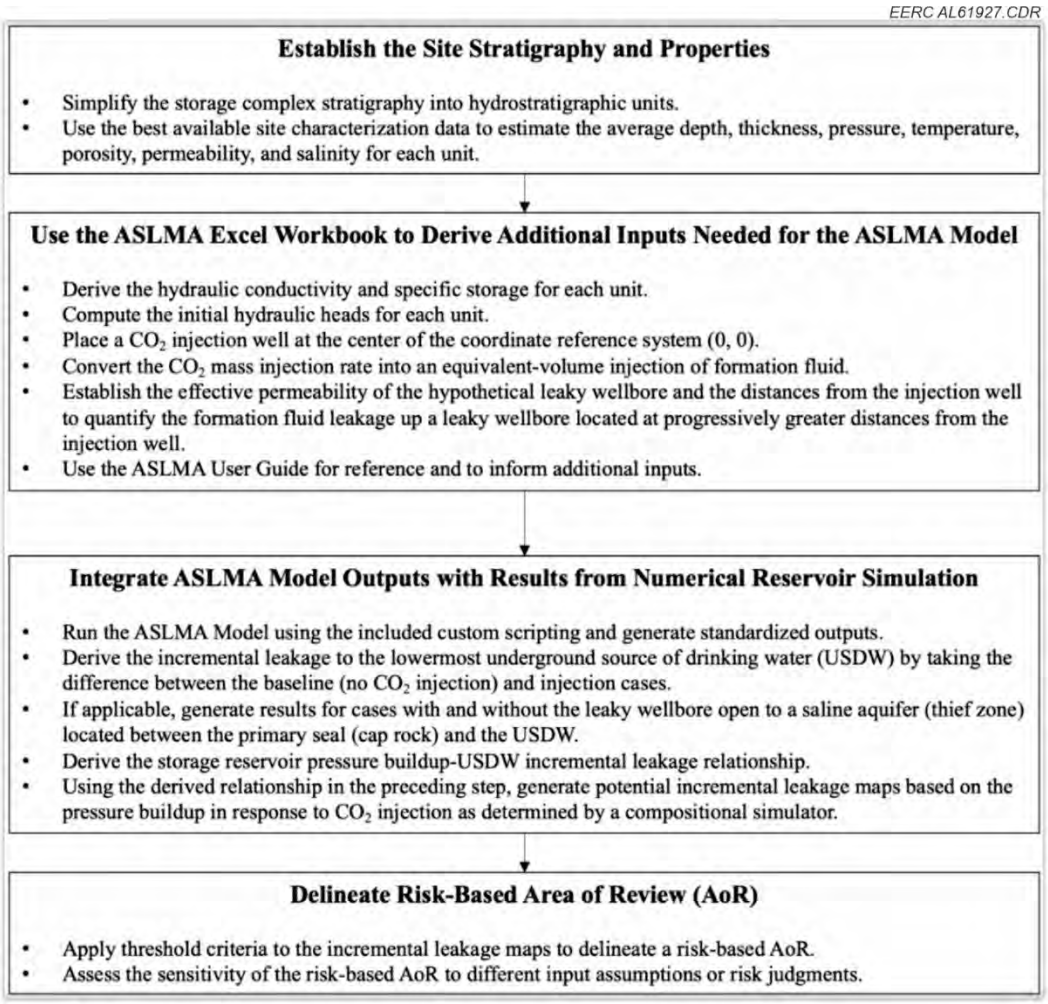



Figure 3-17. Workflow for delineating a risk-based AOR for an SFP (modified from Burton-Kelly and others, 2021).

### *3.5.3 Critical Threshold Pressure Increase Estimation*

For the purposes of delineating AOR for this permit, constant fluid densities for the lowermost USDW (Fox Hills Formation) and injection zone (Broom Creek Formation) were used in the calculations. Respective fluid densities were used to represent the injection zone fluids ($\rho_i$), which are estimated based on the in situ estimated brine salinity, temperature, and pressure at the Archie Erickson 2 stratigraphic test well.

Application of EPA Method 1 (Eq. 1) using model data from the BK Fischer 1 simulation well shows that the injection zone is overpressured with respect to the lowest USDW (i.e., Method 1 $\Delta P_{i,f} < 0$). An example of the EPA Method 1 application showing negative $\Delta P_{i,f}$ (relative overpressure) is given in Table 3-5, with similar results when applied to each column of the grid cells in the Broom Creek Formation simulation model.

**Table 3-5. EPA Method 1 Critical Threshold Pressure Increase Calculated at the BK Fischer 1 Simulation Well**

| Location Depth,* ft | m | $P_i$ Injection Zone Pressure, MPa | $P_u$ USDW Base Pressure, MPa | $\rho_i$ Injection Zone Density, kg/m$^3$ | $Z_u$ USDW Base Elevation, m amsl | $Z_i$ Reservoir Elevation, m amsl | $\Delta P_{i,f}$ Threshold Pressure Increase, MPa | psi |
|---|---|---|---|---|---|---|---|---|
| 5973.2 | 1821 | 19.7 | 4.65 | 1073 | 112 | -1180 | -1.47 | -213 |

* Ground surface elevation is 641 m amsl. Depth provided is the midpoint of the Broom Creek Formation in feet below ground surface.

In accordance with EPA (2013) guidance, the combination of a) a Method 1 negative $\Delta P_{i,f}$ value and b) lack of evidence for hydrostatic equilibrium between the reservoir and the USDW (i.e., Method 2 does not apply) indicates that a risk-based approach to AOR delineation may be pursued.

### *3.5.4 Risk-Based AOR Calculations*

Complete details of the risk-based AOR model are found in Burton-Kelly and others (2021). The inputs, assumptions, and results discussed here provide the necessary details for reproducing and verifying the results. A macro-enabled Microsoft Excel file was used to define the inputs and calculations that were employed in the method (hereafter "ASLMA Workbook").

#### *3.5.4.1 Initial Hydraulic Heads*

The original ASLMA Model (Cihan and others, 2011) initially assumed hydrostatic pressure distributions in the entire system. The current work uses a modified version of the ASLMA Model to simulate pressure perturbations and leakage rates when there are initial head differences in the aquifers (Oldenburg and others, 2014). The initial hydraulic heads are calculated assuming a total head based on the unit-specific elevations and pressures. The total heads are entered into the ASLMA Model and establish the initial pressure conditions for the storage complex prior to $CO_2$ injection.

For example, the initial reference case total heads for the storage reservoir (Aquifer 1), potential thief zone (Aquifer 2), and USDW (Aquifer 3) are shown in Table 3-6. They illustrate the state of overpressure in the storage complex because Aquifer 1 has a greater initial hydraulic head than Aquifer 2 and Aquifer 3. Therefore, the storage complex requires different treatment than the default AOR calculations described by EPA (2013). Details on the calculations of initial hydraulic head are provided in Burton-Kelly and others (2021).

**Table 3-6. Simplified Stratigraphy and Average Properties Used to Represent the Storage Complex**

| Hydrostratigraphic Unit | Depth to Top,* m | Thickness, m | Pressure, MPa | Temperature, °C | Salinity, ppm | Brine Density, kg/m$^3$ | Porosity, % | Permeability, mD | Permeability, m$^2$ | HCON,** m/d | Specific Storage, m$^{-1}$ | Total Head, m |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Overlying Units to Ground Surface (not directly modeled) | 0 | 407 | | | | | | | | | | |
| Aquifer 3 (USDW, Fox Hills Fm) | 407 | 122 | 4.1 | 18 | 1563 | 1001 | 37.5 | 280.0 | 2.76E-13 | 2.23E-01 | 5.69E-06 | 586 |
| Aquitard 2 (Pierre Fm–Inyan Kara Fm) | 529 | 822 | 9.2 | 32 | 1780 | 1000 | 4.39 | 0.025 | 2.47E-17 | 2.72E-05 | 8.98E-06 | 642 |
| Aquifer 2 (potential thief zone – Inyan Kara Fm) | 1351 | 76 | 12.8 | 50 | 3340 | 995 | 13.4 | 7.2 | 7.13E-15 | 1.09E-02 | 4.90E-06 | 559 |
| Aquitard 1 (primary upper seal – Swift Fm–Broom Creek Fm) | 1,427 | 353 | 15.7 | 51 | 52,500 | 1029 | 2.14 | 0.0021 | 2.07E-18 | 3.04E-06 | 9.16E-06 | 597 |
| Aquifer 1 (storage reservoir – Broom Creek Fm) | 1,780 | 81 | 19.7 | 54 | 115,000 | 1073 | 14.1 | 7.5 | 7.40E-15 | 1.03E-02 | 5.27E-06 | 694 |

* Ground surface elevation 641 m amsl.

** Hydraulic conductivity.

*3.5.4.2 $CO_2$ Injection Parameters*

The ASLMA Model for the project used a Broom Creek $CO_2$ injection rate that matched the simulation scenario. A single injector is placed at the center of the ASLMA Model grid at an x,y location of (0,0) in the coordinate reference system. The ASLMA Model requires the $CO_2$ injection rate to be converted into an equivalent-volume injection of formation fluid in units of cubic meters per day. Microsoft Excel Visual Basic for Applications (VBA) functions were used to estimate the $CO_2$ density from the storage reservoir pressure and temperature, which resulted in an estimated density, shown in Table 3-7. The $CO_2$ mass injection rate and $CO_2$ density are then used to derive the daily equivalent-volume injection rate, shown in Table 3-7.

**Table 3-7. $CO_2$ Density and Injection Parameters Used for the ASLMA Model**

| $CO_2$ Density, Reservoir Conditions, kg/m$^3$ | Average $CO_2$ Injection Rate, tonnes per day | Average Equivalent Water Injection Rate, m$^3$ per day | Injection Period, years |
|---|---|---|---|
| 748 | 13,466 | 18,002 | 20 |

*3.5.4.3 Hypothetical Leaky Wellbore*

In the simulation model area, few wellbores are known to exist that penetrate the primary seal of the Broom Creek storage reservoir. However, for heuristic, "what-if" scenario modeling, which is needed to generate the data for delineating a risk-based AOR, a single hypothetical leaky wellbore is inserted into the ASLMA Model at 1, 2, …, 100 km from the $CO_2$ injection well. The pressure buildup in the storage reservoir at each distance, along with the recorded cumulative volume of formation fluid vertically migrating through the leaky wellbore from the storage reservoir to the USDW (i.e., from Aquifer 1 to Aquifer 3) throughout the 20-year injection period, provides the data set needed to derive the risk-based AOR.

Published ranges for the effective permeability of a leaky wellbore (Figure 3-18) have included an "open wellbore" with an effective permeability as high as $10^{-5}$ m$^2$ ($10^{10}$ mD) to values more representative of leakage through a wellbore annulus of $10^{-12}$ to $10^{-10}$ m$^2$ ($10^3$ to $10^5$ mD) (Watson and Bachu, 2008, 2009; Celia and others, 2011). Carey (2017) provides probability distributions for the effective permeability of potentially leaking wells at $CO_2$ storage sites and estimated a wide range from $10^{-20}$ to $10^{-10}$ m$^2$ ($10^{-5}$ to $10^5$ mD). For the project Broom Creek ASLMA Model, the effective permeability of the leaky wellbore is set to $10^{-16}$ m$^2$ (0.1 mD), which is a conservative (highly permeable) value near the top of the published range for the effective permeability of potentially leaking wells at $CO_2$ storage sites (Figure 3-18).

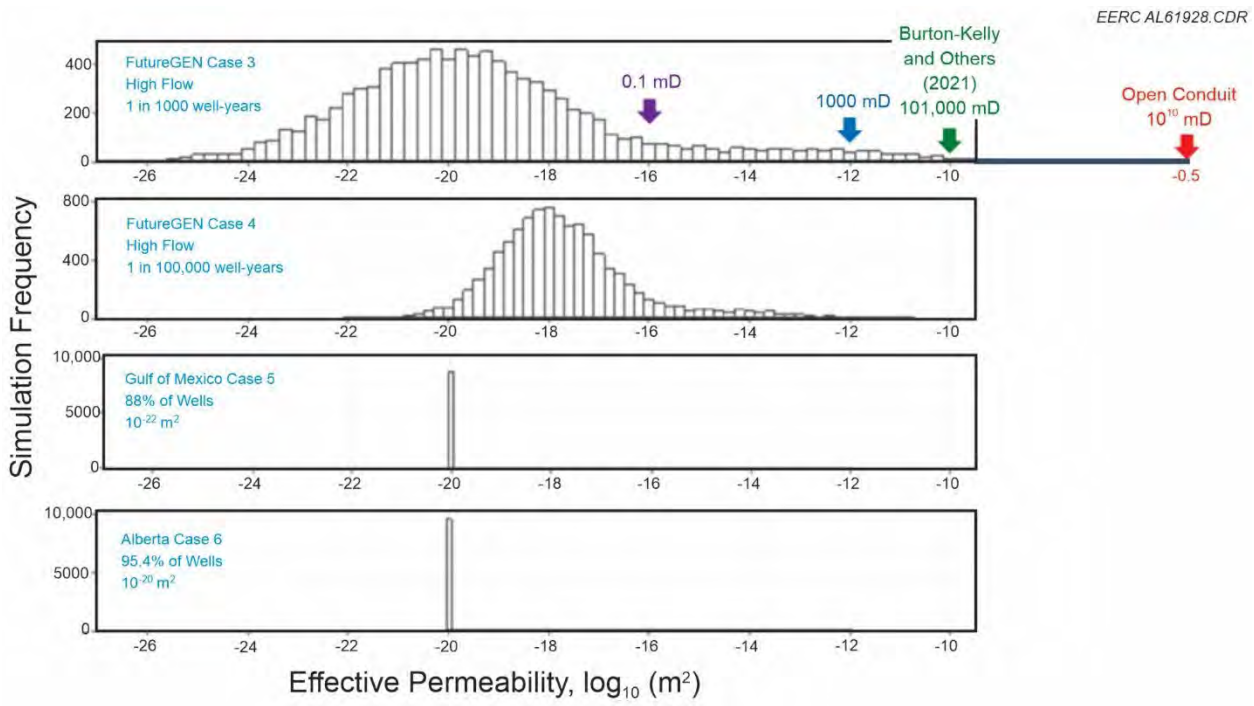



Figure 3-18. Histograms describing the expected frequency of leaky wellbore effective permeabilities under different scenarios. The ASLMA Model used for AOR delineation used a value of approximately 0.1 mD (constructed from data presented by Carey [2017]).

The current work uses the ASLMA Model Type 1 feature (focused leakage only) for the nominal model response, which makes the conservative assumption that the aquitards are impermeable. This assumption prevents the pressure from diffusing into the overlying aquitards, resulting in a greater pressure buildup in the storage reservoir and a commensurately greater amount of formation fluid vertically migrating from the storage reservoir through the leaky wellbore. The conservative assumption of Model Type 1 rather than Model Type 3 (coupled focused and diffuse leakage) provides an added level of protection to the delineation of a risk-based AOR by projecting a larger pressure buildup in the storage reservoir than a scenario in which pressure is allowed to dissipate through the upper seal and, therefore, a greater leakage of formation fluid up the leaky wellbore.

#### *3.5.4.4 Saline Aquifer Potential Thief Zone*

As shown in Table 3-6, a saline aquifer (Aquifer 2, Inyan Kara Formation) exists between the storage reservoir primary seal and the USDW (Aquifer 3, Fox Hills Formation). Formation fluid migrating up a leaky wellbore that is open to Aquifer 2 will preferentially flow into Aquifer 2, and the continued flow up the wellbore and into the USDW will be reduced. Therefore, Aquifer 2 may act as a thief zone and reduce the potential for formation fluid impacts to the groundwater.

The thief zone phenomenon was described by Nordbotten and others (2004) as an “elevator model” by analogy to an elevator full of people on the main floor, who then get off at various floors as the elevator moves up, such that only very few people ride all the way to the top floor.

The term "thief zone" is also used in the oil and gas industry to describe a high-permeability zone encountered during drilling into which circulating fluids can be lost. Models with and without opening the leaky wellbore to Aquifer 2 were run and the results evaluated to quantify the effect of a thief zone on the risk-based AOR.

#### *3.5.4.5 Aquifer- and Aquitard-Derived Properties*

The ASLMA Model assumes homogeneous properties within each hydrostratigraphic unit (Table 3-6). For each unit shown in Table 3-6, pressure, temperature, porosity, permeability, and salinity are used to derive two key inputs for the ASLMA Model: HCON and specific storage (SS). Average porosity and permeability values were derived as follows: Broom Creek, from distributed properties in the geologic model; Fox Hills, from regional well log data. Porosity is represented as an arithmetic mean and permeability as a geometric mean value within each hydrostratigraphic unit (excluding nonsandstone rock types).

VBA functions included in the ASLMA Workbook are used to estimate the formation fluid density and viscosity from the aquifer or aquitard pressure, temperature, and salinity inputs, which are then used to estimate HCON and SS. The estimated reference case HCON for the storage reservoir (Aquifer 1), potential thief zone (Aquifer 2) and USDW (Aquifer 3) are shown in Table 3-6. Details about the HCON and SS derivations are provided in supporting information for Burton-Kelly and others (2021).

### *3.5.5 Risk-Based AOR Results*

#### *3.5.5.1 Relating Pressure Buildup to Incremental Leakage with ASLMA Model and Compositional Simulation*

Figure 3-19 shows the relationship between the maximum pressure buildup in the storage reservoir and incremental leakage to Aquifer 3 (USDW) for scenarios with and without the leaky wellbore open to Aquifer 2 (thief zone). The curvilinear relationship between pressure buildup in the storage reservoir and incremental leakage to Aquifer 3 is used to predict the incremental leakage from the pressure buildup map produced by the compositional simulation of the geocellular model. The average simulated pressure buildup in the reservoir is represented by a raster (grid) map of pressure buildup values. For each raster value (grid cell map location), the relationship between pressure buildup and incremental leakage (Figure 3-19) is used to predict incremental leakage using a linear interpolation between the points making up the curve. The estimated cumulative leakage potential from Aquifer 1 to Aquifer 3 along a hypothetical leaky wellbore without injection occurring (i.e., leakage due to natural overpressure) and no thief zone is shown in Table 3-8.

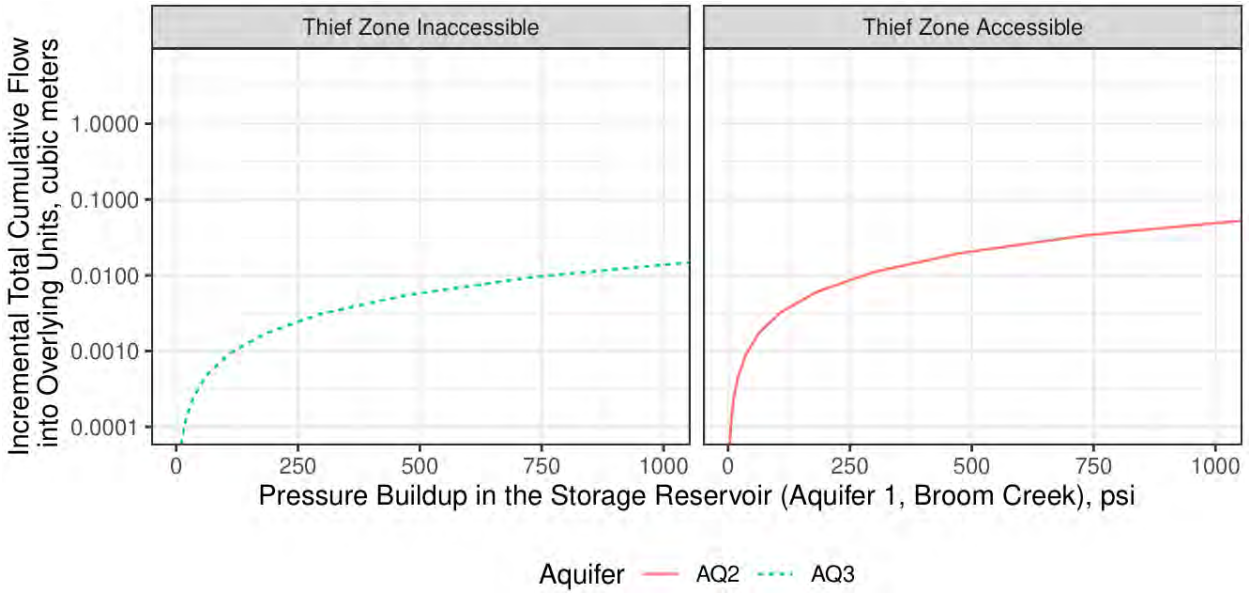



Figure 3-19. Relationship between pressure buildup (x-axis, psi) in the storage reservoir (Aquifer 1, Broom Creek) and incremental total cumulative leakage (y-axis, $m^3$) into Aquifer 2 (thief zone, Inyan Kara, red solid line) and Aquifer 3 (USDW, Fox Hills, dashed blue line). In the left-hand scenario, the leaky wellbore is closed to Aquifer 2, so all flow is from the storage reservoir to the USDW. In the right-hand scenario, the leaky wellbore is open to Aquifer 2, so the vast majority of flow is from the storage reservoir to the Aquifer 2 thief zone, and the curve showing flow into the Aquifer 3 USDW is not visible on this plot.

#### *3.5.5.2 Incremental Flow Maps and AOR Delineation*

The pressure buildup–incremental flow relationship, shown in Figure 3-19, results in the incremental flow map, shown in Figure 3-20, which show the estimated total cumulative incremental flow potential from a hypothetical leaky well into Aquifer 3 (USDW) over the entire injection period if the modeled leaky wellbore is not open to the thief zone.

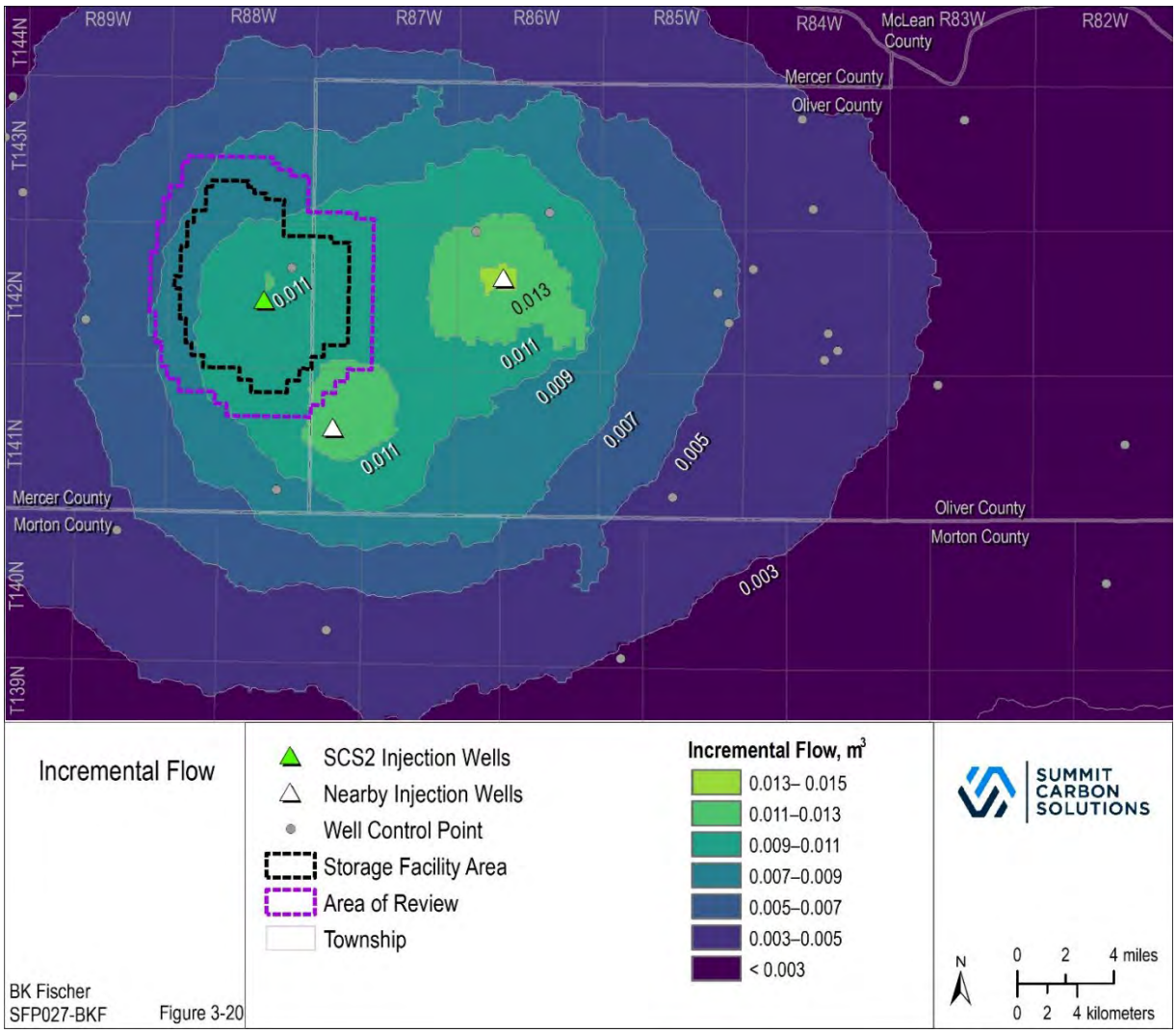



Figure 3-20. Map of potential incremental flow into the USDW at the end of 20 years of $CO_2$ injection for the scenario where the modeled leaky wellbore is closed to Aquifer 2 (thief zone).

The final step of the risk-based AOR workflow is to apply a threshold criterion to the incremental flow maps to delineate a risk-based AOR. For the Broom Creek Formation injection at the project site, a threshold of 1 $m^3$ of potential incremental flow into the Fox Hills Formation USDW along a hypothetical leaky wellbore over the injection period is established. A value of 1 $m^3$ is the lowest meaningful value that can be produced by the ASLMA Model; although the model can return smaller values, they likely represent statistical noise. This potential incremental flow threshold is greater than all calculated potential incremental flow values described by the curve in Figure 3-19. The maximum vertically averaged change in pressure in the storage reservoir at the end of the simulated injection period and the corresponding flow over the injection period are shown in Table 3-8. This pressure is below the potential incremental flow threshold of 1 $m^3$. Therefore, the storage reservoir pressure buildup is not a deciding factor in determining the AOR extent.

**Table 3.8. Summary Results from the Risk-Based AOR Method of Estimated Potential Cumulative Leakage after 20 years of Injection and No Thief Zone**

| | |
|---|---|
| Maximum Vertically Averaged Change in Reservoir Pressure, psi | 1004 |
| Estimated Cumulative Leakage (reservoir to USDW) along Leaky Wellbore *Without* Injection, $m^3$ | 0.006 |
| Maximum Estimated Cumulative Leakage (reservoir to USDW) along Leaky Wellbore *Attributable to* Injection, $m^3$ | 0.014 |

The assumptions and calculations used to determine the risk-based AOR at the project site incorporate at least four safety factors for the protection of groundwater resources. If the ASLMA Model has resulted in an underestimation of the amount of potential leakage over the injection period, such underestimation is likely to be mitigated by:

- The statistical overestimation of hypothetical leaky wellbore permeability compared to known and estimated values in the literature—a more statistically likely hypothetical leaky wellbore permeability would be lower and allow less flow into the USDW.

- The lack of communication between the hypothetical leaky wellbore and Inyan Kara Formation, which would act as a thief zone—a real leaky wellbore would likely communicate with the Inyan Kara Formation, which would receive much, if not all, of the brine leaked from the storage reservoir.

- The low density of known legacy wellbores in the BK Fischer area—$CO_2$ injection is proposed to occur in an area with few available leakage pathways.

- The continued overpressured nature of the Broom Creek Formation with respect to overlying saline aquifers—over relatively short (e.g., 1 year) timescales, overpressured aquifers with leakage pathways would demonstrate a change in upward flow rate and corresponding pressure (Oldenburg and others, 2016).

The risk-based method detailed above shows that storage reservoir pressure buildup is not necessary for determining AOR because the potential incremental flow into the USDW is below the identified threshold of 1 $m^3$. Therefore, the AOR is delineated as the storage facility area plus a 1-mi buffer (Figure 3-21).

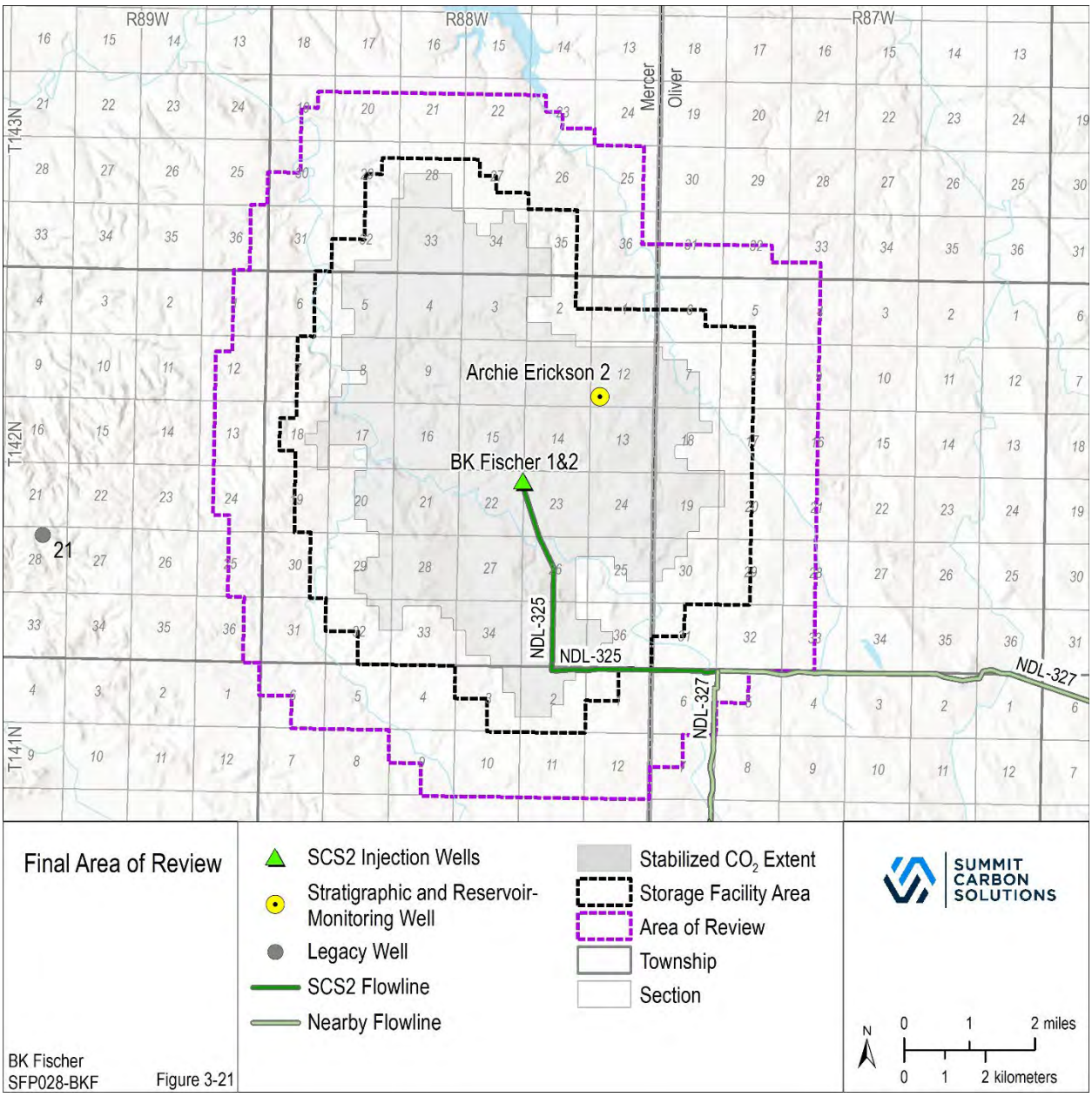



Figure 3-21. Final AOR estimations and stabilized $CO_2$ extent of the BK Fischer storage facility area in relation to nearby legacy wells. Shown is the storage facility area (black dashed line) and AOR (purple dashed line). The gray circle represents a legacy oil and gas well near the storage facility area.

## 3.6 References

Avci, C.B., 1994, Evaluation of flow leakage through abandoned wells and boreholes: Water Resources Research, v. 9, p. 2565–2578.

Bandilla, K.W., Kraemer, S.R., and Birkholzer, J.T., 2012, Using semi-analytical solutions to approximate the area of potential impact for carbon dioxide injection: International Journal of Greenhouse Gas Control, v. 8, p. 196–204.

Birkholzer, J., Cihan, A., and Bandilla, K., 2014, A tiered area-of-review framework for geologic carbon sequestration (2013): Greenhouse Gases Science and Technology. v. 4, no. 1, p. 20–35. https://doi.org/10.1002/ghg.1393.

Birkholzer, J.T., Zhou, Q., and Tsang, C.F., 2009, Large-scale impact of $CO_2$ storage in deep saline aquifers: a sensitivity study on pressure response in stratified systems: International Journal of Greenhouse Gas Control, v. 3, p. 181–194.

Bosshart, N.W., Pekot, L.J., Wildgust, N., Gorecki, C.D., Torres, J.A., Jin, L., Ge, J., Jiang, T., Heebink, L.V., Kurz, M.D., Dalkhaa, C., Peck, W.D., and Burnison, S.A., 2018, Best practices for modeling and simulation of $CO_2$ storage: Plains $CO_2$ Reduction (PCOR) Partnership Phase III, Task 9, Deliverable D69 for U.S. Department of Energy National Energy Technology Laboratory Cooperative Agreement No. DE-FC26-05NT42592.

Burton-Kelly, M.E., Azzolina, N.A., Connors, K.C., Peck, W.D., Nakles, D.V. and Jiang, T., 2021, Risk-based area of review estimation in overpressured reservoirs to support injection well storage facility permit requirements for $CO_2$ storage projects: Greenhouse Gases: Science and Technology, v. 11, p. 887–906. https://doi.org/10.1002/ghg.2098.

Carey, J.W., 2017, Probability distributions for effective permeability of potentially leaking wells at $CO_2$ sequestration sites: NRAPTRS-III-021-2017, NRAP Technical Report Series, Morgantown, West Virginia, U.S. Department of Energy National Energy Technology Laboratory, p. 28.

Celia, M.A., Nordbotten, J.M., Court, B., Dobossy, M., and Bachu, S., 2011, Field-scale application of a semi-analytical model for estimation of $CO_2$ and brine leakage along old wells: International Journal of Greenhouse Gas Control, v. 5, no. 2, p. 257–269.

Cihan, A., Birkholzer, J.T., and Zhou, Q., 2012, Pressure buildup and brine migration during $CO_2$ storage in multilayered aquifers: Ground Water. doi:10.1111/j.1745–6584.2012.00972.x.

Cihan, A., Zhou, Q., and Birkholzer, J.T., 2011, Analytical solutions for pressure perturbation and fluid leakage through aquitards and wells in multilayered aquifer systems: Water Resources Research, v. 47, p. W10504. doi:10.1029/2011WR010721.

Computer Modelling Group, 2021, GEM user guide.

Nicot, J.P., Oldenburg, C.M., Bryant, S.L., and Hovorka, S.D., 2008, Pressure perturbations from geologic carbon sequestration—area-of-review boundaries and borehole leakage driving forces: Proceedings of the 9th International Conference of Greenhouse Gas Control Technologies, Washington, USA, November.

Nordbotten, J., Celia, M., and Bachu, S., 2004, Analytical solutions for leakage rates through abandoned wells: Water Resour. Res., v. 40, p. W04204. doi:10.1029/2003WR002997.

Oldenburg, C.M., Cihan, A., Zhou, Q., Fairweather, S., and Spangler, L.J., 2014, Delineating area of review in a system with pre-injection relative overpressure: Energy Procedia, v. 63, p. 3715–3722.

Oldenburg, C.M., Cihan, A., and Zhou, Q., 2016, Geologic carbon sequestration injection wells in overpressured storage reservoirs—estimating area of review: Greenhouse Gases: Science and Technology, v. 6, no. 6.

Raven, K.G., Lafleur, D.W., and Sweezey, R.A., 1990, Monitoring well into abandoned deep-well disposal formations at Sarnia, Ontario: Canadian Geotechnical Journal, v. 27, no. 1, p. 105–118. https://doi.org/10.1139/t90-010.

Schlumberger, 2020, Petrel 2019.5: Petrel E&P Software Platform.

U.S. Environmental Protection Agency, 2013, Geologic sequestration of carbon dioxide underground injection control (UIC) program Class VI well area of review evaluation and corrective action guidance: EPA 816-R-13-005, May.

Watson, T.L., and Bachu, S., 2008, Identification of wells with high $CO_2$-leakage potential in mature oil fields developed for $CO_2$-enhanced oil recovery, *in* SPE Improved Oil Recovery Symposium: Tulsa, Oklahoma, USA, April19–23, SPE 11294.

Watson, T.L., and Bachu, S., 2009, Evaluation of the potential for gas and $CO_2$ leakage along wellbores*:* SPE Drilling & Completion, v. 24, no. 1, p. 115–126.

White, S., Carroll, S., Chu, S., Bacon, D., Pawar, R., Cumming, L., Hawkins, J., Kelley, M., Demirkanli, I., Middletone, R., Sminchak, J., and Pasumarti, A., 2020, A risk-based approach to evaluating the area of review and leakage risks at $CO_2$ storage sites: International Journal of Greenhouse Gas Control, v. 93, p. 102884.

# SECTION 4.0

# AREA OF REVIEW

# 4.0 AREA OF REVIEW

## 4.1 Area of Review (AOR) Delineation

North Dakota regulations for geologic storage of $CO_2$ require that each storage facility permit (SFP) delineate an AOR, which is defined as "the region surrounding the geologic storage project where underground sources of drinking water [USDW][1] may be endangered by the injection activity" (North Dakota Administrative Code [N.D.A.C.] § 43-05-01-01[4]). Concern regarding the endangerment of USDWs is related to the potential vertical migration of $CO_2$ and/or brine from the injection zone to the USDW. Therefore, the AOR encompasses the region overlying the injected free-phase $CO_2$ plume and the region overlying the extent of formation fluid pressure increase that is sufficient to drive formation fluids (e.g., brine) into USDWs, assuming pathways for this migration (e.g., abandoned wells or transmissive faults) are present.

The minimum fluid pressure increase in the reservoir that results in a sustained flow of brine upward into an overlying drinking water aquifer is referred to as the "critical threshold pressure increase" and resultant pressure as the "critical threshold pressure." Calculation of the allowable increase in pressure using site-specific data from the Archie Erickson 2 (NDIC File No. 38622) shows that the storage reservoir in the project area is overpressured with respect to the lowest USDW (i.e., the allowable increase in pressure is less than zero.) The storage reservoir is calculated to be overpressured, with a value of −213 psi calculated using data from the Archie Erickson 2 well at the BK Fischer simulation well location. The maximum vertically averaged storage reservoir change in pressure at the end of the simulated injection period was 1004 psi in the raster cell intersected by the injection well, which corresponds to less than 0.014 $m^3$ of flow over 20 years (Section 3.5). Based on the computational methods used to simulate $CO_2$ injection activities and associated pressure front (Figure 4-1), the resulting AOR for BK Fischer is delineated as being 1 mi beyond the storage facility area boundary. This extent ensures compliance with existing state regulations.

In accordance with N.D.A.C. § 43-05-01-05(1)(b)(3), a geologist or engineer reviewed the data of public record for all wells within the storage facility area, including those which penetrate the storage reservoir or primary or secondary seals overlying the reservoir and all wells within 1 mi of the storage facility area boundary (Table 4-1).

[1] The Fox Hills Aquifer underlying western North Dakota, including BK Fischer, is a confined-aquifer system that does not receive measurable flow from overlying aquifers or the underlying Pierre Shale. The overlying confining layer in the Hell Creek Formation comprises impermeable clays, and the underlying Pierre Shale serves as the lower confining layer (Trapp and Croft, 1975). Recharge occurs hundreds of miles to the southwest in the Black Hills of South Dakota, where the corresponding geologic layers are exposed at the surface. Flow within the aquifer is to the east with a rate on the order of single feet per year. Groundwater in the Fox Hills Aquifer at BK Fischer is geochemically stable, as it is isolated from its source of recharge and does not receive other sources of recharge (Fischer, 2013). The aquifer itself is a quartz-rich sand and is not known to contain reactive mineralogy. Minimal geochemical variation can be expected to occur across the site, attributable to minor variations in the geologic composition of the aquifer sediments.

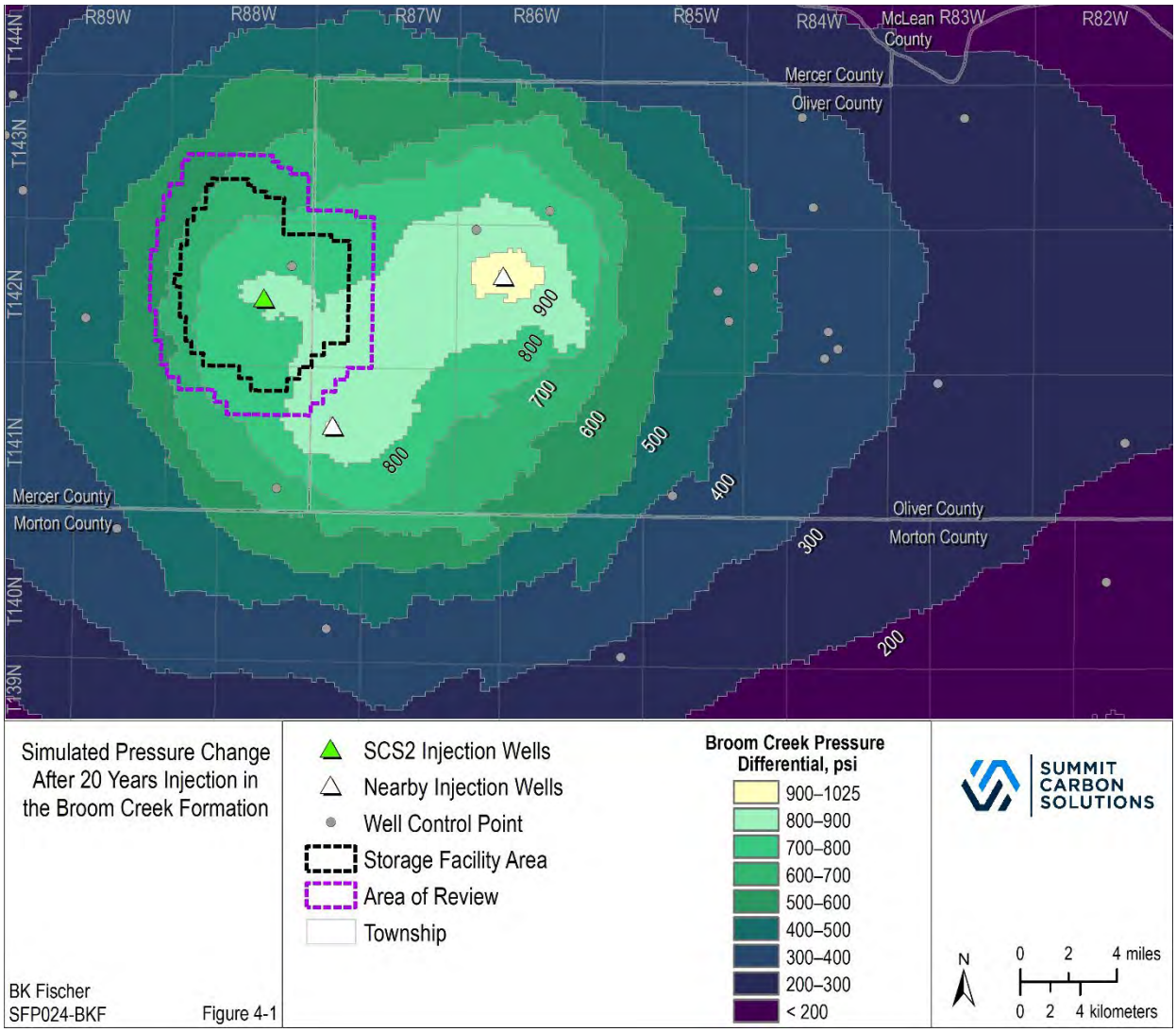



Figure 4-1. Pressure map showing the maximum subsurface pressure influence associated with $CO_2$ injection in the Broom Creek Formation for BK Fischer. Shown are the storage facility area and AOR boundary in relation to the predicted maximum subsurface pressure influence. Subsurface pressure subsides at the cessation of injection.

This section of the SFP application is accompanied by maps and tables that include information required and in accordance with N.D.A.C. § 43-05-01-05(1)(a) and (b) and § 43-05-01-05.1(2), such as the storage facility area; location of any proposed injection wells; presence of occupied structures or gravel pits (Figure 4-2); presence of mining land (mined out and future) (Figure 2-50); and location of water wells, and any other wells within the AOR (Figure 4-3). Table 4-1 lists all the surface and subsurface features that were investigated as part of the AOR evaluation. Surface features that were investigated but not found within the AOR boundary are also identified in Table 4-1.

**Table 4-1. Investigated and Identified Surface and Subsurface Features in the AOR (Figures 2-50, 4-2, and 4-3)**

| Surface and Subsurface Features | Investigated and Identified (Figures 4-2 and 4-3) | Investigated But Not Found in AOR |
|---|---|---|
| Producing (active) Wells | | X |
| Abandoned Wells | | X |
| Plugged Wells or Dry Holes | | X |
| Deep Stratigraphic Boreholes | X | |
| Subsurface Cleanup Sites | | X |
| Surface Bodies of Water | X | |
| Springs | | X |
| Water Wells | X | |
| Mines (surface and subsurface) (Figure 2-50) | X | |
| Quarries/Gravel Pits | X | |
| Man-Made Subsurface Structures and Activities | X | |
| Location of Proposed Wells | X | |
| Location of Proposed Cathodic Protection Boreholes* | | X |
| Surface Facilities | X | |
| Roads | X | |
| State Boundary Lines | | X |
| County Boundary Lines | X | |
| Indian Country Boundary Lines | | X |

* No cathodic protection boreholes are currently included in the site design, and none were identified within the AOR.

An extensive geologic and hydrogeologic characterization performed by a team of geologists from the Energy & Environmental Research Center (EERC) resulted in no evidence of transmissive faults or fractures in the upper confining zone within the AOR (Section 2.5) and revealed that the upper confining zone has sufficient geologic integrity to prevent vertical fluid movement. All geologic data and investigations indicate the storage reservoir within the AOR has sufficient containment and geologic integrity, including geologic confinement above and below the injection zone, to prevent vertical fluid movement.

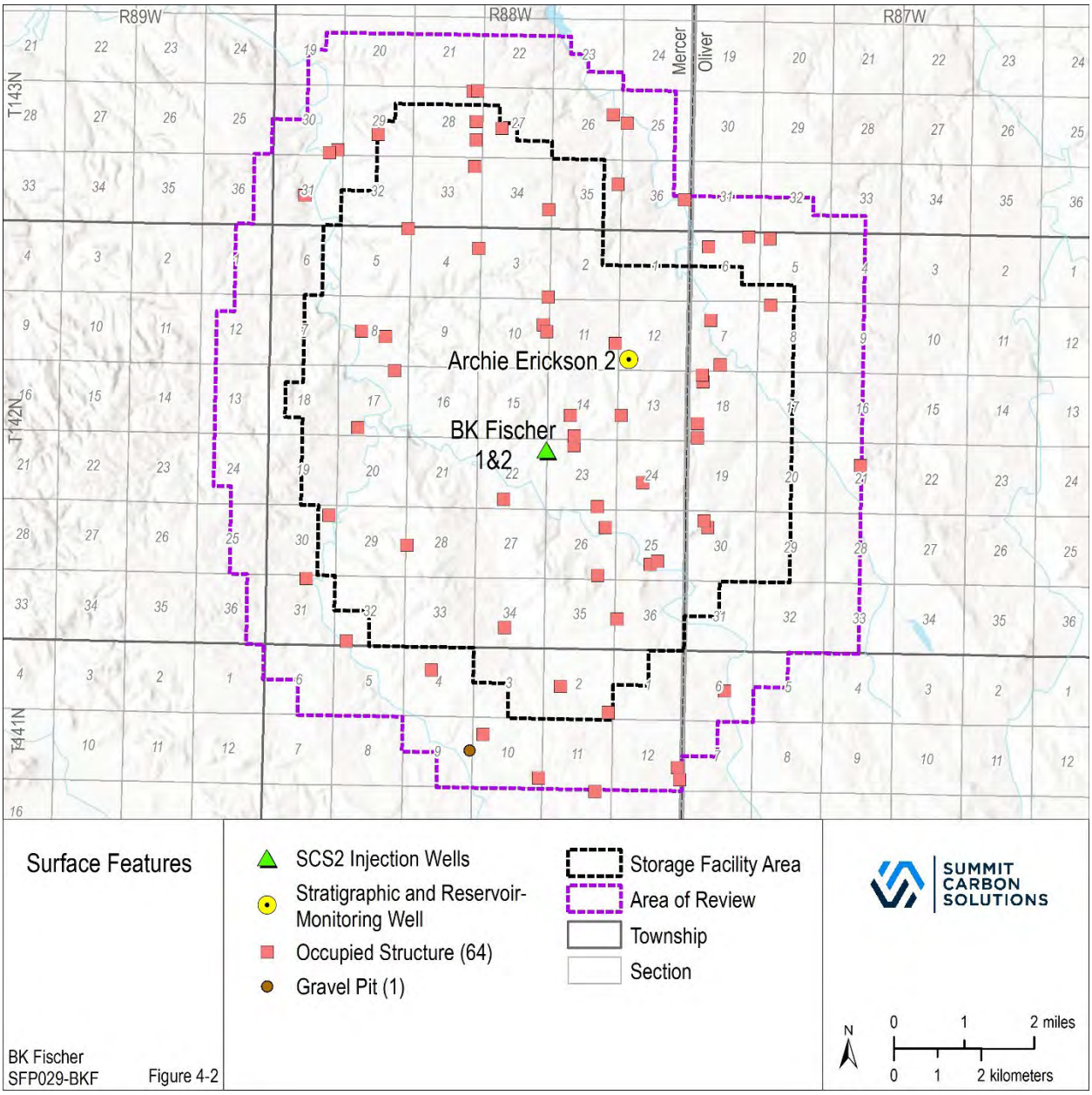



Figure 4-2. Final AOR map showing the BK Fischer storage facility area (dashed black boundary) and AOR (dashed purple boundary). Pink squares represent occupied structures, and the brown circle represents a gravel pit (note: gravel pits were identified using the North Dakota Geographic Information System [GIS] Hub landmarks data layer from the North Dakota Department of Transportation [2002]).

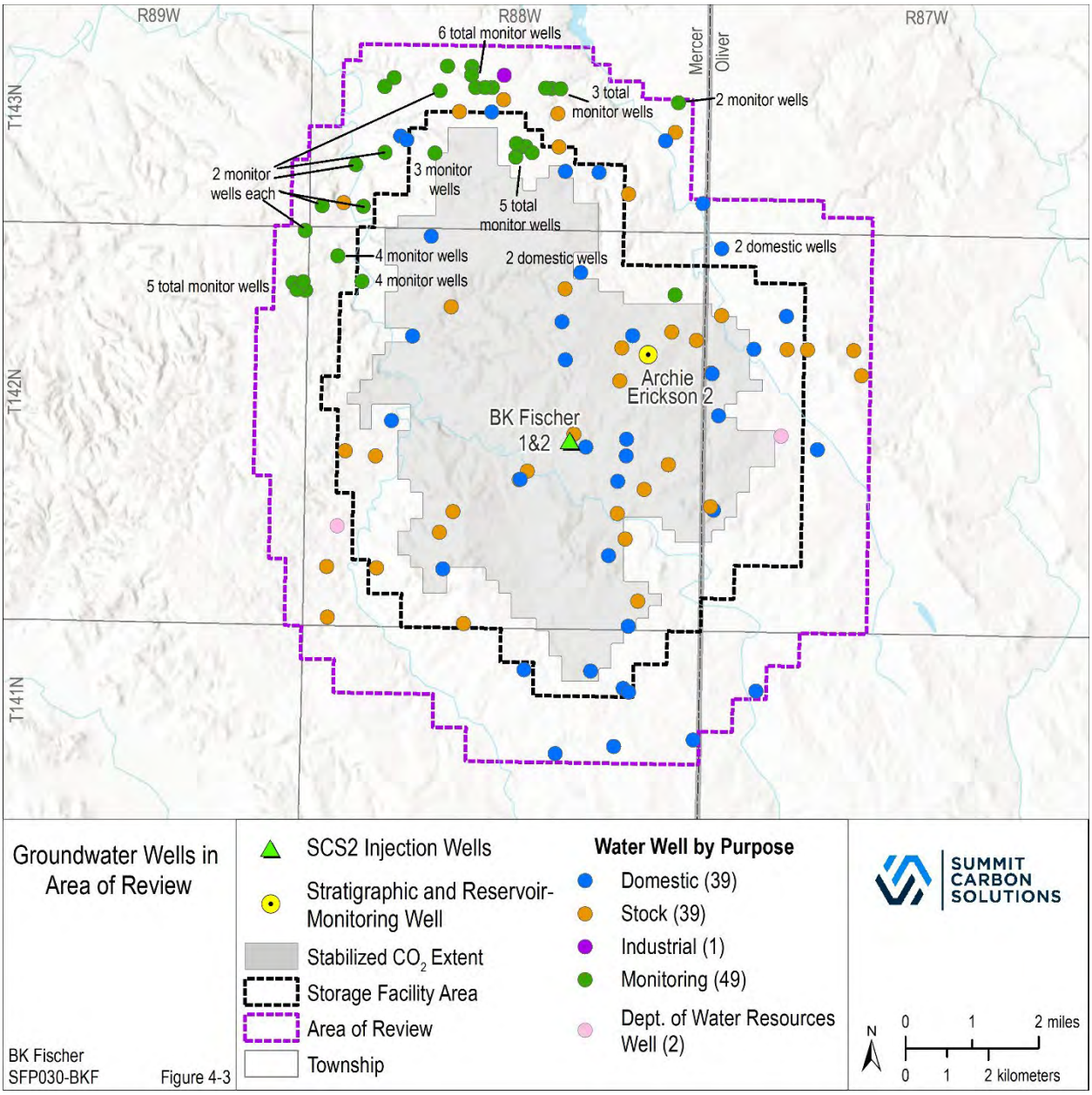



Figure 4-3. Map showing all wells located in the AOR. Shown are the stabilized $CO_2$ plume extent postinjection (gray-shaded area), storage facility area (dashed black boundary), and AOR (dashed purple boundary). All groundwater wells in the AOR are identified based on data available from the Department of Water Resources (DWR). The only existing well penetrating the Broom Creek Formation within the AOR is the Archie Erickson 2 well. No other legacy oil and gas wells are present in the AOR (see Figure 2-47a for any nearby legacy wells outside of the AOR). All observation/monitoring wells shown are shallow groundwater wells associated with the mine activities. No springs are present in the AOR (note: springs were evaluated using the National Map hosted by the U.S. Geological Survey [2023]).

## 4.2 Corrective Action Evaluation

As identified in Table 4-1, any active and abandoned wells and underground mines in the AOR that may penetrate the confining zone were evaluated pursuant to N.D.A.C. § 43-05-01-05.1(2). Tables 4-2 and 4-3 and Figure 4-4 provide a description of each identified well, including well type, construction, date drilled, location, depth, record of plugging and completion, and any additional pertinent information. The evaluation determined that all wells within the AOR have sufficient isolation to prevent formation fluids or injected $CO_2$ from vertically migrating outside of the storage reservoir or into USDWs and that no corrective action is necessary.

**Table 4-2. Well(s) in AOR Evaluated for Corrective Action***

| NDIC Well File No. | Operator | Well Name | Well Type | Spud Date | Surface Casing OD, in. | Surface Casing Depth, ft MD | Long-String Casing OD, in. | Long-String Casing Depth, ft MD | Hole Direction | TD, ft MD | TVD, ft | Status | Plug Date | TWN | RNG | Section | Qtr/Qtr | County | Area | Corrective Action Needed |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 38622 | Summit Carbon Storage #2, LLC | Archie Erickson 2 | Stratigraphic Test | 11/23/2021 | 10.75 | 2156 | 7 | 6390 | Vertical | 6402 | 6402 | TATD | NA | 142 N | 88 W | 12 | NW/NE | Mercer | SFA | No |

* Abbreviations used in table: outside diameter; total depth; true vertical depth; township; range, quarter; temporarily abandoned, drilled to total depth; and storage facility area.

**Table 4-3. Archie Erickson 2 (NDIC File No. 38622) Well Evaluation**

**Well Name:** **Archie Erickson 2 (NDIC File No. 38622)**

No cement plugs in wellbore; procedure approved by DMR-O&G.

| Section | Type | Lead/Tail/Single | Interval, ft MD | Volume, sacks |
|---|---|---|---|---|
| Surface | VariCem GS1 | Lead | 0–2156 | 480 |
| Surface | VariCem GS1 | Tail | | 205 |
| Long String | EconoCem GWS1 | Lead | 0–3745 | 280 |
| Long String | CorrosaCem | Tail | | 480 |
| Long String | CorrosaCem | Single | 3745–6390 | 855 |

All depths are in MD based off KB elevation.

Spud Date: 11/23/2021
Total Depth: 6402' MD (Amsden Formation)

Surface Casing: 10¾" from 0' to 2156' MD
Cased Hole 7" to 6390' MD

| Formation Name | Estimated Top, ft MD | |
|---|---|---|
| Pierre | 1798 | 10¾" casing Class G cement |
| 10¾" Casing Shoe | 2156 | |
| Greenhorn | 3706 | 7" casing cemented, included $CO_2$-resistant cement from 909' to 6402' MD and Class G from 0' to 909' MD |
| Mowry | 4105 | |
| Newcastle | 4183 | |
| Skull Creek | 4193 | |
| Inyan Kara | 4423 | |
| Swift | 4758 | |
| Opeche/Spearfish | 5603 | |
| Broom Creek | 5845 | |
| Amsden | 6148 | |

Corrective Action: No corrective action is necessary. The well is set up as a reservoir-monitoring well within the SFA. It has no perforations and has corrosion-resistant alloy (CRA) material and $CO_2$-resistant cement placed across the Broom Creek Formation. See Figure 4-4 for depths. The well will be completed as shown in Section 11.

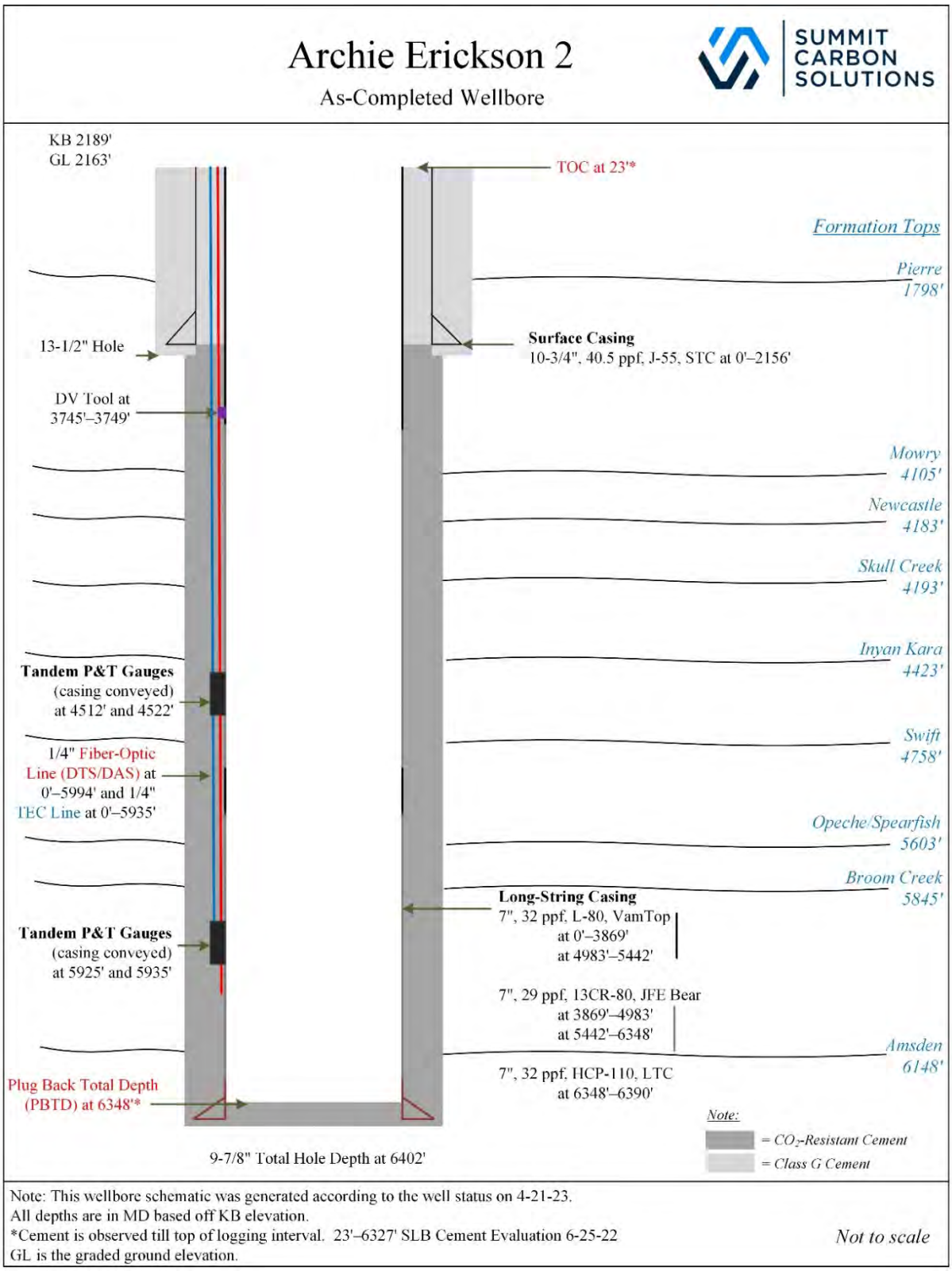



Figure 4-4. Archie Erickson 2 (NDIC File No. 38622) well schematic.

## 4.3 Reevaluation of AOR and Corrective Action Plan

The AOR and corrective action plan will be reevaluated in accordance with N.D.A.C. § 43-05-01-05.1, with the first reevaluation taking place at a period not to exceed 5 years from the date the permit for $CO_2$ injection is issued (N.D.A.C. § 43-05-01-10) or when monitoring and operational conditions warrant a reevaluation. Each successive reevaluation shall take place at a period not to exceed 5 years from the date of the previous reevaluation (each referred to as a "Reevaluation Date"). The AOR reevaluations will address the following:

- Monitoring and operational data (e.g., injection rate and pressure) will be used to update the geologic model and the computational simulations. These updates will then be used to inform a reevaluation of the AOR and corrective action plan, including the computational model that was used to determine the AOR, and the operational data to be utilized as the basis for that update will be identified.

- The protocol to conduct corrective action, if necessary, will be determined, including 1) what corrective action will be performed, and 2) how corrective action will be adjusted if there are changes in the AOR delineation.

As part of the reevaluation, Summit Carbon Storage #2, LLC (SCS2) will either a) demonstrate to the Department of Mineral Resources, Oil and Gas Division (DMR-O&G) using monitoring data and modeling results that no plan amendment is necessary or b) submit an amended AOR and corrective action plan for DMR-O&G approval. Plan amendments must be incorporated into the permit and are subject to permit modification requirements.

## 4.4 Protection of USDWs

### *4.4.1 Introduction of USDW Protection*

The primary confining zone and additional overlying confining zones geologically isolate the Fox Hills and Hell Creek Formations, the lowest USDWs in the AOR, from the underlying injection zone. The Opeche/Spearfish Formation is the primary confining zone for the injection zone with additional confining layers above, geologically isolating all USDWs from the injection zone. The uppermost confining layer is the Pierre Formation, an impermeable shale more than 1000 ft thick, providing an additional seal for all USDWs in the region (Table 4-4).

**Table 4-4. Description of Zones of Confinement above the Immediate Upper Confining Zone (Opeche/Spearfish Formation) (data based on Archie Erickson 2)**

| Name of Formation | Lithology | Formation Top Depth MD, ft | Thickness, ft | Depth below Lowest Identified USDW, ft MD |
|---|---|---|---|---|
| Pierre | Mudstone | 1798 | 1480 | 0 |
| Niobrara | Mudstone | 3278 | 380 | 1480 |
| Carlile | Mudstone | 3658 | 48 | 1860 |
| Greenhorn | Mudstone | 3706 | 106 | 1908 |
| Belle Fourche | Mudstone | 3812 | 293 | 2014 |
| Mowry | Mudstone | 4105 | 78 | 2307 |
| Skull Creek | Mudstone | 4193 | 231 | 2395 |
| Swift | Mudstone | 4758 | 440 | 2960 |
| Rierdon | Mudstone | 5198 | 209 | 3400 |
| Piper (Kline Member) | Carbonate | 5407 | 103 | 3609 |
| Piper (Picard Member) | Mudstone | 5510 | 93 | 3712 |
| Opeche/Spearfish | Mudstone | 5603 | 242 | 3805 |

### *4.4.2 Geology of USDW Formations*

The hydrogeology of western North Dakota is composed of several shallow freshwater-bearing formations of the Quaternary, Tertiary, and upper Cretaceous-aged sediments underlain by multiple saline aquifer systems of the Williston Basin (Figure 4-5). These saline and freshwater systems are separated by the Cretaceous Pierre Shale of the Williston Basin, a regionally extensive shale between 1000 and 1500 ft thick (Thamke and others, 2014).

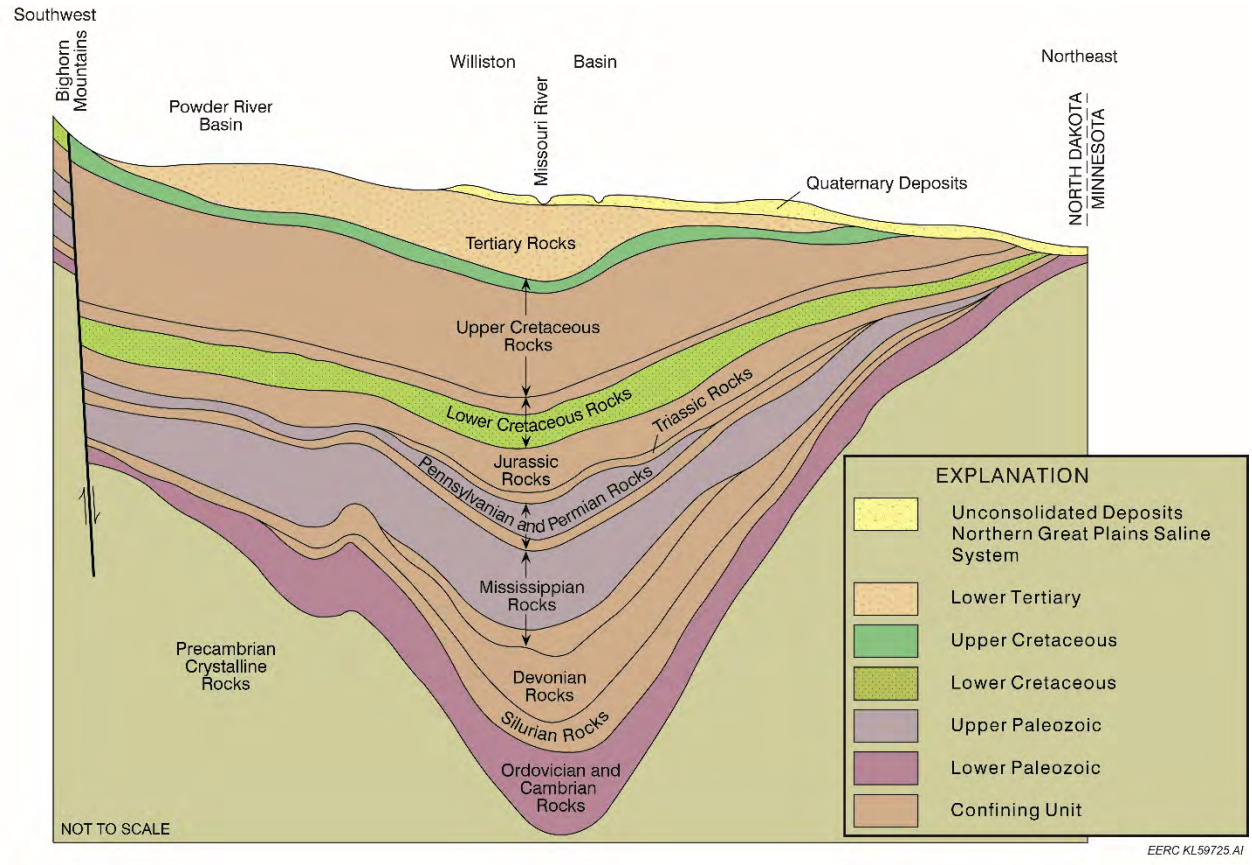



Figure 4-5. Major aquifer systems of the Williston Basin (modified from Downey and Dinwiddie, 1988).

The freshwater aquifers comprise the Cretaceous Fox Hills and Hell Creek Formations; the overlying Cannonball, Tongue River, and Sentinel Butte Formation of the Tertiary Fort Union Group; and the Tertiary Golden Valley Formation (Figure 4-6). Above these formations are undifferentiated alluvial and glacial drift Quaternary aquifer layers which are not necessarily present in all parts of the AOR (Croft, 1973).

| Era | Period | Group | Formation | Freshwater Aquifer(s) Present |
|---|---|---|---|---|
| Cenozoic | Quaternary | | Glacial Drift | Yes |
| | Tertiary | | Golden Valley | Yes |
| | | Fort Union | Sentinel Butte | Yes |
| | | | Tongue River | Yes |
| | | | Cannonball | Yes |
| Mesozoic | Cretaceous | | Hell Creek | Yes |
| | | | Fox Hills | Yes |
| | | | Pierre | No |
| | | Colorado | Niobrara | No |
| | | | Carlile | No |
| | | | Greenhorn | No |
| | | | Belle Fourche | No |

EERC CO63916.CDR

Figure 4-6. Upper stratigraphy of Mercer, Oliver, and Morton Counties showing the stratigraphic relationship of Quaternary, Cretaceous, and Tertiary groundwater-bearing formations (modified from Croft, 1973).

The lowest USDW in the AOR is the Fox Hills Formation, which together with the overlying Hell Creek Formation, is a confined aquifer system. The Hell Creek Formation is a poorly consolidated unit composed of interbedded sandstone, siltstone, and claystones with occasional carbonaceous beds, all of fluvial origin. The underlying Fox Hills Formation is interpreted as interbedded nearshore marine deposits of sand, silt, and shale deposited as part of the final Western Interior Seaway retreat (Fischer, 2013). The Fox Hills Formation in the AOR is approximately 1500 ft deep and 250–300 ft thick (information reported from stratigraphic well installation). The structure of the Fox Hills and Hell Creek Formations follows that of the Williston Basin, dipping gently toward the center of the basin to the northwest of the AOR (Figure 4-7).

The Pierre Shale is a thick, regionally extensive shale unit which forms the lower boundary of the Fox Hills–Hell Creek system, also isolating all overlying freshwater aquifers from the deeper saline aquifer systems. The Pierre Shale is a dark gray to black marine shale and is typically over 1000 ft thick in the AOR (Thamke and others, 2014).

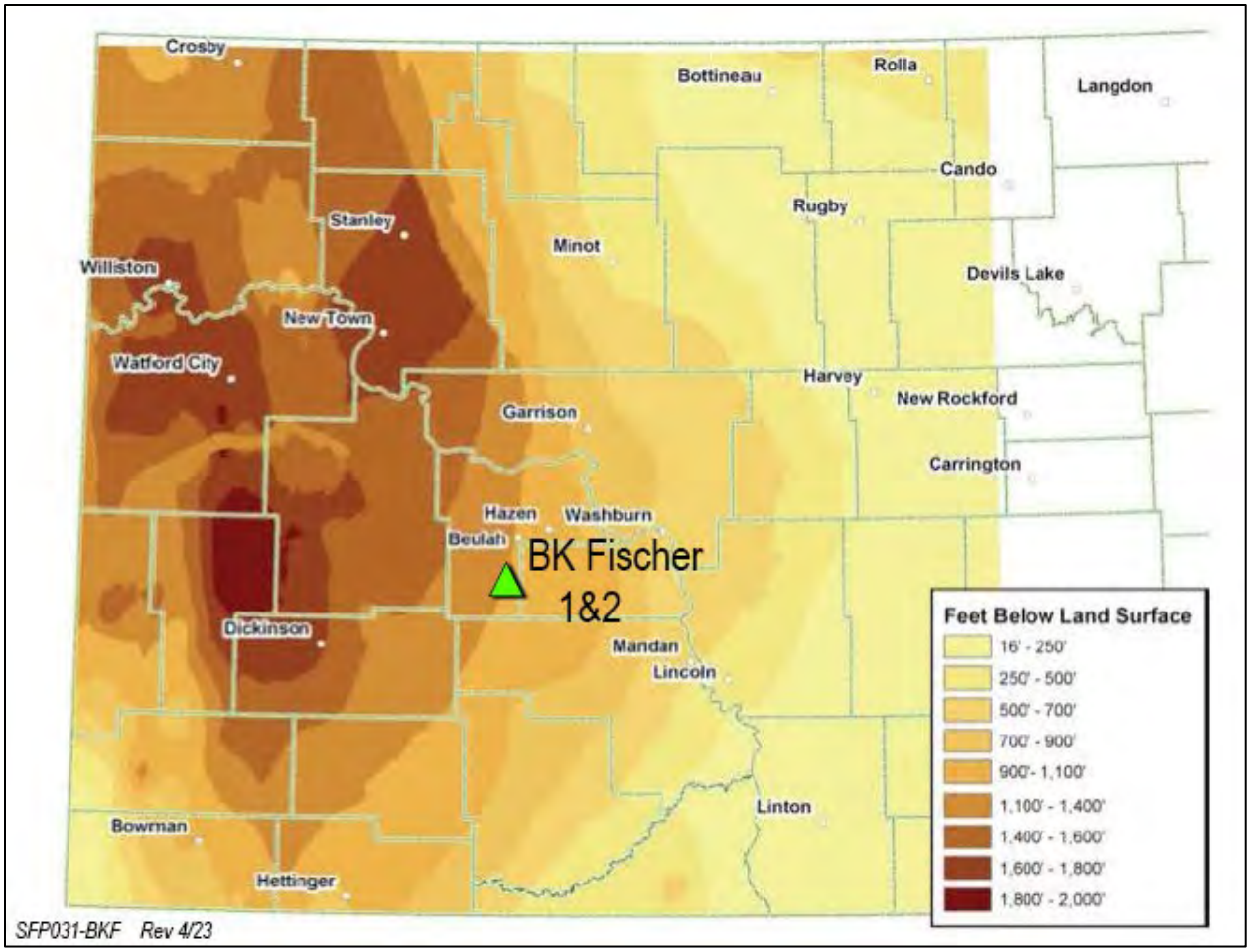



Figure 4-7. Depth to surface of the Fox Hills Formation in western North Dakota (Fischer, 2013).

### *4.4.3 Hydrology of USDW Formations*

The aquifers of the Fox Hills and Hell Creek Formations are hydraulically connected and function as a single confined aquifer system (Fischer, 2013). The Bacon Creek Member of the Hell Creek Formation forms a regional aquitard for the Fox Hills–Hell Creek aquifer system, isolating it from the overlying aquifer layers. Recharge for the Fox Hills–Hell Creek aquifer system occurs in southwestern North Dakota along the Cedar Creek Anticline and discharges into overlying strata under central and eastern North Dakota (Fischer, 2013). Flow through the AOR is to the east (Figure 4-8).

Water sampled from the Fox Hills Formation is a sodium bicarbonate type with a total dissolved solids (TDS) content of approximately 1500–1600 ppm. Previous analysis of Fox Hills Formation water has also noted high levels of fluoride in excess of 5 mg/L (Trapp and Croft, 1975) As such, the Fox Hills–Hell Creek system is typically not used as a primary source of drinking water. However, it is occasionally produced for irrigation and/or livestock watering.

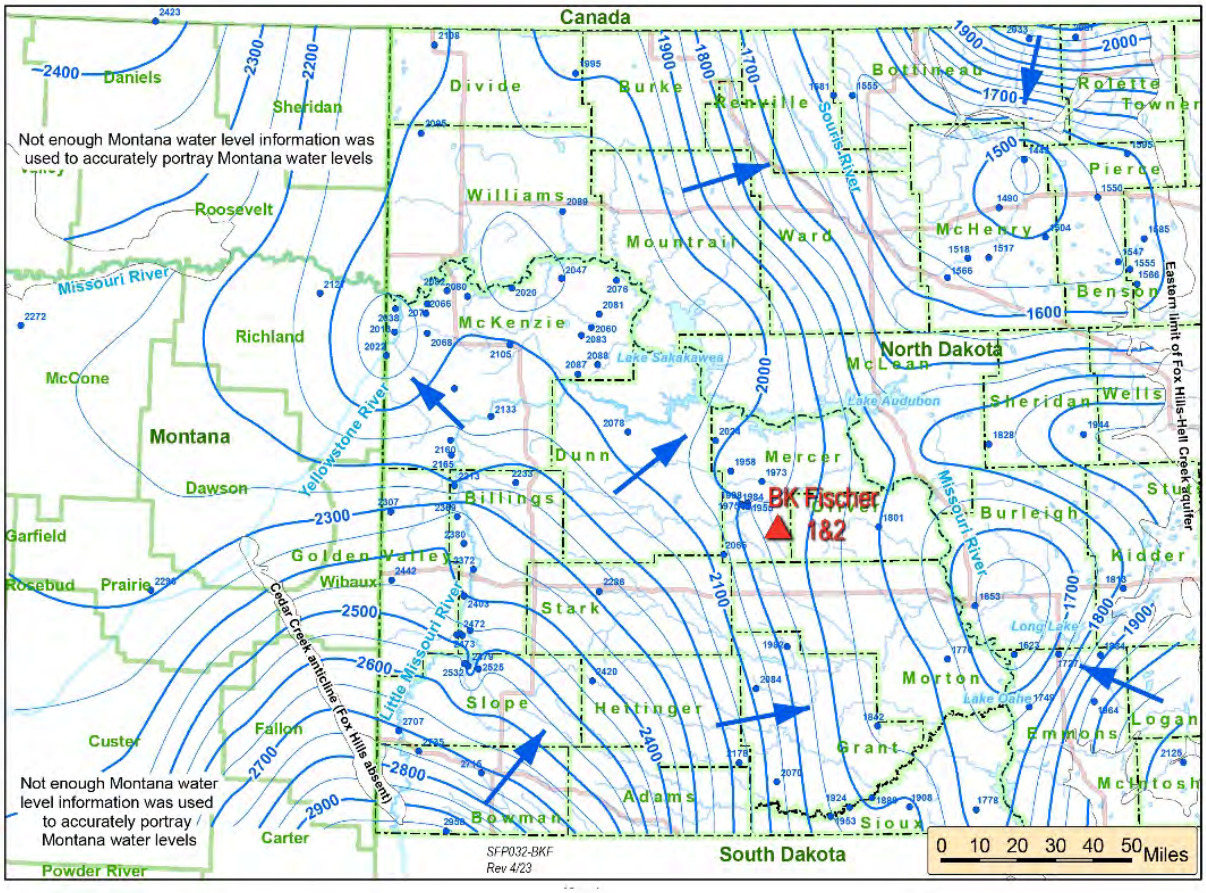



Figure 4-8. Potentiometric surface of the Fox Hills–Hell Creek aquifer system shown in feet of hydraulic head above sea level. Flow is to the east through the AOR in Mercer, Oliver, and Morton Counties (modified from Fischer, 2013).

Multiple other freshwater-bearing units, primarily of Tertiary age, overlie the Fox Hills–Hell Creek aquifer system in the AOR. A cross section of these formations is presented in Figure 4-9. The upper formations are generally used for domestic and agricultural purposes. The Cannonball and Tongue River Formations comprise the major aquifer units of the Fort Union Group, which overlies the Hell Creek Formation. The Cannonball Formation consists of interbedded sandstone, siltstone, claystone, and thin lignite beds of marine origin. The Tongue River Formation is predominantly sandstone interbedded with siltstone, claystone, lignite, and occasional carbonaceous shales. The basal sandstone member of the Tongue River is persistent and a reliable source of groundwater in the region. The thickness of this basal sand ranges from approximately 200 to 500 ft and it directly underlies surficial glacial deposits in the AOR. Tongue River groundwaters are generally a sodium bicarbonate type with a TDS of approximately 1000 ppm (Croft, 1973).

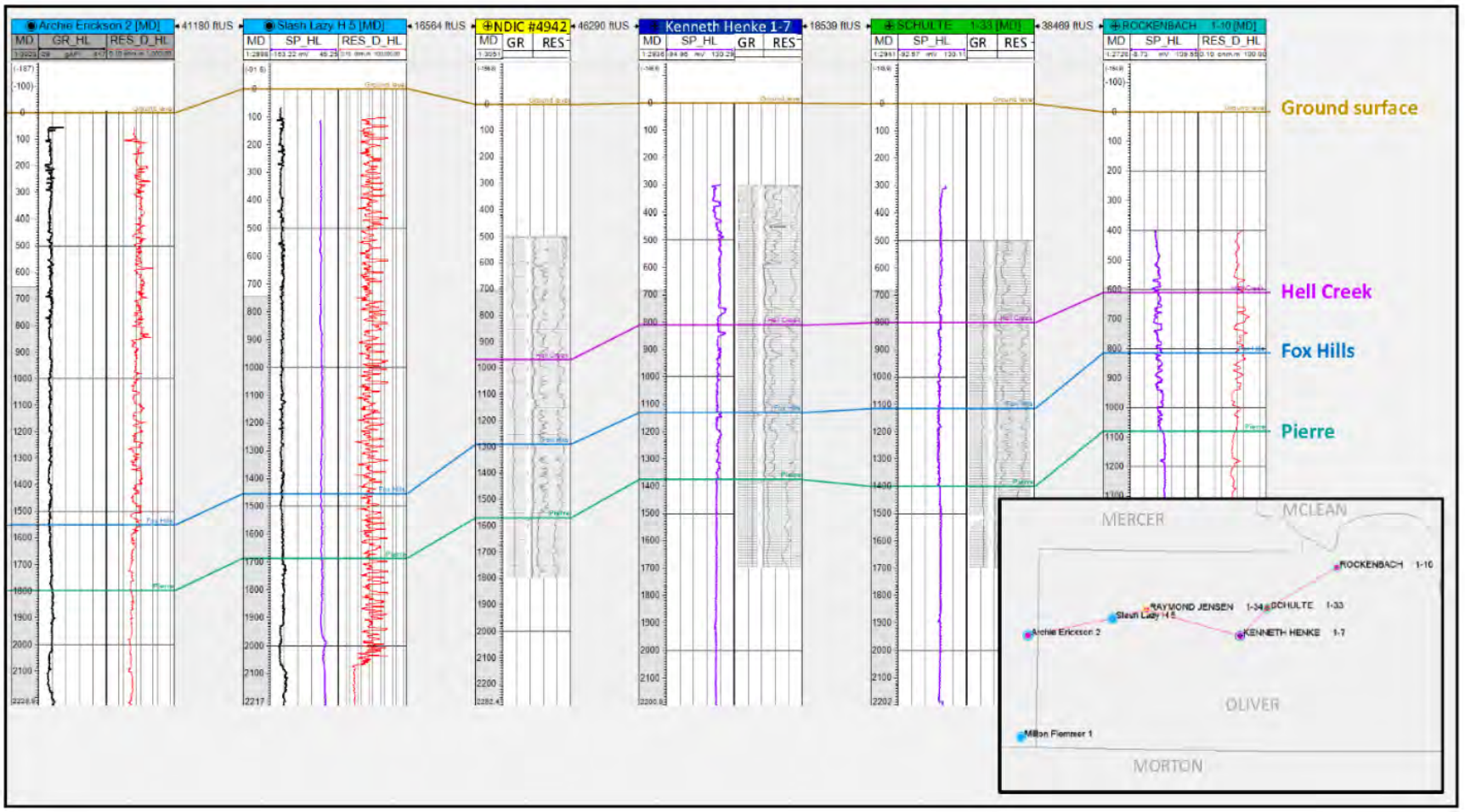



Figure 4-9 West-east cross section of the major aquifer layers in Oliver County. Wells used in the cross section are shown in the inset map and labeled with corresponding well names (NDIC File No. 4942 is Raymond Jensen 1-34).

The Sentinel Butte Formation, a silty fine-to-medium-grained sandstone with claystone and lignite interbeds, overlies the Tongue River Formation in western portions of the AOR. The Sentinel Butte Formation is predominantly sandstone with lignite interbeds. While the Sentinel Butte Formation is another important source of groundwater in the region, primarily to the west of the AOR, the Sentinel Butte Formation is not a source of groundwater within the AOR. TDS in the Sentinel Butte Formation range from approximately 400 to 1000 ppm (Croft, 1973). Above these are undifferentiated alluvial and glacial drift Quaternary aquifer layers.

### *4.4.4 Protection for USDWs*

The Fox Hills–Hell Creek aquifer system is the lowest USDW in the AOR. The injection zone (Broom Creek Formation) and the lowest USDW (Fox Hills–Hell Creek aquifer system) are isolated geologically and hydrologically by multiple impermeable rock layers consisting of shale and siltstone formations (Figure 4-5).

The primary seal of the injection zone is the Permian-aged Opeche/Spearfish Formation with the shales of the Permian-aged Spearfish, Jurassic-aged Piper (Picard), Rierdon, and Swift Formations, all of which overly the Opeche Formation. Above the Swift Formation is the confined saltwater aquifer system of the Inyan Kara Formation that extends across much of the Williston Basin. Above the Inyan Kara Formation are Cretaceous-aged shale formations, namely the Skull Creek, Mowry, Belle Fourche, Greenhorn, Carlisle, Niobrara, and Pierre Formations. The Pierre Formation is the thickest shale formation in the AOR and primary geologic barrier between the USDWs and injection zone. The geologic strata overlying the injection zone consist of multiple impermeable rock layers that are free of transmissive faults or fractures and provide adequate isolation of the USDWs from $CO_2$ injection activities in the AOR.

Figure 4-10 shows the location of groundwater wells selected to be included in the near-surface baseline and operational monitoring plan, which includes one new Fox Hills monitoring well, and up to five existing groundwater wells. The five existing wells (two – Fox Hills, one – Cannonball–Ludlow, and two – Tongue River) were chosen based on depth (>300 ft), location within the AOR, and accessibility. SCS2 screened wells within the AOR to determine suitability of wells for inclusion into the testing and monitoring program. Wells were screened based on land use permissions, site accessibility, and access to historical well data such as drilling, logging, and stratigraphic information. Table 4-5 correlates DWR well numbers with the well numbers used by SCS2 throughout this permit application.

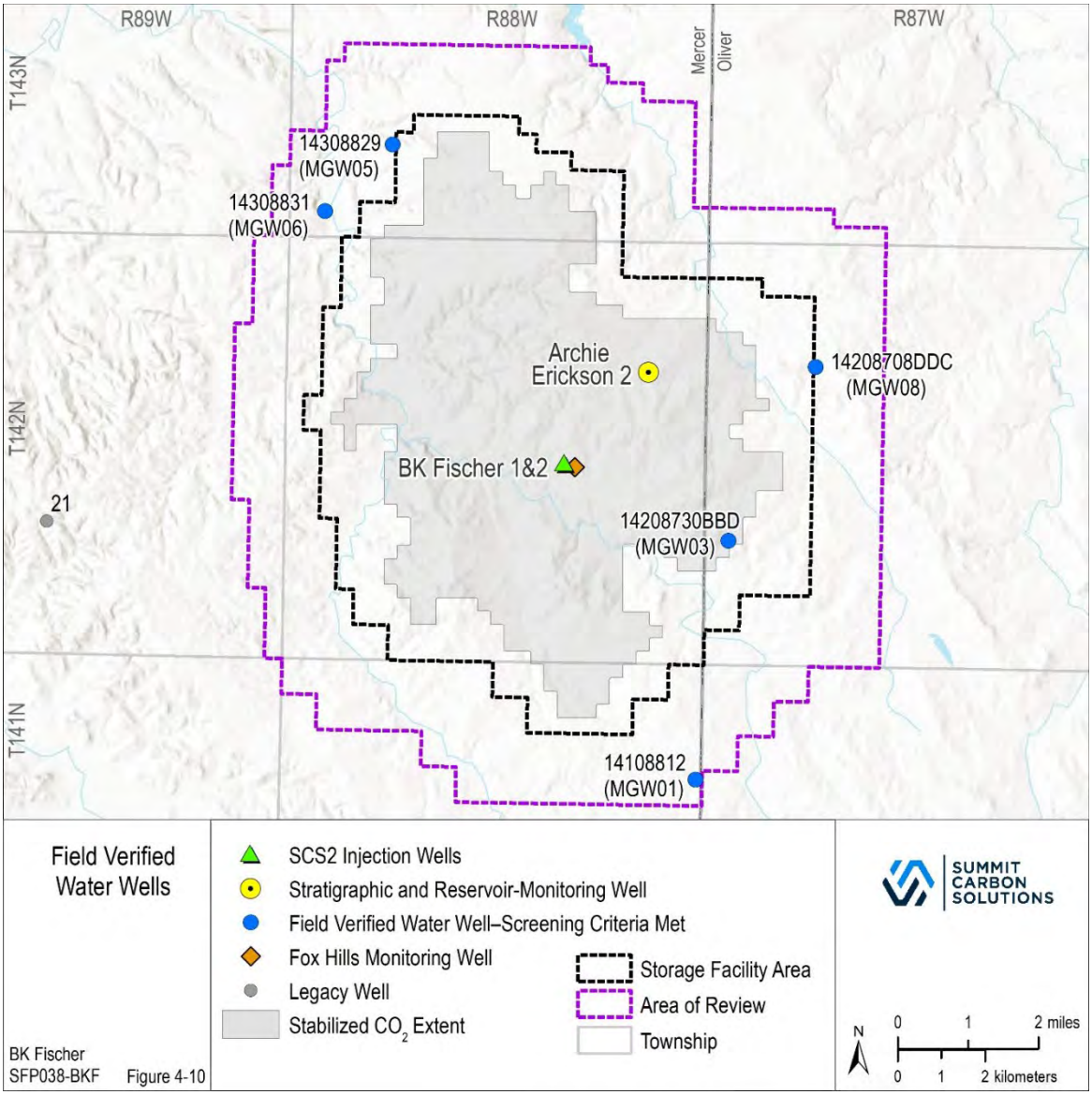



Figure 4-10. Field-verified water wells located within the AOR.

**Table 4-5. DWR and SCS2 Well No. Correlation**

| DWR Well No. | SCS2 Field Verified Location* | SCS2 Well No. | Formation |
|---|---|---|---|
| 14308831 | 143-088-31DBC | MGW06 | Fox Hills |
| 14308829 | 143-088-29CAD | MGW05 | Tongue River |
| 14208708DDC | 142-087-08DBC | MGW08 | Tongue River |
| 14208730BBD | 142-087-30BAC | MGW03 | Cannonball–Ludlow |
| 14108812 | 141-088-12DAD | MGW01 | Fox Hills |

* SCS2 Field Verified Location follows an alpha numeric system indicating the township - range - section and quarter-quarter-quarter. This is a similar system used by the DWR but adds the precise quarter-quarter-quarter location from field verification.

SCS2 will work with landowners of the five existing groundwater wells to collect three to four samples from each well to establish baseline conditions prior to $CO_2$ injection and periodically thereafter during subsequent phases of the project as outlined in Section 5.0. The actual number of wells and samples collected from each existing groundwater well location may vary because some of the groundwater wells may not be operated year-round or site accessibility may be limited (e.g., snow cover during winter months).

SCS2 will install one Fox Hills monitoring well adjacent to the $CO_2$ injection well pad. The Fox Hills monitoring well will be sampled three to four times prior to $CO_2$ injection to establish a seasonal baseline and periodically thereafter during subsequent phases of the project as outlined in Section 5.0.

## 4.5 References

Croft, M.G., 1973, Ground-water resources of Mercer and Oliver Counties, North Dakota: U.S. Geological Survey, County Ground Water Studies – 15.

Downey, J.S., and Dinwiddie, G.A., 1988, The regional aquifer system underlying the northern Great Plains in parts of Montana, North Dakota, South Dakota, and Wyoming—summary: U.S. Geological Survey Professional Paper 1402-A.

Fischer, K., 2013, Groundwater flow model inversion to assess water availability in the Fox Hills–Hell Creek Aquifer: North Dakota State Water Commission Water Resources Investigation No. 54.

North Dakota Department of Transportation, 2002, ND GIS Hub landmarks data layer, February 11: https://gishubdata-ndgov.hub.arcgis.com/datasets/NDGOV::ndgishub-landmarks-nddot/explore (accessed May 2023).

Thamke, J.N., LeCain, G.D., Ryter, D.W., Sando, R., and Long, A.J., 2014, Hydrogeologic framework of the uppermost principal aquifer systems in the Williston and Powder River structural basins, United States and Canada: U.S. Geological Survey Groundwater Resources Program Scientific Investigations Report 2014–5047.

Trapp, H., and Croft, M.G., 1975, Geology and ground water resources of Hettinger and Stark Counties North Dakota: U.S. Geological Survey, County Ground Water Studies – 16.

U.S. Geological Survey, 2023, https://apps.nationalmap.gov/downloader/ (accessed May 2023).

# SECTION 5.0

# TESTING AND MONITORING PLAN

## 5.0 TESTING AND MONITORING PLAN

Pursuant to North Dakota Administrative Code (N.D.A.C.) § 43-05-01-11.4(1)(k), this testing and monitoring plan includes 1) a plan for analyzing the captured $CO_2$ stream, 2) leak detection and corrosion-monitoring plans for surface facilities and all wells associated with the geologic $CO_2$ storage project, 3) a well-logging and -testing plan, 4) an environmental monitoring plan to verify the injected $CO_2$ is contained in the storage reservoir, and 5) a quality assurance and surveillance plan (QASP).

This site-specific testing and monitoring plan was informed by the injection scenario (as described in the Project Summary), site characterization activities (Section 2.0), geologic modeling and simulations (Section 3.0), area of review delineation and corrective action evaluation (Section 4.0), and well design (Section 9.0). Activities described in Table 5-1 will be used to establish preinjection (baseline) conditions at the storage site. Pursuant to N.D.A.C. § 43-05-01-11.4, the set of activities described in Table 5-2 will be used to verify that BK Fischer is operating as permitted and is not endangering underground sources of drinking water (USDW). Summit Carbon Storage #2, LLC (SCS2) will also specify data-quality measures through the QASP.

SCS2 will review this testing and monitoring plan at a minimum of every 5 years from the start of injection, as required by N.D.A.C. § 43-05-01-11.4(j), to ensure the technologies and strategies deployed remain appropriate for demonstrating containment of $CO_2$ in the storage reservoir and conformance with predictive modeling and simulations.

A detailed testing and monitoring plan for the baseline and operational phases is provided in the remainder of this section. Section 6.0 describes the testing and monitoring activities associated with the postinjection phase.

**Table 5-1. Overview of Major Components of the Testing and Monitoring Plan – Preinjection**

| Monitoring Type | Parameter | Activity Description | Primary Purpose(s) of Activity | Equipment/Test | Location | Preinjection/Baseline Sampling Frequency |
|---|---|---|---|---|---|---|
| **$CO_2$ Stream Analysis** | **Injection composition** | $CO_2$ stream sampling | $CO_2$ accounting and ensures stream compatibility with project materials in contact with $CO_2$ | Gas chromatograph and $CO_2$ stream compositional commercial laboratory results | Downstream of pipeline inspection gauge (PIG) receiver | At least once |
| **Wellbore Mechanical Integrity (external)** | **Casing wall thickness** | Ultrasonic logging or other equivalent casing inspection log [CIL] and sonic array logging (inclusive of casing collar locator [CCL], variable density log [VDL] and radial cement bond log [RCBL]), and gamma ray (GR) | Mechanical integrity demonstration and operational safety assurance | Ultrasonic or other equivalent CIL and sonic array tools (inclusive of CCL, VDL, and RCBL), and GR | $CO_2$ injection and reservoir-monitoring wells | Once per well |
| | **Radial cement bond** | | | | | |
| | **Saturation profile** (behind casing) | Pulsed-neutron logging (PNL) | | PNL tool | $CO_2$ injection and reservoir-monitoring wells (run log from Opeche/Spearfish Formation to surface) | |
| | **Temperature profile** | Temperature logging | | Temperature log | $CO_2$ injection and reservoir-monitoring wells | |
| | | Real-time, continuous data recording via supervisory control and data acquisition (SCADA) system | | Distributed temperature sensing (DTS) casing-conveyed fiber-optic cable | Along the outside of the long-string casing of the $CO_2$ injection and reservoir-monitoring wells | Install at casing deployment |
| **Wellbore Mechanical Integrity (internal)** | **Pressure/temperature (P/T)** | Real-time, continuous data recording via SCADA system | Mechanical integrity demonstration and operational safety assurance | Digital surface P/T gauge | Between surface and long-string casing annulus on $CO_2$ injection and reservoir-monitoring wells | Install at well completion |
| | **Annulus pressure** | Tubing-casing annulus pressure testing | | Pressure testing truck with pressure chart | $CO_2$ injection and reservoir-monitoring wells | Once per well |
| | **P/T** | Real-time, continuous data recording via SCADA system | | Digital surface P/T gauge | Between tubing and long-string casing annulus of $CO_2$ injection and reservoir-monitoring wells | Install at well completion |
| | **Annular fluid level** | Real-time, continuous data recording via SCADA system | Prevention of microannulus and monitoring annular fluid volume | Nitrogen ($N_2$) cushion on tubing-casing annulus with seal pot system | On well pad for each $CO_2$ injection well | Add initial volumes to BK Fischer 1 and 2 |
| | **P/T** | Real-time, continuous data recording via SCADA system | Mechanical integrity demonstration and operational safety assurance | Digital surface P/T gauge | Tubing of $CO_2$ injection and reservoir-monitoring wells | Install at well completion |
| | **Saturation profile** (tubing-casing annulus) | PNL | | PNL tool | $CO_2$ injection and reservoir-monitoring wells (run log from Opeche/Spearfish Formation to surface) | Once per well |
| **Downhole Corrosion Detection** | **Saturation profile** (behind casing) | PNL | Corrosion detection of project materials in contact with $CO_2$ and operational safety assurance | PNL tool | $CO_2$ injection and reservoir-monitoring wells (run log from Opeche/Spearfish Formation to surface) | Once per well |
| | **Casing wall thickness** | Ultrasonic logging or other equivalent CIL and sonic array logging (inclusive of CCL, VDL, and RCBL), and GR | | Ultrasonic or other equivalent CIL and sonic array tools (inclusive of CCL, VDL, and RCBL), and GR | $CO_2$ injection and reservoir-monitoring wells | |

Continued …

**Table 5-1. Overview of Major Components of the Testing and Monitoring Plan – Preinjection (continued)**

| Monitoring Type | Parameter | Activity Description | Primary Purpose(s) of Activity | Equipment/Test | Location | Preinjection/Baseline Sampling Frequency |
|---|---|---|---|---|---|---|
| **Near Surface** | **Soil gas composition** | Soil gas sampling (See Figure 5-4) | Assurance near-surface environment is protected | Two soil gas profile stations: MSG02 & MSG05 | One station per $CO_2$ injection and reservoir-monitoring well pad | 3–4 seasonal samples per station (with isotopes) |
| | **Soil gas isotopes** | | Source attribution | | | |
| | **Water composition** | Groundwater well sampling (See Figure 5-4) | Assurance that USDWs are protected | Up to five existing groundwater wells from the Tongue River, Cannonball-Ludlow, and Fox Hills Aquifers (e.g., MGW01, MGW03, MGW05, MGW06, and MGW08) | Within area of review (AOR) | 3–4 seasonal samples per well (water quality with isotopes) |
| | **Water isotopes** | | Source attribution | | | |
| | **Water composition** | | Assurance that lowest USDW is protected | Fox Hills monitoring well | MGW10 adjacent to $CO_2$ injection well pad | 3–4 seasonal samples (water quality with isotopes) |
| | **Water isotopes** | | Source attribution | | | |
| **Above-Zone Monitoring Interval** (Opeche/Spearfish to Skull Creek) | **Saturation profile** | PNL | Assurance of containment in the storage reservoir and protection of USDWs | PNL Tool | $CO_2$ injection and reservoir-monitoring wells | Once per well |
| | **Temperature profile** | Real-time, continuous data recording via SCADA system | | DTS casing-conveyed fiber-optic cable | | Install at casing deployment |
| | | Temperature logging | | Temperature log | | Once per well |
| **Storage Reservoir** (direct) | **P/T** | Real-time, continuous data recording via SCADA system | Storage reservoir monitoring and conformance with model and simulation projections | Casing-conveyed downhole P/T gauge | $CO_2$ injection and reservoir-monitoring wells | Install at casing deployment |
| | **Temperature profile** | Real-time, continuous data recording via SCADA system | | DTS casing-conveyed fiber-optic cable | | Install at casing deployment |
| | | Temperature logging | | Temperature log | | Once per well |
| | **Storage reservoir performance** | Injectivity testing | Demonstration of storage reservoir performance | Pressure falloff test | $CO_2$ injection wells | Once per injection well |
| **Storage Reservoir** (indirect) | **$CO_2$ saturation** | 3D time-lapse seismic surveys | Site characterization and $CO_2$ plume tracking to ensure conformance with model and simulation projections | Vibroseis trucks (source) and geophones and distributed acoustic sensing (DAS) fiber-optic cable (receivers) | Within AOR | Collect 3D baseline survey |
| | **Seismicity** | Continuous data recording | Seismic event detection and source attribution and operational safety assurance | Seismometer stations and DAS fiber optics | Area around injection wells (within 1 mile) | Install stations |

**Table 5-2. Overview of Major Components of the Testing and Monitoring Plan – Injection**

| Monitoring Type | Parameter | Activity Description | Primary Purpose(s) of Activity | Equipment/Test | Location | Sampling Frequency | Injection Reporting (20 years) | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | **Report Content (N.D.A.C. § 43-05-01-18)[1]** | **Reporting Method** | **DMR-O&G Reporting Schedule[2,3]** |
| **$CO_2$ Stream Analysis** Section 5.1 | **Injection volume/mass** | Real-time, continuous data recording with automated triggers and alarms via SCADA system | $CO_2$ accounting, leak detection, and operational safety assurance | Multiple Coriolis mass flowmeters | One flowmeter per injection wellhead placed on flowline after flowline splits on injection pad | Continuous | Monthly average volume (metric tons/MCF) and mass of $CO_2$ stream injected over reporting period and cumulative volume injected to date | Form 26 - Carbon Dioxide Storage Report - SFN 18667; NorthSTAR Sundry (e.g., underground injection control [UIC] supplemental information – date of first injection) | Any evidence of injected $CO_2$ or associated pressure front that may cause an endangerment to USDW or any noncompliance which may endanger health and safety of persons or cause pollution of the environment[6] must be reported with 24 hours.<br><br>File quarterly[4]<br><br>Annual report[5] |
| | **Injection flow rate** | | | | | | Monthly average maximum and minimum injection flow rate | | |
| | **Injection P/T** | | | Multiple P/T gauges | Along NDL-325 flowline; downstream or upstream of flowmeters; and upstream of injection wellheads | | Monthly average pressure (psi) and monthly average temperature (Fahrenheit) | | |
| | **Injection composition** (See Table 5-3, Stream System Specification) | $CO_2$ stream sampling | $CO_2$ accounting and ensures stream compatibility with project materials in contact with $CO_2$ | Gas chromatograph | Downstream of the PIG receiver | | Average $CO_2$ stream composition; any changes to its physical, chemical, and/or relevant characteristics from proposed operating data | Form 26A – Carbon Dioxide Storage Source Report – SFN 18668 | |
| | | | Verify accuracy of field measurements | $CO_2$ stream sampling with sample port | Upstream of the gas chromatograph | Quarterly with option to reduce sampling frequency with approval from DMR O&G | $CO_2$ stream compositional commercial laboratory results | NorthSTAR Sundry (e.g., logs and testing – supplemental information) | File quarterly[4] if analysis is performed during quarter.<br><br>Annual report[5] |
| | **Isotopes** | | Source attribution | | | Within first year of injection and within one year of adding new $CO_2$ source(s) (other than ethanol) | $CO_2$ stream isotopic commercial laboratory results | | |
| **Surface Facilities Leak Detection Plan** Section 5.2 | **Mass balance** | Real-time, continuous data recording with automated triggers and alarms via SCADA system | $CO_2$ accounting, leak detection, and operational safety assurance | Leak detection system (LDS) software, multiple P/T gauges, and Coriolis mass flowmeters | Flowmeter and P/T gauge near each injection wellhead in pump/metering building and flowmeter and P/T gauge at point of transfer | Continuous | Any release of $CO_2$ into the atmosphere or triggering of a surface facilities shutoff device | NorthSTAR Sundry (e.g., logs and testing – supplemental information) | Atmospheric releases or triggering of a shutoff device to be reported within 24 hours[3] after event is confirmed by operator.<br><br>File quarterly[4]<br><br>Annual report[5] |
| | **Gas concentrations** (e.g., $CO_2$, $CH_4$, and $H_2S$) | | | Gas detection stations and safety lights | Stations on each injection and reservoir-monitoring wellhead; station inside pump/metering building and safety light mounted on building exterior; multigas detectors worn by field personnel | | | | |

Continued . . .

**Table 5-2. Overview of Major Components of the Testing and Monitoring Plan – Injection (continued)**

| Monitoring Type | Parameter | Activity Description | Primary Purpose(s) of Activity | Equipment/Test | Location | Sampling Frequency | Injection Reporting (20 years) | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Report Content (N.D.A.C. § 43-05-01-18)[1] | Reporting Method | DMR-O&G Reporting Schedule[2,3] |
| **$CO_2$ Flowline Corrosion Prevention and Detection Plan** Section 5.3 | **Loss of mass** | Real-time, continuous data recording with automated triggers and alarms via SCADA system | Corrosion detection of project materials in contact with $CO_2$ and operational safety assurance | Electrical resistance (ER) probe | Flowline NDL-325 begins at the point of transfer and ends at the inlet valve upstream of the emergency shut off valve at each injection wellhead | Continuous | Summary of ER probe monitoring results | NorthSTAR Sundry (e.g., logs and testing – supplemental information) | File quarterly[4]<br><br>Annual report[5] |
| | | Pipeline Inspection | | PIG | PIG receiver upstream of the gas chromatograph on NDL-325 flowline | Once every 5 years | Summary of PIG monitoring results | | |
| | **Flow conditions** (e.g., saturation point of water) | Real-time, continuous data recording with automated triggers and alarms via SCADA system | | Real-time model with LDS software and multiple P/T gauges and Coriolis mass flowmeters | Flowmeter and P/T gauge near each injection wellhead and at point of transfer | Continuous | Operator statement about flowline operation conditions | | |
| | **Cathodic protection** | Continuous data recording | Corrosion prevention of project materials | Impressed current cathodic protection (ICCP) system | Anodes buried along the length of NDL-325 flowline | | | | |
| **Wellbore Mechanical Integrity (external)** Section 5.4 | **Casing wall thickness** | Ultrasonic logging or other equivalent CIL and sonic array logging (inclusive of CCL, VDL, RCBL), and GR | Mechanical integrity demonstration and operational safety assurance | Ultrasonic or other equivalent CIL and sonic array tools (inclusive of CCL, VDL, and RCBL) and GR | $CO_2$ injection and reservoir-monitoring wells | Repeat when required and when tubing is pulled during workovers | Mechanical integrity test (MIT), injection well test, well workover, and logging results and interpretations | NorthSTAR Sundry (e.g., casing/cement supplemental information; logs and testing – notification of work performed, supplemental information, etc.) | Mechanical integrity failures to be reported within 24 hours after event is confirmed by operator. File quarterly[4] if analysis is performed or log is acquired during quarter.<br><br>Annual report[5] |
| | **Radial cement bond** | | | | | | | | |
| | **Saturation profile** (behind casing) | PNL | | PNL tool | $CO_2$ injection and reservoir-monitoring wells (run log from Opeche/Spearfish Formation to surface) | Year 1, Year 3, and at least once every 3 years thereafter (e.g., Years 6, 9, 12, etc.) | | | |
| | **Temperature profile** | Temperature logging | | Temperature log | $CO_2$ injection and reservoir-monitoring wells | Annually only if DTS fails | MIT (i.e., annual external mechanical integrity demonstration test results) injection well test, well workover, and logging results and interpretations | | |
| | | Real-time, continuous data recording via SCADA system | | DTS casing-conveyed fiber-optic cable | Along the outside of the long-string casing of the $CO_2$ injection and reservoir-monitoring wells | Continuous | | | |

Continued…

**Table 5-2. Overview of Major Components of the Testing and Monitoring Plan – Injection (continued)**

| Monitoring Type | Parameter | Activity Description | Primary Purpose(s) of Activity | Equipment/Test | Location | Sampling Frequency | Injection Reporting (20 years) | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Report Content (N.D.A.C. § 43-05-01-18)[1] | Reporting Method | DMR-O&G Reporting Schedule[2,3] |
| **Wellbore Mechanical Integrity (internal)** Section 5.4 | **P/T** | Real-time, continuous data recording via SCADA system | Mechanical integrity demonstration and operational safety assurance | Digital surface P/T gauge | Between surface and long-string casing annulus on $CO_2$ injection and reservoir-monitoring wells | Continuous | Wellhead temperatures and pressures (surface casing) | Form 26 - Carbon Dioxide Storage Report - SFN 18667;<br><br>NorthSTAR Sundry (e.g., casing/cement supplemental information; logs and testing – notification of work performed, supplemental information, etc.) | Mechanical integrity failures to be reported within 24 hours after event is confirmed by operator.<br><br>Form 26 – Monthly<br><br>File quarterly[4]<br><br>Annual report[5] |
| | **Annulus pressure** | Tubing-casing annulus pressure testing | | Pressure testing truck with pressure chart | $CO_2$ injection and reservoir-monitoring wells | Repeat during workover operations in cases where the tubing must be pulled and no less than once every 5 years. | Monthly average maximum and minimum annular pressure; MIT or well workover results and interpretations; description of event that exceeds operating procedures | | Mechanical integrity failures to be reported within 24 hours after event is confirmed by operator.<br><br>Form 26 – Monthly<br><br>File report by quarter[4] in which the analysis is performed.<br><br>Annual report[5] |
| | **P/T** | Real-time, continuous data recording via SCADA system | | Digital surface P/T gauge | Between tubing and long-string casing annulus of $CO_2$ injection and reservoir-monitoring wells | Continuous | Wellhead temperatures and pressures (annulus) | | Mechanical integrity failures to be reported within 24 hours after event is confirmed by operator.<br><br>Form 26 – Monthly<br><br>File quarterly[4]<br><br>Annual report[5] |
| | **Annular fluid level** | | Prevention of microannulus and monitoring annular fluid volume | Nitrogen ($N_2$) cushion on tubing-casing annulus with seal pot system | On well pad for each $CO_2$ injection well | | Monthly annulus fluid volumes added | | |
| | **P/T** | | Mechanical integrity demonstration and operational safety assurance | Digital surface P/T gauge | Tubing of $CO_2$ injection and reservoir-monitoring wells | | Wellhead temperatures and pressures (tubing) and monthly average, maximum, and minimum injection pressure | | |
| | **Saturation profile** (tubing-casing annulus) | PNL | | PNL tool | $CO_2$ injection and reservoir-monitoring wells (run log from Opeche/Spearfish Formation to surface) | Year 1, Year 3, and at least every 3 years thereafter (e.g., Years 6, 9, 12, etc.) | MIT, injection well test, well workover, and logging results and interpretation | | File report by quarter[4] in which the log is acquired.<br><br>Annual report[5] |

Continued…

**Table 5-2. Overview of Major Components of the Testing and Monitoring Plan – Injection (continued)**

| Monitoring Type | Parameter | Activity Description | Primary Purpose(s) of Activity | Equipment/Test | Location | Sampling Frequency | Injection Reporting (20 years) | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Report Content (N.D.A.C. § 43-05-01-18)[1] | Reporting Method | DMR-O&G Reporting Schedule[2,3] |
| **Downhole Corrosion Detection** Section 5.6.2 | **Saturation profile** (behind casing) | PNL | Corrosion detection of project materials in contact with $CO_2$ and operational safety assurance | PNL tool | $CO_2$ injection and reservoir-monitoring wells (run log from Opeche/Spearfish Formation to surface) | Year 1, Year 3, and at least once every 3 years thereafter | Logging results and interpretations | NorthSTAR Sundry (e.g., casing/cement supplemental information) | File quarterly[4] in which the log is acquired.<br><br>Annual report[5] |
| | **Casing wall thickness** | Ultrasonic logging or other equivalent CIL and sonic array logging (inclusive of CCL, VDL, and RCBL), and GR | | Ultrasonic or other equivalent CIL and sonic array tools (inclusive of CCL, VDL, and RCBL), and GR | $CO_2$ injection and reservoir-monitoring wells | Repeat when required and when tubing is pulled during workovers | | | |
| **Near Surface** Sections 5.7.1 and 5.7.2 | **Soil gas composition** (See Table 5-7) | Soil gas sampling (See Figure 5-4) | Assurance near-surface environment is protected | Two soil gas profile stations: MSG02 and MSG05 | One station per $CO_2$ injection and reservoir-monitoring well pad | Collect 3–4 seasonal samples annually per station (no isotopes; perform concentration analysis) | Summary of lab results | NorthSTAR Sundry (e.g., logs and testing – supplemental information) | Any $CO_2$ release of $CO_2$ to the atmosphere or biosphere requires 24-hour notification.<br><br>File quarterly[4]<br><br>Annual report[5] |
| | **Water composition** (See Table 5-9) | Groundwater well sampling (See Figure 5-4) | Assurance that USDWs are protected | Up to five existing groundwater wells from the Tongue River, Cannonball-Ludlow, and Fox Hills Aquifers (e.g., MGW01, MGW03, MGW05, MGW06, and MGW08) | AOR | At the start of injection, shift sampling program to the Fox Hills monitoring well near the $CO_2$-injection well pad (MGW10). Additional wells may be phased in over time as the $CO_2$ plume migrates. | | | |
| | **Water composition** | | Assurance that lowest USDW is protected | Fox Hills monitoring well | MGW10 adjacent to $CO_2$ injection well pad; additional wells may be phased in over time as the $CO_2$ plume migrates. | 3–4 seasonal samples in Years 1–4 and reduce to annually thereafter. (water quality only; no isotopic testing) | | | |
| **Above-Zone Monitoring Interval** Opeche/Spearfish to Skull Creek Section 5.7.3.1 | **Saturation profile** | PNL | Assurance of containment in the storage reservoir and protection of USDWs | PNL tool | $CO_2$ injection and reservoir-monitoring wells | Year 1, Year 3, and at least every 3 years thereafter | Logging results and interpretations | NorthSTAR Sundry (e.g., logs and testing – supplemental information) | File by quarter[4] in which the log is acquired.<br><br>Annual report[5] |
| | **Temperature profile** | Real-time, continuous data recording via SCADA system | | DTS casing-conveyed fiber-optic cable | | Continuous | | | |
| | | Temperature logging | | Temperature log | | Annually only if DTS fails | | | |

Continued . . .

**Table 5-2. Overview of Major Components of the Testing and Monitoring Plan – Injection (continued)**

| Monitoring Type | Parameter | Activity Description | Primary Purpose(s) of Activity | Equipment/Test | Location | Sampling Frequency | Injection Reporting (20 years) | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Report Content (N.D.A.C. § 43-05-01-18)[1] | Reporting Method | DMR-O&G Reporting Schedule[2,3] |
| **Storage Reservoir (direct)** Sections 5.7 and 5.7.3.2 | **P/T** | Real-time, continuous data recording via SCADA system | Storage reservoir monitoring and conformance with model and simulation projections | Casing-conveyed downhole P/T gauge | $CO_2$ injection and reservoir-monitoring wells | Continuous | Downhole temperatures and pressures | Form 26 - Carbon Dioxide Storage Report - SFN 18667;<br>NorthSTAR Sundry (e.g., logs and testing – supplemental information) | Form 26 - monthly<br>File quarterly[4]<br>Annual report[5] |
| | **Temperature profile** | | | DTS casing-conveyed fiber-optic cable | $CO_2$ injection and reservoir-monitoring wells | | Logging results and interpretations | | File by quarter[4] in which the analysis is performed or log is acquired.<br>Annual report[5] |
| | | Temperature logging | | Temperature log | | Annually only if DTS fails | | | |
| | **Storage reservoir performance** | Injectivity testing | Demonstration of storage reservoir performance | Pressure falloff tests | $CO_2$ injection wells | Once every 5 years per well after the start of injection | Injection well test results | | |
| **Storage Reservoir, (indirect)** Section 5.7.3.3 | **$CO_2$ saturation** | 3D time-lapse seismic surveys (See Figure 5-6) | Site characterization and $CO_2$ plume tracking to ensure conformance with model and simulation projections | Vibroseis trucks (source) and geophones and DAS fiber-optic cable (receivers) | Within AOR | Repeat 3D seismic survey by the end of Year 2 and in Years 4 and 9 and at least once every 5 years thereafter. | Summary of seismic results and interpretations | NorthSTAR Sundry (e.g., logs and testing – supplemental information) | File by quarter[4] in which the analysis is performed.<br>Annual report[5] |
| | **Seismicity** | Continuous data recording | Seismic event detection and source attribution and operational safety assurance | Seismometer stations and DAS fiber optics | Area around injection wells (within 1 mile) | Continuous | | | Report on seismic events detected within 24 hours.<br>File quarterly[4]<br>Annual report[5] |

[1] In addition to the reports, submittals, notifications, and other information described in Table 5-1 and N.D.A.C. § 43-05-01-18, Reporting Requirements, the Director may require other additional information to be reported not outlined in Table 5-1.
[2] SCS2 will notify the Director as soon as possible of any planned changes which may result in noncompliance with permit requirements.
[3] Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements shall be submitted no later than 30 days following each scheduled reporting date. SCS2 shall file with the Director an annual report that summarizes the quarterly reports.
[4] The storage operator shall file with the Director quarterly, or more frequently, if the Director requires. The quarterly report shall also contain events that trigger a shutoff device and any monitoring results.
[5] SCS2 shall file with the Director an annual report that summarizes the quarterly reports and include projections of the response and storage capacity of the storage reservoir including anomalies and assumptions. All anomalies in predicted behavior as indicated in permit conditions or in the assumptions upon which the permit was issued must be explained and, if necessary, the permit conditions amended in accordance with N.D.A.C. § 43-05-01-12. The annual report is due 45 days after the end of the year.
[6] SCS2 shall verbally report noncompliance or malfunction within 24 hours from the time SCS2 became aware of the circumstances. A written submission shall also be provided within 5 days of the time SCS2 became aware and include a description of the noncompliance and its cause; the period of noncompliance, including exact dates and times; and if the noncompliance has not been corrected, the anticipated time it is expected to continue; and steps taken or planned to reduce, eliminate, and prevent reoccurrence of the noncompliance.

## 5.1 $CO_2$ Stream Analysis

The $CO_2$ stream will be monitored during injection operations to accurately measure $CO_2$ volumes transported from the $CO_2$ flowline to the $CO_2$ injection wellheads (BK Fischer 1 and 2). A pressure/temperature (P/T) gauge and Coriolis mass flowmeter installed near each of the $CO_2$ injection wellheads will provide continuous, real-time measurements of the injection volume, flow rate, pressure, and temperature of the $CO_2$ stream during operations. The equipment will be spliced to a supervisory control and data acquisition (SCADA) system and have automated triggers and alarms for notifying the operations center in the event of any anomalous readings.

Another goal of monitoring the $CO_2$ stream is to ensure materials and equipment in contact with the stream are protected. Prior to injection, SCS2 determined the composition of each individual $CO_2$ source and the resultant $CO_2$ stream to establish a system specification, as shown in Table 5-3. Selected flowline and well materials are designed to meet or exceed the system specification. Any new $CO_2$ streams from third-party entities not accounted for at the time of permitting must also meet or exceed the system specification once commingled with the existing $CO_2$ stream as described in Table 5-3.

**Table 5-3. $CO_2$ Stream System Specification**

| Chemical Content | System Specification |
|---|---|
| Carbon Dioxide, $CO_2$ | ≥98.25% |
| Inert, $N_2$ | ≤1.44% |
| Oxygen, $O_2$ | ≤0.31% |
| Water, $H_2O$* | ≤20 lb/MMscf |
| Total Hydrocarbons* | ≤1800 ppm by volume |
| Hydrogen Sulfide, $H_2S$* | ≤10 ppm by volume |
| Total Sulfur, S* | ≤10 ppm by volume |
| Glycol | ≤0.3 gallons/MMscf |

* Denotes trace constituents that do not make up notable percentages of stream composition.

N.D.A.C. § 43-05-01-11.4(1)(a) requires "[a]nalysis of the $CO_2$ stream in compliance with applicable analytical methods and standards generally accepted by industry and with sufficient frequency to yield data representative of its chemical and physical characteristics." Key chemical and physical characteristics of interest include composition, corrosiveness, temperature, and density (N.D.A.C. § 43-05-01-11[9][b]). SCS2 plans to sample the $CO_2$ stream continuously with a gas chromatograph installed on the injection well pad. The gas chromatograph will be spliced to the SCADA system to collect real-time data. Tables 5-1 and 5-2 specify the $CO_2$ stream sampling strategy.

For isotopic analysis of the $CO_2$ stream, a sample port will be placed upstream of the gas chromatograph to collect samples. Figure 5-1 illustrates the anticipated ranges for stable carbon isotopes from various $CO_2$ source signals. At the time of permitting, the $CO_2$ stream is expected to be sourced by ethanol (biofuel) facilities. Therefore, the corresponding stable carbon isotope signature of the $CO_2$ stream is anticipated to be approximately -10 ‰ to -20 ‰, as shown in Figure 5-1. If sources of $CO_2$ other than ethanol are added that were not originally accounted for at the time of permitting, SCS2 will repeat sampling of the $CO_2$ stream within a year of adding the new $CO_2$ source(s) to redetermine its isotopic signature.

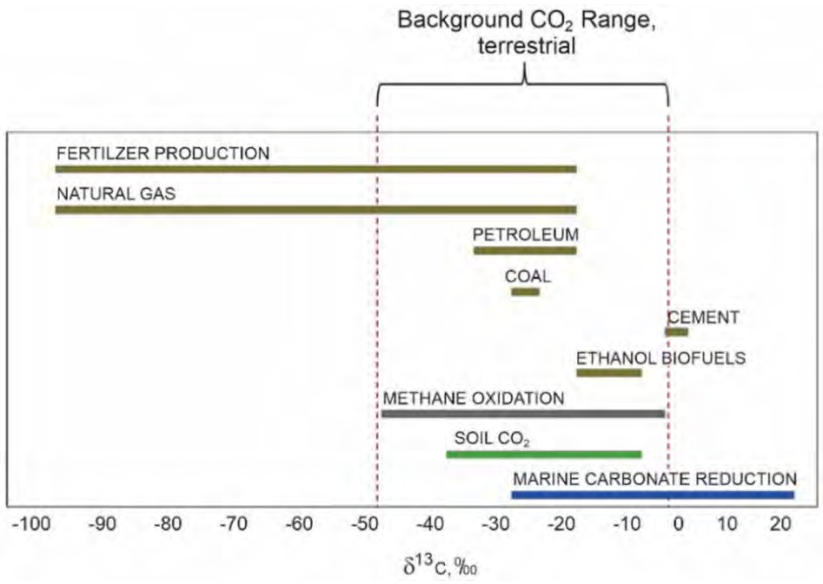



Figure 5-1. Stable carbon isotope signatures of various $CO_2$ source signals (from Dixon and Romanak, 2015).

### *5.1.1 $CO_2$ Stream Analysis QASP*

SCS2 will follow manufacturer guidelines to regularly calibrate and maintain the gas chromatograph (specification sheet provided in Appendix D, Attachment D-1). The gas chromatograph will measure the $CO_2$ stream's individual chemical components for concentration analysis using a thermal conductivity detector. The onboard electronics and software will calculate the concentrations of each individual chemical component and output the results in a tabulated format, similar to what is shown in Table 5-3. $CO_2$ stream analysis with the gas chromatograph will be performed at regularly scheduled intervals determined by SCS2 that meets N.D.A.C. § 43-05-01-11.4(1)(a). Isotopic analyses of the $CO_2$ stream will be outsourced to commercial laboratories that will employ standard analytical quality assurance/quality control (QA/QC) protocols used by the industry. $CO_2$ stream sampling will be performed at regularly scheduled intervals determined by SCS2 that meets N.D.A.C. § 43-05-01-11.4(1)(a) and analyzed by a third-party commercial laboratory.

## 5.2 Surface Facilities Leak Detection Plan

The purpose of this leak detection plan is to specify the monitoring strategies SCS2 will use to quantify any losses of $CO_2$ from surface facilities during operations. Surface facilities include the $CO_2$ injection wellheads (BK Fischer 1 and 2), the reservoir-monitoring wellhead (Archie Erickson 2), and the NDL-325 $CO_2$ flowline, which begins at the first weld seam downstream of the NDL-325/NDL-327 connection (i.e., point of transfer, PLR-26) and ends at the inlet valve upstream of the automated emergency shutoff valve at each $CO_2$ injection wellhead. Figure 5-2 illustrates the $CO_2$ flowline path to $CO_2$ injection wellsite, and Figure 5-3 is a generalized flow diagram from the point of transfer to the $CO_2$ injection wellheads, illustrating key surface facilities' connections and monitoring equipment.

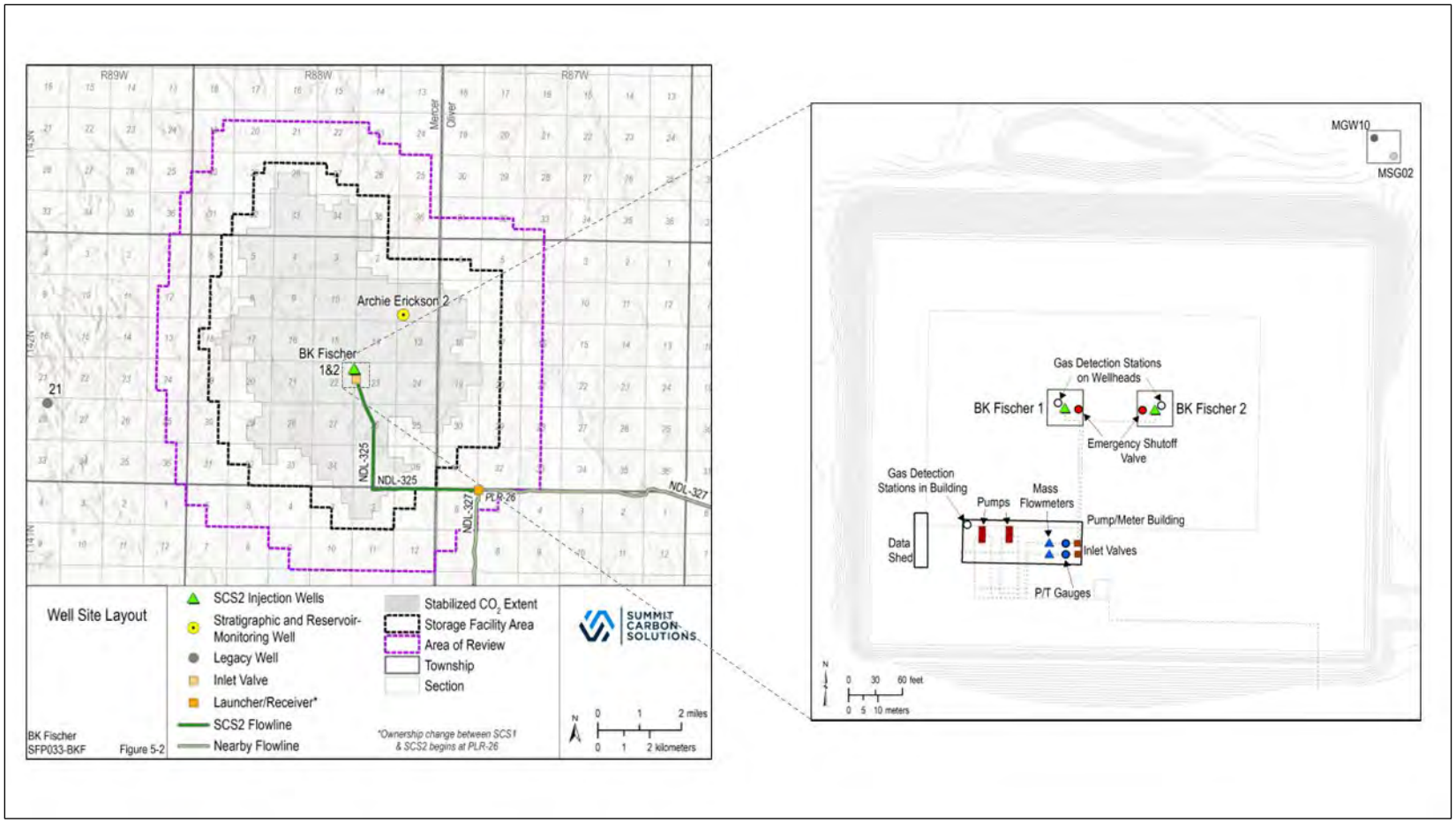



Figure 5-2. Map detailing $CO_2$ flowline path to $CO_2$ injection wellsite (left) and layout of surface facilities at the wellsite (right), illustrating key surface facilities leak detection and monitoring equipment. Soil gas profile station, MSG02, and groundwater well, MGW10, off-pad monitoring locations are also shown.

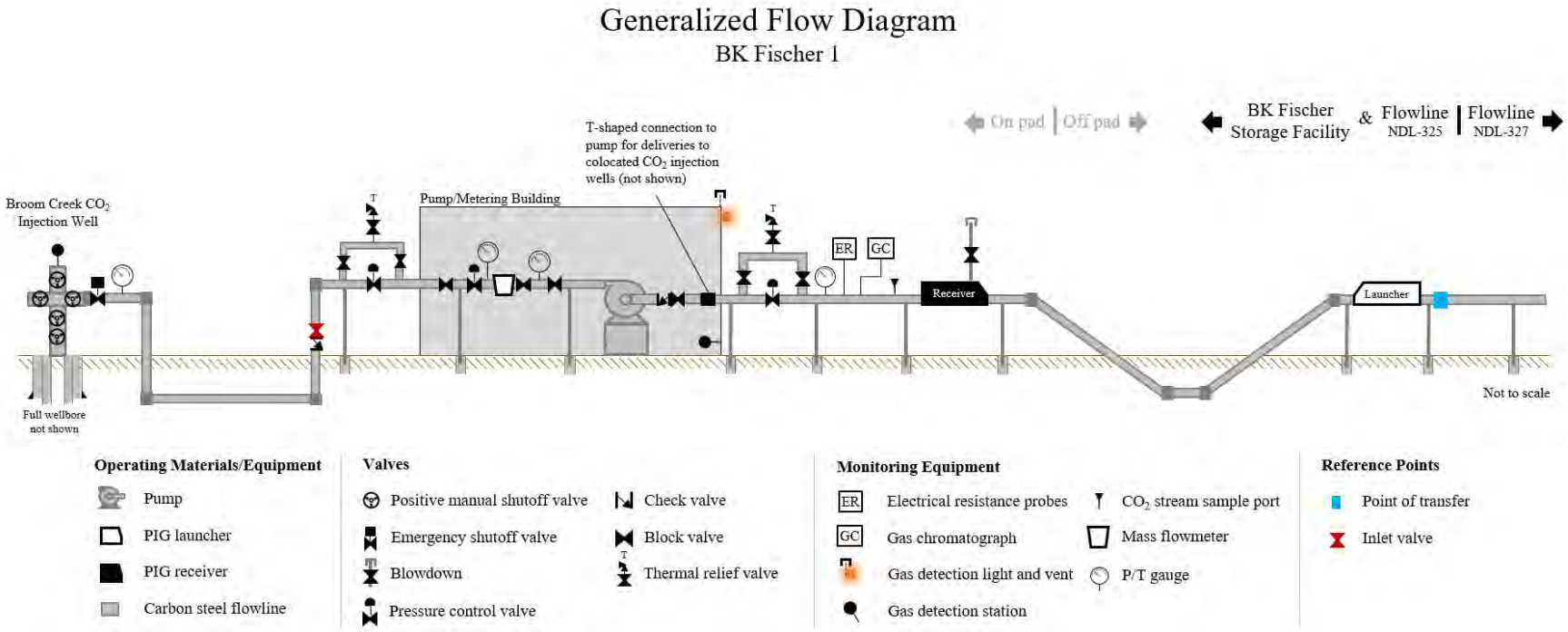



Figure 5-3. Generalized flow diagram from the point of transfer to the BK Fischer 1 $CO_2$ injection well, illustrating key surface facilities' connections and monitoring equipment. The flow diagram is identical for the BK Fischer 2 $CO_2$ injection well (not shown).

As illustrated in Figure 5-3, leak detection equipment includes 1) P/T gauges along the flowline, 2) a Coriolis mass flowmeter placed near each of the injection wellheads, and 3) gas detection stations placed on the $CO_2$ injection wellheads pursuant to N.D.A.C. § 43-05-01-14(1) and inside the pump/metering building. The gas detection stations, which will detect gases such as $CO_2$, methane ($CH_4$), and hydrogen sulfide ($H_2S$), will have automated triggers and alarms to alert SCS2 of any anomalous readings. The SCADA system, which will continuously collect data streams from the leak detection equipment in real time, will also monitor for leaks with leak detection software.

Field personnel from SCS2 will have multigas detectors with them for visiting wellsites or conducting flowline inspections. In addition, gas detection safety lights (part of the integrated alarm system) will be placed outside of the pump/metering building to warn field personnel of potential indoor air quality threats.

### *5.2.1 Data Sharing and Custody Transfer*

The entire $CO_2$ flowline (NDL-325), which begins at the point of transfer and ends at the inlet valve upstream of the automated emergency shutoff valve at each $CO_2$ injection wellhead (Figure 5-3), will be owned by SCS2 and operated by SCS Carbon Transport LLC. NDL-325 consists of 1.0 mile of 24-inch flowline in Oliver County and 4.5 miles of 24/16-inch flowline within Mercer County.

NDL-327 and NDL-325 to the $CO_2$ injection wellsite will be operated as one integrated SCADA system with data flowing to a single operations center. Summit Carbon Storage #1, LLC (SCS1); SCS2; Summit Carbon Storage #3, LLC (SCS3); SCS Permanent Carbon Storage LLC; and SCS Carbon Transport LLC will share operational data and controls in real time and ensure operational parameters (e.g., flowline pressures) are safely maintained between all injection sites at all times. Data shared will include, but are not limited to, defining the financial and operational responsibilities, mass balance and custody transfers, data access and data sharing, and general operations including leak detection and reporting, emergency response, monitoring, and maintenance of NDL-325 and respective wellsites.

Custody transfer of the $CO_2$ will occur using flowmeters placed at each individual $CO_2$ capture facility prior to entering NDM-106 operated by SCS Carbon Transport LLC. Once the transported $CO_2$ stream reaches the NDM-106 pipeline terminus, the $CO_2$ will be metered with a Coriolis mass flowmeter to transfer custody from SCS Carbon Transport LLC to SCS1 at the start of the NDL-327 flowline (Figure PS-3). At the point of transfer (PLR-26), the $CO_2$ stream will not be metered to transfer custody to SCS2. Instead, Coriolis mass flowmeters dedicated to each $CO_2$ injection well (BK Fischer 1 and 2) will be used to meter the injected $CO_2$ stream per well, while the metering equipment associated with SCS1, SCS2 and SCS3 that is operated by SCS Carbon Transport LLC will be used together to monitor the entire flowline system and perform mass balance calculations, including the section of NDL-325 flowline from the point of transfer (PLR-26) to the mass flowmeters at the BK Fischer injection wellsite (Figure 5-3).

### *5.2.2 Surface Facility Leak Detection Plan QASP*

Pursuant to N.D.A.C. § 43-05-01-14(1), the leak detection equipment will be inspected and tested on a semiannual basis. If equipment is defective, SCS2 will repair or replace the equipment within

10 days or, acting with good cause, SCS2 will propose an alternate timeline for approval by the DMR-O&G. Each repaired or replaced detector will be retested, if required. The gas detection stations are described in Appendix D, Attachment D-2. The SCADA system and leak detection software are described in further detail in Appendix D, Attachment D-3, and the personnel multigas detectors are described in Appendix D, Attachment D-4. SCS2 will install leak detection equipment according to the manufacturer's recommendations.

The flowline will be regularly inspected for any visual or auditory signs of equipment failure. Any release of $CO_2$ to the atmosphere or near-surface environments from the surface facilities will be reported to DMR-O&G within 24 hours pursuant to N.D.A.C. § 43-05-01-18(9)(e).

#### *5.2.2.1 NDL-325 Flowline Design*

The NDL-325 flowline will be manufactured with a high-frequency electrical resistance weld or double submerged arc weld process. Based upon volume requirements and pressure service, the 24/16-inch NDL-325 flowline design is summarized in Table 5-4.

**Table 5-4. NDL-325 Flowline Design Specification[1]**

| Parameter | Design Specification |
|---|---|
| Maximum Operating Pressure | 2183 psig |
| Maximum Discharge Pressure[2] | 2160 psig |
| Typical Operating Pressure | 1250–2150 psig |
| Design Temperature (above-grade piping) | −50–120°F |
| Design Temperature (below-grade piping) | 23–120°F |
| Anticipated $CO_2$ Stream Temperature Range | 30–115°F |
| Maximum Design Flow Rate | 314.5 million scf per day[3] |

[1] Abbreviation used in table: pounds per square inch gauge; standard cubic foot
[2] At pump stations or individual capture facilities.
[3] Approximately equivalent to 6 million tonnes of $CO_2$ annually.

The NDL-325 flowline and associated structures will be designed, constructed, inspected, tested, and operated in accordance with industry standards. The flowline will be constructed of high-strength carbon steel pipe, exceeding the American Petroleum Institute (API) 5L (2018) pipe specification. API 5L is the industry standard specification for seamless and welded steel line pipes used in pipeline transportation systems, including the energy industry. These regulations and industry standards specify pipeline and associated facilities materials and qualification and other controls to mitigate the risk of an incident while providing protection for the public and environment.

## 5.3 $CO_2$ Flowline Corrosion Prevention and Detection Plan

The purpose of this plan is to prevent and detect any signs of corrosion in the flowline.

### *5.3.1 Corrosion Prevention*

To protect against corrosion, an external fusion-bonded epoxy coating will be applied to the NDL-325 flowline. Flowline installed by trenchless methods, such as road crossings, will also have an

abrasion-resistant overcoat installed as a secondary coating, over the fusion-bonded epoxy, prior to installation.

SCS2 will install an impressed current cathodic protection (ICCP) system along the buried flowline to mitigate the threat of external soil corrosion on the line. The ICCP system, which will be continuously monitored, involves the installation of deep anode beds along the flowline that are connected to external power through a rectifier. The power provides the current needed to drive an electrochemical reaction whereby the anodes corrode instead of the flowline. Except for a rectifier, junction box, and small diameter vent pipe posted above the anode beds, the ICCP system will be buried.

Because the $CO_2$ stream will contain only trace amounts of water (Table 5-3), SCS2 will operate the surface facilities above the saturation point of water to prevent corrosive conditions from forming.

#### *5.3.1.1 Corrosion Prevention QASP*

The flowline construction materials will be in accordance with API 5L (2018) X-70 PSL 2 requirements, which includes applying external coatings to the pipe (e.g., fusion-bonded epoxy) and any borings or crossings (e.g., abrasive-resistant overcoats) to prevent corrosion. The flowline's ICCP system will be in accordance with Title 49 of the Code of Federal Regulations (CFR), Part 195 and will be pressure-tested prior to $CO_2$ injection operations. SCS2 will supply DMR-O&G with a map of cathodic protection borehole locations to meet N.D.A.C. § 43-05-01-05(1)(a) prior to injection.

### *5.3.2 Corrosion Detection*

Real-time, continuous monitoring of the $CO_2$ flowline with P/T gauges and Coriolis mass flowmeter measurements from the pump/metering building to the point of transfer combined with continuous analysis of the $CO_2$ stream with the gas chromatograph will provide strong evidence that noncorrosive conditions are maintained in the flowline during injection operations. The equipment will be spliced to the SCADA system and have automated triggers and alarms for alerting SCS2 of any anomalous readings.

The flowline segment from point of transfer to the pipeline inspection gauge (PIG) receiver (shown on Figure 5-3) will allow the passage of internal inspection devices (commonly referred to as "smart PIGs"), which are designed to detect certain internal and external anomalies in the line, such as loss of mass/wall thickness, dents, pitting, cracking, and scratches. The launchers and receiver facilities are designed to launch and receive these internal inspection devices along with other types of PIGs (e.g., maintenance pigs). The launchers and receivers will be located at standalone sites in Oliver and Mercer Counties. The frequency for running PIGs in the flowline during operations is described in Table 5-2.

In addition to the activities described above, SCS2 will install at least one electrical resistance (ER) probe along the $CO_2$ flowline upstream of the gas chromatograph to continuously monitor for loss of mass throughout the operational phase. The ER probe will be spliced to the SCADA system for real-time monitoring and will be removable for visual inspection and

replacement, if required. The SCADA system will have automated triggers and alarms for alerting SCS2 of any anomalous readings.

*5.3.2.1 Corrosion Detection QASP*

SCS2 will utilize PIG equipment that has been maintained and calibrated according to the manufacturer's recommendations and 40 CFR Part 195 rules and regulations. The ER probe will be exposed to the $CO_2$ stream and spliced to the SCADA system for continuously measuring losses of mass to calculate a real-time corrosion rate. The ER measurements are mathematically translated into terms of changes in mass and the results are plotted over time. Changes in the regression of the data trend correspond to changes in the corrosion rate. Changes in mass of the exposed probe material can be attributable to changes in the length or cross-sectional area of the probe material, which may include pitting. The ER probe will be spliced to the SCADA system and programmed with triggers and alarms for alerting the operations center of anomalous ER measurements. Specification sheets for the ER probe and data transmitter are provided in Appendix D, Attachments D-5 and D-6, respectively.

SCS2 will investigate anomalies in flowline operating parameters to ensure noncorrosive conditions are maintained during injection operations, including pulling the ER probe for inspection and replacement, as required by DMR-O&G.

## 5.4 Wellbore Mechanical Integrity Testing

Pursuant to N.D.A.C. § 43-05-01-11.1, SCS2 will conduct mechanical integrity testing of the $CO_2$ injection and reservoir-monitoring wellbores to ensure there is no significant leak in the casing, tubing, or packer and that there is no significant fluid movement into an USDW adjacent to the wellbore. Below is a summary of the methods that SCS2 will use to verify mechanical integrity. Tables 5-1 and 5-2 specify the sampling frequency for the set of activities described in this section.

External mechanical integrity in the $CO_2$ injection wells and reservoir-monitoring well will be demonstrated with the following:

1) Ultrasonic or other equivalent casing inspection log (CIL) and sonic array logging tools [inclusive of variable density log (VDL), casing collar locator (CCL), and radial cement bond log (RCBL)].

2) Pulsed-neutron logging (PNL) to examine the saturation profile behind casing from the Opeche/Spearfish Formation to surface. If repeat PNLs detect evidence of unexpected vertical migration of $CO_2$, then SCS2 will notify and work with DMR-O&G to identify and take appropriate action, such as pulling tubing and running an ultrasonic or other equivalent CIL tool for attributing the source of the suspected out-of-zone migration.

3) Distributed temperature sensing (DTS) fiber-optic cable installed outside of the long-string casing will continuously monitor the temperature profile of each wellbore from the storage reservoir to surface. A baseline temperature log will be acquired in case the DTS fiber-optic cable fails and temperature logging is required in the future pursuant to N.D.A.C. § 43-02-05-07(3)(b).

Internal mechanical integrity in the $CO_2$ injection wells and reservoir-monitoring well will be demonstrated with the following:

1) The surface and long-string casing annulus will be continuously monitored with a digital surface P/T gauge.

2) Tubing-casing annulus pressure testing.

3) The tubing-casing annulus pressure will be continuously monitored with a digital surface P/T gauge on each wellhead.

4) A seal pot system with a nitrogen ($N_2$) cushion will be used to continuously monitor and maintain the packer fluid pressure in the tubing-casing annular space at the surface below 300 psi. The $N_2$ cushion accommodates for packer fluid level/volume changes due to temperature fluctuations to ensure that the tubing-casing annular space is kept full.

5) The tubing conditions will be continuously monitored with a digital surface P/T gauge on each wellhead.

6) PNL to examine the saturation profile in the tubing-casing annulus from the Opeche/Spearfish Formation to surface. If repeat PNLs detect evidence of unexpected vertical migration of $CO_2$, then SCS2 will notify and work with DMR-O&G to identify and take appropriate action, such as performing a tubing-casing annulus pressure test or pulling tubing and performing a casing pressure test or running an ultrasonic or other equivalent CIL tool for attributing the source of the suspected out-of-zone migration.

All digital P/T gauges mentioned in the plan will be spliced to the SCADA system for real-time monitoring. Wellbore schematics illustrating the monitoring equipment for the $CO_2$ injection wells and reservoir-monitoring well are shown in Figures 11-2, 11-4, and 11-5, respectively, in Section 11.0.

### *5.4.1 Wellbore Mechanical Integrity Testing QASP*

Specification sheets for the ultrasonic, array sonic, and PNL tools are provided in Appendix D, Attachments D-7, D-8, and D-9, respectively, and specification sheets for the DTS fiber-optic cable and interrogator are provided in Appendix D, Attachments D-10 and D-11, respectively.

An example procedure for conducting an annulus pressure test prior to $CO_2$ injection is provided in Appendix D, Attachment D-12. A diagram of the seal pot system design is provided in Appendix D, Attachment D-13.

Digital surface P/T gauges will be maintained and calibrated according to the manufacturer's recommendations; copies of calibration certificate will be submitted. Pursuant to N.D.A.C. § 43-05-01-14(1), the leak detection equipment (i.e., P/T gauges on wellheads and seal pot system) will be inspected and tested on a semiannual basis. If equipment is defective, SCS2 will repair or replace the equipment within 10 days or, acting with good cause, SCS2 will propose an alternate

timeline for approval by DMR-O&G. Each repaired or replaced detector will be retested, if required.

For all well-logging activities, SCS2 will ensure that third-party contractors follow industry standard or better QA/QC protocols. SCS2 will also ensure reports of logging activities are prepared by a qualified geologist or engineer.

SCS2 will contract a third-party entity to conduct a feasibility study to quantify the $CO_2$ detection capabilities using the proposed PNL method based on the design of the $CO_2$ injection and reservoir-monitoring wellbores. Results of the feasibility study will be submitted to DMR-O&G prior to injection.

### 5.5 Baseline Wellbore Logging and Testing Plan (Site Characterization)

Pursuant to N.D.A.C. § 43-05-01-11.2, SCS2 will collect baseline well-logging and -testing measurements from subsurface geologic formations in the $CO_2$ injection wellbores to 1) verify the depth, thickness, porosity, permeability, lithology, and salinity of the storage complex; 2) ensure conformance with the injection well construction requirements; and 3) establish accurate baseline data for making future time-lapse measurements. Baseline well-logging and -testing measurements will also be collected from the reservoir-monitoring well.

Table 5-5 specifies baseline well-logging and -testing activities completed in the reservoir-monitoring well (Archie Erickson 2), and Table 5-6 identifies the well-logging and -testing plan for the BK Fischer 1. The plan for the BK Fischer 2 wellbore will be the same as what is presented for the BK Fischer 1 but may exclude dipole sonic logging (assuming dipole sonic logging is successful in the BK Fischer 1).

Tables 5-1 and 5-2 specify well-logging and -testing activities associated with establishing mechanical integrity and monitoring the deep subsurface, including the storage complex. Coring activities are described separately in the Section 9.0 as-drilled wellbore diagrams for BK Fischer 1 and 2 and in the text in Section 2.0 for Archie Erickson 2.

SCS2 will provide DMR-O&G with an opportunity to witness all well-logging and -testing activities as required under N.D.A.C. § 43-05-01-11.2(6).

**Table 5-5. Completed Logging and Testing Activities for Archie Erickson 2**

| | Logging/Testing | Justification |
|---|---|---|
| Surface Section | Open-hole logs: triple combo (resistivity and neutron and density porosity), dipole sonic, spontaneous potential (SP), GR, caliper, and temperature | Quantified variability in reservoir properties, such as resistivity and lithology, and measured hole conditions. Identified mechanical properties, including stress anisotropy. Provided compression and shear waves for seismic tie-in and quantitative analysis of the seismic data. |
| | Cased-hole logs: ultrasonic and array sonic tools (inclusive of CCL, VDL, and RCBL), GR, and temperature | Identified cement bond quality radially, evaluated the cement top and zonal isolation, and established external mechanical integrity. Established baseline temperature profile. |
| Long-String Section | Open-hole logs: triple combo and spectral GR | Quantified variability in reservoir properties, including resistivity, porosity, and lithology. Provided input for enhanced geomodeling and predictive simulation of $CO_2$ injection into the interest zones to improve interpretations. Identified mechanical properties, including stress anisotropy. Provided compression and shear waves for seismic tie-in and quantitative analysis of the seismic data. |
| | Open-hole log: dipole sonic | Identified mechanical properties, including stress anisotropy. |
| | Open-hole log: fracture finder log | Quantified fractures in the Broom Creek Formation and confining layers to ensure safe, long-term storage of $CO_2$. |
| | Open-hole log: combinable magnetic resonance (CMR) | Interpreted reservoir properties (e.g., porosity and permeability) and determined the best location for pressure test depths, formation fluid sampling depths, and stress testing depths. |
| | Open-hole log: fluid sampling (modular formation dynamics tester) | Collected fluid samples from the Inyan Kara and Broom Creek Formation for analysis. Collected in situ microfracture stress tests in the Broom Creek and Opeche/Spearfish Formation for formation breakdown pressure, fracture propagation pressure, and fracture closure pressure. |
| | Cased-hole logs: ultrasonic and array sonic tools (inclusive of CCL, VDL, RCBL), GR, and temperature | Identified cement bond quality radially, evaluated the cement top and zonal isolation, confirmed mechanical integrity, and established baseline temperature profile. |

## Table 5-6. Logging and Testing Plan for the BK Fischer 1 and 2 Wellbores

| | Logging/Testing | Justification | N.D.A.C. § 43-05-01-11.2 |
|---|---|---|---|
| Surface Section | Open-hole logs: triple combo, SP, caliper, and temperature | Quantify variability in reservoir properties, such as resistivity and lithology, and measure hole conditions. | (1)(b)(1) |
| | Cased-hole logs: ultrasonic tool or other equivalent CIL and array sonic tools (inclusive of CCL, VDL, and RCBL), GR, and temperature | Identify cement bond quality radially, evaluate the cement top and zonal isolation, and establish external mechanical integrity. Establish baseline temperature profile for temperature-to-DTS calibration. | (1)(b)(2) and (1)(d) |
| Long-String Section | Open-hole logs: quad combo (triple combo plus dipole sonic*), SP**, GR, and caliper | Quantify variability in reservoir properties, including resistivity, porosity, and lithology, and measure hole conditions. Provide input for enhanced geomodeling and predictive simulation of $CO_2$ injection into the interest zones to improve interpretations. Identify mechanical properties, including stress anisotropy. Provide compression and shear waves for seismic tie-in and quantitative analysis of the seismic data. | (1)(c)(1) |
| | Open-hole log: fracture finder log | Quantify fractures in the Broom Creek Formation and confining layers to ensure safe, long-term storage of $CO_2$. | (1)(c)(1) |
| | Open-hole log: magnetic resonance log | Aid in interpreting reservoir permeability and determining the best location for modular formation dynamics testing (MDT) fluid-sampling depths, packer-setting depths, and stress-testing depths. | (1)(c)(1) |
| | Open-hole log: MDT fluid sampling and testing | Collect fluid sample from the Broom Creek Formation for analysis. | (1), (2), and (3) |
| | Open-hole log: spectral GR | Identify clays and lithology that could affect injectivity. Also used for core to log depth correlation. | (4)(b) |
| | Injectivity test | Perform to define the fracture gradient and maximum allowable injection pressure of the storage reservoir. | (4) |
| | Pressure falloff test | Perform to verify hydrogeologic characteristics of the Broom Creek Formation. | (5) |
| | Cased-hole log: PNL | Confirm mechanical integrity from Opeche/Spearfish Formation to surface. | 11.4(g)(1) |
| | Cased-hole logs: ultrasonic tool or other equivalent CIL and array sonic tools (inclusive of CCL, VDL, and RCBL), GR, and temperature | Confirm cement bond quality radially, evaluate cement top and zonal isolation and demonstrate mechanical integrity. Establish baseline for casing inspection logging and temperature profile for temperature-to-DTS calibration. | (1)(c)(2) and (d) |

* Dipole sonic logging may be excluded in BK Fischer 2 assuming that the dipole sonic log is successful in BK Fischer 1.

** A sundry will be submitted requesting a waiver of the SP log and that an alternative method providing equivalent data will be utilized instead upon the DMR-O&G's approval pursuant to N.D.A.C. § 43-05-01-11.2(e).

Wellbore data collected from the reservoir-monitoring well (Archie Erickson 2) have been integrated with the geologic model to inform the reservoir simulations that are used to characterize the initial state of the reservoir before injection operations (Section 3.0). The simulated $CO_2$ plume extents informed the timing and frequency of the application of the direct and indirect monitoring methods of the testing and monitoring plan.

### *5.5.1 Baseline Wellbore Logging and Testing Plan (Site Characterization) QASP*

For all planned well-logging and -testing activities, SCS2 will ensure that third-party contractors follow industry standard or better QA/QC protocols for acquiring and processing the data and that reports of activities are prepared by a qualified geologist or engineer.

## 5.6 Wellbore Corrosion Prevention and Detection Plan

The purpose of this corrosion prevention and detection plan is to monitor the well materials to ensure they meet the minimum standards for material strength and performance, pursuant to N.D.A.C. § 43-05-01-11.4(1)(c).

### *5.6.1 Downhole Corrosion Prevention*

To prevent corrosion of the well materials in the BK Fischer 1 and 2 wellbores, the following preemptive measures will be implemented: 1) cement opposite of the injection interval and extending to the differential valve (DV) staging tool above the top of the Mowry Formation will be $CO_2$-resistant; 2) the well casing will also be $CO_2$-resistant from the bottomhole to just above the Opeche/Spearfish Formation and from below the top of the Swift Formation to just below the top of the Skull Creek Formation; 3) the well tubing will be $CO_2$-resistant from the injection interval to surface; 4) the packer will be $CO_2$-resistant; and 5) the packer fluid will be an industry standard corrosion inhibitor. The tubing-casing annulus will be filled with the packer fluid system that is planned to be a brine-based fluid treated with antimicrobial biocide, corrosion inhibitor, and oxygen scavenger to minimize potential corrosive effects of soluble oxygen.

To prevent corrosion of the well materials in the Archie Erickson 2 wellbore, the following preemptive measures are implemented: 1) cement opposite the injection interval and extending to the differential valve (DV) staging tool above the top of the Mowry Formation is $CO_2$-resistant; 2) the well casing is $CO_2$-resistant from 200 feet below the top of the Amsden Formation to 161 feet above the top of the Opeche/Spearfish Formation and from 225 feet below the top of the Swift Formation to 236 feet above the top of the Mowry Formation; and 3) the long-string casing is filled with an industry standard corrosion inhibitor.

Figures 11-2, 11-4, and 11-5 in Section 11.0 illustrate the downhole corrosion prevention measures in each of the wellbores.

#### *5.6.1.1 Downhole Corrosion Prevention QASP*

Specification sheets for the antimicrobial biocide, corrosion inhibitor, and oxygen scavenger treatment are provided in Appendix D, Attachments D-14, D-15, and D-16, respectively.

SCS2 will ensure that third-party contractors follow industry standard QA/QC protocols when drilling and completing each of the wells and that the selected well materials at a minimum meet the standards selected and presented in Sections 9.0, 10.0, and 11.0 of this permit application.

### *5.6.2 Downhole Corrosion Detection*

PNLs will be run in the BK Fischer 1 and 2 and Archie Erickson 2 wellbores to detect saturations of $CO_2$. Further investigative methods of inspecting for corrosion in the wellbore could include ultrasonic logging or other equivalent CIL when required. Tables 5-1 and 5-2 specify the sampling frequency for acquiring data related to this downhole corrosion detection plan.

#### *5.6.2.1 Downhole Corrosion Detection QASP*

If the PNLs detect possible signs of out-of-zone vertical migration, SCS2 will work with DMR-O&G to take appropriate action, such as running an ultrasonic tool or other equivalent CIL to confirm downhole conditions in the wellbore. For any logging activities related to corrosion detection, SCS2 will ensure that third-party contractors follow industry standard or better QA/QC protocols and that reports of logging activities are prepared by a qualified geologist or engineer.

## 5.7 Environmental Monitoring Plan

To verify the injected $CO_2$ is contained in the storage reservoir, protect all USDW, and demonstrate hydrogeologic properties of the storage reservoir, multiple environments will be monitored.

As required by N.D.A.C. § 43-05-01-11.4(1)(d) and (h), the near-surface environment, defined as the region from the surface down to the lowest USDW (Fox Hills Aquifer), will be monitored by sampling and analyzing vadose-zone soil gas at two soil gas profile stations, one new Fox Hills monitoring well, and up to five existing groundwater wells.

The deep subsurface environment, defined as the region from below the lowest USDW to the base of the storage reservoir, will be monitored with multiple methods, starting with the above-zone monitoring interval (AZMI) or the geologic interval from the confining zone above the storage reservoir to the confining zone above the next permeable zone above the storage reservoir (i.e., Opeche/Spearfish Formation to the Skull Creek Formation). The AZMI will be continuously monitored with DTS fiber optics in the BK Fischer 1 and 2 wellbores as well as PNLs.

Pursuant to N.D.A.C. § 43-05-01-11.4(1)(g), the storage reservoir will be monitored with both direct and indirect methods. Direct methods include continuous fiber optics (DTS) and downhole P/T measurements in the BK Fischer 1 and 2 and Archie Erickson 2 wells, and falloff tests and PNLs in the BK Fischer 1 and 2 wellbores. Falloff testing analysis will provide reservoir pressure data and the completion condition including transmissibility, skin factor, and well flowing and static pressure data for technical adequacy to demonstrate no migration from the reservoir. Indirect methods include time-lapse seismic surveys. These efforts will provide assurance that surface and near-surface environments are protected and that the injected $CO_2$ is safely and permanently contained in the storage reservoir. In addition, SCS2 will install multiple seismometer stations for passively detecting and locating seismic events.

### *5.7.1 Soil Gas Monitoring*

Vadose zone soil gas monitoring directly measures the characteristics of the air space between soil components and is an indirect indicator of both chemical and biological processes occurring in and below a sampling horizon. Two permanent soil gas profile stations installed adjacent to both the $CO_2$ injection and Archie Erickson 2 well pads will be sampled, as shown in Figure 5-4. Figure 5-5 is a typical wellbore schematic of a soil gas profile station.

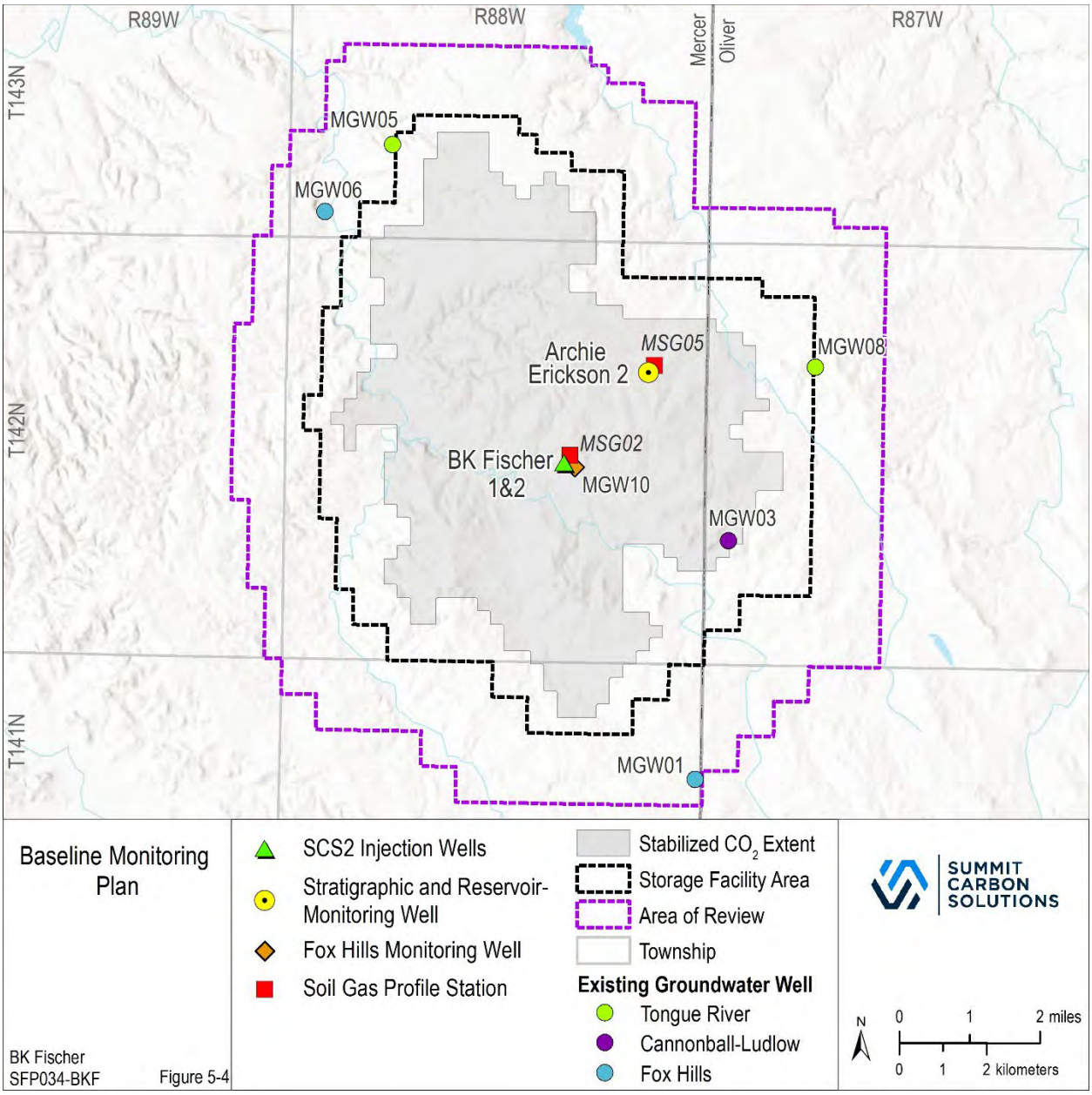



Figure 5-4. SCS2 baseline and operational near-surface sampling locations.

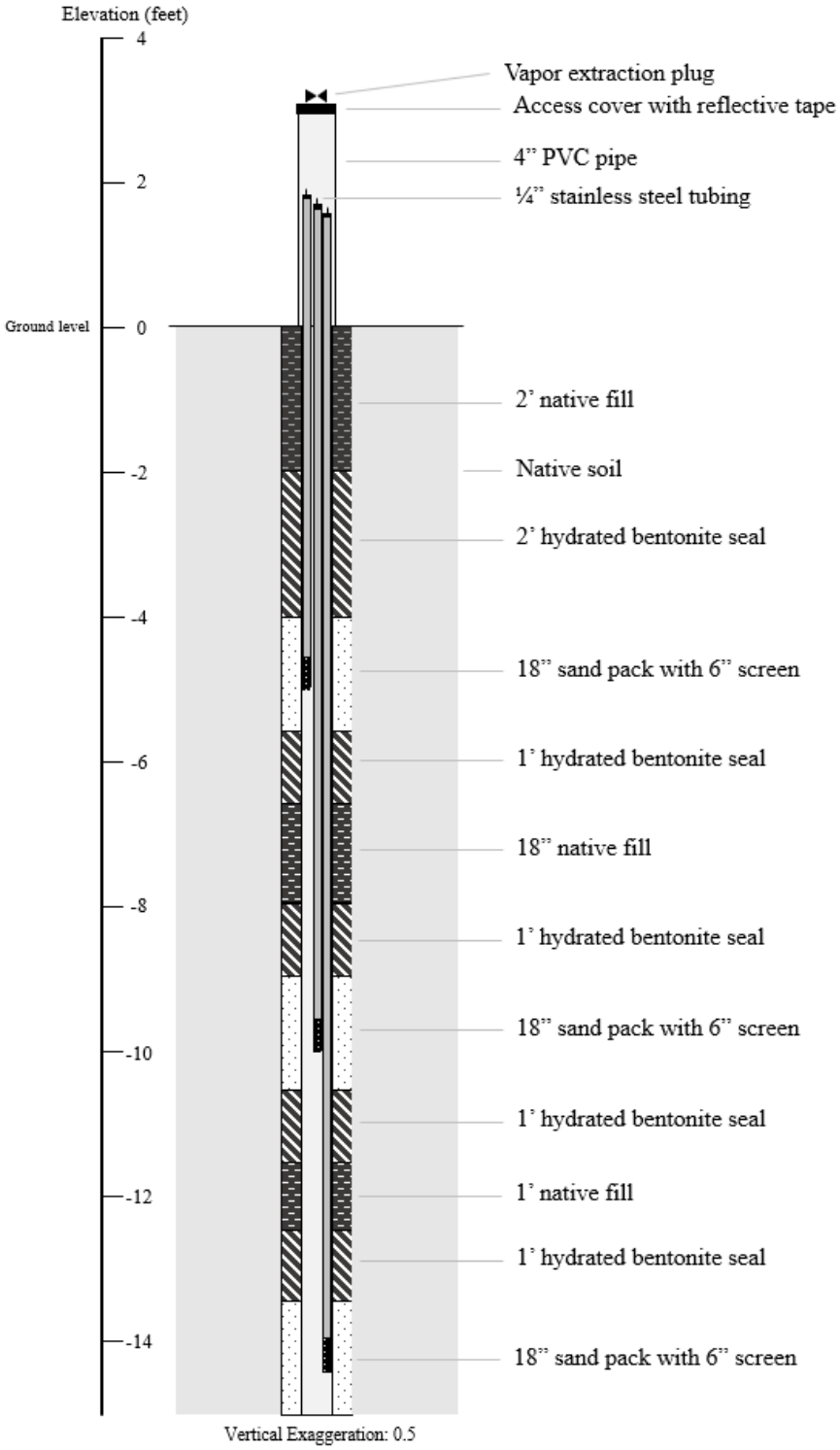



Figure 5-5. A typical wellbore schematic of a soil gas profile station

The sampling frequency for soil gas is summarized in Tables 5-1 and 5-2. During injection, SCS2 may install additional replacement or alternative soil gas sampling sites based on monitoring data results. SCS2 will notify DMR-O&G if either replacement or alternative soil gas sampling sites are added pursuant to N.D.A.C. § 43-05-01-18(2). The results of the baseline soil gas sampling program will be provided to DMR-O&G prior to injection.

*5.7.1.1 Soil Gas Monitoring QASP*

Tables 5-7 and 5-8 indicate a minimum set of analytes that will be included for the soil gas analysis.

**Table 5-7. Soil Gas Compositional Analysis–Primary Components**

| Analyte | Units |
|---|---|
| $N_2$ | Volume % |
| $O_2$ | Volume % |
| $CO_2$ | Volume % |
| Ar | Volume % |
| $CH_4$ | Volume % |

**Table 5-8. Stable and Radiocarbon Isotope Soil Gas Measurements**

| Isotope | Units |
|---|---|
| $\delta^{13}C$ of $CO_2$ and $CH_4$ | ‰ (per mil) |
| $\delta^{14}C$ of $CO_2$ and $CH_4$ | ‰ (per mil) |
| $\delta D$ of $CH_4$ | ‰ (per mil) |

At minimum, SCS2 will ensure that third-party service providers apply a standard procedure for sampling the wells, such as the one provided below. Figure 5-5 is a typical wellbore schematic of a soil gas profile station.

Example Soil Gas Profile Station Sampling Procedure

Prior to the collection of each sample, a minimum of three probe casing volumes will be removed, and the representativeness of the gas flow will be determined by analyzing the soil gas over time for $CO_2$, total volatile organic compounds (VOCs), and $O_2$ using a handheld multigas meter. The handheld meter will be calibrated daily during sampling based on manufacturer instructions. After these measurements of the soil gas composition stabilize, two soil gas samples will be collected for characterization at each location using an air sampling bag and labeled with the appropriate sample number and site information. The samples will be sent to third-party laboratories for analysis.

Soil Gas Sampling QA/QC Procedures

SCS2 will ensure that third-party service providers selected for soil gas sampling and analysis follow industry standard sampling and analytical QA/QC protocols, including collection of field

blanks and duplicate (replicate) samples to identify environmental contamination and evaluate repeatability in sampling and analytical methods, respectively.

### *5.7.2 Groundwater Monitoring*

Groundwater monitoring directly measures the chemical constituents of the water in the pore space between grains of subsurface geologic formations (aquifers) and is an indirect indicator of both chemical and biological processes occurring in and below a sampling horizon. Figure 5-4 identifies the sampling locations associated with the near-surface baseline and operational monitoring plan, which includes one new Fox Hills monitoring well, and up to five existing groundwater wells.

SCS2 will work with landowners of the five existing groundwater wells (MGW01, MGW03, MGW05, MGW06, and MGW08) to attempt to collect samples as specified in Tables 5-1 and 5-2. The number of samples collected from each existing groundwater well may vary by location, since some of the groundwater wells may not be operated year-round or site accessibility may be limited (e.g., snow cover during winter months). If SCS2 is unable to access the wells because of operational status or access concerns, the reason why the sample is unable to be collected will be documented. An attempt was made to identify alternative wells that operate year-round with reduced access concerns but produced no results.

SCS2 will install one Fox Hills monitoring well (MGW10) adjacent to the injection well pad (as shown in Figure 5-4). The Fox Hills monitoring well will be sampled according to the sampling frequency specified in Tables 5-1 and 5-2.

SCS2 reserves the right to evaluate and modify, if necessary, appropriate groundwater sampling locations and frequency based on conformance of the $CO_2$ plume extent in the subsurface. SCS2 will notify DMR-O&G if alternative or new water wells are added to the sampling program pursuant to N.D.A.C. § 43-05-01-18(2).

Appendix B includes a baseline dataset of available geochemistry results for 35 monitoring sites within the area of review (AOR) boundary. The data were obtained from the Public Service Commission (PSC) and Department of Water Resources (DWR). These shallow groundwater wells were excluded from the baseline and operational monitoring plan primarily because they did not meet the depth criterion used to select wells for inclusion in the testing and monitoring plan.

*5.7.2.1 Groundwater Monitoring QASP*

State-certified commercial laboratories will be identified by SCS2 to analyze the water samples for the analytes described in Tables 5-9 and 5-10.

**Table 5-9. General Analytes for Groundwater Samples**

| Analyte | Cation (total and dissolved) | Anion (total) |
|---|---|---|
| **pH** | Aluminum | Bromide |
| **Conductivity** | Antimony | Chloride |
| **Alkalinity** | Arsenic | Fluoride |
| **TDS** | Barium | Nitrate |
| **Total Organic Carbon (TOC)** | Beryllium | Nitrite |
| **Dissolved Organic Carbon (DOC)** | Boron | Sulfate |
| | Cadmium | |
| | Calcium | |
| | Chromium | |
| | Cobalt | |
| | Copper | |
| | Iron | |
| | Lead | |
| | Lithium | |
| | Magnesium | |
| | Manganese | |
| | Mercury | |
| | Molybdenum | |
| | Nickel | |
| | Potassium | |
| | Selenium | |
| | Silicon | |
| | Silver | |
| | Sodium | |
| | Strontium | |
| | Thallium | |
| | Phosphorus | |
| | Vanadium | |
| | Zinc | |

**Table 5-10. Stable and Radiocarbon Isotope Measurements in Groundwater**

| Isotope | Units |
|---|---|
| $\delta D\ H_2O$ | ‰ (per mil) |
| $\delta^{18}O\ H_2O$ | ‰ (per mil) |
| $\delta^{13}C$ Dissolved Inorganic Carbon (DIC) | ‰ (per mil) |
| $^{3}H\ H_2O$ | ‰ (per mil) |
| $\delta^{14}C$ DIC | ‰ (per mil) |

SCS2 will select third-party service providers to collect groundwater samples and ensure that standard industry QA/QC procedures are followed. At minimum, SCS2 will ensure that third-party service providers apply a standard procedure for sampling the wells, such as the one provided below.

Example Groundwater Well Sampling Procedure

Groundwater samples will be collected by a third party from the dedicated Fox Hills monitoring well as well as other shallower groundwater wells, specified by SCS2 and with landowner approval, using a submersible pump. The standard procedure for sampling the wells is provided below:

1. Purge the well, removing a minimum of three casing volumes.

2. Wait for field measurements to stabilize and collect the sample.

   a. Record the location of the sample point.

   b. Collect field readings: temperature, conductivity, and pH.
      Fill appropriate sample containers for analysis with minimum headspace and refrigeration/cooling (chill each sample to ≤6°C) to reduce microbial activity.

3. Collect a duplicate sample from about 1 in every 10 samples for QA/QC purposes.

Groundwater Sampling QA/QC Procedures

SCS2 will ensure that third-party service providers selected for groundwater sampling and analysis follow industry standard sampling and analytical QA/QC protocols, including collection of field blanks and duplicate (replicate) samples to identify environmental contamination and evaluate repeatability in sampling and analytical methods, respectively.

### *5.7.3 Deep Subsurface Monitoring*

Pursuant to N.D.A.C. § 43-05-01-11.4(1)(g), SCS2 will implement direct and indirect methods to monitor the location, thickness, and distribution of the free-phase $CO_2$ plume and associated pressure relative to the permitted storage reservoir. The direct and indirect storage reservoir monitoring methods described in this subsection of the permit application will be used to characterize the $CO_2$ plume's saturation and pressure within the AOR for the baseline and operational phases.

#### *5.7.3.1 Above-Zone Monitoring Interval*

Monitoring of the AZMI during injection operations includes monitoring of the temperature and saturation profiles from the Opeche/Spearfish Formation through the Skull Creek Formation. Temperature in the AZMI will be continuously monitored via DTS fiber-optic cable installed in the BK Fischer 1 and 2 and Archie Erickson 2 wellbores. The plan for acquiring saturation data from PNLs is described in Tables 5-1 and 5-2.

*5.7.3.2 Above-Zone Monitoring Interval QASP*

SCS2 will ensure that all continuous monitoring devices (e.g., fiber optics) are inspected and maintained in accordance with the manufacturer's recommendations. For any logging activities, SCS2 will ensure that third-party contractors follow industry standard or better QA/QC protocols and that reports of logging activities are prepared by a qualified geologist or engineer.

Time-lapse data from the PNLs will be used to ensure $CO_2$ is not detected in the AZMI as an assurance-monitoring technique for evaluating the performance of the storage complex and protecting USDWs.

*5.7.3.3 Direct Reservoir Monitoring*

DTS fiber optics installed in the BK Fischer 1 and 2 and Archie Erickson 2 wellbores will directly monitor the temperature of the storage reservoir. P/T readings from the casing-conveyed gauges in the $CO_2$ injection wells will also monitor conditions in the storage reservoir. To track the pressure front from $CO_2$ injection in the storage reservoir, pressure will be measured continuously from the casing-conveyed P/T gauge installed in the Archie Erickson 2 well. To track the $CO_2$ plume in the storage reservoir, the DTS fiber-optic cable and temperature measurements from the casing-conveyed P/T gauge installed in the Archie Erickson 2 well will be used to estimate the timing of arrival of the $CO_2$ plume at the reservoir-monitoring well. The pressure and temperature data will be used to ensure the monitoring data from the Broom Creek Formation (from Amsden through Opeche/Spearfish Formation) is conforming to the geologic model and numerical simulations. Pressure falloff tests will also be performed in the $CO_2$ injection to demonstrate the performance of the storage reservoir.

*5.7.3.4 Direct Reservoir Monitoring QASP*

SCS2 will ensure that all continuous monitoring devices (e.g., fiber-optics and casing-conveyed P/T gauges) are inspected and maintained in accordance with the manufacturer's recommendations. Casing-conveyed P/T gauges will be calibrated within one year of initial installation; copies of calibration certificate will be submitted. Example specification sheets for the casing-conveyed P/T gauges in the $CO_2$ injection wells and reservoir-monitoring well are provided in Appendix D, Attachment D-17. For any logging activities, SCS2 will ensure that third-party contractors follow industry standard or better QA/QC protocols and that reports of logging activities are prepared by a qualified geologist or engineer.

*5.7.3.5 Indirect Reservoir Monitoring*

SCS2 will acquire 3D time-lapse seismic surveys to track the extent of the $CO_2$ plume within the storage reservoir. The 200-$mi^2$ 3D Beulah seismic survey referenced in Section 2.0 will serve as the baseline survey. To demonstrate conformance between the reservoir model simulation and site performance, a localized 3D seismic survey will be collected to monitor the extent of the $CO_2$ plume, as shown in Figure 5-6 and detailed in Table 5-2.

SCS2 will reevaluate the testing and monitoring plan, inclusive of the design and frequency of the repeat 3D seismic surveys, at least once every 5 years as required. If necessary, the time-lapse seismic monitoring strategy will be adapted based on updated simulations of the predicted extents of the $CO_2$ plume, including expanding the 3D survey area to capture additional data as the $CO_2$ plume expands in the storage reservoir.

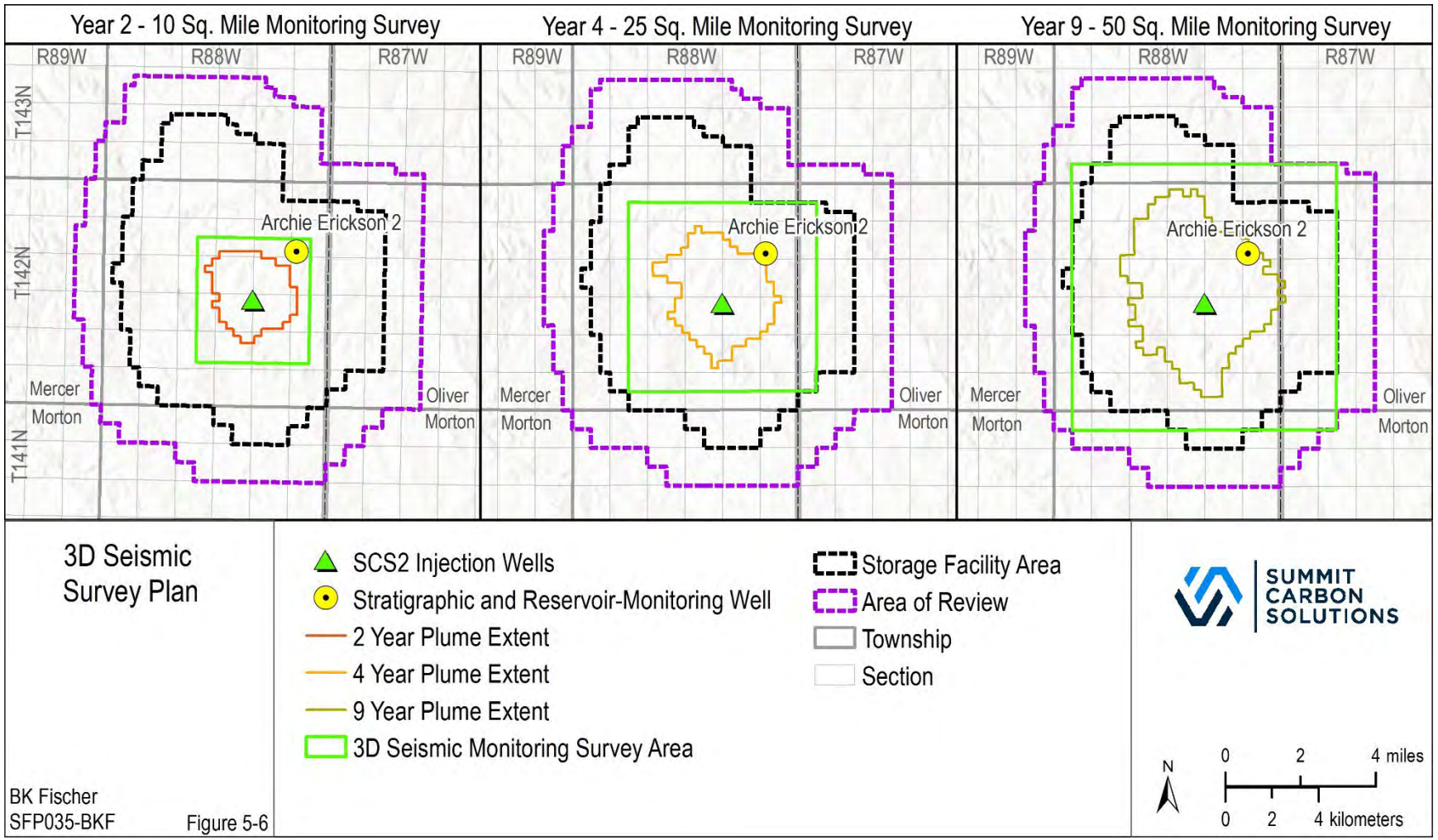



Figure 5-6. Simulated extent of the $CO_2$ plume at the end of Years 2, 4, and 9. The green boxes show the planned 3D seismic monitoring survey extents.

SCS2 plans to install multiple seismometer stations to continuously monitor for seismic events with a magnitude of >1.5 within the AOR boundary during injection. The 3D seismic survey data (e.g., velocity modeling) collected within the AOR boundary will provide supporting evidence for confidently locating seismic events. A traffic light system for detecting larger magnitude events (e.g., >2.7) is presented with the Indirect Reservoir Monitoring QASP section of this application.

5.7.3.5.1 Indirect Reservoir Monitoring QASP

The geophysical monitoring that is planned for the project includes 3D time-lapse seismic surveys. Time-lapse seismic surveys provide a measurement of the change in acoustic properties of the storage formation as injected $CO_2$ saturates the storage interval.

Application of time-lapse seismic surveys for monitoring changes in acoustic properties requires a quality preoperational seismic survey for baseline conditions. The monitor survey should be repeated as closely to the baseline conditions and parameters as possible. The seismic monitor data should be reprocessed simultaneously with the original baseline data or processed with the same steps and workflow to ensure repeatability. Repeatability is a measure of seismic quality (Lumley and others, 1997, 2000) that can be quantified once the processed data are analyzed by an experienced seismic interpreter.

For seismic survey acquisitions, SCS2 will follow the required permitting process pursuant to N.D.C.C. § 38-08.1-04 and N.D.A.C. § 43-02-12-04. Seismic acquisition and processing are performed by highly specialized companies and crews that provide the equipment, procedures, and QA/QC protocols based on the technology selected for acquisition and parameters for processing the data. SCS2 will work with third-party contractors to select the appropriate equipment, procedures, QA/QC protocols, acquisition and processing parameters, and seismic interpreters for all repeat surveys.

5.7.3.5.2 Seismicity Monitoring

The Williston Basin is a tectonically stable region of the North American Craton. A total of 13 events have been detected in North Dakota since 1870. While few seismic events have been recorded in the region, SCS2 plans to maintain a surface array during injection to ensure the safe operation of both the storage facility and associated infrastructure. This seismic monitoring will be conducted with a surface array of seismometer stations.

5.7.3.5.3 Seismicity Monitoring QASP

SCS2 will work with third-party contractors and landowners to ensure proper design and installation of the passive seismicity monitoring array. The design and installation of the seismometer station array is performed by specialized contractors including the following activities:

- Project management support to design seismometer array, model network performance, coordinate permitting and equipment installation, testing and maintenance, and ensuring optimum execution of project.

- Field operation to deploy surface seismic station instrumentation, power and communication systems, data quality, and commissioning.

- Data acquisition, system configuration, and processing setup.

- Continuous support and monitoring for data verification and QA/QC.

- Continuous near-real-time reporting, including analyst review and alert notifications for events at or above predetermined magnitude thresholds over the seismic area.

SCS2 will follow a traffic light system if a seismic event is recorded by either the local or public national array during injection operations.

Traffic Light System

If an event is recorded by either the local private array or the public national array to have occurred within 3 miles of an injection well, SCS2 will implement its Emergency Remedial and Response Plan (Section 7.0) subject to detected earthquake magnitude limits defined below:

- For an event >2.7 located within 3 miles of injection, SCS2 will closely monitor seismic activity and may implement a pause to operations or continue operations at a reduced rate, should analysis indicate a causal relationship between injection operations and detected seismicity. If the event is not related to the storage facility operation, the operator will resume normal injection rates.

- For an event >4.0 located within 3 miles of injection, SCS2 will stop injection and perform an inspection in surface facilities and wells. If there is no damage, the operator will reduce the injection rate by not less than 50% and perform detailed analysis to determine if a causal relationship exists. If the event is not related to the storage facility operation, the operator will resume normal injection rates. Should a causal relationship be determined, a revised injection plan will be developed to reduce or eliminate operationally related seismicity. Such plans are dependent on the pressures and seismicity observed and may include but not be limited to:
  - Pausing operations until reservoir pressures fall below a critical limit.
  - Continuing operations at a reduced rate and/or below a revised maximum operation pressure

- For an event >4.5 located within 3 miles of injection, the operator will stop injection. The operator will inform the regulator of seismic activity and inform them that operations have stopped pending technical analysis. The operator will initiate an inspection of surface infrastructure for damage from the earthquake. A detailed analysis is conducted to determine if a causal relationship exists between injection operations and observed seismic activity. If the event is not related to the storage facility operation, and previously approved by the regulators, the operator will resume normal injection rates in steps, increasing the surveillance. Should a causal relationship be determined, a revised injection plan will be developed to reduce or eliminate operationally related seismicity before resuming injection operations. Such plans are dependent on the pressures and seismicity observed and may include but not be limited to:
  - Pausing operations until reservoir pressures fall below a critical limit.

- Continuing operations at a reduced rate and/or below a revised maximum operation pressure.

## 5.8 Reporting Requirements

SCS2 shall retain the following records for a period of at least 10 years from the date of sample, measurement, or report:

- All data collected for the application of the storage facility permit, injection well permit, and operation of injection well permit.
- Data on the nature and composition of all injected fluids collected pursuant to N.D.A.C. § 43-05-01-11.4(1).
- All records from the closure period, including well plugging reports, postinjection site care data, and the final assessment.
- Upon project completion, SCS2 shall deliver any required records described in N.D.A.C. § 43-05-01-18(11).

SCS2 shall retain the following records for a period of at least 10 years from the date of sample, measurement, or report (N.D.A.C. § 43-05-01-18[12]):

- Monitoring data collected pursuant to N.D.A.C. § 43-05-01-11.4(b-i).
- Calibration and maintenance records.
- All original strip chart records for continuous monitoring instrumentation.
- Copies of all reports required by the storage facility permit.

### *5.8.1 Surface Facilities Leak Detection Reporting*

Leak detection equipment at the wellhead of BK Fischer 1, BK Fischer 2, and Archie Erickson 2 will be inspected and tested on a semiannual basis. If detection equipment is found to be defective, it will be repaired or replaced within 10 days of operator being aware of failure. An extension of time to repair or replacement of a leak detector may be granted by DMR-O&G upon SCS2 showing good cause. Semiannual inspection records will be maintained by SCS2 for at least 10 years and will be made available to DMR-O&G upon request pursuant to N.D.A.C. § 43-05- 01-14(1).

## 5.9 Adaptive Management Approach

SCS2 will employ an adaptive management approach to implementing the testing and monitoring plan by completing periodic reviews of the testing and monitoring plan (Ayash and others, 2017) at least once every 5 years. During each review, monitoring and operational data will be analyzed, and the AOR will be reevaluated. Based on this reevaluation, it will either be demonstrated that 1) no amendment to the testing and monitoring program is needed or 2) modifications are necessary to ensure proper monitoring of storage performance is achieved moving forward. This determination will be submitted to DMR-O&G for approval. Should amendments to the testing

and monitoring plan be necessary, they will be incorporated into the permit following approval by DMR-O&G. Over time, monitoring methods and data collection may be supplemented or replaced as advanced techniques are developed.

Monitoring and operational data will be used to evaluate conformance between observations and history-matched simulation of the $CO_2$ plume and pressure distribution relative to the permitted geologic storage facility. If significant variance is observed, the monitoring and operational data will be used to calibrate the geologic model and associated simulations. The monitoring plan will be adapted to provide suitable characterization and calibration data as necessary to achieve such conformance. Subsequently, history-matched predictive simulation and model interpretations will, in turn, be used to inform adaptations to the monitoring program to demonstrate lateral and vertical containment of the injected $CO_2$ within the permitted geologic storage facility.

## 5.10 References

American Petroleum Institute, 2018, Line pipe: API Specification 5L, Forty-Sixth Ed., April 2018, Errata 1, May 2018, 210 p.

Ayash, S.C., Nakles, D.V., Wildgust, N., Peck, W.D., Sorenson, J.A., Glazewski, K.A., Aulich, T.R., Klapperich, R.J., Azzolina, N.A., and Gorecki, C.D., 2017, Best practice for the commercial deployment of carbon dioxide geologic storage – the adaptive management approach: Plains $CO_2$ Reduction (PCOR) Partnership Phase III, Task 13 Deliverable D102/Milestone M59 for U.S. Department of Energy National Energy Technology Laboratory Cooperative Agreement No. DE-FC26-05NT42592, EERC Publication 2017-EERC-05-01, Grand Forks, North Dakota, Energy and Environmental Research Center, August.

Dixon, T., and Romanak, K.D., 2015, Improving monitoring protocols for $CO_2$ geological storage with technical advances in $CO_2$ attribution monitoring: International Journal of Greenhouse Gas Control, v. 41, p. 29–40, doi: 10.1016/j.ijggc.2015.05.029.

Lumley, D.E., Behrens, R.A., and Wang, Z., 1997, Assessing the technical risk of a 4-D seismic project: The Leading Edge, v. 16, p. 1287–1292, doi: 10.1190/1.1437784.

Lumley, D.E., Cole, S., Meadows, M.A., Tura, A., Hottman, B., Cornish, B., Curtis, M., and Maerefat, N., 2000, A risk analysis spreadsheet for both time-lapse VSP and 4D seismic reservoir monitoring: 70th Annual International Meeting, SEG, Expanded Abstracts, p. 1647–1650.

# SECTION 6.0

# POSTINJECTION SITE CARE AND FACILITY CLOSURE PLAN

## 6.0 POSTINJECTION SITE CARE AND FACILITY CLOSURE PLAN

This postinjection site care (PISC) and facility closure plan describes the activities that Summit Carbon Storage #2, LLC (SCS2) will perform following the cessation of $CO_2$ injection to achieve final closure and issuance of a certificate of project completion. An overview of postinjection testing and monitoring activities is provided in Table 6-1. The postinjection testing and monitoring data will provide evidence that the injected $CO_2$ plume is stable (i.e., $CO_2$ migration will be unlikely to cross the storage facility area [SFA] boundary).

Pursuant to North Dakota Administrative Code (N.D.A.C.) § 43-05-01-19(1)(d), SCS2 proposes to submit the PISC monitoring results annually to the Department of Mineral Resources, Oil and Gas Division (DMR-O&G).

## Table 6-1. Overview of Postinjection Testing and Monitoring Activities[1]

| Monitoring Type/SFP Reference | Parameter | Activity Description | Primary Purpose(s) of Activity | Equipment/Test | Location | Sampling Frequency (10 years minimum) |
|---|---|---|---|---|---|---|
| Wellbore Mechanical Integrity (external) Section 6.2.1 | Material wall thickness | Ultrasonic or other equivalent casing inspection log (CIL) and sonic array logging | Mechanical integrity confirmation and operational safety assurance | Ultrasonic or other equivalent CIL and sonic array tools | Archie Erickson 2 | Repeat when required and when tubing is pulled during workovers. |
| | Radial cement bond | | | | | |
| | Temperature profile | Continuous data recording | | Distributed temperature sensing (DTS) fiber | | Continuous |
| | | Temperature logging | | Temperature log | | Annually only if DTS fiber fails |
| | Saturation profile | Pulsed-neutron log (PNL) | | PNL tool | | Repeat PNL in Year 4 and Year 9 of postinjection. Run log from Opeche/Spearfish Formation to surface. |
| Wellbore Mechanical Integrity (internal) Section 6.2.1 | Pressure/temperature (P/T) | Continuous data recording via supervisory control and data acquisition (SCADA) system | Mechanical integrity confirmation and operational safety assurance | Digital surface P/T gauge on the casing annulus (between surface and long-string sections) | Archie Erickson 2 | Continuous |
| | | Tubing-casing annulus pressure testing | | Pressure testing truck with pressure chart | | Repeat during workover operations in cases where the tubing must be pulled and no less than every 5 years. |
| | | Continuous data recording via SCADA system | | Digital surface P/T gauge on tubing-casing annulus | | Continuous |
| | | Continuous data recording via SCADA system | | Digital surface P/T gauge on tubing | | Continuous |
| | Saturation profile | PNL | | PNL tool | | Repeat PNL in Year 4 and Year 9 of postinjection. Run log from Opeche/Spearfish Formation to surface. |
| Downhole Corrosion Detection Section 6.2.1 | Saturation profile | PNL | Corrosion detection of project materials in contact with $CO_2$ | PNL tool | Archie Erickson 2 | Repeat PNL in Year 4 and Year 9 of postinjection. Run log from Opeche/Spearfish Formation to surface. |
| | Material wall thickness | Ultrasonic or other equivalent CIL | | Ultrasonic or other approved CIL tools | | Repeat when required and when tubing is pulled during workovers.[2] |

[1] Pursuant to N.D.A.C. § 43-05-01-19(1)(d), SCS2 proposes to submit monitoring results annually. The annual report is due 45 days after the end of the year.

[2] If PNL indicates out-of-zone migration, the operator will work with DMR-O&G to take appropriate action.

Continued…

## Table 6-1. Overview of Postinjection Testing and Monitoring Activities (continued)

| Monitoring Type | Parameter | Activity Description | Primary Purpose(s) of Activity | Equipment/Test | Location | Sampling Frequency (10 years minimum) |
|---|---|---|---|---|---|---|
| Near Surface Section 6.2.2 | Soil gas composition (see Table 5-6) | Soil gas sampling (see Figure 6-3) | Protection of near-surface environment | Field meter and sample bags | MSG02 and MSG05 | Collect 3–4 seasonal samples at each station (MSG02 and MSG05) in Year 1 and Year 3 of postinjection and every 3 years thereafter (e.g., Years 6 and 9). |
| | Water composition (see Table 5-9) | Groundwater sampling (see Figure 6-3) | Protection of underground sources of drinking water (USDW) | Field meter and sample containers | MGW01 | Collect 3–4 seasonal samples in Year 1 and Year 3 of postinjection and at least once every 3 years thereafter until facility closure (anticipated in Year 10 of postinjection). |
| | | | | | MGW03, MGW05, MGW06 and MGW08 | Collect 3–4 seasonal samples prior to facility closure (anticipated in Year 10 of postinjection). |
| | | | | | MGW10 | Collect samples from MGW10 annually until facility closure (anticipated in Year 10 of postinjection). |
| Above-Zone Monitoring Interval Section 6.2.3 | Temperature profile | Continuous data recording via SCADA system | Assurance of containment in storage reservoir | DTS casing-conveyed fiber-optic cable | Archie Erickson 2 | Continuous |
| | | Temperature logging | | Temperature log | | Annually only if DTS fiber fails |
| | Saturation profile | PNL | | PNL tool | | Repeat PNL in Year 4 and Year 9 of postinjection. Run log from Opeche/Spearfish Formation to surface. |
| Storage Reservoir (direct) Section 6.2.3 | P/T | Continuous data recording via SCADA system | Pressure front tracking | Casing-conveyed P/T gauge | Archie Erickson 2 | Continuous |
| | Temperature profile | Continuous data recording via SCADA system | $CO_2$ plume tracking | DTS casing-conveyed fiber-optic cable | | Continuous |
| Storage Reservoir (indirect) Section 6.2.3 | $CO_2$ saturation | Time-lapse seismic monitoring | $CO_2$ plume tracking | Time-lapse seismic surveys with source and receivers | Within area of review (AOR) boundary ($CO_2$ plume extents) | Actual design to be determined based on reevaluations of the testing and monitoring plan (Section 5.0) and migration of the $CO_2$ plume over time. Multiple repeat time-lapse seismic surveys will be collected during postinjection, with the first survey occurring by Year 4 of postinjection. |

[1] Pursuant to N.D.A.C. § 43-05-01-19(1)(d), SCS2 proposes to submit monitoring results annually. The annual report is due 45 days after the end of the year.
[2] If PNL indicates out-of-zone migration, the operator will work with DMR-O&G to take appropriate action.

Based on the current simulations of $CO_2$ plume movement following the cessation of $CO_2$ injection, it is projected that the $CO_2$ plume will stabilize within the storage facility area (SFA) boundary (Section 3.0), confirming nonendangerment of USDW within the AOR. Based on these projections, a minimum 10-year postinjection monitoring period is planned to confirm $CO_2$ plume extent and postinjection stabilization pursuant to North Dakota Century Code (N.D.C.C.) § 38-22-17. Monitoring will be extended beyond 10 years if it is determined that additional data are required to demonstrate a stable $CO_2$ plume and nonendangerment of USDW. The nature and duration of that extension will be determined based on an update of this plan and DMR-O&G approval.

In addition to the foregoing postinjection monitoring program, the $CO_2$ injection wells will be plugged as described in the plugging plan (Section 10.0). All surface equipment not associated with long-term monitoring will be removed, and all surface land associated with the project will be reclaimed to as close as is practicable to its predisturbance condition. Following the plume stability demonstration, a final assessment will be prepared to document the status of the site and be submitted to DMR-O&G as part of a facility closure report. After application by the storage operator, NDIC shall consider issuing a certificate of project completion after notice and hearing pursuant to N.D.C.C. § 38-22-17.

## 6.1 Predicted Postinjection Subsurface Conditions

### *6.1.1 Pre- and Postinjection Pressure Differential*

Model simulations were performed to predict the change in pressure in the Broom Creek Formation during and after the cessation of $CO_2$ injection. The simulations were conducted for 20 years of $CO_2$ injection in the Broom Creek Formation at an average total rate of 4.92 MMt/yr, followed by a postinjection period of 10 years.

Figure 6-1 illustrates the predicted pressure differential at the cessation of $CO_2$ injection. At the time that $CO_2$ injection ceases, the models predict an increase in the pressure of the reservoir, with a maximum pressure differential of 823 psi at the BK Fischer well pad. There is insufficient pressure increase caused by $CO_2$ injection to move more than 1 $m^3$ of formation fluids from the storage reservoir to the lowest USDW. The details of the pressure evaluation are provided as part of the AOR delineation discussion within Section 3.0 of this application.

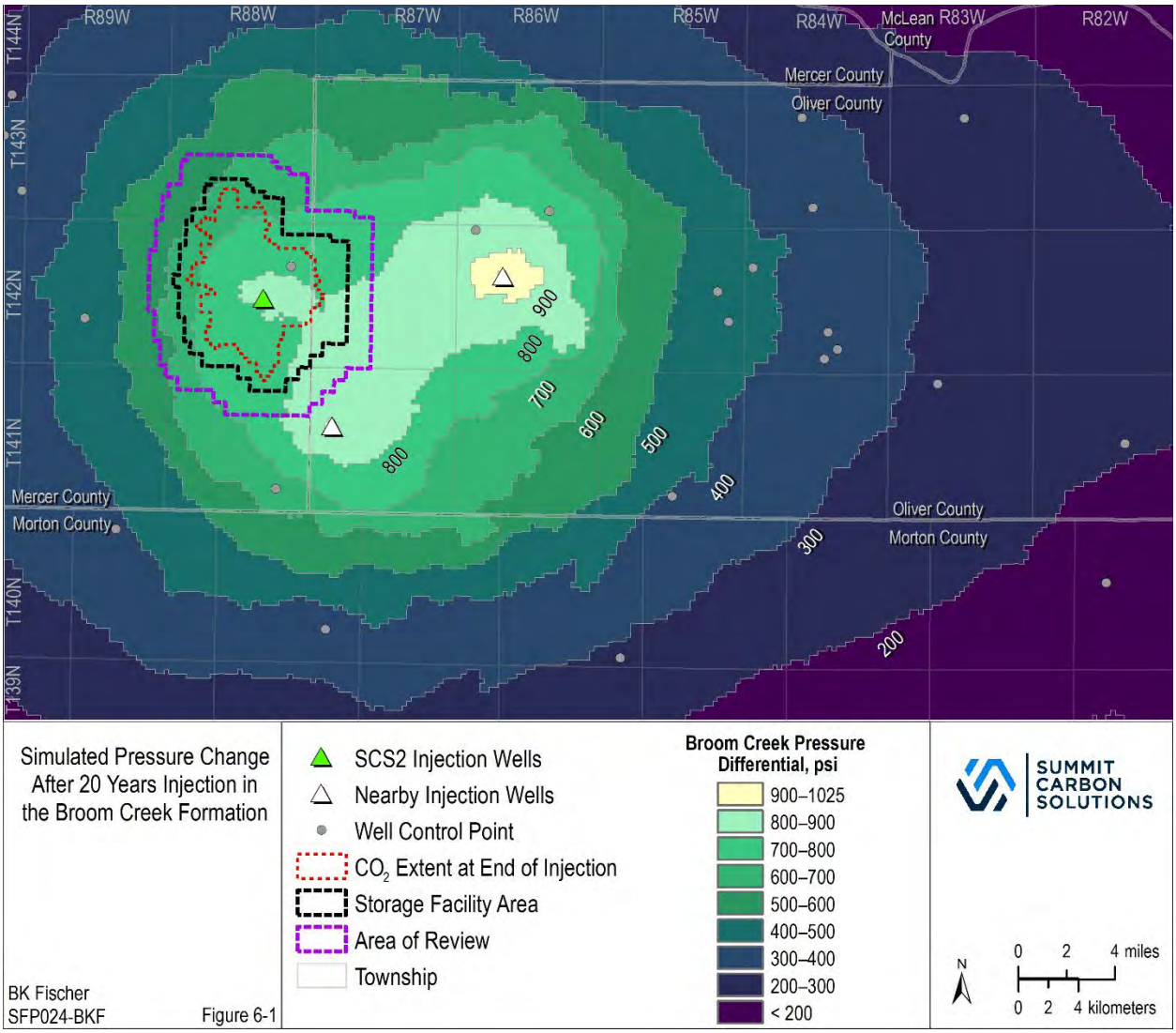



Figure 6-1. Predicted pressure increase in the storage reservoir following 20 years of injection of an average 4.92 MMt/yr of $CO_2$.

Figure 6-2 illustrates the predicted gradual pressure decrease in the storage reservoir, over a 10-year period following the cessation of $CO_2$ injection. The pressure at the BK Fischer $CO_2$ injection well pad at the end of the 10-year period is anticipated to decrease 400–500 psi as compared to the pressure in the storage reservoir at the time $CO_2$ injection ends. This trend of decreasing pressure is anticipated to continue over time until the pressure of the storage reservoir approaches the original reservoir pressure conditions.

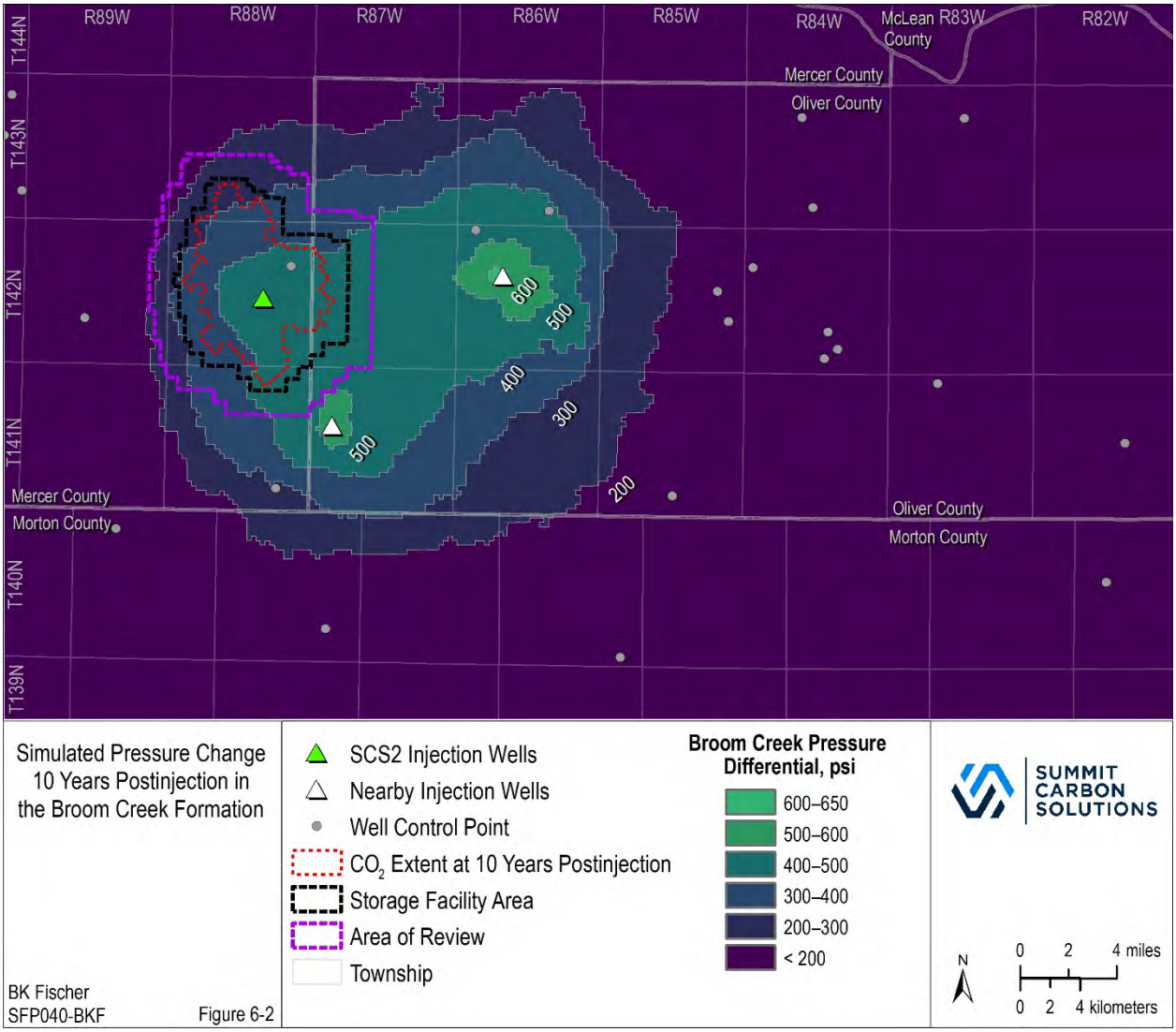



Figure 6-2. Predicted decrease in pressure in the storage reservoir over a 10-year period following the cessation of $CO_2$ injection.

### *6.1.2 Predicted Extent of $CO_2$ Plume*

Figure 6-2 illustrates the extent of the $CO_2$ plume following the planned 10-year PISC period, which is based on numerical simulation predictions. The results of these simulations predict that the $CO_2$ plume extent will expand to an area of approximately 30 $mi^2$ by the end of the 10-year PISC period.

If SCS2 demonstrates at the end of the 10-year PISC period that the $CO_2$ plume at the site is unlikely to extend beyond the SFA boundary, then the $CO_2$ plume will meet the definition of stabilization as presented in N.D.C.C. § 38-22-17(5)(d) as part of qualifying the storage site for receipt of a certificate of project completion.

## 6.2 Postinjection Testing and Monitoring Plan

This postinjection testing and monitoring plan assumes that the $CO_2$ injection wells will be plugged at cessation of injection. Planned postinjection monitoring activities include 1) a mechanical integrity testing and corrosion detection plan for the reservoir-monitoring well (Archie Erickson 2) and 2) an environmental monitoring plan for the near surface and deep subsurface for evidence that the injected $CO_2$ plume is essentially stationary within the storage reservoir and USDWs are nonendangered.

### *6.2.1 Mechanical Integrity Testing and Corrosion Detection*

The postinjection mechanical integrity testing and corrosion detection plan for the Archie Erickson 2 is provided in Table 6-1. The supervisory control and acquisition (SCADA) system will be used to collect real-time and continuous measurements from the surface and downhole gauges in the Archie Erickson 2.

SCS2 will follow the Wellbore Mechanical Integrity Testing Quality Assurance and Surveillance Plan (QASP) and Downhole Corrosion Detection QASP described within Section 5.0 of this application for the set of mechanical integrity and corrosion detection postinjection monitoring activities presented in Table 6-1.

### *6.2.2 Soil Gas and Groundwater Monitoring*

Figure 6-3 identifies the locations of the soil gas profile stations and groundwater wells that are included in this monitoring effort. The two stations (MSG02 and MSG05), a new Fox Hills monitoring well drilled for this project (MGW10), and existing shallow groundwater wells (MGW01, MGW03, MGW05, MGW06, and MGW08) will be sampled according to the plan outlined in Table 6-1. SCS2 may specify alternate groundwater sampling locations and sampling frequencies for the PISC period, if obtaining samples from MGW01, MGW03, MGW05, MGW06, and MGW08 is not feasible.

Analytes and sampling procedures for all soil gas and groundwater monitoring activities conducted during the PISC period are anticipated to be the same as what is presented in the Soil Gas Monitoring QASP and Groundwater Monitoring QASP within Section 5.0 of this application. SCS2 anticipates that the final target list of analytical parameters will likely be reduced for the PISC period based on an evaluation of the monitoring results that are generated during the 20-year injection period of the storage operations.

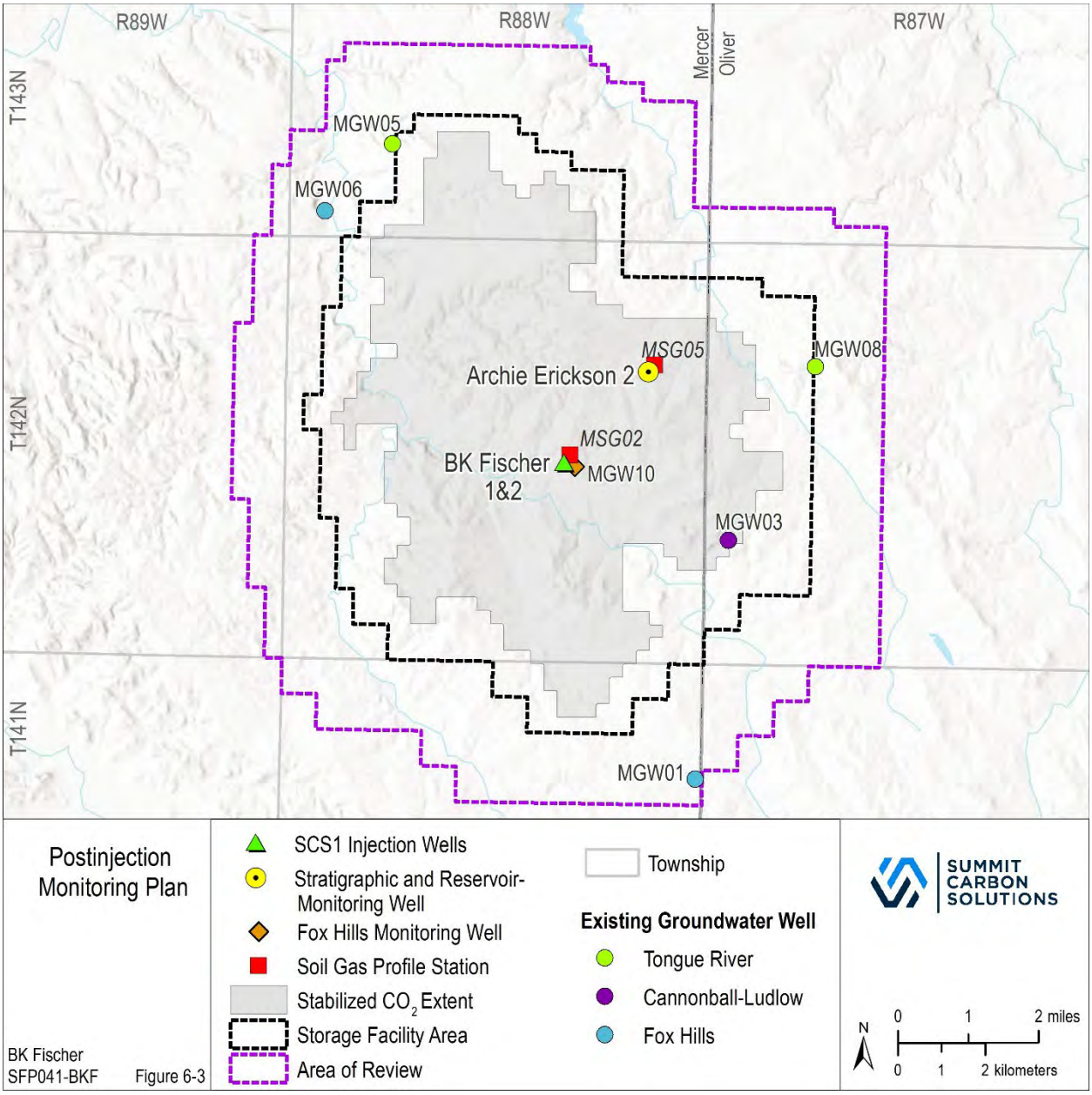



Figure 6-3. Soil gas station and groundwater well sampling locations included in the PISC period.

### *6.2.3 Deep Subsurface Monitoring*

Table 6-1 describes the deep subsurface monitoring strategy during the PISC period. Monitoring methods include a combination of geophysical monitoring (e.g., time-lapse 3D/2D seismic) and formation monitoring (i.e., downhole P/T) for tracking $CO_2$ saturation and associated pressure, respectively, over the entire storage complex.

The design and frequency of the time-lapse seismic survey will depend on how the $CO_2$ plume is migrating during the operational phase of the project and the results of the adaptive

management approach discussion described in Section 5.0 of this application. The seismic survey design will be reevaluated and updated according to monitoring data results gathered in the operational phase.

SCS2 will follow the Above-Zone Monitoring Interval QASP, Direct Reservoir Monitoring QASP, and Indirect Reservoir Monitoring QASP described within Section 5.0 of this application for the set of deep subsurface postinjection monitoring activities presented in Table 6-1.

## 6.3 Postinjection Site Care Plan

At the start of the PISC period, Flowline NDL-325, if not in use or projected use at this time, will be permanently disconnected, purged, and capped at both ends below grade, in accordance with the abandonment of flowlines pursuant to N.D.A.C. § 43-02-03-34.1. Main line valves (MLVs), launcher receivers, and other associated flowline infrastructure at grade or buried at a depth of 3 feet or less will be removed, whereas the NDL-325 flowline will be abandoned in place as the pipe bury depth will be 4 feet top of pipe and will be permanently disconnected, purged, and capped pursuant to N.D.A.C. § 43-02-03-34.1. The cost estimate for flowline segment NDL-325 abandonment can be found in Table 12-3b.

As required by N.D.A.C. § 43-05-01-19(5), PISC activities will include the P&A (plugging and abandonment) of the $CO_2$ injection wells (BK Fischer 1 and 2) and reclamation of the injection well pad. Storage facility equipment, appurtenances, and structures not associated with monitoring will be removed, and the surface will be reclaimed to the DMR-O&G's specifications to return the land as close as practicable to its original condition. Injection well pad reclamation activities may occur contemporaneously with flowline removal and do not include the soil gas profile station (MSG02) and the Fox Hills monitoring well (MGW10).

SCS2 intends to use the Archie Erickson 2 wellbore for deep subsurface monitoring during the PISC period. The postinjection testing and monitoring activities for the Archie Erickson 2 and near-surface sampling are described earlier in Section 6.2. Section 12.0 includes cost estimates for performing these proposed testing and monitoring activities.

### *6.3.1 Schedule for Submitting Postinjection Monitoring Results*

Where possible, PISC-monitoring data and results will be submitted to DMR-O&G within 45 days following the end of the calendar year in which $CO_2$ injection ceased. The annual reports will contain information and data generated during the reporting period, including seismic data acquisition, formation-monitoring data, soil gas and groundwater analytical results, and simulation results from updated geologic models and numerical simulations.

## 6.4 Facility Closure Plan

SCS2 will notify DMR-O&G prior to its intent to close the site, and the facility closure plan will describe a set of activities that will be performed, following approval by DMR-O&G, at the end of the PISC period. Facility closure activities will include the plugging of all wells that are not planned for continued use in monitoring the closed site; the decommissioning and removal of aboveground storage facility equipment, appurtenances, and structures (e.g., buildings, gravel pads, access roads, etc.) not associated with monitoring or another deemed use; and the reclaiming of the surface land of the site to as close as is practicable to its predisturbance condition.

As part of the final assessment, SCS2 will work with DMR-O&G to determine which wells and monitoring equipment will remain and transfer to the state for continued postinjection monitoring. P&A of the Archie Erickson 2 and well pad reclamation costs are factored into Section 12.0, but DMR-O&G may choose to retain this reservoir-monitoring well into the postclosure period. The Fox Hills monitoring well (MGW10) drilled adjacent to the $CO_2$ injection wells (BK Fischer 1 and 2) and the two soil gas profile stations (MSG02 and MSG05) may also transfer ownership to the state or a third party, pending DMR-O&G review and approval of the PISC plan and final assessment pursuant to N.D.A.C. § 43-05-01-19.11. Cost estimates for the PISC and closure periods can be found in Section 12.0 of this permit application in the scenario such that transfer to the state or a third-party entity does not occur.

### *6.4.1 Submission of Facility Closure Report, Survey, and Deed*

A facility closure report will be prepared and submitted to DMR-O&G within 90 days following the execution of the PISC and facility closure plan. This report will provide DMR-O&G with a final assessment that documents the location of the stored $CO_2$ in the reservoir, describes its characteristics, and demonstrates the stability of the $CO_2$ plume in the reservoir over time. The facility closure report will also document the following:

- Plugging records of the $CO_2$ injection wells and reservoir-monitoring well.
- Location of the sealed $CO_2$ injection wells and reservoir-monitoring well on a plat survey that has been submitted to the county recorder's office.
- Notifications to state and local authorities as required by N.D.A.C. § 43-05-01-19.
- Records regarding the nature, composition, and volume of the injected $CO_2$.
- Postinjection monitoring records.

At the same time, SCS2 will also provide DMR-O&G with a copy of an accurate plat certified by a registered surveyor that has been submitted to the county recorder's office designated by DMR-O&G. The plat will indicate the location of the injection well relative to permanently surveyed benchmarks pursuant to N.D.A.C. § 43-05-01-19.

Lastly, SCS2 will record a notation on the deed (or any other title search document) to the property on which the injection well was located pursuant to N.D.A.C. § 43-05-01-19.11.

# SECTION 7.0

# EMERGENCY AND REMEDIAL RESPONSE PLAN

## 7.0 EMERGENCY AND REMEDIAL RESPONSE PLAN

Summit Carbon Storage #2, LLC (SCS2) requires all employees, contractors, and agents to follow the company emergency and remedial response plan (ERRP) for BK Fischer. The purpose of the ERRP is to provide guidance for quick, safe, and effective response to an emergency to protect the public, all responders, company personnel, and the environment.

This ERRP for the geologic storage project 1) describes the local resources and infrastructure in proximity to the project site; 2) identifies events that have the potential to endanger underground sources of drinking water (USDW) during the construction, operation, and postinjection site care phases of the geologic storage project, building upon the screening-level risk assessment (SLRA); and 3) describes the response actions that are necessary to manage these risks to USDWs. In addition, this ERRP describes the emergency response team and command structure, injection facility evacuation plans, HazMat (hazardous materials) capabilities, and emergency communication plans. Lastly, procedures are presented for regularly conducting an evaluation of the adequacy of the ERRP and updating it, if warranted, over the lifetime of the geologic storage project. Copies of this ERRP are available at the company's nearest operational office and at the geologic storage facility.

### 7.1 Background

SCS2 is the owner and operator of BK Fischer, located in Mercer County, approximately 10 miles southwest of Beulah, North Dakota. SCS2 is requesting a commercial permit for the operation of the storage facility for the injection of a $CO_2$ stream that will range from 95% $CO_2$ to ≤99.9% $CO_2$. This $CO_2$ stream range will provide flexibility to receive $CO_2$ from a variety of industrial sources (Table 7-1). This anticipated average $CO_2$ stream composition will ensure the safe and economical operation of the storage facility, including such factors as consistency with the design and materials of transport and storage equipment.

**Table 7-1. Anticipated Average $CO_2$ Stream Composition**

| Chemical Content | System Specification |
|---|---|
| Carbon Dioxide, $CO_2$ | ≥98.25% |
| Inert, $N_2$ | ≤1.44% |
| Oxygen, $O_2$ | ≤0.31% |
| Water, $H_2O$* | ≤20 lb/MMscf |
| Total Hydrocarbons* | ≤1800 ppm by volume |
| Hydrogen Sulfide, $H_2S$* | ≤10 ppm by volume |
| Total Sulfur, S* | ≤10 ppm by volume |
| Glycol | ≤0.3 gallons/MMscf |

* Denotes trace constituents that do not make up notable percentages of stream composition

Figure 7-1 identifies the planned flowlines, injection wells (BK Fischer 1 and BK Fischer 2) and the stratigraphic and reservoir-monitoring well (Archie Erickson 2). The well locations, including latitudes and longitudes, are listed in Table 7-2. At the time SCS2 filed this application, it has not applied for any other permits from state, federal, or local agencies.

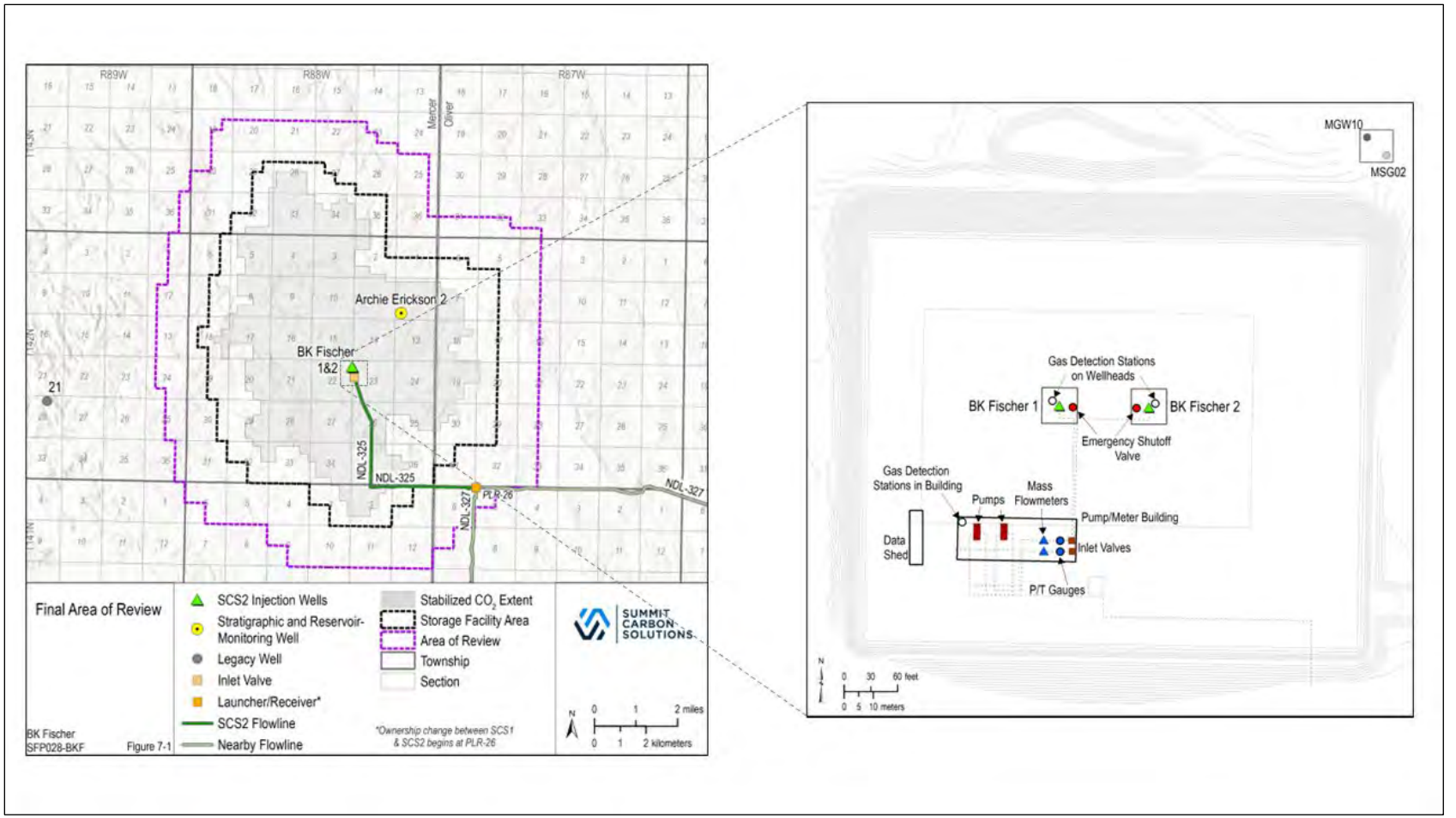



Figure 7-1. Site map detailing the on-pad $CO_2$ flowline(s) and the $CO_2$ injection wellsite. Inset map illustrates a layout of surface facilities with key leak detection and monitoring equipment identified.

**Table 7-2. Well Names and Location Information for the Injection Wells and Reservoir-Monitoring Well of the Geologic Storage Operations**

| Well Name | Purpose | NDIC[1] File No. | Quarter/ Quarter | Section | Township | Range | Latitude[2] | Longitude[2] |
|---|---|---|---|---|---|---|---|---|
| BK Fischer 1 | $CO_2$ injection | 40124 | NE/NE | 22 | 142 | 88 | 47.108453 | -101.808619 |
| BK Fischer 2 | $CO_2$ injection | 40125 | NE/NE | 22 | 142 | 88 | 47.108453 | -101.808219 |
| Archie Erickson 2 | Reservoir monitoring | 38622 | SW/SW | 12 | 142 | 88 | 47.128269 | −101.782453 |

[1] North Dakota Industrial Commission.
[2] North American datum 83 (NAD 83) geographic coordinate system.

The primary SCS2 contacts for the geologic storage project and their contact information are listed in Table 7-3.

**Table 7-3. Primary SCS2 Contacts**

| | | Contact Information |
|---|---|---|
| **Individual** | **Title** | **Office Phone Number** |
| Wade Boeshans | Executive Vice President | 515.531.2608 |
| Jay Volk | Sequestration – Director of Health, Safety & Environmental | 515.207.3563 |
| Jeff Skaare | Director of Land & Legal Affairs | 515.531.2615 |

Contact names and information for key local emergency organizations/agencies are provided in Figures 7-2 through 7-5 and Table 7-4.

## 7.2 Local Resources and Infrastructure

Land use near BK Fischer comprises primarily agricultural activities. Local resources in the vicinity of the geologic storage project that may be impacted as a result of an emergency event include existing groundwater wells (Figure 4-3), a gravel pit (Figure 4-2), and the Coyote Creek Mining Company, LLC's future mining land plus mined-out land at both the Coyote Creek Mine and Westmoreland Beulah Mining LLC's Beulah Mine (Figure 2-50).

The infrastructure in the area of review (AOR) that may be impacted as a result of an emergency event include 1) BK Fischer 1 and 2 ($CO_2$ injection wells), SCS2 flowline NDL-325, and Archie Erickson 2 (stratigraphic and reservoir-monitoring well); 2) surface features and occupied structures (Figure 4-2); and 4) public roads (Figures 7-3 through 7-5). Additional infrastructure nearby includes TB Leingang (SCS1), comprising two $CO_2$ injection wells and respective flowline NDL-327, and Milton Flemmer 1 (stratigraphic and reservoir-monitoring well); KJ Hintz (SCS3), comprising two $CO_2$ injection wells and respective NDL-326 flowline; Slash Lazy H 5 (stratigraphic and reservoir-monitoring well); and the MCE pipeline (Figures 7-3 through 7-5).

## 7.3 Identification of Potential Emergency Events

### *7.3.1 Definition of an Emergency Event*

An emergency event is an event that poses an immediate, or acute, risk to human health, resources, or infrastructure and requires a rapid, immediate response. This ERRP focuses on emergency events that have the potential to move injection fluid or formation fluid in a manner that may endanger USDWs or lead to an accidental release of $CO_2$ to the atmosphere during the construction, operation, or postinjection site care project phases.

| Storage Facility Area | Location | County | EMS District | Fire District | Law Enforcement | LEPC Jurisdiction |
|---|---|---|---|---|---|---|
| TB Leingang | Monitoring Site Milton Flemmer 1 | Mercer | Glen Ullin EMS | Glen Ullin Fire Department | Mercer County Sheriff's Department | Mercer County LEPC |
| | Injection Site TB Leingang 1 and 2 | Oliver | Beulah EMS Mercer County Ambulance | Beulah Rural Fire Dept. | Oliver County Sheriff's Department | Oliver County LEPC |
| | TB Leingang SFA | Mercer/ Oliver/ Morton | New Salem Ambulance Service | New Salem Fire Department | Morton County Sheriff's Department | Mercer County LEPC |
| | | | Glen Ullin EMS | Glen Ullin Fire Department | Mercer County Sheriff's Department | Morton County LEPC |
| BK Fisher | Monitoring Site Archie Erickson 2 | Mercer | Beulah EMS Mercer County Ambulance | Beulah Rural Fire Dept. | Mercer County Sheriff's Department | Mercer County LEPC |
| | Injection Site BK Fisher 1 and 2 | | | | | |
| | BK Fisher SFA | Mercer/ Oliver | | | Oliver County Sheriff's Department | Oliver County LEPC |
| KJ Hintz | Monitoring Site Slash Lazy H 5 | Oliver | Hazen EMS Mercer County Ambulance | Hazen Fire & Rescue | Oliver County Sheriff's Department | Oliver County LEPC |
| | Injection Site KJ Hintz 1 and 2 | | | | | |
| | KJ Hintz SFA | | | New Salem Fire Dept. | | |
| | | | Beulah EMS Mercer County Ambulance | Oliver Fire Dept. | | |
| | | | Oliver EMS | Beulah Rural Fire Dept. | | |

Figure 7-2. Off-site emergency notification list. Emergency management service (EMS) districts, fire districts, law enforcement agencies, and Local Emergency Planning Committee (LEPC) jurisdictions with response jurisdictions intersecting with the BK Fischer storage facility area (SFA) will be provided a copy of this ERRP.

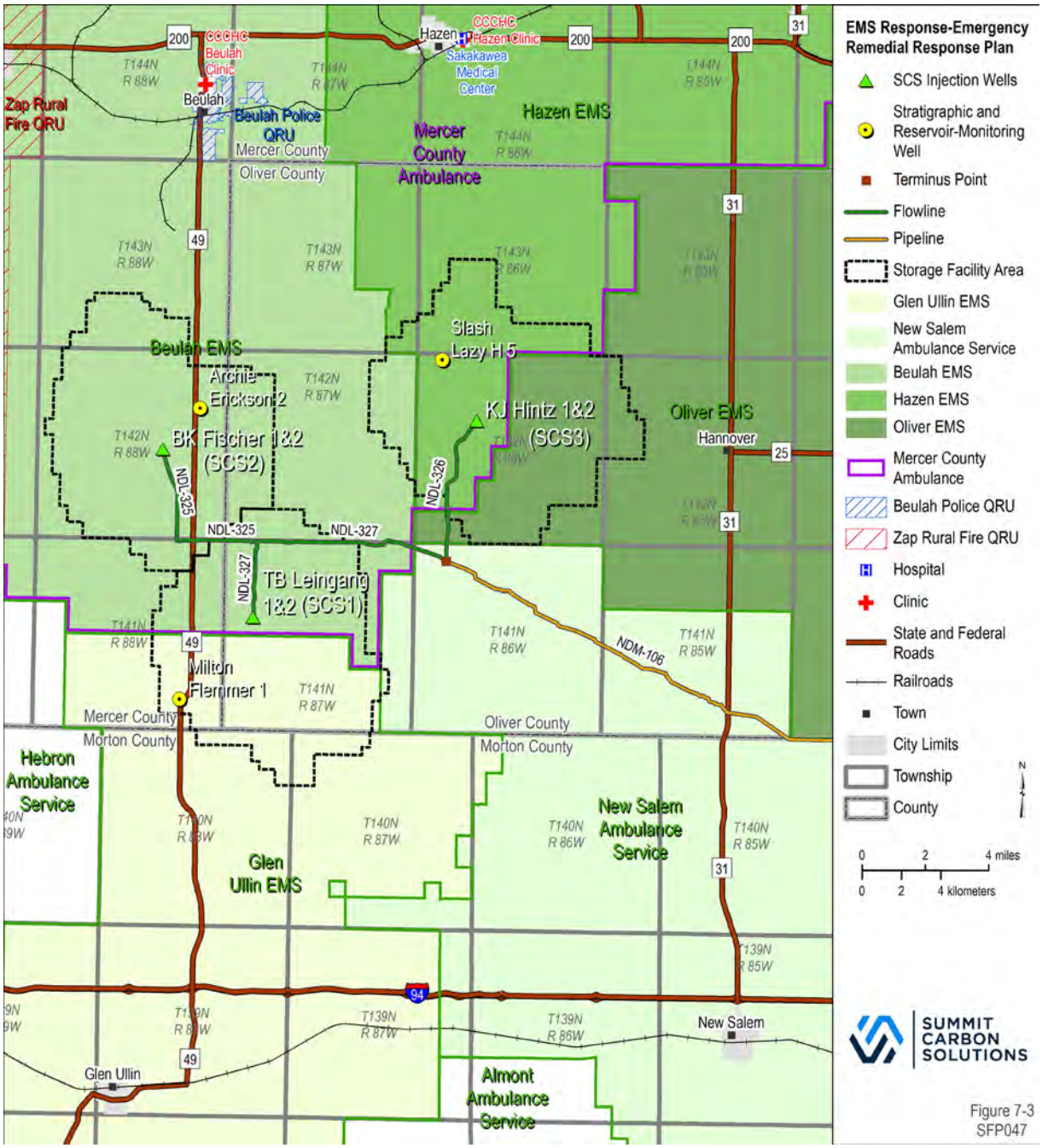



Figure 7-3. Map showing emergency management service (EMS) response zones including, and within the vicinity of, BK Fischer. Also included on this map are the planned $CO_2$ injection wells, stratigraphic and reservoir-monitoring wells, flowline(s), MCE pipeline, and state and federal roads.

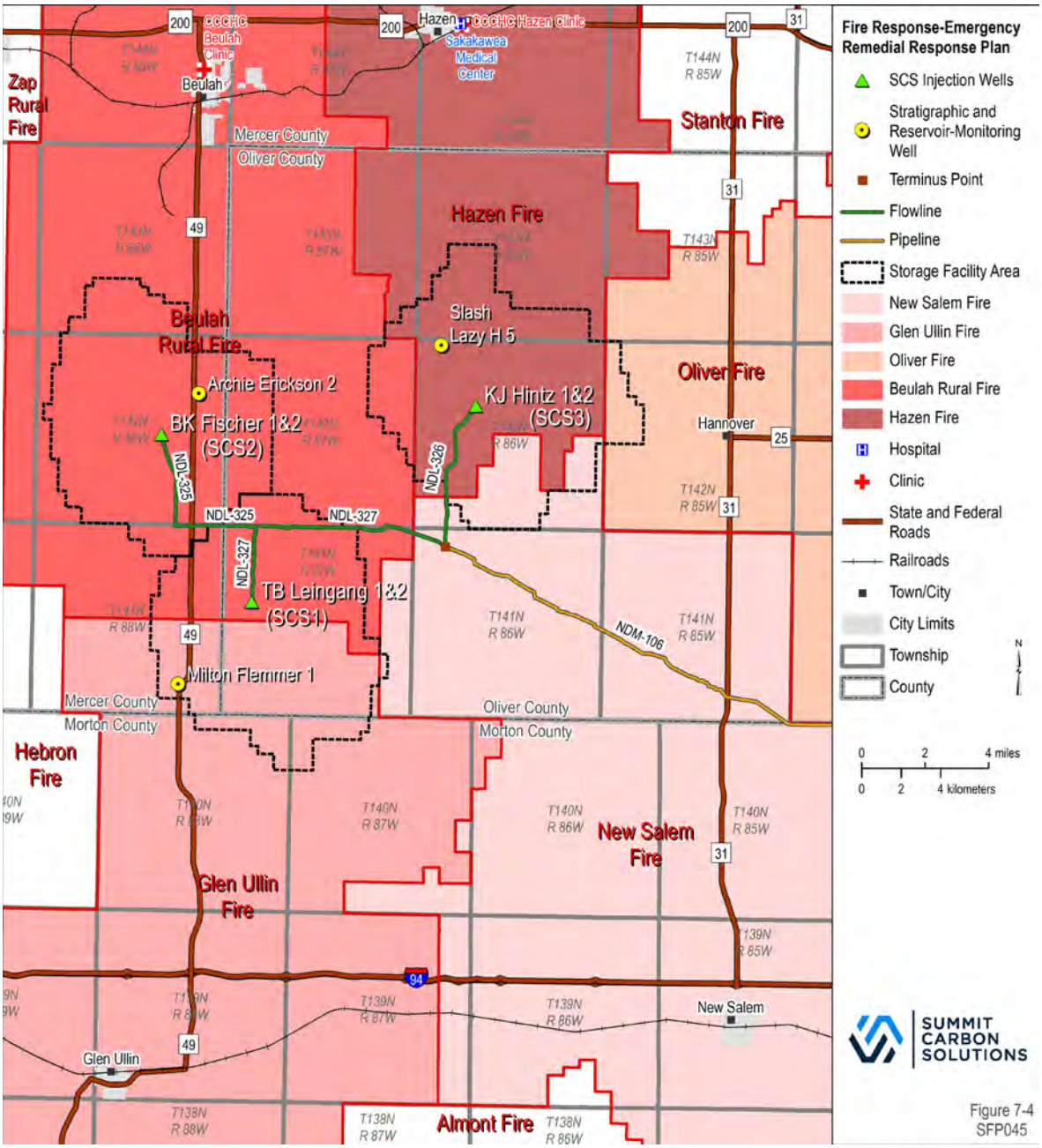



Figure 7-4. Map showing fire response zones including, and within the vicinity of, BK Fischer. Also included on this map are the planned $CO_2$ injection wells, stratigraphic and reservoir-monitoring wells, flowline(s), MCE pipeline, and state and federal roads.

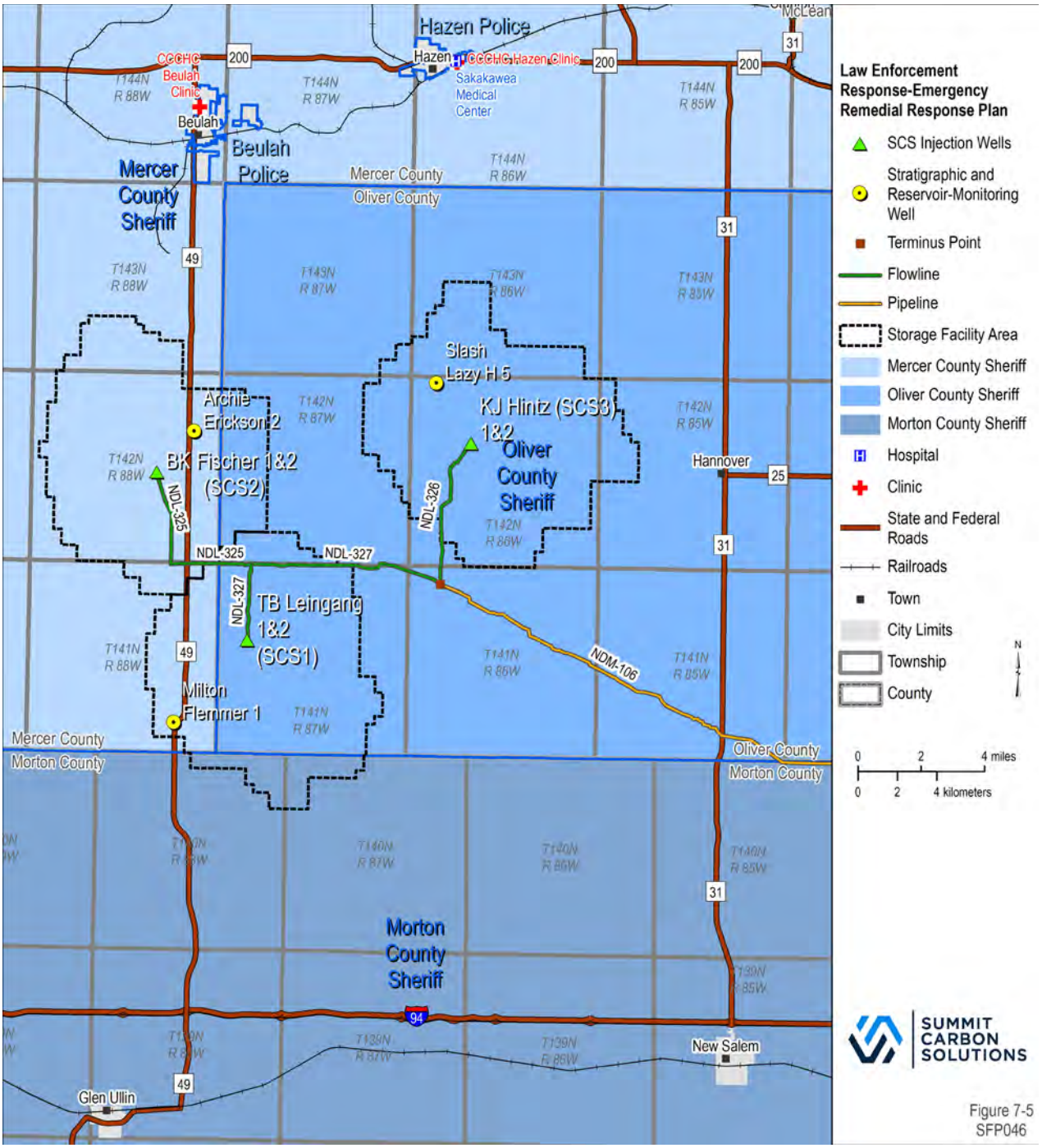



Figure 7-5. Map showing law enforcement response zones including, and within the vicinity of, BK Fischer. Also included on this map are the planned $CO_2$ injection wells, stratigraphic and reservoir-monitoring wells, flowline(s), MCE pipeline, and state and federal roads.

**Table 7-4. Off-Site Emergency Notification/PSAP Phone List**

| Agency | Phone | Alternate Contact/ Notes |
|---|---|---|
| Almont Ambulance Service | 701.943.2355 | |
| Beulah Police Department | 701.873.5252 | Quick Response Unit (QRU) |
| Beulah Rural Fire Department | 701.873.2121 | |
| Coal Country Community Health Center – Beulah Clinic | 701.873.4445 | |
| Coal Country Community Health Center – Hazen Clinic | 701.748.2256 | |
| Coal Country Community Health Center – Center Clinic | 701.794.8798 | |
| Emergency Manager – Mercer County | 701.745.3333 | |
| Emergency Manager – Morton County | 701.667.3307 | |
| Emergency Manager – Oliver County | 701.745.3302 | |
| Glen Ullin Ambulance | 701.348.3507 | |
| Glen Ullin Fire Department | 701.348.3113 | |
| Hazen Police Department | 701.748.2414 | |
| Hazen Fire & Rescue | 701.745.3332 | |
| Hebron Ambulance Service District | 701.878.4600 | |
| Hebron Fire Department | 701.878.4353 | State Radio Dispatch at 701.328.9921 / 1.800.472.2121 |
| Mercer County Ambulance – Beulah EMS | 701.748.7241 | |
| Mercer County Ambulance – Hazen EMS | 701.748.5558 | |
| Mercer County Sheriff's Department | 701.745.3333 | |
| Morton County Sheriff's Department | 701.667.3330 | |
| ND Department of Emergency Services | 1.833.997.7458 | |
| ND Highway Department | 701.327.9921 | |
| ND Highway Patrol | State Radio Dispatch 701.328.9921 / 800.472.2121 | Office: 701.328.2447 |
| ND Poison Control | 1.800.222.1222 | |
| New Salem Ambulance Services | 701.843.7828 | |
| New Salem Fire Department | 701.843.7111 | |
| Oliver County Ambulance Service | 701.794.3555 | |
| Oliver Fire Department | 701.794.3450 | |
| Oliver County Sheriffs Department | 701.794.3450 | Mercer County Dispatch 701.745.3333 |
| Sanford AirMed | 844.424.7633 | Sanford AirMed Dispatch Sioux Falls, SD 1.800.437.6886 |
| Sanford Emergency and Trauma Center - Bismarck | 701.323.6150 | |
| Sakakawea Medical Center – Hazen | 701.748.2225 | Emergency Services |
| Stanton Fire Department | 701.748.2591 | |
| Zap Rural Fire Department | Mercer County Dispatch 701.745.3333 | QRU |
| Western Plains Public Health | 701.667.3370 / 1.888.667.3370 | Formerly Custer Health District |

### *7.3.2 Potential Project Emergency Events and Their Detection*

The SLRA for the project developed a list of potential technical project risks (i.e., a risk register) which were placed into the following six technical risk categories:

1. Injection operations
2. Storage capacity
3. Containment – lateral migration of $CO_2$
4. Containment – pressure propagation
5. Containment – vertical migration of $CO_2$ or formation water brine via injection wells, other wells, or inadequate confining zones
6. Natural disasters (induced seismicity)

Based on a review of these technical risk categories, SCS2 developed, to include in this ERRP, a list of the geologic storage project events that could potentially result in the movement of injection fluid or formation fluid in a manner that may endanger a USDW and, in turn, require an emergency response. These events and means for their detection are provided in Table 7-5.

In addition to the foregoing technical project risks, the occurrence of a natural disaster (e.g., naturally occurring earthquake, tornado, lightning strike, etc.) also represents an event for which an emergency response action may be warranted. For example, an earthquake or weather-related disaster (e.g., tornado or lightning strike) has the potential to result in injection well problems (integrity loss, leakage, or malfunction) and may also disrupt surface and subsurface storage operations. These events are also addressed in this ERRP.

## 7.4 Emergency Response Actions

### *7.4.1 General Emergency Response Actions*

The response actions that will be taken to address the events listed in Table 7-5, as well as potential natural disasters, will follow the same protocol. This protocol consists of the following actions:

- The facility response plan qualified individual (QI), as found in Section 7.5, will be immediately notified and will make an initial assessment of the severity of the event (i.e., does it represent an emergency event?). The QI must make this assessment as soon as practical but must do so within 24 hours of the notification. This protocol will ensure SCS2 has taken all reasonable and necessary steps to identify and characterize any release pursuant to North Dakota Administrative Code (N.D.A.C.) § 43-05-01-13(2)(b).

- If an emergency event exists, the QI or designee shall notify, within 24 hours of the emergency event determination, the Department of Mineral Resources Oil and Gas Division (DMR-O&G) Director (see Sections 7.5 and 7.6 and Table 7-6). N.D.A.C. § 43-05-01-13(2)(c). The QI shall also implement the emergency communications plan (N.D.A.C. § 43-05-01-13[2][d]).

**Table 7-5. Potential Project Emergency Events and Their Detection**

| Potential Emergency Events | Detection of Emergency Events |
|---|---|
| Failure of $CO_2$ Flowline NDL-325 | • Computational flowline continuous monitoring and leak detection system (LDS).<br>– Instrumentation at the flowline for each injection well on the well pad collects pressure, temperature, and flow data.<br>– Pressure, temperature, and flow measurements will be measured at the MCE terminus point.<br>– The LDS software uses the pressure readings and flow rates in and out of the line to produce a real-time model and predictive model.<br>– By monitoring deviations between the real-time model and the predictive model, the software detects flowline leaks.<br>• Frozen ground at leak site may be observed.<br>• $CO_2$ monitors located inside and outside of the process buildings detect a release of $CO_2$ from the flowline, connection, and/or wellhead. |
| Integrity Failure of Injection or Monitoring Well | • Pressure monitoring reveals wellhead pressure exceeds the shutdown pressure specified in the permit.<br>• Annulus pressure indicates a loss of external or internal well containment.<br>• Mechanical integrity test results identify a loss of mechanical integrity.<br>• $CO_2$ monitors located inside and outside of the enclosed wellhead building detect a release of $CO_2$ from the wellhead. |
| Monitoring Equipment Failure of Injection Well | • Failure of monitoring equipment for wellhead pressure, temperature, and/or annulus pressure is detected. |
| Storage Reservoir Unable to Contain the Formation Fluid or Stored $CO_2$ | • Elevated concentrations of indicator parameter(s) in soil gas, groundwater, and/or surface water sample(s) are detected. |

Following these actions, the company will:

- Initiate a project shutdown plan and immediately cease $CO_2$ injection. However, in some circumstances, the company may determine whether gradual or temporary cessation of injection is more appropriate in consultation with the DMR-O&G Director.

- Shut in the $CO_2$ injection well (close the flow valve).

- Vent $CO_2$ from the surface facilities.

- Limit access to the wellhead to authorized personnel only, who will be equipped with appropriate personal protection equipment (PPE).

- If warranted, initiate the evacuation of the injection facilities, and communicate with local emergency authorities to initiate evacuation plans of nearby residents (Figure 7-2 and Table 7-4).

- Perform the necessary actions to determine the cause of the event and identify and implement appropriate emergency response actions in consultation with the DMR-O&G Director. Table 7-6 provides details regarding the specific actions that will be taken to determine the cause and, if required, mitigation of each of the events listed in Table 7-5.

**Table 7-6. Actions Necessary to Determine Cause of Events and Appropriate Emergency Response Actions**

| | |
|---|---|
| Failure of $CO_2$ Flowline NDL-325 | • The $CO_2$ release and its location will be detected by the LDS and/or $CO_2$ wellhead monitors, which will trigger a Pipeline Control* alarm, alerting system operators to take necessary action.<br>• If warranted, initiate an evacuation plan in tandem with an appropriate workspace and/or ambient air-monitoring program, situated near the location of the failure, to monitor the presence of $CO_2$ and its natural dispersion following the shutdown of the flowline.<br>• Inspect the flowline failure to determine the root cause.<br>• Repair/replace the damaged flowline and, if warranted, put in place the measures necessary to eliminate such events in the future. |
| Integrity Failure of Injection or Monitoring Well | • Monitor well pressure, temperature, and annulus pressure to verify integrity loss and determine the cause and extent of failure.<br>• Identify and implement appropriate remedial actions to repair damage to downhole equipment or wellhead (in consultation with the DMR-O&G Director).<br>• If subsurface impacts are detected, implement appropriate site-investigation activities to determine the nature and extent of these impacts.<br>• If warranted based on the site investigations, implement appropriate remedial actions (in consultation with the DMR-O&G Director). |
| Monitoring Equipment Failure of Injection Well | • Monitor well pressure, temperature, and annulus pressure (manually, if necessary) to determine the cause and extent of failure.<br>• Identify and, if necessary, implement appropriate remedial actions (in consultation with the DMR-O&G Director). |

* Pipeline Control refers to the controller monitoring MCE, SCS1, SCS2, and SCS3 flowline operations (see Section 7.5.8).

Continued . . .

**Table 7-6. Actions Necessary to Determine Cause of Events and Appropriate Emergency Response Actions (continued)**

| | |
|---|---|
| Storage Reservoir Unable to Contain the Formation Fluid or Stored $CO_2$ | • Collect a confirmation sample(s) of groundwater from the Fox Hills monitoring well(s) and soil gas profile station(s), and analyze the samples for indicator parameters (Section 5.0).<br>• If the presence of indicator parameters is confirmed, develop (in consultation with the DMR-O&G Director) a case-specific work plan to:<br>1. Install additional monitoring points near the impacted area to delineate the extent of impact:<br>a. If a USDW is impacted above drinking water standards, arrange for an alternate potable water supply for all users of that USDW.<br>b. If a surface release of $CO_2$ to the atmosphere is confirmed and, if warranted, initiate an evacuation plan in tandem with an appropriate workspace and/or ambient air-monitoring program situated at the appropriate incident boundary to monitor the presence of $CO_2$ and its natural dispersion following the termination of $CO_2$ injection.<br>c. If surface release of $CO_2$ to surface waters is confirmed, implement the appropriate surface water-monitoring program to determine if water quality standards are exceeded.<br>2. Proceed with efforts, if necessary, to:<br>a. Remediate the USDW to achieve compliance with drinking water standards (e.g., install a system to intercept/extract brine or $CO_2$ or "pump and treat" the impacted drinking water to mitigate $CO_2$/brine impacts), and/or<br>b. Manage surface waters using natural attenuation (i.e., natural processes, such as biological degradation, active in the environment that can reduce contaminant concentrations), or<br>c. Activate treatment to achieve compliance with applicable water quality standards.<br>• Continue all remediation and monitoring at an appropriate frequency (as determined by company management designee and the DMR-O&G Director) until unacceptable adverse impacts have been fully addressed. |

Continued . . .

**Table 7-6. Actions Necessary to Determine Cause of Events and Appropriate Emergency Response Actions (continued)**

| | |
|---|---|
| Natural Disasters (seismicity) | • Identify when the event occurred and the epicenter and magnitude of the event.<br>• If the magnitude is greater than 2.7 (Section 5.0), then:<br>1. Determine whether there is a connection with injection activities.<br>2. Demonstrate all project wells have maintained mechanical integrity.<br>3. If a loss of $CO_2$ containment is determined, proceed as described above to evaluate and, if warranted, mitigate the loss of containment. |
| Natural Disasters | • Monitor well pressure, temperature, and annulus pressure to verify well status and determine the cause and extent of any failure.<br>• If warranted, perform additional monitoring of groundwater, surface water, and/or workspace/ambient air to delineate the extent of any impacts.<br>• If impacts or endangerment are detected, identify and implement appropriate response actions in accordance with the facility response plan (in consultation with the DMR-O&G Director). |

### *7.4.2 Incident-Specific Response Actions*

If notification is received of a high-risk incident, the following procedures will be followed:

**1. Accidental/Uncontrolled Release of $CO_2$ from the Injection Facility or Associated Flowline(s)**

- On-scene personnel shall confirm that Pipeline Control is aware of the incident. If appropriate, Pipeline Control will effectuate the shutdown of the pipeline and the closure of mainline valves to isolate the release and to minimize the amount of released $CO_2$.

- Consideration should be given to notifying and evacuating the public downwind of the release and closing roads. Coordinate with nearby fire departments and law enforcement to aid in any evacuation efforts.

- Pipeline Control will call the appropriate public safety answering point (PSAP) and nearby fire departments, law enforcement, and other appropriate agencies. Table 7-4 provides a listing of PSAPs. Personnel on-scene during an incident may call 911 directly.

- Pipeline Control dispatches the company response crew (CRC) to investigate the incident and notifies the QI.

- CRC arrives at the incident site and completes initial response actions. A designated CRC member will fill the initial incident commander (IC) position.

- The IC will conduct a risk assessment and coordinate with the QI to determine what National Incident Management System Incident Command System (ICS) positions need to be filled for the local response team (LRT).

- The QI or IC will establish liaison with the local emergency coordinating agencies, such as the 911 emergency call centers or county emergency managers in lieu of communicating individually with each fire, police, or other public entities.

- If the response exceeds local capabilities, the IC will coordinate with the QI to determine the need for mobilization of a company support team (CST).

**2. Fire or Explosion Occurring near or Directly Involving the Injection Facility or Associated Flowline(s).**

Note: $CO_2$ is not flammable, combustible, or explosive.

- Call for assistance from nearby fire departments and company personnel, as needed. Take all possible actions to keep fire from spreading.

- Shut down the pipeline for an explosion involving the injection facility.

- The IC will conduct a preliminary assessment of the situation upon arrival at the scene, evaluate the scene for potential hazards, and determine what product is involved.

- Assemble the LRT at the command post.

- Coordinate response efforts with on-scene fire department.

**3. Operational Failure Causing a Hazardous Condition.**

- On-scene personnel will confirm that Pipeline Control is aware of the incident which will, if appropriate, effectuate the shutdown of the pipeline, injection well(s), and closure of mainline valves to isolate the release and minimize a hazardous condition.

- Consideration should be given to evacuating the public downwind of the release and closing roads. Coordinate with nearby fire departments and law enforcement to aid in any evacuation efforts.

- Pipeline Control will call the appropriate PSAP and nearby fire departments, law enforcement, and other appropriate agencies (Figure 7-2 and Table 7-4). Personnel on-scene during an incident may call 911 directly.

- Pipeline Control dispatches LRT to investigate the incident and notifies the QI.
- CRC arrives at the incident site and completes initial response actions. A designated CRC member will fill the initial IC position.
- The IC will conduct a risk assessment and coordinate with the QI to determine what ICS positions need to be filled for the LRT.
- The QI or IC will establish liaison with the local emergency coordinating agencies, such as the 911 emergency call centers or county emergency managers in lieu of communicating individually with each fire, police, or other public entity.
- If the response exceeds local capabilities, the IC will coordinate with the QI to determine the need for mobilization of a CST.

## 7.5 Response Personnel/Equipment and Training

### *7.5.1 Response Personnel and Equipment*

Designated company personnel will undergo hazardous waste operations and emergency response training (HAZWOPER) in accordance with guidelines produced and maintained by the Occupational Safety and Health Administration (OSHA) (OSHA 29 Code of Federal Regulations [CFR] § 1910.120). In addition, assistance has been secured from local emergency services to implement this ERRP as shown in Figures 7-2 through 7-5.

Equipment (including appropriate PPE) needed in the event of an emergency and remedial response will vary, depending on the emergency event. Response actions (e.g., cessation of injection, well shut-in, and evacuation) will generally not require specialized equipment to implement. However, when specialized equipment is required (such as a drilling rig, logging equipment, or potable water hauling, etc.), one of the primary contacts listed in Table 7-3 is responsible for procurement of this equipment. One of the primary contacts listed in Table 7-3 is also responsible to maintain a list of contractors and equipment vendors (Section 7.6).

The company will provide personnel, training, equipment, instruments, tools, and material as needed to respond to an emergency incident.

- All local company personnel are available for callout as needed for duty on a 24-hour basis to support public safety agencies.
- Additional personnel, if required, will be acquired from agency responders from public safety agencies and/or response contractors.
- If public authorities are involved, they will be given full cooperation and assistance. In no event shall such cooperation and assistance violate safety rules or consist of actions that would endanger the public or employees.

- Company employees, contractors, and agency responders will be equipped with tools, supplies, and equipment available to be used in cases of emergency conditions existing on or near the injection facility and associated flowline(s). $CO_2/O_2$ monitoring devices should be used in the event of an accidental/uncontrolled release of $CO_2$. Self-contained breathing apparatus may be required pending results from on-site-specific hazards and monitoring results.

### *7.5.2 Staff Training and Exercise Procedures*

The company will integrate the training of the emergency response personnel of the geologic storage project into the standard operating procedures and facility operations training programs. Periodic training will be provided, at least annually, to protect all necessary facility- and project-personnel. The training efforts will be documented in accordance with the requirements of company plans which, at a minimum, will include a record of the trainee's name, date of training, type of training (e.g., initial or refresher), and instructor name. The company will also work with local emergency response personnel to perform coordinated training exercises associated with potential emergency events such as a significant release of $CO_2$ to the atmosphere.

### *7.5.3 Emergency Response Procedures*

This section describes organization features and duties of the company's QI, LRT, and CST. The company's initial response to an incident will be provided by the LRT, once activated by the QI. The IC will activate a CST if an incident exceeds the local capabilities. In some cases, the initial responders to an incident may include local law enforcement, ambulance, and/or local fire department(s). The company will work with these agencies to manage a coordinated response effort.

The ICS will be used to manage emergency response activities. Because ICS is a management tool that is readily adaptable to incidents of varying magnitude, it will be used for all emergency incidents. Staffing levels will be adjusted to meet specific response team needs based on incident size, severity, and type of emergency. Local agencies are also trained to use ICS and may fill roles during a coordinated response effort. ICS principles include the following:

- Common terminology
- Manageable span of control
- Management by objectives
- Incident action planning
- Comprehensive resource management
- Established incident facilities
- Integrated communications

As a component of an ICS, the unified command (UC) is a structure that brings together the company and agencies at the command level. The UC links the organizations responding to the incident and provides a forum for the responsible party and responding agencies to make consensus decisions. Under the UC, the various responding agencies and company personnel may blend together throughout the organization to create an integrated response team. The ICS process requires the UC to set clear objectives to guide the on-scene response resources. The primary entities of a UC may be two or more of the following:

- Federal on-scene coordinator
- State on-scene coordinator
- Local on-scene coordinator
- Company IC (responsible party IC)

### *7.5.4 Qualified Individual (QI)*

The QI is defined by the U.S. Department of Transportation, Pipeline and Hazardous Materials Safety Administration (PHMSA) as a company employee who has been given authority to fund response efforts without consulting company leadership for further authorization and knows how to commence the response procedures of this plan. The QI is responsible for activating the ICS response organization, including the LRT and CST.

The QI will be an English-speaking company employee who is available on a 24-hour basis with the full authority to activate and deploy the necessary emergency-response contractors. The QI or alternate QI will activate personnel and equipment, act as a liaison with the UC, and obligate any funds required to carry out all the required or direct emergency-response activities.

#### *7.5.4.1 Communicating to Appropriate Operator Personnel*

If notification of an event relating to a potential emergency requires immediate response, the emergency notification flowchart in Figure 7-6 provides guidance regarding notification of appropriate operator personnel, contractors, and emergency and public officials.

### *7.5.5 Local Response Team (LRT)*

The first company person on scene will function as the IC and person-in-charge until relieved by an authorized person who will then assume the position of IC. The number of positions/personnel required to staff the LRT will depend on the size and complexity of the incident. The duties of each position may be performed by the IC directly or delegated as the situation demands. The IC is always responsible for directing response activities and will assume the duties of all the primary positions until the duties can be delegated to other qualified personnel.

The LRT will fill the necessary positions and request additional support from the CST (defined below) to fill/back up any additional positions necessitated by the incident. Detailed job descriptions of the response team positions are provided within this plan.

### *7.5.6 Company Support Team (CST)*

The QI and IC may decide to mobilize a CST if there are any response operations outside the LRT's capabilities. The members of the LRT will typically become members of the CST.

The CST, once fully staffed, is designed to cover all aspects of a comprehensive and prolonged incident response. The number of positions/personnel required to staff the CST will depend on the size and complexity of the incident. During a prolonged response, additional personnel may be cascaded in to fill additional ICS positions or relieve responding personnel.

The CST is staffed by trained personnel from various company locations and by various contract resources as the situation requires.

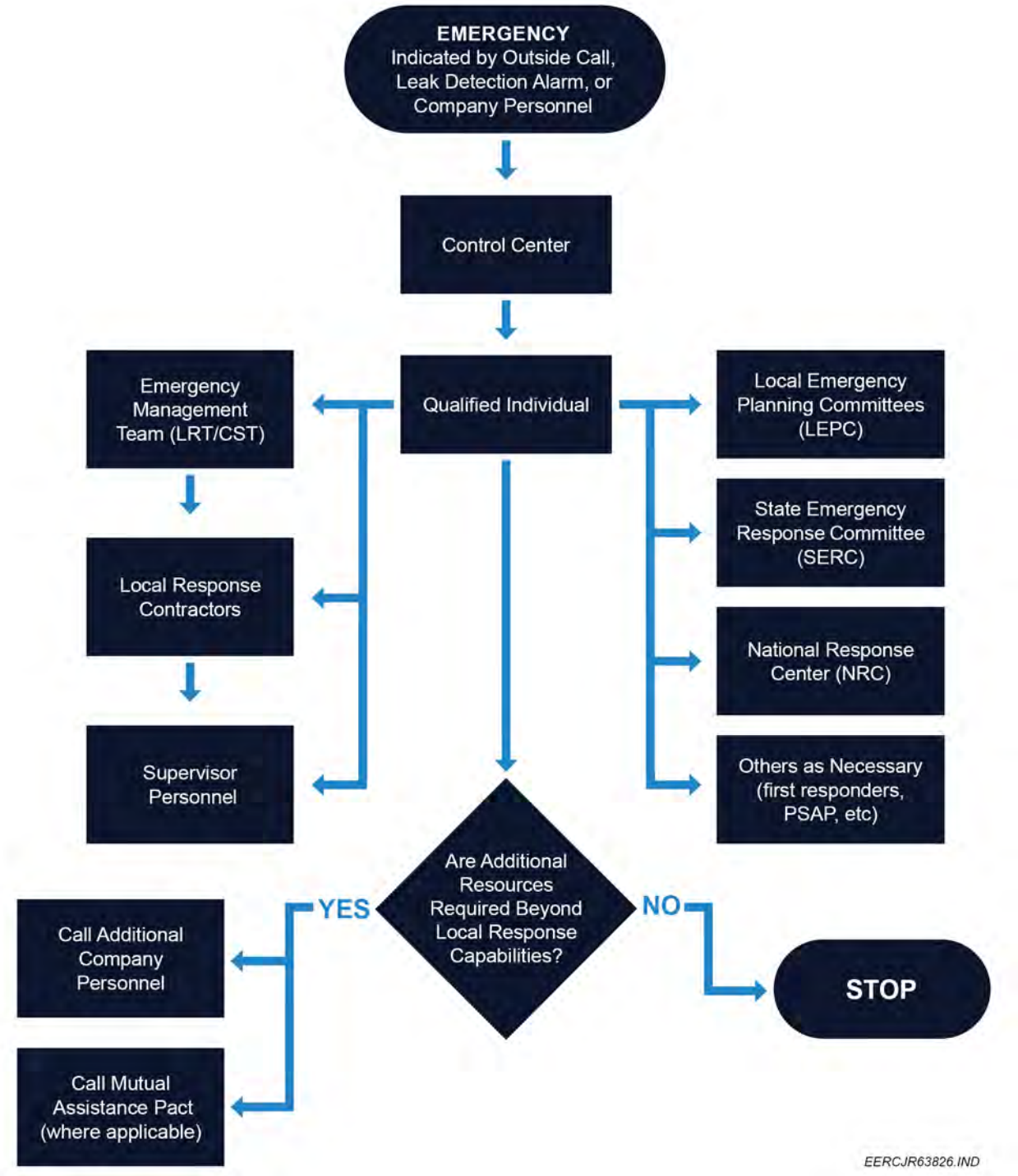



Figure 7-6. Emergency notification flowchart.

### *7.5.7 Preplanning Emergency Response Activities with Public Safety Answering Point, Fire, Police, and Other Public Officials*

To enhance cooperation during an incident response, the company will liaise with agency responders and public officials, including participating in emergency tabletop exercises, coordinating meetings to discuss hazards and emergency response, and conducting facility tours or open houses. These and other public outreach activities will be included in the Public Awareness Program that will be developed and implemented prior to commencing operation of the pipeline.

### *7.5.8 Required Controller Actions*

Pipeline Control actions during emergency response actions will be detailed in the control room management Plan that will be developed and implemented prior to commencing pipeline operations. Generally, the actions will include:

- Identifying abnormal operating conditions – including potential pipeline ruptures.
- Confirmation of abnormal conditions.
- Specific steps to take in response to certain abnormal conditions – including closing valves, notifications internal to the company, and notifications external to agency responders.
- Specific steps to take following pipeline shutdown to reestablish pipeline operations.

## 7.6 Emergency Communications Plan

In the event of an emergency, the facility response plan contains an ICS which specifies the organization of a facility response team, team member roles, and team member responsibilities. The company organizational structure is still in development. The company will provide updated specific identification and contact information for each member of the facility response team. In the event of an emergency, as outlined in N.D.A.C. § 43-05-01-13(2), DMR-O&G will be notified within 24 hours (Table 7-7).

**Table 7-7. DMR-O&G UIC Program Management Contact**

| Company | Service | Location | Phone |
|---|---|---|---|
| DMR-O&G | Class VI/CCUS | Bismarck, ND | 701.328.8020 |

The QI or QI designee is responsible for establishing and maintaining communications with appropriate off-site persons and/or agencies as provided in Figure 7-2 and Table 7-4. Table 7-8 lists available contractors and service providers.

Lastly, the facility response plan contact list also includes addresses and contact information for the neighboring facilities and occupied residences located within a 1-mile radius of the geologic storage project. Because indicated local and regional emergency agencies (Figure 7-2 and Table 7-4) are provided a copy of the facility response plan, the QI or QI designee may rely upon emergency agency assistance when it is necessary and appropriate to alert the applicable neighboring facilities and residents in order to allow the company to focus time and resources on response measures.

**Table 7-8. Potential Contractor and Services Providers**

| Company | Service | Location | Phone |
|---|---|---|---|
| 4th Dimension Surveying & Consulting | Land surveying and drone mapping | Williston, ND | 701.580.5267 |
| Baranko Brothers, Inc. | Excavation, dirt work/hauling | Dickinson, ND | 701.690.7279 |
| Barr Engineering | Engineering services | Bismarck, ND | 701.255.5460 |
| Basin Concrete, Inc | Trucking and rentals | Williston, ND | 701.774.3085 |
| Dakota Outlaw Services | Fencing | Glen Ullin, ND | 701.870.5303 |
| Dryland Enterprises LLC | Waste hauler | Belfield, ND | 701.559.3232 |
| Environmental Solutions | Cuttings disposal | Belfield, ND | 701.300.1156 |
| Farmers Union Oil (Cenex) | Propane, seed, soil fertility testing | Beulah, ND | 701.873.4363 |
| Flowserve | Injection pump manufacturer | Irving, TX | 972.443.6500 |
| Industrial Contractors Inc. | Mechanical | Bismarck, ND | 701.258.9908 |
| J&S Sanitation | Sanitation | Beulah, ND | 701.873.5577 |
| Lake View Services LLC | Crane services and dirt work/hauling | Beulah, ND | 701.873.2719 |
| Meadowland Services | Spraying | Zap, ND | 701.880.0996 |
| Minnesota Valley Testing Laboratories, Inc. | Formation fluids collection and analysis | Bismarck, ND | 701.204.5478 |
| Neuberger Oil | Fuel | Beulah, ND | 701.873.2188 |
| Pale Horse Services, Inc | Cuttings hauling and rentals | Dickinson, ND | 701.690.6408 |
| Roughrider Disposal LLC | Cuttings disposal | Fairfield, ND | 701.638.8053 |
| Roughrider Electric | Power provider | Hazen, ND | 701.748.2293 |
| Siemens | Variable-frequency drive and motor manufacturer | Alpharetta, GA | 800.333.7421 |
| Unruh Trucking | Fresh water hauling | Zap, ND | 701.891.2875 |
| Waste Management | Trash | Bismarck, ND | 701.214.9741 |
| Western Steel Builders | Metal building contractor | Hazen, ND | 701.748.6305 |
| Wild Well Control | Well control emergency responders | Greeley, CO | 281.784.4700 |
| YES LLC | Electrical | Dickinson, ND | 701.483.8330 |

### 7.7 ERRP Review and Updates

This ERRP shall be reviewed:

- At least annually following its approval by DMR-O&G.
- Within 1 year of an AOR reevaluation.
- Within a prescribed period (to be determined by DMR-O&G) following any significant changes to the project (e.g., injection process, the injection rate).
- As required by DMR-O&G.

If the review indicates that no amendments to the ERRP are necessary, the company will provide the documentation supporting the "no amendment necessary" determination to the DMR-O&G Director.

If the review indicates that amendments to the ERRP are necessary, SCS2 will make and submit amendments to the DMR-O&G as soon as reasonably practicable. In no event, however, shall it do so more than 1 year following the commencement of a review.

# SECTION 8.0

# WORKER SAFETY PLAN

## 8.0 WORKER SAFETY PLAN

Summit Carbon Storage #2, LLC (SCS2) requires all employees and contractors to follow the SCS2 Worker Safety Plan (WSP) for BK Fischer. SCS2 maintains and implements a safety program that meets all state and federal requirements for worker safety protections, including the Occupational Safety and Health Administration (OSHA) and the National Fire Protection Association (NFPA). The safety program is described in this WSP. SCS2 will periodically review the WSP, and if substantive changes are warranted, the revised WSP will be provided to the Department of Mineral Resources, Oil and Gas Division (DMR-O&G). Controlled copies of the WSP are available at SCS2's nearest operational office and at the geologic storage facility (North Dakota Administrative Code [N.D.A.C.] § 43-05-01-13).

The WSP outlines steps to protect the health and safety of employees, contractors, and visitors while working near and around $CO_2$. Specific topics included in the WSP are, but are not limited to, the following:

- A list of safety training programs, including annual $CO_2$ safety training, annual safe-working procedures training, and annual Emergency and Remedial Response Plan (ERRP) training, as well as the review frequency for the safety training programs and, if necessary, updates. A record of training completions, including the trainee's name, date and type of training, and the signatures (or other acceptable acknowledgment/ documentation) of the trainee and trainer are maintained and available upon request.

- A site-specific list of potential hazards of working near and around $CO_2$.

- Processes for determining causes of incidents and implementing appropriate emergency response actions.

- Requirements for employees to perform duties in ways that prevent the discharge of $CO_2$.

- Personal protective equipment (PPE) policies for employees while performing their duties, including guidelines for selecting, using, and maintaining PPE.

- New-hire, contractor, and visitor protocols to ensure all on-site individuals are appropriately trained and are aware of the potential hazards of $CO_2$.

- Drug, alcohol, and controlled substances policy complying with all governmental laws and regulations in the workplace and consequences for those who violate the policy.

- Reporting guidelines for all injuries; equipment or property damages; leaks, spills, or releases; or other health, safety, and environmental (HSE)-related incidents.

Only SCS2 employees and contractor personnel who have been properly trained can participate in the on-site activities of drilling, construction, operations, and equipment repair.

# SECTION 9.0

# WELL CASING AND CEMENTING PROGRAM

## 9.0 WELL CASING AND CEMENTING PROGRAM

Summit Carbon Storage #2, LLC (SCS2) plans to construct two $CO_2$ injection wells, BK Fischer 1 (API No. 33-057-00048, North Dakota Industrial Commission [NDIC] File No. 40124) and BK Fischer 2 (API No. 33-057-00049, NDIC File No. 40125) and convert the Archie Erickson 2 stratigraphic test well (API No. 33-057-00042, NDIC File No. 38622) into a reservoir-monitoring well. The following information represents the current proposed state for BK Fischer 1 (Figures 9-1 and 9-2, Tables 9-1 through 9-4) and BK Fischer 2 (Figures 9-3 and 9-4, Tables 9-5 through 9-8); the current, as-completed state for Archie Erickson 2 (Figure 9-5, Tables 9-9 through 9-12); and a radial cement bond log (RCBL) evaluation summary for Archie Erickson 2 (Figure 9-6).

### 9.1 BK Fischer 1: Proposed Injection Well Casing and Cementing Programs

The proposed state of BK Fischer 1 is provided in Figure 9-1. BK Fischer 1 is a deviated well. The well surface location, well trajectory, and bottomhole target location are provided in Figure 9-2. This fieldwork information may change based on field conditions and operational challenges. The information below is the best knowledge available at the time of drafting this permit application.

Table 9-1 provides well information for BK Fischer 1. Tables 9-2 through 9-4 provide the casing and cementing programs for BK Fischer 1 and have been updated according to the proposed drilling estimate for 2025. The tables demonstrate compliance with North Dakota Administrative Code (N.D.A.C.) § 43-05-01. In addition, the materials used for construction satisfy the requirements of N.D.A.C. § 43-05-01-11 for a $CO_2$ injection well.

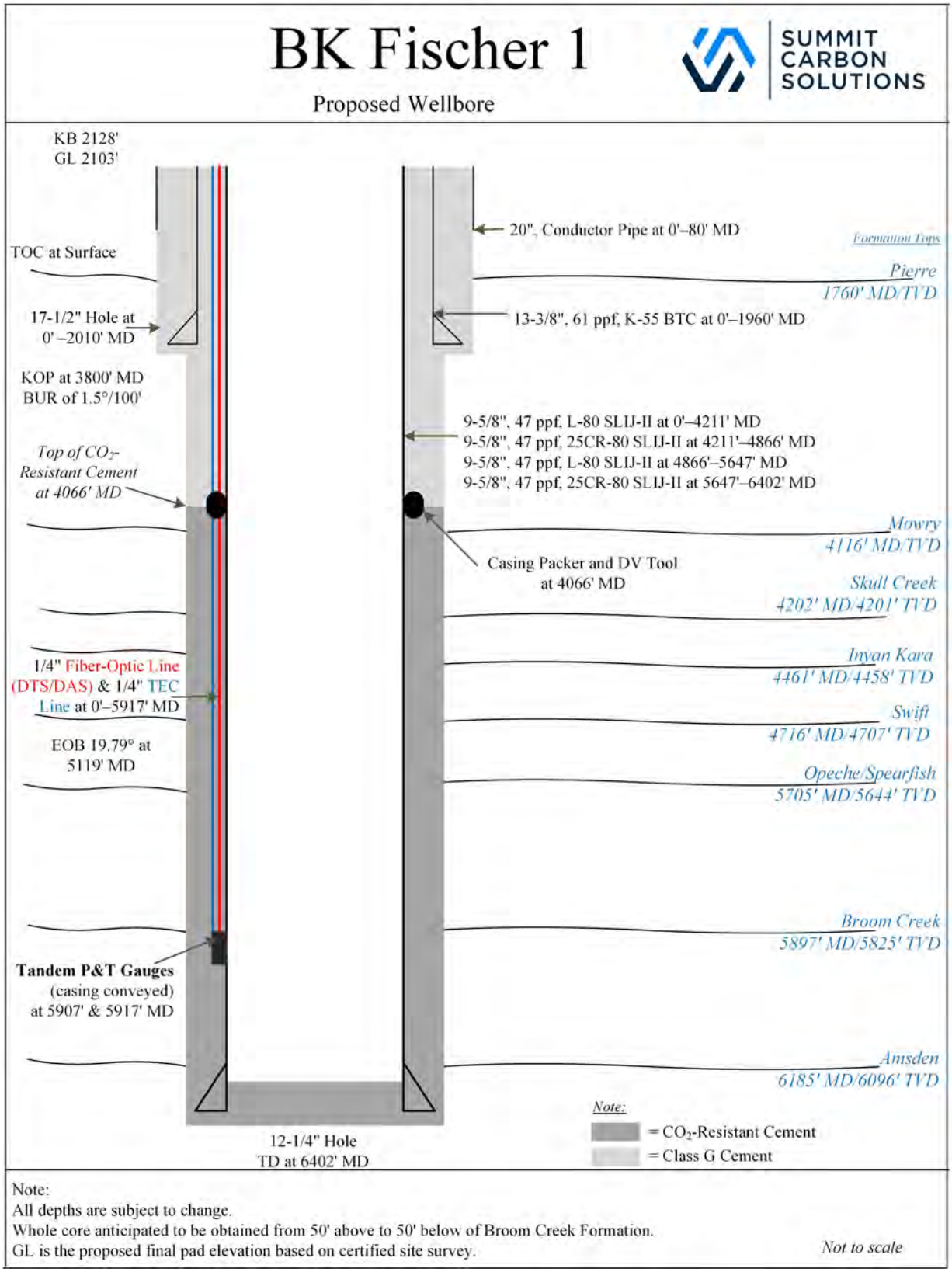



Figure 9-1. BK Fischer 1 proposed wellbore schematic.

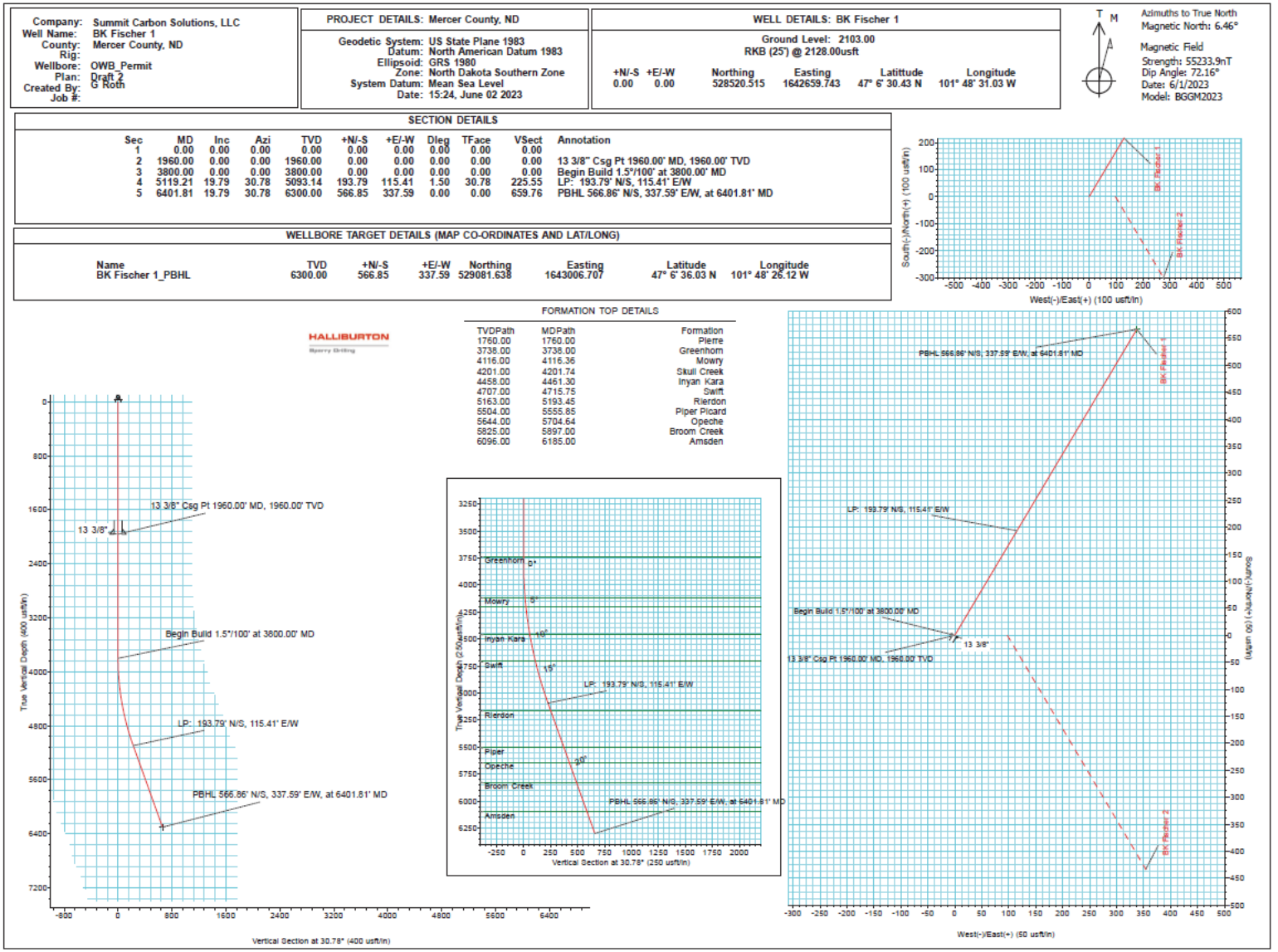



Figure 9-2. BK Fischer 1 proposed wellbore trajectory.

**Table 9-1. BK Fischer 1: Proposed Well Information**

| | | | | | |
|---|---|---|---|---|---|
| **Well Name:** | **BK Fischer 1** | **NDIC File No.:** | 40124 | **API No.:** | 33-057-00048 |
| **County:** | Mercer | **State:** | ND | **Operator:** | SUMMIT CARBON STORAGE #2, LLC |
| **Location:** | Sec. 22, T142N, R88W | **Footages*:** | 1035 ft FNL, 458 ft FEL | **Total Depth:** | 6402 ft, MD |

* From the north line (FNL), from the east line (FEL).

**Table 9-2. BK Fischer 1: Proposed Casing Program**

| Section | Hole Size, in. | Casing OD,* in. | Weight, lb/ft | Grade | Connection** | Top Depth,*** ft | Bottom Depth,*** ft | Objective |
|---|---|---|---|---|---|---|---|---|
| Surface | 17.5 | 13.375 | 61 | K-55 | BTC | 0 | 1960 | Protects underground source of drinking water (USDW) Fox Hills Formation |
| Long-String | 12.25 | 9.625 | 47 | L-80 | SLIJ-II | 0 | 4211 | Long-string casing |
| | 12.25 | 9.625 | 47 | 25Cr-80 | SLIJ-II | 4211 | 4866 | $CO_2$-resistant across Inyan Kara Formation |
| | 12.25 | 9.625 | 47 | L-80 | SLIJ-II | 4866 | 5647 | Long-string casing |
| | 12.25 | 9.625 | 47 | 25Cr-80 | SLIJ-II | 5647 | 6402 | $CO_2$-resistant across Broom Creek Formation |

* Outside diameter.
** BTC: buttress, SLIJ-II: VAM SLIJ-II: gastight premium connection.
*** Depths are in measured depth (MD) based on proposed wellbore trajectory and formation top prognosis.

**Table 9-3. BK Fischer 1: Proposed Casing Properties**

| Section | OD, in. | Grade | Weight, lb/ft | Connection | ID,* in. | Drift ID,* in. | Collapse, psi | Burst, psi | Yield Strength, klb | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Body | Connection |
| Surface | 13.375 | K-55 | 61 | BTC | 12.515 | 12.359 | 1537 | 3088 | 963 | 1170 |
| Long-String | 9.625 | L-80 | 47 | SLIJ-II | 8.681 | 8.525 | 4756 | 6858 | 1087 | 780 |
| | 9.625 | 25Cr-80 | 47 | SLIJ-II | 8.681 | 8.525 | 4756 | 6858 | 1087 | 780 |

* Inside diameter.

**Table 9-4. BK Fischer 1: Proposed Cement Program**

| Section | Casing OD, in. | Cement Class/Type | Lead/Tail/ Single | Stage | Slurry Weight, ppg | Slurry Yield, $ft^3$/sack | Interval,* ft | Excess % | Volume, sacks |
|---|---|---|---|---|---|---|---|---|---|
| Surface | 13.375 | Class G | Single | NA | 12.5 | 2.220 | 0–1960 | 100 | 1270 |
| Long-String | 9.625 | Class G | Single | Stage 2 | 12.2 | 2.214 | 0–4066 | 100 | 920 |
| | **Stage 2 Through DV** Tool at 4066 ft, MD** | | | | | | | | |
| | 9.625 | $CO_2$-resistant | Single | Stage 1 | 13 | 1.541 | 4066–6402 | 100 | 965 |

* The cement top will be confirmed once the RCBL is performed. Depths are in MD based on proposed wellbore trajectory and formation top prognosis.
** Differential valve.

## 9.2 BK Fischer 2: Proposed Injection Well Casing and Cementing Programs

The proposed state of BK Fischer 2 is provided in Figure 9-3. BK Fischer 2 is a deviated well. The well surface location, well trajectory, and bottomhole target location are provided in Figure 9-4. This fieldwork information may change based on field conditions and operational challenges. The information below is the best knowledge available at the time of drafting this permit application.

Table 9-5 provides well information for BK Fischer 2. Tables 9-6 through 9-8 provide the casing and cementing programs for BK Fischer 2 and have been updated according to the proposed drilling estimate for 2025. The tables demonstrate compliance with N.D.A.C. § 43-05-01. In addition, the materials used for construction satisfy the requirements of N.D.A.C. § 43-05-01-11 for a $CO_2$ injection well.

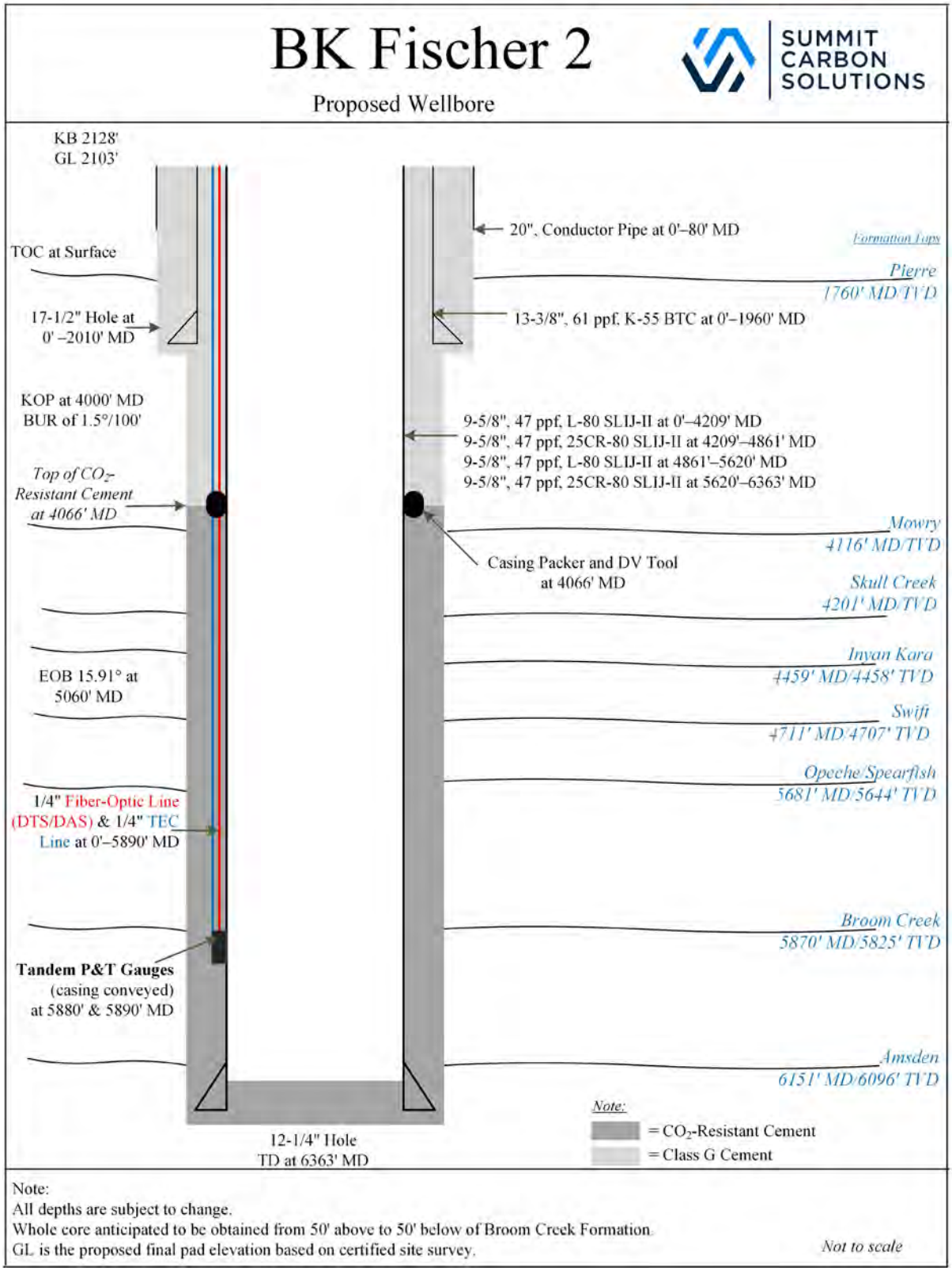



Figure 9-3. BK Fischer 2 proposed wellbore schematic.

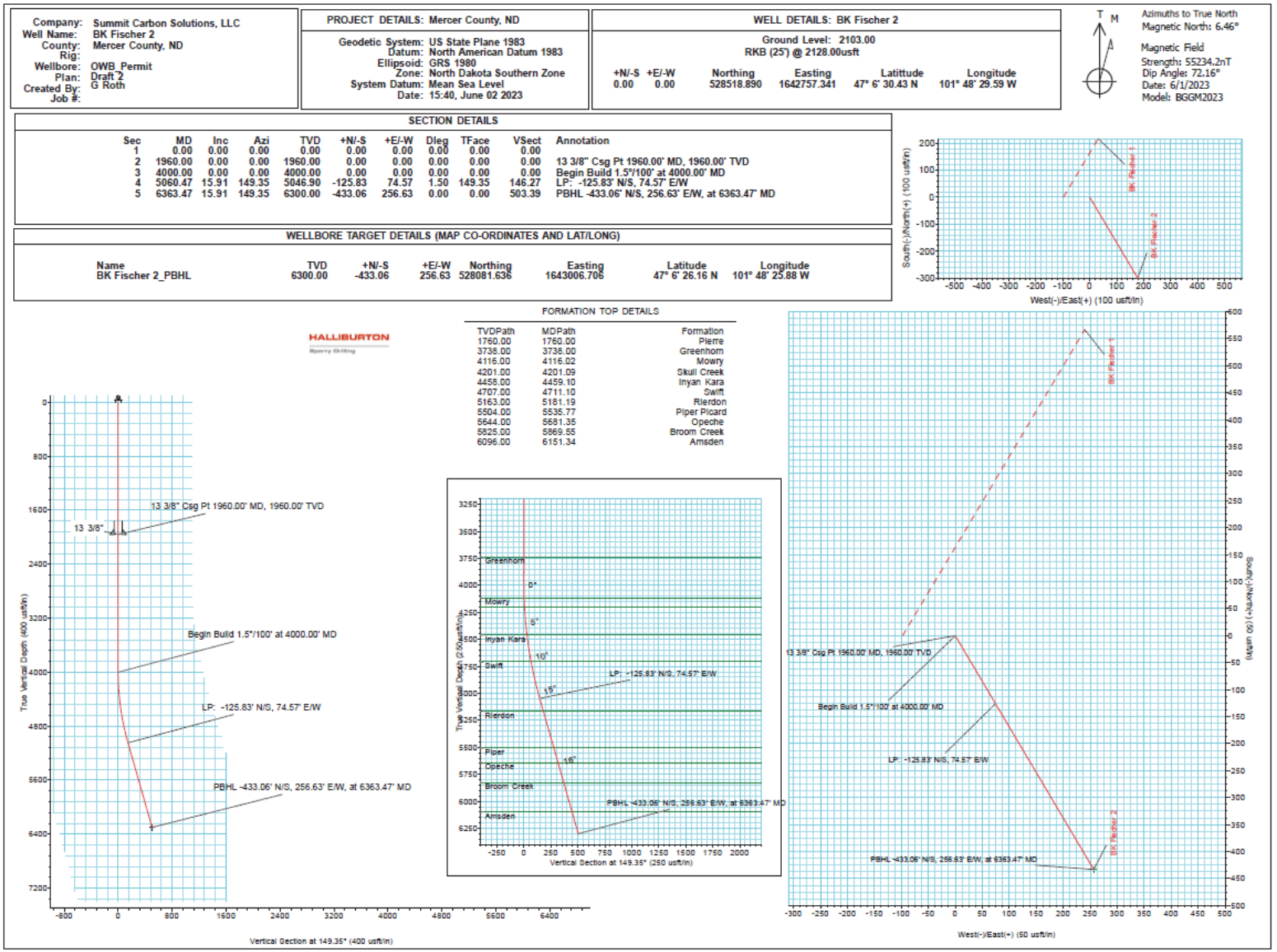



Figure 9-4. BK Fischer 2 proposed wellbore trajectory.

**Table 9-5. BK Fischer 2: Proposed Well Information**

| | | | | | |
|---|---|---|---|---|---|
| **Well Name:** | BK Fischer 2 | **NDIC File No.:** | 40125 | **API No.:** | 33-057-00049 |
| **County:** | Mercer | **State:** | ND | **Operator:** | SUMMIT CARBON STORAGE #2, LLC |
| **Location:** | Sec. 22, T142N, R88W | **Footages:** | 1035 ft FNL, 358 ft FEL | **Total Depth:** | 6363 ft, MD |

**Table 9-6. BK Fischer 2: Proposed Casing Program**

| Section | Hole Size, in. | Casing OD, in. | Weight, lb/ft | Grade | Connection | Top Depth,* ft | Bottom Depth,* ft | Objective |
|---|---|---|---|---|---|---|---|---|
| Surface | 17.5 | 13.375 | 61 | K-55 | BTC | 0 | 1960 | Protects USDW Fox Hills Formation |
| Long-String | 12.25 | 9.625 | 47 | L-80 | SLIJ-II | 0 | 4209 | Long-string casing |
| | 12.25 | 9.625 | 47 | 25Cr-80 | SLIJ-II | 4209 | 4861 | $CO_2$-resistant across Inyan Kara Formation |
| | 12.25 | 9.625 | 47 | L-80 | SLIJ-II | 4861 | 5620 | Long-string casing |
| | 12.25 | 9.625 | 47 | 25Cr-80 | SLIJ-II | 5620 | 6363 | $CO_2$-resistant across Broom Creek Formation |

* Depths are in MD based on proposed wellbore trajectory and formation top prognosis.

**Table 9-7. BK Fischer 2: Proposed Casing Properties**

| Section | OD, in. | Grade | Weight, lb/ft | Connection | ID, in. | Drift ID, in. | Collapse, psi | Burst, psi | Yield Strength, klb | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Body | Connection |
| Surface | 13.375 | K-55 | 61 | BTC | 12.515 | 12.359 | 1537 | 3088 | 963 | 1170 |
| Long-String | 9.625 | L-80 | 47 | SLIJ-II | 8.681 | 8.525 | 4756 | 6858 | 1087 | 780 |
| | 9.625 | 25Cr-80 | 47 | SLIJ-II | 8.681 | 8.525 | 4756 | 6858 | 1087 | 780 |

**Table 9-8. BK Fischer 2: Proposed Cement Program**

| Section | Casing OD, in. | Cement Class/Type | Lead/Tail/Single | Stage | Slurry Weight, ppg | Slurry Yield, $ft^3$/sack | Interval,* ft | Excess % | Volume, sacks |
|---|---|---|---|---|---|---|---|---|---|
| Surface | 13.375 | Class G | Single | NA | 12.5 | 2.220 | 0–1960 | 100 | 1270 |
| Long-String | 9.625 | Class G | Single | Stage 2 | 12.2 | 2.214 | 0–4066 | 100 | 920 |
| | **Stage 2 Through DV Tool at 4066 ft, MD** | | | | | | | | |
| | 9.625 | $CO_2$-resistant | Single | Stage 1 | 13 | 1.541 | 4066–6363 | 100 | 950 |

* The cement top will be confirmed once the RCBL is performed. Depths are in MD based on proposed wellbore trajectory and formation top prognosis.

## 9.3 Archie Erickson 2: As-Completed $CO_2$ Monitoring Well Casing and Cementing Programs

The Archie Erickson 2 well was permitted and drilled as a stratigraphic test well in November 2021 by the original operator, Summit Carbon Solutions, LLC (SCS). The Archie Erickson 2 well was constructed and operated in compliance with N.D.A.C. § 43-05-01 requirements, bonded in accordance with N.D.A.C. § 43-02-03-15, and temporarily abandoned, drilled to total depth (TATD) in accordance with N.D.A.C. § 43-02-03-55. As of December 2023, SCS has transferred ownership and operation of the Archie Erickson 2 (API No. 33-057-00042, NDIC File No. 38622) to SCS2 in accordance with N.D.A.C. § 43-02-03-15. Future plans for the Archie Erickson 2 include utilizing the well as a reservoir-monitoring well. The as-completed state of Archie Erickson 2 is shown in Figure 9-5. The isolation scanner log, generally called an ultrasonic imaging tool (USIT), was deployed to determine the cement bond quality radially and provide a casing inspection log. The isolation scanner log result is provided in Figure 9-6.

Table 9-9 provides well information for Archie Erickson 2. Tables 9-10 through 9-12 provide the casing and cementing programs for Archie Erickson 2 and have been updated according to the drilling performed in November 2021.

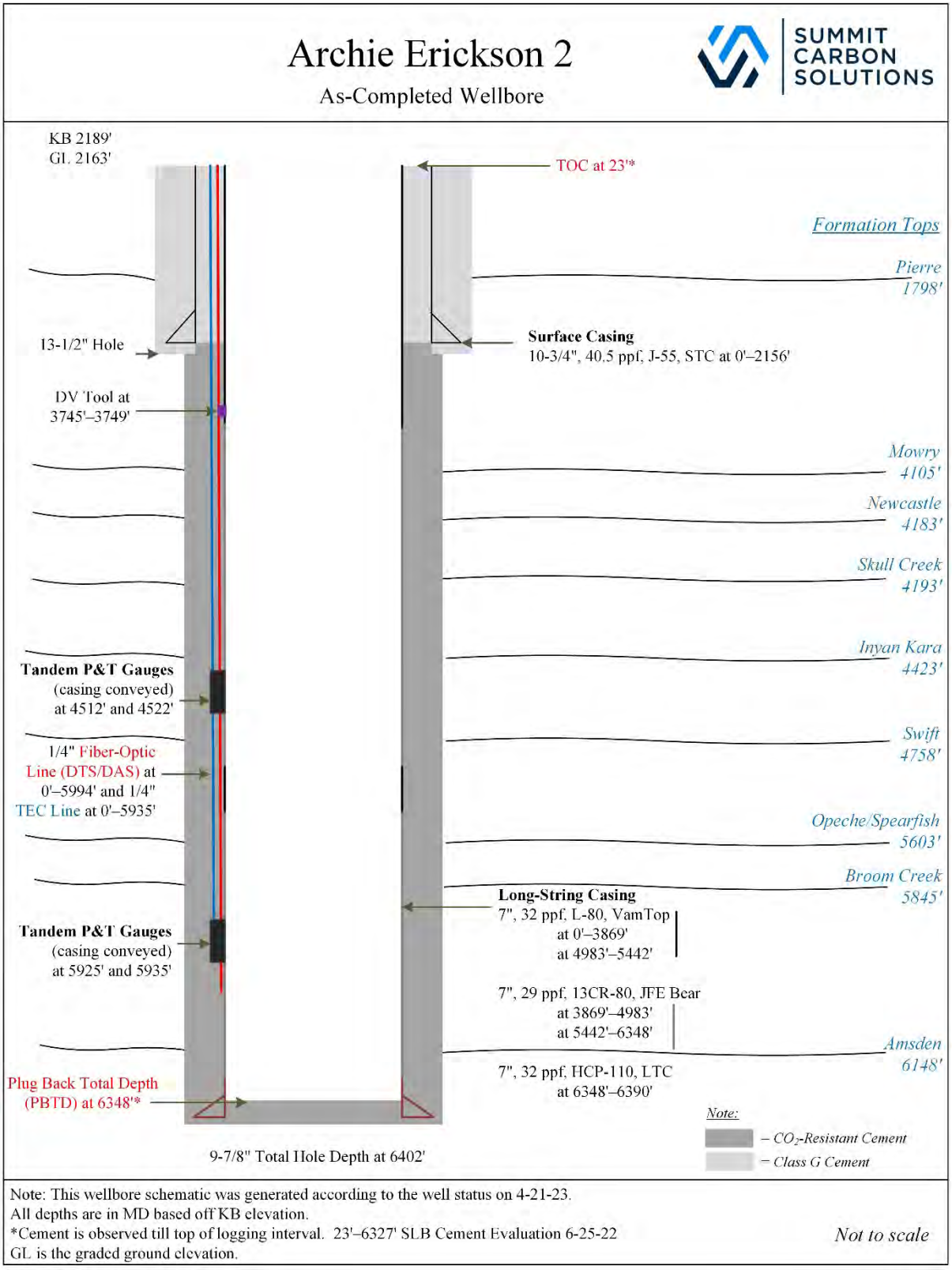



Figure 9-5. Archie Erickson 2 as-completed wellbore schematic.

**Table 9-9. Archie Erickson 2: As-Completed Well Information**

| | | | | | |
|---|---|---|---|---|---|
| **Well Name:** | Archie Erickson 2 | **NDIC File No.:** | 38622 | **API No.:** | 33-057-00042 |
| **County:** | Mercer | **State:** | ND | **Original Operator:**<br>**Current Operator:** | SUMMIT CARBON SOLUTIONS, LLC<br>SUMMIT CARBON STORAGE #2, LLC |
| **Location:** | Sec. 12, T142N, R88W | **Footages*:** | 902 ft FSL,<br>794 ft FWL | **Total Depth:** | 6402 ft, MD |

* From the south line (FSL), from the west line (FWL).

**Table 9-10. Archie Erickson 2: As-Completed Casing Program**

| Section | Hole Size, in. | Casing OD, in. | Weight, lb/ft | Grade | Connection* | Top Depth,** ft | Bottom Depth,** ft | Objective |
|---|---|---|---|---|---|---|---|---|
| Surface | 13.50 | 10.75 | 40.5 | J-55 | STC | 0 | 2156 | Protects USDW Fox Hills Formation |
| Long-String | 9.875 | 7.00 | 32 | L-80 | VAM TOP | 0 | 3869 | Long-string casing |
| | 9.875 | 7.00 | 29 | 13Cr-80 | JFE BEAR | 3869 | 4983 | $CO_2$-resistant across Inyan Kara Formation |
| | 9.875 | 7.00 | 32 | L-80 | VAM TOP | 4983 | 5442 | Long-string casing |
| | 9.875 | 7.00 | 29 | 13Cr-80 | JFE BEAR | 5442 | 6348 | $CO_2$-resistant across Broom Creek Formation |
| | 9.875 | 7.00 | 32 | HCP-110 | LTC | 6348 | 6390 | Long-string casing |

* STC: short-thread and coupled, LTC: long-thread and coupled, VAM TOP and JFE BEAR: gastight premium connection.
** Depths are in MD.

**Table 9-11. Archie Erickson 2: As-Completed Casing Properties**

| Section | OD., in. | Grade | Weight, lb/ft | Connection | ID., in. | Drift ID, in. | Collapse, psi | Burst, psi | Yield Strength, klb | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | Body | Connection |
| Surface | 10.75 | J-55 | 40.5 | STC | 10.050 | 9.894 | 1580 | 3130 | 629 | 420 |
| Long-String | 7.00 | L-80 | 32 | VAM TOP | 6.094 | 5.969 | 8610 | 9060 | 745 | 745 |
| | 7.00 | 13Cr-80 | 29 | JFE BEAR | 6.184 | 6.059 | 7030 | 8160 | 676 | 676 |
| | 7.00 | HCP-110 | 32 | LTC | 6.094 | 5.969 | 10,760 | 12,460 | 1025 | 897 |

**Table 9-12. Archie Erickson 2: As-Completed Cement Program**

| Section | Casing OD, in. | Type | Lead/Tail/ Single | Stage | Slurry Weight, ppg | Interval,* ft, MD | Volume, sacks |
|---|---|---|---|---|---|---|---|
| Surface | 10.75 | VariCem GS1 | Lead | NA | 11.5 | 0–2156 | 480 |
| | 10.75 | VariCem GS1 | Tail | NA | 13.0 | | 205 |
| Long-String | 7.00 | EconoCem GWS 1 | Lead | Stage 2 | 12.2 | 0–3745 | 280 |
| | 7.00 | CorrosaCem | Tail | Stage 2 | 12.2 | | 480 |
| | **Stage 2 Through DV Tool at 3745–3749 ft, MD** | | | | | | |
| | 7.00 | CorrosaCem | Single | Stage 1 | 13.0 | 3745–6390 | 855 |

* The cement intervals are based on designed volumes in the cementing postjob report. According to Halliburton, it is not possible to distinguish where CorrosaCem ends and EconoCem GWS 1 begins, but the isolation scanner illustrates isolation in the $CO_2$ injection zone (Figure 9-6), confining zones, and USDWs.

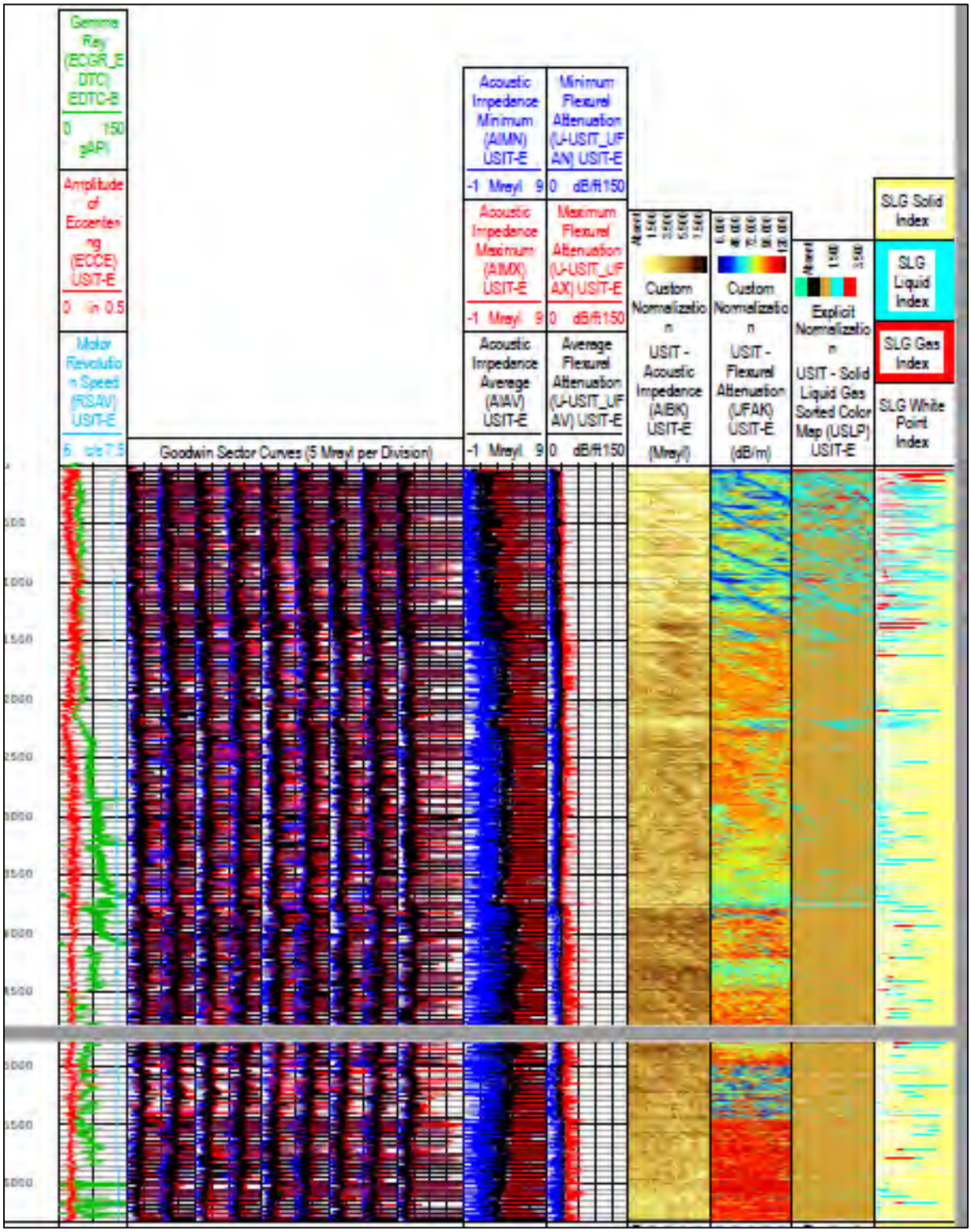



Figure 9-6. Archie Erickson 2 cement evaluation—RCBL from Archie Erickson 2 verifies the cement-bond quality. Using a high-resolution image, the analyst can assess isolation in the $CO_2$ injection zone, confining zones, and USDWs.

# SECTION 10.0

# PLUGGING PLAN

## 10.0 PLUGGING PLAN

The proposed plug and abandonment (P&A) procedures for the BK Fischer 1 and BK Fischer 2 wells are intended to be interpreted as proposed conditions and do not reflect the current as-proposed state for the wells. The proposed plugging procedure for the Archie Erickson 2 does not reflect the current as-completed state but the anticipated completion state at the time of abandonment during site closure. Plugging operations will likely occur at different times in the life cycle of the injector wells, BK Fischer 1 and BK Fischer 2, and the reservoir-monitoring well, Archie Erickson 2. The injection wells, BK Fischer 1 and BK Fischer 2, are planned for P&A once the $CO_2$ injection operation ceases. The reservoir-monitoring well, Archie Erickson 2, is planned for P&A after verification and North Dakota Industrial Commission (NDIC) Department of Mineral Resources, Oil and Gas Division (DMR-O&G) approval that the $CO_2$ plume has stabilized.

A proposed P&A procedure will be provided to DMR-O&G. Final procedures and requirements will be determined and approved at the time of abandonment. A $CO_2$-resistant cement plug will be placed across the $CO_2$ storage reservoir in addition to cement across other zones, as deemed necessary for isolation of oil-bearing zones, nitrogen zones, etc. After approval, ample notification will be given to allow a DMR-O&G representative to be present during the plugging operations. The P&A events will be documented by a workover supervisor during P&A execution. The records of the P&A events shall demonstrate the utilization of $CO_2$-compatible materials and complete isolation of the injection zone as per North Dakota underground injection control (UIC) Class VI requirements.

### 10.1 BK Fischer 1: Proposed Injection Well P&A Program

The BK Fischer 1 $CO_2$ injection well proposed completion schematic is provided in Figure 10-1. The proposed schematic is based on current information. The proposed P&A program may change based on the best knowledge available at the time of execution. The proposed P&A program may also change based on well response during the actual P&A procedures.

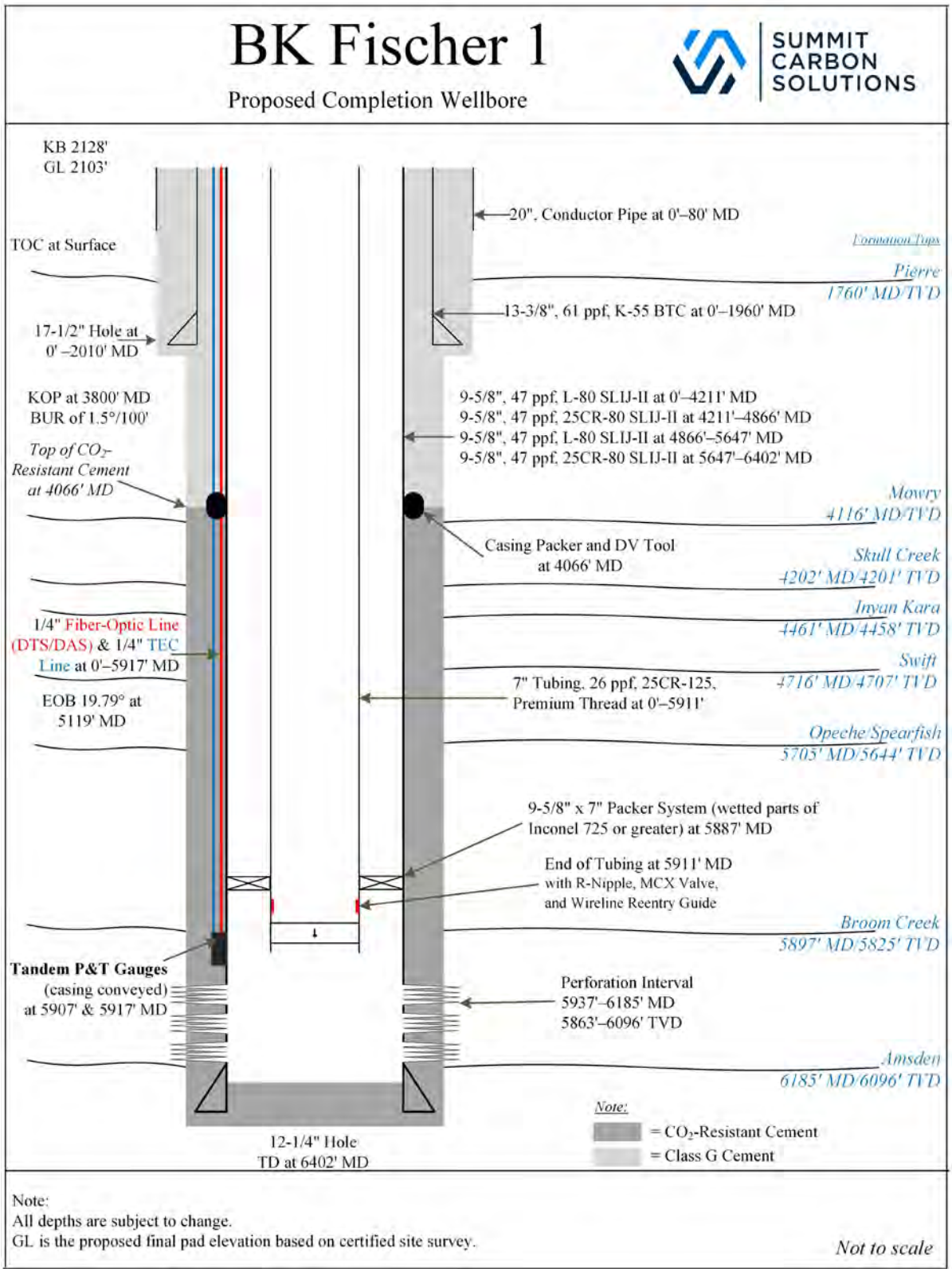



Figure 10-1. BK Fischer 1 proposed completion wellbore schematic.

DMR-O&G will be contacted, and an intent to P&A for BK Fischer 1 will be filed in NorthSTAR for approval. Final adjustments to the proposed P&A procedure will be made based on current wellbore conditions and DMR-O&G field inspector recommendations. Currently, the proposed P&A procedure for the well is as follows.

Proposed P&A Procedure:

1. The procedures described below are subject to modification during execution as necessary to ensure a successful plugging operation. Any significant modifications, as per DMR-O&G approval, due to unforeseen circumstances will be described in the plugging report.

2. After injection operations have been terminated, the well will be flushed with kill fluid, which should be calculated from downhole gauges for proper fluid weight. A sufficient volume will be pumped to kill the well while remaining below the fracture pressure and ensuring control of the well.

3. Contact DMR-O&G supervisor and/or DMR-O&G field inspector 24 hours (hr) prior to moving onto location.

4. Dig out surface casing valve, and bleed off. Confirm most recent date of pull test. Pull test deadman anchors, if required. May require installing new deadman anchors depending on results.

5. Move-in and rig up (MIRU) workover rig and surface equipment onto the BK Fischer 1 well. All $CO_2$ flowlines and valves will be marked and noted by the rig supervisor prior to MIRU.

6. Conduct and document a safety meeting. Check pressure at wellhead, and ensure pressure is off prior to starting work. Additional kill fluid may be needed.

7. Nipple up (NU) lubricator, and install backpressure valve (BPV) in tubing hanger. Nipple down (ND) Christmas tree, NU blowout preventer (BOP). Recover BPV, and install test plug. Test BOP for functionality. Pressure-test BOP to 80% of working pressure. Document BOP test.

8. Recover test plug. Connect a 7-in. work joint to the tubing hanger, and POOH (pull out of hole) until tubing hanger is unseated.

9. Release tubing from packer following the packer manufacturer instructions. Trip out of hole (TOOH) with 7-in. corrosion-resistant alloy (CRA) tubing string, and lay down.

   Contingency: If unable to release tubing from packer, rig up (RU) electric line, and make a cut on the tubing string just above the packer. Pull the tubing string out of hole, and proceed to the next step. If problems are noted, update the cement remediation plan.

10. Pick up (PU) 2⅞-in. work string, and stand in derrick. PU bit and scraper, and trip in hole (TIH) to top of packer. Perform reverse circulation, pump down casing annulus and up the work string to clean hole. TOOH with work string, bit, and scraper.

11. PU cast iron cement retainer (CICR) and stinger, and TIH to depth. Set CICR 20 ft above packer.

12. Spot cement equipment and RU, preparing to squeeze across Broom Creek Formation perforations and balance plugs.

13. Conduct and document a safety meeting prior to pumping cement. Ensure all materials are on location and accounted for. Confirm volumes, tests, procedures, operating equipment, and setting times with cement provider. Ensure **$CO_2$-resistant cement** is used for Broom Creek and Inyan Kara intervals. All other cement plugs should be of Class G grade or equivalent.

14. Pressure-test lines prior to pumping. Sting in, and establish injection rate. Proceed with squeezing Broom Creek Formation perforations per cementer's planned procedures with 260 sacks (sx) of 15.2 pounds per gallon (ppg), 0.92 $ft^3$/sx **$CO_2$-resistant cement** and under displace 5 barrels of cement. Sting out of retainer, and finish displacing the last 5 barrels on top of the cement retainer. Check for flow. Pull work string above the plug.

15. Pressure-test casing to 1000 psi for 30 minutes or as approved by DMR-O&G. Record mechanical integrity test on casing. Circulate wellbore clean. TOOH with stinger and work string standing in derrick, and rig down (RD) stinger.

    Contingency: If pressure test failed, a cast iron bridge plug (CIBP) will be set below each subsequent plug until casing test passes.

16. If needed, RU logging unit. Confirm external mechanical integrity by running one of the tests listed below as options, and RD logging truck:

    - Activated neutron log
    - Noise log
    - Production logging tool (PLT)
    - Tracers
    - Temperature log
    - DTS (distributed-temperature sensing) survey (no required logging unit)

    Note: If external failure in long-string casing is identified, the operator will adjust the P&A plan with DMR-O&G's approval.

17. If pressure test failed, set a CIBP prior to pumping balanced plug. TIH with work string and diffuser to depth of Plug 2. Pump 270 sx of 15.2 ppg, 0.92 $ft^3$/sx **$CO_2$-resistant cement** balanced plug as designed from cementer's proposed procedures across Inyan Kara interval.

18. Pull up work string above the top of the plug, and test casing. Circulate wellbore clean.

19. Set a CIBP prior to pumping Plug 3 if previous test failed. TOOH to depth of Plug 3. Pump 95 sx of 15.8 ppg, 1.15 $ft^3$/sx Class G cement at 2060 ft. Pull up work string above the top of the plug, and circulate wellbore clean.

20. TOOH laying down work string to 90 ft. Pump 40 sx of 15.8 ppg, 1.15 $ft^3$/sx Class G cement plug at 90 ft. Lay down all work string.

    Contingency: Perform top job as necessary to ensure good cement on both sides.

21. RD all equipment, and move out.

22. Dig out wellhead, and cut off casing 5 ft below ground level (GL). Weld ½-in. steel cap on casing with well name, date inscribed, and information that it was used for $CO_2$ injection.

23. Dig out deadman anchors. Report photos of steel cap to DMR-O&G.

24. Within 60 days, submit Form 7 plugging report after plugging operations are complete (N.D.A.C. § 43-05-01-11.5[4]).

25. Submit notice of intent to reclaim to DMR-O&G 30 days in advance prior to reclamation (N.D.A.C. § 43-05-01-18[10][d]).

The proposed P&A plan for BK Fischer 1 is summarized in Table 10-1 and provided in Figure 10-2. These values are estimated; final volume and thickness of plugs will be determined by design at time of plugging.

**Table 10-1. Summary of P&A Plan for BK Fischer 1**

| Cement Plug Number | Cement Type | Weight, ppg | Yield, $ft^3/sx$ | Interval, ft, MD | Thickness, ft | Volume, sacks | Notes |
|---|---|---|---|---|---|---|---|
| Plug 4 | Class G | 15.8 | 1.15 | 0–90 | 90 | 40 | Surface plug. |
| Plug 3 | Class G | 15.8 | 1.15 | 1810–2060 | 250 | 95 | Isolate Fox Hills Formation at base of surface casing. |
| Plug 2 | $CO_2$-resistant | 15.2 | 0.92 | 4261–4861 | 600 | 270 | Isolate Inyan Kara Formation from Fox Hills Formation. |
| Plug 1 | $CO_2$-resistant | 15.2 | 0.92 | 5867–6402 | 535 | 260 | Squeeze perforations and mechanically isolate Broom Creek Formation. |

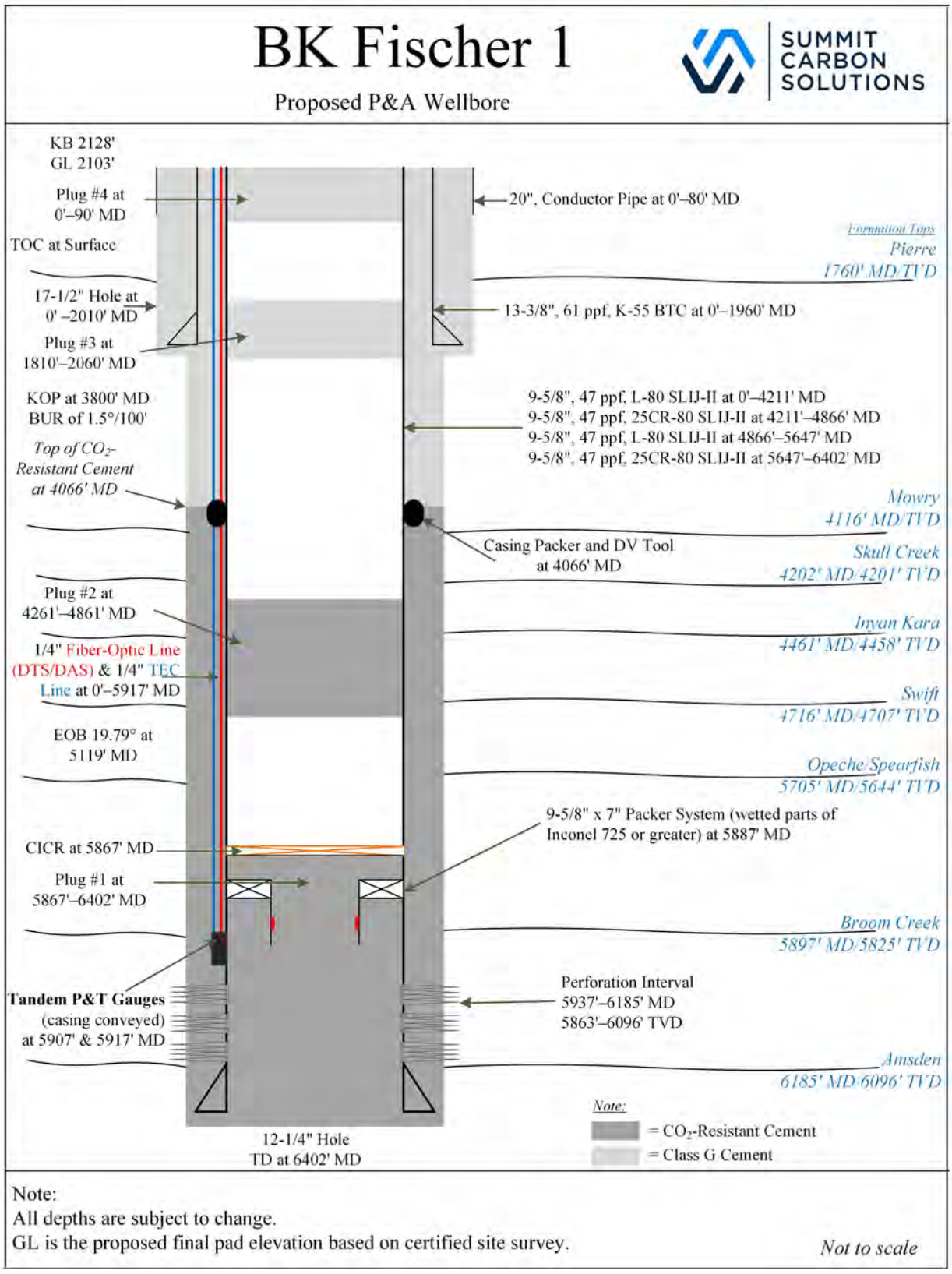



Figure 10-2. BK Fischer 1 proposed P&A wellbore schematic.

## 10.2 BK Fischer 2: Proposed Injection Well P&A Program

The BK Fischer 2 $CO_2$ injection well proposed completion schematic is provided in Figure 10-3. The proposed schematic is based on current information. The proposed P&A program may change based on the best knowledge available at the time of execution. The proposed P&A program may also change based on well response during the actual P&A procedures.

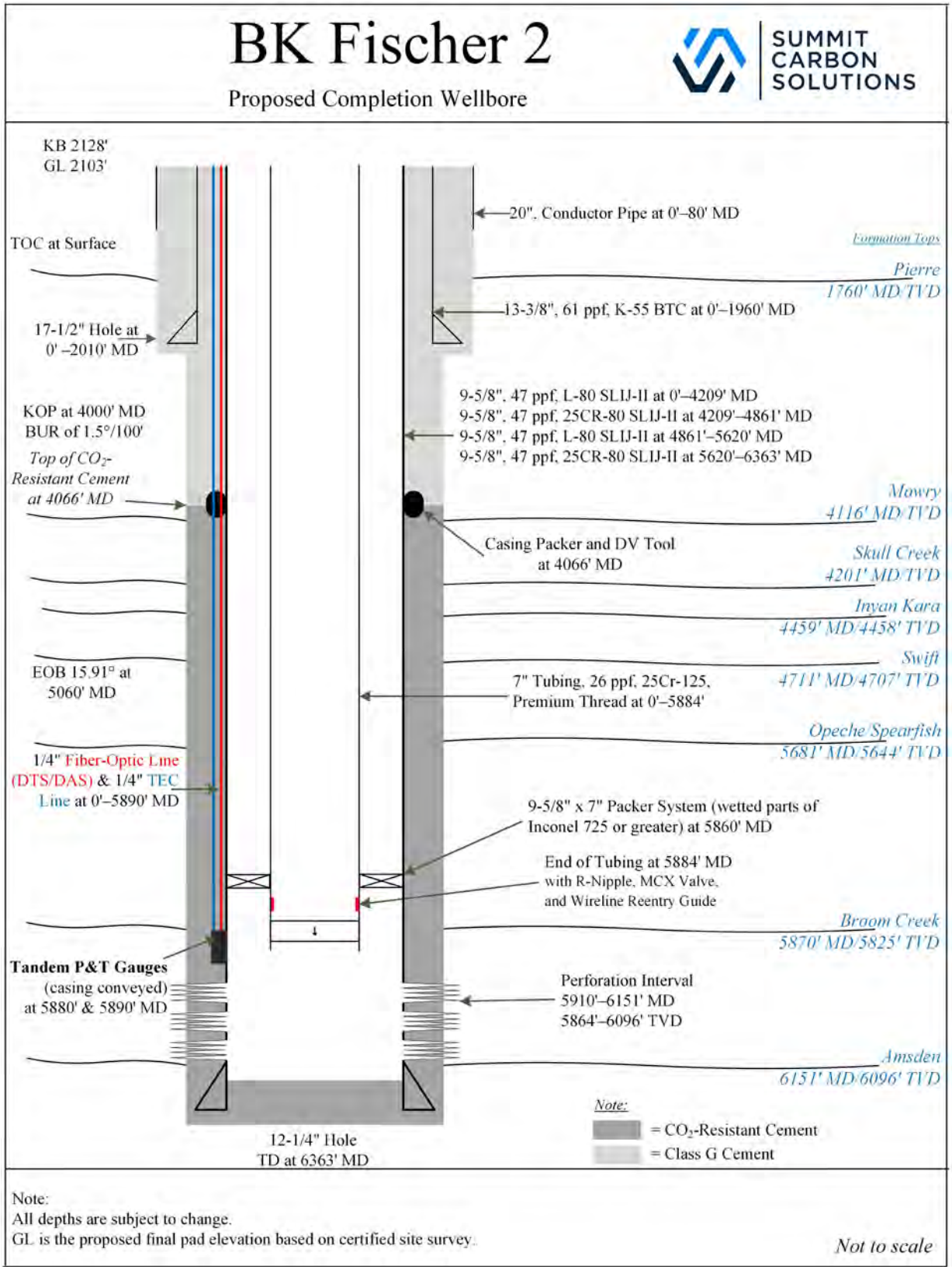



Figure 10-3. BK Fischer 2 proposed completion wellbore schematic.

DMR-O&G will be contacted, and an intent to P&A for BK Fischer 2 will be filed in NorthSTAR for approval. Final adjustments to the proposed P&A procedure will be made based on current wellbore conditions and DMR-O&G field inspector recommendations. Currently, the proposed P&A procedure for the well is as follows.

Proposed P&A Procedure:

1. The procedures described below are subject to modification during execution as necessary to ensure a successful plugging operation. Any significant modifications, as per DMR-O&G approval, due to unforeseen circumstances will be described in the plugging report.

2. After injection operations have been terminated, the well will be flushed with kill fluid, which should be calculated from downhole gauges for proper fluid weight. A sufficient volume will be pumped to kill the well while remaining below the fracture pressure and ensuring control of the well.

3. Contact DMR-O&G supervisor and/or DMR-O&G field inspector 24 hr prior to moving onto location.

4. Dig out surface casing valve, and bleed off. Confirm most recent date of pull test. Pull test deadman anchors, if required. May require installing new deadman anchors depending on results.

5. MIRU workover rig and surface equipment onto the BK Fischer 2 well. All $CO_2$ flowlines and valves will be marked and noted by the rig supervisor prior to MIRU.

6. Conduct and document a safety meeting. Check pressure at wellhead, and ensure pressure is off prior to starting work. Additional kill fluid may be needed.

7. NU lubricator, and install BPV in tubing hanger. ND Christmas tree, NU BOP. Recover BPV, and install test plug. Test BOP for functionality. Pressure-test BOP to 80% of working pressure. Document BOP test.

8. Recover test plug. Connect a 7-in. work joint to the tubing hanger, and POOH until tubing hanger is unseated.

9. Release tubing from packer following the packer manufacturer instructions. TOOH with 7-in. CRA tubing string, and lay down.

   Contingency: If unable to release tubing from packer, RU electric line, and make a cut on the tubing string just above the packer. Pull the tubing string out of hole, and proceed to the next step. If problems are noted, update the cement remediation plan.

10. PU 2⅞-in. work string and stand in derrick. PU bit and scraper, and TIH to top of packer. Perform reverse circulation, pump down casing annulus and up the work string to clean hole. TOOH with work string, bit, and scraper.

11. PU CICR and stinger, and TIH to depth. Set CICR 20 ft above packer.

12. Spot cement equipment, and RU preparing to squeeze across Broom Creek Formation perforations and balance plugs.

13. Conduct and document a safety meeting prior to pumping cement. Ensure all materials are on location and accounted for. Confirm volumes, tests, procedures, operating equipment, and setting times with cement provider. Ensure **$CO_2$-resistant cement** is used for Broom Creek and Inyan Kara intervals. All other cement plugs should be of Class G grade or equivalent.

14. Pressure-test lines prior to pumping. Sting in, and establish injection rate. Proceed with squeezing Broom Creek Formation perforations per cementer's planned procedures with 260 sx of 15.2 ppg, 0.92 $ft^3$/sx **$CO_2$-resistant cement** and under displace 5 barrels of cement. Sting out of retainer, and finish displacing the last 5 barrels on top of the cement retainer. Check for flow. Pull work string above the plug.

15. Pressure-test casing to 1000 psi for 30 minutes or as approved by DMR-O&G. Record mechanical integrity test on casing. Circulate wellbore clean. TOOH with stinger and work string standing in derrick, and RD stinger.

    Contingency: If pressure test failed, a CIBP will be set below each subsequent plug until casing test passes.

16. If needed, RU logging unit. Confirm external mechanical integrity by running one of the tests listed below as options, and RD logging truck:

    - Activated neutron log
    - Noise log
    - PLT
    - Tracers
    - Temperature log
    - DTS survey (no required logging unit)

    Note: If external failure in long-string casing is identified, the operator will adjust the P&A plan with DMR-O&G's approval.

17. If pressure test failed, set a CIBP prior to pumping balanced plug. TIH with work string and diffuser to depth of Plug 2. Pump 270 sx of 15.2 ppg, 0.92 $ft^3$/sx **$CO_2$-resistant cement** balanced plug as designed from cementer's proposed procedures across Inyan Kara interval.

18. Pull up work string above the top of the plug, and test casing. Circulate wellbore clean.

19. Set a CIBP prior to pumping Plug 3 if previous test failed. TOOH to depth of Plug 3. Pump 95 sx of 15.8 ppg, 1.15 $ft^3$/sx Class G cement at 2060 ft. Pull up work string above the top of the plug, and circulate wellbore clean.

20. TOOH laying down work string to 90 ft. Pump 40 sx of 15.8 ppg, 1.15 $ft^3$/sx Class G cement plug at 90 ft. Lay down all work string.

    Contingency: Perform top job as necessary to ensure good cement on both sides.

21. RD all equipment, and move out.

22. Dig out wellhead, and cut off casing 5 ft below GL. Weld ½-in. steel cap on casing with well name, date inscribed, and information that it was used for $CO_2$ injection.

23. Dig out deadman anchors. Report photos of steel cap to DMR-O&G.

24. Within 60 days, submit Form 7 plugging report after plugging operations are complete (N.D.A.C. § 43-05-01-11.5[4]).

25. Submit notice of intent to reclaim to DMR-O&G 30 days in advance prior to reclamation (N.D.A.C. § 43-05-01-18[10][d]).

The proposed P&A plan for BK Fischer 2 is summarized in Table 10-2 and provided in Figure 10-4. These values are estimated; final volume and thickness of plugs will be determined by design at time of plugging.

**Table 10-2. Summary of P&A Plan for BK Fischer 2**

| Cement Plug Number | Cement Type | Weight, ppg | Yield, $ft^3/sx$ | Interval, ft, MD | Thickness, ft | Volume, sx | Notes |
|---|---|---|---|---|---|---|---|
| Plug 4 | Class G | 15.8 | 1.15 | 0–90 | 90 | 40 | Surface plug |
| Plug 3 | Class G | 15.8 | 1.15 | 1810–2060 | 250 | 95 | Isolate Fox Hills Formation at base of surface casing |
| Plug 2 | $CO_2$-resistant | 15.2 | 0.92 | 4259–4859 | 600 | 270 | Isolate Inyan Kara Formation from Fox Hills Formation |
| Plug 1 | $CO_2$-resistant | 15.2 | 0.92 | 5840–6363 | 523 | 260 | Squeeze perforations and mechanically isolate Broom Creek Formation |

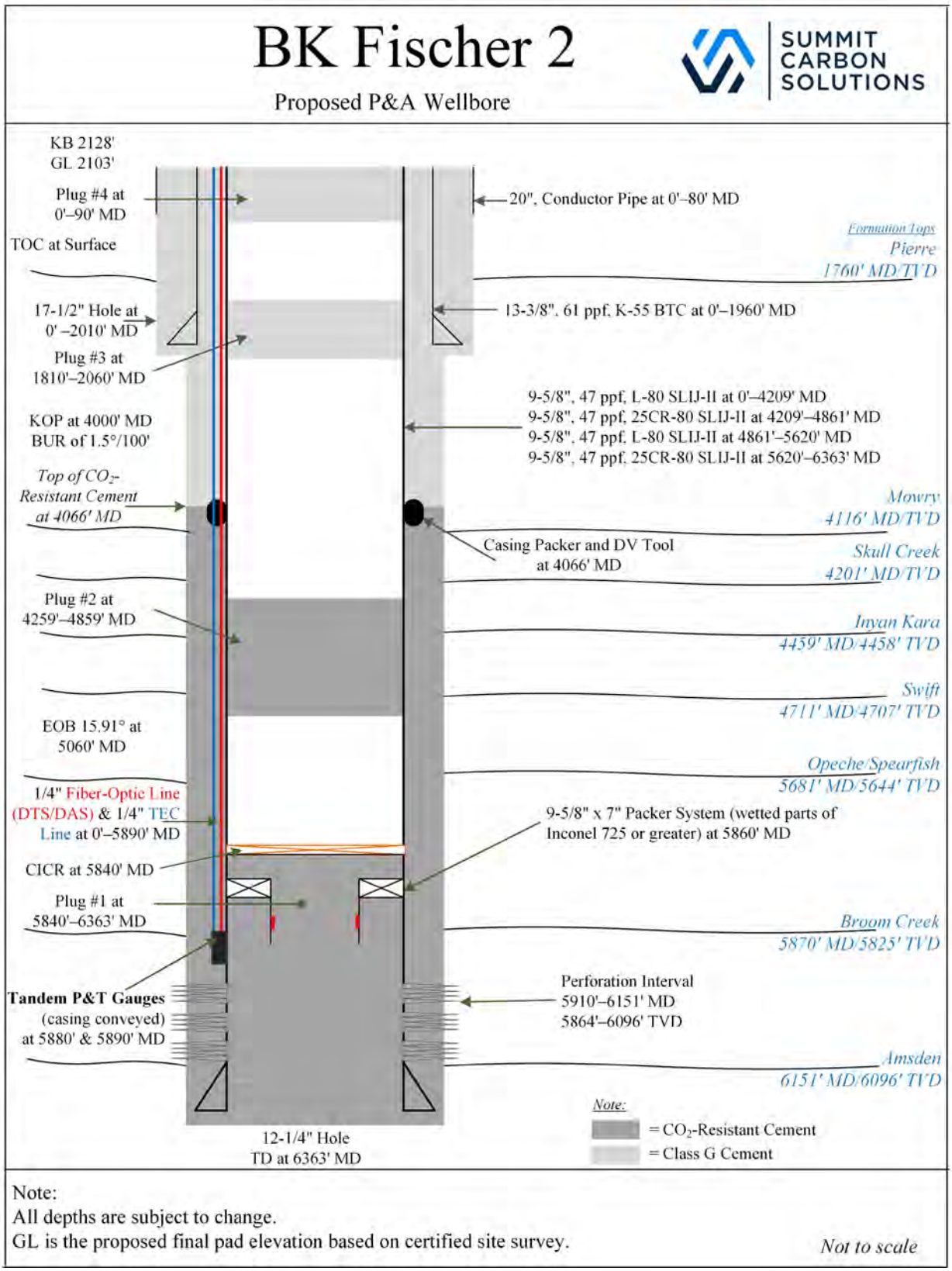



Figure 10-4. BK Fischer 2 proposed P&A wellbore schematic.

### 10.3 Archie Erickson 2: Proposed Reservoir-Monitoring Well P&A Program

The Archie Erickson 2 wellbore will be P&A when the $CO_2$ plume has stabilized and monitoring of the plume extent is no longer necessary. An as-completed reservoir-monitoring well schematic of Archie Erickson 2 is provided in Figure 10-5. The proposed P&A program may change based on the best knowledge available at the time of execution. The proposed P&A program may also change based on well response during the actual P&A procedures.

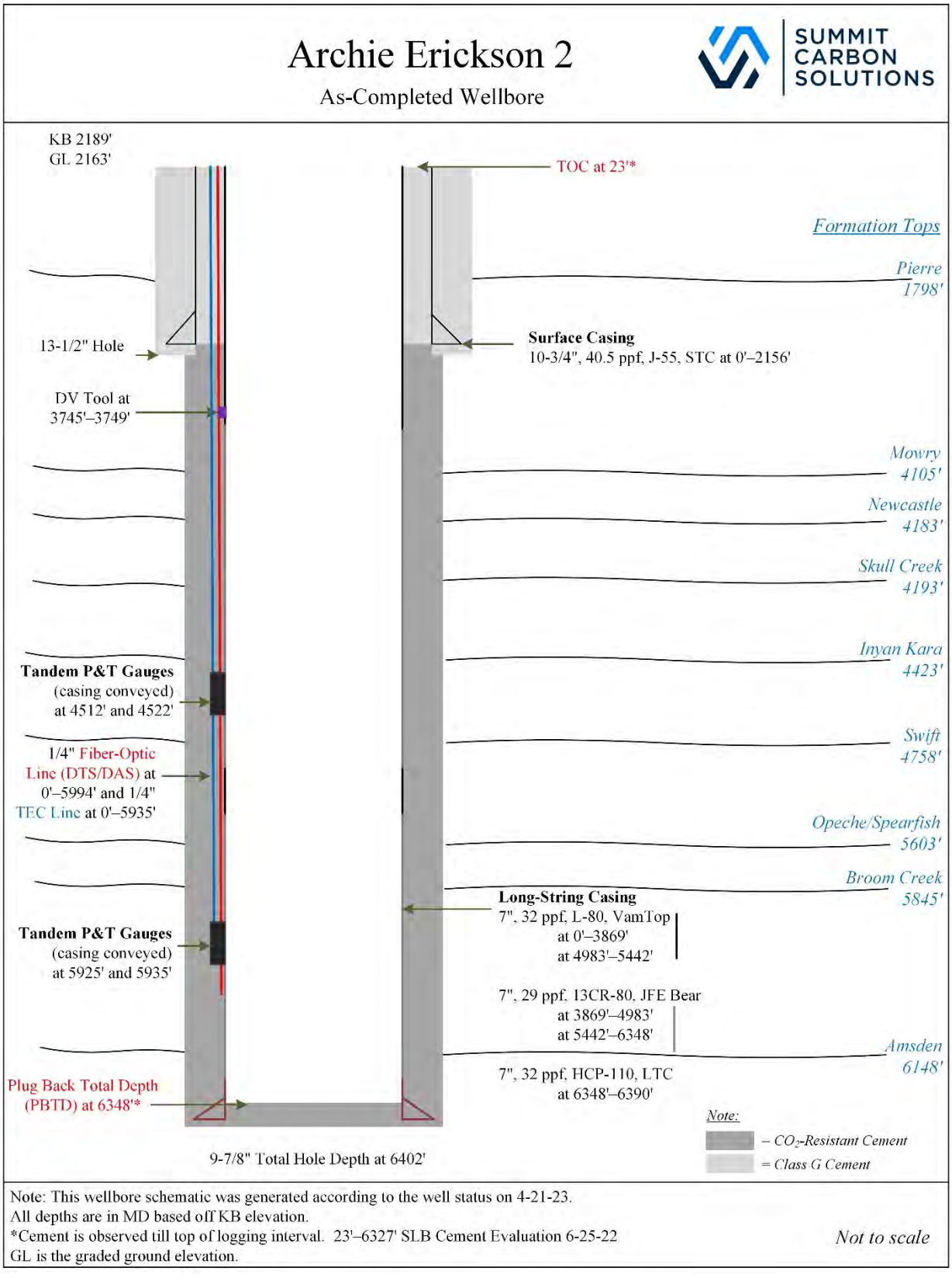



Figure 10-5. Archie Erickson 2 as-completed wellbore schematic.

DMR-O&G will be contacted, and an intent to P&A for Archie Erickson 2 will be filed in NorthSTAR for approval. Final adjustments to the proposed P&A procedure will be made based on current wellbore conditions and DMR-O&G field inspector recommendations. Currently, the proposed P&A procedure for the well is as follows.

Proposed P&A Procedure:

1. The procedures described below are subject to modification during execution as necessary to ensure a successful plugging operation. Any significant modifications, as per DMR-O&G approval, due to unforeseen circumstances will be described in the plugging report.

2. After monitoring operations have been terminated, the well will be flushed with kill fluid, which should be calculated from downhole gauges for proper fluid weight. A sufficient volume will be pumped to kill the well while remaining below the fracture pressure and ensuring control of the well.

3. Contact DMR-O&G supervisor and/or DMR-O&G field inspector 24 hr prior to moving onto location.

4. Dig out surface casing valve, and bleed off. Confirm most recent date of pull test. Pull test deadman anchors, if required. May require installing new deadman anchors depending on results.

5. MIRU workover rig and surface equipment onto the Archie Erickson 2 well.

6. Conduct and document a safety meeting. Check pressure at wellhead, and ensure pressure is off prior to starting work. Additional kill fluid may be needed.

7. ND wellhead, NU BOP. Install test plug. Test BOP for functionality. Pressure test BOP to 80% of working pressure. Document BOP test.

8. PU 2⅞-in. work string and stand in derrick. Pick up bit and scraper, and TIH. Perform reverse circulation, pump down casing annulus and up the work string to clean hole. TOOH with work string, bit and scraper.

9. Pressure-test casing to 1000 psi for 30 minutes or as approved by DMR-O&G. Record mechanical integrity test on casing.

   Contingency: If pressure test failed, a CIBP will be set below each subsequent plug until casing test passes.

10. If needed, RU logging unit. Confirm external mechanical integrity by running one of the tests listed below as options, and RD logging truck:

- Activated neutron log
- Noise log
- PLT
- Tracers
- Temperature log
- DTS survey (no required logging unit)

Note: If external failure in long-string casing is identified, the operator will adjust the P&A plan with DMR-O&G approval.

11. TIH with work string and diffuser to depth as in cementer's proposed procedures for Broom Creek interval.

12. MIRU cementing equipment to perform cement balanced plug across Broom Creek.

13. Conduct and document a safety meeting prior to pumping cement. Ensure all materials are on location and accounted for. Confirm volumes, tests, procedures, operating equipment, and setting times with the cement provider. Ensure **$CO_2$-resistant cement** will be used for the Broom Creek and Inyan Kara intervals. All other cement should be of Class G grade or equivalent.

14. Pressure-test lines prior to pumping. Proceed with pumping 135 sx of 15.2 ppg, 0.92 $ft^3$/sx **$CO_2$-resistant cement** balanced plug as designed from cementer's proposed procedures across Broom Creek interval.

15. Pull work string above the plug and test casing. Circulate wellbore clean. Wait on setting time, and tag top of plug.

16. If pressure test failed, set a CIBP prior to pumping balanced plug. TOOH with work string and diffuser to depth of Plug 2. Pump 135 sx of 15.2 ppg, 0.92 $ft^3$/sx **$CO_2$-resistant cement** balanced plug as designed from cementer's proposed procedures across Inyan Kara interval.

17. Pull up work string above the top of the plug, and test casing. Circulate wellbore clean. Wait on setting time, and tag top of the plug.

18. Set a CIBP prior to pumping balanced Plug 3 if previous test failed. TOOH to depth of Plug 3. Pump 50 sx of 15.8 ppg, 1.15 $ft^3$/sx Class G cement at 2256 ft. Pull up work string above the top of the plug, and circulate wellbore clean. Wait on setting time and tag top of the plug.

19. TOOH laying down work string to 90 ft. Pump 25 sx of 15.8 ppg, 1.15 $ft^3$/sx Class G cement plug at 90 ft. Lay down all work string.

    Contingency: Perform top job as necessary to ensure good cement on both sides.

20. RD all equipment, and move out.

21. Dig out wellhead, and cut off casing 5 ft below GL. Weld ½-in. steel cap on casing with well name, date inscribed, and information that it was used for $CO_2$ monitoring.

22. Dig out deadman anchors, and report photo of steel cap to DMR-O&G.

23. Within 60 days, submit Form 7 plugging report after plugging operations are complete (N.D.A.C. § 43-05-01-11.5[4]).

24. Submit notice of intent to reclaim to DMR-O&G 30 days in advance prior to reclamation (N.D.A.C. § 43-05-01-18[10][d]).

The proposed P&A plan for Archie Erickson 2 is summarized in Table 10-3 and provided in Figure 10-6. These values are estimated; final volume and thickness of plugs will be determined by design at time of plugging.

**Table 10-3. Summary of P&A Plan for Archie Erickson 2**

| Cement Plug Number | Cement Type | Weight, ppg | Yield, $ft^3/sx$ | Interval, ft, MD | Thickness, ft | Volume, sx | Notes |
|---|---|---|---|---|---|---|---|
| Plug 4 | Class G | 15.8 | 1.15 | 0–90 | 90 | 25 | Surface plug |
| Plug 3 | Class G | 15.8 | 1.15 | 2006–2256 | 250 | 50 | Isolate Fox Hills Formation at base of surface casing |
| Plug 2 | $CO_2$-resistant | 15.2 | 0.92 | 4223–4823 | 600 | 135 | Isolate Inyan Kara Formation from Fox Hills Formation |
| Plug 1 | $CO_2$-resistant | 15.2 | 0.92 | 5645–6245 | 600 | 135 | Set balanced plug, and mechanically isolate Broom Creek Formation |

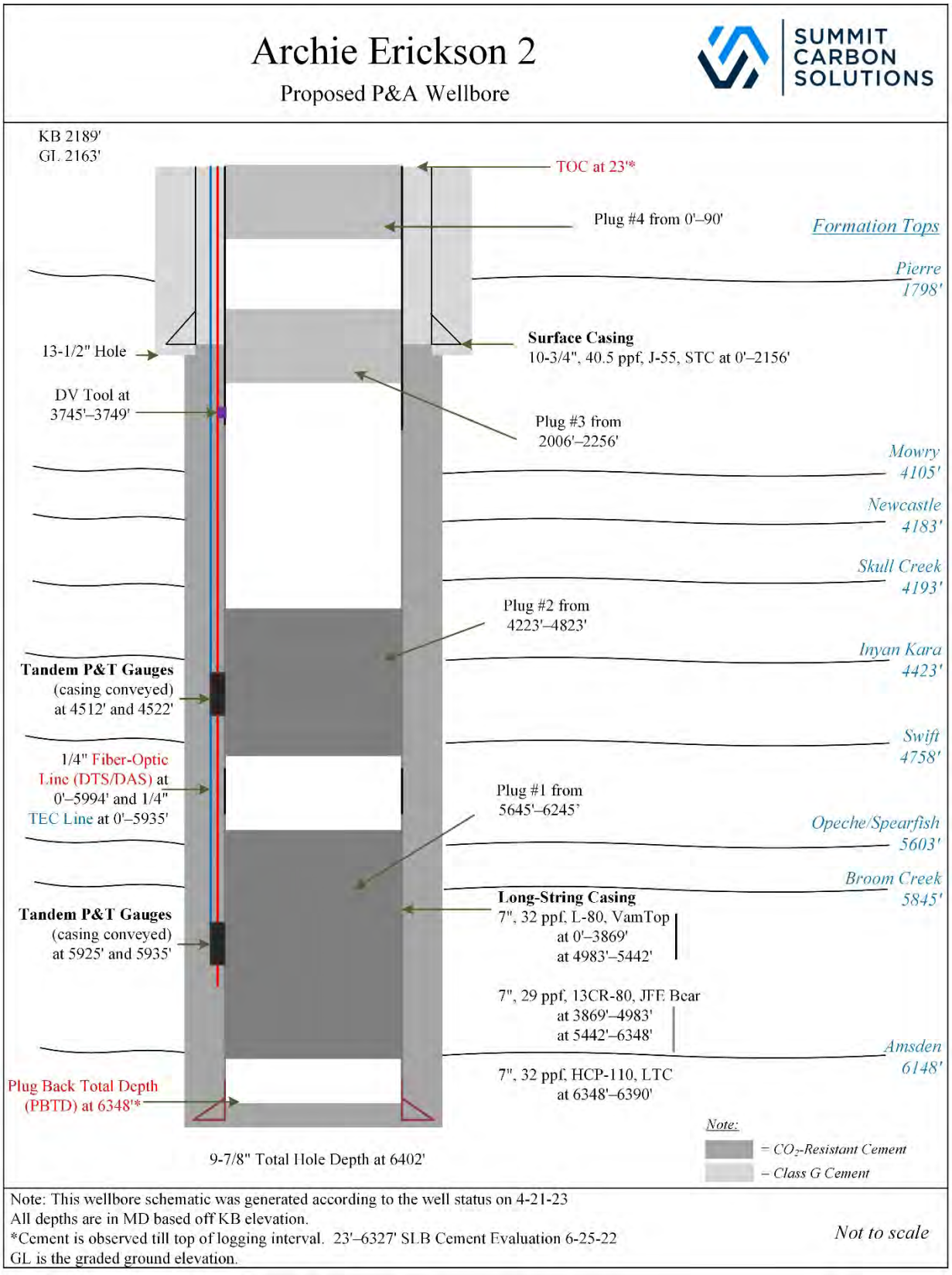



Figure 10-6. Archie Erickson 2 proposed P&A wellbore schematic.

# SECTION 11.0

# INJECTION WELL AND STORAGE OPERATIONS

## 11.0 INJECTION WELL AND STORAGE OPERATIONS

This section of the storage facility permit (SFP) application presents the engineering criteria for completing and operating the injection wells in a manner that protects underground sources of drinking water (USDWs). The information that is presented in Section 11.0 and Table 11-1 meets the permit requirements for injection well and storage operations as documented in North Dakota Administrative Code (N.D.A.C.) § 43-05-01-05 and § 43-05-01-11.3. Planned well logging and testing activities and monitoring activities can be found in Sections 5.0 and 6.0.

**Table 11-1. BK Fischer 1 and BK Fischer 2: Proposed Injection Wells Operating Parameters**

| Item | Values | Description/Comments | |
|---|---|---|---|
| **Injected Volume** | | | |
| Total Injected Mass/Volume | 98.3 MMt<br>1,857,976 MMcf | Based on a maximum wellhead pressure (WHP) constraint of 2100 psi and maximum bottomhole pressure (BHP) constraint | |
| **Injection Rates** | **BK Fischer 1** | **BK Fischer 2** | **Description/Comments** |
| Average Injection Rate | 8397 tonnes/day<br>(158.7 MMscf/day)<br>3.065 MMt/yr<br>1,158,636 MMcf<br>61.3 MMt | 5068 tonnes/day<br>(95.8 MMscf/day)<br>1.850 MMt/yr<br>699,340 MMcf<br>37.0 MMt | Based on a maximum WHP constraint of 2100 psi and maximum BHP constraint |
| Average Maximum Injection Rate* | 26,603 tonnes/day<br>(502.8 MMscf/day)<br>9.71 MMt/yr<br>3,670,590 MMcf<br>194.2 MMt | 25,205 tonnes/day<br>(476.4 MMscf/day)<br>9.20 MMt/yr<br>3,477,798 MMcf<br>184.0 MMt | Based on maximum BHP with only one well injecting at a time:<br>BK Fischer 1: 3633 psi<br>BK Fischer 2: 3624 psi |
| **Depth** | **BK Fischer 1** | **BK Fischer 2** | **Description/Comments** |
| Depth (true vertical depth [TVD]) of the top perforation used in the BHP calculation | 5841 | 5828 | Depths are for simulation modeling, taken prior to final site survey |
| **Pressure (psi)** | **BK Fischer 1** | **BK Fischer 2** | **Description/Comments** |
| Formation Fracture Pressure at Top Perforation | 4037 | 4027 | Based on geomechanical analysis of formation fracture gradient as 0.691 psi/ft |
| Average Surface Injection Pressure | 1903 | 1660 | Based on a maximum WHP constraint of 2100 psi and maximum BHP constraint (Figure 3-10) |
| Maximum Surface Injection Pressure* | 7800 | 8000 | Based on maximum BHP with only one well injecting at a time (using the designed 7-in. tubing):<br>BK Fischer 1: 3633 psi<br>BK Fischer 2: 3624 psi |

Continued . . .

**Table 11-1. BK Fischer 1 and BK Fischer 2: Proposed Injection Wells Operating Parameters (continued)**

| Pressure (psi) | BK Fischer 1 | BK Fischer 2 | Description/Comments |
|---|---|---|---|
| Average BHP | 3630 | 3624 | Based on a maximum WHP constraint of 2100 psi and maximum BHP constraint |
| Calculated Maximum BHP | 3633 | 3624 | Based on 90% of the formation fracture pressure:<br>BK Fischer 1: 4037 psi<br>BK Fischer 2: 4027 psi |

*Maximum injection pressure during operations will be limited to the surface equipment pressure ratings and maximum BHP constraint

## 11.1 BK Fischer 1: Proposed Completion Procedure to Conduct Injection Operations

As described in Section 9.1, the BK Fischer 1 well will be drilled and completed as a $CO_2$ injector (Figures 11-1 and 11-2 and Tables 11-2, 11-3, and 11-4). The following proposed completion procedure outlines the steps necessary to complete and test the well for injection purposes. The procedures described below are subject to change during execution as necessary to ensure successful completion and/or testing.

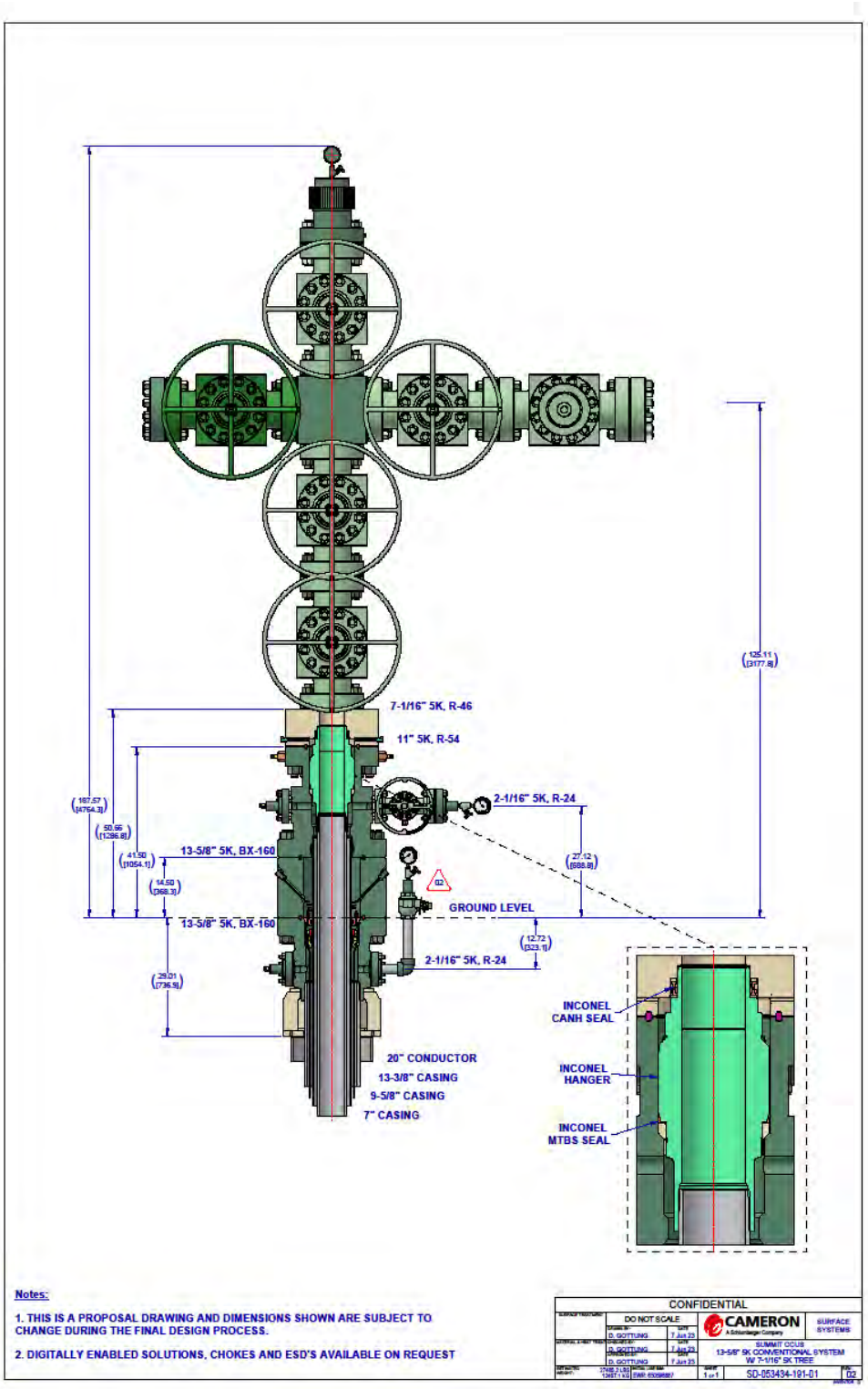



Figure 11-1. BK Fischer 1 proposed $CO_2$-resistant wellhead schematic. The lowest manual valve of injection tree will be of Class HH material, and tubing hanger mandrel will be of CRA material, while the rest of the tree will consist of Class FF and equivalent.

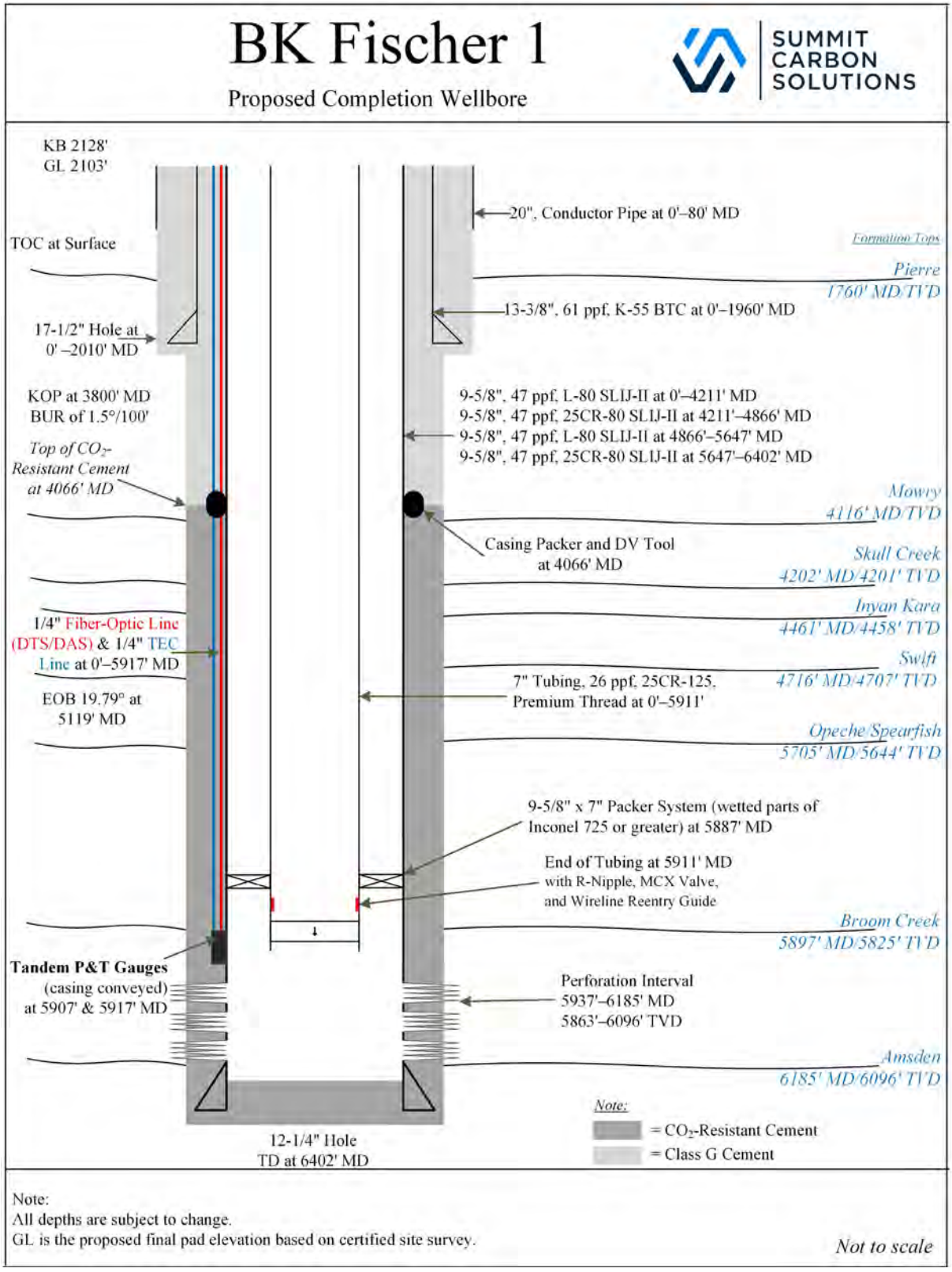



Figure 11-2. BK Fischer 1 proposed completion wellbore schematic.

**Table 11-2. BK Fischer 1: Tubing Properties**

| OD,* in. | Grade | Weight, lb/ft | Connection | ID,** in. | Drift ID, in. | Collapse, psi | Burst, psi | Tension, klb |
|---|---|---|---|---|---|---|---|---|
| 7.000 | 25Cr-125 | 26 | Sentinel | 6.276 | 6.151 | 6233 | 10,239 | 943 |

* Outer diameter.
** Inside diameter.

**Table 11-3. BK Fischer 1: Tubing Accessories**

| Description | OD, in. | Depth*, ft, MD | Material | ID, in. | Drift ID, in. |
|---|---|---|---|---|---|
| Ratch Latch Assembly | 7.765 | 5883 | CRA | 5.98 | 5.95 |
| Packer | 8.220 | 5887 | CRA | 5.98 | 5.95 |
| Pup Joint | 7.000 | 5894 | 25Cr-125 | 6.276 | 6.151 |
| LN Profile | 7.954 | 5900 | CRA | 5.875 | 5.875 |
| Pup Joint | 7.000 | 5902 | 25Cr-125 | 6.276 | 6.151 |
| LN Profile | 7.733 | 5908 | CRA | 5.750 | 5.750 |
| Wireline Reentry Guide | 8.250 | 5910 | CRA | 6.230 | 6.200 |
| MCX Valve** | 5.620 | TBD | CRA | 2.620 | – |

* Estimated, top connection depth will be adjusted with actual tally; TBD: to be determined.
** MCX valve will be run with slickline after installation of tubing assembly.

## Table 11-4. Cased-Hole Logging Plan for the BK Fischer 1

| | Logging | Justification | Frequency | N.D.A.C. § 43-05-01- |
|---|---|---|---|---|
| **Long-String Section Without Tubing** | Sonic array logging (inclusive of radial cement bond log [RCBL], variable-density log [VDL], casing collar locator [CCL]), gamma ray (GR), and temperature log | Identify cement bond quality radially and evaluate cement top and zonal isolation. Establish baseline temperature profile for distributed temperature sensing (DTS) fiber-optic cable calibration. | Baseline and repeat when required and when tubing is pulled during workovers | 11.2(1)(c)(2) and (d) |
| | Ultrasonic logging tool (or other approved casing inspection log [CIL]) | Acquire baseline and demonstrate external mechanical integrity prior to injection. | | 11.2(1)(c)(2) and (d) |
| **Through-Tubing** | Pulsed-neutron log (PNL) | Confirm internal and external mechanical integrity from Opeche/Spearfish Formation to surface. | Baseline and Year 1, Year 3, and at least once every 3 years thereafter (e.g., Years 6, 9, 12, etc.) | 11.4(g)(1) |
| | Temperature logging | Confirm external mechanical integrity and acquire baseline temperature profile. | Baseline and annually only if DTS fails | 11.2(1)(c)(2) and (d) |

Site Well Work Preparations

- Contact the Department of Mineral Resources, Oil and Gas Division (DMR-O&G), and provide schedule to perform DMR-O&G-approved well work.
- Work road and location as needed for safe operations.
- Install rig anchors, and test to 20,000 lbf (pounds-force), or as required by rig contractor. If installed, confirm recent anchor test date and that testing has been performed according to contractor policy.
- Confirm actual casing depths and casing-conveyed gauges with the contractor representative and designated contractor field engineer.
- Conduct safety meetings prior to shifts and treatments/operations.
- Move in (MI) pipe racks, pipe wranglers, tanks, and portable toilet.
- MI and unload 7-in. 25Cr-125 injection string and 2⅞-in. PH6 work string.
- Fill tanks with compatible testing fluid for all well work.

1. Move in and rig up (MIRU) workover (WO) rig capable of 200,000 lb and equipment, check the casing pressure, and release pressure if any. Ensure no pressure buildup before proceeding to the next step.

2. Remove nightcap and nipple up (NU) a blowout preventer (BOP) with variable rams capable of 2⅞ to 7 in.

3. Test BOP to maximum anticipated surface pressure (MASP).

4. Tally and pick up (PU) 2⅞-in. PH6 work string and 8½-in. bit to drill out differential valve (DV) tool and clean out residual cement down to float collar. Pull out of hole (POOH).

5. Run in the hole and work string with bit and scraper in front of the injection zone and at the depth where the packer will be set.

6. Tag plug back total depth (PBTD).

7. Circulate the wellbore with completion fluid, estimated at 9.8 ppg, compatible with the formation. Circulate until clean returns.

8. Trip out of hole (TOOH) work string with bit and scraper.

9. Close blind rams and test casing for 30 min to 1000 psi or as approved by DMR-O&G. If the pressure decreases more than 10% in 30 min, bleed pressure, check surface lines and surface connections, and repeat test. If the failure persists, the operator will be required to assess the root cause and correct it. Document all test results.

10. MIRU logging truck.

11. Conduct safety meeting to discuss logging and perforating operations.

12. Install and test lubricator.

13. Perform logs as per cased-hole logging plan shown in Table 11-4.

    Note: Run radial cement bond log (RCBL) with 500-psi pressure. If the RCBL result shows poor cement bonding or a low top of cement, the results should be communicated to DMR-O&G and an action plan will be prepared.

14. Perforate the Broom Creek Formation (ensure shots do not penetrate fiber-optic cable or downhole gauges. Perforations should be at least 10 ft away from gauge and fiber-optic cable). Actual perforation depths and design will be determined by designated geologists and engineers and based on the log analysis review and selected contractor.

    Note: DTS/DAS (distributed temperature sensing/distributed acoustic sensing) fiber-optic cable and casing-conveyed gauges will be run along the exterior of the long-string casing. Special clamps, bands, and centralizers are installed to protect the fiber and provide a marker for wireline operations.

15. TOOH with perforating guns.

16. Tally and pick up retrievable testing packer with surface readout downhole gauges and run in the hole with work string to the top of the perforations.

17. Set packer above, at least 50 ft, top perforations to isolation and test the annulus to ensure seal and no communication with backside.

18. RU pump truck. Perform an injectivity test/step rate test (SRT) and pressure falloff test with fluid compatible with the formation. The SRT and pressure falloff test will be designed at a later time.

    Note: If the well shows poor injectivity, perform a near-wellbore/perforation cleanout using a designed concentration of acid. Adjust acid formulation and volumes with water samples and a compatibility test. Maximum injection pressure is not to exceed formation fracture pressure. Ensure correct acid and additives are used and the acid formula is determined based on not only the acid/formation compatibility test result but also installed CRA (corrosion resistant alloy) material.

19. Release packer. TOOH and lay down (LD) retrievable packer and LD work string.

20. Prepare rig floor to install injection string assembly (injection tubing and packer).

21. RU wireline. Pick up (PU) wireline-set permanent packer to desired depth.

22. Set injection packer within 50 ft above the top perforations, according to manufacturer recommendations and DMR-O&G requirements.

    Note: Avoid setting packer within 10 ft of casing-conveyed gauges.

23. Tally, PU, and run completion assembly in accordance with program. Displace the well with inhibited packer fluid prior to latching 7-in. 25Cr-125 injection string into permanent packer.

24. Test packer to 1000 psi for 30 min. Ensure good seal.

25. Install tubing hanger.

26. Install backpressure valve (BPV) and nipple down (ND) BOP.

27. NU injection tree. Recover BPV.

28. Install test plug and pressure test injection tree to pressure rating. Recover test plug.

29. Rig down and move out (RDMO) WO rig and equipment.

30. Schedule mechanical integrity test (MIT) with DMR-O&G inspector. Perform and record MIT with DMR-O&G representative present. Document MIT and submit to DMR-O&G.

### 11.2 BK Fischer 2: Proposed Completion Procedure to Conduct Injection Operations

As described in Section 9.1, the BK Fischer 2 well will be drilled and completed as a $CO_2$ injector (Figures 11-3 and 11-4 and Tables 11-5, 11-6, and 11-7). The following proposed completion procedure outlines the steps necessary to complete and test the well for injection purposes. The procedures described below are subject to change during execution as necessary to ensure successful completion and/or testing.

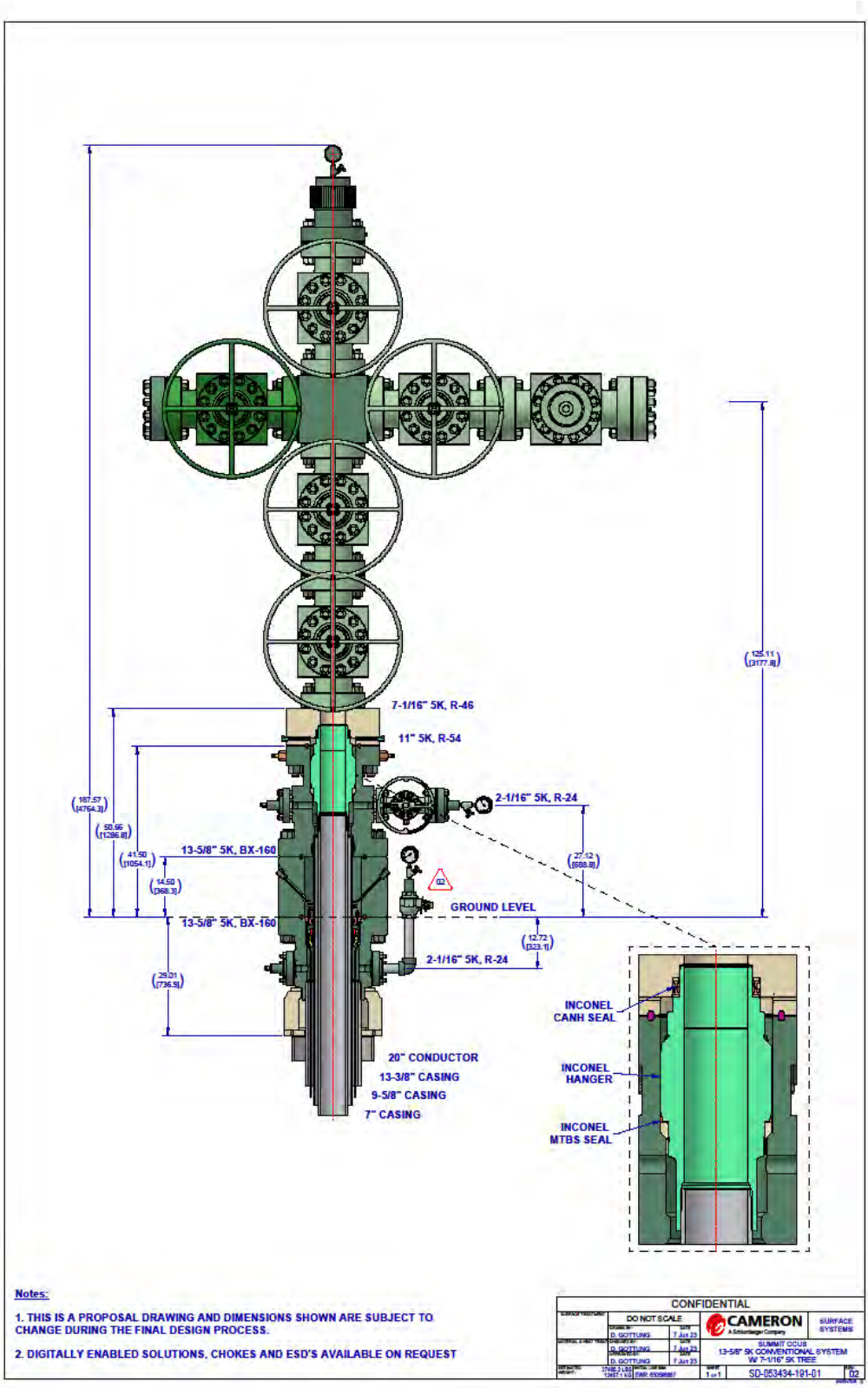



Figure 11-3. BK Fischer 2 proposed $CO_2$-resistant wellhead schematic. Lowest manual valve of injection tree will be of Class HH material, and tubing hanger mandrel will be of corrosion-resistant material, while the rest of the tree will consist of Class FF and equivalent.

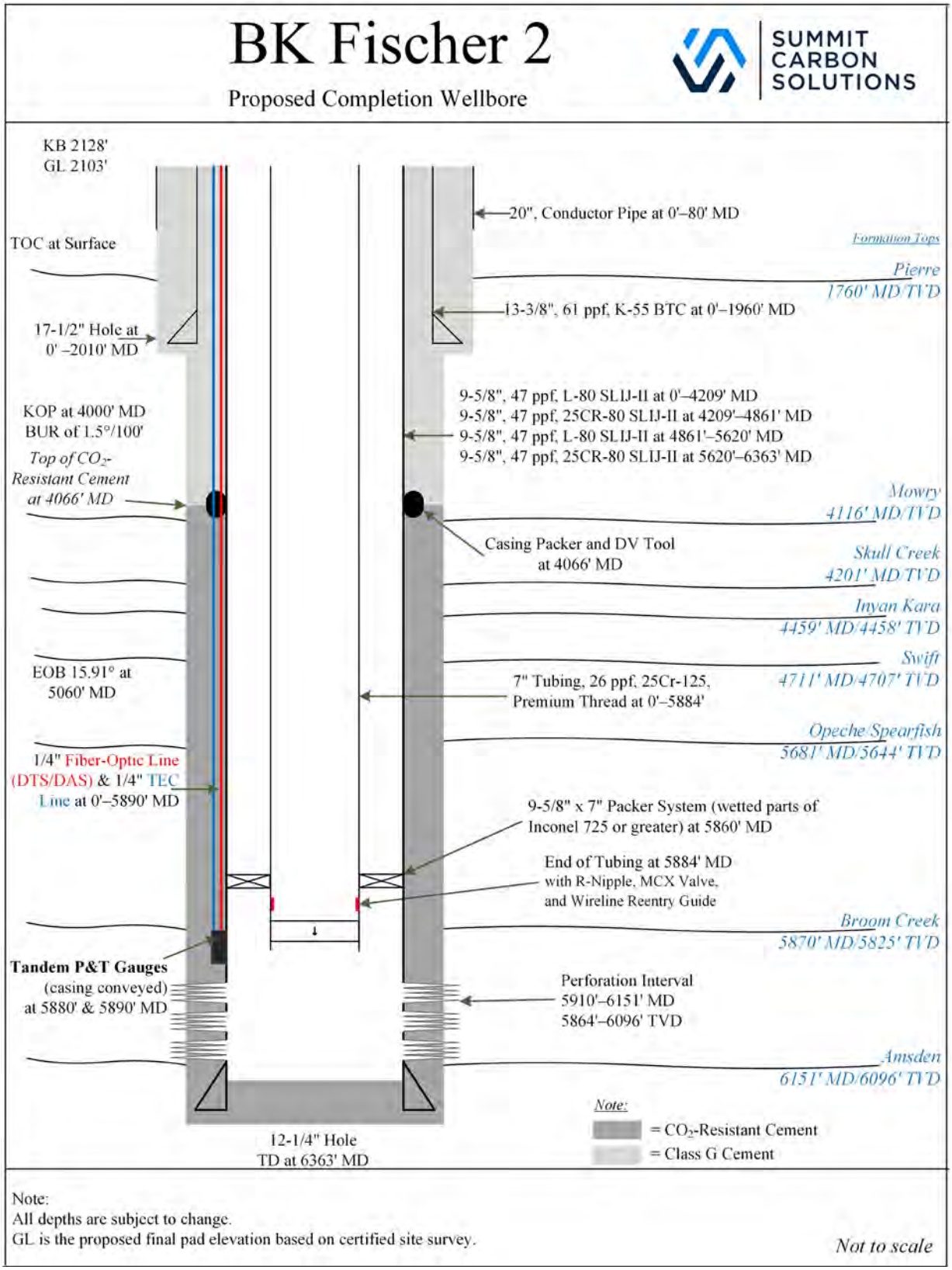



Figure 11-4. BK Fischer 2 proposed completion wellbore schematic.

**Table 11-5. BK Fischer 2: Tubing Properties**

| OD, in. | Grade | Weight, lb/ft | Connection | ID, in. | Drift ID, in. | Collapse, psi | Burst, psi | Tension, klb |
|---|---|---|---|---|---|---|---|---|
| 7.000 | 25Cr-125 | 26 | Sentinel | 6.276 | 6.151 | 6233 | 10,239 | 943 |

**Table 11-6. BK Fischer 2: Tubing Accessories**

| Description | OD, in. | Depth*, ft, MD | Material | ID, in. | Drift ID, in. |
|---|---|---|---|---|---|
| Ratch Latch Assembly | 7.765 | 5856 | CRA | 5.980 | 5.950 |
| Packer | 8.220 | 5860 | CRA | 5.980 | 5.950 |
| Pup Joint | 7.000 | 5867 | 25Cr-125 | 6.276 | 6.151 |
| LN Profile | 7.954 | 5873 | CRA | 5.875 | 5.875 |
| Pup Joint | 7.000 | 5875 | 25Cr-125 | 6.276 | 6.151 |
| LN Profile | 7.733 | 5881 | CRA | 5.750 | 5.750 |
| Wireline Reentry Guide | 8.250 | 5883 | CRA | 6.230 | 6.200 |
| MCX Valve** | 5.620 | TBD | CRA | 2.620 | – |

* Estimated, top connection depth will be adjusted with actual tally, TBD: to be determined.
** MCX valve will be run with slickline after installation of tubing assembly.

## Table 11-7. Cased-Hole Logging Plan for the BK Fischer 2

| | Logging | Justification | Frequency | N.D.A.C. § 43-05-01- |
|---|---|---|---|---|
| **Long-String Section Without Tubing** | Sonic array logging (inclusive of RCBL, VDL, CCL), GR, and temperature log | Identify cement bond quality radially and evaluate cement top and zonal isolation. Establish baseline temperature profile for DTS fiber-optic cable calibration. | Baseline and repeat when required and when tubing is pulled during workovers | 11.2(1)(c)(2) and (d) |
| | Ultrasonic logging tool (or other approved CIL) | Acquire baseline and demonstrate external mechanical integrity prior to injection. | | 11.2(1)(c)(2) and (d) |
| **Through-Tubing** | PNL | Confirm internal and external mechanical integrity from Opeche/Spearfish Formation to surface. | Baseline and Year 1, Year 3, and at least once every 3 years thereafter (e.g., Years 6, 9, 12, etc.) | 11.4(g)(1) |
| | Temperature logging | Confirm external mechanical integrity and acquire baseline temperature profile. | Baseline and annually only if DTS fails | 11.2(1)(c)(2) and (d) |

Site Well Work Preparations

- Contact DMR-O&G and provide schedule to perform DMR-O&G-approved well work.
- Work road and location as needed for safe operations.
- Install rig anchors, and test to 20,000 lbf, or as required by rig contractor. If installed, confirm recent anchor test date and that testing has been performed according to contractor policy.
- Confirm actual casing depths and casing-conveyed gauges with the contractor representative and designated contractor field engineer.
- Conduct safety meetings prior to shifts and treatments/operations.
- MI pipe racks, pipe wranglers, tanks, and portable toilet.
- MI and unload 7-in., 25Cr-125 injection string and 2⅞-in., PH6 work string.
- Fill tanks with compatible testing fluid for all well work.

1. MIRU WO rig capable of 200,000 lb and equipment, check the casing pressure, and release pressure if any. Ensure no pressure buildup before proceeding to the next step.

2. Remove nightcap and NU a BOP with variable rams capable of 2⅞ to 7-in.

3. Test BOP to MASP.

4. Tally and pick up 2⅞-in. PH6 work string and 8½-in. bit to drill out DV tool and clean out residual cement down to float collar. POOH.

5. Run in the hole and work string with bit and scraper in front of the injection zone and at the depth where the packer will be set.

6. Tag PBTD.

7. Circulate the wellbore with completion fluid, estimated at 9.8 ppg, compatible with the formation. Circulate until clean returns.

8. TOOH work string with bit and scraper.

9. Close blind rams and test casing for 30 min to 1000 psi or as approved by DMR-O&G. If the pressure decreases more than 10% in 30 min, bleed pressure, check surface lines and surface connections, and repeat test. If the failure persists, the operator will be required to assess the root cause and correct it. Document all test results.

10. MIRU logging truck.

11. Conduct safety meeting to discuss logging and perforating operations.

12. Install and test lubricator.

13. Perform logs as per cased-hole logging plan shown in Table 11-7.

Note: Run RCBL with 500-psi pressure. If the RCBL result shows poor cement bonding or a low top of cement, the results should be communicated to DMR-O&G and an action plan will be prepared.

14. Perforate the Broom Creek Formation (ensure shots do not penetrate fiber-optic cable or downhole gauges. Perforations should be at least 10 ft away from gauge and fiber-optic cable). Actual perforation depths and design will be determined by designated geologists and engineers and based on the log analysis review and selected contractor.

    Note: DTS/DAS fiber-optic cable and casing-conveyed gauges will be run along the exterior of the long-string casing. Special clamps, bands, and centralizers are installed to protect the fiber and provide a marker for wireline operations.

15. TOOH with perforating guns.

16. Tally and pick up retrievable testing packer with surface readout downhole gauges, and run in the hole with work string to the top of the perforations.

17. Set packer above, at least 50 ft, top perforations to isolation and test the annulus to ensure seal and no communication with backside.

18. RU pump truck. Perform an injectivity test/SRT and pressure falloff test with fluid compatible with the formation. The SRT and pressure falloff test will be designed at a later time.

    Note: If the well shows poor injectivity, perform a near-wellbore/perforation cleanout using a designed concentration of acid. Adjust acid formulation and volumes with water samples and compatibility test. Maximum injection pressure is not to exceed formation fracture pressure. Ensure correct acid and additives are used and the acid formula is determined based on not only the acid/formation compatibility test result but also installed CRA material.

19. Release packer. TOOH, LD retrievable packer, and LD work string.

20. Prepare rig floor to install injection string assembly (injection tubing and packer).

21. RU wireline. Pick up (PU) wireline-set permanent packer to desired depth.

22. Set injection packer within 50 ft above the top perforations, according to manufacturer recommendations and DMR-O&G requirements.

    Note: Avoid setting packer within 10 ft of casing-conveyed gauges.

23. Tally, PU, and run completion assembly in accordance with program. Displace the well with inhibited packer fluid prior to latching 7-in., 25Cr-125 injection string into permanent packer.

24. Test packer to 1000 psi for 30 min. Ensure good seal.

25. Install tubing hanger.

26. Install BPV and ND BOP.

27. NU injection tree. Recover BPV.

28. Install test plug, and pressure-test injection tree to pressure rating. Recover test plug.

29. RDMO WO rig and equipment.

30. Schedule MIT with DMR-O&G inspector. Perform and record MIT with DMR-O&G representative present. Document MIT and submit to DMR-O&G.

### 11.3 Archie Erickson 2: Proposed Completion Procedure for Monitoring Well Operations

Archie Erickson 2 completion meets the requirements for a reservoir-monitoring well (Figures 11-5 and 11-6 and Table 11-8) to support deep subsurface monitoring of BK Fischer 1 and BK Fischer 2, the $CO_2$ injection wells. Monitoring of the $CO_2$ plume extent and the storage reservoir pressure will be conducted continuously through a casing-conveyed fiber-optic cable with DTS and pressure temperature gauges installed outside the long-string casing. Monitoring will be conducted during injection operations as well as during the postinjection site care (PISC) period (see Section 6.0).

Archie Erickson 2 has been drilled, logged, and completed as a monitoring well. This well is capable of being the reservoir-monitoring well for BK Fischer 1 and BK Fischer 2 injection wells.

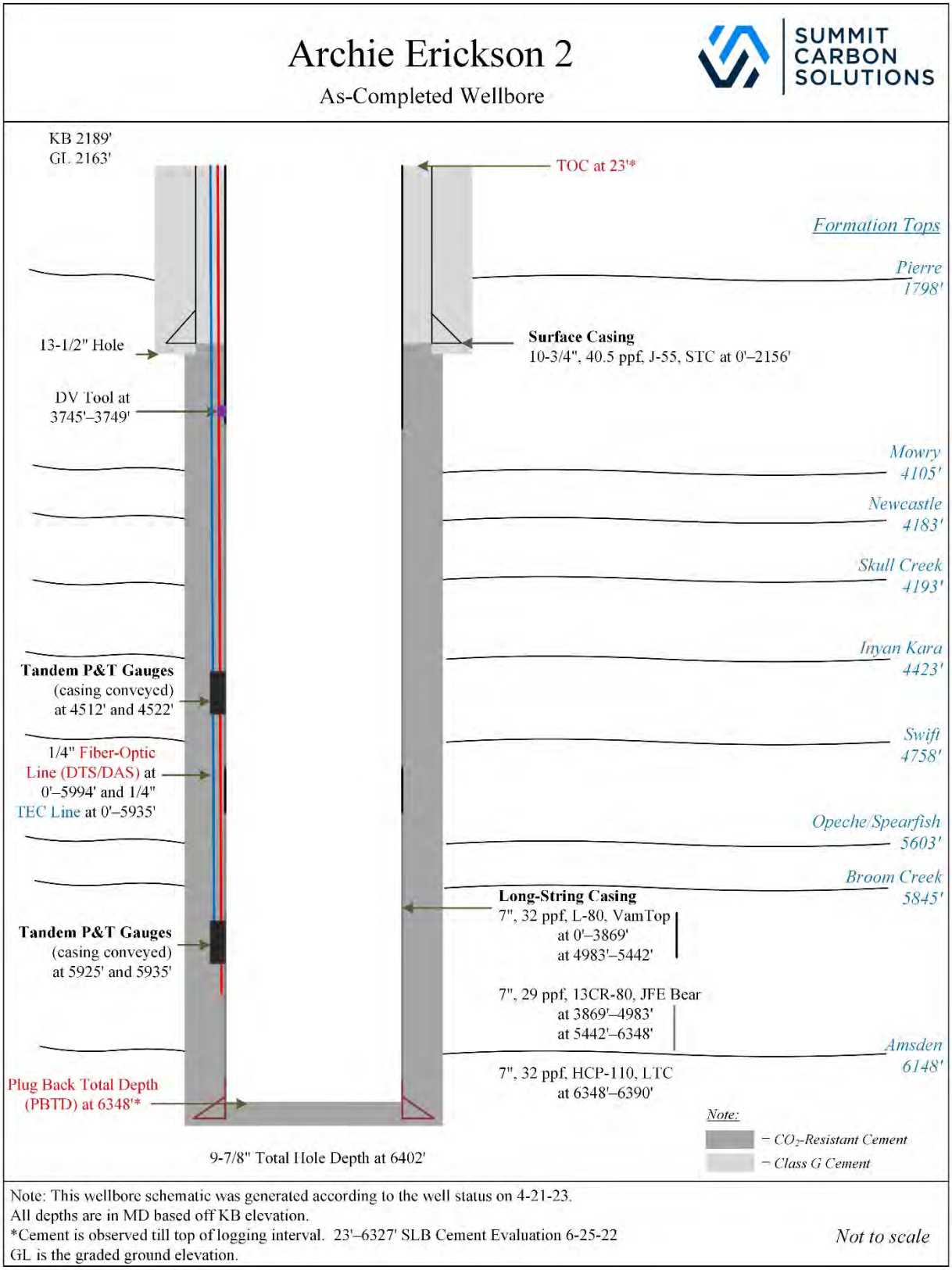



Figure 11-5. Archie Erickson 2 as-completed wellbore schematic.

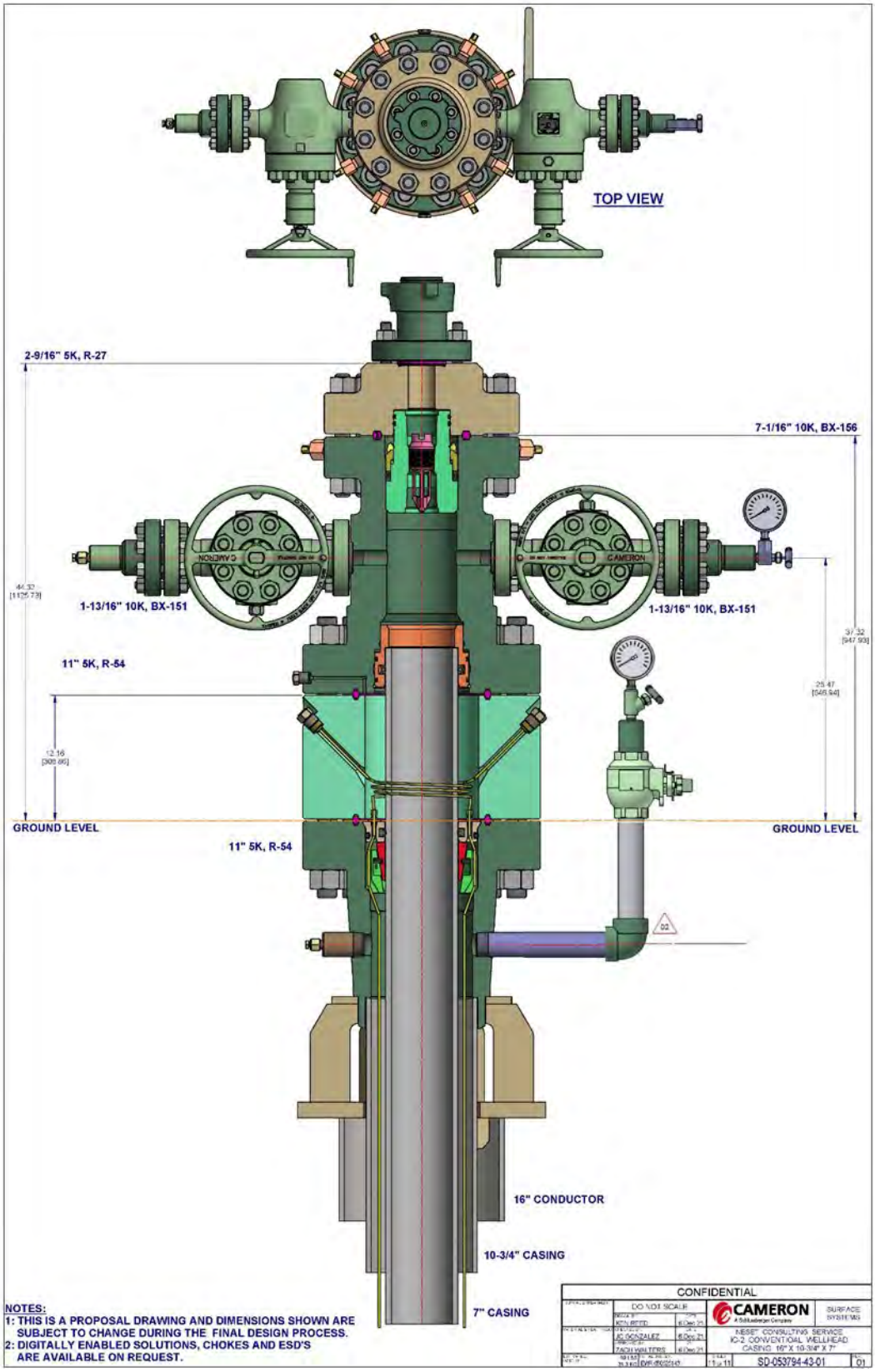



Figure 11-6. Archie Erickson 2 wellhead schematic.

**Table 11-8. Cased-Hole Logging Plan for the Archie Erickson 2**

| | Logging | Justification | Frequency | N.D.A.C. § 43-05-01- |
|---|---|---|---|---|
| **Long-String Section – No Tubing** | Sonic array logging (inclusive of RCBL, VDL, CCL), GR, and temperature log | Baseline already acquired to identify cement bond quality radially and evaluate cement top and zonal isolation. | Repeat when required and when tubing is pulled during workovers | 11.2(1)(c)(2) and (d) |
| | Ultrasonic logging tool (or other approved CIL) | Baseline already acquired. Run log to demonstrate external mechanical integrity. | | 11.2(1)(c)(2) and (d) |
| | PNL | Confirm internal and external mechanical integrity from Opeche/Spearfish Formation to surface. | Baseline and Year 1, Year 3, and at least once every 3 years thereafter (e.g., Years 6, 9, 12, etc.) | 11.4(g)(1) |
| | Temperature logging | Confirm external mechanical integrity and acquire baseline temperature profile. | Baseline and annually only if DTS fails | 11.2(1)(c)(2) and (d) |

# SECTION 12.0

# FINANCIAL ASSURANCE DEMONSTRATION PLAN

## 12.0 FINANCIAL ASSURANCE DEMONSTRATION PLAN

This financial assurance demonstration plan (FADP) is provided to meet the regulatory requirements for the geologic storage of $CO_2$ as prescribed by the state of North Dakota in North Dakota Administrative Code (N.D.A.C.) § 43-05-01-09.1. The storage facility permit (SFP) application must demonstrate that a financial instrument is in place that is sufficient to cover the costs associated with corrective actions and monitoring and reporting.

The FADP describes actions the operator of Summit Carbon Storage #2, LLC (SCS2) has taken and shall take to assure state and federal regulators that sufficient financial support is in place to cover the cost of any corrective action (N.D.A.C. § 43-05-01-05.1) that may be required at the geologic storage facility during any of its phases of operation, including: injection well plugging (N.D.A.C. § 43-05-01-11.5); postinjection site care (PISC) and facility closure (N.D.A.C. § 43-05-01-19); emergency and remedial response plan (ERRP) (N.D.A.C. § 43-05-01-13); and endangerment to underground sources of drinking water (USDW).

This FADP provides cost estimates for each of the above actions (Section 12.0) based on the information that is provided in the SFP application and describes the financial instruments that will be established (Section 12.3). The FADP was prepared to account for the entire operation of BK Fischer.

As the FADP was prepared, U.S. Environmental Protection Agency (EPA) guidance (2011) was also considered to assess the effectiveness of multiple qualifying financial instruments in the context of SCS2, e.g., key aspects of long-term public confidence, optimization of stakeholder interests, and practicality of implementation. Further, because of the structure of entity ownership, the FADP financial instruments were considered in evaluating the assurance approach during each of the operational periods.

SCS2 will establish a financial instrument(s) 30–60 days prior to inception of coverage, which is expected to be at or just prior to the commencement of injection operations. The applicant will provide a surety bond to ensure funds are available for PISC and facility closure activities in accordance with N.D.A.C. § 43-05-01-09.1(1)(a). It will also provide a third-party pollution liability insurance policy to cover emergency and remedial response costs, including endangerment to USDWs, in accordance with N.D.A.C. § 43-05-01-13, and a financial instrument to cover the costs of plugging the injection wells under N.D.A.C. § 43-05-01-11.5. No estimates have been provided for corrective action (N.D.A.C. § 43-05-01-05.1) because no action is required at this time.

The details contained in this FADP along with supporting documentation establish the approach the applicant proposes to use to meet the financial responsibility requirements and ensure that each of these instruments sufficiently addresses the activities and costs associated with the corrective action plan, injection well-plugging program, PISC and facility closure, ERRP, and endangerment of USDWs. The estimated total costs of these activities are presented in Table 12-1.

**Table 12-1. Potential Future Costs Covered by Financial Assurance**

| Phase | Activity | Total Cost | Covered by Surety | Covered by Pollution Liability Policy | Details in Supporting Table |
|---|---|---|---|---|---|
| Preinjection, Active Injection, and PISC | Corrective Action on Wells in Area of Review (AOR) | $0 | $0 | $0 | N/A |
| Cessation of Injection | Plugging of Injection Wells | $1,166,000 | $1,166,000 | $0 | Table 12-2 |
| PISC | PISC Storage Facility Monitoring and Injection Well Site Reclamation | $4,728,800 | $4,728,800 | $0 | Table 12-3a |
| PISC | Flowline Plugged and Abandoned (P&A) | $193,000 | $193,000 | $0 | Table 12-3b |
| PISC | Site Closure and Remediation | $656,000 | $656,000 | $0 | Table 12-4 |
| Active Injection/PISC | ERRP | $11,100,000 | $0 | $11,100,000 | Table 12-6 |
| Active Injection/ PISC | Endangerment of USDWs | $3,025,000 | $0 | $3,025,000 | Table 12-7 |
| | **Total** | **$20,868,800** | **$6,743,800** | **$14,125,000** | |

If there are any changes, updated information related to the financial instruments will be provided on an annual basis to the Department of Mineral Resources, Oil and Gas Division (DMR-O&G) for review and evaluation as required under N.D.A.C. § 43-05-01-09.1.

## 12.1 Facility Information

The facility name, facility contact, and injection well locations are provided below:

Facility Name: Summit Carbon Storage #2, LLC
Facility Contact: Wade Boeshans
Injection Well Locations: BK Fischer 1 and 2; NE¼ of Section 22, T142, R88W

## 12.2 Approach to Financial Responsibility Cost Estimates

In accordance with the requirements contained in N.D.A.C. § 43-05-01-09.1, the FADP provides financial assurance sufficient to cover the activities identified in the corrective action plan, injection well-plugging program, PISC and facility closure, ERRP, and endangerment of USDWs (Table 12-1). The following provides a summary description of the considerations and assessment approach for each activity.

### *12.2.1 Corrective Action*

According to N.D.A.C. § 43-05-01-05.1, corrective action involves inventorying and characterizing existing wells in the proposed AOR. The objective of a corrective action assessment is to describe the actions SCS2 will take, prior to and over the course of the project operation, on existing wells to proactively prevent the movement of fluid into or between USDWs. A detailed description of how the AOR was delineated can be found in Section 3.0 of this SFP application. SCS2 implemented the following workflow to estimate costs associated with corrective action

activities: 1) delineate the AOR and 2) identify and evaluate active and abandoned legacy wells within the AOR to ensure they meet the minimum completion standards for geologic storage of $CO_2$ and require no corrective action.

SCS2 has determined no wells in the proposed AOR require corrective action prior to or during the project operation, PISC, or postclosure period (Section 4.2). The only identified wellbore within the AOR boundary is the stratigraphic test and reservoir-monitoring well, Archie Erickson 2. SCS2 will employ a proactive monitoring approach to track the $CO_2$ plume extent and associated pressure front throughout the life of the project to ensure nonendangerment of USDWs, which includes acquiring time-lapse seismic and continuously monitoring reservoir pressure in the Broom Creek Formation at the $CO_2$ injection wells and reservoir-monitoring well (Section 5.7). For the avoidance of doubt, if injection or monitoring wells proposed as part of the SCS2 site operation require corrective action, such associated activities and costs relating thereto would be accounted for as part of the project's operating budget.

### *12.2.2 Plugging of Injection Wells*

SCS2 will include the costs associated with plugging injection wells during site program closure within the project cost, the FADP, and the proposed instruments that SCS2 will use for plugging (N.D.A.C. § 43-05-01-11.5[2]). The injection wells will be plugged at cessation of the injection operation as discussed in Section 6.0 of this SFP application. The estimate covers the aggregated plugging and abandonment (P&A) cost of SCS2 injector wells BK Fischer 1 and 2, including rig mobilization, workover rig and rentals, labor, cementing, logging, trucking, supervision, and project management (Table 12-2). The specifics of the plugging program of the BK Fischer 1 and 2 wells can be found in Section 10.0. Reservoir-monitoring well plugging is separately accounted for as part of facility closure.

**Table 12-2. Injection Well Plugging**

| Activity | Total Cost |
|---|---|
| Plugging BK Fischer 1 | $583,000 |
| Plugging BK Fischer 2 | $583,000 |
| **Total** | **$1,166,000** |

### *12.2.3 Implementation of the PISC Plan and Facility Closure Activities*

PISC and facility closure cost estimates include site monitoring and periodic reevaluation of the AOR, facilities maintenance and power costs, and overhead and support costs during the 10-year PISC period. Details of the activities and actions contained in the PISC and Facility Closure Plan can be found in Section 6.0 of this SFP application.

The total combined cost for the implementation of the PISC and facility closure activities is estimated to be $5,577,800, including $4,728,800 for implementing the PISC (Table 12-3a), $193,000 for flowline P&A (Table 12-3b), and $656,000 for facility closure activities (Table 12-4). The PISC includes the following: a) formation monitoring (i.e., pulsed-neutron logs

[PNL]), b) near-surface monitoring (i.e., soil gas and Fox Hills Formation testing) and mechanical integrity well tests (i.e., injection well annulus pressure, ultrasonic logging), and c) coordinated repeat time-lapse seismic. The largest element of the PISC cost estimate relates to seismic studies,

**Table 12-3a. Cost Estimate[1] for PISC Activities for BK Fischer Assuming a 10-year PISC Period**

| Activity | Frequency | Unit Cost | Total |
|---|---|---|---|
| **Injection Pad Reclamation** | | | |
| Reclamation Costs of the Injection Well Pad and Aboveground Structure Removal | Perform prior to facility closure (anticipated in Year 10 of postinjection). | $255,000 | $255,000 |
| **Wellbore Monitoring (Archie Erickson 2)** | | | |
| Overhead and Management | Overhead and management of monitoring activities for the whole duration of the PISC period | $60,000 | $600,000 |
| PNL (saturation monitoring) | Repeat PNL in Year 4 and Year 9 during the PISC period. | $45,000 | $90,000 |
| Ultrasonic Logging (or other approved CIL [casing inspection log]) | Repeat when required (assumes two occurrences). | $43,000 | $86,000 |
| Annulus Pressure Testing (internal mechanical integrity) | Repeat during workover operations in cases where the tubing must be pulled (assumes two occurrences). | $8,000 | $16,000 |
| Monitoring Surface Equipment Maintenance and Power | Quarterly inspections of wellhead and surface monitoring equipment. | $5,000 | $50,000 |
| **Near-Surface Monitoring** | | | |
| MSG02 and MSG05 – Sampling and Analysis | Collect three to four seasonal samples at each station (MSG02 and MSG05) in Years 1 and 3 of postinjection and every 3 years thereafter (e.g., Years 6 and 9) and perform concentration analyses on all samples. | $2,150 | $68,800 |
| Existing Groundwater Wells (MGW01)– Sampling and Analysis | Collect three to four seasonal samples in Years 1 and 3 of postinjection and at least once every 3 years thereafter until facility closure (anticipated in Year 10 of postinjection). | $1,500 | $24,000 |
| Existing Groundwater Wells (MGW03, MGW05, MGW06, and MGW08)– Sampling and Analysis | Collect three to four seasonal samples prior to facility closure (anticipated in Year 10 of postinjection). | $1,500 | $24,000 |
| Dedicated Fox Hills Wells (MGW10) – Sampling and Analysis | Collect annually until facility closure (anticipated in Year 10 of postinjection). | $1,500 | $15,000 |
| **Storage Complex Monitoring** | | | |
| Time-Lapse Seismic Survey Acquisition and Processing | Collect multiple repeat time-lapse seismic surveys during postinjection, with the first survey occurring by Year 4 of postinjection (assumes two occurrences). | $1,750,000 | $3,500,000 |
| Total for PISC Activities | | | $4,728,800 |

[1] Does not include interpretation and reporting. Costs are based on 2023 pricing and do not account for inflation.

which are required to be carried out at 5-year intervals to validate models, which are expected to cover an area up to 75 $mi^2$. Additionally, at the start of the PISC period, determined by cessation of injection operations, SCS2 will plug and abandon the BK Fischer 1 and 2 injection wells (Table 12-2) and conduct reclamation of injection well pad and aboveground structures, if no other beneficial use is determined at that time. SCS2 would leave intact for the period of the PISC the reservoir-monitoring well and the dedicated Fox Hills monitoring wells (MGW10). These costs for plugging and surface facility reclamation are included in Table 12-4.

*12.2.3.1 Plugging and Abandonment of Flowlines*

The application must demonstrate that a financial instrument is in place sufficient to cover the costs associated with abandonment of $100,000 or an amount determined by the Director of the DMR-O&G. This document describes the abandonment cost of the flowline and associated structures to be $193,000 (Table 12-3b).

The FADP describes actions the operator has taken and shall take to assure state and federal regulators that sufficient financial support is in place to cover the cost of abandonment which includes:

a) Disconnect and physically isolate the pipeline from any operating facility or other pipeline.
b) Cut off the pipeline or the part of the pipeline to be abandoned below surface at pipeline level.
c) Purge the pipeline with fresh water, air, or inert gas in a manner that effectively removes all fluid.
d) Remove cathodic protection from the pipeline.
e) Permanently plug or cap all open ends by mechanical means or welded means.

**Table 12-3b. Cost Estimate for Flowline Segment NDL-325 Abandonment**

| Activity | Timing | Description | Total |
|---|---|---|---|
| **Closure and Reclamation Costs** | | | |
| Isolation of Flowline from Operating Facility or Other Pipeline | Prior to facility closure | Disconnect and physically isolate the pipeline from any operating facility or other pipeline. | $20,000 |
| Cut of Flowline to Be Abandoned | Prior to facility closure | Cut off the pipeline or the part of the pipeline to be abandoned below surface at pipeline level. | $50,000 |
| Purge Flowline | Prior to facility closure | Purge the pipeline with fresh water, air, or inert gas in a manner that effectively removes all fluid. | $10,000 |
| Cathodic Protection Removal | Prior to facility closure | Remove cathodic protection from the flowline. | $10,000 |
| Remove Launcher/Receivers | Prior to facility closure | Remove 2 launcher and/or receiver (2 sites) associated with NDL-325. | $100,000 |
| Site Reclamation | Prior to facility closure | Main line valves (MLVs)/Launcher Receiver sites based on 0.06 ac/Site 2 sites (seed, seeding, soil prep, and mobilization). | $3,000 |
| Total for Flowline P&A Activities | | | $193,000 |

*12.2.3.2 Facility Closure*

SCS2 will prepare and apply for facility closure to the DMR-O&G and, upon authorization from the DMR-O&G, will proceed with plugging the reservoir-monitoring wells and well pad reclamation as discussed in Section 6.0 of this SFP application. The specifics of the plugging program of the reservoir-monitoring well can be found in Section 10.0. The estimate covers the aggregated P&A and reclamation cost of SCS2 reservoir-monitoring well, Archie Erickson 2, including rig mobilization, Fox Hills monitoring well P&A, soil gas profile station P&A, workover rig and rentals, equipment and labor, cementing, logging, trucking, dirt work, supervision, and project management (Table 12-4). SCS2 is planning that the Fox Hills monitoring well (MGW10) will remain in place because the groundwater monitoring locations may be wanted by DMR-O&G or SCS2 for future use; however, SCS2 has set aside funds in case P&A is required.

**Table 12-4. Cost Estimate[1] for Site Closure and Remediation Activities for BK Fischer $CO_2$ Storage Project**

| Activity | Timing | Description | Total |
|---|---|---|---|
| **Closure and Reclamation Costs** | | | |
| Plugging of Archie Erickson 2 | During facility closure | Plugging activities described in Section 10 plugging plan | $382,500 |
| Reclamation Costs of Archie Erickson 2 Well Pad | During facility closure | Wellhead removal, sump removal, pad reclamation (rock removal and soil coverage), fencing removal, reseeding, general labor | $255,000 |
| Fox Hills Monitoring Well P&A[2] | During facility closure | Pipe removal, pad reclamation (rock removal and soil coverage), reseeding, general labor of MGW10 | $16,000 |
| MSG P&A[2] | During facility closure | P&A of MSG02 and MSG05. | $2500 ($1250 per well) |
| Total for Closure Activities | | | $656,000 |

[1] Does not include interpretation and reporting. Costs are based on 2023 pricing and do not account for inflation.
[2] P&A assumed unless the DMR-O&G requests transfer of ownership.

### *12.2.4 Implementation of Emergency and Remedial Response Actions*

*12.2.4.1 Emergency Response Actions*

The ERRP and associated detailed assessment can be found in Section 7.0 of this SFP application. The ERRP assessment supports a determination that the likelihood of release of significant volumes of $CO_2$ from underground storage into the soil or the atmosphere or significant volumes of saltwater into the environment are considered remote. Multiple factors were considered in the development of the ERRP, including:

a) Extensive and independently verified analysis of the integrity of the storage mechanism.
b) Selection of qualified and experienced storage facility operator.
c) Selection of qualified and experienced drilling contractor.

Risk mitigation measures include:

a) Continuous monitoring of transportation and injection systems.
b) Routine measurement and reporting of $CO_2$ volumes.
c) Physical security, barriers, and signage around injection facilities.
d) Primary and secondary containment for leaked fluids at injection well pads.

A review of the ERRP technical risk categories for SCS2 identified a list of events that could potentially result in the movement of injected $CO_2$ or formation fluids in a manner that may endanger a USDW and require an emergency response. These events are as follows:

a) Loss of injectivity
b) Lower storage capacity than modeled
c) Containment loss – lateral migration of $CO_2$
d) Containment loss – pressure propagation
e) Containment loss – vertical migration of $CO_2$ or formation water brine via injection wells, other wells, or inadequate confining zones
f) Natural disasters

If it is determined that one or more of these events has occurred, the emergency response actions that will be implemented are described in the ERRP (Section 7.0) of this SFP application. SCS2 planned response actions are summarized in Table 7-6.

*12.2.4.2 Estimation of Costs of Emergency Response Actions*

Estimating the costs of implementing the emergency response actions in Table 7-6 is challenging since remediation measures specifically dedicated to $CO_2$ storage impacts are poorly documented, with one of the more important data gaps being the lack of precise knowledge of the leakage mechanisms and associated impacts (Manceau and others, 2014). Furthermore, to date, no remediation action following $CO_2$ leakage after geologic storage has ever been implemented mainly because of the absence of established impacts (Manceau and others, 2014). Consequently, the degree of maturity of remediation measures in the carbon capture and storage (CCS) field is low, making it necessary to rely on literature that is primarily based on modeling or hypotheticals with other release and loss containment events, e.g., the analogy between $CO_2$ and volatile organic compounds, the latter having been addressed extensively in the literature. Additionally, for the remedial measures, costs and time for adequate removal are generally site-dependent, and no information is specifically available in this area in the CCS field.

12.2.4.2.1 Identification of Remediation Technologies

Manceau and others (2014) identified several remediation technologies/strategies that are available to address the potential impacted media that may result from an emergency event. These impacted media and remediation measures are listed in Table 12-5. The impacted media in Table 12-5 include surface and groundwater/USDW, vadose zone, indoor settings, and atmosphere; the remedial measures include a combination of active (e.g., air sparging) and passive (e.g., dispersion, natural attenuation) systems.

**Table 12-5. Proposed Technologies/Strategies for Remediation of Potential Impacted Media**

| Impacted Media | Potential Remedial Measures |
|---|---|
| Groundwater/USDW | Monitored natural attenuation<br>Pump-and-treat<br>Air sparging<br>Permeable reactive barrier<br>Extraction/injection<br>Biological remediation |
| Vadose Zone (soil gas) | Monitored natural attenuation<br>Soil vapor extraction<br>pH adjustment (via spreading of alkaline supplements, irrigation, and drainage) |
| Surface Water | Passive systems, e.g., natural attenuation<br>Active treatment systems |
| Atmosphere | Passive systems, e.g., natural mixing, dispersion |
| Indoor/Workplace Settings | Sealing of leak points<br>Depressurization<br>Ventilation |

However, it is important to note that, at this time, no methodology is widely accepted for designing intervention and remediation plans for $CO_2$ geologic storage projects. In an effort to establish SCS2's site-specific financial assurance obligation, three areas were evaluated, as follows:

1) Cost estimates specific to remediation within SCS2's AOR,
2) Methodologies and estimates from permitted North Dakota storage facilities, and
3) Existing literature (Manceau and others, 2014; Bielicki and others, 2014).

12.2.4.2.2 Estimation of Costs for Implementing Emergency Event Responses

SCS2 has compiled cost estimates regarding a conservative hypothetical emergency event scenario to provide for future financial assurance. This conservative outer-limit cost estimate was calculated and used as a basis for this FADP.

*Emergency Remedial Response Scenarios*

The applicant formed a team to evaluate and quantify project risks based upon the scenarios described in the ERRP. The team consisted of members with relevant professional qualifications and experience in subsurface analysis, drilling engineering, facilities engineering, operations, well control events, and finance. The team evaluated and considered hypothetical scenarios for costs estimates in this document and identified site-specific financial risks.

Following the identification of financial risks, the applicant compiled cost estimates associated with a conservative hypothetical scenario wherein a failure of well integrity in an injection well causes a loss of containment in which a significant volume of $CO_2$ and briny water

migrates to the surface during injection operations through one of the injection wells. The conservative hypothetical scenario response action includes potential responses including but not limited to securing the location, diagnostics, well control and containment activities, remediation of injection well integrity, evaluation of environmental impacts, installation of monitoring equipment, and execution of surface remediation. The remediation plan would be discussed with DMR-O&G. The scenario contemplates a reactive response approach, e.g., mobilization of response personnel and equipment upon discovery of such an event to diagnose and develop a remediation plan. This approach is considered appropriate because of the remoteness of the residual risk. Specific postoccurrence action is not determinable until occurrence; thus actual response to such an event would be based on its severity. Because of the remote likelihood, this single conservative scenario was compiled to account for the outer-limit cost estimate to satisfy event response. The scenario used for cost estimating assumed the optimal operating conditions (10 years of operation) requiring outer-limit response and remediation costs. This conservative outer-limit cost estimate was calculated and used as a basis for this FADP.

*Endangerment of Drinking Water Sources*

As discussed in the ERRP section, the risk of endangerment to USDWs is considered remote. However, as part of the reactive response scenario contemplated in the ERRP cost estimate, the applicant assessed the specific response actions and cost data to represent the likely impact of such an event on sources of drinking water. Because of precautions taken in the design for spill control and pollution prevention, the well pad design incorporates a berm that, in combination with the response strategy, would minimize this portion of environmental repair. Thus, the applicant assessed the second reactive scenario, which contemplates a subsurface leak scenario. This subsurface leak scenario has primary costs related to groundwater delineation and an extended period (10 years) of quarterly monitoring and reporting after emergency remedial actions are taken.

*Selected Elements of Analysis of Inherent Risks*

From the surface to the lowermost USDW—the Fox Hills Aquifer—the groundwater is considered a protected aquifer with <10,000 ppm TDS (total dissolved solids). The Fox Hills base is estimated at a depth of approximately 1000 ft and is followed by a thick section of clays with a thickness of approximately 2600 ft. These clays act as a seal until the next major permeable zone, the Inyan Kara. The Inyan Kara is an underpressured formation that is classified as an exempt aquifer under North Dakota Century Code (N.D.C.C.) § 43-02-05-03 west of the 83W range line, and this formation is mostly targeted for water disposal wells in those areas. Approximately 1087 ft of cap rock acts as a main seal between the Inyan Kara zone and the Broom Creek.

Inside the AOR, 39 domestic water wells, 39 stock water wells, one industrial water well, 49 water monitoring wells, and 2 Department of Water Resources wells are located in shallow aquifers, providing water for the associated farms' livestock, irrigation, and localized consumption (Figure 4-3). Two existing wells that penetrate the Fox Hills Formation (MGW01 and MGW06) and one new Fox Hills monitoring well (MGW10) will monitor the lowest USDW within the AOR, as shown in Figure 5-4 and discussed in the testing and monitoring strategy (Section 5.7).

No producible oil, natural gas, or other reserves are reported in the AOR for the Broom Creek Formation or overlying formations. As described in the AOR and corrective action section (Section 4.0) for the SCS2 storage reservoir, one deep well penetrates the storage complex (the

Archie Erickson 2 stratigraphic wellbore) within or in proximity to the plume boundaries and the identified pressure front. These wells are identified in Section 4.2.

Currently, no existing mines have plans to mine coal in the storage facility area (SFA) during the project's operational period. The Coyote Creek Mine is the closest mine to the SFA's northwest boundary, but through verification of its extended mine plan map filed with the ND PSC Reclamation Division (Extended Mining Plan Map, Section 3.1.4, NDPSC- Reclamation Division Permit # NACC-1302, Rev. 11), Coyote Creek Mine shows no coal development within the SFA boundary; this extended mine plan map references plans through 2040. The Beulah Mine is a mine near the northern storage facility boundary area that no longer has active coal removal and is undergoing final reclamation.

12.2.4.2.3 Cost Estimates

The tables in Section 12 provide a detailed estimate, in current dollars (2023), of the cost for performing corrective actions on wells in the AOR, plugging the injection well, PISC and facility closure, endangerment to USDWs, flowline abandonment and ERRP. Table 12-1 is a summary of the cost estimates underlying the FADP, identifying proposed financial instrument(s) that will provide the appropriate assurance to regulatory agencies of the applicant's intent and ability to fulfill its responsibilities.

The values included in the FADP are based on cost estimates provided during the permit application development process and are based on the hiring of a third party to perform the services or procurement of goods associated with performance. For that reason, the estimate includes costs such as project management and oversight, general and administrative costs, and overhead during the postinjection period. These values are subject to change during the course of the project to account for inflation of costs and any changes to the project that affect the cost of the covered activities. SCS2 will adjust the value of the financial instruments if the cost estimates change, and it will submit any adjustment to DMR-O&G for approval (N.D.A.C. § 43-05-01-09.1[3] and N.D.A.C. § 43-05-01-19).

Tables 12-6 and 12-7 provide additional information for the future cost estimates provided in Table 12-1.

**Table 12-6. Cost Estimate for Emergency and Remedial Response Plan***

| Activity/Item | Cost |
|---|---|
| General Incident Response and Diagnostics | $600,000 |
| Well Control and Containment Activities | $8,100,000 |
| Well Integrity and Site Remediation Activities | $2,400,000 |
| **Total** | **$11,100,000** |

* These costs are based on activities in response to a hypothetical scenario with remote risk of occurrence. Costs are based on estimates of current (2023) contract rates.

**Table 12-7. Cost Estimate for Endangerment of USDWs***

| Description | Total Estimated Amount |
|---|---|
| General Response, Delineation, and Water Replacement | $2,220,000 |
| Quarterly Groundwater Monitoring (10 years) and Reporting | $750,000 |
| P&A of Groundwater-Monitoring Wells | $55,000 |
| **Total** | **$3,025,000** |

* These costs are based on activities in response to a hypothetical scenario with remote risk of occurrence. Costs are based on estimates of current (2023) contract rates.

## 12.3 Financial Instruments

The applicant will establish a financial instrument(s) 30–60 days prior to inception of coverage, which is expected to be at or just prior to the commencement of injection operations (N.D.A.C. § 43-05-01-09.1. The applicant will provide financial assurance in the form of a surety bond to ensure funds are available for PISC and facility closure activities (N.D.A.C. § 43-05-01-09.1[1][a] and N.D.A.C. § 43-05-01-19). The applicant will also obtain a pollution liability policy(s) to cover emergency and remedial response costs and endangerment of USDWs under N.D.A.C. § 43-05-01-13 and a financial instrument (surety bond) to cover the costs of plugging the injection wells (N.D.A.C. § 43-05-01-11.5). No estimates have been provided for corrective action (N.D.A.C. § 43-05-01-05.1) because no action is required at this time.

This application presents the estimated total costs ($20,868,800) of these activities and a breakdown apportionment across proposed financial instruments in Table 12-1. Section 12.2 of this FADP provides additional details of the financial responsibility cost estimates for each activity.

The company providing insurance will meet all the following criteria:

1. The company is authorized to transact business in North Dakota.

2. The company has either passed the specified financial strength requirements based on credit ratings or has met a minimum rating, minimum capitalization, and ability to pass the rating, when applicable.

3. The third-party insurance can be maintained until such a time that DMR-O&G determines that the storage operator has fulfilled its financial obligations.

The third-party insurance, which identifies SCS2 as the covered party, will be provided by one or a combination of the companies meeting the creditworthiness and other requirements of N.D.A.C. §43-05-01-09.1. However, the greatest hypothetical exposure evaluated would be an acute upward migration through a $CO_2$ injection well, which would have an estimated cost of $14,125,000 for emergency and remedial response actions, as well as coverage identified in the endangerment of USDWs.

Coverage terms are of an indicative/estimated nature only at this time, as firm and bindable terms are not possible this far in advance of commencement of injection operations; however, final

coverage terms and costs will be determined upon full underwriting and firm/bindable quotations to be issued by insurers 30–60 days prior to inception of coverage, which is expected to be at or just prior to the commencement of injection operations. The actual third-party insurance companies will be determined closer to the proposed injection start date and will meet both of the following criteria, as specified in N.D.A.C. §43-05-01-09.1(1)(g):

1. The companies satisfy financial strength requirements based on credit ratings in the top four categories of either Standard & Poor's (AAA, AA, A, or BBB) or Moody's (Aaa, Aa, A, Baa).

2. The companies meet a minimum rating (minimum rating based on an issuer, credit, securities, or financial strength rating as a demonstration of financial stability) and minimum capitalization (i.e., demonstration that minimum thresholds are met for the following financial ratios: debt–equity, assets–liabilities, cash return on liabilities, liquidity, and net profit) and are able to pass bond rating in the top four categories of either Standard & Poor's (AAA, AA, A, or BBB) or Moody's (Aaa, Aa, A, Baa), when applicable.

## 12.4 References

Bielicki, J.M., Pollak, M.F., Fitts, J.P., Peters, C.A., and Wilson, E.J., 2014, Causes and financial consequences of geologic $CO_2$ storage reservoir leakage and interference with other subsurface resources: International Journal of Greenhouse Gas Control, v. 20, p. 272–284.

Manceau, J.C., Hatzignatiou, D.G., de Lary, L., Jensen, N.B., and Réveillère, A., 2014, Mitigation and remediation technologies and practices in case of undesired migration of $CO_2$ from a geological storage unit—current status: International Journal of Greenhouse Gas Control, v. 22, p. 272–290.

U.S. Environmental Protection Agency, 2011, Geologic sequestration of carbon dioxide—underground injection control (UIC) Program Class VI financial responsibility guidance: www.epa.gov/sites/default/files/2015-06/documents/uicfinancialresponsibilityguidance final072011v.pdf (accessed November 2023).

# APPENDIX A

# WELL AND WELL FORMATION FLUID SAMPLING LAB ANALYSIS

**MINNESOTA VALLEY TESTING LABORATORIES, INC.**
1126 North Front St. ~ New Ulm, MN 56073 ~ 800-782-3557 ~ Fax 507-359-2890
2616 East Broadway Ave. ~ Bismarck, ND 58501 ~ 800-279-6885 ~ Fax 701-258-9724
1201 Lincoln Hwy. ~ Nevada, IA 50201 ~ 800-362-0855 ~ Fax 515-382-3885
www.MVTL.com

**Account #:** 74217 **Client:** Neset Consulting
**Workorder:** Archie Erickson 2 (966)

Jean Datahan
Neset Consulting
6844 Hwy 40
Tioga, ND 58852

**Certificate of Analysis**

## Approval

**All data reported has been reviewed and approved by:**

Claudette Carroll, Lab Manager Bismarck, ND

Analyses performed under Minnesota Department of Health Accreditation conforms to the current TNI standards.

NEW ULM LAB CERTIFICATIONS:
MN LAB # 027-015-125 ND WW/DW # R-040

BISMARCK LAB CERTIFICATIONS:
MN LAB # 038-999-267 ND W/DW # ND-016 SD SDWA

MVTL guarantees the accuracy of the analysis done on the sample submitted for testing. It is not possible for MVTL to guarantee that a test result obtained on a particular sample will be the same on any other sample unless all conditions affecting the sample are the same, including sampling by MVTL. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

**MINNESOTA VALLEY TESTING LABORATORIES, INC.**
1126 North Front St. ~ New Ulm, MN 56073 ~ 800-782-3557 ~ Fax 507-359-2890
2616 East Broadway Ave. ~ Bismarck, ND 58501 ~ 800-279-6885 ~ Fax 701-258-9724
1201 Lincoln Hwy. ~ Nevada, IA 50201 ~ 800-362-0855 ~ Fax 515-382-3885
www.MVTL.com

**Account #:** 74217 **Client:** Neset Consulting

## Workorder Summary

### Workorder Comments

All samples that have analytes analyzed by method 6010D or 6020B that have a number other than 1 displayed in the DF column required dilution due to matrix and/or high concentration of target analytes. Reporting limits have been raised to account for dilution.

### Analysis Results Comments

***966001 (Inyan Kara)***

Sample analyzed beyond holding time.(pH)

***966002 (Broom Creek)***

Sample analyzed beyond holding time.(pH)

MVTL guarantees the accuracy of the analysis done on the sample submitted for testing. It is not possible for MVTL to guarantee that a test result obtained on a particular sample will be the same on any other sample unless all conditions affecting the sample are the same, including sampling by MVTL. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

**MINNESOTA VALLEY TESTING LABORATORIES, INC.**
1126 North Front St. ~ New Ulm, MN 56073 ~ 800-782-3557 ~ Fax 507-359-2890
2616 East Broadway Ave. ~ Bismarck, ND 58501 ~ 800-279-6885 ~ Fax 701-258-9724
1201 Lincoln Hwy. ~ Nevada, IA 50201 ~ 800-362-0855 ~ Fax 515-382-3885
www.MVTL.com

**Account #:** 74217 **Client:** Neset Consulting

## Analytical Results

**Lab ID:** 966001 **Date Collected:** 05/06/2022 03:53 **Matrix:** Groundwater
**Sample ID:** Inyan Kara **Date Received:** 05/06/2022 08:10 **Collector:** MVTL Field Service

**Temp @ Receipt (C):** 6.3 **Received on Ice:** Yes

### Calculated

**Method: SM1030F**

| Parameter | Results | Units | RDL | DF | Prepared | Analyzed | By | Cert | Qual |
|---|---|---|---|---|---|---|---|---|---|
| Cation Summation | **53.6** | meq/L | | 1 | 06/01/2022 08:20 | 06/01/2022 08:20 | CW | | |
| Anion Summation | **56.0** | meq/L | | 1 | 06/01/2022 08:20 | 06/01/2022 08:20 | CW | | |
| Percent Difference | **-2.23** | % | | 1 | 06/01/2022 08:20 | 06/01/2022 08:20 | CW | | |

### Inorganic Chemistry

**Method: ASTM D516-11**

| Parameter | Results | Units | RDL | DF | Prepared | Analyzed | By | Cert | Qual |
|---|---|---|---|---|---|---|---|---|---|
| Sulfate | **1270** | mg/L | 100 | 20 | 05/11/2022 08:45 | 05/11/2022 08:45 | SRD | MA,NDA | |

**Method: EPA 350.1**

| Parameter | Results | Units | RDL | DF | Prepared | Analyzed | By | Cert | Qual |
|---|---|---|---|---|---|---|---|---|---|
| Ammonia as N | **1.04** | mg/L | 0.2 | 1 | 05/09/2022 10:25 | 05/09/2022 10:25 | EJV | | |

**Method: EPA 353.2**

| Parameter | Results | Units | RDL | DF | Prepared | Analyzed | By | Cert | Qual |
|---|---|---|---|---|---|---|---|---|---|
| Nitrate + Nitrite as N | <0.2 | mg/L | 0.2 | 1 | 05/12/2022 10:51 | 05/12/2022 10:51 | EJV | MA,NDA | |

**Method: SM 5310C-2014**

| Parameter | Results | Units | RDL | DF | Prepared | Analyzed | By | Cert | Qual |
|---|---|---|---|---|---|---|---|---|---|
| Total Organic Carbon | **49.1** | mg/L | 0.5 | 10 | 05/17/2022 08:23 | 05/17/2022 08:23 | NS | MA,NDA | |

**Method: SM2320 B-2011**

| Parameter | Results | Units | RDL | DF | Prepared | Analyzed | By | Cert | Qual |
|---|---|---|---|---|---|---|---|---|---|
| Alkalinity, Total | **399** | mg/L as CaCO3 | 20.5 | 1 | 05/09/2022 15:02 | 05/09/2022 15:02 | RAA | MA,NDA | |
| Alkalinity, Phenolphthalein | <20.5 | mg/L as CaCO3 | 20.5 | 1 | 05/09/2022 15:02 | 05/09/2022 15:02 | RAA | | |
| Carbonate | <20.5 | mg/L as CaCO3 | 20.5 | 1 | 05/09/2022 15:02 | 05/09/2022 15:02 | RAA | | |
| Bicarbonate | **397** | mg/L as CaCO3 | 20.5 | 1 | 05/09/2022 15:02 | 05/09/2022 15:02 | RAA | | |
| Hydroxide | <20.5 | mg/L as CaCO3 | 20.5 | 1 | 05/09/2022 15:02 | 05/09/2022 15:02 | RAA | | |

MVTL guarantees the accuracy of the analysis done on the sample submitted for testing. It is not possible for MVTL to guarantee that a test result obtained on a particular sample will be the same on any other sample unless all conditions affecting the sample are the same, including sampling by MVTL. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

**MINNESOTA VALLEY TESTING LABORATORIES, INC.**
1126 North Front St. ~ New Ulm, MN 56073 ~ 800-782-3557 ~ Fax 507-359-2890
2616 East Broadway Ave. ~ Bismarck, ND 58501 ~ 800-279-6885 ~ Fax 701-258-9724
1201 Lincoln Hwy. ~ Nevada, IA 50201 ~ 800-362-0855 ~ Fax 515-382-3885
www.MVTL.com

**Account #:** 74217 **Client:** Neset Consulting

## Analytical Results

**Lab ID:** 966001 **Date Collected:** 05/06/2022 03:53 **Matrix:** Groundwater
**Sample ID:** Inyan Kara **Date Received:** 05/06/2022 08:10 **Collector:** MVTL Field Service

**Temp @ Receipt (C):** 6.3 **Received on Ice:** Yes

### Inorganic Chemistry

**Method: SM2510 B-2011 EC**

| Parameter | Results | Units | RDL | DF | Prepared | Analyzed | By | Cert | Qual |
|---|---|---|---|---|---|---|---|---|---|
| Specific Conductance | **5105** | umhos/cm | 1 | 1 | 05/09/2022 15:02 | 05/09/2022 15:02 | RAA | MA,NDA | |

**Method: SM4500 H+ B-2011**

| Parameter | Results | Units | RDL | DF | Prepared | Analyzed | By | Cert | Qual |
|---|---|---|---|---|---|---|---|---|---|
| pH | **8.3** | units | 0.1 | 1 | 05/09/2022 15:02 | 05/09/2022 15:02 | RAA | MA,NDA | * |

**Method: SM4500-Cl-E 2011**

| Parameter | Results | Units | RDL | DF | Prepared | Analyzed | By | Cert | Qual |
|---|---|---|---|---|---|---|---|---|---|
| Chloride | **766** | mg/L | 10.0 | 5 | 05/09/2022 12:12 | 05/09/2022 12:12 | SRD | MA,NDA | |

**Method: USGS I-1750-85**

| Parameter | Results | Units | RDL | DF | Prepared | Analyzed | By | Cert | Qual |
|---|---|---|---|---|---|---|---|---|---|
| Total Dissolved Solids | **3340** | mg/L | 10 | 1 | 05/09/2022 13:50 | 05/09/2022 13:50 | RAA | MA,NDA | |

### Metals

**Method: EPA 245.1**

| Parameter | Results | Units | RDL | DF | Prepared | Analyzed | By | Cert | Qual |
|---|---|---|---|---|---|---|---|---|---|
| Mercury, Dissolved | <0.0002 | mg/L | 0.0002 | 1 | 05/10/2022 14:24 | 05/09/2022 13:30 | MDE | MA,NDA | |

**Method: EPA 6010D**

| Parameter | Results | Units | RDL | DF | Prepared | Analyzed | By | Cert | Qual |
|---|---|---|---|---|---|---|---|---|---|
| Calcium | **20.8** | mg/L | 5 | 5 | 05/06/2022 16:55 | 05/16/2022 13:39 | SLZ | MA,NDA | |
| Magnesium | <5 | mg/L | 5 | 5 | 05/06/2022 16:55 | 05/16/2022 13:39 | SLZ | MA,NDA | |
| Sodium | **1200** | mg/L | 5 | 5 | 05/06/2022 16:55 | 05/16/2022 13:39 | SLZ | MA,NDA | |
| Potassium | **6.19** | mg/L | 5 | 5 | 05/06/2022 16:55 | 05/16/2022 13:39 | SLZ | MA,NDA | |
| Iron | <0.5 | mg/L | 0.5 | 5 | 05/06/2022 16:55 | 05/10/2022 12:58 | SLZ | MA,NDA | |
| Manganese | <0.25 | mg/L | 0.25 | 5 | 05/06/2022 16:55 | 05/10/2022 12:58 | SLZ | MA,NDA | |
| Barium, Dissolved | <0.5 | mg/L | 0.5 | 5 | 05/11/2022 15:02 | 05/12/2022 11:03 | SLZ | MA,NDA | |
| Strontium, Dissolved | **0.89** | mg/L | 0.5 | 5 | 05/11/2022 15:02 | 05/12/2022 11:03 | SLZ | MA,NDA | |

MVTL guarantees the accuracy of the analysis done on the sample submitted for testing. It is not possible for MVTL to guarantee that a test result obtained on a particular sample will be the same on any other sample unless all conditions affecting the sample are the same, including sampling by MVTL. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

**MINNESOTA VALLEY TESTING LABORATORIES, INC.**
1126 North Front St. ~ New Ulm, MN 56073 ~ 800-782-3557 ~ Fax 507-359-2890
2616 East Broadway Ave. ~ Bismarck, ND 58501 ~ 800-279-6885 ~ Fax 701-258-9724
1201 Lincoln Hwy. ~ Nevada, IA 50201 ~ 800-362-0855 ~ Fax 515-382-3885
www.MVTL.com

**Account #:** 74217 **Client:** Neset Consulting

## Analytical Results

**Lab ID:** 966001 **Date Collected:** 05/06/2022 03:53 **Matrix:** Groundwater
**Sample ID:** Inyan Kara **Date Received:** 05/06/2022 08:10 **Collector:** MVTL Field Service

**Temp @ Receipt (C):** 6.3 **Received on Ice:** Yes

### Metals

**Method: EPA 6020B**

| Parameter | Results | Units | RDL | DF | Prepared | Analyzed | By | Cert | Qual |
|---|---|---|---|---|---|---|---|---|---|
| Arsenic, Dissolved | <0.002 | mg/L | 0.002 | 5 | 05/11/2022 15:02 | 05/24/2022 15:10 | MDE | MA,NDA | |
| Chromium, Dissolved | **0.0037** | mg/L | 0.002 | 5 | 05/11/2022 15:02 | 05/24/2022 15:10 | MDE | MA,NDA | |
| Lead, Dissolved | **0.0014** | mg/L | 0.0005 | 5 | 05/11/2022 15:02 | 05/24/2022 15:10 | MDE | MA,NDA | |
| Selenium, Dissolved | <0.005 | mg/L | 0.005 | 5 | 05/11/2022 15:02 | 05/24/2022 15:10 | MDE | MA,NDA | |
| Silver, Dissolved | <0.0005 | mg/L | 0.0005 | 5 | 05/11/2022 15:02 | 05/24/2022 15:10 | MDE | MA,NDA | |
| Cadmium, Dissolved | <0.0005 | mg/L | 0.0005 | 5 | 05/11/2022 15:02 | 05/24/2022 15:10 | MDE | MA,NDA | |
| Molybdenum, Dissolved | **0.0106** | mg/L | 0.002 | 5 | 05/11/2022 15:02 | 05/24/2022 15:10 | MDE | MA,NDA | |
| Copper, Dissolved | **0.0228** | mg/L | 0.002 | 5 | 05/11/2022 15:02 | 05/24/2022 15:10 | MDE | MA,NDA | |

### Sampling Information

**Method: 120.1**

| Parameter | Results | Units | RDL | DF | Prepared | Analyzed | By | Cert | Qual |
|---|---|---|---|---|---|---|---|---|---|
| Specific Conductance - Field | **5744** | umhos/cm | 1 | 1 | 05/06/2022 03:53 | 05/06/2022 03:53 | JSM | | |

**Method: 150.2**

| Parameter | Results | Units | RDL | DF | Prepared | Analyzed | By | Cert | Qual |
|---|---|---|---|---|---|---|---|---|---|
| pH - Field | **8.15** | units | 0.01 | 1 | 05/06/2022 03:53 | 05/06/2022 03:53 | JSM | | |

**Method: 170.1**

| Parameter | Results | Units | RDL | DF | Prepared | Analyzed | By | Cert | Qual |
|---|---|---|---|---|---|---|---|---|---|
| Temperature - Field C | **17.97** | degrees C | | 1 | 05/06/2022 03:53 | 05/06/2022 03:53 | JSM | | |

MVTL guarantees the accuracy of the analysis done on the sample submitted for testing. It is not possible for MVTL to guarantee that a test result obtained on a particular sample will be the same on any other sample unless all conditions affecting the sample are the same, including sampling by MVTL. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

Report Date: Wednesday, June 1, 2022 8:44:42 AM

**MINNESOTA VALLEY TESTING LABORATORIES, INC.**
1126 North Front St. ~ New Ulm, MN 56073 ~ 800-782-3557 ~ Fax 507-359-2890
2616 East Broadway Ave. ~ Bismarck, ND 58501 ~ 800-279-6885 ~ Fax 701-258-9724
1201 Lincoln Hwy. ~ Nevada, IA 50201 ~ 800-362-0855 ~ Fax 515-382-3885
www.MVTL.com

**Account #:** 74217 **Client:** Neset Consulting

## Analytical Results

**Lab ID:** 966002 **Date Collected:** 05/06/2022 03:40 **Matrix:** Groundwater
**Sample ID:** Broom Creek **Date Received:** 05/06/2022 08:10 **Collector:** MVTL Field Service

**Temp @ Receipt (C):** 6.3 **Received on Ice:** Yes

### Calculated

**Method: SM1030F**

| Parameter | Results | Units | RDL | DF | Prepared | Analyzed | By | Cert | Qual |
|---|---|---|---|---|---|---|---|---|---|
| Cation Summation | **1960** | meq/L | | 1 | 06/01/2022 08:21 | 06/01/2022 08:21 | CW | | |
| Anion Summation | **2210** | meq/L | | 1 | 06/01/2022 08:21 | 06/01/2022 08:21 | CW | | |
| Percent Difference | **-5.92** | % | | 1 | 06/01/2022 08:21 | 06/01/2022 08:21 | CW | | |

### Inorganic Chemistry

**Method: ASTM D516-11**

| Parameter | Results | Units | RDL | DF | Prepared | Analyzed | By | Cert | Qual |
|---|---|---|---|---|---|---|---|---|---|
| Sulfate | **2800** | mg/L | 100 | 20 | 05/11/2022 08:46 | 05/11/2022 08:46 | SRD | MA,NDA | |

**Method: EPA 350.1**

| Parameter | Results | Units | RDL | DF | Prepared | Analyzed | By | Cert | Qual |
|---|---|---|---|---|---|---|---|---|---|
| Ammonia as N | **0.34** | mg/L | 0.2 | 1 | 05/09/2022 10:26 | 05/09/2022 10:26 | EJV | | |

**Method: EPA 353.2**

| Parameter | Results | Units | RDL | DF | Prepared | Analyzed | By | Cert | Qual |
|---|---|---|---|---|---|---|---|---|---|
| Nitrate + Nitrite as N | **104** | mg/L | 20 | 100 | 05/12/2022 10:41 | 05/12/2022 10:41 | EJV | MA,NDA | |

**Method: SM 5310C-2014**

| Parameter | Results | Units | RDL | DF | Prepared | Analyzed | By | Cert | Qual |
|---|---|---|---|---|---|---|---|---|---|
| Total Organic Carbon | **0.5** | mg/L | 0.5 | 1 | 05/17/2022 08:23 | 05/17/2022 08:23 | NS | MA,NDA | |

**Method: SM2320 B-2011**

| Parameter | Results | Units | RDL | DF | Prepared | Analyzed | By | Cert | Qual |
|---|---|---|---|---|---|---|---|---|---|
| Alkalinity, Total | **98** | mg/L as CaCO3 | 20.5 | 1 | 05/09/2022 15:21 | 05/09/2022 15:21 | RAA | MA,NDA | |
| Alkalinity, Phenolphthalein | <20.5 | mg/L as CaCO3 | 20.5 | 1 | 05/09/2022 15:21 | 05/09/2022 15:21 | RAA | | |
| Carbonate | <20.5 | mg/L as CaCO3 | 20.5 | 1 | 05/09/2022 15:21 | 05/09/2022 15:21 | RAA | | |
| Bicarbonate | **98** | mg/L as CaCO3 | 20.5 | 1 | 05/09/2022 15:21 | 05/09/2022 15:21 | RAA | | |
| Hydroxide | <20.5 | mg/L as CaCO3 | 20.5 | 1 | 05/09/2022 15:21 | 05/09/2022 15:21 | RAA | | |

MVTL guarantees the accuracy of the analysis done on the sample submitted for testing. It is not possible for MVTL to guarantee that a test result obtained on a particular sample will be the same on any other sample unless all conditions affecting the sample are the same, including sampling by MVTL. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

**MINNESOTA VALLEY TESTING LABORATORIES, INC.**
1126 North Front St. ~ New Ulm, MN 56073 ~ 800-782-3557 ~ Fax 507-359-2890
2616 East Broadway Ave. ~ Bismarck, ND 58501 ~ 800-279-6885 ~ Fax 701-258-9724
1201 Lincoln Hwy. ~ Nevada, IA 50201 ~ 800-362-0855 ~ Fax 515-382-3885
www.MVTL.com

**Account #:** 74217 **Client:** Neset Consulting

## Analytical Results

**Lab ID:** 966002 **Date Collected:** 05/06/2022 03:40 **Matrix:** Groundwater
**Sample ID:** Broom Creek **Date Received:** 05/06/2022 08:10 **Collector:** MVTL Field Service

**Temp @ Receipt (C):** 6.3 **Received on Ice:** Yes

### Inorganic Chemistry

**Method: SM2510 B-2011 EC**

| Parameter | Results | Units | RDL | DF | Prepared | Analyzed | By | Cert | Qual |
|---|---|---|---|---|---|---|---|---|---|
| Specific Conductance | **121300** | umhos/cm | 1 | 1 | 05/09/2022 15:21 | 05/09/2022 15:21 | RAA | MA,NDA | |

**Method: SM4500 H+ B-2011**

| Parameter | Results | Units | RDL | DF | Prepared | Analyzed | By | Cert | Qual |
|---|---|---|---|---|---|---|---|---|---|
| pH | **6.8** | units | 0.1 | 1 | 05/09/2022 15:21 | 05/09/2022 15:21 | RAA | MA,NDA | * |

**Method: SM4500-Cl-E 2011**

| Parameter | Results | Units | RDL | DF | Prepared | Analyzed | By | Cert | Qual |
|---|---|---|---|---|---|---|---|---|---|
| Chloride | **76000** | mg/L | 1000 | 500 | 05/09/2022 12:47 | 05/09/2022 12:47 | SRD | MA,NDA | |

**Method: USGS I-1750-85**

| Parameter | Results | Units | RDL | DF | Prepared | Analyzed | By | Cert | Qual |
|---|---|---|---|---|---|---|---|---|---|
| Total Dissolved Solids | **115000** | mg/L | 10 | 1 | 05/09/2022 13:50 | 05/09/2022 13:50 | RAA | MA,NDA | |

### Metals

**Method: EPA 245.1**

| Parameter | Results | Units | RDL | DF | Prepared | Analyzed | By | Cert | Qual |
|---|---|---|---|---|---|---|---|---|---|
| Mercury, Dissolved | <0.0002 | mg/L | 0.0002 | 1 | 05/10/2022 14:24 | 05/09/2022 13:30 | MDE | MA,NDA | |

**Method: EPA 6010D**

| Parameter | Results | Units | RDL | DF | Prepared | Analyzed | By | Cert | Qual |
|---|---|---|---|---|---|---|---|---|---|
| Calcium | **2410** | mg/L | 50 | 50 | 05/06/2022 16:55 | 05/16/2022 13:44 | SLZ | MA,NDA | |
| Magnesium | **409** | mg/L | 50 | 50 | 05/06/2022 16:55 | 05/16/2022 13:44 | SLZ | MA,NDA | |
| Sodium | **41200** | mg/L | 250 | 250 | 05/06/2022 16:55 | 05/19/2022 16:42 | SLZ | MA,NDA | |
| Potassium | **774** | mg/L | 50 | 50 | 05/06/2022 16:55 | 05/16/2022 13:44 | SLZ | MA,NDA | |
| Iron | <5 | mg/L | 5 | 50 | 05/06/2022 16:55 | 05/10/2022 13:05 | SLZ | MA,NDA | |
| Manganese | <2.5 | mg/L | 2.5 | 50 | 05/06/2022 16:55 | 05/10/2022 13:05 | SLZ | MA,NDA | |
| Barium, Dissolved | <5 | mg/L | 5 | 50 | 05/11/2022 15:02 | 05/12/2022 11:06 | SLZ | MA,NDA | |
| Strontium, Dissolved | **73.4** | mg/L | 5 | 50 | 05/11/2022 15:02 | 05/12/2022 11:06 | SLZ | MA,NDA | |

MVTL guarantees the accuracy of the analysis done on the sample submitted for testing. It is not possible for MVTL to guarantee that a test result obtained on a particular sample will be the same on any other sample unless all conditions affecting the sample are the same, including sampling by MVTL. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

Report Date: Wednesday, June 1, 2022 8:44:42 AM

**MINNESOTA VALLEY TESTING LABORATORIES, INC.**
1126 North Front St. ~ New Ulm, MN 56073 ~ 800-782-3557 ~ Fax 507-359-2890
2616 East Broadway Ave. ~ Bismarck, ND 58501 ~ 800-279-6885 ~ Fax 701-258-9724
1201 Lincoln Hwy. ~ Nevada, IA 50201 ~ 800-362-0855 ~ Fax 515-382-3885
www.MVTL.com

**Account #:** 74217 **Client:** Neset Consulting

## Analytical Results

**Lab ID:** 966002 **Date Collected:** 05/06/2022 03:40 **Matrix:** Groundwater
**Sample ID:** Broom Creek **Date Received:** 05/06/2022 08:10 **Collector:** MVTL Field Service

**Temp @ Receipt (C):** 6.3 **Received on Ice:** Yes

### Metals

**Method: EPA 6020B**

| Parameter | Results | Units | RDL | DF | Prepared | Analyzed | By | Cert | Qual |
|---|---|---|---|---|---|---|---|---|---|
| Arsenic, Dissolved | <0.02 | mg/L | 0.02 | 50 | 05/11/2022 15:02 | 05/24/2022 16:39 | MDE | MA,NDA | |
| Chromium, Dissolved | <0.02 | mg/L | 0.02 | 50 | 05/11/2022 15:02 | 05/24/2022 16:39 | MDE | MA,NDA | |
| Lead, Dissolved | <0.005 | mg/L | 0.005 | 50 | 05/11/2022 15:02 | 05/24/2022 16:39 | MDE | MA,NDA | |
| Selenium, Dissolved | **0.1653** | mg/L | 0.05 | 50 | 05/11/2022 15:02 | 05/24/2022 16:39 | MDE | MA,NDA | |
| Silver, Dissolved | <0.005 | mg/L | 0.005 | 50 | 05/11/2022 15:02 | 05/24/2022 16:39 | MDE | MA,NDA | |
| Cadmium, Dissolved | **0.0244** | mg/L | 0.005 | 50 | 05/11/2022 15:02 | 05/24/2022 16:39 | MDE | MA,NDA | |
| Molybdenum, Dissolved | **0.7248** | mg/L | 0.02 | 50 | 05/11/2022 15:02 | 05/24/2022 16:39 | MDE | MA,NDA | |
| Copper, Dissolved | **0.1610** | mg/L | 0.02 | 50 | 05/11/2022 15:02 | 05/24/2022 16:39 | MDE | MA,NDA | |

### Sampling Information

**Method: 120.1**

| Parameter | Results | Units | RDL | DF | Prepared | Analyzed | By | Cert | Qual |
|---|---|---|---|---|---|---|---|---|---|
| Specific Conductance - Field | **133869** | umhos/cm | 1 | 1 | 05/06/2022 03:40 | 05/06/2022 03:40 | JSM | | |

**Method: 150.2**

| Parameter | Results | Units | RDL | DF | Prepared | Analyzed | By | Cert | Qual |
|---|---|---|---|---|---|---|---|---|---|
| pH - Field | **6.55** | units | 0.01 | 1 | 05/06/2022 03:40 | 05/06/2022 03:40 | JSM | | |

**Method: 170.1**

| Parameter | Results | Units | RDL | DF | Prepared | Analyzed | By | Cert | Qual |
|---|---|---|---|---|---|---|---|---|---|
| Temperature - Field C | **17.67** | degrees C | | 1 | 05/06/2022 03:40 | 05/06/2022 03:40 | JSM | | |

MVTL guarantees the accuracy of the analysis done on the sample submitted for testing. It is not possible for MVTL to guarantee that a test result obtained on a particular sample will be the same on any other sample unless all conditions affecting the sample are the same, including sampling by MVTL. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

Report Date: Wednesday, June 1, 2022 8:44:42 AM

**MINNESOTA VALLEY TESTING LABORATORIES, INC.**
1126 North Front St. ~ New Ulm, MN 56073 ~ 800-782-3557 ~ Fax 507-359-2890
2616 East Broadway Ave. ~ Bismarck, ND 58501 ~ 800-279-6885 ~ Fax 701-258-9724
1201 Lincoln Hwy. ~ Nevada, IA 50201 ~ 800-362-0855 ~ Fax 515-382-3885
www.MVTL.com

Member ACIL

**Account #:** 74217 **Client:** Neset Consulting

Minnesota Valley Testing Laboratories
2616 E. Broadway Ave
Bismarck, ND 58501
(701) 258-9720

Neset Consulting
WO: 966

**Chain of Custody Record**

| | | | |
|---|---|---|---|
| Report To: | Neset Consulting | CC: | Project Name: Archie Erickson 2 |
| Attn: | Jean Datahan | | Event: |
| Address: | 6844 Hwy 40<br>Tioga, ND 58852 | | Sampled By: |
| Phone: | 701-664-1492 | | |
| Email: | jeandatahan@nestconsulting.com | | |

| | Sample Information | | | | Sample Containers | | | | | | | | | Field Readings | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lab Number | Sample ID | Date | Time | Sample Type | 1 Liter Raw | 500 mL HNO3 | 500 mL HNO3 (filtered) | 250 mL H2SO4 | TOC (set of 3) | | | | | Temp (°C) | Spec. Cond. | pH | | Analysis Required |
| 001 | Inyo Kaw3 | 6 May 22 | 0353 | GW | X | X | X | X | X | | | | | 17.97 | 5744 | 8.15 | | Neset GW well List |
| 002 | Broom Creek | 6 May 22 | 0340 | GW | X | X | X | X | X | | | | | 17.67 | 133,869 | 6.55 | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | | |

Comments:

| Relinquished By | | | Sample Condition | | Received By | |
|---|---|---|---|---|---|---|
| | Name | Date/Time | Location | Temp (°C) | Name | Date/Time |
| 1 | | 6 May 22 0810 | Log In Walk In #2 | RSL 6.3 TM562 TM805 | | 6 May 22 0810 |
| 2 | | | | | | |

MVTL guarantees the accuracy of the analysis done on the sample submitted for testing. It is not possible for MVTL to guarantee that a test result obtained on a particular sample will be the same on any other sample unless all conditions affecting the sample are the same, including sampling by MVTL. As a mutual protection to clients, the public and ourselves, all reports are submitted as the confidential property of clients, and authorization for publication of statements, conclusions or extracts from or regarding our reports is reserved pending our written approval.

# APPENDIX B

# FRESHWATER WELL FLUID SAMPLING

## B-1. FRESHWATER WELL FLUID SAMPLING

Table B-1 summarizes the results from existing groundwater wells for ranges of pH, electrical conductivity (EC), total dissolved solids (TDS), and total alkalinity measured from 35 monitoring sites within BK Fischer area of review (AOR). Monitoring sites were selected to supplement forthcoming groundwater sampling to establish baseline conditions. Figure B-1 is a map showing the locations of the selected monitoring sites. Water chemistry results are included below.

**Table B-1. Summary of Available Water Chemistry Data at 35 Sampling Locations within the AOR**

| Number of Wells | Water Samples | Data Vintage | Sampling Horizon | pH | EC, mS/cm | TDS, mg/L | Total Alkalinity, mg/L $CaCO_3$ |
|---|---|---|---|---|---|---|---|
| 4 | 16 | 2018–22 | Antelope Creek | 6.8–8.1 | 528–2839 | 1620–2240 | 529–2831 |
| 1 | 5 | 2018–22 | Coyote Creek Alluvium | 7.3–7.8 | 660–3690 | 2120–2430 | 680–2853 |
| 2 | 6 | 2018–22 | Jim Creek | 7.4–8.1 | 1410–2690 | 1520–1780 | 1320–2490 |
| 1 | 5 | 2018–22 | Upper Kinneman Creek | 7.0–8.29 | 1569–3136 | 2010–2070 | 1540–3150 |
| 5 | 25 | 2018–22 | Schoolhouse | 4.0–8.3 | 856–3470 | 1760–2390 | 0–2838 |
| 2 | 3 | 2018–22 | Twin Buttes | 6.9–7.3 | 1326–4937 | 889–3470 | 406–1560 |
| 13 | 60 | 2018–22 | Beulah–Zap | 6.3–8.3 | 577–3078 | 831–2350 | 291–2831 |
| 5 | 19 | 2018–22 | Spaer | 6.9–8.4 | 1385–3013 | 1050–2730 | 490–1333 |
| 2 | 2 | 1967–68; 1994 | Unknown | 6.3–7.0 | 1400–1850 | 951–1290 | NA |

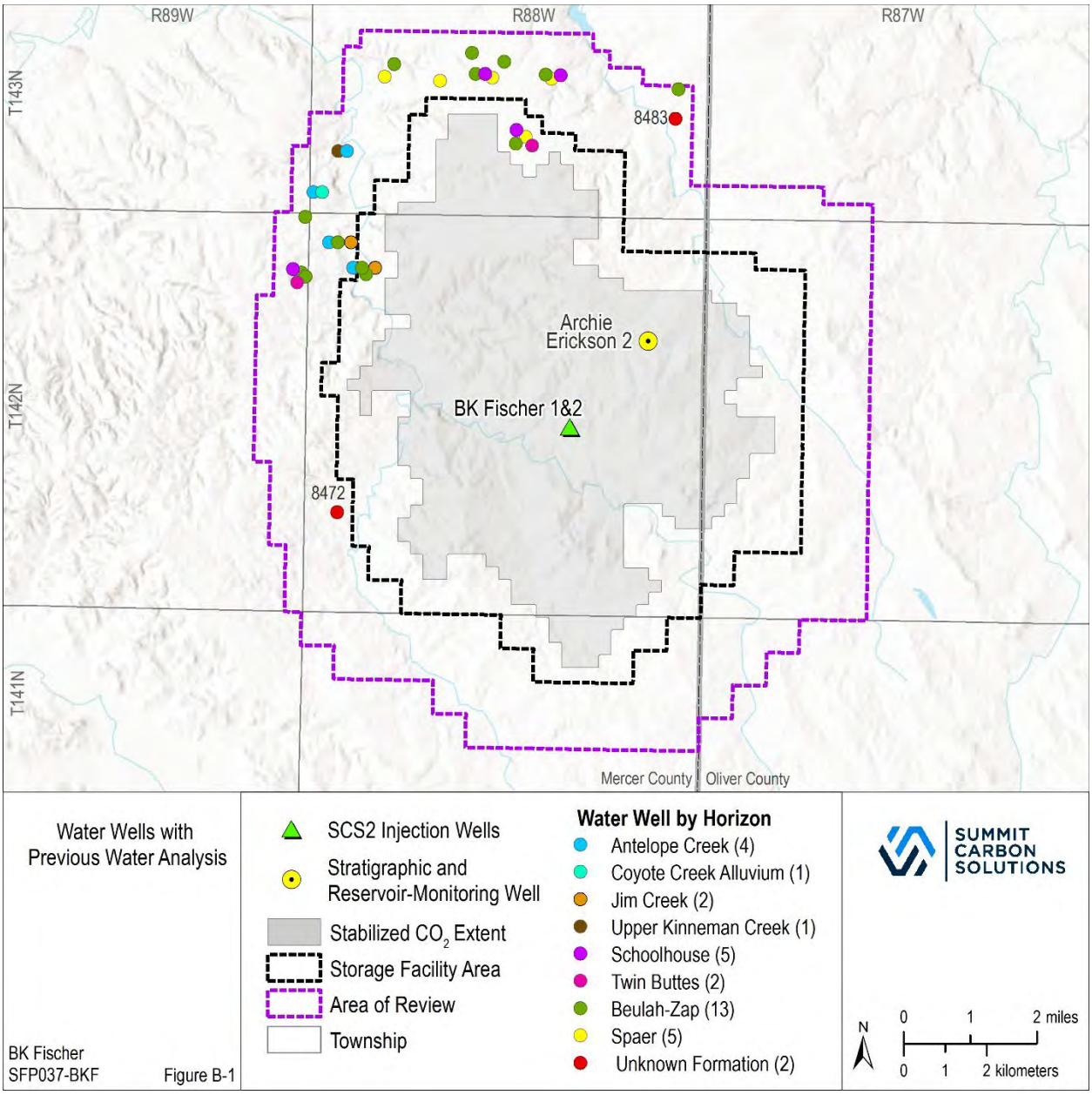



Figure B-1. Locations within the AOR of the 35 water wells with available sampling data.

# APPENDIX C

# GEOCHEMICAL INTERACTIONS

## C.1 GEOCHEMICAL INTERACTIONS

### C.1.1 Geochemical Interaction of Injection Zone (Broom Creek Formation)

Geochemical simulation was performed to calculate the effects of introducing the $CO_2$ stream to the injection zone. The injection zone, the Broom Creek Formation, was investigated using the geochemical analysis option available in GEM, the compositional simulation software package from Computer Modelling Group Ltd. (CMG). GEM is also the primary simulation software used for evaluation of the reservoir's dynamic behavior resulting from the expected $CO_2$ injection. For this geochemical modeling study, the injection scenario consisted of a single injection well injecting for a 20-year period with maximum bottomhole pressure (BHP) and maximum wellhead pressure (WHP) constraints of 3624 and 2100 psi, respectively. A postinjection period of 25 years was run in the model to evaluate any dynamic behavior and/or geochemical reaction after the $CO_2$ injection is stopped.

The anticipated average $CO_2$ stream composition is 98.25% $CO_2$, 1.44% $N_2$, and 0.31% $O_2$, with a trace amount of $H_2S$. The $CO_2$ stream, shown in Table C-1 that was used for geochemical modeling, contains a higher amount of $O_2$ (2%). The modeled stream containing ~95% $CO_2$ and 2% $O_2$ was used to represent a conservative scenario where the oxygen concentration is highest, potentially triggering more geochemical reactions in the formation. This simulation scenario was run with and without the geochemical model analysis option included, and results from the two cases were compared (Figures C-1 and C-2).

The case with geochemical analysis (geochemistry case) was constructed using the average mineralogical composition of the Broom Creek Formation rock materials (78% of bulk reservoir volume) and average formation brine composition (22% of bulk reservoir volume). X-ray diffraction (XRD) data from the Archie Erickson 2 core samples were used to inform the mineralogical composition of the Broom Creek Formation (Table C-2). Illite was chosen to represent clay for geochemical modeling as it was the most prominent type of clay identified in the XRD data. Ionic composition of the Broom Creek Formation water, derived from the state-certified analysis reported in Appendix A, is listed in Table C-3.

**Table C-1. $CO_2$ Stream Composition Used for Geochemical Modeling**

| Component | mol% |
|---|---|
| $CO_2$ | 94.999 |
| $N_2$ | 3 |
| $O_2$ | 2 |
| $H_2S$ | 1.0E-3 |

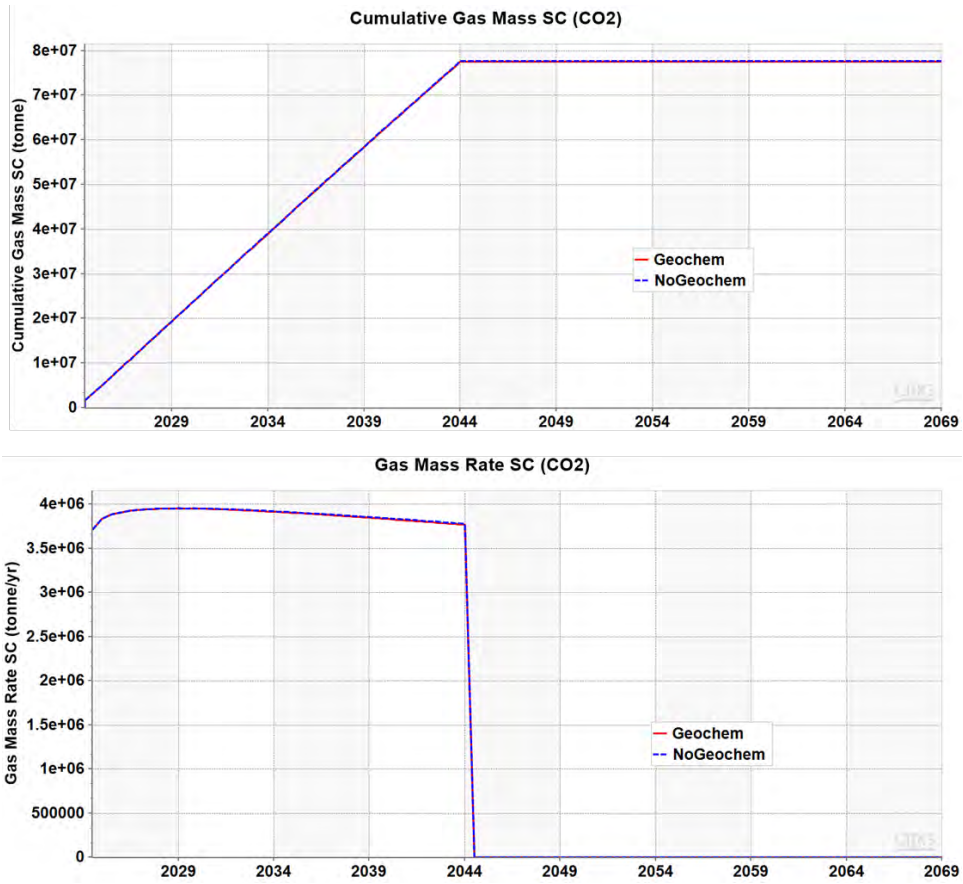



Figure C-1. Top graph shows cumulative injection vs. time; bottom graph shows gas injection rate vs. time. There is no observable difference in injection volume and gas rate due to geochemical reactions.

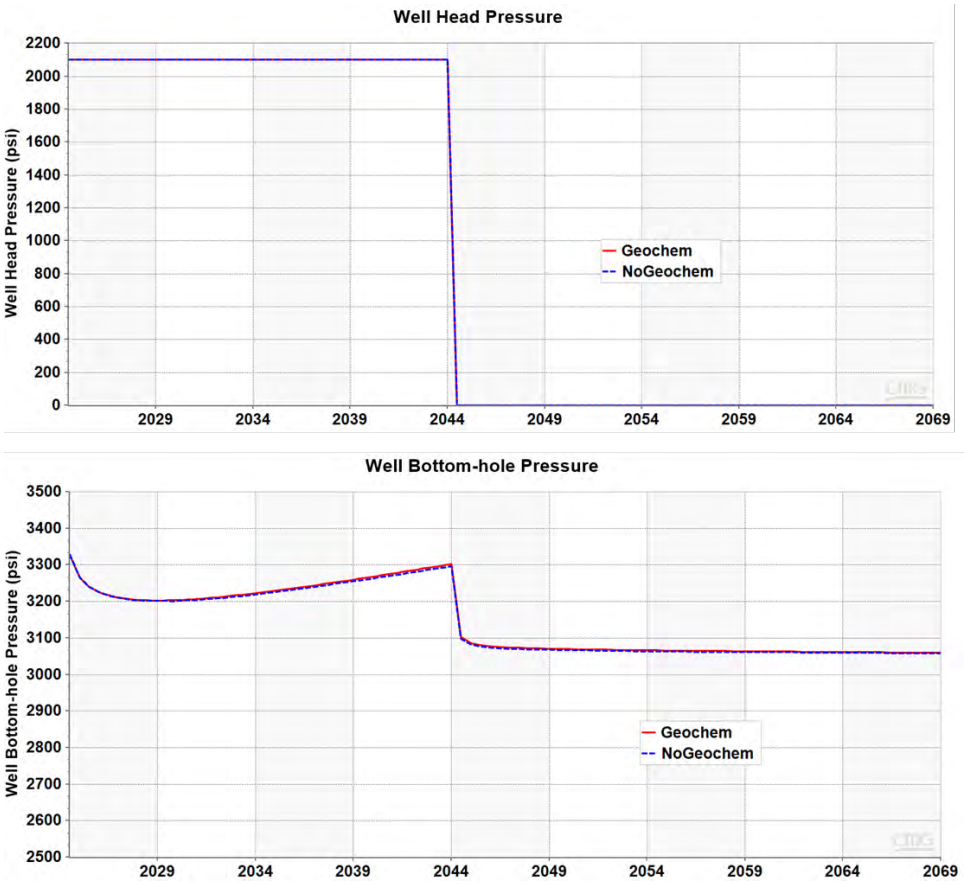



Figure C-2. Top graph shows WHP vs. time; bottom graph shows BHP vs. time. There is no observable difference in pressures due to geochemical reactions.

**Table C-2. Averaged XRD data for (Archie Erickson 2) Broom Creek Core Sample**

| Mineral Data | wt% |
|---|---|
| Illite | 3.91 |
| K-Feldspar | 3.54 |
| Albite | 1.23 |
| Quartz | 49.57 |
| Dolomite | 34.5 |
| Anhydrite | 7.2 |
| Siderite | 1.00E-08 |
| Hematite | 0.05 |
| Ankerite | 1.00E-08 |
| $Fe(OH)_3$ | 1.00E-08 |

**Table C-3. Archie Erickson 2 Broom Creek Formation Water Ionic Composition**

| Component | mg/L | Molality |
|---|---|---|
| $Na^+$ | 41,200 | 1.87593 |
| $K^+$ | 774 | 0.020723 |
| $Ca^{2+}$ | 2410 | 0.062946 |
| $Mg^{2+}$ | 409 | 0.017615 |
| $Fe^{2+}$ | 5 | 9.37E-05 |
| $SO_4^{2-}$ | 2800 | 3.05E-02 |
| $Cl^-$ | 76,000 | 2.24398 |
| $HCO_3^-$ | 98 | 1.68E-03 |
| $H^+$ | 0.0001131 | 1.17E-07 |
| $Al^{3+}$ | 1E-10 | 3.88E-15 |
| $OH^-$ | 0.0095643 | 5.89E-07 |
| $SiO_2$(aq) | 1.00E-10 | 1.74E-15 |
| $CO_3^{2-}$ | 0.00001 | 1.74E-10 |
| $Fe^{3+}$ | 1.00E-10 | 1.86E-15 |

The results do not show an evident difference in the $CO_2$ gas molality fraction between both cases as seen in Figures C-1 and C-2 for volume injected and injection pressure simulation results. As a result of geochemical reactions in the reservoir, cumulative volume and injection rate have no observable difference between the geochemical and nongeochemical cases. The resulting BHP and WHP from the two cases are nearly identical, with no appreciable differences.

Figure C-3 shows the location of the cross sections and Layer 30 used in Figures C-4a and C-4b to depict the geochemical modeling results. Figures C-4a and C-4b show the concentration of $CO_2$, in molality, in the reservoir after 20 years of injection plus 25 years of postinjection for the geochemistry model and nongeochemistry model, respectively.

The pH of the reservoir brine changes in the vicinity of the $CO_2$ accumulation, as shown in Figure C-5a. The pH of the Broom Creek Formation native-brine sample is 6.95, whereas the fluid pH declines to approximately 4.52 in the $CO_2$-flooded areas near the well as a result of $CO_2$ dissolution in the native formation brine (Figure C-5b).

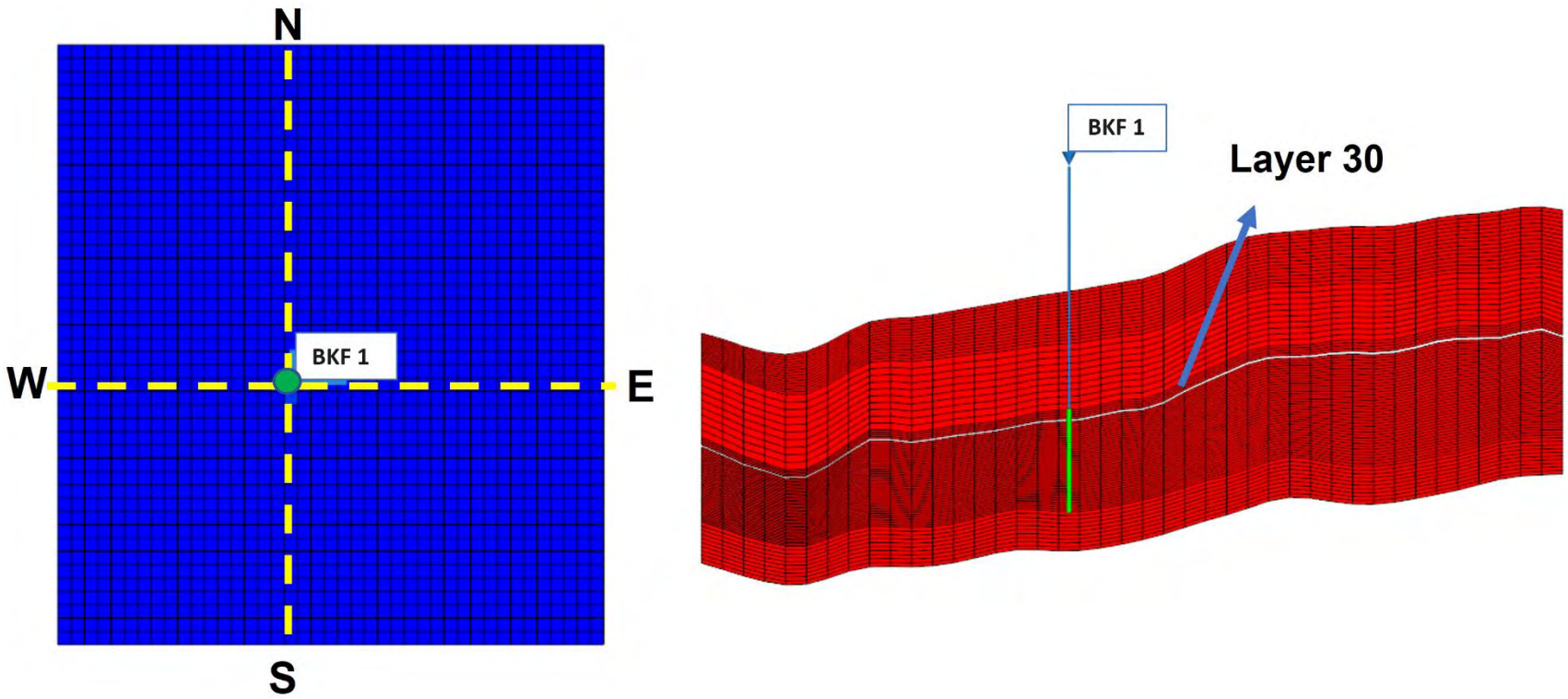



Figure C-3. Index map of west-east and south-north cross sections, and simulation Layer 30 at 3736.3 ft (SSTVD, subsea true vertical depth).

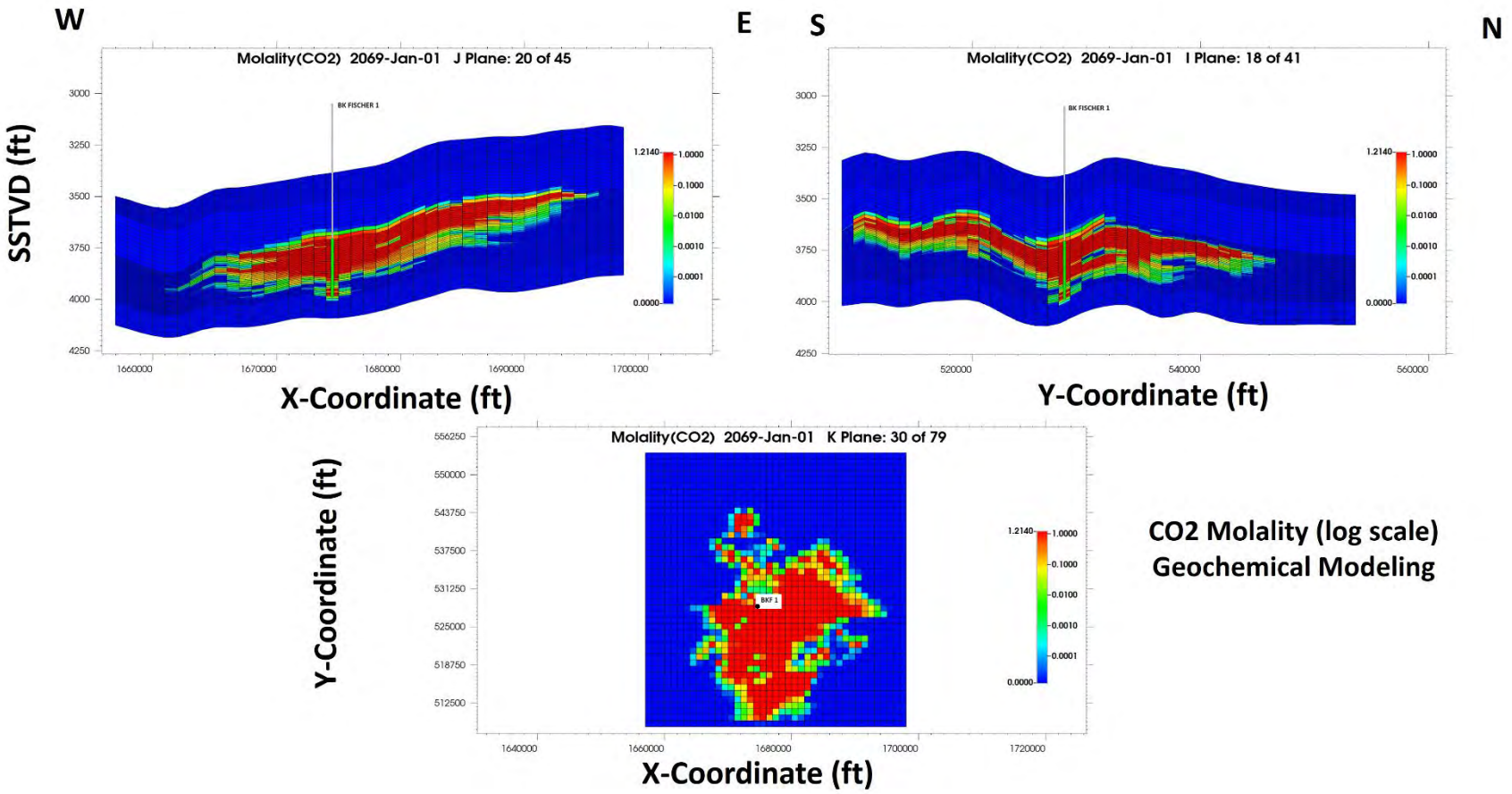



Figure C-4a. $CO_2$ molality for the geochemistry case simulation results after 20 years of injection plus 25 years postinjection, showing the distribution of $CO_2$ molality in log scale. The top-left image is west-east, and the top-right image is a south-north cross section. The bottom image is a planar view of simulation Layer 30 at 3736.3 ft (SSTVD).

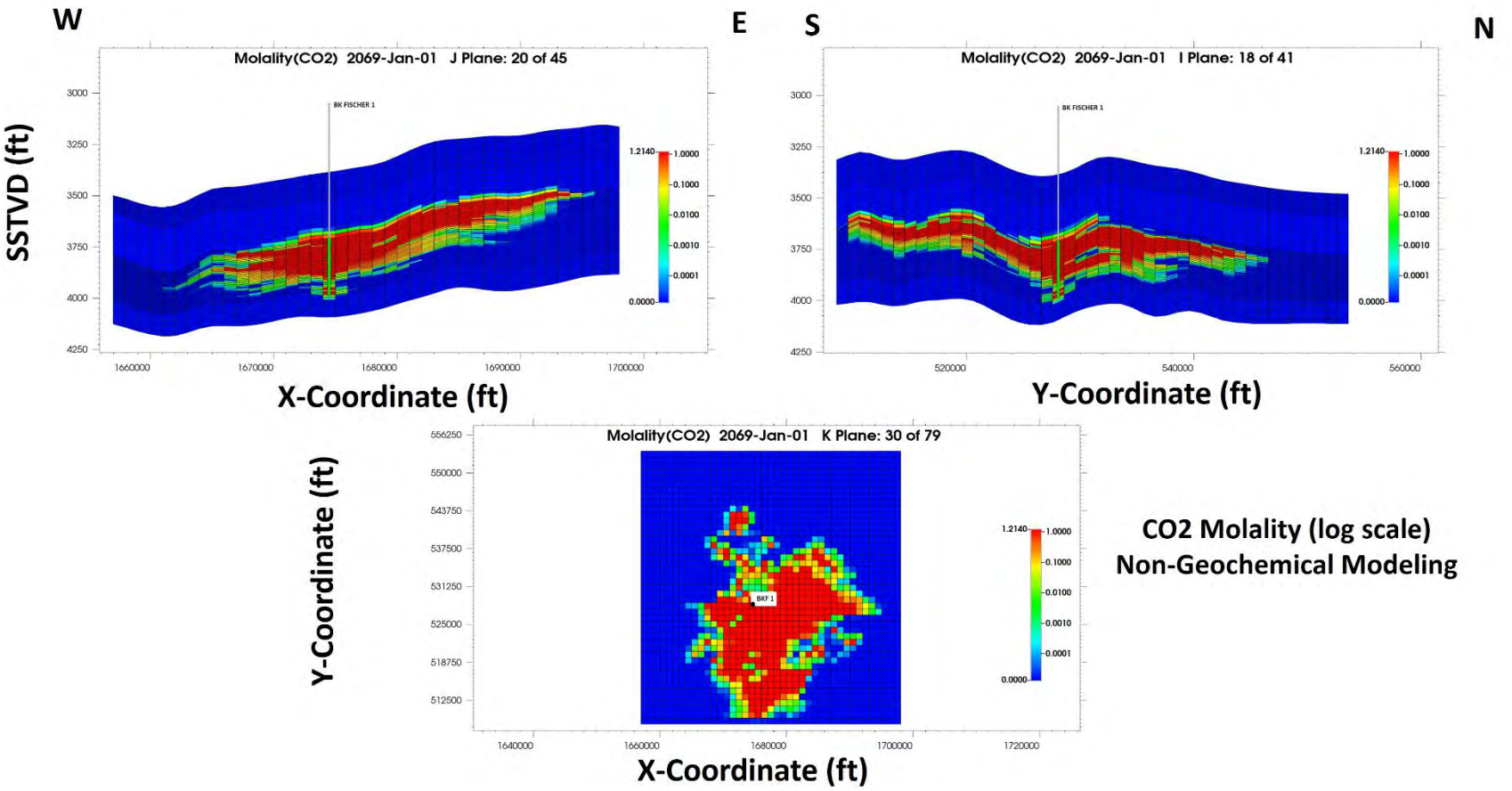



Figure C-4b. $CO_2$ molality for the nongeochemistry case simulation results after 20 years of injection plus 25 years postinjection, showing the distribution of $CO_2$ molality in log scale. The top-left image is west-east, and top-right image is a south-north cross section. The bottom image is a planar view of simulation Layer 30 at 3736.3 ft (SSTVD).

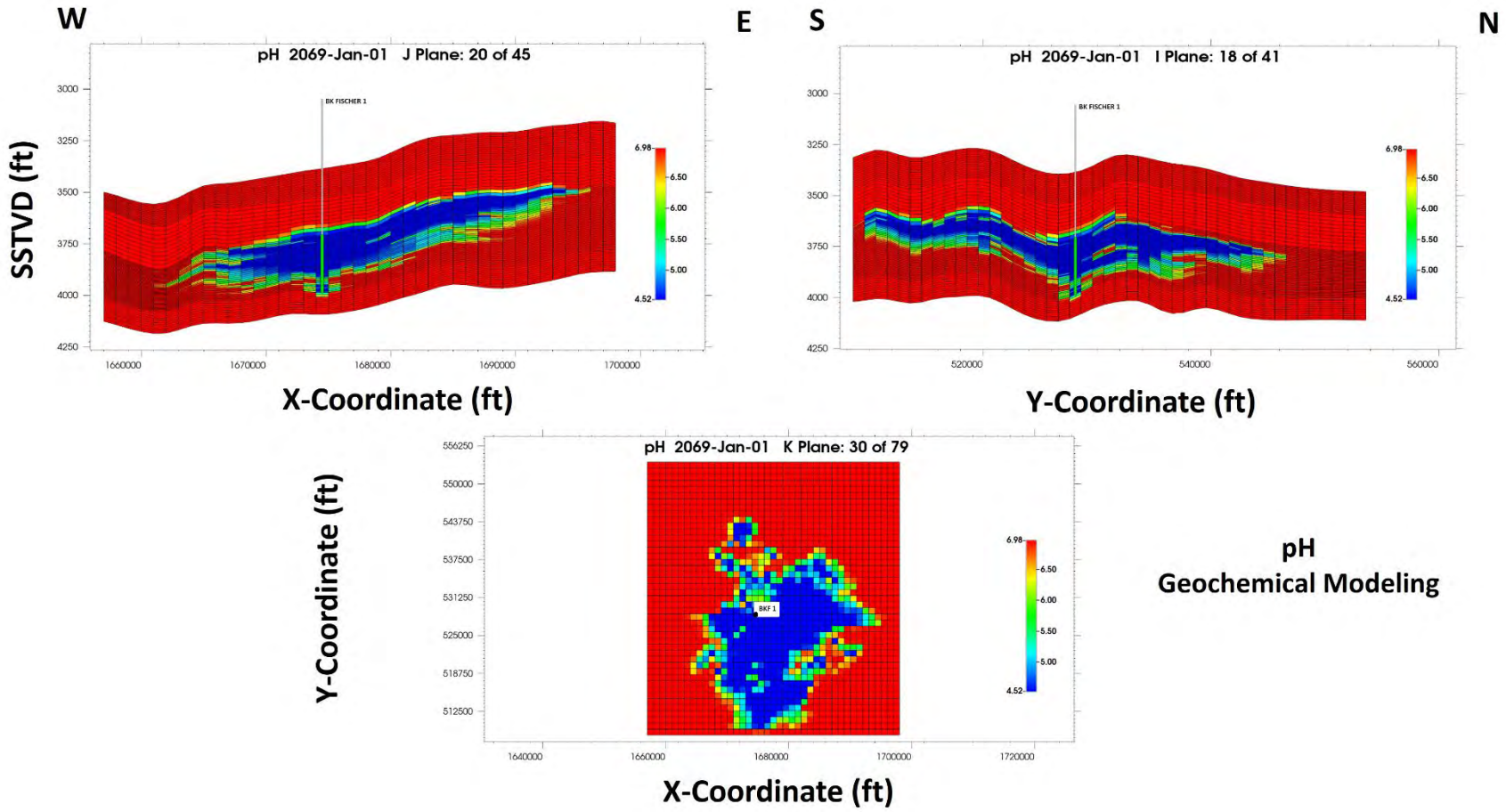



Figure C-5a. Geochemistry case simulation results after 20 years of injection plus 25 years postinjection showing the pH of formation brine in log scale. The top-left image is west-east, and top-right image is a south-north cross section. The bottom image is a planar view of simulation Layer 30 at 3736.3 ft (SSTVD).

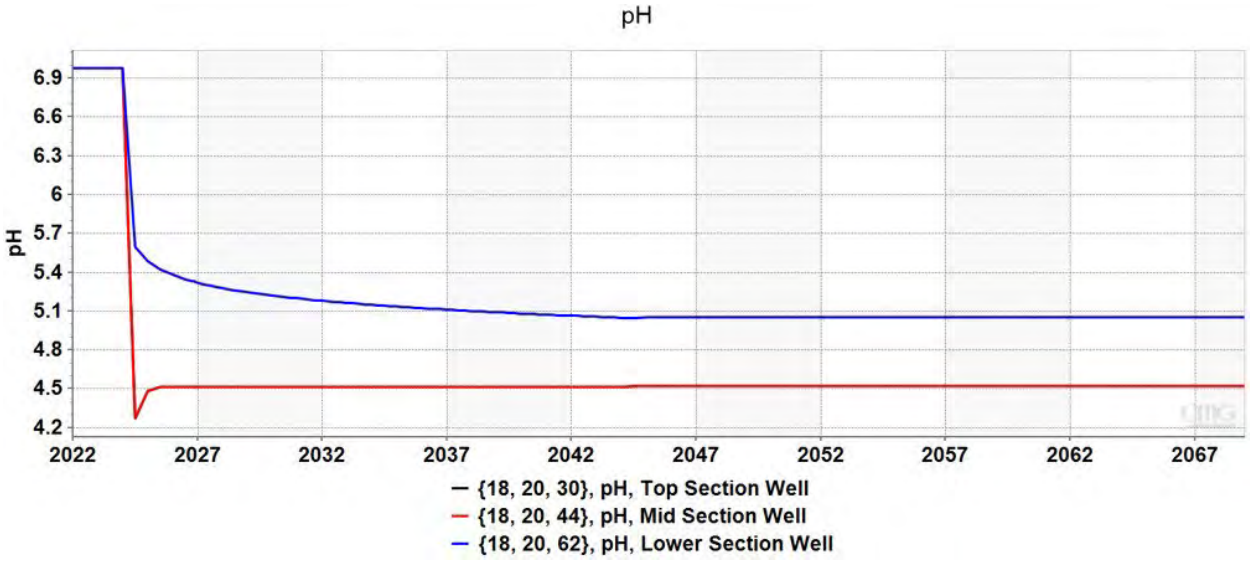



Figure C-5b. Geochemistry case simulation results through 20 years of injection plus 25 years postinjection showing the pH of the Broom Creek Formation brine at the wellbore vs. time for Layer 30 at 3736.3 ft (SSTVD), Layer 44 at 3824.5 ft (SSTVD), and Layer 62 at 3938 ft. (SSTVD).

Figures C-6a and C-6b show the cross section for $O_2$ molality in the Broom Creek Formation. Figure C-6a shows the cross section for the concentration of $O_2$, in molality, in the reservoir after 20 years of injection plus 25 years of postinjection for the geochemistry model scenario, and Figure C-6b shows the same information for the nongeochemistry simulation case for comparison. The results do not show an evident difference in the $O_2$ gas molality fraction between both cases. After being injected, the 2% molar oxygen content in the injection stream is dissolved in the brine and likely to cause oxidative reactions of the minerals which may induce dissolution/precipitation of reactive minerals and formation of secondary minerals in the reservoir. The simulation results showed no significant precipitation caused by the high concentration of $O_2$ that would affect the $CO_2$ injection volume as demonstrated by the comparison in injection rates between the case with and without geochemical modeling shown in Figure C-2.

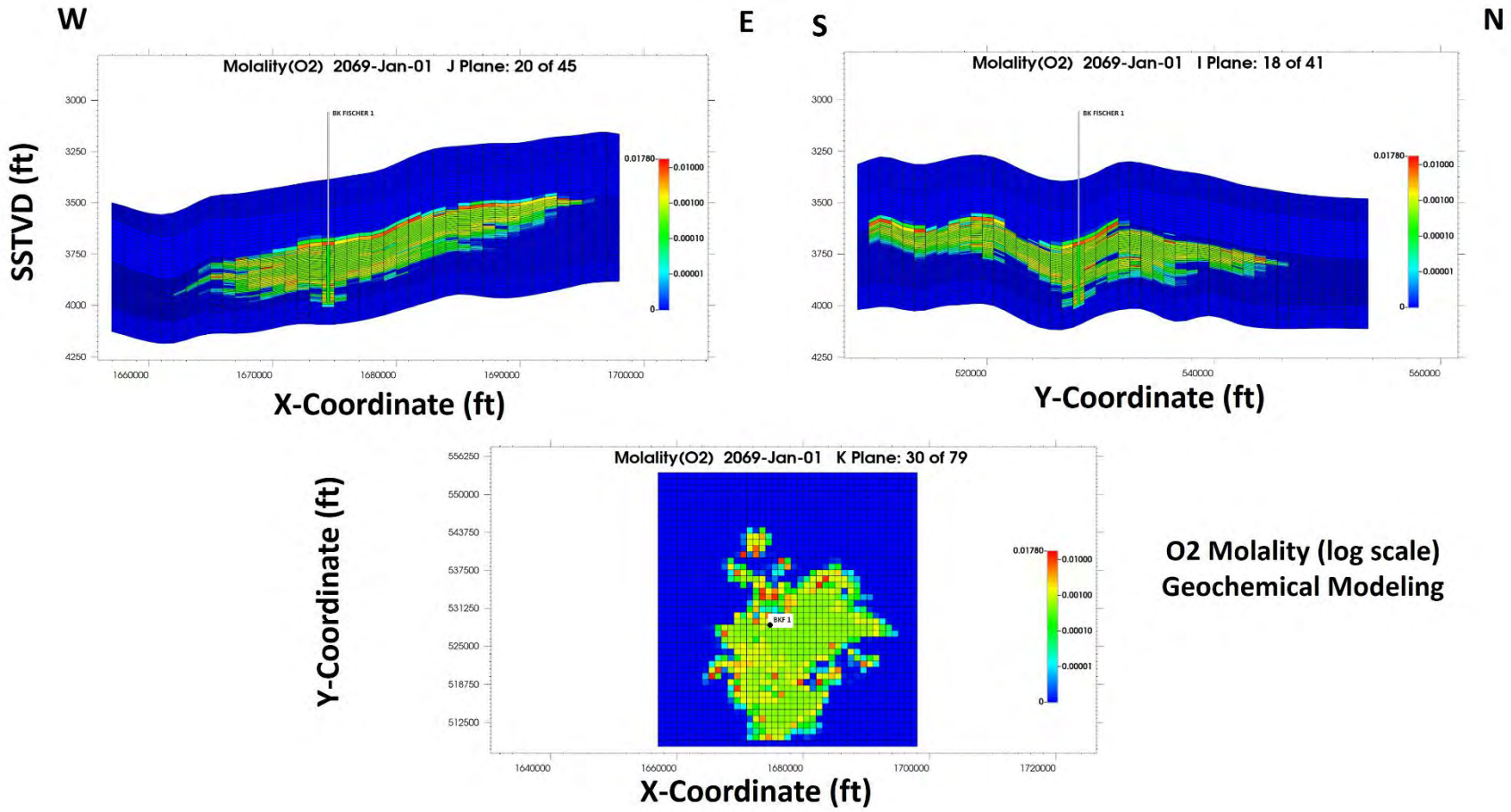



Figure C-6a. Cross section for $O_2$ molality for the geochemistry case simulation results after 20 years of injection plus 25 years postinjection showing the distribution of $O_2$ in gas phase in a log scale. The top-left image is west-east, and the top-right image is a south-north cross section. The bottom image is a planar view of simulation Layer 30 at 3736.3 ft (SSTVD).

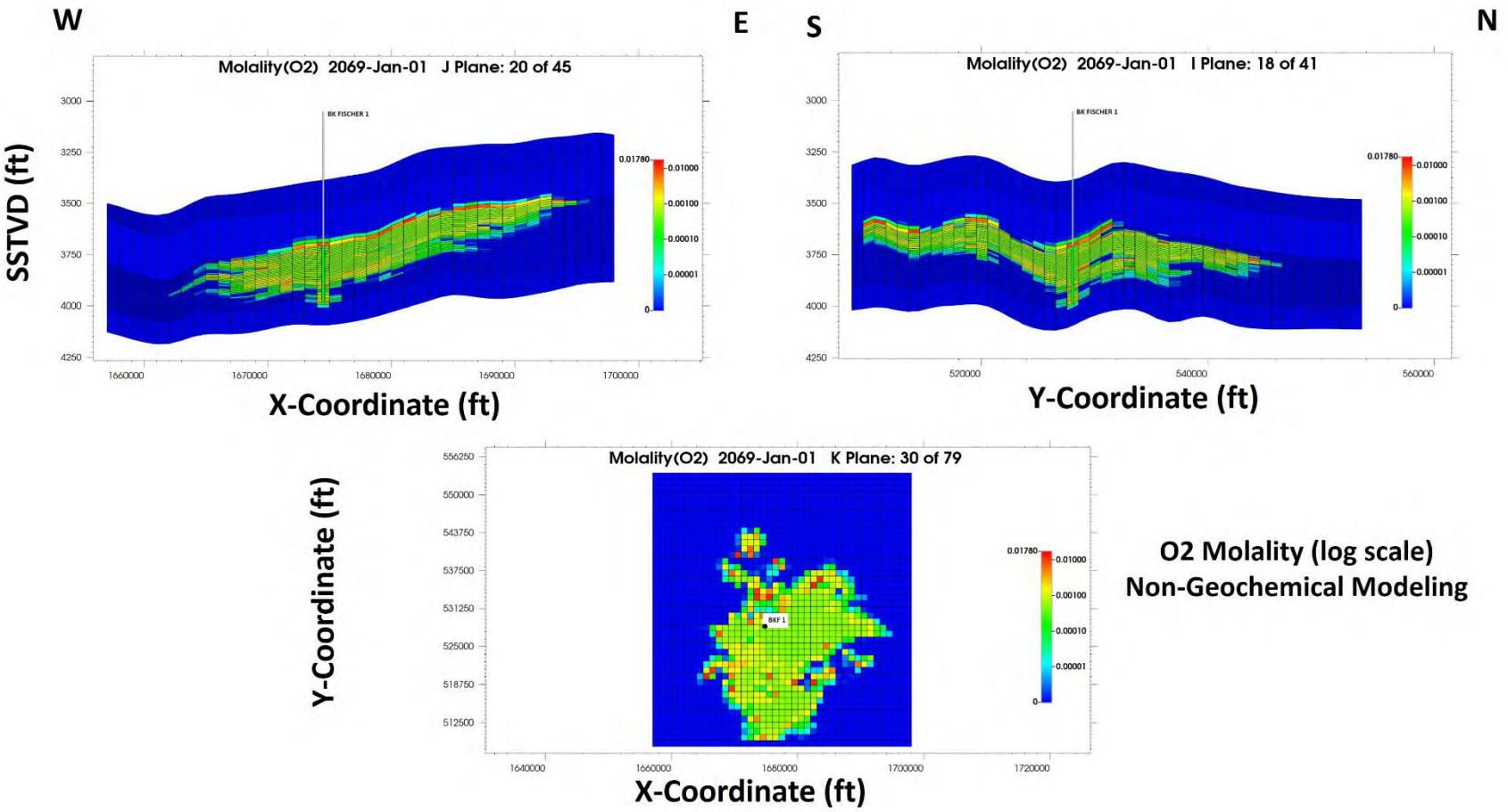



Figure C-6b. Cross section for $O_2$ molality for the nongeochemistry case simulation results after 20 years of injection plus 25 years postinjection showing the distribution of $O_2$ in gas phase in a log scale. The top-left image is west-east, and the top-right image is a south-north cross section. The bottom image is a planar view of simulation Layer 30 at 3736.3 ft (SSTVD).

Figure C-7 shows the mass of mineral dissolution and precipitation due to $CO_2$ injection in the Broom Creek Formation. Dolomite is the most prominent dissolved mineral, while anhydrite is the most prominent precipitated mineral. All other minerals showed very limited variations.

Simulation results show that, during $CO_2$ injection, the supercritical $CO_2$ (free-$CO_2$ gas) remains dominant. $CO_2$ dissolution in the formation water and residual trapping of $CO_2$ slowly increased over time, while $CO_2$ mineralization is negligible at the plot scale in Figure C-7, it can be observed at the plot scale in Figure C-8. Once $CO_2$ injection ceases in 2044, injected concentrated $CO_2$ begins to expand, resulting in more $CO_2$ that is capillary-trapped or dissolved into fresh brine, as evidenced by the crossover in Figure C-8. Figures C-9 and C-10, respectively, provide an indication of the change in distribution of the mineral that experienced the most dissolution, dolomite, and the mineral that experienced the most precipitation, anhydrite. Considering the apparent net dissolution of minerals in the system, as indicated in Figure C-7, there is an associated net increase in porosity in the affected areas, as shown in Figure C-11. Del Porosity Mineral (DPORMNR) output calculates the porosity change due to mineral dissolution/precipitation. It is calculated as Initial Porosity – Porosity at Time "t." Negative values of this output indicate net mineral dissolution (porosity increase), while positive values indicate net mineral precipitation (porosity decrease). However, the porosity change is small, less than 0.01% porosity units, equating to a maximum increase in average porosity from 22.00% to 22.01% after the 20-year injection period plus 25 years of postinjection.

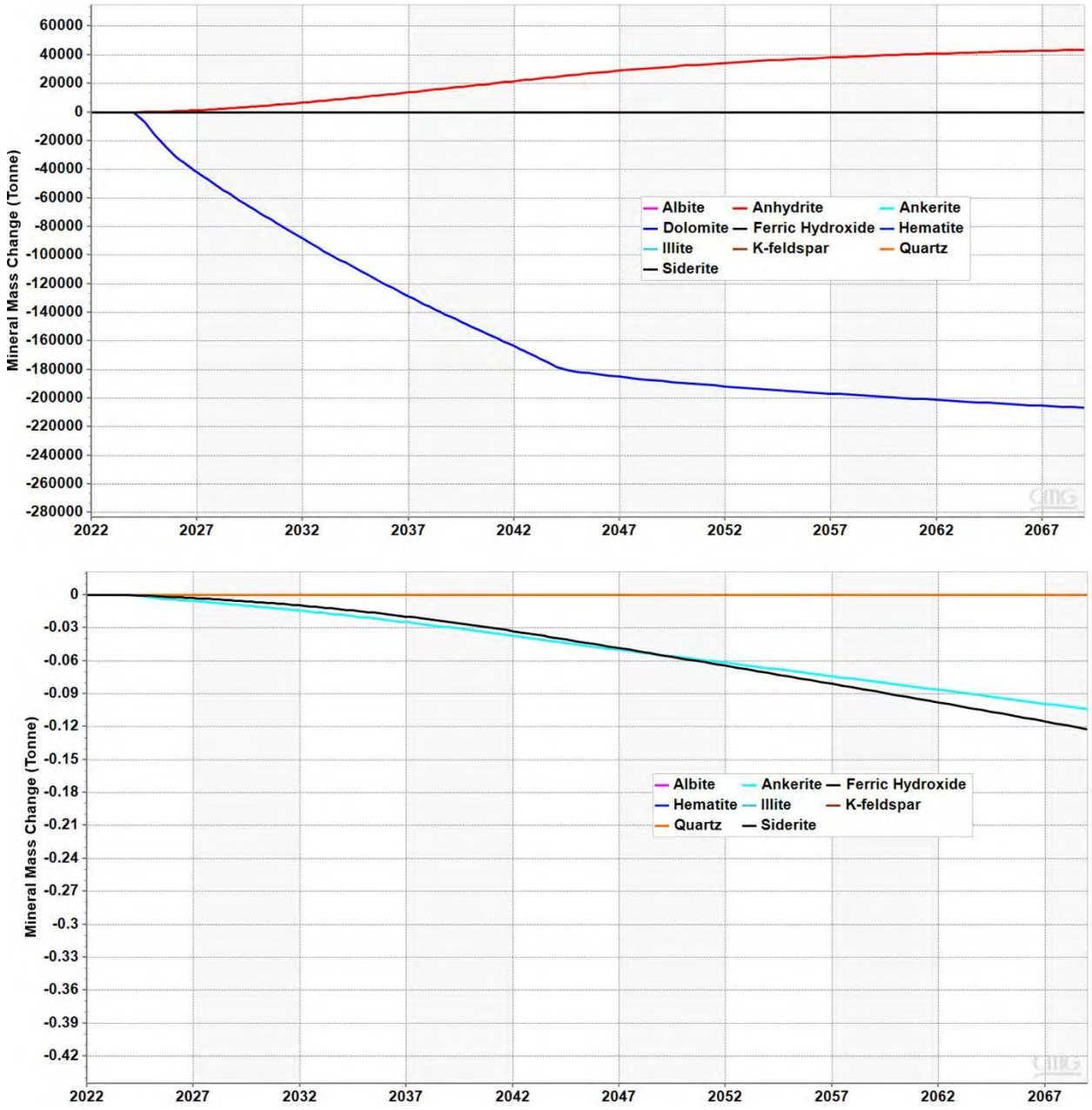



Figure C-7. Modeled change in the mineral masses (minus values show dissolution and positive values show precipitation) due to $CO_2$ injection (top: all minerals; bottom: zoomed-in after removing anhydrite and dolomite). Dissolution of dolomite with precipitation of anhydrite was observed. All of the other minerals showed very small values and account as net zero in this figure.

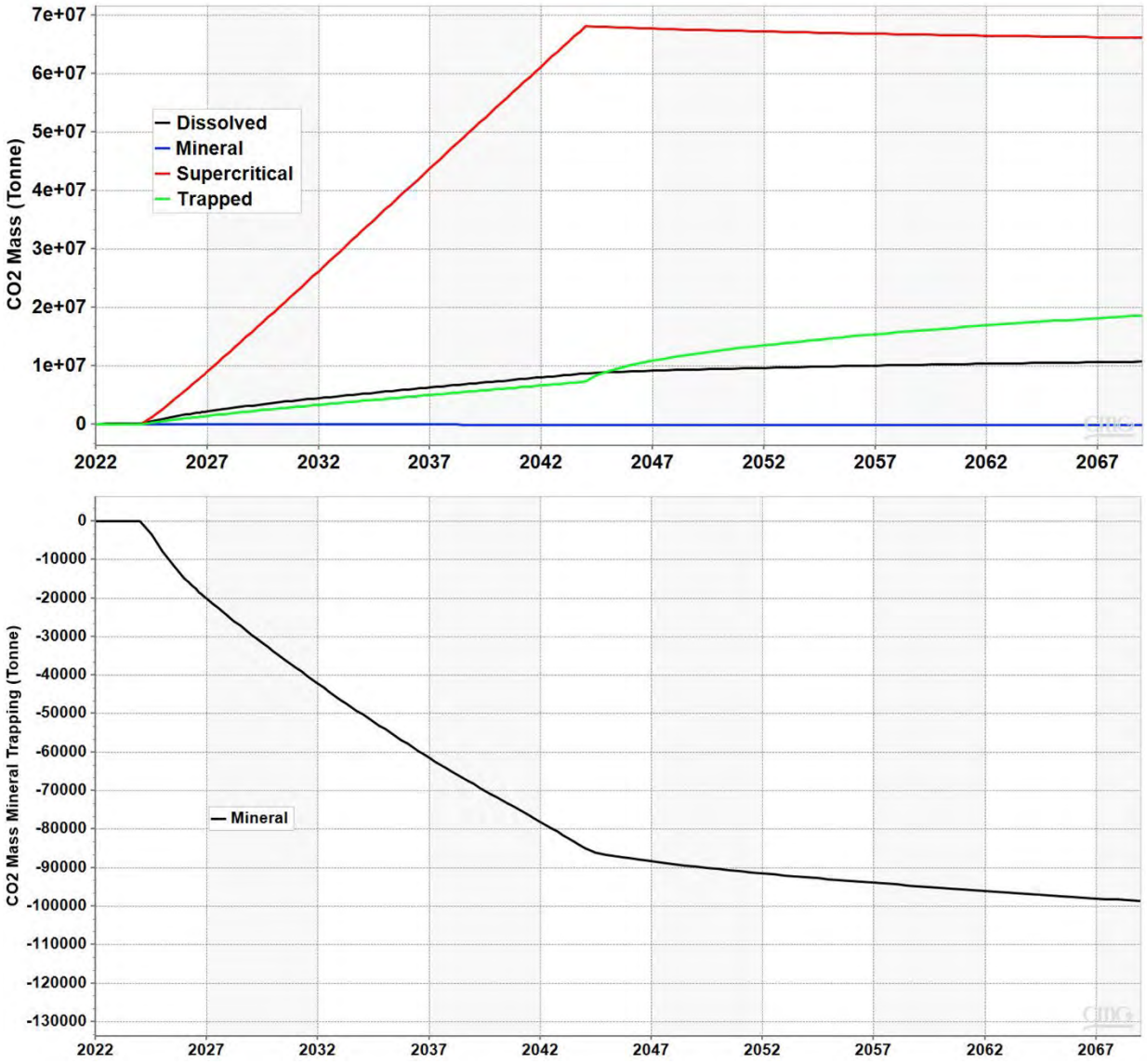



Figure C-8. Top image: mineral mass changes, in metric tons (tonnes), for the different $CO_2$-trapping mechanisms present during $CO_2$ injection with geochemical modeling in the injection zone for the Broom Creek Formation; bottom image: $CO_2$ mineral trapping.

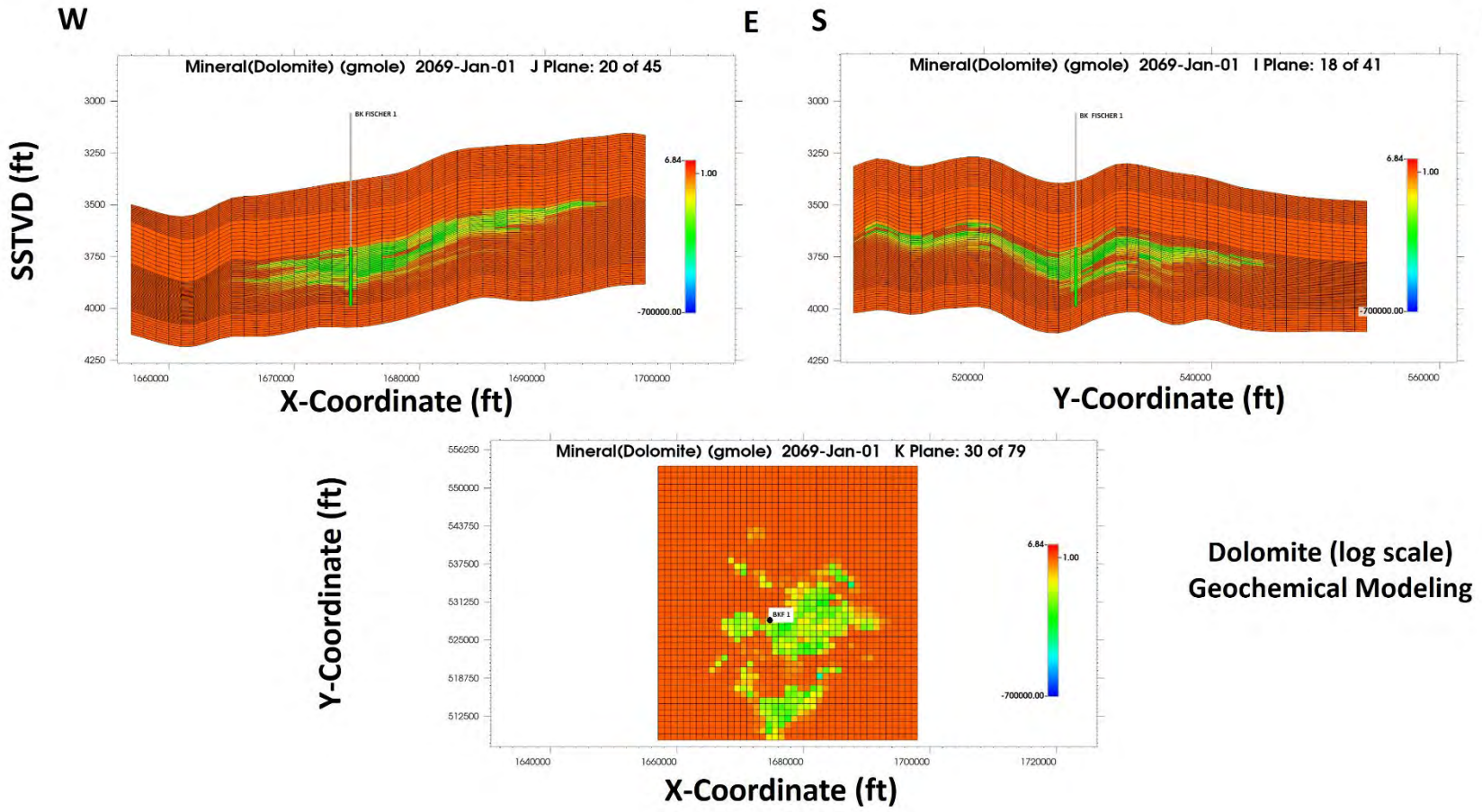



Figure C-9. Modeled change in molar distribution of dolomite, the most prominent dissolved mineral after 20 years of injection plus a 25-year postinjection period. The top-left image is west-east, and the top-right image is a south-north cross section. The bottom image is a planar view of simulation Layer 30 at 3736.3 ft (SSTVD).

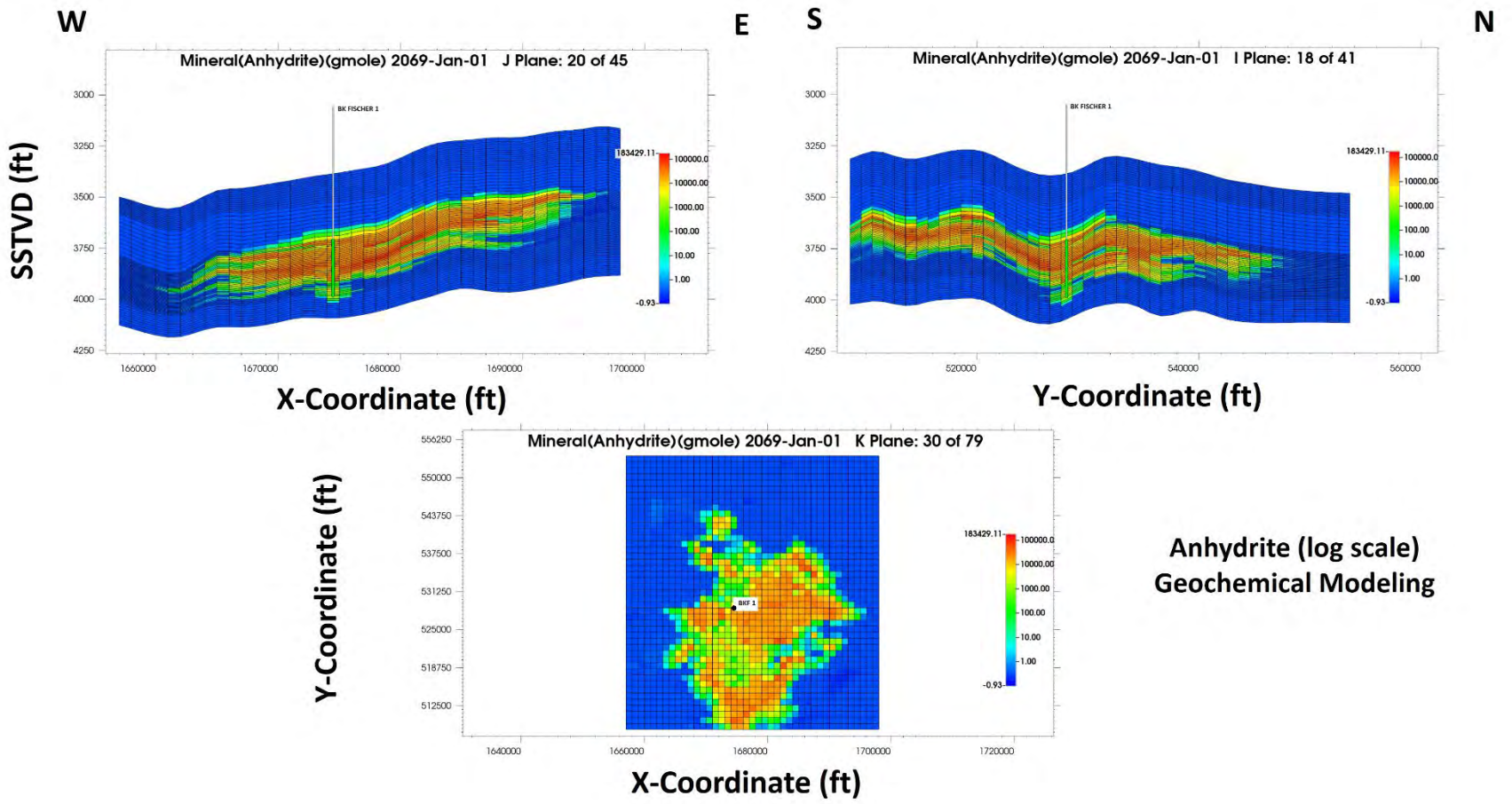



Figure C-10. Modeled change in molar distribution of anhydrite, the most prominent precipitated mineral after 20 years of injection plus 25-year postinjection period. The top-left image is west-east, and the top-right image is a south-north cross section. The bottom image is a planar view of simulation Layer 30 at 3736.3 ft (SSTVD).

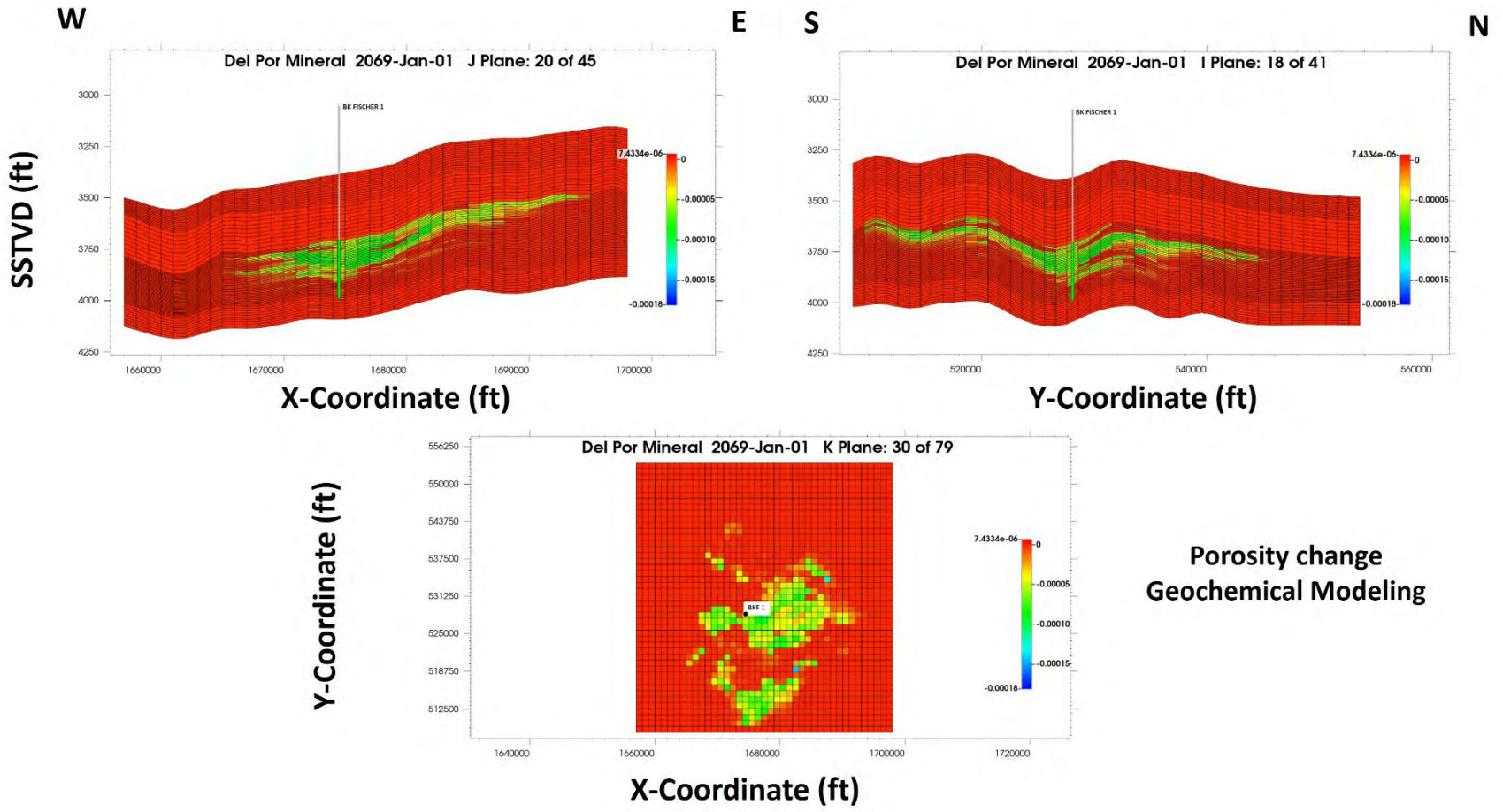



Figure C-11. Modeled change in porosity due to net geochemical dissolution after 20 years of injection plus 25-year postinjection period. The top-left image is west-east, and the top-right image is a south-north cross section. The bottom image is a planar view of simulation Layer 30 at 3736.3 ft (SSTVD).

### C.1.2 Geochemical Interaction of the Upper Confining Zone (Cap Rock, Opeche/Spearfish Formation)

Geochemical simulation using the PHREEQC geochemical software was performed to calculate the potential effects of an injected multicomponent $CO_2$ stream on the Opeche/Spearfish Formation. Note: PHREEQC's unit of measure is metric. A vertically oriented 1D simulation was created using a stack of 1-meter grid cells where the formation was exposed to the injection stream mixture at the bottom boundary of the simulation and allowed to enter the system by molecular diffusion processes. Direct fluid flow into the Opeche/Spearfish Formation by free-phase saturation from the injection stream is not expected to occur because of the low permeability of the confining zone. Results were calculated at the grid cell centers: 0.5, 1.5, 2.5, and 3.5 meters above the cap rock–$CO_2$ exposure boundary. The mineralogical composition calculated from the XRD results of the deepest sample from the Opeche/Spearfish Formation was honored (Table C-4). Formation brine composition was assumed to be the same as the known composition from the Broom Creek Formation injection zone below (Table C-5).

The anticipated average $CO_2$ stream composition is 98.25% $CO_2$, 1.44% $N_2$, and 0.31% $O_2$, with a trace amount of $H_2S$. The $CO_2$ stream that was used for geochemical modeling, described in Table C-1, contains a higher amount of $O_2$ (2%). The modeled stream containing ~95% $CO_2$ and 2% $O_2$ (Table C-1) was used to represent a conservative scenario where the higher oxygen concentration may trigger more geochemical reactions in the formation. The exposure level, expressed in moles per year, of the $CO_2$ stream to the confining layer was 4.5 moles/yr. This value is considerably higher than the expected actual exposure level of 2.3 moles/year (Espinoza and Santamarina, 2017). Again, this conservative overestimation was done to ensure that the degree and pace of geochemical change would not be underestimated. This geochemical simulation was run for 45 years to represent 20 years of injection plus 25 years of postinjection. The simulation was performed at elevated reservoir pressure and temperature conditions obtained from the dynamic reservoir simulation.

**Table C-4. Mineral Composition of the Opeche/Spearfish Derived from XRD Analysis of Archie Erickson 2 Core Sample at a Depth of 5848 ft MD**

| | Minerals, wt% |
|---|---|
| Albite | 1.5 |
| Anhydrite | 95.5 |
| Celestite | 1.0 |
| Dolomite | 1.7 |
| Quartz | 0.3 |

**Table C-5. Formation Water Chemistry from Broom Creek Formation Fluid Sample from Archie Erickson 2**

| | | | |
|---|---|---|---|
| pH | 6.55 | Calcium | 2410 mg/L |
| Total Alkalinity | 98 mg/L $CaCO_3$ | Magnesium | 409 mg/L |
| Bicarbonate | 98 mg/L $CaCO_3$ | Sodium | 41,200 mg/L |
| Carbonate | <20.5 mg/L $CaCO_3$ | Potassium | 774 mg/L |
| Hydroxide | <20.5 mg/L $CaCO_3$ | Strontium | 73.4 mg/L |
| Sulfate | 2800 mg/L | Nitrate | 104 mg/L |
| Chloride | 76,000 mg/L | Iron | 5 mg/L |
| TDS | 115,000 mg/L | | |

Results showed geochemical processes at work. Figures C-12 through C-16 show results from geochemical modeling. Figure C-12 shows a change in fluid pH over time as $CO_2$ diffuses into the system. For the cell at the $CO_2$ interface, Cell 1 (C1), the pH starts declining from an initial pH of 6.24 to below 4.6 after 5 years of simulation time and continues to decrease to a level of 4.4 by the end of 25 years of postinjection. For the cell occupying the space 1 to 2 meters into the cap rock, C2, the pH starts to decline after Year 5 and decreases to 4.9 by the end of simulation. For the cell occupying the space 2 to 3 meters into the cap rock, C3, the pH begins to change after Year 44. Lastly, the pH is unaffected in C4, indicating $CO_2$ does not penetrate this cell within the 45 years of simulation.

Figure C-13 shows the modeled change in mineral dissolution and precipitation in grams per cubic meter of rock for C1 and C2. The net change due to precipitation or dissolution in C1 and C2 is less than 0.5 kg per cubic meter, with little change in dissolution or precipitation taking place throughout the entire simulation time. Albite and dolomite start to dissolve slowly from the beginning of the simulation period while illite and quartz precipitate for C1 at the same time. Any effects in C3 are like the change observed for C2. Mineralogical composition with more than 95% of anhydrite and less dissolution of $CO_2$ because of high salinity results in minimal dissolution and precipitation in the C1 and C2.

Figure C-14 represents the initial fractions of potentially reactive minerals in the Opeche/Spearfish Formation based on XRD data shown in Table C-4. The expected dissolution of these minerals in weight percentage is also shown for C1 and C2 of the model. In C1 and C2, albite and dolomite are the primary minerals that dissolve. Dissolution (%) in C1 and C2 is minimal (<0.02%) and not significant to represent at the scale in Figure C-14.

Figure C-15 represents minerals expected to be precipitated in weight (%) shown for C1 and C2 of the model. In C1 and C2, illite and anhydrite are the primary minerals to be precipitated. Calcite is the secondary mineral to be precipitated in C2.

Figure C-16 shows the modeled change in porosity of the cap rock for C1–C4. The overall net porosity changes from dissolution and precipitation are minimal, less than 0.01% change during the life of the simulation. Initially, C1 experiences an increase in porosity because of dissolution upon first $CO_2$ exposure and initial model equilibration, but the change is temporary. For C2, porosity decrease is observed for the first few years, and then it gets back to its initial

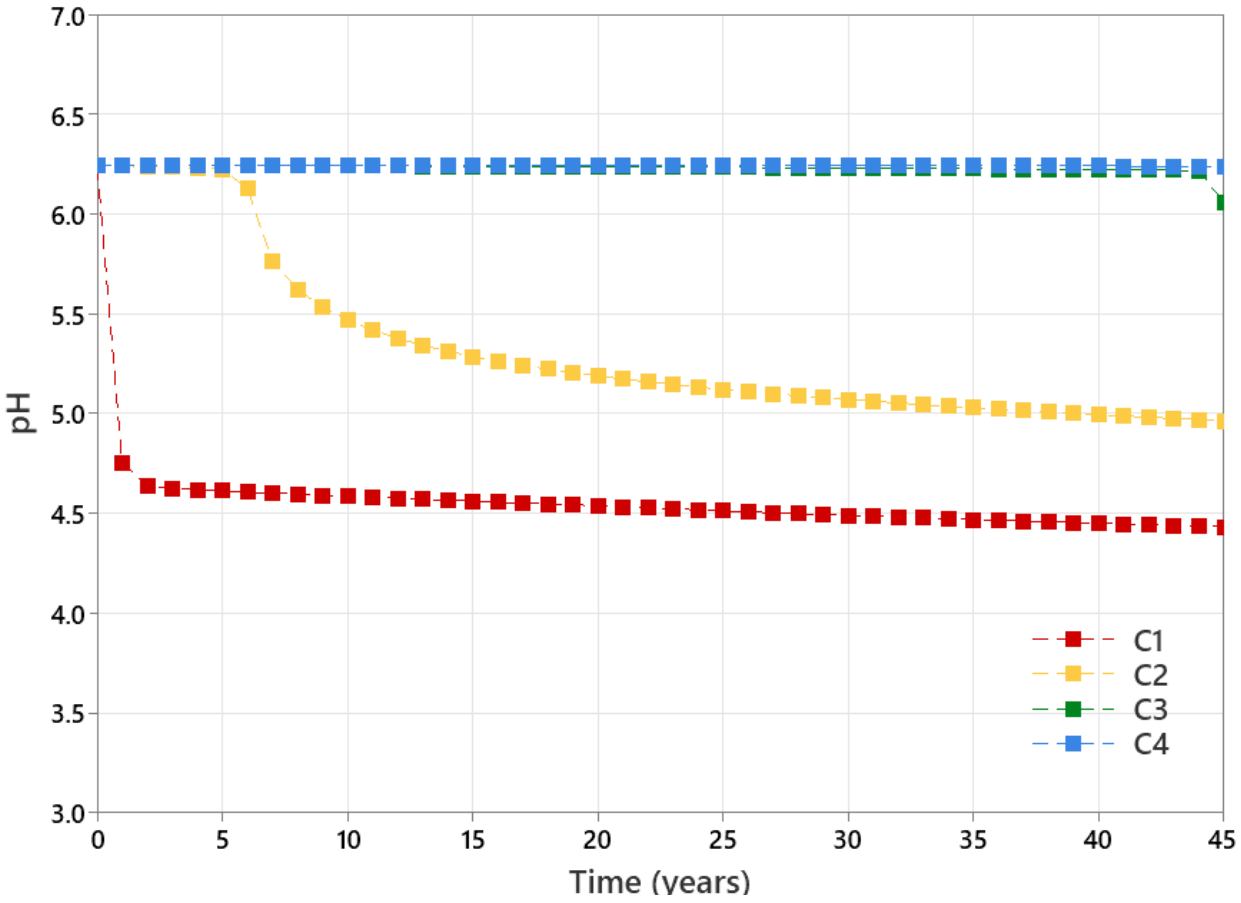



Figure C-12. Modeled change in fluid pH vs. time. Red line shows pH for the center of C1, 0.5 meters above the Opeche/Spearfish Formation cap rock base. Yellow line shows C2, 1.5 meters above the cap rock base. Green line shows C3, 2.5 meters above the cap rock base. Blue line shows C4, 3.5 meters above the cap rock base.

porosity. No significant porosity changes were observed for C3. These results suggest that geochemical change from exposure to $CO_2$ is minor; therefore, the ability of the Opeche/Spearfish Formation to maintain its sealing integrity will not be compromised by geochemical processes.

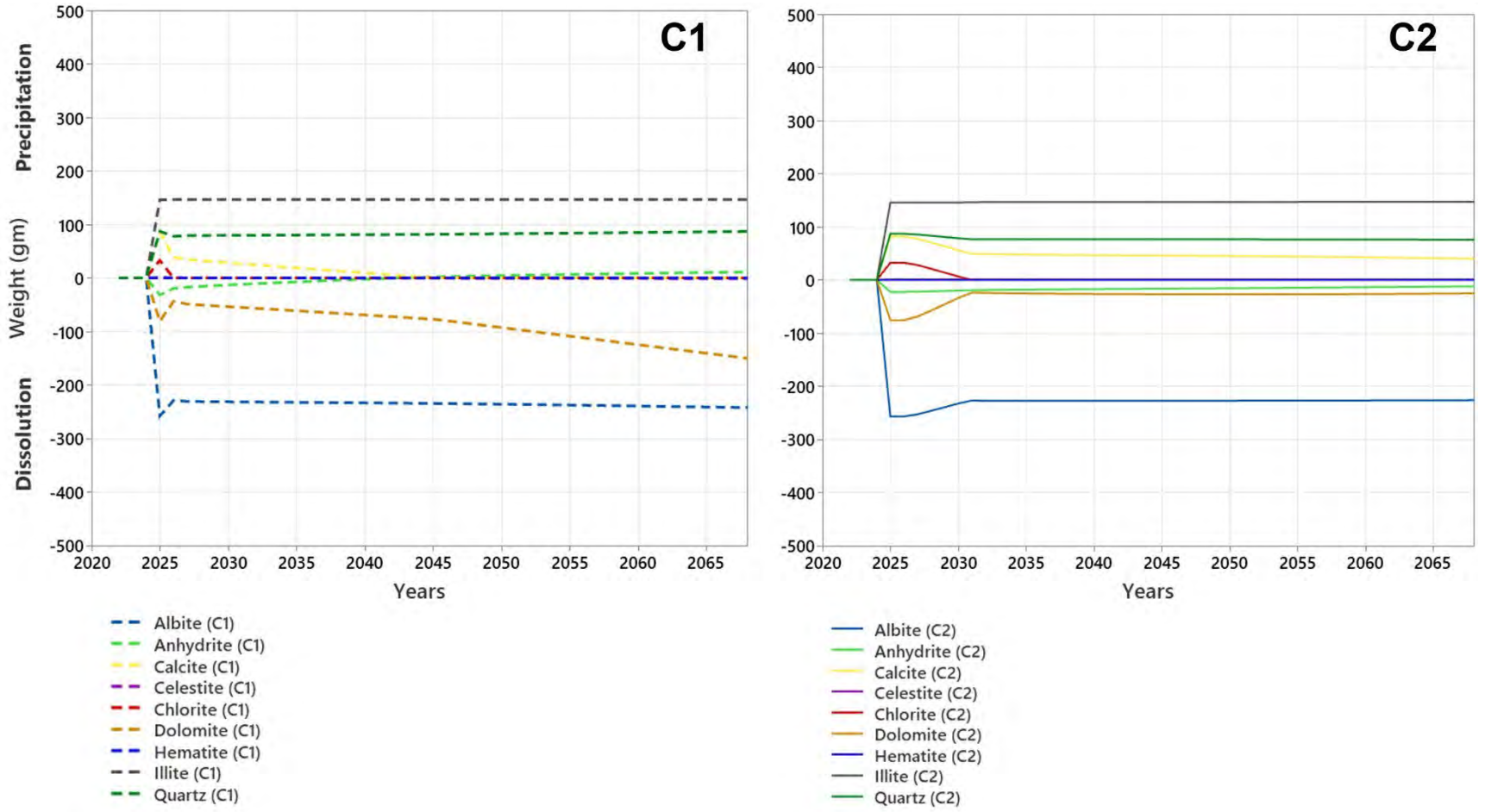



Figure C-13. Modeled dissolution and precipitation of minerals in the Opeche/Spearfish Formation cap rock. Dashed lines show results calculated for C1, at 0.5 meters above the cap rock base. Solid lines show results for C2, 1.5 meters above the cap rock base. Results from C3, 2.5 meters above the cap rock base are similar to the change observed for C2.



BK FISCHER/ARCHIE ERICKSON 2

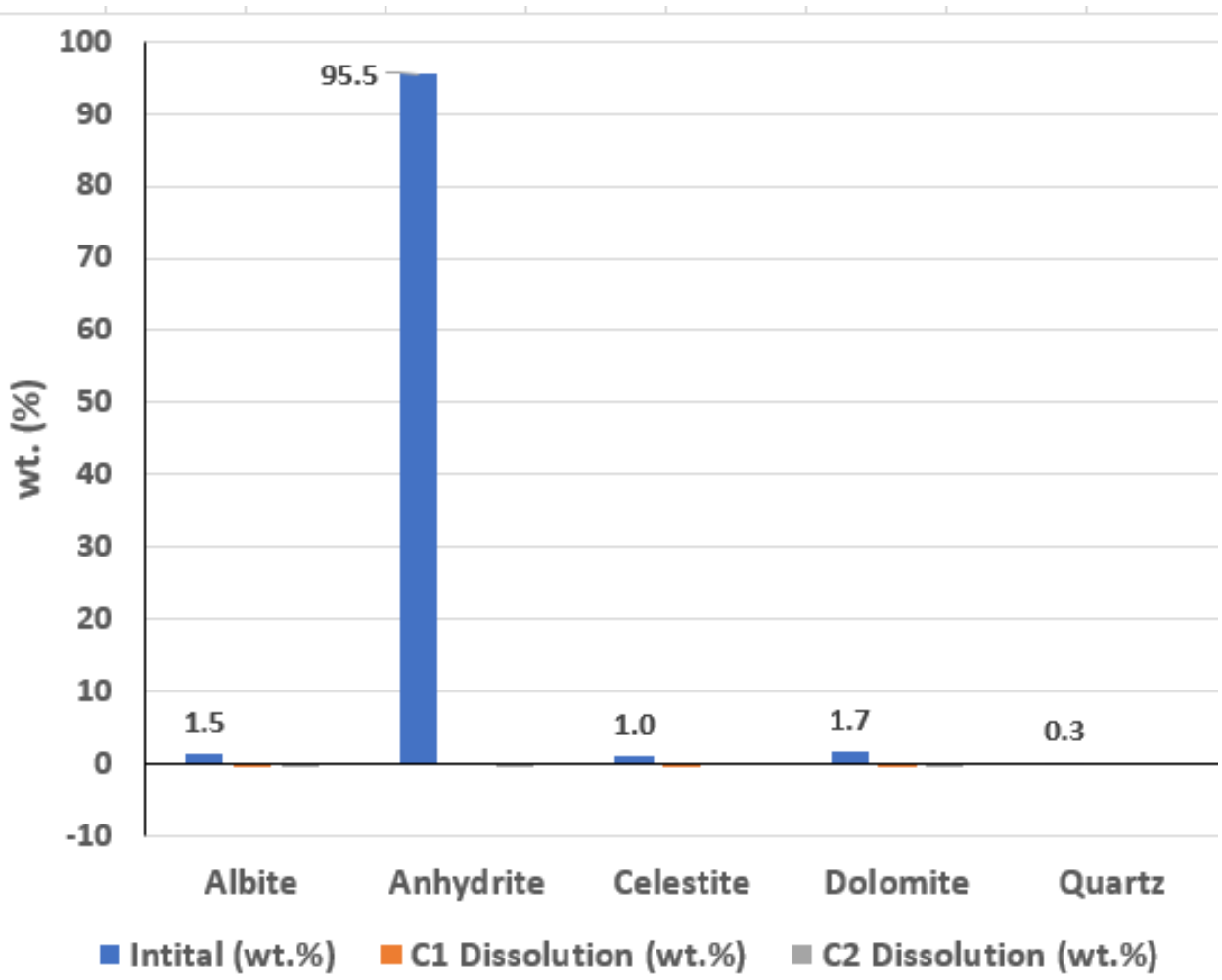



Figure C-14. Weight percentage (wt%) of potentially reactive minerals present in the Opeche/Spearfish Formation geochemistry model before simulation (blue) and expected dissolution of minerals in C1 (orange, too small to see in the figure) and C2 (gray, too small to see in the figure) after 20 years of injection plus 25 years of postinjection. Negative values represent total wt% associated with dissolution.

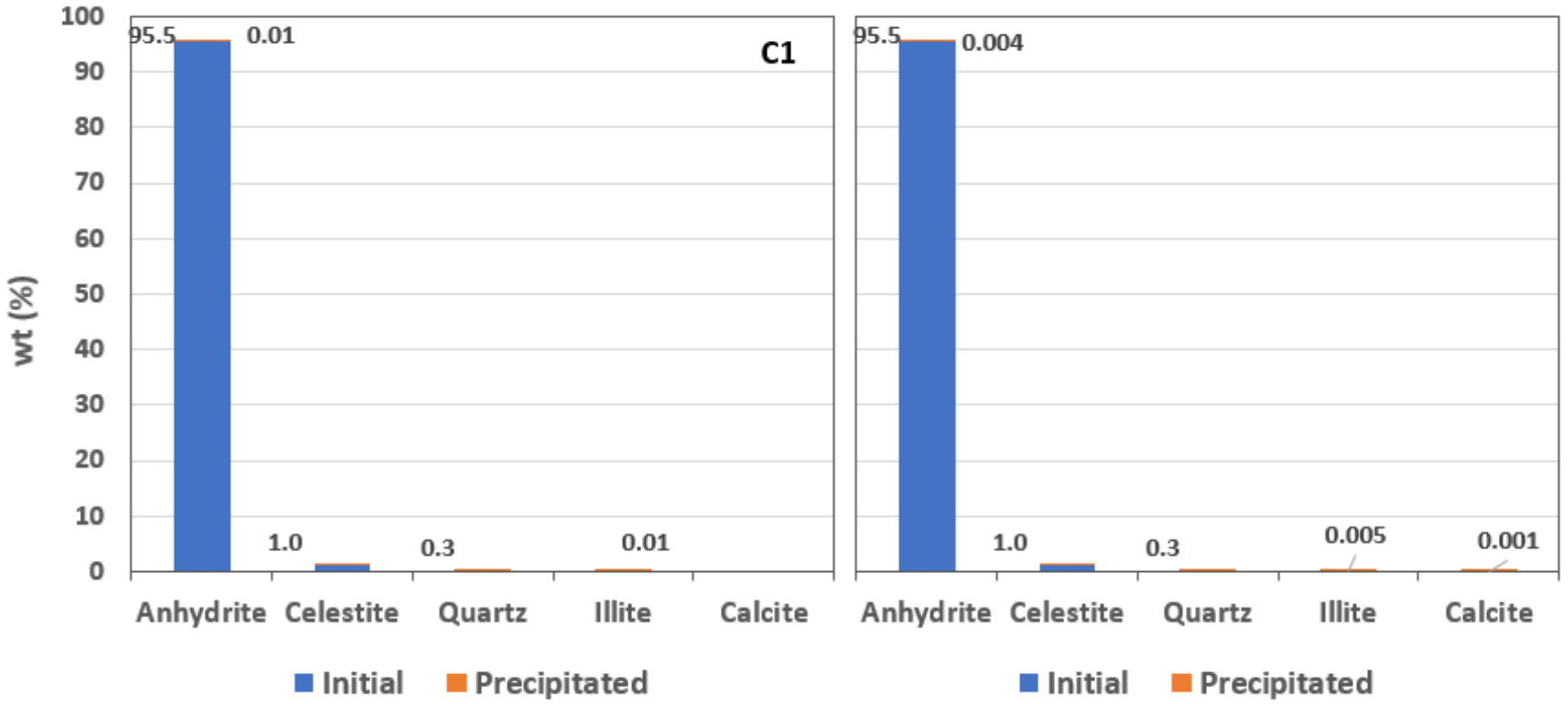



Figure C-15. Weight percentage (wt%) of initial (blue) and precipitated (orange) minerals of the Opeche/Spearfish Formation in C1 and C2 normalized based on total solid (initial – dissolution + precipitation) present in C1 and C2 after 20 years of injection and 25 years of postinjection. Minerals precipitated in C1 and C2 are too small to be seen in the figure.

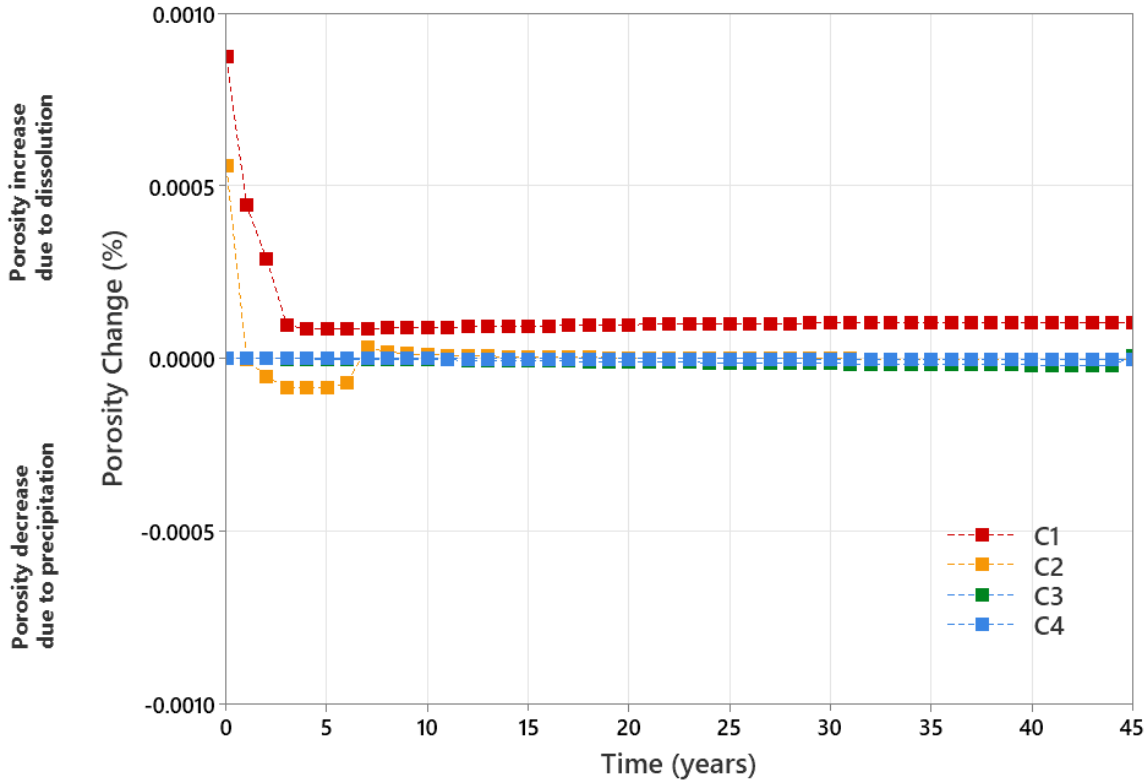



Figure C-16. Modeled change in percent porosity of the Opeche/Spearfish Formation cap rock. Red line shows porosity change calculated for C1, 0.5 meters above the cap rock base. Orange line shows C2, 1.5 meters above the cap rock base. Green line shows C3, 2.5 meters above the cap rock base. Blue line shows C4, 3.5 meters above the cap rock base. Long-term change in porosity is minimal and stabilized. Positive change in porosity is related to dissolution of minerals, and negative change is due to mineral precipitation.

### C.1.3 Geochemical Interaction of the Lower Confining Zone (Amsden Formation)

The Broom Creek Formation's underlying confining layer, the Amsden Formation, was investigated using PHREEQC geochemical software. A vertically oriented 1D simulation was created using a stack of 16 cells, each cell 1 meter in thickness. The formation was exposed to $CO_2$ stream components at the top boundary of the simulation, and $CO_2$ was allowed to enter the system by advection and dispersion processes. Direct fluid flow into the Amsden Formation by free-phase saturation from the injection stream is not expected to occur because of the low permeability of the confining zone. Results were calculated at the center of each cell below the confining layer–$CO_2$ exposure boundary. The average mineralogical composition calculated from the results of four samples from the Amsden Formation was honored (Table C-6). The formation brine composition was assumed to be the same as the known composition from the overlying Broom Creek Formation injection zone (Table C-5). A $CO_2$ stream containing ~95% $CO_2$ and 2% $O_2$, shown in Table C-1, was used in the geochemical modeling to represent a conservative scenario, where higher oxygen concentration may trigger more geochemical reactions in the formation. The maximum formation temperature and pressure, projected from CMG simulation results described in Section 3.0, were used to represent the potential maximum pore pressure and temperature level.

**Table C-6. Averaged Mineral Composition of the Amsden Formation Derived from XRD Analysis of Archie Erickson 2 Core Samples at Depths of 6152.7, 6157.6, 6161.5 and 6168 ft MD**

| Minerals, wt% | |
|---|---|
| Albite | 1.76 |
| Anhydrite/Gypsum | 2.0 |
| Dolomite | 61.45 |
| Illite | 8.69 |
| K-Feldspar | 11.79 |
| Quartz | 12.80 |
| Hematite | 0.23 |
| Others | 1.28 |

The higher-pressure results are shown here to represent a potentially more rapid pace of geochemical change. This simulation was run for 45 years to represent 20 years of injection plus 25 years of postinjection.

Modeling results show geochemical processes at work. Figures C-17 through C-22 show results from the geochemical modeling. Figure C-17 shows change in fluid pH over 45 years (representing 20 years of injection and 25 years of postinjection) as $CO_2$ enters the system. Initial change in pH in all of the cells, for C1 to C16, is related to initial equilibration of the model. For the cell at the $CO_2$ interface, C1, the pH declines to a level of 5.5 after 3 years of injection, further declining to 5.0 by the end of the modeled injection period, and hits 4.55 by the end of simulation period. Progressively lower or slower pH changes occur for each cell that is more distant from the $CO_2$ interface. The pH for C16 did not decline over the 45 years of simulation time. Figure C-18 shows that $CO_2$ penetration greater than 0.01 molality is limited to C1–C9 and does not penetrate more than 9 meters (represented by C10–C11) over the 20 years of injection and 25 years of postinjection.

Figure C-19 shows the modeled changes in mineral dissolution and precipitation in grams per cubic meter over 45 years of simulation time. For C1, albite and K-feldspar start to dissolve from the beginning of the simulation period while quartz and illite start to precipitate. C1 observed dolomite dissolution, and anhydrite precipitation at the later year of simulation. C2 shows the similar trends but with dolomite precipitation and anhydrite dissolution and major geochemical process begins approximately 20 years after Cell C1.

Figure C-20 represents the initial fractions of potentially reactive minerals in the Amsden Formation based on the XRD data shown in Table C-6. The expected dissolution of the minerals in weight percentage is also shown for C1 and C2 of the model. In C1 and C2, albite and K-feldspar are the primary minerals that dissolve. No dissolution is observed for illite and quartz. The minerals that experience dissolution in the model are almost completely replaced by the precipitation of other minerals.

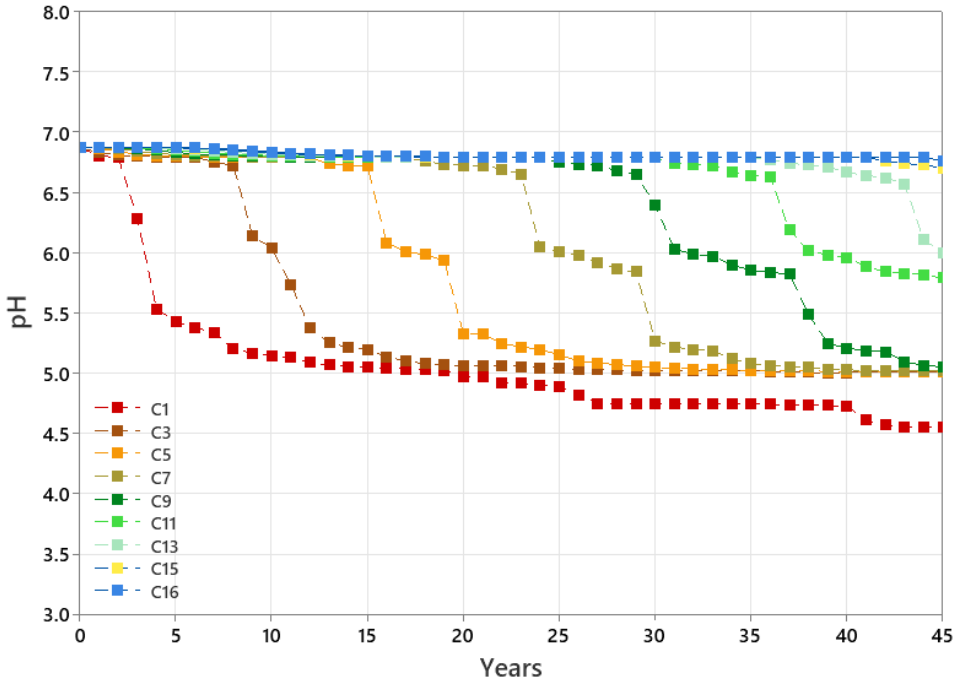



Figure C-17. Modeled change in fluid pH for C1–C16 (odd numbered cells through C15 plus C16) in the Amsden Formation underlying confining layer.

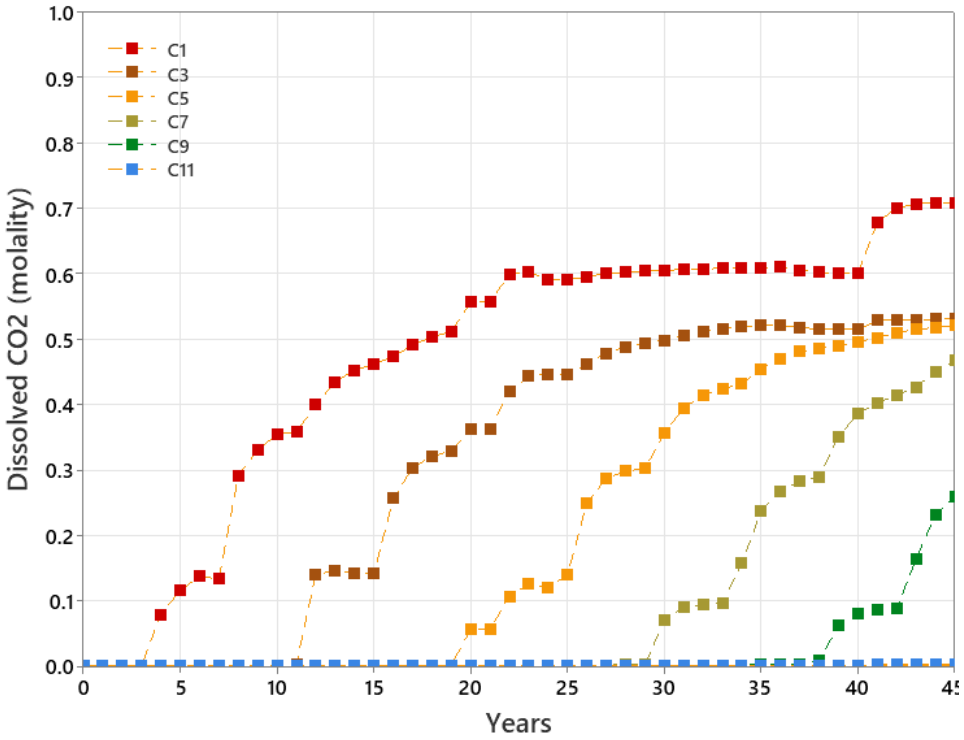



Figure C-18. Modeled $CO_2$ concentration (molality) of the odd numbered cells, C1–C11, in the Amsden Formation underlying confining layer. $CO_2$ penetration in C11 is less than 0.01 molality.

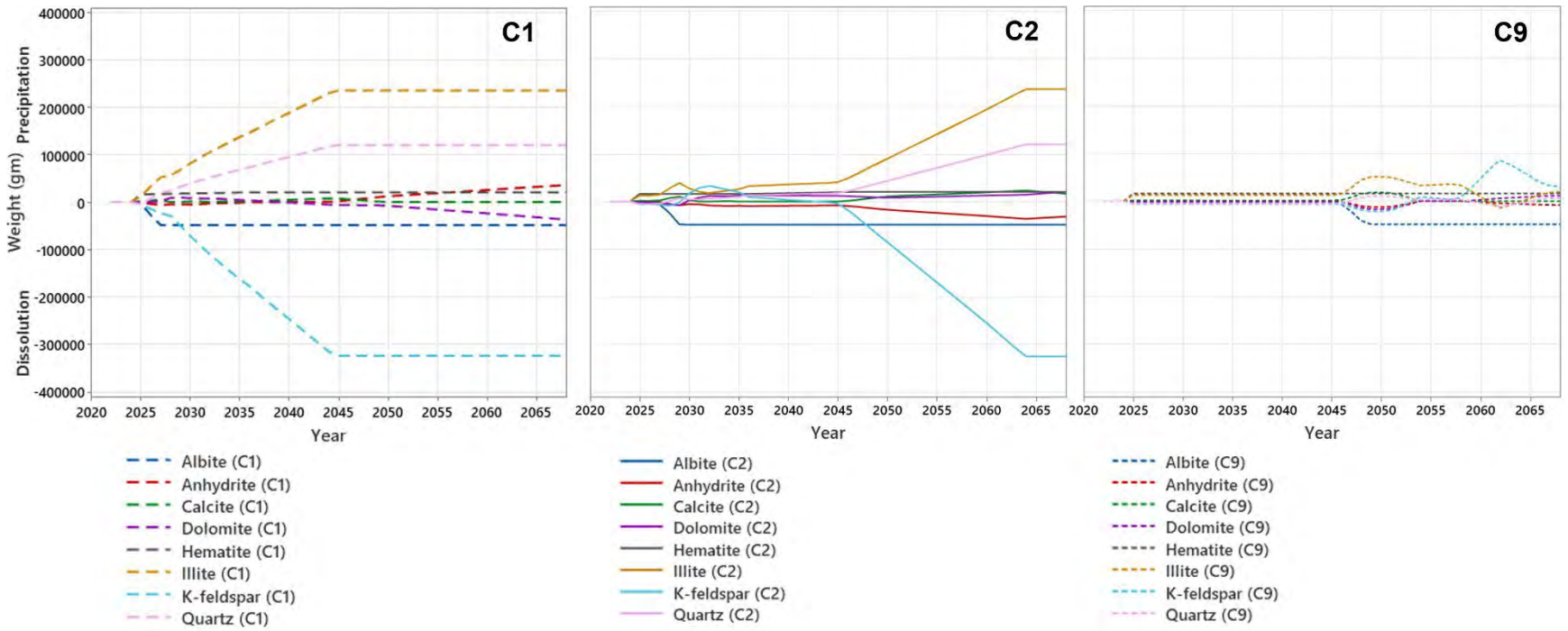



Figure C-19. Modeled dissolution and precipitation of minerals in the Amsden Formation underlying confining layer. Dashed lines show results for C1, 0 to 1 meter below the Amsden Formation top. Solid lines show results for C2, 1 to 2 meters below the Amsden Formation top. Dotted lines show results for C9, 8 to 9 meters below the Amsden Formation top. C9 shows minimal dissolution and precipitation at the end of 25 years postinjection because of smaller amount of $CO_2$ penetration in C9 by the end of 45 years of simulation.

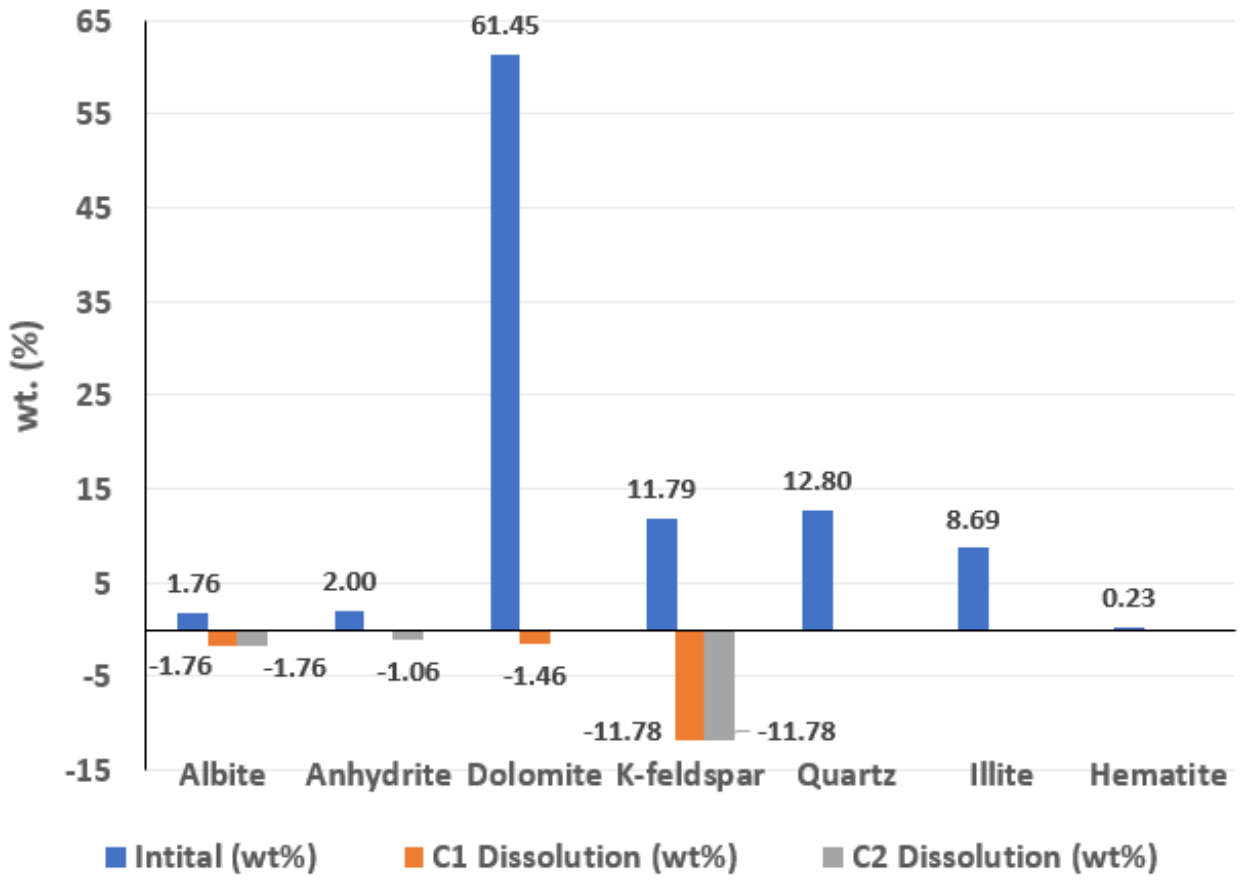



Figure C-20. Weight percentage (wt%) of potentially reactive minerals present in the Amsden Formation geochemistry model before simulation (blue) and expected dissolution of minerals in C1 (orange) and C2 (gray) after 20 years of injection plus 25 years of postinjection. Negative values represent total wt% associated with dissolution.

Figure C-21 represents this replacement with the minerals expected to be precipitated in weight percentage (wt%) shown for C1 and C2 of the model. In C1 and C2, illite and quartz are the key primary minerals expected to be precipitated. In C1, anhydrite and hematite precipitate as the secondary minerals. In C2, calcite, dolomite, and hematite precipitate as the secondary minerals.

The modeled change in porosity (% units) of the Amsden Formation is displayed in Figure C-22 for C1-C3. The overall net porosity changes from dissolution and precipitation are minimal, less than 2% change during the life of the simulation. C1-C3 shows an initial porosity decrease, but this change is temporary. C1 returns to its near initial porosity after year 20. For C2 and C3, a cyclic pattern of porosity increase and subsequent decrease with low amplitude is observed. No significant porosity changes were observed in C2–C3 after 20 years of modeled injection. Cells C4–C16 showed similar results, with porosity change being less than 0.1% at each time step (not shown in Figure C-22).

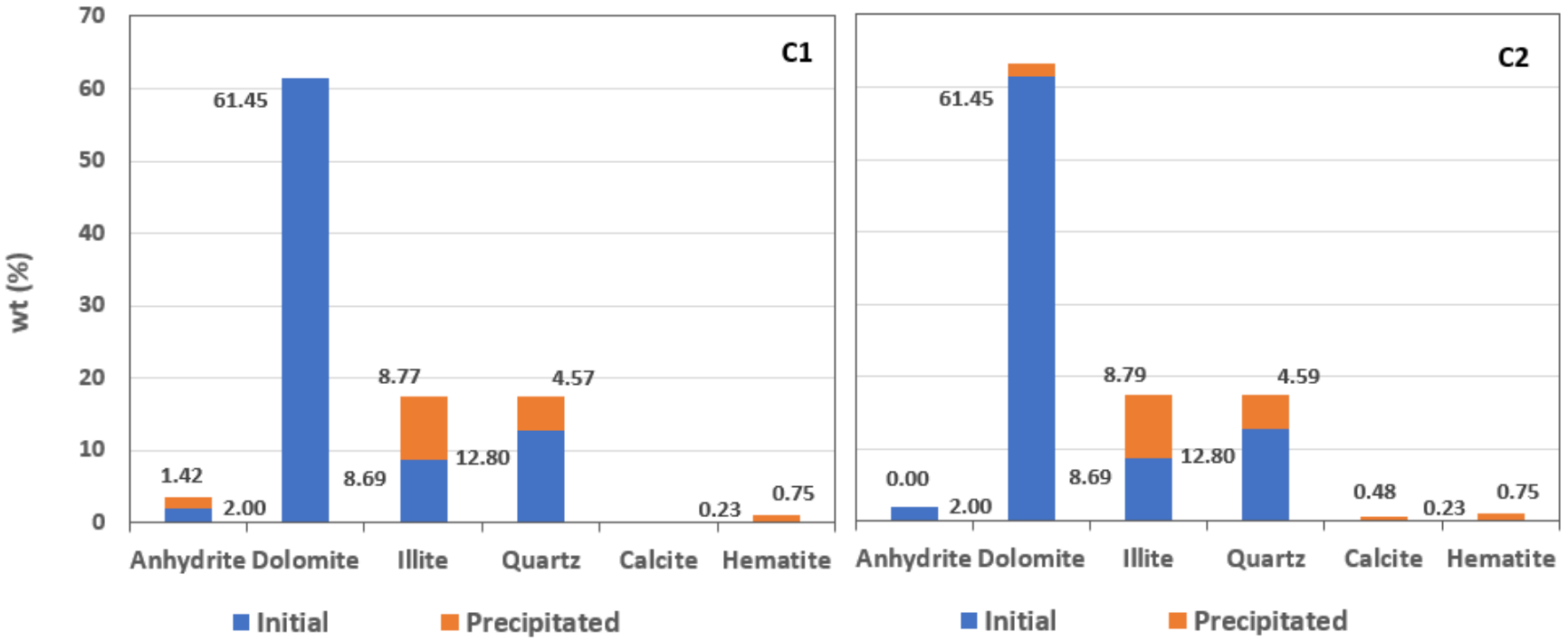



Figure C-21. Weight percentage (wt%) of initial (blue) and precipitated (orange) minerals in the Amsden Formation in C1 and C2 normalized based on total solid (initial – dissolution + precipitation) present in C1 and C2 after 20 years of injection and 25 years of postinjection. There is no calcite precipitation in C1.

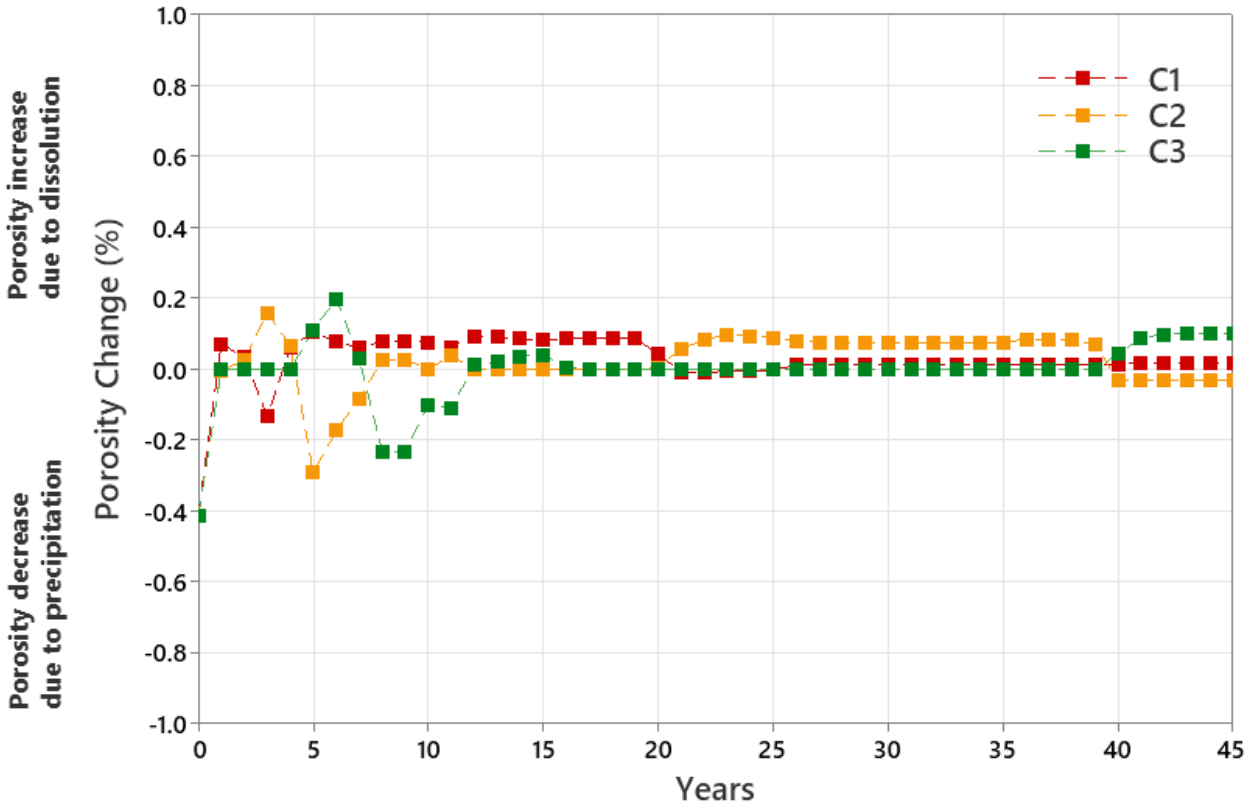



Figure C-22. Modeled change in percent porosity in the Amsden Formation underlying confining layer. Red line shows porosity change for C1, 0 to 1 meter below the Amsden Formation top. Orange line shows C2, 1 to 2 meters below the Amsden Formation top. Green line shows C3, 2 to 3 meters below the Amsden Formation top. Long-term change in porosity is minimal and stabilized. Positive change in porosity is related to dissolution of minerals, and negative change is due to mineral precipitation.

## C.1.4 REFERENCES

Espinoza, D.N., and Santamarina, J.C., 2017, $CO_2$ breakthrough—caprock sealing efficiency and integrity for carbon geological storage: International Journal of Greenhouse Gas Control, v. 66, p. 218–229.

# APPENDIX D

# MONITORING EQUIPMENT SPECIFICATION INFORMATION

**Attachment D-1 – Gas Chromatograph Specification Sheet**

Envent
Knowledge by Analysis

# Envent Model 132S

## Process Gas Chromatograph

The Model 132S Process Gas Chromatograph (GC) is a simple approach to energy measurement, created and designed for many different applications. Envent provides a Process Gas Chromatograph platform that is efficiently manufactured to ensure industry leading delivery, while providing a GC that allows for ease of serviceability.

### Features

- High performance GC columns packed in our Envent GC Lab
- Reduced carrier usage due to efficient column design
- Environmental chamber tested prior to shipment

### Field-Serviceability

- Easy access Electronics Enclosure with single board technology
- Easy access GC Detector/Column Oven for easy GC valve diaphragm replacement and column change
- Typical downtime for diaphragm and column change: approx. 30 minutes
- No modules to maintain or un-planned downtime due to non-serviceability and high cost of competitor's module technology
- Returns ownership to the measurement technician rather than the GC manufacturer

### Natural Gas Applications

- Energy Measurement
- Pipeline Monitoring
- Custody Transfer
- Biogas/Landfill
- Power Generation
- Turbine Control

### Gas Processing Applications

- Cryogenic gas plant
- NGL/LPG (methanol ethanol)
- LNG
- Fractionation/ Hydrocarbon Purity
- Gas Sweetening
- Methanol in NGL
- Methanol in Natural Gas

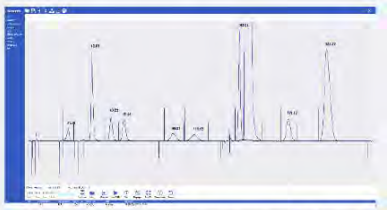
### Electronics

- Non-incendive electronic circuit design approved for Class I Division 2 electrical areas
- Eliminates the need for explosion proof enclosures or purge-air
- Includes all CPU, Memory, and I/O functions on a single board that operates together with the Envent Gas Chromatograph software
- Low-cost, simplified electronic troubleshooting approach

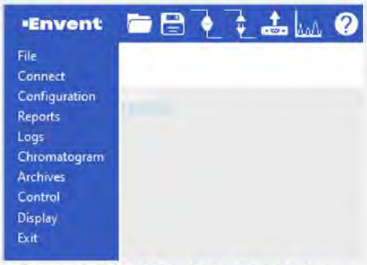
### Software

- Archived custody stream chromatogram/chart storage
- Auto-storage of most recent calibration chromatogram/chart
- 18 months of archived analysis reports
- 6 months of archived calibration reports

132S Process Configuration



Envent **G**as **C**hromatograph **S**oftware (GCS)




Envent GCS User Interface Menu

www.enventengineering.com

CD-19-0.2.3_R0_10 May 22

Continued…

## Attachment D-1 – Gas Chromatograph Specification Sheet (continued)

Envent
Knowledge by Analysis

Easily Accessible GC Oven

1. Thermal Conductivity Detector (Max 2)
2. GC Valve (Max 6)
3. Column Dish
4. Sample Pre-Heat Coil (Max 4)

High performance micro-packed GC columns manufactured at our Envent GC lab in Houston, TX

Specifications

| | |
|---|---|
| Environmental Temperature | -18° to 54°C (0° to 130°F) Quoted per application |
| Dimensions | Standard Configuration: 72" H x 24" W x 16" D<br>(183cm H x 61cm W x 41cm D) |
| Mounting | Wall mount or floor mount |
| Enclosure | NEMA 4X |
| Electrical Classification | Class I, Division 2, Groups B, C, D |
| Power | 120 +/- 10% VAC 50/60 Hz Standard<br>240 +/- 10% VAC 50/60 Hz Available |
| Power Consumption | Start up: 150 watts<br>Steady State: 60 - 80 watts nominal |
| Oven | Airless Heat Sink |
| GC Valves | Six-port and ten-port diaphragm chromatograph valves<br>Thermal Conductivity Detector (TCD)<br>Single or Dual TCD Capabilities (2-min application) |
| Stream Valves | Double Block and Bleed |
| Carrier Gas | UHP Helium (99.999%) or UHP Hydrogen (99.999%) |
| Actuation Gas | Helium, Nitrogen, Instrument Air<br>(GC Valves/Stream Valves Regulated to 65 psig) |
| Detector | Thermal Conductivity Detector: Single or Dual TCD capabilities<br>Advanced TCD allows for low ppm measurement |
| Peak Gating | Auto-Slope detection |
| Streams | Up to 4 Custody streams (plus auto-calibration stream) |
| Input/Output | 2 analog outputs<br>4 dry contact relay outputs<br>4 digital inputs<br>4 solenoid outputs |
| Communications | SIM 2251 Modbus mapping<br>User Modbus mapping<br>1 RS-232 serial communication ports (Modbus capable)<br>2 RS-485 serial communication ports (Modbus capable)<br>1 Ethernet communication port RJ-45 (Modbus capable) |
| Measurement Calculations | Latest GPA 2145, GPA 2172, AGA 8, and ISO 6976 calculations |

www.enventengineering.com

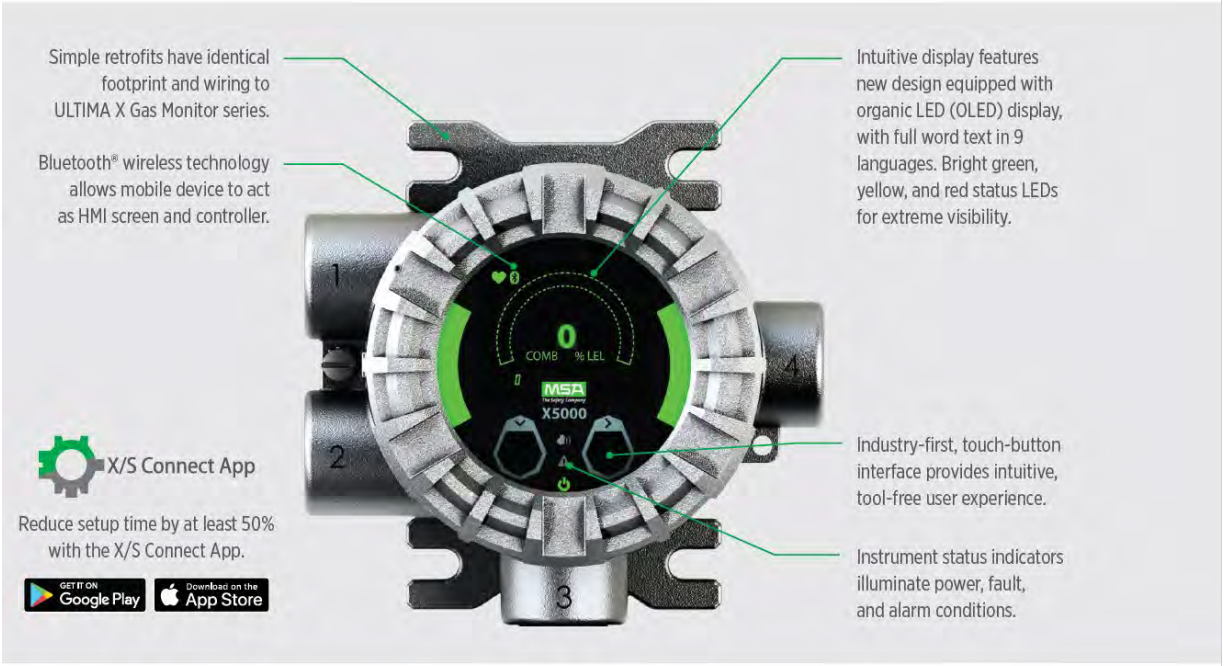
CD-19-0.2.3_R0_10 May 22

**Attachment D-2 – Gas Detection Station Specification Sheet**

# ULTIMA® X5000 Gas Monitor

The future looks bright.

MSA The Safety Company




## Advanced Sensor Technology

POWERED BY XCell® SENSORS WITH TruCal® TECHNOLOGY

- Patented XCell $H_2S$ and CO Sensors with TruCal technology extend calibration cycles for as long as 2 years, actively monitor sensor integrity, and compensate for environmental factors and electrochemical sensor drift.
  - **Diffusion Supervision** sends acoustic signal every 6 hours to check that sensor inlet isn't obstructed so gas can reach the sensor.
  - Worry-free operation—automatically self-checks four times per day.
- 3-year warranty and 5-year expected life for XCell Sensors.
- **Dual sensor capability** doubles sensing power with half the footprint of a single gas sensor transmitter.
- **SafeSwap** enables safe and quick XCell Sensor replacement without powering off gas detector.

### Applications

- Chemical
- Oil and gas
- Petrochemical
- Utilities
- Wastewater
- General industry

Continued…

## Attachment D-2 – Gas Detection Station Specification Sheet (continued)

# ULTIMA X5000 Gas Monitor: Sensor Specifications

MSA The Safety Company

| Electrochemical Sensors | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gas | Default Range | Selectable Full Scale Range | Resolution | Response Time* | | Repeatability | Zero Drift | Operating Temperature | | Sensor Type | Sensor Life | Warranty | Classification |
| | | | | *T50* | *T90* | | | *Min.* | *Max.* | | | | |
| Ammonia - 100 | 0 - 100 ppm | 25 - 100 ppm | 0.1 ppm | < 20 Sec | < 60 Sec | < ±1% | < 1% FS / Month | -40°C (-40°F) | 60°C (140°F) | XCell | 5 Years | 3 Years | Div/Zone 2 |
| Ammonia - 1000 | 0 - 1000 ppm | 190 - 1000 ppm | 10 ppm | < 20 Sec | < 300 Sec | < ±15% | < 1% FS / Month | -30°C (-22°F) | 50°C (122°F) | Echem | 2 Years | 1 Year | Div/Zone 2 |
| Carbon Monoxide - 100 | 0 - 100 ppm | 10 - 1000 ppm | 1 ppm | < 3 Sec | < 9 Sec | < ±1% | < 1% FS / Year | -40°C (-40°F) | 60°C (140°F) | XCell | 5 Years | 3 Years | Div/Zone 1 |
| Carbon Monoxide - 1000 | 0 - 1000 ppm | 10 - 1000 ppm | 1 ppm | < 3 Sec | < 9 Sec | < ±1% | < 1% FS / Year | -40°C (-40°F) | 60°C (140°F) | XCell | 5 Years | 3 Years | Div/Zone 1 |
| Carbon Monoxide - 500 | 0 - 500 ppm | 10 - 1000 ppm | 1 ppm | < 3 Sec | < 9 Sec | < ±1% | < 1% FS / Year | -40°C (-40°F) | 60°C (140°F) | XCell | 5 Years | 3 Years | Div/Zone 1 |
| Carbon Monoxide $H_2$ Resistant | 0 - 100 ppm | 10 - 1000 ppm | 1 ppm | < 3 Sec | < 9 Sec | < ±1% | < 1% FS / Year | -40°C (-40°F) | 60°C (140°F) | XCell | 5 Years | 3 Years | Div/Zone 1 |
| Chlorine - 5 | 0 - 5 ppm | 1 - 20 ppm | 0.1 ppm | < 5 Sec | < 12 Sec | < ±1% | < 1% FS / Month | -40°C (-40°F) | 60°C (140°F) | XCell | 5 Years | 3 Years | Div/Zone 2 |
| Chlorine - 10 | 0 - 10 ppm | 1 - 20 ppm | 0.1 ppm | < 5 Sec | < 12 Sec | < ±1% | < 1% FS / Month | -40°C (-40°F) | 60°C (140°F) | XCell | 5 Years | 3 Years | Div/Zone 2 |
| Chlorine - 20 | 0 - 20 ppm | 1 - 20 ppm | 0.1 ppm | < 5 Sec | < 12 Sec | < ±1% | < 1% FS / Month | -40°C (-40°F) | 60°C (140°F) | XCell | 5 Years | 3 Years | Div/Zone 2 |
| Chlorine Dioxide | 0 - 3 ppm | 0.5-3.0 ppm | 0.01 ppm | < 12 Sec | < 30 Sec | < +15% | < 1% FS / Month | -40°C (-40°F) | 50°C (122°F) | XCell | 5 Years | 3 Years | Div/Zone 2 |
| Ethylene Oxide | 0 - 10 ppm | 1 - 10 ppm | 0.1 ppm | < 50 Sec | < 140 Sec | < ±15% | < 2% FS/Month | -20°C (-4°F) | 40°C (104°F) | Echem | 2 Years | 1 Year | Div/Zone 2 |
| Hydrogen | 0 - 1000 ppm | 250 - 1000 ppm | 10 ppm | < 40 Sec | < 185 Sec | < ±10% | < 1% FS / Month | -30°C (-22°F) | 50°C (122°F) | Echem | 2 Years | 1 Year | Div/Zone 1 |
| Hydrogen Chloride | 0 - 50 ppm | 25 - 50 ppm | 1 ppm | < 30 Sec | < 120 Sec | < ±35% | < 1% FS / Month | -30°C (-22°F) | 40°C (104°F) | Echem | 2 Years | 1 Year | Div/Zone 2 |
| Hydrogen Cyanide | 0 - 50 ppm | 25 - 50 ppm | 1 ppm | < 8 Sec | < 30 Sec | < ±15% | < 1% FS / Month | -20°C (-4°F) | 40°C (104°F) | Echem | 2 Years | 1 Year | Div/Zone 1 |
| Hydrogen Fluoride | 0 - 10 ppm | 5 - 10 ppm | 0.1 ppm | < 60 Sec | < 90 Sec | < ±15% | < 2% FS / Month | 0°C (32°F) | 50°C (122°F) | Echem | 2 Years | 1 Year | Div/Zone 2 |
| Hydrogen Sulfide - 10 | 0 - 10 ppm | 10 - 100 ppm | 0.1 ppm | < 7 Sec | < 23 Sec | < ±1% | < 1% FS / Year | -40°C (-40°F) | 60°C (140°F) | XCell | 5 Years | 3 Years | Div/Zone 1 |
| Hydrogen Sulfide - 50 | 0 - 50 ppm | 10 - 100 ppm | 0.1 ppm | < 7 Sec | < 23 Sec | < ±1% | < 1% FS / Year | -40°C (-40°F) | 60°C (140°F) | XCell | 5 Years | 3 Years | Div/Zone 1 |
| Hydrogen Sulfide - 100 | 0 - 100 ppm | 10 - 100 ppm | 0.1 ppm | < 7 Sec | < 23 Sec | < ±1% | < 1% FS / Year | -40°C (-40°F) | 60°C (140°F) | XCell | 5 Years | 3 Years | Div/Zone 1 |
| Hydrogen Sulfide - 500 | 0 - 500 ppm | 20 - 500 ppm | 1 ppm | < 20 Sec | < 60 Sec | < ±10% | < 1% FS / Month | -40°C (-40°F) | 50°C (122°F) | Echem | 2 Years | 1 Year | Div/Zone 1 |
| Nitrogen Dioxide | 0 - 10 ppm | 1.5 - 10 ppm | 0.1 ppm | < 30 Sec | < 60 Sec | < ±10% | < 1% FS / Month | -40°C (-40°F) | 50°C (122°F) | Echem | 2 Years | 1 Year | Div/Zone 2 |
| Nitrogen Oxide | 0 - 100 ppm | 2.5 - 100 ppm | 0.5 ppm | < 5 Sec | < 20 Sec | < ±15% | < 1% FS / Month | -30°C (-22°F) | 50°C (122°F) | Echem | 2 Years | 1 Year | Div/Zone 1 |
| Oxygen | 0 - 25% | 5 - 25% | 0.10% | < 6 Sec | < 11 Sec | < ±1% Vol | < 0.2 % Vol / Year | -40°C (-40°F) | 60°C (140°F) | XCell | 5 Years | 3 Years | Div/Zone 1 |
| Oxygen (FM) | 0 - 25% | 5 - 25% | 0.10% | < 6 Sec | < 11 Sec | < ±1% Vol | < 0.2 % Vol / Year | -40°C (-40°F) | 60°C (140°F) | XCell | 5 Years | 3 Years | Div/Zone 1 |
| Oxygen, Low | 0 - 25% | 2 - 25% | 0.10% | < 10 Sec | < 30 Sec | < ±10% | < 1% FS / Month | -30°C (-22°F) | 50°C (122°F) | Echem | 2 Years | 1 Year | Div/Zone 1 |
| Sulfur Dioxide - 100 | 0 - 100 ppm | 25 - 100 ppm | 1 ppm | < 10 Sec | < 30 Sec | < ±15% | < 1% FS / Month | -30°C (-22°F) | 50°C (122°F) | Echem | 2 Years | 1 Year | Div/Zone 2 |
| Sulfur Dioxide - 25 | 0 - 25 ppm | 5 - 25 ppm | 0.1 ppm | < 3 Sec | < 6 Sec | < ±1% | < 1% FS / Month | -40°C (-40°F) | 60°C (140°F) | XCell | 5 Years | 3 Years | Div/Zone 2 |

**Typical response at standard temperature and pressure test conditions*

Continued…

**Attachment D-2 – Gas Detection Station Specification Sheet (continued)**

# ULTIMA X5000 Gas Monitor: Sensor Specifications

MSA The Safety Company

| XCell Catalytic Bead Sensors | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gas | Default Range | Selectable Full Scale Range | Resolution | Response Time* | | Repeatability | Zero Drift | Operating Temperature | | Sensor Type | Sensor Life | Warranty | Classification |
| | | | | T50 | T90 | | | Min. | Max. | | | | |
| Methane (5.0%) | 0 - 100% LEL | 20 - 100% LEL | 1% | < 10 Sec | < 22 Sec | < ±1% LEL | < 5% LEL / Year | -40°C (-40°F) | 60°C (140°F) | XCell | 5 Years | 3 Years | Div/Zone 1 |
| Propane (2.1%) | 0 - 100% LEL | 20 - 100% LEL | 1% | < 10 Sec | < 22 Sec | < ±1% LEL | < 5% LEL / Year | -40°C (-40°F) | 60°C (140°F) | XCell | 5 Years | 3 Years | Div/Zone 1 |
| Heptane (1.05%) | 0 - 100% LEL | 20 - 100% LEL | 1% | < 10 Sec | < 22 Sec | < ±1% LEL | < 5% LEL / Year | -40°C (-40°F) | 60°C (140°F) | XCell | 5 Years | 3 Years | Div/Zone 1 |
| Nonane (0.8%) | 0 - 100% LEL | 20 - 100% LEL | 1% | < 10 Sec | < 22 Sec | < ±1% LEL | < 5% LEL / Year | -40°C (-40°F) | 60°C (140°F) | XCell | 5 Years | 3 Years | Div/Zone 1 |
| Hydrogen (4.0%) | 0 - 100% LEL | 20 - 100% LEL | 1% | < 10 Sec | < 22 Sec | < ±1% LEL | < 5% LEL / Year | -40°C (-40°F) | 60°C (140°F) | XCell | 5 Years | 3 Years | Div/Zone 1 |
| Methane (4.4% EN) | 0 - 100% LEL | 20 - 100% LEL | 1% | < 10 Sec | < 22 Sec | < ±1% LEL | < 5% LEL / Year | -40°C (-40°F) | 60°C (140°F) | XCell | 5 Years | 3 Years | Div/Zone 1 |
| Propane (1.7% EN) | 0 - 100% LEL | 20 - 100% LEL | 1% | < 10 Sec | < 22 Sec | < ±1% LEL | < 5% LEL / Year | -40°C (-40°F) | 60°C (140°F) | XCell | 5 Years | 3 Years | Div/Zone 1 |
| Heptane (0.85% EN) | 0 - 100% LEL | 20 - 100% LEL | 1% | < 10 Sec | < 22 Sec | < ±1% LEL | < 5% LEL / Year | -40°C (-40°F) | 60°C (140°F) | XCell | 5 Years | 3 Years | Div/Zone 1 |
| Nonane (0.7% EN) | 0 - 100% LEL | 20 - 100% LEL | 1% | < 10 Sec | < 22 Sec | < ±1% LEL | < 5% LEL / Year | -40°C (-40°F) | 60°C (140°F) | XCell | 5 Years | 3 Years | Div/Zone 1 |

| ULTIMA XIR Plus Infrared Sensors | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Gas | Default Range | Selectable Full Scale Range | Resolution | Response Time* | | Repeatability | Zero Drift | Operating Temperature | | Sensor Life | Warranty | Classification |
| | | | | T50 | T90 | | | Min. | Max. | | | |
| XIR+ 0-100% LEL Ethanol | 0 - 100% LEL | 20 - 100% LEL | 1% | — | < 2 Sec | < ±1% LEL | N/A | -40°C (-40°F) | 60°C (140°F) | 10+ Years | 10 Years | Div/Zone 1 |
| XIR+ 0-100% LEL Ethylene Oxide | 0 - 100% LEL | 20 - 100% LEL | 1% | — | < 2 Sec | < ±1% LEL | N/A | -40°C (-40°F) | 60°C (140°F) | 10+ Years | 10 Years | Div/Zone 1 |
| XIR+ 0-100% LEL Gasoline Hexane | 0 - 100% LEL | 20 - 100% LEL | 1% | — | < 2 Sec | < ±1% LEL | N/A | -40°C (-40°F) | 60°C (140°F) | 10+ Years | 10 Years | Div/Zone 1 |
| XIR+ 0-100% LEL Hexane | 0 - 100% LEL | 20 - 100% LEL | 1% | — | < 2 Sec | < ±1% LEL | N/A | -40°C (-40°F) | 60°C (140°F) | 10+ Years | 10 Years | Div/Zone 1 |
| XIR+ 0-100% LEL Isopropanol | 0 - 100% LEL | 20 - 100% LEL | 1% | — | < 2 Sec | < ±1% LEL | N/A | -40°C (-40°F) | 60°C (140°F) | 10+ Years | 10 Years | Div/Zone 1 |
| XIR+ 0-100% LEL Methane (5%) | 0 - 100% LEL | 20 - 100% LEL | 1% | — | < 2 Sec | < ±1% LEL | N/A | -40°C (-40°F) | 60°C (140°F) | 10+ Years | 10 Years | Div/Zone 1 |
| XIR+ 0-100% LEL Methyl Methacrylate | 0 - 100% LEL | 20 - 100% LEL | 1% | — | < 2 Sec | < ±1% LEL | N/A | -40°C (-40°F) | 60°C (140°F) | 10+ Years | 10 Years | Div/Zone 1 |
| XIR+ 0-100% LEL Propane (2.1%) | 0 - 100% LEL | 20 - 100% LEL | 1% | — | < 2 Sec | < ±1% LEL | N/A | -40°C (-40°F) | 60°C (140°F) | 10+ Years | 10 Years | Div/Zone 1 |
| XIR+ 0-100% LEL Ethanol EN | 0 - 100% LEL | 20 - 100% LEL | 1% | — | < 2 Sec | < ±1% LEL | N/A | -40°C (-40°F) | 60°C (140°F) | 10+ Years | 10 Years | Div/Zone 1 |
| XIR+ 0-100% LEL Ethylene Oxide EN | 0 - 100% LEL | 20 - 100% LEL | 1% | — | < 2 Sec | < ±1% LEL | N/A | -40°C (-40°F) | 60°C (140°F) | 10+ Years | 10 Years | Div/Zone 1 |
| XIR+ 0-100% LEL Gasoline Hexane EN | 0 - 100% LEL | 20 - 100% LEL | 1% | — | < 2 Sec | < ±1% LEL | N/A | -40°C (-40°F) | 60°C (140°F) | 10+ Years | 10 Years | Div/Zone 1 |
| XIR+ 0-100% LEL Methane (4.4%) EN | 0 - 100% LEL | 20 - 100% LEL | 1% | — | < 2 Sec | < ±1% LEL | N/A | -40°C (-40°F) | 60°C (140°F) | 10+ Years | 10 Years | Div/Zone 1 |
| XIR+ 0-100% LEL Propane (1.7%) EN | 0 - 100% LEL | 20 - 100% LEL | 1% | — | < 2 Sec | < ±1% LEL | N/A | -40°C (-40°F) | 60°C (140°F) | 10+ Years | 10 Years | Div/Zone 1 |
| XIR+ Carbon Dioxide (2%) | 0 - 2% Vol | 0.4 - 2% | 0.05% | < 3 Sec | < 6 Sec | < ±1% | N/A | -40°C (-40°F) | 60°C (140°F) | 10+ Years | 10 Years | Div/Zone 1 |
| XIR+ Carbon Dioxide (5%) | 0 - 5% Vol | 1 - 5% | 0.05% | < 3 Sec | < 6 Sec | < ±1% | N/A | -40°C (-40°F) | 60°C (140°F) | 10+ Years | 10 Years | Div/Zone 1 |

*Typical response at standard temperature and pressure test conditions

Continued…

**Attachment D-2 – Gas Detection Station Specification Sheet (continued)**

# ULTIMA® X5000 Gas Monitor

MSA The Safety Company

## Specifications

| Product Specifications | | |
|---|---|---|
| COMBUSTIBLE GAS SENSOR TYPE | Catalytic Bead (XCell combustible)<br>Infrared (XIR Plus) | |
| TOXIC GAS & OXYGEN SENSOR TYPE | **XIR PLUS** | Carbon Dioxide ($CO_2$) |
| | **XCell Toxic** | Ammonia ($NH_3$),<br>Carbon Monoxide (CO),<br>Carbon Monoxide (CO) $H_2$-resistant,<br>Hydrogen Sulfide ($H_2S$),<br>Chlorine ($Cl_2$),<br>Chlorine Dioxide ($ClO_2$)<br>Sulfur Dioxide ($SO_2$) |
| | **XCell $O_2$** | Oxygen ($O_2$) |
| | **Electrochem.** | Ammonia ($NH_3$),<br>Ethylene Oxide (ETO)<br>Hydrogen ($H_2$),<br>Hydrogen Chloride (HCl),<br>Hydrogen Cyanide (HCN),<br>Hydrogen Fluoride (HF)<br>Nitric Oxide (NO),<br>Nitrogen Dioxide ($NO_2$),<br>Sulfur Dioxide ($SO_2$) |
| SENSOR MEASURING RANGES | **Combustible** | 0-100% LEL |
| | **$CO_2$** | 0-2%, 0-5% Vol |
| | **CO** | 0-100, 0-500, 0-1000 ppm |
| | **CO, $H_2$-resistant** | 0-100 ppm |
| | **$Cl_2$** | 0-5, 0-10, 0-20 ppm |
| | **$ClO_2$** | 0-3 ppm |
| | **ETO** | 0-10 ppm |
| | **$H_2$** | 0-1000 ppm |
| | **HCl** | 0-50 ppm |
| | **HCN** | 0-50 ppm |
| | **HF** | 0-10 ppm |
| | **$H_2S$** | 0-10, 0-50, 0-100, 0-500 ppm |
| | **$NH_3$** | 0-100, 0-1000 ppm |
| | **NO** | 0-100 ppm |
| | **$NO_2$** | 0-10 ppm |
| | **$O_2$** | 0-25% |
| | **$SO_2$** | 0-25, 0-100 ppm |
| APPROVALS CLASSIFICATION | *Markings vary by component.*<br>*See manual for specific component markings.* | |
| DIVISIONS (US/CAN) | Class I, II, III; Div 1 & 2, T4/T5/T6 | |
| ZONES (GLOBAL) | Ex db nA IIC T5 Gb (Class I, Zone 1/Zone2)<br>Ex tb IIIC T85°C Db (Class II, Zone 21) | |
| ENCLOSURE RATING | Type 4X, IP66 | |
| WARRANTY | **X5000 transmitter** | 2 years |
| | **XIR PLUS** | 10 years source,<br>5 years electronics |
| | **XCell Sensors** | 3 years |
| | **Electrochemical Sensors** | Varies by gas |
| APPROVALS | CSA, FM*, ATEX, IECEx, INMETRO, DNV-GL Marine, CE Marking. SIL 2 suitable.<br>Complies with C22.2 No. 152, FM 6320 | |

| Environmental Specifications | | |
|---|---|---|
| OPERATING TEMPERATURE RANGE | **XCell** | -40°C to +60°C |
| | **Electrochem.** | *See page 2* |
| | **XIR PLUS** | -40°C to +60°C |
| RELATIVE HUMIDITY (NON-CONDENSING) | **XCell toxics & $O_2$** | 10-95% |
| | **XCell combustible** | 0-95% |
| | **XIR PLUS** | 15-95% |

| Mechanical Specifications | | | |
|---|---|---|---|
| INPUT POWER | 11 to 30 VDC, 3 wire | | |
| SIGNAL OUTPUT | Dual 4-20 mA current source, HART | | |
| BLUETOOTH (OPTIONAL) | Bluetooth Low Energy (BLE) v4.3 or higher | | |
| RELAY RATINGS | 5 A @ 30 VDC; 5 A @ 220 VAC<br>(3X) SPDT - fault, warn, alarm | | |
| RELAY MODES | Common, discrete, horn | | |
| NORMAL MAX POWER | | ***Without Relays*** | ***With Relays*** |
| | **XIR PLUS** | 5.7 W | 6.7 W |
| | **XCell combustible** | 3.9 W | 4.9 W |
| | **XCell Toxic & $O_2$** | 1.8 W | 2.8 W |
| | **XIR PLUS & XCell combustible** | 9.9 W | 10.9 W |
| | **XIR PLUS & XCell toxic or $O_2$** | 6.0 W | 7.0 W |
| | **Dual XIR PLUS** | 10.6 W | 11.6 W |
| | **Dual XCell toxic & $O_2$** | 2.6 W | 3.6 W |
| | **Dual XCell combustible** | 9.6 W | 10.6 W |
| | **Dual XCell comb. & XCell toxic or $O_2$** | 4.3 W | 5.3 W |
| EMC DIRECTIVE | Complies with EN 50270, EN 61000-6-4, EN 61000-6-3 | | |
| DISPLAY | Organic LED (multi-lingual) with contrast ratio of 2000:1 and view angle of 160° | | |
| HART | HART 7, HART device description language available | | |
| FAULTS MONITORED | Low supply voltage, RAM checksum error, flash checksum error, EEPROM error, internal circuit error, relay, invalid sensor configuration, sensor faults, general system | | |
| CABLE REQUIREMENTS | 3-wire shielded cable for single sensor and 4-wire shielded cable for dual sensor configurations. Accommodates up to 12 AWG or 4 mm2<br>*Refer to manual for mounting distances.* | | |

| Dimensions | |
|---|---|
| HOUSING (W x H) | 5.88" x 5.71" (150 x 145 mm) |
| W/XCELL SENSOR | 5.88" x 10.15" (150 x 258 mm) |
| W/XCELL & XIR SENSORS | 13.42" x 10.15" (341 x 258 mm) |
| LID (DEPTH) | |
| W/RELAY BOARD | 4.86" (123 mm) |
| W/O RELAY BOARD | 3.86" (98 mm) |
| WEIGHT | 8.8 lb. (4 kg), 316 SS |

*See manual for FM approved sensors.*

Note: This Bulletin contains only a general description of the products shown. While product uses and performance capabilities are generally described, the products shall not, under any circumstances, be used by untrained or unqualified individuals. The products shall not be used until the product instructions/user manual, which contains detailed information concerning the proper use and care of the products, including any warnings or cautions, have been thoroughly read and understood. Specifications are subject to change without prior notice. MSA is a registered trademark of MSA Technology, LLC in the US, Europe, and other Countries. For all other trademarks visit https://us.msasafety.com/Trademarks.

MSA operates in over 40 countries worldwide. To find an MSA office near you, please visit ***MSAsafety.com/offices***.

**0720-185-MC / 02.2022**
© MSA 2022

*MSA**safety**.com/detection*

## Attachment D-3 – SCADA System and Leak Detection Software

### Supervisory Control and Data Acquisition (SCADA) System

The SCADA system is a computer-based system or systems used by personnel in a control room that aims to collect and display information about the $CO_2$ geologic storage project injection operations in real time. This supervisory system collects data at an assigned time interval and stores the data in the historian server. Using Summit Carbon Storage #2, LLC (SCS2) process control selections, the SCADA system will have the ability to send commands and control the storage injection network (i.e., start or stop pumps, open or close valves, control process equipment remotely, etc.).

In addition to monitoring and control ability, the SCADA system will include warnings, both audible and visual, to alert the SCS2 control room, which is staffed 24/7, of near or excessive violations of set parameters within the system.

### Leak Detection Software

The leak detection system (LDS) will monitor the $CO_2$ flowline from the point of transfer to each of the injection wellheads. Instrumentation at both ends of the $CO_2$ flowline and each injection well collects pressure, temperature, and flow data. The LDS software uses the pressure readings and flow rates in and out of the line to produce a real-time model and predictive model. By monitoring deviations between the real-time model and the predictive model, the software is able to detect leaks along the $CO_2$ flowline.

## Attachment D-4 – Personnel Multigas Detector Specifications

# IBRID MX6

An easy and flexible way to do gas detection

**Get ready to see hazardous levels of oxygen, toxic and combustible gas, and volatile organic compounds (VOCs) like never before.**

The MX6 iBrid™ is more than an intelligent hybrid of Industrial Scientific's best monitoring technologies. It's the first gas monitor to feature a full-color LCD display screen.

The display improves safety with clear readings in low-light, bright-light or anywhere in between. Whether the work is outside, inside or underground, it's easy to see what gas hazards lurk in the immediate work environment.

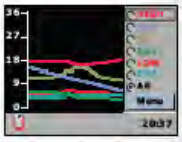
And a color display is more than eye-catching. It allows the user to step through instrument settings and functions with an intuitive menu and the instrument's five-way navigation button. It even supports the option of on-board graphing for easily interpreted direct readings and recorded data.

Plus, the MX6 iBrid is our most rugged instrument ever. It is compatible with our DSX™ Docking Station and iNet

**MX6 IBRID COLOUR SCREEN**

The MX6 clearly shows real-time readings in PPM or % by volume.

An intuitive menu provides easy access to features and setup.



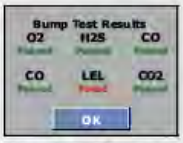

Datalog trends and direct readings can be viewed graphically.

Calibration progress and results are shown for each sensor.

A "calibration due" warning appears for each relevant sensor.

Bright red numerals and a flashing backlight show alarm conditions.

Alarms shown with "Go/No Go" text and flashing backlight.




Color-coded text shows test or calibration results at a glance.

### KEY FEATURES

- 24 "Plug-and-Play" fieldreplaceable sensors including PID and Infrared options
- Up to 6 gases monitored simultaneously
- Simple, user-friendly, customizable menudriven navigation
- Five-way navigation button
- Durable, concussionproof overmold
- Optional integral sampling pump with strong 30.5 meter (100 feet) sample draw
- Full-color graphic LCD is highly visible in a variety of lighting conditions
- Powerful, 95 dB audible alarm

iNet READY

Continued…

## Attachment D-4 – Personnel Multigas Detector Specifications (continued)

### TYPICAL RANGE OF GASES DETECTED

| SENSOR | RANGE | RESOLUTION |
|---|---|---|
| **CATALYTIC BEAD** | | |
| Combustible Gas | 0-100% LEL | 1% |
| Methane | 0-5% vol | 0.01% |
| **ELECTROCHEMICAL** | | |
| Ammonia | 0-500 ppm | 1 |
| Carbon Monoxide | 0-1,500 ppm | 1 |
| Carbon Monoxide (High Range) | 0-9,999 ppm | 1 |
| Carbon Monoxide/ Hydrogen low | 0-1,000 ppm | 1 |
| Chlorine | 0-50 ppm | 0.1 |
| Chlorine Dioxide | 0-1 ppm | 0.01 |
| Carbon Monoxide/ | CO: 0-1,500 ppm | 1 |
| Hydrogen Sulfide (COSH) | H2S: 0-500 ppm | 0.1 |
| Hydrogen | 0-2,000 ppm | 1 |
| Hydrogen Chloride | 0-30 ppm | 0.1 |
| Hydrogen Cyanide | 0-30 ppm | 0.1 |
| Hydrogen Sulfide | 0-500 ppm | 0.1 |
| Nitric Oxide | 0-1,000 ppm | 1 |
| Nitrogen Dioxide | 0-150 ppm | 0.1 |
| Oxygen | 0-30% vol | 0.1% |
| Phosphine | 0-5 ppm | 0.01 |
| Phosphine (High Range) | 0-1,000 ppm | 1 |
| Sulfur Dioxide | 0-150 ppm | 0.1 |
| **INFRARED** | | |
| Hydrocarbons | 0-100% LEL | 1% |
| Methane (% vol) | 0-100% vol | 1% |
| Methane (% LEL) | 0-100% LEL | 1% |
| Carbon Dioxide | 0-5% vol | 0.01% |
| **PHOTOIONIZATION** | | |
| VOC | 0-2,000 ppm | 0.1 |

### SPECIFICATIONS

Specifications subject to change without notice

| | |
|---|---|
| **INSTRUMENT WARRANTY:** | Warranted for as long as the instrument is supported by Industrial Scientific Corporation |
| **CASE MATERIAL:** | Lexan/ABS/Stainless Steel w/ protective rubber overmold |
| **DIMENSIONS:** | 135 mm x 77 mm x 43 mm (5.3" x 3.05" x 1.7") – without pump<br>167 mm x 77 mm x 56 mm (6.6" x 3.1" x 2.2") – with pump |
| **WEIGHT:** | 409 g (14.4 oz) typical – without pump<br>511 g (18.0 oz) typical – with pump |
| **DISPLAY/READOUT:** | Color Graphic Liquid Crystal Display |
| **POWER SOURCE/ RUN TIMES:** | Rechargeable Lithium-ion (Li-ion) Battery Pack (24 hours) – without pump<br>Rechargeable, Extended-Range Lithium-ion (Li-ion) Battery Pack (36 hours) – without pump<br>Replaceable AA Alkaline Battery Pack (10.5 hours) – without pump |
| **OPERATING TEMPERATURE RANGE:** | -20°C to 55°C (-4°F to 131°F) |
| **OPERATING HUMIDITY RANGE:** | 15% to 95% non-condensing (continuous) |

**Attachment D-5 – Electrical Resistance (ER) Probe Specification Sheet**

**Roxar Retrievable ER Probes**
FA-T218-A

**Product Data Sheet**
06.07.2015

# Roxar Electrical Resistance (ER) Probes

## 2" Retrievable System

## High Accuracy ER Probes

Corrosion is a serious industrial problem, and corrosion control is important in order to avoid damage and loss of integrity in a plant or production site. Efficient corrosion mitigation requires fast and reliable tools for control and verification of protection programs, such as the use of corrosion inhibitors.

Electrical Resistance (ER) Probes are probably the most commonly used technology used for internal corrosion monitoring. ER Probes provide a high resolution and sensitivity compared to other technologies available, and changes in corrosion rates can be identified within hours or days [1].

ER Probes measure corrosion and corrosion rates as an increase in electrical resistance over time for a steel element in the probe face. The increase in electrical resistance is proportional to the accumulated corrosion of the probe element over the exposure period. Since resistance is also dependent on temperature, a reference element (not exposed to corrosion) is buried inside the probe body for temperature correction.

ER Probes can generally be used in most common environments, like oil, gas and water. The ER Probes described in this data sheet are of the 2" high pressure retrievable type, typically used in upstream, high pressure applications.

Quality of information and measurement accuracy depend on measurement frequency and instruments used. For best results, it is recommended that Roxar ER Probes are used with Roxar CorrLog or Roxar CorrLog Wireless high accuracy instruments, covering a wide range of configuration options.

Operating conditions vary from case to case, and it is important to choose the right probe for the specific application. For this reason, a range of ER Probes is available with flush or projecting design.

The useful life of an ER Probe is normally defined as half the measurement element thickness.

[1] *Depending on probe type, measurement frequency and corrosion rates.*

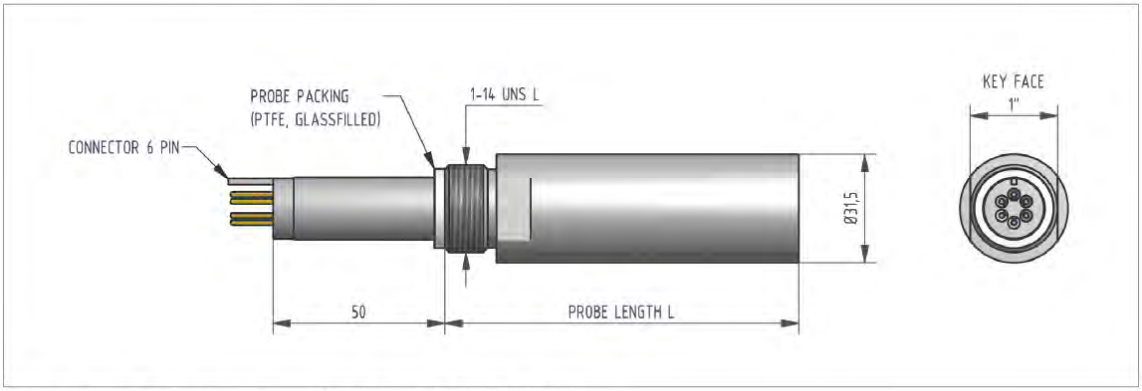
roxar
MAXIMUM RESERVOIR PERFORMANCE

EMERSON
Process Management

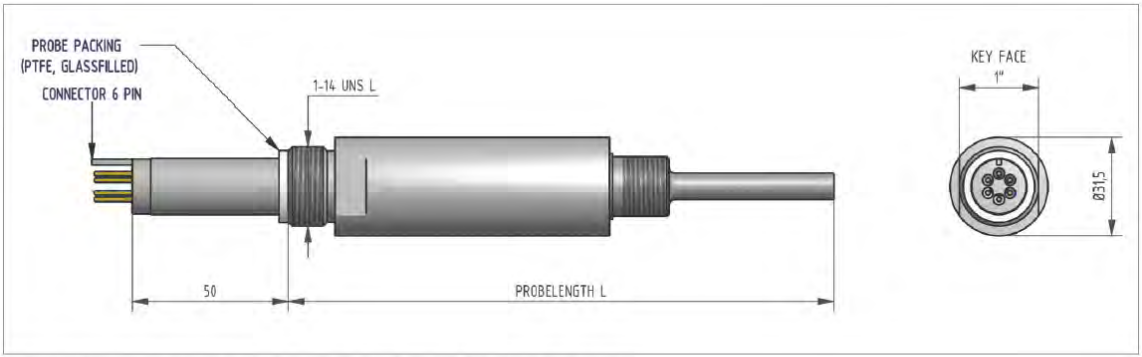
Continued…

## Attachment D-5 – ER Probe Specification Sheet (continued)

**Roxar Retrievable ER Probes** 06.07.2015




*Drawing shows flush probe outline and basis for probe length calculations.*




*Drawing shows tubular probe outline and basis for probe length calculations.*

A special reinforced probe design is available for conditions where velocities are high, sometimes in combination with a need for long probes. Need for reinforced design probes is normally evaluated based on wake frequency calculations. Picture shows reinforced probe body with reinforced hollow plug.



Continued…

## Attachment D-5 – ER Probe Specification Sheet (continued)



### Repro D Probe

*Repro D Probe front*

The design of the Repro D Probe ensures a high resistance, and thus, highly accurate measurements, even if probe has a thick element. This design is therefore suitable for corrosion monitoring where corrosion rates are assumed to be from moderate to high, maintaining a high measurement resolution and accuracy. Repro D Probe is available with element thicknesses 1, 2 and 4 mm (40, 80 and 160 mil).

### Repro E Probe

*Repro E Probe front*

The simple design of the probe makes it suitable in conditions where conductive deposits could cause short circuits between sections of the probe element for more sophisticated probe element designs (e.g. in sour production environments).

### Repro F Probe

*Repro F Probe front*

The Repro F Probe has an element with an optimized shape, and is available with a 0,1 mm (4 mil) measurement element. The design gives the probe a very high sensitivity, however, a limited life for many field applications. The probe is mostly recommended for conditions where corrosion is expected to be low, or for test/research applications where fast response is required.

### Tubular T10 and T20 Probes

*Roxar Tubular Probe front*

Roxar tubular element probes are designed with a tubular shaped element protruding into the flow. The probes are available with 0.25 and 0.5 mm (10 and 20 mil) elements.

*Protective shields for the tubular elements are available (T10 probe left, T20 probe right)*



Continued…

## Attachment D-5 – ER Probe Specification Sheet (continued)



## Specifications - Roxar Retrievable ER Probes

| Item | Description |
|---|---|
| Mounting: | 2" high pressure access fitting (mechanical or hydraulic system) |
| Probe body material: | 316 SS (other materials available upon request) |
| Pressure rating: | Standard: 6,000 psi (420 bar)<br>Optional: 10,000 psi (690 bar) |
| Connector: | 6 pin Amphenol male |
| Temperature rating: | Operating Temperature up to 145˚C (293˚F) (Welded element tubular probes are option at higher temperature rating, please ask Roxar for details). |

## Model Code Selector - Roxar Retrievable ER Probes

| Model | Product Description | | |
|---|---|---|---|
| THCMPR | Corrosion Monitoring Probe | | |
| **Code** | **Measuring Method** | | |
| 1 | Electrical Resistance | | |
| **Code** | **Probe Body Type** | | |
| 01 | Standard Design Fixed Length | | |
| 02 | Reinforced Design Fixed Length for Access Fitting Flareweld | | |
| 03 | Reinforced Design Fixed Length for Access Fitting MECH ≤300#, HYD ≤1500# | | |
| 04 | Reinforced Design Fixed Length for Access Fitting MEC ≥4/600#, HYD 2500# | | |
| 99 [5] | Other Design | | |
| **Code** | **Probe Body Material** | | |
| 2C6A | Stainless Steel A 479 Gr. 316L, bar | EN 10204 3.1 NACE MR0175 | |
| 2D6A | Duplex A 276 / A 479 UNS S31803, bar | EN 10204 3.1 NACE MR0175 | |
| 2C6C | Stainless Steel A 479 Gr. 316L, bar | EN 10204 3.1 NACE MR0175 | NORSOK M630 MDS S01 |
| 2D6C | Duplex A 276 / A 479 UNS S31803, bar | EN 10204 3.1 NACE MR0175 | NORSOK M630 MDS D47 |
| 9X9X [5] | Project Specific Material | | |
| **Code** | **Element Type and Material** | | |
| 00S [1] | Flush | Repro D 1.0 mm | St 52-3N |
| 01S [1] | Flush | Repro D 2.0 mm | St 52-3N |
| 02S [1] | Flush | Repro D 4.0 mm | St 52-3N |
| 03S [1] | Flush | Repro E 0.25 mm | St 52-3N |
| 04S [1] | Flush | Repro E 0.50 mm | St 52-3N |

**Attachment D-6 – ER Probe Data Transmitter Specification Sheet**

# Rosemount™ 4390 Series of Corrosion and Erosion Wireless Transmitters

Maximize your process performance with continuous online corrosion and erosion monitoring

Rosemount 4390 Series of Corrosion and Erosion Wireless Transmitters provide continuous, accurate and highly sensitive real time corrosion and erosion monitoring data, enabling maximum performance through process optimization and eliminate the need of costly walk-downs. The transmitter delivers superior corrosion management data by using top of the range instruments thus providing improved data processing, flexible data management solutions and friendly user interface.

- Best-in-class inline corrosion and erosion data monitoring by providing continuous, accurate and highly sensitive monitoring data
- Increase safety at your plant by reducing exposure to personnel in hazardous areas and eliminating walk-downs to gather data
- *Wireless*HART® – seamless compatibility with existing Emerson™ devices
- Self-organizing, self-healing, adaptive mesh network – no wireless expertise is required
- Better cost control by enabling maximum performance through process optimization

## Easy to Deploy and Easy to Maintain

Corrosion monitoring system

- The transmitter is compatible with Electrical Resistance Probes (ER probes), Linear Polarization Probes (LPR probes) and Multi Element Sand probes from Emerson and other major vendors
- Various data formats (calculated metal loss data, corrosion and erosion rates or probe raw data) can be selected from the HART® terminal, or from the Emerson Asset Management System (AMS)
- The corrosion wireless transmitter can be seamlessly integrated with Plantweb™ Insight Inline Corrosion Application and provides actionable data right to your desk
- High resolution (24 bit) ensuring reliable and fast corrosion and erosion monitoring
- Optimized power consumption up-to 4 times more compared to previous generation
- 15 times better sampling rate compared to previous generation
- Delivers high reliability in challenging radio environments using Direct Sequence Spread Spectrum (DSSS) technology

**For more information, visit**
**Emerson.com/Corrosion-Erosion**
**or contact your local Emerson Sales Representative**

EMERSON

Continued…

**Attachment D-6 – ER Probe Data Transmitter Specification Sheet (continued)**

# Rosemount 4390 Series of Corrosion and Erosion Wireless Transmitters

| Product Specifications | |
|---|---|
| General | For connection with intrusive corrosion and erosion probes |
| Connection | Connected to probe via a probe cable - maximum 65 feet (20 m) |
| Humidity Limits | 5 - 95% relative humidity |
| Instrument Resolution | 24 bit |
| Measurement Intervals | Multiple Element probes and Electrical Resistance (ER) probes can be measured as fast as 1-minute interval<br>Linear Polarization Resistance (LPR) probes can be measured as fast as 4-minutes intervals |
| Communication | *Wireless*HART 2.4 GHz DSSS (Discrete Sequential Spread Spectrum) |
| ER Probe | Actual accuracy 10-100 ppm of probe element thickness, depending on probe type and environmental conditions |
| LPR Probe | Accuracy of 100ppm for the resistance measured on the LPR port |
| Sand Probe | Actual accuracy 10-100 ppm of probe element thickness, depending on probe type and environmental conditions |
| Operating Temperature | -40 to 158 °F (-40 to +70 °C) |
| Power Module | Black power module, type 701PBKKF. Replaceable, non-rechargeable. Intrinsically safe Lithium-Thionyl Chloride power module pack with PBT/PC enclosure. 7.2 V |
| Housing & Weight | Painted aluminum, IP 66, NEMA® 4x, 5kg |
| Hazardous Location Protection Type | Intrinsically Safe (Ex ia) device |

*See product data sheet for full specifications.

## RELATED PRODUCTS

| Electrical Resistance Probes (ER) | Linear Polarization Probes (LPR) | Multi Element Sand Probes |
|---|---|---|
| | | |

Emerson Automation Solutions
North America
6021 Innovation Blvd.
Shakopee MN 55379
USA
+1 800 999 9307 or +1 952 906 8888
+1 952 949 7001
RFQ.RMD-RCC@Emerson.com

The Emerson logo is a trademark and service mark of Emerson Electric Co. Brand logotype are registered trademarks of one of the Emerson family of companies. All other marks are the property of their respective owners. ©2020 Emerson Electric Co. All rights reserved.

00807-0200-4841 Rev AA

Consider It Solved.
Emerson Automation Solutions supports you with innovative technologies and expertise to address your toughest challenges.
For more information, visit Emerson.com/Corrosion-Erosion

ROSEMOUNT™

EMERSON™

## Attachment D-7 – Example Ultrasonic Tool Specification Sheet



Flexural wave imaging is used by Isolation Scanner service as a significant complement to pulse-echo acoustic impedance measurement. It relies on the pulsed excitation and propagation of a casing flexural mode, which leaks deep-penetrating acoustic bulk waves into the annulus. Attenuation of the first casing arrival, estimated at two receivers, is used to unambiguously determine the state of the material coupled to the casing as solid, liquid, or gas (SLG). Third-interface reflection echoes arising from the annulus/formation interface yield additional characterization of the cased hole environment:

- acoustic velocity (*P* or *S*) of the annulus material
- position of the casing within the borehole or a second casing string
- geometrical shape of the wellbore.

Vertical sampling is selectable to as low as 0.6 in [1.52 cm], and the azimuthal resolution has a maximum of 10°. Because acoustic impedance and flexural attenuation are independent measurements, their combined analysis provides borehole fluid properties, not requiring a separate fluid property measurement.

### Applications

- Differentiate high-performance lightweight cements (foam, LiteCRETE*, and Ultra LiteCRETE* systems) from liquids
- Map annulus material as SLG
- Confirm hydraulic isolation
- Image channels and defects in annular isolating material
- Visualize position of casing in the borehole
- Image wellbore shape
- Determine casing internal diameter and thickness
- Determine depth for sidetracking and casing milling.

Copyright © SLB. All Rights Reserved. Private & Confidential. Reproduction only by permission.



Continued…

## Attachment D-7 – Example Ultrasonic Tool Specification Sheet (continued)



| Isolation Scanner Service Measurement Specifications | |
|---|---|
| Output† | Solid-liquid-gas map of annulus material, hydraulic communication map, acoustic impedance, flexural attenuation, rugosity image, casing thickness image, internal radius image |
| Logging speed | Standard resolution (6 in, 10° sampling): 2,700 ft/h [823 m/h]<br>High resolution (0.6 in, 5° sampling): 563 ft/h [172 m/h]<br>Up to 13,000 ft/h [3,972 m/h] using SLB Power Transducers |
| Range of measurement | Min. casing thickness: 0.15 in [0.38 cm]<br>Max. casing thickness: 0.79 in [2.01 cm] |
| Vertical resolution | High resolution: 0.6 in [1.52 cm] High speed: 6 in [15.24 cm] |
| Accuracy‡ | Acoustic impedance:§ 0 to 10 Mrayl (range); 0.2 Mrayl (resolution);<br>0 to 3.3 Mrayl = ±0.5 Mrayl, >3.3 Mrayl = ±15% (accuracy)<br>Flexural attenuation:†† 0 to 2 dB/cm (range), 0.05 dB/cm (resolution), ±0.01 dB/cm (accuracy) |
| Depth of investigation | Casing and annulus up to 3 in [7.62 cm] |
| Mud type or weight limitations‡‡ | Conditions simulated before logging |
| Combinability | Bottom only, combinable with most wireline tools Telemetry: fast transfer bus (FTB) or enhanced FTB (EFTB) |
| Special applications | $H_2S$ service |

† Investigation of annulus width depends on the presence of third-interface echoes. Analysis and processing beyond cement evaluation can yield additional answers through additional outputs, including the Variable Density log of the annulus waveform and polar movies in AVI format

‡ 8-mm calibration target

§ Differentiation of materials by acoustic impedance alone requires a minimum gap of 0.5 Mrayl between the fluid behind the casing and a solid

†† For 0.3-in [8-mm] casing thickness

‡‡ Max. mud weight depends on the mud formulation, sub used, and casing size and weight, which are simulated before logging

| Isolation Scanner Service Mechanical Specifications | |
|---|---|
| Temperature rating | 350 degF [177 degC] |
| Pressure rating | 20,000 psi [138 MPa] |
| Casing size—min.† | 4 ½ in (min. pass-through restriction: 4 in [10.16 cm]) |
| Casing size—max.† | 13 ⅜ in |
| Outside diameter | IBCS-A: 3.375 in [8.57 cm]<br>IBCS-B: 4.472 in [11.36 cm]<br>IBCS-C: 6.657 in [16.91 cm]<br>IBCS-D: 8.736 in [22.19 cm] |
| Length | Without sub: 19.73 ft [6.01 m]<br>IBCS-A sub: 2.01 ft [0.61 m]<br>IBCS-B sub: 1.98 ft [0.60 m]<br>IBCS-C sub: 1.98 ft [0.60 m]<br>IBCS-D sub: 1.98 ft [0.60 m] |
| Weight | Without sub: 333 lbm [151 kg]<br>IBCS-A sub: 16.75 lbm [7.59 kg]<br>IBCS-B sub: 20.64 lbm [9.36 kg]<br>IBCS-C sub: 23.66 lbm [10.73 kg]<br>IBCS-D sub: 24.55 lbm [11.13 kg] |
| Sub max. tension | 2,250 lbf [10,000 N] |
| Sub max. compression | 12,250 lbf [50,000 N] |

† Limits for casing size depend on the sub used. Data can be acquired in casing larger than 9⅝ in with low-attenuation mud (e.g., water, brine). If the chrome content of the tubing or casing is higher than 13%, contact your local SLB representative.

## Attachment D-8 – Example Array Sonic Tool Specification Sheet



# Array Sonic Tool (ASLT)

Acoustic, or sonic, tools provide a measurement of the formation integral travel time ($\Delta t$) in a variety of environments. Acoustic logs recognize secondary, or vugular, porosity in hard rock sediments. Acoustic tools can be run in conjunction with density and compensated neutron tools in bad borehole conditions to measure porosity, and this third porosity is also used to identify complex lithology.

The Array Sonic Tool (ASLT) is made up with a Sonic Array Logging Sonde (ASLT), which uses the Digital Telemetry System, to provide either compressional $\Delta t$ measurements or Cement Bond Log (CBL) and Variable Density log (VDL) measurements and digital waveform recording and display. The conventional sonic measurements are borehole-compensated (BHC) (3- to 5-ft [0.91- to 1.52-m]) transit time and long-spacing depth-derived BHC (DDBHC) (5- to 7-ft [2.43- to 3.65-m]) and STC.

### Applications

- → 2 ft span BHC (3ft to 5ft) delta-T
- → 2 ft span BHC (5ft to 7ft) delta-T (Compensated measurement for tool tilt and wash out)
- → 6 in span BHC Compressional Δt
- → Compressional and Shear slowness from multi receiver STC analysis
  - Gas detection
  - Seismic ties & Synthetics
  - Sonic Porosity
- → ASLT has capability to obtain Shear Slowness in fast formation through STC Processing

| ASLT Measurement Specifications | |
|---|---|
| Output | OH: BHC (3-5ft), DDBHC (5-7ft), STC<br>CH: 1ft and 3ft CBL, VDL, Attenuation |
| Logging speed | 3,600 ft/h [1,097 m/h] |
| Range of measurement | 40 to 200 us/ft [131 to 656 us/m] |
| Maximum compressional slowness | 155 (us/ft) with DT mud at 180 (us/ft) |
| Maximum shear slowness3 | DT mud – 50 (us/ft) |
| Tx – Rx Configuration | Upper and Lower Transmitter – 6 Receivers Array |
| Mud type or weight limitations | None |
| Combinability | Combinable with most services |


Copyright © SLB. All Rights Reserved. Private & Confidential. Reproduction only by permission.

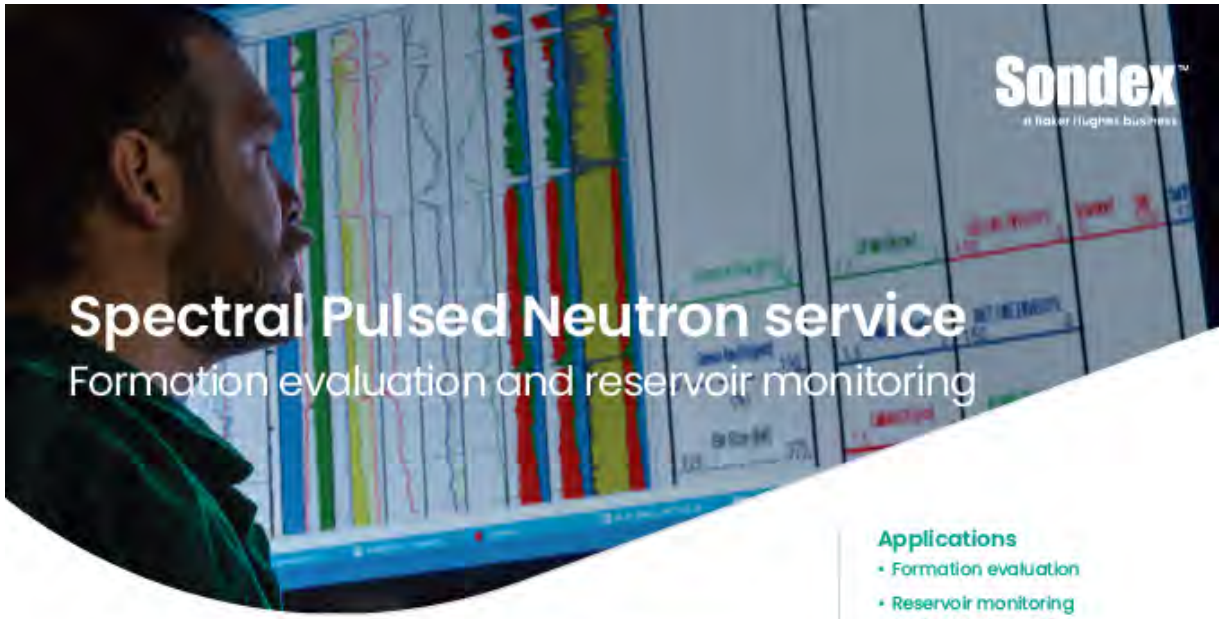

Continued…

## Attachment D-8 – Example Array Sonic Tool Specification Sheet (continued)



| ASLT Mechanical Specifications | |
|---|---|
| Temperature rating | 302 degF [150 degC] |
| Pressure rating | 20,000 psi [138 MPa] |
| Borehole size—min. | OH: 5 in<br>CH: 5 1/2 in |
| Borehole size—max. | OH: 13 5/8 in<br>CH: 17 1/2 in |
| Outside diameter | 3⅝ in |
| Length | 14.66 ft |
| Weight | 100 kgf |
| Tension | 20,000 lbs |
| Compression | 3,000 lbs |

**Attachment D-9 – Example Pulsed-Neutron Logging Tool Specification Sheet**




The **Spectral Pulsed Neutron (SPN) service** can undertake a broad scope of reservoir evaluation and management applications, including reservoir saturation and produced fluids monitoring, formation evaluation, production profiling, workover and well abandonment evaluation, borehole diagnostics, location of bypassed oil, gas detection and quantification, and identification of water production.

The service uses an advanced, slim-hole, multifunction, pulsed neutron reservoir monitoring tool and is ideally suited for acquiring data through tubing. The tool is flexible with multiple operating modes that are selectable by surface commands. The tool is also very efficient with multiple sensors that enable faster tool movement while performing data acquisition. The SPN service combines multiple acquisition modes, reducing multiple passes down to one pass, without compromising data quality, resulting in logging times reduced by up to 66%.

The Spectral Pulsed Neutron tool employs three high-density high-resolution gamma ray detectors and an advanced digital downhole acquisition system. The reliable high output neutron generator produces gamma ray counts up to 3 times higher than conventional instrumentation providing the most accurate and efficient measurements in the industry. The enhanced detectors and electronics measure both the arrival time and energy of detected gamma rays. The generator is pulsed at distinct frequencies, and the data acquisition system operates in various timing modes to obtain the different gamma ray measurements.

Data acquisition through casing is enabled by the high energy neutrons emitted from the non-chemical pulsed neutron source, even in complicated well completions utilizing multiple tubing and casing strings and sizes. The instrumentation combines multiple nuclear measurements in one system with industry-leading accuracy and precision. Carbon/Oxygen (C/O) and Pulsed Neutron Capture (PNC) measurements acquired with the SPN tool provide formation fluid saturations, porosity, three-phase holdup determination, and oxygen activation measurements for the detection of water flow in annuli and channels.

Extensive physical characterization of the SPN tool is conducted at our Houston Technology Center. The characterization provides forward-

## Applications

- Formation evaluation
- Reservoir monitoring and management
- Borehole diagnostics
- Workover applications

## Features and benefits

- Higher count rates and improved signal-to-noise ratio significantly reduces logging times
- Innovative mixed acquisition mode provides a complete pulsed neutron data set all in the same pass
- Multiple modes for operating versatility
- Flexible deployment on e-line
- Pre-job MCNP modelling to provide accurate quantitative fluid saturation

sondex.com

Continued…

## Attachment D-9 – Example Pulsed-Neutron Logging Tool Specification Sheet (continued)

looking pulsed neutron measurement response predictions for well candidate evaluation and data analysis. The tool's measurements are interpreted using Monte Carlo N-Particle (MCNP) transport mode modelling to provide accurate saturation profiles in a wide range of borehole, casing, formation, and fluid conditions.

The Spectral Pulsed Neutron service includes modelling of unique downhole conditions to ensure that the analysis of the reservoir is as accurate as possible. Extensive pre-job planning tools are available for the design of a data acquisition program that optimizes the answers provided by the service.

Spectral Pulsed Neutron Service data can be matched with previous-generation **RPM™ reservoir performance monitor service** measurements for easy comparison in mature fields. For remedial work and time-lapse monitoring, the data can be overlaid with existing log measurements in real time, allowing rapid workover planning.

The SPN hardware is combinable with other production logging instruments. It is constructed in short, modular sections to facilitate shipping and handling.

### Applications description

**Formation evaluation**

- Salinity-independent quantitative measurement with the **GasView™ gas saturation service**
- Salinity-independent quantitative measurement with the **OmniView™ three-phase fluid saturation service**
- Salinity-independent quantitative measurement in light oil reservoirs with the **OilView™ two-phase fluid saturation service**
- Quantitative measurement in light oil or high salinity reservoirs with the **FluidView™ multiphase saturation service**
- Formation resistivity, neutron porosity, and density data with **NEO™ openhole log emulation**
- Porosity evaluation

**Reservoir monitoring and management**

- Reservoir management base logs
- Monitoring fluid contacts
- Time-lapse fluid saturation monitoring
- Production and reservoir depletion
- Identification of pressure-depleted sands
- Monitoring wells with air or gas filled boreholes
- Gas flood monitoring for steam, $CO_2$ sequestration and EOR projects
- Steam envelope build up in steam-assisted gravity drainage (SAGD) wells

**Borehole diagnostics**

- Production and hold-up monitoring in horizontal wellbores
- Identification of water channeling
- Annular injection profiling in multiple-string completions

**Workover applications**

- Location of bypassed and irreducible hydrocarbons, residual oil saturation independent of water salinities
- Re-evaluation of marginal fields
- Gravel pack evaluation and monitoring

**Tool specification**

| Description | Specification |
|---|---|
| Tool diameter | 1.80 in. (w/ Boron coating) |
| Tool length | 19 ft<br>29.75 ft (w/ telemetry, GR and CCL) |
| Temperature | 350°F |
| Pressure | 20,000 psi |
| Minimum restriction | 1.90 in. |
| Maximum hole size | 12.25 in. |
| Tool compressive strength | 570 lb |
| Tool tensile strength | 22,000 lb |
| Maximum bend rate | 30°/100 ft |
| Crystals | BriLance 380 |

**Logging speed**

| Mode | Speed |
|---|---|
| PNC | 30 fpm |
| C/O | 2 to 6 fpm |
| PNC3D | 20 fpm |
| PNHI | 20 fpm |
| Hydrolog | 2 to 150 fpm |
| Mixed mode | 2 to 6 fpm |

Sondex™
bakerhughes.com

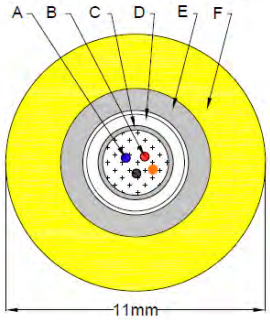
Copyright © 2020 Baker Hughes Company. All rights reserved. 82160

## Attachment D-10 – DTS Fiber-Optic Cable Specification Sheet

Cable Engineered by Prysmian

**TEF w/ 4 OPTICAL FIBERS 825 ALLOY SHEATH TUBE ROUND ENCAPSULATION**

**CARBON CAPTURE AND STORAGE (CCS) APPLICATION**




### Components

A: 2 x Fibercore GIMM CMTDA 50/125 Graded Index Fiber; Colored Blue & Orange
B: 2 x Fibercore SM1250 CMTDA Single Mode Fiber; Colored Red & Black
C: FIMT: 3.2 mm x 2.8 mm Stainless Steel 316L, Filled with LA4000 EFL ≥ 0.30%
D: Natural Polypropylene; O.D.: 4.57mm (0.180") Nominal – Belt OD run larger for CCS Application
E: 825 Alloy Tube; Wall Thickness: 0.89 mm (0.035"); O.D.: 6.35 mm (0.250") Nominal
F: Yellow Round Profile Polypropylene; OD.: 11 mm (0.433") Nominal

### Print Legend

"FiberSight$^{tm}$" P/N: 103200010 (Batch Number) (month/year)" Plus Footage Markings

### Physical Characteristics

| | |
|---|---|
| Tube Min Tensile Strength | : 3546 lbs |
| Tube Min Yield Strength | : 2246 lbs |
| Cable Breaking Strength, Theoretical | : 4166 lbs Maximum |
| Fiber Coating | : 245µm ± 15µm |
| Cable Weight, kg/km (lbs/1000 ft) | : 208 (140) Nominal |
| Temperature Rating | : 150°C |

### Optical Characteristics

| | |
|---|---|
| Optical Attenuation at 850 / 1300nm | : ≤ 3.0 dB/km / ≤ 1.0 dB/km |
| Optical Attenuation at 1310 / 1550nm | : ≤ 0.5 dB/km / ≤ 0.3 dB/km |
| Point Discontinuity MMF / SMF | : ≤ 0.2 dB / ≤ 0.1 dB |

| Rev | DATE | CHANGE DETAIL |
|---|---|---|
| 0 | 09/11/23 | New Issue |
| 1 | 10/09/23 | SCN 43522 |
| | | |
| | | |

Approvals: Created By: Reviewed By:

Prysmian reserves the right to modify this information without prior notification and does not make a warranty or representation of any kind, whether implied or expressed with respect to the information contained herein. Prysmian assumes no risks, and will not be liable for direct or indirect, special; incidental or consequential damages, any defect or personal injury resulting from the use of this document. Values shown on drawing unless otherwise noted are to be interpreted as nominal values. The information contained in this document is the exclusive and proprietary intellectual property of Prysmian Group and its affiliates, any reproduction or disclosure, in whole or in part, is prohibited without express written consent of an officer of Prysmian Group.

EngDrawing-Rev06-April 2021

Prysmian Group

**Prysmian Cable Systems USA, LLC**
111 Chimney Rock Road
Bridgewater, New Jersey 08807
Phone: 866-786-8823 Fax: 732-469-6363

| | |
|---|---|
| **Project Name:** | Halliburton 103200010 |
| **Part Number:** | 20431710 |
| **Quote Number:** | |
| **File Number:** | |
| **Page Number:** | Page 1 of 1 |

## Attachment D-11 – DTS Fiber Optics Interrogator Specification Sheet

PINNACLE

Distributed Temperature Sensing (DTS) Interrogator

# FiberWatch® DTS Hydrogen Tolerant (HT) System

The FiberWatch® DTS hydrogen tolerant (HT) system is designed to provide DTS results in the harshest upstream environments. This system incorporates our patented dual-laser technology to mitigate effects of degradation to capture meaningful data on multi-mode fiber that may have previously been unusable. The interrogator is designed for long-term monitoring to assess life of well performance.

*FiberWatch® DTS HT System*

| Performance | |
|---|---|
| **Nominal Range** | 5 km |
| **Spatial Resolution** | 1 m |
| **Sampling Resolution** | 0.5 m |
| **Accuracy** | ±2°C |
| **Temperature Resolution** | See Performance Curves |
| **Measurement Time per Channel** | 10-second minimum (See Performance Curves) |

| Specifications | |
|---|---|
| **Operating Temperature** | 0°C to 40°C (32°F to 104°F) |
| **Storage Temperature** | -20°C to 70°C (-4°F to 158°F) |
| **Data Storage** | 194 GB solid state drive |
| **Fiber Compatibility** | 50 µm graded index multimode fiber |
| **Optical Channels** | 1, 2, 4, 8, 12, or 16 with E2000/APC connectors. Single-ended configuration only. |
| **Laser Safety** | Lasers are certified as Class 1M per IEC 60825-1:2007 |
| **Certification** | Low voltage safety: IEC 61010-1:2012, IEC 60825-1:2007<br>EMC: EN 61326-1:2005, CISPR 11:2003, IEC 61000-4-2:2001, IEC 61000-4-3:2002, IEC 61000-4-4:2004, IEC 61000-4-6:2003<br>Hazardous area: EN 60079-0:2012, EN 60079-28:2007<br>Output is inherently safe optical radiation.<br>Suitable for Zone 1 and 2 areas. |
| **Packaging** | 2U, Rackmount, w x d x h: 482x508x89 mm (19x20x3.5 in.) |
| **Power (AC or DC options)** | 110 to 240 VAC: 90 W Peak, 70 W Typical<br>18 to 36 VDC: 90 W Peak, 70 W Typical |
| **Weight** | 9 kg (19.8 lb) |

Pinnacle

HALLIBURTON

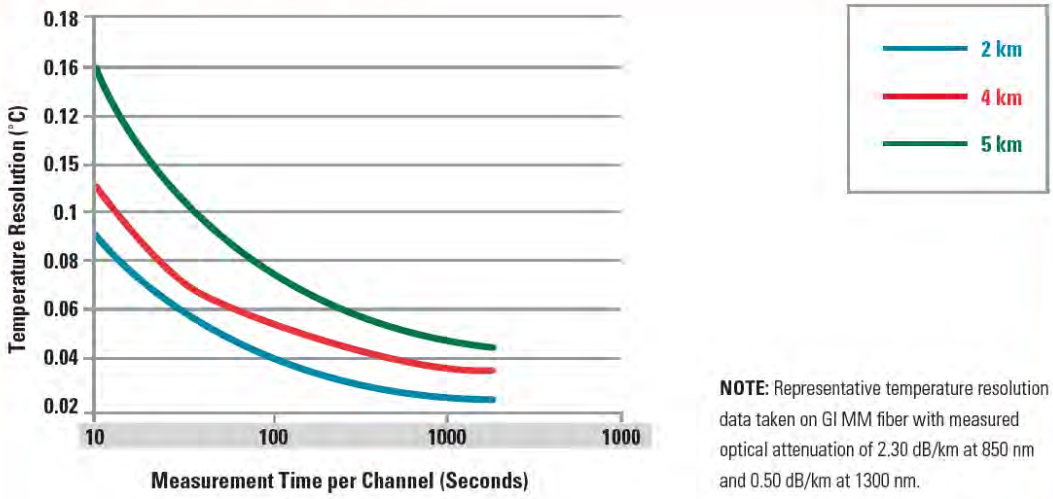
Continued…

# Attachment D-11 – DTS Fiber Optics Interrogator Specification Sheet

PINNACLE

| Software and Communications | |
|---|---|
| **Software** | OS (Windows Embedded Systems 7), DTS Commander™, FiberView™ software |
| **Communication Ports** | Ethernet x 2 , USB x 2, DB9 x 1, VGA x 1 |
| **Data Protocols** | Standard: Modbus (TCP/IP), Modbus (RS232), DNP3 (TCP/IP), DNP3 (RS232)<br>Optional: OPC (TCP/IP) |
| **Data Zones and Alarms** | Multiple zoning with individual alarms per zone |
| **Remote Access** | Full operator remote control and data access capabilities |
| **Diagnostics** | Real-time diagnostics for remote support, system health alarms |

## DTS HT Interrogator Performance Curves




**NOTE:** Representative temperature resolution data taken on GI MM fiber with measured optical attenuation of 2.30 dB/km at 850 nm and 0.50 dB/km at 1300 nm.

## Naming Convention

**DTS-HT-XX-Y-WW-ZZ-SF**

| | | |
|---|---|---|
| **XX** | Channels | 01, 02, 04, 08, 12, or 16 |
| **Y** | Packaging | R = Rackmount, S = Subsea, LP = Low Power |
| **WW** | Integral SPDT Relays | 00 or 16 |
| **ZZ** | Voltage | AC or DC |
| **SF** | SEAFOM Testing | SF |

**For more information on FiberWatch® DTS HT System, contact us at askanexpert@pinntech.com.**

© 2015 Halliburton. All rights reserved. Sales of Halliburton products and services will be in accord solely with the terms and conditions contained in the contract between Halliburton and the customer that is applicable to the sale.

H011908-A4 11/15

www.halliburton.com

Pinnacle
A HALLIBURTON SERVICE

HALLIBURTON

## Attachment D-12 – Example Annulus Pressure Test Procedure

The following is a checklist SCS2 will use as a guide for conducting an initial annulus pressure test. Annulus pressure tests are required prior to commencing injection and are requisite in reestablishing mechanical integrity following a workover that involves tubing removal. If necessary, a detailed annulus pressure test procedure can be provided with the written notification prior to conducting the test.

**Pretest Protocol:**

- Notify the Department of Mineral Resources, Oil and Gas Division (DMR-O&G) in writing at least 30 days prior to annulus pressure testing and again at least 48 hours in advance to witness the test.

- Prepare a well schematic that includes sufficient information to confirm the packer is set opposite a cemented interval of the long-string casing and no more than 50 feet above the uppermost perforation or at a location otherwise approved by DMR-O&G. If the test well was worked over and the tubing or tubing/packer retrieved from the well, provide a workover record to the DMR-O&G inspector for review and verification of packer depth.

- Provide the on-site DMR-O&G inspector with a well schematic confirming the test well packer is in an approved location.

- Provide the on-site DMR-O&G inspector with a calibration certificate for the mechanical or digital device used to record the annulus pressure test verifying calibration within 1 year of the test date.

**Test Protocol:**

- Install or select the wellhead pressure gauge and continuous recording device to measure pressure and serve as a record of the pressure data witnessed on the wellhead pressure gauge. Select a pressure gauge with an appropriate scale so that the anticipated testing pressure falls within 25% and 75% of the full gauge scale and that the gauge range is at a minimum twice the testing pressure. The pressure gauge and continuous recording device shall have sufficient accuracy and precision to identify a 10% pressure change.

- Fill the tubing-casing annulus with an approved liquid and confirm the annulus will remain full. Measure and record the liquid type and volume required to fill the annulus. Allow time for the temperature of the well and annulus liquid to equilibrate.

- Confirm that the annulus is liquid-filled.

- Build and maintain the annulus pressure at 1000 psig or a value previously approved by DMR-O&G.

- Isolate the well from the pressure source and confirm no leaks occur at shut-off valves. If present, consider disconnecting the seal pot or surge tank to also prevent leaks at their shut-off valves.

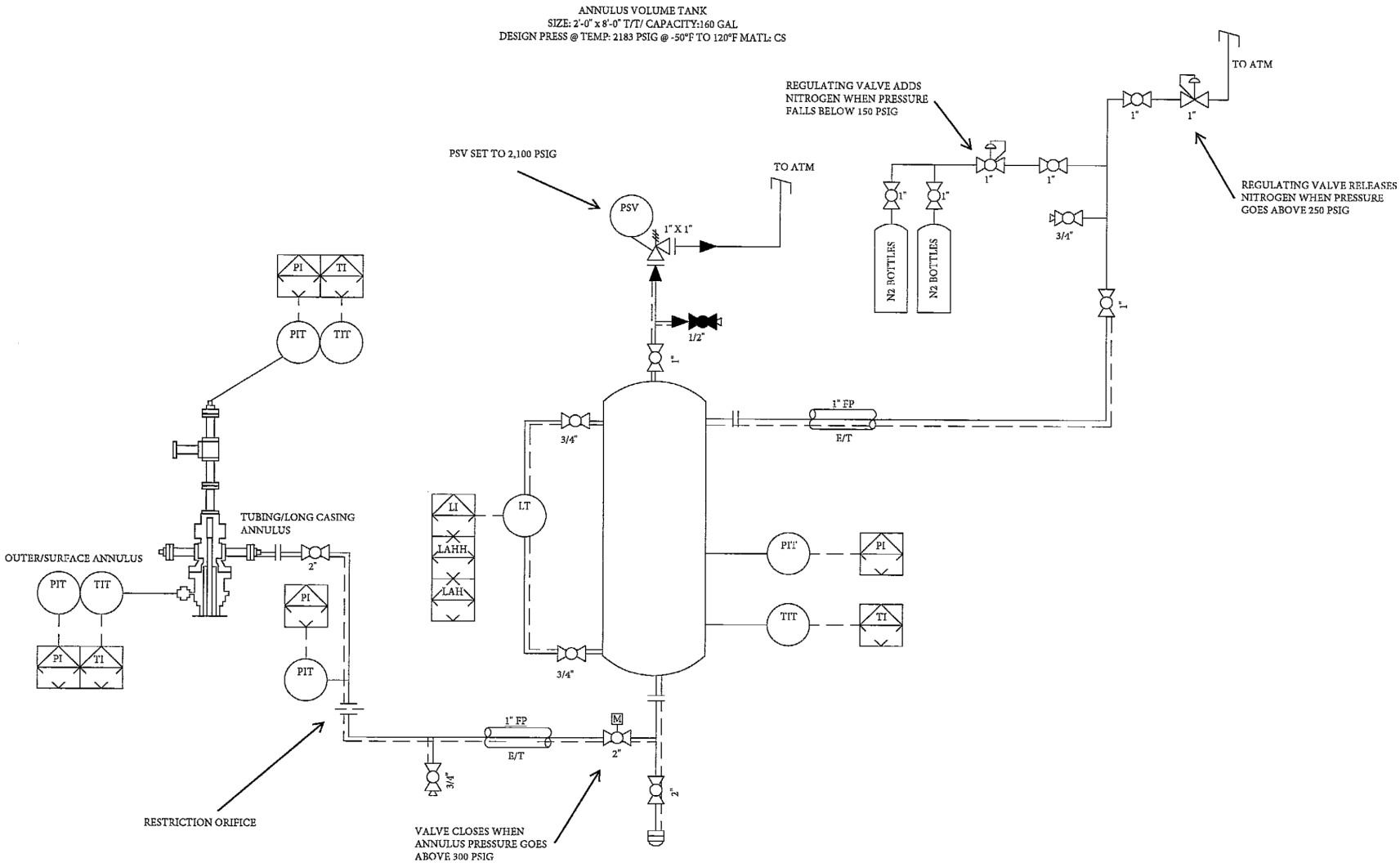
- Maintain a minimum pressure differential of 200 psi between the tubing pressure and annulus pressure. If a lower pressure differential is needed, the storage facility operator must obtain prior DMR-O&G approval.

- Record the annulus pressure for at least 30 minutes.
  - Note the time, the annulus pressure, and the tubing pressure at the start of the test and at least every 5 minutes thereafter to the end of the test.
  - The continuous recording device shall serve as a backup. A copy of the continuous pressure recording shall be submitted with the written reports to DMR-O&G.
  - A net pressure change of more than 10% constitutes a failed test.

**Posttesting Protocol:**

- Report to DMR-O&G within 30 days the results of any annulus pressure test.
- Publish the annulus pressure test results in the quarterly report in which the test was performed.

# Attachment D-13 – Diagram of the Seal Pot System



## Attachment D-14 – Antimicrobial Biocide Specification Sheet

**PRODUCT DATA SHEET**

# ALDACIDE® G

**BIOCIDE**

### Product Description

ALDACIDE® G biocide is suitable for use in water-based drilling fluids and packer fluids. ALDACIDE G biocide is effective against aerobic and anaerobic bacteria and is compatible with all brine types. Use of ALDACIDE G biocide in conjunction with sulphite oxygen scavengers is not recommended.

### Applications/Functions

- Water-based drilling fluids
- Completion and packer fluids
- Aqueous waste treatment
- Used as part of corrosion control systems

### Advantages

- Effective against a broad range of microbes, bacteria and fungi
- Effective in small concentrations
- Compatible with most water-based drilling fluids

### Typical Properties

- Appearance: Transparent liquid
- Specific gravity: 1.06
- pH: 3.1 - 4.5

### Recommended Treatment

Initial additions around 0.4 lb/bbl (1.1. kg/m3) will achieve effective antimicrobial action. Packer fluids should be treated with ALDACIDE G along with other corrosion control additives. Circulating fluids require regular additions of ALDACIDE G in order to maintain protection.

Caution: ALDACIDE G biocide is incompatible with BARASCAV™ D and BARASCAV L oxygen scavenges.

### Packaging

ALDACIDE G biocide is packaged in 5-gal (18.9-l) pails and 55-gal (208-l) drums.

ALDACIDE is a registered trademark of Halliburton. BARASCAV is a trademark of Halliburton. © 2016 Halliburton. All rights reserved. Because the conditions of use of this product are beyond the seller's control, the product is sold without warranty either express or implied and upon condition that purchaser make its own test to determine the suitability for purchaser's application. Purchaser assumes all risk of use and handling of this product. This product will be replaced if defective in manufacture or packaging or if damaged. Except for such replacement, seller is not liable for any damages caused by this product or its use. The statements and recommendations made herein are believed to be accurate. No guarantee of their accuracy is made, however.

## Attachment D-15 – Corrosion Inhibitor Specification Sheet

**Baroid Fluid Services**

# BARACOR® 100

**Corrosion Inhibitor** — **Product Data Sheet**

### Product Description

BARACOR 100 inhibitor is a highly active, film forming, water-dispersible corrosion inhibitor for use in solids-free brines.

### Applications / Functions

- BARACOR 100 inibitor is an effective corrosion inhibitor in solids-free packer fluids and other oil and gas industry applications. BARACOR 100 inhibitor is effective at temperatures up to 400°F (204°C) in monovalent (sodium and potassium) brines and up to 300°F (148°C) in divalent (calcium and zinc) brines. Typical results show over ninety percent corrosion inhibition.

### Advantages

- Effective at low concentrations
- Convenient and easy to use
- Economical

### Typical Properties

| | |
|---|---|
| • Appearance | Dark liquid |
| • Flash point, TCC | 92 °F |
| • Flash point, TCC | 33 °C |
| • pH, (1% aqueous solution) | 10.5 |
| • Pour point | -10 °F |
| • Pour point | -23 °C |
| • Specific gravity | 1 |

### Recommended Treatment

Treatment recommendations should be based on area histories which indicate a need for an inhibited packer fluid and compatibility test of BARACOR 100 inhibitor with the packer fluid. Many producing companies require the use of inhibited packer fluids in areas known to have corrosion problems. This is low-cost insurance for production strings.
The suggested treatment for solids-free freshwater or brine packer fluids is 0.5%-1% by volume. BARACOR 100 inhibitor should be mixed with the packer brine after filtration, then spotted in the hole.

### Packaging

BARACOR 100 inhibitor is packaged in 55-gal (208-l) drums containing 462-lb (210-kg) net weight.

**HALLIBURTON | Fluid Systems**

Baroid Fluid Services • P.O. Box 1675 • Houston TX 77251 • 281-871-5516

Because the conditions of use of this product are beyond the seller's control, the product is sold without warranty either express or implied and upon condition that purchaser make its own test to determine the suitability for purchaser's application. Purchaser assumes all risk of use and handling of this product. This product will be replaced if defective in manufacture or packaging or if damaged. Except for such replacement, seller is not liable for any damages caused by this product or its use. The statements and recommendations made herein are believed to be accurate. No guarantee of their accuracy is made, however.

BARACOR is a registered trademark of Halliburton © 2005 Halliburton All Rights Reserved

April 2005

## Attachment D-16 – Scaling Inhibitor (Oxygen Scavenger) Specification Sheet

# OXYGON™ Scavenger

PRODUCT DATA SHEET

Fluid Additive

### Product Description

OXYGON™ is a non-sulfite oxygen scavenger used to minimize the corrosive effects of soluble oxygen. Dissolved oxygen can be removed from drilling, completion and packer fluids. OXYGON works in conjunction with inhibitors, other scavengers and biocides to minimize corrosion and avoid damage to drilling and completion equipment.

### Applications/Functions

- Removes soluble oxygen from drilling, completion and packer fluids
- Compatible with fresh water, mono- and divalent brines
- Used as part of corrosion control systems

### Advantages

- Effective at low concentrations
- Rapid removal of dissolved oxygen
- Stable in solution to 250°F (121°C)
- Stability can be extended up to 500°F (260°C)

### Typical Properties

| | |
|---|---|
| • Appearance: | White granular powder |
| • Solubility: | Water Soluble |
| • Specific Gravity: | 1.2 |

### Recommended Treatment

Packer fluids should be treated with 0.1 lb/bbl (0.29 kg/m$^3$) OXYGON, along with other corrosion control additives. Circulating fluids require regular additions of OXYGON. Service at temperatures above 250°F (121°C) requires treatment with 0.5 lb/bbl (1.45 kg/m$^3$) CFS-635 OXYGON stabilizer.

### Packaging

OXYGON is packed in 50lb and 25kg pails.

© 2014 Halliburton. All rights reserved. Because the conditions of use of this product are beyond the seller's control, the product is sold without warranty either express or implied and upon condition that purchaser make its own test to determine the suitability for purchaser's application. Purchaser assumes all risk of use and handling of this product. This product will be replaced if defective in manufacture or packaging or if damaged. Except for such replacement, seller is not liable for any damages caused by this product or its use. The statements and recommendations made herein are believed to be accurate. No guarantee of their accuracy is made, however.
OXYGON is a trademark of Halliburton © 2014 Halliburton All Rights Reserved

HALLIBURTON

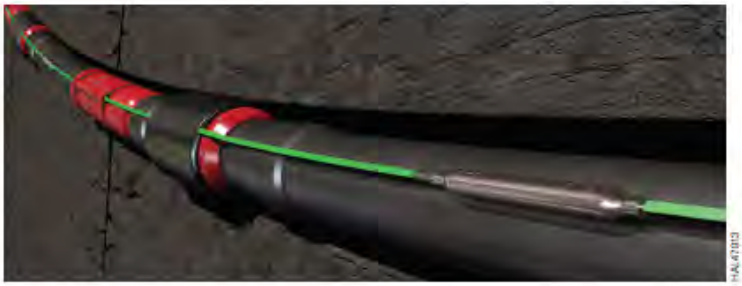
Baroid

**Attachment D-17 – Example Casing-Conveyed P/T Gauge Specifications**

INTELLIGENT COMPLETIONS | Permanent Monitoring

# DataSphere® Array System

## RELIABLE MULTI-POINT RESERVOIR MONITORING



### OVERVIEW

The DataSphere® Array system is the next step in the evolution of DataSphere permanent monitoring suite. The technology is built upon the reliability of ROC™ gauge hybrid technology and provides greater system customization by deploying multiple discrete sensors across challenging wellbore regions.

A system comprised of conventional gauges can communicate with multiple Array sensor systems distributed across different wellbore intervals. Each Array system provides discrete real-time annular downhole distributed multi-point temperature and pressure monitoring data. The Array system incorporates no cable terminations, which reduces installation time and eliminates risks associated with multiple terminations. Furthermore, the Array system uses internal short circuit protection circuitry that minimizes system line takedowns.

Based on an industry-standard, field-proven resonating quartz crystal sensor, the Array system can be used for distributed, single zone, or multi-zone monitoring applications.

In distributed monitoring, the use of Halliburton conventional downhole gauges can be enhanced by the Array system, allowing operators greater visibility into their operations efficiency in a cost-effective manner.

### APPLICATIONS

- ICD efficiency monitoring
- Production monitoring
- Injection monitoring
- Field reservoir monitoring
- SmartWell® completion system optimization
- Artificial lift/gas lift optimization
- Pressure gradient monitoring

### FMJ CABLE TERMINATION

When connected to a conventional gauge, the DataSphere Array system uses a high-performance cable termination with a sealing arrangement based on our highly reliable intelligent completion FMJ connector. This cable termination incorporates a pressure-testable dual metal-to-metal ferrule seal arrangement for isolating the downhole cable outer metal sheath from the well fluid.

### FEATURES

- Can be deployed standalone
- Up to 50 sensors per array
- ROC-MODBUS communication protocol
- Designed for harsh environments up to 16,000 psi and 175°C
- AWES qualified
- Reduced OD design
- Multi-drop capability on single core tubing encased conductor (TEC)
- Hermetically sealed electron beam-welded design
- Application Specific Integrated Chip (ASIC) technology
- Increased capabilities such as fault protection per sensor
- Designed for a 10 year life at 185°C

### BENEFITS

- Quartz-sensors provide high accuracy and resolution and low drift
- Can be deployed across the sandface for greater reservoir inflow/outflow understanding
- Reduces rig time through faster installation times (up to eight hours saved per gauge)
- Reduces need for cable terminations
- Eliminates requirement for gauge mandrels in annular sensing applications
- Validates/disproves reservoir models
- Tool head voltage and gauge current measurement for diagnostics
- Reduces potential leak points by minimizing system connections

HALLIBURTON | Completion Tools

Continued…

## Attachment D-17 – Example Casing-Conveyed P/T Gauge Specifications (continued)

**INTELLIGENT COMPLETIONS** | Permanent Monitoring

### TESTING

The individual sensor design has gone through the Design for Reliability process, which includes a Highly Accelerated Lifetime Test (HALT) program. This program is a series of controlled environmental stresses designed to ensure that stringent criteria are met for thermal shock, mechanical shock, vibration and thermal aging. During manufacture, all gauges are also subjected to Environmental Stress Screening (ESS) to highlight any defect in functionality prior to installation at the well site. This method of screening has proven to be far more effective than "burn-in" techniques.

All of the individual sensors that make up the DataSphere Array system are independently calibration-checked in our manufacturing facility. During Factory Acceptance Testing (FAT), the DataSphere Array sensor welds are pressure tested for integrity as the array is being built and spooled onto the final drum.

### DATASPHERE ARRAY SYSTEM DESIGNS

- Quartz transducer and hybrid technology
- ASIC technology
- Maximum 175°C operating temperature
- Can be used in conjunction with existing gauges
- Improved shock and vibration performance
- 0.625-in. OD ultra slim design
- Less than 7-in. length per sensor
- Does not need a gauge mandrel to be deployed
- Short-circuit protection per sensor, prevents line takedowns

*Temperature and Pressure Sensor > The DataSphere® Array system is comprised of multiple ultra slim, highly accurate quartz-based temperature and pressure sensors.*

### DataSphere® Array System - Temperature Performance

| | |
|---|---|
| Accuracy (°C) | 0.5 |
| Typical Accuracy (°C) | 0.15 |
| Achievable Resolution (°C/sec) | < 0.005 |
| Repeatability (°C) | < 0.01 |
| Drift at 177°C (°C/year) | < 0.1 |

### DataSphere® Array System - Pressure Performance

| | | |
|---|---|---|
| Pressure Range (psi / bar) | 0 to 10,000 / 0 to 690 | 0 to 16,000 / 0 to 1,100 |
| Accuracy (% FS) | 0.015 | 0.02 |
| Typical Accuracy (% FS) | 0.012 | 0.015 |
| Achievable Resolution (psi/sec) | < 0.006 | < 0.008 |
| Repeatability (% FS) | < 0.01 | < 0.01 |
| Response Time to FS Step (for 99.5% FS) | < 1 sec | < 1 sec |
| Acceleration Sensitivity (psi/g – any axis) | < 0.02 | < 0.02 |
| Drift at 14 psi and 25°C (%FS/year) | Negligible | Negligible |
| Drift at Max. Pressure and Temperature (%FS/year) | 0.02 | 0.02 |

For more information, contact your local Halliburton representative or visit us on the web at www.halliburton.com

Sales of Halliburton products and services will be in accord solely with the terms and conditions contained in the contract between Halliburton and the customer that is applicable to the sale.

H073309 09/19 © 2019 Halliburton. All Rights Reserved.

HALLIBURTON | Completion Tools

# APPENDIX E

# STORAGE FACILITY PERMIT REGULATORY COMPLIANCE TABLE

| Subject | N.D.C.C. / N.D.A.C. Reference | Requirement | Regulatory Summary | Storage Facility Permit Application (Section and Page Number; see main body for reference cited) | Figure/Table Number and Description (Page Number) |
|---|---|---|---|---|---|
| **Pore Space Amalgamation** | N.D.C.C. §§ 38-22-06(3) and (4)<br><br>N.D.A.C. §§ 43-05-01-08(1) and (2) | **N.D.C.C. § 38-22-06**<br>3. Notice of the hearing must be given to each mineral lessee, mineral owner, and pore space owner within the storage reservoir and within one-half mile of the storage reservoir's boundaries.<br><br>4. Notice of the hearing must be given to each surface owner of land overlying the storage reservoir and within one-half mile of the reservoir's boundaries.<br><br>**N.D.A.C. § 43-05-01-08**<br>1. The commission shall hold a public hearing before issuing a storage facility permit. At least forty-five days prior to the hearing, the applicant shall give notice of the hearing to the following:<br><br>a. Each operator of mineral extraction activities within the facility area and within one-half mile [.80 kilometer] of its outside boundary;<br><br>b. Each mineral lessee of record within the facility area and within one-half mile [.80 kilometer] of its outside boundary;<br><br>c. Each owner of record of the surface within the facility area and one-half mile [.80 kilometer] of its outside boundary;<br><br>d. Each owner of record of minerals within the | a. An affidavit of mailing certifying that all pore space owners and lessees within the storage reservoir boundary and within one-half mile outside of its boundary have been notified of the proposed carbon dioxide storage project; | **1.0 PORE SPACE ACCESS**<br>Summit Carbon Storage #2, LLC (SCS2) will notify in accordance with N.D.A.C. § 43-05-01-08 of the SFP hearing at least 45 days prior to the scheduled hearing. An affidavit of mailing will be provided to NDIC to certify that these notifications were made. | The affidavit has not yet been prepared. |
| | | | b. A map showing the extent of the pore space that will be occupied by carbon dioxide over the life of the project; | **1.0 PORE SPACE ACCESS** (p. 1-1)<br>North Dakota law explicitly grants title to pore space in all strata underlying the surface of lands and waters to the owner of the overlying surface estate; i.e., the surface owner owns the pore space (North Dakota Century Code [N.D.C.C.] § 47-31-03). Prior to issuance of the storage facility permit (SFP), North Dakota law mandates the storage operator obtain the consent of landowners who own at least 60% of the pore space of the storage reservoir for geologic storage of $CO_2$ (N.D.C.C. § 38-22-08[5]). The statute also mandates that a good faith effort be made to obtain consent from all pore space owners and that all nonconsenting pore space owners are, or will be, equitably compensated (N.D.C.C. §§ 38-22-08[4], [14]). North Dakota law grants the North Dakota Industrial Commission (NDIC) the authority to require pore space owned by nonconsenting owners to be included in a storage facility and subject to geologic storage through pore space amalgamation (N.D.C.C. § 38-22-10). Amalgamation of pore space will be considered at an administrative hearing as part of the regulatory process required for consideration of the SFP application. Surface access for any potential aboveground activities is not included in pore space amalgamation.<br><br>Summit Carbon Storage #2, LLC (SCS2) has identified the owners (surface and mineral) (N.D.C.C §§ 38-22-06[3], [4]; North Dakota Administrative Code [N.D.A.C] § 43-05-01-08[1]). In addition, with the exception of coal extraction, there are no mineral lessees or operators of mineral extraction activities within the facility area or within 0.5 miles of its outside boundary. SCS2 will notify all owners of a pore space amalgamation hearing at least 45 days prior to the scheduled hearing and will provide information about the proposed $CO_2$ storage project and the details of the scheduled hearing. An affidavit of mailing will be provided to NDIC to certify that these notifications were made (N.D.C.C. §§ 38-22-06[3], [4]; N.D.A.C. §§ 43-05-01-08[1], [2]).<br><br>All owners, lessees, and operators that require notification have been identified in accordance with North Dakota law, which vests the title to the pore space in all strata underlying the surface of lands and water to the owner of the overlying surface estate (N.D.C.C. § 47-31-03). The review of pertinent county recorder records identified no severance of pore space from the surface estate or leasing of pore space to a third party prior to April 9, 2009. All surface owners and pore space owners and lessees are the same owner of record.<br><br>The map in Figure 1-1 shows the extent of the pore space that will be occupied by $CO_2$ at the cessation of injection (20 years) and over the life of the project (the stabilized $CO_2$ extent) as well as the storage facility area boundary and 0.5 miles outside of the storage facility area boundary (the hearing notification area). | **Figure 1-1.** Map illustrating the pore space $CO_2$ extent at the cessation of injection (20 years), alongside the stabilized $CO_2$ extent over the life of the project. Map also depicts the storage facility area boundary, and 0.5 miles outside of the storage facility area boundary is the hearing notification area. Additionally, 0.5 miles outside the hearing notification area, the area of review boundary is depicted. (p. 1-2) |
| | | | c. A map showing the storage reservoir boundary and one-half mile outside of the storage reservoir boundary with a description of pore space ownership; | | **Figure 1-1.** Map illustrating the pore space $CO_2$ extent at the cessation of injection (20 years), alongside the stabilized $CO_2$ extent over the life of the project. Map also depicts the storage facility area boundary, and 0.5 miles outside of the storage facility area boundary is the hearing notification area. Additionally, 0.5 miles outside the hearing notification area, the area of review boundary is depicted. (p. 1-2) |
| | | | d. A map showing the storage reservoir boundary and one-half mile outside of its boundary with a description of each operator of mineral extraction activities; | | **Figure 1-1.** Map illustrating the pore space $CO_2$ extent at the cessation of injection (20 years), alongside the stabilized $CO_2$ extent |

| Subject | N.D.C.C. / N.D.A.C. Reference | Requirement | Regulatory Summary | Storage Facility Permit Application (Section and Page Number; see main body for reference cited) | Figure/Table Number and Description (Page Number) |
|---|---|---|---|---|---|
| | | facility area and within one-half mile [.80 kilometer] of its outside boundary;<br><br>e. Each owner and each lessee of record of the pore space within the storage reservoir and within one-half mile [.80 kilometer] of the reservoir's boundary; and<br><br>f. Any other persons as required by the commission.<br><br>2. The notice given by the applicant must contain:<br><br>a. A legal description of the land within the facility area.<br><br>b. The date, time, and place that the commission will hold a hearing on the permit application.<br><br>c. A statement that a copy of the permit application and draft permit may be obtained from the commission. | e. A map showing the storage reservoir boundary and one-half mile outside of its boundary with a description of each mineral lessee of record;<br><br>f. A map showing the storage reservoir boundary and one-half mile outside of its boundary with a description of each surface owner of record;<br><br>g. A map showing the storage reservoir boundary and one-half mile outside of its boundary with a description of each owner of record of minerals. | | over the life of the project. Map also depicts the storage facility area boundary, and 0.5 miles outside of the storage facility area boundary is the hearing notification area. Additionally, 0.5 miles outside the hearing notification area, the area of review boundary is depicted. (p. 1-2)<br><br>**Figure 1-1.** Map illustrating the pore space $CO_2$ extent at the cessation of injection (20 years), alongside the stabilized $CO_2$ extent over the life of the project. Map also depicts the storage facility area boundary, and 0.5 miles outside of the storage facility area boundary is the hearing notification area. Additionally, 0.5 miles outside the hearing notification area, the area of review boundary is depicted. (p. 1-2)<br><br>**Figure 1-1.** Map illustrating the pore space $CO_2$ extent at the cessation of injection (20 years), alongside the stabilized $CO_2$ extent over the life of the project. Map also depicts the storage facility area boundary, and 0.5 miles outside of the storage facility area boundary is the hearing notification area. Additionally, 0.5 miles outside the hearing notification area, the area of review boundary is depicted. (p. 1-2) |
| **Geologic** | N.D.A.C. § 43-05-01-05 | **N.D.A.C. § 43-05-01-05 (1)(b)** | a. Geologic description of the storage reservoir: | **2.1 Overview of Project Area Geology** (p. 2-1) | **Figure 2-1.** Topographic map showing well |

| Subject | N.D.C.C. / N.D.A.C. Reference | Requirement | Regulatory Summary | Storage Facility Permit Application (Section and Page Number; see main body for reference cited) | Figure/Table Number and Description (Page Number) |
|---|---|---|---|---|---|
| | (1)(b)(1) | (1) The name, description, and average depth of the storage reservoirs; | Name<br>Lithology<br>Average thickness<br>Average depth | The BK Fischer is situated approximately 11 miles south of Beulah, North Dakota (Figure 2-1). This project site is on the eastern flank of the Williston Basin.<br><br>Overall, the stratigraphy of the Williston Basin has been well studied, particularly the numerous oil-bearing formations. Through research conducted by the Energy & Environmental Research Center (EERC) via the Plains $CO_2$ Reduction (PCOR) Partnership, the Williston Basin has been identified as an excellent candidate for long-term $CO_2$ storage due, in part, to the thick sequence of clastic and carbonate sedimentary rocks and subtle structural character and tectonic stability of the basin (Peck and others, 2014; Glazewski and others, 2015).<br><br>The $CO_2$ storage reservoir for this project is the Broom Creek Formation, a predominantly sandstone formation 5845 ft below kelly bushing (KB) elevation at the stratigraphic and reservoir-monitoring well (Archie Erickson 2: NDIC File No. 38622) (Figure 2-2). Unconformably overlying the Broom Creek Formation is 242 ft of predominantly siltstone with interbedded dolostone and anhydrite of the undifferentiated Opeche and Spearfish Formations, hereafter referred to as the Opeche/Spearfish Formation. The Minnekahta Formation (limestone) is used to distinguish between the Spearfish Formation (above) and Opeche Formation (below); since the Minnekahta Formation is absent at Archie Erickson 2, and due to the similarity in lithology between the two formations, the Opeche and Spearfish are undifferentiated. The Opeche/Spearfish Formation serves as the primary upper confining zone (Figure 2-2). The Amsden Formation (dolostone, anhydrite, sandstone) unconformably underlies the Broom Creek Formation and serves as the lower confining zone (Figure 2-2). Together, the Opeche/Spearfish, Broom Creek, and Amsden Formations comprise the $CO_2$ storage complex for BK Fischer (Table 2-1).<br><br>Including the Opeche/Spearfish Formation, there are 1087 ft (thickness at Archie Erickson 2) of impermeable rock formations between the Broom Creek Formation and the next overlying permeable zone, the Inyan Kara Formation. An additional 2625 ft (thickness at Archie Erickson 2) of impermeable intervals separates the Inyan Kara Formation and the lowest underground source of drinking water (USDW), the Fox Hills Formation (Figure 2-2).<br><br>**Table 2-1. Formations Comprising the BK Fischer (simulation model values calculated from model extent shown in Figure 2-3)**<br><br>**Formation** / **Purpose** / **Thickness at Archie Erickson 2, ft** / **Depth at Archie Erickson 2, MD* ft** / **Average Simulation Model Thickness, ft** / **Average Simulation Model Depth, TVD** ft** / **Lithology**<br>Opeche/ Spearfish / Upper confining zone / 242 / 5603 / 138 / 5106 / Siltstone, Dolostone, Anhydrite,<br>Broom Creek / Storage reservoir (i.e., injection zone) / 303 / 5845 / 280 / 5244 / Sandstone, Dolostone, Anhydrite, Siltstone<br>Amsden / Lower confining zone / 265*** / 6148 / 257 / 5524 / Dolostone, Sandstone, Anhydrite<br>* Measured depth.<br>** True vertical depth.<br>*** Thickness estimated based on offset well information. | locations and BK Fischer in relation to the city of Beulah, North Dakota. (p. 2-2)<br><br>**Figure 2-2.** Stratigraphic column identifying the storage reservoir and confining zones (outlined in red) and the lowest USDW (outlined in blue). The Minnekahta Formation is not present at Archie Erickson 2. (p. 2-3)<br><br>**Table 2-1.** Formations Comprising the Storage Complex for BK Fischer (simulation model values calculated from model shown in Figure 2-3) (p. 2-4) |

| Subject | N.D.C.C. / N.D.A.C. Reference | Requirement | Regulatory Summary | Storage Facility Permit Application (Section and Page Number; see main body for reference cited) | Figure/Table Number and Description (Page Number) |
|---|---|---|---|---|---|
| | N.D.A.C. § 43-05-01-05(1)(b)(2)(k) | **N.D.A.C. § 43-05-01-05(1)(b)(2)** (k) Data on the depth, areal extent, thickness, mineralogy, porosity, permeability, and capillary pressure of the injection and confining zone, including facies changes based on field data, which may include geologic cores, outcrop data, seismic surveys, well logs, and names and lithologic descriptions; | b. Data on the injection zone and source of the data which may include geologic cores, outcrop data, seismic surveys, and well logs:<br>Depth<br>Areal extent<br>Thickness<br>Mineralogy<br>Porosity<br>Permeability<br>Capillary pressure<br>Facies changes | **2.2 Data and Information Sources (p. 2-4)**<br>Several sets of data were used to characterize the injection and confining zones to establish their suitability for the storage and containment of injected $CO_2$. Data sets used for characterization included both existing data (e.g., from published literature, publicly available databases, purchased/leased digital well logs, existing 3D and 2D seismic) and site-specific data acquired specifically to characterize the storage complex.<br><br>***2.2.1 Existing Data* (p. 2-4)**<br>Well log data and interpreted formation top depths from 115 wellbores within the 4070-mi$^2$ (74-mi × 55-mi) area covered by the geologic model were used to characterize the depth, thickness, and extent of the subsurface geologic formations (Figure 2-3). Seismic interpretation products (seismic horizons and acoustic impedance volumes) from legacy 3D seismic data and 2D seismic data shown in Figure 2-3 were used to support generation of the 3D geologic model.<br><br>In addition to data from Archie Erickson 2, existing laboratory measurements for core samples from the Broom Creek Formation and its confining zones were available from nine additional wells: ANG 1 (ND-UIC-101), Flemmer 1 (NDIC File No. 34243), BNI 1 (NDIC File No. 34244), J-LOC 1 (NDIC File No. 37380), Liberty 1 (NDIC File No. 37672), MAG 1 (NDIC File No. 37833), Coteau 1 (NDIC File No. 38379), Milton Flemmer 1 (NDIC File No. 38594), and Slash Lazy H 5 (NDIC File No. 38701) (Figure 2-4). These measurements were compiled and used to establish relationships between measured petrophysical characteristics and estimates from well log data and were integrated with newly acquired site-specific data.<br>***2.2.2 Site-Specific Data* (p. 2-6)**<br>Site-specific efforts to characterize the storage complex generated multiple data sets, including geophysical well logs, petrophysical data, fluid analyses, whole core, and 3D seismic data. Archie Erickson 2 was drilled to a depth of 6402 ft MD in 2022, specifically to gather subsurface geologic data to support the development of this $CO_2$ storage facility permit (SFP) application and serve as a future $CO_2$ reservoir-monitoring well. Downhole logs were acquired, and cores were collected from the associated storage complex (Opeche/Spearfish, Broom Creek, and Amsden Formations). Broom Creek Formation stress tests, a fluid sample, and temperature and pressure measurements were collected in Archie Erickson 2 (Figure 2-5).<br><br>**2.3 Storage Reservoir (injection zone)** (p. 2-16)<br>The Broom Creek Formation is laterally extensive across the simulation model area and surrounding region (Figure 2-9). The Broom Creek Formation comprises interbedded eolian/nearshore marine sandstone (permeable storage intervals) and dolostone layers (impermeable layers) with minor amounts of siltstone and anhydrite layers. The Broom Creek Formation unconformably overlies the Amsden Formation and is unconformably overlain by the Opeche/Spearfish Formation (Figure 2-2) (Murphy and others, 2009).<br><br>The top of the Broom Creek Formation is located at a depth of 5845 ft below KB elevation at Archie Erickson 2 and the cored interval is made up of 215 ft of sandstone, 72 ft of dolostone and 16 ft of anhydrite. The thickness of the Broom Creek Formation at the Archie Erickson 2 is 303 ft. Cored wells within the extent of the simulation model show minor anhydrite and siltstone intervals are also present in the Broom Creek Formation. Across the simulation model area, the Broom Creek Formation ranges in thickness from 139 to 492 ft (Figures 2-10a and 2-10b), with an average thickness of 280 ft based on offset-well data and geologic model characteristics. The net sandstone thickness within the simulation model area ranges from 6 to 397 ft, with an average thickness of 140 ft.<br><br>The top of the Broom Creek Formation was picked based on the stratigraphic transition from a relatively low GR signature of sandstone and dolostone lithologies within the Broom Creek Formation to a relatively high GR signature representing the siltstones of the Opeche/Spearfish Formation (Figure 2-11). This transition is also noted with a drop in bulk density (RHOB) and dipole sonic compressional slowness values (DTC) and an increase in neutron porosity (NEUT) and resistivity (RES_D, RES_S). The bottom of the Broom Creek Formation was placed at the base of a relatively low GR package representing a 14-ft package of anhydrite that can be correlated across much of the study area. This rock package divides the clean sandstones and dolostone lithologies of the Broom Creek Formation from the dolostone and anhydrite of the Amsden Formation. Seismic data collected as part of site characterization efforts (Figure 2-8) were used to reinforce structural correlation and thickness estimations of the storage reservoir. The combined structural correlation and seismic interpretation indicate that the formation is continuous across the area near Archie Erickson 2 (Figures 2-12 and 2-13). A structure map of the Broom Creek Formation shows no detectable features with associated spill points in the simulation model area (Figures 2-14 and 2-15).<br><br>Thirty-one (31) 1-in. diameter core plugs collected from the Broom Creek Formation were sampled and used to determine the distribution of porosity and permeability values throughout the formation (Table 2-6, Figure 2-16). The range in porosity and permeability predominantly captured the sandstone variability as this rock type was prominent in the sampling program over the dolostone. | **Figure 2-3**. Map showing the extent of the regional geologic model, distribution of well control points, 2D and 3D seismic, and extent of the simulation model. The wells shown penetrate the storage reservoir and the upper and lower confining zones. (p. 2-5)<br><br>**Figure 2-4.** Map showing the spatial relationship between the BK Fischer and ten wells where core samples were collected from the formations comprising the storage complex. (p. 2-6)<br><br>**Figure 2-9.** Broom Creek Formation in North Dakota. The area within the green dashed line shows the extent originally proposed by Rygh (1990), and the area outside of the green dashed line has been modified based on new well control. (p. 2-16)<br><br>**Figure 2-10a**. Isopach map of the Broom Creek Formation in the simulation model area. A convergent interpolation gridding algorithm was used with well formation tops, 3D seismic, and 2D seismic in the creation of this map (thickness of the Broom Creek Formation at Archie Erickson 2 is 303 ft, see Table 2-6). (p. 2-17)<br><br>**Figure 2-10b.** Isopach map of the Broom Creek Formation focused |

| Subject | N.D.C.C. / N.D.A.C. Reference | Requirement | Regulatory Summary | Storage Facility Permit Application (Section and Page Number; see main body for reference cited) | Figure/Table Number and Description (Page Number) |
|---|---|---|---|---|---|

Core-derived measurements from Archie Erickson 2 were used as the foundation for the generation of porosity and permeability properties within the 3D geologic model. The 1-in.-diameter core plug sample measurements showed good agreement with the geologic model property distribution at the location of Archie Erickson 2. This agreement gave confidence to the geologic model, which is a spatially and computationally larger data set created with the extrapolation of porosity and permeability from offset well logs. The geologic model property distribution statistics shown in Table 2-6 are derived from a combination of the core plug analysis and the larger data set derived from offset well logs.

Sandstone intervals in the Broom Creek Formation are associated with low GR, low density, high porosity (neutron, density, and sonic), low resistivity because of brine salinity, and high sonic slowness measurements (Figure 2-11). The dolostone intervals in the formation are associated with an increase in GR measurements compared to the sandstone intervals, in addition to high density, low porosity (neutron, density, and sonic), high resistivity, and low sonic slowness measurements. The dolomitic sandstone intervals in the formation are the transitions between sandstone and dolostone, where the porosity begins to decrease, and density begins to increase in a transition from predominantly sandstone to dolostone (Figure 2-16).

***2.3.1 Mineralogy of the Injeciton Zone*** (p. 2-26)
Powder XRD for average bulk composition analysis of 31 finely ground, homogenized samples from the Broom Creek Formation shows quartz as the most common mineral (~49%) followed by carbonate (~35%, mostly dolomite with some ankerite), sulfate (~7%, mostly anhydrite), feldspars (~5%, mostly K-feldspar), and clay minerals, ~4% (illite) **(**Figure 2-17a**)**. Minor amounts of halide and oxide/hydroxide make up the rest of the mineralogy. The major constituents of the Broom Creek Formation obtained by XRD are also shown in Table 2-7a. These data align with the average elemental composition obtained by XRF which shows higher content of silica (Si) (>60%) followed by calcium (Ca), magnesium (Mg), sulfur (S), aluminum (Al), and others **(**Figure 2-17a**)**.

XRF analysis of the Broom Creek Formation (Figure 2-17b) shows a high percentage of $SiO_2$ (2%–98%), CaO (0.2%–39%), and MgO (0%–22%) that confirm the dominance of sandstone and dolomite intervals in the Broom Creek Formation. A high percentage of CaO (~27%) and MgO (~18%) at the top of the formation indicates the presence of a dolomite layer that isolates the Broom Creek Formation from the Opeche/Spearfish Formation. As the formation gets deeper, the mineralogy changes to anhydrite-rich as indicated by a higher percentage of CaO (~39%) and $SO_3$ (~49%) that separates the Broom Creek Formation from the bottom Amsden Formation. The Broom Creek Formation consists of a clay content ranging from 0% to 21% with an average of ~4%, with illite being the dominant clay type.

The Broom Creek Formation midsection at the core depth of 5919.5–5974 ft and KB elevation of 5915.3–5969.7 ft represents a highly porous and permeable zone averaging more than 20% total porosity, reaching as high as 30.67% total porosity at some intervals, with permeability of >1000 mD. Thin-section and SEM EDS (energy-dispersive spectroscopy micrographs of the most porous sample show isolated grains of moderately sorted, subrounded quartz and subangular feldspar grains (Figures 2-18a and c). Grain contacts are mostly tangential with intergranular spaces occasionally occupied by dolomite (Figures 2-18a and c). In contrast, the least porous sample with ultralow permeability located at the Broom Creek Formation–Amsden Formation boundary primarily consists of anhydrite (>90%) with dolomite (~5%), quartz, and illite clay (Figures 2-18b and d). Figure 2-19 shows changes in the mineralogy at the Archie Erickson 2 as a function of depth next to the core sample porosity and permeability data. The Broom Creek Formation is highlighted in gray.

**Table 2-6. Description of $CO_2$ Storage Reservoir (injection zone) at Archie Erickson 2 (p. 2-24)**

| **Injection Zone Core Derived Properties** | | | |
|---|---|---|---|
| **Property** | **Description** | | |
| Formation Name | Broom Creek | | |
| Lithology | Sandstone, dolostone, anhydrite | | |
| Formation Top Depth (MD), ft | 5845 | | |
| Thickness, ft | 303 (sandstone 215, dolostone 72, anhydrite 16) | | |
| Capillary Entry Pressure (brine/$CO_2$), psi | 3.12 | | |
| **Geologic Properties** | | | |
| **Formation** | **Property** | **Laboratory Analysis** | **Simulation Model Property Distribution** |
| Broom Creek (sandstone) | Porosity, %* | 20.0 (2.9-29.7) | 22.2 (0.0–35.3) |

around the three stratigraphic and reservoir-monitoring wells (thickness of the Broom Creek Formation at Archie Erickson 2 is 303 ft, see Table 2-6). (p. 2-18)

**Figure 2-11.** Well log display of the interpreted facies of the Opeche/Spearfish, Broom Creek, and Amsden Formations in Archie Erickson 2. Tracks from left to right are 1) SSTVD; 2) GR (black) and caliper (dark blue); 3) MD; 4) resistivity – deep (red) and resistivity – shallow (light blue); 5) delta time (black), NEUT (blue) and density (green); and 6) facies. (p. 2-19)

**Figure 2-12.** Regional well log stratigraphic cross sections of the upper confining zone and injection zone flattened on the top of the Amsden Formation. Logs displayed in tracks from left to right are 1) SSTVD; 2) GR (black) and caliper (dark blue); 3) MD; 4) NEUT (blue) and bulk density (green); and 5) facies. The different depth scales are used between A-A' and B-B' for image display purposes. Cross section is scaled in SSTVD. (p. 2-20)

**Figure 2-13.** Regional well log cross sections showing the structure of the upper confining zone and injection zone. Logs

| Subject | N.D.C.C. / N.D.A.C. Reference | Requirement | Regulatory Summary | Storage Facility Permit Application (Section and Page Number; see main body for reference cited) | Figure/Table Number and Description (Page Number) |
|---|---|---|---|---|---|

| | | | |
|---|---|---|---|
| | Permeability, mD** | 848.0481, 150.3868 (0.0222-3710) | 458.79, 136.96 (0.0–3401.2) |
| Broom Creek (dolostone) | Porosity, %* | 6.4 (0.8-13.8) | 4.4 (0.0–34.9) |
| | Permeability, mD** | 4.7060, 0.0184 (0.0–62.9) | 2.07, 0.0221 (0.0–919.6) |

* Porosity values are reported as the arithmetic mean followed by the range of values in parentheses. Values measured at 2400 psi.

** Permeability values are reported as the arithmetic mean and geometric mean, respectively, followed by the range of values in parentheses and do not have the 2.5 permeability calibration factor applied during simulation. Values measured at 2400 psi.

***Appendix C***

***C.1.1 Geochemical Information of Injection Zone (Broom Creek Formation )*****(p. C-1)**

Geochemical simulation was performed to calculate the effects of introducing the $CO_2$ stream to the injection zone. The injection zone, the Broom Creek Formation, was investigated using the geochemical analysis option available in GEM, the compositional simulation software package from Computer Modelling Group Ltd. (CMG). GEM is also the primary simulation software used for evaluation of the reservoir's dynamic behavior resulting from the expected $CO_2$ injection. For this geochemical modeling study, the injection scenario consisted of a single injection well injecting for a 20-year period with maximum bottomhole pressure (BHP) and maximum wellhead pressure (WHP) constraints of 3624 and 2100 psi, respectively. A postinjection period of 25 years was run in the model to evaluate any dynamic behavior and/or geochemical reaction after the $CO_2$ injection is stopped.

The anticipated average $CO_2$ stream composition is 98.25% $CO_2$, 1.44% $N_2$, and 0.31% $O_2$, with a trace amount of $H_2S$. The $CO_2$ stream, shown in Table C-1 that was used for geochemical modeling, contains a higher amount of $O_2$ (2%). The modeled stream containing ~95% $CO_2$ and 2% $O_2$ was used to represent a conservative scenario where the oxygen concentration is highest, potentially triggering more geochemical reactions in the formation. This simulation scenario was run with and without the geochemical model analysis option included, and results from the two cases were compared (Figures C-1 and C-2).

The case with geochemical analysis (geochemistry case) was constructed using the average mineralogical composition of the Broom Creek Formation rock materials (78% of bulk reservoir volume) and average formation brine composition (22% of bulk reservoir volume). X-ray diffraction (XRD) data from the Archie Erickson 2 core samples were used to inform the mineralogical composition of the Broom Creek Formation (Table C-2). Illite was chosen to represent clay for geochemical modeling as it was the most prominent type of clay identified in the XRD data. Ionic composition of the Broom Creek Formation water, derived from the state-certified analysis reported in Appendix A, is listed in Table C-3.

The results do not show an evident difference in the $CO_2$ gas molality fraction between both cases as seen in Figures C-1 and C-2 for volume injected and injection pressure simulation results. As a result of geochemical reactions in the reservoir, cumulative volume and injection rate have no observable difference between the geochemical and nongeochemical cases. The resulting BHP and WHP from the two cases are nearly identical, with no appreciable differences.

Figure C-3 shows the location of the cross sections and Layer 30 used in Figures C-4a and C-4b to depict the geochemical modeling results. Figures C-4a and C-4b show the concentration of $CO_2$, in molality, in the reservoir after 20 years of injection plus 25 years of postinjection for the geochemistry model and nongeochemistry model, respectively.

The pH of the reservoir brine changes in the vicinity of the $CO_2$ accumulation, as shown in Figure C-5a. The pH of the Broom Creek Formation native-brine sample is 6.95, whereas the fluid pH declines to approximately 4.52 in the $CO_2$-flooded areas near the well as a result of $CO_2$ dissolution in the native formation brine (Figure C-5b).

Figures C-6a and C-6b show the cross section for $O_2$ molality in the Broom Creek Formation. Figure C-6a shows the cross section for the concentration of $O_2$, in molality, in the reservoir after 20 years of injection plus 25 years of postinjection for the geochemistry model scenario, and Figure C-6b shows the same information for the nongeochemistry simulation case for comparison. The results do not show an evident difference in the $O_2$ gas molality fraction between both cases. After being injected, the 2% molar oxygen content in the injection stream is dissolved in the brine and likely to cause oxidative reactions of the minerals which may induce dissolution/precipitation of reactive minerals and formation of secondary minerals in the reservoir. The simulation results showed no significant precipitation caused by the high concentration of $O_2$ that would

displayed in tracks from left to right are 1) SSTVD, 2) GR (black) and caliper (dark blue), 3) MD, 4) NEUT (blue) and bulk density (green), and 5) facies. The different depth scales are used between A-A' and B-B' for image display purposes. Cross section is scaled in SSTVD. (p. 2-21)

**Figure 2-14.** Structure map of the Broom Creek Formation in the simulation model referenced in feet below mean sea level. A convergent interpolation gridding algorithm was used with well formation tops, 3D seismic, and 2D seismic in the creation of this map. (p. 2-22)

**Figure 2-15.** Cross section of the BK Fischer storage complex from the geologic model showing facies distribution in the Broom Creek Formation. Depths are referenced as feet below mean sea level. Geologic model extent is displayed by the blue box in the inset map in the upper-left corner. (p. 2-23)

**Table 2-6.** Description of $CO_2$ Storage Reservoir (injection zone) at Archie Erickson 2 (p. 2-24)

**Figure 2-16.** Vertical distribution of core-derived porosity and permeability values in the BK Fischer storage

| Subject | N.D.C.C. / N.D.A.C. Reference | Requirement | Regulatory Summary | Storage Facility Permit Application (Section and Page Number; see main body for reference cited) | Figure/Table Number and Description (Page Number) |
|---|---|---|---|---|---|
| | | | | affect the $CO_2$ injection volume as demonstrated by the comparison in injection rates between the case with and without geochemical modeling shown in Figure C-2.<br><br>Figure C-7 shows the mass of mineral dissolution and precipitation due to $CO_2$ injection in the Broom Creek Formation. Dolomite is the most prominent dissolved mineral, while anhydrite is the most prominent precipitated mineral. All other minerals showed very limited variations.<br><br>Simulation results show that, during $CO_2$ injection, the supercritical $CO_2$ (free-$CO_2$ gas) remains dominant. $CO_2$ dissolution in the formation water and residual trapping of $CO_2$ slowly increased over time, while $CO_2$ mineralization is negligible at the plot scale in Figure C-7, it can be observed at the plot scale in Figure C-8. Once $CO_2$ injection ceases in 2044, injected concentrated $CO_2$ begins to expand, resulting in more $CO_2$ that is capillary-trapped or dissolved into fresh brine, as evidenced by the crossover in Figure C-8. Figures C-9 and C-10, respectively, provide an indication of the change in distribution of the mineral that experienced the most dissolution, dolomite, and the mineral that experienced the most precipitation, anhydrite. Considering the apparent net dissolution of minerals in the system, as indicated in Figure C-7, there is an associated net increase in porosity in the affected areas, as shown in Figure C-11. Del Porosity Mineral (DPORMNR) output calculates the porosity change due to mineral dissolution/precipitation. It is calculated as Initial Porosity – Porosity at Time "t." Negative values of this output indicate net mineral dissolution (porosity increase), while positive values indicate net mineral precipitation (porosity decrease). However, the porosity change is small, less than 0.01% porosity units, equating to a maximum increase in average porosity from 22.00% to 22.01% after the 20-year injection period plus 25 years of postinjection. | complex from Archie Erickson 2. Tracks from left to right are 1) SSTVD; 2) GR (black) and caliper (dark blue); 3) MD; 4) delta time (black), NEUT (blue), and bulk density (green); 5) core porosity (2400 psi) and log porosity (light blue); 6) core permeability (2400 psi) and log permeability (black); 7) facies; and 8) upscaled facies. (p. 2-25)<br><br>**Figure 2-17a** Bar charts showing a) average mineralogy (wt.%) and b) average elemental composition (wt.%) of the Broom Creek Formation at Archie Erickson 2 (note elemental data by XRF were determined as oxides of the respective elements). (p. 2-26)<br><br>**Figure 2-17b**. Elemental composition by XRF as a function of depth in the Broom Creek Formation at Archie Erickson 2. (p. 2-28)<br><br>**Figure 2-18**. Thin section (a, b) and SEM (c, d) micrographs of the most porous (a, c) and the least porous (b, d) samples from the Broom Creek Formation at Archie Erickson 2. The most porous sample has a total porosity and permeability of 30.67% and >1000 mD, respectively, which notably reduced to 0.55% and 0.0039 mD in the |

| Subject | N.D.C.C. / N.D.A.C. Reference | Requirement | Regulatory Summary | Storage Facility Permit Application (Section and Page Number; see main body for reference cited) | Figure/Table Number and Description (Page Number) |
|---|---|---|---|---|---|
| | | | | | least porous sample. The blue color in the thin sections a and b represents porosity. (p. 2-29)<br><br>**Figure 2-19.** Change in the mineralogy of the target reservoir Broom Creek Formation (highlighted in gray) at Archie Erickson 2 as a function of depth based on XRD in comparison to GR, facies, core sample total porosity (%), and permeability (mD). Data gaps in the porosity and permeability plots are due to the inability to obtain testable samples as solid plugs (e.g., samples too soft/brittle). Tracks from left to right are 1) GR (black), 2) MD, 3) total feldspar (orange), 4) quartz (blue), 5) anhydrite (yellow green), 6) dolomite (green), 7) total clay (light blue), 8) other (light green), 9) facies, 10) core porosity (2400 psi) (dark blue), and 11) core permeability (2400 psi) (red). (p. 2-30)<br><br>**Table C-1** $CO_2$ Stream Composition Used for Geochemical Modeling (p. C-1)<br><br>**Figure C-1** Top graph shows cumulative injection vs. time; bottom graph shows gas injection rate vs. time. There is no observable difference in injection volume and gas rate due to geochemical reactions. (p. C-2) |

| Subject | N.D.C.C. / N.D.A.C. Reference | Requirement | Regulatory Summary | Storage Facility Permit Application (Section and Page Number; see main body for reference cited) | Figure/Table Number and Description (Page Number) |
|---|---|---|---|---|---|
| | | | | | **Figure C-2** Top graph shows WHP vs. time; bottom graph shows BHP vs. time. There is no observable difference in pressures due to geochemical reactions. (p. C-3)<br><br>**Table C-2** Averaged XRD data for (Archie Erickson 2) Broom Creek Core Sample (p. C-3)<br><br>**Table C-3** Broom Creek Formation Water Ionic Composition (p. C-4)<br><br>**Figure C-3** Index map of west-east and south-north cross sections, and simulation Layer 30 at 3736.3 ft (SSTVD, subsea true vertical depth). (p. C-5)<br><br>**Figure C-4a** $CO_2$ molality for the geochemistry case simulation results after 20 years of injection plus 25 years postinjection, showing the distribution of $CO_2$ molality in log scale. The top-left image is west-east, and the top-right image is a south-north cross section. The bottom image is a planar view of simulation Layer 30 at 3736.3 ft (SSTVD). (p. C-6)<br><br>**Figure C-4b** $CO_2$ molality for the nongeochemistry case simulation results after 20 years of injection plus 25 years postinjection, showing the distribution of $CO_2$ molality in log scale. The top-left image |

| Subject | N.D.C.C. / N.D.A.C. Reference | Requirement | Regulatory Summary | Storage Facility Permit Application (Section and Page Number; see main body for reference cited) | Figure/Table Number and Description (Page Number) |
|---|---|---|---|---|---|
| | | | | | is west-east, and top-right image is a south-north cross section. The bottom image is a planar view of simulation Layer 30 at 3736.3 ft (SSTVD). (p. C-7)<br><br>**Figure C-5a** Geochemistry case simulation results after 20 years of injection plus 25 years postinjection showing the pH of formation brine in log scale. The top-left image is west-east, and top-right image is a south-north cross section. The bottom image is a planar view of simulation Layer 30 at 3736.3 ft (SSTVD). (p. C-8)<br><br>**Figure C-5b** Geochemistry case simulation results through 20 years of injection plus 25 years postinjection showing the pH of the Broom Creek Formation brine at the wellbore vs. time for Layer 30 at 3736.3 ft (SSTVD), Layer 44 at 3824.5 ft (SSTVD), and Layer 62 at 3938 ft. (SSTVD). (p. C-9)<br><br>**Figure C-6a** Cross section for $O_2$ molality for the geochemistry case simulation results after 20 years of injection plus 25 years postinjection showing the distribution of $O_2$ in gas phase in a log scale. The top-left image is west-east, and the top-right image is a |

| Subject | N.D.C.C. / N.D.A.C. Reference | Requirement | Regulatory Summary | Storage Facility Permit Application (Section and Page Number; see main body for reference cited) | Figure/Table Number and Description (Page Number) |
|---|---|---|---|---|---|
| | | | | | south-north cross section. The bottom image is a planar view of simulation Layer 30 at 3736.3 ft (SSTVD). (p. C-10)<br>**Figure C-6b** Cross section for $O_2$ molality for the nongeochemistry case simulation results after 20 years of injection plus 25 years postinjection showing the distribution of $O_2$ in gas phase in a log scale. The top-left image is west-east, and the top-right image is a south-north cross section. The bottom image is a planar view of simulation Layer 30 at 3736.3 ft (SSTVD). (p. C-11)<br><br>**Figure C-7** Modeled change in the mineral masses (minus values show dissolution and positive values show precipitation) due to $CO_2$ injection (top: all minerals; bottom: zoomed-in after removing anhydrite and dolomite). Dissolution of dolomite with precipitation of anhydrite was observed. All of the other minerals showed very small values and account as net zero in this figure. (p. C-13)<br><br>**Figure C-8** Top image: mineral mass changes, in metric tons (tonnes), for the different $CO_2$-trapping mechanisms present during $CO_2$ injection with geochemical modeling in the injection zone for the |

| Subject | N.D.C.C. / N.D.A.C. Reference | Requirement | Regulatory Summary | Storage Facility Permit Application (Section and Page Number; see main body for reference cited) | Figure/Table Number and Description (Page Number) |
|---|---|---|---|---|---|
| | | | | | Broom Creek Formation; bottom image: $CO_2$ mineral trapping. (p. C-14)<br><br>**Figure C-9** Modeled change in molar distribution of dolomite, the most prominent dissolved mineral after 20 years of injection plus a 25-year postinjection period. The top-left image is west-east, and the top-right image is a south-north cross section. The bottom image is a planar view of simulation Layer 30 at 3736.3 ft (SSTVD). (p. C-15)<br><br>**Figure C-10** Modeled change in molar distribution of anhydrite, the most prominent precipitated mineral after 20 years of injection plus 25-year postinjection period. The top-left image is west-east, and the top-right image is a south-north cross section. The bottom image is a planar view of simulation Layer 30 at 3736.3 ft (SSTVD). (p. C-16)<br><br>**Figure C-11** Modeled change in porosity due to net geochemical dissolution after 20 years of injection plus 25-year postinjection period. The top-left image is west-east, and the top-right image is a south-north cross section. The bottom image is a planar view of simulation Layer 30 at |

<table>
<tr><th>Subject</th><th>N.D.C.C. / N.D.A.C. Reference</th><th>Requirement</th><th>Regulatory Summary</th><th>Storage Facility Permit Application<br>(Section and Page Number; see main body for reference cited)</th><th>Figure/Table Number and Description<br>(Page Number)</th></tr>
<tr><td></td><td></td><td></td><td></td><td>3736.3 ft (SSTVD).<br>(p. C-17)</td><td></td></tr>
<tr><td></td><td></td><td></td><td>c. Data on the confining zone and source of the data which may include geologic cores, outcrop data, seismic surveys, and well logs:<br>Depth<br>Areal extent<br>Thickness<br>Mineralogy<br>Porosity<br>Permeability<br>Capillary pressure<br>Facies changes</td><td>See discussion above under 2.2.1 Existing Data (p. 2-4)<br><br>AND<br><br>2.4 Confining Zones (p. 2-31)<br>The confining zones for the Broom Creek Formation are the overlying Opeche/Spearfish Formation and the underlying Amsden Formation (Figure 2-2, Table 2-7b). Both the overlying and underlying confining formations consist primarily of impermeable rock layers.<br><br>Table 2-7b. Properties of Upper and Lower Confining Zones at Archie Erickson 2 (p. 2-32)<br><table><tr><th>Confining Zone Properties</th><th>Upper Confining Zone</th><th>Lower Confining Zone</th></tr><tr><td>Stratigraphic Unit</td><td>Opeche/Spearfish</td><td>Amsden</td></tr><tr><td>Lithology</td><td>Siltstone/anhydrite/ dolostone</td><td>Dolostone/<br>anhydrite/sandstone</td></tr><tr><td>Formation Top Depth (MD), ft</td><td>5603</td><td>6148</td></tr><tr><td>Thickness, ft</td><td>242</td><td>265*</td></tr><tr><td>Capillary Entry Pressure (brine/$CO_2$), psi</td><td>2009.6</td><td>278.7</td></tr><tr><td>Depth below Lowest Identified USDW, ft</td><td>4052</td><td>4597</td></tr></table><br><table><tr><th>Formation</th><th>Property</th><th>Laboratory Analysis</th><th>Simulation Model Property Distribution</th></tr><tr><td>Opeche/Spearfish</td><td>Porosity, %**</td><td>4.6<br>(0.7–7.6)</td><td>2.1<br>(0.0–14.6)</td></tr></table></td><td>Table 2-7b. Properties of Upper and Lower Confining Zones at Archie Erickson 2<br>(p. 2-32)<br><br>Figure 2-20. Structure map of the Opeche/Spearfish Formation across the simulation model area in feet below mean sea level. A convergent interpolation gridding algorithm was used with well formation tops, 3D seismic, and 2D seismic in creation of this map.<br>(p. 2-33)<br><br>Figure 2-21. Isopach map of the Opeche/Spearfish Formation in the simulation model area. A convergent interpolation gridding algorithm was used with well formation tops, 3D seismic, and 2D seismic in creation of this map. (p. 2-34)<br><br>Figure 2-22a. Bar charts showing a) average mineralogy (wt.%) and b)</td></tr>
</table>

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Subject | N.D.C.C. / N.D.A.C. Reference | Requirement | Regulatory Summary | Storage Facility Permit Application (Section and Page Number; see main body for reference cited) | | | | Figure/Table Number and Description (Page Number) |
| | | | | | Permeability, mD *** | 0.0011, 0.0005 (0.0001–0.0043) | 0.1088, 0.0021 (0.00–6.37) | average elemental composition (wt.%) of the Opeche/Spearfish Formation at Archie Erickson 2 (note: elemental data by XRF were determined as oxides of the respective elements). (p. 2-35) |
| | | | | | Amsden | Porosity, % ** | 3.8 (0.4–9.4) | 2.9 (0.0–35.1) |
| | | | | | | Permeability, mD *** | 3.3256, 0.0022 (0.0002–26.6) | 0.7056, 0.0070 (0.00–156.05) |
| | | | | * Thickness estimated based on offset well information<br>** Porosity values recorded at 2400-psi confining pressure. Porosity values from the model are reported as the arithmetic mean followed by the range of values in parentheses.<br>*** Permeability values recorded at 2400-psi confining pressure. Permeability values are reported as the arithmetic mean and geometric mean, respectively, followed by the range of values in parentheses and do not have the 2.5 permeability calibration factor applied during simulation. | | | | **Figure 2-22b.** Elemental composition by XRF as a function of depth in the Opeche/Spearfish Formation at Archie Erickson 2. (p. 2-36) |
| | | | | ***2.4.1 Upper Confining Zone (p. 2-32)***<br>In BK Fischer, the upper confining zone, the Opeche/Spearfish Formation, consists of predominantly siltstone with interbedded dolostone and anhydrite (Table 2-7b). The upper confining zone is laterally extensive across the simulation model area (Figure 2-20) and is 5603 ft below the KB elevation and 242 ft thick as observed in Archie Erickson 2 (Figures 2-20 and 2-21). The contact between the underlying Broom Creek Formation and the upper confining zone is an unconformity that can be correlated across the Broom Creek Formation extent where the resistivity and GR logs show a significant change across the contact. A relatively low GR signature of sandstone and dolostone lithologies within the Broom Creek Formation changes to a relatively high GR signature representing the siltstones of the Opeche/Spearfish Formation (Figure 2-11).<br><br>***2.4.1.1 Mineralogy of the Upper Confining Zone (p. 2-35)***<br>Powder XRD for average bulk composition analysis of 10 finely ground, homogenized samples from the Opeche/Spearfish Formation shows carbonates (~24%, mostly dolomite with some ankerite) and quartz (~23%) as the most common minerals followed by feldspar (~18%, sodium- and potassium-feldspar contributing equally), clay (~17%, mostly illite and chlorite with a minor contribution from kaolinite), and sulfates (~16%, mostly anhydrite) (Figure 2-22a). Minor amounts of oxide/hydroxide (~0.5%) and sulfide (~0.2%) minerals make up the rest of the mineralogy. The major constituents of the Opeche/Spearfish Formation obtained by XRD are also shown in Table 2-7c. XRD data aligns with the average elemental composition obtained by XRF which shows silica (Si) as the dominant element followed by calcium (Ca), sulfur (S), aluminum (Al), magnesium (Mg), iron (Fe), potassium (K), and other trace elements (Figure 2-22a).<br><br>XRF analysis of the Opeche/Spearfish Formation (Figure 2-22b) identifies $SiO_2$ (1-65%), CaO (5-40%), MgO (0.3-17%), and $Al_2O_3$ (0.2-11%) correlating well with the silicate, carbonate, and aluminum-rich mineralogy determined by XRD. A high percentage of CaO (~40%) and $SO_3$ (~55%) at the base of the Opeche/Spearfish Formation indicates the dominance of anhydrite separating the Opeche/Spearfish Formation from the Broom Creek Formation. The Opeche/Spearfish Formation consists of a much higher clay content compared to the Broom Creek Formation ranging from 0% to 24% with an average of ~17% with illite being the most dominant clay type.<br><br>**Appendix C**<br>*C.1.2 Geochemical Interaction of the Upper Confining Zone (Cap Rock, Opeche/Spearfish Formation) (p.C-18)*<br>Geochemical simulation using the PHREEQC geochemical software was performed to calculate the potential effects of an injected multicomponent $CO_2$ stream on the Opeche/Spearfish Formation. Note: PHREEQC's unit of measure is metric. A vertically oriented 1D simulation was created using a stack of 1-meter grid cells where the formation was exposed to the injection stream mixture at the bottom boundary of the simulation and allowed to enter the system by molecular diffusion processes. Direct fluid flow into the Opeche/Spearfish Formation by free-phase saturation from the injection stream is not expected to occur because of the low permeability of the confining zone. Results were calculated at the grid cell centers: 0.5, 1.5, 2.5, and 3.5 meters above the cap rock–$CO_2$ exposure boundary. The mineralogical composition calculated from the XRD results of the deepest sample from the Opeche/Spearfish Formation was honored (Table C-4). Formation brine composition was assumed to be the same as the known composition from the Broom Creek Formation injection zone below (Table C-5). | | | | **Figure 2-23.** Thin section (a, b) and SEM (c, d) micrographs of the most porous (a, c) and the least porous (b, d) samples from the Opeche/Spearfish Formation at Archie Erickson 2. The most porous sample has a total porosity and permeability of 8.25% and 0.00202 mD. In the least porous sample, the porosity is notably reduced to 0.28% and permeability is 0.00225 mD. The blue color in thin section a represents porosity. (p. 2-37)<br><br>**Figure 2-24.** Change in the mineralogy of the upper-confining Opeche/Spearfish Formation (highlighted in gray) at Archie Erickson 2as a function of depth based on XRD in comparison to GR, facies, core sample total porosity (%), and permeability (mD). Very low total porosity and permeability with a high clay content |

| Subject | N.D.C.C. / N.D.A.C. Reference | Requirement | Regulatory Summary | Storage Facility Permit Application (Section and Page Number; see main body for reference cited) | Figure/Table Number and Description (Page Number) |
|---|---|---|---|---|---|
| | | | | The anticipated average $CO_2$ stream composition is 98.25% $CO_2$, 1.44% $N_2$, and 0.31% $O_2$, with a trace amount of $H_2S$. The $CO_2$ stream that was used for geochemical modeling, described in Table C-1, contains a higher amount of $O_2$ (2%). The modeled stream containing ~95% $CO_2$ and 2% $O_2$ (Table C-1) was used to represent a conservative scenario where the higher oxygen concentration may trigger more geochemical reactions in the formation. The exposure level, expressed in moles per year, of the $CO_2$ stream to the confining layer was 4.5 moles/yr. This value is considerably higher than the expected actual exposure level of 2.3 moles/year (Espinoza and Santamarina, 2017). Again, this conservative overestimation was done to ensure that the degree and pace of geochemical change would not be underestimated. This geochemical simulation was run for 45 years to represent 20 years of injection plus 25 years of postinjection. The simulation was performed at elevated reservoir pressure and temperature conditions obtained from the dynamic reservoir simulation.<br><br>Results showed geochemical processes at work. Figures C-12 through C-16 show results from geochemical modeling. Figure C-12 shows a change in fluid pH over time as $CO_2$ diffuses into the system. For the cell at the $CO_2$ interface, Cell 1 (C1), the pH starts declining from an initial pH of 6.24 to below 4.6 after 5 years of simulation time and continues to decrease to a level of 4.4 by the end of 25 years of postinjection. For the cell occupying the space 1 to 2 meters into the cap rock, C2, the pH starts to decline after Year 5 and decreases to 4.9 by the end of simulation. For the cell occupying the space 2 to 3 meters into the cap rock, C3, the pH begins to change after Year 44. Lastly, the pH is unaffected in C4, indicating $CO_2$ does not penetrate this cell within the 45 years of simulation.<br><br>Figure C-13 shows the modeled change in mineral dissolution and precipitation in grams per cubic meter of rock for C1 and C2. The net change due to precipitation or dissolution in C1 and C2 is less than 0.5 kg per cubic meter, with little change in dissolution or precipitation taking place throughout the entire simulation time. Albite and dolomite start to dissolve slowly from the beginning of the simulation period while illite and quartz precipitate for C1 at the same time. Any effects in C3 are like the change observed for C2. Mineralogical composition with more than 95% of anhydrite and less dissolution of $CO_2$ because of high salinity results in minimal dissolution and precipitation in the C1 and C2.<br><br>Figure C-14 represents the initial fractions of potentially reactive minerals in the Opeche/Spearfish Formation based on XRD data shown in Table C-4. The expected dissolution of these minerals in weight percentage is also shown for C1 and C2 of the model. In C1 and C2, albite and dolomite are the primary minerals that dissolve. Dissolution (%) in C1 and C2 is minimal (<0.02%) and not significant to represent at the scale in Figure C-14.<br><br>Figure C-15 represents minerals expected to be precipitated in weight (%) shown for C1 and C2 of the model. In C1 and C2, illite and anhydrite are the primary minerals to be precipitated. Calcite is the secondary mineral to be precipitated in C2.<br><br>Figure C-16 shows the modeled change in porosity of the cap rock for C1–C4. The overall net porosity changes from dissolution and precipitation are minimal, less than 0.01% change during the life of the simulation. Initially, C1 experiences an increase in porosity because of dissolution upon first $CO_2$ exposure and initial model equilibration, but the change is temporary. For C2, porosity decrease is observed for the first few years, and then it gets back to its initial porosity. No significant porosity changes were observed for C3. These results suggest that geochemical change from exposure to $CO_2$ is minor; therefore, the ability of the Opeche/Spearfish Formation to maintain its sealing integrity will not be compromised by geochemical processes.<br><br>**C1.3 Geochemical Interaction of the Lower Confining Zone (Amsden Formation) (p. C-24)**<br>The Broom Creek Formation's underlying confining layer, the Amsden Formation, was investigated using PHREEQC geochemical software. A vertically oriented 1D simulation was created using a stack of 16 cells, each cell 1 meter in thickness. The formation was exposed to $CO_2$ stream components at the top boundary of the simulation, and $CO_2$ was allowed to enter the system by advection and dispersion processes. Direct fluid flow into the Amsden Formation by free-phase saturation from the injection stream is not expected to occur because of the low permeability of the confining zone. Results were calculated at the center of each cell below the confining layer–$CO_2$ exposure boundary. The average mineralogical composition calculated from the results of four samples from the Amsden Formation was honored (Table C-6). The formation brine composition was assumed to be the same as the known composition from the overlying Broom Creek Formation injection zone (Table C-5). A $CO_2$ stream containing ~95% $CO_2$ and 2% $O_2$, shown in Table C-1, was used in the geochemical modeling to represent a conservative scenario, where higher oxygen concentration may trigger more geochemical reactions in the formation. The maximum formation temperature and pressure, projected from CMG simulation results described in Section 3.0, were used to represent the potential maximum pore pressure and temperature level.<br><br>The higher-pressure results are shown here to represent a potentially more rapid pace of geochemical change. This simulation was run for 45 years to represent 20 years of injection plus 25 years of postinjection. | make the Opeche/Spearfish Formation an ultralow permeable formation. Data gaps in the porosity and permeability plots are due to the inability to obtain testable samples as solid plugs (e.g., samples too soft/brittle). Tracks from left to right are 1) GR (black); 2) MD; 3) total Feldspar (orange), 4) Quartz (blue); 5) Anhydrite (yellow green); 6) Dolomite (green); 7) total Clay (light blue) 8) Other (light green); 9) Facies; 10) core porosity (2400 psi) (dark blue); 11) core permeability (2400 psi) (red). (p. 2-38)<br><br>**Table C-4** Mineral Composition of the Opeche/Spearfish Derived from XRD Analysis of Archie Erickson 2 Core Sample at a Depth of 5848 ft MD (p. C-18)<br><br>**Table C-5** Formation Water Chemistry from Broom Creek Formation Fluid Sample from Archie Erickson 2 (p. C-19)<br><br>**Figure C-12** Modeled change in fluid pH vs. time. Red line shows pH for the center of C1, 0.5 meters above the Opeche/Spearfish Formation cap rock base. Yellow line shows C2, 1.5 meters above the cap rock base. Green line shows C3, 2.5 meters |

| Subject | N.D.C.C. / N.D.A.C. Reference | Requirement | Regulatory Summary | Storage Facility Permit Application (Section and Page Number; see main body for reference cited) | Figure/Table Number and Description (Page Number) |
|---|---|---|---|---|---|

Modeling results show geochemical processes at work. Figures C-17 through C-22 show results from the geochemical modeling. Figure C-17 shows change in fluid pH over 45 years (representing 20 years of injection and 25 years of postinjection) as $CO_2$ enters the system. Initial change in pH in all of the cells, for C1 to C16, is related to initial equilibration of the model. For the cell at the $CO_2$ interface, C1, the pH declines to a level of 5.5 after 3 years of injection, further declining to 5.0 by the end of the modeled injection period, and hits 4.55 by the end of simulation period. Progressively lower or slower pH changes occur for each cell that is more distant from the $CO_2$ interface. The pH for C16 did not decline over the 45 years of simulation time. Figure C-18 shows that $CO_2$ penetration greater than 0.01 molality is limited to C1–C9 and does not penetrate more than 9 meters (represented by C10–C11) over the 20 years of injection and 25 years of postinjection.

Figure C-19 shows the modeled changes in mineral dissolution and precipitation in grams per cubic meter over 45 years of simulation time. For C1, albite and K-feldspar start to dissolve from the beginning of the simulation period while quartz and illite start to precipitate. C1 observed dolomite dissolution, and anhydrite precipitation at the later year of simulation. C2 shows the similar trends but with dolomite precipitation and anhydrite dissolution and major geochemical process begins approximately 20 years after Cell C1.

Figure C-20 represents the initial fractions of potentially reactive minerals in the Amsden Formation based on the XRD data shown in Table C-6. The expected dissolution of the minerals in weight percentage is also shown for C1 and C2 of the model. In C1 and C2, albite and K-feldspar are the primary minerals that dissolve. No dissolution is observed for illite and quartz. The minerals that experience dissolution in the model are almost completely replaced by the precipitation of other minerals.

***2.4.2 Additional Overlying Confining Zones*** (p. 2-39)

Several other formations provide additional confinement above the Opeche/Spearfish Formation. Impermeable rocks above the primary seal include the Piper, Rierdon, and Swift Formations, which make up the first additional group of confining formations (Table 2-8a). At Archie Erickson 2, together with the Opeche/Spearfish Formation, these intervals are 1087 ft thick and will isolate Broom Creek Formation fluids from migrating upward to the next permeable interval, the Inyan Kara Formation (Figure 2-25). Above the Inyan Kara Formation, 2625 ft of impermeable rocks acts as an additional seal between the Inyan Kara sandstone interval and the lowermost USDW, the Fox Hills Formation (Figure 2-26). Confining layers above the Inyan Kara sandstone interval include the Skull Creek, Mowry, Belle Fourche, Greenhorn, Carlile, Niobrara, and Pierre Formations (Table 2-8a).

The formations between the Broom Creek and Inyan Kara Formations and between the Inyan Kara Formation and lowest USDW have demonstrated the ability to prevent the vertical migration of fluids throughout geologic time and are recognized as impermeable flow barriers in the Williston Basin (Downey, 1986; Downey and Dinwiddie, 1988).

**Table 2-8a. Description of Zones of Confinement above the Immediate Upper Confining Zone (data based on Archie Erickson 2). (p. 2-39)**

| Name of Formation | Lithology | Formation Top Depth MD, ft | Thickness, ft | Depth below Lowest Identified USDW, ft |
|---|---|---|---|---|
| Pierre | Mudstone | 1798 | 1480 | 0 |
| Niobrara | Mudstone | 3278 | 380 | 1480 |
| Carlile | Mudstone | 3658 | 48 | 1860 |
| Greenhorn | Mudstone | 3706 | 106 | 1908 |
| Belle Fourche | Mudstone | 3812 | 293 | 2014 |
| Mowry | Mudstone | 4105 | 78 | 2307 |
| Skull Creek | Mudstone | 4193 | 230 | 2395 |

above the cap rock base. Blue line shows C4, 3.5 meters above the cap rock base. (p. C-20)

**Figure C-13** Modeled dissolution and precipitation of minerals in the Opeche/Spearfish Formation cap rock. Dashed lines show results calculated for C1, at 0.5 meters above the cap rock base. Solid lines show results for C2, 1.5 meters above the cap rock base. Results from C3, 2.5 meters above the cap rock base are similar to the change observed for C2. (p. C-21)

**Figure C-14** Weight percentage (wt%) of potentially reactive minerals present in the Opeche/Spearfish Formation geochemistry model before simulation (blue) and expected dissolution of minerals in C1 (orange, too small to see in the figure) and C2 (gray, too small to see in the figure) after 20 years of injection plus 25 years of postinjection. Negative values represent total wt% associated with dissolution. (p. C-22)

**Figure C-15** Weight percentage (wt%) of initial (blue) and precipitated (orange) minerals of the Opeche/Spearfish Formation in C1 and C2 normalized based on total solid (initial – dissolution

| Subject | N.D.C.C. / N.D.A.C. Reference | Requirement | Regulatory Summary | Storage Facility Permit Application (Section and Page Number; see main body for reference cited) | Figure/Table Number and Description (Page Number) |
|---|---|---|---|---|---|

| | | | | | |
|---|---|---|---|---|---|
| Swift | Mudstone | 4758 | 440 | 2960 |
| Rierdon | Mudstone | 5198 | 209 | 3400 |
| Piper (Kline Member) | Carbonate | 5407 | 103 | 3609 |
| Piper (Picard Member) | Mudstone | 5510 | 93 | 3712 |

Sandstones of the Inyan Kara Formation comprise the first unit with relatively high porosity and permeability stratigraphically above the injection zone and the primary sealing formation. The Inyan Kara represents the most likely candidate to act as an overlying pressure dissipation zone. Monitoring distributed temperature sensor data for the Inyan Kara Formation using the downhole fiber-optic cable provides an additional opportunity for mitigation and remediation (Section 5.0). In the unlikely event of out-of-zone migration through the primary and secondary sealing formations, $CO_2$ would become trapped in the Inyan Kara Formation. The depth to the Inyan Kara Formation at the Archie Erickson 2 well location is 4423 ft below KB elevation, and the interval itself is 335 ft thick.

***2.4.3 Lower Confining Zones*** (p. 2-42)
The lower confining zone of the storage complex is the Amsden Formation, which comprises primarily dolostone and anhydrite. The Amsden Formation does include some thin sandstone intervals on the order of 1 to 8 in. thick. The sandstone intervals in the Amsden Formation are isolated from the sandstones of the Broom Creek Formation by thick impermeable dolostone and anhydrite intervals. The top of the Amsden Formation was placed at the top of an argillaceous dolostone, which has relatively high GR character that can be correlated across the simulation model area (Figure 2-11). The Amsden Formation is 6148 ft below KB elevation and 265 ft thick at BK Fischer as determined at Archie Erickson 2 (Figures 2-27 and 2-28).

The contact between the underlying Amsden Formation and the overlying Broom Creek Formation is evident on wireline logs as there is a lithological change from the dolostone and anhydrite beds of the Amsden Formation to the porous sandstones of the Broom Creek Formation (Figure 2-11). The top of the Amsden in Archie Erickson 2 is picked at the base of a 14-ft anhydrite bed in the Broom Creek Formation which can be correlated across much of the study area. This lithologic change is also recognized in the core from Archie Erickson 2. The lithology of the cored section of the Amsden Formation from Archie Erickson 2 is predominantly dolostone and anhydrite with lesser predominant lithologies of sandstone.

***2.4.3.1 Mineralogy of the Lower Confining Zone*** (p. 2-44)
Powder XRD for average bulk composition analysis of nine finely ground, homogenized samples from the Amsden Formation shows carbonate as the most dominant mineral (~37%, mostly dolomite) followed by sulfates (~26%, mostly anhydrite), and quartz (~25%). Clay minerals (illite) and feldspar (mostly K-feldspar) accounted for about 5% each with minor amounts of halide (~0.1%), oxide/hydroxide (~0.2%), and sulfide (~0.1%) **(**Figure 2-29a**)**. The major constituents of the Amsden Formation obtained by XRD are also shown in Table 2-8b. These data align with the average elemental composition obtained by XRF which shows silica (Si) as the dominant element followed by calcium (Ca), sulfur (S), magnesium (Mg), aluminum (Al), potassium (K), and other minor elements (Figure 2-29a).

XRF analysis of the Amsden Formation (Figure 2-29b) shows that the contact between the Amsden and Broom Creek Formations is dominated by CaO, MgO, and $SiO_2$ indicating the dominance of dolomite and sandstone. As the formation gets deeper, the chemistry changes to more anhydrite-rich, as shown by the high percentage of CaO (~41%) and $SO_3$ (~56%). The Amsden Formation contains clay as high as 16% with an average of ~5% with illite being the dominant clay type.

Similar to the Opeche/Spearfish Formation, the higher content of anhydrite (up to 65% with an average of ~26%) and clay minerals (up to 16% with an average of ~5%) makes the Amsden Formation less porous and more impermeable compared to the target Broom Creek Formation. Thin-section and SEM-EDS micrographs of the most porous sample at the core depth of 6188.1 ft – KB elevation of 6184.5 ft show moderately sorted, fine- to medium-grained, quartz and feldspar grains with intergranular pore spaces filled by dolomite and anhydrite (Figures 2-30a and c). Porosity is mostly intergranular, long, and sutured (Figure 2-30c).

+ precipitation) present in C1 and C2 after 20 years of injection and 25 years of postinjection. Minerals precipitated in C1 and C2 are too small to be seen in the figure. (p. C-23)

**Figure C-16** Modeled change in percent porosity of the Opeche/Spearfish Formation cap rock. Red line shows porosity change calculated for C1, 0.5 meters above the cap rock base. Orange line shows C2, 1.5 meters above the cap rock base. Green line shows C3, 2.5 meters above the cap rock base. Blue line shows C4, 3.5 meters above the cap rock base. Long-term change in porosity is minimal and stabilized. Positive change in porosity is related to dissolution of minerals, and negative change is due to mineral precipitation. (p. C-24)

**Table C-6** Averaged Mineral Composition of the Amsden Formation Derived from XRD Analysis of Archie Erickson 2 Core Samples at Depths of 6152.7, 6157.6, 6161.5 and 6168 ft MD (p. C-25)

**Figure C-17** Modeled change in fluid pH for C1–C16 (odd numbered cells through C15 plus C16) in the Amsden Formation underlying confining layer. (p. C-26)

| Subject | N.D.C.C. / N.D.A.C. Reference | Requirement | Regulatory Summary | Storage Facility Permit Application (Section and Page Number; see main body for reference cited) | Figure/Table Number and Description (Page Number) |
|---|---|---|---|---|---|
| | | | | | **Figure C-18** Modeled $CO_2$ concentration (molality) of the odd numbered cells, C1–C11, in the Amsden Formation underlying confining layer. $CO_2$ penetration in C11 is less than 0.01 molality. (p. C-26)<br><br>**Figure C-19** Modeled dissolution and precipitation of minerals in the Amsden Formation underlying confining layer. Dashed lines show results for C1, 0 to 1 meter below the Amsden Formation top. Solid lines show results for C2, 1 to 2 meters below the Amsden Formation top. Dotted lines show results for C9, 8 to 9 meters below the Amsden Formation top. C9 shows minimal dissolution and precipitation at the end of 25 years postinjection because of smaller amount of $CO_2$ penetration in C9 by the end of 45 years of simulation. (p. C-27)<br><br>**Figure C-20** Weight percentage (wt%) of potentially reactive minerals present in the Amsden Formation geochemistry model before simulation (blue) and expected dissolution of minerals in C1 (orange) and C2 (gray) after 20 years of injection plus 25 years of postinjection. Negative values represent total |

| Subject | N.D.C.C. / N.D.A.C. Reference | Requirement | Regulatory Summary | Storage Facility Permit Application (Section and Page Number; see main body for reference cited) | Figure/Table Number and Description (Page Number) |
|---|---|---|---|---|---|
| | | | | | wt% associated with dissolution. (p. C-28)<br><br>**Figure C-21** Weight percentage (wt%) of initial (blue) and precipitated (orange) minerals in the Amsden Formation in C1 and C2 normalized based on total solid (initial – dissolution + precipitation) present in C1 and C2 after 20 years of injection and 25 years of postinjection. There is no calcite precipitation in C1. (p. C-29)<br><br>**Figure C-22** Modeled change in percent porosity in the Amsden Formation underlying confining layer. Red line shows porosity change for C1, 0 to 1 meter below the Amsden Formation top. Orange line shows C2, 1 to 2 meters below the Amsden Formation top. Green line shows C3, 2 to 3 meters below the Amsden Formation top. Long-term change in porosity is minimal and stabilized. Positive change in porosity is related to dissolution of minerals, and negative change is due to mineral precipitation. (p. C-30)<br><br>**Table 2-8a.** Description of Zones of Confinement above the Immediate Upper Confining Zone (data based on Archie Erickson 2). (p. 2-39)<br><br>**Figure 2-25.** Isopach map of the interval |

| Subject | N.D.C.C. / N.D.A.C. Reference | Requirement | Regulatory Summary | Storage Facility Permit Application (Section and Page Number; see main body for reference cited) | Figure/Table Number and Description (Page Number) |
|---|---|---|---|---|---|
| | | | | | between the top of the Broom Creek Formation and the top of the Swift Formation. This interval represents the primary and secondary confinement zones. A convergent interpolation gridding algorithm was used with well formation tops, 3D seismic, and 2D seismic in creation of this map. (p. 2-40)<br><br>**Figure 2-26**. Isopach map of the interval between the top of the Inyan Kara Formation and the top of the Pierre Formation. This interval represents the tertiary confinement zone. A convergent interpolation gridding algorithm was used with well formation tops, 3D seismic, and 2D seismic in creation of this map. (p. 2-41)<br><br>**Figure 2-27**. Structure map of the Amsden Formation across the simulation model area in feet below mean sea level. A convergent interpolation gridding algorithm was used with well formation tops, 3D seismic, and 2D seismic in creation of this map. (p. 2-42)<br><br>**Figure 2-28.** Isopach map of the Amsden Formation across the simulation model area. The convergent interpolation gridding algorithm was used with well formation tops, 3D seismic, and 2D seismic in creation of this map. (p. 2-43). |

| Subject | N.D.C.C. / N.D.A.C. Reference | Requirement | Regulatory Summary | Storage Facility Permit Application (Section and Page Number; see main body for reference cited) | Figure/Table Number and Description (Page Number) |
|---|---|---|---|---|---|
| | | | | | **Figure 2-29a.** Bar charts showing a) average mineralogy (wt%) and b) average elemental composition (wt%) of the Amsden Formation at the Archie Erickson 2 well. Elemental data by XRF were determined as oxides of the respective elements. (p. 2-44)<br><br>Figure 2-29b. Elemental composition by XRF as a function of depth in the Amsden Formation at Archie Erickson 2. (p. 2-45)<br><br>**Figure 2-30.** Thin section (a, b) and SEM (c, d) micrographs of the most porous sample (a, c) and the least porous (b, d) samples of the Amsden Formation at the Archie Erickson 2 well. The most porous sample of the Amsden Formation has a porosity and permeability of ~9.73% and 30.2 mD, respectively, which is notably reduced to 0.34% and 0.00291 mD, respectively, in the least porous sample. The blue color in thin section a represents porosity. (p. 2-46)<br><br>**Figure 2-31.** Change in the mineralogy of the lower confining Amsden Formation (highlighted in gray) at Archie Erickson 2 as a function of depth based on XRD in comparison to GR, facies, core sample total porosity (%), and permeability (mD). Data gaps in the |

| Subject | N.D.C.C. / N.D.A.C. Reference | Requirement | Regulatory Summary | Storage Facility Permit Application (Section and Page Number; see main body for reference cited) | Figure/Table Number and Description (Page Number) |
|---|---|---|---|---|---|
| | | | | porosity and permeability plots are due to the inability to obtain testable samples as solid plugs (e. g., samples too soft/brittle). Tracks from left to right are 1) GR (black); 2) MD; 3) total Feldspar (orange), 4) Quartz (blue); 5) Anhydrite (yellow green); 6) Dolomite (green); 7) total Clay (light blue) 8) Other (light green); 9) Facies; 10) core porosity (2400 psi) (dark blue); 11) core permeability (2400 psi) (red). (p. 2-47) | |
| | N.D.A.C. § 43-05-01-05(1)(b)(2) | **N.D.A.C. § 43-05-01-05(1)(b)**<br>(2) A geologic and hydrogeologic evaluation of the facility area, including an evaluation of all existing information on all geologic strata overlying the storage reservoir, including the immediate caprock containment characteristics and all subsurface zones to be used for monitoring. The evaluation must include any available geophysical data and assessments of any regional tectonic activity, local seismicity and regional or local fault zones, and a comprehensive description of local and regional structural or stratigraphic features. The evaluation must describe the storage reservoir's mechanisms of geologic confinement, including rock properties, regional pressure gradients, structural | d. A description of the storage reservoir's mechanisms of geologic confinement characteristics with regard to preventing migration of carbon dioxide beyond the proposed storage reservoir, including:<br>Rock properties<br>Regional pressure gradients<br>Adsorption processes | ***2.2.2.3 Formation Temperature and Pressure*** (p. 2-9)<br>Temperature measurements from Archie Erickson 2 were used to derive a temperature gradient for the proposed injection site (Table 2-2b). In combination with depth, the temperature property was used primarily to inform predictive simulation inputs and assumptions. Temperature data were also used as inputs for geochemical modeling.<br><br>Formation pressure testing at Archie Erickson 2 was performed with the SLB (formerly Schlumberger) MDT (modular formation dynamics tester) tool. The MDT tool's formation pressure measurements from the Broom Creek Formation are included in Table 2-3. The calculated pressure gradients were used to model formation pressure profiles for use in the numerical simulations of $CO_2$ injection.<br><br>**Table 2-1b. Description of Archie Erickson 2 Temperature Measurements and Calculated Temperature Gradients**<br>**Formation** \| **Sensor Depth MD, ft** \| **Sensor Depth TVD, ft** \| **Temperature, °F**<br>Opeche/Spearfish \| 5802.45 \| 5802.37 \| –*<br>Broom Creek \| 5933.99 \| 5933.90 \| 123.86<br>5958.29 \| 5958.20 \| 126.25<br>6034.03 \| 6033.92 \| 128.20<br>6068.39 \| 6068.28 \| 129.78<br>Mean Broom Creek Temperature, °F \| 127.02<br>Broom Creek Temperature Gradient, °F/ft \| 0.015**<br>* Dry test. Temperature measurement is unreliable because it was impacted by tool temperature rather than fluid.<br>** The temperature gradient is an average of the measured temperature minus the average annual surface temperature (40° F), divided by the associated test depth.<br><br>**Table 2-3. Description of Archie Erickson 2 Well Formation Pressure Measurements and Calculated Pressure Gradients**<br>**Formation** \| **Sensor Depth MD, ft** \| **Sensor Depth TVD, ft** \| **Sensor Formation Pressure, psia**<br>Opeche/Spearfish \| 5802.45 \| 5802.37 \| –* | **Table 2-2b.** Description of Archie Erickson 2 Temperature Measurements and Calculated Temperature Gradients (p. 2-9)<br><br>**Table 2-3.** Description of Archie Erickson 2 Formation Pressure Measurements and Calculated Pressure Gradients (p. 2-10) |

| Subject | N.D.C.C. / N.D.A.C. Reference | Requirement | Regulatory Summary | Storage Facility Permit Application (Section and Page Number; see main body for reference cited) | Figure/Table Number and Description (Page Number) |
|---|---|---|---|---|---|
| | | features, and adsorption characteristics with regard to the ability of that confinement to prevent migration of carbon dioxide beyond the proposed storage reservoir. The evaluation must also identify any productive existing or potential mineral zones occurring within the facility area and any underground sources of drinking water in the facility area and within one mile [1.61 kilometers] of its outside boundary. The evaluation must include exhibits and plan view maps showing the following: | | Broom Creek 5933.99 5933.90 2842.83<br>5958.29 5958.20 2854.14<br>6034.03 6033.92 2888.71<br>6068.39 6068.28 2904.57<br>Mean Broom Creek Pressure, psi 2872.56<br>Broom Creek Pressure Gradient, psi/ft 0.48*<br>* Dry test. No fluid was withdrawn because of low permeability.<br>** The pressure gradient is an average of the sensor-measured pressures minus standard atmospheric pressure at 14.7 psi, divided by the associated test depth.<br><br>***2.3.2 Mechanism of Geologic Confinement*** (p. 2-31)<br>For BK Fischer, the initial mechanism for geologic confinement of $CO_2$ injected into the Broom Creek Formation will be the upper confining formation (Opeche/Spearfish Formation), which will contain the initially buoyant $CO_2$ in the reservoir under the effects of relative permeability and capillary pressure. Lateral movement of the injected $CO_2$ will be restricted by residual gas trapping (relative permeability) and solubility trapping (dissolution of the $CO_2$ into the native formation brine), confining the $CO_2$ within the proposed storage reservoir. After injected $CO_2$ becomes dissolved in the formation brine, the brine density will increase. This higher-density brine will ultimately sink in the storage formation (convective mixing). Over a much longer period (>100 years), mineralization of the injected $CO_2$ will ensure long-term, permanent geologic confinement. Injected $CO_2$ is not expected to adsorb to any of the mineral constituents of the target formation; therefore, this process is not considered to be a viable trapping mechanism in this project.<br><br>***2.4.4.2 Core-Fracture Analysis*** (p. 2-48)<br>The fractures observed in the Opeche/Spearfish Formation were tectonic, vertical to subvertical, mainly closed, and cemented with anhydrite where the aperture ranges between 0.1 to 1.5 inches. The Amsden Formation was determined to be a nonfractured interval. A few discontinuous closed fractures were noted. The presence of stylolites was also noted in the dolomitic intervals of the Amsden Formation. | |
| | N.D.A.C. § 43-05-01-05(1)(b)(2)(g) | **N.D.A.C. § 43-05-01-05(1)(b)(2)**<br>(g) Identification of all structural spill points or stratigraphic discontinuities controlling the isolation of stored carbon dioxide and associated fluids within the storage reservoir; | e. Identification of all characteristics controlling the isolation of stored carbon dioxide and associated fluids within the storage reservoir, including:<br>Structural spill points<br>Stratigraphic discontinuities | *2.2.2.6 Seismic Survey* (p. 2-14)<br>A 208-square-mile 3D seismic survey was conducted from November 2021 to February 2022 south of Beulah, North Dakota (Figure 2-8). The Beulah 3D seismic data provided visualization of deep geologic formations at lateral-spatial intervals as short as 82.5 ft. Additionally, seismic data from nearby 3D surveys to the east, namely, the Center 3D and Minnkota 3D, and a connecting 2D line were used to interpret and evaluate the subsurface (Figure 2-8). The seismic data were used for assessment of the geologic structure and reservoir properties.<br><br>Data products generated from the interpretation of the Beulah 3D were used as inputs for the geologic model that was used to simulate migration of the $CO_2$ plume. The Beulah 3D seismic data and the Archie Erickson 2 well logs were used to interpret surfaces for the formations of interest within the survey area. These surfaces were converted to depth using the time-to-depth relationship derived from Archie Erickson 2, Milton Flemmer 1, and Slash Lazy H 5 dipole sonic logs. The depth-converted surfaces for the storage reservoir and upper and lower confining zones were used as inputs for the geologic model. Detailed information about the structure and varying thickness of the formations away from well control was derived from these surfaces. A prestack seismic inversion was generated from the 3D seismic data and well logs from the Milton Flemmer 1, Archie Erickson 2, and Slash Lazy H 5 stratigraphic test wells. Depth-converted surfaces and poststack seismic inversion results from the Center 3D and Minnkota 3D were also used as inputs for the geologic model.<br><br>Interpretation of the 3D seismic data suggests there are no major stratigraphic pinch-outs or structural features with associated spill points (e.g., folds, domes, or fault traps) in BK Fischer. No structural features, faults, or discontinuities that would cause a concern about seal integrity in the strata above the Broom Creek Formation extending to the deepest USDW, the Fox Hills Formation, were observed in the 3D seismic data in BK Fischer.<br><br>***2.3.2 Mechanism of Geologic Confinement*** (p. 2-31)<br>*See discussion above under 2.3.2 Mechanism of Geologic Confinement* | **Figure 2-8.** Map showing the 2D and 3D seismic surveys used to characterize BK Fischer and inform the construction of the geologic model. The 3D seismic surveys from west to east are the Beulah 3D, Center 3D and Minnkota 3D. (p. 2-15)<br><br>**Figure 2-12.** Regional well log stratigraphic cross sections of the upper confining zone and injection zone flattened on the top of the Amsden Formation. Logs displayed in tracks from left to right are 1) SSTVD; 2) GR (black) |

| Subject | N.D.C.C. / N.D.A.C. Reference | Requirement | Regulatory Summary | Storage Facility Permit Application (Section and Page Number; see main body for reference cited) | Figure/Table Number and Description (Page Number) |
|---|---|---|---|---|---|
| | | | | | and caliper (dark blue); 3) MD;<br>4) NEUT (blue) and bulk density (green); and 5) facies. The different depth scales are used between A-A' and B-B' for image display purposes. Cross section is scaled in SSTVD.<br>(p. 2-20)<br><br>**Figure 2-13.** Regional well log cross sections showing the structure of the upper confining zone and injection zone. Logs displayed in tracks from left to right are 1) SSTVD, 2) GR (black) and caliper (dark blue), 3) MD, 4) NEUT (blue) and bulk density (green), and 5) facies. The different depth scales are used between A-A' and B-B' for image display purposes. Cross section is scaled in SSTVD.<br>(p. 2-21)<br><br>**Figure 2-14.** Structure map of the Broom Creek Formation in the simulation model referenced in feet below mean sea level. A convergent interpolation gridding algorithm was used with well formation tops, 3D seismic, and 2D seismic in the creation of this map. (p. 2-22)<br><br>**Figure 2-15**. Cross section of the BK Fischer storage complex from the geologic model showing facies distribution in the Broom Creek Formation. Depths are referenced as feet below mean sea level. Geologic model |

| Subject | N.D.C.C. / N.D.A.C. Reference | Requirement | Regulatory Summary | Storage Facility Permit Application (Section and Page Number; see main body for reference cited) | Figure/Table Number and Description (Page Number) |
|---|---|---|---|---|---|
| | | | | | extent is displayed by the blue box in the inset map in the upper-left corner. (p.2-23) |
| | N.D.A.C. § 43-05-01-05(1)(b)(2)(c) | **N.D.A.C. § 43-05-01-05(1)(b)(2)** (c) Any regional or local faulting; | f. Any regional or local faulting; | **2.5 Faults, Fractures, and Seismic Activity** (First two paragraphs on p. 2-64) This section discusses local and regional faults including a regional structural feature, the Stanton Fault and interpreted basement faults. In the area of review (AOR), none of these known or suspected faults or fractures has sufficient permeability and vertical extent to allow fluid movement out of the storage reservoir. The absence of transmissive faults is supported by fluid sample analysis results from Archie Erickson 2 that suggest the injection interval, the Broom Creek Formation (115,000 mg/L), is isolated from the next permeable interval, the Inyan Kara Formation (3340 mg/L) (Appendix A).<br><br>This section also discusses the seismic history of North Dakota and the low probability that seismic activity will interfere with containment. | **Figure 2-44.** Location of major faults, tectonic boundaries, and earthquakes in North Dakota (modified from Anderson, 2016). The black dots indicate earthquake locations listed in Table 2-12. (p. 2-71) |
| | N.D.A.C. § 43-05-01-05(1)(b)(2)(j) | **N.D.A.C. § 43-05-01-05(1)(b)(2)** (j) The location, orientation, and properties of known or suspected faults and fractures that may transect the confining zone in the area of review, and a determination that they would not interfere with containment; | g. Properties of known or suspected faults and fractures that may transect the confining zone in the area of review:<br>Location<br>Orientation<br>Determination of the probability that they would interfere with containment | *See discussion above under 2.5 Faults, Fractures, and Seismic Activity (p. 2-64)* | **Figure 2-44.** Location of major faults, tectonic boundaries, and earthquakes in North Dakota (modified from Anderson, 2016). The black dots indicate earthquake locations listed in Table 2-12. (p. 2-71) |
| | N.D.A.C. §§ 43-05-01-05(1)(b)(2) and (1)(b)(2)(m) | **N.D.A.C. § 43-05-01-05(1)(b)** (2) A geologic and hydrogeologic evaluation of the facility area, including an evaluation of all existing information on all geologic strata overlying the storage reservoir, including the immediate caprock containment characteristics and all subsurface zones to be used for monitoring. The evaluation must include any available geophysical data and assessments of any regional tectonic activity, local seismicity and regional or local fault zones, and a comprehensive description of local and regional structural or | h. Information on any regional tectonic activity, and the seismic history, including:<br>The presence and depth of seismic sources;<br>Determination of the probability that seismicity would interfere with containment; | ***2.5.4 Seismic Activity*** (p. 2-70) The Williston Basin is a tectonically stable region of the North American Craton. Zhou and others (2008) summarize that "the Williston Basin as a whole is in an overburden compressive stress regime," which could be attributed to the general stability of the North American Craton. Interpreted structural features associated with tectonic activity in the Williston Basin in North Dakota include anticlinal and synclinal structures in the western half of the state, lineaments associated with Precambrian basement block boundaries, and faults (North Dakota Industrial Commission, 2022).<br><br>Between 1870 and 2015, 13 earthquakes have been detected within the North Dakota portion of the Williston Basin (Table 2-12) (Anderson, 2016). Of these 13 earthquakes, only three have occurred along one of the eight Precambrian basement faults interpreted by Anderson (2016) in the North Dakota portion of the Williston Basin (Figure 2-44). The earthquake recorded closest to the project area occurred in 1927, located approximately 20 miles southwest of the BK Fischer 1 injection well, near Hebron, North Dakota (Table 2-12). The magnitude of this earthquake is estimated to have been 3.2.<br><br>**Table 2-12. Summary of Earthquakes Reported to Have Occurred in North Dakota (from Anderson, 2016)**<br>**Map Label** / **Date** / **Magnitude** / **Depth, miles** / **Longitude** / **Latitude** / **City or Vicinity of Earthquake** / **Distance to TB Leingang 1 well, miles**<br>A / Sept. 28, 2012 / 3.3 / 0.4* / −103.48 / 48.01 / Southeast of Williston / 109.59<br>B / June 14, 2010 / 1.4 / 3.1 / −103.96 / 46.03 / Boxelder Creek / 126.30<br>C / March 21, 2010 / 2.5 / 3.1 / −103.98 / 47.98 / Buford / 123.40<br>D / Aug. 30, 2009 / 1.9 / 3.1 / −102.38 / 47.63 / Ft. Berthold southwest / 50.89<br>E / Jan. 3, 2009 / 1.5 / 8.3 / −103.95 / 48.36 / Grenora / 137.75 | **Table 2-12.** Summary of Seismic Events Reported to Have Occurred in North Dakota (from Anderson, 2016) (p. 2-71)<br><br>**Figure 2-44.** Location of major faults, tectonic boundaries, and earthquakes in North Dakota (modified from Anderson, 2016). The black dots indicate earthquake locations listed in Table 2-12. (p. 2-72)<br><br>**Figure 2-45**. Probabilistic map showing how often scientists expect damaging earthquake shaking around the United States (U.S. |

| Subject | N.D.C.C. / N.D.A.C. Reference | Requirement | Regulatory Summary | Storage Facility Permit Application (Section and Page Number; see main body for reference cited) | Figure/Table Number and Description (Page Number) |
|---|---|---|---|---|---|

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | stratigraphic features. The evaluation must describe the storage reservoir's mechanisms of geologic confinement, including rock properties, regional pressure gradients, structural features, and adsorption characteristics with regard to the ability of that confinement to prevent migration of carbon dioxide beyond the proposed storage reservoir. The evaluation must also identify any productive existing or potential mineral zones occurring within the facility area and any underground sources of drinking water in the facility area and within one mile [1.61 kilometers] of its outside boundary. The evaluation must include exhibits and plan view maps showing the following:<br><br>**N.D.A.C. § 43-05-01-05(1)(b)(2)**<br>(m) Information on the seismic history, including the presence and depth of seismic sources and a determination that the seismicity would not interfere with containment; | | F | Nov. 15, 2008 | 2.6 | 11.2 | −100.04 | 47.46 | Goodrich | 86.76 | Geological Survey, 2019). The map shows there is a low probability of damaging earthquake events occurring in North Dakota. (p. 2-73) |
| | | | | G | Nov. 11, 1998 | 3.5 | 3.1 | −104.03 | 48.55 | Grenora | 149.33 | |
| | | | | H | March 9, 1982 | 3.3 | 11.2 | −104.03 | 48.51 | Grenora | 147.41 | |
| | | | | I | July 8, 1968 | 4.4 | 20.5 | −100.74 | 46.59 | Huff | 56.63 | |
| | | | | J | May 13, 1947 | 3.7** | U*** | −100.90 | 46.00 | Selfridge | 81.94 | |
| | | | | K | Oct. 26, 1946 | 3.7** | U | −103.70 | 48.20 | Williston | 121.84 | |
| | | | | L | April 29, 1927 | 3.2** | U | −102.10 | 46.90 | Hebron | 19.15 | |
| | | | | M | Aug. 8, 1915 | 3.7** | U | −103.60 | 48.20 | Williston | 118.35 | |
| | | | | * Estimated depth.<br>** Magnitude estimated from reported modified Mercalli intensity (MMI) value.<br>*** Unknown.<br><br>Studies completed by the U.S. Geological Survey (USGS) indicate there is a low probability of earthquake events occurring in North Dakota that would cause damage to infrastructure, with less than two damaging earthquake events predicted to occur over a 10,000-year time period (Figure 2-45) (U.S. Geological Survey, 2019). A 1-year seismic forecast (including both induced and natural seismic events) released by USGS in 2016 determined North Dakota has very low risk (less than 1% chance) of experiencing any seismic events resulting in damage (U.S. Geological Survey, 2016). Frohlich and others (2015) states there is very little seismic activity near injection wells in the Williston Basin. They noted only two historic earthquake events in North Dakota that could be associated with nearby oil and gas activities. Additionally, no earthquakes occurring along the Stanton Fault have been reported. This indicates stable geologic conditions in the region surrounding the potential injection site. The results from the USGS studies, the low risk of induced seismicity due to the basin stress regime, and the depth of the target reservoir in proximity to the basement and vertical extents of the interpreted faults suggest the probability that seismicity interfering with $CO_2$ containment is low. | | | | | | | | | | |
| | N.D.A.C. §§ 43-05-01-05(1)(b)(2) and (1)(b)(2)(n) | **N.D.A.C. § 43-05-01-05(1)(b)**<br>(2) A geologic and hydrogeologic evaluation of the facility area, including an evaluation of all existing information on all geologic strata overlying the storage reservoir, including the immediate caprock containment characteristics and all | i. Illustration of the regional geology, hydrogeology, and the geologic structure of the storage reservoir area:<br>Geologic maps<br>Topographic maps<br>Cross sections | **2.1 Overview of Project Area Geology** (p. 2-1)<br>*See discussion above under 2.1 Overview of Project Area Geology*<br><br>***4.4.3 Hydrology of USDW Formations*** (p. 4-13)<br>The aquifers of the Fox Hills and Hell Creek Formations are hydraulically connected and function as a single confined aquifer system (Fischer, 2013). The Bacon Creek Member of the Hell Creek Formation forms a regional aquitard for the Fox Hills–Hell Creek aquifer system, isolating it from the overlying aquifer layers. Recharge for the Fox Hills–Hell Creek aquifer system occurs in southwestern North Dakota along the Cedar Creek Anticline and discharges into overlying strata under central and eastern North Dakota (Fischer, 2013). Flow through the AOR is to the east (Figure 4-8).<br><br>Water sampled from the Fox Hills Formation is a sodium bicarbonate type with a total dissolved solids (TDS) content of approximately 1500–1600 ppm. Previous analysis of Fox Hills Formation water has also noted high levels of fluoride in excess of 5 mg/L (Trapp and Croft, 1975) | **Figure 2-1.** Topographic map showing well locations and BK Fischer in relation to the city of Beulah, North Dakota. (p. 2-2)<br><br>**Figure 2-9.** Broom Creek Formation in North Dakota. The area within the green dashed line shows the extent originally proposed by |

| Subject | N.D.C.C. / N.D.A.C. Reference | Requirement | Regulatory Summary | Storage Facility Permit Application (Section and Page Number; see main body for reference cited) | Figure/Table Number and Description (Page Number) |
|---|---|---|---|---|---|
| | | subsurface zones to be used for monitoring. The evaluation must include any available geophysical data and assessments of any regional tectonic activity, local seismicity and regional or local fault zones, and a comprehensive description of local and regional structural or stratigraphic features. The evaluation must describe the storage reservoir's mechanisms of geologic confinement, including rock properties, regional pressure gradients, structural features, and adsorption characteristics with regard to the ability of that confinement to prevent migration of carbon dioxide beyond the proposed storage reservoir. The evaluation must also identify any productive existing or potential mineral zones occurring within the facility area and any underground sources of drinking water in the facility area and within one mile [1.61 kilometers] of its outside boundary. The evaluation must include exhibits and plan view maps showing the following:<br><br>**N.D.A.C. § 43-05-01-05(1)(b)(2)**<br>(n) Geologic and topographic maps and cross sections illustrating regional geology, hydrogeology, and the geologic structure of the facility area; and | | As such, the Fox Hills–Hell Creek system is typically not used as a primary source of drinking water. However, it is occasionally produced for irrigation and/or livestock watering.<br><br>Multiple other freshwater-bearing units, primarily of Tertiary age, overlie the Fox Hills–Hell Creek aquifer system in the AOR. A cross section of these formations is presented in Figure 4-9. The upper formations are generally used for domestic and agricultural purposes. The Cannonball and Tongue River Formations comprise the major aquifer units of the Fort Union Group, which overlies the Hell Creek Formation. The Cannonball Formation consists of interbedded sandstone, siltstone, claystone, and thin lignite beds of marine origin. The Tongue River Formation is predominantly sandstone interbedded with siltstone, claystone, lignite, and occasional carbonaceous shales. The basal sandstone member of the Tongue River is persistent and a reliable source of groundwater in the region. The thickness of this basal sand ranges from approximately 200 to 500 ft and it directly underlies surficial glacial deposits in the AOR. Tongue River groundwaters are generally a sodium bicarbonate type with a TDS of approximately 1000 ppm (Croft, 1973).<br><br>The Sentinel Butte Formation, a silty fine-to-medium-grained sandstone with claystone and lignite interbeds, overlies the Tongue River Formation in western portions of the AOR. The Sentinel Butte Formation is predominantly sandstone with lignite interbeds. While the Sentinel Butte Formation is another important source of groundwater in the region, primarily to the west of the AOR, the Sentinel Butte Formation is not a source of groundwater within the AOR. TDS in the Sentinel Butte Formation range from approximately 400 to 1000 ppm (Croft, 1973). Above these are undifferentiated alluvial and glacial drift Quaternary aquifer layers. | Rygh (1990), and the area outside of the green dashed line has been modified based on new well control. (p. 2-16)<br><br>**Figure 2-12.** Regional well log stratigraphic cross sections of the upper confining zone and injection zone flattened on the top of the Amsden Formation. Logs displayed in tracks from left to right are 1) SSTVD; 2) GR (black) and caliper (dark blue); 3) MD; 4) NEUT (blue) and bulk density (green); and 5) facies. The different depth scales are used between A-A' and B-B' for image display purposes. Cross section is scaled in SSTVD. (p. 2-20)<br><br>**Figure 2-13.** Regional well log cross sections showing the structure of the upper confining zone and injection zone. Logs displayed in tracks from left to right are 1) SSTVD, 2) GR (black) and caliper (dark blue), 3) MD, 4) NEUT (blue) and bulk density (green), and 5) facies. The different depth scales are used between A-A' and B-B' for image display purposes. Cross section is scaled in SSTVD. (p. 2-21)<br><br>**Figure 2-15.** Cross section of the BK Fischer storage complex from the geologic model showing facies distribution in the Broom Creek Formation. |

| Subject | N.D.C.C. / N.D.A.C. Reference | Requirement | Regulatory Summary | Storage Facility Permit Application (Section and Page Number; see main body for reference cited) | Figure/Table Number and Description (Page Number) |
|---|---|---|---|---|---|
| | | | | | Depths are referenced as feet below mean sea level. Geologic model extent is displayed by the blue box in the inset map in the upper-left corner. (p. 2-23)<br><br>**Figure 4-8.** Potentiometric surface of the Fox Hills–Hell Creek aquifer system shown in feet of hydraulic head above sea level. Flow is to the east through the AOR in Mercer, Oliver, and Morton Counties (modified from Fischer, 2013). (p. 4-14)<br><br>**Figure 4-9.** West-east cross section of the major aquifer layers in Oliver County. Wells used in the cross section are shown in the inset map and labeled with corresponding well names (NDIC File No. 4942 is Raymond Jensen 1-34). (p. 4-15) |
| | N.D.A.C. § 43-05-01-05(1)(b)(2)(d) | **N.D.A.C. § 43-05-01-05(1)(b)(2)**<br>(d) An isopach map of the storage reservoirs; | j. An isopach map of the storage reservoir(s); | See Figure 2-10a on p. 2-17 and Figure 2-10b on p. 2-18 | **Figure 2-10a**. Isopach map of the Broom Creek Formation in the simulation model area. A convergent interpolation gridding algorithm was used with well formation tops, 3D seismic, and 2D seismic in the creation of this map. (p. 2-17)<br><br>**Figure 2-10b**. Isopach map of the Broom Creek Formation focused around the three stratigraphic and reservoir-monitoring wells. (p. 2-18) |
| | N.D.A.C. § 43-05-01-05(1)(b)(2)(e) | **N.D.A.C. § 43-05-01-05(1)(b)(2)** | k. An isopach map of the primary containment barrier for the storage reservoir; | See Figure 2-21 on p. 2-34 | **Figure 2-21.** Isopach map of the Opeche/Spearfish |

| Subject | N.D.C.C. / N.D.A.C. Reference | Requirement | Regulatory Summary | Storage Facility Permit Application (Section and Page Number; see main body for reference cited) | Figure/Table Number and Description (Page Number) |
|---|---|---|---|---|---|
| | | (e)An isopach map of the primary and any secondary containment barrier for the storage reservoir; | | | Formation in the simulation model area. A convergent interpolation gridding algorithm was used with well formation tops, 3D seismic, and 2D seismic in creation of this map. (p. 2-34) |
| | | | l. An isopach map of the secondary containment barrier for the storage reservoir; | See Figure 2-25 on p. 2-40 and Figure 2-26 on p. 2-41 | **Figure 2-25.** Isopach map of the interval between the top of the Broom Creek Formation and the top of the Swift Formation. This interval represents the primary and secondary confinement zones. A convergent interpolation gridding algorithm was used with well formation tops, 3D seismic, and 2D seismic in creation of this map. (p. 2-40)<br><br>**Figure 2-26.** Isopach map of the interval between the top of the Inyan Kara Formation and the top of the Pierre Formation. This interval represents the tertiary confinement zone. A convergent interpolation gridding algorithm was used with well formation tops, 3D seismic, and 2D seismic in creation of this map. (p. 2-41) |
| | N.D.A.C. § 43-05-01-05(1)(b)(2)(f) | **N.D.A.C. § 43-05-01-05(1)(b)(2)**<br>(f) A structure map of the top and base of the storage reservoirs; | m. A structure map of the top of the storage formation; | See Figure 2-14 on p. 2-22 and Figure 2-20 on page 2-33. | **Figure 2-14.** Structure map of the Broom Creek Formation in the simulation model referenced in feet below mean sea level. A convergent interpolation gridding algorithm was used with well formation tops, 3D seismic, and 2D seismic in the creation of this map. (p. 2-22) |

| Subject | N.D.C.C. / N.D.A.C. Reference | Requirement | Regulatory Summary | Storage Facility Permit Application (Section and Page Number; see main body for reference cited) | Figure/Table Number and Description (Page Number) |
|---|---|---|---|---|---|
| | | | | | **Figure 2-20**. Structure map of the Opeche/Spearfish Formation across the simulation model area in feet below mean sea level. A convergent interpolation gridding algorithm was used with well formation tops, 3D seismic, and 2D seismic in creation of this map. (p. 2-33) |
| | | | n. A structure map of the base of the storage formation; | See Figure 2-27 on p. 2-42 | **Figure 2-27.** Structure map of the Amsden Formation across the simulation model area in feet below mean sea level. A convergent interpolation gridding algorithm was used with well formation tops, 3D seismic, and 2D seismic in creation of this map. (p. 2-42) |
| | N.D.A.C. § 43-05-01-05(1)(b)(2)(i) | **N.D.A.C. § 43-05-01-05(1)(b)(2)**<br>(i) Structural and stratigraphic cross sections that describe the geologic conditions at the storage reservoir; | o. Structural cross sections that describe the geologic conditions at the storage reservoir; | See Figure 2-13 on p. 2-21 and Figure 2-15 on p. 2-23. | **Figure 2-13.** Regional well log cross sections showing the structure of the upper confining zone and injection zone. Logs displayed in tracks from left to right are 1) SSTVD, 2) GR (black) and caliper (dark blue), 3) MD, 4) NEUT (blue) and bulk density (green), and 5) facies. The different depth scales are used between A-A' and B-B' for image display purposes. Cross section is scaled in SSTVD. (p. 2-21)<br><br>**Figure 2-15.** Cross section of the BK Fischer storage complex from the geologic model showing facies distribution in the Broom Creek Formation. Depths are referenced as feet below mean sea level. Geologic model |

| Subject | N.D.C.C. / N.D.A.C. Reference | Requirement | Regulatory Summary | Storage Facility Permit Application (Section and Page Number; see main body for reference cited) | Figure/Table Number and Description (Page Number) |
|---|---|---|---|---|---|
| | | | | | extent is displayed by the blue box in the inset map in the upper-left corner. (p. 2-23) |
| | | | p. Stratigraphic cross sections that describe the geologic conditions at the storage reservoir; | See Figure 2-12 on p. 2-20 | **Figure 2-12.** Regional well log stratigraphic cross sections of the upper confining zone and injection zone flattened on the top of the Amsden Formation. Logs displayed in tracks from left to right are 1) SSTVD; 2) GR (black) and caliper (dark blue); 3) MD; 4) NEUT (blue) and bulk density (green); and 5) facies. The different depth scales are used between A-A' and B-B' for image display purposes. Cross section is scaled in SSTVD. (p. 2-20) |
| | N.D.A.C. § 43-05-01-05(1)(b)(2)(h) | **N.D.A.C. § 43-05-01-05(1)(b)(2)** (h) Evaluation of the pressure front and the potential impact on underground sources of drinking water, if any; | q. Evaluation of the pressure front and the potential impact on underground sources of drinking water, if any; | **3.4 Simulation Results** (p. 3-16) The maximum WHP constraint of 2100 psi was one of the constraints on the injection wells for the entire 20 years of simulated injection. The maximum BHP constraint of 3633 psi for BK Fischer 1 and 3624 psi for BK Fischer 2 (equal to 90% of the product when multiplying the fracture gradient by top perforation depth) was approached near years 13 and 5 of injection, respectively (Figure 3-10), translating to a cumulative combined 98.3 MMt of $CO_2$ injected into the Broom Creek Formation by BK Fischer 1 and 2 (Figure 3-11). Simulations of $CO_2$ injection with the given well constraints, listed in Table 3-4, predicted the injection rate would decline from a maximum initial injection rate of approximately 4.02 MMt/yr per well to a final rate of approximately 2.19 and 0.73 MMt/yr per well (with a 20-year combined average of approximately 3.07 and 1.85 MMt/yr per injection well, respectively) (Figure 3-12).<br><br>WHP and BHP responses depend on several factors, including predicted injection rate, injection tubing parameters (tubing internal radius and relative roughness), and surface injection temperature. For the designed tubing size of 7 in., the wells are operated at the maximum WHP of 2100 psi during the 20-year injection period (Figure 3-10).<br><br>During and after injection, supercritical $CO_2$ (free-phase $CO_2$) accounts for the majority of $CO_2$ observed in the modeled pore space. Throughout the injection operation, a portion of the free-phase $CO_2$ is trapped in the pore space through a process known as residual trapping. Residual trapping can occur as a function of low $CO_2$ saturation and inability to flow under the effects of relative permeability. $CO_2$ also dissolves into the formation brine throughout injection operations (and continues afterward), although the rate of dissolution slows over time. The free-phase $CO_2$ transitions to either residually trapped or dissolved $CO_2$ during the postinjection period, resulting in a decline in the mass of free-phase $CO_2$. The relative portions of supercritical, trapped, and dissolved $CO_2$ can be tracked throughout the duration of the simulation (Figure 3-13).<br><br>The pressure fronts (Figures 3-14a–d) show the distribution of average pressure increase throughout the Broom Creek Formation after 5, 10, and 20 years of injection as well as 10 years postinjection. A maximum increase of approximately 1024 psi was estimated in the near-wellbore area at the end of the 20-year injection period (Figure 3-14c).<br><br>***6.1.1 Pre- and Postinjection Pressure Differential*** (p. 6-4) | **Figure 3-14a.** Average pressure increase within the Broom Creek Formation after 5 years of simulated $CO_2$ injection operation. (p. 3-20)<br><br>**Figure 3-14b.** Average pressure increase within the Broom Creek Formation after 10 years of simulated $CO_2$ injection operation. (p. 3-21)<br><br>**Figure 3-14c.** Average pressure increase within the Broom Creek Formation after 20 years of simulated $CO_2$ injection operation (end of injection operation). (p. 3-22) |

| Subject | N.D.C.C. / N.D.A.C. Reference | Requirement | Regulatory Summary | Storage Facility Permit Application (Section and Page Number; see main body for reference cited) | Figure/Table Number and Description (Page Number) |
|---|---|---|---|---|---|
| | | | | Model simulations were performed to predict the change in pressure in the Broom Creek Formation during and after the cessation of $CO_2$ injection. The simulations were conducted for 20 years of $CO_2$ injection in the Broom Creek Formation at an average total rate of 4.92 MMt/yr, followed by a postinjection period of 10 years.<br><br>Figure 6-1 illustrates the predicted pressure differential at the cessation of $CO_2$ injection. At the time that $CO_2$ injection ceases, the models predict an increase in the pressure of the reservoir, with a maximum pressure differential of 823 psi at the BK Fischer well pad. There is insufficient pressure increase caused by $CO_2$ injection to move more than 1 $m^3$ of formation fluids from the storage reservoir to the lowest USDW. The details of the pressure evaluation are provided as part of the AOR delineation discussion within Section 3.0 of this application.<br><br>Figure 6-2 illustrates the predicted gradual pressure decrease in the storage reservoir, over a 10-year period following the cessation of $CO_2$ injection. The pressure at the BK Fischer $CO_2$ injection well pad at the end of the 10-year period is anticipated to decrease 400–500 psi as compared to the pressure in the storage reservoir at the time $CO_2$ injection ends. This trend of decreasing pressure is anticipated to continue over time until the pressure of the storage reservoir approaches the original reservoir pressure conditions. | **Figure 3-14d.** Predicted decrease in pressure in the storage reservoir over a 10-year period following the cessation of $CO_2$ injection. (p. 3-23)<br><br>**Figure 6-1.** Predicted pressure increase in the storage reservoir following 20 years of injection of an average 4.92 MMt/yr of $CO_2$. (p. 6-5)<br><br>**Figure 6-2.** Predicted decrease in pressure in the storage reservoir over a 10-year period following the cessation of $CO_2$ injection. (p. 6-6) |
| | N.D.A.C. § 43-05-01-05(1)(b)(2)(l) | **N.D.A.C. § 43-05-01-05(1)(b)(2)**<br>(l) Geomechanical information on fractures, stress, ductility, rock strength, and in situ fluid pressures within the confining zone. The confining zone must be free of transmissive faults or fractures and of sufficient areal extent and integrity to contain the injected carbon dioxide stream; | r. Geomechanical information on the confining zone. The confining zone must be free of transmissive faults or fractures and of sufficient areal extent and integrity to contain the injected carbon dioxide:<br>Fractures<br>Stress<br>Ductility<br>Rock strength<br>In situ fluid pressure | ***2.4.4 Geomechanical Information of Confining Zone (p. 2-48)***<br><br>*2.4.4.1 Fracture Analysis*<br>Fractures within the overlying confining zone (the Opeche/Spearfish Formation) and the underlying confining zone (Amsden Formation) were assessed during the description of the Archie Erickson 2 core. Observable fractures were categorized by attributes including morphology, orientation, aperture, and origin. Secondly, natural fractures and in situ stress were assessed through the interpretation of the image log acquired during the drilling of Archie Erickson 2 well.<br><br>*2.4.4.2 Core-Fracture Analysis*<br>The fractures observed in the Opeche/Spearfish Formation were tectonic, vertical to subvertical, mainly closed, and cemented with anhydrite where the aperture ranges between 0.1 to 1.5 inches. The Amsden Formation was determined to be a nonfractured interval. A few discontinuous closed fractures were noted. The presence of stylolites was also noted in the dolomitic intervals of the Amsden Formation.<br><br>*2.4.4.3 Borehole Image Fracture Analysis*<br>Natural fractures and in situ stresses were assessed through the interpretation of borehole image log, dipole shear sonic slowness (DTS), and DTC logs acquired during the drilling of the Archie Erickson 2 well. Borehole image logs provide a 360-degree image of the formation of interest and are oriented to provide an understanding of the general orientation of the observed features.<br><br>Fractures within Opeche/Spearfish Formation are primarily resistive fractures, mainly oriented NNE-SSW with the presence of other sets oriented ENE-WSW (Figure 2-32). They were commonly filled with anhydrite. A few conductive continuous and non-continuous fractures are highlighted. They are oriented N-S and NE-SW, respectively and they are generally filled with clay. One conductive partially resistive fracture is underlined, oriented NE-SW, and filled with quartz and clay. The fractures vary in orientation and exhibit horizontal, oblique, and vertical trends. The aperture varies from closed to millimeter-scale (Figure 2-33a, Figure 2-33b, and Figure 2-33c).<br><br>In addition, one minor fault was present in the Opeche/Spearfish Formation at the depth of 5812 ft MD, and it is located around 33 feet above the top of Broom Creek Formation. Oriented ENE-WSW and dipping to the south with a dip angle equal to 68 degrees. This minor fault shows normal faulting with an offset of 0.09 ft (Figure 2-34). The analysis of the different attributes such as the fault's depth, length, strike, dip, offset, | **Figure 2-32.** Strike orientation per type of fracture that characterizes the Opeche/Spearfish Formation: conductive continuous fractures (blue), conductive noncontinuous fractures (teal), conductive partially resistive fractures (dark green), minor faults (lime green), resistive non-continuous fractures (yellow), resistive continuous fractures (orange). Colored dots represent the dip value for corresponding type of fracture and the dip azimuth of the fracture. (p. 2-49)<br><br>**Figure 2-33a.** Sedimentary and tectonic features in Opeche/Spearfish Formation observed on the borehole image log. |

| Subject | N.D.C.C. / N.D.A.C. Reference | Requirement | Regulatory Summary | Storage Facility Permit Application (Section and Page Number; see main body for reference cited) | Figure/Table Number and Description (Page Number) |
|---|---|---|---|---|---|
| | | | | and aperture indicate that the minor fault appears isolated and does not interact with any fracture network, and will not act as a conduit for fluid migration. No fractures were observed in the transition between the Opeche Formation and Broom Creek Formation.<br><br>The Amsden Formation is considered to be a nonfractured interval; however, two (02) resistive non-continuous fractures and two (02) conductive non-continuous fractures are highlighted with the presence of horizontal compaction features (stylolites). The fractures are oriented NW-SE, and WNW-ESE (Figure 2-35). The fractures vary in orientation and exhibit oblique and vertical trends. The aperture varies from closed to millimeter-scale (Figures 2-36, Figure 2-37a, Figure 2-37b, and Figure 2-37c). No microfaults were found in the Amsden interval. No fractures were observed in the transition between the Broom Creek Formation and Amsden Formation.<br><br>Drilling-induced fractures (DIF) were identified only in the Mowry Formation and oriented NE–SW (Figure 2-38). The tensile fractures might indicate that the maximum horizontal stress (SHmax) has an orientation of N045°.<br><br>*2.4.4.4 Stress, Ductility and Rock Strength (p.2-60)*<br>The dynamic elastic properties (dynamic Young's modulus and Poisson's ratio) for the Opeche/Spearfish, Broom Creek, and Amsden Formations were calculated by using DTC, DTS and density log collected from Archie Erickson 2. These dynamic elastic properties were converted to static elastic properties with calibrations of geomechanical laboratory core measurements.<br><br>A 1D MEM in the Broom Creek section was built for Archie Erickson 2 using the available wireline data such as GR logs, caliper logs, density logs (RHOB), dipole sonic logs (DTC, DTS), and image logs. The 1D MEM consists of pore pressure, the vertical in situ stress (Sv, overburden), minimum and maximum horizontal in situ stresses (Shmin, SHmax), static and dynamic Young's moduli (E), static and dynamic Poisson's ratio (v), Bulk modulus (K), shear modulus (G), unconfined compressive strength (UCS), tensile strength (To), and friction angle (FA or FANG) (Tables 2-9 and 2-10).<br><br>Sv is one of the three principal stresses that act upon a rock. It is defined as the stress applied by the overlaying lithostatic column, at the depth (z), and is estimated using the Plumb and others (1991) equation. Sv is calculated using the RHOB log as an input. For the pore pressure, porosity proxy logging data based on a normal compaction trendline concept were used (for hydraulic static pressure, 1.03 g/cm$^3$ = 0.44675 psi/ft = 8.6 ppg). For the Broom Creek Formation, the MDT data taken in sand bodies show pore pressure equivalent to 9.2 ppg equivalent to 0.48 psi/ft, which is slightly overpressured. The pore pressure estimation honored the MDT measurement. Dynamic to static Young's modulus function used a linear conversion where a dynamic Young's modulus log was calculated from the available sonic (DTC, DTS) and density log. For Poisson's ratio, dynamic and static parameters are assumed to be equal. The Biot factor was estimated using the formula Biot's factor =1- (K0 / Kmineral); where K0 is the bulk modulus of the porous medium and Kmineral is the bulk modulus of solid parts of the porous medium. It is a function of mineral volumes and minerals' bulk modulus. For rock properties, Young's modulus, and Poisson's ratio, were estimated from well logs and were calibrated with the triaxial core laboratory measurements (Figure 2-39).<br><br>Unconfined compressive strength (UCS) was calculated using empirical correlations between UCS and DTC for shale, sandstone, and dolostone: the Chang (2006) method was used for shale formation, the McNally (1987) method was used for sandstone formation, and Golubev and Rabinovich (1976) was used for dolostone formation. The tensile strength was assumed to be 10% of the calculated UCS. The friction angle (FA or FANG) was estimated using an empirical correlation between the internal angle of friction and DTC: Lal's approach (1999) was used to calculate the FA in the Opeche/Spearfish and Amsden Formations, and Weingarten and Perkins (1995) in Broom Creek Formation. Horizontal stresses (Shmin and SHmax) were estimated using the poroelastic equations (Plumb et al, 2000). The orientations of Shmin and SHmax were estimated with the help of image logs (Figure 2-38). The magnitude of Shmin was calibrated by the closure pressures which were measured with a mini-frac stress test. In addition, the 1D MEM shows that the stress regime observed in the Opeche/Spearfish, Broom Creek, and Amsden Formations is normal (Sv>SHmax>Shmin). The analysis of the pore pressure measured in the Broom Creek Formation attests that it could be considered an overpressured reservoir with a gradient of 0.48 psi/ft.<br><br>Triaxial test (static elastic properties), ultrasonic velocity (dynamic elastic properties), destructive test (compressive strength) at reservoir conditions, and pore volume compressibility (PVC) for reservoir samples were conducted on ten core samples acquired from the Opeche/Spearfish, Broom Creek, and Amsden Formations in Archie Erickson 2 well. These values were used to calibrate the static and dynamic Young's modulus and Poisson's ratio generated from well logs (Table 2-11). | The tracks from left to right are 1) MD; 2) formation; 3) HSGR, HCal; 4) borehole dynamic image log; 5) borehole static image log; 6) tectonic and sedimentary tadpole orientation in the interval between 5,602 and 5,691 ft MD. (p. 2-50)<br><br>**Figure 2-33b.** Sedimentary and tectonic features in Opeche/Spearfish Formation observed on the borehole image log. The tracks from left to right are 1) MD; 2) formation; 3) HSGR, HCal; 4) borehole dynamic image log; 5) borehole static image log; 6) tectonic and sedimentary tadpole orientation in the interval between 5,687 and 5,776 ft MD. (p. 2-51)<br><br>**Figure 2-33c.** Sedimentary and tectonic features in Opeche/Spearfish Formation observed on the borehole image log. The tracks from left to right are 1) MD; 2) formation; 3) HSGR, HCal; 4) borehole dynamic image log; 5) borehole static image log; 6) tectonic and sedimentary tadpole orientation in the interval between 5,768 and 5,858 ft MD. (p. 2-52)<br><br>**Figure 2-34.** Minor fault and other sedimentary and tectonic features in Opeche/Spearfish Formation observed on |

| Subject | N.D.C.C. / N.D.A.C. Reference | Requirement | Regulatory Summary | Storage Facility Permit Application (Section and Page Number; see main body for reference cited) | Figure/Table Number and Description (Page Number) |
|---|---|---|---|---|---|
| | | | | | the borehole image log. The tracks from left to right are 1) MD; 2) formation; 3) HSGR, HCal; 4) borehole dynamic image log; 5) borehole static image log; 6) tectonic and sedimentary tadpole orientation in the interval between 5,808.8 and 5,817.8 ft MD. (p. 2-53)<br><br>**Figure 2-35.** Strike orientation per type of fracture that characterizes the Amsden Formation: conductive non-continuous fractures (teal) and resistive non-continuous fractures (green). Colored dots represent the dip value for the corresponding type of fracture and the dip azimuth of the fracture. (p. 2-54)<br><br>**Figure 2-36.** Sedimentary and tectonic features in Amsden Formation observed on the borehole image log. The tracks from left to right show 1) MD; 2) formation; 3) HSGR, HCal; 4) borehole dynamic image log; 5) borehole static image log; 6) tectonic and sedimentary tadpole orientation in the interval between 6,128 and 6,217 ft MD. (p. 2-55)<br><br>**Figure 2-37a**. Sedimentary and tectonic features in Amsden Formation observed on the borehole image log. The tracks from left to right show: 1) MD; 2) |

| Subject | N.D.C.C. / N.D.A.C. Reference | Requirement | Regulatory Summary | Storage Facility Permit Application (Section and Page Number; see main body for reference cited) | Figure/Table Number and Description (Page Number) |
|---|---|---|---|---|---|
| | | | | | formation; 3) HSGR, HCal; 4) borehole dynamic image log; 5) borehole static image log; 6) tectonic and sedimentary tadpole orientation in the interval between 6,206 and 6,296 ft MD. (p. 2-56)<br><br>**Figure 2-37b.** Sedimentary and tectonic features in Amsden Formation observed on the borehole image log. The tracks from left to right show: 1) MD; 2) formation; 3) HSGR, HCal; 4) borehole dynamic image log; 5) borehole static image log; 6) tectonic and sedimentary tadpole orientation in the interval between 6,288 and 6,377 ft MD. (p. 2-57)<br><br>**Figure 2-37c.** Sedimentary and tectonic features in Amsden Formation observed on the borehole image log. The tracks from left to right show: 1) MD; 2) formation; 3) HSGR, HCal; 4) borehole dynamic image log; 5) borehole static image log; 6) tectonic and sedimentary tadpole orientation in the interval between 6,320 and 6,407 ft. MD (p. 2-58)<br><br>**Figure 2-38.** Orientation of the tensile drilling-induced fractures in Archie Erickson 2 observed in Mowry Formation showing maximum horizontal stress (SHmax) direction |

| Subject | N.D.C.C. / N.D.A.C. Reference | Requirement | Regulatory Summary | Storage Facility Permit Application (Section and Page Number; see main body for reference cited) | Figure/Table Number and Description (Page Number) |
|---|---|---|---|---|---|
| | | | | | about N045°. (p. 2-59)<br><br>**Table 2-9.** Ranges and Averages of the Elastic Properties Estimated from 1D MEM in Opeche/Spearfish, Broom Creek, and Amsden Formations: Static Young's Modulus (E_Stat), Static Poisson's Ratio (ν_Stat), Static Bulk Modulus (K), Static Shear Modulus (G), Unconfined Compressive Strength (UCS), Dynamic Young's Modulus (E_Dyn), and Dynamic Poisson's ratio (ν_Dyn) (p. 2-60)<br><br>**Table 2-10.** Ranges and Averages of the Vertical Stress (Sv), Pore pressure, Shmin, and FA Estimated from 1D MEM in the Opeche/Spearfish, Broom Creek, and Amsden Formations (p. 2-60)<br><br>**Figure 2-39.** Geomechanical parameters in the Opeche/Spearfish, Broom Creek, and Amsden Formations. The tracks from left to right are 1) MD; 2) formation; 3) HSGR, HCal; 4) TNPH (neutron porosity), and RHOZ (bulk density); 5) dynamic Young's modulus (E_dyn), static Young's modulus (E_Stat)_calibrated with core measurements (E_Core); 6) dynamic Poisson's ratio (PR_dyn) calibrated with core measurements (PR_Core); 7) cohesion, |

| Subject | N.D.C.C. / N.D.A.C. Reference | Requirement | Regulatory Summary | Storage Facility Permit Application (Section and Page Number; see main body for reference cited) | Figure/Table Number and Description (Page Number) |
|---|---|---|---|---|---|
| | | | | | bulk modulus (K_dyn), and Biot's factor; 8) UCS, tensile strength, and FA; 9) pore pressure, hydropressure calibrated with MDT pressure data; 10) Sv, SHmax, and Shmin calibrated with the MDT stress test; 11) pore pressure, Shmin, and Eaton fracture gradients. (p. 2-62)<br><br>**Table 2-11.** Formation, Lithology, Sample Depth (MD), Vertical Stress, Pore Pressure, Effective Vertical Stress, Horizontal Stress, Static Young's modulus, Poisson's ratio, and Compressive Strength in Opeche/Spearfish, Broom Creek, and Amsden Formations (p. 2-63) |
| | N.D.A.C. § 43-05-01-05(1)(b)(2)(o) | **N.D.A.C. § 43-05-01-05(1)(b)(2)**<br>(o) Identify and characterize additional strata overlying the storage reservoir that will prevent vertical fluid movement, are free of transmissive faults or fractures, allow for pressure dissipation, and provide additional opportunities for monitoring, mitigation, and remediation. | s. Identify and characterize additional strata overlying the storage reservoir that will prevent vertical fluid movement:<br>Free of transmissive faults<br>Free of transmissive fractures<br>Effect on pressure dissipation<br>Utility for monitoring, mitigation, and remediation. | *See discussion under **2.4.2 Additional Overlying Confining Zones*** (p. 2-39) | **Table 2-8a** Description of Zones of Confinement above the Immediate Upper Confining Zone (data based on Archie Erickson 2) (p. 2-39)<br><br>**Figure 2-25.** Isopach map of the interval between the top of the Broom Creek Formation and the top of the Swift Formation. This interval represents the primary and secondary confinement zones. A convergent interpolation gridding algorithm was used with well formation tops, 3D seismic, and 2D seismic in creation of this map. (p. 2-40) |

| Subject | N.D.C.C. / N.D.A.C. Reference | Requirement | Regulatory Summary | Storage Facility Permit Application (Section and Page Number; see main body for reference cited) | Figure/Table Number and Description (Page Number) |
|---|---|---|---|---|---|
| | | | | | **Figure 2-26**. Isopach map of the interval between the top of the Inyan Kara Formation and the top of the Pierre Formation. This interval represents the tertiary confinement zone. A convergent interpolation gridding algorithm was used with well formation tops, 3D seismic, and 2D seismic in creation of this map. (p. 2-41) |
| **Area of Review Delineation** | N.D.A.C. §§ 43-05-01-05(1)(j) and (1)(b)(3) | **N.D.A.C. § 43-05-01-05(1)** j. An area of review and corrective action plan that meets the requirements pursuant to section 43-05-01-05.1;<br><br>**N.D.A.C. § 43-05-01-05(1)(b)** (3) A review of the data of public record, conducted by a geologist or engineer, for all wells within the facility area, which penetrate the storage reservoir or primary or secondary seals overlying the reservoir, and all wells within the facility area and within one mile [1.61 kilometers], or any other distance as deemed necessary by the commission, of the facility area boundary. The review must include the following: | The carbon dioxide storage reservoir area of review includes the areal extent of the storage reservoir and one mile outside of the storage reservoir boundary, plus the maximum extent of the pressure front caused by injection activities. The area of review delineation must include the following: | **4.1 Area of Review (AOR) Delineation** (p. 4-1)<br>North Dakota regulations for geologic storage of $CO_2$ require that each storage facility permit (SFP) delineate an AOR, which is defined as "the region surrounding the geologic storage project where underground sources of drinking water [USDW] may be endangered by the injection activity" (North Dakota Administrative Code [N.D.A.C.] § 43-05-01-01[4]). Concern regarding the endangerment of USDWs is related to the potential vertical migration of $CO_2$ and/or brine from the injection zone to the USDW. Therefore, the AOR encompasses the region overlying the injected free-phase $CO_2$ plume and the region overlying the extent of formation fluid pressure increase that is sufficient to drive formation fluids (e.g., brine) into USDWs, assuming pathways for this migration (e.g., abandoned wells or transmissive faults) are present.<br><br>The minimum fluid pressure increase in the reservoir that results in a sustained flow of brine upward into an overlying drinking water aquifer is referred to as the "critical threshold pressure increase" and resultant pressure as the "critical threshold pressure." Calculation of the allowable increase in pressure using site-specific data from the Archie Erickson 2 (NDIC File No. 38622) shows that the storage reservoir in the project area is overpressured with respect to the lowest USDW (i.e., the allowable increase in pressure is less than zero.) The storage reservoir is calculated to be overpressured, with a value of −213 psi calculated using data from the Archie Erickson 2 well at the BK Fischer simulation well location. The maximum vertically averaged storage reservoir change in pressure at the end of the simulated injection period was 1004 psi in the raster cell intersected by the injection well, which corresponds to less than 0.014 $m^3$ of flow over 20 years (Section 3.5). Based on the computational methods used to simulate $CO_2$ injection activities and associated pressure front (Figure 4-1), the resulting AOR for BK Fischer is delineated as being 1 mi beyond the storage facility area boundary. This extent ensures compliance with existing state regulations.<br><br>In accordance with N.D.A.C. § 43-05-01-05(1)(b)(3), a geologist or engineer reviewed the data of public record for all wells within the storage facility area, including those which penetrate the storage reservoir or primary or secondary seals overlying the reservoir and all wells within 1 mi of the storage facility area boundary (Table 4-1).<br><br>This section of the SFP application is accompanied by maps and tables that include information required and in accordance with N.D.A.C. § 43-05-01-05(1)(a) and (b) and § 43-05-01-05.1(2), such as the storage facility area; location of any proposed injection wells; presence of occupied structures or gravel pits (Figure 4-2); presence of mining land (mined out and future) (Figure 2-50); and location of water wells, and any other wells within the AOR (Figure 4-3). Table 4-1 lists all the surface and subsurface features that were investigated as part of the AOR evaluation. Surface features that were investigated but not found within the AOR boundary are also identified in Table 4-1.<br><br>An extensive geologic and hydrogeologic characterization performed by a team of geologists from the Energy & Environmental Research Center (EERC) resulted in no evidence of transmissive faults or fractures in the upper confining zone within the AOR (Section 2.5) and revealed that the upper confining zone has sufficient geologic integrity to prevent vertical fluid movement. All geologic data and investigations indicate the storage reservoir within the AOR has sufficient containment and geologic integrity, including geologic confinement above and below the injection zone, to prevent vertical fluid movement. | **Figure 4-2**. Final AOR map showing the BK Fischer storage facility area (dashed black boundary) and AOR (dashed purple boundary). Pink squares represent occupied structures, and the brown circle represents a gravel pit (note: gravel pits were identified using the North Dakota Geographic Information System [GIS] Hub landmarks data layer from the North Dakota Department of Transportation [2002]). (p. 4-4) |

| Subject | N.D.C.C. / N.D.A.C. Reference | Requirement | Regulatory Summary | Storage Facility Permit Application (Section and Page Number; see main body for reference cited) | Figure/Table Number and Description (Page Number) |
|---|---|---|---|---|---|
| | N.D.A.C. §§ 43-05-01-05(1)(b)(3) and (1)(a) | **N.D.A.C. § 43-05-01-05(1)(b)**<br>(3) A review of the data of public record, conducted by a geologist or engineer, for all wells within the facility area, which penetrate the storage reservoir or primary or secondary seals overlying the reservoir, and all wells within the facility area and within one mile [1.61 kilometers], or any other distance as deemed necessary by the commission, of the facility area boundary. The review must include the following:<br><br>**N.D.A.C. § 43-05-01-05(1)**<br>a. A site map showing the boundaries of the storage reservoir and the location of all proposed wells, proposed cathodic protection boreholes, and surface facilities within the carbon dioxide storage facility area; | a. A map showing the following within the carbon dioxide reservoir area:<br>i. Boundaries of the storage reservoir<br>ii. Location of all proposed wells<br>iii. Location of proposed cathodic protection boreholes<br>iv. Any existing or proposed aboveground facilities; | **2.3 Storage Reservoir (injection zone)** (p. 2-16)<br>See Figure 2-9 on page 2-16.<br><br>***5.7.1 Soil Gas Monitoring*** (p. 5-22)<br>See Figure 5-4 on page 5-23.<br><br>*3.5.5.2 Incremental Leakage Maps and AOR Delineation* (p. 3-40)<br>See Figure 3-21 on page 3-43.<br><br>**5.2 Surface Facilities Leak Detection Plan** (p. 5-10)<br>See Figure 5-1 on page 5-10.<br><br>**4.1 Area of Review (AOR) Delineation (p. 4-1)**<br>See Figure 4-2 on page 4-4 | **Figure 2-9.** Broom Creek Formation in North Dakota. The area within the green dashed line shows the extent originally proposed by Rygh (1990), and the area outside of the green dashed line has been modified based on new well control. (p. 2-16)<br><br>**Figure 5-4.** SCS2 baseline and operational near-surface sampling locations. (p. 5-23)<br><br>**Figure 3-21.** Final AOR estimations and stabilized $CO_2$ extent of the BK Fischer storage facility area in relation to nearby legacy wells. Shown is the storage facility area (black dashed line) and AOR (purple dashed line). The gray circle represents a legacy oil and gas well near the storage facility area. (p. 3-43)<br><br>**Figure 5-2.** Map detailing $CO_2$ flowline path to $CO_2$ injection wellsite (left) and layout of surface facilities at the wellsite (right), illustrating key surface facilities leak detection and monitoring equipment. Soil gas profile station, MSG02, and groundwater well, MGW10, off-pad monitoring locations are also shown. (p. 5-11)<br><br>**Figure 4-2.** Final AOR map showing the BK Fischer storage facility |

| Subject | N.D.C.C. / N.D.A.C. Reference | Requirement | Regulatory Summary | Storage Facility Permit Application (Section and Page Number; see main body for reference cited) | Figure/Table Number and Description (Page Number) |
|---|---|---|---|---|---|
| | | | | | area (dashed black boundary) and AOR (dashed purple boundary). Pink squares represent occupied structures, and the brown circle represents a gravel pit (note: gravel pits were identified using the North Dakota Geographic Information System [GIS] Hub landmarks data layer from the North Dakota Department of Transportation [2002]). (p. 4-4) |
| | N.D.A.C. § 43-05-01-05(1)(b)(2)(a) | **N.D.A.C. § 43-05-01-05(1)(b)(2)**<br>(a) All wells, including water, oil, and natural gas exploration and development wells, and other manmade subsurface structures and activities, including coal mines, within the facility area and within one mile [1.61 kilometers] of its outside boundary; | b. A map showing the following within the storage reservoir area and within one mile outside of its boundary:<br>i. All wells, including water, oil, and natural gas exploration and development wells<br>ii. All other manmade subsurface structures and activities, including coal mines; | **4.1 Area of Review (AOR) Delineation** (p. 4-1)<br>See Figure 4-2 on page 4-4 and Figure 4-3 on page 4-5.<br><br>*2.6 Potential Mineral Zones* (p. 2-73)<br>See Figure 2-47a on page 2-76. | **Figure 4-2.** Final AOR map showing the BK Fischer storage facility area (dashed black boundary) and AOR (dashed purple boundary). Pink squares represent occupied structures, and the brown circle represents a gravel pit (note: gravel pits were identified using the North Dakota Geographic Information System [GIS] Hub landmarks data layer from the North Dakota Department of Transportation [2002]). (p. 4-4)<br><br>**Figure 4-3.** Map showing all wells located in the AOR. Shown are the stabilized $CO_2$ plume extent postinjection (gray-shaded area), storage facility area (dashed black boundary), and AOR (dashed purple boundary). All groundwater wells in the AOR are identified based on data available from the Department of Water Resources (DWR). The only existing well penetrating the Broom |

| Subject | N.D.C.C. / N.D.A.C. Reference | Requirement | Regulatory Summary | Storage Facility Permit Application (Section and Page Number; see main body for reference cited) | Figure/Table Number and Description (Page Number) |
|---|---|---|---|---|---|
| | | | | | Creek Formation within the AOR is the Archie Erickson 2 well. No other legacy oil and gas wells are present in the AOR (see Figure 2-47a for any nearby legacy wells outside of the AOR). All observation/monitoring wells shown are shallow groundwater wells associated with the mine activities. No springs are present in the AOR (note: springs were evaluated using the National Map hosted by the U.S. Geological Survey [2023]). (p. 4-5)<br><br>**Figure 2-47a.** Map showing stratigraphic wells for the project and nearest legacy wells. Gray circles indicate dry wells. The red circle indicates the closest oil and gas producing well (NDIC File No. 7616). (p. 2-76) |
| | N.D.A.C. § 43-05-01-05(1)(c) and N.D.A.C. § 43-05-01-05.1(1)(a) | **N.D.A.C. § 43-05-01-05(1)**<br>c. The extent of the pore space that will be occupied by carbon dioxide as determined by utilizing all appropriate geologic and reservoir engineering information and reservoir analysis, which must include various computational models for reservoir characterization, and the projected response of the carbon dioxide plume and storage capacity of the storage reservoir. The computational model must be based on detailed geologic data collected to characterize the injection | c. A description of the method used for delineating the area of review, including:<br>i. The computational model to be used<br>ii. The assumptions that will be made<br>iii. The site characterization data on which the model will be based; | ***3.5.2 Risk-Based AOR Delineation* (p. 3-32)**<br>The methods described by EPA (2013) for estimating the AOR under the Class VI rule (40 U.S. Code of Federal Regulations [CFR] 146.81 et seq.) were developed assuming that the storage reservoirs would be in hydrostatic equilibrium with overlying aquifers. However, in the state of North Dakota, and potentially elsewhere around the United States, candidate storage reservoirs are already overpressured relative to overlying aquifers and thus subject to potential vertical formation fluid migration from the storage reservoir to the lowermost USDW, even prior to the planned storage project. Consequently, applying EPA (2013) methods to these geologic situations essentially results in an infinite AOR, which makes regulatory compliance infeasible.<br><br>Several researchers have recognized the need for alternative methods for estimating the AOR for locations that are already overpressured relative to overlying aquifers. For example, Birkholzer and others (2014) described the unnecessary conservatism in EPA's definition of critical pressure, which could lead to a heavy burden on storage facility permit (SFP) applicants. As an alternative, Burton-Kelly and others (2021) proposed a risk-based reinterpretation of this framework that would allow for a reduction in the AOR while ensuring protection of drinking water resources.<br><br>A computational framework for estimating a risk-based AOR was proposed by Oldenburg and others (2014, 2016), who compared formation fluid leakage through a hypothetical open flow path in the baseline scenario (no $CO_2$ injection) to the incrementally larger leakage that would occur in the $CO_2$ injection case. The modeling for the risk-based AOR used semianalytical solutions to single-phase flow equations to model reservoir pressurization and vertical migration through leaky wells. These semianalytical solutions were extensions of earlier work for formation fluid leakage through abandoned wellbores by Raven and others (1990) and Avci (1994), which were creatively solved, coded, and compiled in FORTRAN under the name ASLMA (Analytical Solution for Leakage in Multilayered Aquifers) and extensively described by Cihan and others (2011, 2012) (hereafter "ASLMA Model"). | **Figure 3-17.** Workflow for delineating a risk-based AOR for a SFP (modified from Burton-Kelly and others, 2021). (p. 3-34).<br><br>**Table 3-5.** EPA Method 1 Critical Threshold Pressure Increase Calculated at the BK Fischer 1 Simulation Well (p. 3-35)<br><br>**Table 3-6.** Simplified Stratigraphy and Average Properties Used to Represent the Storage Complex. (p. 3-36)<br><br>**Table 3-7.** $CO_2$ Density and Injection Parameters |

| Subject | N.D.C.C. / N.D.A.C. Reference | Requirement | Regulatory Summary | Storage Facility Permit Application (Section and Page Number; see main body for reference cited) | Figure/Table Number and Description (Page Number) |
|---|---|---|---|---|---|
| | | zones, confining zones, and any additional zones;<br><br>**N.D.A.C. § 43-05-01-05.1(1)**<br>a. The method for delineating the area of review, including the model to be used, assumptions that will be made, and the site characterization data on which the model will be based; | | White and others (2020) outlined a similar risk-based approach for evaluating the AOR using the National Risk Assessment Partnership (NRAP) Integrated Assessment Model for Carbon Storage (NRAP-IAM-CS). However, NRAP-IAM-CS and the subsequent open-sourced version (NRAP-Open-IAM) are constrained to the assumption that the storage reservoir is in hydrostatic equilibrium with overlying aquifers and, therefore, may not accurately estimate the AOR for storage projects located in regions where the storage reservoir is overpressured relative to overlying aquifers.<br><br>Building a geologic model in a commercial-grade software platform (like Petrel; Schlumberger, 2020) and running fluid flow simulations using numerical reservoir simulation in a commercial-grade software platform (like CMG's compositional simulator, GEM) provide the "gold standard" for estimating pressure buildup in response to $CO_2$ injection (e.g., Bosshart and others, 2018). However, these numerical reservoir simulations are typically limited to the storage reservoir and primary seal formation (cap rock) and do not include the geologic units overlying the cap rock because of the computational burden of conducting such a complex simulation. In addition, geologic modeling of the overlying units may add a substantial amount of time and effort during prefeasibility-phase projects that are unwarranted given the amount of uncertainty that may be present if only a few nearby wells can be used for characterization activities. Earlier studies (e.g., Nicot and others, 2008; Birkholzer and others, 2009; Bandilla and others, 2012; Cihan and others, 2011, 2012) have shown that far-field fluid pressure changes outside of the $CO_2$ plume domain can be reasonably described by a single-phase flow calculation by representing $CO_2$ injection as an equivalent-volume injection of brine (Oldenburg and others, 2014).<br><br>The semianalytical solutions embedded within the ASLMA Model have been shown to compare with the numerical model, TOUGH2-ECO2-N, and provided accurate results for pressures beyond the $CO_2$ plume zone (Birkholzer and others, 2009; Cihan and others, 2011, 2012). Therefore, the proposed workflow for delineating a risk-based AOR uses the ASLMA Model to examine pressure buildup in the storage reservoir and resultant effects of this buildup on the vertical migration of formation fluid via (single) hypothetical leaky wellbores located at progressively greater distances from the injection well (Figure 3-17).<br><br>An important distinction between EPA Methods 1 and 2, which both calculate a critical pressure threshold (either $\Delta P_{i,f}$ for Method 1 or $\Delta P_c$ for Method 2) and the risk-based AOR approach is that the risk-based approach 1) calculates and maps the potential incremental flow of formation fluids from the storage reservoir to the USDW that could occur and then 2) delineates the areal extent beyond which no significant leakage would occur. Therefore, the region beyond which no significant leakage would occur does not present an endangerment to the USDW; hence, the region inside of this areal extent is the risk-based AOR.<br><br>***3.5.3 Critical Threshold Pressure Increase Estimation (P. 3-34)***<br>For the purposes of delineating AOR for this permit, constant fluid densities for the lowermost USDW (Fox Hills Formation) and injection zone (Broom Creek Formation) were used in the calculations. Respective fluid densities were used to represent the injection zone fluids ($\rho_i$), which are estimated based on the in situ estimated brine salinity, temperature, and pressure at the Archie Erickson 2 stratigraphic test well.<br><br>Application of EPA Method 1 (Eq. 1) using model data from the BK Fischer 1 simulation well shows that the injection zone is overpressured with respect to the lowest USDW (i.e., Method 1 $\Delta P_{i,f} < 0$). An example of the EPA Method 1 application showing negative $\Delta P_{i,f}$ (relative overpressure) is given in Table 3-5, with similar results when applied to each column of the grid cells in the Broom Creek Formation simulation model.<br><br>In accordance with EPA (2013) guidance, the combination of a) a Method 1 negative $\Delta P_{i,f}$ value and b) lack of evidence for hydrostatic equilibrium between the reservoir and the USDW (i.e., Method 2 does not apply) indicates that a risk-based approach to AOR delineation may be pursued.<br><br>***3.5.4 Risk-Based AOR Calculations (p. 3-35)***<br>Complete details of the risk-based AOR model are found in Burton-Kelly and others (2021). The inputs, assumptions, and results discussed here provide the necessary details for reproducing and verifying the results. A macro-enabled Microsoft Excel file was used to define the inputs and calculations that were employed in the method (hereafter "ASLMA Workbook").<br><br>*3.5.4.1 Initial Hydraulic Heads*<br>The original ASLMA Model (Cihan and others, 2011) initially assumed hydrostatic pressure distributions in the entire system. The current work uses a modified version of the ASLMA Model to simulate pressure perturbations and leakage rates when there are initial head differences in the aquifers (Oldenburg and others, 2014). The initial hydraulic heads are calculated assuming a total head based on the unit-specific elevations and pressures. The total heads are entered into the ASLMA Model and establish the initial pressure conditions for the storage complex prior to $CO_2$ injection. | Used for the ASLMA Model (p. 3-37)<br><br>**Figure 3-18.** Histograms describing the expected frequency of leaky wellbore effective permeabilities under different scenarios. The ASLMA Model used for AOR delineation used a value of approximately 0.1 mD (constructed from data presented by Carey [2017]). (p.3-38) |

| Subject | N.D.C.C. / N.D.A.C. Reference | Requirement | Regulatory Summary | Storage Facility Permit Application (Section and Page Number; see main body for reference cited) | Figure/Table Number and Description (Page Number) |
|---|---|---|---|---|---|
| | | | | For example, the initial reference case total heads for the storage reservoir (Aquifer 1), potential thief zone (Aquifer 2), and USDW (Aquifer 3) are shown in Table 3-6. They illustrate the state of overpressure in the storage complex because Aquifer 1 has a greater initial hydraulic head than Aquifer 3. Therefore, the storage complex requires different treatment than the default AOR calculations described by EPA (2013). Details on the calculations of initial hydraulic head are provided in Burton-Kelly and others (2021).<br><br>*3.5.4.2 $CO_2$ Injection Parameters*<br>The ASLMA Model for the project used a Broom Creek $CO_2$ injection rate that matched the simulation scenario. A single injector is placed at the center of the ASLMA Model grid at an x,y location of (0,0) in the coordinate reference system. The ASLMA Model requires the $CO_2$ injection rate to be converted into an equivalent-volume injection of formation fluid in units of cubic meters per day. Microsoft Excel Visual Basic for Applications (VBA) functions were used to estimate the $CO_2$ density from the storage reservoir pressure and temperature, which resulted in an estimated density, shown in Table 3-7. The $CO_2$ mass injection rate and $CO_2$ density are then used to derive the daily equivalent-volume injection rate, shown in Table 3-7.<br><br>*3.5.4.3 Hypothetical Leaky Wellbore*<br>In the simulation model area, few wellbores are known to exist that penetrate the primary seal of the Broom Creek storage reservoir. However, for heuristic, "what-if" scenario modeling, which is needed to generate the data for delineating a risk-based AOR, a single hypothetical leaky wellbore is inserted into the ASLMA Model at 1, 2, …, 100 km from the $CO_2$ injection well. The pressure buildup in the storage reservoir at each distance, along with the recorded cumulative volume of formation fluid vertically migrating through the leaky wellbore from the storage reservoir to the USDW (i.e., from Aquifer 1 to Aquifer 3) throughout the 20-year injection period, provides the data set needed to derive the risk-based AOR.<br><br>Published ranges for the effective permeability of a leaky wellbore (Figure 3-18) have included an "open wellbore" with an effective permeability as high as $10^{-5}$ m$^2$ ($10^{10}$ mD) to values more representative of leakage through a wellbore annulus of $10^{-12}$ to $10^{-10}$ m$^2$ ($10^3$ to $10^5$ mD) (Watson and Bachu, 2008, 2009; Celia and others, 2011). Carey (2017) provides probability distributions for the effective permeability of potentially leaking wells at $CO_2$ storage sites and estimated a wide range from $10^{-20}$ to $10^{-10}$ m$^2$ ($10^{-5}$ to $10^5$ mD). For the project Broom Creek ASLMA Model, the effective permeability of the leaky wellbore is set to $10^{-16}$ m$^2$ (0.1 mD), which is a conservative (highly permeable) value near the top of the published range for the effective permeability of potentially leaking wells at $CO_2$ storage sites (Figure 3-18).<br>The current work uses the ASLMA Model Type 1 feature (focused leakage only) for the nominal model response, which makes the conservative assumption that the aquitards are impermeable. This assumption prevents the pressure from diffusing into the overlying aquitards, resulting in a greater pressure buildup in the storage reservoir and a commensurately greater amount of formation fluid vertically migrating from the storage reservoir through the leaky wellbore. The conservative assumption of Model Type 1 rather than Model Type 3 (coupled focused and diffuse leakage) provides an added level of protection to the delineation of a risk-based AOR by projecting a larger pressure buildup in the storage reservoir than a scenario in which pressure is allowed to dissipate through the upper seal and, therefore, a greater leakage of formation fluid up the leaky wellbore.<br><br>*3.5.4.4 Saline Aquifer Potential Thief Zone*<br>As shown in Table 3-6, a saline aquifer (Aquifer 2, Inyan Kara Formation) exists between the storage reservoir primary seal and the USDW (Aquifer 3, Fox Hills Formation). Formation fluid migrating up a leaky wellbore that is open to Aquifer 2 will preferentially flow into Aquifer 2, and the continued flow up the wellbore and into the USDW will be reduced. Therefore, Aquifer 2 may act as a thief zone and reduce the potential for formation fluid impacts to the groundwater.<br><br>The thief zone phenomenon was described by Nordbotten and others (2004) as an "elevator model" by analogy to an elevator full of people on the main floor, who then get off at various floors as the elevator moves up, such that only very few people ride all the way to the top floor.<br><br>3.5.4.5 Aquifer- and Aquitard-Derived Properties<br>The ASLMA Model assumes homogeneous properties within each hydrostratigraphic unit (Table 3-6). For each unit shown in Table 3-6, pressure, temperature, porosity, permeability, and salinity are used to derive two key inputs for the ASLMA Model: HCON and specific storage (SS). Average porosity and permeability values were derived as follows: Broom Creek, from distributed properties in the geologic model; Fox Hills, from regional well log data. Porosity is represented as an arithmetic mean and permeability as a geometric mean value within each hydrostratigraphic unit (excluding nonsandstone rock types).<br><br>VBA functions included in the ASLMA Workbook are used to estimate the formation fluid density and viscosity from the aquifer or aquitard pressure, temperature, and salinity inputs, which are then used to estimate HCON and SS. The estimated reference case HCON for the storage | |

| Subject | N.D.C.C. / N.D.A.C. Reference | Requirement | Regulatory Summary | Storage Facility Permit Application (Section and Page Number; see main body for reference cited) | Figure/Table Number and Description (Page Number) |
|---|---|---|---|---|---|
| | | | | reservoir (Aquifer 1), potential thief zone (Aquifer 2) and USDW (Aquifer 3) are shown in Table 3-6. Details about the HCON and SS derivations are provided in supporting information for Burton-Kelly and others (2021). | |
| | N.D.A.C. § 43-05-01-05.1(1)(b)(1-4) | **N.D.A.C. § 43-05-01-05.1(1)**<br>b. A description of:<br>(1) The reevaluation date, not to exceed five years, at which time the storage operator shall reevaluate the area of review;<br><br>(2) The monitoring and operational conditions that would warrant a reevaluation of the area of review prior to the next scheduled reevaluation date;<br><br>(3) How monitoring and operational data (e.g., injection rate and pressure) will be used to inform an area of review reevaluation; and<br><br>(4) How corrective action will be conducted to meet the requirements of this section, including what corrective action will be performed prior to injection and what, if any, portions of the area of review will have corrective action addressed on a phased basis and how the phasing will be determined; how corrective action will be adjusted if there are changes in the area of review; and how site access will be guaranteed for future corrective action. | d. A description of:<br>(1) The reevaluation date, not to exceed five years, at which time the storage operator shall reevaluate the area of review;<br><br>(2) Any monitoring and operational conditions that would warrant a reevaluation of the area of review prior to the next scheduled reevaluation date;<br><br>(3) How monitoring and operational data (e.g., injection rate and pressure) will be used to inform an area of review reevaluation;<br><br>(4) How corrective action will be conducted if necessary, including:<br>a. What corrective action will be performed prior to injection<br>b. How corrective action will be adjusted if there are changes in the area of review; | **4.3 Reevaluation of AOR and Corrective Action Plan** (p. 4-9)<br>The AOR and corrective action plan will be reevaluated in accordance with N.D.A.C. § 43-05-01-05.1, with the first reevaluation taking place at a period not to exceed 5 years from the date the permit for $CO_2$ injection is issued (N.D.A.C. § 43-05-01-10) or when monitoring and operational conditions warrant a reevaluation. Each successive reevaluation shall take place at a period not to exceed 5 years from the date of the previous reevaluation (each referred to as a "Reevaluation Date"). The AOR reevaluations will address the following:<br><br>• Monitoring and operational data (e.g., injection rate and pressure) will be used to update the geologic model and the computational simulations. These updates will then be used to inform a reevaluation of the AOR and corrective action plan, including the computational model that was used to determine the AOR, and the operational data to be utilized as the basis for that update will be identified.<br><br>• The protocol to conduct corrective action, if necessary, will be determined, including 1) what corrective action will be performed, and 2) how corrective action will be adjusted if there are changes in the AOR delineation.<br><br>As part of the reevaluation, Summit Carbon Storage #2, LLC (SCS2) will either a) demonstrate to the Department of Mineral Resources, Oil and Gas Division (DMR-O&G) using monitoring data and modeling results that no plan amendment is necessary or b) submit an amended AOR and corrective action plan for DMR-O&G approval. Plan amendments must be incorporated into the permit and are subject to permit modification requirements. | N/A |

| Subject | N.D.C.C. / N.D.A.C. Reference | Requirement | Regulatory Summary | Storage Facility Permit Application (Section and Page Number; see main body for reference cited) | Figure/Table Number and Description (Page Number) |
|---|---|---|---|---|---|
| | N.D.A.C. § 43-05-01-05(1)(b)(2)(b) | **N.D.A.C. § 43-05-01-05(1)(b)(2)**<br>(b) All manmade surface structures that are intended for temporary or permanent human occupancy within the facility area and within one mile [1.61 kilometers] of its outside boundary; | e. A map showing the areal extent of all manmade surface structures that are intended for temporary or permanent human occupancy within the storage reservoir area, and within one mile outside of its boundary; | ***4.1 Area of Review (AOR) Delineation (p. 4-1)***<br>*See Figure 4-2 on page 4-4.* | **Figure 4-2.** Final AOR map showing the BK Fischer storage facility area (dashed black boundary) and AOR (dashed purple boundary). Pink squares represent occupied structures, and the brown circle represents a gravel pit (note: gravel pits were identified using the North Dakota Geographic Information System [GIS] Hub landmarks data layer from the North Dakota Department of Transportation [2002]). (p. 4-4) |
| | N.D.A.C. § 43-05-01-05(1)(b)(2) | **N.D.A.C. § 43-05-01-05(1)(b)**<br>(2) A geologic and hydrogeologic evaluation of the facility area, including an evaluation of all existing information on all geologic strata overlying the storage reservoir, including the immediate caprock containment characteristics and all subsurface zones to be used for monitoring. The evaluation must include any available geophysical data and assessments of any regional tectonic activity, local seismicity and regional or local fault zones, and a comprehensive description of local and regional structural or stratigraphic features. The evaluation must describe the storage reservoir's mechanisms of geologic confinement, including rock properties, regional pressure gradients, structural features, and adsorption | f. A map and cross section identifying any productive existing or potential mineral zones occurring within the storage reservoir area and within one mile outside of its boundary; | **2.6 Potential Mineral Zones** (p. 2-73)<br>See Figure 2-46, Figure 2-47a, Figure 2-47b, Figure 2-48, Figure 2-49, and Figure 2-50. | **Figure 2-46.** Drillstem test results indicating the presence of oil in the Spearfish Formation samples (modified from Stolldorf, 2020). (p. 2-74)<br><br>**Figure 2-47a.** Map showing stratigraphic wells for the project and nearest legacy wells. Gray circles indicate dry wells. The red circle indicates the closest oil and gas producing well (NDIC File No. 7616). (p. 2-76)<br><br>**Figure 2-47b.** Coal beds of the Sentinel Butte and Bullion Creek (Tongue River) Formations showing the lignite coals in western North Dakota (Zygarlicke and others, 2019). (p. 2-77)<br><br>**Figure 2-48.** Beulah net coal isopach map and resource area (modified from Ellis and others, 1999). (p. 2-78) |

| Subject | N.D.C.C. / N.D.A.C. Reference | Requirement | Regulatory Summary | Storage Facility Permit Application (Section and Page Number; see main body for reference cited) | Figure/Table Number and Description (Page Number) |
|---|---|---|---|---|---|
| | | characteristics with regard to the ability of that confinement to prevent migration of carbon dioxide beyond the proposed storage reservoir. The evaluation must also identify any productive existing or potential mineral zones occurring within the facility area and any underground sources of drinking water in the facility area and within one mile [1.61 kilometers] of its outside boundary. The evaluation must include exhibits and plan view maps showing the following: | | | **Figure 2-49.** Beulah overburden isopach map (modified from Ellis and others, 1999). (p. 2-79)<br><br>**Figure 2-50.** Map showing the past and future mining area for the Coyote Creek Mine through 2040. (p. 2-80) |
| | N.D.A.C. § 43-05-01-05(1)(b)(3) and N.D.A.C. § 43-05-01-05.1(2)(b) | **N.D.A.C. § 43-05-01-05(1)(b)**<br>(3) A review of the data of public record, conducted by a geologist or engineer, for all wells within the facility area, which penetrate the storage reservoir or primary or secondary seals overlying the reservoir, and all wells within the facility area and within one mile [1.61 kilometers], or any other distance as deemed necessary by the commission, of the facility area boundary. The review must include the following:<br><br>**N.D.A.C. § 43-05-01-05.1(2)**<br>b. Using methods approved by the commission, identify all penetrations, including active and abandoned wells and underground mines, in the area of review that may penetrate the confining zone. Provide a | g. A map identifying all wells within the area of review, which penetrate the storage formation or primary or secondary seals overlying the storage formation. | ***2.6 Potential Mineral Zones*** (p. 2-73)<br>See Figure 2-47a on p. 2-76 for nearby legacy wells. | **Figure 2-47a.** Map showing stratigraphic wells for the project and nearest legacy wells. Gray circles indicate dry wells. The red circle indicates the closest oil and gas producing well (NDIC File No. 7616). (p. 2-76) |

| Subject | N.D.C.C. / N.D.A.C. Reference | Requirement | Regulatory Summary | Storage Facility Permit Application (Section and Page Number; see main body for reference cited) | Figure/Table Number and Description (Page Number) |
|---|---|---|---|---|---|
| | | description of each well's type, construction, date drilled, location, depth, record of plugging and completion, and any additional information the commission may require; | | | |
| | N.D.A.C. § 43-05-01-05(1)(b)(3)(a)<br><br>N.D.A.C. § 43-05-01-05(1)(b)(3)(b)<br><br>N.D.A.C. § 43-05-01-05(1)(b)(3)(c)<br><br>N.D.A.C. §§ 43-05-01-05(1)(b)(3)(d) and (e) | **N.D.A.C. § 43-05-01-05(1)(b)(3)**<br>(a) A determination that all abandoned wells have been plugged and all operating wells have been constructed in a manner that prevents the carbon dioxide or associated fluids from escaping from the storage reservoir;<br><br>**N.D.A.C. § 43-05-01-05(1)(b)(3)**<br>(b) A description of each well's type, construction, date drilled, location, depth, record of plugging, and completion;<br><br>**N.D.A.C. § 43-05-01-05(1)(b)(3)**<br>(c) Maps and stratigraphic cross sections indicating the general vertical and lateral limits of all underground sources of drinking water, water wells, and springs within the area of review; their positions relative to the injection zone; and the direction of water movement, where known;<br><br>**N.D.A.C. § 43-05-01-05(1)(b)(3)**<br>(d) Maps and cross sections of the area of review; | h. A review of these wells must include the following:<br><br>(1) A determination that all abandoned wells have been plugged in a manner that prevents the carbon dioxide or associated fluids from escaping the storage formation;<br><br>(2) A determination that all operating wells have been constructed in a manner that prevents the carbon dioxide or associated fluids from escaping the storage formation;<br><br>(3) A description of each well:<br>a. Type<br>b. Construction<br>c. Date drilled<br>d. Location<br>e. Depth<br>f. Record of plugging<br>g. Record of completion<br><br>(4) Maps and stratigraphic cross sections of all underground sources of drinking water within the area of review indicating the following:<br>a. Their positions relative to the injection zone<br>b. The direction of water movement, where known<br>c. General vertical and lateral limits<br>d. Water wells<br>e. Springs | **See discussion in *4.1 Area of Review (AOR) Delineation*** *(p. 4-1)*<br><br>See Figure 4-2 on page 4-4.<br><br>**4.2 Corrective Action Evaluation (p. 4-6)**<br>See Table 4-2 on p. 4-7, Table 4-3 on p. 4-7.<br><br>See Figure 4-4 on p. 4-8<br><br>**4.4 Protection of USDWs** (p. 4-9)<br>Table 4-4 on page 4-10, Figure 4-5 on page 4-11, Figure 4-6 on page 4-12, Figure 4-7 on page 4-13, Figure 4-8 on page 4-14, Figure 4-9 on page 4-15, Figure 4-10 on page 4-17, and Table 4-5 on page 4-17.<br><br>***2.6 Potential Mineral Zones*** (p. 2-73)<br>See Figure 2-47a on p. 2-76 for nearby legacy wells. | **Figure 4-2.** Final AOR map showing the BK Fischer storage facility area (dashed black boundary) and AOR (dashed purple boundary). Pink squares represent occupied structures, and the brown circle represents a gravel pit (note: gravel pits were identified using the North Dakota Geographic Information System [GIS] Hub landmarks data layer from the North Dakota Department of Transportation [2002]). (p. 4-4)<br><br>**Table 4-2.** Well(s) in AOR Evaluated for Corrective Action* (p. 4-7)<br><br>**Table 4-3**. Archie Erickson 2 (NDIC File No. 38622) Well Evaluation (p. 4-7)<br><br>**Figure 4-4.** Archie Erickson 2 (NDIC File No. 38622) well schematic. (p. 4-8)<br><br>**Table 4-4**. Description of Zones of Confinement above the Immediate Upper Confining Zone (Opeche/Spearfish Formation) (data based on Archie Erickson 2) (p. 4-10)<br><br>**Figure 4-5.** Major aquifer systems of the |

| Subject | N.D.C.C. / N.D.A.C. Reference | Requirement | Regulatory Summary | Storage Facility Permit Application (Section and Page Number; see main body for reference cited) | Figure/Table Number and Description (Page Number) |
|---|---|---|---|---|---|
| | N.D.A.C. § 43-05-01-05(1)(b)(3)(f) | **N.D.A.C. § 43-05-01-05(1)(b)(3)**<br>(e) A map of the area of review showing the number or name and location of all injection wells, producing wells, abandoned wells, plugged wells or dry holes, deep stratigraphic boreholes, state-approved or United States environmental protection agency-approved subsurface cleanup sites, surface bodies of water, springs, mines (surface and subsurface), quarries, water wells, other pertinent surface features, including structures intended for human occupancy, state, county, or Indian country boundary lines, and roads;<br><br>**N.D.A.C. § 43-05-01-05(1)(b)(3)**<br>(f) A list of contacts, submitted to the commission, when the area of review extends across state jurisdiction boundary lines; | (5) Map and cross sections of the area of review;<br><br>(6) A map of the area of review showing the following:<br>a. Number or name and location of all injection wells<br>b. Number or name and location of all producing wells<br>c. Number or name and location of all abandoned wells<br>d. Number of name and location of all plugged wells or dry holes<br>e. Number or name and location of all deep stratigraphic boreholes<br>f. Number or name and location of all state-approved or United States Environmental Protection Agency-approved subsurface cleanup sites<br>g. Name and location of all surface bodies of water<br>h. Name and location of all springs<br>i. Name and location of all mines (surface and subsurface)<br>j. Name and location of all quarries<br>k. Name and location of all water wells<br>l. Name and location of all other pertinent surface features<br>m. Name and location of all structures intended for human occupancy<br>n. Name and location of all state, county, or Indian country boundary lines<br>o. Name and location of all roads | | Williston Basin (modified from Downey and Dinwiddie, 1988). (p. 4-11)<br><br>**Figure 4-6.** Upper stratigraphy of Mercer, Oliver, and Morton Counties showing the stratigraphic relationship of Cretaceous and Tertiary groundwater-bearing formations (modified from Croft, 1973). (p. 4-12)<br><br>**Figure 4-7.** Depth to surface of the Fox Hills Formation in western North Dakota (Fischer, 2013). (p. 4-13)<br><br>**Figure 4-8.** Potentiometric surface of the Fox Hills–Hell Creek aquifer system shown in feet of hydraulic head above sea level. Flow is to the east through the AOR in Mercer, Oliver, and Morton Counties (modified from Fischer, 2013). (p. 4-14)<br><br>**Figure 4-9.** West-east cross section of the major aquifer layers in Oliver County. Wells used in the cross section are shown in the inset map and labeled with corresponding well names (NDIC File No. 4942 is Raymond Jensen 1-34). (p. 4-15)<br><br>**Figure 4-10.** Field-verified water wells located within the AOR. (p. 4-17) |

| Subject | N.D.C.C. / N.D.A.C. Reference | Requirement | Regulatory Summary | Storage Facility Permit Application (Section and Page Number; see main body for reference cited) | Figure/Table Number and Description (Page Number) |
|---|---|---|---|---|---|
| | | | (7) A list of contacts, submitted to the Commission, when the area of review extends across state jurisdiction boundary lines. | | **Table 4-5**. DWR and SCS1 Well No. Correlation (p. 4-17)<br><br>**Figure 2-47a.** Map showing stratigraphic wells for the project and nearest legacy wells. Gray circles indicate dry wells. The red circle indicates the closest oil and gas producing well (NDIC File No. 7616). (p. 2-76) |
| | N.D.A.C. § 43-05-01-05(1)(b)(3)(g) | **N.D.A.C. § 43-05-01-05(1)(b)(3)**<br>(g) Baseline geochemical data on subsurface formations, including all underground sources of drinking water in the area of review; and | i. Baseline geochemical data on subsurface formations, including all underground sources of drinking water in the area of review. | See Appendices A (Well and Well Formation Fluid-Sampling Laboratory Analysis) and B (Freshwater Well Fluid Sampling) | N/A |
| **Required Plans** | N.D.A.C. § 43-05-01-05(1)(k) | **N.D.A.C. § 43-05-01-05(1)**<br>k. The storage operator shall comply with the financial responsibility requirements pursuant to section 43-05-01-9.1; | a. Financial Assurance Demonstration | **12.3 Financial Instruments (p.12-11)**<br>The applicant will establish a financial instrument(s) 30–60 days prior to inception of coverage, which is expected to be at or just prior to the commencement of injection operations (N.D.A.C. § 43-05-01-09.1. The applicant will provide financial assurance in the form of a surety bond to ensure funds are available for PISC and facility closure activities (N.D.A.C. § 43-05-01-09.1[1][a] and N.D.A.C. § 43-05-01-19). The applicant will also obtain a pollution liability policy(s) to cover emergency and remedial response costs and endangerment of USDWs under N.D.A.C. § 43-05-01-13 and a financial instrument (surety bond) to cover the costs of plugging the injection wells (N.D.A.C. § 43-05-01-11.5). No estimates have been provided for corrective action (N.D.A.C. § 43-05-01-05.1) because no action is required at this time.<br><br>This application presents the estimated total costs ($20,868,800) of these activities and a breakdown apportionment across proposed financial instruments in Table 12-1. Section 12.2 of this FADP provides additional details of the financial responsibility cost estimates for each activity.<br><br>The company providing insurance will meet all the following criteria:<br><br>1. The company is authorized to transact business in North Dakota.<br><br>2. The company has either passed the specified financial strength requirements based on credit ratings or has met a minimum rating, minimum capitalization, and ability to pass the rating, when applicable.<br><br>3. The third-party insurance can be maintained until such a time that DMR-O&G determines that the storage operator has fulfilled its financial obligations.<br><br>The third-party insurance, which identifies SCS2 as the covered party, will be provided by one or a combination of the companies meeting the creditworthiness and other requirements of N.D.A.C. §43-05-01-09.1. However, the greatest hypothetical exposure evaluated would be an acute upward migration through a $CO_2$ injection well, which would have an estimated cost of $14,125,000 for emergency and remedial response actions, as well as coverage identified in the endangerment of USDWs.<br><br>Coverage terms are of an indicative/estimated nature only at this time, as firm and bindable terms are not possible this far in advance of commencement of injection operations; however, final coverage terms and costs will be determined upon full underwriting and firm/bindable quotations to be issued by insurers 30–60 days prior to inception of coverage, which is expected to be at or just prior to the commencement of | **Table 12-1.** Potential Future Costs Covered by Financial Assurance (p. 12-2)<br><br>**Table 12-2.** Injection Well Plugging (p. 12-3)<br><br>**Table 12-3a.** Cost Estimate1 for PISC Activities for BK Fischer Assuming a 10-year PISC Period (p. 12-4)<br><br>**Table 12-3b.** Cost Estimate for Flowline Segment NDL-325 Abandonment (p. 12-5)<br><br>**Table 12-4.** Cost Estimate1 for Site Closure and Remediation Activities for BK Fischer CO2 Storage Project (p. 12-5).<br><br>**Table 12-6.** Cost Estimate for Emergency |

| Subject | N.D.C.C. / N.D.A.C. Reference | Requirement | Regulatory Summary | Storage Facility Permit Application (Section and Page Number; see main body for reference cited) | Figure/Table Number and Description (Page Number) |
|---|---|---|---|---|---|
| | | | | injection operations. The actual third-party insurance companies will be determined closer to the proposed injection start date and will meet both of the following criteria, as specified in N.D.A.C. §43-05-01-09.1(1)(g):<br><br>1. The companies satisfy financial strength requirements based on credit ratings in the top four categories of either Standard & Poor's (AAA, AA, A, or BBB) or Moody's (Aaa, Aa, A, Baa).<br><br>2. The companies meet a minimum rating (minimum rating based on an issuer, credit, securities, or financial strength rating as a demonstration of financial stability) and minimum capitalization (i.e., demonstration that minimum thresholds are met for the following financial ratios: debt–equity, assets–liabilities, cash return on liabilities, liquidity, and net profit) and are able to pass bond rating in the top four categories of either Standard & Poor's (AAA, AA, A, or BBB) or Moody's (Aaa, Aa, A, Baa), when applicable. | and Remedial Response Plan* (p. 12-10).<br><br>**Table 12-7.** Cost Estimate for Endangerment of USDWs* (p. 12-11). |
| | N.D.A.C. § 43-05-01-05(1)(d) | **N.D.A.C. § 43-05-01-05(1)(d)**<br>d. An emergency and remedial response plan pursuant to section 43-05-01-13; | b. An emergency and remedial response plan; | **7.0 EMERGENCY AND REMEDIAL RESPONSE PLAN** (p. 7-1)<br>Summit Carbon Storage #2, LLC (SCS2) requires all employees, contractors, and agents to follow the company emergency and remedial response plan (ERRP) for BK Fischer. The purpose of the ERRP is to provide guidance for quick, safe, and effective response to an emergency to protect the public, all responders, company personnel, and the environment.<br><br>This ERRP for the geologic storage project 1) describes the local resources and infrastructure in proximity to the project site; 2) identifies events that have the potential to endanger underground sources of drinking water (USDW) during the construction, operation, and postinjection site care phases of the geologic storage project, building upon the screening-level risk assessment (SLRA); and 3) describes the response actions that are necessary to manage these risks to USDWs. In addition, this ERRP describes the emergency response team and command structure, injection facility evacuation plans, HazMat (hazardous materials) capabilities, and emergency communication plans. Lastly, procedures are presented for regularly conducting an evaluation of the adequacy of the ERRP and updating it, if warranted, over the lifetime of the geologic storage project. Copies of this ERRP are available at the company's nearest operational office and at the geologic storage facility. | **Table 7-3.** Primary SCS2 Contacts (p. 7-4)<br><br>**Figure 7-2**. Off-site emergency notification list. Emergency management service (EMS) districts, fire districts, law enforcement agencies, and Local Emergency Planning Committee (LEPC) jurisdictions with response jurisdictions intersecting with the BK Fischer storage facility area (SFA) will be provided a copy of this ERRP. (p. 7-5)<br><br>**Figure 7-3**. Map showing emergency management service (EMS) response zones including, and within the vicinity of, BK Fischer. Also included on this map are the planned $CO_2$ injection wells, stratigraphic and reservoir-monitoring wells, flowline(s), MCE pipeline, and state and federal roads. (p. 7-6)<br><br>**Figure 7-4** Map showing fire response zones including, and within the vicinity of, BK Fischer. Also included on this map are the planned $CO_2$ |

| Subject | N.D.C.C. / N.D.A.C. Reference | Requirement | Regulatory Summary | Storage Facility Permit Application (Section and Page Number; see main body for reference cited) | Figure/Table Number and Description (Page Number) |
|---|---|---|---|---|---|
| | | | | | injection wells, stratigraphic and reservoir-monitoring wells, flowline(s), MCE pipeline, and state and federal roads. (p.7-7)<br><br>**Figure 7-5.** Map showing law enforcement response zones including, and within the vicinity of, BK Fischer. Also included on this map are the planned $CO_2$ injection wells, stratigraphic and reservoir-monitoring wells, flowline(s), MCE pipeline, and state and federal roads. (p.7-8)<br><br>**Table 7-4.** Off-Site Emergency Notification/PSAP Phone List (p.7-9)<br><br>**Table 7-5.** Potential Project Emergency Events and Their Detection (p.7-11)<br><br>**Table 7-6.** Actions Necessary to Determine Cause of Events and Appropriate Emergency Response (p.7-13)<br><br>**Figure 7-6**. Emergency notification flowchart. (p.7-20)<br><br>**Table 7-7.** DMR-O&G UIC Program Management Contact (p.7-21)<br><br>**Table 7-8.** Potential Contractor and Services Providers (p.7-23) |
| | N.D.A.C. § 43-05-01-05(1)(e) | **N.D.A.C. § 43-05-01-05(1)** e. A detailed worker safety plan that addresses carbon dioxide safety training and | c. A detailed worker safety plan that addresses the following:<br>i. Carbon dioxide safety training | **8.0 WORKER SAFETY PLAN** (p. 8-1) | N/A |

| Subject | N.D.C.C. / N.D.A.C. Reference | Requirement | Regulatory Summary | Storage Facility Permit Application (Section and Page Number; see main body for reference cited) | Figure/Table Number and Description (Page Number) |
|---|---|---|---|---|---|
| | | safe working procedures at the storage facility pursuant to section 43-05-01-13; | ii. Safe working procedures at the storage facility; | | |
| | N.D.A.C. § 43-05-01-05(1)(f) | **N.D.A.C. § 43-05-01-05(1)**<br>f. A corrosion monitoring and prevention plan for all wells and surface facilities pursuant to section 43-05-01-15; | d. A corrosion monitoring and prevention plan for all wells and surface facilities; | **5.3 $CO_2$ Flowline Corrosion Prevention and Detection Plan (p. 5-14)**<br>The purpose of this plan is to prevent and detect any signs of corrosion in the flowline.<br><br>***5.3.1 Corrosion Prevention***<br>To protect against corrosion, an external fusion-bonded epoxy coating will be applied to the NDL-325 flowline. Flowline installed by trenchless methods, such as road crossings, will also have an abrasion-resistant overcoat installed as a secondary coating, over the fusion-bonded epoxy, prior to installation.<br><br>SCS2 will install an impressed current cathodic protection (ICCP) system along the buried flowline to mitigate the threat of external soil corrosion on the line. The ICCP system, which will be continuously monitored, involves the installation of deep anode beds along the flowline that are connected to external power through a rectifier. The power provides the current needed to drive an electrochemical reaction whereby the anodes corrode instead of the flowline. Except for a rectifier, junction box, and small diameter vent pipe posted above the anode beds, the ICCP system will be buried.<br><br>Because the $CO_2$ stream will contain only trace amounts of water (Table 5-3), SCS2 will operate the surface facilities above the saturation point of water to prevent corrosive conditions from forming.<br><br>***5.3.2 Corrosion Detection***<br>Real-time, continuous monitoring of the $CO_2$ flowline with P/T gauges and Coriolis mass flowmeter measurements from the pump/metering building to the point of transfer combined with continuous analysis of the $CO_2$ stream with the gas chromatograph will provide strong evidence that noncorrosive conditions are maintained in the flowline during injection operations. The equipment will be spliced to the SCADA system and have automated triggers and alarms for alerting SCS2 of any anomalous readings.<br><br>The flowline segment from point of transfer to the pipeline inspection gauge (PIG) receiver (shown on Figure 5-3) will allow the passage of internal inspection devices (commonly referred to as “smart PIGs”), which are designed to detect certain internal and external anomalies in the line, such as loss of mass/wall thickness, dents, pitting, cracking, and scratches. The launchers and receiver facilities are designed to launch and receive these internal inspection devices along with other types of PIGs (e.g., maintenance pigs). The launchers and receivers will be located at standalone sites in Oliver and Mercer Counties. The frequency for running PIGs in the flowline during operations is described in Table 5-2.<br><br>In addition to the activities described above, SCS2 will install at least one electrical resistance (ER) probe along the $CO_2$ flowline upstream of the gas chromatograph to continuously monitor for loss of mass throughout the operational phase. The ER probe will be spliced to the SCADA system for real-time monitoring and will be removable for visual inspection and replacement, if required. The SCADA system will have automated triggers and alarms for alerting SCS2 of any anomalous readings.<br><br>**5.6 Wellbore Corrosion Prevention and Detection Plan (p. 5-21)**<br>The purpose of this corrosion prevention and detection plan is to monitor the well materials to ensure they meet the minimum standards for material strength and performance, pursuant to N.D.A.C. § 43-05-01-11.4(1)(c).<br><br>***5.6.1 Downhole Corrosion Prevention***<br>To prevent corrosion of the well materials in the BK Fischer 1 and 2 wellbores, the following preemptive measures will be implemented: 1) cement opposite of the injection interval and extending to the differential valve (DV) staging tool above the top of the Mowry Formation will be $CO_2$-resistant; 2) the well casing will also be $CO_2$-resistant from the bottomhole to just above the Opeche/Spearfish Formation and from below the top of the Swift Formation to just below the top of the Skull Creek Formation; 3) the well tubing will be $CO_2$-resistant from the injection interval to surface; 4) the packer will be $CO_2$-resistant; and 5) the packer fluid will be an industry standard corrosion inhibitor. The tubing-casing annulus will be filled with the packer fluid system that is planned to be a brine-based fluid treated with antimicrobial biocide, corrosion inhibitor, and oxygen scavenger to minimize potential corrosive effects of soluble oxygen.<br><br>To prevent corrosion of the well materials in the Archie Erickson 2 wellbore, the following preemptive measures are implemented: 1) cement opposite the injection interval and extending to the differential valve (DV) staging tool above the top of the Mowry Formation is $CO_2$-resistant; 2) the well casing is $CO_2$-resistant from 200 feet below the top of the Amsden Formation to 161 feet above the top of the Opeche/Spearfish | **Figure 5-2.** Map detailing $CO_2$ flowline path to $CO_2$ injection wellsite (left) and layout of surface facilities at the wellsite (right), illustrating key surface facilities leak detection and monitoring equipment. Soil gas profile station, MSG02, and groundwater well, MGW10, off-pad monitoring locations are also shown. (p. 5-11)<br><br>**Figure 5-3.** Generalized flow diagram from the point of transfer to the BK Fischer 1 $CO_2$ injection well, illustrating key surface facilities’ connections and monitoring equipment. The flow diagram is identical for the BK Fischer 2 $CO_2$ injection well (not shown). (p. 5-12)<br><br>**Table 5-3.** $CO_2$ Stream System Specification (p. 5-9) |

| Subject | N.D.C.C. / N.D.A.C. Reference | Requirement | | Regulatory Summary | Storage Facility Permit Application (Section and Page Number; see main body for reference cited) | Figure/Table Number and Description (Page Number) |
|---|---|---|---|---|---|---|
| | | | | | Formation and from 225 feet below the top of the Swift Formation to 236 feet above the top of the Mowry Formation; and 3) the long-string casing is filled with an industry standard corrosion inhibitor.<br><br>Figures 11-2, 11-4, and 11-5 in Section 11.0 illustrate the downhole corrosion prevention measures in each of the wellbores.<br><br>***5.6.2 Downhole Corrosion Detection***<br>PNLs will be run in the BK Fischer 1 and 2 and Archie Erickson 2 wellbores to detect saturations of $CO_2$. Further investigative methods of inspecting for corrosion in the wellbore could include ultrasonic logging or other equivalent CIL when required. Tables 5-1 and 5-2 specify the sampling frequency for acquiring data related to this downhole corrosion detection plan. | |
| | N.D.A.C. § 43-05-01-05(1)(g) | **N.D.A.C. § 43-05-01-05(1)**<br>g. A leak detection and monitoring plan for all wells and surface facilities pursuant to section 43-05-01-14. The plan must:<br><br>(1) Identify the potential for release to the atmosphere;<br><br>(2) Identify potential degradation of ground water resources with particular emphasis on underground sources of drinking water; and<br><br>(3) Identify potential migration of carbon dioxide into any mineral zone in the facility area. | e. | A surface leak detection and monitoring plan for all wells and surface facilities pursuant to N.D.A.C. § 43-05-01-14; | **5.2 Surface Facilities Leak Detection Plan (p. 5-10)**<br>The purpose of this leak detection plan is to specify the monitoring strategies SCS2 will use to quantify any losses of $CO_2$ from surface facilities during operations. Surface facilities include the $CO_2$ injection wellheads (BK Fischer 1 and 2), the reservoir-monitoring wellhead (Archie Erickson 2), and the NDL-325 $CO_2$ flowline, which begins at the first weld seam downstream of the NDL-325/NDL-327 connection (i.e., point of transfer, PLR-26) and ends at the inlet valve upstream of the automated emergency shutoff valve at each $CO_2$ injection wellhead. Figure 5-2 illustrates the $CO_2$ flowline path to $CO_2$ injection wellsite, and Figure 5-3 is a generalized flow diagram from the point of transfer to the $CO_2$ injection wellheads, illustrating key surface facilities' connections and monitoring equipment.<br><br>As illustrated in Figure 5-3, leak detection equipment includes 1) P/T gauges along the flowline, 2) a Coriolis mass flowmeter placed near each of the injection wellheads, and 3) gas detection stations placed on the $CO_2$ injection wellheads pursuant to N.D.A.C. § 43-05-01-14(1) and inside the pump/metering building. The gas detection stations, which will detect gases such as $CO_2$, methane ($CH_4$), and hydrogen sulfide ($H_2S$), will have automated triggers and alarms to alert SCS2 of any anomalous readings. The SCADA system, which will continuously collect data streams from the leak detection equipment in real time, will also monitor for leaks with leak detection software.<br><br>Field personnel from SCS2 will have multigas detectors with them for visiting wellsites or conducting flowline inspections. In addition, gas detection safety lights (part of the integrated alarm system) will be placed outside of the pump/metering building to warn field personnel of potential indoor air quality threats. | N/A |
| | N.D.A.C. § 43-05-01-05(1)(h) | **N.D.A.C. § 43-05-01-05(1)**<br>h. A leak detection and monitoring plan to monitor any movement of the carbon dioxide outside of the storage reservoir. This may include the collection of baseline information of carbon dioxide background concentrations in ground water, surface soils, and chemical composition of in situ waters within the facility area and the storage reservoir and within one mile [1.61 kilometers] of the facility area's outside boundary. Provisions in the plan will be dictated by the site characteristics as documented by materials | f. | A subsurface leak detection and monitoring plan to monitor for any movement of the carbon dioxide outside of the storage reservoir. This may include the collection of baseline information of carbon dioxide background concentrations in ground water, surface soils, and chemical composition of in situ waters within the facility area and the storage reservoir and within one mile of the facility area's outside boundary; | **5.7 Environmental Monitoring Plan (p. 5-22)**<br>To verify the injected $CO_2$ is contained in the storage reservoir, protect all USDW, and demonstrate hydrogeologic properties of the storage reservoir, multiple environments will be monitored.<br><br>As required by N.D.A.C. § 43-05-01-11.4(1)(d) and (h), the near-surface environment, defined as the region from the surface down to the lowest USDW (Fox Hills Aquifer), will be monitored by sampling and analyzing vadose-zone soil gas at two soil gas profile stations, one new Fox Hills monitoring well, and up to five existing groundwater wells.<br><br>The deep subsurface environment, defined as the region from below the lowest USDW to the base of the storage reservoir, will be monitored with multiple methods, starting with the above-zone monitoring interval (AZMI) or the geologic interval from the confining zone above the storage reservoir to the confining zone above the next permeable zone above the storage reservoir (i.e., Opeche/Spearfish Formation to the Skull Creek Formation). The AZMI will be continuously monitored with DTS fiber optics in the BK Fischer 1 and 2 wellbores as well as PNLs.<br><br>Pursuant to N.D.A.C. § 43-05-01-11.4(1)(g), the storage reservoir will be monitored with both direct and indirect methods. Direct methods include continuous fiber optics (DTS) and downhole P/T measurements in the BK Fischer 1 and 2 and Archie Erickson 2 wells, and falloff tests and PNLs in the BK Fischer 1 and 2 wellbores. Falloff testing analysis will provide reservoir pressure data and the completion condition including transmissibility, skin factor, and well flowing and static pressure data for technical adequacy to demonstrate no migration from the reservoir. Indirect methods include time-lapse seismic surveys. These efforts will provide assurance that surface and near-surface environments are protected and that the injected $CO_2$ is safely and permanently contained in the storage reservoir. In addition, SCS2 will install multiple seismometer stations for passively detecting and locating seismic events. | |

| Subject | N.D.C.C. / N.D.A.C. Reference | Requirement | Regulatory Summary | Storage Facility Permit Application (Section and Page Number; see main body for reference cited) | Figure/Table Number and Description (Page Number) |
|---|---|---|---|---|---|
| | | submitted in support of the permit application but must:<br><br>(1) Identify the potential for release to the atmosphere;<br><br>(2) Identify potential degradation of ground water resources with particular emphasis on underground sources of drinking water; and<br><br>(3) Identify potential migration of carbon dioxide into any mineral zone in the facility area. | | ***5.7.1 Soil Gas Monitoring***<br>Vadose zone soil gas monitoring directly measures the characteristics of the air space between soil components and is an indirect indicator of both chemical and biological processes occurring in and below a sampling horizon. Two permanent soil gas profile stations installed adjacent to both the $CO_2$ injection and Archie Erickson 2 well pads will be sampled, as shown in Figure 5-4.<br>Figure 5-5 is a typical wellbore schematic of a soil gas profile station.<br><br>The sampling frequency for soil gas is summarized in Tables 5-1 and 5-2. During injection, SCS2 may install additional replacement or alternative soil gas sampling sites based on monitoring data results. SCS2 will notify DMR-O&G if either replacement or alternative soil gas sampling sites are added pursuant to N.D.A.C. § 43-05-01-18(2). The results of the baseline soil gas sampling program will be provided to DMR-O&G prior to injection.<br><br>***5.7.2 Groundwater Monitoring***<br>Groundwater monitoring directly measures the chemical constituents of the water in the pore space between grains of subsurface geologic formations (aquifers) and is an indirect indicator of both chemical and biological processes occurring in and below a sampling horizon. Figure 5-4 identifies the sampling locations associated with the near-surface baseline and operational monitoring plan, which includes one new Fox Hills monitoring well, and up to five existing groundwater wells.<br><br>SCS2 will work with landowners of the five existing groundwater wells (MGW01, MGW03, MGW05, MGW06, and MGW08) to attempt to collect samples as specified in Tables 5-1 and<br>5-2. The number of samples collected from each existing groundwater well may vary by location, since some of the groundwater wells may not be operated year-round or site accessibility may be limited (e.g., snow cover during winter months). If SCS2 is unable to access the wells because of operational status or access concerns, the reason why the sample is unable to be collected will be documented. An attempt was made to identify alternative wells that operate year-round with reduced access concerns but produced no results.<br><br>SCS2 will install one Fox Hills monitoring well (MGW10) adjacent to the injection well pad (as shown in Figure 5-4). The Fox Hills monitoring well will be sampled according to the sampling frequency specified in Tables 5-1 and 5-2.<br><br>SCS2 reserves the right to evaluate and modify, if necessary, appropriate groundwater sampling locations and frequency based on conformance of the $CO_2$ plume extent in the subsurface. SCS2 will notify DMR-O&G if alternative or new water wells are added to the sampling program pursuant to N.D.A.C. § 43-05-01-18(2).<br><br>Appendix B includes a baseline dataset of available geochemistry results for 35 monitoring sites within the area of review (AOR) boundary. The data were obtained from the Public Service Commission (PSC) and Department of Water Resources (DWR). These shallow groundwater wells were excluded from the baseline and operational monitoring plan primarily because they did not meet the depth criterion used to select wells for inclusion in the testing and monitoring plan.<br><br>***5.7.3 Deep Subsurface Monitoring***<br>Pursuant to N.D.A.C. § 43-05-01-11.4(1)(g), SCS2 will implement direct and indirect methods to monitor the location, thickness, and distribution of the free-phase $CO_2$ plume and associated pressure relative to the permitted storage reservoir. The direct and indirect storage reservoir monitoring methods described in this subsection of the permit application will be used to characterize the $CO_2$ plume's saturation and pressure within the AOR for the baseline and operational phases.<br><br>*5.7.3.3 Direct Reservoir Monitoring*<br>DTS fiber optics installed in the BK Fischer 1 and 2 and Archie Erickson 2 wellbores will directly monitor the temperature of the storage reservoir. P/T readings from the casing-conveyed gauges in the $CO_2$ injection wells will also monitor conditions in the storage reservoir. To track the pressure front from $CO_2$ injection in the storage reservoir, pressure will be measured continuously from the casing-conveyed P/T gauge installed in the Archie Erickson 2 well. To track the $CO_2$ plume in the storage reservoir, the DTS fiber-optic cable and temperature measurements from the casing-conveyed P/T gauge installed in the Archie Erickson 2 well will be used to estimate the timing of arrival of the $CO_2$ plume at the reservoir-monitoring well. The pressure and temperature data will be used to ensure the monitoring data from the Broom Creek Formation (from Amsden through Opeche/Spearfish Formation) is conforming to the geologic model and numerical simulations. Pressure falloff tests will also be performed in the $CO_2$ injection to demonstrate the performance of the storage reservoir. | |

| Subject | N.D.C.C. / N.D.A.C. Reference | Requirement | Regulatory Summary | Storage Facility Permit Application (Section and Page Number; see main body for reference cited) | Figure/Table Number and Description (Page Number) |
|---|---|---|---|---|---|
| | | | | *5.7.3.5 Indirect Reservoir Monitoring*<br>SCS2 will acquire 3D time-lapse seismic surveys to track the extent of the $CO_2$ plume within the storage reservoir. The 200-$mi^2$ 3D Beulah seismic survey referenced in Section 2.0 will serve as the baseline survey. To demonstrate conformance between the reservoir model simulation and site performance, a localized 3D seismic survey will be collected to monitor the extent of the $CO_2$ plume, as shown in Figure 5-6 and detailed in Table 5-2.<br><br>SCS2 will reevaluate the testing and monitoring plan, inclusive of the design and frequency of the repeat 3D seismic surveys, at least once every 5 years as required. If necessary, the time-lapse seismic monitoring strategy will be adapted based on updated simulations of the predicted extents of the $CO_2$ plume, including expanding the 3D survey area to capture additional data as the $CO_2$ plume expands in the storage reservoir.<br><br>**5.9 Adaptive Management Approach (p. 5-33)**<br>SCS2 will employ an adaptive management approach to implementing the testing and monitoring plan by completing periodic reviews of the testing and monitoring plan (Ayash and others, 2017) at least once every 5 years. During each review, monitoring and operational data will be analyzed, and the AOR will be reevaluated. Based on this reevaluation, it will either be demonstrated that 1) no amendment to the testing and monitoring program is needed or 2) modifications are necessary to ensure proper monitoring of storage performance is achieved moving forward. This determination will be submitted to DMR-O&G for approval. Should amendments to the testing and monitoring plan be necessary, they will be incorporated into the permit following approval by DMR-O&G. Over time, monitoring methods and data collection may be supplemented or replaced as advanced techniques are developed.<br><br>Monitoring and operational data will be used to evaluate conformance between observations and history-matched simulation of the $CO_2$ plume and pressure distribution relative to the permitted geologic storage facility. If significant variance is observed, the monitoring and operational data will be used to calibrate the geologic model and associated simulations. The monitoring plan will be adapted to provide suitable characterization and calibration data as necessary to achieve such conformance. Subsequently, history-matched predictive simulation and model interpretations will, in turn, be used to inform adaptations to the monitoring program to demonstrate lateral and vertical containment of the injected $CO_2$ within the permitted geologic storage facility. | |
| | N.D.A.C. § 43-05-01-05(1)(l) | **N.D.A.C. § 43-05-01-05(1)**<br>l. A testing and monitoring plan pursuant to section 43-05-01-11.4; | g. A testing and monitoring plan pursuant to N.D.A.C. Section 43-05-01-11.4; | See Section **5.0 TESTING AND MONITORING PLAN**<br><br>Note: See Table 5-1 on p. 5-2; Table 5-2 on p. 5-4; Table 5-3 on p. 5-9; Table 5-4 on p. 5-14; Table 5-5 on p. 5-19; and Table 5-6 on p. 5-20, for detailed summaries of the testing and monitoring plan. | **Table 5-1.** Overview of Major Components of the Testing and Monitoring Plan – Preinjection (p. 5-2)<br><br>**Table 5-2.** Overview of Major Components of the Testing and Monitoring Plan – Injection (p. 5-4)<br><br>**Table 5-3.** $CO_2$ Stream System Specification (p. 5-9)<br><br>**Table 5-4.** NDL-325 Flowline Design Specification (p. 5-14)<br><br>**Table 5-5.** Completed Logging and Testing Activities for Archie Erickson 2 (p. 5-19) |

| Subject | N.D.C.C. / N.D.A.C. Reference | Requirement | Regulatory Summary | Storage Facility Permit Application (Section and Page Number; see main body for reference cited) | Figure/Table Number and Description (Page Number) |
|---|---|---|---|---|---|
| | | | | | **Table 5-6.** Logging and Testing Plan for the BK Fischer 1 and 2 Wellbores (p. 5-20) |
| | N.D.A.C. § 43-05-01-05(1)(i) | **N.D.A.C. § 43-05-01-05 (1)** i. The proposed well casing and cementing program detailing compliance with section 43-05-01-09; | h. The proposed well casing and cementing program; | **9.0 WELL CASING AND CEMENTING PROGRAM** (p. 9-1) | **Figure 9-1**. BK Fischer 1 proposed wellbore schematic. (p. 9-2)<br><br>**Figure 9-2**. BK Fischer 1 proposed wellbore trajectory. (p. 9-3)<br><br>**Figure 9-3.** BK Fischer 2 proposed wellbore schematic. (p. 9-7)<br><br>**Figure 9-4.** BK Fischer 2 proposed wellbore trajectory. (p. 9-8)<br><br>**Figure 9-5**. Archie Erickson 2 as-constructed wellbore schematic. (p. 9-12)<br><br>**Figure 9-6.** Archie Erickson 2 cement evaluation – RCBL from Archie Erickson 2 verifies the cement-bond quality. Using a high-resolution image, the analyst can assess isolation in the $CO_2$ injection zone, confining zones, and USDWs. (p. 9-15) |
| | N.D.A.C. § 43-05-01-05(1)(m) | **N.D.A.C. § 43-05-01-05(1)** m. A plugging plan that meets requirements pursuant to section 43-05-01-11.5; | i. A plugging plan; | ***Refer to Section 10.1 BK Fischer 1: Proposed Injection Well P&A Program (p. 10-1)***<br><br>***Refer to Section 10.2 BK Fischer 2: Proposed Injection Well P&A Program (p. 10-8)***<br><br>***Refer to Section 10.3 Archie Erickson 2: Proposed Reservoir-Monitoring Well P&A Program (p. 10-15)*** | **Figure 10-1**. BK Fischer 1 proposed completion wellbore schematic. (p. 10-2)<br><br>**Figure 10-2.** BK Fischer 1 proposed P&A wellbore schematic. (p. 10-7)<br><br>**Figure 10-3**. BK Fischer 2 proposed completion |

| Subject | N.D.C.C. / N.D.A.C. Reference | Requirement | Regulatory Summary | Storage Facility Permit Application (Section and Page Number; see main body for reference cited) | Figure/Table Number and Description (Page Number) |
|---|---|---|---|---|---|
| | | | | | wellbore schematic. (p. 10-9)<br><br>**Figure 10-4.** BK Fischer 2 proposed P&A wellbore schematic (p. 10-14)<br><br>**Figure 10-5.** Archie Erickson 2 proposed completion wellbore schematic. (p. 10-16)<br><br>**Figure 10-6.** Archie Erickson 2 proposed P&A wellbore schematic. (p. 10-21) |
| | N.D.A.C. § 43-05-01-05(1)(n) | **N.D.A.C. § 43-05-01-05(1)** n. A postinjection site care and facility closure plan pursuant to section 43-05-01-19; and | j. A post-injection site care and facility closure plan. | **6.0 POSTINJECTION SITE AND FACILITY CLOSURE PLAN (p. 6-1)**<br><br>Note: Refer to Table 6-1 on p. 6-2 | **Table 6-1.** Overview of Postinjection Testing and Monitoring Activities[1] (p. 6-2) |
| **Storage Facility Operations** | N.D.A.C. § 43-05-01-05(1)(b)(4) | **N.D.A.C. § 43-05-01-05(1)(b)**<br>(4) The proposed calculated average and maximum daily injection rates, daily volume, and the total anticipated volume of the carbon dioxide stream using a method acceptable to and filed with the commission; | The following items are required as part of the storage facility permit application:<br><br>a. The proposed average and maximum daily injection rates; | **11.0 INJECTION WELL AND STORAGE OPERATIONS (p. 11-1)**<br>This section of the storage facility permit (SFP) application presents the engineering criteria for completing and operating the injection wells in a manner that protects underground sources of drinking water (USDWs). The information that is presented in Section 11.0 and Table 11-1 meets the permit requirements for injection well and storage operations as documented in North Dakota Administrative Code (N.D.A.C.) § 43-05-01-05 and § 43-05-01-11.3. Planned well logging and testing activities and monitoring activities can be found in Sections 5.0 and 6.0. | **Table 11-1.** BK Fischer 1 and BK Fischer 2: Proposed Injection Wells Operating Parameters (p. 11-1) |
| | | | b. The proposed average and maximum daily injection volume; | **Table 11-1. BK Fischer 1 and BK Fischer 2: Proposed Injection Well Operating Parameters** | |
| | | | c. The proposed total anticipated volume of the carbon dioxide to be stored; | | |

| Subject | N.D.C.C. / N.D.A.C. Reference | Requirement | Regulatory Summary | Storage Facility Permit Application (Section and Page Number; see main body for reference cited) | Figure/Table Number and Description (Page Number) |
|---|---|---|---|---|---|
| | N.D.A.C. § 43-05-01-05(1)(b)(5) | **N.D.A.C. § 43-05-01-05(1)(b)**<br>(5) The proposed average and maximum bottom hole injection pressure to be utilized at the reservoir. The maximum allowed injection pressure, measured in pounds per square inch gauge, shall be approved by the commission and specified in the permit. In approving a maximum injection pressure limit, the commission shall consider the results of well tests and other studies that assess the risks of tensile failure and shear failure. The commission shall approve limits that, with a reasonable degree of certainty, will avoid initiating a new fracture or propagating an existing fracture in the confining zone or cause the movement of injection or formation fluids into an underground source of drinking water; | d. The proposed average and maximum bottom hole injection pressure to be utilized;<br><br>e. The proposed average and maximum surface injection pressures to be utilized; | | |

| Item | Values | Description/Comments | |
|---|---|---|---|
| **Injected Volume** | | | |
| Total Injected Mass/Volume | 98.3 MMt<br>1,857,976 MMcf | Based on a maximum wellhead pressure (WHP) constraint of 2100 psi and maximum bottomhole pressure (BHP) constraint | |
| **Injection Rates** | **BK Fischer 1** | **BK Fischer 2** | **Description/Comments** |
| Average Injection Rate | 8397 tonnes/day<br>(158.7 MMscf/day)<br>3.065 MMt/yr<br>1,158,636 MMcf<br>61.3 MMt | 5068 tonnes/day<br>(95.8 MMscf/day)<br>1.850 MMt/yr<br>699,340 MMcf<br>37.0 MMt | Based on a maximum WHP constraint of 2100 psi and maximum BHP constraint |
| Average Maximum Injection Rate* | 26,603 tonnes/day<br>(502.8 MMscf/day)<br>9.71 MMt/yr<br>3,670,590 MMcf<br>194.2 MMt | 25,205 tonnes/day<br>(476.4 MMscf/day)<br>9.20 MMt/yr<br>3,477,798 MMcf<br>184.0 MMt | Based on maximum BHP with only one well injecting at a time:<br>BK Fischer 1: 3633 psi<br>BK Fischer 2: 3624 psi |
| **Depth** | **BK Fischer 1** | **BK Fischer 2** | **Description/Comments** |
| Depth (true vertical depth [TVD]) of the top perforation used in the BHP calculation | 5841 | 5828 | Depths are for simulation modeling, taken prior to final site survey |
| **Pressure (psi)** | **BK Fischer 1** | **BK Fischer 2** | **Description/Comments** |
| Formation Fracture Pressure at Top Perforation | 4037 | 4027 | Based on geomechanical analysis of formation fracture gradient as 0.691 psi/ft |
| Average Surface Injection Pressure | 1903 | 1660 | Based on a maximum WHP constraint of 2100 psi and maximum BHP constraint (Figure 3-10) |
| Maximum Surface Injection Pressure* | 7800 | 8000 | Based on maximum BHP with only one well injecting at a time (using the designed 7-in. tubing):<br>BK Fischer 1: 3633 psi<br>BK Fischer 2: 3624 psi |
| **Pressure (psi)** | **BK Fischer 1** | **BK Fischer 2** | **Description/Comments** |
| Average BHP | 3630 | 3624 | Based on a maximum WHP constraint of 2100 psi and maximum BHP constraint |
| Calculated Maximum BHP | 3633 | 3624 | Based on 90% of the formation fracture pressure:<br>BK Fischer 1: 4037 psi<br>BK Fischer 2: 4027 psi |

*Maximum injection pressure during operations will be limited to the surface equipment pressure ratings and maximum BHP constraint

<table>
<tr><th>Subject</th><th>N.D.C.C. / N.D.A.C. Reference</th><th>Requirement</th><th>Regulatory Summary</th><th>Storage Facility Permit Application<br>(Section and Page Number; see main body for reference cited)</th><th>Figure/Table Number and Description<br>(Page Number)</th></tr>
<tr><td></td><td>N.D.A.C. § 43-05-01-05(1)(b)(6)</td><td>N.D.A.C. § 43-05-01-05(1)(b)<br>(6) The proposed preoperational formation testing program to obtain an analysis of the chemical and physical characteristics of the injection zone and confining zone pursuant to section 43-05-01-11.2;</td><td>f. The proposed preoperational formation testing program to obtain an analysis of the chemical and physical characteristics of the injection zone;<br><br>g. The proposed preoperational formation testing program to obtain an analysis of the chemical and physical characteristics of the confining zone;</td><td>
5.5 Baseline Wellbore Logging and Testing Plan (p. 5-18)<br>
Pursuant to N.D.A.C. § 43-05-01-11.2, SCS2 will collect baseline well-logging and -testing measurements from subsurface geologic formations in the $CO_2$ injection wellbores to 1) verify the depth, thickness, porosity, permeability, lithology, and salinity of the storage complex; 2) ensure conformance with the injection well construction requirements; and 3) establish accurate baseline data for making future time-lapse measurements. Baseline well-logging and -testing measurements will also be collected from the reservoir-monitoring well.<br><br>
Table 5-5 specifies baseline well-logging and -testing activities completed in the reservoir-monitoring well (Archie Erickson 2), and Table 5-6 identifies the well-logging and -testing plan for the BK Fischer 1. The plan for the BK Fischer 2 wellbore will be the same as what is presented for the BK Fischer 1 but may exclude dipole sonic logging (assuming dipole sonic logging is successful in the BK Fischer 1).<br><br>
Tables 5-1 and 5-2 specify well-logging and -testing activities associated with establishing mechanical integrity and monitoring the deep subsurface, including the storage complex. Coring activities are described separately in the Section 9.0 as-drilled wellbore diagrams for BK Fischer 1 and 2 and in the text in Section 2.0 for Archie Erickson 2.<br><br>
SCS2 will provide DMR-O&G with an opportunity to witness all well-logging and -testing activities as required under N.D.A.C. § 43-05-01-11.2(6).<br><br>
See Appendix A: WELL AND WELL FORMATION FLUID SAMPLING LABORATORY ANALYSIS<br><br>
2.0 GEOLOGIC EXHIBITS<br>
Refer to 2.2 Data and Information Sources (p. 2-4)<br>
Refer to 2.2.2 Site-Specific Data (p. 2-6)<br><br>
2.2.2.2 Core Sample Analyses (p. 2-8)<br>
Four hundred fifty (450) ft of 4-in whole core was recovered from the storage complex in the Archie Erickson 2: 97 ft core from the Opeche/Spearfish Formation, 303 ft core from the Broom Creek Formation, and 50 ft core from the Amsden Formation. Core was analyzed to characterize the lithologies of the Opeche/Spearfish, Broom Creek, and Amsden Formations and correlated to the well log data. A core gamma ray log was acquired and matched to wireline gamma ray-to-depth correct core depth measurements (Table 2-2a). Core analyses included porosity and permeability measurements, x-ray diffraction (XRD), x-ray fluorescence (XRF), thin-section analysis, scanning electron microscopy (SEM), interfacial tension (IFT) and contact angle (CA), geomechanics and capillary entry pressure measurements. The results were used to inform geologic modeling and predictive simulation inputs and assumptions, geochemical modeling, and geomechanical modeling.<br><br>
Table 5-5. Completed Logging and Testing Activities for Archie Erickson 2 (p. 5-19)
<table>
<tr><th></th><th>Logging/Testing</th><th>Justification</th></tr>
<tr><td>Surface Section</td><td>Open-hole logs: triple combo (resistivity and neutron and density porosity), dipole sonic, spontaneous potential (SP), GR, caliper, and temperature</td><td>Quantified variability in reservoir properties, such as resistivity and lithology, and measured hole conditions. Identified mechanical properties, including stress anisotropy. Provided compression and shear waves for seismic tie-in and quantitative analysis of the seismic data.</td></tr>
<tr><td></td><td>Cased-hole logs: ultrasonic and array sonic tools (inclusive of CCL, VDL, and RCBL), GR, and temperature</td><td>Identified cement bond quality radially, evaluated the cement top and zonal isolation, and established external mechanical integrity. Established baseline temperature profile.</td></tr>
</table>
</td><td>Table 5-6. Logging and Testing Plan for the BK Fischer 1 and 2 Wellbores<br>(p. 5-20)</td></tr>
</table>

| Subject | N.D.C.C. / N.D.A.C. Reference | Requirement | Regulatory Summary | Storage Facility Permit Application (Section and Page Number; see main body for reference cited) | | | Figure/Table Number and Description (Page Number) |
|---|---|---|---|---|---|---|---|
| | | | | Long-String Section | Open-hole logs:<br>triple combo and spectral GR | Quantified variability in reservoir properties, including resistivity, porosity, and lithology. Provided input for enhanced geomodeling and predictive simulation of $CO_2$ injection into the interest zones to improve interpretations. Identified mechanical properties, including stress anisotropy. Provided compression and shear waves for seismic tie-in and quantitative analysis of the seismic data. | |
| | | | | | Open-hole log: dipole sonic | Identified mechanical properties, including stress anisotropy. | |
| | | | | | Open-hole log: fracture finder log | Quantified fractures in the Broom Creek Formation and confining layers to ensure safe, long-term storage of $CO_2$. | |
| | | | | | Open-hole log: combinable magnetic resonance (CMR) | Interpreted reservoir properties (e.g., porosity and permeability) and determined the best location for pressure test depths, formation fluid sampling depths, and stress testing depths. | |
| | | | | | Open-hole log: fluid sampling (modular formation dynamics tester) | Collected fluid samples from the Inyan Kara and Broom Creek Formation for analysis. Collected in situ microfracture stress tests in the Broom Creek and Opeche/Spearfish Formation for formation breakdown pressure, fracture propagation pressure, and fracture closure pressure. | |
| | | | | | Cased-hole logs: ultrasonic and array sonic tools (inclusive of CCL, VDL, RCBL), GR, and temperature | Identified cement bond quality radially, evaluated the cement top and zonal isolation, confirmed mechanical integrity, and established baseline temperature profile. | |
| | N.D.A.C. § 43-05-01-05(1)(b)(7) | **N.D.A.C. § 43-05-01-05(1)(b)**<br>(7) The proposed stimulation program, a description of stimulation fluids to be used, and a determination that stimulation will not interfere with containment; and | h. The proposed stimulation program:<br>1. A description of the stimulation fluids to be used<br>2. A determination of the probability that stimulation will interfere with containment | **11.0 INJECTION WELL AND STORAGE OPERATIONS (p. 11-1)**<br>This section of the storage facility permit (SFP) application presents the engineering criteria for completing and operating the injection wells in a manner that protects underground sources of drinking water (USDWs). The information that is presented in Section 11.0 and Table 11-1 meets the permit requirements for injection well and storage operations as documented in North Dakota Administrative Code (N.D.A.C.) § 43-05-01-05 and § 43-05-01-11.3. Planned well logging and testing activities and monitoring activities can be found in Sections 5.0 and 6.0. | | | N/A |
| | N.D.A.C. § 43-05-01-05(1)(b)(8) | **N.D.A.C. § 43-05-01-05(1)(b)**<br>(8) The proposed procedure to outline steps necessary to conduct injection operations. | i. Steps to begin injection operations | **11.0 INJECTION WELL AND STORAGE OPERATIONS (p. 11-1)**<br>This section of the storage facility permit (SFP) application presents the engineering criteria for completing and operating the injection wells in a manner that protects underground sources of drinking water (USDWs). The information that is presented in Section 11.0 and Table 11-1 meets the permit requirements for injection well and storage operations as documented in North Dakota Administrative Code (N.D.A.C.) § 43-05-01-05 and § 43-05-01-11.3. Planned well logging and testing activities and monitoring activities can be found in Sections 5.0 and 6.0.<br><br>***Refer to Table 11-1. Injection Well and Storage Operations (p. 11-1)***<br><br>***Refer to Section 11.1 BK Fischer 1: Proposed Completion Procedure to Conduct Injection Operations (p. 11-2)***<br><br>***Refer to Section 11.2 BK Fischer 2: Proposed Completion Procedure to Conduct Injection Operations (p. 11-10)*** | | | N/A |

| | |
|---|---|
| **From:** | Forsberg, Sara L. |
| **Bcc:** | jvolk@summitcarbon.com; LBender@fredlaw.com; Anderson, Carl J.; Murphy, Ed C.; Paczkowski, John A.; boomgaard.craig@epa.gov; Minter.Douglas@epa.gov; ndfieldoffice@fws.gov; achp@achp.gov; Williams, Jeb R.; Peterson, Bill; lwickstr@blm.gov; BLM_MT_North_Dakota_FO@blm.gov; Kbear@mhanation.com; slhall@mhanation.com; texx@restel.com; klyson@mhanation.com; chairmanfox@mhanation.com; Cynthia.monteau@Tax-MHANation.com; ceverett@mhanation.com; luke_toso@fws.gov; sgermann@blm.gov |
| **Subject:** | NDIC Notice of Hearing - Summit Carbon Solutions #1 LLC; Summit Carbon Solutions #2 LLC; and Summit Carbon Solutions #3 LLC |
| **Date:** | Tuesday, April 16, 2024 1:28:00 PM |
| **Attachments:** | image001.png<br>Summit Carbon Storage #1 - Notice of Hearing.pdf<br>Summit Carbon Storage #2 - Notice of Hearing.pdf<br>Summit Carbon Storage #3 - Notice of Hearing.pdf |

---

The attached hearing notice is sent pursuant to North Dakota Administrative Code Section 43-05-01-08(5). The fact sheet, storage facility permit application, and draft permit are available for download at:

Class VI - Geologic Sequestration Wells | Department of Mineral Resources, North Dakota (nd.gov)

Thank you,


Sara Forsberg
Legal Assistant, Oil and Gas Division

701.328.8020 • slforsberg@nd.gov • www.dmr.nd.gov

NORTH Dakota | Mineral Resources
Be Legendary.

701.328.8020 • 600 E Boulevard Ave Dept. 474 • Bismarck, ND 58505

| | |
|---|---|
| **From:** | Forsberg, Sara L. |
| **Bcc:** | -Info-Public Service Commission; Heringer, Joe A.; Schulz, Cody J.; Henke, Ronald J.; Schmidt, Jaden; Koapke, Patricia A.; Reed, Carmen A.; m9wmk@westriv.com; wmmar@westriv.com; rick_bauman1@outlook.com; tfrey.mcc@gmail.com; Rhone, Dawn R.; natalie.pierce@mortonnd.org |
| **Subject:** | NDIC Notice of Hearing - Summit Carbon Solutions #1 LLC; Summit Carbon Solutions #2 LLC; and Summit Carbon Solutions #3 LLC |
| **Date:** | Tuesday, April 16, 2024 1:28:00 PM |
| **Attachments:** | Summit Carbon Storage #1 - Notice of Hearing.pdf<br>Summit Carbon Storage #2 - Notice of Hearing.pdf<br>Summit Carbon Storage #3 - Notice of Hearing.pdf<br>image001.png |

---

The attached hearing notice is sent pursuant to North Dakota Administrative Code Section 43-05-01-08(5). The fact sheet, storage facility permit application, and draft permit are available for download at:

Class VI - Geologic Sequestration Wells | Department of Mineral Resources, North Dakota (nd.gov)

Please contact our office if you have any questions.

Thank you,


Sara Forsberg

Legal Assistant, Oil and Gas Division

701.328.8020 • slforsberg@nd.gov • www.dmr.nd.gov

NORTH Dakota | Mineral Resources

Be Legendary.

701.328.8020 • 600 E Boulevard Ave Dept. 474 • Bismarck, ND 58505

**From:** Forsberg, Sara L.

**Bcc:** thamman@undeerc.org; btownsend@covaliscapital.com; jon.primm@chordenergy.com; Tyler.C.McCormack@hess.com; rklute@ndoil.org; justin.b.sanders@exxonmobil.com; zinran@comcast.net; hillsvalleyranch@gmail.com; don_hochhalter@msn.com; kurt@mapmechanical.com; markfalck@hotmail.com; josh.armstrong@ameritas.com; littlejudyd@gmail.com; ejedison@crowleyfleck.com; ejbrown@blm.gov; kskarda38@gmail.com; tjiang@undeerc.org; philriely@wyomingcasing.com; kforsthoefel@marathonpetroleum.com; jvolk@summitcarbon.com; smartt@onebane.com; chase.tunell@championx.com; burlev@hotmail.com; HullKevin2010@gmail.com; LMHOVDEN@YAHOO.COM; georgina.mccartney@thomsonreuters.com; adforthu@hotmail.com; Parent, Amanda; edelzer@ndoil.org; machterling@northdakotamonitor.com; rainy247@hotmail.com; garrett.gissler@bmo.com; nick.kellerman@fhr.com; nick.english@meridiemcapital.com; peter_garbee@eogresources.com; chad.frost@und.edu; Sanchez, Jessica; Spencer, Lynn; sherry.hovden@gmail.com; keenan.casavant@dteenergy.com; Reiten, John R.; stuber@interwestpetro.com; jeremy.beaman@spglobal.com; gary.minard@carbcapsolutions.com; sxqcloud@icloud.com; Joseph.Harris@bismarcktribune.com; juan@northernenergycorporation.com; cbbenson@srt.com; asalazar@paloduro.com; dant@mail.ee; UPST-UOG-BAKKEN-REGULATORY-DISTRIBUTION@exxonmobil.com; cathy@vcn.com; binish.azhar@spglobal.com; e.uzuegbu@und.edu; britts1@hotmail.com; jjames@enerplus.com; Adam.Schreiner@oneok.com; kjones.mcf@gmail.com; mike.dio@tidal-us.com; tpage@huntenergy.com; mha.energyliaison@gmail.com; Hecker, Garret; arathy.s@tr.com; cmarshall@targaresources.com; findooley@gmail.com; derrick@braatenlawfirm.com; LGARCIA@HEWTEX.COM; cctschirhart@marathonoil.com; brentbrannan@auroraenergyllc.com; ryanokland@gmail.com; ejahner@ndoil.org; brett.holmes@argusmedia.com; ahoffer@summitcarbon.com; swapnil@fusionnd.com; ccarlson@limerockresources.com; michael@newscoopnd.org; ssyvertson@deltaconstructors.net; rcoskey@roseexp.com; bbree45@hotmail.com; tylerh@bepc.com; kjsrental1@gmail.com; publisher@esidney.com; dhuffington@petrotek.com; aim.marcher@comcast.net; jlarson@nacompanies.com; jbradfute@marathonoil.com; paulsonken@tcrfortberthold.com; matthew_maher@tcenergy.com; madison@colgatemanagement.com; jeff.bergeron@exxonmobil.com; jonwgt@viagellc.com; cjacobson@bepc.com; tonya@ironoil.com; cbellet55@gmail.com; Christian.Sizemore@ovintiv.com; zeiken@crowleyfleck.com; matthew.elias@ashlercapital.com; darnell.bortz@kochind.com; chelsea.carpenter@ovintiv.com; will.houser@clr.com; kdarnay@kxnet.com; megan.lindquist@dvn.com; miles.demster@nexteraenergy.com; jessica.gregg@carbonamerica.com; melodyhacker@me.com; klesmann@fibt.com; kanagnost@undeerc.org; abargelski@gmail.com; katrinachristiansen@gmail.com; gburshteyn@wellington.com; courtneyturich@echantillonadvising.com; kate@inlandoil.net; jeggleton@dorahq.com; colsen@undeerc.org; jacob.cullip@outlook.com; orleysinkler@outlook.com; dness777@gmail.com; keith.hapipsr1@gmail.com; klurfeld@nyc.rr.com; charlesb@ajcm.com; mtwocrow@gmail.com; kaylae@jmacresources.com; mark.rainey@radpros.com; mhj303@gmail.com; eliot@drcinfo.com; darst@google.com; cevans@energyintel.com; cebreckon@aol.com; cynthia.fischer7@gmail.com; sarah.leung@hq.doe.gov; christopher.friez@nacco.com; jcather@summitag.com; DJSNOW@MARATHONPETROLEUM.COM; rfvanvoorhees@bclplaw.com; hdemuth@petrotek.com; SHHS70@GMAIL.COM; jay.q@badlandshydrovac.com; smh@rampartenergy.com; tip.meckel@beg.utexas.edu; abdelmalek.bellal@und.edu; JDeWitt@MarathonOil.com; bthoma@gmellc.com; phoenixenergyadvisors@gmail.com; daveb@redtrailenergy.com; rab@inflowpetro.com; snance@catahoularesources.com; ktracy@elysian.cc; clweaver@eprod.com; pmttransport@me.com; dave_french@mckinsey.com; cfgress@yahoo.com; jon@tradesmanadvisors.com; jeb@evosquared.com; levijohns@vitesseoil.com; keefekat@bresnan.net; hvettleson@undeerc.org; JASON_MARTIN@TCENERGY.COM; pdjordan@lbl.gov; jennifer_lee@tcenergy.com; Sales@dacotahwest.com; jerickson@e-m-services.com; nkoudouonambelesimplice@gmail.com; Nodaky12@gmail.com; Tyler.Johannes@Agribank.com; jwilcoxen@cliftygroup.com; Spangelo, Kayla M.; brad@fayglobal.com; juneberry2017@gmail.com; kconnors@undeerc.org; VanEckhout, Brendan F.; brentbrannan@gmail.com; katie@mckennettlaw.com; LEWIS18022@AOL.COM; quimber@yahoo.com; kennethaschmidt@hotmail.com; bpelton@ndoil.org; julia.johnson@agribank.com; effiong@5blogistics.com; redison@nd.gov; jackie.jahfetson@bismarcktribune.com; dthorson@inbox.lv; c-jwentz@gmellc.com; Espy, Jackie M.; albert.x.reiss@gs.com; Dscott@bhico.com; carlaneal@eis-llc.com; scook8@slb.com; nnowiski@slb.com; laura.bird@whiting.com; getitdone@wrangousa.com; cfagerland@undeerc.org; sara.phiaxay@steelreef.ca; Sisk, Amy (Bismarck Tribune)

**Subject:** NDIC Notice of Hearing - Summit Carbon Solutions #1 LLC; Summit Carbon Solutions #2 LLC; and Summit Carbon Solutions #3 LLC

**Date:** Tuesday, April 16, 2024 1:28:00 PM

**Attachments:** Summit Carbon Storage #1 - Notice of Hearing.pdf
Summit Carbon Storage #2 - Notice of Hearing.pdf
Summit Carbon Storage #3 - Notice of Hearing.pdf
image001.png

---

The attached hearing notice is sent pursuant to North Dakota Administrative Code Section 43-05-01-08(5). The fact sheet, storage facility permit application, and draft permit are available for download at:

Class VI - Geologic Sequestration Wells | Department of Mineral Resources, North Dakota (nd.gov)

Please contact out office if you have any questions.

Thank you,

Sara Forsberg
Legal Assistant, Oil and Gas Division
701.328.8020 • slforsberg@nd.gov • www.dmr.nd.gov
NORTH Dakota | Mineral Resources
Be Legendary.
701.328.8020 • 600 E Boulevard Ave Dept. 474 • Bismarck, ND 58505

NORTH Dakota | Mineral Resources
Be Legendary.™

April 15, 2024

**NOTICE OF HEARING**
**N.D. INDUSTRIAL COMMISSION**
**OIL AND GAS DIVISION**

You are hereby notified of a hearing pursuant to North Dakota Administrative Code § 43-05-01 requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND pursuant to North Dakota Administrative Code Chapter 43-05-01. **The hearing will be held June 11 and June 12, 2024 at 9:00 a.m.**, 1000 East Calgary Avenue, Bismarck, North Dakota.

Case No. **30873** In the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND pursuant to North Dakota Administrative Code Chapter 43-05-01. View the draft storage facility permit, fact sheet, and storage facility permit application at www.dmr.nd.gov/dmr/oilgas/. Summit Carbon Storage #2, LLC intends to receive carbon dioxide from the Midwest Carbon Express Pipeline and sequester it in the Broom Creek Formation. The Commission will accept and consider written comments on the merits of the application and draft permit if received no later than 5:00 pm CDT June 10, 2024. Submit written comments to the Oil and Gas Division, 1016 East Calgary Ave, Bismarck, ND 58503-5512 or slforsberg@nd.gov. Further draft permit information may be obtained from Tammy Madche, and further hearing information may be obtained from Sara Forsberg, both at the ND Oil and Gas Division, 1016 East Calgary Ave, Bismarck, ND 58503-5512, 701-328-8020. Summit Carbon Storage #2, LLC, 2321 North Loop Dr Suite #221, Ames, IA 50010.

Case No. **30874** In the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87

West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation, pursuant to North Dakota Century Code Section 38-22-10.

Case No. **30875** In the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation, pursuant to North Dakota Administrative Code Section 43-05-01-09.1.

Case No. **30876** In the matter of a hearing called on a motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

Please contact our office if you have any questions.

Sincerely,

Lynn D. Helms
Director

NORTH Dakota | Mineral Resources
Be Legendary.™

April 15, 2024

Bureau of Indian Affairs
MS-4606
1849 C Street, N.W.
Washington, D.C. 20240

Re: NDIC Case Nos. 30873 - 30876

**NOTICE OF HEARING**
**N.D. INDUSTRIAL COMMISSION**
**OIL AND GAS DIVISION**

You are hereby notified of a hearing pursuant to North Dakota Administrative Code § 43-05-01 requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND pursuant to North Dakota Administrative Code Chapter 43-05-01. **The hearing will be held June 11 and June 12, 2024 at 9:00 a.m.**, 1000 East Calgary Avenue, Bismarck, North Dakota.

Case No. **30873** In the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND pursuant to North Dakota Administrative Code Chapter 43-05-01. View the draft storage facility permit, fact sheet, and storage facility permit application at www.dmr.nd.gov/dmr/oilgas/. Summit Carbon Storage #2, LLC intends to receive carbon dioxide from the Midwest Carbon Express Pipeline and sequester it in the Broom Creek Formation. The Commission will accept and consider written comments on the merits of the application and draft permit if received no later than 5:00 pm CDT June 10, 2024. Submit written comments to the Oil and Gas Division, 1016 East Calgary Ave, Bismarck, ND 58503-5512 or slforsberg@nd.gov. Further draft permit information may be obtained from Tammy Madche, and further hearing information may be obtained from Sara Forsberg, both at the ND Oil and Gas Division, 1016 East Calgary Ave, Bismarck, ND 58503-5512, 701-328-8020. Summit Carbon Storage #2, LLC, 2321 North Loop Dr Suite #221, Ames, IA 50010.

Case No. **30874** In the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation, pursuant to North Dakota Century Code Section 38-22-10.

Case No. **30875** In the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation, pursuant to North Dakota Administrative Code Section 43-05-01-09.1.

Case No. **30876** In the matter of a hearing called on a motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

Please contact our office if you have any questions.

Sincerely,

Lynn D. Helms
Director

NORTH Dakota | Mineral Resources
Be Legendary.™

April 15, 2024

U.S. Department of the Interior
1849 C Street NW
Washington, DC 20240

Re: NDIC Case Nos. 30873 - 30876

**NOTICE OF HEARING**
**N.D. INDUSTRIAL COMMISSION**
**OIL AND GAS DIVISION**

You are hereby notified of a hearing pursuant to North Dakota Administrative Code § 43-05-01 requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND pursuant to North Dakota Administrative Code Chapter 43-05-01. **The hearing will be held June 11 and June 12, 2024 at 9:00 a.m.**, 1000 East Calgary Avenue, Bismarck, North Dakota.

Case No. **30873** In the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND pursuant to North Dakota Administrative Code Chapter 43-05-01. View the draft storage facility permit, fact sheet, and storage facility permit application at www.dmr.nd.gov/dmr/oilgas/. Summit Carbon Storage #2, LLC intends to receive carbon dioxide from the Midwest Carbon Express Pipeline and sequester it in the Broom Creek Formation. The Commission will accept and consider written comments on the merits of the application and draft permit if received no later than 5:00 pm CDT June 10, 2024. Submit written comments to the Oil and Gas Division, 1016 East Calgary Ave, Bismarck, ND 58503-5512 or slforsberg@nd.gov. Further draft permit information may be obtained from Tammy Madche, and further hearing information may be obtained from Sara Forsberg, both at the ND Oil and Gas Division, 1016 East Calgary Ave, Bismarck, ND 58503-5512, 701-328-8020. Summit Carbon Storage #2, LLC, 2321 North Loop Dr Suite #221, Ames, IA 50010.

Case No. **30874** In the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation, pursuant to North Dakota Century Code Section 38-22-10.

Case No. **30875** In the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation, pursuant to North Dakota Administrative Code Section 43-05-01-09.1.

Case No. **30876** In the matter of a hearing called on a motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

Please contact our office if you have any questions.

Sincerely,

Lynn D Helms

Lynn D. Helms
Director

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

| | | |
|---|---|---|
| In re application of Summit | : Case No(s). | 30869 |
| Carbon Storage #1, LLC requesting | : | 30870 |
| consideration for the geologic | : | 30871 |
| storage of carbon dioxide in the | : | 30872 |
| Broom Creek Formation from the | : | 30873 |
| Midwest Carbon Express Pipeline in | : | 30874 |
| the storage facility located in | : | 30875 |
| Sections 31, 32, 33, and 34, | : | 30876 |
| Township 142 North, Range 87 West, | : | 30877 |
| Sections 1, 11, 12, 13, 14, 15, | : | 30878 |
| 22, 23, 24, 25, 26, 35, and 36, | : | 30879 |
| Township 141 North, Range 88 West, | : | 30880 |
| Sections 2, 3, 4, 5, 6, 7, 8, 9, | : | |
| 10, 11, 14, 15, 16, 17, 18, 19, | : | |
| 20, 21, 22, 23, 25, 26, 27, 28, | : | |
| 29, 30, 31, 32, 33, 34, and 35, | : | |
| Township 141 North, Range 87 West, | : | |
| Sections 1, 2, 3, and 12, Township | : | |
| 140 North, Range 88 West and | : | |
| Sections 4, 5, 6, and 7, Township | : | |
| 140 North, Range 87 West, Mercer, | : | |
| Morton, and Oliver Counties, ND. | : | |
| | | |
| In re application of Summit | : | |
| Carbon Storage #1, LLC to | : | |
| consider the amalgamation of the | : | |
| storage reservoir pore space, in | : | |
| which the Commission may require | : | |
| that the pore space owned by | : | |
| nonconsenting owners be included | : | |
| in the geologic storage, as | : | |
| required to operate the Summit | : | |
| Carbon Storage #1, LLC storage | : | |
| facility located in Sections 31, | : | |
| 32, 33, and 34, Township 142 | : | |
| North, Range 87 West, Sections 1, | : | |
| 11, 12, 13, 14, 15, 22, 23, 24, | : | |
| 25, 26, 35, and 36, Township 141 | : | |
| North, Range 88 West, Sections 2, | : | |
| 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, | : | |
| 15, 16, 17, 18, 19, 20, 21, 22, | : | |
| 23, 25, 26, 27, 28, 29, 30, 31, | : | |

32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re application of Summit Carbon Storage #1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35,

Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.

In re application of Summit Carbon Storage #2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35,

Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.

In re application of Summit Carbon Storage #2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.

In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13,

14, 15, 16, 17, 18, 19, 20, 21, :
22, 23, 24, 25, 26, 27, 28, 29, :
30, 32, 33, 34, 35, and 36, :
Township 142 North, Range 88 West,:
Sections 5, 6, 7, 8, 17, 18, 19, :
20, 29, 30, and 31, Township 142 :
North, Range 87 West, and Sections:
1, 2, and 3, Township 141 North, :
Range 88 West, Mercer and Oliver :
Counties, ND, subject to the :
application of Summit Carbon :
Storage #2, LLC for the geologic :
storage of carbon dioxide in the :
Broom Creek Formation, and enact :
such special field rules as may :
be necessary. :

In re application of Summit :
Carbon Storage #3, LLC requesting :
consideration for the geologic :
storage of carbon dioxide in the :
Broom Creek Formation from the :
Midwest Carbon Express Pipeline in:
the storage facility located in :
Section 36, Township 143 North, :
Range 87 West, Sections 19, 20, :
21, 28, 29, 30, 31, 32, 33, 34, :
35, and 36, Township 143 North, :
Range 86 West, Sections 1, 2, 11, :
12, 13, 14, and 24, Township 142 :
North, Range 87 West, Sections 1, :
2, 3, 4, 5, 6, 7, 8, 9, 10, 11, :
12, 13, 14, 15, 16, 17, 18, 19, :
20, 21, 22, 23, 24, 25, 26, 27, :
28, 29, 30, 32, 33, 34, and 35, :
Township 142 North, Range 86 :
West, and Sections 6, 7, 17, 18, :
19, and 20, Township 142 North, :
Range 85 West, Oliver County, ND. :

In re application of Summit :
Carbon Storage #3, LLC to consider:
the amalgamation of the storage :
reservoir space, in which the :
Commission may require that the :
pore space owned by nonconsenting :
owners be included in the geologic:

storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.

In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.

| | |
|---|---|
| In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary. | : |

**TRANSCRIPT OF HEARING**

**VOLUME I - (Pages 1 - 276)**

**Taken At**
**1000 East Calgary Avenue**
**Bismarck, North Dakota**
**June 11, 2024**

**BEFORE DAVID P. GARNER**
**-- HEARING EXAMINER --**

# A P P E A R A N C E S

NDIC STAFF PRESENT:

MR. LYNN HELMS
MR. MARK BOHRER
MR. RICHARD SUGGS
MS. TAMARA MADCHE
MR. TRAVIS STOLLDORF
MS. ASHLEIGH THIEL
MR. DAVID TABOR
MR. STEPHEN FRIED
MR. CALEB ALBERTSON
MS. SARA FORSBERG

---

MR. LAWRENCE BENDER
MR. TYLER J. GLUDT
Fredrikson & Byron, P.A.
Attorneys at Law
Suite 400
304 East Front Avenue
Bismarck, North Dakota 58504

FOR SUMMIT CARBON STORAGE #1, SUMMIT CARBON STORAGE #2 AND SUMMIT CARBON STORAGE #3.

---

MR. DERRICK BRAATEN
MS. DESIRAE ZASTE, Paralegal
Braaten Law Firm
Attorneys at Law
Suite 100
109 North Fourth Street
Bismarck, North Dakota 58501

FOR THE INTERVENORS, THE SWENSON LIVING TRUST, BAUMAN, GERVING, HAUPT, JOCHIM, KRAFT, LIEBELT, MAIZE, METZ, RUST, AND SMITH.

---

# TABLE OF CONTENTS

## INDEX OF PROCEEDINGS

Page

Opening Comments by Hearing Examiner Garner..... 11

---

## APPLICANT'S WITNESSES

### WADE BOESHANS/JEFFREY SKAARE

Direct Examination by Mr. Bender..... Page 20

Direct Examination by Mr. Bender..... Page 43

Cross-Examination by Mr. Braaten..... Page 61

Examination by Ms. Madche..... Page 192

Examination by Mr. Stolldorf..... Page 195

Further Examination by Ms. Madche..... Page 200

Examination by Mr. Suggs..... Page 200

Examination by Mr. Bohrer..... Page 207

Further Examination by Mr. Suggs..... Page 208

### AMANDA DOUGLAS/CAITLIN OLSEN

Direct Examination by Mr. Bender..... Page 211

Direct Examination by Mr. Bender..... Page 230

Cross-Examination by Mr. Braaten..... Page 238

---

# T A B L E  O F  C O N T E N T S (Cont'd)

## APPLICANT'S EXHIBITS


| Exhibit No. | Offered | Received |
|---|---|---|
| 1A | 23 | 24 |
| 1B | 23 | 24 |
| 1C | 23 | 24 |
| 2A | 25 | 25 |
| 2B | 25 | 25 |
| 2C | 25 | 25 |
| 3A | 30 | 30 |
| 4A | 40 | 41 |
| 5A | 55 | 56 |
| 5B | 55 | 56 |
| 5C | 55 | 56 |


--------

(The following proceedings were had and made of record herein, commencing at 9:00 a.m., Tuesday, the 11th day of June, 2024:)

HEARING EXAMINER GARNER: We are on the record for the hearings in the matters listed in the North Dakota Industrial Commission hearing docket for June 11. I am David Garner, hearing examiner for these hearings. We are at the hearing for the Department of Mineral Resources, Oil & Gas Division, and it is 9 a.m.

There are 12 cases on the docket which will be consolidated into one hearing. Before calling them, I would just like to give anyone appearing an opportunity to discuss any housekeeping matters or anything that we need to discuss at this point in time.

MR. BENDER: I'll make an appearance -- excuse me -- I'll make an appearance, Mr. Examiner, if that's appropriate. Lawrence Bender, P.O. Box 1855, Bismarck. I'm with Fredrikson law firm, and with me here today is Mr. Ty Gludt. He's immediately to my left.

HEARING EXAMINER GARNER: Okay.

MR. BRAATEN: Derrick Braaten with Braaten Law Firm, Bismarck, North Dakota, here appearing on

behalf of and representing a number of the landowner intervenors, including The Swenson Living Trust, Michael Bauman, Glenn and Lisa Gerving, Michael and Bonnie Haupt, John Jochim, Kevin and Kimberly Kraft, Charmayne Liebelt, Kirk and Linda Maize, Allen Maize, Paul and Christy Metz, JoLene Rust, and Gary and Cassie Smith.

HEARING EXAMINER GARNER: Okay. Before I call the cases, I would just like to note in the interest of time, please try and have the witnesses not repeat each other's testimony. It will obviously make things go a lot quicker if we can just keep it to that.

And just as a reminder, this is not a PSC hearing on the pipeline. This is an Industrial Commission hearing on storage facilities. So please keep your testimony limited to that subject matter.

MR. BENDER: Mr. Examiner, maybe now is the appropriate time, since you mentioned you're consolidating the cases, and we believe that is going to be very helpful in expediting the hearings here today, you may recall in some of the other $CO_2$ sequestration matters we've had before the Commission, we've called our witnesses in groups.

Those groups are typically no larger than two, but I think that also expedites the hearing process because you can have two individuals up. One individual may not know the answer to something, the other witness is there, and that has in the past worked pretty well instead of -- instead of calling them singly in terms of expediting the hearing process. And I did talk to Mr. Braaten about that before the hearing.

HEARING EXAMINER GARNER: And one other matter. There was a motion to compel submitted at 5 p.m. last night. Attorney Bender, did you have an opportunity to review that motion?

MR. BENDER: I did not.

HEARING EXAMINER GARNER: You did not.

MR. BENDER: But I will respond to it in -- I don't know what the time period is, 10 days or 14 days, but I will respond to it. Probably even respond to it more quickly than that.

HEARING EXAMINER GARNER: Okay. Well, with that, I will call the cases. Case Number 30869, in the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #1, LLC, requesting consideration for the geologic storage

of carbon dioxide in the Broom Creek Formation from the Madison [sic] Carbon Express Pipeline.

Case Number 30870, in the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #1, LLC, to consider the amalgamation of the storage reservoir pore space, in which the Commission may require the pore space owned by the nonconsenting owners be included in the geologic storage.

In the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #1, LLC, for an order of the Commission determining the amount of financial responsibility for the geologic storage of a carbon dioxide -- of carbon dioxide from the Midwest Carbon Express Pipeline.

Case Number 30872, in the matter of a hearing called on a motion of the Commission to consider establishing the field and pool limits for lands located in Sections 31, 32, 33 and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35 and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19,

20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34 and 35, Township 141 North, Range 87 West, Sections 1, 2, 3 and 12, Township 140 North, Range 88 West, and Sections 4, 5, 6 and 7, Township 140 North, Range 87 West, Mercer, Morton and Oliver Counties, subject to the application of Summit Carbon Storage #1, LLC, for the geologic storage of carbon dioxide in the Broom Creek Formation.

Case Number 30873, in the matter of a hearing called on motion of the Commission to considering the application of Summit Carbon Storage #2, LLC, requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline.

Case Number 30874, in the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #2, LLC, to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by the nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC, storage facility.

Case Number 30875, in the matter of a

hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #2, LLC, for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline.

Case Number 30876, in the matter of a hearing called on a motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34 and 35, Township 143 North, Range 88 West, sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35 and 36, Township 142 North, Range 38 West -- 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30 and 31, Township 142 North, Range 87 West, Sections 1, 2, 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, North Dakota, subject to the application of Summit Carbon Storage #2 for the geologic storage of carbon dioxide in the Broom Creek Formation.

Case Number 30877, in the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #3, LLC, requesting consideration for the geologic

storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline.

Case Number 30878, in the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #3, LLC, to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by the nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC, storage facility.

Case Number 30879, in the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #3, LLC, for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline.

And 30880, in the matter of a hearing called on a motion of the Commission to consider establishing field and pool limits for lands located in Sections 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35 and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14 and 24,

Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33 and 34 and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19 and 20, Township 142 North, Range 85 West, Oliver County, North Dakota, subject to the application of Summit Carbon Storage #3, LLC, for the geologic storage of carbon dioxide in the Broom Creek Formation.

All interested parties please come forward.

MR. BENDER: I made my appearance. Maybe one more housekeeping matter, Mr. Examiner. As you know, these applications are lengthy in terms of how long it actually takes to get to the point where they'd be put on the docket. Numerous documents are filed with the Commission, both in paper and electronically, and those all become part of the record.

What we've done here today is we want to focus on what we're going to refer to as the final form of application, and that's -- what we have done is we've provided a paper copy of that final form to Sara as the official record. I know everyone has it on their computers, so we didn't

make a bunch of copies. I think the last time or the time before I made a bunch of copies and I took them back because no one wanted them. I did offer a copy -- paper copy to Mr. Braaten. He indicated that he was going to follow along on the computer. The witness will have a paper copy to follow through, and like I indicated, Sara will have the official record.

What our plan is today, Mr. Examiner, in addition to consolidating, what we're going to do is spend some time going through in relatively great detail the -- the application for the Leingang storage unit. And after we go through that in detail, there will be some testimony as to the -- to the other storage units, the Fischer and the Hintz, but for the most part we're going to go through very carefully the Leingang application.

And after we finish that, we will then call a witness who will summarize and compare the differences between Leingang versus Fischer and Hintz. We did that in the Minnkota application, thought it worked pretty well, saved a lot of time where hopefully we can do the same thing here.

HEARING EXAMINER GARNER: Okay.

MR. BENDER: And with that in mind, we

have two witnesses that we'd like to call: Wade Boeshans and Jeff Skaare.

HEARING EXAMINER GARNER: Can you repeat the first name?

MR. BENDER: Wade Boeshans, B-o-e-s-h-a-n-s.

HEARING EXAMINER GARNER: And the next one again.

MR. BENDER: And Jeff Skaare, S-k-a-a-r-e.

HEARING EXAMINER GARNER: Mr. Boeshans.

**WADE BOESHANS,**

being first duly sworn, was examined and testified as follows:

**DIRECT EXAMINATION**

**BY MR. BENDER:**

Q. Wade, would you state your full name for the record, please?

A. Wade Wayne Boeshans.

Q. And by whom are you employed?

A. Summit Carbon Solutions.

Q. In what capacity?

A. As executive vice president.

Q. Wade, what I'd like you to do to begin with is briefly highlight for the examiner, the Commission staff and opposing counsel your

educational background and work experience.

A. Sure. My education, I have a B.S. in civil engineering from North Dakota State University, as well as I've completed the executive leadership program through the University of Minnesota's Carlson School of Business.

My work background after graduating, I started my career in consulting engineering and residential development in Phoenix, Arizona. Came back to North Dakota two years later and started my career in the lignite coal industry near Beulah.

Worked around the country and Gulf Coast, Powder River Basin. Came back to North Dakota about 20 years ago and most recently was the president and general manager of BNI Coal and BNI Energy operating the mine up by Center and as a subsidiary of ALLETE, a diversified energy company.

While I was there, it became very apparent to me that for there to be a future in the lignite energy, we were going to need a carbon solution, and so I started investing a significant amount of my time and energy working with other industry leaders, research leaders to advance the science, engineering and regulatory frameworks for commercializing carbon capture and storage.

Q. Okay. Wade, let's talk a little bit about some of your duties and responsibilities with respect to your employment with Summit Carbon Solutions.

A. Yeah. As executive vice president, I have responsibility for the $CO_2$ sequestration, the scope of Summit's project. I lead a team based here in Bismarck that is responsible for, you know, the engineering, design, permitting, ultimately construction of the storage facilities.

Q. Okay. Now let's move into what you're primarily here to talk about today and that's the -- the project, and I'll refer to it as the project summary. Can you provide us with some background on Summit Carbon Solutions?

A. Yes. So Summit Carbon Solutions is a U.S. company with U.S. roots that is committed to driving economic growth and job growth in the Midwest, reducing emissions and providing a substantial boost to the agriculture and energy industries that are critical to rural American communities and the livelihoods of its citizens. We believe we can fulfill those commitments through carbon management solutions.

And so in 2021, the company announced its

partnership with ethanol plants to build out what is now known as the Midwest Carbon Express system, and in that partnership what we're proposing to do is to capture $CO_2$ that's currently being emitted into the atmosphere from those plants, transport it to North Dakota via a pipeline system, and inject it in the deep subsurface, approximately one mile below the surface, for injection and -- and permanent storage and sequestration.

Q. Okay. Wade, now I'd like you to turn your attention to Exhibits 1A, 1B and 1C. Can you tell me what those exhibits are?

A. Yes. So Exhibit 1A is the application in final form for the Carbon Storage, LLC, #1 TB Leingang permit application.

Q. And then what is Exhibit 1B?

A. It is the application in final form for Summit Carbon Storage #2, geologic storage facility permit for the BK Fischer.

Q. And what is Exhibit 1C?

A. It's the application in final form for the KJ Hintz storage facility permit.

MR. BENDER: Move admission of these three exhibits.

HEARING EXAMINER GARNER: Any objection?

MR. BRAATEN: Just a point of clarification, if I may. I should have asked this beforehand. But the exhibits that we're referring to here that you're submitting are the same as the applications on the case docket; right?

MR. BENDER: That's correct.

MR. BRAATEN: Okay. No -- I object to any kind of hearsay, hearsay within hearsay, unsupported statements that are contained within the applications. To the extent we're marking and admitting the applications just to have the application in the record, I don't have an objection to that.

HEARING EXAMINER GARNER: The objection is noted. The exhibits are admitted.

MR. BENDER: Okay.

Q. (MR. BENDER CONTINUING) What I'd like you to do, Wade, is let's turn to what's been previously marked as Exhibit 2A, 2B and 2C, and this is an exhibit we haven't handed out yet. We'll do that right now.

Wade, can you briefly describe what these exhibits are?

A. So these exhibits -- start with 2A -- is an updated business structure that depicts, you

know, the SCS, LLC, #1 business structure as a wholly owned subsidiary of Summit Carbon Storage.

Q. And was -- were these two exhibits prepared either by you or under your control and supervision?

A. Yes.

MR. BENDER: Offer the exhibits.

HEARING EXAMINER GARNER: Any objection?

MR. BRAATEN: No objection.

HEARING EXAMINER GARNER: Exhibits are admitted.

Q. (MR. BENDER CONTINUING) Why don't you spend a little time, Wade, just going through Exhibits 2B and 2C and explain just what is being requested?

A. Yes. So the exhibit reflects the business structure, as I mentioned. At the bottom you see the Summit Carbon Storage, LLC, #1, Summit Carbon Storage, LLC, #2, and Summit Carbon Storage, LLC [sic], which respectively are the owners and operators of the TB Leingang storage facility, BK Fischer storage facility and KJ Hintz storage facilities. These are all wholly owned subsidiaries of Summit Permanent Carbon Storage LLC, which is a wholly owned subsidiary of Summit

Carbon Solutions.

Also you see on the diagram SCS Carbon Transport which is the operator of the pipeline system and will be the operator of the flowline systems included in the three respective storage facility permit applications. We will have operating agreements between Summit Carbon Storage, LLC, #1, #2 and #3 and Summit Carbon Transport -- or SCS Carbon Transport -- excuse me -- LLC.

Q. Okay. All right. Well, thank you for describing Exhibits 2B and 2C. Let's now -- I'll ask you the question again. What are each of these applicants requesting?

A. They're each requesting commercial permits for operations and injection of $CO_2$ and the flexibility to receive $CO_2$ from a variety of industrial sources.

Q. Okay. Now, you've touched on this, but can you go into a little bit more detail in terms of the purpose of the applications that are being made by SCS1, SCS2 and SCS3?

A. Yeah. The purpose of the application is to receive -- again, to receive commercial permits to operate the TB Leingang storage facility, the BK Fischer storage facility and the KJ Hintz storage

facility for the injection of $CO_2$.

Q. And where is the $CO_2$ that these entities are planning to store -- where is that coming from?

A. The $CO_2$ is coming from industrial sources across five states in the upper Midwest: North Dakota, South Dakota, Iowa, Nebraska and Minnesota.

Q. And I'd like you now to maybe explain just in a little bit more detail the Midwest Carbon Express project.

A. Yes. So the Midwest Carbon Express project is an integrated carbon capture, transportation and storage project that proposes to capture $CO_2$ from industrial facilities across the five-state footprint, transport that $CO_2$ to North Dakota via a pipeline system where it will then be injected and permanently stored.

Q. Okay. Why don't you go into a little bit more detail in terms of after the $CO_2$ is captured and it comes to North Dakota, what happens next?

A. So after the $CO_2$ is captured, it's transported via a pipeline system. Essentially we have smaller what I'll describe as lateral lines connecting each one of the sources to a mainline trunk line system, 24-inch line that will deliver the $CO_2$ to North Dakota to the area of the storage

facilities in Oliver and Mercer Counties, where we would then inject the $CO_2$ into the Broom Creek Formation per these applications for permanent storage.

Q. Now, Mr. Garner made it pretty clear that today is not a PSC hearing. It's an Industrial Commission hearing and we don't want to talk about pipelines, but I think it might be appropriate just for you to describe very, very briefly construction of the pipeline.

A. Yes. As I mentioned, it's an integrated pipeline system, about 2,500 miles. It will all be designed, constructed and operated per PHMSA standards. Have a minimum depth of pipe of 4 feet to the top of pipe. All the pipe is high carbon -- or high-strength carbon steel. And the system will be fitted with automatic valves and remote system operations and operated through a control center based in Ames, Iowa, and be monitored and operated 24/7.

Q. And what's the cost of the project?

A. It's about $8 billion.

Q. And how does that -- how does this project, what you're here today to discuss, compare to other $CO_2$ sequestration projects?

A. So it's -- it's similar to the currently operating Red Trail Energy ethanol carbon capture project and the Blue Flint carbon capture ethanol project up at Underwood. Similar to those in that we're capturing -- planning to capture $CO_2$ primarily from ethanol plants and -- and sequester it. The difference being that this project has 57 plants so it's much larger in scale and includes a longer transportation system.

Q. And what does this project do in terms of benefits to the U.S. economy?

A. So the ethanol industry in the U.S. supports about 360,000 jobs and contributes about 45 billion annually to the U.S. GDP. Our project which is proposing to connect with 57 ethanol plants, those 57 plants produce about 5.7 billion gallons of ethanol annually and consume about 1.7 billion bushels of corn that is produced on 30 million acres or about 30 million acres, so significant to the regional economy and regional corn market.

Additionally, we also have an agreement with a sustainable aviation facility that's proposed in South Dakota. And sustainable aviation fuels are essentially making jet fuel out of corn.

Last year it was reported that 158 million gallons of sustainable aviation fuels were delivered to the airline industry globally. That same industry has commitments for 3.3 billion gallons by 2030.

So that is a significant opportunity for the corn producers and by extension the corn markets which has a material impact on land prices and commodity prices.

Q. Wade, I now want to direct your attention to Exhibit 3A. I've had it circulated amongst the Commission staff and opposing counsel. Can you tell me what Exhibit 3A is?

A. It's the project overview map.

Q. Okay. And was this prepared by you or under your control and supervision?

A. It was.

MR. BENDER: Offer the exhibit.

HEARING EXAMINER GARNER: Any objections?

MR. BRAATEN: No objection.

HEARING EXAMINER GARNER: Exhibit's admitted.

Q. (MR. BENDER CONTINUING) Let's take a look at Exhibit 3A, Wade. Can you briefly discuss what's contained upon it and the importance of this exhibit with respect to this hearing?

A. Sure. So the -- the exhibit is a project overview map. All of the red squares on the map are the approximate locations of the 57 ethanol plants that are part of the project. And then in the gray shaded area in North Dakota, you can see the diamonds that reflect the approximate location of the storage facilities that we're proposing to permit. The significance of this exhibit is that it revises the Figure PS-2 that's in the application and revises the number of plants to 57 sources.

Q. So PS-2 would be in each one of the exhibits, 1A, 1B and 1C; is that correct?

A. Yes. That's right.

Q. And this would, in essence, be updated information to that particular page; is that correct?

A. That's correct.

Q. Now, you spent some time discussing what this project will do for the U.S. economy. Can you tell us what it will do -- what the project will do for the 57 ethanol plants that you just briefly mentioned and that are depicted on your Exhibit 3A?

A. Yes. What the project does for the ethanol plants is it allows them to lower their

carbon intensity score of the ethanol they produce which then enables them to participate in emerging low carbon fuels markets, both fuel transportation and sustainable aviation fuels in the future.

And by doing so, in essence, the biggest thing it does is it solves from a proximity challenge, if you will, in that as you can see by the diagram on Exhibit 3A, most of the ethanol plants are situated on -- over the Corn Belt, which the Corn Belt is not situated for most of the plants over suitable geologic storage, and so ultimately it connects -- provides an opportunity for these plants to capture their $CO_2$, lower their CO -- their CI score -- excuse me -- and transport their $CO_2$ to a suitable geologic storage basin here in North Dakota.

Q. Now I'd like you to spend just a little time explaining what benefits this project will bring to the -- to North Dakota.

A. Sure. So --

MR. BRAATEN: I'm going to object, Your Honor, to the extent this is being offered as any kind of expert testimony without foundation about any kind of economic or other benefits that would require some sort of economist. If he's just

talking generally about what they believe the benefits of the project are, I don't have that objection.

HEARING EXAMINER GARNER: Overruled.

Q. (MR. BENDER CONTINUING) You can answer.

A. Yeah. So, you know, the North Dakota economy or agriculture and energy represent about 70 percent of the North Dakota economy, and in North Dakota, you know, we -- we produce a significant volume of corn. The Red Trail -- excuse me, not the Red Trail -- the Tharaldson Ethanol plant, which is part of our project, consumes about 60 million bushels of corn a year. We grow between 350 and 400 million corns -- or bushels of corn per year. So the Tharaldson plant alone consumes around 15 percent -- 15 to 20 percent of the corn that's produced in North Dakota annually.

Additionally, the ethanol industry consumes over half of North Dakota's corn. And so these -- this project and its participants provide material markets and market demand for corn that's grown here in North Dakota.

Q. Okay. And these -- some of the $CO_2$ that's going to go into your storage facilities that are

before the Commission today are going to be coming from the Tharaldson Ethanol plant; is that correct?

A. Yes.

Q. And can you tell me where the Tharaldson Ethanol plant gets its corn from?

A. According to my conversations with Tharaldson, they have -- they purchase corn from about a 150-mile radius around the Casselton plant there.

Q. And how does the project, in your opinion, benefit agricultural -- agriculture and energy in the state of North Dakota?

A. It benefits agriculture and energy in North Dakota in that it develops CCS infrastructure, or specifically carbon pipeline infrastructure, that is a common carrier system that could be used for others. It commercially deploys CCS in the state that again provides support for others doing the same.

Q. And, in your opinion, is the project good -- good for or will benefit regional corn markets?

A. Yes. It provides significant demand for regional corn.

Q. Let's talk a little bit about stream

composition. What I mean by that is what's the composition of the $CO_2$ going to be? And perhaps we could turn to Exhibit 1A and on page PS-3. Might be easier for everyone to follow if we're looking at that page.

Can you just briefly summarize what's contained on that page?

A. Yes. So Table PS-1 on page PS-3 indicates the $CO_2$ system specification. As you can see, it's -- the system spec is greater than 98.25 percent $CO_2$ and then trace amounts of other constituents listed on -- in the table, primarily constituents of air, nitrogen, oxygen.

Q. Okay. And you talked briefly about possibly down the road the project taking some $CO_2$ from a sustained aviation fuel facility. What are some of the considerations that Summit will have with respect to the requirements for potentially taking this additional $CO_2$ from nonethanol sources?

A. Yeah. So we are -- we have conservatively designed the system and the -- again, within this permit to greater than 95 percent $CO_2$. And so as we secure new sources, the requirements will be that they are greater than 95 percent $CO_2$ at capture, and when commingled and delivered to the sequestration

sites, greater than 98.25 percent $CO_2$.

Q. And, Wade, is North Dakota a good place to store or sequester $CO_2$, and if so, why?

A. Yes, North Dakota has -- has ideal geology for sequestration. We'll hear a lot from the rest of the team here later about the geology. But specifically North Dakota has, you know, extensive sand layers that are surrounded by confining layers that provide for -- that cover a large areal extent and provide for suitable geologic reservoir for storage.

Q. Wade, you sometimes hear concerns that perhaps we shouldn't be storing $CO_2$ in the state of North Dakota from other states because there is this concern about whether there's an abundance of storage space in North Dakota. Can you tell us a little bit about what your understanding is of that?

MR. BRAATEN: Object to foundation.

HEARING EXAMINER GARNER: Overruled.

MR. BOESHANS: Yes. The U.S. Geologic Survey has recorded an estimated storage resource in the Williston Basin of over 250 billion tons. That would be the equivalent of storing all of the $CO_2$ from all North Dakota industrial sources for

over 5,000 years. So it's a very prolific storage resource.

Q. (MR. BENDER CONTINUING) Okay. Wade, I'm going to direct your attention to Exhibit -- wait a minute -- yeah. I'm going to direct your attention back to Exhibit 1A and particularly page PS-5. Can you provide us with an overview of the proposed location?

A. Sure. As you see laid out in figure PS-3 on page PS-5 of Exhibit 1, you see the locations of the storage facilities within Oliver and Mercer Counties, and so you see that the BK Fischer site, or SCS2 as the applicant, is located in Mercer County; and then SCS1, the TB Leingang, is located in Oliver County; and SCS3, the KJ Hintz storage facility, is located in Oliver County as well.

Q. Do you believe this is a good area to store $CO_2$?

A. We do.

MR. BRAATEN: Object to foundation.

HEARING EXAMINER GARNER: Overruled.

Q. (MR. BENDER CONTINUING) How did Summit select this project area and the injection sites?

A. So we looked at, you know, available information, particularly mapping of sand

thicknesses, previous oil and gas and stratigraphic well drilling information, ultimately identified an area in -- that included, you know, Oliver, Mercer and Morton Counties as a suitable target area for $CO_2$ storage.

Q. Okay. And you talked about the storage area, but what about -- how about the injection sites? How did you select those?

A. So after we'd identified, you know, this general area of the three counties, we then identified a specific area within that. Based on that information of about 170,000 acres, we proceeded to secure permissions to do survey and secure land rights and completed site-specific characterization, including seismic survey on over 95 percent of roughly a 140,000-acre block within that.

And then based on utilizing kind of that information to build a -- engaged with the EERC to build a geologic model, run simulations. And based on the geology of the area as well as landowner participation or cooperation for those who had signed leases and then considering also surface infrastructure, including roads, availability of power, locations of dwellings, et cetera,

identified the specific injection sites and -- and the storage boundaries came from that.

Q. Now, Wade, are there flowlines that are associated with the injection wells? And if it's easier to discuss that by looking at Exhibit 1A, please do so.

A. Sure. Yes. I'm looking at Figure PS-3 on page PS-5 in Exhibit 1A. You can see that there are flowlines. You can see the mainline system upon this diagram labeled NDM-106 comes into the -- to Oliver County. At that point there's a terminus and then there's flowlines from that point out with NDL-326 going to the KJ Hintz site, NDL-327 continuing to the west to the TB Leingang site, and then NDL-325 going to the BK Fischer storage site.

Q. And in selecting this area, did Summit give any consideration to other permitted projects in the area?

A. We did.

Q. Okay. And perhaps I already handed it out, but Exhibit 4A -- I show you what's been marked Exhibit 4A. Can you tell me what that exhibit is?

A. Yeah. So this is an exhibit that includes the three Summit sites proposed in the application

here, three Summit storage facilities -- TB Leingang, BK Fischer and KJ Hintz -- as well as the already permitted Minnkota facilities, DCC West and DCC East.

And what this -- what you see from that is kind of the proximity between the storage facilities with DCC facilities being closest to the KJ Hintz site. It's approximately 11 miles from the DCC West injection site to the KJ Hintz injection site and about 19 miles from the DCC East injection site to the KJ Hintz injection site.

Q. And it's -- I'm sorry. I interrupted you.

A. And the storage boundaries between DCC West and KJ Hintz are approximately 3 miles apart.

Q. And is it a fair statement that you're very familiar with both the permitted sites and the proposed sites that you're here today to permit?

A. I am.

Q. And is it a fair statement that this exhibit was prepared under your control and supervision?

A. Yes.

Q. Okay.

MR. BENDER: Offer Exhibit 4A.

HEARING EXAMINER GARNER: Any objections?

MR. BRAATEN: Yeah. I object to foundation.

HEARING EXAMINER GARNER: Overruled. The exhibit is admitted.

Q. (MR. BENDER CONTINUING) Wade, you indicated that Summit did consider impacts on other permitted projects. Which permitted facilities did Summit consider?

A. The DCC West and DCC East permits.

Q. Okay. And can you explain just a bit as to what sort of considerations you gave to those sites?

A. Yeah. So what you're seeing on the exhibit indicates the extent of the $CO_2$ plumes of each of the five sites operating at permitted limits at the end of five years. And so as you can see, the plumes do not go outside of the storage areas at -- by the end of five years, which, of course, is then our understanding that they're -- the Commission requires a reevaluation and adjustments to the permit in a five-year reevaluation period.

And so what this tells us is that there is no risk. From this simulation it indicates the plume boundaries are within the storage area at the

end of the -- end of five years and -- and the renewal period, which then gives us the opportunity to validate modeling assumptions and adjust accordingly or present to the Commission proposed amendments to the permits.

Q. And this shows what you believe will be the plume extent after five years; is that correct?

A. That's correct.

Q. And you said the Commission will have an opportunity to review these storage areas -- or the storage units after five years; is that correct?

A. That's correct.

Q. Is it also your understanding that the Commission has continuing jurisdiction, and if it deems necessary, could review earlier than five years?

A. Yes. That's correct.

Q. Okay. Now, Wade, in the past the Commission has always requested information on an NAICS industrial classification code.

A. Yes.

Q. Do you know what that is?

A. I do. It is NAICS code 486990, all other pipeline transportation.

Q. Okay. And, in your opinion, is the

storage facility in the public interest?

A. Yes.

MR. BENDER: That's all the questions I have for this witness, Mr. Examiner. We would like to move to the next witness and then give the Commission and opposing counsel an opportunity to ask questions at that time so they can switch back and forth without wasting time.

HEARING EXAMINER GARNER: I'm sorry, you'd like to call your second witness before cross?

MR. BENDER: Yes. Yep.

HEARING EXAMINER GARNER: Any objections to that?

MR. BRAATEN: No.

HEARING EXAMINER GARNER: Okay. You can proceed. Mr. Skaare.

MR. BENDER: Skaare.

HEARING EXAMINER GARNER: Skaare. Sorry.

**JEFFREY SKAARE,**

being first duly sworn, was examined and testified as follows:

**DIRECT EXAMINATION**

**BY MR. BENDER:**

Q. Jeff, state your full name for the record, please.

A. Yeah. Jeffrey Skaare.
Q. And, Jeff, by whom are you employed?
A. Summit Carbon Solutions.
Q. In what capacity?
A. I am the director of land, legal and regulatory affairs for sequestration.
Q. And I would like -- what I'd like you to do next, Jeff, is I'd like you to briefly highlight for the Commission staff and opposing counsel your educational background and work experience.
A. Sure. I received a bachelor of science degree in business administration from the University of North Dakota in 1997. Went on to law school at UND, received my juris doctorate degree in 2000. I have spent the majority of my career working in the oil and gas sector, primarily as a landman throughout mostly the Williston Basin.
Q. Okay. And what are some of your duties and responsibilities with respect to your employment with Summit?
A. Yeah. My duties with respect to Summit include essentially the pore space acquisition efforts which included mineral and, you know, surface title review; the document creation; the negotiations; and, of course, some of the surface

facilities and flowline acquisitions throughout that project.

Q. And you were also involved in the notice requirement that is provided by statute prior to holding this hearing; is that correct?

A. That is correct.

Q. And would you characterize those notice requirements somewhat stringent?

A. They are.

Q. Okay. Can you describe what you did in terms of identifying owners and then making sure those owners were provided notice?

A. Certainly. So we started by doing a complete surface and mineral title review of the areas inside the storage facility permits and within the one-half mile buffer outside of that particular area to determine who the record owners are.

Q. And were you specifically involved in identifying those owners?

A. I was.

Q. Okay. But you had others who were working under your control and supervision; is that correct?

A. That is correct. I oversaw the team.

Q. Now, after you identified the individuals that you were going to provide notice to, what did you do next?

A. So consistent with North Dakota Century Code, we provided notice to all within that inside and one-half mile boundary, notice of the -- notice to all the surface owners, to all the mineral owners, to any mineral lessees within that same boundary, and any owner or lessee of record as well.

Q. And was that notice given by certified mail return receipt requested?

A. It was.

Q. Okay. And what -- what information was contained in that notice, Jeff?

A. So, again, also consistent, we included the legal description of each of the storage facilities; the date, time and location of the hearing; notice that a copy of the permit application was available through the NDIC. We also included an explanation on how comments could be submitted. And then, lastly, a notice that amalgamation would be required.

Q. And you've indicated this was sent certified mail return receipt; is that correct?

A. That is correct.

Q. And were all of the certified mailings delivered? In other words, did you get a green card back that was signed by the owner that you sent the certified mailing to?

A. We did not.

Q. Okay. And what steps did you take with respect to giving notice to those individuals who did not receive notice and you knew they didn't receive notice because the green card came back unsigned?

A. Yeah. When we received something back, we employed a third-party search to essentially identify an updated address. And when an updated address was obtained, we sent out a second notice.

Q. Okay. Were you also involved, Jeff, in taking pore space leasings -- pore space leases -- excuse me -- for the storage permit facility area?

A. I was.

Q. And was all of that work done under your control and supervision?

A. Yes, it was.

Q. Can you provide for us a brief summary of that?

A. Gladly. So the process started by

identifying landowners through public court records, essentially verifying title, creating the documents necessary to engage with the landowners. Next we -- we did engage with those landowners and worked on any terms. And then we essentially moved forward acquiring a lot of that pore space through an option and a lease and as a result signed approximately 90 percent of the landowners in the SCS1/TB Leingang and approximately 92 percent of the landowners in the SCS2, also known as the BK Fischer. And then, lastly, in SCS -- and when I say "SCS," I mean Summit Carbon Solutions #3 -- storage #3, LLC, and the KJ Hintz we acquired approximately 97 percent.

Q. And having been involved in searching title to provide notice and searching title to take pore space leases, you would know if there was any federal acreage in any of these proposed units; is that a fair statement?

A. That is a fair statement.

Q. Is there any federal acreage in the proposed units?

A. There is not.

Q. Is there any State acreage in the proposed units?

A. Yes, there is.

Q. Okay. Can you tell us a little bit about that? Where is it located and how much land are we talking about?

A. Within each of the applications, there is a single quarter of land that is under the control and direction of the North Dakota Trust Lands. The first one in the TB Leingang, also Summit Carbon Storage #1, would be in Township 141, Range 88, Section 36 in the southwest quarter.

In SCS2 in the BK Fischer, there's one quarter in Township 143, Range 88, Section 32 in the southwest. And then, lastly, in the KJ Hintz, Township 143, Range 87, Section 36, the southwest quarter.

Q. And has Summit secured an interest in the pore space of the State lands?

A. We have not.

Q. Are you in the process of attempting to acquire a pore space lease?

A. We are actively engaged in our discussions with North Dakota Trust Lands.

Q. Okay. Let's talk a little bit more about the fee owners. Can you very briefly discuss for us the procedure or procedures that Summit utilized

under your control and supervision to secure pore space leases from private owners?

A. Sure. So once we have -- as I testified before determining title, we reached out both by phone calls and having landmen setting up meetings and meeting with specific landowners. Within the unit, one of -- one more step that we took, I guess, of multiple steps included after all of those engagements when we had difficulty locating somebody, we did send out a copy of the option and pore space lease via certified mail. We did that last fall in 2023. We did the same again via certified mail to the unleased owners in just this past spring of 2024.

In addition to that, we had sent out an invitation to -- you know, prior to the hearing to all of the landowners, surface owners within the storage facility areas and within that half-mile buffer to essentially two different informational meetings. One was held in Beulah and the second one was held in New Salem about a week apart to accommodate for schedules. And while we were there, we included a hard copy of the -- the pore space -- the option and pore space lease to be delivered directly.

And then, lastly, leading into these hearings, this late spring, early summer I personally took efforts wherein I was able to locate a phone number to contact the landowners that had not leased.

Q. Okay. And with respect to those owners who have -- have not leased at this point in time, are you requesting that the Commission amalgamate those unleased interests; is that correct?

A. That is correct.

Q. And let's talk a little bit about -- I think you testified that in TB Leingang you have approximately 90 percent of the pore space leased; is that correct?

A. Just a touch under 90. Yes. That is correct.

Q. Okay. And what do you have with respect to the BK Fischer?

A. The BK Fischer is approximately 92 percent.

Q. And the KJ Hintz?

A. The KJ Hintz is approximately 97 percent.

Q. And do you know what the requirement is in terms of leased acreage within a storage area that you need before the Commission can amalgamate the

remaining portion?

A. I do.

Q. What is that?

A. It is 60 percent.

Q. Okay. And you touched on this when you discussed what you have been doing in terms of securing leases from private pore space owners. Now that you have those high percentages that you testified to, have you just stopped leasing? Have you taken the position, hey, this is -- we're well over the 60 percent, we don't need to go out and get any more leases?

A. No.

Q. Okay. What have you done?

A. We have continued to secure pore space leases. The last one -- the most recent one signed yesterday morning.

Q. All right. Let me switch gears now on you, Jeff. Let's go to one of the exhibits. Perhaps that's -- that's Exhibit 1A, I believe; is that --

A. It is.

Q. Okay. And I'm going to have you turn in to -- turn in that particular exhibit, 1A, to the storage agreement.

A. I am there.

Q. Okay. And were you involved in drafting that storage agreement?

A. I was.

Q. Okay. I'm going to have you go to Exhibit A in that storage agreement. It's a little confusing. We're in Exhibit 1A, but now we're going to go to Exhibit A of the storage agreement in 1A.

A. I am there.

Q. And can you tell me what Exhibit A is?

A. Yes. It is a tract map showing the boundary of the storage facility area. In that map you can see the townships, ranges and sections, and in addition you will be able to see the tract numbering system.

Q. Okay. And you would have a similar storage agreement in a similar exhibit in each one of the other storage units that's before the Commission today, the Hintz and the -- I guess that's the TB Leingang -- you'd also have one for the Fischer and the Hintz; is that correct?

A. That is correct.

Q. Okay. Let's go to Exhibit B. Tell me what Exhibit B is, of the storage agreement.

A. Sure. Tract B -- or excuse me -- Exhibit B, rather, is the -- the tract summary of the -- the different owners within that previous storage facility outline.

Q. And can you describe the tract participation for each pore space owner?

A. Certainly. What you will see across this document is, of course, the legal description, the total acres, the owners, the acreage that they own, which would then indicate their participation in the tract itself, as well as that tract's participation in the greater storage facility.

Q. And since -- since the application was filed -- in fact, you mentioned a few moments ago that you've secured additional leases as recently as yesterday afternoon -- have you had an opportunity to update the tract participation summary which is Exhibit B in each one of the storage units in the three applications?

A. Yes, we have.

Q. Okay. I'm going to show you what's been previously marked as Exhibit 5A. I'll give you -- I'll just give it a minute till everybody has a copy.

Okay. Jeff, let's turn to what's been

previously marked as Exhibit 5A, 5B and 5C. Can you tell me what each one of those exhibits is?

A. It is a tract participation summary similar to what we just discussed as the tract summary, with the addition of the last column furthest to the right showing the percentage of acreage leased with a total leasehold on the final page.

Q. Okay. And let's just go to 5A. I don't think we need to go through each one of these, but let's go to the last page of 5A. You talked about it including an additional column. Does that confirm what you previously testified to that you -- that Summit has approximately 90 percent of the area within that storage area leased?

A. That is correct.

Q. Okay. And then that's how the other two exhibits would work as well, 5B and 5C, having that additional column and indicating what the percentage of leased acreage is?

A. That is correct.

MR. BENDER: Okay. We'd offer Exhibits 5A, 5B and 5C.

HEARING EXAMINER GARNER: Any objection?

MR. BRAATEN: No objection.

HEARING EXAMINER GARNER: Exhibits are admitted.

Q. (MR. BENDER CONTINUING) Let's go to Exhibit D in Exhibit 1A. We've been discussing Exhibit C, so that would be the next exhibit; correct?

A. I believe we have not touched on Exhibit C.

Q. We have not touched on what?

A. Exhibit C.

Q. All right. Well, we can -- I think we did actually, but --

A. Okay.

Q. So I think you testified that it was the tract participation schedule. But to make sure, let's just go back very quickly to Exhibit C and tell me what that is.

A. Sure. Much like Exhibit B, it is a bit more of a summary showing the section of land that is, you know, listed by tract with the acres of that particular section and the total tract participation. A bit more of a summary. Not to confuse everybody. I just wanted to --

Q. No. No. That's fine.

A. -- make sure we're talking about the same

thing.

Q. I thought we touched on it, but perhaps we did not.

Let's go to D.

A. I am there.

Q. Okay. And tell us what Exhibit D is.

A. Yes. Exhibit D is the Form of Pore Space Lease that we used largely to acquire the percentages we previously discussed.

Q. Okay. And will nonconsent -- well, let me rephrase that. Will unleased owners be subject to the provisions of Exhibit D?

A. Yes.

Q. Okay. And how does Summit propose to compensate the unleased pore space owners that appear in Exhibit D or ultimately do not lease?

A. Equally to the leased owners.

Q. Okay. And can you be a little bit more specific in terms of what -- what that means? Is there a bonus, is there a royalty? Can you -- and without giving percentages or numbers because I think we've made some promises to landowners that we're not going to discuss that, so can you just generally talk about what's going to be the same?

A. Yes. So under the terms of the pore space

lease, there is a bonus. That is the same bonus that we pay to the existing leased owners, so consistent with what you'll see in term -- or Section 2(a). In addition we have a royalty that is called out and that royalty is the same as well. That royalty can be found in paragraph 3 of the Form of Pore Space Lease.

Q. And it's based on the tonnage of injection; is that correct?

A. That is correct.

Q. Okay. Let's go to Article 8 of the storage agreement.

A. I am there.

Q. Okay. And I believe it was your testimony that if the Commission grants the request for amalgamation, this -- this storage -- well, yeah, this storage agreement will be effective for those owners; is that correct?

A. That is correct.

Q. Tell me how unleased owners will be treated with respect to Article 8.

A. So consistent with our practices thus far, we intend to specifically engage with willing landowners and -- for any surface impact that may exist and try our -- to minimize any impact that

may exist on any surface owner. As it stands today, I do not believe we have any significant surface use needs outside of what we have leased.

Q. Let me try to summarize that and you tell me if this is correct. If you have unleased owners in a storage unit now and the Commission amalgamates those owners, you will do your level best -- Summit will do its level best not to have surface activities on those lands; is that a fair statement?

A. That is a very fair statement.

Q. Okay. What types of activities is Summit anticipating in terms of surface use within the storage areas?

A. As of today, we have identified our locations for injection and then --

Q. Let me stop you. I want you to talk about just generally first and then you can talk about where you are in terms of the process. I apologize for interrupting you, Jeff --

A. No. That's okay.

Q. -- but why don't you talk about just generally what type of surface use and then talk about where you are in the process, the status.

A. Sure. Generally for surface use, we would

need, of course, our well site locations and the flowlines.

Q. Perhaps some roads?

A. And perhaps some roads, yes.

Q. Okay. Now let's move to where Summit is in that process.

A. Yes. Thank you. So we have identified the location of our three injection wells, and we have worked with those landowners regarding those locations. We have secured 100 percent voluntary easements for the location of the flowlines, and we will continue to engage with the county as needed regarding any particular road use.

Q. Okay. And with respect to well pads where you have secured surface rights, were those -- were those owners -- did they also lease pore space?

A. They did.

Q. Okay. And was that also the case where you have secured easements for flowlines?

A. That is true.

Q. Okay. What was the approach that you took in securing surface for easements for well pads, flowlines, roads, that sort of thing?

A. Sure. We invited all the impacted landowners into our office in Bismarck, sat down

with them and explained what we were doing and how it worked. We gave them all an opportunity to ask questions together. We met with some of them as a group and some of them individually and came to terms and signed all of those easements.

MR. BENDER: Thank you, Jeff. I don't have any other questions at this time, Mr. Examiner.

HEARING EXAMINER GARNER: Why don't we -- rather than move to cross, why don't we take a ten-minute break at this point in time.

(Recessed at 10:08 a.m. and reconvened at 10:20 a.m.)

HEARING EXAMINER GARNER: Okay. We are back on the record, and we will resume with cross-examination of the witnesses by Attorney Braaten.

MR. BRAATEN: Thank you. Your Honor.

**CROSS-EXAMINATION**

**BY MR. BRAATEN:**

Q. Why were the applications submitted by Summit Carbon Solutions, LLC?

A. (BY MR. BOESHANS) Excuse me?

Q. Why were the applications submitted to the North Dakota Industrial Commission by Summit Carbon

Solutions, LLC?

A. So Summit Carbon Solutions, LLC, is the parent to Summit Permanent Carbon Storage and the parent -- who is then the parent to or owner of Summit Carbon LLC #1, 2 and 3.

Q. And so Summit Carbon Solutions submitted the three applications on behalf of the Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC?

A. No. I believe the applicant is -- or the applicant is Summit Carbon Storage #1, LLC, #2, LLC, and #3, LLC; correct.

Q. So why did the applications get submitted by Summit Carbon Solutions, LLC?

MR. BENDER: What do you mean by "submitted"? I'm not trying to argue with you, but --

Q. (MR. BRAATEN CONTINUING) Filed with the NDIC.

A. Just that they were -- Summit Carbon Solutions is the parent to Summit Carbon Storage -- excuse me -- yeah, Summit Carbon Storage, LLC, #1, #2 and #3.

Q. Okay. You talked a little bit about industrial sources for the $CO_2$ coming in the state

and there was a discussion of ethanol plants and an aviation facility. Is there anything else that is connecting or are there any other sources connecting to the system that you didn't discuss?

A. Not at this time.

Q. Okay. Do you have any plans to connect other sources to the system at this time?

A. We've had commercial discussions with others, but no -- no affirmative plans, if you will, or agreements.

Q. Are those discussions all with facilities that would have a $CO_2$ stream within the parameters you said in your application?

A. So I'm not the chief commercial officer so I can't speak to the specifics of -- on the $CO_2$ stream characteristics of all potential sources that we've had commercial discussions with, but -- but per the application, they would be required to be within that specification.

Q. Okay. Would you agree with the statement that North Dakota has a huge economic advantage because our geology is such that we can do storage in pore space in North Dakota where other states can't?

A. I can't testify to the, quote, magnitude

of the advantage, but I would agree that being located on top of suitable storage is an advantage.

Q. And so would you agree that Red Trail Energy as an ethanol plant has an economic advantage by being able to sequester its own $CO_2$ emissions directly beneath the earth under its facility?

A. Yeah. Again, I can't testify to the specific economics of Red Trail Energy and what their operating and production costs are, et cetera, et cetera, but certainly being located on top of geologic storage is advantageous to them, I would believe.

Q. Does your project sell that advantage to ethanol plants in other states?

A. Can you restate that?

Q. Does your project sell that advantage to ethanol plants in other states?

A. I don't believe so.

Q. Do they obtain an advantage by being able to inject their $CO_2$?

A. Being able to connect to our system and by extension store their $CO_2$, they're able to lower their CI score, yes, and then that creates an advantage for them or benefit to them.

Q. And that takes away the advantage North Dakota ethanol plants would have if they were the only ones doing sequestration of their $CO_2$?

A. I don't believe so.

Q. How -- how is that?

A. Well, I don't believe that the North Dakota plants can support -- given their size can support a greater than 1-billion-gallon market.

Q. So they would find themselves in a system, in a market with a massive demand and a low supply?

A. I -- I would say that it's -- there likely wouldn't be enough supply to support the market.

Q. Do you think that that supply could then be filled by development of other projects?

A. Potentially.

Q. Do you think that other projects would have an advantage if they were able to sequester $CO_2$ directly underneath their facility?

A. They may have.

Q. All of the ethanol plants connected to your system but one are from outside of North Dakota?

A. Currently, yes.

Q. You testified regarding what has been marked as Exhibit 4A. Do you have a copy of that

in front of you still?

A. I do.

Q. You indicated that this was prepared under your direction and control?

A. Correct.

Q. Who prepared it?

A. The Energy & Environmental Research Center.

Q. And who at the Energy & Environmental Research Center prepared it?

A. I don't know specifically who.

Q. How did you direct them if you don't know who they are?

A. I directed the project lead at the EERC to prepare this exhibit, but I don't know exactly which one of the EERC experts did the work.

Q. Who is the project lead at EERC?

A. That would be Amanda.

Q. Amanda who?

A. Amanda -- excuse me -- Amanda Douglas.

Q. How long has Amanda Douglas been working on the project?

A. She's been involved in the project since we started developing the project in late 2021.

Q. How did Amanda's team determine where to

put the lines on this particular map for this exhibit?

A. Amanda will have to testify to that.

Q. Well, but you directed her to create this exhibit for you; right?

A. I did. Correct.

Q. What did you ask her to put on the exhibit?

A. I asked her to put on the exhibit the plume extent after five years of injection and the other -- the storage boundaries, et cetera.

Q. Okay. Do you have an understanding of how the plume extent at five years was calculated and then put onto this map as a line?

A. Say that one more time.

Q. I think I can. Do you have an understanding of how the plume extent at five years was calculated and then put on this map as a line?

A. Yes. It's my understanding that the plume extent was calculated using dynamic model simulation to determine the extent.

Q. Would it be fair to say that you wouldn't have any independent information of your own as to where the line should be drawn to indicate the $CO_2$ extent at five years of injection?

A. That I wouldn't have any independent --

Q. I'm not trying to be tricky. Let me be basic here. You asked Amanda to put the lines on here, but you don't know how she created these lines or where the data comes from to determine that that's where the line should go?

So let me ask a better question. That wasn't fair. That's just what I'm trying to get at, though.

A. Okay.

Q. So as far as where the plume extent is on this exhibit, you would have to rely on Amanda in order to determine whether that's accurate; is that fair?

A. That's correct. I would have to -- I would have to rely on, you know, the geoscience team and reservoir engineers at EERC that ran the model to produce the plume extent.

Q. Okay. And so other than what you testified to that this Exhibit 4A represents, in order to understand where all of the information came from and how the decisions were made as to where to put the lines, we would have to talk to EERC about the models they ran?

A. Yes. To understand the process, if you

will, and the modeling that produces the lines, the EERC geoscience team would be the experts.

Q. Does Summit Carbon Solutions, LLC, have a contract with the EERC for that work?

A. It does.

Q. And does the EERC have a contract with any of the Summit or SCS entities listed on Exhibits 2A, 2B or 2C other than Summit Carbon Solutions, LLC?

A. I don't believe so.

Q. To your knowledge, does EERC have a contract -- well, let me back up.

Are you aware of any contracts EERC has with private parties that relate specifically to the project that we are here today for?

A. Specific parties related -- can you specify which parties or --

Q. With anyone. But do you know if EERC has contracts with any private parties, other than the one you just mentioned with Summit Carbon Solutions, that relate to this subject matter and this Summit project that brings us here today?

A. I'm aware that they also have contracts with Minnkota, but it's not related to this project.

Q. Okay. Yeah. So, no, just related to this project, are you aware of EERC having contracts with other parties other than Summit for the purposes of working on or related to this Summit project?

A. I'm not.

Q. Okay. Is the EERC a State-funded institution?

A. I'm not sure how the EERC is funded. I know they're part of the University of North Dakota, but in terms of how they're funded, I'm not aware.

Q. Do they regularly take on work producing applications for industry clients to get permits for new projects?

A. Yes. That's my understanding.

Q. What other projects are you aware of them doing that for?

A. I'm aware of them doing that for the Minnkota projects, the DCC projects. I'm also aware that they did work on the Red Trail project.

Q. Okay. So outside of the few carbon sequestration projects that have occurred in North Dakota in the last five or so years, are you aware of EERC ever helping industry participants with

applications to get permits for new projects?

A. I'm not aware of their role in projects, you know, outside of North Dakota for sure.

Q. But are you aware of them contracting with and helping industry participants with applications for permits for new projects outside of carbon sequestration?

A. I am not.

Q. Okay. Does the contract signed between Summit Carbon Solutions, LLC, and EERC in 2021 cover the scope of all work that EERC has done for Summit on this project?

A. No. We have multiple contracts with the EERC.

Q. Okay. How many contracts does Summit or its affiliates and subsidiaries have with the EERC related to the project we're here for today?

A. Today we have, I believe, one active -- active contract.

Q. Okay. How many contracts have you had since you signed -- and when I say "you," I'm referring to Summit Carbon Solutions, LLC, its affiliates and subsidiaries. How many contracts have you had since you signed the first contract with EERC for this project?

A. I believe we had four --

Q. Okay.

A. -- separate.

Q. And did the four contracts cover different subject matter or scope of work or were they renewals of the same contract?

A. It was all similar subject matter, slightly different scopes.

Q. Did Summit Carbon Solutions, LLC, or its affiliates or subsidiaries get bids or proposals from any institutions or consulting firms other than EERC for the work it eventually contracted to EERC?

A. Not that I'm aware of.

Q. How do you know whether the expense or charges from EERC are competitive with other providers?

MR. BENDER: Objection. Relevance.

HEARING EXAMINER GARNER: Overruled.

MR. BOESHANS: I would just say from the Summit perspective, we've engaged lots of different advisors across a broad scale of our scope, and so what we do is we look at rates comparable to what others would do for similar types of work on other scopes of the overall project, and that's how we

judge competitive or not.

Q. (MR. BRAATEN CONTINUING) Okay. Right. But you just said that with respect to the work EERC did for you. You didn't actually get any bids or scope out any other competitors to do that work; right?

A. We did.

Q. You did?

A. No. Excuse me. We did not. That's what I said.

Q. So how do you know if EERC's rates were competitive?

A. Again, as -- as I stated, we look at similar proposals for similar types of work, permitting, engineering, modeling, those kinds of things on the project overall and that's our best comparison.

Q. So did you compare the work you were asking EERC to do with estimates or proposals from other institutions or consulting firms who could have done the work?

A. So if your question is did we competitively bid this specific work, the answer would be no, we did not get proposals from -- for the exact scope of work or request for proposal.

Q. Okay. Are you testifying that you did nonetheless generally look at rates for similar types of work as part of that process or did you just choose to go with the EERC regardless of whether their rates were competitive?

A. We, again, looked at comparables to others to do, you know, professional work and the same -- not the exact same type of work but what I would describe as similar work, and we accepted their proposal.

Q. Okay. Is the amount charged by EERC more or less than what you saw in the similar types of rates that would be charged for work by other firms?

A. I don't recall specifically. I would say it was similar in nature from looking at hourly rates perspective.

Q. And does Summit actually compensate EERC under the contract for the work that they're doing?

A. If your question is do we pay them for their services, yes.

Q. Are you familiar with the contract Summit has with private engineering and consulting firms?

A. Generally.

Q. Are there any provisions in the EERC

contracts that allow them to do things like use your data for research and education purposes?

A. I don't recall specifically. I don't recall those provisions.

Q. Do you have copies of those contracts?

A. We do.

Q. Is there anyone testifying today that knows the provisions of those agreements?

A. Not that I'm aware of. It's possible, but I don't -- I don't -- I can't say for sure.

Q. Does your contract with EERC require them to maintain your data in a confidential manner?

A. It does.

Q. How does that work with a public institution subject to open records requests?

A. That would --

MR. BENDER: If you know, Wade.

MR. BOESHANS: Yeah, I don't know for sure, but, again, that's a better question for the EERC.

Q. (MR. BRAATEN CONTINUING) Are you having the EERC testify in support of your application?

A. We are.

Q. You made some comments about the NAICS industrial classification code. Can you tell me

again what you were saying about that?

A. I was saying that this was the classification code.

Q. According to whom?

A. What's that?

Q. According to whom?

A. According to how it's been, I guess, classified based on the type of the system it is.

Q. By whom?

MR. BOESHANS: Jeff.

A. (BY MR. SKAARE) Yeah, I don't recall -- what was the acronym again? Can you -- what was the acronym for the code? I think we have it somewhere.

Q. NAICS industrial classification code.

A. I don't have the answer for you. I'm sorry.

Q. 486990 was the number you guys gave. You knew that much; right?

A. We did.

Q. What's that number for?

A. I'm not sure I'm the appropriate person to answer that question, but we can --

Q. Well, who -- who knew -- well, let me ask the question again. What is the NAICS industrial

classification code you claim applies to the storage facilities?

A. (BY MR. BOESHANS) I can't answer that question.

Q. But you did.

A. No. I stated this is what the classification code is. We'll have --

Q. But you don't know if it is?

A. I can confirm that Jay Volk, who will be testifying here later today who works under my direction, made that determination along with our counsel, and he can testify specifically to that question.

Q. What's his name?

A. Jay.

Q. Jay.

Did he make the determination that 486990 is the NAICS industrial classification code?

A. Yes. That's my understanding.

Q. Do you have any understanding of why?

A. I do not.

Q. Is it because that refers -- well, how would you describe the facility that you're saying has classification code 486990? What is it?

A. How would I describe the facility?

Q. Yeah.
A. It's a storage facility.
Q. Is it a coal pipeline transportation facility?
A. No, it's not a coal pipeline. I believe it falls in the "other" category.
Q. Is it a slurry pipeline transportation?
A. It is not.
Q. Is it pipeline transportation except crude oil, natural gas, refined petroleum products?
A. Say that again.
Q. Pipeline transportation except crude oil, natural glass -- natural gas, refined petroleum products?
A. That sounds correct.
Q. Your storage facility is for pipeline transportation?
MR. BENDER: Mr. Examiner, you know, we can continue to waste time asking these questions. We've identified another person who may be able to help us with this, so --
MR. BRAATEN: He testified to this already and only upon cross-exam is it being discovered that he doesn't know that much about it, but I think I'm entitled to exhaust my questions given

that this was a very specific code that they brought up on direct and said is the code, and I'm just asking why it is.

HEARING EXAMINER GARNER: Overruled.

Q. (MR. BRAATEN CONTINUING) So you think pipeline transportation except crude oil, natural gas and refined petroleum products is an accurate description of your carbon sequestration facility?

A. Yes. That's my understanding based on the -- the advice of our team.

Q. Are you going to store the $CO_2$ in a pipeline underground?

A. We are not. We are going to transport it to the site.

Q. And then you're going to transport it out of a pipeline and into a wellbore; right?

A. Yes. It will -- from the pipeline it goes to the wellhead and then into a wellbore.

Q. And then into the reservoir?

A. Correct.

Q. Where is the pipeline in the reservoir?

A. There is no pipeline in the reservoir.

Q. Then why would you call a storage facility in the reservoir a pipeline?

A. Based on the, again, advice of our team,

we believe that's the appropriate -- the appropriate classification.

Q. Well, but not because it's an accurate description of the facility; right?

A. It describes it as "all other."

Q. What describes what as "all other"?

A. The classification, as I understand it.

Q. 486990 is for "all other"?

A. Yes. That's my understanding.

Q. There was some discussion earlier about how there are PSC hearings going on regarding the Midwest Carbon Express; do you recall that?

A. I do.

Q. Is the Midwest Carbon Express the same as the storage facility that we're here talking about today?

A. It's not the same.

Q. It's a different project; right?

A. Well, no, the Midwest Carbon Express -- excuse me. Let me restate that.

The Midwest Carbon Express is the -- is the pipeline. This is the storage facility that's part of -- the storage component of the Midwest Carbon Express project, if you will.

Q. What is the Midwest Carbon Express

project?

A. So the Midwest Carbon Express project, as I understand it, is the combination of capturing of $CO_2$ at the plants, transporting the $CO_2$ via the pipeline and storing the $CO_2$ at the injection facilities that we're permitting here today or the storage facilities -- excuse me -- that we're permitting here today.

Q. Where does the Midwest Carbon Express pipeline end?

A. The -- you said where does the Midwest Carbon Express Pipeline end?

Q. Yes.

A. It's -- you know, back to the exhibit that shows the terminus of the pipeline.

Q. Can you direct me to the -- or you're on one of the marked exhibits?

A. Yes. Oh, excuse me. It's in Exhibit 1.

MR. BENDER: 1A.

MR. BOESHANS: Exhibit 1A. Yes. If you refer to page PS-5, Figure PS-3, the red box indicates the terminus of the Midwest Carbon Express Pipeline. That's the end of the line.

Q. (MR. BRAATEN CONTINUING) With respect to the applications under consideration today, does

the subject matter for those applications all begin where that pipeline ends?

A. It does.

Q. And so when we're talking about an industrial classification that's applicable to these three sequestration facilities that we see on PS-5, it would not be accurate to classify those as a pipeline, would it?

A. I don't agree with that. There's -- there's a flowline and the injection facilities that are all part of this application.

Q. So the flowlines. Anything else that you would consider a pipeline that begins after the terminus of the Midwest Carbon Express Pipeline?

A. Okay. Anything else that I would consider a pipeline?

Q. Right.

A. No.

Q. Going back to Exhibit 1, PS-5, the diagram you noted, there's a terminus point for the Midwest Carbon Express Pipeline?

A. Yes.

Q. Are there any booster pumping stations after that terminus point?

A. There are.

Q. Where are those?
A. At the well pads.
Q. Okay. Is there a valve station at the terminus point?
A. Yes, there is.
Q. Where is that valve station operated from?
A. The -- all the valves will have the ability to be operated from the main control center and/or backup control center. Current plans for the main control center are in Ames, Iowa. They're also capable of being operated manually in the field.
Q. You had indicated there was no federal acreage within the sequestration areas. Was that a criteria used in the search in order to avoid federal acreage?
A. (BY MR. SKAARE) It was not.
Q. Okay. You had indicated you signed pore space leases yesterday. Was that with individual landowners?
A. It was.
Q. You're asking the Commission after this hearing to amalgamate all unleased property owners; is that right?
A. That is right.

Q. If you've not reached a deal with the North Dakota Department of Trust Lands for the State-owned lands, are you asking the Commission to also amalgamate the State-owned lands administered by the Department of Trust Lands?

A. So we've -- well, I can answer that question this way: Zack Pelham, who has been busy with a number of different hearings, has been appointed to assist the North Dakota Department of Trust Lands. We have agreed on the substantive lease -- or easement agreement, and we're anticipating the ability to complete that shortly. It just wasn't capable of being done prior to this hearing.

Q. Have you come to an agreement on compensation?

A. I would say we've covered all substantive issues including compensation.

Q. What do you mean by you've covered the issue of compensation?

A. Sure. So the State of North Dakota Trust Lands, of course, is an easement agreement rather than a -- for pore space rather than a pore space lease. We have presented and worked through a number of terms, including our compensation offers

that are consistent with the existing leased landowners and have received no pushback regarding those terms. We're working through the remaining terms on that agreement. Quite honestly, we've been very busy. We submitted this to the State I would say probably about a year ago and have been working on it off and on through that time frame.

Q. Are the provisions of the easement that you're negotiating with the Department of Trust Lands different than the pore space leases you signed with landowners?

A. To the extent that they call it an easement versus a lease, yes. Beyond that, not any significant changes.

Q. But there are some changes?

A. Sure. Because they consider the pore space a -- you know, instead of a lease, they consider it an easement. But beyond those primary -- that is your primary difference, that they consider it an easement rather than a lease. So that would be a difference.

Q. Are there any additional protections for reclamation or soils or anything like that in the Department of Trust Land lease or easement?

A. Yeah, there are. However, as part of our

discussions with the State, we have no plans for any surface on there. So, again, those are -- I mean, that's a good point, and I do believe that they have some specific requirements when there are pipelines or there are facilities. We, however, do not have any surface plants on any of those lands.

Q. So why wouldn't you offer those same reclamation provisions to all of the landowners for whom you don't have plans for their surface?

A. Sure. In fact, we went further and offered every unleased landowner a no surface facilities clause, thus, signaling that prior to essentially any surface encounter, that we would enter into a separate written agreement. So as we go forward with amalgamation, that was -- if you recall in my testimony, that every unleased owner received a copy of the lease -- the option and lease agreement via certified mail in the fall of '23 and again in the spring of '24 that included a no surface facilities clause.

Q. Did you also include language related to soil reclamation and soil separation in the Department of Trust Lands easement?

A. So they have a -- what I would consider a standardized form regarding pipelines. In my

experience of acquiring right-of-way in North Dakota, I've encountered that same form. That includes, of course, things such as -- and I'm -- forgive me, I'm going from memory -- soil segregations and other certain conditions, seed mixtures and the likes, and I believe that they included that on this particular agreement. I know that Attorney Pelham and I talked about the necessity as we considered perhaps a no surface occupancy that would sort of negate the need for that, but it is on that agreement.

Q. So you said you're familiar with some of the Department of Trust Lands standardized forms; would that be accurate?

A. I would say I'm generally familiar. I've been involved in other right-of-way.

Q. So you're aware, for example, that the State Department of Trust Lands has standardized forms for things like a pipeline easement or a well pad agreement out in the oil patch?

A. I am.

Q. And you may also know that with some of those forms, they have some specific exhibits or attachments that cover things like their preferred seed mixture or soil stripping requirements. Have

you seen those before?

A. I certainly have, yes.

Q. And have you noticed that a lot of the language throughout some of those different agreements tends to be the same?

A. I would say that's a fair statement.

Q. That was a bad question, but thank you.

Are you aware of who at the Department of Trust Lands actually drafts those agreements and forms?

A. I am not.

Q. But we can assume it's the staff; right?

A. Yes.

Q. Do you know who did a lot, if not all, of the negotiating for the surface division in the development of a lot of the surface divisions forms for the Department of Trust Lands throughout the oil boom?

A. I would be speculating if I answered. I do not.

Q. Do you know who Mike Haupt is?

A. I do.

Q. Are you aware that he developed the forms and the leases that were submitted to Summit on behalf of landowners working off of the exact same

forms that he developed for the State Department of Trust Lands while he was at the State for his whole career?

A. Will you please repeat that?

MR. BRAATEN: Would you mind reading it back, Steph?

(Record read as requested.)

MR. SKAARE: Okay. So what I'm -- I want to answer your question, but are you specifically referencing a lease that we received?

Q. (MR. BRAATEN CONTINUING) Correct.

A. And what lease are we talking about specifically?

Q. The one from Mike Haupt.

A. We received one from the Swenson group that had some of the same forms that I would say looked familiar or similar to the State. I'm not sure that answers your question, but I understand that there were some similarities.

Q. So does the State get that language in their contract and the landowners don't simply because they're the State?

A. I would disagree. We offered all unleased landowners a no surface occupancy.

Q. But not protections for the surface;

right?

A. Well, by suggest -- or by entering into a separate written agreement in the event that we needed something, that would give them the opportunity. So we did not gain access to the surface for any facilities, pipeline, roads or otherwise.

Q. Until the end of this hearing when you ask the Commission to give that to you; right?

A. Under amalgamation you are correct, yes, there are certain rights that would come in that particular direction.

Q. So it doesn't really matter what the landowner signed, does it?

A. What landowner? I -- I'm sorry. I'm not trying to be tricky here. Can you ask that question --

Q. Regardless of what any landowner signs with you for your project, they are going to be subject to Exhibit D to your storage agreement; right?

A. I would disagree.

Q. Why?

A. Because we have a separate written contract.

Q. That is superseded by that storage agreement the second this Commission issues its order; right?

A. No.

Q. Okay. Why not?

A. Well, let me correct that. Your question was whether the storage agreement overrides the existing contracts with individual landowners for pore space leases. Did I understand your question correctly?

Q. I don't know, but I'd like the answer to that question.

A. Sure. I believe that a written contract with our landowners is a contract that we will adhere to.

Q. Unless it is in conflict with the storage agreement; right?

A. No.

Q. So you're going to ask the Industrial Commission to impose the storage agreement and impose Exhibit D as a pore space lease on every unleased landowner; right?

A. Yes.

Q. And are you saying that you're not going to impose that on the landowners that signed a

lease?

A. It will exist, but I think there are additional protections in those leases. Yes.

Q. Additional protections that will not be superseded or obviated by the storage agreement?

A. Well, for example, where we have a no surface occupancy, we will honor that contract.

Q. Okay. Any others?

A. Nothing at -- that comes to mind specifically.

Q. So other than a no surface occupancy agreement, any agreement any landowner signed is not going to be honored if it violates the storage agreement?

A. I disagree with that. I think that is a mischaracterization of what I was trying to say.

Q. Well, I'm not trying to characterize what you're trying to say. I'm asking you a question.

If a landowner signed a lease with Summit --

A. Mm-hmm.

Q. -- for the use of their pore space --

A. Mm-hmm.

Q. -- and that lease now has terms that conflict with the terms of the storage agreement,

what controls?

A. We would honor the lease.

Q. And so you're not asking the Industrial Commission to impose any kind of contractual terms on any single landowner if they signed a lease with you?

A. Okay. Having an opportunity to re-review this, would you mind if I had the question read back to me so I can be accurate in my answer?

MR. BRAATEN: Sure. Would you mind reading it?

(Record read as requested.)

MR. SKAARE: I think we're asking them to execute the storage facility agreement as -- as here as part of the application. I'm not sure that it creates any additional burdens on landowners that we don't address in our lease.

Q. (MR. BRAATEN CONTINUING) Does the storage agreement or Exhibit D to the storage agreement have any applicability to a landowner who signed a lease with you?

A. It does.

Q. How so?

A. I'm not sure I understand your question. Can you repeat it?

Q. How does the storage agreement apply to a landowner who signed a lease -- pore space lease with Summit?

A. Well, I believe the storage agreement applies to all landowners. However, I believe we've also entered into a separate legal contract or agreement with certain landowners that has additional details and considerations.

Q. Does the storage agreement impose the lease at Exhibit D on landowners?

A. I would say it imposes those on the unleased landowners, yes.

Q. Okay. And are you saying it does not impose Exhibit D and the terms of Exhibit D on the leased landowners?

A. I would say that's a fair characterization. I believe that we've entered into a lease agreement with individual landowners.

Q. Do the individual lease agreements that you've entered into with landowners have any material differences to the Exhibit D in the storage agreement?

A. I would say not material.

Q. And that's because you absolutely refuse to negotiate any kind of material change to the

lease for exactly that reason; right?

A. That is not true.

Q. Why was it that you did not negotiate material changes to your lease?

A. Well, Mr. Braaten, through good-faith negotiations with over 450 landowners, we acquired in excess of 146,500 acres covering 16 townships and 3 counties, and from the start we had some changes to that agreement.

Q. How many?

A. I don't recall specifically, but we've made some changes to the agreement. Some --

Q. More than five?

A. I don't recall the exact number.

Q. Less than ten?

A. I don't recall the exact number.

Q. Less than 20?

A. I don't recall the exact number of changes.

Q. Less than a hundred?

A. I don't recall the exact number of changes.

Q. But none of them were material?

A. No, I believe some were, including an increase in the royalty rate.

Q. How much?
A. A 50 percent increase in royalty rate.
Q. To whom?
A. All landowners that signed equally.
Q. Okay. Okay. So you've made a few changes to the global lease you circulated. Other than changes that you made to the lease for anyone who signed the lease, did you make any changes to the lease in response to concerns expressed from any individual that were material?
A. Yes. As I testified before, as we developed the project, we offered a no surface-facilities clause to a number of individuals.
Q. Okay. Anything other than that?
A. Not that I recall.
Q. How many leases did you say you signed?
A. So we've executed -- the exact number I don't know. What I could tell you is I know that it's over 450 different individual signatures across multiple different agreements. That covers the -- the large scope of the project, including the 146,000 acres that we've acquired.
Q. And you didn't allow a single landowner a single material change based on their concerns in

all of those negotiations?

A. I think that's a mischaracterization.

Q. Can you name one?

A. Sure. Favored nations at the request of your client.

Q. And that went to everyone; right?

A. It did, yes.

Q. So I'm talking about changes that weren't global to the lease for everybody who signed.

A. No, we treated everybody equally.

Q. So no material changes to the lease form based on negotiations with landowners about their concerns?

A. No, but we took into consideration all of our discussions across that entire footprint with all these different landowners.

Q. If your answer to the landowners' concerns and questions before they even expressed them is no, how is that good faith?

A. Well, our answer wasn't no. We sat down and had multiple meetings with many landowners from the start of the project.

Q. How many material changes to the lease did those meetings result in?

A. Again, I don't know the exact number, but

I can say that we've made some adjustments to that lease. I think that lease is reflected in the exhibits.

Q. And so the landowners who signed a lease with you would get the same lease imposed on them if they had not signed that lease?

A. Yes, with a few minor exceptions. For example, a no surface occupancy clause that we've granted to some.

Q. Okay. Any other exceptions?

A. No.

Q. Did you grant the no surface occupancy clause only to those landowners who you were not intending to put anything on anyway?

A. Well, I think the best way to understand this is that when we started our project and our leasing, it required some site characterization, and so we didn't have a -- a complete understanding of where everything would go. Through that site characterization process, we were able to determine where those things are located. And so it is something that we were willing to grant to those once we understood where we -- where we were putting our facilities.

Q. If you do not reach an agreement with the

North Dakota Department of Trust Lands at the time that this Commission issues its order, are you asking this Commission to issue an order also amalgamating the State lands that are administered by detail?

A. If we were unable to enter into an agreement and the Commission entered an order, it would amalgamate those lands. It is not our intention to do that. As I stated previously, we've been actively working through the terms of that agreement with the attorney appointed to assist who's been in some of the many hearings I think that you've been in, too, so --

Q. Has he shared any price points with you from other transactions?

A. Can you elaborate on that question?

Q. Has the attorney with whom you're negotiating for the Department of Trust Lands shared with you any price points or comparable transactions he thought you might want to review in talking about compensation?

A. They have not.

MR. BRAATEN: Lawrence, were you using -- which number are you using for the application?

MR. BENDER: 1A.

MR. BRAATEN: Okay. I'm going to have you take a look at Exhibit 1A, which I understand to be the application for the Leingang facility?

MR. BENDER: Yes.

Q. (MR. BRAATEN CONTINUING) And I'd like to direct your attention to the storage agreement within the application. Do you have the page up in front of you -- I show it as page 2 that has the recitals listed at the top?

A. I do.

Q. Okay. So the recital states, "It is in the public interest to promote the geologic storage of carbon dioxide in a manner which will benefit the state and the global environment by reducing greenhouse gas emissions and in a manner which will help ensure the viability of the state's coal and power industries, to the economic benefit of North Dakota and its citizens."

How does the Summit project benefit the State and the global environment by reducing greenhouse gas emissions?

A. (BY MR. BOESHANS) So clearly our project reduces greenhouse gas emissions. We're storing significant amounts of $CO_2$.

Q. How is that a benefit to the global

environment?

A. So it's reducing emissions, number one. Number two is we are providing -- we're -- we are commercializing CCS and demonstrating commercial CCS that can be implemented for others or by others. We're also supporting North Dakota's largest industries. Obviously the -- the $CO_2$ that's coming from our project is being -- originated from corn and corn markets are important to the citizens of North Dakota. Supporting commodity prices and land prices for agricultural sector. We're also creating the opportunity for owners of pore space to monetize that value of that resource.

Q. At whatever price you choose?

A. At the -- at the royalty rate in which we've agreed to with in this case 93 percent of the landowners.

Q. You didn't change it for a single one of them, though; right?

A. No. As Jeff testified to, we changed -- we adjusted the royalty rate during our negotiations.

Q. Globally.

A. Correct. We -- we entered into a -- included a favored nations clause, so it applies to

all.

Q. How does reducing greenhouse gas emissions benefit the state of North Dakota?

A. Well, in this case it allows the continued -- allows the plants in this case, the ethanol plants, to continue producing ethanol and selling that -- having access to new markets, continuing the viability of those plants and that industry --

Q. Which ethanol plants?

A. -- therefore supporting the -- therefore supporting the corn markets.

Q. Oh, okay. I'm sorry. I should have let you finish. Sorry.

But that's a benefit from a speculative uplift in the price of corn from the financial success of the ethanol plants flowing from their response to a regulatory issue; right?

A. I wouldn't characterize it that way.

Q. How would you characterize it?

A. I'd say corn is a globally traded commodity, and our project and our project partners create a significant demand. And so there's a supply/demand relationship. And to the extent that they continue to operate and purchase that volume

and likely more, that that has a positive impact on the overall agricultural commodity markets and specifically corn.

Q. Okay. So let's put that aside and I want to ask my specific question again, which is how does reducing greenhouse gas emissions benefit the state of North Dakota?

A. Again, as I said, this project reduces greenhouse gas emissions.

Q. But I'm not asking about projects that are -- or benefits that flow from this project. I'm simply asking how does reducing greenhouse gas emissions benefit the state of North Dakota? Or maybe I should start does it benefit the state of North Dakota to reduce greenhouse gas emissions in Iowa?

A. So I think as you think about greenhouse gas, you can't think about it as one state at a time. Obviously, air goes everywhere. $CO_2$ is in the air so reducing it at one point impacts the overall concentration of $CO_2$, you know, globally, so to speak.

Q. But that's not a substantial and direct impact for the citizens of North Dakota with respect to the air they're breathing because we

took emissions out of the air in Iowa?

A. I would say that reducing -- excuse me -- reducing $CO_2$ emissions -- reducing $CO_2$ emissions is not about making the air healthier. I don't really understand the question or the -- the point of the question.

Q. What benefits flow to anyone from reducing greenhouse gas emissions?

A. (BY MR. SKAARE) Perhaps this will provide a little more understanding to the recitals. North Dakota Century Code Chapter 38-22-01 is policy. It reads, "It is in the public interest to promote" -- excuse me -- "to promote geologic storage of carbon dioxide." Doing so will benefit the State and the global environment by reducing greenhouse gas emissions. Consistent with the statute, we included this in our recitals, and we believe that there is benefits. I don't know that we can get into the very specifics here. I think you're asking a broad question.

Q. What benefits do you think there are to the State of North Dakota from reducing greenhouse gas emissions? Can you name one?

A. Yes.

Q. What?

A. I believe it -- it allows one of our major ethanol plants the opportunity to engage in low-carbon fuel markets.

Q. How does the Summit project help ensure the viability of the state's coal industry?

A. (BY MR. BOESHANS) So I would say based on my experience pursuing commercial CCS for the coal industry, the biggest challenge is others having done it before, having been done at large commercial scale. And so by deploying CCS at commercial scale, as we will here, we, in essence, build out the pathway, if you will, for others to follow and do the same.

Additionally, we're building a $CO_2$ transportation network that can provide benefits to others or opportunities for others to -- to use as well.

Q. So how is the coal industry going to benefit from what you're doing?

A. They're going to benefit from ultimately the -- the demonstration at commercial scale and that it's -- that it's been done and that by extension makes the second of a kind -- kind of provides a road map, so to speak.

Q. Didn't Minnkota already demonstrate it's

fully capable of doing that and then come in here and express concerns about your application?

A. So Minnkota has a proposed project that has yet to be constructed.

Q. Have you constructed your project?

A. Not yet.

Q. What projects are constructed?

A. Could you be more specific?

Q. Well, Red Trail is demonstrating success with ethanol doing direct injection of carbon in North Dakota; right?

A. They are.

Q. What are you doing that they don't already know how to do?

A. We are replicating the same or similar at scale.

Q. You're just bigger?

A. Yes, it's bigger.

Q. How does the Summit project help ensure the viability of the state's power industries?

A. In the same way.

Q. If Summit constructs its project and injects $CO_2$ as planned for the next 20 years, will that reduce the global temperature?

A. So you're asking me to speculate?

Q. I don't know if I am.
A. You are asking me to speculate.
Q. Okay.
A. Because I don't know what others are going to do as well.
Q. Hold all other things constant.
A. Again, I'm not a climate scientist, but I don't believe so.
Q. The recitals also state that to further geologic storage of carbon dioxide, a potentially valuable commodity, may allow for its ready availability if needed for commercial, industrial or other uses, including enhanced recovery of oil, gas and other minerals. Does any of that apply to the Summit project?
A. Read that one more time.
Q. "To further geologic storage of carbon dioxide, a potentially valuable commodity, may allow for its ready availability if needed for commercial, industrial, or other uses, including enhanced recovery of oil, gas and other minerals."
A. (BY MR. SKAARE) So as I mentioned before, right, these recitals are codified to a large extent under 38-22-01 which also reads, "Further geologic storage of carbon dioxide, a potentially

valuable commodity, may allow for its ready availability if needed for commercial, industrial or other uses, including enhanced oil recovery" -- excuse me -- "including enhanced recovery of oil, gas and other minerals." And as I testified earlier, the recitals are talking about the policy as issued by the North Dakota State Legislature in 38-22-01.

Q. With the implication being that they apply to your project, though; right?

A. Sure.

Q. And that one doesn't? That's a question. Sorry. It's a bad question. Does anything in the recitals, Section B, apply to your Summit project?

A. (BY MR. BOESHANS) Well, in reading it, it says, "To further geologic storage of carbon dioxide," which we are doing.

Q. And is the carbon dioxide that is going to be stored by the Summit project going to be readily available for commercial, industrial or other uses, including enhanced oil -- recovery of oil, gas and other minerals?

A. Not under the current sets of agreements, but potentially it could be.

Q. If you change the law?

A. If I change the law? Excuse me. I don't understand the question.

Q. Meaning that -- well, let me back up. In order to get your tax credits for your project, you have to permanently sequester the $CO_2$ underground; right?

A. Yes, for the -- for the current customers, yes, or partners, if you will.

Q. At what point are you going to switch your 45Q credits over the EOR credits?

A. We don't have any plans to do that.

Q. When do you think you will?

A. Again, I said we don't have any plans to do that.

Q. So you're going to do the first 20 years and then do that?

A. I would just say we don't have any plans to do that.

Q. Have you talked about it?

A. Have we talked about?

Q. Switching to the EOR credit?

A. We have not.

Q. Are you going to pull the $CO_2$ being sequestered in your project back out of the ground at some point?

A. That's not the plan.

Q. Could be the plan, though, if it changes?

A. I would say it's -- it's -- the current contracts require us to permanently store it.

Q. Which contracts?

A. What's that? Our agreements.

Q. Agreements with who, though?

A. With our -- our -- with our plant partners.

Q. Is that because they need it to be permanently sequestered in order to get their low-carbon fuel standard credits?

A. That's my understanding.

Q. How long are those agreements locked in for?

MR. BENDER: Can you speak up just a little bit?

Q. (MR. BRAATEN CONTINUING) Sorry. How long are those agreement terms?

A. I have not seen all the agreements so I don't know the terms.

Q. Would it be fair to say that the $CO_2$ is going to get stored there until 2040?

A. I don't -- I don't know that that's fair.

Q. Okay. Is it possible that you will

withdraw $CO_2$ from the reservoir before the year 2040?

A. Again, it's not part of our plan. It might be technically possible. I believe it would be economically prohibitive and it's not part of our plan.

Q. Are there any legal barriers that you have identified that would prevent you from doing that other than your contracts with the partners?

A. I haven't analyzed that to determine. Again, not part of our plan.

Q. If you made a plan to withdraw $CO_2$ from the reservoir, would the landowners receive any additional compensation?

MR. BOESHANS: I'm going to defer to you, Jeff.

A. (BY MR. SKAARE) Sure. Again, not our plan, as Wade testified. Under the existing contract, there is no additional compensation for the removal of $CO_2$.

Q. Have you ever reviewed any gas storage agreements?

A. Nothing specific or lately.

Q. Have you seen gas storage agreements with pricing structures that require payments both for

things being injected into and taken out of the storage facility?

A. I have not.

Q. Are you aware that that's the most common price structure for a gas storage agreement in the United States?

A. Sure.

Q. Does Summit intend to compensate the landowners for the withdrawals of gases at any point if it starts withdrawing $CO_2$?

MR. BENDER: Asked and answered.

HEARING EXAMINER GARNER: Sustained.

Q. (MR. BRAATEN CONTINUING) Have you done technical feasibility studies on your ability to withdraw $CO_2$ from the reservoir after injection?

A. (BY MR. BOESHANS) We have not.

Q. Have you done any kind of research or study on that?

A. We have not.

Q. Why do you say that you think it would not be feasible to withdraw the $CO_2$ then?

A. I say that I believe it would not be feasible because when you withdrew the $CO_2$, you'd have to separate it from the rest of the -- you know, from the fluids and -- and separate out the

$CO_2$, compress it, transport it, and then reinject the other fluids. And so from that perspective, you'd take the $CO_2$ from the line first. But, again, we haven't -- I haven't done any studies on it to validate costs or -- it's just my -- from my general knowledge or understanding of how this, you know, would work under the question you were asking.

Q. Is it your understanding that after 20 years these facilities will stop taking further injections?

A. It's my understanding that we are permitting these facilities for -- for 20 years. That those permits will be reviewed and updated every 5 years, and the time frame, you know, could change if CCS continues to be a commercial -- commercially viable solution.

Q. But the facilities are still going to fill up at some point; right?

A. Yes. At some point the facilities would be full.

Q. What do you do with all the $CO_2$ coming through that pipeline when they're full?

A. Well, then we would permit additional facilities or -- assuming we needed additional

storage, at that point we would proceed to permit additional facilities.

Q. Might those facilities include things other than storage?

A. Your question is "might they"?

Q. Correct.

A. I guess that's possible.

Q. Would it be accurate to say there are no plans to shut down the flow into that pipeline when these storage facilities are full?

A. I would say that we have designed the project around 20 years. We haven't contemplated plans to shut it down afterwards. It's just that is the estimated project life at this point, but there are no plans to shut it down when the facilities are full. Again, I think it would come back to a -- you know, commercial considerations that are viable options at that point in time.

Q. Do you have a permanent required offtake agreement as a term of the agreements you have with your partners?

A. Say that one more time.

Q. Yeah. That was bad. Let me start over.

Do you have any contracts with your partners that require you to permanently take all

of the $CO_2$ coming out of their ethanol plants for the life of their facility?

A. Again, I'm not aware of all the details of those contracts. I haven't reviewed them, so I can't answer that question.

Q. Well, this is just a general question, too, though. Is the idea or the commitment being made by Summit that they're committing to take all the $CO_2$ from these plants for the life of those plants or is it just for a 20-year project period?

A. I don't know the term of how long.

Q. That's pretty fundamental to the entire project, though; right?

A. Certainly the offtake agreements I would say, yes, I would agree are fundamental to the project. What I'm telling you is I don't know the specific duration of 57 different contracts because I haven't reviewed them.

Q. Okay. I'll have you go to the definitions in the storage agreement.

Real quick on the last question, have you had any of your partners renew any contracts at this point for offtake?

A. Yes, I'm aware of renewals.

Q. How many?

A. I don't know. I'm just generally aware that we've renewed. I don't know how many.

Q. Have you discussed plans to expand the geographic area of your storage facilities where they exist right now in the future as a way to increase your storage capacity?

A. So we have secured agreements with landowners that own about 145,000 or over 145,000 acres. Our project is much like a mine-mouth coal plant operation in that we have a very large capital investment, $8 billion, that's depending on utilizing every resource at the end of the line, much like a coal plant has -- mine-mouth coal plant is dependent on the lignite coal resource. And so they in those operations, you know, have secured, generally leased hundreds of millions of tons adjacent to the plant.

Initially, they'll permit a portion of that, develop it. As they continue through operations, they'll permit incremental reserves over time. I would anticipate -- you know, that's why we lease such a large area, and we don't have current plans in terms of an application or a specific design, but we secured pore space leases over a larger area with the -- with the intent at

some point in time having the optionality to permit additional areas and develop additional resources. But we don't have specific plans, which I believe is what your question was.

Q. But if you wanted to, for example, simply expand the boundary of one of these storage units, what is the limiting factor on how much more $CO_2$ you can put in? Is it simply the geographic size of what is permitted or is it related to the pressures at which you're injecting?

A. Yeah, that's going to -- I would say that's perhaps a better question for the reservoir engineers, but certainly there's a variety of factors that would come to play there. It would be the design of the facility, the geologic characteristics, the reservoir performance and all of these different factors.

Q. Have you done modeling to determine how much further out from the injectors past the boundaries of the current storage facility you could extend the plume in those storage facilities?

A. We have not. We ran our simulations for 20 years.

Q. On page 3 of the storage agreement in the definitions -- this is back to Exhibit 1A --

there's a definition at 1.10 for storage expense. It states it's all costs, expenses or indebtedness incurred by the storage operator pursuant to this agreement for or on account of storage operations. Can you tell me generally what costs, expenses and indebtedness would be covered by this definition with respect to Summit's actual costs, expenses and indebtedness for this project?

A. (BY MR. SKAARE) Is it -- is it referenced elsewhere in the agreement besides the definition?

Q. I don't know.

MR. BENDER: Do you mind if I help?

MR. BRAATEN: Oh, no. Go ahead.

MR. BENDER: Take a look at 11.3.

MR. SKAARE: Yeah, almost there. Yeah, 11.3 references under Article 11, Relationship of Parties, 11.3, Pore Space Owners Free of Cost. "This Agreement is not intended to impose and shall not be construed to impose upon any Pore Space Owner any obligation to pay any Storage Expense unless such Pore Space Owner is otherwise obligated." So I would suggest or -- that it was a definition intended to come back to reference that section, which is, "All costs, expenses or indebtedness incurred by the Storage Operator," as

sort of a comprehensive definition of any expenses that are not allocated to the pore space owner.

Q. (MR. BRAATEN CONTINUING) Can you give me a few examples of costs and expenses or indebtedness incurred by the storage operator pursuant to this agreement for or on account of storage operations?

A. Sure. Lease operating costs or other things are not intended to be imposed upon the pore space owners.

Q. What are the lease operating costs for the leases here?

A. So a lease operator would be someone who's working on the project or other sort of expenses in relation to the operation of the facilities are what I consider storage expenses.

Q. Okay. So the lease operator, you're referring to the pore space leases with the landowner and Summit as the operator?

A. Yes.

Q. Okay. And those are the expenses for the operations related to those pore space leases; right?

A. That is correct.

Q. And so storage expense as used here

doesn't cover the amounts paid for the pipeline easements for the Midwest Carbon Express; correct?

A. I don't know that that's correct. Can you repeat that question?

Q. Well, let me ask it -- I thought I knew the answer so let me ask it. Do storage expenses as defined in the storage agreement as all costs, expense or indebtedness incurred by the storage operator pursuant to this agreement for or on account of storage operations refer to the payments made for easements for the Midwest Carbon Express Pipeline?

A. I'm sorry. I need it again. I want to be clear on this one.

MR. BRAATEN: Steph, would you mind reading it?

(Record read as requested.)

MR. SKAARE: Your question is confusing. I can answer it this way: I believe that the definition is comprehensive, and that pursuant to Article 11.3 that it is not intended to impose any of those costs upon the pore space owners.

Q. (MR. BRAATEN CONTINUING) What confuses you about the question?

A. The length, for starters.

Q. Okay. I can shorten it up for you.
A. Sure.
Q. Lease operating expenses, you're referring to that as the expenses of the operator; right?
A. Well, I -- you asked for an example.
Q. Okay. And you're saying lease operating expenses.
A. So I was not comprehensive at all.
Q. Right. But that's one?
A. Sure.
Q. Okay. Has Summit paid money for easements for the Midwest Carbon Express Pipeline?
A. Yes.
Q. Is that money that you paid for those easements something you would consider a storage expense as defined under Section 1.10 of the storage agreement?
A. I believe it falls under the overall costs and expenses of a storage operator.
Q. How about the cost of the pipe?
MR. BENDER: Are you talking about the costs of the pipe for the pipeline or are you talking about costs of the pipe for the flowlines?
Q. (MR. BRAATEN CONTINUING) That's a fair question. I mean for the main pipeline, the

Midwest Carbon Express Pipeline.

MR. BENDER: If you know.

MR. SKAARE: I don't know.

Q. (MR. BRAATEN CONTINUING) You don't know if the cost for the pipe for the Midwest Carbon Express Pipeline would be considered part of the storage expenses as they are defined in the storage agreement, Section 1.10?

A. I don't know that I'm the best person to answer the question with respect to all things that would be considered a storage expense.

Q. Did you draft that definition?

A. I worked and oversaw the development of this, yes.

Q. Well, what did you mean when you wrote it?

A. I think as I was testifying earlier, it was intended to create, as listed in 11.3, cost free to the pore space owners, much like an oil and gas lease, that they're not intended to pay for the expenses of the injection operations.

Q. But there's never a question that any of those oil and gas lessors need to pay for the Dakota Access Pipeline, is there?

A. No.

Q. So why would the people in the storage

facility have any concern with the pipeline from Iowa?

Let me ask you a different question. Are you telling me that all the expenses for your pipeline are included in the storage expenses for the storage facility?

A. I guess I'm not sure I'm understanding the line of questioning.

Q. Do you understand that question?

A. Can you rephrase it?

Q. Are all of your expenses for the Midwest Carbon Express Pipeline considered expenses incurred by the storage operator on account of the storage operations?

A. I would say yes.

Q. So is that pipeline part of what you're asking the Commission to give you a permit for today?

A. No. If you're referring to the pipeline in front of the PSC, the answer is no.

Q. Well, I don't mean the siting permit. I'm asking you when you refer to the storage facilities you're asking the Commission to permit, are you including your pipeline to Iowa in that?

A. No.

HEARING EXAMINER GARNER: Okay. Why don't we stop here and take an hour for lunch.

MR. BRAATEN: Okay.

(Recessed at 12:08 p.m. and reconvened at 1:10 p.m.)

HEARING EXAMINER GARNER: We are back on the record. Mr. Braaten, I believe you were questioning Summit's witnesses.

MR. BRAATEN: Thank you, Your Honor.

Q. (MR. BRAATEN CONTINUING) There was a short discussion, Mr. Boeshans, about mine-mouth plants, and I think you were explaining how North Dakota's mine-mouth plants work as an analogy for the Summit project; is that a fair statement?

A. (BY MR. BOESHANS) That's correct.

Q. Okay. Is it your testimony that the lignite mines and the mine-mouth plants in North Dakota are a single source?

A. I can't testify to the agreements that exist between all of the mines and all of the plants because they all have contracts -- different contracts and contract terms. My point is those utilities and/or co-ops made significant investments and entered into relationships with -- or contracts with their coal providers that

required the coal provider to provide them the fuel they needed to run the plant or the resource, said differently, for decades. And many of those have survived for now greater than 50 years.

The similarity to the Summit situation is that we were investing $8 billion to move $CO_2$ to Oliver and Mercer County and so, consequently, you know, we've secured to date over 145,000 acres of pore space and today we're considering permits to develop 90,000 acres.

Q. You were an executive at a coal mine; right?

A. I was.

Q. Do the coal power plants and the coal mines have different industrial classification codes?

A. I don't recall what their industrial classification codes are.

Q. If they used different industrial classification codes, would that indicate to you that perhaps Summit should consider something similar by way of analogy?

A. I -- again, I'm not an expert in those codes and classification codes in terms of how they're used for tracking. I really can't answer

your question.

Q. Do the words "other nonhazardous waste treatment and disposal" describe the storage facilities?

A. Say that again. Repeat that again.

Q. "Other nonhazardous treatment and disposal."

A. Again, I'd have to look at all of the codes to say which one fits the best.

Q. Well, and I'm not asking what fits the best, but do those words describe the Summit storage facility?

Let's break it down. The emissions -- the $CO_2$ is coming from emissions from ethanol plants; right?

A. Correct.

Q. Would they consider that a waste stream coming out of their emissions stack?

A. Coming out of their stack they would, yes, I presume.

Q. Are you -- and we've talked about how you don't have any plans to pull the $CO_2$ back out; right?

A. Correct. Back out of the reservoir, you're saying?

Q. Correct.

Could we agree that $CO_2$ is nonhazardous?

A. In -- yes, in the atmosphere, for sure.

Q. So other nonhazardous treatment and disposal, do those words just generally describe what Summit's doing with its storage facilities?

A. I would say the way you've described it, yes.

Q. Okay. Are you aware that 221112 is the industrial classification code for fossil fuel generation?

A. I'm not.

Q. Are you aware that 212114 is the industrial classification code for surface coal mining?

A. I am not.

Q. Does fossil fuel generation describe the lignite power plants in North Dakota, generally speaking?

A. Yes, generally speaking.

Q. And does surface coal mining describe the lignite mines at the mine-mouth plants in North Dakota, generally speaking?

A. Yes. Generally speaking, yes.

Q. And you'd agree that a fossil fuel

generation plant is a different facility than a surface coal mine?

A. Yes.

Q. There was testimony earlier that you would do your level best to not put surface facilities on an unleased landowner. Why can't you just put into the Exhibit D lease no surface access for the unleased landowners?

A. The Exhibit D in the storage agreement?

Q. Sorry. Yes.

MR. BOESHANS: Go ahead, Jeff.

A. (BY MR. SKAARE) Sure. To the extent that we had a clause for no surface facilities, I don't know that it would be that difficult to add that to the -- to the lease.

Q. Can --

A. We know that some access may be necessary for things such as seismic or other things.

Q. Is that something that you would know well in advance?

A. I think that's safe to say.

Q. So is it also safe to say that the Industrial Commission could include a provision allowing no surface access for unleased mineral -- or unleased surface owners, and if you needed any

relief from that, say, to conduct seismic, you could always come back and ask for that; right?

A. To be clear, you used the term no surface access, and I probably should be clear about it's a no surface-facilities clause.

Q. What can you do other than put facilities on the surface with a no surface-access clause that you have in your leases?

A. To the extent we'd be required, we would continue to negotiate and work with landowners for purposes of seismic or other times we would need to enter into the land, thus access.

Q. So if you had agreed to a no surface-access provision with a landowner -- sorry. Let me start over.

With respect to the provision you've referenced that is a no surface-access provision that was included in some of Summit's pore space leases, is it your testimony that Summit would still be allowed to conduct seismic operations on those properties even with the applicability of that no surface-access clause?

A. This may be a good time to make sure that my testimony is straight. I may have used the term no surface access in general terms. What it is is

a no surface facilities that we've offered to the landowners across the -- across the board. So to the extent that I said that differently, that was not intentional.

Q. Specifically, does the provision state, "Unless otherwise agreed in writing, lessee agrees that there will be no facilities, including well sites, pipelines, power lines, or other surface facilities on the following described real property," and then it would go on to describe whatever lease --

A. Yes. That's correct. Thank you for bringing that up. That's the clause.

Q. And so what -- the version I have at least states as the title before what I just read No Surface Occupancy. And so is it a fair statement that the no surface-access or no surface-facilities clause that we've discussed, let's call it a no surface occupancy clause for the moment, regardless of what we call it, we're still always talking about the same clause; right?

A. Yes.

Q. And with respect to that clause and the leases in which it appears with Summit and then the pore space owners, is it your position that Summit

still has the right to go on and conduct seismic operations even on property with a lease that has that no surface occupancy clause?

A. Yes.

Q. Did you hear concerns from landowners about seismic operations?

A. Yes.

Q. And what were those concerns?

A. Concerns about distances from existing water wells.

Q. With respect to the storage facilities, is Summit asking to amalgamate the interests of just the unleased owners?

A. That is correct.

Q. But is it intending to impose the provisions of the storage agreement with the attached pore space lease on all owners, leased or unleased?

A. So, Mr. Braaten, as I testified before, I do believe that, yes, it does, but it also -- you know, we have written agreements with the existing lease owners that we feel would govern with respect to the -- the terms of the lease.

Q. Can I have you look at Section 3.3 of the storage agreement?

A. Sure.

Q. And so you're able to testify that you're going to honor those other leases because in Section 3.3 of the storage agreement you're going to impose on everyone, leased or unleased, it states that the provisions of the various leases, agreements, or other instruments pertaining to respective tracts or the storage and storage substances therein, including the pore space leases attached hereto as Exhibit D, are amended to the extent necessary to make them conform to the provisions of this agreement.

Did I read that right?

A. You did read that correctly.

Q. So anyone who signed a lease is having their lease conformed to this storage agreement no matter what they negotiated with you and that's what you're asking the Industrial Commission to do right here, right now. Did I get any of that wrong?

A. I don't necessarily agree with that.

Q. What do you disagree with?

A. I think the two work hand in hand still.

Q. What two?

A. The storage agreement and the pore space

leases that we've entered into.

Q. How so?

A. Because it says that they shall otherwise remain in effect.

Q. But only to the extent they are now in perfect conformance with the lease that you have submitted to the Industrial Commission to impose; right?

A. Perhaps, but I don't -- I know that Summit's intention is to honor the lease agreements that we've entered into.

Q. Then why doesn't it put that intent in writing that it's asking the Commission to do today?

A. I'm not sure.

Q. Would you like to ask the Commission to do that, then?

A. I would think so.

Q. Yeah?

A. I think it would be fair.

Q. So we're going to amend this provision to allow all of the pore space leases signed to remain in full force and effect and not be abridged in any way by the storage agreement submitted here?

A. I think I'll defer to counsel on the best

way to amend it rather than testify to it.

Q. Okay. Up above in the definitions there's a storage facility participation, the term, and then that refers to -- well, I'll just read it to start. It says "Storage Facility Participation" -- sorry, I'm on page 4.

A. Mm-hmm.

Q. -- "is the percentage shown on Exhibit 'C' for allocating payments for use of the Pore Space under each Tract identified in Exhibit 'B'."

So I think I will start with Exhibit C, if we can.

Would it be accurate to say that when you listed the tracts -- let me start that over.

Would it be accurate to say that the tracts listed were identified as all of the acreage that is both in the storage facility and in any given section and that would be one tract?

A. I think so.

Q. That was a bad question. Sorry. So let me just -- tract number 1 includes all lands in Section 27 that are also in the storage facility; is that right?

A. I'm -- the one I'm looking at is maybe different. I'm looking at --

Q. Oh, sorry.

A. -- storage 1, but I anticipate that your question is -- the answer is yes.

Q. Yeah. Let me grab the one you're on real quick. Okay. So tract 1 refers to Section 34 on the application you're looking at in Exhibit C to the storage agreement; is that right?

A. It does.

Q. Okay. And so it's only 120 acres, and I'm presuming that that is because tract 1 includes all acreage from Section 34 that is also in the storage facility; is that accurate?

A. That is accurate.

Q. And is that how you determined each separate tract would essentially be a separate section and all of the land from that separate section then is also within the storage facility?

A. That is correct.

Q. Okay. And so just as one example, tract number 1 refers to Section 34, Township 142 North, Range 87 West, and that has 120 acres and a tract participation factor of 0.40754336 percent. Would it be fair to say that that is the percentage of the total acreage that tract 1 makes up of the storage facility?

A. Yes.

Q. Okay. And so if we go up to Exhibit B.

MR. BENDER: Did you say B or D?

MR. BRAATEN: Exhibit B, as in boy.

MR. BENDER: Okay. Thank you.

MR. BRAATEN: And it is the tract summary.

Q. (MR. BRAATEN CONTINUING) And there, again, we have tract number 1, Section 34, Township 142 North, Range 87 West, 120 acres, but we have three different owners of interest each with, we'll just say, 40 acres each.

A. Mm-hmm.

Q. And so they each have 33.3 percent tract participation and that is the tract participation factor for that tract number 1 and their interest in it; is that accurate?

A. Yes.

Q. Okay. And then the storage facility participation would essentially -- well, let's just go straight across the top line for Gerald. So essentially what this means, then, is for tract 1 -- and I don't know, Gerald may have other tracts, but let's say that Gerald just owns tract 1 -- what this says is that Gerald's interest in that tract is 33 percent and therefore you would

multiply that -- well, actually, how do you get from the tract participation to the storage facility participation?

A. Sure. Let me grab one number and I can explain it. May I see Exhibit 5A? I think we had it below us here. I have it. Exhibit 5A shows that the total acreage for the Summit Carbon -- or for the SCS1, TB Leingang, as 29,444.72 acres. If you were to divide 40 by that number, you would see that Gerald -- he pronounces his name Gerald --

Q. Thank you.

A. -- at .00135848 or .13584799 -- or 779 --

Q. Okay.

A. Sorry.

-- percent.

Q. So the storage facility participation number would be the proportionate share of the acreage for that individual landowner based on their interest in that tract if we are following their name across the row in your Exhibit B? That was bad. Let me start over.

So let's start with Gerald. If we go across, that storage facility participation number is .13584779?

A. Correct.

Q. That would be his -- and putting aside potential other interests, but if we assume this is his only interest, what that is indicating is that's his proportionate interest in the storage facility based on his percentage interest in tract 1?

A. That is right.

Q. Okay. How did Summit determine which landowners it would ask the Commission to amalgamate for its projects? And just so I'm not confusing you, I'm not trying to ask for names here. What I mean is not -- not the people, but how did you decide which tracts of property or what land you needed to amalgamate for purposes of the project and the applications?

A. Sure. The unleased landowners inside the storage facility boundary.

Q. Okay. Why the ones that are inside the storage facility boundary?

A. So development of $CO_2$ or $CO_2$ storage projects requires the cooperation of multiple parties, and because their land is internal or inside of that boundary, we know that it will be impacted, or said differently, have $CO_2$ stored in it and that's why we're seeking to amalgamate that

interest to develop the rights of the other 93 percent on average.

Q. How was the storage facility boundary determined?

A. By the geologic model.

Q. Based on landowners that need to be amalgamated or what was the basis for the boundaries as set?

A. (BY MR. BOESHANS) Yeah. So maybe I can help with that one. So the storage facility design, or said different, simulation determines the boundary or the plume extents at the end of 20 years of injection. Then we also modeled the stabilized plume and then established the boundary outside of that generally following describable lines. It would have curved lines. We followed a describable boundary that included buffer around that.

Q. How far did you place the storage facility boundary from the extent of the modeled plume?

A. The boundary was not always consistent. In other words, we didn't just use the same buffer everywhere.

Q. What's the range?

A. Don't recall specifically. I would say it

ranges between 500 feet, thousand feet, somewhere in that neighborhood per my recollection, and maybe as much as half a mile or so.

Q. With respect to the modeled $CO_2$ plume --

A. Mm-hmm.

Q. -- that line was drawn based on literally what the model generated for the external boundaries of that plume; right?

A. Yeah. I'll let Amanda testify more specifically to that, but that was my understanding is we were looking at the -- the model output for the plume boundary at the end of 20 years of injection. And then, additionally, the plume boundary -- or the stabilized plume boundary approximately 16 years later or I forget exactly the name, but the stabilized plume boundary, and that's what -- then we developed a storage boundary outside of that.

Q. Did someone at EERC make the decisions on the extent of the buffer area between the stabilized plume boundary and the buffer zone -- or the storage facility boundary?

A. No. They had -- they had input on it, but we made the decisions -- Summit made the decisions.

Q. Based on what considerations?

A. Based on all the things I mentioned, along with kind of the -- the -- which included, you know, describable boundaries, reasonable buffer and participating landowners.

Q. So you didn't draw the boundaries to exclude unleased owners that you weren't able to get leases from?

A. So if we had adequate buffer, we would -- we would not -- try to -- try to minimize the amalgamation or the force --

Q. How do you determine whether the buffer is adequate?

A. Basically, we know that the boundaries, if you will, that are identified, you know, by the modeling are at -- on thousand-foot blocks, thousand-foot grid cells, and 5 percent saturation, so we know what we start out with. It's fairly thick to begin with. And then ultimately from that we look at what is a reasonable boundary or buffer that we have -- I would describe it as confidence the plume will stay -- plume will stay inside of and have included margin for error.

Q. What was the range of the buffer area from the plume limit?

A. As I recall, it was around 500 feet to a

half mile, maybe more. Again, I'd have to go back and look specifically or we'd have to look specifically at those. I don't recall them off the top of my head.

Q. But you're saying the model was using thousand-foot blocks?

A. Yes. The grid cell size was a thousand feet, as I recall it.

Q. Why 5 percent saturation and not something lower?

A. I'm going to defer that one to the -- to the EERC team.

Q. Why did you use 5 percent?

A. I used 5 percent because that's what the standard that EERC had indicated had been used in other permits, to my knowledge.

Q. Do you have any actual testing?

A. What kind of testing?

Q. Any.

A. Again, I -- what kind of testing?

Q. Testing to determine the saturation.

A. No. Testing to determine the saturation, it's predicted by the model from my understanding.

Q. If you're using thousand-foot blocks, how can that model tell you anything about where to put

a buffer in a 500--to-2,000-foot range?

A. Again, I'm going to defer that to the reservoir engineering and geoscience team that is more knowledgeable on the model and the software and its reliability and predictability and how it's been used.

Q. Is it your understanding that a change in the 5 percent saturation could change the extent of the plume model?

A. Again, that's outside of my specific area of expertise and knowledge on how the model works, but I would anticipate change of saturation would -- potentially could change the boundary, push it into a different cell.

Q. And it's your testimony that EERC is the one who made the decision on -- well, let me start that over.

With respect to the saturation percentage, generally speaking, is it your testimony that the folks at EERC made the decisions related to that percentage and the modeling?

A. The EERC team of experts made a recommendation to us on percentage saturation that as I understand was consistent with what other projects had done, and that's what we used in

developing the -- the permit application. But, again, they'll be testifying later. They can speak more specifically to the exact methodologies and workings of the software.

Q. Is there any reason you would want to hide that data from further review?

A. Hide what data?

Q. The data used by EERC to create the model.

A. Not to my knowledge. I believe it's submitted to the -- to the DMR.

Q. The raw data for the model is submitted to the DMR?

A. I'm going to let them testify specifically, but that's my understanding is that the model itself has been submitted to the DMR.

Q. Do you know when?

A. I don't know exactly the date.

Q. Was it within the last four weeks?

A. No. It would have been prior to that.

Q. And you're testifying that the data -- the data decks and the model itself were all submitted to the DMR?

A. Again, I'll have to, you know, defer to the team that put all of the submittals into the DMR. It is my understanding that the geologic

model was submitted to the DMR.

Q. Is there a reason that you would not want people to have the data to assess that model?

A. No, I don't -- I don't think so. I -- it's my understanding that that, once submitted to the DMR, is publicly available. But, again, my understanding.

Q. Can I have you turn to Section 1.15 and the definition of Storage Reservoir.

I'll ask a quick question first. I was going to ask some questions about, for example, the variation or range of vertical depth of pore space throughout the reservoir. Would those be better for the EERC folks?

A. Yes.

Q. Okay. Let's go down to 1.16 for Storage Rights, then. From where does Summit obtain storage rights to explore, develop and operate lands within the facility area?

MR. BOESHANS: Jeff, I'll defer to you.

A. (BY MR. SKAARE) So I'm a little confused by the question. Are you wondering -- well, maybe you can ask it in a different way so I can understand the question.

Q. Does Summit have any rights to explore,

develop and operate lands within the facility area for the storage of storage substances as those words are used in Section 1.16 of the storage agreement?

A. Yes. Under the terms of the lease.

Q. Which lease?

A. To the extent that we have leased owners, and then this would tie back, of course, to the lease that we're -- we've attached as Exhibit D.

Q. Okay. So as defined, storage rights are the rights to explore, develop and operate lands within the facility area for the storage of storage substances, and your testimony is that the source of those rights is the -- or are the leases signed with the individual pore space owners as well as the lease attached as Exhibit D to the storage agreement; is that accurate?

A. I think that's fair.

Q. When you sign a lease -- one of the pore space leases with one of the landowners who signed, how is it that you get rights from signing a contract with them?

A. Well, I think the question's basic, and I don't mean this to sound -- we've entered into a property right agreement --

Q. Yeah.
A. -- through the terms of a lease.
Q. Yep.
A. Is that the question you're asking me?
Q. And are they conveying property rights to you in exchange for money?
A. Yes.
Q. And so in that situation, there's a consensual transaction by which that landowner transfers specific property rights to Summit?
A. That is correct.
Q. In the case of Exhibit D attached to the storage agreement, there's no consent from any landowners, so by what power is that imposed on a landowner if not by his consent?
A. If the Commission were to enforce Exhibit D, the rights to inject and store carbon dioxide under the terms of that lease would exist in paragraph 4, but I understand that that's an imposed lease.
Q. And what power does the Commission have to impose a contractual document on a North Dakota citizen?
A. I think that's more of a legal question.
Q. Are you a lawyer?

A. I am. So that's -- the powers granted by the legislature in 38-22 to allow for the amalgamation is the power that is granted to the Commission through the legislature.

Q. And what is the Commission doing when it amalgamates property rights?

A. Again, not trying to be flippant, I mean, they're amalgamating the rights -- i mean, they're -- can you expand on the question? I'm not sure I understand the next --

Q. After the Commission amalgamates property rights, does Summit end up with some property rights that previously belonged to a landowner?

A. I would say yes, that's fair.

Q. Because the Commission took it from them and gave it to you?

A. I wouldn't characterize it like that. I think the Commission's working under the authority granted to it by the State legislature.

Q. Authority to take private property; right?

A. To amalgamate interests across multiple owners for the development of $CO_2$. I understand the question, yes, it is the property --

Q. In order to amalgamate the owners, what you're doing is taking their property rights and

telling them you no longer have the right to exclude me from your property. I'm coming on whether you like it or not, and that means that you now have a property right, the right to exclude, that they used to have, but now they don't have and you do have, all by virtue of the Commission order; is that accurate?

MR. BENDER: Objection. Argumentative. Compound.

HEARING EXAMINER GARNER: Sustained.

Q. (MR. BRAATEN CONTINUING) Can Summit operate the storage facility without amalgamating it?

A. No.

Q. Why not?

A. Much like oil and gas, in order to develop a resource, in this case pore space, would require the cooperation of multiple landowners for development into that formation.

Q. And what happens if they don't cooperate?

A. The same thing we've just discussed which is an order for amalgamation.

Q. What happens in oil and gas when they don't cooperate?

A. An unleased landowner has certain

statutory rights regarding the development of oil and gas.

Q. And you do oil and gas law; right?

A. I do.

Q. They get their just and equitable and their proportionate share in the reservoir; right?

A. So a nonleased landowner in North Dakota who decides to go nonconsent to a well is subject to a risk penalty, and upon completion of that risk penalty, they are entitled to their proportionate share of the minerals that they reserved or own in that particular unit, and I believe there's a statutory provision for a royalty along the way.

Q. So essentially what they get is a 16 percent interest cost free, meaning on gross, and the remainder 84 percent on net revenue?

A. After the imposed risk penalty.

Q. Which is statutorily prescribed to be just for oil and gas?

A. Yes. That's true.

Q. So if we want to apply oil and gas law to the Summit project, let's go up to Exhibit B, specifically Exhibit B, the Tract Summary attached to the storage agreement. Gerald's just and proportionate equitable share if we were talking

about an oil and gas reservoir would be .13584779 percent; right?

A. Yes.

Q. And under the oil and gas laws you were just talking about, it would be that percentage split out into a 16 percent on gross and an 84 percent on net revenue?

A. In oil and gas when it is the extraction of an existing mineral, yes.

Q. Right. Because that mineral isn't owned by the operator necessarily; it's owned by the mineral owners?

A. That's right.

Q. Just like the pore space is owned by the surface owners?

A. I understand. Yes.

Q. Can I have you turn to Section 2.4 of the storage agreement in the application, Exhibit 1A. There's a Section 2.4 on correcting errors, and the second sentence says, "If it subsequently appears that any Tract, mechanical miscalculation or clerical error has been made, Storage Operator, with the approval of Pore Space Owners ... shall correct the mistake."

Can you just tell me what is meant by a

"mechanical miscalculation"?

MR. BENDER: Can I help?

MR. BRAATEN: Yeah, please.

MR. BENDER: I think that's a typo. I think that should say mathematical.

MR. BRAATEN: Okay. That makes more sense.

Q. (MR. BRAATEN CONTINUING) Okay. So in the same exhibit, at Section 3.1 we had some discussion of this, but it states that any pore space owner in the storage facility who owns a pore space interest in the storage reservoir that is not leased for the purposes of this agreement and during the term hereof, shall be treated as if it were subject to the pore space lease attached hereto as Exhibit D.

Is Summit willing to adjust that Exhibit D to ensure there is no surface occupancy as it has done for some of the signed lease owners?

A. Yes, we would do that.

Q. Okay. Can I have you go down to Section 8.1 of the storage agreement. 8.1 states, "Grant of Easement. Storage Operator shall have the right to use as much of the surface of the land within the Facility Area as may be reasonably necessary for Storage Operations in the injection of Storage

Substances."

Does that apply to unleased lands, surface lands?

A. As written today, it does.

Q. And would Summit also change that provision so that it does not apply to unleased surface lands?

A. Yes. I -- I think it was implied in my answer that consistent with the leases that we sent to everybody in the spring of -- excuse me -- the fall of '23 and again in the spring of '24, we've included that no surface-facilities clause and so it's an easy thing to provide. And so we can add that to the Exhibit D pore space lease.

Q. Okay.

A. And -- and then it would have its impact in here as well, if that's the question, subject to Exhibit D.

Q. Okay. As it's written right now, with the landowners who have signed leases with Summit --

A. Mm-hmm.

Q. -- do their leases give Summit explicitly the right to use as much of the surface of the land within the facilities area as may be reasonably necessary for operations?

A. No, it does not.

Q. Okay. So this is granting additional rights to Summit to use the surface of property that is leased as well as unleased?

A. So as I testified earlier in direct, we do not anticipate additional surface usage specifically towards facilities, roads, pipelines, et cetera. There may be needs for ingress and egress for purposes of various studies or otherwise.

Q. And are you saying that if your existing leases and agreements with the landowners don't give you those rights of ingress and egress, you're asking the Commission here to grant those rights to you regardless of whether you have them in the private contracts; is that accurate?

A. No. Our existing leases do have rights of ingress and egress.

Q. Okay. So I want to back up, though. Do you think that this provision 8.1 gives Summit any rights on the surface of landowners who have signed leases that aren't already explicitly in the lease?

A. So it -- in its language it states "as may be reasonably necessary."

Q. In the lease or in this?

A. In this clause.

Q. Okay. And that --

A. So --

Q. Sorry. Go ahead.

A. I'm sorry too. The storage operator shall have the right to use as much of the surface of the land within the facility area as may be reasonably necessary for storage operations and the injection of stored substances. I read that sentence in its entirety, and there is an imposed reasonableness standard on what's there. So unless it's reasonably necessary, I -- I think it's limited by "reasonably necessary."

Q. Does the grant of an easement to do what is reasonably necessary for your operations expand your rights to use the surface of any of the lands that are leased?

A. I don't believe it expands the rights when we have an existing lease. We have an existing written contract when there is a lease.

Q. So it's not your intent to obtain any rights to use the surface beyond the rights explicitly granted in your leases with respect to the properties that are under lease?

A. With respect to the properties that are

under lease, that is correct.

Q. Okay. And with respect to the unleased properties, would it be accurate to say that you're asking the Commission to give you the property rights necessary to do what is reasonably necessary for your storage operations on the surface of those unleased lands?

A. Yes. That's correct.

Q. By what authority do you think the North Dakota Industrial Commission can grant anyone the right to use the surface?

MR. BENDER: I'm going to object with respect to his characterization of "anybody." We're not talking about anybody. We're talking about the operator of the pore -- of the storage unit.

MR. BRAATEN: That's fair. I'll withdraw the question and reask.

Q. (MR. BRAATEN CONTINUING) By what authority do you think the North Dakota Industrial Commission can grant Summit property rights sufficient to allow it to do what is reasonably necessary for storage operations on the property of the intervenor landowners I represent?

A. So the North Dakota Industrial Commission

is operating under North Dakota Century Code Chapter 38-22 and its administrative rules which I believe are 43-01-05. I might have that backwards.

Q. Two -- 2-05.

A. Oh, 2-05? Allow me to look. 43-05-01.

Q. Oh, we're both wrong.

A. And so I think that the authority, to answer your question, comes both from the legislature and the Century Code and then based on the rules that they've developed.

Q. What provision of Chapter 38-22 provides any authority to do anything, amalgamation or otherwise, to the surface lands as opposed to the pore space?

A. I would say under 38-22-03 entitled Commission Authority, which reads, "The Commission has authority over all persons and property necessary to administer and enforce this chapter and its objectives."

Q. And so are there no limits on the Commission's authority as long as that's what they're doing?

A. I think that's a mischaracterization.

Q. Well, I'm asking. I'm not saying that's what you said.

A. Certainly there are limitations, much like the reasonableness standard that's in the draft storage agreement.

Q. And what are those limitations?

A. I would say limited to the extent necessary to develop and store $CO_2$ under Century Code.

Q. Would you agree it's also limited by the mandates and prohibitions of the constitution of North Dakota?

A. So I'm not a constitutional lawyer. I don't know that I have an opinion on that.

Q. Well, as a lawyer, do you support and uphold the constitution --

A. I do.

Q. -- as a practicing lawyer?

A. Yes, I do.

Q. Does that trump the other law?

A. Does -- when you say "that" --

Q. The constitution?

MR. BENDER: Mr. Examiner, I think we're getting into areas now where we're arguing legal issues, and I don't think this is the appropriate way to make those legal arguments.

HEARING EXAMINER GARNER: Sustained.

Q. (MR. BRAATEN CONTINUING) Can I have you turn to Section 8.4 of the agreement that we're looking at. There's a reference to the surface and subsurface operating rights, and it references use of water. Can you explain the ways that you understand Summit intends to use water from the reservoir in the formation?

A. (BY MR. BOESHANS) Yes. I would say this is more of a question for the drilling operations and that team. My understanding is that as we drill the well and maintain the well, we have needs to pull samples or move fluids in or out of the reservoir during the drilling and completion process, but they can speak more specifically to that.

Q. Are the drilling folks the folks from EERC?

A. No. They're members of our team.

Q. Okay. And is it like a separate drilling, like, consultant or they're actual employees of Summit?

A. We have employees of Summit that will --

Q. Okay.

A. -- be testifying here.

Q. Okay. Are you asking in this provision

for the Commission to grant property rights or ownership rights to the water or just the ability to use the water in the drilling operation?

A. I would defer to Jeff here as well. My understanding is that we're requesting the permission to use the water as needed to facilitate operation and injection of $CO_2$.

Q. So I'll ask a couple questions just to kind of explain what I'm getting at here.

A. Sure.

Q. The -- are you aware that, generally speaking, until put to beneficial use, water in North Dakota is generally all considered waters of the state?

A. Mm-hmm.

Q. And to the extent any waters in the reservoir have not been put to any kind of beneficial use, they may be deemed to be waters of the state. And so my question is simply in here are you asking to be able to use the waters in the reservoir as necessary for your operation, or are you asking for the State to actually grant you the right to that water in that reservoir to use however you please?

MR. BOESHANS: Sure. Jeff, I'll let you

take that. That's more of a definition.

A. (BY MR. SKAARE) Sure. "Except to the extent modified in this Agreement, Storage Operator" -- "Operator shall have the same rights to use the surface and sub-surface and use of water and any other rights granted to Storage Operator in any lease covering the Pore Space Interests." I understand that to mean the rights to use water where necessary. Our needs for water will be privately contracted for drilling.

Q. So just to use perhaps a slightly ridiculous example, you don't have plans and it's not your intent that you would be able to, then, open up a water depot and start pumping water out and selling it?

A. That would not be commercially reasonable. It would not -- no. Absolutely.

Q. Okay. And so if we were in the oil and gas context -- and you can object -- but generally what you're saying is what you're asking for is the ability to use the water in the reservoir as reasonably necessary for your operations; is that a fair statement?

A. That is correct.

Q. Okay. Turn down now to Exhibit D, the

Form of Pore Space Lease, that we've referred to a few times. It's in the application.

A. I am there.

Q. In Section No. 2 under the Term, there's a reference to bonus payment of $20 per acre and an annual rental of $4 per acre for the initial term.

MR. BENDER: I think you may have misread that, Mr. Braaten. Mine says $25.

MR. SKAARE: So does mine.

MR. BRAATEN: What did I say?

MR. SKAARE: 20.

MR. BENDER: You said 20.

Q. (MR. BRAATEN CONTINUING) Sorry. Let me start that over. So I read this to say they're paying a bonus payment of $25 per acre and it states that's a single one-time bonus payment. And an annual rental of $4 per acre for the initial term. How did Summit decide upon those numbers for the bonus and rental?

A. (BY MR. BOESHANS) Yeah, I would say kind of two ways. We initially started with numbers that were consistent with coal leases and coal leasing that I had familiarity with in obviously my previous experience. They were then adjusted from there based on negotiations with the landowners.

Those are some of the terms that changed during the -- the negotiations.

Q. And then just to follow up on that, there's a Section 3, Royalty, that has a 50 cent per metric ton and then later percentage increases. Did you decide on those numbers the same way as the bonus and the rental?

A. That's what we ultimately started with.

Q. Okay.

A. And then, again, same deal as -- through negotiations, they were adjusted.

Q. And the coal leases, are those with just one operator or numerous operators?

A. You're -- you're asking me for my points of -- point of reference?

Q. Yeah.

A. Yeah. With numerous.

Q. Okay. And those were North Dakota coal leases?

A. Correct.

Q. Were any of them new leases signed within the last 50 years?

A. Yes. Haven't been in the business 50 years.

Q. What companies are still leasing coal in

North Dakota?

A. I don't know specifically who's actively leasing or not leasing. We were leasing when I was at BNI.

Q. When you were leasing at BNI, had you adjusted the rates you were paying since the 1930s?

A. We had.

Q. How much, just percentagewise?

A. Well, I wasn't there in the 1930s.

Q. No. That's fair. Sorry. I didn't mean to imply you were.

A. I know I'm getting gray, but -- I am gray.

Q. Okay. So how many times did you adjust or change the bonus or rental or royalty amount that you were offering landowners for a pore space lease? And I'm speaking now -- sorry. We were talking about BNI. So I'm talking Summit now. In the time with Summit, how often did Summit adjust the bonus, rental or royalty in response to their negotiations with the landowners?

MR. BOESHANS: Maybe I could defer to Jeff here as well. We -- I don't recall specifically the order in which the changes were made, but we were moving those around or adjusting them through the negotiations, but I don't recall was it all at

once or multiple steps. My recollection is it was multiple steps, but I'm going to defer to Jeff and his -- his --

A. (BY MR. SKAARE) Sure. So we began negotiations in September of '21, made significant offers -- and when I say "significant," we reached out to a large number of landowners. We started to see some of these leases come in. We received feedback from a number of people, including some of your clients, regarding multiple terms. Those terms included annual rental, and I'm going off of memory. They included increase in royalty, an increase in the extension term bonus. They included percentage increase year over year. They included favored nations. And perhaps others that I'm not recalling at the moment.

Q. And, I'm sorry, I should have asked that question more specifically, but what I -- what I'd intended was just -- and let me actually start -- break it down and ask some different questions.

Is the $25-an-acre bonus, $4-an-acre rental and 50 cent per metric ton the monetary offer made by Summit in the first pore space leases you mentioned that were set out -- sent out?

A. No.

Q. And what was the opening offer that Summit made to landowners?

A. If my memory serves me correct, the bonus payment of $25 an acre is consistent. The royalty was 25 cents. The annual rental was $2 per acre. And the reason the majority of the changes came together, though discussed with multiple landowners, is primarily due to the favored nations clause, at which point we sent out a first amendment to our pore space agreements to anyone who had signed prior to provide them with the same terms as what we eventually came to from the negotiations on -- as I testified was 450-plus different landowners.

Q. And so once you had given all of the landowners that most favored nations clause, you were unable to modify things for any additional landowners negotiating with you without changing all the other agreements. Is that your testimony?

A. With respect to compensation, yes. Well, may I qualify that? Any change applied to everyone.

Q. And so other than the change such as the no surface-facilities clause we discussed, what were the changes to the compensation level you just

mentioned, you simply didn't make changes for other landowners in individual negotiations; is that right?

A. I think that's correct, yes.

MR. BOESHANS: Change to compensation.

MR. BRAATEN: I included that, yeah.

Q. (MR. BRAATEN CONTINUING) So other than the coal leases you say you looked at when you started developing this, did you gather any information or do any research or investigation other than that to arrive on monetary amounts to put into the leases?

A. (BY MR. BOESHANS) With my -- you know, in my former role I was aware of compensation related to Minnkota's project, but other than that, at the time there weren't any other public available references, if you will, lease terms around $CO_2$ projects that I was -- had access to. And so the only thing from a $CO_2$ perspective, market perspective that I had was the one project that I was familiar with. And --

Q. But -- I'm sorry. Go ahead.

A. So, yeah, that was kind of the -- that was what I would describe as the extent of it.

Q. Okay. Can I have you turn to Section 17

of Exhibit D to the storage agreement in the application, Exhibit 1A. Sorry, we've got exhibits within exhibits. That got a little long. But we are looking at Exhibit 1A, the application. Within that exhibit there is a storage agreement, and attached to that storage agreement is Exhibit D which is the Form of Pore Space lease.

A. (BY MR. SKAARE) Yep.

Q. Within that Exhibit D, Section 17 I'd like to direct your attention to.

A. I am there.

Q. Thank you. So this section states that the bonus and royalty amounts contemplated and paid to lessor hereunder is compensation for, among other things, damages sustained by lessor for lost land value, lost use of and access to lessor's land and lost value of improvements, if any, and to the extent applicable.

So if Summit needs to access some of its facilities and it drives across the farm field planted with wheat and takes out part of a farmer's crop and that farmer is unleased, this provision says they don't get damages for the part of their crop that was destroyed and they've already been compensated with the royalty?

A. That is incorrect.

Q. Okay. Explain how that's wrong.

A. So under paragraph 11 on page D-4, we have our Hold Harmless and Indemnification. The intent of paragraph 17 is essentially acknowledgment that the bonus and royalties are compensation for the use of, in this case, the real property or the pore space. So acknowledging that if we did permanent storage, that that particular reservoir may be unusable in the future, so the clause was intended to be acknowledgment that the compensation would utilize and use that pore space.

Q. So then in 17 would it be accurate to say that the intent is to limit that language as if we added to the end "rising out of the ordinary and reasonable operations of Summit"? And I'm not asking to amend it. I'm just trying to make myself understood here that when you say that the bonus and the royalty amounts are compensation for lost land value, lost use of access, you're saying it's compensation for lost land value, lost use and access arising from exercising the rights to inject into the pore space but not I accidentally started a fire in your field?

A. You are correct. We are not seeking --

your characterization is correct.

Q. Okay. So in Section 16 there's a force majeure clause. When a force majeure clause is signed between two parties to a contract, generally speaking we understand how that's going to work if there's a dispute, but in the event of force majeure here if -- well, let me start over.

In the event of a force majeure event to which Section 16 would apply, who would make the determination as to whether it was a legitimate force majeure event for an unleased mineral owner -- or an unleased surface owner on whom this contract is being imposed by the Commission?

A. I'm sorry to ask the qualifying question. Who would make the decision that the force majeure event happened in an unleased landowner scenario?

Q. Yeah. Maybe a better way to ask it is to whom should the landowner go to for relief in that scenario, the Commission or a court?

A. I don't know.

Q. Okay. Let's look at Section 18. If a landowner gives Summit a warranty of title and someone else sues Summit saying I own that property, not Joe over there, does a warranty of title require that landowner to step in and defend

Summit and hire lawyers to defend them?

A. Technically, perhaps, but I'm not sure that's how it works in general practice.

Q. But as a matter of law, that landowner who gave the warranty of title is legally obligated to provide a defense to Summit because that's literally what the warranty is; right?

A. Sure. Yes.

Q. And Summit is asking the North Dakota Industrial Commission to impose an obligation to warrant title on a landowner; is that right?

A. I understand the question. Yes.

Q. That is right?

A. It is right.

Q. Do you understand how that would even be possible as a lawyer? Because it starts to sound like indentured servitude, doesn't it?

A. Wouldn't characterize it that far.

Q. On that spectrum?

A. My answer to warranty of title is generally that, to be clear, common property law in my experience in property law is that while, yes, it does suggest that there be a duty to defend, it means that your ownership, that you would stand by that and support in the form of documentation or

otherwise that would show your ownership. So if there was recorded deeds and everything was in place, that would stand to -- you know, that would stand as record title. If there were things such as dresser-drawer deeds or deeds to others, late filed or after death filed -- excuse me -- recorded, I think we're looking at those types of warranties that they don't exist or that to the extent that they're aware.

Q. But if you simply said the lessor hereby represents that to the best of his knowledge he has no dresser deeds or stray deeds and is not aware of any unrecorded documents, that would all mean exactly what you just said.

A. Mm-hmm.

Q. But then when you used the word "lessor represents and warrants," that triggers all the warranties of title and covenants of title that includes a title warranty, that includes the obligation to defend, that includes the obligation to hire lawyers to defend Summit; right?

A. Fair.

Q. Does Summit believe that the Commission can impose a warranty of title on an unwilling landowner to warrant title to another person or

company or anyone? Is that what you're asking for?

A. I think it would make sense that to the extent the lease indicates what you're suggesting, a modification would make sense. That is not our intention.

Q. But you agree that is what it says?

A. I don't necessarily agree. I would need to look at it closely. I don't believe that was the intention, but I understand the argument.

Q. I mean, it says, "Lessor hereby warrants and agrees to defend title."

A. Yes, it does.

Q. Real quick, I just want to note that we had a discussion just now about the warranty of title and I didn't address that, but there is a warranty as well in the storage agreement at 7.1. Would you agree that similarly there it was not the intent to impose a title warranty on individual landowners to defend title for Summit?

A. Yeah. I think that's fair. And -- and for the sake of the Commission to know and understand that, typically the warranty and -- and, again, this is in practice. If somebody else claims that they own your land, we are asking that you would stand up alongside us and say, no, I own

my land. And so that was the intention. I understand the adjustments that may need to be made for that purpose.

Q. Before I leave it again, in the storage agreement at 10.1, there's a provision on Transfer of Title. I'll let you get there.

A. Thank you. I'm sorry, I was taking notes. Can you tell me where we're going?

Q. I think I sent us to the wrong place anyway so that worked out. I'll come back to it, but I do want to check on also to 10.2. It's on page 13. Oh, sorry, I'm on a different one. I don't know if my page numbers are the same, but Section 10.2, Waiver of Rights to Partition.

Sort of a similar question, but with respect to Section 10.2, are you asking the Commission to issue an order that landowners have no further rights in perpetuity to bring a partition action of property?

A. No. So a modification may be required there.

Q. And you'd agree that even if the Commission had jurisdiction over an individual, it doesn't have jurisdiction to bar partition actions in perpetuity for a piece of property?

A. That's correct.

Q. Are you familiar with the process, just generally, that occurs at the end of project and upon certification to the State of North Dakota?

A. Yes.

MR. BOESHANS: Generally, yes.

Q. So in the Century Code 38-22-17, it says that once a certificate is issued, title to the storage facility and to the stored carbon dioxide transfers without payment of any compensation to the State. Are you just generally familiar with that provision and what it means?

A. I am.

Q. And when that provision states title to the storage facility and to the stored carbon dioxide transfers, can you tell me how you understand, and you not as a lawyer but you as Summit, how -- or let me ask it better. How does Summit understand the phrase "title to the storage facility" and what that means?

A. I would say it is a transfer of the leasehold rights as well as the stored $CO_2$.

Q. And so would another way to say that be to say that it transfers all property rights Summit has in the storage facility to the State as well as

the stored $CO_2$?

A. That is fair.

Q. Okay. Could one of the unleased landowners market the $CO_2$ being stored?

A. No.

Q. Why not?

A. Under the terms of the lease and also under the terms of the lease that we intend to ask for in Exhibit D, ownership to the $CO_2$ in exchange for the compensation belongs to Summit or in that case the State.

Q. And if there were no lease, would the $CO_2$ being put under land of an objecting landowner eventually be abandoned there as a matter of law? Well, let me ask a different question.

You indicated that a landowner couldn't commercialize or market the $CO_2$ being stored there and it's because of the provisions of the pore space leases signed by individuals or by the provisions of the Form of Pore Space Lease. If the Commission didn't impose that Form of Pore Space Lease on a landowner, would there be any barrier to them pulling the $CO_2$ out and marketing it?

A. Legally or technically?

Q. Both. And I understand you can't

necessarily speak to all of them, but just whatever you know.

A. To the extent -- so the storage and in this case the removal would require the cooperation of multiple landowners, and so I don't believe technically they could without other agreements.

Q. Why couldn't a landowner put a well directly under their own property into their own pore space and just pull up whatever's there?

A. Because it would likely impact the surrounding landowners depending upon -- I understand the question. Yes, assuming it didn't impact other landowners.

Q. Can I have you turn to Exhibit 1A to the storage agreement and specifically to Exhibit D, the Form of Pore Space Lease to the storage agreement, and then specifically Section 25.

A. I am there.

Q. And 25 states Confidentiality and says, "Lessor shall maintain in the strictest confidence, for the benefit of Lessee, all information pertaining to the compensation paid under this Lease, any information regarding Lessee and its business or operations on the Leased Premises or on any other lands, the capacity and suitability of

any Reservoir or reservoirs and subsurface pore spaces, stratum or strata unitized or amalgamated therewith, and any other information that is deemed proprietary or that Lessee requests or identifies to be held confidential, in each such case whether disclosed by Lessee or discovered by Lessor."

Is Summit asking the North Dakota Industrial Commission to impose that prohibition on free speech on unleased mineral owners and surface owners?

A. We would strike that clause.

Q. Section 34 of that same document has an insurance clause.

MR. BENDER: We'd be willing to strike that.

MR. BRAATEN: Okay. I guess that gets rid of all my questions.

Q. (MR. BRAATEN CONTINUING) No. So I have a specific one. Is the intent here that the million dollar limit is a limit in place with respect to that tract in that lease or a million dollar limit for the entire project?

A. I'm not sure.

Q. Okay. Is Summit only maintaining an insurance policy with a million dollar limit for

this project?

A. (BY MR. BOESHANS) No.

Q. Okay. And so just to follow up, this provision is not indicative of what Summit's actual insurance levels are but rather what they're providing within a contract as a contractual obligation that they will take on for a landowner; is that fair?

A. I think that's fair, yes.

Q. Okay.

HEARING EXAMINER GARNER: I think now's probably a good time to take another ten-minute break.

MR. BRAATEN: Sure. Thank you.

HEARING EXAMINER GARNER: We're off the record.

(Recessed at 3:03 p.m. and reconvened at 3:18 p.m.)

HEARING EXAMINER GARNER: We are back on the record. Mr. Braaten, you were questioning Summit's witnesses.

MR. BRAATEN: Thank you, Your Honor.

Q. (MR. BRAATEN CONTINUING) So back to the insurance provision. Would Summit do a waiver of subrogation with respect to the insurance it's

carrying for the landowners?

A. (BY MR. SKAARE) Yeah, I believe we could.

Q. And would that apply to both the landowners and their renters?

A. Well, so waiving rights of subrogation would prevent any insurance company from recovering from who is legally held liable.

Q. But just as to the landowner and their renter is what I'm asking.

A. I think we could consider that, yes.

Q. And would that be a change, then, to the -- both the Exhibit D form lease as well as the section in the storage agreement we talked about? Wait. Now I confused myself. Never mind.

I'm just talking about Section 34 of the Exhibit D. Is that a change that could be made there?

A. I believe we could present something to that effect.

Q. Would the commercial general liability insurance cover -- that's referenced in Section 34 here cover pollution events or contamination events?

A. I am not sure.

Q. Is that something that Summit is willing

to have insurance for that covers the landowners?

A. I believe we've indemnified under paragraph 11 --

Q. Okay.

A. -- for those same purposes.

Q. If that's true, is it fair to assume that you do have insurance for that?

A. I would believe we do, yes.

Q. And so with respect to whatever insurance policy Summit has for pollution and contamination events, can it add the landowners who own the property as additional insureds on those policies?

A. Subject to that language, I think we could add as additional named insureds. Let me verify that with my team.

Q. I understand.

A. There is a legal term of art there that I would need to address with my legal team.

Q. Okay. Is there a reason for -- well, let me ask: With respect to Section 34 and the million dollar liability limit, is Summit putting in place a separate insurance policy for each tract?

A. No, I don't believe that to be the case.

Q. Okay. So is there one insurance policy covering all tracts of land with a million dollar

limit?

A. I believe the limit's -- yes, there is a policy.

Q. Okay. And can Summit add the landowners to its general liability policy as additional insureds?

A. I would need to talk to our legal team.

Q. Okay. Does that seem like a fair thing to do if you're forcing those landowners into this facility to take on that risk without any choice in the matter?

A. I think it seems fair, yeah.

Q. We were looking at the application earlier at I think PS-5. Yeah, if you could look at the application, page PS-5 with the diagram on it. It's Figure PS-3, project summary map. We talked a little bit about the facilities and I'm going to talk about the facilities after the terminus point, and when I say that, what I mean is essentially everything downstream from the Midwest Carbon Express Pipeline.

So after that terminus point, we talked about flowlines. We talked about a valve station at the terminus point and obviously there's the Class VI injector wells. What other surface

facilities will you have, if any, other than the ones I just mentioned downstream from that terminus point?

A. (BY MR. BOESHANS) Sure. There's -- that's going to be covered in Section 5 of the application and there's a diagram in there. It'll be testified here later when we get to that section. But, generally speaking, there's a launcher receiver there. There's metering and measurement, there's -- as well as -- as I recall, but, anyway, we'll get into the system layout in Section 5.

Q. And is that one of the folks from EERC that'll be covering that?

A. It will be a person from EERC along with Jimmy Powell, our chief operating officer.

Q. Okay. And I see that you have positive manual shutoff valves, emergency shutoff valves, a blow-down, a pressure control valve, some check valves and block valves. Have you done any kind of modeling or investigation or research into the safety aspects of those valves and what happens with a valve failure?

A. Yeah, again, I'm going to defer those to Jimmy and the team that comes up here for that

specific section.

Q. If I have questions about performing LOPA, or level of protection analysis, or hazard and operability study, would those also be questions for those same folks?

A. That's correct.

Q. I'm going to have you go back up to Section 3.9 of the storage agreement within the application. We were talking earlier about Exhibits B and C to the storage agreement and the tract participation factors, and I think I was asking if the participation factor was the percentage of acreage owned proportionately within the storage facility. Is that the proportionate acreage owned in that particular storage facility, being the Hintz or the Leingang or the BK Fischer?

A. (BY MR. SKAARE) I believe I understood your question. I believe the answer is yes. That was a little long.

Q. So in Sections 3.7, 3.8 and 3.9 of the storage agreement, there's a discussion of transfer of storage substances from one storage facility to another. And it says that this is allowed when the ownership between the storage facility and the transfer storage facility is common. What do you

mean by -- or what does this contract or storage agreement mean when it says the ownership between the storage facility and the transfer storage facility is common?

A. It's not intended to talk about a storage facility that is adjacent to each other. It is intended to talk about the storage facilities that may be in a stacked play.

Q. Okay. Makes a lot more sense that way.

A. It does.

Q. And so this provision doesn't -- or wouldn't have any applicability unless and until Summit were to permit an additional storage facility in a formation above or below the formation it's targeting with these proceedings?

A. That is correct.

Q. Okay. Did any of the landowners attempt to limit the scope of their lease vertically based on the formation being targeted?

A. If you recall, that was a request that you made.

Q. Okay. Did -- did any other landowners make a request to limit vertically the scope of the lease with Summit?

A. No.

Q. Okay. Do you have all of the agreements and rights under contract necessary for any surface facilities planned at present?

A. Yes.

Q. There was some discussion earlier about the boundary lines for both the $CO_2$ plume as well as the storage facility boundaries.

A. Mm-hmm.

Q. Do you have an understanding of why the storage facility boundary is required to be drawn outside of the $CO_2$ plume?

A. (BY MR. BOESHANS) Yes. My understanding of why the storage boundary is outside of the $CO_2$ is so that, you know, kind of per the requirements of the permit, we're required to operate within the boundary that we're permitted to operate in. Okay. And so we use the methodology described to determine a boundary, you know, with the understanding there's five-year review and renewal and adjustment. So we've identified the boundary in our case of outside of the post-injection stabilized plume area, so --

Q. Is it your position or belief that the area of the reservoir in which you are operating is confined to the area of the reservoir into which

you are physically injecting $CO_2$ and it is existing in the reservoir thereafter?

A. Say that again so I under -- make sure I got the question.

MR. BRAATEN: Could I have you read it back.

(Record read as requested.)

MR. BENDER: I don't think that the question's clear. I think it's ambiguous. You aren't talking about whether you're talking about the areal extent, you're talking about vertical. So I don't know that he can answer without you being specific.

Q. (MR. BRAATEN CONTINUING) Okay. Well, let me just take another run at it.

MR. BENDER: What I'm getting at is there's vertical limits and horizontal limits, and --

MR. BRAATEN: Right.

MR. BENDER: -- you haven't defined -- perhaps you want him to answer both. I don't know.

MR. BRAATEN: Yeah. No. That's fair.

Q. (MR. BRAATEN CONTINUING) So let's confine my question to within -- in between -- vertically in between the confining layers as defined by the

application. So when I am talking about the reservoir for this question, it's in between the confining layers. And we'll call that the target reservoir.

A. Mm-hmm.

Q. Is it your position or belief that Summit's operations are confined to that part of the target reservoir containing actual $CO_2$ that was injected by Summit?

A. It's my understanding and belief that in our application we're requesting a permit to store $CO_2$ in that -- in this case the Broom Creek Formation and the confining layers above and below. If that's what you mean by operations is the storage of $CO_2$, then I would say yes.

Q. What else constitutes your operations other than the storage of $CO_2$ downhole from the well injectors?

A. So we have monitoring of various, you know, reservoir formations, monitoring equipment along the well, monitoring of the plume using 3D seismic, for example, and so those are all parts of what I would say the operations is the monitoring of the activities of the well which we're monitoring outside of the storage horizons.

Q. Why are you monitoring outside of the storage horizon?

A. To confirm -- confirm storage or permits, if you will.

Q. Are you monitoring anything other than the chemical makeup of the fluids in the reservoir, the target reservoir?

A. So we're going to get into that, you know, extensively in the monitoring plan, of course. You know, we're -- we're monitoring, you know, water quality at various horizons which will be identified in the monitoring plan. We are monitoring the plume movement over time, and that's covered in the monitoring plan as well.

Q. How do you monitor --

A. We're monitoring the -- or monitoring the wellbore and doing inspections on the wellbore, those kinds of things.

Q. How do you monitor the movement of the plume?

A. We're proposing again in our monitor plan, which we'll get into that in detail, but we're planning to monitor it incrementally using -- or periodically using 3D seismic as our current -- current proposal.

Q. Does any of your monitoring look at the pressures in the formation?

A. Yes. There is -- or there are pressure temperature sensors within the -- within the wellbore.

Q. Do you get data on temperature and pressure anywhere other than at the wellbore?

A. We will also get that in the deep subsurface monitoring wells, stratigraphic wells that are identified on -- what is it, PS-3 or 4.

Q. How many of those do you have?

A. We have three.

Q. Three stratigraphic -- stratigraphic test wells?

A. Well, monitoring wells, yeah.

Q. Okay. How many total monitors do you have for temperature and pressure within the reservoir?

A. So I'll defer that to the discussion on monitoring because I don't -- but we have them on the stratigraphic wells, as I mentioned, deep stratigraphic monitoring wells.

Q. Why are you monitoring the temperature and pressures in the reservoir?

A. Again, I'm going to defer to the -- to the team that presents the monitoring plan to give you

the specifics on the recommendations and why we're doing that.

Q. Do you know what the Safe Drinking Water Act says about where to place the boundaries for your storage facility?

A. I do not specifically.

Q. Do you think that the boundaries as defined by the Safe Drinking Water Act for the protection of freshwater aquifers is the same as the area within which you need to obtain property rights for your project?

A. Say that again.

Q. Do you believe that the area required to be used for a storage facility in the Safe Drinking Water Act is the same as the area within which you need to acquire property rights for your project?

A. I would say I don't specifically know that.

Q. Who would know that?

A. (BY MR. SKAARE) So if I can ask, are you asking if the Safe Water Drinking Act applies?

Q. No. I'm asking if the boundaries required by the Safe Drinking Water Act are the same as the boundary around the property rights that you needed to acquire for your project?

MR. BENDER: We have another witness that we're going to call who will be able to answer that question.

Q. (MR. BRAATEN CONTINUING) You guys don't know the answer?

A. I'm not sure I understand the question.

MR. BRAATEN: I have nothing further.

HEARING EXAMINER GARNER: Any questions from the staff?

**EXAMINATION**

**BY MS. MADCHE:**

Q. I'll jump in here first. Just as a preamble before I start asking my questions, because we are listening to these as combined cases for all three applications, if I ask a question and it applies to all three, by all means provide the answer for each individual one. I'll try to clarify if I think there's going to be a question that would be more consistent across all three or an individual question.

And to start out, my questions here I'm going to be talking about are within the Project Summary section of the three applications.

So in your Exhibit 2A through 2C that you had provided showing the business structure for the

three LLCs, I just want to have you clarify that when you have SCS Carbon Transport LLC listed as the flowline operator, that you are intending to mean that the three flowlines for these three facilities will be operated by SCS Carbon Transport LLC but the ownership will still be under the individual Summit Carbon Storage, LLCs; is that correct?

A. (BY MR. BOESHANS) That's correct.

Q. You currently stated that you have 57 ethanol plants with contracts on. Is it fair to state at this time all of those ethanol plants are currently emitting all of their $CO_2$ production that they make?

A. Yes, to the best of my knowledge.

Q. How many miles of MCE pipeline, the transmission pipeline, is within the PSC jurisdiction in North Dakota?

A. So there's -- okay. You're asking how many miles within the --

Q. Of the transmission pipeline, how many miles are in North Dakota that would be under PSC jurisdiction?

A. I'm going to defer to Jimmy on that question. My recollection is it's 352 miles, but,

again, that -- I want to make sure that we get the right number.

Q. On page PS-3 of all three applications, you report that the three storage facilities combined over a 20-year proposed injection period were modeled to be able to store approximately 352 million metric tons of carbon dioxide which would be on average around 17.6 million metric tons a year. Additionally, later on on that page you state that the Midwest Carbon Express, the MCE transmission pipeline, is being designed to transport 18 million metric tons a year. Can you provide approximately how many metric tons you currently have contracts for?

A. Yes. Couple of things there. The current design of the MCE pipeline system is 18 and a half million metric tons. With the 57 plants we have approximately 16 million tons -- or they emit approximately 16 million tons that could be captured.

Q. And as a follow-up to that, if you ended up getting to a point where you have contracts with a value that is up to what your current design is for the MCE pipeline, would you just be looking at additional storage facilities to be permitted to

take on the additional capacity?

A. That's correct.

MS. MADCHE: Those are the only questions I have for this group. Thank you.

**EXAMINATION**

**BY MR. STOLLDORF:**

Q. I'm going to talk a little bit about Section 1 of the pore space to start off with, and, again, some of these answers may relate to SCS2 and 3. Please answer for all of them if you can.

Within the proposed storage facility area shown, it's both Figure 1-1 on page 1-2, or it's Exhibit A, the tract map of the storage agreement. In relation to that, has any pore space been severed from the surface estate since April 9, 2009?

A. (BY MR. SKAARE) No.

Q. Is that the case for SCS2 and 3 -- 1, 2 and 3?

A. That is the case for all three units.

Q. Was any pore space leased from the surface owner prior to Summit leasing of the storage facility?

A. No, for all three units.

Q. Is the storage facility and proposed well

sites, testing and monitor equipment, flowline -- and flowline located on or proposed to be located on any Indian lands, historic or archeological sites?

A. (BY MR. BOESHANS) No.

Q. Okay. And is that for all of them?

A. Yes, for all three.

Q. Have you guys seen the written comments from the North Dakota State Historical Preservation Office that was sent on May 15, 2024?

A. (BY MR. SKAARE) I have.

Q. And do you intend to meet their requests?

A. We do.

Q. Will the development or operations of the storage facility affect hydrocarbons, coal reserves or any other potential mineral zones?

MR. BENDER: The next witness will handle that question.

Q. (MR. STOLLDORF CONTINUING) Okay. I will defer -- based on that answer, I will defer a couple questions and go to a couple of errors we found on the land descriptions.

A. Okay.

Q. The -- provided as part of the storage facility area, a document called the Unit Legal

Description for KJ Hintz, we'll need an amended copy. The errors are in Township 142 North, Range 85 West, Section 7. It's listed as all of this section is within the storage facility area. This instead appears to be the west half and the west half of the northeast quarter, the northwest quarter of the southeast quarter and the south half of the southeast quarter. Did you catch all that?

MR. BENDER: Do you have tract numbers?

MR. STOLLDORF: No, but we could pull them up.

Q. (MR. STOLLDORF CONTINUING) And then the second one is Township 142 North, Range 86 West, Section 25 where it states the east half of the northeast quarter. This instead appears to be the west half of the northeast quarter.

A. Understood.

Q. And that is all for that section. Oh, no. No. I've got a couple more.

MR. STOLLDORF: Did you find that tract?

MS. MADCHE: I'll keep looking.

MR. STOLLDORF: Okay.

Q. (MR. STOLLDORF CONTINUING) Now we'll move on to the storage agreement. And Article 1.1 defines carbon dioxide as including incidental

associated substances following the definition of carbon dioxide stream from North Dakota Administrative Code Chapter 43-05-01. In the pore space lease section, 3, royalty, page D-2, carbon dioxides -- $CO_2$ or carbon dioxides is called out.

Is -- the question is is payment based on the mass of the $CO_2$ component of the stream only or the full injection stream mass including incidental?

A. I believe it is on the full stream, but there is someone better able to answer that question.

Q. Okay. Can you briefly explain why you used the Milton Flemmer 1 as the type log in Article 1.15 for all three storage agreements?

MR. BENDER: We'll have another witness who can answer that question.

MR. STOLLDORF: Okay. I think that's -- sorry, I'm moving to a different question based on your answer.

Q. (MR. STOLLDORF CONTINUING) I'm going to move to Article 5, Tract Participations. In the storage agreement you indicate the tract participation is based a hundred percent upon the ratio of surface acreage within the facility area.

Can you explain the reasoning behind using land basis rather than pore volume?

A. Sure. We believe that using a tract basis provides an equitable method for compensating all landowners based upon the life of the project.

Q. In Article 8, you touched on some of these things earlier in cross-examination. Just a couple things I wanted to clarify. That this use of the -- the activities this is going to cover includes like the location of monitoring equipment for soil, gas, Fox Hills groundwater wells and also any seismic equipment or activity?

A. That is correct.

Q. Okay.

A. And for the Commission's understanding, we'll continue to work as we have with willing landowners for every opportunity.

MR. STOLLDORF: Okay. I think that's all I have for that section and you guys.

MS. MADCHE: So just to jump in, for the two corrections, the first one was in tract 23. The second one is tract 56.

MR. BENDER: Thank you for that.

**FURTHER EXAMINATION**

**BY MS. MADCHE:**

Q. And just one additional item in the storage agreement and the pore space lease agreement. There is a note, so in Article 1.15 you're currently defining the storage reservoir is including both the upper and lower confining zone in addition to the injection zone, and then in Article 3.6 where you talk about injection rights, it states, The storage operator is granted to inject into the storage reservoir any storage substances in whatever amounts the storage operator may deem necessary.

I just want to clarify, again, that the injection and storage of $CO_2$ should only occur within the injection zone and not within the confining zones.

A. (BY MR. BOESHANS) Yeah. Understood.

MS. MADCHE: Thank you.

**EXAMINATION**

**BY MR. SUGGS:**

Q. All right. I'll try to bat cleanup here. A couple of things. First, there were a number of items that were discussed through the surface use agreement and the lease attached to Exhibit D as

possible amendments to language within both. I guess at this time I'm going to ask that whatever that amended language is proposed to be, that it be worked up and submitted as a supplemental.

And that -- I've got a -- I don't know if it's a complete list, but there was a discussion on -- so in the surface agreement it would be 3.3, 2.4, 7.1, 10.2 and 8.1, and then I think 25 and 34 of Exhibit D is what I caught. I might have missed a couple.

A. (BY MR. SKAARE) Would you mind repeating that so I can cross-reference my notes?

Q. Okay. All right. So I had notes on 3.3 -- so surface agreement -- I'll start with surface agreement, 3.3, 2.4, 7.1, 10.2 and 8.1.

A. That matches.

Q. And then in the Exhibit D, I had Article 24 and 34?

A. That matches my notes.

Q. I'm also going to request -- the court reporter is currently working up a transcript. I'm going to request that the transcript be provided as a supplemental exhibit after the hearing.

Wade, specifically, there was a fair amount of discussion as to the economics and the

effect that this project would have on the North Dakota economy. And per your preamble in the project summary on PS-3, you indicate that the $CO_2$ storage is critical to both agriculture and energy industries in North Dakota. Is it your intent at this time that the Commission will make a determination with respect to 43-05-01-17 and the fees required for submission -- or for injection of $CO_2$ and whether or not those fees shall be charged pursuant to part A of that or part B, part A being they contribute to the North Dakota energy or agricultural economies, and part B, they don't? Is it your -- so the question is are you requesting that that determination be made as a part of this hearing?

A. (BY MR. BOESHANS) Yeah, our request is that the Commission make the determination on Summit's project part A or part B.

Q. And you understand that if the determination were to be that it did not contribute and was subject to 1B, that we would need a supplemental -- or not a supplemental -- subsequent hearing to determine what those fees should be set at?

A. I do understand that, yes.

Q. With respect to that request, I'm going to ask for another supplement of what you provided as Exhibit 3A identifying, I guess, each of the capture facilities that you have identified there and where their locations are. It's probably sufficient just to indicate which states they're in or just number them and give us the name so we can determine whether or not they're -- where exactly they are.

A. Understood.

Q. With respect to the cases on the docket for the establishment of the pool and field boundaries associated with these facilities, does -- does Summit have any opposition or any concern if the field boundaries are established as the facility area boundaries, and the storage reservoir or pool defined in those would be equivalent to the storage area as proposed in the surface use agreement?

A. No.

Q. I'm going to ask this here, though it may be appropriate for another witness. On your Figure 1-1, page 1-2, this is the map illustrating the pore space. Looking at Section 35 and 141-88, it would look like the plume boundary is almost

equivalent if not at the exact same point as the storage facility boundary. The line appears to be at the same spot.

A. So can you say the diagram you're looking at again?

Q. So Figure 1-1, it's on page 1-2 of the application.

A. Okay. Yes. I have it now.

Q. And, again, so Township 141, Range 88, Section 35, there's a little portion of the identified stabilized $CO_2$ plume extent that is at the same point as the storage facility area -- at the line that the storage facility area identifies. So it looks like there's no buffer there. Is that intentional or is that something that should be directed at another witness?

A. Yeah, we have another witness that can testify to the specifics, but there is a buffer there.

Q. Okay. Do you know what that buffer is?

A. We'll have another witness testify exactly the buffer.

Q. And would the other witness also be the person to direct the odd shape of the plume? So when I say "the odd shape of the plume," there's a

little carveout in the middle. It looks like no $CO_2$ is going to affect that central area.

A. Yes. I think we'll defer that to the next section here --

Q. Next group.

A. -- the geologic modeling and simulations, to answer that.

Q. Okay. There was a fair bit of discussion on Section 8 of the storage agreement. And I just want to point out that, I guess, there's -- Article 8.3 within -- within there indicates that the damages will be paid to any surface owners disturbed at the surface; is that correct?

A. (BY MR. SKAARE) That is correct.

Q. One minor typo in the surface use agreement, Article 15.1, I believe the title of that section should be bolded and underlined.

A. (BY MR. BOESHANS) Oh, Term?

Q. Yep. Single word.

Article 16.2 on page 15 of the storage agreement, I'm not a lawyer so I'm just looking for what this language means. The joinder and dual capacity language here, I don't really want to quote it at you -- I think you can read it yourself -- but what is the intent of that article

and specifically with respect to the "and any additional interest thereafter acquired" language?

MR. BENDER: Do you want me to take a crack at it?

MR. SUGGS: I don't care who answers it.

MR. BENDER: You don't have any objection?

MR. BRAATEN: No.

MR. BENDER: If there were a situation where the operator, Summit, who is the operator, and also owned an interest in the pore space, by executing the storage agreement, they'd be executing basically as both parties, both as an operator and as an owner of the pore space.

MR. SUGGS: So with that explanation, it would have nothing to do with anything that a landowner acquired after the point at which they executed?

MR. BENDER: I don't believe so. It would be -- it -- it would apply to a situation, though, if Summit were to sign this as a -- as a joint owner and then acquired additional surface interests, that surface interest would then be basically agreed upon with this language. If -- if that's something you -- I don't know that it's -- it's certainly not necessary in -- in this

agreement, so it's something that I can speak with my clients and see if we can't get it resolved.

MR. SUGGS: Okay. Add that to the list of supplemental language adjustments.

MR. BENDER: Okay.

MR. SUGGS: Okay. That's all I've got. Thank you.

**EXAMINATION**

**BY MR. BOHRER:**

Q. Just a couple quick questions, Jeff, on Exhibit 5A, if you go to page B-3. That would be as good as any.

A. (BY MR. SKAARE) And what page was that?

Q. B-3. On the very right column there's blank columns, and we'll look at tract number 8, in the life estate those columns are filled out all the way across, and then there's four blank ones there. What's the -- what's the meaning of that -- those interests or whatever they are with basically zero participation?

A. Sure. So as you look specifically on page B-3, tract number 8, JoAnne Skalsky owns a life estate. The -- the parties listed below her are the remaindermen such that upon her death, they gain the interest in the property.

Q. Okay.

A. And so we joined them in our pore space lease because they own a future interest.

Q. Okay. And then with your no surface facility, no surface occupancy discussion and any amendments that may take place with that, would it be your intent that that language would not preclude Summit from conducting future seismic operations?

A. That is correct. It is a no surface facilities.

MR. BOHRER: Thank you.

MR. SUGGS: Apologies, I do have two more things to address.

**FURTHER EXAMINATION**

**BY MR. SUGGS:**

Q. There was a fair bit of discussion about the NAICS code, the industrial codes. The provision in the rules, 43-05-01-07, it's part 3.c indicates that four standard industrial classification codes which best reflect the principal products or services provided by the facility shall be provided as part of the application. To date, the codes that have been provided for other facilities have listed either

the ethanol facility -- that have been related to the ethanol facility that was being used or the industrial entity as the source of the $CO_2$ in the case of DGC. I don't recall what it was, but it was related to the synfuels plant.

The code you provided would indicate it was pipeline related as the source of the $CO_2$ as far as the sequestration facilities were concerned. Do you have the code or do you know what it is or can you supply it for ethanol facilities as the source of the $CO_2$?

A. (BY MR. BOESHANS) We could supply it. I don't have it.

Q. We'll probably request that. If another witness doesn't have it available, we'll request that that probably be provided as well as the potential -- well, at this time you're not including the alternate source of the $CO_2$ as the --

MR. BENDER: Mr. Suggs, one of our witnesses is going to talk about Section 12 in the -- in the application. He would be the witness to address the question about the codes.

MR. SUGGS: Okay. That's fine. We'll -- we'll hit it there then.

Q. (MR. SUGGS CONTINUING) And then one --

one more, I guess, piece of clarification. When you were being questioned, Wade, regarding the model and what was submitted to the Commission, you indicated that the model had been submitted to the Commission, the whole model. Point of just clarification, what is submitted to the Commission is the numerical simulation in the GEM software which includes the model as it was imported from the geologic model that the EERC developed in Petre -- or Petrel. Sorry. So we don't have the whole geologic model. What we have is the version of it that comes in through the numerical simulation. So just a point of clarification on that testimony.

A. Yeah. That's my understanding as well, and certainly Amanda can testify on more specifics as needed related to what was submitted to the DMR in that regard.

MR. SUGGS: And that's all I've got. Thank you.

HEARING EXAMINER GARNER: Any redirect, Attorney Bender?

MR. BENDER: No redirect.

HEARING EXAMINER GARNER: Okay. Call your next witness.

MR. BENDER: Okay. We'll be calling Amanda Douglas and Caitlin Olsen.

HEARING EXAMINER GARNER: Okay. Ms. Douglas, please raise your right hand.

**AMANDA DOUGLAS,**

being first duly sworn, was examined and testified as follows:

**DIRECT EXAMINATION**

**BY MR. BENDER:**

Q. Amanda, state your full name for the record, please.

A. Amanda Jordan Douglas. I'd just like to note that I do go by Amanda Livers-Douglas, so you may hear that as well today.

Q. And, Amanda, by whom are you employed by?

A. The Energy & Environmental Research Center at the University of North Dakota.

Q. In what capacity?

A. So I'm an assistant director for integrated subsurface projects.

Q. Can you explain just very briefly what that title includes in terms of your role with EERC?

A. Yes. So I oversee and manage the collection of geophysical and geologic

characterization data. I also manage and serve as an advisor on commercial, carbon capture and storage development projects. I also oversee and manage a team of geoscientists, including ten geologic modelers.

Q. Okay. And I'd like you to highlight for us your educational background and work experience.

A. I have a bachelor's from -- in physics from Concordia College in Moorhead, Minnesota, and I have a master's in geology from the University of Kansas.

My work experience includes three years as a graduate research assistant at the Kansas Geological Survey where I worked on a professional seismic crew, and eight years of employment at the EERC.

Q. Amanda, what are some of your duties and responsibilities with respect to your employment with EERC generally and specifically with respect to the project that's before us today -- or projects?

A. So as previously stated, my roles at the EERC with respect to this project in particular, I oversaw the development of several sections of the storage facility permit application. I also

advised on data collection as well as geologic modeling and simulation.

Q. And it's my understanding that you had direct involvement in Sections 2 and 3 as well as Appendix C; is that correct?

A. That's correct.

Q. Okay. Let's turn your attention to Sections 2 and 3 of the application. Can you provide us with a brief overview of what your testimony will cover?

A. Yes. So I'll be providing a high-level overview of the key takeaways from Section 2, 3 and associated appendices which are Appendix A and C.

Q. Okay. And Wade provided us with sort of a high-level overview of the project. What I'd like you to do is provide the Commission with a more detailed overview of the project.

A. Okay.

Q. You'll do that?

A. Yeah.

Q. Okay. Let's start, how was the project area selected?

A. So as Wade previously testified to, there are several factors with respect to the technical considerations related to the suitability of the

geology for determining the site location.

Previous state and federal funded projects suggested that this region of North Dakota has suitable geology for $CO_2$ storage. Through this project, acquisition of site-specific data confirmed the viability of the subsurface geology for safe and permanent storage of $CO_2$.

Q. Can you explain for the Commission staff and opposing counsel why the Broom Creek Formation in this area is a good candidate for $CO_2$ storage?

A. Yes. So the Broom Creek in this area has sufficient thickness and porosity and permeability for the injection and storage of large volumes of $CO_2$. It's also at a depth at which $CO_2$ would stay in a super-critical state which is conducive for the efficient use of pore space.

I'd also like to point to figure 2.9 on page 2-16. So this is a map of the extent of the Broom Creek Formation in North Dakota showing that the Broom Creek is laterally extensive across this project site. The Broom Creek is also overlain by an upper confining zone that is devoid of transmissive faults and fractures with sufficient vertical extent and permeability to serve as fluid migration pathways, and that upper confining zone

is laterally continuous over the storage facility areas.

Q. Amanda, now I'd like you to discuss a bit the confining zones of the Broom Creek Formation. You explained for us why the Broom Creek Formation was selected from the standpoint of it being prevalent in the area. Can you now discuss for us the confining zones above and below the Broom Creek?

A. Yes. So the upper confining zone is considered to be all of the formations from the top of the Spearfish Formation down to the top of the Broom Creek Formation. And so I'd like to point you guys to page 2-19. So we're showing on Figure 2-11 a well log display, and I'd just like to point you to the upper confining zone which is labeled as the Opeche/Spearfish.

So this is log data from the Milton Flemmer 1 well, and so at the Milton Flemmer 1 well the upper confining zone consists of the Spearfish, Minnekahta and the Opeche. The Minnekahta is typically used to differentiate between the Spearfish and the Opeche. At the Milton Flemmer well, the Minnekahta is approximately 23 feet thick, but the Minnekahta pinches out. And so

that's why we'll refer to the upper confining zone here as the Opeche/Spearfish because in most places for this specific storage facility area and the other two storage facility areas, the Opeche/Spearfish is undifferentiated due to the absence of the Minnekahta.

Q. Now, what properties in the upper confining zone that you just discussed make it a good seal?

A. So the upper confining zone has a low permeability and porosity. It also has a high relative permeability -- or sorry -- a high capillary entry pressure relative to the injection zone. It is devoid, as I mentioned, of faults and fractures with sufficient permeability and vertical extent to act as a fluid migration pathway. And it's laterally extensive across the storage facility areas.

Q. And what data did you use to validate suitability of the storage complex for $CO_2$ injection and long-term storage?

A. So I'm going to point you to the two maps on page 2-5 and 2-6, which is Figure 2-3 and Figure 2-4. So these maps are showing the data used for our evaluation as well as the construction of the

geologic model. So this includes 2D and 3D seismic data. It includes site-specific well log, core, fluid sampling and formation testing data as well as regional logs, core, fluid samples and formation testing data.

Q. And, Amanda, what are the mechanisms for geologic confinement?

A. So initially as -- after the $CO_2$ is injected, it will be contained by the upper confining zone itself. So the $CO_2$ is a buoyant fluid and it will be contained under the effects of relative permeability.

So laterally the $CO_2$ will be contained via residual gas trapping, and as $CO_2$ dissolves in the formation brine, it'll be confined through solubility trapping. As mentioned after the -- as the $CO_2$ dissolves, the brine it dissolves into will become more dense and that will eventually sink lower in the Broom Creek Formation. And over a much longer period of time, hundreds of years, mineralization will start to occur and that will also become a trapping mechanism.

Q. Amanda, in your expert opinion, will geochemical interaction impact seal integrity or injectivity?

A. So, no, geochemical interactions of injected $CO_2$ with the upper confining zone will not impact the integrity of the confining zone. So we did an analysis using geochemical modeling. So the upper confining zones, as I mentioned, are low porosity and low permeability. We don't expect the $CO_2$ to have much interaction with the upper confining zone, but we wanted to look at an extreme case or a conservative case what would happen if the $CO_2$ did have interactions with the upper confining zone, would there be any adverse geochemical reactions that would impact the ability of the confining zone to contain the $CO_2$.

So what we did is we used a software called PHREEQC to do modeling of the upper confining zone. So the PHREEQC software doesn't -- it uses a transport mechanism of dispersion to allow $CO_2$ to flow through the model cells. It doesn't use permeability to dictate flow in the model. And so this is a conservative case where we're able to expose the model cells to that $CO_2$.

So to populate the model, we used site-specific geochemical analysis of fluids, of mineralogy from the core data and $CO_2$ composition. So it should be noted for the $CO_2$ composition we

also took a conservative approach where we modeled the $CO_2$ stream of 95 percent $CO_2$ and 2 percent oxygen. So this is more oxygen -- higher oxygen amount than is in the anticipated $CO_2$ stream, as Wade testified to earlier. We chose to use this composition for modeling as oxygen is known to be more reactive, and so we wanted to look at an extreme case.

And even in this extreme case where we're ignoring permeability, we're allowing $CO_2$ to contact the upper confining zone, we're using a $CO_2$ composition with higher $O_2$, the modeling demonstrated that action with the $CO_2$ to the upper confining zone would result in no adverse effects. So there is little to no porosity change due to precipitation or dissolution from the model.

Additionally -- sorry --

Q. No. You're fine.

A. Additionally, related to injection we also did geochemical modeling of the injection reservoir using CMG's GEM software where we simulated $CO_2$ injection into the reservoir, again using that 95 percent $CO_2$ and 2 percent oxygen case, and we saw, similarly, little to no effect on porosity due to precipitation or dissolution of minerals due to

the interaction of the $CO_2$, so we don't anticipate geochemical reactions will impact injectivity adversely.

Q. Okay. When the two previous witnesses were up here testifying, there were some questions about what sort of impact injection could have on underground sources of drinking water. In your -- in your expert opinion, will there be any adverse effects?

A. No. There will be no adverse effects on underground sources of drinking water. As I previously mentioned, the Broom Creek is overlain by a competent confining zone that is devoid of transmissive faults and fractures that could serve as fluid migration pathways.

I'd also like to note that above that primary confining zone there is approximately a thousand feet of additional low permeability rock that will contain the $CO_2$. In addition to that thousand feet, there is another 2,000-plus feet of impermeable rock below the lowest USDW which we're defining as the Fox Hills Formation.

Q. Now, you indicated that there was no evidence of fluid migration pathways. How did you determine an absence of fluid migration pathways?

A. So we looked at several data sets, including 3D seismic data. We looked at formation image logs in terms of fracture analysis. We also did fracture analysis of the whole core that was collected from the project. Additionally, we looked at fluid samples to evaluate if the Broom Creek Formation was hydraulically isolated from the next porous and permeable zone, which is the Inyan Kara Formation.

Q. Let's talk a little bit about seismicity. In your expert opinion, is there a risk that seismicity will interfere with the containment of the $CO_2$?

A. There is little risk that seismicity will interfere with containment of $CO_2$. So I'm referring to both naturally and induced seismicity. So there is a lack of historical earthquakes in North Dakota. So we've looked at historical earthquake data. Just one study in the permit that references this, a study done by Anderson and others in 2016, on page 2-69, Figure 2-44, shows -- the dots on this map reflect the historical earthquakes from the late 1800s to 2015, and there's fewer than 20 historical earthquakes during this time frame.

And so this can be attributed to the

general geologic stability of the formation. So in addition to this stability of the -- the region, we'll be operating the project under the fracture pressure gradient of the Broom Creek Formation which is also lower than the fracture pressure gradient of the upper confining zone which reduces risks of induced seismicity.

Q. Now, Commission staff had some questions of the past two witnesses about commercially valuable minerals. Do any of the three proposed storage facilities contain commercially valuable minerals?

A. Yes. So there is lignite coal reserves within each storage facility.

Q. And are there any oil-bearing formations or other hydrocarbon reserves located within the boundaries of the storage facilities?

A. So the North Dakota Geological Survey recognizes the Spearfish Formation as the only hydrocarbon-bearing formation above the Broom Creek Formation, and that is devoid of hydrocarbons in the project area. We also found no evidence of hydrocarbons in formations below the Broom Creek Formation or within the Broom Creek Formation.

We evaluated this through review of legacy

wellbores, existing oil and gas exploration studies, historical production data which are discussed in the permit, as well as evaluation of the mud logs for the three stratigraphic test wells.

Q. What if hydrocarbons were ultimately discovered within the storage facility area? Is there some way to develop those hydrocarbons?

A. Yes. So engineering controls could be used to produce hydrocarbons located below the injected $CO_2$ at each storage facility area. These may include, you know, increased mud weight to account for increased pressure in the reservoir due to injection. Also, you could potentially drill horizontally underneath the plume to produce any potential hydrocarbons that are discovered in the future.

Q. And directional as well; is that correct?

A. Yes.

Q. Okay. I don't know if you covered this so I'm going to go back to it just for a moment. I think you indicated that there were some reclaimed coal mines in the area. Are there any -- are there any plans to mine any coal that's in the area?

A. So there's a map on page 2-77. It's

Figure 2-51. So 2-51 is showing the future and reclaimed mining areas for the Coyote Creek and the Beulah Mine, so those are the two mines closest to the three storage facility areas. So within the storage facility areas themselves, there is no -- currently there's no future mining plans from either of these wells.

Additionally, operation of the storage facility area wouldn't preclude future production of the coal. And the areas where there's surface facilities for this project, there are no active coal leases that are known.

Q. And since the storage zone is quite a bit deeper than the coal in this area, is it a possibility of mining the coal even though you have a storage facility in place?

A. Yes.

Q. Okay. Let's -- let's switch now to Section 3 of the application. And can you briefly provide an explanation of which permit requirements are addressed in Section 3?

A. Yes. So Section 3 provides an overview of the geologic modeling and dynamic reservoir simulation activities that were conducted to define the vertical and lateral extents and migration of

injected $CO_2$ as well as the associated pressure front, the stabilized $CO_2$ plume and the area of review.

Q. And can you talk a little bit about the geologic modeling activities that were conducted with respect to these three applications?

A. So geologic modeling was conducted using industry standard methods and Petrel software. So this included the evaluation of geologic data, the construction of a structural framework and distribution of rock and petrophysical properties.

Q. How was the geologic model utilized to address the permit requirements?

A. The geologic model served as inputs for the dynamic reservoir simulations. So the dynamic reservoir simulations were done using industry standard methods and CMG software.

As mentioned, the dynamic reservoir simulations were conducted to determine the lateral and vertical extents of the injected $CO_2$ to define the project boundaries.

Q. And how was the area of review delineated?

A. The area of review was delineated using a risk-based approach developed by the EERC and published in Matt Burton-Kelly 2021.

Q. Amanda, before I get to the statutory questions, there were some questions about previously filed information that ultimately resulted in what I'm going to call the final form of the application. Can you just enlighten us as to when you started working on this project, when you started filing things with the Commission and give us a little bit of an idea of what you filed?

A. Previously or --

Q. Yeah.

A. -- the final form?

Q. Yeah.

A. So EERC was -- submitted a contract to Summit, I believe Wade mentioned, in early 2020. We began work on collecting the site-specific data. We helped prepare permit applications and we submitted draft permit applications to the DMR, I believe, late spring, early summer of 2023.

Q. And there was some discussion about some of the data that was submitted and the modeling that was done. Could you describe just a little bit of that and what was submitted to the Commission in terms of the data and providing the Commission an opportunity to review that data and do simulations?

A. Yep. So as requested by the DMR, we supplied all the shapefiles associated with the project. We also provided the geologic model in the form of the output that was used for dynamic reservoir simulations.

Q. And is it your understanding that all that information that was submitted to the Commission was available to the public?

A. Yes. And in addition to that, the -- the majority of the input data for the model is publicly available. A lot of the data -- or majority of the data used in the geologic model can be found on the NDIC's website which included, you know, core data, well logs, fluid sample analysis, as well as formation tests.

Q. Okay. Now, the statutory questions. In your opinion, Amanda, is the storage facility suitable and feasible for carbon dioxide injection and storage?

A. Yes. As I previously mentioned, the Broom Creek Formation has characteristics that are conducive for geologic storage of $CO_2$, including being overlain by a competent confining zone.

Q. And in your opinion is the carbon dioxide to be stored of a quality that allows it to be

safely and efficiently stored in the storage reservoir?

A. Yes. So we conducted geochemical modeling that demonstrated that the anticipated $CO_2$ stream will not have adverse geochemical interactions on the upper confining zone.

Q. And, in your opinion, will substances that compromise the integrity of the storage reservoir, will they not enter the storage reservoir?

A. Yes. So the anticipated $CO_2$ stream to be used for the project is not anticipated to have adverse impact due to geochemical interactions.

Q. Okay. And to get a conclusion from you with respect to some of the things you discussed having to do with minerals in the area, do the storage facilities contain commercially valuable minerals?

A. Yes. As previously mentioned, all three storage facilities contain lignite coal reserves.

Q. And as you testified previously, that doesn't prohibit that this storage facility or these storage facilities won't prohibit the mining of those -- of that coal if it's economically possible to do so; is that correct?

A. Yes. That's correct.

Q. Okay. In your opinion, will issuance of a storage facility permit adversely affect mineral owners or mineral lessees?

A. No. As previously stated, if there's hydrocarbon reserves discovered in the future, there is engineering controls and other methods for the extraction of those minerals.

Q. And, in your opinion, can the proposed storage facility be operated in a manner that will not adversely affect surface waters or formations containing fresh water?

A. Yes. So as mentioned, the storage formation is overlain by a competent upper confining zone that's devoid of transmissive faults and fractures with sufficient permeability and vertical extent that could act as a fluid migration pathway.

Q. And you touched on this in your testimony, but just a question to confirm. In your opinion, can the proposed storage facility be operated so that carbon dioxide will not escape from the storage reservoir?

A. Yes. As mentioned, it's -- the storage reservoir is overlain by a competent upper confining zone that is devoid of -- sorry -- devoid

of potential fluid migration pathways.

Q. And based on your study and review of the testimony and exhibits that you've testified here today and your knowledge of the project as a whole, in your expert opinion are the horizontal and vertical boundaries of the storage reservoir adequately defined and include buffer areas to ensure that the storage facility is operated safely?

A. Yes. So geologic modeling and dynamic reservoir simulations were used to define the vertical and horizontal boundaries of the storage facility area, and the storage facility area includes an appropriate buffer.

MR. BENDER: That's all the questions I have for this witness. We'd like to move to Caitlin Olsen, if we may.

HEARING EXAMINER GARNER: Ms. Olsen, please raise your right hand.

**CAITLIN OLSEN,**

being first duly sworn, was examined and testified as follows:

**DIRECT EXAMINATION**

**BY MR. BENDER:**

Q. Caitlin, can you state your full name for

the record, please?

A. Caitlin Olsen.

Q. And, Caitlin, by whom are you employed?

A. The Energy & Environmental Research Center.

Q. In what capacity?

A. I am a principal policy and regulatory strategist.

Q. And like Amanda did, what I'd like you to do is briefly highlight for us your educational background and work experience.

A. I graduated with a bachelor's of science degree in geology with an emphasis in hydrogeology from the University of Wisconsin, River Falls. I started work for the Department of Mineral Resources where I started as a petroleum engineer field inspector. I ended here with the Department of Mineral Resources as a production supervisor.

In 2022 -- I held those positions for eight years, and in 2022 I started working for the EERC where I -- my position was a senior regulatory and permitting specialist. My position today with the EERC is a principal policy and regulatory strategist.

Q. Caitlin, what I'd like you now to discuss

for us is what some of your duties and responsibility are with respect to your employment with the EERC generally and specifically with respect to the projects that are before the Commission today.

A. Sure. So generally I oversee commercial $CO_2$ storage projects and development of their permits. I also work in oil and gas regulations and provide policy advisement there. Specific to this storage facility permit, I oversaw the creation of the storage facility permit and compliance with regulations.

Q. Okay. So Amanda spent some time discussing Sections 2 and 3 in the application. Let me direct your attention to Section 4 of the applications. Can you briefly explain how the AOR was used to evaluate the region and to meet specific permit requirements?

A. Sure. The area of review, as you'll see on page 4-1, is defined as the region surrounding the geologic storage project where underground sources of drinking water may be endangered. The AOR in this case contains the storage facility area boundary, and that is based on the simulation extent of the stabilized plume. It includes a

one-mile buffer outside of the storage facility area to encompass the entire area of review.

Q. So can you direct your attention to the map in the application that depicts the AOR. And give everyone a little time to get there.

A. If you'll look at Figure 4-3, that map shows the area of review on the outside in purple. In farther is the storage facility area denoted as a black line. And in even farther is the stabilized $CO_2$ plume extent. Within this map, you'll see groundwater wells and one spring. You'll see the stratigraphic reservoir monitoring well, the Milton Flemmer 1. You'll see the two proposed injection wells. And if there were legacy oil and gas wells present, they would be shown here, but there are no legacy oil and gas wells present in this particular permit.

Q. So, Caitlin, after you identified the AOR, what type of evaluation was conducted by you and other staff members of EERC?

A. A review of data of public record was performed where -- for all wells within the storage facility area and the AOR itself, and included in that review was any wells that penetrate the overlying seal, the Opeche/Spearfish Formation and

any other wells that might exist in the area of review.

Q. So the first step of evaluating the AOR is you look for any wells that are drilled in the area; is that correct?

A. That's correct.

Q. Okay. And did you identify any wells?

A. We did. There's one particular well that -- only one well in this area of review that penetrates the upper confining seal, the Opeche/Spearfish Formation, and that well is described as the Milton Flemmer 1, which was drilled specifically for this project as a stratigraphic test well and as the monitoring well.

Figure 4-4 further explains the Milton Flemmer 1 and how it's constructed. So the Milton Flemmer 1, during this review process by a geologist and an engineer, was found to be properly isolated which prevents the migration of any fluids into USDWs, and a determination was made that no corrective action is needed for this well.

Q. Now, Caitlin, it's -- it's my understanding that a reevaluation of the AOR and corrective action plan period is proposed not to exceed five years. In your opinion, what would

trigger reevaluation prior to the five years and what sort of reevaluation would that address?

A. Yeah. So Summit will comply with North Dakota rules which is to reevaluate the storage facility area every five years. Any triggers prior to that five years where Summit would be required to reevaluate the area of review and storage facility area would be if monitoring operational data requires it or if there's a significant enough change found in the area of review that would warrant it.

Q. If there were significant changes, what would happen next, in your opinion?

A. Summit would update the model using history match data or the site-specific data that they found through injection activities. And then based on that updated model would work with the DMR to perform any corrective action if required or if needed.

Q. Now, in addition to the matters that were discussed by Amanda with respect to confining zones, what other information and data was used to assess protection of underground sources of drinking water within the AOR?

A. So aside from looking at the DMR database

for the Milton Flemmer 1 well and using Summit's own records -- alongside using Summit's records and DMR records for the Milton Flemmer 1 stratigraphic test well, other data sources were used. Those data sources to review these wells within the area of review include the USGS database, the U.S. Geological Survey database, the Public Service Commission and the Department of Water Resources.

Q. And did you examine freshwater zones?

A. We did.

Q. Can you explain to us what the lowest freshwater zone was that you examined?

A. So described on page 4-12, the lowest USDW in the AOR is the Fox Hills Formation, and together that comprises -- includes the Hell Creek Formation to comprise the confined aquifer system that includes both. The Fox Hills Formation in the AOR is about 1500 feet deep here and about 250 to 300 feet thick.

Q. Are there any Fox Hills wells in the AOR?

A. There is one Fox Hills well existing in the area of review. That's included in a map on the next page -- nope -- on Figure 4-10 on page 4-17. That well is included to be in the testing and monitoring plan during the life of the

Summit project and is included in the baseline testing and monitoring plan.

Q. So other than the Fox Hills, did you look at any other freshwater zones?

A. Yes. So Summit worked with landowners in the area to identify any other potential freshwater zones above the Fox Hills where testing could be performed. They ground-truthed the area based on the groundwater well maps that you'll see in Figure 4-3, and during those ground-truthing efforts and based on depth of wells, a final determination of the baseline testing and monitoring plan with respect to groundwater monitoring and the life of the injection project groundwater monitoring plan was determined, and the final wells to be included is shown on Figure 4-10.

Q. So other than what you've discussed so far, what additional protections are in place or will be in place for underground sources of drinking water?

A. There are multiple impermeable layers throughout the -- this area. So as Amanda testified to, directly above the Broom Creek is the Opeche/Spearfish Formation, and then directly below the Fox Hill Formation is the Pierre Shale which is

an impermeable shale that provides the -- the protection directly beneath the Fox Hills, and in between those two impermeable layers are multiple confining layers that provide protection to USDWs.

Q. Caitlin, in your expert opinion, can the storage facility be operated so that it will not endanger human health nor unduly endanger the environment?

A. Yes. Engineering safeguards are in place, and the site consists of ideal geologic confinement and geologic mechanisms that will protect human health and the environment from any $CO_2$ injection activity.

MR. BENDER: No further questions of Ms. Olsen.

HEARING EXAMINER GARNER: Mr. Braaten.

MR. BRAATEN: Thank you, Your Honor.

**CROSS-EXAMINATION**

**BY MR. BRAATEN:**

Q. Is there a lower porosity in the lower confining zone than the upper confining zone?

A. (BY MS. DOUGLAS) So Table 2-7b on page 2-32 contains ranges for permeability as well as averages from core analysis as well as the simulation model. With respect to the -- the

Amsden Formation, typically the Opeche/Spearfish, which is the upper confining zone, has lower permeability than the Amsden Formation, which is the lower confining zone.

Q. You discussed the Fox Hills freshwater aquifer. Is that the only freshwater aquifer that you studied with respect to the application?

A. No. As Caitlin mentioned, we identified several other freshwater aquifers in the project area. Additionally, I'll point you to Appendix B which includes some of the fluid sample analyses. So one of the other horizon samples listed on page B-1 includes the Tongue River.

Q. Do you have a depth for where that sample came from?

A. I don't have one in front of me at this time.

Q. Is -- do you know whether the Mission Canyon or Lodgepole or anything in the Minnelusa Group contains a freshwater aquifer within North Dakota, as defined by the Safe Drinking Water Act?

A. (BY MS. OLSEN) Are you asking if those are USDWs?

Q. Correct.

A. The lowermost USDW is the Fox Hills

Formation, so nothing below that would be considered a USDW.

Q. Based on the criteria in the Safe Drinking Water Act or just classification?

A. Yeah, based on -- I mean, specific -- what specifically in the Safe Water Drinking Act are you referring to?

Q. Does it -- does -- are these freshwater aquifers pursuant to the criteria for a U.S. drinking water in the Safe Drinking Water Act?

A. (BY MS. DOUGLAS) I can't speak to the entirety of the Williston Basin or North Dakota, but within the storage facility area, I do not believe that they are below 10,000 parts per million.

Q. How does the permeability of the Spearfish or the other impermeable zones compare to the Bakken or the Three Forks?

A. I don't have data from those formations on hand.

Q. Do you know how it compares generally, though?

MR. BENDER: Objection. Relevance.

HEARING EXAMINER GARNER: Overruled.

MS. DOUGLAS: I'd say it's comparable.

Q. (MR. BRAATEN CONTINUING) Did you take any water samples from any areas within the Minnelusa Group or the Madison Group?

A. We did not. I'm basing that answer on regional salinity maps.

Q. And based on regional salinity maps, those -- you're saying the total dissolved solids for those are above the thresholds in the Safe Drinking Water Act or below?

A. Above. So they're above 10,000 parts per million.

Q. Do you know what they are?

A. I don't have those maps on hand, no.

Q. Do you know if they're between 10 and 15 thousand?

A. I don't know that.

Q. Where would that information be contained?

A. Several of those maps can be found publicly available. I believe the North Dakota Geological Survey has published some of those online.

Q. Do you know whether -- well, do you know for certain whether the total dissolved solids in any of those -- in any of the water in those formations -- let me start over.

With respect to any waters in the Minnelusa Group or the Madison Group, do you know sitting here today that they are below 10,000 total dissolved solids?

A. I do not know that. We did not sample that as part of this data characterization plan regarding potential leakage pathways from the storage reservoir into those zones. The Amsden is also devoid of transmissive faults and fractures that have sufficient vertical extent of permeability for $CO_2$ to leak from the Amsden into lower formations.

Q. Would you make any suggestions on alternative ways to conduct operations here if you discovered that there was a U.S. drinking water and a freshwater aquifer under the Safe Drinking Water Act in the Minnelusa or Madison Group?

A. So for the operation we'd potentially want to add additional monitoring of those zones as well, but I don't believe the injection operations as a -- in my opinion, I would not recommend any changes to injection operations besides additional monitoring.

Q. And when you say you wouldn't recommend any changes to injection operations, are you

referring primarily to the injection pressures and the max pressure of injection?

A. Correct. And targeting the Broom Creek itself for injection.

Could you clarify your earlier question? You talked about the Madison Group. Did you also mention the Minnelusa Group?

Q. I did.

A. So the Broom Creek itself is within the Minnelusa Group, and so we've sampled that and it is over 10,000 parts per million.

Q. And that sample was from above the Amsden Formation?

A. Correct.

Q. So as part of developing this application, you ran a model in the Petrel software?

A. I personally did not, but the EERC team did, yes.

Q. Okay. And ran a model in the GEM software?

A. So I'd say we constructed the model in the Petrel software and then we used it to run dynamic reservoir simulations in CMG.

Q. And you also used the PHREEQC model for the geochemical interaction modeling?

A. That's correct.

Q. And did you submit the data decks for each of those three models to the oil and gas division?

A. So all of the data that was used is either described in the permit, was provided to the DMR, or is publicly available outside of the seismic data.

Q. Did you say that all of the data provided to the DMR is what is in the permit application? No. I misheard that.

Did you, EERC, provide the data decks for those three models to the oil and gas division?

A. Can you define "data decks"?

Q. What do you understand a data deck to be?

A. So the -- the raw data we use is publicly available. Any assumptions used have been detailed in the permit. It -- for example, geochemical modeling, we list the mineralogy from the specific sample that was used. We listed the $CO_2$ composition. We listed the -- some of the additional other input data, including -- just one second -- including parameters such as exposure level and things like that.

So we believe that in the case of geochemical modeling, they would have all the

information they would need to evaluate or replicate the modeling.

Q. You say they would have the data they need to replicate the modeling. Who's "they"?

A. The DMR. In the case of the geochemical modeling, all the information is publicly available, so anyone could potentially replicate these results.

Q. Is your education and professional background in geology or engineering or both?

A. So I have a master's in geology with an emphasis in geophysics, and I have a bachelor's in physics.

Q. Okay. Do you ever talk to coworkers and other colleagues about the models that we just discussed?

A. That's correct. So as I mentioned earlier, I actually oversee the EERC's geologic modeling team.

Q. And have you ever heard someone at EERC use the phrase "data deck"?

A. No, we don't use that term.

Q. Have you ever heard anyone doing petroleum reservoir engineering use the term "data deck"?

A. The term's familiar.

Q. Do you know what a data deck is?
A. I think the definition's subjective.
Q. Is the well testing data that you used to tune and develop the permeability model publicly available?
A. The well testing data from the Milton Flemmer 1 well is publicly available on the NDIC website, yes.
Q. The .DAT file?
A. I'm uncertain of the format that's online.
Q. What would you do with a PDF file with that information? It's not really usable; right?
A. Depending if it's in tabular or table format or if it's graphical.
HEARING EXAMINER GARNER: You know, now's a good time to take our last ten-minute break and then we'll come back and finish up.
(Recessed at 5:11 p.m. and reconvened at 5:23 p.m.)
HEARING EXAMINER GARNER: We are back on the record. Mr. Braaten, you were questioning Summit's witnesses.
MR. BRAATEN: Thank you, Your Honor.
Q. (MR. BRAATEN CONTINUING) You said that the data to run the geologic model is publicly

available; right?

A. (BY MS. DOUGLAS) Everything except the 3D seismic and interpretative volumes from the 3D seismic.

Q. Can you do it without the 3D seismic?

A. Can we replicate the exact model?

Q. Yeah.

A. No. Actually let me correct that. So based on what's in the permit, yes, because with the 3D seismic, we used the seismic to interpret variograms, and the variograms links interpreted from the seismic were listed here. The -- the one thing you might not be able to replicate is that we used interpreted seismic horizons from the seismic data for the structural model. So that would be not duplicatable without the 3D seismic.

Q. If you were asked to analyze the models that you created here, as a third party and given the data you're saying is publicly available but knowing nothing about the project going in, how long would it take you by yourself to replicate these models by going through all of the publicly available data and reconstructing it, collating it, organizing it, choosing it, picking your tops? How long would it take you to recreate that model?

A. Typically our modeling workflow for a model of this size and scale with this amount of data would be approximately six to eight weeks to go through that process. Keeping in mind with the formation tops, there are publicly available formation tops out there. It's a matter of QC'ing them.

Q. Is that what you did?

A. Yes.

Q. But you chose the formation tops used in your model; right?

A. So we went through the publicly available ones and quality controlled them.

Q. How did you do that?

A. So our method is based on core analysis. So we also looked at core analysis to determine where we thought the top of the Broom Creek was, and so we've reported in the permit how we picked the top of the Broom Creek. So if someone wanted to pick how we picked it, we report where we pick it on gamma ray log signatures. That's -- that's in the permit. And so we evaluate whether the publicly available picks match that specific signature in the logs to determine if we're going to use that top or adjust it.

Q. Without the impedance data, you could not recreate the model to the same degree of accuracy as you did; right?

A. The models would be different.

Q. And you said if you had to start from scratch knowing nothing, you think you could get it done in -- was it six to eight weeks?

A. Six to eight weeks with the -- with what's published in the permit and the publicly available data. I think what's published in the permit provides a lot of time savings.

Q. And is that time estimate for you and your team to do that?

A. If we were to replicate this with all the things in the permit, it would be significantly quicker.

Q. Meaning it would be quicker if you had your whole team doing it?

A. No. Quicker if we're replicating using assumptions, using the variogram links that we report and stuff like that because we're not interpreting the data to come up with new variogram links. So if we wanted to replicate the model using the -- the permit -- what's in the permit and the publicly available data, it -- it'd be

considerably faster than six to eight weeks.

Q. And, again, is that for you and your team to do that?

A. That would be for one or two individuals, correct.

Q. Working full-time?

A. Yes.

Q. All day, every day?

A. Eight hours a day.

Q. If we didn't have the impedance data, how would the model be different?

A. So as I mentioned, the main difference would be the structural surfaces. So your structural surfaces would be confined with your well control, so there would be slight variations on the structure of the formations. Petrophysical property distribution might be slightly different as well.

Q. Different meaning less accurate?

A. Is -- is your -- so --

Q. It results in a less predictive model?

MR. BENDER: Which question do you want her to answer, Derrick?

MR. BRAATEN: Well, I was clarifying my prior one.

MR. BENDER: Okay.

MS. DOUGLAS: So I'd say the models are different. I think it's subjective how you define model accuracy.

Q. (MR. BRAATEN CONTINUING) But if we define it as how predictive it is, it would be less predictive if we didn't have the impedance data?

A. It would have potentially less detail in it.

Q. Are you familiar with the PHREEQCi input files?

A. Generally.

Q. Did you create one for the PHREEQC model you ran here?

A. Yes, an input file was generated.

Q. And did you give that to the oil and gas division?

A. No.

Q. Why not?

A. The DMR staff did not request it directly.

Q. Did you submit that to the EPA's portal?

A. What EPA portal are you referring to? The --

Q. Did you file it with the EPA?

A. No.

Q. Did you have some kind of an input file that was created for the other two models?

A. The other two models being the geochemical model for GEM and the geologic model?

Q. Correct.

A. Those models use multiple sources of input data, so it's not a specific input file.

Q. It's a data deck?

A. You could confine it as a data deck.

Q. Do you have a data package that contains all of the input files in one zip file or something similar that can then be used as a load file with the software programs?

A. Yes. The Petrel project itself can be saved as a file. One thing to note about that, while all the data is publicly available, that Petrel file, as it is now, does contain some digitized well logs that were purchased from a data broker and are deemed confidential under a license agreement. So that would have to be -- those specific digitized logs would have to be stripped from that Petrel project.

Q. Or simply paid for by someone else to get a license? Why do you say they would have to be stripped? For what purpose would you strip them

from the package?

A. They're governed by a specific license agreement, so I don't have those terms available now. But there are potential ways that someone else could purchase those digitized logs for those specific wells.

Q. And if they had a license, you could give your copy to them?

A. Again, I'm not sure the specific license terms for the logs in question.

Q. Are you aware of the GEM model having a single file called -- with a file extension .DAT that you can use to run a model on the program?

A. Correct.

Q. Do you have one of those .DAT files that would allow us to run the model you ran in that program?

A. For the $CO_2$ simulations or the geochemical simulations?

Q. $CO_2$ simulation.

A. Yes, I believe that was provided to the Commission already.

Q. And that could just be taken and loaded into the GEM program to run the model that you ran?

A. That's my understanding, yes.

Q. Any idea why Summit won't provide that to the intervenors?

A. I believe it was already provided to the DMR so it's publicly available.

Q. Any idea why the DMR would refuse to provide that to the intervenors?

A. I can't speak to that.

Q. Did EERC in your -- to your knowledge tell the DMR not to provide those files to the intervenors?

A. Not the specific files we provided to DMR, no.

Q. Did the EERC tell the DMR not to provide anything to the intervenors?

A. No.

Q. Okay. Did the EERC tell the DMR not to disclose any information that it was providing to the DMR?

A. No.

Q. And there is a .DAT file that can be used to run that GEM model for the $CO_2$ dispersion that was provided to the DMR? That's your testimony?

A. That is my understanding, yes.

Q. I'm going to have you turn to Exhibit 1A, which was a copy of the application we were using.

A. What page?

Q. Can I have you turn to page 3-15?

A. I'm there.

Q. Can I have you just review the first full paragraph I think that starts, "The simulation model permeability."

A. I've reviewed it.

Q. Can you explain what you did when you say that the simulation model permeability was tuned globally by applying a permeability multiplier to match the reservoir properties estimated from the well-testing data on the Milton Flemmer?

A. Yep. So the injection test from the Milton Flemmer 1 well resulted in an estimation of permeability for the Broom Creek Formation, so that permeability was significantly higher than the permeability determined through well log interpretation core analysis. So based on those results, a 2.5 X multiplier was applied to the permeability of the model globally.

Q. And is 2.5 essentially the delta between what you had in your model and what you saw in the Milton Flemmer, or does that represent the delta?

A. Yes. I believe the injection well data suggested slightly higher. We thought 2.5 was

reasonable.

Q. Does that affect your ultimate injection pressure limit?

A. Permeability is a factor that could impact predicted pressure. Yes.

Q. Would you describe the permeability in these storage facilities in the Broom Creek as heterogenous or homogenous?

MS. DOUGLAS: Could you repeat the question?

(Record read as requested.)

MS. DOUGLAS: They're heterogenous.

Q. (MR. BRAATEN CONTINUING) Did you consider looking for a heterogenous cause rather than applying a multiplier across the entire reservoir?

A. So the model already represented heterogenous distribution of permeability as distributed by the well log controls, the -- from seismic data as well as the variograms used to distribute properties, so applying the 2.5 multiplier would increase -- or it would increase the -- the permeability for the full range of permeabilities.

And so a single multiplier was applied as we felt, you know, the -- that test covers a large

area as determined by the radius of investigation. And so the response of the reservoir to determine permeability we felt is representative of the response that we're going to encounter during operations.

Q. But even taking all that, it's possible that what you saw there was simply the result of heterogenous permeability and it didn't require an adjustment to the model at all; right?

A. That's a possibility. There have also been previous studies that have published results from injection tests that have also seen similarly higher permeability as determined by injection tests. So in our technical opinion and experience with the Broom Creek Formation, we felt 2.5 was adequate to apply.

Q. Those other studies that did the injection tests, were those done in oil fields?

A. No. The other study I'm referring to is the injection test published in the Tundra SGS storage facility permits.

Q. Did you try running the adjustment on models for each of the facilities individually versus across the entire reservoir?

A. No. The way we set up the model, we

didn't have an indicator that would allow us to multiply permeabilities for individual regions.

Q. The simulation model permeability that you had to begin with, was that based on the core logs?

A. It was based on evaluation of several well logs, site-specific core analysis, as well as regional core data. It was also informed from rock properties derived from inversion of the 3D seismic data.

Q. And you changed all that based on one injection well test?

A. Yes.

Q. Can I have you go to page 3-7 and Figure 3-4?

A. I'm there.

Q. Can you describe what we're looking at in this Figure 3-4?

A. So this is an aerial view for one layer of the simulation model showing the permeability within the Broom Creek.

Q. And can you explain the units being used in the legend with the various colors on the right and the numbers indicating which color is which number?

A. Yeah. So permeability is being displayed

here in millidarcies.

Q. Are these pre or post application of multiplier?

A. Post application.

Q. I'm sorry. You said post application?

A. Mm-hmm. Yep. So the 2.5 permeability multiplier is already applied, and then it's hard to view at this scale but -- so the top there we're looking at is 5,000 millidarcies. That's a decimal place.

Q. Does that map look like a reasonable range in distribution of millidarcies?

A. Yes. So one thing that should be noted about the Broom Creek and one thing that supports the use of applying a permeability multiplier is the fact that the Broom Creek contains several unconsolidated sands, so these are poorly cemented sands with extremely high porosity and permeability. Because of the unconsolidated nature of the sands, we're unable to perform core analysis in them.

And so the geologic model that's based on the well log data, the core analysis and the seismic is -- typically underpredicts the permeability because we aren't able to capture data

from these unconsolidated sands. And so that's one of the reasons that we believe applying the 2.5 permeability multiplier is reasonable in this case.

Q. What was the max perm you observed in the cores?

A. So on page 2-24, Table 2-6 has the range of permeabilities from core analysis. So permeability for the high range is 2,700 millidarcies.

Q. Sorry. I'm just finding it. Did you say 2,700?

A. Yep. So --

Q. Oh, I see. Got it.

So your model has 10 to 20 percent at what appears to be 5,000 millidarcies. Does that seem reasonable?

A. Given the unconsolidated nature of the Broom Creek, yes. One thing to be noted, I gave you the max range for the TB Leingang permit. The other permits have slightly different data sets, some of which are higher from the core data for those specific stratigraphic test wells.

Q. Higher perm?

A. Higher permeability. So if I can point you to Exhibit -- the Fischer storage facility

permit, similar on page 2-24, Table 2-6. The maximum permeability from the core analysis for the Archie Erickson well is over 3,700 millidarcies.

Q. When you say the 2.5 multiplier, are you literally saying that you're increasing the perm across the entire reservoir by two and a half times?

A. Correct.

Q. Based on one injection test?

A. Correct. So, again, on our years of experience studying the -- the Broom Creek in multiple forms with core log analysis, well log analysis -- sorry -- core analysis, well log analysis, seismic interpretation, we believe that's reasonable. One thing that should be noted, you know, we felt confident in using that value from this test. We will be using actual operational data to validate our model every five years as part of the reevaluation.

Q. Does an overall increase in the modeled permeability across the reservoir allow you in the end to inject higher -- at higher pressures thus resulting in the ability to inject more $CO_2$ into the ground?

A. So the pressure you can inject at is

constrained by 90 percent of the fracture pressure gradient, so you can't inject higher than that. If you had higher permeability, you would be able -- you'd likely be able to inject higher volumes of $CO_2$ before reaching that.

Q. Okay. Can I have you go to page 2-18 and Figure -- sorry, I mean 2-19.

A. I'm there.

Q. Okay. You have an isopach map indicated on the prior page and the well log of the formation. Other than this data, did you do any kind of research or study of the depositional environments for the formation?

A. Yes.

Q. And what did you do?

A. So the EERC has studied the Broom Creek way back into the early 2000s, so we produced a formation outline in the Broom Creek. Regarding the depositional environment, the gold standard published study on that is a thesis by an author named Rygh that details the depositional environment. EERC has been a part of projects that have drilled and collected core from numerous wells, Broom Creek core, and our evaluation of those core data as well as the 3D seismic confirmed

Rygh's interpretation of the depositional environment.

Q. Was Rygh looking at certain rock types?

A. Offhand, I can't recall. You know, his thesis focused on the depositional environment and he also looked at type logs through those means. Yes, he would have looked at rock types.

Q. Eolian sand dunes and interbedded marine and lacustrine limestones, are those part of the depositional environment in the Broom Creek?

A. Are you referring to a specific paragraph or page from the formation -- or from the -- sorry -- from the permit?

Q. No. I'm asking if those are depositional -- if those are rock types in the depositional environment studied by Rygh.

A. I don't believe that there is limestone within the Broom Creek. I know he describes it eolian dunes as well as interbedded carbonates which consist mostly of dolostone as well as anhydrite.

Q. Did you put a description of the depositional environment into the application?

A. Yes. It can be found on page 2-16 in the second sentence under -- in the text at the top.

We talk about how the formation comprises of interbedded eolian/nearshore marine sandstone and dolostone layers with minor amounts of siltstones and anhydrites.

Q. How did your analysis of the depositional environment affect your analysis of the variability of the permeability across the reservoir?

A. So I'll speak to -- interpret depositional environment which is -- can be prevalently seen on the 3D seismic with attribute analysis. From the 3D seismic, you can actually see dune forms. You can also see indication of interbedded carbonates and anhydrites in that.

Through evaluation of -- of the 3D seismic as well as correlation to well logs in the area analysis of that core, we have an understanding of the lateral distribution of the different lithologies within the Broom Creek, particularly as I mentioned those unconsolidated sands. The Broom Creek sands come in several different forms. We have those very unconsolidated sands. We also have high-angle crossbedded sandstones and things like that.

So all those data sets gave us a better understanding of the heterogeneity in the

reservoir; the depositional environment; how those different reservoir lithologies, particularly the sands, were distributed across the area; and what was reasonable and prudent in terms of applying for rock and petrophysic properties as well as the multiplier.

Q. Are you familiar with the Broom Creek Formation in Wyoming?

A. I am not.

Q. Okay. Are you familiar with how wind direction can influence deposition and produce sand dunes elongated in one direction?

A. Yes, I am.

Q. And have you seen that phenomenon in the Broom Creek in North Dakota?

A. Yes, we have. As inferred, we can see that orientation in the 3D seismic data, and that orientation was accounted for with using the acoustic impedance derived from the seismic data for variograms which are used to distribute properties in the model.

Q. How useful would your model be if you did not account for the deposition that we just discussed?

A. Define "useful."

Q. Would it have had utility to create the application for Summit for this proceeding?

A. Yes. So there are multiple ways to create geologic models. The EPA has a guidance document out there where they suggest modeling best practices. Some modeling best practices also include recommendations for simplified models. That might just include well log data. So even simple models can have utilities to define storage -- or define vertical and horizontal boundaries. Uncertainties with those different types of models need to be accounted for when determining appropriate buffers and things of that nature.

Q. Can I have you turn back to page 3-7 and specifically the Figure 3-4?

A. I'm there.

Q. Would you expect a map showing the range of permeability of the formation to reflect the deposition of the elongated sand dunes in the Broom Creek that we just discussed?

A. Yeah. So to -- one comment to make about that is some of these dunes are reworked. So while we can see elongated dunes, if you're looking at a particular slice, there might be difference in

cementation of the sands and things like that. As being a part of the team that interpreted the 3D seismic, I can tell you that the elongated dunes more orientated northeast to the southwest. And based on that orientation, to my trained eye, I can see that reflected here on Figure 3-4.

Q. But only because you had access to that seismic data and the 3D modeling that was done with it?

A. Correct.

Q. How would we replicate the permeability distribution without the 3D seismic and the attribute analysis?

A. So if you turn to page 3-2, Section 3.2.3 talks about the variograms derived from the 3D seismic data. These variograms are what were used to distribute properties. So the only difference in a model made without using acoustic impedance derived from the seismic is that you wouldn't have that as a control point.

Q. What would you do without the control point?

A. You would still have the log data and the variograms to distribute properties.

Q. In 3.2.3.2 it states, "Seismic data were

resampled to the geologic model grid."

Can you explain what that means?

A. Yes. The seismic data were sampled at intervals related to the bin spacing, which I believe were on the order of 80 to 120 feet in this case. So we have a data point from each one of those bins, and so the seismic data from those bins had to be upscaled to the modeled grid cell size.

Q. And if we use the variograms, we wouldn't be able to double-check your interpretations of the 3D seismic; right?

A. Correct.

Q. I'll have you go to page 3-4. My electronic copy is marked at least a little weird, but --

A. I'm there.

Q. Let me start by having you just describe what we're looking at here.

A. On page 3-4 we're looking at Figure 3-1. Is that what you're looking at; correct?

Q. Yes.

A. So this is a west-east cross-section of the geologic model showing the PHIE property from the model that was used to distribute permeability through the model.

Q. Are you able to look at this picture and find something that you would interpret to be undulating sand dunes?

A. So the high porosity zones in yellow and red represent those reservoir sands. The dunes here in the Broom Creek is a dune complex where there is deposition of sediments and formation of the dunes. When sea level rose, there was reworking of the dunes. When sea level fell, there is again deposition and reworking of -- deposition sediments, reworking of -- of the sands to form dune complexes. So it's a stacked dune complex.

Interpretation from a cross-section alone makes it difficult to interpret the dune complex. That's why a plainer view would be required to interpret dune complexes with more certainty.

Q. Is there anything you see on Figure 3-1 that would be an indication to you of those types of undulating sand dunes?

A. Yes. Again, based on my involvement and experience with interpretation of the larger data set, my trained eye can -- can pick out the dune forms or the stacked dune complexes.

Q. Based on the knowledge and information you have from reviewing the seismic data?

A. Correct.

Q. What were the actual test results from the injection well that you used to make the adjustment to the model on the permeability?

A. The results from the injection tests were a calculated permeability.

Q. Calculated from what data derived from the injection test?

A. I'll defer that question to a later witness.

Q. Do you know where in the application it's referenced?

A. Outside of the paragraph you previously had me review about the 2.5 X multiplier, I do not believe that test is discussed in terms of interpretation.

Q. Okay. I apologize. I needed to find my place here. But back on 3-15, that paragraph I referred to earlier, it says, "The permeability multiplier was calculated based on the area of study during the injectivity test, the radius of investigation, and the permeability thickness (transmissibility) values from the pressure transient analysis."

Were you involved in determining or

assessing the area of study during the injectivity test?

A. I was not, but we have a witness coming up that was involved with this testing.

Q. And were you involved in determining the radius of investigation?

A. I was not involved in interpretation of the well test results.

Q. Okay. And I don't know what this means so I don't know if it's that, but were you involved in permeability thickness (transmissibility) values from the pressure transient analysis?

A. No.

Q. Okay. Were you involved in deciding on whether or not the global multiplier should be the number 2.5?

A. Yes.

Q. Okay. What data did you review in order to assess what that number should be, in your opinion?

A. Results of the well tests were presented to me. I've also been involved or aware of previous studies with similar injection tests as previously discussed, as well as knowledge, again, of the Broom Creek and the other data sets that

support use of a permeability multiplier.

Q. And the studies you reference is just the one well in Project Tundra when that was done?

A. Correct.

Q. And when you say you were given the results of the injection well test, does that -- I don't know if I got that right. Is that right?

A. I was presented the results by subject matter experts.

Q. Okay. And, generally speaking, what did they present to you as the results?

A. What's listed in the paragraph. Their interpretation from the injection tests of those different parameters, including radius of investigation, permeability thickness and such.

Q. And how did you use those, then, to determine a multiplier of 2.5?

A. So the -- the permeability -- the summary of those results was the -- the permeability was higher, on the order of 2.7 or so times higher than permeability from some of the laboratory analysis.

Q. Are you aware of what a calculated KH was?

A. I don't recall at this time.

Q. Were you given that number at some point?

A. I -- I don't recall at this time. I know

we've looked at KH in terms of -- of the model. I was given the permeability thickness.

Q. And what was that?

A. I don't recall at this time.

Q. Do you have the time height?

A. I don't have the test results in front of me.

Q. Okay. But were you given those -- that information?

A. I don't recall specifically, but I believe that information is in the well testing report that's on the NDIC website.

Q. All of the information included the -- including the calculated KH is all on the NDIC website?

A. I would have to review it. I can't speak to that level of specifics.

Q. And can you explain -- you've said that it was -- the difference in the perm was calculated at 2.7 and you went with 2.5. Can you explain why? And actually let me back up.

The number calculated from the injection test was 2.7; right?

A. On the order -- approximately. I don't recall the exact value.

Q. Okay. And you decided to go with a multiplier of 2.5. Why use 2.5 instead of the actual value?

A. We felt it was a conservative assumption.

Q. Why do you describe it with the word "conservative"? How is it conservative?

A. It's lower than the -- the test results reflected.

Q. Is there any reason to assume it's more likely that the perm is lower than the test result than higher?

A. So I don't think we have data that would indicate which is the appropriate choice to go, higher or lower. We chose 2.5 based on our knowledge of the Broom Creek. We believe that was a conservative estimate to use in the model. As we discussed previously, higher permeability might result in higher volume of $CO_2$ but also potential higher pressure. So using the more conservative, going on a lesser number, helps ensure that we're not overestimating $CO_2$ plume size.

Q. And are you being conservative because you're concerned about the risk of having that number be 2.7 -- having a delta of 2.7 between the injection test and your modeled perm?

A. There's -- there's not a concern with using the exact value. We wanted to be conservative in what we chose in terms of how we defined the horizontal and the vertical boundaries.

Q. But isn't the actual data the best data that you have?

A. I -- again, it's not the only data set we have.

Q. Okay. So you're putting less weight on the data derived from the injection well test than from the projected permeability from the other data you've used?

A. Not less weight. We just chose to choose a conservative value.

Q. But when you say the word "conservative," why is it more conservative to go to 2.5 from 2.7 rather than going to 2.9 from 2.7?

A. Can you repeat the last part of the question?

Q. Well, when you say that you were choosing 2.5 rather than 2.7 because you're being conservative, I'm asking why it's conservative to adjust down to 2.5 versus adjusting up to 2.9. Why is that conservative?

A. Again, as you mentioned, this is a single

test and it was -- this permeability multiplier applied to the model which the model was used to define the storage facility boundaries. In then the development of the project, we felt it was prudent not to overpredict the plume size if the reservoir doesn't act like that. Then we've permitted an area much larger than would be needed.

HEARING EXAMINER GARNER: Okay. I think this is a good place to stop. We will resume tomorrow morning at 9 a.m. So that will, I guess, conclude our hearings for the day. Off the record at 6:30 p.m.

(Recessed at 6:30 p.m., Tuesday, the 11th day of June, 2024.)

## #

**#3** [2] - 8:16, 62:23

## $

**$20** [1] - 162:5
**$25** [3] - 162:8, 162:15, 166:4

## '

**'21** [1] - 165:5
**'23** [2] - 86:19, 153:11
**'24** [2] - 86:19, 153:11
**'C'** [1] - 134:8

## 0

**0.40754336** [1] - 135:22
**00135848** [1] - 137:12

## 1

**1** [77] - 1:4, 1:8, 1:12, 1:15, 1:19, 1:21, 2:1, 2:6, 2:10, 2:14, 2:21, 3:1, 3:4, 3:12, 3:16, 4:1, 4:5, 4:14, 4:18, 4:23, 5:4, 5:15, 5:16, 6:4, 6:5, 6:17, 6:18, 7:4, 7:5, 7:16, 8:14, 13:24, 14:6, 14:13, 14:22, 15:3, 15:7, 16:12, 16:17, 17:25, 18:1, 23:14, 25:1, 25:18, 26:8, 37:10, 49:9, 62:5, 62:8, 62:11, 62:22, 81:18, 82:19, 134:21, 135:2, 135:5, 135:10, 135:20, 135:24, 136:8, 136:15, 136:22, 136:24, 138:6, 195:8, 195:18, 198:14, 215:19, 233:13, 234:12, 234:16, 234:17, 236:1, 236:3, 246:7, 255:14
**1-1** [3] - 195:12, 203:23, 204:6
**1-2** [3] - 195:12, 203:23, 204:6
**1-billion-gallon** [1] - 65:8
**1.1** [1] - 197:24
**1.10** [3] - 118:1, 121:16, 122:8
**1.15** [3] - 145:8, 198:15, 200:5
**1.16** [2] - 145:16, 146:3
**1.7** [1] - 29:18
**10** [18] - 1:10, 1:23, 2:12, 2:23, 3:12, 4:2, 4:14, 4:24, 5:16, 6:6, 6:19, 7:6, 13:17, 14:25, 16:12, 18:2, 241:14, 260:14
**10,000** [4] - 240:14, 241:10, 242:3, 243:11
**10.1** [1] - 174:5
**10.2** [5] - 174:11, 174:14, 174:16, 201:8, 201:15
**100** [2] - 8:20, 60:10
**1000** [1] - 7:19
**109** [1] - 8:20
**10:08** [1] - 61:12
**10:20** [1] - 61:13
**11** [32] - 1:8, 1:10, 1:21, 1:23, 2:10, 2:12, 2:21, 2:23, 3:12, 4:2, 4:14, 4:24, 5:15, 5:16, 6:4, 6:6, 6:17, 6:19, 7:4, 7:6, 7:20, 9:4, 11:7, 14:22, 14:25, 16:12, 17:25, 18:2, 40:8, 118:16, 169:3, 181:3
**11.3** [5] - 118:14, 118:16, 118:17, 120:21, 122:17
**11th** [2] - 11:3, 276:13
**12** [27] - 1:8, 1:12, 1:21, 2:2, 2:10, 2:14, 2:21, 3:1, 3:12, 4:2, 4:15, 4:24, 5:15, 5:17, 6:5, 6:6, 6:17, 6:19, 7:5, 7:6, 11:11, 14:23, 15:3, 16:12, 17:25, 18:2, 209:20
**120** [4] - 135:9, 135:21, 136:9, 268:5
**12:08** [1] - 124:4
**13** [21] - 1:8, 1:21, 2:10, 2:21, 3:12, 4:2, 4:15, 4:24, 5:15, 5:17, 6:5, 6:6, 6:17, 6:19, 7:5, 7:6, 14:23, 16:12, 17:25, 18:2, 174:12
**13584779** [2] - 137:24, 151:2
**13584799** [1] - 137:12
**14** [26] - 1:8, 1:10, 1:21, 1:23, 2:11, 2:12, 2:21, 2:23, 3:12, 4:2, 4:15, 5:1, 5:15, 5:17, 6:5, 6:6, 6:17, 6:19, 7:5, 7:6, 13:18, 14:23, 14:25, 16:12, 17:25, 18:2
**140** [10] - 1:12, 1:13, 2:2, 2:3, 2:15, 2:16, 3:2, 3:3, 15:3, 15:4
**140,000-acre** [1] - 38:16
**141** [17] - 1:9, 1:11, 1:22, 2:1, 2:11, 2:14, 2:22, 3:1, 3:16, 4:6, 4:18, 5:4, 14:24, 15:2, 16:17, 49:9, 204:9
**141-88** [1] - 203:24
**142** [34] - 1:7, 1:20, 2:10, 2:20, 3:14, 3:15, 4:3, 4:5, 4:16, 4:18, 5:2, 5:3, 5:15, 5:18, 5:19, 6:5, 6:8, 6:9, 6:18, 6:20, 6:21, 7:5, 7:8, 7:9, 14:22, 16:14, 16:16, 18:1, 18:4, 18:6, 135:20, 136:9, 197:2, 197:13
**143** [17] - 3:11, 4:1, 4:13, 4:23, 5:13, 5:14, 6:2, 6:4, 6:15, 6:16, 7:2, 7:4, 16:11, 17:22, 17:24, 49:12, 49:14
**145,000** [3] - 116:8, 116:9, 125:8
**146,000** [1] - 96:23
**146,500** [1] - 95:7
**15** [25] - 1:8, 1:10, 1:21, 1:23, 2:11, 2:12, 2:21, 2:23, 3:13, 4:2, 4:15, 5:1, 5:17, 6:6, 6:19, 7:6, 14:23, 14:25, 16:12, 18:2, 33:16, 196:10, 205:20, 241:14
**15.1** [1] - 205:16
**150-mile** [1] - 34:8
**1500** [1] - 236:18
**158** [1] - 30:1
**16** [23] - 1:10, 1:23, 2:12, 2:23, 3:13, 4:2, 4:15, 5:1, 5:17, 6:6, 6:19, 7:6, 14:25, 16:13, 18:2, 95:7, 140:15, 150:15, 151:6, 170:2, 170:9, 194:18, 194:19
**16.2** [1] - 205:20
**17** [29] - 1:10, 1:23, 2:12, 2:23, 3:13, 3:15, 4:2, 4:4, 4:15, 4:17, 5:1, 5:3, 5:17, 5:19, 6:6, 6:8, 6:19, 6:21, 7:6, 7:8, 14:25, 16:13, 16:15, 18:3, 18:5, 167:25, 168:9, 169:5, 169:13
**17.6** [1] - 194:8
**170,000** [1] - 38:12
**18** [28] - 1:10, 1:23, 2:13, 2:23, 3:13, 3:15, 4:2, 4:4, 4:15, 4:17, 5:1, 5:3, 5:17, 5:19, 6:6, 6:8, 6:19, 6:21, 7:6, 7:8, 14:25, 16:13, 16:16, 18:3, 18:5, 170:21, 194:12, 194:16
**1800s** [1] - 221:23
**1855** [1] - 11:20
**19** [31] - 1:10, 1:23, 2:13, 2:23, 3:13, 3:15, 4:2, 4:4, 4:15, 4:17, 5:1, 5:3, 5:13, 5:17, 5:19, 6:3, 6:6, 6:8, 6:16, 6:19, 6:21, 7:3, 7:6, 7:8, 14:25, 16:13, 16:16, 17:23, 18:3, 18:5, 40:10
**192** [1] - 9:12
**1930s** [2] - 164:6, 164:9
**195** [1] - 9:13
**1997** [1] - 44:13
**1:10** [1] - 124:5
**1A** [23] - 10:5, 23:11, 23:13, 31:13, 35:3, 37:6, 39:5, 39:8, 52:20, 52:24, 53:7, 53:9, 56:4, 81:19, 81:20, 99:25, 100:2, 117:25, 151:18, 168:2, 168:4, 177:14, 254:24
**1B** [5] - 10:5, 23:11, 23:16, 31:13, 202:21
**1C** [4] - 10:6, 23:11, 23:20, 31:13

## 2

**2** [59] - 1:9, 1:12, 1:22, 2:2, 2:12, 2:14, 2:22, 3:1, 3:8, 3:12, 3:16, 3:19, 3:23, 4:1, 4:5, 4:8, 4:9, 4:14, 4:18, 4:23, 5:4, 5:6, 5:15, 5:16, 6:4, 6:6, 6:17, 6:18, 7:4, 7:6, 8:15, 14:24, 15:3, 15:12, 15:19, 15:24, 16:3, 16:12, 16:17, 16:20, 17:25, 18:1, 23:18, 25:19, 26:8, 62:5, 62:8, 62:11, 62:23, 100:8, 162:4, 166:5, 195:18, 213:4, 213:8, 213:12, 219:2, 219:23, 232:14
**2(a)** [1] - 58:4
**2,000-plus** [1] - 220:20
**2,500** [1] - 28:12
**2,700** [2] - 260:8, 260:11
**2-05** [2] - 157:4, 157:5
**2-11** [1] - 215:15
**2-16** [2] - 214:18, 263:24
**2-18** [1] - 262:6
**2-19** [2] - 215:14, 262:7
**2-24** [2] - 260:6, 261:1
**2-3** [1] - 216:23
**2-32** [1] - 238:23
**2-4** [1] - 216:24
**2-44** [1] - 221:21
**2-5** [1] - 216:23
**2-51** [2] - 224:1
**2-6** [3] - 216:23, 260:6, 261:1
**2-69** [1] - 221:21
**2-77** [1] - 223:25
**2-7b** [1] - 238:22
**2.4** [4] - 151:17, 151:19, 201:8, 201:15
**2.5** [18] - 255:19, 255:21, 255:25, 256:20, 257:15, 259:6, 260:2, 261:4, 270:14, 271:16, 272:17, 273:20, 274:2, 274:14, 275:16, 275:21, 275:23
**2.7** [8] - 272:20, 273:20, 273:23, 274:24, 275:16, 275:17, 275:21
**2.9** [3] - 214:17, 275:17,

275:23
**20** [46] - 1:10, 1:23, 2:13, 2:23, 3:13, 3:15, 4:2, 4:4, 4:15, 4:17, 5:1, 5:3, 5:13, 5:17, 5:19, 6:3, 6:7, 6:9, 6:16, 6:19, 6:21, 7:3, 7:7, 7:9, 9:9, 15:1, 16:13, 16:16, 17:23, 18:3, 18:5, 21:14, 33:17, 95:17, 106:23, 109:15, 113:10, 113:13, 114:12, 117:23, 139:13, 140:12, 162:11, 162:12, 221:23, 260:14
**20-year** [2] - 115:10, 194:5
**200** [2] - 9:14, 9:15
**2000** [1] - 44:15
**2000s** [1] - 262:17
**2009** [1] - 195:16
**2015** [1] - 221:23
**2016** [1] - 221:20
**2020** [1] - 226:14
**2021** [4] - 22:25, 66:24, 71:10, 225:25
**2022** [2] - 231:19, 231:20
**2023** [2] - 50:12, 226:18
**2024** [5] - 7:20, 11:3, 50:14, 196:10, 276:14
**2030** [1] - 30:4
**2040** [2] - 110:23, 111:2
**207** [1] - 9:16
**208** [1] - 9:17
**21** [20] - 1:10, 1:23, 2:13, 2:23, 3:13, 4:2, 4:15, 5:1, 5:14, 5:17, 6:3, 6:7, 6:16, 6:19, 7:3, 7:7, 15:1, 16:13, 17:23, 18:3
**211** [1] - 9:20
**212114** [1] - 127:13
**22** [20] - 1:8, 1:10, 1:21, 1:23, 2:11, 2:13, 2:21, 2:23, 3:13, 4:2, 4:15, 5:1, 5:17, 6:7, 6:19, 7:7, 14:23, 15:1, 16:13, 18:3
**221112** [1] - 127:9
**23** [25] - 1:8, 1:10, 1:21, 1:24, 2:11, 2:13, 2:21, 2:23, 3:13, 4:2, 4:15, 5:1, 5:17, 6:7, 6:19, 7:7, 10:5, 10:5, 10:6, 14:23, 15:1, 16:13, 18:3, 199:21, 215:24
**230** [1] - 9:21
**238** [1] - 9:22
**24** [24] - 1:8, 1:21, 2:11, 2:21, 3:13, 4:2, 4:15, 5:1, 5:15, 5:17, 6:5, 6:7, 6:17, 6:19, 7:5, 7:7, 10:5, 10:5, 10:6, 14:23, 16:13, 17:25, 18:3, 201:18
**24-inch** [1] - 27:24
**24/7** [1] - 28:20
**25** [31] - 1:8, 1:10, 1:22, 1:24, 2:11, 2:13, 2:21, 2:23, 3:13, 4:2, 4:15, 5:1, 5:17, 6:7, 6:19, 7:7, 10:6, 10:7, 10:7, 14:23, 15:1, 16:13, 18:3, 166:5, 177:17, 177:19, 197:14, 201:8
**25-an-acre** [1] - 165:21
**250** [2] - 36:23, 236:18
**26** [20] - 1:8, 1:10, 1:22, 1:24, 2:11, 2:13, 2:21, 2:23, 3:13, 4:3, 4:15, 5:1, 5:17, 6:7, 6:20, 7:7, 14:23, 15:1, 16:13, 18:3
**27** [21] - 1:10, 1:24, 2:13, 2:23, 3:11, 3:13, 3:23, 4:3, 4:13, 4:15, 4:22, 5:1, 5:17, 6:7, 6:20, 7:7, 15:1, 16:10, 16:13, 18:3, 134:22
**276** [1] - 7:16
**28** [25] - 1:10, 1:24, 2:13, 2:23, 3:11, 3:13, 3:24, 4:3, 4:13, 4:16, 4:22, 5:1, 5:14, 5:18, 6:3, 6:7, 6:16, 6:20, 7:3, 7:7, 15:1, 16:10, 16:13, 17:23, 18:3
**29** [30] - 1:11, 1:24, 2:13, 2:24, 3:11, 3:13, 3:15, 3:24, 4:3, 4:4, 4:13, 4:16, 4:17, 4:22, 5:1, 5:3, 5:14, 5:18, 6:3, 6:7, 6:16, 6:20, 7:3, 7:7, 15:1, 16:10, 16:14, 16:16, 17:23, 18:3
**29,444.72** [1] - 137:8
**2A** [5] - 10:6, 24:19, 24:24, 69:8, 192:24
**2B** [5] - 10:7, 24:19, 25:14, 26:11, 69:8
**2C** [6] - 10:7, 24:19, 25:14, 26:11, 69:8, 192:24
**2D** [1] - 217:1

## 3

**3** [57] - 1:9, 1:12, 1:23, 2:2, 2:12, 2:14, 2:22, 3:1, 3:12, 3:16, 4:1, 4:5, 4:14, 4:18, 4:23, 5:4, 5:10, 5:16, 5:21, 6:1, 6:6, 6:11, 6:18, 7:6, 7:10, 14:24, 15:3, 16:12, 16:17, 16:25, 17:6, 17:11, 17:15, 18:2, 18:8, 26:8, 40:14, 48:12, 48:13, 58:6, 62:5, 62:9, 62:12, 95:8, 117:24, 163:4, 195:10, 195:18, 195:19, 198:4, 213:4, 213:8, 213:12, 224:19, 224:21, 224:22, 232:14
**3,700** [1] - 261:3
**3-1** [2] - 268:19, 269:17
**3-15** [2] - 255:2, 270:18
**3-2** [1] - 267:14
**3-4** [6] - 258:14, 258:17, 266:16, 267:6, 268:13, 268:19
**3-7** [2] - 258:13, 266:15
**3.1** [1] - 152:9
**3.2.3** [1] - 267:14
**3.2.3.2** [1] - 267:25
**3.3** [6] - 30:4, 131:24, 132:4, 201:7, 201:14, 201:15
**3.6** [1] - 200:9
**3.7** [1] - 184:20
**3.8** [1] - 184:20
**3.9** [2] - 184:8, 184:20
**3.c** [1] - 208:19
**30** [29] - 1:11, 1:24, 2:13, 2:24, 3:13, 3:15, 4:3, 4:4, 4:16, 4:17, 5:2, 5:3, 5:14, 5:18, 6:3, 6:7, 6:16, 6:20, 7:3, 7:7, 10:8, 15:1, 16:14, 16:16, 17:23, 18:4, 29:18, 29:19
**300** [1] - 236:19
**304** [1] - 8:12
**30869** [2] - 1:3, 13:22
**30870** [2] - 1:4, 14:3
**30871** [1] - 1:4
**30872** [2] - 1:5, 14:18
**30873** [2] - 1:5, 15:9
**30874** [2] - 1:6, 15:16
**30875** [2] - 1:6, 15:25
**30876** [2] - 1:7, 16:7
**30877** [2] - 1:7, 16:22
**30878** [2] - 1:8, 17:3
**30879** [2] - 1:8, 17:12
**30880** [2] - 1:9, 17:19
**31** [20] - 1:7, 1:11, 1:20, 1:24, 2:9, 2:13, 2:20, 2:24, 3:15, 4:4, 4:17, 5:3, 5:14, 6:3, 6:16, 7:3, 14:21, 15:1, 16:16, 17:23
**32** [31] - 1:7, 1:11, 1:20, 2:1, 2:9, 2:13, 2:20, 2:24, 3:11, 3:14, 3:24, 4:3, 4:13, 4:16, 4:22, 5:2, 5:14, 5:18, 6:3, 6:7, 6:16, 6:20, 7:3, 7:7, 14:21, 15:1, 16:10, 16:14, 17:23, 18:4, 49:12
**33** [31] - 1:7, 1:11, 1:20, 2:1, 2:9, 2:13, 2:20, 2:24, 3:11, 3:14, 3:24, 4:3, 4:13, 4:16, 4:22, 5:2, 5:14, 5:18, 6:3, 6:7, 6:16, 6:20, 7:3, 7:7, 14:21, 15:1, 16:10, 16:14, 17:24, 18:4, 136:25
**33.3** [1] - 136:13
**34** [40] - 1:7, 1:11, 1:20, 2:1, 2:10, 2:13, 2:20, 2:24, 3:11, 3:14, 3:24, 4:3, 4:13, 4:16, 4:23, 5:2, 5:14, 5:18, 6:3, 6:7, 6:16, 6:20, 7:3, 7:7, 14:21, 15:2, 16:10, 16:14, 17:24, 18:4, 135:5, 135:11, 135:20, 136:8, 178:12, 180:15, 180:21, 181:20, 201:8, 201:18
**35** [32] - 1:8, 1:11, 1:22, 2:1, 2:11, 2:14, 2:21, 2:24, 3:11, 3:14, 3:24, 4:3, 4:13, 4:16, 4:23, 5:2, 5:14, 5:18, 6:4, 6:7, 6:16, 6:20, 7:4, 7:7, 14:23, 15:2, 16:11, 16:14, 17:24, 18:4, 203:24, 204:10
**350** [1] - 33:14
**352** [2] - 193:25, 194:6
**36** [22] - 1:8, 1:22, 2:11, 2:21, 3:14, 4:3, 4:16, 5:2, 5:13, 5:14, 6:2, 6:4, 6:15, 6:16, 7:2, 7:4, 14:23, 16:14, 17:22, 17:24, 49:10, 49:14
**360,000** [1] - 29:13
**38** [1] - 16:15
**38-22** [3] - 148:2, 157:2, 157:11
**38-22-01** [3] - 104:11, 107:24, 108:8
**38-22-03** [1] - 157:15
**38-22-17** [1] - 175:7
**3:03** [1] - 179:17
**3:18** [1] - 179:18
**3A** [7] - 10:8, 30:10, 30:12, 30:23, 31:23, 32:8, 203:3
**3D** [20] - 188:21, 189:24, 217:1, 221:2, 247:2, 247:3, 247:5, 247:10, 247:16, 258:8, 262:25, 264:10, 264:11, 264:14, 265:17, 267:2, 267:8, 267:12, 267:15, 268:11

## 4

**4** [27] - 1:9, 1:13, 1:23, 2:2, 2:12, 2:15, 2:22, 3:2, 3:12, 4:1, 4:14, 4:24, 5:16, 6:6, 6:18, 7:6, 14:25, 15:4, 16:12, 18:2, 28:14, 134:6, 147:19, 162:6, 162:17, 190:10, 232:15
**4-1** [1] - 232:20
**4-10** [2] - 236:23, 237:16
**4-12** [1] - 236:13
**4-17** [1] - 236:24
**4-3** [2] - 233:6, 237:10
**4-4** [1] - 234:15
**4-an-acre** [1] - 165:21

**40** [3] - 10:8, 136:11, 137:9
**400** [2] - 8:12, 33:14
**41** [1] - 10:8
**43** [1] - 9:10
**43-01-05** [1] - 157:3
**43-05-01** [2] - 157:5, 198:3
**43-05-01-07** [1] - 208:19
**43-05-01-17** [1] - 202:7
**45** [1] - 29:14
**450** [2] - 95:6, 96:20
**450-plus** [1] - 166:13
**45Q** [1] - 109:10
**486990** [5] - 42:23, 76:18, 77:17, 77:24, 80:8
**4A** [6] - 10:8, 39:21, 39:22, 40:24, 65:25, 68:20

## 5

**5** [35] - 1:9, 1:13, 1:23, 2:2, 2:12, 2:15, 2:22, 3:2, 3:12, 3:15, 4:1, 4:4, 4:14, 4:17, 4:24, 5:3, 5:16, 6:6, 6:18, 7:6, 13:12, 14:25, 15:4, 16:12, 16:15, 18:2, 113:15, 141:16, 142:9, 142:13, 142:14, 143:8, 183:5, 183:12, 198:22
**5,000** [3] - 37:1, 259:9, 260:15
**5.7** [1] - 29:16
**50** [6] - 96:2, 125:4, 163:4, 163:22, 163:24, 165:22
**500** [3] - 140:1, 141:25, 143:1
**55** [3] - 10:9, 10:9, 10:10
**56** [4] - 10:9, 10:9, 10:10, 199:22
**57** [9] - 29:7, 29:15, 29:16, 31:3, 31:10, 31:22, 115:17, 193:10, 194:17
**58501** [1] - 8:21
**58504** [1] - 8:13
**5:11** [1] - 246:18
**5:23** [1] - 246:19
**5A** [9] - 10:9, 54:22, 55:1, 55:9, 55:11, 55:23, 137:5, 137:6, 207:11
**5B** [4] - 10:9, 55:1, 55:18, 55:23
**5C** [4] - 10:10, 55:1, 55:18, 55:23

## 6

**6** [30] - 1:9, 1:13, 1:23, 2:3, 2:12, 2:15, 2:22, 3:2, 3:12, 3:15, 4:1, 4:4, 4:14, 4:17, 4:24, 5:3, 5:16, 5:19, 6:6, 6:8, 6:18, 6:21, 7:6, 7:8, 14:25, 15:4, 16:12, 16:15, 18:2, 18:5
**60** [3] - 33:13, 52:4, 52:11
**61** [1] - 9:11
**6:30** [2] - 276:12, 276:13

## 7

**7** [31] - 1:9, 1:13, 1:23, 2:3, 2:12, 2:15, 2:22, 3:2, 3:12, 3:15, 4:1, 4:4, 4:14, 4:17, 4:24, 5:3, 5:16, 5:19, 6:6, 6:8, 6:18, 6:21, 7:6, 7:8, 14:25, 15:4, 16:12, 16:15, 18:2, 18:5, 197:3
**7.1** [3] - 173:16, 201:8, 201:15
**70** [1] - 33:8
**779** [1] - 137:12

## 8

**8** [29] - 1:9, 1:23, 2:12, 2:22, 3:12, 3:15, 4:1, 4:4, 4:14, 4:17, 4:24, 5:3, 5:16, 6:6, 6:18, 7:6, 14:25, 16:12, 16:15, 18:2, 28:22, 58:11, 58:21, 116:11, 125:6, 199:6, 205:9, 207:15, 207:22
**8.1** [5] - 152:21, 154:20, 201:8, 201:15
**8.3** [1] - 205:11
**8.4** [1] - 159:2
**80** [1] - 268:5
**84** [2] - 150:16, 151:7
**85** [6] - 5:20, 6:9, 6:22, 7:9, 18:6, 197:3
**86** [11] - 5:15, 5:18, 6:4, 6:8, 6:17, 6:21, 7:4, 7:8, 17:24, 18:5, 197:13
**87** [33] - 1:7, 1:11, 1:13, 1:21, 2:1, 2:3, 2:10, 2:14, 2:16, 2:20, 3:1, 3:3, 3:16, 4:5, 4:18, 5:4, 5:13, 5:16, 6:3, 6:5, 6:15, 6:18, 7:3, 7:5, 14:22, 15:2, 15:5, 16:17, 17:23, 18:1, 49:14, 135:21, 136:9
**88** [28] - 1:9, 1:12, 1:22, 2:2, 2:12, 2:15, 2:22, 3:2, 3:12, 3:14, 3:17, 4:1, 4:4, 4:6, 4:14, 4:16, 4:19, 4:23, 5:2, 5:5, 14:24, 15:4, 16:11, 16:15, 16:18, 49:9, 49:12, 204:9

## 9

**9** [18] - 1:9, 1:23, 2:12, 2:22, 3:12, 4:2, 4:14, 4:24, 5:16, 6:6, 6:19, 7:6, 11:10, 14:25, 16:12, 18:2, 195:15, 276:10
**90** [5] - 48:8, 51:13, 51:15, 55:14, 262:1
**90,000** [1] - 125:10
**92** [2] - 48:9, 51:20
**93** [2] - 101:16, 139:2
**95** [5] - 35:22, 35:24, 38:16, 219:2, 219:23
**97** [2] - 48:14, 51:22
**98.25** [2] - 35:11, 36:1
**9:00** [1] - 11:2

## A

**a.m** [5] - 11:2, 11:10, 61:12, 61:13, 276:10
**abandoned** [1] - 176:14
**ability** [7] - 83:8, 84:12, 112:14, 160:2, 161:21, 218:12, 261:23
**able** [23] - 51:3, 53:15, 64:5, 64:20, 64:22, 64:23, 65:17, 78:20, 98:20, 132:2, 141:6, 160:20, 161:13, 192:2, 194:6, 198:11, 218:21, 247:13, 259:25, 262:3, 262:4, 268:10, 269:1
**abridged** [1] - 133:23
**absence** [2] - 216:6, 220:25
**absolutely** [2] - 94:24, 161:17
**abundance** [1] - 36:15
**accepted** [1] - 74:9
**access** [19] - 90:5, 102:7, 128:7, 128:17, 128:24, 129:4, 129:7, 129:12, 129:14, 129:17, 129:22, 129:25, 130:17, 167:18, 168:16, 168:19, 169:20, 169:22, 267:7
**Access** [1] - 122:23
**accidentally** [1] - 169:23
**accommodate** [1] - 50:22
**according** [4] - 34:6, 76:4, 76:6, 76:7
**accordingly** [1] - 42:4
**account** [6] - 118:4, 119:6, 120:10, 123:13, 223:13, 265:23
**accounted** [2] - 265:18, 266:12
**accuracy** [2] - 249:2, 251:4
**accurate** [18] - 68:13, 79:7, 80:3, 82:7, 87:14, 93:9, 114:8, 134:13, 134:15, 135:12, 135:13, 136:16, 146:17, 149:7, 154:16, 156:3, 169:13, 250:19
**acknowledging** [1] - 169:8
**acknowledgment** [2] - 169:5, 169:11
**acoustic** [2] - 265:19, 267:18
**acquire** [4] - 49:20, 57:8, 191:16, 191:25
**acquired** [6] - 48:13, 95:6, 96:23, 206:2, 206:16, 206:21
**acquiring** [2] - 48:6, 87:1
**acquisition** [2] - 44:22, 214:5
**acquisitions** [1] - 45:1
**acre** [6] - 162:5, 162:6, 162:15, 162:17, 166:4, 166:5
**acreage** [17] - 48:18, 48:21, 48:24, 51:24, 54:9, 55:7, 55:20, 83:14, 83:16, 134:16, 135:11, 135:24, 137:7, 137:18, 184:13, 184:15, 198:25
**acres** [15] - 29:19, 38:12, 54:9, 56:20, 95:7, 96:23, 116:9, 125:8, 125:10, 135:9, 135:21, 136:9, 136:11, 137:8
**acronym** [2] - 76:12, 76:13
**act** [3] - 216:16, 229:16, 276:6
**Act** [11] - 191:4, 191:8, 191:15, 191:21, 191:23, 239:21, 240:4, 240:6, 240:10, 241:9, 242:17
**action** [5] - 174:19, 219:13, 234:21, 234:24, 235:18
**actions** [1] - 174:24
**active** [3] - 71:18, 71:19, 224:11
**actively** [3] - 49:21, 99:10, 164:2
**activities** [7] - 59:9, 59:12, 188:24, 199:9, 224:24, 225:5, 235:16
**activity** [2] - 199:12, 238:13
**actual** [9] - 118:7, 142:17, 159:20, 179:4, 188:8, 261:17, 270:2, 274:3, 275:5
**add** [7] - 128:14, 153:13, 181:11, 181:14, 182:4, 207:3, 242:19
**added** [1] - 169:15
**addition** [10] - 19:10, 50:15, 53:15, 55:5, 58:4, 200:8,

220:19, 222:2, 227:9, 235:20
**additional** [33] - 35:19, 54:15, 55:12, 55:19, 85:22, 92:3, 92:4, 93:16, 94:8, 111:14, 111:19, 113:24, 113:25, 114:2, 117:2, 154:2, 154:6, 166:17, 181:12, 181:14, 182:5, 185:13, 194:25, 195:1, 200:3, 206:2, 206:21, 220:18, 237:18, 242:19, 242:22, 244:21
**additionally** [10] - 29:22, 33:19, 105:14, 140:13, 194:9, 219:17, 219:19, 221:5, 224:8, 239:10
**address** [9] - 47:14, 47:15, 93:17, 173:15, 181:18, 208:14, 209:22, 225:13, 235:2
**addressed** [1] - 224:21
**adequate** [3] - 141:8, 141:12, 257:16
**adequately** [1] - 230:7
**adhere** [1] - 91:15
**adjacent** [2] - 116:17, 185:6
**adjust** [6] - 42:3, 152:16, 164:13, 164:18, 248:25, 275:23
**adjusted** [4] - 101:21, 162:24, 163:11, 164:6
**adjusting** [2] - 164:24, 275:23
**adjustment** [4] - 186:20, 257:9, 257:22, 270:3
**adjustments** [4] - 41:21, 98:1, 174:2, 207:4
**administer** [1] - 157:18
**administered** [2] - 84:4, 99:4
**administration** [1] - 44:12
**administrative** [1] - 157:2
**Administrative** [1] - 198:3
**admission** [1] - 23:23
**admitted** [5] - 24:15, 25:11, 30:21, 41:4, 56:2
**admitting** [1] - 24:11
**advance** [2] - 21:23, 128:20
**advantage** [10] - 63:21, 64:1, 64:2, 64:5, 64:14, 64:17, 64:20, 64:25, 65:1, 65:17
**advantageous** [1] - 64:12
**adverse** [6] - 218:11, 219:14, 220:8, 220:10, 228:5, 228:12
**adversely** [3] - 220:3, 229:2, 229:10
**advice** [2] - 79:10, 79:25
**advised** [1] - 213:1
**advisement** [1] - 232:9
**advisor** [1] - 212:2
**advisors** [1] - 72:22
**aerial** [1] - 258:18
**affairs** [1] - 44:6
**affect** [6] - 196:15, 205:2, 229:2, 229:10, 256:2, 264:6
**affiliates** [3] - 71:16, 71:23, 72:10
**afternoon** [1] - 54:16
**afterwards** [1] - 114:13
**ago** [3] - 21:14, 54:14, 85:6
**agree** [13] - 63:20, 64:1, 64:3, 82:9, 115:15, 127:2, 127:25, 132:21, 158:8, 173:6, 173:7, 173:17, 174:22
**agreed** [5] - 84:10, 101:16, 129:13, 130:6, 206:23
**Agreement** [2] - 118:18, 161:3
**agreement** [104] - 29:22, 52:25, 53:3, 53:6, 53:8, 53:18, 53:25, 58:12, 58:17, 84:11, 84:15, 84:22, 85:4, 86:14, 86:18, 87:7, 87:11, 87:20, 90:3, 90:20, 91:2, 91:7, 91:17, 91:20, 92:5, 92:12, 92:14, 92:25, 93:14, 93:19, 94:1, 94:4, 94:7, 94:9, 94:18, 94:22, 95:9, 95:12, 98:25, 99:7, 99:11, 100:6, 110:19, 112:5, 114:20, 115:20, 117:24, 118:4, 118:10, 119:6, 120:7, 120:9, 121:17, 122:8, 128:9, 131:16, 131:25, 132:4, 132:12, 132:16, 132:25, 133:24, 135:7, 146:4, 146:17, 146:25, 147:13, 150:24, 151:18, 152:13, 152:21, 158:3, 159:2, 168:1, 168:5, 168:6, 173:16, 174:5, 177:15, 177:17, 180:13, 184:8, 184:10, 184:21, 185:2, 195:13, 197:24, 198:23, 200:4, 200:5, 200:25, 201:7, 201:14, 201:15, 203:19, 205:9, 205:16, 205:21, 206:11, 207:1, 252:20, 253:3
**agreements** [27] - 26:7, 63:10, 75:8, 88:5, 88:9, 94:19, 96:21, 108:23, 110:6, 110:7, 110:14, 110:20, 111:22, 111:24, 114:20, 115:14, 116:7, 124:19, 131:21, 132:7, 133:10, 154:12, 166:10, 166:19, 177:6, 186:1, 198:15
**agrees** [2] - 130:6, 173:11
**agricultural** [4] - 34:11, 101:11, 103:2, 202:12
**agriculture** [5] - 22:20, 33:7, 34:11, 34:13, 202:4
**ahead** [4] - 118:13, 128:11, 155:4, 167:22
**air** [6] - 35:13, 103:19, 103:20, 103:25, 104:1, 104:4
**airline** [1] - 30:3
**ALBERTSON** [1] - 8:7
**Allen** [1] - 12:6
**ALLETE** [1] - 21:17
**allocated** [1] - 119:2
**allocating** [1] - 134:9
**allow** [13] - 75:1, 96:24, 107:11, 107:19, 108:1, 133:22, 148:2, 156:22, 157:5, 218:18, 253:16, 258:1, 261:21
**allowed** [2] - 129:20, 184:23
**allowing** [2] - 128:24, 219:10
**allows** [5] - 31:25, 102:4, 102:5, 105:1, 227:25
**almost** [2] - 118:15, 203:25
**alone** [2] - 33:16, 269:13
**alongside** [2] - 173:25, 236:2
**alternate** [1] - 209:18
**alternative** [1] - 242:14
**amalgamate** [11] - 51:8, 51:25, 83:23, 84:4, 99:8, 131:12, 138:10, 138:14, 138:25, 148:21, 148:24
**amalgamated** [2] - 139:7, 178:2
**amalgamates** [3] - 59:7, 148:6, 148:11
**amalgamating** [3] - 99:4, 148:8, 149:12
**amalgamation** [14] - 1:16, 3:19, 5:22, 14:6, 15:19, 17:6, 46:23, 58:16, 86:15, 90:10, 141:10, 148:3, 149:22, 157:12
**AMANDA** [2] - 9:19, 211:5
**Amanda** [25] - 66:18, 66:19, 66:20, 66:21, 67:3, 68:3, 68:12, 140:9, 210:16, 211:2, 211:10, 211:12, 211:13, 211:15, 212:17, 215:3, 217:6, 217:23, 226:1, 227:17, 231:9, 232:13, 235:21, 237:22
**Amanda's** [1] - 66:25
**ambiguous** [1] - 187:9
**amend** [3] - 133:21, 134:1, 169:17
**amended** [3] - 132:10, 197:1, 201:3
**amendment** [1] - 166:10
**amendments** [3] - 42:5, 201:1, 208:6
**American** [1] - 22:21
**Ames** [2] - 28:19, 83:10
**amount** [12] - 2:7, 4:10, 6:12, 14:14, 16:4, 17:16, 21:21, 74:11, 164:14, 201:25, 219:4, 248:2
**amounts** [8] - 35:11, 100:24, 120:1, 167:11, 168:13, 169:19, 200:12, 264:3
**Amsden** [5] - 239:1, 239:3, 242:8, 242:11, 243:12
**analogy** [2] - 124:13, 125:22
**analyses** [1] - 239:11
**analysis** [27] - 184:3, 218:4, 218:23, 221:3, 221:4, 227:14, 238:24, 248:15, 248:16, 255:18, 258:6, 259:20, 259:23, 260:7, 261:2, 261:12, 261:13, 261:14, 264:5, 264:6, 264:10, 264:16, 267:13, 270:24, 271:12, 272:21
**analyze** [1] - 247:17
**analyzed** [1] - 111:10
**AND** [3] - 1:2, 8:15, 8:24
**Anderson** [1] - 221:20
**angle** [1] - 264:22
**anhydrite** [1] - 263:21
**anhydrites** [2] - 264:4, 264:13
**announced** [1] - 22:25
**annual** [4] - 162:6, 162:17, 165:11, 166:5
**annually** [3] - 29:14, 29:17, 33:18
**answer** [36] - 13:4, 33:5, 73:23, 76:16, 76:23, 77:3, 84:6, 89:9, 91:11, 93:9, 97:17, 97:20, 115:5, 120:6, 120:19, 122:10, 123:20, 125:25, 135:3, 153:9, 157:8, 171:20, 184:18, 187:12, 187:21, 192:2, 192:5, 192:17, 195:10, 196:20, 198:11, 198:17, 198:20, 205:7, 241:4, 250:23
**answered** [2] - 88:19, 112:11
**answers** [3] - 89:18, 195:9, 206:5
**anticipate** [5] - 116:21, 135:2, 143:12, 154:6, 220:1
**anticipated** [4] - 219:4, 228:4, 228:10, 228:11

**anticipating** [2] - 59:13, 84:12
**anyway** [3] - 98:14, 174:10, 183:11
**AOR** [11] - 232:16, 232:23, 233:4, 233:18, 233:23, 234:3, 234:23, 235:24, 236:14, 236:17, 236:20
**apart** [2] - 40:14, 50:21
**apologies** [1] - 208:13
**apologize** [2] - 59:19, 270:17
**apparent** [1] - 21:18
**appear** [1] - 57:16
**appearance** [3] - 11:17, 11:18, 18:12
**appearing** [2] - 11:14, 11:25
**appendices** [1] - 213:13
**Appendix** [3] - 213:5, 213:13, 239:10
**applicability** [3] - 93:20, 129:21, 185:12
**applicable** [2] - 82:5, 168:18
**applicant** [3] - 37:13, 62:10, 62:11
**APPLICANT'S** [2] - 9:6, 10:2
**applicants** [1] - 26:13
**application** [80] - 1:3, 1:15, 2:5, 3:4, 3:7, 3:18, 4:8, 4:9, 5:6, 5:9, 5:21, 6:11, 7:10, 13:24, 14:5, 14:13, 15:6, 15:11, 15:18, 16:2, 16:19, 16:24, 17:5, 17:14, 18:7, 18:22, 19:12, 19:17, 19:21, 23:13, 23:15, 23:17, 23:21, 24:12, 26:22, 31:10, 39:25, 46:20, 54:13, 63:13, 63:18, 75:22, 82:11, 93:15, 99:24, 100:3, 100:7, 106:2, 116:23, 135:6, 144:1, 151:18, 162:2, 168:2, 168:4, 182:13, 182:15, 183:6, 184:9, 188:1, 188:11, 204:7, 208:24, 209:21, 212:25, 213:8, 224:19, 226:5, 232:14, 233:4, 239:7, 243:15, 244:9, 254:25, 259:2, 259:4, 259:5, 263:23, 266:2, 270:11
**applications** [26] - 18:14, 24:5, 24:10, 24:11, 26:6, 26:20, 28:3, 49:5, 54:19, 61:21, 61:24, 62:7, 62:13, 70:14, 71:1, 71:5, 81:25, 82:1, 138:15, 192:15, 192:23, 194:3, 225:6, 226:16, 226:17, 232:16
**applied** [5] - 166:21, 255:19, 256:24, 259:7, 276:2
**applies** [5] - 77:1, 94:5, 101:25, 191:21, 192:16
**apply** [11] - 94:1, 107:14, 108:9, 108:14, 150:21, 153:2, 153:6, 170:9, 180:3, 206:19, 257:16
**applying** [6] - 255:10, 256:15, 256:20, 259:15, 260:2, 265:4
**appointed** [2] - 84:9, 99:11
**approach** [3] - 60:21, 219:1, 225:24
**appropriate** [11] - 11:19, 12:20, 28:8, 76:22, 80:1, 80:2, 158:23, 203:22, 230:14, 266:13, 274:13
**approval** [1] - 151:23
**approximate** [2] - 31:3, 31:6
**April** [1] - 195:15
**aquifer** [5] - 236:16, 239:6, 239:20, 242:16
**aquifers** [3] - 191:9, 239:9, 240:9
**archeological** [1] - 196:3
**Archie** [1] - 261:3
**Area** [1] - 152:24
**area** [90] - 27:25, 31:5, 37:17, 37:23, 38:3, 38:4, 38:7, 38:10, 38:11, 38:21, 39:16, 39:18, 41:25, 45:17, 47:18, 51:24, 53:13, 55:15, 116:4, 116:22, 116:25, 140:20, 141:23, 143:10, 145:19, 146:1, 146:12, 153:24, 155:7, 186:22, 186:24, 186:25, 191:10, 191:13, 191:15, 195:11, 196:25, 197:4, 198:25, 203:16, 203:18, 204:12, 204:13, 205:2, 213:22, 214:10, 214:11, 215:7, 216:3, 222:22, 223:7, 223:11, 223:23, 223:24, 224:9, 224:14, 225:2, 225:22, 225:23, 228:15, 230:13, 232:19, 232:23, 233:2, 233:7, 233:8, 233:23, 234:1, 234:5, 234:9, 235:5, 235:7, 235:8, 235:10, 236:5, 236:22, 237:6, 237:8, 237:22, 239:10, 240:13, 257:1, 264:15, 265:3, 270:20, 271:1, 276:7
**areal** [2] - 36:9, 187:11
**areas** [17] - 41:18, 42:10, 45:15, 50:18, 59:14, 83:14, 117:2, 158:22, 215:2, 216:4, 216:18, 224:2, 224:4, 224:5, 224:10, 230:7, 241:2
**argue** [1] - 62:16
**arguing** [1] - 158:22
**argument** [1] - 173:9
**argumentative** [1] - 149:8
**arguments** [1] - 158:24
**arising** [1] - 169:22
**Arizona** [1] - 21:9
**arrive** [1] - 167:11
**art** [1] - 181:17
**article** [2] - 205:20, 205:25
**Article** [13] - 58:11, 58:21, 118:16, 120:21, 197:24, 198:15, 198:22, 199:6, 200:5, 200:9, 201:17, 205:10, 205:16
**ASHLEIGH** [1] - 8:6
**aside** [3] - 103:4, 138:1, 235:25
**aspects** [1] - 183:22
**assess** [3] - 145:3, 235:23, 271:19
**assessing** [1] - 271:1
**assist** [2] - 84:9, 99:12
**assistant** [2] - 211:19, 212:13
**associated** [6] - 39:4, 198:1, 203:13, 213:13, 225:1, 227:2
**assume** [4] - 88:12, 138:2, 181:6, 274:9
**assuming** [2] - 113:25, 177:12
**assumption** [1] - 274:4
**assumptions** [3] - 42:3, 244:16, 249:20
**atmosphere** [2] - 23:5, 127:3
**attached** [9] - 131:17, 132:10, 146:9, 146:16, 147:12, 150:23, 152:15, 168:6, 200:25
**attachments** [1] - 87:24
**attempt** [1] - 185:17
**attempting** [1] - 49:19
**attention** [9] - 23:11, 30:9, 37:4, 37:5, 100:6, 168:10, 213:7, 232:15, 233:3
**Attorney** [3] - 61:16, 87:8, 210:22
**attorney** [3] - 13:12, 99:11, 99:17
**Attorneys** [2] - 8:11, 8:19
**attribute** [2] - 264:10, 267:13
**attributed** [1] - 221:25
**author** [1] - 262:20
**Authority** [1] - 157:16
**authority** [8] - 148:18, 148:20, 156:9, 156:20, 157:7, 157:12, 157:17, 157:21
**automatic** [1] - 28:17
**availability** [4] - 38:24, 107:12, 107:19, 108:2
**available** [25] - 37:24, 46:20, 108:20, 145:6, 167:16, 209:15, 227:8, 227:11, 241:19, 244:6, 244:16, 245:7, 246:5, 246:7, 247:1, 247:19, 247:23, 248:5, 248:12, 248:23, 249:9, 249:25, 252:16, 253:3, 254:4
**Avenue** [2] - 7:19, 8:12
**average** [2] - 139:2, 194:8
**averages** [1] - 238:24
**aviation** [6] - 29:23, 29:24, 30:2, 32:4, 35:16, 63:2
**avoid** [1] - 83:15
**aware** [28] - 69:13, 69:23, 70:2, 70:12, 70:17, 70:19, 70:21, 70:24, 71:2, 71:4, 72:14, 75:9, 87:17, 88:8, 88:23, 112:4, 115:3, 115:24, 116:1, 127:9, 127:13, 160:11, 167:14, 172:9, 172:12, 253:11, 271:22, 272:22

## B

**B'** [1] - 134:10
**B-1** [1] - 239:13
**B-3** [3] - 207:11, 207:14, 207:22
**B-o-e-s-h-a-n-s** [1] - 20:6
**B.S** [1] - 21:2
**bachelor** [1] - 44:11
**bachelor's** [3] - 212:8, 231:12, 245:12
**background** [7] - 21:1, 21:7, 22:15, 44:10, 212:7, 231:11, 245:10
**backup** [1] - 83:9
**backwards** [1] - 157:3
**bad** [5] - 88:7, 108:13, 114:23, 134:20, 137:21
**Bakken** [1] - 240:18
**bar** [1] - 174:24
**barrier** [1] - 176:22
**barriers** [1] - 111:7
**based** [48] - 22:7, 28:19, 38:11, 38:18, 38:20, 58:8, 76:8, 79:9, 79:25, 96:25, 97:12, 105:6, 137:18, 138:5, 139:6, 140:6, 140:25, 141:1, 157:9, 162:25, 185:18, 196:20, 198:6, 198:19, 198:24, 199:5, 225:24, 230:2, 232:24, 235:17, 237:8,

237:11, 240:3, 240:5, 241:6, 247:9, 248:15, 255:18, 258:4, 258:5, 258:10, 259:22, 261:9, 267:5, 269:20, 269:24, 270:20, 274:14
**baseline** [2] - 237:1, 237:12
**basic** [2] - 68:3, 146:23
**Basin** [4] - 21:13, 36:23, 44:17, 240:12
**basin** [1] - 32:15
**basing** [1] - 241:4
**basis** [3] - 139:7, 199:2, 199:3
**bat** [1] - 200:22
**Bauman** [1] - 12:3
**BAUMAN** [1] - 8:23
**bearing** [2] - 222:15, 222:20
**became** [1] - 21:18
**become** [3] - 18:18, 217:18, 217:22
**BEFORE** [1] - 7:22
**beforehand** [1] - 24:3
**began** [2] - 165:4, 226:15
**begin** [4] - 20:23, 82:1, 141:18, 258:4
**begins** [1] - 82:13
**behalf** [3] - 12:1, 62:7, 88:25
**behind** [1] - 199:1
**belief** [3] - 186:23, 188:6, 188:10
**belonged** [1] - 148:13
**belongs** [1] - 176:10
**below** [14] - 23:8, 137:6, 185:14, 188:13, 207:23, 215:8, 220:21, 222:23, 223:10, 237:24, 240:1, 240:14, 241:9, 242:3
**Belt** [2] - 32:9, 32:10
**BENDER** [76] - 8:10, 11:17, 12:19, 13:14, 13:16, 18:12, 19:25, 20:5, 20:9, 20:15, 23:23, 24:6, 24:16, 24:17, 25:7, 25:12, 30:17, 30:22, 33:5, 37:3, 37:22, 40:24, 41:5, 43:3, 43:11, 43:17, 43:23, 55:22, 56:3, 61:6, 62:15, 72:18, 75:17, 78:18, 81:19, 99:25, 100:4, 110:16, 112:11, 118:12, 118:14, 121:21, 122:2, 136:3, 136:5, 149:8, 152:2, 152:4, 156:12, 158:21, 162:7, 162:12, 178:14, 187:8, 187:16, 187:20, 192:1, 196:17, 197:9, 198:16, 199:23, 206:3, 206:6, 206:8, 206:18, 207:5, 209:19, 210:23, 211:1, 211:9, 230:15, 230:24, 238:14, 240:23, 250:22, 251:1
**Bender** [3] - 11:19, 13:12, 210:22
**Bender.....** [4] - 9:9, 9:10, 9:20, 9:21
**beneath** [2] - 64:6, 238:2
**beneficial** [2] - 160:12, 160:18
**benefit** [16] - 34:11, 34:21, 64:25, 100:13, 100:17, 100:19, 100:25, 102:3, 102:15, 103:6, 103:13, 103:14, 104:14, 105:19, 105:20, 177:21
**benefits** [10] - 29:11, 32:18, 32:24, 33:2, 34:13, 103:11, 104:7, 104:18, 104:21, 105:15
**best** [15] - 59:8, 73:16, 98:15, 122:9, 126:9, 126:11, 128:5, 133:25, 172:11, 193:15, 208:21, 266:5, 266:6, 275:5
**better** [8] - 68:7, 75:19, 117:12, 145:13, 170:17, 175:18, 198:11, 264:24
**between** [20] - 19:20, 26:7, 33:14, 40:6, 40:13, 71:9, 124:20, 140:1, 140:20, 170:4, 184:24, 185:2, 187:24, 187:25, 188:2, 215:22, 238:3, 241:14, 255:21, 274:24
**Beulah** [3] - 21:11, 50:20, 224:3
**beyond** [3] - 85:13, 85:18, 155:22
**bid** [1] - 73:23
**bids** [2] - 72:10, 73:4
**bigger** [2] - 106:17, 106:18
**biggest** [2] - 32:5, 105:8
**billion** [8] - 28:22, 29:14, 29:16, 29:18, 30:4, 36:23, 116:11, 125:6
**bin** [1] - 268:4
**bins** [2] - 268:7
**Bismarck** [7] - 7:19, 8:13, 8:21, 11:20, 11:25, 22:8, 60:25
**bit** [25] - 22:1, 26:19, 27:8, 27:17, 34:25, 36:17, 41:10, 49:2, 49:23, 51:11, 56:18, 56:22, 57:18, 62:24, 110:17, 182:17, 195:7, 205:8, 208:17, 215:3, 221:10, 224:13, 225:4, 226:8, 226:22
**BK** [11] - 23:19, 25:21, 26:24, 37:12, 39:15, 40:2, 48:10, 49:11, 51:18, 51:19, 184:16
**black** [1] - 233:9
**blank** [2] - 207:15, 207:17
**block** [2] - 38:16, 183:20
**blocks** [3] - 141:15, 142:6, 142:24
**blow** [1] - 183:19
**blow-down** [1] - 183:19
**Blue** [1] - 29:3
**BNI** [5] - 21:15, 164:4, 164:5, 164:17
**board** [1] - 130:2
**Boeshans** [5] - 20:2, 20:5, 20:10, 20:18, 124:11
**BOESHANS** [33] - 20:11, 36:21, 61:23, 72:20, 75:18, 76:10, 77:3, 81:20, 100:22, 105:6, 108:15, 111:15, 112:16, 124:15, 128:11, 139:9, 145:20, 159:8, 160:25, 162:20, 164:21, 167:5, 167:13, 175:6, 179:2, 183:4, 186:12, 193:9, 196:5, 200:18, 202:16, 205:18, 209:12
**BOESHANS/JEFFREY** [1] - 9:8
**BOHRER** [3] - 8:4, 207:9, 208:12
**Bohrer.....** [1] - 9:16
**bolded** [1] - 205:17
**Bonnie** [1] - 12:4
**bonus** [16] - 57:20, 58:1, 162:5, 162:15, 162:16, 162:19, 163:7, 164:14, 164:19, 165:13, 165:21, 166:3, 168:13, 169:6, 169:18
**boom** [1] - 88:18
**boost** [1] - 22:20
**booster** [1] - 82:23
**bottom** [1] - 25:17
**boundaries** [24] - 39:2, 40:13, 41:25, 67:11, 117:20, 139:8, 140:8, 141:3, 141:5, 141:13, 186:7, 191:4, 191:7, 191:22, 203:13, 203:15, 203:16, 222:17, 225:21, 230:6, 230:12, 266:11, 275:4, 276:3
**boundary** [32] - 46:6, 46:9, 53:13, 117:6, 138:17, 138:19, 138:23, 139:3, 139:12, 139:14, 139:17, 139:20, 139:21, 140:12, 140:14, 140:16, 140:17, 140:21, 140:22, 141:19, 143:13, 186:6, 186:10, 186:13, 186:16, 186:18, 186:20, 191:24, 203:25, 204:2, 232:24
**Box** [1] - 11:20
**box** [1] - 81:21
**boy** [1] - 136:4
**BRAATEN** [73] - 8:18, 11:24, 24:1, 24:7, 25:9, 30:19, 32:21, 36:19, 37:20, 41:1, 43:14, 55:25, 61:18, 61:20, 62:18, 73:2, 75:21, 78:22, 79:5, 81:24, 89:5, 89:11, 93:10, 93:18, 99:23, 100:1, 100:5, 110:18, 112:13, 118:13, 119:3, 120:15, 120:23, 121:24, 122:4, 124:3, 124:9, 124:10, 136:4, 136:6, 136:7, 149:11, 152:3, 152:6, 152:8, 156:17, 156:19, 159:1, 162:10, 162:13, 167:6, 167:7, 178:16, 178:18, 179:14, 179:22, 179:23, 187:5, 187:14, 187:19, 187:22, 187:23, 192:4, 192:7, 206:7, 238:17, 238:19, 241:1, 246:23, 246:24, 250:24, 251:5, 256:13
**Braaten** [13] - 8:19, 11:24, 13:8, 19:4, 61:17, 95:5, 124:7, 131:19, 162:8, 179:20, 238:16, 246:21
**Braaten.....** [2] - 9:11, 9:22
**break** [5] - 61:11, 126:13, 165:20, 179:13, 246:16
**breathing** [1] - 103:25
**brief** [2] - 47:23, 213:9
**briefly** [14] - 20:24, 24:22, 28:9, 30:23, 31:22, 35:6, 35:14, 44:8, 49:24, 198:13, 211:21, 224:19, 231:10, 232:16
**brine** [2] - 217:15, 217:17
**bring** [2] - 32:19, 174:18
**bringing** [1] - 130:13
**brings** [1] - 69:22
**broad** [2] - 72:22, 104:20
**broker** [1] - 252:19
**Broom** [63] - 1:5, 2:4, 2:17, 3:5, 3:9, 4:7, 4:19, 5:7, 5:11, 6:10, 6:22, 7:11, 14:1, 15:8, 15:13, 16:21, 17:1, 18:9, 28:2, 188:12, 214:9, 214:11, 214:19, 214:20, 214:21, 215:4, 215:5, 215:8, 215:13, 217:19, 220:12, 221:6, 222:4, 222:20, 222:23, 222:24, 227:20, 237:23,

243:3, 243:9, 248:17, 248:19, 255:15, 256:7, 257:15, 258:20, 259:14, 259:16, 260:18, 261:11, 262:16, 262:18, 262:24, 263:10, 263:18, 264:18, 264:19, 265:7, 265:15, 266:20, 269:6, 271:25, 274:15
**brought** [1] - 79:2
**buffer** [19] - 45:16, 50:19, 139:17, 139:22, 140:20, 140:21, 141:3, 141:8, 141:11, 141:19, 141:23, 143:1, 204:14, 204:18, 204:20, 204:22, 230:7, 230:14, 233:1
**buffers** [1] - 266:13
**build** [4] - 23:1, 38:19, 38:20, 105:12
**building** [1] - 105:14
**bunch** [2] - 19:1, 19:2
**buoyant** [1] - 217:10
**burdens** [1] - 93:16
**Burton** [1] - 225:25
**Burton-Kelly** [1] - 225:25
**bushels** [3] - 29:18, 33:13, 33:15
**Business** [1] - 21:6
**business** [7] - 24:25, 25:1, 25:16, 44:12, 163:23, 177:24, 192:25
**busy** [2] - 84:7, 85:5
**BY** [55] - 20:15, 43:23, 61:20, 61:23, 76:11, 77:3, 83:17, 100:22, 104:9, 105:6, 107:22, 108:15, 111:17, 112:16, 118:9, 124:15, 128:12, 139:9, 145:21, 159:8, 161:2, 162:20, 165:4, 167:13, 168:8, 179:2, 180:2, 183:4, 184:17, 186:12, 191:20, 192:11, 193:9, 195:6, 195:17, 196:5, 196:11, 200:2, 200:18, 200:21, 201:11, 202:16, 205:14, 205:18, 207:9, 207:13, 208:16, 209:12, 211:9, 230:24, 238:19, 238:22, 239:22, 240:11, 247:2
**Byron** [1] - 8:11

## C

**Caitlin** [10] - 211:2, 230:17, 230:25, 231:2, 231:3, 231:25, 233:18, 234:22, 238:5, 239:8
**CAITLIN** [1] - 230:20
**calculated** [10] - 67:13, 67:18, 67:20, 270:6, 270:7, 270:20, 272:22, 273:14, 273:19, 273:22
**CALEB** [1] - 8:7
**Calgary** [1] - 7:19
**candidate** [1] - 214:10
**Canyon** [1] - 239:19
**capable** [3] - 83:11, 84:13, 106:1
**capacity** [8] - 20:21, 44:4, 116:6, 177:25, 195:1, 205:23, 211:18, 231:6
**capillary** [1] - 216:13
**capital** [1] - 116:11
**capture** [12] - 21:25, 23:4, 27:11, 27:13, 29:2, 29:3, 29:5, 32:13, 35:24, 203:4, 212:2, 259:25
**captured** [3] - 27:18, 27:20, 194:20
**capturing** [2] - 29:5, 81:3
**Carbon** [108] - 1:4, 1:6, 1:15, 1:19, 2:6, 2:8, 3:4, 3:8, 3:10, 3:19, 3:23, 4:8, 4:9, 4:12, 5:6, 5:10, 5:12, 5:21, 6:1, 6:11, 6:14, 7:10, 13:24, 14:2, 14:5, 14:13, 14:17, 15:7, 15:11, 15:14, 15:18, 15:24, 16:2, 16:6, 16:20, 16:24, 17:2, 17:5, 17:11, 17:14, 17:18, 18:8, 20:20, 22:3, 22:15, 22:16, 23:2, 23:14, 23:18, 25:2, 25:18, 25:19, 25:24, 26:1, 26:2, 26:7, 26:8, 26:9, 27:8, 27:10, 44:3, 48:12, 49:8, 61:22, 61:25, 62:2, 62:3, 62:5, 62:6, 62:8, 62:9, 62:11, 62:14, 62:20, 62:21, 62:22, 69:3, 69:8, 69:20, 71:10, 71:22, 72:9, 80:12, 80:14, 80:19, 80:21, 80:24, 80:25, 81:2, 81:9, 81:12, 81:22, 82:14, 82:21, 120:2, 120:11, 121:12, 122:1, 122:5, 123:12, 137:7, 182:20, 193:2, 193:5, 193:7, 194:10
**CARBON** [3] - 8:14, 8:15, 8:15
**carbon** [55] - 1:5, 2:8, 3:5, 3:9, 4:11, 5:7, 5:11, 6:13, 7:11, 14:1, 14:16, 15:8, 15:13, 16:5, 16:21, 17:1, 17:17, 18:9, 21:20, 21:25, 22:24, 27:11, 28:15, 28:16, 29:2, 29:3, 32:1, 32:3, 34:15, 70:22, 71:6, 79:8, 100:13, 104:13, 105:3, 106:10, 107:10, 107:17, 107:25, 108:16, 108:18, 110:12, 147:17, 175:9, 175:15, 194:7, 197:25, 198:2, 198:4, 198:5, 212:2, 227:18, 227:24, 229:21
**carbonates** [2] - 263:19, 264:12
**card** [2] - 47:4, 47:10
**care** [1] - 206:5
**career** [4] - 21:8, 21:11, 44:15, 89:3
**carefully** [1] - 19:17
**Carlson** [1] - 21:6
**carrier** [1] - 34:16
**carrying** [1] - 180:1
**carveout** [1] - 205:1
**case** [28] - 24:5, 60:18, 101:16, 102:4, 102:5, 147:12, 149:17, 169:7, 176:11, 177:4, 178:5, 181:23, 186:21, 188:12, 195:18, 195:20, 209:4, 218:9, 218:20, 219:8, 219:9, 219:23, 232:23, 244:24, 245:5, 260:3, 268:6
**Case** [11] - 1:3, 13:21, 14:3, 14:18, 15:9, 15:16, 15:25, 16:7, 16:22, 17:3, 17:12
**cases** [6] - 11:11, 12:9, 12:21, 13:21, 192:14, 203:11
**Casselton** [1] - 34:8
**Cassie** [1] - 12:7
**catch** [1] - 197:8
**category** [1] - 78:6
**caught** [1] - 201:9
**CCS** [7] - 34:14, 34:18, 101:4, 101:5, 105:7, 105:10, 113:16
**cell** [3] - 142:7, 143:14, 268:8
**cells** [3] - 141:16, 218:18, 218:21
**cementation** [1] - 267:1
**cemented** [1] - 259:17
**cent** [2] - 163:4, 165:22
**center** [4] - 28:18, 83:8, 83:9, 83:10
**Center** [5] - 21:16, 66:8, 66:10, 211:16, 231:5
**central** [1] - 205:2
**cents** [1] - 166:5
**Century** [6] - 46:4, 104:11, 157:1, 157:9, 158:6, 175:7
**certain** [6] - 87:5, 90:11, 94:7, 149:25, 241:23, 263:3
**certainly** [9] - 45:13, 54:7, 64:11, 88:2, 115:14, 117:13, 158:1, 206:25, 210:16
**certainty** [1] - 269:16
**certificate** [1] - 175:8
**certification** [1] - 175:4
**certified** [7] - 46:11, 46:25, 47:2, 47:5, 50:11, 50:13, 86:18
**cetera** [5] - 38:25, 64:11, 67:11, 154:8
**challenge** [2] - 32:7, 105:8
**change** [19] - 94:25, 96:25, 101:18, 108:25, 109:1, 113:16, 143:7, 143:8, 143:12, 143:13, 153:5, 164:14, 166:21, 166:23, 167:5, 180:11, 180:16, 219:15, 235:10
**changed** [3] - 101:20, 163:1, 258:10
**changes** [21] - 85:14, 85:15, 95:4, 95:9, 95:12, 95:19, 95:22, 96:5, 96:7, 96:8, 97:8, 97:11, 97:23, 110:2, 164:23, 166:6, 166:25, 167:1, 235:12, 242:22, 242:25
**changing** [1] - 166:18
**Chapter** [4] - 104:11, 157:2, 157:11, 198:3
**chapter** [1] - 157:18
**characteristics** [3] - 63:16, 117:16, 227:21
**characterization** [8] - 38:15, 94:17, 98:17, 98:20, 156:13, 170:1, 212:1, 242:6
**characterize** [6] - 45:7, 92:17, 102:19, 102:20, 148:17, 171:18
**charged** [3] - 74:11, 74:13, 202:9
**charges** [1] - 72:16
**Charmayne** [1] - 12:5
**check** [3] - 174:11, 183:19, 268:10
**chemical** [1] - 189:6
**chief** [2] - 63:14, 183:16
**choice** [2] - 182:10, 274:13
**choose** [3] - 74:4, 101:14, 275:13
**choosing** [2] - 247:24, 275:20
**chose** [5] - 219:5, 248:10, 274:14, 275:3, 275:13
**Christy** [1] - 12:6
**CI** [2] - 32:14, 64:24
**circulated** [2] - 30:10, 96:6
**citizen** [1] - 147:23

**citizens** [4] - 22:22, 100:18, 101:9, 103:24
**civil** [1] - 21:3
**claim** [1] - 77:1
**claims** [1] - 173:24
**clarification** [4] - 24:2, 210:1, 210:6, 210:13
**clarify** [5] - 192:18, 193:1, 199:8, 200:14, 243:5
**clarifying** [1] - 250:24
**Class** [1] - 182:25
**classification** [19] - 42:20, 75:25, 76:3, 76:15, 77:1, 77:7, 77:18, 77:24, 80:2, 80:7, 82:5, 125:15, 125:18, 125:20, 125:24, 127:10, 127:14, 208:21, 240:4
**classified** [1] - 76:8
**classify** [1] - 82:7
**clause** [26] - 86:12, 86:20, 96:13, 98:8, 98:13, 101:25, 128:13, 129:5, 129:7, 129:22, 130:13, 130:18, 130:19, 130:21, 130:23, 131:3, 153:12, 155:1, 166:9, 166:16, 166:24, 169:10, 170:3, 178:11, 178:13
**cleanup** [1] - 200:22
**clear** [6] - 28:5, 120:14, 129:3, 129:4, 171:21, 187:9
**clearly** [1] - 100:22
**clerical** [1] - 151:22
**client** [1] - 97:5
**clients** [3] - 70:14, 165:10, 207:2
**climate** [1] - 107:7
**closely** [1] - 173:8
**closest** [2] - 40:7, 224:3
**CMG** [2] - 225:17, 243:23
**CMG's** [1] - 219:21
**co** [1] - 124:23
**CO** [1] - 32:14
**co-ops** [1] - 124:23
**CO2** [160] - 12:23, 22:6, 23:4, 26:15, 26:16, 27:1, 27:2, 27:4, 27:13, 27:14, 27:18, 27:20, 27:25, 28:2, 28:25, 29:5, 32:13, 32:15, 33:24, 35:2, 35:9, 35:11, 35:15, 35:19, 35:22, 35:24, 36:1, 36:3, 36:13, 36:25, 37:18, 38:5, 41:14, 62:25, 63:12, 63:15, 64:5, 64:21, 64:23, 65:3, 65:17, 67:24, 79:11, 81:4, 81:5, 100:24, 101:7, 103:19, 103:21, 104:3, 105:14, 106:23, 109:5, 109:23, 110:22, 111:1, 111:12, 111:20, 112:10, 112:15, 112:21, 112:23, 113:1, 113:3, 113:22, 115:1, 115:9, 117:7, 125:6, 126:14, 126:22, 127:2, 138:20, 138:24, 140:4, 148:22, 158:6, 160:7, 167:17, 167:19, 175:22, 176:1, 176:4, 176:9, 176:12, 176:17, 176:23, 186:6, 186:11, 186:13, 187:1, 188:8, 188:12, 188:15, 188:17, 193:13, 198:5, 198:7, 200:15, 202:3, 202:9, 204:11, 205:1, 209:3, 209:7, 209:11, 209:18, 214:4, 214:7, 214:10, 214:14, 216:20, 217:8, 217:10, 217:13, 217:14, 217:17, 218:2, 218:7, 218:10, 218:13, 218:18, 218:21, 218:24, 218:25, 219:2, 219:4, 219:10, 219:11, 219:13, 219:21, 219:23, 220:1, 220:19, 221:13, 221:15, 223:11, 225:1, 225:2, 225:20, 227:22, 228:4, 228:10, 232:7, 233:10, 238:12, 242:11, 244:19, 253:18, 253:20, 254:21, 261:23, 262:4, 274:18, 274:21
**coal** [35] - 21:11, 78:3, 78:5, 100:16, 105:5, 105:7, 105:18, 116:10, 116:13, 116:14, 124:25, 125:1, 125:11, 125:14, 127:14, 127:21, 128:2, 162:22, 163:12, 163:18, 163:25, 167:8, 196:15, 222:13, 223:23, 223:24, 224:10, 224:12, 224:14, 224:15, 228:19, 228:23
**Coal** [1] - 21:15
**Coast** [1] - 21:12
**Code** [7] - 46:5, 104:11, 157:1, 157:9, 158:7, 175:7, 198:3
**code** [17] - 42:20, 42:23, 75:25, 76:3, 76:13, 76:15, 77:1, 77:7, 77:18, 77:24, 79:1, 79:2, 127:10, 127:14, 208:18, 209:6, 209:9
**codes** [10] - 125:16, 125:18, 125:20, 125:24, 126:9, 208:18, 208:21, 208:24, 209:22
**codified** [1] - 107:23
**collating** [1] - 247:23
**colleagues** [1] - 245:15
**collected** [2] - 221:5, 262:23
**collecting** [1] - 226:15
**collection** [2] - 211:25, 213:1
**College** [1] - 212:9
**color** [1] - 258:23
**colors** [1] - 258:22
**column** [4] - 55:5, 55:12, 55:19, 207:14
**columns** [2] - 207:15, 207:16
**combination** [1] - 81:3
**combined** [2] - 192:14, 194:5
**coming** [12] - 27:3, 27:4, 34:1, 62:25, 101:8, 113:22, 115:1, 126:14, 126:18, 126:19, 149:2, 271:3
**commencing** [1] - 11:2
**comment** [1] - 266:22
**Comments** [1] - 9:4
**comments** [3] - 46:21, 75:24, 196:8
**commercial** [19] - 26:14, 26:23, 63:8, 63:14, 63:17, 101:4, 105:7, 105:10, 105:11, 105:21, 107:12, 107:20, 108:2, 108:20, 113:16, 114:17, 180:20, 212:2, 232:6
**commercialize** [1] - 176:17
**commercializing** [2] - 21:25, 101:4
**commercially** [6] - 34:17, 113:17, 161:16, 222:9, 222:11, 228:16
**commingled** [1] - 35:25
**Commission** [103] - 1:17, 2:6, 3:20, 4:10, 4:21, 5:23, 6:12, 7:1, 11:6, 12:16, 12:25, 13:23, 14:4, 14:8, 14:12, 14:14, 14:19, 15:10, 15:17, 15:21, 16:1, 16:3, 16:8, 16:23, 17:4, 17:8, 17:13, 17:15, 17:20, 18:17, 20:25, 28:7, 30:11, 34:1, 41:20, 42:4, 42:9, 42:14, 42:19, 43:6, 44:9, 51:8, 51:25, 53:20, 58:15, 59:6, 61:25, 83:22, 84:3, 90:9, 91:2, 91:20, 93:4, 99:2, 99:3, 99:7, 123:17, 123:23, 128:23, 132:18, 133:7, 133:13, 133:16, 138:9, 147:16, 147:21, 148:4, 148:5, 148:11, 148:15, 149:6, 154:14, 156:4, 156:10, 156:21, 156:25, 157:16, 160:1, 170:13, 170:19, 171:10, 172:23, 173:21, 174:17, 174:23, 176:21, 178:8, 202:6, 202:17, 210:3, 210:5, 210:6, 213:16, 214:8, 222:8, 226:7, 226:23, 226:24, 227:7, 232:5, 236:8, 253:22
**Commission's** [3] - 148:18, 157:21, 199:15
**commitment** [1] - 115:7
**commitments** [2] - 22:23, 30:4
**committed** [1] - 22:17
**committing** [1] - 115:8
**commodity** [7] - 30:8, 101:10, 102:22, 103:2, 107:11, 107:18, 108:1
**common** [5] - 34:16, 112:4, 171:21, 184:25, 185:4
**communities** [1] - 22:22
**companies** [1] - 163:25
**company** [5] - 21:17, 22:17, 22:25, 173:1, 180:6
**comparable** [3] - 72:23, 99:19, 240:25
**comparables** [1] - 74:6
**compare** [4] - 19:19, 28:24, 73:18, 240:17
**compares** [1] - 240:21
**comparison** [1] - 73:17
**compel** [1] - 13:11
**compensate** [3] - 57:15, 74:18, 112:8
**compensated** [1] - 168:25
**compensating** [1] - 199:4
**compensation** [19] - 84:16, 84:18, 84:20, 84:25, 99:21, 111:14, 111:19, 166:20, 166:25, 167:5, 167:14, 168:14, 169:6, 169:11, 169:19, 169:21, 175:10, 176:10, 177:22
**competent** [4] - 220:13, 227:23, 229:13, 229:24
**competitive** [4] - 72:16, 73:1, 73:12, 74:5
**competitively** [1] - 73:23
**competitors** [1] - 73:5
**complete** [4] - 45:14, 84:12, 98:18, 201:6
**completed** [2] - 21:4, 38:14
**completion** [2] - 150:9, 159:13
**complex** [4] - 216:20, 269:6, 269:12, 269:14
**complexes** [3] - 269:12, 269:16, 269:23
**compliance** [1] - 232:12
**comply** [1] - 235:3
**component** [2] - 80:23, 198:7
**composition** [7] - 35:1, 35:2,

218:24, 218:25, 219:6, 219:12, 244:20
**compound** [1] - 149:9
**comprehensive** [3] - 119:1, 120:20, 121:8
**compress** [1] - 113:1
**comprise** [1] - 236:16
**comprises** [2] - 236:15, 264:1
**compromise** [1] - 228:8
**computer** [1] - 19:5
**computers** [1] - 18:25
**concentration** [1] - 103:21
**concern** [4] - 36:15, 123:1, 203:15, 275:1
**concerned** [2] - 209:8, 274:23
**concerns** [9] - 36:12, 96:9, 96:25, 97:13, 97:17, 106:2, 131:5, 131:8, 131:9
**conclude** [1] - 276:11
**conclusion** [1] - 228:13
**Concordia** [1] - 212:9
**conditions** [1] - 87:5
**conducive** [2] - 214:15, 227:22
**conduct** [4] - 129:1, 129:20, 131:1, 242:14
**conducted** [6] - 224:24, 225:5, 225:7, 225:19, 228:3, 233:19
**conducting** [1] - 208:8
**confidence** [2] - 141:20, 177:20
**confident** [1] - 261:16
**confidential** [3] - 75:12, 178:5, 252:19
**Confidentiality** [1] - 177:19
**confine** [2] - 187:23, 252:9
**confined** [5] - 186:25, 188:7, 217:15, 236:16, 250:14
**confinement** [2] - 217:7, 238:10
**confining** [40] - 36:8, 187:25, 188:3, 188:13, 200:7, 200:17, 214:22, 214:25, 215:4, 215:8, 215:10, 215:16, 215:20, 216:1, 216:8, 216:10, 217:10, 218:2, 218:3, 218:5, 218:8, 218:11, 218:13, 218:16, 219:11, 219:14, 220:13, 220:17, 222:6, 227:23, 228:6, 229:14, 229:25, 234:10, 235:21, 238:4, 238:21, 239:2, 239:4
**confirm** [5] - 55:13, 77:9, 189:3, 229:19
**confirmed** [2] - 214:6, 262:25
**conflict** [2] - 91:16, 92:25
**conform** [1] - 132:11
**conformance** [1] - 133:6
**conformed** [1] - 132:16
**confuse** [1] - 56:23
**confused** [2] - 145:21, 180:14
**confuses** [1] - 120:23
**confusing** [3] - 53:7, 120:18, 138:11
**connect** [3] - 29:15, 63:6, 64:22
**connected** [1] - 65:20
**connecting** [3] - 27:23, 63:3, 63:4
**connects** [1] - 32:12
**consensual** [1] - 147:9
**consent** [2] - 147:13, 147:15
**consequently** [1] - 125:7
**conservative** [16] - 218:9, 218:20, 219:1, 274:4, 274:6, 274:16, 274:19, 274:22, 275:3, 275:14, 275:15, 275:16, 275:22, 275:24
**conservatively** [1] - 35:20
**consider** [35] - 1:16, 2:18, 3:19, 4:9, 4:21, 5:21, 7:1, 13:23, 14:5, 14:6, 14:12, 14:20, 15:18, 15:19, 16:2, 16:9, 16:24, 17:5, 17:6, 17:14, 17:20, 41:6, 41:8, 82:13, 82:15, 85:16, 85:18, 85:20, 86:24, 119:16, 121:15, 125:21, 126:17, 180:10, 256:13
**considerably** [1] - 250:1
**consideration** [9] - 1:4, 3:8, 5:10, 13:25, 15:12, 16:25, 39:17, 81:25, 97:14
**considerations** [6] - 35:17, 41:11, 94:8, 114:17, 140:25, 213:25
**considered** [7] - 87:9, 122:6, 122:11, 123:12, 160:13, 215:11, 240:2
**considering** [3] - 15:11, 38:23, 125:9
**consist** [1] - 263:20
**consistent** [12] - 46:4, 46:16, 58:3, 58:22, 85:1, 104:16, 139:21, 143:24, 153:9, 162:22, 166:4, 192:19
**consists** [2] - 215:20, 238:10
**consolidated** [1] - 11:12
**consolidating** [2] - 12:21, 19:10
**constant** [1] - 107:6
**constituents** [2] - 35:12, 35:13
**constitutes** [1] - 188:16
**constitution** [3] - 158:9, 158:14, 158:20
**constitutional** [1] - 158:11
**constrained** [1] - 262:1
**constructed** [6] - 28:13, 106:4, 106:5, 106:7, 234:16, 243:21
**construction** [4] - 22:10, 28:9, 216:25, 225:10
**constructs** [1] - 106:22
**construed** [1] - 118:19
**consultant** [1] - 159:20
**consulting** [4] - 21:8, 72:11, 73:20, 74:23
**consume** [1] - 29:17
**consumes** [3] - 33:13, 33:16, 33:20
**Cont'd** [1] - 10:1
**contact** [2] - 51:4, 219:10
**contain** [6] - 218:13, 220:19, 222:11, 228:16, 228:19, 252:17
**contained** [8] - 24:9, 30:24, 35:7, 46:15, 217:9, 217:11, 217:13, 241:17
**containing** [2] - 188:8, 229:11
**containment** [2] - 221:12, 221:15
**contains** [5] - 232:23, 238:23, 239:20, 252:10, 259:16
**contamination** [2] - 180:22, 181:10
**contemplated** [2] - 114:12, 168:13
**context** [1] - 161:19
**continue** [7] - 60:12, 78:19, 102:6, 102:25, 116:19, 129:10, 199:16
**continued** [2] - 52:15, 102:5
**continues** [1] - 113:16
**continuing** [3] - 39:14, 42:14, 102:8
**CONTINUING** [44] - 24:17, 25:12, 30:22, 33:5, 37:3, 37:22, 41:5, 56:3, 62:18, 73:2, 75:21, 79:5, 81:24, 89:11, 93:18, 100:5, 110:18, 112:13, 119:3, 120:23, 121:24, 122:4, 124:10, 136:7, 149:11, 152:8, 156:19, 159:1, 162:13, 167:7, 178:18, 179:23, 187:14, 187:23, 192:4, 196:19, 197:12, 197:23, 198:21, 209:25, 241:1, 246:24, 251:5, 256:13
**continuous** [1] - 215:1
**contract** [26] - 69:4, 69:6, 69:12, 71:9, 71:19, 71:24, 72:6, 74:19, 74:22, 75:11, 89:21, 90:25, 91:13, 91:14, 92:7, 94:6, 111:19, 124:22, 146:22, 155:20, 170:4, 170:13, 179:6, 185:1, 186:2, 226:13
**contracted** [2] - 72:12, 161:10
**contracting** [1] - 71:4
**contracts** [26] - 69:13, 69:19, 69:23, 70:2, 71:13, 71:15, 71:20, 71:23, 72:4, 75:1, 75:5, 91:8, 110:4, 110:5, 111:9, 114:24, 115:4, 115:17, 115:22, 124:21, 124:22, 124:25, 154:16, 193:11, 194:14, 194:22
**contractual** [3] - 93:4, 147:22, 179:6
**contribute** [2] - 202:11, 202:20
**contributes** [1] - 29:13
**control** [16] - 25:4, 28:18, 30:15, 40:20, 45:23, 47:21, 49:6, 50:1, 66:4, 83:8, 83:9, 83:10, 183:19, 250:15, 267:20, 267:21
**controlled** [1] - 248:13
**controls** [4] - 93:1, 223:9, 229:6, 256:18
**conversations** [1] - 34:6
**conveying** [1] - 147:5
**cooperate** [2] - 149:20, 149:24
**cooperation** [4] - 38:22, 138:21, 149:18, 177:4
**copies** [3] - 19:1, 19:2, 75:5
**copy** [14] - 18:23, 19:4, 19:6, 46:19, 50:10, 50:23, 54:24, 65:25, 86:17, 197:2, 253:8, 254:25, 268:14
**core** [23] - 217:2, 217:4, 218:24, 221:4, 227:14, 238:24, 248:15, 248:16, 255:18, 258:4, 258:6, 258:7, 259:20, 259:23, 260:7, 260:21, 261:2, 261:12, 261:13, 262:23, 262:24, 262:25, 264:16
**cores** [1] - 260:5
**Corn** [2] - 32:9, 32:10
**corn** [21] - 29:18, 29:21, 29:25, 30:6, 33:10, 33:13, 33:15, 33:17, 33:20, 33:22, 34:5, 34:7, 34:21, 34:24, 101:9, 102:12, 102:16, 102:21, 103:3

**corns** [1] - 33:14
**correct** [95] - 24:6, 31:13, 31:17, 31:18, 34:2, 42:7, 42:8, 42:11, 42:12, 42:17, 45:5, 45:6, 45:24, 45:25, 46:25, 47:1, 51:9, 51:10, 51:14, 51:16, 53:22, 53:23, 55:16, 55:21, 56:6, 58:9, 58:10, 58:18, 58:19, 59:5, 62:12, 66:5, 67:6, 68:15, 78:15, 79:20, 89:11, 90:10, 91:6, 101:24, 114:6, 119:24, 120:2, 120:3, 124:15, 126:16, 126:24, 127:1, 130:12, 131:14, 135:18, 137:25, 147:11, 151:24, 156:1, 156:8, 161:24, 163:20, 166:3, 167:4, 169:25, 170:1, 175:1, 184:6, 185:16, 193:8, 193:9, 195:2, 199:13, 205:13, 205:14, 208:10, 213:5, 213:6, 223:18, 228:24, 228:25, 234:5, 234:6, 239:24, 243:3, 243:14, 244:1, 245:17, 247:8, 250:5, 252:5, 253:14, 261:8, 261:10, 267:10, 268:12, 268:20, 270:1, 272:4
**correcting** [1] - 151:19
**corrections** [1] - 199:21
**corrective** [3] - 234:21, 234:24, 235:18
**correctly** [2] - 91:10, 132:14
**correlation** [1] - 264:15
**Cost** [1] - 118:17
**cost** [5] - 28:21, 121:20, 122:5, 122:17, 150:15
**costs** [14] - 64:10, 113:5, 118:2, 118:5, 118:7, 118:24, 119:4, 119:8, 119:11, 120:7, 120:22, 121:18, 121:22, 121:23
**counsel** [7] - 20:25, 30:11, 43:6, 44:9, 77:12, 133:25, 214:9
**Counties** [13] - 1:14, 2:4, 2:17, 3:3, 3:17, 4:6, 4:19, 5:5, 15:6, 16:18, 28:1, 37:12, 38:4
**counties** [2] - 38:10, 95:8
**country** [1] - 21:12
**County** [10] - 5:20, 6:9, 6:22, 7:9, 18:6, 37:14, 37:15, 37:16, 39:11, 125:7
**county** [1] - 60:12
**couple** [9] - 160:8, 194:15, 196:21, 197:19, 199:7, 200:23, 201:10, 207:10
**course** [8] - 41:19, 44:25, 54:8, 60:1, 84:22, 87:3, 146:8, 189:9
**court** [3] - 48:1, 170:19, 201:20
**covenants** [1] - 172:18
**cover** [9] - 36:9, 71:11, 72:4, 87:24, 120:1, 180:21, 180:22, 199:9, 213:10
**covered** [6] - 84:17, 84:19, 118:6, 183:5, 189:14, 223:20
**covering** [4] - 95:7, 161:7, 181:25, 183:14
**covers** [3] - 96:21, 181:1, 256:25
**coworkers** [1] - 245:14
**Coyote** [1] - 224:2
**crack** [1] - 206:4
**create** [7] - 67:4, 102:23, 122:17, 144:8, 251:13, 266:1, 266:3
**created** [3] - 68:4, 247:18, 252:2
**creates** [2] - 64:24, 93:16
**creating** [2] - 48:2, 101:12
**creation** [2] - 44:24, 232:11
**credit** [1] - 109:21
**credits** [4] - 109:4, 109:10, 110:12
**Creek** [65] - 1:5, 2:4, 2:17, 3:5, 3:9, 4:7, 4:20, 5:7, 5:11, 6:10, 6:22, 7:11, 14:1, 15:8, 15:14, 16:21, 17:1, 18:9, 28:2, 188:12, 214:9, 214:11, 214:19, 214:20, 214:21, 215:4, 215:5, 215:9, 215:13, 217:19, 220:12, 221:7, 222:4, 222:20, 222:23, 222:24, 224:2, 227:21, 236:15, 237:23, 243:3, 243:9, 248:17, 248:19, 255:15, 256:7, 257:15, 258:20, 259:14, 259:16, 260:18, 261:11, 262:16, 262:18, 262:24, 263:10, 263:18, 264:18, 264:20, 265:7, 265:15, 266:21, 269:6, 271:25, 274:15
**crew** [1] - 212:15
**criteria** [3] - 83:15, 240:3, 240:9
**critical** [3] - 22:21, 202:4, 214:15
**crop** [2] - 168:22, 168:24
**Cross** [2] - 9:11, 9:22
**cross** [8] - 43:10, 61:10, 61:16, 78:23, 199:7, 201:12, 268:22, 269:13
**CROSS** [2] - 61:19, 238:18
**cross-exam** [1] - 78:23
**Cross-Examination** [2] - 9:11, 9:22
**cross-examination** [2] - 61:16, 199:7
**CROSS-EXAMINATION** [2] - 61:19, 238:18
**cross-reference** [1] - 201:12
**cross-section** [2] - 268:22, 269:13
**crossbedded** [1] - 264:22
**crude** [3] - 78:9, 78:12, 79:6
**current** [10] - 83:9, 108:23, 109:7, 110:3, 116:23, 117:20, 189:24, 189:25, 194:15, 194:23
**curved** [1] - 139:16
**customers** [1] - 109:7

## D

**D-2** [1] - 198:4
**D-4** [1] - 169:3
**DAKOTA** [1] - 1:1
**Dakota** [96] - 7:19, 8:13, 8:21, 11:6, 11:25, 16:19, 18:7, 21:3, 21:10, 21:13, 23:6, 27:6, 27:15, 27:19, 27:25, 29:24, 31:5, 32:16, 32:19, 33:6, 33:8, 33:9, 33:18, 33:23, 34:12, 34:14, 36:2, 36:4, 36:7, 36:14, 36:16, 36:25, 44:13, 46:4, 49:7, 49:22, 61:25, 63:21, 63:23, 65:2, 65:7, 65:22, 70:11, 70:24, 71:3, 84:2, 84:9, 84:21, 87:2, 99:1, 100:18, 101:10, 102:3, 103:7, 103:13, 103:15, 103:24, 104:11, 104:22, 106:11, 108:7, 122:23, 124:18, 127:18, 127:23, 147:22, 150:7, 156:10, 156:20, 156:25, 157:1, 158:10, 160:13, 163:18, 164:1, 171:9, 175:4, 178:7, 193:18, 193:22, 196:9, 198:2, 202:2, 202:5, 202:11, 211:17, 214:3, 214:19, 221:18, 222:18, 235:4, 239:21, 240:12, 241:19, 265:15
**Dakota's** [3] - 33:20, 101:6, 124:13
**damages** [3] - 168:15, 168:23, 205:12
**DAT** [4] - 246:9, 253:12, 253:15, 254:20
**data** [109] - 68:5, 75:2, 75:12, 144:6, 144:7, 144:8, 144:11, 144:20, 144:21, 145:3, 190:6, 212:1, 213:1, 214:5, 215:18, 216:19, 216:24, 217:2, 217:3, 217:5, 218:24, 221:1, 221:2, 221:19, 223:2, 225:9, 226:15, 226:20, 226:23, 226:24, 227:10, 227:11, 227:12, 227:14, 233:21, 235:9, 235:15, 235:22, 236:4, 236:5, 240:19, 242:6, 244:2, 244:4, 244:7, 244:8, 244:11, 244:13, 244:14, 244:15, 244:21, 245:3, 245:21, 245:24, 246:1, 246:3, 246:6, 246:25, 247:15, 247:19, 247:23, 248:3, 249:1, 249:10, 249:22, 249:25, 250:10, 251:7, 252:7, 252:8, 252:9, 252:10, 252:16, 252:18, 255:12, 255:24, 256:19, 258:7, 258:9, 259:23, 259:25, 260:20, 260:21, 261:18, 262:11, 262:25, 264:24, 265:17, 265:19, 266:8, 267:8, 267:16, 267:23, 267:25, 268:3, 268:6, 268:7, 269:21, 269:25, 270:7, 271:18, 271:25, 274:12, 275:5, 275:7, 275:10, 275:11
**database** [3] - 235:25, 236:6, 236:7
**date** [4] - 46:18, 125:8, 144:17, 208:24
**David** [1] - 11:7
**DAVID** [2] - 7:22, 8:6
**days** [2] - 13:17, 13:18
**DCC** [9] - 40:3, 40:4, 40:7, 40:9, 40:10, 40:13, 41:9, 70:20
**deal** [2] - 84:1, 163:10
**death** [2] - 172:6, 207:24
**decades** [1] - 125:3
**decide** [3] - 138:13, 162:18, 163:6
**decided** [1] - 274:1
**decides** [1] - 150:8
**deciding** [1] - 271:14
**decimal** [1] - 259:9
**decision** [2] - 143:16, 170:15
**decisions** [5] - 68:22, 140:19, 140:24, 143:20
**deck** [6] - 244:14, 245:21, 245:24, 246:1, 252:8, 252:9

**decks** [4] - 144:21, 244:2, 244:11, 244:13
**deeds** [5] - 172:2, 172:5, 172:12
**deem** [1] - 200:13
**deemed** [3] - 160:18, 178:3, 252:19
**deems** [1] - 42:15
**deep** [4] - 23:7, 190:8, 190:20, 236:18
**deeper** [1] - 224:14
**defend** [7] - 170:25, 171:1, 171:23, 172:20, 172:21, 173:11, 173:19
**defense** [1] - 171:6
**defer** [17] - 111:15, 133:25, 142:11, 143:2, 144:23, 145:20, 160:4, 164:21, 165:2, 183:24, 190:18, 190:24, 193:24, 196:20, 205:3, 270:9
**define** [10] - 224:24, 225:20, 230:11, 244:13, 251:3, 251:5, 265:25, 266:9, 266:10, 276:3
**defined** [12] - 120:7, 121:16, 122:7, 146:10, 187:20, 187:25, 191:8, 203:17, 230:7, 232:20, 239:21, 275:4
**defines** [1] - 197:25
**defining** [2] - 200:6, 220:22
**definition** [10] - 118:1, 118:6, 118:10, 118:23, 119:1, 120:20, 122:12, 145:9, 161:1, 198:1
**definition's** [1] - 246:2
**definitions** [3] - 115:19, 117:25, 134:2
**degree** [4] - 44:12, 44:14, 231:13, 249:2
**delineated** [2] - 225:22, 225:23
**deliver** [1] - 27:24
**delivered** [4] - 30:2, 35:25, 47:3, 50:25
**delta** [3] - 255:21, 255:23, 274:24
**demand** [4] - 33:22, 34:23, 65:10, 102:23
**demonstrate** [1] - 105:25
**demonstrated** [2] - 219:13, 228:4
**demonstrating** [2] - 101:4, 106:9
**demonstration** [1] - 105:21
**denoted** [1] - 233:8
**dense** [1] - 217:18
**Department** [17] - 11:9, 84:2, 84:5, 84:9, 85:9, 85:24, 86:23, 87:13, 87:18, 88:8, 88:17, 89:1, 99:1, 99:18, 231:15, 231:17, 236:8
**dependent** [1] - 116:14
**depicted** [1] - 31:23
**depicts** [2] - 24:25, 233:4
**deploying** [1] - 105:10
**deploys** [1] - 34:18
**deposition** [6] - 265:11, 265:23, 266:20, 269:7, 269:10
**depositional** [12] - 262:12, 262:19, 262:21, 263:1, 263:5, 263:10, 263:15, 263:16, 263:23, 264:5, 264:8, 265:1
**depot** [1] - 161:14
**depth** [5] - 28:14, 145:12, 214:14, 237:11, 239:14
**derived** [6] - 258:8, 265:19, 267:15, 267:19, 270:7, 275:10
**Derrick** [2] - 11:24, 250:23
**DERRICK** [1] - 8:18
**describable** [3] - 139:15, 139:17, 141:3
**describe** [21] - 24:22, 27:22, 28:9, 45:10, 54:5, 74:9, 77:23, 77:25, 126:3, 126:11, 127:5, 127:17, 127:21, 130:10, 141:20, 167:24, 226:21, 256:6, 258:16, 268:17, 274:5
**described** [6] - 127:7, 130:9, 186:17, 234:12, 236:13, 244:5
**describes** [3] - 80:5, 80:6, 263:18
**describing** [1] - 26:11
**Description** [1] - 197:1
**description** [5] - 46:17, 54:8, 79:8, 80:4, 263:22
**descriptions** [1] - 196:22
**design** [6] - 22:9, 116:24, 117:15, 139:11, 194:16, 194:23
**designed** [4] - 28:13, 35:21, 114:11, 194:11
**DESIRAE** [1] - 8:18
**destroyed** [1] - 168:24
**detail** [8] - 19:12, 19:14, 26:19, 27:8, 27:18, 99:5, 189:22, 251:8
**detailed** [2] - 213:17, 244:16
**details** [3] - 94:8, 115:3, 262:21
**determination** [9] - 77:11, 77:17, 170:10, 202:7, 202:14, 202:17, 202:20, 234:20, 237:11
**determine** [21] - 45:17, 66:25, 67:21, 68:5, 68:13, 98:20, 111:10, 117:18, 138:8, 141:11, 142:21, 142:22, 186:18, 202:23, 203:8, 220:25, 225:19, 248:16, 248:24, 257:2, 272:17
**determined** [6] - 135:14, 139:4, 237:15, 255:17, 257:1, 257:13
**determines** [1] - 139:11
**determining** [11] - 2:7, 4:10, 6:12, 14:14, 16:3, 17:15, 50:4, 214:1, 266:13, 270:25, 271:5
**develop** [11] - 116:19, 117:2, 125:10, 139:1, 145:18, 146:1, 146:11, 149:16, 158:6, 223:8, 246:4
**developed** [7] - 88:23, 89:1, 96:12, 140:17, 157:10, 210:9, 225:24
**developing** [4] - 66:24, 144:1, 167:9, 243:15
**development** [13] - 21:9, 65:14, 88:16, 122:13, 138:20, 148:22, 149:19, 150:1, 196:14, 212:3, 212:24, 232:7, 276:4
**develops** [1] - 34:14
**devoid** [8] - 214:22, 216:14, 220:13, 222:21, 229:14, 229:25, 242:9
**DGC** [1] - 209:4
**diagram** [7] - 26:2, 32:8, 39:10, 82:19, 182:15, 183:6, 204:4
**diamonds** [1] - 31:6
**dictate** [1] - 218:19
**difference** [7] - 29:7, 85:19, 85:21, 250:12, 266:25, 267:17, 273:19
**differences** [2] - 19:20, 94:21
**different** [40] - 50:19, 54:3, 72:4, 72:8, 72:21, 80:18, 84:8, 85:10, 88:4, 96:20, 96:21, 97:16, 115:17, 117:17, 123:3, 124:21, 125:15, 125:19, 128:1, 134:25, 136:10, 139:11, 143:14, 145:23, 165:20, 166:14, 174:12, 176:15, 198:19, 249:4, 250:11, 250:17, 250:19, 251:3, 260:20, 264:17, 264:20, 265:2, 266:11, 272:14
**differentiate** [1] - 215:22
**differently** [3] - 125:3, 130:3, 138:24
**difficult** [2] - 128:14, 269:14
**difficulty** [1] - 50:9
**digitized** [3] - 252:18, 252:21, 253:5
**dioxide** [35] - 1:5, 2:8, 3:5, 3:9, 4:11, 5:7, 5:11, 6:13, 7:11, 14:1, 14:16, 15:8, 15:13, 16:5, 16:21, 17:1, 17:17, 18:9, 100:13, 104:14, 107:10, 107:18, 107:25, 108:17, 108:18, 147:18, 175:9, 175:16, 194:7, 197:25, 198:2, 227:18, 227:24, 229:21
**dioxides** [2] - 198:5
**Direct** [4] - 9:9, 9:10, 9:20, 9:21
**direct** [15] - 30:9, 37:4, 37:5, 66:12, 79:2, 81:16, 100:6, 103:23, 106:10, 154:5, 168:10, 204:24, 213:4, 232:15, 233:3
**DIRECT** [4] - 20:14, 43:22, 211:8, 230:23
**directed** [3] - 66:14, 67:4, 204:16
**direction** [6] - 49:7, 66:4, 77:11, 90:12, 265:11, 265:12
**directional** [1] - 223:18
**directly** [8] - 50:25, 64:6, 65:18, 177:8, 237:23, 237:24, 238:2, 251:20
**director** [2] - 44:5, 211:19
**disagree** [4] - 89:23, 90:22, 92:15, 132:22
**disclose** [1] - 254:17
**disclosed** [1] - 178:6
**discovered** [6] - 78:23, 178:6, 223:7, 223:16, 229:5, 242:15
**discuss** [11] - 11:14, 11:16, 28:24, 30:23, 39:5, 49:24, 57:23, 63:4, 215:3, 215:7, 231:25
**discussed** [21] - 52:6, 55:4, 57:9, 116:3, 130:18, 149:21, 166:7, 166:24, 200:24, 216:8, 223:3, 228:14, 235:21, 237:17, 239:5, 245:16, 265:24, 266:21, 270:15, 271:24, 274:17
**discussing** [3] - 31:19, 56:4, 232:14
**discussion** [14] - 63:1, 80:10, 124:11, 152:9, 173:14, 184:21, 186:5, 190:18, 201:6, 201:25,

205:8, 208:5, 208:17, 226:19
**discussions** [6] - 49:21, 63:8, 63:11, 63:17, 86:1, 97:15
**dispersion** [2] - 218:17, 254:21
**display** [1] - 215:15
**displayed** [1] - 258:25
**disposal** [3] - 126:3, 126:7, 127:5
**dispute** [1] - 170:6
**dissolution** [2] - 219:16, 219:25
**dissolved** [3] - 241:7, 241:23, 242:4
**dissolves** [3] - 217:14, 217:17
**distances** [1] - 131:9
**distribute** [5] - 256:20, 265:20, 267:17, 267:24, 268:24
**distributed** [2] - 256:18, 265:3
**distribution** [6] - 225:11, 250:17, 256:17, 259:12, 264:17, 267:12
**disturbed** [1] - 205:13
**diversified** [1] - 21:17
**divide** [1] - 137:9
**DIVISION** [1] - 1:2
**Division** [1] - 11:10
**division** [4] - 88:15, 244:3, 244:12, 251:17
**divisions** [1] - 88:16
**DMR** [25] - 144:10, 144:12, 144:15, 144:22, 144:25, 145:1, 145:6, 210:17, 226:17, 227:1, 235:17, 235:25, 236:3, 244:5, 244:9, 245:5, 251:20, 254:4, 254:5, 254:9, 254:11, 254:13, 254:16, 254:18, 254:22
**docket** [5] - 11:7, 11:11, 18:16, 24:5, 203:11
**doctorate** [1] - 44:14
**document** [6] - 44:24, 54:8, 147:22, 178:12, 196:25, 266:4
**documentation** [1] - 171:25
**documents** [3] - 18:17, 48:3, 172:13
**dollar** [5] - 178:20, 178:21, 178:25, 181:21, 181:25
**dolostone** [2] - 263:20, 264:3
**done** [24] - 18:20, 18:23, 47:20, 52:14, 71:11, 73:21, 84:13, 105:9, 105:22, 112:13, 112:17, 113:4, 117:18, 143:25, 152:18, 183:20, 221:20, 225:16, 226:21, 249:7, 257:18, 267:8, 272:3
**dots** [1] - 221:21
**double** [1] - 268:10
**double-check** [1] - 268:10
**Douglas** [6] - 66:20, 66:21, 211:2, 211:4, 211:12, 211:13
**DOUGLAS** [8] - 211:5, 238:22, 240:11, 240:25, 247:2, 251:2, 256:9, 256:12
**DOUGLAS/CAITLIN** [1] - 9:19
**down** [14] - 35:15, 60:25, 97:20, 114:9, 114:13, 114:15, 126:13, 145:16, 152:20, 161:25, 165:20, 183:19, 215:12, 275:23
**downhole** [1] - 188:17
**downstream** [2] - 182:20, 183:2
**draft** [3] - 122:12, 158:2, 226:17
**drafting** [1] - 53:2
**drafts** [1] - 88:9
**draw** [1] - 141:5
**drawer** [1] - 172:5
**drawn** [3] - 67:24, 140:6, 186:10
**dresser** [2] - 172:5, 172:12
**dresser-drawer** [1] - 172:5
**drill** [2] - 159:11, 223:14
**drilled** [3] - 234:4, 234:13, 262:23
**drilling** [7] - 38:2, 159:9, 159:13, 159:16, 159:19, 160:3, 161:10
**drinking** [7] - 220:7, 220:11, 232:22, 235:24, 237:20, 240:10, 242:15
**Drinking** [11] - 191:3, 191:8, 191:14, 191:21, 191:23, 239:21, 240:3, 240:6, 240:10, 241:9, 242:16
**drives** [1] - 168:20
**driving** [1] - 22:18
**dual** [1] - 205:22
**due** [7] - 166:8, 216:5, 219:15, 219:24, 219:25, 223:13, 228:12
**duly** [4] - 20:12, 43:20, 211:6, 230:21
**dune** [8] - 264:11, 269:6, 269:12, 269:14, 269:16, 269:22, 269:23
**dunes** [12] - 263:8, 263:19, 265:12, 266:20, 266:23, 266:24, 267:3, 269:3, 269:5, 269:8, 269:9, 269:19
**duplicatable** [1] - 247:16
**duration** [1] - 115:17
**during** [11] - 101:21, 152:13, 159:13, 163:1, 221:24, 234:17, 236:25, 237:10, 257:4, 270:21, 271:1
**duties** [5] - 22:2, 44:18, 44:21, 212:17, 232:1
**duty** [1] - 171:23
**dwellings** [1] - 38:25
**dynamic** [8] - 67:20, 224:23, 225:15, 225:18, 227:4, 230:10, 243:22

## E

**early** [4] - 51:2, 226:14, 226:18, 262:17
**earth** [1] - 64:6
**earthquake** [1] - 221:18
**earthquakes** [3] - 221:17, 221:22, 221:24
**Easement** [1] - 152:22
**easement** [10] - 84:11, 84:22, 85:8, 85:13, 85:18, 85:20, 85:24, 86:23, 87:19, 155:14
**easements** [8] - 60:11, 60:19, 60:22, 61:5, 120:2, 120:11, 121:11, 121:15
**easier** [2] - 35:4, 39:5
**east** [2] - 197:14, 268:22
**East** [5] - 7:19, 8:12, 40:4, 40:10, 41:9
**easy** [1] - 153:13
**economic** [5] - 22:18, 32:24, 63:21, 64:4, 100:17
**economically** [2] - 111:5, 228:23
**economics** [2] - 64:9, 201:25
**economies** [1] - 202:12
**economist** [1] - 32:25
**economy** [6] - 29:11, 29:20, 31:20, 33:7, 33:8, 202:2
**education** [3] - 21:2, 75:2, 245:9
**educational** [4] - 21:1, 44:10, 212:7, 231:10
**EERC** [63] - 38:19, 66:14, 66:16, 66:17, 68:17, 68:24, 69:2, 69:4, 69:6, 69:11, 69:13, 69:18, 70:2, 70:7, 70:9, 70:25, 71:10, 71:11, 71:14, 71:16, 71:25, 72:12, 72:13, 72:16, 73:4, 73:19, 74:4, 74:11, 74:18, 74:25, 75:11, 75:20, 75:22, 140:19, 142:12, 142:15, 143:15, 143:20, 143:22, 144:8, 145:14, 159:17, 183:13, 183:15, 210:9, 211:23, 212:16, 212:19, 212:23, 225:24, 226:13, 231:21, 231:23, 232:3, 233:20, 243:17, 244:11, 245:20, 254:8, 254:13, 254:16, 262:16, 262:22
**EERC's** [2] - 73:11, 245:18
**effect** [5] - 133:4, 133:23, 180:19, 202:1, 219:24
**effective** [1] - 58:17
**effects** [4] - 217:11, 219:14, 220:9, 220:10
**efficient** [1] - 214:16
**efficiently** [1] - 228:1
**efforts** [3] - 44:23, 51:3, 237:10
**egress** [3] - 154:9, 154:13, 154:18
**eight** [7] - 212:15, 231:20, 248:3, 249:7, 249:8, 250:1, 250:9
**either** [4] - 25:4, 208:25, 224:7, 244:4
**elaborate** [1] - 99:16
**electronic** [1] - 268:14
**electronically** [1] - 18:18
**elongated** [4] - 265:12, 266:20, 266:24, 267:3
**elsewhere** [1] - 118:10
**emergency** [1] - 183:18
**emerging** [1] - 32:2
**emissions** [20] - 22:19, 64:6, 100:15, 100:21, 100:23, 101:2, 102:2, 103:6, 103:9, 103:13, 103:15, 104:1, 104:3, 104:8, 104:16, 104:23, 126:13, 126:14, 126:18
**emit** [1] - 194:18
**emitted** [1] - 23:4
**emitting** [1] - 193:13
**emphasis** [2] - 231:13, 245:12
**employed** [5] - 20:19, 44:2, 47:13, 211:15, 231:3
**employees** [2] - 159:20, 159:22
**employment** [5] - 22:3, 44:20, 212:15, 212:18, 232:2
**enables** [1] - 32:2
**enact** [3] - 3:6, 5:7, 7:12
**encompass** [1] - 233:2
**encounter** [2] - 86:13, 257:4

**encountered** [1] - 87:2
**end** [15] - 41:16, 41:18, 42:1, 81:10, 81:12, 81:23, 90:8, 116:12, 139:12, 140:12, 148:12, 169:15, 175:3, 261:22
**endanger** [2] - 238:7
**endangered** [1] - 232:22
**ended** [2] - 194:21, 231:17
**ends** [1] - 82:2
**Energy** [8] - 21:16, 29:2, 64:4, 64:9, 66:7, 66:9, 211:16, 231:4
**energy** [9] - 21:17, 21:20, 21:22, 22:20, 33:7, 34:11, 34:13, 202:4, 202:11
**enforce** [2] - 147:16, 157:18
**engage** [5] - 48:3, 48:4, 58:23, 60:12, 105:2
**engaged** [3] - 38:19, 49:21, 72:21
**engagements** [1] - 50:9
**engineer** [2] - 231:16, 234:18
**engineering** [12] - 21:3, 21:8, 21:24, 22:9, 73:15, 74:23, 143:3, 223:9, 229:6, 238:9, 245:10, 245:24
**engineers** [2] - 68:17, 117:13
**enhanced** [5] - 107:13, 107:21, 108:3, 108:4, 108:21
**enlighten** [1] - 226:5
**ensure** [6] - 100:16, 105:4, 106:19, 152:17, 230:8, 274:20
**enter** [4] - 86:14, 99:6, 129:12, 228:9
**entered** [9] - 94:6, 94:17, 94:20, 99:7, 101:24, 124:24, 133:1, 133:11, 146:24
**entering** [1] - 90:2
**entire** [7] - 97:15, 115:12, 178:22, 233:2, 256:15, 257:24, 261:6
**entirety** [2] - 155:10, 240:12
**entities** [2] - 27:2, 69:7
**entitled** [3] - 78:25, 150:10, 157:15
**entity** [1] - 209:3
**entry** [1] - 216:13
**environment** [16] - 100:14, 100:20, 101:1, 104:15, 238:8, 238:12, 262:19, 262:22, 263:2, 263:5, 263:10, 263:16, 263:23, 264:6, 264:9, 265:1
**Environmental** [4] - 66:7, 66:9, 211:16, 231:4
**environments** [1] - 262:13
**eolian** [2] - 263:8, 263:19
**eolian/nearshore** [1] - 264:2
**EOR** [2] - 109:10, 109:21
**EPA** [3] - 251:22, 251:24, 266:4
**EPA's** [1] - 251:21
**equally** [3] - 57:17, 96:4, 97:10
**equipment** [4] - 188:20, 196:1, 199:10, 199:12
**equitable** [3] - 150:5, 150:25, 199:4
**equivalent** [3] - 36:24, 203:18, 204:1
**Erickson** [1] - 261:3
**error** [2] - 141:22, 151:22
**errors** [3] - 151:19, 196:21, 197:2
**escape** [1] - 229:21
**essence** [3] - 31:15, 32:5, 105:11
**essentially** [15] - 27:21, 29:25, 44:22, 47:13, 48:2, 48:5, 50:19, 86:13, 135:15, 136:19, 136:21, 150:14, 169:5, 182:19, 255:21
**established** [2] - 139:14, 203:15
**establishing** [6] - 2:19, 4:21, 7:1, 14:20, 16:9, 17:21
**establishment** [1] - 203:12
**estate** [3] - 195:15, 207:16, 207:23
**estimate** [2] - 249:12, 274:16
**estimated** [3] - 36:22, 114:14, 255:11
**estimates** [1] - 73:19
**estimation** [1] - 255:14
**et** [5] - 38:25, 64:10, 64:11, 67:11, 154:8
**Ethanol** [3] - 33:12, 34:2, 34:5
**ethanol** [32] - 23:1, 29:2, 29:3, 29:6, 29:12, 29:15, 29:17, 31:3, 31:22, 31:25, 32:1, 32:8, 33:19, 63:1, 64:4, 64:15, 64:18, 65:2, 65:20, 102:6, 102:10, 102:17, 105:2, 106:10, 115:1, 126:14, 193:11, 193:12, 209:1, 209:2, 209:10
**evaluate** [4] - 221:6, 232:17, 245:1, 248:22
**evaluated** [1] - 222:25
**evaluating** [1] - 234:3
**evaluation** [7] - 216:25, 223:3, 225:9, 233:19, 258:5, 262:24, 264:14
**event** [6] - 90:3, 170:6, 170:8, 170:11, 170:16
**events** [3] - 180:22, 180:23, 181:11
**eventually** [4] - 72:12, 166:12, 176:14, 217:18
**everywhere** [2] - 103:19, 139:23
**evidence** [2] - 220:24, 222:22
**exact** [14] - 73:25, 74:8, 88:25, 95:14, 95:16, 95:18, 95:21, 96:18, 97:25, 144:3, 204:1, 247:6, 273:25, 275:2
**exactly** [7] - 66:15, 95:1, 140:15, 144:17, 172:14, 203:8, 204:21
**exam** [1] - 78:23
**Examination** [12] - 9:9, 9:10, 9:11, 9:12, 9:13, 9:14, 9:15, 9:16, 9:17, 9:20, 9:21, 9:22
**examination** [2] - 61:16, 199:7
**EXAMINATION** [12] - 20:14, 43:22, 61:19, 192:10, 195:5, 200:1, 200:20, 207:8, 208:15, 211:8, 230:23, 238:18
**examine** [1] - 236:9
**examined** [5] - 20:12, 43:20, 211:6, 230:21, 236:12
**Examiner** [2] - 9:4, 11:18
**examiner** [9] - 11:8, 12:19, 18:13, 19:9, 20:24, 43:4, 61:8, 78:18, 158:21
**EXAMINER** [50] - 7:23, 11:4, 11:23, 12:8, 13:10, 13:15, 13:20, 19:24, 20:3, 20:7, 20:10, 23:25, 24:14, 25:8, 25:10, 30:18, 30:20, 33:4, 36:20, 37:21, 40:25, 41:3, 43:9, 43:12, 43:15, 43:18, 55:24, 56:1, 61:9, 61:14, 72:19, 79:4, 112:12, 124:1, 124:6, 149:10, 158:25, 179:11, 179:15, 179:19, 192:8, 210:21, 210:24, 211:3, 230:18, 238:16, 240:24, 246:15, 246:20, 276:8
**example** [10] - 87:17, 92:6, 98:8, 117:5, 121:5, 135:19, 145:11, 161:12, 188:22, 244:17
**examples** [1] - 119:4
**exceed** [1] - 234:25
**except** [5] - 78:9, 78:12, 79:6, 161:2, 247:2
**exceptions** [2] - 98:7, 98:10
**excess** [1] - 95:7
**exchange** [2] - 147:6, 176:9
**exclude** [3] - 141:6, 149:2, 149:4
**excuse** [19] - 11:18, 26:9, 32:14, 33:11, 47:18, 54:1, 61:23, 62:22, 66:20, 73:9, 80:20, 81:7, 81:18, 104:2, 104:13, 108:4, 109:1, 153:10, 172:6
**execute** [1] - 93:14
**executed** [2] - 96:18, 206:17
**executing** [2] - 206:11, 206:12
**executive** [4] - 20:22, 21:4, 22:5, 125:11
**exercising** [1] - 169:22
**exhaust** [1] - 78:25
**exhibit** [24] - 24:20, 25:16, 30:17, 30:25, 31:1, 31:8, 39:23, 39:24, 40:20, 41:4, 41:14, 52:24, 53:18, 56:5, 66:15, 67:2, 67:5, 67:8, 67:9, 68:12, 81:14, 152:9, 168:5, 201:23
**Exhibit** [98] - 10:4, 23:13, 23:16, 23:20, 24:19, 30:10, 30:12, 30:23, 31:23, 32:8, 35:3, 37:4, 37:6, 37:10, 39:5, 39:8, 39:21, 39:22, 40:24, 52:20, 53:6, 53:7, 53:8, 53:11, 53:24, 53:25, 54:2, 54:18, 54:22, 55:1, 56:4, 56:5, 56:8, 56:10, 56:16, 56:18, 57:6, 57:7, 57:12, 57:16, 65:25, 68:20, 81:18, 81:20, 82:19, 90:20, 91:21, 93:19, 94:10, 94:14, 94:21, 100:2, 117:25, 128:7, 128:9, 132:10, 134:8, 134:10, 134:11, 135:6, 136:2, 136:4, 137:5, 137:6, 137:20, 146:9, 146:16, 147:12, 147:17, 150:22, 150:23, 151:18, 152:15, 152:16, 153:14, 153:18, 161:25, 168:1, 168:2, 168:4, 168:6, 168:9, 176:9, 177:14, 177:15, 180:12, 180:16, 192:24, 195:13, 200:25, 201:9, 201:17, 203:3, 207:11, 254:24, 260:25
**exhibit's** [1] - 30:20
**Exhibits** [6] - 23:11, 25:14, 26:11, 55:23, 69:8, 184:10
**EXHIBITS** [1] - 10:2
**exhibits** [20] - 23:12, 23:24, 24:3, 24:15, 24:23, 24:24, 25:3, 25:7, 25:10, 31:13,

52:19, 55:2, 55:18, 56:1, 81:17, 87:23, 98:3, 168:2, 168:3, 230:3
**exist** [8] - 58:25, 59:1, 92:2, 116:5, 124:20, 147:18, 172:8, 234:1
**existing** [14] - 58:2, 85:1, 91:8, 111:18, 131:9, 131:21, 151:9, 154:11, 154:17, 155:19, 187:1, 223:1, 236:21
**expand** [4] - 116:3, 117:6, 148:9, 155:15
**expands** [1] - 155:18
**expect** [2] - 218:6, 266:18
**expedites** [1] - 13:2
**expediting** [2] - 12:22, 13:7
**expense** [6] - 72:15, 118:1, 119:25, 120:8, 121:16, 122:11
**Expense** [1] - 118:20
**expenses** [20] - 118:2, 118:5, 118:7, 118:24, 119:1, 119:4, 119:14, 119:16, 119:21, 120:6, 121:3, 121:4, 121:7, 121:19, 122:7, 122:20, 123:4, 123:5, 123:11, 123:12
**experience** [12] - 21:1, 44:10, 87:1, 105:7, 162:24, 171:22, 212:7, 212:12, 231:11, 257:14, 261:11, 269:21
**expert** [7] - 32:23, 125:23, 217:23, 220:8, 221:11, 230:5, 238:5
**expertise** [1] - 143:11
**experts** [4] - 66:16, 69:2, 143:22, 272:9
**explain** [18] - 25:14, 27:7, 41:10, 137:5, 159:5, 160:9, 169:2, 198:13, 199:1, 211:21, 214:8, 232:16, 236:11, 255:8, 258:21, 268:2, 273:18, 273:20
**explained** [2] - 61:1, 215:5
**explaining** [2] - 32:18, 124:12
**explains** [1] - 234:15
**explanation** [3] - 46:21, 206:14, 224:20
**explicitly** [3] - 153:22, 154:22, 155:23
**exploration** [1] - 223:1
**explore** [3] - 145:18, 145:25, 146:11
**expose** [1] - 218:21
**exposure** [1] - 244:22
**Express** [35] - 1:6, 2:8, 3:10, 4:12, 5:12, 6:14, 14:2, 14:17, 15:14, 16:6, 17:2, 17:18, 23:2, 27:9, 27:10, 80:12, 80:14, 80:19, 80:21, 80:24, 80:25, 81:2, 81:9, 81:12, 81:23, 82:14, 82:21, 120:2, 120:11, 121:12, 122:1, 122:6, 123:12, 182:21, 194:10
**express** [1] - 106:2
**expressed** [2] - 96:9, 97:18
**extend** [1] - 117:21
**extension** [5] - 30:6, 64:23, 105:23, 165:13, 253:12
**extensive** [3] - 36:7, 214:20, 216:17
**extensively** [1] - 189:9
**extent** [42] - 24:10, 32:22, 36:9, 41:14, 42:7, 67:10, 67:13, 67:17, 67:20, 67:21, 67:25, 68:11, 68:18, 85:12, 102:24, 107:24, 128:12, 129:9, 130:3, 132:11, 133:5, 139:20, 140:20, 143:8, 146:7, 158:5, 160:16, 161:3, 167:24, 168:18, 172:9, 173:3, 177:3, 187:11, 204:11, 214:18, 214:24, 216:16, 229:16, 232:25, 233:10, 242:10
**extents** [3] - 139:12, 224:25, 225:20
**external** [1] - 140:7
**extraction** [2] - 151:8, 229:7
**extreme** [3] - 218:8, 219:8, 219:9
**extremely** [1] - 259:18
**eye** [2] - 267:5, 269:22

## F

**facilitate** [1] - 160:6
**facilities** [78] - 12:16, 22:10, 25:23, 27:13, 28:1, 31:7, 33:25, 37:11, 40:1, 40:3, 40:7, 41:7, 45:1, 46:18, 63:11, 77:2, 81:6, 81:7, 82:6, 82:10, 86:5, 86:12, 86:20, 90:6, 96:13, 98:24, 113:10, 113:13, 113:18, 113:20, 113:25, 114:2, 114:3, 114:10, 114:16, 116:4, 117:21, 119:15, 123:22, 126:4, 127:6, 128:5, 128:13, 129:5, 129:6, 130:1, 130:7, 130:9, 130:17, 131:11, 153:12, 153:24, 154:7, 166:24, 168:20, 182:17, 182:18, 183:1, 185:7, 186:3, 193:5, 194:4, 194:25, 203:4, 203:13, 208:11, 208:25, 209:8, 209:10, 222:11, 222:17, 224:11, 228:16, 228:19, 228:22, 256:7, 257:23
**Facility** [2] - 134:5, 152:24
**facility** [141] - 1:6, 1:20, 2:9, 3:10, 3:23, 4:12, 5:12, 6:2, 6:14, 15:24, 17:11, 23:18, 23:22, 25:21, 25:22, 26:6, 26:24, 26:25, 27:1, 29:23, 35:16, 37:16, 43:1, 45:15, 47:18, 50:18, 53:13, 54:4, 54:12, 63:2, 64:7, 65:18, 77:23, 77:25, 78:2, 78:4, 78:16, 79:8, 79:23, 80:4, 80:15, 80:22, 93:14, 100:3, 112:2, 115:2, 117:15, 117:20, 123:1, 123:6, 126:12, 128:1, 134:3, 134:17, 134:22, 135:12, 135:17, 135:25, 136:18, 137:3, 137:16, 137:23, 138:5, 138:17, 138:19, 139:3, 139:10, 139:19, 140:22, 145:19, 146:1, 146:12, 149:12, 152:11, 155:7, 175:9, 175:15, 175:20, 175:25, 182:10, 184:14, 184:15, 184:22, 184:24, 184:25, 185:3, 185:4, 185:6, 185:14, 186:7, 186:10, 191:5, 191:14, 195:11, 195:23, 195:25, 196:15, 196:25, 197:4, 198:25, 203:16, 204:2, 204:12, 204:13, 208:5, 208:23, 209:1, 209:2, 212:25, 215:1, 216:3, 216:4, 216:18, 222:14, 223:7, 223:11, 224:4, 224:5, 224:9, 224:16, 227:17, 228:21, 229:2, 229:9, 229:20, 230:8, 230:13, 232:10, 232:11, 232:23, 233:1, 233:8, 233:23, 235:5, 235:8, 238:6, 240:13, 257:21, 260:25, 276:3
**fact** [3] - 54:14, 86:10, 259:16
**factor** [5] - 117:7, 135:22, 136:15, 184:12, 256:4
**factors** [4] - 117:14, 117:17, 184:11, 213:24
**failure** [1] - 183:23
**fair** [36] - 40:15, 40:19, 48:19, 48:20, 59:9, 59:11, 67:22, 68:8, 68:14, 88:6, 94:16, 110:22, 110:24, 121:24, 124:14, 130:16, 133:20, 135:23, 146:18, 148:14, 156:17, 161:23, 164:10, 172:22, 173:20, 176:2, 179:8, 179:9, 181:6, 182:8, 182:12, 187:22, 193:11, 201:24, 205:8, 208:17
**fairly** [1] - 141:17
**faith** [2] - 95:5, 97:19
**fall** [3] - 50:12, 86:18, 153:11
**falls** [2] - 78:6, 121:18
**Falls** [1] - 231:14
**familiar** [12] - 40:16, 74:22, 87:12, 87:15, 89:17, 167:21, 175:2, 175:11, 245:25, 251:10, 265:7, 265:10
**familiarity** [1] - 162:23
**far** [6] - 58:22, 68:11, 139:19, 171:18, 209:7, 237:18
**farm** [1] - 168:20
**farmer** [1] - 168:22
**farmer's** [1] - 168:21
**faster** [1] - 250:1
**faults** [5] - 214:23, 216:14, 220:14, 229:14, 242:9
**favored** [5] - 97:4, 101:25, 165:15, 166:8, 166:16
**feasibility** [1] - 112:14
**feasible** [3] - 112:21, 112:23, 227:18
**federal** [5] - 48:18, 48:21, 83:13, 83:16, 214:2
**fee** [1] - 49:24
**feedback** [1] - 165:9
**fees** [3] - 202:8, 202:9, 202:23
**feet** [12] - 28:14, 140:1, 141:25, 142:8, 215:24, 220:18, 220:20, 236:18, 236:19, 268:5
**fell** [1] - 269:9
**felt** [6] - 256:25, 257:3, 257:15, 261:16, 274:4, 276:4
**few** [6] - 54:14, 70:22, 96:5, 98:7, 119:4, 162:2
**fewer** [1] - 221:23
**field** [15] - 2:19, 3:6, 4:21, 5:8, 7:1, 7:12, 14:20, 16:9, 17:21, 83:12, 168:20, 169:24, 203:12, 203:15, 231:17
**fields** [1] - 257:18
**Figure** [23] - 31:9, 39:7, 81:21, 182:16, 195:12, 203:22, 204:6, 215:14, 216:23, 221:21, 224:1, 233:6, 236:23, 237:9,

237:16, 258:13, 258:17, 262:7, 266:16, 267:6, 268:19, 269:17
**figure** [3] - 37:9, 214:17, 234:15
**file** [13] - 246:9, 246:11, 251:15, 251:24, 252:1, 252:7, 252:11, 252:12, 252:15, 252:17, 253:12, 254:20
**filed** [7] - 18:17, 54:14, 62:18, 172:6, 226:3, 226:8
**files** [5] - 251:11, 252:11, 253:15, 254:9, 254:11
**filing** [1] - 226:7
**fill** [1] - 113:18
**filled** [2] - 65:14, 207:16
**final** [10] - 18:21, 18:23, 23:14, 23:17, 23:21, 55:7, 226:4, 226:11, 237:11, 237:15
**financial** [7] - 2:7, 4:11, 6:13, 14:15, 16:4, 17:16, 102:16
**fine** [3] - 56:24, 209:23, 219:18
**finish** [3] - 19:18, 102:14, 246:17
**fire** [1] - 169:24
**Firm** [2] - 8:19, 11:25
**firm** [1] - 11:20
**firms** [4] - 72:11, 73:20, 74:14, 74:23
**first** [18] - 20:4, 20:12, 43:20, 49:8, 59:18, 71:24, 109:15, 113:3, 145:10, 165:23, 166:9, 192:12, 199:21, 200:23, 211:6, 230:21, 234:3, 255:4
**Fischer** [15] - 19:15, 19:20, 23:19, 25:22, 26:25, 37:12, 39:15, 40:2, 48:11, 49:11, 51:18, 51:19, 53:22, 184:16, 260:25
**fits** [2] - 126:9, 126:10
**fitted** [1] - 28:17
**five** [22] - 27:5, 27:14, 41:15, 41:16, 41:18, 41:21, 42:1, 42:7, 42:11, 42:15, 67:10, 67:13, 67:17, 67:25, 70:24, 95:13, 186:19, 234:25, 235:1, 235:5, 235:6, 261:18
**five-state** [1] - 27:14
**five-year** [2] - 41:21, 186:19
**Flemmer** [14] - 198:14, 215:19, 215:23, 233:13, 234:12, 234:16, 234:17, 236:1, 236:3, 246:7, 255:12, 255:14, 255:23
**flexibility** [1] - 26:16
**Flint** [1] - 29:3
**flippant** [1] - 148:7
**flow** [5] - 103:11, 104:7, 114:9, 218:18, 218:19
**flowing** [1] - 102:17
**flowline** [6] - 26:4, 45:1, 82:10, 193:3, 196:1, 196:2
**flowlines** [11] - 39:3, 39:9, 39:12, 60:2, 60:11, 60:19, 60:23, 82:12, 121:23, 182:23, 193:4
**fluid** [13] - 214:24, 216:16, 217:3, 217:4, 217:11, 220:15, 220:24, 220:25, 221:6, 227:14, 229:16, 230:1, 239:11
**fluids** [6] - 112:25, 113:2, 159:12, 189:6, 218:23, 234:19
**focus** [1] - 18:21
**focused** [1] - 263:5
**folks** [6] - 143:20, 145:14, 159:16, 183:13, 184:5
**follow** [7] - 19:5, 19:6, 35:4, 105:13, 163:3, 179:3, 194:21
**follow-up** [1] - 194:21
**followed** [1] - 139:16
**following** [5] - 11:1, 130:9, 137:19, 139:15, 198:1
**follows** [4] - 20:13, 43:21, 211:7, 230:22
**foot** [4] - 141:15, 141:16, 142:6, 142:24
**footprint** [2] - 27:14, 97:15
**FOR** [2] - 8:14, 8:22
**force** [8] - 133:23, 141:10, 170:2, 170:3, 170:6, 170:8, 170:11, 170:15
**forcing** [1] - 182:9
**forget** [1] - 140:15
**forgive** [1] - 87:4
**Forks** [1] - 240:18
**Form** [7] - 57:7, 58:7, 162:1, 168:7, 176:20, 176:21, 177:16
**form** [14] - 18:22, 18:24, 23:14, 23:17, 23:21, 86:25, 87:2, 97:11, 171:25, 180:12, 226:4, 226:11, 227:4, 269:11
**format** [2] - 246:10, 246:14
**Formation** [50] - 1:5, 2:4, 2:17, 3:6, 3:9, 4:7, 4:20, 5:7, 5:11, 6:10, 6:23, 7:11, 14:1, 15:8, 15:14, 16:21, 17:2, 18:9, 28:3, 188:13, 214:9, 214:19, 215:4, 215:5, 215:12, 215:13, 217:19, 220:22, 221:7, 221:9, 222:4, 222:19, 222:21, 222:24, 227:21, 233:25, 234:11, 236:14, 236:15, 236:17, 237:24, 237:25, 239:1, 239:3, 240:1, 243:13, 255:15, 257:15, 265:8
**formation** [24] - 149:19, 159:7, 185:14, 185:15, 185:19, 190:2, 217:3, 217:4, 217:15, 221:2, 222:1, 222:20, 227:15, 229:13, 248:5, 248:6, 248:10, 262:11, 262:13, 262:18, 263:12, 264:1, 266:19, 269:7
**formations** [9] - 188:20, 215:11, 222:15, 222:23, 229:10, 240:19, 241:25, 242:12, 250:16
**former** [1] - 167:14
**forms** [12] - 87:13, 87:19, 87:23, 88:10, 88:16, 88:23, 89:1, 89:16, 261:12, 264:11, 264:20, 269:23
**FORSBERG** [1] - 8:8
**forth** [1] - 43:8
**forward** [3] - 18:11, 48:6, 86:15
**fossil** [3] - 127:10, 127:17, 127:25
**foundation** [4] - 32:23, 36:19, 37:20, 41:2
**four** [5] - 72:1, 72:4, 144:18, 207:17, 208:20
**Fourth** [1] - 8:20
**Fox** [12] - 199:11, 220:22, 236:14, 236:17, 236:20, 236:21, 237:3, 237:7, 237:25, 238:2, 239:5, 239:25
**fracture** [5] - 221:3, 221:4, 222:3, 222:5, 262:1
**fractures** [5] - 214:23, 216:15, 220:14, 229:15, 242:9
**frame** [3] - 85:7, 113:15, 221:24
**framework** [1] - 225:10
**frameworks** [1] - 21:24
**Fredrikson** [2] - 8:11, 11:20
**Free** [1] - 118:17
**free** [3] - 122:18, 150:15, 178:9
**fresh** [1] - 229:11
**freshwater** [11] - 191:9, 236:9, 236:12, 237:4, 237:6, 239:5, 239:6, 239:9, 239:20, 240:8, 242:16
**FRIED** [1] - 8:7
**front** [6] - 66:1, 100:8, 123:20, 225:2, 239:16, 273:6
**Front** [1] - 8:12
**fuel** [9] - 29:25, 32:3, 35:16, 105:3, 110:12, 125:1, 127:10, 127:17, 127:25
**fuels** [4] - 29:25, 30:2, 32:3, 32:4
**fulfill** [1] - 22:23
**full** [14] - 20:16, 43:24, 113:21, 113:23, 114:10, 114:16, 133:23, 198:8, 198:10, 211:10, 230:25, 250:6, 255:4, 256:22
**full-time** [1] - 250:6
**fully** [1] - 106:1
**fundamental** [2] - 115:12, 115:15
**funded** [4] - 70:7, 70:9, 70:11, 214:2
**FURTHER** [2] - 200:1, 208:15
**furthest** [1] - 55:6
**future** [11] - 21:19, 32:4, 116:5, 169:10, 208:3, 208:8, 223:17, 224:1, 224:6, 224:9, 229:5

## G

**gain** [2] - 90:5, 207:25
**gallons** [3] - 29:17, 30:1, 30:4
**gamma** [1] - 248:21
**Garner** [2] - 11:7, 28:5
**GARNER** [50] - 7:22, 11:4, 11:23, 12:8, 13:10, 13:15, 13:20, 19:24, 20:3, 20:7, 20:10, 23:25, 24:14, 25:8, 25:10, 30:18, 30:20, 33:4, 36:20, 37:21, 40:25, 41:3, 43:9, 43:12, 43:15, 43:18, 55:24, 56:1, 61:9, 61:14, 72:19, 79:4, 112:12, 124:1, 124:6, 149:10, 158:25, 179:11, 179:15, 179:19, 192:8, 210:21, 210:24, 211:3, 230:18, 238:16, 240:24, 246:15, 246:20, 276:8
**Garner**..... .... [1] - 9:4
**Gary** [1] - 12:7
**gas** [45] - 38:1, 44:16, 78:10, 78:13, 79:7, 100:15, 100:21, 100:23, 102:2, 103:6, 103:9, 103:12, 103:15, 103:18, 104:8, 104:15, 104:23, 107:14,

107:21, 108:5, 108:21, 111:21, 111:24, 112:5, 122:19, 122:22, 149:16, 149:23, 150:2, 150:3, 150:19, 150:21, 151:1, 151:4, 151:8, 161:19, 199:11, 217:14, 223:1, 232:8, 233:15, 233:16, 244:3, 244:12, 251:16
**Gas** [1] - 11:9
**GAS** [1] - 1:2
**gases** [1] - 112:9
**gather** [1] - 167:9
**GDP** [1] - 29:14
**gears** [1] - 52:18
**GEM** [7] - 210:7, 219:21, 243:19, 252:4, 253:11, 253:24, 254:21
**general** [9] - 21:15, 38:10, 113:6, 115:6, 129:25, 171:3, 180:20, 182:5, 222:1
**generally** [33] - 33:1, 57:24, 59:18, 59:23, 59:25, 74:2, 74:24, 87:15, 116:1, 116:16, 118:5, 127:5, 127:18, 127:20, 127:23, 127:24, 139:15, 143:19, 160:11, 160:13, 161:19, 170:4, 171:21, 175:3, 175:6, 175:11, 183:8, 212:19, 232:3, 232:6, 240:21, 251:12, 272:10
**generated** [2] - 140:7, 251:15
**generation** [3] - 127:11, 127:17, 128:1
**geochemical** [16] - 217:24, 218:1, 218:4, 218:12, 218:23, 219:20, 220:2, 228:3, 228:5, 228:12, 243:25, 244:17, 244:25, 245:5, 252:3, 253:18
**geographic** [2] - 116:4, 117:8
**geologic** [68] - 1:4, 1:18, 2:8, 3:5, 3:8, 3:22, 4:11, 5:6, 5:10, 5:24, 6:13, 7:11, 13:25, 14:9, 14:15, 15:7, 15:13, 15:23, 16:5, 16:20, 16:25, 17:10, 17:17, 18:8, 23:18, 32:11, 32:15, 36:10, 38:20, 64:12, 100:12, 104:13, 107:10, 107:17, 107:25, 108:16, 117:15, 139:5, 144:25, 205:6, 210:9, 210:11, 211:25, 212:5, 213:1, 217:1, 217:7, 222:1, 224:23, 225:5, 225:7, 225:9, 225:12, 225:14, 227:3, 227:12, 227:22, 230:10, 232:21, 238:10, 238:11, 245:18, 246:25, 252:4, 259:22, 266:4, 268:1, 268:23
**Geologic** [1] - 36:21
**Geological** [4] - 212:14, 222:18, 236:7, 241:20
**geologist** [1] - 234:18
**geology** [11] - 36:4, 36:6, 38:21, 63:22, 212:10, 214:1, 214:4, 214:6, 231:13, 245:10, 245:11
**geophysical** [1] - 211:25
**geophysics** [1] - 245:12
**geoscience** [3] - 68:16, 69:2, 143:3
**geoscientists** [1] - 212:4
**Gerald** [6] - 136:20, 136:22, 136:23, 137:10, 137:22
**Gerald's** [2] - 136:24, 150:24
**GERVING** [1] - 8:23
**Gerving** [1] - 12:3
**given** [11] - 46:11, 65:7, 78:25, 134:18, 166:15, 247:18, 260:17, 272:5, 272:24, 273:2, 273:8
**gladly** [1] - 47:25
**glass** [1] - 78:13
**Glenn** [1] - 12:3
**global** [8] - 96:6, 97:9, 100:14, 100:20, 100:25, 104:15, 106:24, 271:15
**globally** [6] - 30:3, 101:23, 102:21, 103:21, 255:10, 255:20
**Gludt** [1] - 11:21
**GLUDT** [1] - 8:10
**gold** [1] - 262:19
**good-faith** [1] - 95:5
**govern** [1] - 131:22
**governed** [1] - 253:2
**grab** [2] - 135:4, 137:4
**gradient** [3] - 222:4, 222:6, 262:2
**graduate** [1] - 212:13
**graduated** [1] - 231:12
**graduating** [1] - 21:7
**Grant** [1] - 152:21
**grant** [8] - 98:12, 98:22, 154:14, 155:14, 156:10, 156:21, 160:1, 160:22
**granted** [7] - 98:9, 148:1, 148:3, 148:19, 155:23, 161:6, 200:10
**granting** [1] - 154:2
**grants** [1] - 58:15
**graphical** [1] - 246:14
**gray** [3] - 31:5, 164:12
**great** [1] - 19:12
**greater** [7] - 35:10, 35:22, 35:24, 36:1, 54:12, 65:8, 125:4
**green** [2] - 47:3, 47:10
**greenhouse** [12] - 100:15, 100:21, 100:23, 102:2, 103:6, 103:9, 103:12, 103:15, 103:17, 104:8, 104:15, 104:22
**grid** [4] - 141:16, 142:7, 268:1, 268:8
**gross** [2] - 150:15, 151:6
**ground** [4] - 109:24, 237:8, 237:10, 261:24
**ground-truthed** [1] - 237:8
**ground-truthing** [1] - 237:10
**groundwater** [5] - 199:11, 233:11, 237:9, 237:13, 237:14
**Group** [9] - 239:20, 241:3, 242:2, 242:17, 243:6, 243:7, 243:10
**group** [4] - 61:4, 89:15, 195:4, 205:5
**groups** [2] - 12:25, 13:1
**grow** [1] - 33:14
**grown** [1] - 33:23
**growth** [2] - 22:18
**guess** [11] - 50:8, 53:20, 76:7, 114:7, 123:7, 178:16, 201:2, 203:3, 205:10, 210:1, 276:10
**guidance** [1] - 266:4
**Gulf** [1] - 21:12
**guys** [5] - 76:18, 192:4, 196:8, 199:19, 215:14

## H

**half** [13] - 33:20, 45:16, 46:6, 50:18, 140:3, 142:1, 194:16, 197:5, 197:6, 197:7, 197:14, 197:16, 261:6
**half-mile** [1] - 50:18
**hand** [6] - 132:23, 211:4, 230:19, 240:20, 241:13
**handed** [2] - 24:20, 39:20
**handle** [1] - 196:17
**hard** [2] - 50:23, 259:7
**Harmless** [1] - 169:4
**HAUPT** [1] - 8:23
**Haupt** [3] - 12:4, 88:21, 89:14
**hazard** [1] - 184:3
**head** [1] - 142:4
**health** [2] - 238:7, 238:12
**healthier** [1] - 104:4
**hear** [4] - 36:5, 36:12, 131:5, 211:14
**heard** [2] - 245:20, 245:23
**HEARING** [51] - 7:15, 7:23, 11:4, 11:23, 12:8, 13:10, 13:15, 13:20, 19:24, 20:3, 20:7, 20:10, 23:25, 24:14, 25:8, 25:10, 30:18, 30:20, 33:4, 36:20, 37:21, 40:25, 41:3, 43:9, 43:12, 43:15, 43:18, 55:24, 56:1, 61:9, 61:14, 72:19, 79:4, 112:12, 124:1, 124:6, 149:10, 158:25, 179:11, 179:15, 179:19, 192:8, 210:21, 210:24, 211:3, 230:18, 238:16, 240:24, 246:15, 246:20, 276:8
**hearing** [33] - 11:6, 11:7, 11:8, 11:12, 12:15, 12:16, 13:2, 13:8, 13:9, 13:22, 14:4, 14:11, 14:19, 15:10, 15:17, 16:1, 16:8, 16:23, 17:4, 17:13, 17:19, 28:6, 28:7, 30:25, 45:5, 46:19, 50:16, 83:23, 84:14, 90:8, 201:23, 202:15, 202:23
**Hearing** [1] - 9:4
**hearings** [8] - 11:5, 11:8, 12:22, 51:2, 80:11, 84:8, 99:12, 276:11
**hearsay** [3] - 24:8
**height** [1] - 273:5
**held** [5] - 50:20, 50:21, 178:5, 180:7, 231:19
**Hell** [1] - 236:15
**HELMS** [1] - 8:3
**help** [7] - 78:21, 100:16, 105:4, 106:19, 118:12, 139:10, 152:2
**helped** [1] - 226:16
**helpful** [1] - 12:22
**helping** [2] - 70:25, 71:5
**helps** [1] - 274:20
**hereby** [2] - 172:10, 173:10
**herein** [1] - 11:2
**hereof** [1] - 152:14
**hereto** [2] - 132:10, 152:15
**hereunder** [1] - 168:14
**heterogeneity** [1] - 264:25
**heterogenous** [5] - 256:8, 256:12, 256:14, 256:17, 257:8
**hide** [2] - 144:5, 144:7
**high** [11] - 28:15, 28:16, 52:8, 213:11, 213:15, 216:11, 216:12, 259:18, 260:8, 264:22, 269:4
**high-angle** [1] - 264:22
**high-level** [2] - 213:11, 213:15

**high-strength** [1] - 28:16
**higher** [20] - 219:3, 219:12, 255:16, 255:25, 257:13, 260:21, 260:23, 260:24, 261:22, 262:2, 262:3, 262:4, 272:20, 274:11, 274:14, 274:17, 274:18, 274:19
**highlight** [4] - 20:24, 44:8, 212:6, 231:10
**Hill** [1] - 237:25
**Hills** [11] - 199:11, 220:22, 236:14, 236:17, 236:20, 236:21, 237:3, 237:7, 238:2, 239:5, 239:25
**Hintz** [20] - 19:16, 19:21, 23:22, 25:22, 26:25, 37:15, 39:13, 40:2, 40:8, 40:9, 40:11, 40:14, 48:13, 49:13, 51:21, 51:22, 53:20, 53:22, 184:16, 197:1
**hire** [2] - 171:1, 172:21
**historic** [1] - 196:3
**historical** [5] - 221:17, 221:18, 221:22, 221:24, 223:2
**Historical** [1] - 196:9
**history** [1] - 235:15
**hit** [1] - 209:24
**hmm** [11] - 92:21, 92:23, 134:7, 136:12, 140:5, 153:21, 160:15, 172:15, 186:8, 188:5, 259:6
**Hold** [1] - 169:4
**hold** [1] - 107:6
**holding** [1] - 45:5
**homogenous** [1] - 256:8
**honestly** [1] - 85:4
**honor** [4] - 92:7, 93:2, 132:3, 133:10
**Honor** [6] - 32:22, 61:18, 124:9, 179:22, 238:17, 246:23
**honored** [1] - 92:13
**hopefully** [1] - 19:23
**horizon** [2] - 189:2, 239:12
**horizons** [3] - 188:25, 189:11, 247:14
**horizontal** [5] - 187:17, 230:5, 230:12, 266:10, 275:4
**horizontally** [1] - 223:15
**hour** [1] - 124:2
**hourly** [1] - 74:16
**hours** [1] - 250:9
**housekeeping** [2] - 11:15, 18:13
**huge** [1] - 63:21
**human** [2] - 238:7, 238:11
**hundred** [2] - 95:20, 198:24
**hundreds** [2] - 116:16, 217:20
**hydraulically** [1] - 221:7
**hydrocarbon** [3] - 222:16, 222:20, 229:5
**hydrocarbon-bearing** [1] - 222:20
**hydrocarbons** [7] - 196:15, 222:21, 222:23, 223:6, 223:8, 223:10, 223:16
**hydrogeology** [1] - 231:13

**I**

**idea** [4] - 115:7, 226:8, 254:1, 254:5
**ideal** [2] - 36:4, 238:10
**identified** [19] - 38:2, 38:9, 38:11, 39:1, 46:1, 59:15, 60:7, 78:20, 111:8, 134:10, 134:16, 141:14, 186:20, 189:12, 190:10, 203:4, 204:11, 233:18, 239:8
**identifies** [2] - 178:4, 204:13
**identify** [3] - 47:14, 234:7, 237:6
**identifying** [4] - 45:11, 45:20, 48:1, 203:3
**ignoring** [1] - 219:10
**illustrating** [1] - 203:23
**image** [1] - 221:3
**immediately** [1] - 11:22
**impact** [15] - 30:7, 58:24, 58:25, 103:1, 103:24, 153:16, 177:10, 177:13, 217:24, 218:3, 218:12, 220:2, 220:6, 228:12, 256:4
**impacted** [2] - 60:24, 138:24
**impacts** [2] - 41:6, 103:20
**impedance** [5] - 249:1, 250:10, 251:7, 265:19, 267:18
**impermeable** [5] - 220:21, 237:21, 238:1, 238:3, 240:17
**implemented** [1] - 101:5
**implication** [1] - 108:9
**implied** [1] - 153:8
**imply** [1] - 164:11
**importance** [1] - 30:24
**important** [1] - 101:9
**imported** [1] - 210:8
**impose** [18] - 91:20, 91:21, 91:25, 93:4, 94:9, 94:14, 118:18, 118:19, 120:21, 131:15, 132:5, 133:7, 147:22, 171:10, 172:24, 173:18, 176:21, 178:8
**imposed** [7] - 98:5, 119:9, 147:14, 147:20, 150:17, 155:10, 170:13
**imposes** [1] - 94:11
**improvements** [1] - 168:17
**incidental** [2] - 197:25, 198:9
**include** [9] - 44:22, 86:21, 114:3, 128:23, 223:12, 230:7, 236:6, 266:7, 266:8
**included** [36] - 1:18, 3:21, 5:24, 14:9, 15:22, 17:9, 26:5, 38:3, 44:23, 46:16, 46:21, 50:8, 50:23, 86:19, 87:7, 101:25, 104:17, 123:5, 129:18, 139:17, 141:2, 141:22, 153:12, 165:11, 165:12, 165:14, 165:15, 167:6, 225:9, 227:13, 233:23, 236:22, 236:24, 237:1, 237:15, 273:13
**includes** [20] - 29:8, 39:24, 87:3, 134:21, 135:10, 172:19, 172:20, 199:10, 210:8, 211:22, 212:12, 217:1, 217:2, 230:14, 232:25, 236:15, 236:17, 239:11, 239:13
**including** [28] - 12:2, 38:15, 38:24, 55:12, 84:18, 84:25, 95:24, 96:22, 107:13, 107:20, 108:3, 108:4, 108:21, 123:24, 130:7, 132:9, 165:9, 197:25, 198:8, 200:7, 209:18, 212:4, 221:2, 227:22, 244:21, 244:22, 272:14, 273:14
**incorrect** [1] - 169:1
**increase** [9] - 95:25, 96:2, 116:6, 165:12, 165:13, 165:14, 256:21, 261:20
**increased** [2] - 223:12, 223:13
**increases** [1] - 163:5
**increasing** [1] - 261:5
**incremental** [1] - 116:20
**incrementally** [1] - 189:23
**incurred** [5] - 118:3, 118:25, 119:5, 120:8, 123:13
**indebtedness** [6] - 118:2, 118:6, 118:8, 118:25, 119:5, 120:8
**Indemnification** [1] - 169:4
**indemnified** [1] - 181:2
**indentured** [1] - 171:17
**independent** [2] - 67:23, 68:1
**INDEX** [1] - 9:2
**Indian** [1] - 196:3
**indicate** [8] - 54:10, 67:24, 125:20, 198:23, 202:3, 203:6, 209:6, 274:13
**indicated** [13] - 19:4, 19:7, 41:6, 46:24, 66:3, 83:13, 83:18, 142:15, 176:16, 210:4, 220:23, 223:22, 262:9
**indicates** [7] - 35:8, 41:14, 41:24, 81:22, 173:3, 205:11, 208:20
**indicating** [3] - 55:19, 138:3, 258:23
**indication** [2] - 264:12, 269:18
**indicative** [1] - 179:4
**indicator** [1] - 258:1
**individual** [16] - 13:4, 83:19, 91:8, 94:18, 94:19, 96:10, 96:20, 137:18, 146:15, 167:2, 173:18, 174:23, 192:17, 192:20, 193:7, 258:2
**individually** [2] - 61:4, 257:23
**individuals** [6] - 13:3, 46:1, 47:8, 96:14, 176:19, 250:4
**induced** [2] - 221:16, 222:7
**industrial** [23] - 26:17, 27:4, 27:13, 36:25, 42:20, 62:25, 75:25, 76:15, 76:25, 77:18, 82:5, 107:12, 107:20, 108:2, 108:20, 125:15, 125:17, 125:19, 127:10, 127:14, 208:18, 208:20, 209:3
**Industrial** [14] - 11:6, 12:15, 28:6, 61:25, 91:19, 93:3, 128:23, 132:18, 133:7, 156:10, 156:20, 156:25, 171:10, 178:8
**industries** [5] - 22:21, 100:17, 101:7, 106:20, 202:5
**industry** [15] - 21:11, 21:22, 29:12, 30:3, 33:19, 70:14, 70:25, 71:5, 102:9, 105:5, 105:8, 105:18, 225:8, 225:16
**inferred** [1] - 265:16
**influence** [1] - 265:11
**information** [25] - 31:16, 37:25, 38:2, 38:12, 38:19, 42:19, 46:14, 67:23, 68:21, 167:10, 177:21, 177:23, 178:3, 226:3, 227:7, 235:22, 241:17, 245:1, 245:6, 246:12, 254:17, 269:24, 273:9, 273:11, 273:13

**informational** [1] - 50:19
**informed** [1] - 258:7
**infrastructure** [3] - 34:15, 34:16, 38:24
**ingress** [3] - 154:8, 154:13, 154:18
**initial** [2] - 162:6, 162:17
**inject** [11] - 23:6, 28:2, 64:21, 147:17, 169:22, 200:11, 261:22, 261:23, 261:25, 262:2, 262:4
**injected** [8] - 27:16, 112:1, 188:9, 217:9, 218:2, 223:11, 225:1, 225:20
**injecting** [2] - 117:10, 187:1
**injection** [71] - 23:8, 26:15, 27:1, 37:23, 38:7, 39:1, 39:4, 40:9, 40:10, 40:11, 58:9, 59:16, 60:8, 67:10, 67:25, 81:5, 82:10, 106:10, 112:15, 122:20, 139:13, 140:13, 152:25, 155:8, 160:7, 186:21, 194:5, 198:8, 200:8, 200:9, 200:15, 200:16, 202:8, 214:13, 216:13, 216:20, 219:19, 219:20, 219:22, 220:6, 223:14, 227:18, 233:14, 235:16, 237:14, 238:12, 242:20, 242:22, 242:25, 243:1, 243:2, 243:4, 255:13, 255:24, 256:2, 257:12, 257:13, 257:17, 257:20, 258:11, 261:9, 270:3, 270:5, 270:8, 271:23, 272:6, 272:13, 273:22, 274:25, 275:10
**injections** [1] - 113:11
**injectivity** [4] - 217:25, 220:2, 270:21, 271:1
**injector** [1] - 182:25
**injectors** [2] - 117:19, 188:18
**injects** [1] - 106:23
**input** [9] - 140:23, 227:10, 244:21, 251:10, 251:15, 252:1, 252:6, 252:7, 252:11
**inputs** [1] - 225:14
**inside** [6] - 45:15, 46:5, 138:16, 138:18, 138:23, 141:21
**inspections** [1] - 189:17
**inspector** [1] - 231:17
**instead** [6] - 13:6, 85:17, 197:5, 197:15, 274:2
**institution** [2] - 70:8, 75:15
**institutions** [2] - 72:11, 73:20
**instruments** [1] - 132:7
**insurance** [12] - 178:13, 178:25, 179:5, 179:24, 179:25, 180:6, 180:21, 181:1, 181:7, 181:9, 181:22, 181:24
**insureds** [3] - 181:12, 181:14, 182:6
**integrated** [3] - 27:11, 28:11, 211:20
**integrity** [3] - 217:24, 218:3, 228:8
**intend** [4] - 58:23, 112:8, 176:8, 196:12
**intended** [10] - 118:18, 118:23, 119:9, 120:21, 122:17, 122:19, 165:19, 169:10, 185:5, 185:7
**intending** [3] - 98:14, 131:15, 193:3
**intends** [1] - 159:6
**intensity** [1] - 32:1
**intent** [11] - 116:25, 133:12, 155:21, 161:13, 169:4, 169:14, 173:18, 178:19, 202:5, 205:25, 208:7
**intention** [5] - 99:9, 133:10, 173:5, 173:9, 174:1
**intentional** [2] - 130:4, 204:15
**interaction** [4] - 217:24, 218:7, 220:1, 243:25
**interactions** [4] - 218:1, 218:10, 228:5, 228:12
**interbedded** [4] - 263:8, 263:19, 264:2, 264:12
**interest** [20] - 12:10, 43:1, 49:16, 100:12, 104:12, 136:10, 136:15, 136:24, 137:19, 138:3, 138:4, 138:5, 139:1, 150:15, 152:11, 206:2, 206:10, 206:22, 207:25, 208:3
**interested** [1] - 18:10
**interests** [6] - 51:9, 131:12, 138:2, 148:21, 206:22, 207:19
**Interests** [1] - 161:7
**interfere** [2] - 221:12, 221:15
**internal** [1] - 138:22
**interpret** [5] - 247:10, 264:8, 269:2, 269:14, 269:16
**interpretation** [8] - 255:18, 261:14, 263:1, 269:13, 269:21, 270:16, 271:7, 272:13
**interpretations** [1] - 268:10
**interpretative** [1] - 247:3
**interpreted** [3] - 247:11, 247:14, 267:2
**interpreting** [1] - 249:22
**interrupted** [1] - 40:12
**interrupting** [1] - 59:20
**intervals** [1] - 268:4
**intervenor** [1] - 156:24
**intervenors** [5] - 12:2, 254:2, 254:6, 254:10, 254:14
**INTERVENORS** [1] - 8:22
**inversion** [1] - 258:8
**investigation** [6] - 167:10, 183:21, 257:1, 270:22, 271:6, 272:15
**investing** [2] - 21:21, 125:6
**investment** [1] - 116:11
**investments** [1] - 124:24
**invitation** [1] - 50:16
**invited** [1] - 60:24
**involved** [14] - 45:3, 45:19, 47:16, 48:15, 53:2, 66:23, 87:16, 270:25, 271:4, 271:5, 271:7, 271:10, 271:14, 271:22
**involvement** [2] - 213:4, 269:20
**Inyan** [1] - 221:8
**Iowa** [7] - 27:6, 28:19, 83:10, 103:16, 104:1, 123:2, 123:24
**isolated** [2] - 221:7, 234:19
**isopach** [1] - 262:9
**issuance** [1] - 229:1
**issue** [4] - 84:20, 99:3, 102:18, 174:17
**issued** [2] - 108:7, 175:8
**issues** [4] - 84:18, 91:2, 99:2, 158:23
**it'd** [1] - 249:25
**it'll** [2] - 183:6, 217:15
**item** [1] - 200:3
**items** [1] - 200:24
**itself** [8] - 54:11, 144:15, 144:21, 217:10, 233:23, 243:4, 243:9, 252:14

## J

**Jay** [3] - 77:9, 77:15, 77:16
**Jeff** [21] - 20:2, 20:9, 43:24, 44:2, 44:8, 46:15, 47:16, 52:19, 54:25, 59:20, 61:6, 76:10, 101:20, 111:16, 128:11, 145:20, 160:4, 160:25, 164:21, 165:2, 207:10
**JEFFREY** [1] - 43:19
**Jeffrey** [1] - 44:1
**jet** [1] - 29:25
**Jimmy** [3] - 183:16, 183:25, 193:24
**JoAnne** [1] - 207:22
**job** [1] - 22:18
**jobs** [1] - 29:13
**JOCHIM** [1] - 8:23
**Jochim** [1] - 12:4
**Joe** [1] - 170:24
**John** [1] - 12:4
**joinder** [1] - 205:22
**joined** [1] - 208:2
**joint** [1] - 206:20
**JoLene** [1] - 12:6
**Jordan** [1] - 211:12
**judge** [1] - 73:1
**jump** [2] - 192:12, 199:20
**June** [4] - 7:20, 11:3, 11:7, 276:14
**juris** [1] - 44:14
**jurisdiction** [5] - 42:14, 174:23, 174:24, 193:18, 193:23

## K

**Kansas** [2] - 212:11, 212:13
**Kara** [1] - 221:9
**keep** [3] - 12:13, 12:17, 197:21
**keeping** [1] - 248:4
**Kelly** [1] - 225:25
**Kevin** [1] - 12:4
**key** [1] - 213:12
**KH** [3] - 272:22, 273:1, 273:14
**Kimberly** [1] - 12:5
**kind** [21] - 24:8, 32:23, 32:24, 38:18, 40:6, 93:4, 94:25, 105:23, 112:17, 141:2, 142:18, 142:20, 160:9, 160:17, 162:20, 167:23, 183:20, 186:14, 252:1, 262:12
**kinds** [2] - 73:15, 189:18
**Kirk** [1] - 12:5
**KJ** [15] - 23:22, 25:22, 26:25, 37:15, 39:13, 40:2, 40:8, 40:9, 40:11, 40:14, 48:13, 49:13, 51:21, 51:22, 197:1
**knowing** [2] - 247:20, 249:6
**knowledge** [12] - 69:11, 113:6, 142:16, 143:11, 144:9, 172:11, 193:15, 230:4, 254:8, 269:24, 271:24, 274:15
**knowledgeable** [1] - 143:4
**known** [4] - 23:2, 48:10, 219:6, 224:12
**knows** [1] - 75:8
**Kraft** [1] - 12:5
**KRAFT** [1] - 8:23

## L

**labeled** [2] - 39:10, 215:16
**laboratory** [1] - 272:21
**lack** [1] - 221:17
**lacustrine** [1] - 263:9
**laid** [1] - 37:9
**Land** [1] - 85:24
**land** [24] - 30:7, 38:14, 44:5, 49:3, 49:6, 56:19, 101:11, 129:12, 135:16, 138:14, 138:22, 152:23, 153:23, 155:7, 168:16, 169:20, 169:21, 173:24, 174:1, 176:13, 181:25, 196:22, 199:1
**landman** [1] - 44:17
**landmen** [1] - 50:5
**landowner** [36] - 12:2, 38:21, 86:11, 90:14, 90:15, 90:18, 91:22, 92:12, 92:19, 93:5, 93:20, 94:2, 96:24, 119:19, 128:6, 129:14, 137:18, 147:9, 147:15, 148:13, 149:25, 150:7, 170:16, 170:18, 170:22, 170:25, 171:4, 171:11, 172:25, 176:13, 176:16, 176:22, 177:7, 179:7, 180:8, 206:16
**landowners** [83] - 48:1, 48:3, 48:4, 48:8, 48:10, 50:6, 50:17, 51:4, 57:22, 58:24, 60:9, 60:25, 83:20, 85:2, 85:11, 86:8, 88:25, 89:21, 89:24, 91:8, 91:14, 91:25, 93:16, 94:5, 94:7, 94:10, 94:12, 94:15, 94:18, 94:20, 95:6, 96:4, 97:12, 97:16, 97:21, 98:4, 98:13, 101:17, 111:13, 112:9, 116:8, 128:8, 129:10, 130:2, 131:5, 138:9, 138:16, 139:6, 141:4, 146:20, 147:14, 149:18, 153:20, 154:12, 154:21, 156:24, 162:25, 164:15, 164:20, 165:7, 166:2, 166:8, 166:14, 166:16, 166:18, 167:2, 173:19, 174:17, 176:4, 177:5, 177:11, 177:13, 180:1, 180:4, 181:1, 181:11, 182:4, 182:9, 185:17, 185:22, 199:5, 199:17, 237:5
**landowners'** [1] - 97:17
**lands** [25] - 2:19, 4:22, 7:2, 14:21, 16:10, 17:21, 49:17, 59:9, 84:3, 84:4, 86:6, 99:4, 99:8, 134:21, 145:19, 146:1, 146:11, 153:2, 153:3, 153:7, 155:16, 156:7, 157:13, 177:25, 196:3
**Lands** [15] - 49:7, 49:22, 84:2, 84:5, 84:10, 84:22, 85:10, 86:23, 87:13, 87:18, 88:9, 88:17, 89:2, 99:1, 99:18
**language** [14] - 86:21, 88:4, 89:20, 154:23, 169:14, 181:13, 201:1, 201:3, 205:22, 205:23, 206:2, 206:23, 207:4, 208:7
**large** [9] - 36:9, 96:22, 105:9, 107:23, 116:11, 116:22, 165:7, 214:13, 256:25
**largely** [1] - 57:8
**larger** [5] - 13:1, 29:8, 116:25, 269:21, 276:7
**largest** [1] - 101:7
**last** [13] - 13:12, 19:1, 30:1, 50:12, 52:16, 55:5, 55:11, 70:24, 115:21, 144:18, 163:22, 246:16, 275:18
**lastly** [4] - 46:22, 48:11, 49:13, 51:1
**late** [5] - 51:2, 66:24, 172:5, 221:23, 226:18
**lately** [1] - 111:23
**lateral** [4] - 27:22, 224:25, 225:19, 264:17
**laterally** [4] - 214:20, 215:1, 216:17, 217:13
**launcher** [1] - 183:9
**Law** [4] - 8:11, 8:19, 8:19, 11:25
**law** [11] - 11:20, 44:13, 108:25, 109:1, 150:3, 150:21, 158:18, 171:4, 171:21, 171:22, 176:14
**LAWRENCE** [1] - 8:10
**Lawrence** [2] - 11:19, 99:23
**laws** [1] - 151:4
**lawyer** [7] - 147:25, 158:11, 158:13, 158:16, 171:16, 175:17, 205:21
**lawyers** [2] - 171:1, 172:21
**layer** [1] - 258:18
**layers** [9] - 36:8, 187:25, 188:3, 188:13, 237:21, 238:3, 238:4, 264:3
**layout** [1] - 183:11
**lead** [3] - 22:7, 66:14, 66:17
**leaders** [2] - 21:23
**leadership** [1] - 21:5
**leading** [1] - 51:1
**leak** [1] - 242:11
**leakage** [1] - 242:7
**lease** [96] - 48:7, 49:20, 50:11, 50:24, 57:16, 58:1, 60:16, 84:11, 84:24, 85:13, 85:17, 85:20, 85:24, 86:17, 86:18, 89:10, 89:12, 91:21, 92:1, 92:19, 92:24, 93:2, 93:5, 93:17, 93:21, 94:2, 94:10, 94:18, 94:19, 95:1, 95:4, 96:6, 96:7, 96:8, 96:9, 97:9, 97:11, 97:23, 98:2, 98:4, 98:5, 98:6, 116:22, 119:8, 119:11, 119:13, 119:17, 121:3, 121:6, 122:19, 128:7, 128:15, 130:11, 131:2, 131:17, 131:22, 131:23, 132:15, 132:16, 133:6, 133:10, 146:5, 146:6, 146:9, 146:16, 146:19, 147:2, 147:18, 147:20, 152:15, 152:18, 153:14, 154:22, 154:25, 155:19, 155:20, 155:24, 156:1, 161:7, 164:16, 167:17, 168:7, 173:3, 176:7, 176:8, 176:12, 178:21, 180:12, 185:18, 185:24, 198:4, 200:4, 200:25, 208:3
**Lease** [7] - 57:8, 58:7, 162:1, 176:20, 176:22, 177:16, 177:23
**Leased** [1] - 177:24
**leased** [20] - 51:5, 51:7, 51:13, 51:24, 55:7, 55:15, 55:20, 57:17, 58:2, 59:3, 85:1, 94:15, 116:16, 131:17, 132:5, 146:7, 152:12, 154:4, 155:17, 195:21
**leasehold** [2] - 55:7, 175:22
**leases** [46] - 38:23, 47:17, 48:17, 50:2, 52:7, 52:12, 52:16, 54:15, 83:19, 85:10, 88:24, 91:9, 92:3, 96:17, 116:24, 119:12, 119:18, 119:22, 129:8, 129:19, 130:24, 132:3, 132:6, 132:9, 133:1, 133:22, 141:7, 146:14, 146:20, 153:9, 153:20, 153:22, 154:12, 154:17, 154:22, 155:23, 162:22, 163:12, 163:19, 163:21, 165:8, 165:23, 167:8, 167:12, 176:19, 224:12
**leasing** [9] - 52:9, 98:17, 162:23, 163:25, 164:3, 164:5, 195:22
**leasings** [1] - 47:17
**least** [2] - 130:14, 268:14
**leave** [1] - 174:4
**left** [1] - 11:22
**legacy** [3] - 222:25, 233:14, 233:16
**Legal** [1] - 196:25
**legal** [11] - 44:5, 46:17, 54:8, 94:6, 111:7, 147:24, 158:22, 158:24, 181:17, 181:18, 182:7
**legally** [3] - 171:5, 176:24, 180:7
**legend** [1] - 258:22
**Legislature** [1] - 108:7
**legislature** [4] - 148:2, 148:4, 148:19, 157:9
**legitimate** [1] - 170:10
**Leingang** [17] - 19:13, 19:17, 19:20, 23:15, 25:21, 26:24, 37:14, 39:14, 40:2, 48:9, 49:8, 51:12, 53:21, 100:3, 137:8, 184:16, 260:19
**length** [1] - 120:25
**lengthy** [1] - 18:14
**less** [10] - 74:12, 95:15, 95:17, 95:20, 250:19, 250:21, 251:6, 251:8, 275:9, 275:13
**Lessee** [4] - 177:21, 177:23, 178:4, 178:6
**lessee** [2] - 46:9, 130:6
**lessees** [2] - 46:8, 229:3
**lesser** [1] - 274:20
**Lessor** [1] - 178:6
**lessor** [6] - 168:14, 168:15, 172:10, 172:16, 173:10, 177:20
**lessor's** [1] - 168:16
**lessors** [1] - 122:22
**level** [11] - 59:7, 59:8, 128:5, 166:25, 184:3, 213:11, 213:15, 244:23, 269:8, 269:9, 273:17
**levels** [1] - 179:5
**liability** [3] - 180:20, 181:21, 182:5
**liable** [1] - 180:7
**license** [5] - 252:19, 252:24, 253:2, 253:7, 253:9
**LIEBELT** [1] - 8:24
**Liebelt** [1] - 12:5
**life** [8] - 114:14, 115:2, 115:9, 199:5, 207:16, 207:22, 236:25, 237:13
**lignite** [8] - 21:11, 21:19, 116:14, 124:17, 127:18, 127:22, 222:13, 228:19
**likely** [5] - 65:11, 103:1, 177:10, 262:4, 274:10
**limestone** [1] - 263:17
**limestones** [1] - 263:9

**limit** [11] - 141:24, 169:14, 178:20, 178:21, 178:25, 181:21, 182:1, 185:18, 185:23, 256:3
**limit's** [1] - 182:2
**limitations** [2] - 158:1, 158:4
**limited** [4] - 12:17, 155:12, 158:5, 158:8
**limiting** [1] - 117:7
**limits** [10] - 2:19, 4:22, 7:2, 14:20, 16:9, 17:21, 41:16, 157:20, 187:17
**Linda** [1] - 12:5
**line** [15] - 27:24, 67:14, 67:18, 67:24, 68:6, 81:23, 113:3, 116:13, 123:8, 136:20, 140:6, 204:2, 204:13, 233:9
**lines** [10] - 27:22, 67:1, 68:3, 68:5, 68:23, 69:1, 130:8, 139:16, 186:6
**links** [3] - 247:11, 249:20, 249:23
**Lisa** [1] - 12:3
**list** [3] - 201:6, 207:3, 244:18
**listed** [17] - 11:5, 35:12, 56:20, 69:7, 100:9, 122:17, 134:14, 134:16, 193:2, 197:3, 207:23, 208:25, 239:12, 244:19, 244:20, 247:12, 272:12
**listening** [1] - 192:14
**literally** [3] - 140:6, 171:7, 261:5
**lithologies** [2] - 264:18, 265:2
**livelihoods** [1] - 22:22
**Livers** [1] - 211:13
**Livers-Douglas** [1] - 211:13
**Living** [1] - 12:2
**LIVING** [1] - 8:22
**LLC** [57] - 1:4, 1:15, 1:19, 2:6, 3:4, 3:8, 3:19, 3:23, 4:8, 4:9, 5:6, 5:10, 5:21, 6:1, 6:11, 7:10, 13:24, 14:6, 14:13, 15:7, 15:12, 15:19, 15:24, 16:3, 16:25, 17:6, 17:11, 17:15, 18:8, 23:14, 25:1, 25:18, 25:19, 25:25, 26:8, 26:9, 48:13, 61:22, 62:1, 62:2, 62:5, 62:8, 62:9, 62:11, 62:12, 62:14, 62:22, 69:3, 69:9, 71:10, 71:22, 72:9, 193:2, 193:6
**LLCs** [2] - 193:1, 193:7
**load** [1] - 252:12
**loaded** [1] - 253:23
**locate** [1] - 51:4
**located** [26] - 1:6, 1:20, 2:9, 2:19, 3:10, 3:23, 4:13, 4:22, 5:12, 6:2, 6:15, 7:2, 14:21, 16:10, 17:22, 37:13, 37:14, 37:16, 49:3, 64:2, 64:11, 98:21, 196:2, 222:16, 223:10
**locating** [1] - 50:9
**location** [7] - 31:6, 37:8, 46:18, 60:8, 60:11, 199:10, 214:1
**locations** [7] - 31:3, 37:10, 38:25, 59:16, 60:1, 60:10, 203:5
**locked** [1] - 110:14
**Lodgepole** [1] - 239:19
**log** [14] - 198:14, 215:15, 215:18, 217:2, 248:21, 255:17, 256:18, 259:23, 261:12, 261:13, 262:10, 266:8, 267:23
**logs** [13] - 217:4, 221:3, 223:4, 227:14, 248:24, 252:18, 252:21, 253:5, 253:10, 258:4, 258:6, 263:6, 264:15
**long-term** [1] - 216:21
**look** [26] - 30:22, 72:23, 73:13, 74:2, 100:2, 118:14, 126:8, 131:24, 141:19, 142:2, 157:5, 170:21, 173:8, 182:14, 190:1, 203:25, 207:15, 207:21, 218:8, 219:7, 233:6, 234:4, 237:3, 259:11, 269:1
**looked** [12] - 37:24, 74:6, 89:17, 167:8, 221:1, 221:2, 221:6, 221:18, 248:16, 263:6, 263:7, 273:1
**looking** [26] - 35:4, 39:5, 39:7, 74:16, 134:24, 134:25, 135:6, 140:11, 159:3, 168:4, 172:7, 182:13, 194:24, 197:21, 203:24, 204:4, 205:21, 235:25, 256:14, 258:16, 259:9, 263:3, 266:24, 268:18, 268:19, 268:20
**looks** [2] - 204:14, 205:1
**LOPA** [1] - 184:2
**lost** [7] - 168:15, 168:16, 168:17, 169:19, 169:20, 169:21
**low** [8] - 32:3, 65:10, 105:3, 110:12, 216:10, 218:5, 218:6, 220:18
**low-carbon** [2] - 105:3, 110:12
**lower** [15] - 31:25, 32:13, 64:23, 142:10, 200:7, 217:19, 222:5, 238:20, 239:2, 239:4, 242:12, 274:7, 274:10, 274:14
**lowermost** [1] - 239:25
**lowest** [3] - 220:21, 236:11, 236:13
**lunch** [1] - 124:2
**LYNN** [1] - 8:3

## M

**MADCHE** [7] - 8:5, 192:11, 195:3, 197:21, 199:20, 200:2, 200:19
**Madche.....** [1] - 9:14
**Madche.....** [1] - 9:12
**Madison** [5] - 14:2, 241:3, 242:2, 242:17, 243:6
**magnitude** [1] - 63:25
**mail** [5] - 46:12, 46:25, 50:11, 50:13, 86:18
**mailing** [1] - 47:5
**mailings** [1] - 47:2
**main** [4] - 83:8, 83:10, 121:25, 250:12
**mainline** [2] - 27:23, 39:9
**maintain** [3] - 75:12, 159:11, 177:20
**maintaining** [1] - 178:24
**MAIZE** [1] - 8:24
**Maize** [2] - 12:6
**majeure** [6] - 170:3, 170:7, 170:8, 170:11, 170:15
**major** [1] - 105:1
**majority** [4] - 44:15, 166:6, 227:10, 227:12
**makeup** [1] - 189:6
**manage** [3] - 211:24, 212:1, 212:4
**management** [1] - 22:24
**manager** [1] - 21:15
**mandates** [1] - 158:9
**manner** [4] - 75:12, 100:13, 100:15, 229:9
**manual** [1] - 183:18
**manually** [1] - 83:11
**map** [22] - 30:13, 31:2, 53:12, 53:13, 67:1, 67:14, 67:18, 105:24, 182:16, 195:13, 203:23, 214:18, 221:22, 223:25, 233:4, 233:6, 233:10, 236:22, 259:11, 262:9, 266:18
**mapping** [1] - 37:25
**maps** [7] - 216:22, 216:24, 237:9, 241:5, 241:6, 241:13, 241:18
**margin** [1] - 141:22
**marine** [2] - 263:8, 264:2
**MARK** [1] - 8:4
**marked** [7] - 24:19, 39:22, 54:22, 55:1, 65:25, 81:17, 268:14
**market** [8] - 29:21, 33:22, 65:8, 65:10, 65:12, 167:19, 176:4, 176:17
**marketing** [1] - 176:23
**markets** [9] - 30:7, 32:3, 33:22, 34:22, 101:9, 102:7, 102:12, 103:2, 105:3
**marking** [1] - 24:10
**mass** [2] - 198:7, 198:8
**massive** [1] - 65:10
**master's** [2] - 212:10, 245:11
**match** [3] - 235:15, 248:23, 255:11
**matches** [2] - 201:16, 201:19
**material** [11] - 30:7, 33:22, 94:21, 94:23, 94:25, 95:4, 95:23, 96:10, 96:25, 97:11, 97:23
**mathematical** [1] - 152:5
**Matt** [1] - 225:25
**matter** [26] - 12:18, 13:11, 13:22, 14:3, 14:11, 14:18, 15:9, 15:16, 15:25, 16:7, 16:22, 17:3, 17:12, 17:19, 18:13, 69:21, 72:5, 72:7, 82:1, 90:13, 132:17, 171:4, 176:14, 182:11, 248:6, 272:9
**matters** [4] - 11:5, 11:15, 12:24, 235:20
**max** [3] - 243:2, 260:4, 260:19
**maximum** [1] - 261:2
**MCE** [4] - 193:16, 194:10, 194:16, 194:24
**mean** [23] - 35:1, 48:12, 62:15, 84:19, 86:3, 121:25, 122:15, 123:21, 138:12, 146:24, 148:7, 148:8, 161:8, 164:10, 172:13, 173:10, 182:19, 185:1, 185:2, 188:14, 193:4, 240:5, 262:7
**meaning** [5] - 109:3, 150:15, 207:18, 249:17, 250:19
**means** [11] - 57:19, 136:21, 149:3, 171:24, 175:12, 175:20, 192:16, 205:22, 263:6, 268:2, 271:9
**meant** [1] - 151:25
**measurement** [1] - 183:10
**mechanical** [2] - 151:21, 152:1
**mechanism** [2] - 217:22, 218:17
**mechanisms** [2] - 217:6, 238:11

**meet** [2] - 196:12, 232:17
**meeting** [1] - 50:6
**meetings** [4] - 50:5, 50:20, 97:21, 97:24
**members** [2] - 159:18, 233:20
**memory** [3] - 87:4, 165:12, 166:3
**mention** [1] - 243:7
**mentioned** [27] - 12:20, 25:17, 28:11, 31:23, 54:14, 69:20, 107:22, 141:1, 165:24, 167:1, 183:2, 190:20, 216:14, 217:16, 218:5, 220:12, 225:18, 226:14, 227:20, 228:18, 229:12, 229:23, 239:8, 245:17, 250:12, 264:19, 275:25
**Mercer** [15] - 1:13, 2:3, 2:16, 3:3, 3:17, 4:6, 4:19, 5:5, 15:5, 16:18, 28:1, 37:11, 37:13, 38:3, 125:7
**met** [1] - 61:3
**metering** [1] - 183:9
**method** [2] - 199:4, 248:15
**methodologies** [1] - 144:3
**methodology** [1] - 186:17
**methods** [3] - 225:8, 225:17, 229:6
**metric** [7] - 163:5, 165:22, 194:7, 194:8, 194:12, 194:13, 194:17
**Metz** [1] - 12:6
**METZ** [1] - 8:24
**Michael** [2] - 12:3, 12:4
**middle** [1] - 205:1
**Midwest** [36] - 1:6, 2:8, 3:10, 4:12, 5:12, 6:14, 14:17, 15:14, 16:5, 17:2, 17:17, 22:19, 23:2, 27:5, 27:8, 27:10, 80:12, 80:14, 80:19, 80:21, 80:23, 80:25, 81:2, 81:9, 81:11, 81:22, 82:14, 82:20, 120:2, 120:11, 121:12, 122:1, 122:5, 123:11, 182:20, 194:10
**might** [14] - 28:8, 35:3, 99:20, 111:4, 114:3, 114:5, 157:3, 201:9, 234:1, 247:13, 250:17, 266:8, 266:25, 274:17
**migration** [9] - 214:25, 216:16, 220:15, 220:24, 220:25, 224:25, 229:16, 230:1, 234:19
**Mike** [2] - 88:21, 89:14
**mile** [7] - 23:7, 45:16, 46:6, 50:18, 140:3, 142:1, 233:1
**miles** [8] - 28:12, 40:8, 40:10, 40:14, 193:16, 193:20, 193:22, 193:25
**millidarcies** [6] - 259:1, 259:9, 259:12, 260:9, 260:15, 261:3
**million** [19] - 29:19, 30:1, 33:13, 33:14, 178:19, 178:21, 178:25, 181:20, 181:25, 194:7, 194:8, 194:12, 194:17, 194:18, 194:19, 240:15, 241:11, 243:11
**millions** [1] - 116:17
**Milton** [14] - 198:14, 215:18, 215:19, 215:23, 233:13, 234:12, 234:15, 234:16, 236:1, 236:3, 246:6, 255:12, 255:14, 255:23
**mind** [10] - 19:25, 89:5, 92:9, 93:8, 93:10, 118:12, 120:15, 180:14, 201:11, 248:4
**Mine** [1] - 224:3
**mine** [12] - 21:16, 116:10, 116:13, 124:11, 124:13, 124:17, 125:11, 127:22, 128:2, 162:8, 162:9, 223:24
**mine-mouth** [6] - 116:10, 116:13, 124:11, 124:13, 124:17, 127:22
**mineral** [13] - 44:23, 45:14, 46:7, 46:8, 128:24, 151:9, 151:10, 151:12, 170:11, 178:9, 196:16, 229:2, 229:3
**Mineral** [3] - 11:9, 231:15, 231:18
**mineralization** [1] - 217:21
**mineralogy** [2] - 218:24, 244:18
**minerals** [11] - 107:14, 107:21, 108:5, 108:22, 150:11, 219:25, 222:10, 222:12, 228:15, 228:17, 229:7
**mines** [6] - 124:17, 124:20, 125:15, 127:22, 223:23, 224:3
**minimize** [2] - 58:25, 141:9
**minimum** [1] - 28:14
**mining** [6] - 127:15, 127:21, 224:2, 224:6, 224:15, 228:22
**Minnekahta** [5] - 215:21, 215:24, 215:25, 216:6
**Minnelusa** [6] - 239:19, 241:2, 242:2, 242:17, 243:7, 243:10
**Minnesota** [2] - 27:6, 212:9
**Minnesota's** [1] - 21:6
**Minnkota** [6] - 19:21, 40:3, 69:24, 70:20, 105:25, 106:3
**Minnkota's** [1] - 167:15
**minor** [3] - 98:7, 205:15, 264:3
**minute** [5] - 37:5, 54:23, 61:11, 179:12, 246:16
**miscalculation** [2] - 151:21, 152:1
**mischaracterization** [3] - 92:16, 97:2, 157:23
**misheard** [1] - 244:10
**misread** [1] - 162:7
**missed** [1] - 201:9
**Mission** [1] - 239:18
**mistake** [1] - 151:24
**mixture** [1] - 87:25
**mixtures** [1] - 87:6
**model** [86] - 38:20, 67:20, 68:18, 139:5, 140:7, 140:11, 142:5, 142:23, 142:25, 143:4, 143:9, 143:11, 144:8, 144:11, 144:15, 144:21, 145:1, 145:3, 210:3, 210:4, 210:5, 210:8, 210:9, 210:11, 217:1, 218:18, 218:20, 218:21, 218:22, 219:16, 225:12, 225:14, 227:3, 227:10, 227:12, 235:14, 235:17, 238:25, 243:16, 243:19, 243:21, 243:24, 246:4, 246:25, 247:6, 247:15, 247:25, 248:2, 248:11, 249:2, 249:23, 250:11, 250:21, 251:4, 251:13, 252:4, 253:11, 253:13, 253:16, 253:24, 254:21, 255:6, 255:9, 255:20, 255:22, 256:16, 257:9, 257:25, 258:3, 258:19, 259:22, 260:14, 261:18, 265:21, 265:22, 267:18, 268:1, 268:23, 268:24, 268:25, 270:4, 273:1, 274:16, 276:2
**modeled** [8] - 139:13, 139:20, 140:4, 194:6, 219:1, 261:20, 268:8, 274:25
**modelers** [1] - 212:5
**modeling** [31] - 42:3, 69:1, 73:15, 117:18, 141:15, 143:21, 183:21, 205:6, 213:2, 218:4, 218:15, 219:6, 219:12, 219:20, 224:23, 225:5, 225:7, 226:20, 228:3, 230:10, 243:25, 244:18, 244:25, 245:2, 245:4, 245:6, 245:19, 248:1, 266:5, 266:6, 267:8
**models** [16] - 68:24, 244:3, 244:12, 245:15, 247:17, 247:22, 249:4, 251:2, 252:2, 252:3, 252:6, 257:23, 266:4, 266:7, 266:9, 266:12
**modification** [2] - 173:4, 174:20
**modified** [1] - 161:3
**modify** [1] - 166:17
**moment** [3] - 130:19, 165:16, 223:21
**moments** [1] - 54:14
**monetary** [2] - 165:22, 167:11
**monetize** [1] - 101:13
**money** [3] - 121:11, 121:14, 147:6
**monitor** [5] - 189:15, 189:19, 189:21, 189:23, 196:1
**monitored** [1] - 28:19
**monitoring** [32] - 188:19, 188:20, 188:21, 188:23, 188:25, 189:1, 189:5, 189:9, 189:10, 189:12, 189:13, 189:14, 189:16, 190:1, 190:9, 190:15, 190:19, 190:21, 190:22, 190:25, 199:10, 233:12, 234:14, 235:8, 236:25, 237:2, 237:12, 237:13, 237:14, 242:19, 242:23
**monitors** [1] - 190:16
**Moorhead** [1] - 212:9
**morning** [2] - 52:17, 276:10
**Morton** [6] - 1:14, 2:3, 2:16, 3:3, 15:5, 38:4
**most** [8] - 19:16, 21:14, 32:8, 32:10, 52:16, 112:4, 166:16, 216:2
**mostly** [2] - 44:17, 263:20
**motion** [17] - 2:18, 4:21, 7:1, 13:11, 13:13, 13:23, 14:4, 14:12, 14:19, 15:10, 15:17, 16:1, 16:8, 16:23, 17:4, 17:13, 17:20
**mouth** [6] - 116:10, 116:13, 124:11, 124:13, 124:17, 127:22
**move** [10] - 22:11, 23:23, 43:5, 60:5, 61:10, 125:6, 159:12, 197:23, 198:22, 230:16
**moved** [1] - 48:5
**movement** [2] - 189:13, 189:19

**moving** [2] - 164:24, 198:19
**MR** [237] - 8:3, 8:4, 8:4, 8:5, 8:6, 8:7, 8:7, 8:10, 8:10, 8:18, 11:17, 11:24, 12:19, 13:14, 13:16, 18:12, 19:25, 20:5, 20:9, 20:15, 23:23, 24:1, 24:6, 24:7, 24:16, 24:17, 25:7, 25:9, 25:12, 30:17, 30:19, 30:22, 32:21, 33:5, 36:19, 36:21, 37:3, 37:20, 37:22, 40:24, 41:1, 41:5, 43:3, 43:11, 43:14, 43:17, 43:23, 55:22, 55:25, 56:3, 61:6, 61:18, 61:20, 61:23, 62:15, 62:18, 72:18, 72:20, 73:2, 75:17, 75:18, 75:21, 76:10, 76:11, 77:3, 78:18, 78:22, 79:5, 81:19, 81:20, 81:24, 83:17, 89:5, 89:8, 89:11, 93:10, 93:13, 93:18, 99:23, 99:25, 100:1, 100:4, 100:5, 100:22, 104:9, 105:6, 107:22, 108:15, 110:16, 110:18, 111:15, 111:17, 112:11, 112:13, 112:16, 118:9, 118:12, 118:13, 118:14, 118:15, 119:3, 120:15, 120:18, 120:23, 121:21, 121:24, 122:2, 122:3, 122:4, 124:3, 124:9, 124:10, 124:15, 128:11, 128:12, 136:3, 136:4, 136:5, 136:6, 136:7, 139:9, 145:20, 145:21, 149:8, 149:11, 152:2, 152:3, 152:4, 152:6, 152:8, 156:12, 156:17, 156:19, 158:21, 159:1, 159:8, 160:25, 161:2, 162:7, 162:9, 162:10, 162:11, 162:12, 162:13, 162:20, 164:21, 165:4, 167:5, 167:6, 167:7, 167:13, 168:8, 175:6, 178:14, 178:16, 178:18, 179:2, 179:14, 179:22, 179:23, 180:2, 183:4, 184:17, 186:12, 187:5, 187:8, 187:14, 187:16, 187:19, 187:20, 187:22, 187:23, 191:20, 192:1, 192:4, 192:7, 193:9, 195:6, 195:17, 196:5, 196:11, 196:17, 196:19, 197:9, 197:10, 197:12, 197:20, 197:22, 197:23, 198:16, 198:18, 198:21, 199:18, 199:23, 200:18, 200:21, 201:11, 202:16, 205:14, 205:18, 206:3, 206:5, 206:6, 206:7, 206:8, 206:14, 206:18, 207:3, 207:5, 207:6, 207:9, 207:13, 208:12, 208:13, 208:16, 209:12, 209:19, 209:23, 209:25, 210:19, 210:23, 211:1, 211:9, 230:15, 230:24, 238:14, 238:17, 238:19, 240:23, 241:1, 246:23, 246:24, 250:22, 250:24, 251:1, 251:5, 256:13
**MS** [18] - 8:5, 8:6, 8:8, 8:18, 192:11, 195:3, 197:21, 199:20, 200:2, 200:19, 238:22, 239:22, 240:11, 240:25, 247:2, 251:2, 256:9, 256:12
**mud** [2] - 223:4, 223:12
**multiple** [17] - 50:8, 71:13, 96:21, 97:21, 138:21, 148:21, 149:18, 165:1, 165:2, 165:10, 166:7, 177:5, 237:21, 238:3, 252:6, 261:12, 266:3
**multiplier** [18] - 255:10, 255:19, 256:15, 256:21, 256:24, 259:3, 259:7, 259:15, 260:3, 261:4, 265:6, 270:14, 270:20, 271:15, 272:1, 272:17, 274:2, 276:1
**multiply** [2] - 137:1, 258:2

## N

**NAICS** [7] - 42:20, 42:23, 75:24, 76:15, 76:25, 77:18, 208:18
**name** [12] - 20:4, 20:16, 43:24, 77:14, 97:3, 104:23, 137:10, 137:20, 140:16, 203:7, 211:10, 230:25
**named** [2] - 181:14, 262:21
**names** [1] - 138:11
**nations** [5] - 97:4, 101:25, 165:15, 166:8, 166:16
**natural** [4] - 78:10, 78:13, 79:6
**naturally** [1] - 221:16
**nature** [4] - 74:16, 259:19, 260:17, 266:14
**ND** [12] - 1:14, 2:4, 2:17, 3:3, 3:17, 4:7, 4:19, 5:5, 5:20, 6:9, 6:22, 7:9
**NDIC** [6] - 8:2, 46:20, 62:19, 246:7, 273:12, 273:14
**NDIC's** [1] - 227:13
**NDL-325** [1] - 39:15
**NDL-326** [1] - 39:13
**NDL-327** [1] - 39:13
**NDM-106** [1] - 39:10
**near** [1] - 21:11
**Nebraska** [1] - 27:6
**necessarily** [4] - 132:21, 151:11, 173:7, 177:1
**necessary** [25] - 3:6, 5:8, 7:12, 42:15, 48:3, 128:17, 132:11, 152:24, 153:25, 154:24, 155:8, 155:12, 155:13, 155:15, 156:5, 156:23, 157:18, 158:6, 160:21, 161:9, 161:22, 186:2, 200:13, 206:25
**necessity** [1] - 87:9
**need** [23] - 11:15, 21:20, 51:25, 52:11, 55:10, 60:1, 87:10, 110:10, 120:13, 122:22, 129:11, 139:6, 173:7, 174:2, 181:18, 182:7, 191:10, 191:16, 197:1, 202:21, 245:1, 245:3, 266:12
**needed** [16] - 60:12, 90:4, 107:12, 107:19, 108:2, 113:25, 125:2, 128:25, 138:14, 160:6, 191:24, 210:17, 234:21, 235:19, 270:17, 276:7
**needs** [5] - 59:3, 154:8, 159:11, 161:9, 168:19
**negate** [1] - 87:10
**negotiate** [3] - 94:25, 95:3, 129:10
**negotiated** [1] - 132:17
**negotiating** [4] - 85:9, 88:15, 99:18, 166:18
**negotiations** [13] - 44:25, 95:6, 97:1, 97:12, 101:22, 162:25, 163:2, 163:11, 164:20, 164:25, 165:5, 166:13, 167:2
**neighborhood** [1] - 140:2
**net** [2] - 150:16, 151:7
**network** [1] - 105:15
**never** [2] - 122:21, 180:14
**New** [1] - 50:21
**new** [7] - 35:23, 70:15, 71:1, 71:6, 102:7, 163:21, 249:22
**next** [16] - 20:7, 27:19, 43:5, 44:8, 46:3, 48:4, 56:5, 106:23, 148:10, 196:17, 205:3, 205:5, 210:25, 221:8, 235:13, 236:23
**night** [1] - 13:12
**nitrogen** [1] - 35:13
**No(s)** [1] - 1:3
**nonconsent** [2] - 57:10, 150:8
**nonconsenting** [6] - 1:18, 3:21, 5:23, 14:9, 15:22, 17:9
**none** [1] - 95:23
**nonethanol** [1] - 35:19
**nonetheless** [1] - 74:2
**nonhazardous** [4] - 126:2, 126:6, 127:2, 127:4
**nonleased** [1] - 150:7
**NORTH** [1] - 1:1
**North** [171] - 1:7, 1:9, 1:11, 1:12, 1:13, 1:21, 1:22, 2:1, 2:2, 2:3, 2:10, 2:11, 2:14, 2:15, 2:16, 2:20, 2:22, 3:1, 3:2, 3:3, 3:11, 3:14, 3:15, 3:16, 4:1, 4:3, 4:5, 4:6, 4:14, 4:16, 4:18, 4:19, 4:23, 5:2, 5:4, 5:4, 5:13, 5:14, 5:16, 5:18, 5:19, 6:2, 6:4, 6:5, 6:8, 6:9, 6:15, 6:17, 6:18, 6:20, 6:22, 7:2, 7:4, 7:5, 7:8, 7:9, 7:19, 8:13, 8:20, 8:21, 11:6, 11:25, 14:22, 14:24, 15:2, 15:3, 15:5, 16:11, 16:14, 16:16, 16:18, 16:19, 17:22, 17:24, 18:1, 18:4, 18:6, 18:7, 21:3, 21:10, 21:13, 23:6, 27:5, 27:14, 27:19, 27:25, 31:5, 32:16, 32:19, 33:6, 33:8, 33:9, 33:17, 33:20, 33:23, 34:12, 34:14, 36:2, 36:4, 36:7, 36:14, 36:16, 36:25, 44:13, 46:4, 49:7, 49:22, 61:25, 63:21, 63:23, 65:1, 65:6, 65:21, 70:10, 70:23, 71:3, 84:2, 84:9, 84:21, 87:1, 99:1, 100:17, 101:6, 101:10, 102:3, 103:7, 103:13, 103:15, 103:24, 104:10, 104:22, 106:11, 108:7, 124:12, 124:17, 127:18, 127:22, 135:20, 136:9, 147:22, 150:7, 156:9, 156:20, 156:25, 157:1, 158:10, 160:13, 163:18, 164:1, 171:9, 175:4, 178:7, 193:18, 193:22, 196:9, 197:2, 197:13, 198:2, 202:1, 202:5, 202:11, 211:17, 214:3, 214:19, 221:17, 222:18, 235:3, 239:20, 240:12, 241:19, 265:15
**northeast** [4] - 197:6, 197:15, 197:16, 267:4
**northwest** [1] - 197:6
**note** [6] - 12:9, 173:13,

200:5, 211:13, 220:16, 252:15
**noted** [6] - 24:15, 82:20, 218:25, 259:13, 260:18, 261:15
**notes** [4] - 174:7, 201:12, 201:13, 201:19
**nothing** [7] - 92:9, 111:23, 192:7, 206:15, 240:1, 247:20, 249:6
**notice** [16] - 45:3, 45:7, 45:12, 46:2, 46:5, 46:6, 46:11, 46:15, 46:19, 46:22, 47:8, 47:9, 47:10, 47:15, 48:16
**noticed** [1] - 88:3
**now's** [2] - 179:11, 246:15
**Number** [10] - 13:21, 14:3, 14:18, 15:9, 15:16, 15:25, 16:7, 16:22, 17:3, 17:12
**number** [39] - 12:1, 31:10, 51:4, 76:18, 76:21, 84:8, 84:25, 95:14, 95:16, 95:18, 95:21, 96:13, 96:18, 97:25, 99:24, 101:2, 101:3, 134:21, 135:20, 136:8, 136:15, 137:4, 137:9, 137:17, 137:23, 165:7, 165:9, 194:2, 200:23, 203:7, 207:15, 207:22, 258:24, 271:16, 271:19, 272:24, 273:22, 274:20, 274:24
**numbering** [1] - 53:16
**numbers** [7] - 57:21, 162:18, 162:21, 163:6, 174:13, 197:9, 258:23
**numerical** [2] - 210:7, 210:12
**numerous** [4] - 18:16, 163:13, 163:17, 262:23

## O

**O2** [1] - 219:12
**object** [7] - 24:7, 32:21, 36:19, 37:20, 41:1, 156:12, 161:19
**objecting** [1] - 176:13
**objection** [13] - 23:25, 24:13, 24:14, 25:8, 25:9, 30:19, 33:3, 55:24, 55:25, 72:18, 149:8, 206:6, 240:23
**objections** [3] - 30:18, 40:25, 43:12
**objectives** [1] - 157:19
**obligated** [2] - 118:22, 171:5
**obligation** [5] - 118:20, 171:10, 172:20, 179:7
**observed** [1] - 260:4
**obtain** [4] - 64:20, 145:17, 155:21, 191:10
**obtained** [1] - 47:15
**obviated** [1] - 92:5
**obviously** [5] - 12:12, 101:7, 103:19, 162:23, 182:24
**Occupancy** [1] - 130:16
**occupancy** [10] - 87:10, 89:24, 92:7, 92:11, 98:8, 98:12, 130:19, 131:3, 152:17, 208:5
**occur** [2] - 200:15, 217:21
**occurred** [1] - 70:23
**occurs** [1] - 175:3
**odd** [2] - 204:24, 204:25
**OF** [2] - 7:15, 9:2
**offer** [8] - 19:3, 25:7, 30:17, 40:24, 55:22, 86:7, 165:23, 166:1
**offered** [5] - 32:22, 86:11, 89:23, 96:12, 130:1
**Offered** [1] - 10:4
**offering** [1] - 164:15
**offers** [2] - 84:25, 165:6
**offhand** [1] - 263:4
**Office** [1] - 196:10
**office** [1] - 60:25
**officer** [2] - 63:14, 183:16
**official** [2] - 18:24, 19:8
**offtake** [3] - 114:19, 115:14, 115:23
**often** [1] - 164:18
**Oil** [1] - 11:9
**OIL** [1] - 1:2
**oil** [34] - 38:1, 44:16, 78:10, 78:12, 79:6, 87:20, 88:18, 107:13, 107:21, 108:3, 108:4, 108:21, 122:18, 122:22, 149:16, 149:23, 150:1, 150:3, 150:19, 150:21, 151:1, 151:4, 151:8, 161:18, 222:15, 223:1, 232:8, 233:15, 233:16, 244:3, 244:12, 251:16, 257:18
**oil-bearing** [1] - 222:15
**Oliver** [22] - 1:14, 2:4, 2:16, 3:3, 3:17, 4:6, 4:19, 5:5, 5:20, 6:9, 6:22, 7:9, 15:5, 16:18, 18:6, 28:1, 37:11, 37:15, 37:16, 38:3, 39:11, 125:7
**OLSEN** [3] - 9:19, 230:20, 239:22
**Olsen** [5] - 211:2, 230:17, 230:18, 231:2, 238:15
**once** [6] - 50:3, 98:23, 145:5, 165:1, 166:15, 175:8
**one** [103] - 11:12, 13:3, 13:10, 18:13, 19:3, 20:7, 23:7, 27:23, 31:12, 45:16, 46:6, 49:8, 49:11, 50:7, 50:20, 50:21, 52:16, 52:19, 53:18, 53:21, 54:18, 55:2, 55:10, 65:21, 66:16, 67:15, 69:20, 71:18, 81:17, 89:14, 89:15, 97:3, 101:2, 101:18, 103:18, 103:20, 104:23, 105:1, 107:16, 108:12, 114:22, 117:6, 120:14, 121:9, 126:9, 134:18, 134:24, 135:4, 135:19, 137:4, 139:10, 142:11, 143:16, 146:19, 146:20, 162:16, 163:13, 167:20, 174:12, 176:3, 178:19, 181:24, 183:13, 184:22, 192:17, 197:13, 199:21, 199:22, 200:3, 205:15, 209:19, 209:25, 210:1, 221:19, 233:1, 233:11, 234:8, 234:9, 236:21, 239:12, 239:16, 244:21, 247:12, 250:4, 250:25, 251:13, 252:11, 252:15, 253:15, 258:10, 258:18, 259:13, 259:14, 260:1, 260:18, 261:9, 261:15, 265:12, 266:22, 268:6, 272:3
**one-half** [2] - 45:16, 46:6
**one-mile** [1] - 233:1
**one-time** [1] - 162:16
**ones** [5] - 65:3, 138:18, 183:2, 207:17, 248:13
**online** [2] - 241:21, 246:10
**Opeche** [2] - 215:21, 215:23
**Opeche/Spearfish** [7] - 215:17, 216:2, 216:5, 233:25, 234:11, 237:24, 239:1
**open** [2] - 75:15, 161:14
**opening** [1] - 166:1
**Opening** [1] - 9:4
**operability** [1] - 184:4
**operate** [13] - 1:19, 3:22, 6:1, 15:23, 17:10, 26:24, 102:25, 145:18, 146:1, 146:11, 149:12, 186:15, 186:16
**operated** [11] - 28:13, 28:18, 28:19, 83:6, 83:8, 83:11, 193:5, 229:9, 229:20, 230:8, 238:6
**operating** [14] - 21:16, 26:7, 29:2, 41:15, 64:10, 119:8, 119:11, 121:3, 121:6, 157:1, 159:4, 183:16, 186:24, 222:3
**operation** [7] - 116:10, 119:15, 160:3, 160:7, 160:21, 224:8, 242:18
**operational** [2] - 235:8, 261:17
**Operations** [1] - 152:25
**operations** [33] - 26:15, 28:18, 116:15, 116:20, 118:4, 119:7, 119:22, 120:10, 122:20, 123:14, 129:20, 131:2, 131:6, 153:25, 155:8, 155:15, 156:6, 156:23, 159:9, 161:22, 169:16, 177:24, 188:7, 188:14, 188:16, 188:23, 196:14, 208:9, 242:14, 242:20, 242:22, 242:25, 257:5
**Operator** [6] - 118:25, 151:22, 152:22, 161:4, 161:6
**operator** [21] - 26:3, 26:4, 118:3, 119:5, 119:13, 119:17, 119:19, 120:9, 121:4, 121:19, 123:13, 151:11, 155:5, 156:15, 163:13, 193:3, 200:10, 200:12, 206:9, 206:13
**operators** [2] - 25:21, 163:13
**opinion** [20] - 34:10, 34:20, 42:25, 158:12, 217:23, 220:8, 221:11, 227:17, 227:24, 228:7, 229:1, 229:8, 229:19, 230:5, 234:25, 235:13, 238:5, 242:21, 257:14, 271:20
**opportunities** [1] - 105:16
**opportunity** [15] - 11:14, 13:13, 30:5, 32:12, 42:2, 42:10, 43:6, 54:17, 61:2, 90:5, 93:7, 101:12, 105:2, 199:17, 226:24
**opposed** [1] - 157:13
**opposing** [5] - 20:25, 30:11, 43:6, 44:9, 214:9
**opposition** [1] - 203:14
**ops** [1] - 124:23
**option** [4] - 48:7, 50:10, 50:24, 86:17
**optionality** [1] - 117:1
**options** [1] - 114:18
**order** [25] - 2:6, 4:10, 6:12, 14:14, 16:3, 17:15, 68:13, 68:21, 83:15, 91:3, 99:2, 99:3, 99:7, 109:4, 110:11, 148:24, 149:6, 149:16, 149:22, 164:23, 174:17, 268:5, 271:18, 272:20, 273:24
**ordinary** [1] - 169:15
**organizing** [1] - 247:24

**orientated** [1] - 267:4
**orientation** [3] - 265:17, 265:18, 267:5
**originated** [1] - 101:8
**otherwise** [7] - 90:7, 118:21, 130:6, 133:3, 154:10, 157:13, 172:1
**outline** [2] - 54:4, 262:18
**output** [2] - 140:11, 227:4
**outside** [19] - 41:17, 45:16, 59:3, 65:21, 70:22, 71:3, 71:6, 139:15, 140:18, 143:10, 186:11, 186:13, 186:21, 188:25, 189:1, 233:1, 233:7, 244:6, 270:13
**overall** [6] - 72:25, 73:16, 103:2, 103:21, 121:18, 261:20
**overestimating** [1] - 274:21
**overlain** [5] - 214:21, 220:12, 227:23, 229:13, 229:24
**overlying** [1] - 233:25
**overpredict** [1] - 276:5
**overrides** [1] - 91:7
**overruled** [7] - 33:4, 36:20, 37:21, 41:3, 72:19, 79:4, 240:24
**oversaw** [4] - 45:25, 122:13, 212:24, 232:10
**oversee** [4] - 211:24, 212:3, 232:6, 245:18
**overview** [8] - 30:13, 31:2, 37:7, 213:9, 213:12, 213:15, 213:17, 224:22
**own** [13] - 54:9, 64:5, 67:23, 116:8, 150:11, 170:23, 173:24, 173:25, 177:8, 181:11, 208:3, 236:2
**owned** [17] - 1:17, 3:21, 5:23, 14:8, 15:21, 17:8, 25:2, 25:23, 25:25, 84:3, 84:4, 151:10, 151:11, 151:14, 184:13, 184:15, 206:10
**owner** [13] - 46:9, 47:4, 54:6, 59:1, 62:4, 86:16, 119:2, 152:10, 170:12, 195:22, 206:13, 206:21
**Owner** [2] - 118:20, 118:21
**owners** [53] - 1:18, 3:21, 5:24, 14:9, 15:22, 17:9, 25:20, 45:11, 45:12, 45:17, 45:20, 46:7, 46:8, 49:24, 50:2, 50:13, 50:17, 51:6, 52:7, 54:3, 54:9, 57:11, 57:15, 57:17, 58:2, 58:18, 58:20, 59:5, 59:7, 60:16, 83:23, 101:12, 119:10, 120:22, 122:18, 128:25, 130:25, 131:13, 131:17, 131:22, 136:10, 141:6, 146:7, 146:15, 148:22, 148:24, 151:12, 151:15, 152:18, 178:9, 178:10, 205:12, 229:3
**Owners** [2] - 118:17, 151:23
**ownership** [7] - 160:2, 171:24, 172:1, 176:9, 184:24, 185:2, 193:6
**owns** [3] - 136:23, 152:11, 207:22
**oxygen** [6] - 35:13, 219:3, 219:6, 219:23

## P

**P.A** [1] - 8:11
**p.m** [9] - 13:12, 124:4, 124:5, 179:17, 179:18, 246:18, 246:19, 276:12, 276:13
**P.O** [1] - 11:19
**package** [2] - 252:10, 253:1
**pad** [1] - 87:20
**pads** [3] - 60:14, 60:22, 83:2
**page** [53] - 31:16, 35:3, 35:5, 35:7, 35:8, 37:6, 37:10, 39:8, 55:8, 55:11, 81:21, 100:7, 100:8, 117:24, 134:6, 169:3, 174:12, 174:13, 182:15, 194:3, 194:9, 195:12, 198:4, 203:23, 204:6, 205:20, 207:11, 207:13, 207:21, 214:18, 215:14, 216:23, 221:21, 223:25, 232:20, 236:13, 236:23, 236:24, 238:23, 239:12, 255:1, 255:2, 258:13, 260:6, 261:1, 262:6, 262:10, 263:12, 263:24, 266:15, 267:14, 268:13, 268:19
**Page** [13] - 9:3, 9:9, 9:10, 9:11, 9:12, 9:13, 9:14, 9:15, 9:16, 9:17, 9:20, 9:21, 9:22
**Pages** [1] - 7:16
**paid** [7] - 120:1, 121:11, 121:14, 168:13, 177:22, 205:12, 252:23
**paper** [4] - 18:18, 18:23, 19:4, 19:6
**paragraph** [10] - 58:6, 147:19, 169:3, 169:5, 181:3, 255:5, 263:11, 270:13, 270:18, 272:12
**Paralegal** [1] - 8:18
**parameters** [3] - 63:12, 244:22, 272:14
**parent** [4] - 62:3, 62:4, 62:21
**part** [35] - 18:18, 19:16, 31:4, 33:12, 70:10, 74:3, 80:23, 82:11, 85:25, 93:15, 111:3, 111:5, 111:11, 122:6, 123:16, 168:21, 168:23, 188:7, 196:24, 202:10, 202:12, 202:14, 202:18, 208:19, 208:23, 242:6, 243:15, 261:18, 262:22, 263:9, 267:2, 275:18
**participants** [3] - 33:21, 70:25, 71:5
**participate** [1] - 32:2
**participating** [1] - 141:4
**Participation** [1] - 134:5
**participation** [21] - 38:22, 54:6, 54:10, 54:12, 54:17, 55:3, 56:15, 56:22, 134:3, 135:22, 136:14, 136:19, 137:2, 137:3, 137:16, 137:23, 184:11, 184:12, 198:24, 207:20
**Participations** [1] - 198:22
**particular** [15] - 31:16, 45:17, 52:24, 56:21, 60:13, 67:1, 87:7, 90:12, 150:12, 169:9, 184:15, 212:23, 233:17, 234:8, 266:25
**particularly** [4] - 37:6, 37:25, 264:18, 265:2
**parties** [10] - 18:10, 69:14, 69:16, 69:17, 69:19, 70:3, 138:22, 170:4, 206:12, 207:23
**Parties** [1] - 118:17
**Partition** [1] - 174:14
**partition** [2] - 174:19, 174:24
**partners** [7] - 102:22, 109:8, 110:9, 111:9, 114:21, 114:25, 115:22
**partnership** [2] - 23:1, 23:3
**parts** [4] - 188:22, 240:14, 241:10, 243:11
**party** [2] - 47:13, 247:18
**past** [5] - 13:6, 42:18, 50:14, 117:19, 222:9
**patch** [1] - 87:20
**pathway** [3] - 105:12, 216:16, 229:17
**pathways** [6] - 214:25, 220:15, 220:24, 220:25, 230:1, 242:7
**Paul** [1] - 12:6
**pay** [5] - 58:2, 74:20, 118:20, 122:19, 122:22
**paying** [2] - 162:15, 164:6
**payment** [6] - 162:5, 162:15, 162:16, 166:4, 175:10, 198:6
**payments** [3] - 111:25, 120:10, 134:9
**PDF** [1] - 246:11
**Pelham** [2] - 84:7, 87:8
**penalty** [3] - 150:9, 150:10, 150:17
**penetrate** [1] - 233:24
**penetrates** [1] - 234:10
**people** [4] - 122:25, 138:12, 145:3, 165:9
**per** [17] - 28:3, 28:13, 33:15, 63:18, 140:2, 162:5, 162:6, 162:15, 162:17, 163:5, 165:22, 166:5, 186:14, 202:2, 240:14, 241:10, 243:11
**percent** [42] - 33:8, 33:16, 33:17, 35:11, 35:22, 35:24, 36:1, 38:16, 48:8, 48:9, 48:14, 51:13, 51:20, 51:22, 52:4, 52:11, 55:14, 60:10, 96:2, 101:16, 135:22, 136:13, 136:25, 137:15, 139:2, 141:16, 142:9, 142:13, 142:14, 143:8, 150:15, 150:16, 151:2, 151:6, 151:7, 198:24, 219:2, 219:23, 260:14, 262:1
**percentage** [12] - 55:6, 55:20, 134:8, 135:23, 138:5, 143:18, 143:21, 143:23, 151:5, 163:5, 165:14, 184:13
**percentages** [3] - 52:8, 57:9, 57:21
**percentagewise** [1] - 164:8
**perfect** [1] - 133:6
**perform** [2] - 235:18, 259:20
**performance** [1] - 117:16
**performed** [2] - 233:22, 237:8
**performing** [1] - 184:2
**perhaps** [16] - 35:2, 36:13, 39:20, 52:20, 57:2, 60:3, 60:4, 87:9, 104:9, 117:12, 125:21, 133:9, 161:11, 165:15, 171:2, 187:21
**period** [7] - 13:17, 41:22, 42:2, 115:10, 194:5, 217:20, 234:24
**periodically** [1] - 189:24
**perm** [6] - 260:4, 260:23, 261:5, 273:19, 274:10, 274:25
**Permanent** [2] - 25:24, 62:3
**permanent** [5] - 23:9, 28:3, 114:19, 169:8, 214:7
**permanently** [5] - 27:16, 109:5, 110:4, 110:11, 114:25

**permeabilities** [3] - 256:23, 258:2, 260:7
**permeability** [61] - 214:12, 214:24, 216:11, 216:12, 216:15, 217:12, 218:6, 218:19, 219:10, 220:18, 229:15, 238:23, 239:3, 240:16, 242:11, 246:4, 255:6, 255:9, 255:10, 255:15, 255:16, 255:17, 255:20, 256:4, 256:6, 256:17, 256:22, 257:3, 257:8, 257:13, 258:3, 258:19, 258:25, 259:6, 259:15, 259:19, 259:25, 260:3, 260:8, 260:24, 261:2, 261:21, 262:3, 264:7, 266:19, 267:11, 268:24, 270:4, 270:6, 270:19, 270:22, 271:11, 272:1, 272:15, 272:18, 272:19, 272:21, 273:2, 274:17, 275:11, 276:1
**permeable** [1] - 221:8
**permission** [1] - 160:6
**permissions** [1] - 38:13
**permit** [48] - 23:15, 23:19, 23:22, 26:6, 31:8, 35:22, 40:17, 41:21, 46:19, 47:18, 113:24, 114:1, 116:18, 116:20, 117:1, 123:17, 123:21, 123:23, 144:1, 185:13, 186:15, 188:11, 212:25, 221:19, 223:3, 224:20, 225:13, 226:16, 226:17, 229:2, 232:10, 232:11, 232:18, 233:17, 244:5, 244:9, 244:17, 247:9, 248:18, 248:22, 249:9, 249:10, 249:15, 249:24, 260:19, 261:1, 263:13
**permits** [15] - 26:14, 26:23, 41:9, 42:5, 45:15, 70:14, 71:1, 71:6, 113:14, 125:9, 142:16, 189:3, 232:8, 257:21, 260:20
**permitted** [10] - 39:17, 40:3, 40:16, 41:7, 41:15, 117:9, 186:16, 194:25, 276:7
**permitting** [6] - 22:9, 73:15, 81:6, 81:8, 113:13, 231:22
**perpetuity** [2] - 174:18, 174:25
**person** [6] - 76:22, 78:20, 122:9, 172:25, 183:15, 204:24
**personally** [2] - 51:3, 243:17
**persons** [1] - 157:17
**perspective** [5] - 72:21, 74:17, 113:2, 167:19, 167:20
**pertaining** [2] - 132:7, 177:22
**Petre** [1] - 210:10
**Petrel** [7] - 210:10, 225:8, 243:16, 243:22, 252:14, 252:17, 252:22
**petroleum** [5] - 78:10, 78:13, 79:7, 231:16, 245:23
**petrophysic** [1] - 265:5
**petrophysical** [2] - 225:11, 250:16
**phenomenon** [1] - 265:14
**PHIE** [1] - 268:23
**PHMSA** [1] - 28:13
**Phoenix** [1] - 21:9
**phone** [2] - 50:5, 51:4
**phrase** [2] - 175:19, 245:21
**PHREEQC** [4] - 218:15, 218:16, 243:24, 251:13
**PHREEQCi** [1] - 251:10
**physically** [1] - 187:1
**physics** [2] - 212:8, 245:13
**pick** [3] - 248:20, 269:22
**picked** [2] - 248:18, 248:20
**picking** [1] - 247:24
**picks** [1] - 248:23
**picture** [1] - 269:1
**piece** [2] - 174:25, 210:1
**Pierre** [1] - 237:25
**pinches** [1] - 215:25
**pipe** [7] - 28:14, 28:15, 121:20, 121:22, 121:23, 122:5
**pipeline** [49] - 12:15, 23:6, 26:3, 27:15, 27:21, 28:10, 28:12, 34:15, 42:24, 78:3, 78:5, 78:7, 78:9, 78:12, 78:16, 79:6, 79:12, 79:16, 79:17, 79:21, 79:22, 79:24, 80:22, 81:5, 81:10, 81:15, 82:2, 82:8, 82:13, 82:16, 87:19, 90:6, 113:23, 114:9, 120:1, 121:22, 121:25, 123:1, 123:5, 123:16, 123:19, 123:24, 193:16, 193:17, 193:21, 194:11, 194:16, 194:24, 209:7
**Pipeline** [23] - 1:6, 2:9, 3:10, 4:12, 5:12, 6:14, 14:2, 14:17, 15:15, 16:6, 17:2, 17:18, 81:12, 81:23, 82:14, 82:21, 120:12, 121:12, 122:1, 122:6, 122:23, 123:12, 182:21
**pipelines** [5] - 28:8, 86:5, 86:25, 130:8, 154:7
**place** [15] - 36:2, 139:19, 172:3, 174:9, 178:20, 181:21, 191:4, 208:6, 224:16, 237:18, 237:19, 238:9, 259:10, 270:18, 276:9
**places** [1] - 216:2
**plainer** [1] - 269:15
**plan** [19] - 19:9, 110:1, 110:2, 111:3, 111:6, 111:11, 111:12, 111:18, 189:9, 189:12, 189:14, 189:21, 190:25, 234:24, 236:25, 237:2, 237:12, 237:14, 242:6
**planned** [2] - 106:23, 186:3
**planning** [3] - 27:3, 29:5, 189:23
**plans** [18] - 63:6, 63:9, 83:9, 86:1, 86:9, 109:11, 109:13, 109:17, 114:9, 114:13, 114:15, 116:3, 116:23, 117:3, 126:22, 161:12, 223:24, 224:6
**plant** [14] - 33:12, 33:15, 34:2, 34:5, 34:8, 64:4, 110:8, 116:10, 116:13, 116:14, 116:17, 125:2, 128:1, 209:5
**planted** [1] - 168:21
**plants** [41] - 23:1, 23:5, 29:6, 29:7, 29:16, 31:4, 31:10, 31:22, 31:25, 32:9, 32:11, 32:13, 63:1, 64:15, 64:18, 65:2, 65:7, 65:20, 81:4, 86:6, 102:5, 102:6, 102:8, 102:10, 102:17, 105:2, 115:1, 115:9, 115:10, 124:12, 124:13, 124:17, 124:21, 125:14, 126:14, 127:18, 127:22, 193:11, 193:12, 194:17
**play** [2] - 117:14, 185:8
**plume** [39] - 41:25, 42:7, 67:10, 67:13, 67:17, 67:19, 68:11, 68:18, 117:21, 139:12, 139:14, 139:20, 140:4, 140:8, 140:12, 140:13, 140:14, 140:16, 140:21, 141:21, 141:24, 143:9, 186:6, 186:11, 186:22, 188:21, 189:13, 189:20, 203:25, 204:11, 204:24, 204:25, 223:15, 225:2, 232:25, 233:10, 274:21, 276:5
**plumes** [2] - 41:14, 41:17
**point** [47] - 11:16, 18:15, 24:1, 39:11, 39:12, 51:7, 61:11, 82:20, 82:24, 83:4, 86:3, 103:20, 104:5, 109:9, 109:25, 112:10, 113:19, 113:20, 114:1, 114:14, 114:18, 115:23, 117:1, 124:22, 163:15, 166:9, 182:18, 182:22, 182:24, 183:3, 194:22, 204:1, 204:12, 205:10, 206:16, 210:5, 210:13, 214:17, 215:13, 215:15, 216:22, 239:10, 260:24, 267:20, 267:22, 268:6, 272:24
**points** [3] - 99:14, 99:19, 163:14
**policies** [1] - 181:12
**policy** [11] - 104:11, 108:6, 178:25, 181:10, 181:22, 181:24, 182:3, 182:5, 231:7, 231:23, 232:9
**pollution** [2] - 180:22, 181:10
**pool** [8] - 2:19, 4:22, 7:2, 14:20, 16:9, 17:21, 203:12, 203:17
**poorly** [1] - 259:17
**populate** [1] - 218:22
**Pore** [13] - 57:7, 58:7, 118:17, 118:19, 118:21, 134:9, 151:23, 161:7, 162:1, 168:7, 176:20, 176:21, 177:16
**pore** [85] - 1:16, 1:17, 3:20, 3:21, 5:23, 14:7, 14:8, 15:20, 15:21, 17:7, 17:8, 44:22, 47:17, 48:6, 48:17, 49:17, 49:20, 50:1, 50:11, 50:23, 50:24, 51:13, 52:7, 52:15, 54:6, 57:15, 57:25, 60:16, 63:23, 83:18, 84:23, 85:10, 85:16, 91:9, 91:21, 92:22, 94:2, 101:12, 116:24, 119:2, 119:9, 119:18, 119:22, 120:22, 122:18, 125:9, 129:18, 130:25, 131:17, 132:9, 132:25, 133:22, 145:12, 146:15, 146:19, 149:17, 151:14, 152:10, 152:11, 152:15, 153:14, 156:15, 157:14, 164:15, 165:23, 166:10, 169:7, 169:12, 169:23, 176:18, 177:9, 178:1, 195:8, 195:14, 195:21, 198:3, 199:2, 200:4, 203:24, 206:10, 206:13, 208:2, 214:16
**porosity** [8] - 214:12, 216:11, 218:6, 219:15, 219:24, 238:20, 259:18, 269:4
**porous** [1] - 221:8
**portal** [2] - 251:21, 251:22
**portion** [3] - 52:1, 116:18,

204:10
**position** [6] - 52:10, 130:25, 186:23, 188:6, 231:21, 231:22
**positions** [1] - 231:19
**positive** [2] - 103:1, 183:17
**possibility** [2] - 224:15, 257:10
**possible** [8] - 75:9, 110:25, 111:4, 114:7, 171:16, 201:1, 228:24, 257:6
**possibly** [1] - 35:15
**post** [4] - 186:21, 259:2, 259:4, 259:5
**post-injection** [1] - 186:21
**potential** [10] - 63:16, 138:2, 196:16, 209:17, 223:16, 230:1, 237:6, 242:7, 253:4, 274:18
**potentially** [11] - 35:18, 65:15, 107:10, 107:18, 107:25, 108:24, 143:13, 223:14, 242:18, 245:7, 251:8
**Powder** [1] - 21:13
**Powell** [1] - 183:16
**power** [9] - 38:25, 100:17, 106:20, 125:14, 127:18, 130:8, 147:14, 147:21, 148:3
**powers** [1] - 148:1
**practice** [2] - 171:3, 173:23
**practices** [3] - 58:22, 266:6
**practicing** [1] - 158:16
**pre** [1] - 259:2
**preamble** [2] - 192:13, 202:2
**precipitation** [2] - 219:16, 219:25
**preclude** [2] - 208:8, 224:9
**predictability** [1] - 143:5
**predicted** [2] - 142:23, 256:5
**predictive** [3] - 250:21, 251:6, 251:7
**preferred** [1] - 87:24
**Premises** [1] - 177:24
**prepare** [2] - 66:15, 226:16
**prepared** [6] - 25:4, 30:14, 40:20, 66:3, 66:6, 66:10
**prescribed** [1] - 150:18
**PRESENT** [1] - 8:2
**present** [6] - 42:4, 180:18, 186:3, 233:15, 233:17, 272:11
**presented** [3] - 84:24, 271:21, 272:8
**presents** [1] - 190:25
**Preservation** [1] - 196:9
**president** [3] - 20:22, 21:15, 22:5
**pressure** [17] - 183:19, 190:3, 190:7, 190:17, 216:13, 222:4, 222:5, 223:13, 225:1, 243:2, 256:3, 256:5, 261:25, 262:1, 270:23, 271:12, 274:19
**pressures** [5] - 117:9, 190:2, 190:23, 243:1, 261:22
**presume** [1] - 126:20
**presuming** [1] - 135:10
**pretty** [4] - 13:6, 19:22, 28:5, 115:12
**prevalent** [1] - 215:7
**prevalently** [1] - 264:9
**prevent** [2] - 111:8, 180:6
**prevents** [1] - 234:19
**previous** [7] - 38:1, 54:3, 162:24, 214:2, 220:4, 257:11, 271:23
**previously** [19] - 24:19, 54:22, 55:1, 55:13, 57:9, 99:9, 148:13, 212:22, 213:23, 220:12, 226:3, 226:9, 227:20, 228:18, 228:20, 229:4, 270:13, 271:24, 274:17
**price** [5] - 99:14, 99:19, 101:14, 102:16, 112:5
**prices** [4] - 30:7, 30:8, 101:10, 101:11
**pricing** [1] - 111:25
**primarily** [6] - 22:12, 29:5, 35:12, 44:16, 166:8, 243:1
**primary** [3] - 85:19, 220:17
**principal** [3] - 208:22, 231:7, 231:23
**private** [7] - 50:2, 52:7, 69:14, 69:19, 74:23, 148:20, 154:16
**privately** [1] - 161:10
**procedure** [1] - 49:25
**procedures** [1] - 49:25
**proceed** [2] - 43:16, 114:1
**proceeded** [1] - 38:13
**proceeding** [1] - 266:2
**proceedings** [2] - 11:1, 185:15
**PROCEEDINGS** [1] - 9:2
**process** [14] - 13:2, 13:8, 47:25, 49:19, 59:19, 59:24, 60:6, 68:25, 74:3, 98:20, 159:14, 175:2, 234:17, 248:4
**produce** [7] - 29:16, 32:1, 33:9, 68:18, 223:10, 223:15, 265:11
**produced** [3] - 29:18, 33:17, 262:17
**producers** [1] - 30:6
**produces** [1] - 69:1
**producing** [2] - 70:13, 102:6
**production** [5] - 64:10, 193:13, 223:2, 224:9, 231:18
**products** [4] - 78:10, 78:14, 79:7, 208:22
**professional** [3] - 74:7, 212:14, 245:9
**program** [4] - 21:5, 253:13, 253:17, 253:24
**programs** [1] - 252:13
**prohibit** [2] - 228:21, 228:22
**prohibition** [1] - 178:8
**prohibitions** [1] - 158:9
**prohibitive** [1] - 111:5
**project** [122] - 22:7, 22:13, 22:14, 27:9, 27:11, 27:12, 28:21, 28:24, 29:3, 29:4, 29:7, 29:10, 29:14, 30:13, 31:1, 31:4, 31:20, 31:21, 31:24, 32:18, 33:2, 33:12, 33:21, 34:10, 34:20, 35:15, 37:23, 45:2, 64:14, 64:17, 66:14, 66:17, 66:22, 66:23, 66:24, 69:15, 69:22, 69:25, 70:2, 70:5, 70:21, 71:12, 71:17, 71:25, 72:25, 73:16, 80:18, 80:24, 81:1, 81:2, 90:19, 96:12, 96:22, 97:22, 98:16, 100:19, 100:22, 101:8, 102:22, 103:8, 103:11, 105:4, 106:3, 106:5, 106:19, 106:22, 107:15, 108:10, 108:14, 108:19, 109:4, 109:24, 114:12, 114:14, 115:10, 115:13, 115:16, 116:9, 118:8, 119:14, 124:14, 138:15, 150:22, 167:15, 167:20, 175:3, 178:22, 179:1, 182:16, 191:11, 191:16, 191:25, 199:5, 202:1, 202:3, 202:18, 212:20, 212:23, 213:15, 213:17, 213:21, 214:5, 214:21, 221:5, 222:3, 222:22, 224:11, 225:21, 226:6, 227:3, 228:11, 230:4, 232:21, 234:13, 237:1, 237:14, 239:9, 247:20, 252:14, 252:22, 276:4
**Project** [2] - 192:22, 272:3
**projected** [1] - 275:11
**projects** [26] - 28:25, 39:17, 41:7, 65:14, 65:16, 70:15, 70:17, 70:20, 70:23, 71:1, 71:2, 71:6, 103:10, 106:7, 138:10, 138:21, 143:25, 167:18, 211:20, 212:3, 212:21, 214:2, 232:4, 232:7, 262:22
**prolific** [1] - 37:1
**promises** [1] - 57:22
**promote** [3] - 100:12, 104:12, 104:13
**pronounces** [1] - 137:10
**properly** [1] - 234:18
**properties** [13] - 129:21, 155:24, 155:25, 156:3, 216:7, 225:11, 255:11, 256:20, 258:8, 265:5, 265:21, 267:17, 267:24
**property** [36] - 83:23, 130:10, 131:2, 138:13, 146:25, 147:5, 147:10, 148:6, 148:11, 148:12, 148:20, 148:23, 148:25, 149:2, 149:4, 154:3, 156:4, 156:21, 156:23, 157:17, 160:1, 169:7, 170:24, 171:21, 171:22, 174:19, 174:25, 175:24, 177:8, 181:12, 191:10, 191:16, 191:24, 207:25, 250:17, 268:23
**proportionate** [6] - 137:17, 138:4, 150:6, 150:10, 150:25, 184:14
**proportionately** [1] - 184:13
**proposal** [3] - 73:25, 74:10, 189:25
**proposals** [4] - 72:10, 73:14, 73:19, 73:24
**propose** [1] - 57:14
**proposed** [20] - 29:24, 37:7, 39:25, 40:17, 42:4, 48:18, 48:22, 48:24, 106:3, 194:5, 195:11, 195:25, 196:2, 201:3, 203:18, 222:10, 229:8, 229:20, 233:14, 234:24
**proposes** [1] - 27:12
**proposing** [4] - 23:3, 29:15, 31:7, 189:21
**proprietary** [1] - 178:4
**protect** [1] - 238:11
**protection** [5] - 184:3, 191:9, 235:23, 238:2, 238:4
**protections** [5] - 85:22, 89:25, 92:3, 92:4, 237:18
**provide** [26] - 22:14, 33:21, 36:9, 36:10, 37:7, 46:2, 47:23, 48:16, 104:9, 105:15, 125:1, 153:13, 166:11, 171:6, 192:16, 194:13, 213:9, 213:16, 224:20, 232:9, 238:4, 244:11, 254:1, 254:6, 254:9, 254:13

**provided** [21] - 18:23, 45:4, 45:12, 46:5, 192:25, 196:24, 201:22, 203:2, 208:22, 208:23, 208:25, 209:6, 209:16, 213:14, 227:3, 244:5, 244:8, 253:21, 254:3, 254:11, 254:22
**provider** [1] - 125:1
**providers** [2] - 72:17, 124:25
**provides** [9] - 32:12, 34:18, 34:23, 105:24, 157:11, 199:4, 224:22, 238:1, 249:11
**providing** [6] - 22:19, 101:3, 179:6, 213:11, 226:23, 254:17
**provision** [19] - 128:23, 129:14, 129:16, 129:17, 130:5, 133:21, 150:13, 153:6, 154:20, 157:11, 159:25, 168:22, 174:5, 175:12, 175:14, 179:4, 179:24, 185:11, 208:19
**provisions** [11] - 57:12, 74:25, 75:4, 75:8, 85:8, 86:8, 131:16, 132:6, 132:12, 176:18, 176:20
**proximity** [2] - 32:6, 40:6
**prudent** [2] - 265:4, 276:5
**PS-1** [1] - 35:8
**PS-2** [2] - 31:9, 31:12
**PS-3** [9] - 35:3, 35:8, 37:9, 39:7, 81:21, 182:16, 190:10, 194:3, 202:3
**PS-5** [8] - 37:6, 37:10, 39:8, 81:21, 82:7, 82:19, 182:14, 182:15
**PSC** [6] - 12:14, 28:6, 80:11, 123:20, 193:17, 193:22
**Public** [1] - 236:7
**public** [8] - 43:1, 48:1, 75:14, 100:12, 104:12, 167:16, 227:8, 233:21
**publicly** [18] - 145:6, 227:11, 241:19, 244:6, 244:15, 245:6, 246:4, 246:7, 246:25, 247:19, 247:22, 248:5, 248:12, 248:23, 249:9, 249:25, 252:16, 254:4
**published** [7] - 225:25, 241:20, 249:9, 249:10, 257:11, 257:20, 262:20
**pull** [5] - 109:23, 126:22, 159:12, 177:9, 197:10
**pulling** [1] - 176:23
**pumping** [2] - 82:23, 161:14
**purchase** [3] - 34:7, 102:25, 253:5
**purchased** [1] - 252:18
**purple** [1] - 233:7
**purpose** [4] - 26:20, 26:22, 174:3, 252:25
**purposes** [7] - 70:4, 75:2, 129:11, 138:14, 152:13, 154:9, 181:5
**pursuant** [6] - 118:3, 119:6, 120:9, 120:20, 202:10, 240:9
**pursuing** [1] - 105:7
**push** [1] - 143:14
**pushback** [1] - 85:2
**put** [23] - 18:16, 67:1, 67:7, 67:9, 67:14, 67:18, 68:3, 68:23, 98:14, 103:4, 117:8, 128:5, 128:6, 129:6, 133:12, 142:25, 144:24, 160:12, 160:17, 167:12, 176:13, 177:7, 263:22
**putting** [4] - 98:24, 138:1, 181:21, 275:9

## Q

**QC'ing** [1] - 248:6
**qualify** [1] - 166:21
**qualifying** [1] - 170:14
**quality** [3] - 189:11, 227:25, 248:13
**quarter** [10] - 49:6, 49:10, 49:12, 49:15, 197:6, 197:7, 197:8, 197:15, 197:16
**question's** [2] - 146:23, 187:9
**questioned** [1] - 210:2
**questioning** [4] - 123:8, 124:8, 179:20, 246:21
**questions** [26] - 43:3, 43:7, 61:3, 61:7, 78:19, 78:25, 97:18, 145:11, 160:8, 165:20, 178:17, 184:2, 184:4, 192:8, 192:13, 192:21, 195:3, 196:21, 207:10, 220:5, 222:8, 226:2, 227:16, 230:15, 238:14
**quick** [5] - 115:21, 135:5, 145:10, 173:13, 207:10
**quicker** [4] - 12:12, 249:16, 249:17, 249:19
**quickly** [2] - 13:19, 56:16
**quite** [2] - 85:4, 224:13
**quote** [2] - 63:25, 205:24

## R

**radius** [5] - 34:8, 257:1, 270:21, 271:6, 272:14
**raise** [2] - 211:4, 230:19
**ran** [8] - 68:17, 68:24, 117:22, 243:16, 243:19, 251:14, 253:16, 253:24
**Range** [78] - 1:7, 1:9, 1:11, 1:12, 1:13, 1:21, 1:22, 2:1, 2:2, 2:3, 2:10, 2:11, 2:14, 2:15, 2:16, 2:20, 2:22, 3:1, 3:2, 3:3, 3:11, 3:14, 3:16, 3:16, 4:1, 4:4, 4:5, 4:6, 4:14, 4:16, 4:18, 4:19, 4:23, 5:2, 5:4, 5:5, 5:13, 5:15, 5:16, 5:18, 5:20, 6:3, 6:4, 6:5, 6:8, 6:9, 6:15, 6:17, 6:18, 6:20, 6:22, 7:3, 7:4, 7:5, 7:8, 7:9, 14:22, 14:24, 15:2, 15:3, 15:5, 16:11, 16:15, 16:17, 16:18, 17:22, 17:24, 18:1, 18:4, 18:6, 49:9, 49:12, 49:14, 135:21, 136:9, 197:2, 197:13, 204:9
**range** [10] - 139:24, 141:23, 143:1, 145:12, 256:22, 259:11, 260:6, 260:8, 260:19, 266:18
**ranges** [3] - 53:14, 140:1, 238:23
**rate** [4] - 95:25, 96:2, 101:15, 101:21
**rates** [7] - 72:23, 73:11, 74:2, 74:5, 74:13, 74:17, 164:6
**rather** [11] - 54:2, 61:10, 84:22, 84:23, 85:20, 134:1, 179:5, 199:2, 256:14, 275:17, 275:21
**ratio** [1] - 198:25
**raw** [2] - 144:11, 244:15
**ray** [1] - 248:21
**re** [13] - 1:3, 1:15, 2:5, 2:18, 3:7, 3:18, 4:8, 4:21, 5:9, 5:21, 6:11, 7:1, 93:7
**re-review** [1] - 93:7
**reach** [1] - 98:25
**reached** [3] - 50:4, 84:1, 165:6
**reaching** [1] - 262:5
**reactions** [2] - 218:12, 220:2
**reactive** [1] - 219:7
**read** [15] - 89:7, 93:8, 93:12, 107:16, 120:17, 130:15, 132:13, 132:14, 134:4, 155:9, 162:14, 187:5, 187:7, 205:24, 256:11
**readily** [1] - 108:19
**reading** [4] - 89:5, 93:11, 108:15, 120:16
**reads** [3] - 104:12, 107:24, 157:16
**ready** [3] - 107:11, 107:19, 108:1
**real** [5] - 115:21, 130:9, 135:4, 169:7, 173:13
**really** [5] - 90:13, 104:4, 125:25, 205:23, 246:12
**reask** [1] - 156:18
**reason** [6] - 95:1, 144:5, 145:2, 166:6, 181:19, 274:9
**reasonable** [10] - 141:3, 141:19, 161:16, 169:16, 256:1, 259:11, 260:3, 260:16, 261:15, 265:4
**reasonableness** [2] - 155:10, 158:2
**reasonably** [10] - 152:24, 153:24, 154:24, 155:7, 155:12, 155:13, 155:15, 156:5, 156:22, 161:22
**reasoning** [1] - 199:1
**reasons** [1] - 260:2
**recalling** [1] - 165:16
**receipt** [2] - 46:12, 46:25
**receive** [6] - 26:16, 26:23, 47:9, 47:10, 111:13
**received** [8] - 44:11, 44:14, 47:12, 85:2, 86:17, 89:10, 89:15, 165:8
**Received** [1] - 10:4
**receiver** [1] - 183:9
**recent** [1] - 52:16
**recently** [2] - 21:14, 54:15
**Recessed** [5] - 61:12, 124:4, 179:17, 246:18, 276:13
**recital** [1] - 100:11
**recitals** [7] - 100:9, 104:10, 104:17, 107:9, 107:23, 108:6, 108:14
**reclaimed** [2] - 223:22, 224:2
**reclamation** [3] - 85:23, 86:8, 86:22
**recognizes** [1] - 222:19
**recollection** [3] - 140:2, 165:1, 193:25
**recommend** [2] - 242:21, 242:24
**recommendation** [1] - 143:23
**recommendations** [2] - 191:1, 266:7
**reconstructing** [1] - 247:23
**reconvened** [4] - 61:12, 124:4, 179:17, 246:18
**Record** [5] - 89:7, 93:12, 120:17, 187:7, 256:11
**record** [20] - 11:2, 11:5, 18:19, 18:24, 19:8, 20:17, 24:12, 43:24, 45:17, 46:9, 61:15, 124:7, 172:4, 179:16, 179:20, 211:11,

231:1, 233:21, 246:21, 276:11
**recorded** [3] - 36:22, 172:2, 172:7
**records** [5] - 48:2, 75:15, 236:2, 236:3
**recovering** [1] - 180:6
**recovery** [5] - 107:13, 107:21, 108:3, 108:4, 108:21
**recreate** [2] - 247:25, 249:2
**red** [3] - 31:2, 81:21, 269:5
**Red** [7] - 29:2, 33:10, 33:11, 64:3, 64:9, 70:21, 106:9
**redirect** [2] - 210:21, 210:23
**reduce** [2] - 103:15, 106:24
**reduces** [3] - 100:23, 103:8, 222:6
**reducing** [14] - 22:19, 100:14, 100:20, 101:2, 102:2, 103:6, 103:12, 103:20, 104:2, 104:3, 104:7, 104:15, 104:22
**reevaluate** [2] - 235:4, 235:7
**reevaluation** [6] - 41:20, 41:22, 234:23, 235:1, 235:2, 261:19
**refer** [6] - 18:21, 22:13, 81:21, 120:10, 123:22, 216:1
**reference** [6] - 118:23, 159:3, 162:5, 163:15, 201:12, 272:2
**referenced** [4] - 118:9, 129:17, 180:21, 270:12
**references** [4] - 118:16, 159:4, 167:17, 221:19
**referencing** [1] - 89:10
**referred** [2] - 162:1, 270:19
**referring** [11] - 24:3, 71:22, 119:18, 121:3, 123:19, 221:15, 240:7, 243:1, 251:22, 257:19, 263:11
**refers** [4] - 77:22, 134:4, 135:5, 135:20
**refined** [3] - 78:10, 78:13, 79:7
**reflect** [4] - 31:6, 208:21, 221:22, 266:19
**reflected** [3] - 98:2, 267:6, 274:8
**reflects** [1] - 25:16
**refuse** [2] - 94:24, 254:5
**regard** [1] - 210:18
**regarding** [12] - 60:9, 60:13, 65:24, 80:11, 85:2, 86:25, 150:1, 165:10, 177:23, 210:2, 242:7, 262:18
**regardless** [4] - 74:4, 90:18, 130:19, 154:15
**region** [4] - 214:3, 222:2, 232:17, 232:20
**regional** [8] - 29:20, 34:21, 34:24, 217:4, 241:5, 241:6, 258:7
**regions** [1] - 258:2
**regularly** [1] - 70:13
**regulations** [2] - 232:8, 232:12
**regulatory** [6] - 21:24, 44:6, 102:18, 231:7, 231:21, 231:23
**reinject** [1] - 113:1
**relate** [3] - 69:14, 69:21, 195:9
**related** [17] - 69:16, 69:24, 70:1, 70:4, 71:17, 86:21, 117:9, 119:22, 143:20, 167:14, 209:1, 209:5, 209:7, 210:17, 213:25, 219:19, 268:4
**relation** [2] - 119:15, 195:14
**Relationship** [1] - 118:16
**relationship** [1] - 102:24
**relationships** [1] - 124:24
**relative** [3] - 216:12, 216:13, 217:12
**relatively** [1] - 19:11
**relevance** [2] - 72:18, 240:23
**reliability** [1] - 143:5
**relief** [2] - 129:1, 170:18
**rely** [2] - 68:12, 68:16
**remain** [2] - 133:4, 133:22
**remainder** [1] - 150:16
**remaindermen** [1] - 207:24
**remaining** [2] - 52:1, 85:3
**reminder** [1] - 12:14
**remote** [1] - 28:17
**removal** [2] - 111:20, 177:4
**renew** [1] - 115:22
**renewal** [2] - 42:2, 186:19
**renewals** [2] - 72:6, 115:24
**renewed** [1] - 116:2
**rental** [9] - 162:6, 162:17, 162:19, 163:7, 164:14, 164:19, 165:11, 165:22, 166:5
**renter** [1] - 180:9
**renters** [1] - 180:4
**repeat** [8] - 12:11, 20:3, 89:4, 93:25, 120:4, 126:5, 256:9, 275:18
**repeating** [1] - 201:11
**rephrase** [2] - 57:11, 123:10
**replicate** [9] - 245:2, 245:4, 245:7, 247:6, 247:13, 247:21, 249:14, 249:23, 267:11
**replicating** [2] - 106:15, 249:19
**report** [4] - 194:4, 248:20, 249:21, 273:11
**reported** [2] - 30:1, 248:18
**reporter** [1] - 201:21
**represent** [4] - 33:7, 156:24, 255:23, 269:5
**representative** [1] - 257:3
**represented** [1] - 256:16
**representing** [1] - 12:1
**represents** [3] - 68:20, 172:11, 172:17
**request** [12] - 58:15, 73:25, 97:4, 185:20, 185:23, 201:20, 201:22, 202:16, 203:1, 209:14, 209:15, 251:20
**requested** [9] - 25:15, 42:19, 46:12, 89:7, 93:12, 120:17, 187:7, 227:1, 256:11
**requesting** [12] - 1:4, 3:8, 5:10, 13:25, 15:12, 16:25, 26:13, 26:14, 51:8, 160:5, 188:11, 202:13
**requests** [3] - 75:15, 178:4, 196:12
**require** [15] - 1:17, 3:20, 5:23, 14:8, 15:21, 17:8, 32:25, 75:11, 110:4, 111:25, 114:25, 149:17, 170:25, 177:4, 257:8
**required** [20] - 1:19, 3:22, 6:1, 15:23, 17:10, 46:23, 63:18, 98:17, 114:19, 125:1, 129:9, 174:20, 186:10, 186:15, 191:13, 191:22, 202:8, 235:6, 235:18, 269:15
**requirement** [2] - 45:4, 51:23
**requirements** [9] - 35:18, 35:23, 45:8, 86:4, 87:25, 186:14, 224:20, 225:13, 232:18
**requires** [3] - 41:20, 138:21, 235:9
**resampled** [1] - 268:1
**research** [7] - 21:23, 75:2, 112:17, 167:10, 183:21, 212:13, 262:12
**Research** [4] - 66:7, 66:10, 211:16, 231:4
**reserved** [1] - 150:11
**reserves** [6] - 116:20, 196:15, 222:13, 222:16, 228:19, 229:5
**Reservoir** [2] - 145:9, 178:1
**reservoir** [74] - 1:16, 3:20, 5:22, 14:7, 15:20, 17:7, 36:10, 68:17, 79:19, 79:21, 79:22, 79:24, 111:1, 111:13, 112:15, 117:12, 117:16, 126:24, 143:3, 145:13, 150:6, 151:1, 152:12, 159:7, 159:13, 160:17, 160:21, 160:23, 161:21, 169:9, 186:24, 186:25, 187:2, 188:2, 188:4, 188:8, 188:20, 189:6, 189:7, 190:17, 190:23, 200:6, 200:11, 203:17, 219:20, 219:22, 223:13, 224:23, 225:15, 225:16, 225:18, 227:5, 228:2, 228:8, 228:9, 229:22, 229:24, 230:6, 230:11, 233:12, 242:8, 243:23, 245:24, 255:11, 256:15, 257:2, 257:24, 261:6, 261:21, 264:7, 265:1, 265:2, 269:5, 276:6
**reservoirs** [1] - 178:1
**residential** [1] - 21:9
**residual** [1] - 217:14
**resolved** [1] - 207:2
**resource** [7] - 36:22, 37:2, 101:13, 116:12, 116:15, 125:2, 149:17
**resources** [1] - 117:2
**Resources** [4] - 11:9, 231:16, 231:18, 236:8
**respect** [48] - 22:3, 30:25, 35:18, 44:19, 44:21, 47:8, 51:6, 51:17, 58:21, 60:14, 73:3, 81:24, 103:25, 118:7, 122:10, 129:16, 130:23, 131:11, 131:22, 140:4, 143:18, 155:23, 155:25, 156:2, 156:13, 166:20, 174:16, 178:20, 179:25, 181:9, 181:20, 202:7, 203:1, 203:11, 206:1, 212:18, 212:19, 212:23, 213:24, 225:6, 228:14, 232:2, 232:4, 235:21, 237:13, 238:25, 239:7, 242:1
**respective** [2] - 26:5, 132:8
**respectively** [1] - 25:20
**respond** [3] - 13:16, 13:18, 13:19
**response** [5] - 96:9, 102:18, 164:19, 257:2, 257:4
**responsibilities** [3] - 22:2, 44:19, 212:18
**responsibility** [8] - 2:7, 4:11, 6:13, 14:15, 16:4, 17:16, 22:6, 232:2
**responsible** [1] - 22:8
**rest** [2] - 36:5, 112:24
**restate** [2] - 64:16, 80:20
**result** [6] - 48:7, 97:24,

219:14, 257:7, 274:10, 274:18
**resulted** [2] - 226:4, 255:14
**resulting** [1] - 261:23
**results** [14] - 245:8, 250:21, 255:19, 257:11, 270:2, 270:5, 271:8, 271:21, 272:6, 272:8, 272:11, 272:19, 273:6, 274:7
**resume** [2] - 61:15, 276:9
**return** [2] - 46:12, 46:25
**revenue** [2] - 150:16, 151:7
**review** [32] - 13:13, 42:10, 42:15, 44:24, 45:14, 93:7, 99:20, 144:6, 186:19, 222:25, 225:3, 225:22, 225:23, 226:24, 230:2, 232:19, 233:2, 233:7, 233:21, 233:24, 234:2, 234:9, 234:17, 235:7, 235:10, 236:5, 236:6, 236:22, 255:4, 270:14, 271:18, 273:16
**reviewed** [5] - 111:21, 113:14, 115:4, 115:18, 255:7
**reviewing** [1] - 269:25
**revises** [2] - 31:9, 31:10
**reworked** [1] - 266:23
**reworking** [3] - 269:9, 269:10, 269:11
**RICHARD** [1] - 8:4
**rid** [1] - 178:16
**ridiculous** [1] - 161:12
**right-of-way** [2] - 87:1, 87:16
**rights** [46] - 38:14, 60:15, 90:11, 139:1, 145:18, 145:25, 146:10, 146:11, 146:14, 146:21, 147:5, 147:10, 147:17, 148:6, 148:8, 148:12, 148:13, 148:25, 150:1, 154:3, 154:13, 154:14, 154:17, 154:21, 155:16, 155:18, 155:22, 156:5, 156:21, 159:4, 160:1, 160:2, 161:4, 161:6, 161:8, 169:22, 174:18, 175:22, 175:24, 180:5, 186:2, 191:11, 191:16, 191:24, 200:9
**Rights** [2] - 145:17, 174:14
**rising** [1] - 169:15
**risk** [9] - 41:24, 150:9, 150:17, 182:10, 221:11, 221:14, 225:24, 274:23
**risk-based** [1] - 225:24
**risks** [1] - 222:7
**River** [3] - 21:13, 231:14, 239:13
**road** [3] - 35:15, 60:13, 105:24
**roads** [6] - 38:24, 60:3, 60:4, 60:23, 90:6, 154:7
**rock** [8] - 220:18, 220:21, 225:11, 258:7, 263:3, 263:7, 263:15, 265:5
**role** [3] - 71:2, 167:14, 211:22
**roles** [1] - 212:22
**roots** [1] - 22:17
**rose** [1] - 269:8
**roughly** [1] - 38:16
**row** [1] - 137:20
**royalties** [1] - 169:6
**Royalty** [1] - 163:4
**royalty** [17] - 57:20, 58:4, 58:5, 58:6, 95:25, 96:2, 101:15, 101:21, 150:13, 164:14, 164:19, 165:12, 166:4, 168:13, 168:25, 169:19, 198:4
**rules** [7] - 3:6, 5:8, 7:12, 157:2, 157:10, 208:19, 235:4
**run** [9] - 38:20, 125:2, 187:15, 243:22, 246:25, 253:13, 253:16, 253:24, 254:21
**running** [1] - 257:22
**rural** [1] - 22:21
**RUST** [1] - 8:24
**Rust** [1] - 12:7
**Rygh** [3] - 262:21, 263:3, 263:16
**Rygh's** [1] - 263:1

## S

**S-k-a-a-r-e** [1] - 20:9
**Safe** [11] - 191:3, 191:8, 191:14, 191:21, 191:23, 239:21, 240:3, 240:6, 240:10, 241:8, 242:16
**safe** [3] - 128:21, 128:22, 214:7
**safeguards** [1] - 238:9
**safely** [2] - 228:1, 230:9
**safety** [1] - 183:22
**sake** [1] - 173:21
**Salem** [1] - 50:21
**salinity** [2] - 241:5, 241:6
**sample** [6] - 227:14, 239:11, 239:14, 242:5, 243:12, 244:19
**sampled** [2] - 243:10, 268:3
**samples** [5] - 159:12, 217:4, 221:6, 239:12, 241:2
**sampling** [1] - 217:3
**sand** [7] - 36:8, 37:25, 263:8, 265:11, 266:20, 269:3, 269:19
**sands** [11] - 259:17, 259:18, 259:20, 260:1, 264:19, 264:20, 264:21, 265:3, 267:1, 269:5, 269:11
**sandstone** [1] - 264:2
**sandstones** [1] - 264:22
**Sara** [2] - 18:24, 19:7
**SARA** [1] - 8:8
**sat** [2] - 60:25, 97:20
**saturation** [8] - 141:16, 142:9, 142:21, 142:22, 143:8, 143:12, 143:18, 143:23
**saved** [2] - 19:22, 252:15
**savings** [1] - 249:11
**saw** [4] - 74:12, 219:24, 255:22, 257:7
**scale** [8] - 29:8, 72:22, 105:10, 105:11, 105:21, 106:16, 248:2, 259:8
**scenario** [2] - 170:16, 170:19
**schedule** [1] - 56:15
**schedules** [1] - 50:22
**School** [1] - 21:6
**school** [1] - 44:14
**science** [3] - 21:23, 44:11, 231:12
**scientist** [1] - 107:7
**scope** [9] - 22:6, 71:11, 72:5, 72:22, 73:5, 73:25, 96:22, 185:18, 185:23
**scopes** [2] - 72:8, 72:25
**score** [3] - 32:1, 32:14, 64:24
**scratch** [1] - 249:6
**SCS** [8] - 25:1, 26:2, 26:9, 48:11, 48:12, 69:7, 193:2, 193:5
**SCS1** [3] - 26:21, 37:14, 137:8
**SCS1/TB** [1] - 48:9
**SCS2** [6] - 26:21, 37:13, 48:10, 49:11, 195:9, 195:18
**SCS3** [2] - 26:21, 37:15
**sea** [2] - 269:8, 269:9
**seal** [4] - 216:9, 217:24, 233:25, 234:10
**search** [2] - 47:13, 83:15
**searching** [2] - 48:15, 48:16
**second** [10] - 43:10, 47:15, 50:20, 91:2, 105:23, 151:20, 197:13, 199:22, 244:22, 263:25
**section** [19] - 56:19, 56:21, 118:24, 134:18, 135:16, 135:17, 168:12, 180:13, 183:8, 184:1, 192:23, 197:4, 197:18, 198:4, 199:19, 205:4, 205:17, 268:22, 269:13
**Section** [55] - 5:13, 6:2, 6:15, 7:2, 49:10, 49:12, 49:14, 58:4, 108:14, 121:16, 122:8, 131:24, 132:4, 134:22, 135:5, 135:11, 135:20, 136:8, 145:8, 146:3, 151:17, 151:19, 152:9, 152:20, 159:2, 162:4, 163:4, 167:25, 168:9, 170:2, 170:9, 170:21, 174:14, 174:16, 177:17, 178:12, 180:15, 180:21, 181:20, 183:5, 183:12, 184:8, 195:8, 197:3, 197:14, 203:24, 204:10, 205:9, 209:20, 213:12, 224:19, 224:21, 224:22, 232:15, 267:14
**sections** [3] - 16:11, 53:14, 212:24
**Sections** [69] - 1:7, 1:8, 1:9, 1:12, 1:13, 1:20, 1:21, 1:22, 2:1, 2:2, 2:9, 2:10, 2:12, 2:14, 2:15, 2:20, 2:21, 2:22, 3:1, 3:2, 3:11, 3:12, 3:14, 3:16, 3:23, 4:1, 4:4, 4:5, 4:13, 4:14, 4:17, 4:18, 4:22, 4:23, 5:3, 5:4, 5:13, 5:15, 5:16, 5:19, 6:3, 6:4, 6:5, 6:8, 6:15, 6:17, 6:18, 6:21, 7:3, 7:4, 7:5, 7:8, 14:21, 14:22, 14:24, 15:3, 15:4, 16:10, 16:15, 16:17, 17:22, 17:23, 17:25, 18:1, 18:5, 184:20, 213:4, 213:8, 232:14
**sector** [2] - 44:16, 101:11
**secure** [5] - 35:23, 38:13, 38:14, 50:1, 52:15
**secured** [9] - 49:16, 54:15, 60:10, 60:15, 60:19, 116:7, 116:16, 116:24, 125:8
**securing** [2] - 52:7, 60:22
**sediments** [2] - 269:7, 269:11
**see** [34] - 25:17, 26:2, 31:5, 32:7, 35:9, 37:9, 37:10, 37:12, 39:8, 39:9, 40:5, 41:17, 53:14, 53:15, 54:7, 58:3, 82:6, 137:5, 137:9, 165:8, 183:17, 207:2, 232:19, 233:11, 233:12, 233:13, 237:9, 260:13, 264:11, 264:12, 265:16, 266:24, 267:6, 269:17
**seed** [2] - 87:5, 87:25
**seeing** [1] - 41:13
**seeking** [2] - 138:25, 169:25

**seem** [2] - 182:8, 260:15
**segregations** [1] - 87:5
**seismic** [44] - 38:15, 128:18, 129:1, 129:11, 129:20, 131:1, 131:6, 188:22, 189:24, 199:12, 208:8, 212:15, 217:1, 221:2, 244:6, 247:3, 247:4, 247:5, 247:10, 247:12, 247:14, 247:16, 256:19, 258:8, 259:24, 261:14, 262:25, 264:10, 264:11, 264:14, 265:17, 265:19, 267:3, 267:8, 267:12, 267:16, 267:19, 267:25, 268:3, 268:7, 268:11, 269:25
**seismicity** [5] - 221:10, 221:12, 221:14, 221:16, 222:7
**select** [2] - 37:23, 38:8
**selected** [2] - 213:22, 215:6
**selecting** [1] - 39:16
**sell** [2] - 64:14, 64:17
**selling** [2] - 102:7, 161:15
**send** [1] - 50:10
**senior** [1] - 231:21
**sense** [4] - 152:7, 173:2, 173:4, 185:9
**sensors** [1] - 190:4
**sent** [9] - 46:24, 47:5, 47:15, 50:15, 153:9, 165:24, 166:9, 174:9, 196:10
**sentence** [3] - 151:20, 155:9, 263:25
**separate** [12] - 72:3, 86:14, 90:3, 90:24, 94:6, 112:24, 112:25, 135:15, 135:16, 159:19, 181:22
**separation** [1] - 86:22
**September** [1] - 165:5
**sequester** [5] - 29:6, 36:3, 64:5, 65:17, 109:5
**sequestered** [2] - 109:24, 110:11
**sequestration** [14] - 12:24, 22:6, 23:9, 28:25, 35:25, 36:5, 44:6, 65:3, 70:23, 71:7, 79:8, 82:6, 83:14, 209:8
**serve** [3] - 212:1, 214:24, 220:14
**served** [1] - 225:14
**serves** [1] - 166:3
**Service** [1] - 236:7
**services** [2] - 74:21, 208:22
**servitude** [1] - 171:17
**set** [6] - 139:8, 165:24, 202:23, 257:25, 269:22, 275:7
**sets** [5] - 108:23, 221:1, 260:20, 264:24, 271:25
**setting** [1] - 50:5
**several** [8] - 212:24, 213:24, 221:1, 239:9, 241:18, 258:5, 259:16, 264:20
**severed** [1] - 195:15
**SGS** [1] - 257:20
**shaded** [1] - 31:5
**Shale** [1] - 237:25
**shale** [1] - 238:1
**shall** [10] - 118:18, 133:3, 151:23, 152:14, 152:22, 155:5, 161:4, 177:20, 202:9, 208:23
**shape** [2] - 204:24, 204:25
**shapefiles** [1] - 227:2
**share** [4] - 137:17, 150:6, 150:11, 150:25
**shared** [2] - 99:14, 99:19
**short** [1] - 124:11
**shorten** [1] - 121:1
**shortly** [1] - 84:12
**show** [4] - 39:21, 54:21, 100:8, 172:1
**showing** [11] - 53:12, 55:6, 56:19, 192:25, 214:19, 215:14, 216:24, 224:1, 258:19, 266:18, 268:23
**shown** [4] - 134:8, 195:12, 233:15, 237:16
**shows** [5] - 42:6, 81:15, 137:6, 221:21, 233:7
**shut** [3] - 114:9, 114:13, 114:15
**shutoff** [2] - 183:18
**sic** [2] - 14:2, 25:20
**sign** [2] - 146:19, 206:20
**signaling** [1] - 86:12
**signature** [1] - 248:24
**signatures** [2] - 96:20, 248:21
**signed** [34] - 38:23, 47:4, 48:7, 52:16, 61:5, 71:9, 71:21, 71:24, 83:18, 85:11, 90:14, 91:25, 92:12, 92:19, 93:5, 93:20, 94:2, 96:4, 96:8, 96:17, 97:9, 98:4, 98:6, 132:15, 133:22, 146:14, 146:20, 152:18, 153:20, 154:21, 163:21, 166:11, 170:4, 176:19
**significance** [1] - 31:8
**significant** [14] - 21:21, 29:20, 30:5, 33:10, 34:23, 59:2, 85:14, 100:24, 102:23, 124:23, 165:5, 165:6, 235:9, 235:12
**significantly** [2] - 249:15, 255:16
**signing** [1] - 146:21
**signs** [1] - 90:18
**siltstones** [1] - 264:3
**similar** [20] - 29:1, 29:4, 53:17, 53:18, 55:4, 72:7, 72:24, 73:14, 74:2, 74:9, 74:12, 74:16, 89:17, 106:15, 125:22, 174:15, 252:12, 261:1, 271:23
**similarities** [1] - 89:19
**similarity** [1] - 125:5
**similarly** [3] - 173:17, 219:24, 257:12
**simple** [1] - 266:9
**simplified** [1] - 266:7
**simply** [9] - 89:21, 103:12, 117:5, 117:8, 160:19, 167:1, 172:10, 252:23, 257:7
**simulated** [1] - 219:21
**simulation** [14] - 41:24, 67:21, 139:11, 210:7, 210:13, 213:2, 224:24, 232:24, 238:25, 253:20, 255:5, 255:9, 258:3, 258:19
**simulations** [12] - 38:20, 117:22, 205:6, 225:15, 225:16, 225:19, 226:25, 227:5, 230:11, 243:23, 253:18, 253:19
**single** [11] - 49:6, 93:5, 96:24, 96:25, 101:18, 124:18, 162:16, 205:19, 253:12, 256:24, 275:25
**singly** [1] - 13:7
**sink** [1] - 217:18
**site** [23] - 37:12, 38:14, 39:13, 39:14, 39:15, 40:8, 40:9, 40:10, 40:11, 60:1, 79:14, 98:17, 98:19, 214:1, 214:5, 214:21, 217:2, 218:23, 226:15, 235:15, 238:10, 258:6
**site-specific** [7] - 38:14, 214:5, 217:2, 218:23, 226:15, 235:15, 258:6
**sites** [12] - 36:1, 37:23, 38:8, 39:1, 39:25, 40:16, 40:17, 41:12, 41:15, 130:8, 196:1, 196:4
**siting** [1] - 123:21
**sitting** [1] - 242:3
**situated** [2] - 32:9, 32:10
**situation** [4] - 125:5, 147:8, 206:8, 206:19
**six** [4] - 248:3, 249:7, 249:8, 250:1
**size** [7] - 65:7, 117:8, 142:7, 248:2, 268:8, 274:21, 276:5
**SKAARE** [28] - 9:8, 43:19, 76:11, 83:17, 89:8, 93:13, 104:9, 107:22, 111:17, 118:9, 118:15, 120:18, 122:3, 128:12, 145:21, 161:2, 162:9, 162:11, 165:4, 168:8, 180:2, 184:17, 191:20, 195:17, 196:11, 201:11, 205:14, 207:13
**Skaare** [6] - 20:2, 20:9, 43:16, 43:17, 43:18, 44:1
**Skalsky** [1] - 207:22
**slice** [1] - 266:25
**slight** [1] - 250:15
**slightly** [5] - 72:8, 161:11, 250:17, 255:25, 260:20
**slurry** [1] - 78:7
**smaller** [1] - 27:22
**Smith** [1] - 12:7
**SMITH** [1] - 8:24
**software** [12] - 143:4, 144:4, 210:7, 218:14, 218:16, 219:21, 225:8, 225:17, 243:16, 243:20, 243:22, 252:13
**soil** [5] - 86:22, 87:4, 87:25, 199:11
**soils** [1] - 85:23
**solids** [3] - 241:7, 241:23, 242:4
**solubility** [1] - 217:16
**solution** [2] - 21:20, 113:17
**Solutions** [19] - 20:20, 22:4, 22:15, 22:16, 26:1, 44:3, 48:12, 61:22, 62:1, 62:2, 62:6, 62:14, 62:21, 69:3, 69:9, 69:21, 71:10, 71:22, 72:9
**solutions** [1] - 22:24
**solves** [1] - 32:6
**someone** [8] - 119:13, 140:19, 170:23, 198:11, 245:20, 248:19, 252:23, 253:4
**sometimes** [1] - 36:12
**somewhat** [1] - 45:8
**somewhere** [2] - 76:14, 140:1
**sorry** [37] - 40:12, 43:9, 43:18, 76:17, 90:15, 102:13, 102:14, 108:13, 110:18, 120:13, 128:10, 129:14, 134:6, 134:20, 135:1, 137:14, 155:4, 155:5, 162:13, 164:10, 164:16, 165:17, 167:22, 168:2, 170:14, 174:7, 174:12, 198:19, 210:10, 216:12, 219:17, 229:25,

259:5, 260:10, 261:13, 262:7, 263:13
**sort** [10] - 32:25, 41:11, 60:23, 87:10, 119:1, 119:14, 174:15, 213:14, 220:6, 235:2
**sound** [2] - 146:24, 171:16
**sounds** [1] - 78:15
**source** [6] - 124:18, 146:13, 209:3, 209:7, 209:10, 209:18
**sources** [19] - 26:17, 27:4, 27:23, 31:11, 35:19, 35:23, 36:25, 62:25, 63:3, 63:7, 63:16, 220:7, 220:11, 232:22, 235:23, 236:4, 236:5, 237:19, 252:6
**South** [2] - 27:6, 29:24
**south** [1] - 197:7
**southeast** [2] - 197:7, 197:8
**southwest** [4] - 49:10, 49:13, 49:14, 267:4
**Space** [13] - 57:7, 58:7, 118:17, 118:19, 118:21, 134:9, 151:23, 161:7, 162:1, 168:7, 176:20, 176:21, 177:16
**space** [84] - 1:16, 1:17, 3:20, 3:21, 5:22, 5:23, 14:7, 14:8, 15:20, 15:21, 17:7, 17:8, 36:16, 44:22, 47:17, 48:6, 48:17, 49:17, 49:20, 50:2, 50:11, 50:24, 51:13, 52:7, 52:15, 54:6, 57:15, 57:25, 60:16, 63:23, 83:19, 84:23, 85:10, 85:17, 91:9, 91:21, 92:22, 94:2, 101:12, 116:24, 119:2, 119:10, 119:18, 119:22, 120:22, 122:18, 125:9, 129:18, 130:25, 131:17, 132:9, 132:25, 133:22, 145:12, 146:15, 146:20, 149:17, 151:14, 152:10, 152:11, 152:15, 153:14, 157:14, 164:15, 165:23, 166:10, 169:8, 169:12, 169:23, 176:19, 177:9, 195:8, 195:14, 195:21, 198:4, 200:4, 203:24, 206:10, 206:13, 208:2, 214:16
**spaces** [1] - 178:2
**spacing** [1] - 268:4
**speaking** [10] - 127:19, 127:20, 127:23, 127:24, 143:19, 160:12, 164:16, 170:5, 183:8, 272:10
**Spearfish** [5] - 215:12, 215:20, 215:23, 222:19, 240:16
**spec** [1] - 35:10
**special** [3] - 3:6, 5:8, 7:12
**specialist** [1] - 231:22
**specific** [42] - 38:11, 38:14, 39:1, 50:6, 57:19, 64:9, 69:16, 73:23, 79:1, 86:4, 87:23, 103:5, 106:8, 111:23, 115:17, 116:24, 117:3, 143:10, 147:10, 178:19, 184:1, 187:13, 214:5, 216:3, 217:2, 218:23, 226:15, 232:9, 232:18, 235:15, 240:5, 244:18, 248:23, 252:7, 252:21, 253:2, 253:6, 253:9, 254:11, 258:6, 260:22, 263:11
**specifically** [40] - 34:15, 36:7, 45:19, 58:23, 66:11, 69:14, 74:15, 75:3, 77:12, 89:9, 89:13, 92:10, 95:11, 103:3, 130:5, 139:25, 140:10, 142:2, 142:3, 144:3, 144:14, 150:23, 154:7, 159:14, 164:2, 164:22, 165:18, 177:15, 177:17, 191:6, 191:17, 201:24, 206:1, 207:21, 212:19, 232:3, 234:13, 240:6, 266:16, 273:10
**specification** [2] - 35:9, 63:19
**specifics** [6] - 63:15, 104:19, 191:1, 204:18, 210:16, 273:17
**specify** [1] - 69:17
**spectrum** [1] - 171:19
**speculate** [2] - 106:25, 107:2
**speculating** [1] - 88:19
**speculative** [1] - 102:15
**speech** [1] - 178:9
**spend** [3] - 19:11, 25:13, 32:17
**spent** [3] - 31:19, 44:15, 232:13
**split** [1] - 151:6
**spot** [1] - 204:3
**spring** [7] - 50:14, 51:2, 86:19, 153:10, 153:11, 226:18, 233:11
**squares** [1] - 31:2
**stability** [2] - 222:1, 222:2
**stabilized** [9] - 139:14, 140:14, 140:16, 140:21, 186:22, 204:11, 225:2, 232:25, 233:10
**stack** [2] - 126:18, 126:19
**stacked** [3] - 185:8, 269:12, 269:23
**staff** [9] - 20:25, 30:11, 44:9, 88:12, 192:9, 214:8, 222:8, 233:20, 251:20
**STAFF** [1] - 8:2
**stand** [4] - 171:24, 172:3, 172:4, 173:25
**standard** [8] - 110:12, 142:15, 155:11, 158:2, 208:20, 225:8, 225:17, 262:19
**standardized** [3] - 86:25, 87:13, 87:18
**standards** [1] - 28:14
**standpoint** [1] - 215:6
**stands** [1] - 59:1
**start** [26] - 24:24, 95:8, 97:22, 103:14, 114:23, 129:15, 134:5, 134:11, 134:14, 137:21, 137:22, 141:17, 143:16, 161:14, 162:14, 165:19, 170:7, 192:13, 192:21, 195:8, 201:14, 213:21, 217:21, 241:25, 249:5, 268:17
**started** [17] - 21:8, 21:10, 21:21, 45:13, 47:25, 66:24, 98:16, 162:21, 163:8, 165:7, 167:9, 169:23, 226:6, 226:7, 231:15, 231:16, 231:20
**starters** [1] - 120:25
**starts** [3] - 112:10, 171:16, 255:5
**state** [23] - 20:16, 27:14, 34:12, 34:18, 36:13, 43:24, 62:25, 100:14, 102:3, 103:7, 103:13, 103:14, 103:18, 107:9, 130:5, 160:14, 160:19, 193:12, 194:10, 211:10, 214:2, 214:15, 230:25
**State** [27] - 21:3, 48:24, 49:17, 70:7, 84:3, 84:4, 84:21, 85:5, 86:1, 87:18, 89:1, 89:2, 89:17, 89:20, 89:22, 99:4, 100:20, 104:14, 104:22, 108:7, 148:19, 160:22, 175:4, 175:11, 175:25, 176:11, 196:9
**state's** [3] - 100:16, 105:5, 106:20
**State-funded** [1] - 70:7
**State-owned** [2] - 84:3, 84:4
**statement** [11] - 40:15, 40:19, 48:19, 48:20, 59:10, 59:11, 63:20, 88:6, 124:14, 130:16, 161:23
**statements** [1] - 24:9
**States** [1] - 112:6
**states** [20] - 27:5, 36:14, 63:23, 64:15, 64:18, 100:11, 118:2, 130:15, 132:6, 152:10, 152:21, 154:23, 162:16, 168:12, 175:14, 177:19, 197:14, 200:10, 203:6, 267:25
**station** [3] - 83:3, 83:6, 182:23
**stations** [1] - 82:23
**status** [1] - 59:24
**statute** [2] - 45:4, 104:16
**statutorily** [1] - 150:18
**statutory** [4] - 150:1, 150:13, 226:1, 227:16
**stay** [3] - 141:21, 214:14
**steel** [1] - 28:16
**step** [3] - 50:7, 170:25, 234:3
**Steph** [2] - 89:6, 120:15
**STEPHEN** [1] - 8:7
**steps** [4] - 47:7, 50:8, 165:1, 165:2
**still** [9] - 66:1, 113:18, 129:20, 130:20, 131:1, 132:23, 163:25, 193:6, 267:23
**STOLLDORF** [11] - 8:5, 195:6, 196:19, 197:10, 197:12, 197:20, 197:22, 197:23, 198:18, 198:21, 199:18
**Stolldorf.....** [1] - 9:13
**stop** [4] - 59:17, 113:10, 124:2, 276:9
**stopped** [1] - 52:9
**Storage** [57] - 1:4, 1:15, 1:19, 2:6, 3:4, 3:8, 3:19, 3:23, 4:8, 4:9, 5:6, 5:10, 5:21, 6:1, 6:11, 7:10, 13:24, 14:5, 14:13, 15:7, 15:12, 15:18, 15:24, 16:2, 16:20, 16:24, 17:5, 17:11, 17:14, 18:8, 23:14, 23:18, 25:2, 25:18, 25:19, 25:24, 26:7, 49:9, 62:3, 62:8, 62:9, 62:11, 62:21, 62:22, 118:20, 118:25, 134:5, 145:9, 145:16, 151:22, 152:25, 161:3, 161:6, 193:7
**STORAGE** [3] - 8:14, 8:15, 8:15
**storage** [358] - 1:5, 1:6, 1:16, 1:18, 1:19, 2:8, 2:9, 3:5, 3:9, 3:10, 3:20, 3:22, 3:23, 4:11, 4:12, 5:7, 5:11, 5:12, 5:22, 6:1, 6:2, 6:13, 6:14, 7:11, 12:16, 13:25, 14:7, 14:10, 14:16, 15:7, 15:13, 15:20, 15:23, 15:24, 16:5, 16:20, 17:1, 17:7, 17:10,

17:11, 17:17, 18:8, 19:13, 19:15, 21:25, 22:10, 23:9, 23:18, 23:22, 25:21, 25:22, 26:5, 26:24, 26:25, 27:12, 27:25, 28:4, 31:7, 32:11, 32:15, 33:25, 36:11, 36:16, 36:22, 37:1, 37:11, 37:15, 38:5, 38:6, 39:2, 39:15, 40:1, 40:6, 40:13, 41:17, 41:25, 42:10, 42:11, 43:1, 45:15, 46:17, 47:18, 48:13, 50:18, 51:24, 52:25, 53:3, 53:6, 53:8, 53:13, 53:18, 53:19, 53:25, 54:4, 54:12, 54:19, 55:15, 58:12, 58:16, 58:17, 59:6, 59:14, 63:22, 64:2, 64:12, 67:11, 77:2, 78:2, 78:16, 79:23, 80:15, 80:22, 80:23, 81:7, 90:20, 91:1, 91:7, 91:16, 91:20, 92:5, 92:13, 92:25, 93:14, 93:18, 93:19, 94:1, 94:4, 94:9, 94:22, 100:6, 100:12, 104:13, 107:10, 107:17, 107:25, 108:16, 111:21, 111:24, 112:2, 112:5, 114:1, 114:4, 114:10, 115:20, 116:4, 116:6, 117:6, 117:20, 117:21, 117:24, 118:1, 118:3, 118:4, 119:5, 119:7, 119:16, 119:25, 120:6, 120:7, 120:8, 120:10, 121:15, 121:17, 121:19, 122:7, 122:11, 122:25, 123:5, 123:6, 123:13, 123:14, 123:22, 126:3, 126:12, 127:6, 128:9, 131:11, 131:16, 131:25, 132:4, 132:8, 132:16, 132:25, 133:24, 134:3, 134:17, 134:22, 135:2, 135:7, 135:11, 135:17, 135:25, 136:18, 137:2, 137:16, 137:23, 138:4, 138:17, 138:19, 138:20, 139:3, 139:10, 139:19, 140:17, 140:22, 145:18, 146:2, 146:3, 146:10, 146:12, 146:16, 147:13, 149:12, 150:24, 151:18, 152:11, 152:12, 152:21, 152:22, 155:5, 155:8, 156:6, 156:15, 156:23, 158:3, 168:1, 168:5, 168:6, 169:9, 173:16, 174:4, 175:9, 175:15, 175:19, 175:25, 177:3, 177:15, 177:16, 180:13, 184:8, 184:10, 184:14, 184:15, 184:21, 184:22, 184:24, 184:25, 185:1, 185:3, 185:5, 185:7, 185:13, 186:7, 186:10, 186:13, 188:15, 188:17, 188:25, 189:2, 189:3, 191:5, 191:14, 194:4, 194:25, 195:11, 195:13, 195:22, 195:25, 196:15, 196:24, 197:4, 197:24, 198:15, 198:23, 200:4, 200:6, 200:10, 200:11, 200:12, 200:15, 202:4, 203:16, 203:18, 204:2, 204:12, 204:13, 205:9, 205:20, 206:11, 212:3, 212:25, 214:4, 214:7, 214:10, 214:13, 215:1, 216:3, 216:4, 216:17, 216:20, 216:21, 222:11, 222:14, 222:17, 223:7, 223:11, 224:4, 224:5, 224:8, 224:13, 224:16, 227:17, 227:19, 227:22, 228:1, 228:8, 228:9, 228:16, 228:19, 228:21, 228:22, 229:2, 229:9, 229:12, 229:20, 229:22, 229:23, 230:6, 230:8, 230:12, 230:13, 232:7, 232:10, 232:11, 232:21, 232:23, 233:1, 233:8, 233:22, 235:4, 235:7, 238:6, 240:13, 242:8, 256:7, 257:21, 260:25, 266:10, 276:3

**store** [10] - 27:3, 36:3, 37:18, 64:23, 79:11, 110:4, 147:17, 158:6, 188:11, 194:6

**stored** [13] - 27:16, 108:19, 110:23, 138:24, 155:9, 175:9, 175:15, 175:22, 176:1, 176:4, 176:17, 227:25, 228:1

**storing** [4] - 36:13, 36:24, 81:5, 100:23

**straight** [2] - 129:24, 136:20

**strata** [1] - 178:2

**strategist** [2] - 231:8, 231:24

**stratigraphic** [11] - 38:1, 190:9, 190:13, 190:20, 190:21, 223:4, 233:12, 234:14, 236:3, 260:22

**stratum** [1] - 178:2

**stray** [1] - 172:12

**stream** [12] - 34:25, 63:12, 63:16, 126:17, 198:2, 198:7, 198:8, 198:10, 219:2, 219:4, 228:4, 228:10

**Street** [1] - 8:20

**strength** [1] - 28:16

**strictest** [1] - 177:20

**strike** [2] - 178:11, 178:14

**stringent** [1] - 45:8

**strip** [1] - 252:25

**stripped** [2] - 252:21, 252:25

**stripping** [1] - 87:25

**structural** [4] - 225:10, 247:15, 250:13, 250:14

**structure** [6] - 24:25, 25:1, 25:17, 112:5, 192:25, 250:16

**structures** [1] - 111:25

**studied** [3] - 239:7, 262:16, 263:16

**studies** [8] - 112:14, 113:4, 154:9, 223:2, 257:11, 257:17, 271:23, 272:2

**study** [10] - 112:18, 184:4, 221:19, 221:20, 230:2, 257:19, 262:12, 262:20, 270:21, 271:1

**studying** [1] - 261:11

**stuff** [1] - 249:21

**sub** [1] - 161:5

**sub-surface** [1] - 161:5

**subject** [20] - 3:4, 5:5, 7:9, 12:17, 15:6, 16:19, 18:7, 57:11, 69:21, 72:5, 72:7, 75:15, 82:1, 90:20, 150:8, 152:14, 153:17, 181:13, 202:21, 272:8

**subjective** [2] - 246:2, 251:3

**submission** [1] - 202:8

**submit** [2] - 244:2, 251:21

**submittals** [1] - 144:24

**submitted** [27] - 13:11, 46:22, 61:21, 61:24, 62:6, 62:13, 62:16, 85:5, 88:24, 133:7, 133:24, 144:10, 144:11, 144:15, 144:21, 145:1, 145:5, 201:4, 210:3, 210:4, 210:6, 210:17, 226:13, 226:17, 226:20, 226:22, 227:7

**submitting** [1] - 24:4

**subrogation** [2] - 179:25, 180:5

**subsequent** [1] - 202:22

**subsequently** [1] - 151:20

**subsidiaries** [4] - 25:24, 71:16, 71:23, 72:10

**subsidiary** [3] - 21:17, 25:2, 25:25

**substances** [8] - 132:9, 146:2, 146:13, 155:9, 184:22, 198:1, 200:12, 228:7

**Substances** [1] - 153:1

**substantial** [2] - 22:20, 103:23

**substantive** [2] - 84:10, 84:17

**subsurface** [6] - 23:7, 159:4, 178:1, 190:9, 211:20, 214:6

**success** [2] - 102:17, 106:9

**sues** [1] - 170:23

**sufficient** [7] - 156:22, 203:6, 214:12, 214:23, 216:15, 229:15, 242:10

**suggest** [4] - 90:2, 118:22, 171:23, 266:5

**suggested** [2] - 214:3, 255:25

**suggesting** [1] - 173:3

**suggestions** [1] - 242:13

**SUGGS** [11] - 8:4, 200:21, 206:5, 206:14, 207:3, 207:6, 208:13, 208:16, 209:23, 209:25, 210:19

**Suggs** [1] - 209:19

**Suggs.....** [1] - 9:17

**Suggs.....** [1] - 9:15

**suitability** [3] - 177:25, 213:25, 216:20

**suitable** [7] - 32:11, 32:15, 36:10, 38:4, 64:2, 214:4, 227:18

**Suite** [2] - 8:12, 8:20

**summarize** [3] - 19:19, 35:6, 59:4

**summary** [12] - 22:14, 47:23, 54:2, 54:18, 55:3, 55:5, 56:19, 56:22, 136:6, 182:16, 202:3, 272:18

**Summary** [2] - 150:23, 192:23

**summer** [2] - 51:2, 226:18

**Summit** [176] - 1:3, 1:15, 1:19, 2:5, 3:4, 3:7, 3:18, 3:22, 4:8, 4:9, 5:6, 5:9, 5:21, 6:1, 6:11, 7:10, 13:24, 14:5, 14:13, 15:6, 15:11, 15:18, 15:23, 16:2, 16:19, 16:24, 17:5, 17:10, 17:14, 18:7, 20:20, 22:3, 22:15, 22:16, 23:18, 25:2, 25:18, 25:19, 25:24, 25:25, 26:7, 26:8, 35:17, 37:22, 39:16, 39:25, 40:1, 41:6, 41:8, 44:3, 44:20, 44:21, 48:12, 49:8, 49:16, 49:25, 55:14, 57:14, 59:8, 59:12, 60:5, 61:22, 61:25, 62:2, 62:3, 62:5, 62:6, 62:7, 62:8, 62:9, 62:11, 62:14, 62:20, 62:21, 62:22, 69:3, 69:7, 69:8, 69:20, 69:22,

70:3, 70:4, 71:10, 71:12, 71:15, 71:22, 72:9, 72:21, 74:18, 74:22, 88:24, 92:20, 94:3, 100:19, 105:4, 106:19, 106:22, 107:15, 108:14, 108:19, 112:8, 115:8, 119:19, 121:11, 124:14, 125:5, 125:21, 126:11, 129:19, 130:24, 130:25, 131:12, 137:7, 138:8, 140:24, 145:17, 145:25, 147:10, 148:12, 149:11, 150:22, 152:16, 153:5, 153:20, 153:22, 154:3, 154:20, 156:21, 159:6, 159:21, 159:22, 162:18, 164:17, 164:18, 165:23, 166:1, 168:19, 169:16, 170:22, 170:23, 171:1, 171:6, 171:9, 172:21, 172:23, 173:19, 175:18, 175:19, 175:24, 176:10, 178:7, 178:24, 179:24, 180:25, 181:10, 181:21, 182:4, 185:13, 185:24, 188:9, 193:7, 195:22, 203:14, 206:9, 206:20, 208:8, 226:14, 235:3, 235:6, 235:14, 237:1, 237:5, 254:1, 266:2

**SUMMIT** [3] - 8:14, 8:14, 8:15

**Summit's** [13] - 22:7, 118:7, 124:8, 127:6, 129:18, 133:10, 179:4, 179:21, 188:7, 202:18, 236:1, 236:2, 246:22

**super** [1] - 214:15

**super-critical** [1] - 214:15

**superseded** [2] - 91:1, 92:5

**supervision** [6] - 25:5, 30:15, 40:21, 45:23, 47:21, 50:1

**supervisor** [1] - 231:18

**supplement** [1] - 203:2

**supplemental** [5] - 201:4, 201:23, 202:22, 207:4

**supplied** [1] - 227:2

**supply** [5] - 65:10, 65:12, 65:13, 209:10, 209:12

**supply/demand** [1] - 102:24

**support** [8] - 34:19, 65:7, 65:8, 65:12, 75:22, 158:13, 171:25, 272:1

**supporting** [4] - 101:6, 101:10, 102:11, 102:12

**supports** [2] - 29:13, 259:14

**surface** [97] - 23:8, 38:23, 44:24, 44:25, 45:14, 46:7, 50:17, 58:24, 59:1, 59:3, 59:9, 59:13, 59:23, 59:25, 60:15, 60:22, 86:2, 86:6, 86:9, 86:11, 86:13, 86:20, 87:9, 88:15, 88:16, 89:24, 89:25, 90:6, 92:7, 92:11, 96:13, 98:8, 98:12, 127:14, 127:21, 128:2, 128:5, 128:7, 128:13, 128:24, 128:25, 129:3, 129:5, 129:7, 129:14, 129:17, 129:22, 129:25, 130:1, 130:8, 130:17, 130:19, 131:3, 151:15, 152:17, 152:23, 153:2, 153:7, 153:12, 153:23, 154:3, 154:6, 154:21, 155:6, 155:16, 155:22, 156:6, 156:11, 157:13, 159:3, 161:5, 166:24, 170:12, 178:9, 182:25, 186:2, 195:15, 195:21, 198:25, 200:24, 201:7, 201:14, 201:15, 203:19, 205:12, 205:13, 205:15, 206:21, 206:22, 208:4, 208:5, 208:10, 224:10, 229:10

**Surface** [1] - 130:16

**surface-access** [5] - 129:7, 129:14, 129:17, 129:22, 130:17

**surface-facilities** [5] - 96:13, 129:5, 130:17, 153:12, 166:24

**surfaces** [2] - 250:13, 250:14

**surrounded** [1] - 36:8

**surrounding** [2] - 177:11, 232:20

**Survey** [5] - 36:22, 212:14, 222:18, 236:7, 241:20

**survey** [2] - 38:13, 38:15

**survived** [1] - 125:4

**sustainable** [4] - 29:23, 29:24, 30:2, 32:4

**sustained** [5] - 35:16, 112:12, 149:10, 158:25, 168:15

**SWENSON** [1] - 8:22

**Swenson** [2] - 12:2, 89:15

**switch** [4] - 43:7, 52:18, 109:9, 224:18

**switching** [1] - 109:21

**sworn** [4] - 20:12, 43:20, 211:6, 230:21

**synfuels** [1] - 209:5

**system** [25] - 23:2, 23:6, 26:4, 27:15, 27:21, 27:24, 28:12, 28:16, 28:17, 29:9, 34:16, 35:9, 35:10, 35:21, 39:9, 53:16, 63:4, 63:7, 64:22, 65:9, 65:21, 76:8, 183:11, 194:16, 236:16

**systems** [1] - 26:5

## T

**Table** [4] - 35:8, 238:22, 260:6, 261:1

**table** [2] - 35:12, 246:13

**TABOR** [1] - 8:6

**tabular** [1] - 246:13

**takeaways** [1] - 213:12

**talks** [1] - 267:15

**TAMARA** [1] - 8:5

**target** [4] - 38:4, 188:3, 188:8, 189:7

**targeted** [1] - 185:19

**targeting** [2] - 185:15, 243:3

**tax** [1] - 109:4

**TB** [11] - 23:14, 25:21, 26:24, 37:14, 39:14, 40:1, 49:8, 51:12, 53:21, 137:8, 260:19

**team** [26] - 22:7, 36:6, 45:25, 66:25, 68:17, 69:2, 79:10, 79:25, 142:12, 143:3, 143:22, 144:24, 159:10, 159:18, 181:15, 181:18, 182:7, 183:25, 190:25, 212:4, 243:17, 245:19, 249:13, 249:18, 250:2, 267:2

**technical** [3] - 112:14, 213:24, 257:14

**technically** [4] - 111:4, 171:2, 176:24, 177:6

**temperature** [5] - 106:24, 190:4, 190:6, 190:17, 190:22

**ten** [5] - 61:11, 95:15, 179:12, 212:4, 246:16

**ten-minute** [3] - 61:11, 179:12, 246:16

**tends** [1] - 88:5

**term** [14] - 58:3, 114:20, 115:11, 129:3, 129:24, 134:3, 152:13, 162:6, 162:18, 165:13, 181:17, 216:21, 245:22, 245:24

**Term** [2] - 162:4, 205:18

**term's** [1] - 245:25

**terminus** [11] - 39:11, 81:15, 81:22, 82:14, 82:20, 82:24, 83:4, 182:18, 182:22, 182:24, 183:2

**terms** [49] - 13:7, 18:14, 26:19, 27:18, 29:10, 45:11, 48:5, 51:24, 52:6, 57:19, 57:25, 59:13, 59:19, 61:5, 70:11, 84:25, 85:3, 85:4, 92:24, 92:25, 93:4, 94:14, 99:10, 110:19, 110:21, 116:23, 124:22, 125:24, 129:25, 131:23, 146:5, 147:2, 147:18, 163:1, 165:10, 165:11, 166:12, 167:17, 176:7, 176:8, 211:22, 221:3, 226:23, 253:3, 253:10, 265:4, 270:15, 273:1, 275:3

**test** [25] - 190:13, 223:4, 234:14, 236:4, 255:13, 256:25, 257:20, 258:11, 260:22, 261:9, 261:17, 270:2, 270:8, 270:15, 270:21, 271:2, 271:8, 272:6, 273:6, 273:23, 274:7, 274:10, 274:25, 275:10, 276:1

**testified** [25] - 20:12, 43:20, 50:3, 51:12, 52:9, 55:13, 56:14, 65:24, 68:20, 78:22, 96:11, 101:20, 108:5, 111:18, 131:19, 154:5, 166:13, 183:7, 211:6, 213:23, 219:5, 228:20, 230:3, 230:21, 237:23

**testify** [13] - 63:25, 64:8, 67:3, 75:22, 77:12, 124:19, 132:2, 134:1, 140:9, 144:13, 204:18, 204:21, 210:16

**testifying** [8] - 74:1, 75:7, 77:10, 122:16, 144:2, 144:20, 159:24, 220:5

**testimony** [19] - 12:11, 12:17, 19:14, 32:23, 58:14, 86:16, 124:16, 128:4, 129:19, 129:24, 143:15, 143:19, 146:13, 166:19, 210:14, 213:10, 229:18, 230:3, 254:22

**testing** [17] - 142:17, 142:18, 142:20, 142:21, 142:22, 196:1, 217:3, 217:5, 236:25, 237:2, 237:7, 237:12, 246:3, 246:6, 255:12, 271:4, 273:11

**tests** [8] - 227:15, 257:12, 257:14, 257:18, 270:5, 271:21, 271:23, 272:13

**text** [1] - 263:25

**Tharaldson** [5] - 33:11, 33:15, 34:2, 34:4, 34:7

**that'll** [1] - 183:14

**THE** [2] - 8:22, 8:22

**themselves** [2] - 65:9, 224:5

**thereafter** [2] - 187:2, 206:2

**therefore** [3] - 102:11, 136:25

**therein** [1] - 132:9

**therewith** [1] - 178:3
**thesis** [2] - 262:20, 263:5
**they've** [2] - 157:10, 168:24
**thick** [3] - 141:18, 215:25, 236:19
**thickness** [5] - 214:12, 270:22, 271:11, 272:15, 273:2
**thicknesses** [1] - 38:1
**THIEL** [1] - 8:6
**third** [2] - 47:13, 247:18
**third-party** [1] - 47:13
**thousand** [9] - 140:1, 141:15, 141:16, 142:6, 142:7, 142:24, 220:18, 220:20, 241:15
**thousand-foot** [4] - 141:15, 141:16, 142:6, 142:24
**Three** [1] - 240:18
**three** [33] - 23:23, 26:5, 38:10, 39:25, 40:1, 54:19, 60:8, 62:7, 82:6, 136:10, 190:12, 190:13, 192:15, 192:16, 192:19, 192:23, 193:1, 193:4, 194:3, 194:4, 195:20, 195:24, 196:7, 198:15, 212:12, 222:10, 223:4, 224:4, 225:6, 228:18, 244:3, 244:12
**thresholds** [1] - 241:8
**throughout** [6] - 44:17, 45:1, 88:4, 88:17, 145:13, 237:22
**tie** [1] - 146:8
**Title** [1] - 174:6
**title** [27] - 44:24, 45:14, 48:2, 48:16, 50:4, 130:15, 170:22, 170:25, 171:5, 171:11, 171:20, 172:4, 172:18, 172:19, 172:24, 172:25, 173:11, 173:15, 173:18, 173:19, 175:8, 175:14, 175:19, 205:16, 211:22
**to-2,000-foot** [1] - 143:1
**today** [32] - 11:21, 12:23, 18:20, 19:9, 22:12, 28:6, 28:24, 34:1, 40:17, 53:20, 59:2, 59:15, 69:15, 69:22, 71:17, 71:18, 75:7, 77:10, 80:16, 81:6, 81:8, 81:25, 123:18, 125:9, 133:14, 153:4, 211:14, 212:20, 230:4, 231:22, 232:5, 242:3
**together** [3] - 61:3, 166:7, 236:14
**tomorrow** [1] - 276:10
**ton** [2] - 163:5, 165:22
**Tongue** [1] - 239:13
**tonnage** [1] - 58:8
**tons** [9] - 36:23, 116:17, 194:7, 194:8, 194:12, 194:13, 194:17, 194:18, 194:19
**took** [8] - 19:2, 50:7, 51:3, 60:21, 97:14, 104:1, 148:15, 219:1
**top** [13] - 28:15, 64:2, 64:12, 100:9, 136:20, 142:4, 215:11, 215:12, 248:17, 248:19, 248:25, 259:8, 263:25
**tops** [4] - 247:24, 248:5, 248:6, 248:10
**total** [9] - 54:9, 55:7, 56:21, 135:24, 137:7, 190:16, 241:7, 241:23, 242:3
**touch** [1] - 51:15
**touched** [7] - 26:18, 52:5, 56:7, 56:9, 57:2, 199:6, 229:18
**towards** [1] - 154:7
**Township** [78] - 1:7, 1:9, 1:11, 1:12, 1:13, 1:20, 1:22, 2:1, 2:2, 2:3, 2:10, 2:11, 2:14, 2:15, 2:16, 2:20, 2:22, 3:1, 3:1, 3:2, 3:11, 3:14, 3:15, 3:16, 4:1, 4:3, 4:5, 4:6, 4:13, 4:16, 4:17, 4:18, 4:23, 5:2, 5:3, 5:4, 5:13, 5:14, 5:15, 5:18, 5:19, 6:2, 6:4, 6:5, 6:8, 6:9, 6:15, 6:16, 6:18, 6:20, 6:21, 7:2, 7:4, 7:5, 7:8, 7:9, 14:22, 14:24, 15:2, 15:3, 15:4, 16:11, 16:14, 16:16, 16:17, 17:22, 17:24, 18:1, 18:4, 18:6, 49:9, 49:12, 49:14, 135:20, 136:8, 197:2, 197:13, 204:9
**townships** [2] - 53:14, 95:7
**trace** [1] - 35:11
**tracking** [1] - 125:25
**tract** [43] - 53:12, 53:15, 54:1, 54:2, 54:5, 54:11, 54:17, 55:3, 55:4, 56:15, 56:20, 56:21, 134:18, 134:21, 135:5, 135:10, 135:15, 135:19, 135:21, 135:24, 136:6, 136:8, 136:13, 136:14, 136:15, 136:21, 136:23, 136:25, 137:2, 137:19, 138:6, 178:21, 181:22, 184:11, 195:13, 197:9, 197:20, 198:23, 199:3, 199:21, 199:22, 207:15, 207:22
**Tract** [4] - 134:10, 150:23, 151:21, 198:22
**tract's** [1] - 54:11
**tracts** [6] - 132:8, 134:14, 134:16, 136:23, 138:13, 181:25
**traded** [1] - 102:21
**Trail** [7] - 29:2, 33:10, 33:11, 64:3, 64:9, 70:21, 106:9
**trained** [2] - 267:5, 269:22
**transaction** [1] - 147:9
**transactions** [2] - 99:15, 99:20
**TRANSCRIPT** [1] - 7:15
**transcript** [2] - 201:21, 201:22
**Transfer** [1] - 174:5
**transfer** [4] - 175:21, 184:21, 184:25, 185:3
**transfers** [4] - 147:10, 175:10, 175:16, 175:24
**transient** [2] - 270:24, 271:12
**transmissibility** [2] - 270:23, 271:11
**transmission** [3] - 193:17, 193:21, 194:11
**transmissive** [4] - 214:23, 220:14, 229:14, 242:9
**Transport** [5] - 26:3, 26:8, 26:9, 193:2, 193:5
**transport** [8] - 23:5, 27:14, 32:14, 79:13, 79:15, 113:1, 194:12, 218:17
**transportation** [11] - 27:12, 29:9, 32:3, 42:24, 78:3, 78:7, 78:9, 78:12, 78:17, 79:6, 105:15
**transported** [1] - 27:21
**transporting** [1] - 81:4
**trapping** [3] - 217:14, 217:16, 217:22
**TRAVIS** [1] - 8:5
**treated** [3] - 58:21, 97:10, 152:14
**treatment** [3] - 126:3, 126:6, 127:4
**tricky** [2] - 68:2, 90:16
**trigger** [1] - 235:1
**triggers** [2] - 172:17, 235:5
**true** [4] - 60:20, 95:2, 150:20, 181:6
**trump** [1] - 158:18
**trunk** [1] - 27:24
**TRUST** [1] - 8:23
**Trust** [17] - 12:3, 49:7, 49:22, 84:2, 84:5, 84:10, 84:21, 85:9, 85:24, 86:23, 87:13, 87:18, 88:9, 88:17, 89:2, 99:1, 99:18
**truthed** [1] - 237:8
**truthing** [1] - 237:10
**try** [8] - 12:10, 58:25, 59:4, 141:9, 192:17, 200:22, 257:22
**trying** [10] - 62:16, 68:2, 68:8, 90:16, 92:16, 92:17, 92:18, 138:11, 148:7, 169:17
**Tuesday** [2] - 11:3, 276:13
**Tundra** [2] - 257:20, 272:3
**tune** [1] - 246:4
**tuned** [1] - 255:9
**turn** [17] - 23:10, 24:18, 35:3, 52:23, 52:24, 54:25, 145:8, 151:17, 159:2, 161:25, 167:25, 177:14, 213:7, 254:24, 255:2, 266:15, 267:14
**two** [26] - 13:1, 13:3, 20:1, 21:10, 25:3, 50:19, 55:17, 101:3, 132:23, 132:24, 157:4, 162:21, 170:4, 199:21, 208:13, 216:4, 216:22, 220:4, 222:9, 224:3, 233:13, 238:3, 250:4, 252:2, 252:3, 261:6
**Ty** [1] - 11:21
**TYLER** [1] - 8:10
**type** [6] - 59:23, 74:8, 76:8, 198:14, 233:19, 263:6
**types** [11] - 59:12, 72:24, 73:14, 74:3, 74:12, 172:7, 263:3, 263:7, 263:15, 266:12, 269:18
**typically** [6] - 13:1, 173:22, 215:22, 239:1, 248:1, 259:24
**typo** [2] - 152:4, 205:15

## U

**U.S** [10] - 22:16, 22:17, 29:11, 29:12, 29:14, 31:20, 36:21, 236:6, 240:9, 242:15
**ultimate** [1] - 256:2
**ultimately** [9] - 22:9, 32:12, 38:2, 57:16, 105:20, 141:18, 163:8, 223:6, 226:3
**unable** [3] - 99:6, 166:17, 259:20
**uncertain** [1] - 246:10
**uncertainties** [1] - 266:11
**unconsolidated** [6] - 259:17, 259:19, 260:1, 260:17, 264:19, 264:21
**UND** [1] - 44:14
**under** [49] - 25:4, 30:15, 40:20, 45:23, 47:20, 49:6,

50:1, 51:15, 57:25, 64:6, 66:3, 74:19, 77:10, 81:25, 90:10, 107:24, 108:23, 111:18, 113:7, 118:16, 121:16, 121:18, 134:10, 146:5, 147:18, 148:18, 151:4, 155:24, 156:1, 157:1, 157:15, 158:6, 162:4, 169:3, 176:7, 176:8, 176:13, 177:8, 177:22, 181:2, 186:2, 187:3, 193:6, 193:22, 217:11, 222:3, 242:16, 252:19, 263:25
**underground** [7] - 79:12, 109:5, 220:7, 220:11, 232:21, 235:23, 237:19
**underlined** [1] - 205:17
**underneath** [2] - 65:18, 223:15
**underpredicts** [1] - 259:24
**understood** [6] - 98:23, 169:18, 184:17, 197:17, 200:18, 203:10
**Underwood** [1] - 29:4
**undifferentiated** [1] - 216:5
**undulating** [2] - 269:3, 269:19
**unduly** [1] - 238:7
**Unit** [1] - 196:25
**unit** [5] - 19:13, 50:7, 59:6, 150:12, 156:16
**United** [1] - 112:6
**unitized** [1] - 178:2
**units** [11] - 19:15, 42:11, 48:18, 48:22, 48:25, 53:19, 54:19, 117:6, 195:20, 195:24, 258:21
**University** [7] - 21:4, 21:5, 44:13, 70:10, 211:17, 212:10, 231:14
**unleased** [33] - 50:13, 51:9, 57:11, 57:15, 58:20, 59:5, 83:23, 86:11, 86:16, 89:23, 91:22, 94:12, 128:6, 128:8, 128:24, 128:25, 131:13, 131:18, 132:5, 138:16, 141:6, 149:25, 153:2, 153:6, 154:4, 156:2, 156:7, 168:22, 170:11, 170:12, 170:16, 176:3, 178:9
**unless** [5] - 91:16, 118:21, 130:6, 155:11, 185:12
**unrecorded** [1] - 172:13
**unsigned** [1] - 47:11
**unsupported** [1] - 24:9
**unusable** [1] - 169:10
**unwilling** [1] - 172:24
**up** [38] - 13:3, 21:16, 29:4, 50:5, 69:12, 79:2, 100:7, 109:3, 110:16, 113:19, 121:1, 130:13, 134:2, 135:24, 136:2, 148:12, 150:22, 154:19, 161:14, 163:3, 173:25, 177:9, 179:3, 183:25, 184:7, 194:21, 194:22, 194:23, 197:11, 201:4, 201:21, 220:5, 246:17, 249:22, 257:25, 271:3, 273:21, 275:23
**update** [2] - 54:17, 235:14
**updated** [6] - 24:25, 31:15, 47:14, 113:14, 235:17
**uphold** [1] - 158:14
**uplift** [1] - 102:16
**upper** [25] - 27:5, 200:7, 214:22, 214:25, 215:10, 215:16, 215:20, 216:1, 216:7, 216:10, 217:9, 218:2, 218:5, 218:7, 218:10, 218:15, 219:11, 219:13, 222:6, 228:6, 229:13, 229:24, 234:10, 238:21, 239:2
**upscaled** [1] - 268:8
**usable** [1] - 246:12
**usage** [1] - 154:6
**USDW** [4] - 220:21, 236:13, 239:25, 240:2
**USDWs** [3] - 234:20, 238:4, 239:23
**useful** [2] - 265:22, 265:25
**uses** [5] - 107:13, 107:20, 108:3, 108:20, 218:17
**USGS** [1] - 236:6
**utilities** [2] - 124:23, 266:9
**utility** [1] - 266:1
**utilize** [1] - 169:12
**utilized** [2] - 49:25, 225:12
**utilizing** [2] - 38:18, 116:12

## V

**validate** [4] - 42:3, 113:5, 216:19, 261:18
**valuable** [6] - 107:11, 107:18, 108:1, 222:10, 222:11, 228:16
**value** [11] - 101:13, 168:16, 168:17, 169:20, 169:21, 194:23, 261:16, 273:25, 274:3, 275:2, 275:14
**values** [2] - 270:23, 271:11
**valve** [5] - 83:3, 83:6, 182:23, 183:19, 183:23
**valves** [7] - 28:17, 83:7, 183:18, 183:20, 183:22
**variability** [1] - 264:6
**variation** [1] - 145:12
**variations** [1] - 250:15
**variety** [2] - 26:16, 117:13
**variogram** [2] - 249:20, 249:22
**variograms** [8] - 247:11, 256:19, 265:20, 267:15, 267:16, 267:24, 268:9
**various** [5] - 132:6, 154:9, 188:19, 189:11, 258:22
**verify** [1] - 181:14
**verifying** [1] - 48:2
**version** [2] - 130:14, 210:11
**versus** [4] - 19:20, 85:13, 257:24, 275:23
**vertical** [13] - 145:12, 187:11, 187:17, 214:24, 216:15, 224:25, 225:20, 229:16, 230:6, 230:12, 242:10, 266:10, 275:4
**vertically** [3] - 185:18, 185:23, 187:24
**VI** [1] - 182:25
**via** [8] - 23:6, 27:15, 27:21, 50:11, 50:12, 81:4, 86:18, 217:13
**viability** [5] - 100:16, 102:8, 105:5, 106:20, 214:6
**viable** [2] - 113:17, 114:18
**vice** [2] - 20:22, 22:5
**view** [3] - 258:18, 259:8, 269:15
**violates** [1] - 92:13
**virtue** [1] - 149:6
**Volk** [1] - 77:9
**volume** [4] - 33:10, 102:25, 199:2, 274:18
**VOLUME** [1] - 7:16
**volumes** [3] - 214:13, 247:3, 262:4
**voluntary** [1] - 60:10

## W

**WADE** [2] - 9:8, 20:11
**Wade** [26] - 20:1, 20:5, 20:16, 20:18, 20:23, 22:1, 23:10, 24:18, 24:22, 25:13, 30:9, 30:23, 36:2, 36:12, 37:3, 39:3, 41:5, 42:18, 75:17, 111:18, 201:24, 210:2, 213:14, 213:23, 219:5, 226:14
**wait** [2] - 37:4, 180:14
**waiver** [1] - 179:24
**Waiver** [1] - 174:14
**waiving** [1] - 180:5
**warrant** [3] - 171:11, 172:25, 235:11
**warranties** [2] - 172:8, 172:18
**warrants** [2] - 172:17, 173:10
**warranty** [11] - 170:22, 170:24, 171:5, 171:7, 171:20, 172:19, 172:24, 173:14, 173:16, 173:18, 173:22
**waste** [3] - 78:19, 126:2, 126:17
**wasting** [1] - 43:8
**Water** [12] - 191:3, 191:8, 191:15, 191:21, 191:23, 236:8, 239:21, 240:4, 240:6, 240:10, 241:9, 242:16
**water** [25] - 131:10, 159:5, 159:6, 160:2, 160:3, 160:6, 160:12, 160:23, 161:5, 161:8, 161:9, 161:14, 161:21, 189:10, 220:7, 220:11, 229:11, 232:22, 235:24, 237:20, 240:10, 241:2, 241:24, 242:15
**waters** [6] - 160:13, 160:16, 160:18, 160:20, 229:10, 242:1
**Wayne** [1] - 20:18
**ways** [5] - 159:5, 162:21, 242:14, 253:4, 266:3
**website** [4] - 227:13, 246:8, 273:12, 273:15
**week** [1] - 50:21
**weeks** [5] - 144:18, 248:3, 249:7, 249:8, 250:1
**weight** [3] - 223:12, 275:9, 275:13
**weird** [1] - 268:14
**well-testing** [1] - 255:12
**wellbore** [6] - 79:16, 79:18, 189:17, 190:5, 190:7
**wellbores** [1] - 223:1
**wellhead** [1] - 79:18
**wells** [29] - 39:4, 60:8, 131:10, 182:25, 190:9, 190:14, 190:15, 190:20, 190:21, 199:11, 223:5, 224:7, 233:11, 233:14, 233:15, 233:16, 233:22, 233:24, 234:1, 234:4, 234:7, 236:5, 236:20, 237:11, 237:15, 253:6, 260:22, 262:24
**West** [79] - 1:7, 1:9, 1:11, 1:12, 1:13, 1:21, 1:22, 2:1, 2:2, 2:3, 2:10, 2:12, 2:14, 2:15, 2:16, 2:20, 2:22, 3:1, 3:2, 3:3, 3:12, 3:14, 3:16, 3:17, 4:1, 4:4, 4:5, 4:6, 4:14, 4:17, 4:18, 4:19, 4:23, 5:2, 5:4, 5:5, 5:13,

5:15, 5:16, 5:19, 5:20, 6:3, 6:4, 6:5, 6:8, 6:9, 6:15, 6:17, 6:18, 6:21, 6:22, 7:3, 7:4, 7:5, 7:8, 7:9, 14:22, 14:24, 15:2, 15:4, 15:5, 16:11, 16:15, 16:17, 16:18, 17:23, 17:25, 18:1, 18:5, 18:6, 40:3, 40:9, 40:14, 41:9, 135:21, 136:9, 197:3, 197:13
**west** [5] - 39:14, 197:5, 197:16, 268:22
**west-east** [1] - 268:22
**whatever's** [1] - 177:9
**wheat** [1] - 168:21
**wherein** [1] - 51:3
**whole** [6] - 89:2, 210:5, 210:11, 221:4, 230:4, 249:18
**wholly** [3] - 25:2, 25:23, 25:25
**willing** [6] - 58:23, 98:22, 152:16, 178:14, 180:25, 199:16
**Williston** [3] - 36:23, 44:17, 240:12
**wind** [1] - 265:10
**Wisconsin** [1] - 231:14
**withdraw** [5] - 111:1, 111:12, 112:15, 112:21, 156:17
**withdrawals** [1] - 112:9
**withdrawing** [1] - 112:10
**withdrew** [1] - 112:23
**witness** [20] - 13:5, 19:6, 19:19, 43:4, 43:5, 43:10, 192:1, 196:17, 198:16, 203:22, 204:16, 204:17, 204:21, 204:23, 209:15, 209:21, 210:25, 230:16, 270:10, 271:3
**witnesses** [10] - 12:10, 12:25, 20:1, 61:16, 124:8, 179:21, 209:20, 220:4, 222:9, 246:22
**WITNESSES** [1] - 9:6
**wondering** [1] - 145:22
**word** [4] - 172:16, 205:19, 274:5, 275:15
**words** [6] - 47:3, 126:2, 126:11, 127:5, 139:22, 146:3
**workflow** [1] - 248:1
**workings** [1] - 144:4
**works** [3] - 77:10, 143:11, 171:3
**writing** [2] - 130:6, 133:13
**written** [9] - 86:14, 90:3, 90:24, 91:13, 131:21, 153:4, 153:19, 155:20, 196:8
**wrote** [1] - 122:15
**Wyoming** [1] - 265:8

## Y

**year** [11] - 30:1, 33:13, 33:15, 41:21, 85:6, 111:1, 165:14, 186:19, 194:9, 194:12
**years** [37] - 21:10, 21:14, 37:1, 41:16, 41:18, 42:1, 42:7, 42:11, 42:16, 67:10, 67:13, 67:17, 67:25, 70:24, 106:23, 109:15, 113:10, 113:13, 113:15, 114:12, 117:23, 125:4, 139:13, 140:12, 140:15, 163:22, 163:24, 212:12, 212:15, 217:20, 231:20, 234:25, 235:1, 235:5, 235:6, 261:10, 261:18
**yellow** [1] - 269:4
**yesterday** [3] - 52:17, 54:16, 83:19
**yourself** [2] - 205:25, 247:21

## Z

**Zack** [1] - 84:7
**ZASTE** [1] - 8:18
**zero** [1] - 207:20
**zip** [1] - 252:11
**zone** [36] - 140:21, 200:7, 200:8, 200:16, 214:22, 214:25, 215:10, 215:16, 215:20, 216:1, 216:8, 216:10, 216:14, 217:10, 218:2, 218:3, 218:8, 218:11, 218:13, 218:16, 219:11, 219:14, 220:13, 220:17, 221:8, 222:6, 224:13, 227:23, 228:6, 229:14, 229:25, 236:12, 238:21, 239:2, 239:4
**zones** [13] - 196:16, 200:17, 215:4, 215:8, 218:5, 235:22, 236:9, 237:4, 237:7, 240:17, 242:8, 242:19, 269:4

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

| | | |
|---|---|---|
| In re application of Summit | : Case No(s). | 30869 |
| Carbon Storage #1, LLC requesting | : | 30870 |
| consideration for the geologic | : | 30871 |
| storage of carbon dioxide in the | : | 30872 |
| Broom Creek Formation from the | : | 30873 |
| Midwest Carbon Express Pipeline in | : | 30874 |
| the storage facility located in | : | 30875 |
| Sections 31, 32, 33, and 34, | : | 30876 |
| Township 142 North, Range 87 West, | : | 30877 |
| Sections 1, 11, 12, 13, 14, 15, | : | 30878 |
| 22, 23, 24, 25, 26, 35, and 36, | : | 30879 |
| Township 141 North, Range 88 West, | : | 30880 |
| Sections 2, 3, 4, 5, 6, 7, 8, 9, | : | |
| 10, 11, 14, 15, 16, 17, 18, 19, | : | |
| 20, 21, 22, 23, 25, 26, 27, 28, | : | |
| 29, 30, 31, 32, 33, 34, and 35, | : | |
| Township 141 North, Range 87 West, | : | |
| Sections 1, 2, 3, and 12, Township | : | |
| 140 North, Range 88 West and | : | |
| Sections 4, 5, 6, and 7, Township | : | |
| 140 North, Range 87 West, Mercer, | : | |
| Morton, and Oliver Counties, ND. | : | |
| | | |
| In re application of Summit | : | |
| Carbon Storage #1, LLC to | : | |
| consider the amalgamation of the | : | |
| storage reservoir pore space, in | : | |
| which the Commission may require | : | |
| that the pore space owned by | : | |
| nonconsenting owners be included | : | |
| in the geologic storage, as | : | |
| required to operate the Summit | : | |
| Carbon Storage #1, LLC storage | : | |
| facility located in Sections 31, | : | |
| 32, 33, and 34, Township 142 | : | |
| North, Range 87 West, Sections 1, | : | |
| 11, 12, 13, 14, 15, 22, 23, 24, | : | |
| 25, 26, 35, and 36, Township 141 | : | |
| North, Range 88 West, Sections 2, | : | |
| 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, | : | |
| 15, 16, 17, 18, 19, 20, 21, 22, | : | |
| 23, 25, 26, 27, 28, 29, 30, 31, | : | |

32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re application of Summit Carbon Storage #1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35,

Township 141 North, Range 87 West,:
Sections 1, 2, 3, and 12, Township:
140 North, Range 88 West and :
Sections 4, 5, 6, and 7, Township :
140 North, Range 87 West, Mercer, :
Morton, and Oliver Counties, ND, :
subject to the application of :
Summit Carbon Storage #1, LLC for :
the geologic storage of carbon :
dioxide in the Broom Creek :
Formation, and enact such special :
field rules as may be necessary. :

In re application of Summit :
Carbon Storage #2, LLC requesting :
consideration for the geologic :
storage of carbon dioxide in the :
Broom Creek Formation from the :
Midwest Carbon Express Pipeline :
in the storage facility located in:
Sections 27, 28, 29, 32, 33, 34, :
and 35, Township 143 North, Range :
88 West, Sections 1, 2, 3, 4, 5, :
6, 7, 8, 9, 10, 11, 12, 13, 14, :
15, 16, 17, 18, 19, 20, 21, 22, :
23, 24, 25, 26, 27, 28, 29, 30, :
32, 33, 34, 35, and 36, Township :
142 North, Range 88 West, Sections:
5, 6, 7, 8, 17, 18, 19, 20, 29, :
30, and 31, Township 142 North, :
Range 87 West, and Sections 1, 2, :
and 3, Township 141 North, Range :
88 West, Mercer and Oliver :
Counties, ND. :

In re application of Summit :
Carbon Storage #2, LLC to :
consider the amalgamation of the :
storage reservoir pore space, in :
which the Commission may require :
that the pore space owned by :
nonconsenting owners be included :
in the geologic storage, as :
required to operate the Summit :
Carbon Storage #2, LLC storage :
facility located in Sections 27, :
28, 29, 32, 33, 34, and 35, :

Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.

In re application of Summit Carbon Storage #2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.

In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13,

14, 15, 16, 17, 18, 19, 20, 21, :
22, 23, 24, 25, 26, 27, 28, 29, :
30, 32, 33, 34, 35, and 36, :
Township 142 North, Range 88 West,:
Sections 5, 6, 7, 8, 17, 18, 19, :
20, 29, 30, and 31, Township 142 :
North, Range 87 West, and Sections:
1, 2, and 3, Township 141 North, :
Range 88 West, Mercer and Oliver :
Counties, ND, subject to the :
application of Summit Carbon :
Storage #2, LLC for the geologic :
storage of carbon dioxide in the :
Broom Creek Formation, and enact :
such special field rules as may :
be necessary. :

In re application of Summit :
Carbon Storage #3, LLC requesting :
consideration for the geologic :
storage of carbon dioxide in the :
Broom Creek Formation from the :
Midwest Carbon Express Pipeline in:
the storage facility located in :
Section 36, Township 143 North, :
Range 87 West, Sections 19, 20, :
21, 28, 29, 30, 31, 32, 33, 34, :
35, and 36, Township 143 North, :
Range 86 West, Sections 1, 2, 11, :
12, 13, 14, and 24, Township 142 :
North, Range 87 West, Sections 1, :
2, 3, 4, 5, 6, 7, 8, 9, 10, 11, :
12, 13, 14, 15, 16, 17, 18, 19, :
20, 21, 22, 23, 24, 25, 26, 27, :
28, 29, 30, 32, 33, 34, and 35, :
Township 142 North, Range 86 :
West, and Sections 6, 7, 17, 18, :
19, and 20, Township 142 North, :
Range 85 West, Oliver County, ND. :

In re application of Summit :
Carbon Storage #3, LLC to consider:
the amalgamation of the storage :
reservoir space, in which the :
Commission may require that the :
pore space owned by nonconsenting :
owners be included in the geologic:

storage, as required to operate :
the Summit Carbon Storage #3, LLC :
storage facility located in :
Section 36, Township 143 North, :
Range 87 West, Sections 19, 20, :
21, 28, 29, 30, 31, 32, 33, 34, :
35, and 36, Township 143 North, :
Range 86 West, Sections 1, 2, 11, :
12, 13, 14, and 24, Township 142 :
North, Range 87 West, Sections 1, :
2, 3, 4, 5, 6, 7, 8, 9, 10, 11, :
12, 13, 14, 15, 16, 17, 18, 19, :
20, 21, 22, 23, 24, 25, 26, 27, :
28, 29, 30, 32, 33, 34, and 35, :
Township 142 North, Range 86 West,:
and Sections 6, 7, 17, 18, 19, and:
20, Township 142 North, Range 85 :
West, Oliver County, ND, in the :
Broom Creek Formation. :

In re application of Summit :
Carbon Storage #3, LLC for an :
order of the Commission :
determining the amount of :
financial responsibility for the :
geologic storage of carbon dioxide:
from the Midwest Carbon Express :
Pipeline in the storage facility :
located in Section 36, Township :
143 North, Range 87 West, Sections:
19, 20, 21, 28, 29, 30, 31, 32, :
33, 34, 35, and 36, Township 143 :
North, Range 86 West, Sections 1, :
2, 11, 12, 13, 14, and 24, :
Township 142 North, Range 87 West,:
Sections 1, 2, 3, 4, 5, 6, 7, 8, :
9, 10, 11, 12, 13, 14, 15, 16, 17,:
18, 19, 20, 21, 22, 23, 24, 25, :
26, 27, 28, 29, 30, 32, 33, 34, :
and 35, Township 142 North, Range :
86 West, and Sections 6, 7, 17, :
18, 19, and 20, Township 142 :
North, Range 85 West, Oliver :
County, ND, in the Broom Creek :
Formation. :

In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

**TRANSCRIPT OF HEARING**

**VOLUME I - (Pages 1 - 276)**

**Taken At**
**1000 East Calgary Avenue**
**Bismarck, North Dakota**
**June 11, 2024**

**BEFORE DAVID P. GARNER**
**-- HEARING EXAMINER --**

**A P P E A R A N C E S**

NDIC STAFF PRESENT:

MR. LYNN HELMS
MR. MARK BOHRER
MR. RICHARD SUGGS
MS. TAMARA MADCHE
MR. TRAVIS STOLLDORF
MS. ASHLEIGH THIEL
MR. DAVID TABOR
MR. STEPHEN FRIED
MR. CALEB ALBERTSON
MS. SARA FORSBERG

---

MR. LAWRENCE BENDER
MR. TYLER J. GLUDT
Fredrikson & Byron, P.A.
Attorneys at Law
Suite 400
304 East Front Avenue
Bismarck, North Dakota 58504

FOR SUMMIT CARBON STORAGE #1, SUMMIT CARBON STORAGE #2 AND SUMMIT CARBON STORAGE #3.

---

MR. DERRICK BRAATEN
MS. DESIRAE ZASTE, Paralegal
Braaten Law Firm
Attorneys at Law
Suite 100
109 North Fourth Street
Bismarck, North Dakota 58501

FOR THE INTERVENORS, THE SWENSON LIVING TRUST, BAUMAN, GERVING, HAUPT, JOCHIM, KRAFT, LIEBELT, MAIZE, METZ, RUST, AND SMITH.

---

# TABLE OF CONTENTS

## INDEX OF PROCEEDINGS

Page

Opening Comments by Hearing Examiner Garner..... 11

---

## APPLICANT'S WITNESSES

WADE BOESHANS/JEFFREY SKAARE

Direct Examination by Mr. Bender..... Page 20

Direct Examination by Mr. Bender..... Page 43

Cross-Examination by Mr. Braaten..... Page 61

Examination by Ms. Madche..... Page 192

Examination by Mr. Stolldorf..... Page 195

Further Examination by Ms. Madche..... Page 200

Examination by Mr. Suggs..... Page 200

Examination by Mr. Bohrer..... Page 207

Further Examination by Mr. Suggs..... Page 208

AMANDA DOUGLAS/CAITLIN OLSEN

Direct Examination by Mr. Bender..... Page 211

Direct Examination by Mr. Bender..... Page 230

Cross-Examination by Mr. Braaten..... Page 238

---

T A B L E O F C O N T E N T S (Cont'd)

APPLICANT'S EXHIBITS


| Exhibit No. | Offered | Received |
|---|---|---|
| 1A | 23 | 24 |
| 1B | 23 | 24 |
| 1C | 23 | 24 |
| 2A | 25 | 25 |
| 2B | 25 | 25 |
| 2C | 25 | 25 |
| 3A | 30 | 30 |
| 4A | 40 | 41 |
| 5A | 55 | 56 |
| 5B | 55 | 56 |
| 5C | 55 | 56 |


--------

11

(The following proceedings were had and made of record herein, commencing at 9:00 a.m., Tuesday, the 11th day of June, 2024:)

HEARING EXAMINER GARNER: We are on the record for the hearings in the matters listed in the North Dakota Industrial Commission hearing docket for June 11. I am David Garner, hearing examiner for these hearings. We are at the hearing for the Department of Mineral Resources, Oil & Gas Division, and it is 9 a.m.

There are 12 cases on the docket which will be consolidated into one hearing. Before calling them, I would just like to give anyone appearing an opportunity to discuss any housekeeping matters or anything that we need to discuss at this point in time.

MR. BENDER: I'll make an appearance -- excuse me -- I'll make an appearance, Mr. Examiner, if that's appropriate. Lawrence Bender, P.O. Box 1855, Bismarck. I'm with Fredrikson law firm, and with me here today is Mr. Ty Gludt. He's immediately to my left.

HEARING EXAMINER GARNER: Okay.

MR. BRAATEN: Derrick Braaten with Braaten Law Firm, Bismarck, North Dakota, here appearing on

12

behalf of and representing a number of the landowner intervenors, including The Swenson Living Trust, Michael Bauman, Glenn and Lisa Gerving, Michael and Bonnie Haupt, John Jochim, Kevin and Kimberly Kraft, Charmayne Liebelt, Kirk and Linda Maize, Allen Maize, Paul and Christy Metz, JoLene Rust, and Gary and Cassie Smith.

HEARING EXAMINER GARNER: Okay. Before I call the cases, I would just like to note in the interest of time, please try and have the witnesses not repeat each other's testimony. It will obviously make things go a lot quicker if we can just keep it to that.

And just as a reminder, this is not a PSC hearing on the pipeline. This is an Industrial Commission hearing on storage facilities. So please keep your testimony limited to that subject matter.

MR. BENDER: Mr. Examiner, maybe now is the appropriate time, since you mentioned you're consolidating the cases, and we believe that is going to be very helpful in expediting the hearings here today, you may recall in some of the other $CO_2$ sequestration matters we've had before the Commission, we've called our witnesses in groups.

13

Those groups are typically no larger than two, but I think that also expedites the hearing process because you can have two individuals up. One individual may not know the answer to something, the other witness is there, and that has in the past worked pretty well instead of -- instead of calling them singly in terms of expediting the hearing process. And I did talk to Mr. Braaten about that before the hearing.

HEARING EXAMINER GARNER: And one other matter. There was a motion to compel submitted at 5 p.m. last night. Attorney Bender, did you have an opportunity to review that motion?

MR. BENDER: I did not.

HEARING EXAMINER GARNER: You did not.

MR. BENDER: But I will respond to it in -- I don't know what the time period is, 10 days or 14 days, but I will respond to it. Probably even respond to it more quickly than that.

HEARING EXAMINER GARNER: Okay. Well, with that, I will call the cases. Case Number 30869, in the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #1, LLC, requesting consideration for the geologic storage

14

of carbon dioxide in the Broom Creek Formation from the Madison [sic] Carbon Express Pipeline.

Case Number 30870, in the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #1, LLC, to consider the amalgamation of the storage reservoir pore space, in which the Commission may require the pore space owned by the nonconsenting owners be included in the geologic storage.

In the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #1, LLC, for an order of the Commission determining the amount of financial responsibility for the geologic storage of a carbon dioxide -- of carbon dioxide from the Midwest Carbon Express Pipeline.

Case Number 30872, in the matter of a hearing called on a motion of the Commission to consider establishing the field and pool limits for lands located in Sections 31, 32, 33 and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35 and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19,

15

20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34 and 35, Township 141 North, Range 87 West, Sections 1, 2, 3 and 12, Township 140 North, Range 88 West, and Sections 4, 5, 6 and 7, Township 140 North, Range 87 West, Mercer, Morton and Oliver Counties, subject to the application of Summit Carbon Storage #1, LLC, for the geologic storage of carbon dioxide in the Broom Creek Formation.

Case Number 30873, in the matter of a hearing called on motion of the Commission to considering the application of Summit Carbon Storage #2, LLC, requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline.

Case Number 30874, in the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #2, LLC, to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by the nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC, storage facility.

Case Number 30875, in the matter of a

16

hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #2, LLC, for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline.

Case Number 30876, in the matter of a hearing called on a motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34 and 35, Township 143 North, Range 88 West, sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35 and 36, Township 142 North, Range 38 West -- 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30 and 31, Township 142 North, Range 87 West, Sections 1, 2, 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, North Dakota, subject to the application of Summit Carbon Storage #2 for the geologic storage of carbon dioxide in the Broom Creek Formation.

Case Number 30877, in the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #3, LLC, requesting consideration for the geologic

17

storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline.

Case Number 30878, in the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #3, LLC, to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by the nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC, storage facility.

Case Number 30879, in the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #3, LLC, for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline.

And 30880, in the matter of a hearing called on a motion of the Commission to consider establishing field and pool limits for lands located in Sections 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35 and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14 and 24,

18

Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33 and 34 and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19 and 20, Township 142 North, Range 85 West, Oliver County, North Dakota, subject to the application of Summit Carbon Storage #3, LLC, for the geologic storage of carbon dioxide in the Broom Creek Formation.

All interested parties please come forward.

MR. BENDER: I made my appearance. Maybe one more housekeeping matter, Mr. Examiner. As you know, these applications are lengthy in terms of how long it actually takes to get to the point where they'd be put on the docket. Numerous documents are filed with the Commission, both in paper and electronically, and those all become part of the record.

What we've done here today is we want to focus on what we're going to refer to as the final form of application, and that's -- what we have done is we've provided a paper copy of that final form to Sara as the official record. I know everyone has it on their computers, so we didn't

19

make a bunch of copies. I think the last time or the time before I made a bunch of copies and I took them back because no one wanted them. I did offer a copy -- paper copy to Mr. Braaten. He indicated that he was going to follow along on the computer. The witness will have a paper copy to follow through, and like I indicated, Sara will have the official record.

What our plan is today, Mr. Examiner, in addition to consolidating, what we're going to do is spend some time going through in relatively great detail the -- the application for the Leingang storage unit. And after we go through that in detail, there will be some testimony as to the -- to the other storage units, the Fischer and the Hintz, but for the most part we're going to go through very carefully the Leingang application.

And after we finish that, we will then call a witness who will summarize and compare the differences between Leingang versus Fischer and Hintz. We did that in the Minnkota application, thought it worked pretty well, saved a lot of time where hopefully we can do the same thing here.

HEARING EXAMINER GARNER: Okay.

MR. BENDER: And with that in mind, we

20

have two witnesses that we'd like to call: Wade Boeshans and Jeff Skaare.

HEARING EXAMINER GARNER: Can you repeat the first name?

MR. BENDER: Wade Boeshans, B-o-e-s-h-a-n-s.

HEARING EXAMINER GARNER: And the next one again.

MR. BENDER: And Jeff Skaare, S-k-a-a-r-e.

HEARING EXAMINER GARNER: Mr. Boeshans.

**WADE BOESHANS,**

being first duly sworn, was examined and testified as follows:

**DIRECT EXAMINATION**

**BY MR. BENDER:**

Q. Wade, would you state your full name for the record, please?

**A.** Wade Wayne Boeshans.

Q. And by whom are you employed?

**A.** Summit Carbon Solutions.

Q. In what capacity?

**A.** As executive vice president.

Q. Wade, what I'd like you to do to begin with is briefly highlight for the examiner, the Commission staff and opposing counsel your

21

educational background and work experience.

**A.** Sure. My education, I have a B.S. in civil engineering from North Dakota State University, as well as I've completed the executive leadership program through the University of Minnesota's Carlson School of Business.

My work background after graduating, I started my career in consulting engineering and residential development in Phoenix, Arizona. Came back to North Dakota two years later and started my career in the lignite coal industry near Beulah.

Worked around the country and Gulf Coast, Powder River Basin. Came back to North Dakota about 20 years ago and most recently was the president and general manager of BNI Coal and BNI Energy operating the mine up by Center and as a subsidiary of ALLETE, a diversified energy company.

While I was there, it became very apparent to me that for there to be a future in the lignite energy, we were going to need a carbon solution, and so I started investing a significant amount of my time and energy working with other industry leaders, research leaders to advance the science, engineering and regulatory frameworks for commercializing carbon capture and storage.

22

Q. Okay. Wade, let's talk a little bit about some of your duties and responsibilities with respect to your employment with Summit Carbon Solutions.

**A.** Yeah. As executive vice president, I have responsibility for the $CO_2$ sequestration, the scope of Summit's project. I lead a team based here in Bismarck that is responsible for, you know, the engineering, design, permitting, ultimately construction of the storage facilities.

Q. Okay. Now let's move into what you're primarily here to talk about today and that's the -- the project, and I'll refer to it as the project summary. Can you provide us with some background on Summit Carbon Solutions?

**A.** Yes. So Summit Carbon Solutions is a U.S. company with U.S. roots that is committed to driving economic growth and job growth in the Midwest, reducing emissions and providing a substantial boost to the agriculture and energy industries that are critical to rural American communities and the livelihoods of its citizens. We believe we can fulfill those commitments through carbon management solutions.

And so in 2021, the company announced its

23

partnership with ethanol plants to build out what is now known as the Midwest Carbon Express system, and in that partnership what we're proposing to do is to capture $CO_2$ that's currently being emitted into the atmosphere from those plants, transport it to North Dakota via a pipeline system, and inject it in the deep subsurface, approximately one mile below the surface, for injection and -- and permanent storage and sequestration.

Q. Okay. Wade, now I'd like you to turn your attention to Exhibits 1A, 1B and 1C. Can you tell me what those exhibits are?

**A.** Yes. So Exhibit 1A is the application in final form for the Carbon Storage, LLC, #1 TB Leingang permit application.

Q. And then what is Exhibit 1B?

**A.** It is the application in final form for Summit Carbon Storage #2, geologic storage facility permit for the BK Fischer.

Q. And what is Exhibit 1C?

**A.** It's the application in final form for the KJ Hintz storage facility permit.

MR. BENDER: Move admission of these three exhibits.

HEARING EXAMINER GARNER: Any objection?

24

MR. BRAATEN: Just a point of clarification, if I may. I should have asked this beforehand. But the exhibits that we're referring to here that you're submitting are the same as the applications on the case docket; right?

MR. BENDER: That's correct.

MR. BRAATEN: Okay. No -- I object to any kind of hearsay, hearsay within hearsay, unsupported statements that are contained within the applications. To the extent we're marking and admitting the applications just to have the application in the record, I don't have an objection to that.

HEARING EXAMINER GARNER: The objection is noted. The exhibits are admitted.

MR. BENDER: Okay.

Q. (MR. BENDER CONTINUING) What I'd like you to do, Wade, is let's turn to what's been previously marked as Exhibit 2A, 2B and 2C, and this is an exhibit we haven't handed out yet. We'll do that right now.

Wade, can you briefly describe what these exhibits are?

**A.** So these exhibits -- start with 2A -- is an updated business structure that depicts, you

25

know, the SCS, LLC, #1 business structure as a wholly owned subsidiary of Summit Carbon Storage.

Q. And was -- were these two exhibits prepared either by you or under your control and supervision?

**A.** Yes.

MR. BENDER: Offer the exhibits.

HEARING EXAMINER GARNER: Any objection?

MR. BRAATEN: No objection.

HEARING EXAMINER GARNER: Exhibits are admitted.

Q. (MR. BENDER CONTINUING) Why don't you spend a little time, Wade, just going through Exhibits 2B and 2C and explain just what is being requested?

**A.** Yes. So the exhibit reflects the business structure, as I mentioned. At the bottom you see the Summit Carbon Storage, LLC, #1, Summit Carbon Storage, LLC, #2, and Summit Carbon Storage, LLC [sic], which respectively are the owners and operators of the TB Leingang storage facility, BK Fischer storage facility and KJ Hintz storage facilities. These are all wholly owned subsidiaries of Summit Permanent Carbon Storage LLC, which is a wholly owned subsidiary of Summit

26

Carbon Solutions.

Also you see on the diagram SCS Carbon Transport which is the operator of the pipeline system and will be the operator of the flowline systems included in the three respective storage facility permit applications. We will have operating agreements between Summit Carbon Storage, LLC, #1, #2 and #3 and Summit Carbon Transport -- or SCS Carbon Transport -- excuse me -- LLC.

Q. Okay. All right. Well, thank you for describing Exhibits 2B and 2C. Let's now -- I'll ask you the question again. What are each of these applicants requesting?

**A.** They're each requesting commercial permits for operations and injection of $CO_2$ and the flexibility to receive $CO_2$ from a variety of industrial sources.

Q. Okay. Now, you've touched on this, but can you go into a little bit more detail in terms of the purpose of the applications that are being made by SCS1, SCS2 and SCS3?

**A.** Yeah. The purpose of the application is to receive -- again, to receive commercial permits to operate the TB Leingang storage facility, the BK Fischer storage facility and the KJ Hintz storage

27

facility for the injection of $CO_2$.
Q. And where is the $CO_2$ that these entities are planning to store -- where is that coming from?
**A.** The $CO_2$ is coming from industrial sources across five states in the upper Midwest: North Dakota, South Dakota, Iowa, Nebraska and Minnesota.
Q. And I'd like you now to maybe explain just in a little bit more detail the Midwest Carbon Express project.
**A.** Yes. So the Midwest Carbon Express project is an integrated carbon capture, transportation and storage project that proposes to capture $CO_2$ from industrial facilities across the five-state footprint, transport that $CO_2$ to North Dakota via a pipeline system where it will then be injected and permanently stored.
Q. Okay. Why don't you go into a little bit more detail in terms of after the $CO_2$ is captured and it comes to North Dakota, what happens next?
**A.** So after the $CO_2$ is captured, it's transported via a pipeline system. Essentially we have smaller what I'll describe as lateral lines connecting each one of the sources to a mainline trunk line system, 24-inch line that will deliver the $CO_2$ to North Dakota to the area of the storage

28

facilities in Oliver and Mercer Counties, where we would then inject the $CO_2$ into the Broom Creek Formation per these applications for permanent storage.
Q. Now, Mr. Garner made it pretty clear that today is not a PSC hearing. It's an Industrial Commission hearing and we don't want to talk about pipelines, but I think it might be appropriate just for you to describe very, very briefly construction of the pipeline.
**A.** Yes. As I mentioned, it's an integrated pipeline system, about 2,500 miles. It will all be designed, constructed and operated per PHMSA standards. Have a minimum depth of pipe of 4 feet to the top of pipe. All the pipe is high carbon -- or high-strength carbon steel. And the system will be fitted with automatic valves and remote system operations and operated through a control center based in Ames, Iowa, and be monitored and operated 24/7.
Q. And what's the cost of the project?
**A.** It's about $8 billion.
Q. And how does that -- how does this project, what you're here today to discuss, compare to other $CO_2$ sequestration projects?

29

**A.** So it's -- it's similar to the currently operating Red Trail Energy ethanol carbon capture project and the Blue Flint carbon capture ethanol project up at Underwood. Similar to those in that we're capturing -- planning to capture $CO_2$ primarily from ethanol plants and -- and sequester it. The difference being that this project has 57 plants so it's much larger in scale and includes a longer transportation system.
Q. And what does this project do in terms of benefits to the U.S. economy?
**A.** So the ethanol industry in the U.S. supports about 360,000 jobs and contributes about 45 billion annually to the U.S. GDP. Our project which is proposing to connect with 57 ethanol plants, those 57 plants produce about 5.7 billion gallons of ethanol annually and consume about 1.7 billion bushels of corn that is produced on 30 million acres or about 30 million acres, so significant to the regional economy and regional corn market.
Additionally, we also have an agreement with a sustainable aviation facility that's proposed in South Dakota. And sustainable aviation fuels are essentially making jet fuel out of corn.

30

Last year it was reported that 158 million gallons of sustainable aviation fuels were delivered to the airline industry globally. That same industry has commitments for 3.3 billion gallons by 2030.
So that is a significant opportunity for the corn producers and by extension the corn markets which has a material impact on land prices and commodity prices.
Q. Wade, I now want to direct your attention to Exhibit 3A. I've had it circulated amongst the Commission staff and opposing counsel. Can you tell me what Exhibit 3A is?
**A.** It's the project overview map.
Q. Okay. And was this prepared by you or under your control and supervision?
**A.** It was.
MR. BENDER: Offer the exhibit.
HEARING EXAMINER GARNER: Any objections?
MR. BRAATEN: No objection.
HEARING EXAMINER GARNER: Exhibit's admitted.
Q. (MR. BENDER CONTINUING) Let's take a look at Exhibit 3A, Wade. Can you briefly discuss what's contained upon it and the importance of this exhibit with respect to this hearing?

31

**A.** Sure. So the -- the exhibit is a project overview map. All of the red squares on the map are the approximate locations of the 57 ethanol plants that are part of the project. And then in the gray shaded area in North Dakota, you can see the diamonds that reflect the approximate location of the storage facilities that we're proposing to permit. The significance of this exhibit is that it revises the Figure PS-2 that's in the application and revises the number of plants to 57 sources.

Q. So PS-2 would be in each one of the exhibits, 1A, 1B and 1C; is that correct?

**A.** Yes. That's right.

Q. And this would, in essence, be updated information to that particular page; is that correct?

**A.** That's correct.

Q. Now, you spent some time discussing what this project will do for the U.S. economy. Can you tell us what it will do -- what the project will do for the 57 ethanol plants that you just briefly mentioned and that are depicted on your Exhibit 3A?

**A.** Yes. What the project does for the ethanol plants is it allows them to lower their

32

carbon intensity score of the ethanol they produce which then enables them to participate in emerging low carbon fuels markets, both fuel transportation and sustainable aviation fuels in the future.

And by doing so, in essence, the biggest thing it does is it solves from a proximity challenge, if you will, in that as you can see by the diagram on Exhibit 3A, most of the ethanol plants are situated on -- over the Corn Belt, which the Corn Belt is not situated for most of the plants over suitable geologic storage, and so ultimately it connects -- provides an opportunity for these plants to capture their $CO_2$, lower their CO -- their CI score -- excuse me -- and transport their $CO_2$ to a suitable geologic storage basin here in North Dakota.

Q. Now I'd like you to spend just a little time explaining what benefits this project will bring to the -- to North Dakota.

**A.** Sure. So --

MR. BRAATEN: I'm going to object, Your Honor, to the extent this is being offered as any kind of expert testimony without foundation about any kind of economic or other benefits that would require some sort of economist. If he's just

33

talking generally about what they believe the benefits of the project are, I don't have that objection.

HEARING EXAMINER GARNER: Overruled.

Q. (MR. BENDER CONTINUING) You can answer.

**A.** Yeah. So, you know, the North Dakota economy or agriculture and energy represent about 70 percent of the North Dakota economy, and in North Dakota, you know, we -- we produce a significant volume of corn. The Red Trail -- excuse me, not the Red Trail -- the Tharaldson Ethanol plant, which is part of our project, consumes about 60 million bushels of corn a year. We grow between 350 and 400 million corns -- or bushels of corn per year. So the Tharaldson plant alone consumes around 15 percent -- 15 to 20 percent of the corn that's produced in North Dakota annually.

Additionally, the ethanol industry consumes over half of North Dakota's corn. And so these -- this project and its participants provide material markets and market demand for corn that's grown here in North Dakota.

Q. Okay. And these -- some of the $CO_2$ that's going to go into your storage facilities that are

34

before the Commission today are going to be coming from the Tharaldson Ethanol plant; is that correct?

**A.** Yes.

Q. And can you tell me where the Tharaldson Ethanol plant gets its corn from?

**A.** According to my conversations with Tharaldson, they have -- they purchase corn from about a 150-mile radius around the Casselton plant there.

Q. And how does the project, in your opinion, benefit agricultural -- agriculture and energy in the state of North Dakota?

**A.** It benefits agriculture and energy in North Dakota in that it develops CCS infrastructure, or specifically carbon pipeline infrastructure, that is a common carrier system that could be used for others. It commercially deploys CCS in the state that again provides support for others doing the same.

Q. And, in your opinion, is the project good -- good for or will benefit regional corn markets?

**A.** Yes. It provides significant demand for regional corn.

Q. Let's talk a little bit about stream

composition. What I mean by that is what's the composition of the $CO_2$ going to be? And perhaps we could turn to Exhibit 1A and on page PS-3. Might be easier for everyone to follow if we're looking at that page.

Can you just briefly summarize what's contained on that page?

**A.** Yes. So Table PS-1 on page PS-3 indicates the $CO_2$ system specification. As you can see, it's -- the system spec is greater than 98.25 percent $CO_2$ and then trace amounts of other constituents listed on -- in the table, primarily constituents of air, nitrogen, oxygen.

Q. Okay. And you talked briefly about possibly down the road the project taking some $CO_2$ from a sustained aviation fuel facility. What are some of the considerations that Summit will have with respect to the requirements for potentially taking this additional $CO_2$ from nonethanol sources?

**A.** Yeah. So we are -- we have conservatively designed the system and the -- again, within this permit to greater than 95 percent $CO_2$. And so as we secure new sources, the requirements will be that they are greater than 95 percent $CO_2$ at capture, and when commingled and delivered to the sequestration





sites, greater than 98.25 percent $CO_2$.

Q. And, Wade, is North Dakota a good place to store or sequester $CO_2$, and if so, why?

**A.** Yes, North Dakota has -- has ideal geology for sequestration. We'll hear a lot from the rest of the team here later about the geology. But specifically North Dakota has, you know, extensive sand layers that are surrounded by confining layers that provide for -- that cover a large areal extent and provide for suitable geologic reservoir for storage.

Q. Wade, you sometimes hear concerns that perhaps we shouldn't be storing $CO_2$ in the state of North Dakota from other states because there is this concern about whether there's an abundance of storage space in North Dakota. Can you tell us a little bit about what your understanding is of that?

MR. BRAATEN: Object to foundation.

HEARING EXAMINER GARNER: Overruled.

MR. BOESHANS: Yes. The U.S. Geologic Survey has recorded an estimated storage resource in the Williston Basin of over 250 billion tons. That would be the equivalent of storing all of the $CO_2$ from all North Dakota industrial sources for



over 5,000 years. So it's a very prolific storage resource.

Q. (MR. BENDER CONTINUING) Okay. Wade, I'm going to direct your attention to Exhibit -- wait a minute -- yeah. I'm going to direct your attention back to Exhibit 1A and particularly page PS-5. Can you provide us with an overview of the proposed location?

**A.** Sure. As you see laid out in figure PS-3 on page PS-5 of Exhibit 1, you see the locations of the storage facilities within Oliver and Mercer Counties, and so you see that the BK Fischer site, or SCS2 as the applicant, is located in Mercer County; and then SCS1, the TB Leingang, is located in Oliver County; and SCS3, the KJ Hintz storage facility, is located in Oliver County as well.

Q. Do you believe this is a good area to store $CO_2$?

**A.** We do.

MR. BRAATEN: Object to foundation.

HEARING EXAMINER GARNER: Overruled.

Q. (MR. BENDER CONTINUING) How did Summit select this project area and the injection sites?

**A.** So we looked at, you know, available information, particularly mapping of sand



thicknesses, previous oil and gas and stratigraphic well drilling information, ultimately identified an area in -- that included, you know, Oliver, Mercer and Morton Counties as a suitable target area for $CO_2$ storage.

Q. Okay. And you talked about the storage area, but what about -- how about the injection sites? How did you select those?

**A.** So after we'd identified, you know, this general area of the three counties, we then identified a specific area within that. Based on that information of about 170,000 acres, we proceeded to secure permissions to do survey and secure land rights and completed site-specific characterization, including seismic survey on over 95 percent of roughly a 140,000-acre block within that.

And then based on utilizing kind of that information to build a -- engaged with the EERC to build a geologic model, run simulations. And based on the geology of the area as well as landowner participation or cooperation for those who had signed leases and then considering also surface infrastructure, including roads, availability of power, locations of dwellings, et cetera,

39

identified the specific injection sites and -- and the storage boundaries came from that.

Q. Now, Wade, are there flowlines that are associated with the injection wells? And if it's easier to discuss that by looking at Exhibit 1A, please do so.

**A.** Sure. Yes. I'm looking at Figure PS-3 on page PS-5 in Exhibit 1A. You can see that there are flowlines. You can see the mainline system upon this diagram labeled NDM-106 comes into the -- to Oliver County. At that point there's a terminus and then there's flowlines from that point out with NDL-326 going to the KJ Hintz site, NDL-327 continuing to the west to the TB Leingang site, and then NDL-325 going to the BK Fischer storage site.

Q. And in selecting this area, did Summit give any consideration to other permitted projects in the area?

**A.** We did.

Q. Okay. And perhaps I already handed it out, but Exhibit 4A -- I show you what's been marked Exhibit 4A. Can you tell me what that exhibit is?

**A.** Yeah. So this is an exhibit that includes the three Summit sites proposed in the application

40

here, three Summit storage facilities -- TB Leingang, BK Fischer and KJ Hintz -- as well as the already permitted Minnkota facilities, DCC West and DCC East.

And what this -- what you see from that is kind of the proximity between the storage facilities with DCC facilities being closest to the KJ Hintz site. It's approximately 11 miles from the DCC West injection site to the KJ Hintz injection site and about 19 miles from the DCC East injection site to the KJ Hintz injection site.

Q. And it's -- I'm sorry. I interrupted you.

**A.** And the storage boundaries between DCC West and KJ Hintz are approximately 3 miles apart.

Q. And is it a fair statement that you're very familiar with both the permitted sites and the proposed sites that you're here today to permit?

**A.** I am.

Q. And is it a fair statement that this exhibit was prepared under your control and supervision?

**A.** Yes.

Q. Okay.

MR. BENDER: Offer Exhibit 4A.

HEARING EXAMINER GARNER: Any objections?

41

MR. BRAATEN: Yeah. I object to foundation.

HEARING EXAMINER GARNER: Overruled. The exhibit is admitted.

Q. (MR. BENDER CONTINUING) Wade, you indicated that Summit did consider impacts on other permitted projects. Which permitted facilities did Summit consider?

**A.** The DCC West and DCC East permits.

Q. Okay. And can you explain just a bit as to what sort of considerations you gave to those sites?

**A.** Yeah. So what you're seeing on the exhibit indicates the extent of the $CO_2$ plumes of each of the five sites operating at permitted limits at the end of five years. And so as you can see, the plumes do not go outside of the storage areas at -- by the end of five years, which, of course, is then our understanding that they're -- the Commission requires a reevaluation and adjustments to the permit in a five-year reevaluation period.

And so what this tells us is that there is no risk. From this simulation it indicates the plume boundaries are within the storage area at the

42

end of the -- end of five years and -- and the renewal period, which then gives us the opportunity to validate modeling assumptions and adjust accordingly or present to the Commission proposed amendments to the permits.

Q. And this shows what you believe will be the plume extent after five years; is that correct?

**A.** That's correct.

Q. And you said the Commission will have an opportunity to review these storage areas -- or the storage units after five years; is that correct?

**A.** That's correct.

Q. Is it also your understanding that the Commission has continuing jurisdiction, and if it deems necessary, could review earlier than five years?

**A.** Yes. That's correct.

Q. Okay. Now, Wade, in the past the Commission has always requested information on an NAICS industrial classification code.

**A.** Yes.

Q. Do you know what that is?

**A.** I do. It is NAICS code 486990, all other pipeline transportation.

Q. Okay. And, in your opinion, is the

43

storage facility in the public interest?
**A.** Yes.
MR. BENDER: That's all the questions I have for this witness, Mr. Examiner. We would like to move to the next witness and then give the Commission and opposing counsel an opportunity to ask questions at that time so they can switch back and forth without wasting time.
HEARING EXAMINER GARNER: I'm sorry, you'd like to call your second witness before cross?
MR. BENDER: Yes. Yep.
HEARING EXAMINER GARNER: Any objections to that?
MR. BRAATEN: No.
HEARING EXAMINER GARNER: Okay. You can proceed. Mr. Skaare.
MR. BENDER: Skaare.
HEARING EXAMINER GARNER: Skaare. Sorry.

**JEFFREY SKAARE,**

being first duly sworn, was examined and testified as follows:

**DIRECT EXAMINATION**

**BY MR. BENDER:**

Q. Jeff, state your full name for the record, please.

44

**A.** Yeah. Jeffrey Skaare.
Q. And, Jeff, by whom are you employed?
**A.** Summit Carbon Solutions.
Q. In what capacity?
**A.** I am the director of land, legal and regulatory affairs for sequestration.
Q. And I would like -- what I'd like you to do next, Jeff, is I'd like you to briefly highlight for the Commission staff and opposing counsel your educational background and work experience.
**A.** Sure. I received a bachelor of science degree in business administration from the University of North Dakota in 1997. Went on to law school at UND, received my juris doctorate degree in 2000. I have spent the majority of my career working in the oil and gas sector, primarily as a landman throughout mostly the Williston Basin.
Q. Okay. And what are some of your duties and responsibilities with respect to your employment with Summit?
**A.** Yeah. My duties with respect to Summit include essentially the pore space acquisition efforts which included mineral and, you know, surface title review; the document creation; the negotiations; and, of course, some of the surface

45

facilities and flowline acquisitions throughout that project.
Q. And you were also involved in the notice requirement that is provided by statute prior to holding this hearing; is that correct?
**A.** That is correct.
Q. And would you characterize those notice requirements somewhat stringent?
**A.** They are.
Q. Okay. Can you describe what you did in terms of identifying owners and then making sure those owners were provided notice?
**A.** Certainly. So we started by doing a complete surface and mineral title review of the areas inside the storage facility permits and within the one-half mile buffer outside of that particular area to determine who the record owners are.
Q. And were you specifically involved in identifying those owners?
**A.** I was.
Q. Okay. But you had others who were working under your control and supervision; is that correct?
**A.** That is correct. I oversaw the team.

46

Q. Now, after you identified the individuals that you were going to provide notice to, what did you do next?
**A.** So consistent with North Dakota Century Code, we provided notice to all within that inside and one-half mile boundary, notice of the -- notice to all the surface owners, to all the mineral owners, to any mineral lessees within that same boundary, and any owner or lessee of record as well.
Q. And was that notice given by certified mail return receipt requested?
**A.** It was.
Q. Okay. And what -- what information was contained in that notice, Jeff?
**A.** So, again, also consistent, we included the legal description of each of the storage facilities; the date, time and location of the hearing; notice that a copy of the permit application was available through the NDIC. We also included an explanation on how comments could be submitted. And then, lastly, a notice that amalgamation would be required.
Q. And you've indicated this was sent certified mail return receipt; is that correct?

47

**A.** That is correct.
Q. And were all of the certified mailings delivered? In other words, did you get a green card back that was signed by the owner that you sent the certified mailing to?
**A.** We did not.
Q. Okay. And what steps did you take with respect to giving notice to those individuals who did not receive notice and you knew they didn't receive notice because the green card came back unsigned?
**A.** Yeah. When we received something back, we employed a third-party search to essentially identify an updated address. And when an updated address was obtained, we sent out a second notice.
Q. Okay. Were you also involved, Jeff, in taking pore space leasings -- pore space leases -- excuse me -- for the storage permit facility area?
**A.** I was.
Q. And was all of that work done under your control and supervision?
**A.** Yes, it was.
Q. Can you provide for us a brief summary of that?
**A.** Gladly. So the process started by

48

identifying landowners through public court records, essentially verifying title, creating the documents necessary to engage with the landowners. Next we -- we did engage with those landowners and worked on any terms. And then we essentially moved forward acquiring a lot of that pore space through an option and a lease and as a result signed approximately 90 percent of the landowners in the SCS1/TB Leingang and approximately 92 percent of the landowners in the SCS2, also known as the BK Fischer. And then, lastly, in SCS -- and when I say "SCS," I mean Summit Carbon Solutions #3 -- storage #3, LLC, and the KJ Hintz we acquired approximately 97 percent.
Q. And having been involved in searching title to provide notice and searching title to take pore space leases, you would know if there was any federal acreage in any of these proposed units; is that a fair statement?
**A.** That is a fair statement.
Q. Is there any federal acreage in the proposed units?
**A.** There is not.
Q. Is there any State acreage in the proposed units?

49

**A.** Yes, there is.
Q. Okay. Can you tell us a little bit about that? Where is it located and how much land are we talking about?
**A.** Within each of the applications, there is a single quarter of land that is under the control and direction of the North Dakota Trust Lands. The first one in the TB Leingang, also Summit Carbon Storage #1, would be in Township 141, Range 88, Section 36 in the southwest quarter.
In SCS2 in the BK Fischer, there's one quarter in Township 143, Range 88, Section 32 in the southwest. And then, lastly, in the KJ Hintz, Township 143, Range 87, Section 36, the southwest quarter.
Q. And has Summit secured an interest in the pore space of the State lands?
**A.** We have not.
Q. Are you in the process of attempting to acquire a pore space lease?
**A.** We are actively engaged in our discussions with North Dakota Trust Lands.
Q. Okay. Let's talk a little bit more about the fee owners. Can you very briefly discuss for us the procedure or procedures that Summit utilized

50

under your control and supervision to secure pore space leases from private owners?
**A.** Sure. So once we have -- as I testified before determining title, we reached out both by phone calls and having landmen setting up meetings and meeting with specific landowners. Within the unit, one of -- one more step that we took, I guess, of multiple steps included after all of those engagements when we had difficulty locating somebody, we did send out a copy of the option and pore space lease via certified mail. We did that last fall in 2023. We did the same again via certified mail to the unleased owners in just this past spring of 2024.
In addition to that, we had sent out an invitation to -- you know, prior to the hearing to all of the landowners, surface owners within the storage facility areas and within that half-mile buffer to essentially two different informational meetings. One was held in Beulah and the second one was held in New Salem about a week apart to accommodate for schedules. And while we were there, we included a hard copy of the -- the pore space -- the option and pore space lease to be delivered directly.

51

And then, lastly, leading into these hearings, this late spring, early summer I personally took efforts wherein I was able to locate a phone number to contact the landowners that had not leased.

Q. Okay. And with respect to those owners who have -- have not leased at this point in time, are you requesting that the Commission amalgamate those unleased interests; is that correct?

**A.** That is correct.

Q. And let's talk a little bit about -- I think you testified that in TB Leingang you have approximately 90 percent of the pore space leased; is that correct?

**A.** Just a touch under 90. Yes. That is correct.

Q. Okay. And what do you have with respect to the BK Fischer?

**A.** The BK Fischer is approximately 92 percent.

Q. And the KJ Hintz?

**A.** The KJ Hintz is approximately 97 percent.

Q. And do you know what the requirement is in terms of leased acreage within a storage area that you need before the Commission can amalgamate the

52

remaining portion?

**A.** I do.

Q. What is that?

**A.** It is 60 percent.

Q. Okay. And you touched on this when you discussed what you have been doing in terms of securing leases from private pore space owners. Now that you have those high percentages that you testified to, have you just stopped leasing? Have you taken the position, hey, this is -- we're well over the 60 percent, we don't need to go out and get any more leases?

**A.** No.

Q. Okay. What have you done?

**A.** We have continued to secure pore space leases. The last one -- the most recent one signed yesterday morning.

Q. All right. Let me switch gears now on you, Jeff. Let's go to one of the exhibits. Perhaps that's -- that's Exhibit 1A, I believe; is that --

**A.** It is.

Q. Okay. And I'm going to have you turn in to -- turn in that particular exhibit, 1A, to the storage agreement.

53

**A.** I am there.

Q. Okay. And were you involved in drafting that storage agreement?

**A.** I was.

Q. Okay. I'm going to have you go to Exhibit A in that storage agreement. It's a little confusing. We're in Exhibit 1A, but now we're going to go to Exhibit A of the storage agreement in 1A.

**A.** I am there.

Q. And can you tell me what Exhibit A is?

**A.** Yes. It is a tract map showing the boundary of the storage facility area. In that map you can see the townships, ranges and sections, and in addition you will be able to see the tract numbering system.

Q. Okay. And you would have a similar storage agreement in a similar exhibit in each one of the other storage units that's before the Commission today, the Hintz and the -- I guess that's the TB Leingang -- you'd also have one for the Fischer and the Hintz; is that correct?

**A.** That is correct.

Q. Okay. Let's go to Exhibit B. Tell me what Exhibit B is, of the storage agreement.

54

**A.** Sure. Tract B -- or excuse me -- Exhibit B, rather, is the -- the tract summary of the -- the different owners within that previous storage facility outline.

Q. And can you describe the tract participation for each pore space owner?

**A.** Certainly. What you will see across this document is, of course, the legal description, the total acres, the owners, the acreage that they own, which would then indicate their participation in the tract itself, as well as that tract's participation in the greater storage facility.

Q. And since -- since the application was filed -- in fact, you mentioned a few moments ago that you've secured additional leases as recently as yesterday afternoon -- have you had an opportunity to update the tract participation summary which is Exhibit B in each one of the storage units in the three applications?

**A.** Yes, we have.

Q. Okay. I'm going to show you what's been previously marked as Exhibit 5A. I'll give you -- I'll just give it a minute till everybody has a copy.

Okay. Jeff, let's turn to what's been

55

previously marked as Exhibit 5A, 5B and 5C. Can you tell me what each one of those exhibits is?

**A.** It is a tract participation summary similar to what we just discussed as the tract summary, with the addition of the last column furthest to the right showing the percentage of acreage leased with a total leasehold on the final page.

Q. Okay. And let's just go to 5A. I don't think we need to go through each one of these, but let's go to the last page of 5A. You talked about it including an additional column. Does that confirm what you previously testified to that you -- that Summit has approximately 90 percent of the area within that storage area leased?

**A.** That is correct.

Q. Okay. And then that's how the other two exhibits would work as well, 5B and 5C, having that additional column and indicating what the percentage of leased acreage is?

**A.** That is correct.

MR. BENDER: Okay. We'd offer Exhibits 5A, 5B and 5C.

HEARING EXAMINER GARNER: Any objection?

MR. BRAATEN: No objection.

56

HEARING EXAMINER GARNER: Exhibits are admitted.

Q. (MR. BENDER CONTINUING) Let's go to Exhibit D in Exhibit 1A. We've been discussing Exhibit C, so that would be the next exhibit; correct?

**A.** I believe we have not touched on Exhibit C.

Q. We have not touched on what?

**A.** Exhibit C.

Q. All right. Well, we can -- I think we did actually, but --

**A.** Okay.

Q. So I think you testified that it was the tract participation schedule. But to make sure, let's just go back very quickly to Exhibit C and tell me what that is.

**A.** Sure. Much like Exhibit B, it is a bit more of a summary showing the section of land that is, you know, listed by tract with the acres of that particular section and the total tract participation. A bit more of a summary. Not to confuse everybody. I just wanted to --

Q. No. No. That's fine.

**A.** -- make sure we're talking about the same

57

thing.

Q. I thought we touched on it, but perhaps we did not.

Let's go to D.

**A.** I am there.

Q. Okay. And tell us what Exhibit D is.

**A.** Yes. Exhibit D is the Form of Pore Space Lease that we used largely to acquire the percentages we previously discussed.

Q. Okay. And will nonconsent -- well, let me rephrase that. Will unleased owners be subject to the provisions of Exhibit D?

**A.** Yes.

Q. Okay. And how does Summit propose to compensate the unleased pore space owners that appear in Exhibit D or ultimately do not lease?

**A.** Equally to the leased owners.

Q. Okay. And can you be a little bit more specific in terms of what -- what that means? Is there a bonus, is there a royalty? Can you -- and without giving percentages or numbers because I think we've made some promises to landowners that we're not going to discuss that, so can you just generally talk about what's going to be the same?

**A.** Yes. So under the terms of the pore space

58

lease, there is a bonus. That is the same bonus that we pay to the existing leased owners, so consistent with what you'll see in term -- or Section 2(a). In addition we have a royalty that is called out and that royalty is the same as well. That royalty can be found in paragraph 3 of the Form of Pore Space Lease.

Q. And it's based on the tonnage of injection; is that correct?

**A.** That is correct.

Q. Okay. Let's go to Article 8 of the storage agreement.

**A.** I am there.

Q. Okay. And I believe it was your testimony that if the Commission grants the request for amalgamation, this -- this storage -- well, yeah, this storage agreement will be effective for those owners; is that correct?

**A.** That is correct.

Q. Tell me how unleased owners will be treated with respect to Article 8.

**A.** So consistent with our practices thus far, we intend to specifically engage with willing landowners and -- for any surface impact that may exist and try our -- to minimize any impact that

59

may exist on any surface owner. As it stands today, I do not believe we have any significant surface use needs outside of what we have leased.

Q. Let me try to summarize that and you tell me if this is correct. If you have unleased owners in a storage unit now and the Commission amalgamates those owners, you will do your level best -- Summit will do its level best not to have surface activities on those lands; is that a fair statement?

**A.** That is a very fair statement.

Q. Okay. What types of activities is Summit anticipating in terms of surface use within the storage areas?

**A.** As of today, we have identified our locations for injection and then --

Q. Let me stop you. I want you to talk about just generally first and then you can talk about where you are in terms of the process. I apologize for interrupting you, Jeff --

**A.** No. That's okay.

Q. -- but why don't you talk about just generally what type of surface use and then talk about where you are in the process, the status.

**A.** Sure. Generally for surface use, we would

60

need, of course, our well site locations and the flowlines.

Q. Perhaps some roads?

**A.** And perhaps some roads, yes.

Q. Okay. Now let's move to where Summit is in that process.

**A.** Yes. Thank you. So we have identified the location of our three injection wells, and we have worked with those landowners regarding those locations. We have secured 100 percent voluntary easements for the location of the flowlines, and we will continue to engage with the county as needed regarding any particular road use.

Q. Okay. And with respect to well pads where you have secured surface rights, were those -- were those owners -- did they also lease pore space?

**A.** They did.

Q. Okay. And was that also the case where you have secured easements for flowlines?

**A.** That is true.

Q. Okay. What was the approach that you took in securing surface for easements for well pads, flowlines, roads, that sort of thing?

**A.** Sure. We invited all the impacted landowners into our office in Bismarck, sat down

61

with them and explained what we were doing and how it worked. We gave them all an opportunity to ask questions together. We met with some of them as a group and some of them individually and came to terms and signed all of those easements.

MR. BENDER: Thank you, Jeff. I don't have any other questions at this time, Mr. Examiner.

HEARING EXAMINER GARNER: Why don't we -- rather than move to cross, why don't we take a ten-minute break at this point in time.

(Recessed at 10:08 a.m. and reconvened at 10:20 a.m.)

HEARING EXAMINER GARNER: Okay. We are back on the record, and we will resume with cross-examination of the witnesses by Attorney Braaten.

MR. BRAATEN: Thank you. Your Honor.

**CROSS-EXAMINATION**

**BY MR. BRAATEN:**

Q. Why were the applications submitted by Summit Carbon Solutions, LLC?

**A.** (BY MR. BOESHANS) Excuse me?

Q. Why were the applications submitted to the North Dakota Industrial Commission by Summit Carbon

62

Solutions, LLC?

**A.** So Summit Carbon Solutions, LLC, is the parent to Summit Permanent Carbon Storage and the parent -- who is then the parent to or owner of Summit Carbon LLC #1, 2 and 3.

Q. And so Summit Carbon Solutions submitted the three applications on behalf of the Summit Carbon Storage #1, LLC, Summit Carbon Storage #2, LLC, and Summit Carbon Storage #3, LLC?

**A.** No. I believe the applicant is -- or the applicant is Summit Carbon Storage #1, LLC, #2, LLC, and #3, LLC; correct.

Q. So why did the applications get submitted by Summit Carbon Solutions, LLC?

MR. BENDER: What do you mean by "submitted"? I'm not trying to argue with you, but --

Q. (MR. BRAATEN CONTINUING) Filed with the NDIC.

**A.** Just that they were -- Summit Carbon Solutions is the parent to Summit Carbon Storage -- excuse me -- yeah, Summit Carbon Storage, LLC, #1, #2 and #3.

Q. Okay. You talked a little bit about industrial sources for the $CO_2$ coming in the state

63

and there was a discussion of ethanol plants and an aviation facility. Is there anything else that is connecting or are there any other sources connecting to the system that you didn't discuss?

**A.** Not at this time.

Q. Okay. Do you have any plans to connect other sources to the system at this time?

**A.** We've had commercial discussions with others, but no -- no affirmative plans, if you will, or agreements.

Q. Are those discussions all with facilities that would have a $CO_2$ stream within the parameters you said in your application?

**A.** So I'm not the chief commercial officer so I can't speak to the specifics of -- on the $CO_2$ stream characteristics of all potential sources that we've had commercial discussions with, but -- but per the application, they would be required to be within that specification.

Q. Okay. Would you agree with the statement that North Dakota has a huge economic advantage because our geology is such that we can do storage in pore space in North Dakota where other states can't?

**A.** I can't testify to the, quote, magnitude

64

of the advantage, but I would agree that being located on top of suitable storage is an advantage.

Q. And so would you agree that Red Trail Energy as an ethanol plant has an economic advantage by being able to sequester its own $CO_2$ emissions directly beneath the earth under its facility?

**A.** Yeah. Again, I can't testify to the specific economics of Red Trail Energy and what their operating and production costs are, et cetera, et cetera, but certainly being located on top of geologic storage is advantageous to them, I would believe.

Q. Does your project sell that advantage to ethanol plants in other states?

**A.** Can you restate that?

Q. Does your project sell that advantage to ethanol plants in other states?

**A.** I don't believe so.

Q. Do they obtain an advantage by being able to inject their $CO_2$?

**A.** Being able to connect to our system and by extension store their $CO_2$, they're able to lower their CI score, yes, and then that creates an advantage for them or benefit to them.

65

Q. And that takes away the advantage North Dakota ethanol plants would have if they were the only ones doing sequestration of their $CO_2$?

**A.** I don't believe so.

Q. How -- how is that?

**A.** Well, I don't believe that the North Dakota plants can support -- given their size can support a greater than 1-billion-gallon market.

Q. So they would find themselves in a system, in a market with a massive demand and a low supply?

**A.** I -- I would say that it's -- there likely wouldn't be enough supply to support the market.

Q. Do you think that that supply could then be filled by development of other projects?

**A.** Potentially.

Q. Do you think that other projects would have an advantage if they were able to sequester $CO_2$ directly underneath their facility?

**A.** They may have.

Q. All of the ethanol plants connected to your system but one are from outside of North Dakota?

**A.** Currently, yes.

Q. You testified regarding what has been marked as Exhibit 4A. Do you have a copy of that

66

in front of you still?

**A.** I do.

Q. You indicated that this was prepared under your direction and control?

**A.** Correct.

Q. Who prepared it?

**A.** The Energy & Environmental Research Center.

Q. And who at the Energy & Environmental Research Center prepared it?

**A.** I don't know specifically who.

Q. How did you direct them if you don't know who they are?

**A.** I directed the project lead at the EERC to prepare this exhibit, but I don't know exactly which one of the EERC experts did the work.

Q. Who is the project lead at EERC?

**A.** That would be Amanda.

Q. Amanda who?

**A.** Amanda -- excuse me -- Amanda Douglas.

Q. How long has Amanda Douglas been working on the project?

**A.** She's been involved in the project since we started developing the project in late 2021.

Q. How did Amanda's team determine where to

67

put the lines on this particular map for this exhibit?
**A.** Amanda will have to testify to that.
Q. Well, but you directed her to create this exhibit for you; right?
**A.** I did. Correct.
Q. What did you ask her to put on the exhibit?
**A.** I asked her to put on the exhibit the plume extent after five years of injection and the other -- the storage boundaries, et cetera.
Q. Okay. Do you have an understanding of how the plume extent at five years was calculated and then put onto this map as a line?
**A.** Say that one more time.
Q. I think I can. Do you have an understanding of how the plume extent at five years was calculated and then put on this map as a line?
**A.** Yes. It's my understanding that the plume extent was calculated using dynamic model simulation to determine the extent.
Q. Would it be fair to say that you wouldn't have any independent information of your own as to where the line should be drawn to indicate the $CO_2$ extent at five years of injection?

68

**A.** That I wouldn't have any independent --
Q. I'm not trying to be tricky. Let me be basic here. You asked Amanda to put the lines on here, but you don't know how she created these lines or where the data comes from to determine that that's where the line should go?
So let me ask a better question. That wasn't fair. That's just what I'm trying to get at, though.
**A.** Okay.
Q. So as far as where the plume extent is on this exhibit, you would have to rely on Amanda in order to determine whether that's accurate; is that fair?
**A.** That's correct. I would have to -- I would have to rely on, you know, the geoscience team and reservoir engineers at EERC that ran the model to produce the plume extent.
Q. Okay. And so other than what you testified to that this Exhibit 4A represents, in order to understand where all of the information came from and how the decisions were made as to where to put the lines, we would have to talk to EERC about the models they ran?
**A.** Yes. To understand the process, if you will, and the modeling that produces the lines, the EERC geoscience team would be the experts.
Q. Does Summit Carbon Solutions, LLC, have a contract with the EERC for that work?
**A.** It does.
Q. And does the EERC have a contract with any of the Summit or SCS entities listed on Exhibits 2A, 2B or 2C other than Summit Carbon Solutions, LLC?
**A.** I don't believe so.
Q. To your knowledge, does EERC have a contract -- well, let me back up.
Are you aware of any contracts EERC has with private parties that relate specifically to the project that we are here today for?
**A.** Specific parties related -- can you specify which parties or --
Q. With anyone. But do you know if EERC has contracts with any private parties, other than the one you just mentioned with Summit Carbon Solutions, that relate to this subject matter and this Summit project that brings us here today?
**A.** I'm aware that they also have contracts with Minnkota, but it's not related to this project.

69

70

Q. Okay. Yeah. So, no, just related to this project, are you aware of EERC having contracts with other parties other than Summit for the purposes of working on or related to this Summit project?
**A.** I'm not.
Q. Okay. Is the EERC a State-funded institution?
**A.** I'm not sure how the EERC is funded. I know they're part of the University of North Dakota, but in terms of how they're funded, I'm not aware.
Q. Do they regularly take on work producing applications for industry clients to get permits for new projects?
**A.** Yes. That's my understanding.
Q. What other projects are you aware of them doing that for?
**A.** I'm aware of them doing that for the Minnkota projects, the DCC projects. I'm also aware that they did work on the Red Trail project.
Q. Okay. So outside of the few carbon sequestration projects that have occurred in North Dakota in the last five or so years, are you aware of EERC ever helping industry participants with

71

applications to get permits for new projects?
**A.** I'm not aware of their role in projects, you know, outside of North Dakota for sure.
Q. But are you aware of them contracting with and helping industry participants with applications for permits for new projects outside of carbon sequestration?
**A.** I am not.
Q. Okay. Does the contract signed between Summit Carbon Solutions, LLC, and EERC in 2021 cover the scope of all work that EERC has done for Summit on this project?
**A.** No. We have multiple contracts with the EERC.
Q. Okay. How many contracts does Summit or its affiliates and subsidiaries have with the EERC related to the project we're here for today?
**A.** Today we have, I believe, one active -- active contract.
Q. Okay. How many contracts have you had since you signed -- and when I say "you," I'm referring to Summit Carbon Solutions, LLC, its affiliates and subsidiaries. How many contracts have you had since you signed the first contract with EERC for this project?

72

**A.** I believe we had four --
Q. Okay.
**A.** -- separate.
Q. And did the four contracts cover different subject matter or scope of work or were they renewals of the same contract?
**A.** It was all similar subject matter, slightly different scopes.
Q. Did Summit Carbon Solutions, LLC, or its affiliates or subsidiaries get bids or proposals from any institutions or consulting firms other than EERC for the work it eventually contracted to EERC?
**A.** Not that I'm aware of.
Q. How do you know whether the expense or charges from EERC are competitive with other providers?
MR. BENDER: Objection. Relevance.
HEARING EXAMINER GARNER: Overruled.
MR. BOESHANS: I would just say from the Summit perspective, we've engaged lots of different advisors across a broad scale of our scope, and so what we do is we look at rates comparable to what others would do for similar types of work on other scopes of the overall project, and that's how we

73

judge competitive or not.
Q. (MR. BRAATEN CONTINUING) Okay. Right. But you just said that with respect to the work EERC did for you. You didn't actually get any bids or scope out any other competitors to do that work; right?
**A.** We did.
Q. You did?
**A.** No. Excuse me. We did not. That's what I said.
Q. So how do you know if EERC's rates were competitive?
**A.** Again, as -- as I stated, we look at similar proposals for similar types of work, permitting, engineering, modeling, those kinds of things on the project overall and that's our best comparison.
Q. So did you compare the work you were asking EERC to do with estimates or proposals from other institutions or consulting firms who could have done the work?
**A.** So if your question is did we competitively bid this specific work, the answer would be no, we did not get proposals from -- for the exact scope of work or request for proposal.

74

Q. Okay. Are you testifying that you did nonetheless generally look at rates for similar types of work as part of that process or did you just choose to go with the EERC regardless of whether their rates were competitive?
**A.** We, again, looked at comparables to others to do, you know, professional work and the same -- not the exact same type of work but what I would describe as similar work, and we accepted their proposal.
Q. Okay. Is the amount charged by EERC more or less than what you saw in the similar types of rates that would be charged for work by other firms?
**A.** I don't recall specifically. I would say it was similar in nature from looking at hourly rates perspective.
Q. And does Summit actually compensate EERC under the contract for the work that they're doing?
**A.** If your question is do we pay them for their services, yes.
Q. Are you familiar with the contract Summit has with private engineering and consulting firms?
**A.** Generally.
Q. Are there any provisions in the EERC

75

contracts that allow them to do things like use your data for research and education purposes?
**A.** I don't recall specifically. I don't recall those provisions.
Q. Do you have copies of those contracts?
**A.** We do.
Q. Is there anyone testifying today that knows the provisions of those agreements?
**A.** Not that I'm aware of. It's possible, but I don't -- I don't -- I can't say for sure.
Q. Does your contract with EERC require them to maintain your data in a confidential manner?
**A.** It does.
Q. How does that work with a public institution subject to open records requests?
**A.** That would --
MR. BENDER: If you know, Wade.
MR. BOESHANS: Yeah, I don't know for sure, but, again, that's a better question for the EERC.
Q. (MR. BRAATEN CONTINUING) Are you having the EERC testify in support of your application?
**A.** We are.
Q. You made some comments about the NAICS industrial classification code. Can you tell me

76

again what you were saying about that?
**A.** I was saying that this was the classification code.
Q. According to whom?
**A.** What's that?
Q. According to whom?
**A.** According to how it's been, I guess, classified based on the type of the system it is.
Q. By whom?
MR. BOESHANS: Jeff.
**A.** (BY MR. SKAARE) Yeah, I don't recall -- what was the acronym again? Can you -- what was the acronym for the code? I think we have it somewhere.
Q. NAICS industrial classification code.
**A.** I don't have the answer for you. I'm sorry.
Q. 486990 was the number you guys gave. You knew that much; right?
**A.** We did.
Q. What's that number for?
**A.** I'm not sure I'm the appropriate person to answer that question, but we can --
Q. Well, who -- who knew -- well, let me ask the question again. What is the NAICS industrial

77

classification code you claim applies to the storage facilities?
**A.** (BY MR. BOESHANS) I can't answer that question.
Q. But you did.
**A.** No. I stated this is what the classification code is. We'll have --
Q. But you don't know if it is?
**A.** I can confirm that Jay Volk, who will be testifying here later today who works under my direction, made that determination along with our counsel, and he can testify specifically to that question.
Q. What's his name?
**A.** Jay.
Q. Jay.
Did he make the determination that 486990 is the NAICS industrial classification code?
**A.** Yes. That's my understanding.
Q. Do you have any understanding of why?
**A.** I do not.
Q. Is it because that refers -- well, how would you describe the facility that you're saying has classification code 486990? What is it?
**A.** How would I describe the facility?

78

Q. Yeah.
**A.** It's a storage facility.
Q. Is it a coal pipeline transportation facility?
**A.** No, it's not a coal pipeline. I believe it falls in the "other" category.
Q. Is it a slurry pipeline transportation?
**A.** It is not.
Q. Is it pipeline transportation except crude oil, natural gas, refined petroleum products?
**A.** Say that again.
Q. Pipeline transportation except crude oil, natural glass -- natural gas, refined petroleum products?
**A.** That sounds correct.
Q. Your storage facility is for pipeline transportation?
MR. BENDER: Mr. Examiner, you know, we can continue to waste time asking these questions. We've identified another person who may be able to help us with this, so --
MR. BRAATEN: He testified to this already and only upon cross-exam is it being discovered that he doesn't know that much about it, but I think I'm entitled to exhaust my questions given

79

that this was a very specific code that they brought up on direct and said is the code, and I'm just asking why it is.

HEARING EXAMINER GARNER: Overruled.

Q. (MR. BRAATEN CONTINUING) So you think pipeline transportation except crude oil, natural gas and refined petroleum products is an accurate description of your carbon sequestration facility?

**A.** Yes. That's my understanding based on the -- the advice of our team.

Q. Are you going to store the $CO_2$ in a pipeline underground?

**A.** We are not. We are going to transport it to the site.

Q. And then you're going to transport it out of a pipeline and into a wellbore; right?

**A.** Yes. It will -- from the pipeline it goes to the wellhead and then into a wellbore.

Q. And then into the reservoir?

**A.** Correct.

Q. Where is the pipeline in the reservoir?

**A.** There is no pipeline in the reservoir.

Q. Then why would you call a storage facility in the reservoir a pipeline?

**A.** Based on the, again, advice of our team,

80

we believe that's the appropriate -- the appropriate classification.

Q. Well, but not because it's an accurate description of the facility; right?

**A.** It describes it as "all other."

Q. What describes what as "all other"?

**A.** The classification, as I understand it.

Q. 486990 is for "all other"?

**A.** Yes. That's my understanding.

Q. There was some discussion earlier about how there are PSC hearings going on regarding the Midwest Carbon Express; do you recall that?

**A.** I do.

Q. Is the Midwest Carbon Express the same as the storage facility that we're here talking about today?

**A.** It's not the same.

Q. It's a different project; right?

**A.** Well, no, the Midwest Carbon Express -- excuse me. Let me restate that.

The Midwest Carbon Express is the -- is the pipeline. This is the storage facility that's part of -- the storage component of the Midwest Carbon Express project, if you will.

Q. What is the Midwest Carbon Express

81

project?

**A.** So the Midwest Carbon Express project, as I understand it, is the combination of capturing of $CO_2$ at the plants, transporting the $CO_2$ via the pipeline and storing the $CO_2$ at the injection facilities that we're permitting here today or the storage facilities -- excuse me -- that we're permitting here today.

Q. Where does the Midwest Carbon Express pipeline end?

**A.** The -- you said where does the Midwest Carbon Express Pipeline end?

Q. Yes.

**A.** It's -- you know, back to the exhibit that shows the terminus of the pipeline.

Q. Can you direct me to the -- or you're on one of the marked exhibits?

**A.** Yes. Oh, excuse me. It's in Exhibit 1.

MR. BENDER: 1A.

MR. BOESHANS: Exhibit 1A. Yes. If you refer to page PS-5, Figure PS-3, the red box indicates the terminus of the Midwest Carbon Express Pipeline. That's the end of the line.

Q. (MR. BRAATEN CONTINUING) With respect to the applications under consideration today, does

82

the subject matter for those applications all begin where that pipeline ends?

**A.** It does.

Q. And so when we're talking about an industrial classification that's applicable to these three sequestration facilities that we see on PS-5, it would not be accurate to classify those as a pipeline, would it?

**A.** I don't agree with that. There's -- there's a flowline and the injection facilities that are all part of this application.

Q. So the flowlines. Anything else that you would consider a pipeline that begins after the terminus of the Midwest Carbon Express Pipeline?

**A.** Okay. Anything else that I would consider a pipeline?

Q. Right.

**A.** No.

Q. Going back to Exhibit 1, PS-5, the diagram you noted, there's a terminus point for the Midwest Carbon Express Pipeline?

**A.** Yes.

Q. Are there any booster pumping stations after that terminus point?

**A.** There are.

83

Q. Where are those?
A. At the well pads.
Q. Okay. Is there a valve station at the terminus point?
A. Yes, there is.
Q. Where is that valve station operated from?
A. The -- all the valves will have the ability to be operated from the main control center and/or backup control center. Current plans for the main control center are in Ames, Iowa. They're also capable of being operated manually in the field.
Q. You had indicated there was no federal acreage within the sequestration areas. Was that a criteria used in the search in order to avoid federal acreage?
A. (BY MR. SKAARE) It was not.
Q. Okay. You had indicated you signed pore space leases yesterday. Was that with individual landowners?
A. It was.
Q. You're asking the Commission after this hearing to amalgamate all unleased property owners; is that right?
A. That is right.

84

Q. If you've not reached a deal with the North Dakota Department of Trust Lands for the State-owned lands, are you asking the Commission to also amalgamate the State-owned lands administered by the Department of Trust Lands?
A. So we've -- well, I can answer that question this way: Zack Pelham, who has been busy with a number of different hearings, has been appointed to assist the North Dakota Department of Trust Lands. We have agreed on the substantive lease -- or easement agreement, and we're anticipating the ability to complete that shortly. It just wasn't capable of being done prior to this hearing.
Q. Have you come to an agreement on compensation?
A. I would say we've covered all substantive issues including compensation.
Q. What do you mean by you've covered the issue of compensation?
A. Sure. So the State of North Dakota Trust Lands, of course, is an easement agreement rather than a -- for pore space rather than a pore space lease. We have presented and worked through a number of terms, including our compensation offers

85

that are consistent with the existing leased landowners and have received no pushback regarding those terms. We're working through the remaining terms on that agreement. Quite honestly, we've been very busy. We submitted this to the State I would say probably about a year ago and have been working on it off and on through that time frame.
Q. Are the provisions of the easement that you're negotiating with the Department of Trust Lands different than the pore space leases you signed with landowners?
A. To the extent that they call it an easement versus a lease, yes. Beyond that, not any significant changes.
Q. But there are some changes?
A. Sure. Because they consider the pore space a -- you know, instead of a lease, they consider it an easement. But beyond those primary -- that is your primary difference, that they consider it an easement rather than a lease. So that would be a difference.
Q. Are there any additional protections for reclamation or soils or anything like that in the Department of Trust Land lease or easement?
A. Yeah, there are. However, as part of our

86

discussions with the State, we have no plans for any surface on there. So, again, those are -- I mean, that's a good point, and I do believe that they have some specific requirements when there are pipelines or there are facilities. We, however, do not have any surface plants on any of those lands.
Q. So why wouldn't you offer those same reclamation provisions to all of the landowners for whom you don't have plans for their surface?
A. Sure. In fact, we went further and offered every unleased landowner a no surface facilities clause, thus, signaling that prior to essentially any surface encounter, that we would enter into a separate written agreement. So as we go forward with amalgamation, that was -- if you recall in my testimony, that every unleased owner received a copy of the lease -- the option and lease agreement via certified mail in the fall of '23 and again in the spring of '24 that included a no surface facilities clause.
Q. Did you also include language related to soil reclamation and soil separation in the Department of Trust Lands easement?
A. So they have a -- what I would consider a standardized form regarding pipelines. In my

87

experience of acquiring right-of-way in North Dakota, I've encountered that same form. That includes, of course, things such as -- and I'm -- forgive me, I'm going from memory -- soil segregations and other certain conditions, seed mixtures and the likes, and I believe that they included that on this particular agreement. I know that Attorney Pelham and I talked about the necessity as we considered perhaps a no surface occupancy that would sort of negate the need for that, but it is on that agreement.

Q. So you said you're familiar with some of the Department of Trust Lands standardized forms; would that be accurate?

**A.** I would say I'm generally familiar. I've been involved in other right-of-way.

Q. So you're aware, for example, that the State Department of Trust Lands has standardized forms for things like a pipeline easement or a well pad agreement out in the oil patch?

**A.** I am.

Q. And you may also know that with some of those forms, they have some specific exhibits or attachments that cover things like their preferred seed mixture or soil stripping requirements. Have

88

you seen those before?

**A.** I certainly have, yes.

Q. And have you noticed that a lot of the language throughout some of those different agreements tends to be the same?

**A.** I would say that's a fair statement.

Q. That was a bad question, but thank you.

Are you aware of who at the Department of Trust Lands actually drafts those agreements and forms?

**A.** I am not.

Q. But we can assume it's the staff; right?

**A.** Yes.

Q. Do you know who did a lot, if not all, of the negotiating for the surface division in the development of a lot of the surface divisions forms for the Department of Trust Lands throughout the oil boom?

**A.** I would be speculating if I answered. I do not.

Q. Do you know who Mike Haupt is?

**A.** I do.

Q. Are you aware that he developed the forms and the leases that were submitted to Summit on behalf of landowners working off of the exact same

89

forms that he developed for the State Department of Trust Lands while he was at the State for his whole career?

**A.** Will you please repeat that?

MR. BRAATEN: Would you mind reading it back, Steph?

(Record read as requested.)

MR. SKAARE: Okay. So what I'm -- I want to answer your question, but are you specifically referencing a lease that we received?

Q. (MR. BRAATEN CONTINUING) Correct.

**A.** And what lease are we talking about specifically?

Q. The one from Mike Haupt.

**A.** We received one from the Swenson group that had some of the same forms that I would say looked familiar or similar to the State. I'm not sure that answers your question, but I understand that there were some similarities.

Q. So does the State get that language in their contract and the landowners don't simply because they're the State?

**A.** I would disagree. We offered all unleased landowners a no surface occupancy.

Q. But not protections for the surface;

90

right?

**A.** Well, by suggest -- or by entering into a separate written agreement in the event that we needed something, that would give them the opportunity. So we did not gain access to the surface for any facilities, pipeline, roads or otherwise.

Q. Until the end of this hearing when you ask the Commission to give that to you; right?

**A.** Under amalgamation you are correct, yes, there are certain rights that would come in that particular direction.

Q. So it doesn't really matter what the landowner signed, does it?

**A.** What landowner? I -- I'm sorry. I'm not trying to be tricky here. Can you ask that question --

Q. Regardless of what any landowner signs with you for your project, they are going to be subject to Exhibit D to your storage agreement; right?

**A.** I would disagree.

Q. Why?

**A.** Because we have a separate written contract.

91

Q. That is superseded by that storage agreement the second this Commission issues its order; right?
**A.** No.
Q. Okay. Why not?
**A.** Well, let me correct that. Your question was whether the storage agreement overrides the existing contracts with individual landowners for pore space leases. Did I understand your question correctly?
Q. I don't know, but I'd like the answer to that question.
**A.** Sure. I believe that a written contract with our landowners is a contract that we will adhere to.
Q. Unless it is in conflict with the storage agreement; right?
**A.** No.
Q. So you're going to ask the Industrial Commission to impose the storage agreement and impose Exhibit D as a pore space lease on every unleased landowner; right?
**A.** Yes.
Q. And are you saying that you're not going to impose that on the landowners that signed a

92

lease?
**A.** It will exist, but I think there are additional protections in those leases. Yes.
Q. Additional protections that will not be superseded or obviated by the storage agreement?
**A.** Well, for example, where we have a no surface occupancy, we will honor that contract.
Q. Okay. Any others?
**A.** Nothing at -- that comes to mind specifically.
Q. So other than a no surface occupancy agreement, any agreement any landowner signed is not going to be honored if it violates the storage agreement?
**A.** I disagree with that. I think that is a mischaracterization of what I was trying to say.
Q. Well, I'm not trying to characterize what you're trying to say. I'm asking you a question.
If a landowner signed a lease with Summit --
**A.** Mm-hmm.
Q. -- for the use of their pore space --
**A.** Mm-hmm.
Q. -- and that lease now has terms that conflict with the terms of the storage agreement,

93

what controls?
**A.** We would honor the lease.
Q. And so you're not asking the Industrial Commission to impose any kind of contractual terms on any single landowner if they signed a lease with you?
**A.** Okay. Having an opportunity to re-review this, would you mind if I had the question read back to me so I can be accurate in my answer?
MR. BRAATEN: Sure. Would you mind reading it?
(Record read as requested.)
MR. SKAARE: I think we're asking them to execute the storage facility agreement as -- as here as part of the application. I'm not sure that it creates any additional burdens on landowners that we don't address in our lease.
Q. (MR. BRAATEN CONTINUING) Does the storage agreement or Exhibit D to the storage agreement have any applicability to a landowner who signed a lease with you?
**A.** It does.
Q. How so?
**A.** I'm not sure I understand your question. Can you repeat it?

94

Q. How does the storage agreement apply to a landowner who signed a lease -- pore space lease with Summit?
**A.** Well, I believe the storage agreement applies to all landowners. However, I believe we've also entered into a separate legal contract or agreement with certain landowners that has additional details and considerations.
Q. Does the storage agreement impose the lease at Exhibit D on landowners?
**A.** I would say it imposes those on the unleased landowners, yes.
Q. Okay. And are you saying it does not impose Exhibit D and the terms of Exhibit D on the leased landowners?
**A.** I would say that's a fair characterization. I believe that we've entered into a lease agreement with individual landowners.
Q. Do the individual lease agreements that you've entered into with landowners have any material differences to the Exhibit D in the storage agreement?
**A.** I would say not material.
Q. And that's because you absolutely refuse to negotiate any kind of material change to the

95

lease for exactly that reason; right?
**A.** That is not true.
Q. Why was it that you did not negotiate material changes to your lease?
**A.** Well, Mr. Braaten, through good-faith negotiations with over 450 landowners, we acquired in excess of 146,500 acres covering 16 townships and 3 counties, and from the start we had some changes to that agreement.
Q. How many?
**A.** I don't recall specifically, but we've made some changes to the agreement. Some --
Q. More than five?
**A.** I don't recall the exact number.
Q. Less than ten?
**A.** I don't recall the exact number.
Q. Less than 20?
**A.** I don't recall the exact number of changes.
Q. Less than a hundred?
**A.** I don't recall the exact number of changes.
Q. But none of them were material?
**A.** No, I believe some were, including an increase in the royalty rate.

96

Q. How much?
**A.** A 50 percent increase in royalty rate.
Q. To whom?
**A.** All landowners that signed equally.
Q. Okay. Okay. So you've made a few changes to the global lease you circulated. Other than changes that you made to the lease for anyone who signed the lease, did you make any changes to the lease in response to concerns expressed from any individual that were material?
**A.** Yes. As I testified before, as we developed the project, we offered a no surface-facilities clause to a number of individuals.
Q. Okay. Anything other than that?
**A.** Not that I recall.
Q. How many leases did you say you signed?
**A.** So we've executed -- the exact number I don't know. What I could tell you is I know that it's over 450 different individual signatures across multiple different agreements. That covers the -- the large scope of the project, including the 146,000 acres that we've acquired.
Q. And you didn't allow a single landowner a single material change based on their concerns in

97

all of those negotiations?
**A.** I think that's a mischaracterization.
Q. Can you name one?
**A.** Sure. Favored nations at the request of your client.
Q. And that went to everyone; right?
**A.** It did, yes.
Q. So I'm talking about changes that weren't global to the lease for everybody who signed.
**A.** No, we treated everybody equally.
Q. So no material changes to the lease form based on negotiations with landowners about their concerns?
**A.** No, but we took into consideration all of our discussions across that entire footprint with all these different landowners.
Q. If your answer to the landowners' concerns and questions before they even expressed them is no, how is that good faith?
**A.** Well, our answer wasn't no. We sat down and had multiple meetings with many landowners from the start of the project.
Q. How many material changes to the lease did those meetings result in?
**A.** Again, I don't know the exact number, but

98

I can say that we've made some adjustments to that lease. I think that lease is reflected in the exhibits.
Q. And so the landowners who signed a lease with you would get the same lease imposed on them if they had not signed that lease?
**A.** Yes, with a few minor exceptions. For example, a no surface occupancy clause that we've granted to some.
Q. Okay. Any other exceptions?
**A.** No.
Q. Did you grant the no surface occupancy clause only to those landowners who you were not intending to put anything on anyway?
**A.** Well, I think the best way to understand this is that when we started our project and our leasing, it required some site characterization, and so we didn't have a -- a complete understanding of where everything would go. Through that site characterization process, we were able to determine where those things are located. And so it is something that we were willing to grant to those once we understood where we -- where we were putting our facilities.
Q. If you do not reach an agreement with the

99

North Dakota Department of Trust Lands at the time that this Commission issues its order, are you asking this Commission to issue an order also amalgamating the State lands that are administered by detail?

**A.** If we were unable to enter into an agreement and the Commission entered an order, it would amalgamate those lands. It is not our intention to do that. As I stated previously, we've been actively working through the terms of that agreement with the attorney appointed to assist who's been in some of the many hearings I think that you've been in, too, so --

Q. Has he shared any price points with you from other transactions?

**A.** Can you elaborate on that question?

Q. Has the attorney with whom you're negotiating for the Department of Trust Lands shared with you any price points or comparable transactions he thought you might want to review in talking about compensation?

**A.** They have not.

MR. BRAATEN: Lawrence, were you using -- which number are you using for the application?

MR. BENDER: 1A.

100

MR. BRAATEN: Okay. I'm going to have you take a look at Exhibit 1A, which I understand to be the application for the Leingang facility?

MR. BENDER: Yes.

Q. (MR. BRAATEN CONTINUING) And I'd like to direct your attention to the storage agreement within the application. Do you have the page up in front of you -- I show it as page 2 that has the recitals listed at the top?

**A.** I do.

Q. Okay. So the recital states, "It is in the public interest to promote the geologic storage of carbon dioxide in a manner which will benefit the state and the global environment by reducing greenhouse gas emissions and in a manner which will help ensure the viability of the state's coal and power industries, to the economic benefit of North Dakota and its citizens."

How does the Summit project benefit the State and the global environment by reducing greenhouse gas emissions?

**A.** (BY MR. BOESHANS) So clearly our project reduces greenhouse gas emissions. We're storing significant amounts of $CO_2$.

Q. How is that a benefit to the global

101

environment?

**A.** So it's reducing emissions, number one. Number two is we are providing -- we're -- we are commercializing CCS and demonstrating commercial CCS that can be implemented for others or by others. We're also supporting North Dakota's largest industries. Obviously the -- the $CO_2$ that's coming from our project is being -- originated from corn and corn markets are important to the citizens of North Dakota. Supporting commodity prices and land prices for agricultural sector. We're also creating the opportunity for owners of pore space to monetize that value of that resource.

Q. At whatever price you choose?

**A.** At the -- at the royalty rate in which we've agreed to with in this case 93 percent of the landowners.

Q. You didn't change it for a single one of them, though; right?

**A.** No. As Jeff testified to, we changed -- we adjusted the royalty rate during our negotiations.

Q. Globally.

**A.** Correct. We -- we entered into a -- included a favored nations clause, so it applies to

102

all.

Q. How does reducing greenhouse gas emissions benefit the state of North Dakota?

**A.** Well, in this case it allows the continued -- allows the plants in this case, the ethanol plants, to continue producing ethanol and selling that -- having access to new markets, continuing the viability of those plants and that industry --

Q. Which ethanol plants?

**A.** -- therefore supporting the -- therefore supporting the corn markets.

Q. Oh, okay. I'm sorry. I should have let you finish. Sorry.

But that's a benefit from a speculative uplift in the price of corn from the financial success of the ethanol plants flowing from their response to a regulatory issue; right?

**A.** I wouldn't characterize it that way.

Q. How would you characterize it?

**A.** I'd say corn is a globally traded commodity, and our project and our project partners create a significant demand. And so there's a supply/demand relationship. And to the extent that they continue to operate and purchase that volume

103

and likely more, that that has a positive impact on the overall agricultural commodity markets and specifically corn.

Q. Okay. So let's put that aside and I want to ask my specific question again, which is how does reducing greenhouse gas emissions benefit the state of North Dakota?

**A.** Again, as I said, this project reduces greenhouse gas emissions.

Q. But I'm not asking about projects that are -- or benefits that flow from this project. I'm simply asking how does reducing greenhouse gas emissions benefit the state of North Dakota? Or maybe I should start does it benefit the state of North Dakota to reduce greenhouse gas emissions in Iowa?

**A.** So I think as you think about greenhouse gas, you can't think about it as one state at a time. Obviously, air goes everywhere. $CO_2$ is in the air so reducing it at one point impacts the overall concentration of $CO_2$, you know, globally, so to speak.

Q. But that's not a substantial and direct impact for the citizens of North Dakota with respect to the air they're breathing because we

104

took emissions out of the air in Iowa?

**A.** I would say that reducing -- excuse me -- reducing $CO_2$ emissions -- reducing $CO_2$ emissions is not about making the air healthier. I don't really understand the question or the -- the point of the question.

Q. What benefits flow to anyone from reducing greenhouse gas emissions?

**A.** (BY MR. SKAARE) Perhaps this will provide a little more understanding to the recitals. North Dakota Century Code Chapter 38-22-01 is policy. It reads, "It is in the public interest to promote" -- excuse me -- "to promote geologic storage of carbon dioxide." Doing so will benefit the State and the global environment by reducing greenhouse gas emissions. Consistent with the statute, we included this in our recitals, and we believe that there is benefits. I don't know that we can get into the very specifics here. I think you're asking a broad question.

Q. What benefits do you think there are to the State of North Dakota from reducing greenhouse gas emissions? Can you name one?

**A.** Yes.

Q. What?

105

**A.** I believe it -- it allows one of our major ethanol plants the opportunity to engage in low-carbon fuel markets.

Q. How does the Summit project help ensure the viability of the state's coal industry?

**A.** (BY MR. BOESHANS) So I would say based on my experience pursuing commercial CCS for the coal industry, the biggest challenge is others having done it before, having been done at large commercial scale. And so by deploying CCS at commercial scale, as we will here, we, in essence, build out the pathway, if you will, for others to follow and do the same.

Additionally, we're building a $CO_2$ transportation network that can provide benefits to others or opportunities for others to -- to use as well.

Q. So how is the coal industry going to benefit from what you're doing?

**A.** They're going to benefit from ultimately the -- the demonstration at commercial scale and that it's -- that it's been done and that by extension makes the second of a kind -- kind of provides a road map, so to speak.

Q. Didn't Minnkota already demonstrate it's

106

fully capable of doing that and then come in here and express concerns about your application?

**A.** So Minnkota has a proposed project that has yet to be constructed.

Q. Have you constructed your project?

**A.** Not yet.

Q. What projects are constructed?

**A.** Could you be more specific?

Q. Well, Red Trail is demonstrating success with ethanol doing direct injection of carbon in North Dakota; right?

**A.** They are.

Q. What are you doing that they don't already know how to do?

**A.** We are replicating the same or similar at scale.

Q. You're just bigger?

**A.** Yes, it's bigger.

Q. How does the Summit project help ensure the viability of the state's power industries?

**A.** In the same way.

Q. If Summit constructs its project and injects $CO_2$ as planned for the next 20 years, will that reduce the global temperature?

**A.** So you're asking me to speculate?

107

Q. I don't know if I am.
A. You are asking me to speculate.
Q. Okay.
A. Because I don't know what others are going to do as well.
Q. Hold all other things constant.
A. Again, I'm not a climate scientist, but I don't believe so.
Q. The recitals also state that to further geologic storage of carbon dioxide, a potentially valuable commodity, may allow for its ready availability if needed for commercial, industrial or other uses, including enhanced recovery of oil, gas and other minerals. Does any of that apply to the Summit project?
A. Read that one more time.
Q. "To further geologic storage of carbon dioxide, a potentially valuable commodity, may allow for its ready availability if needed for commercial, industrial, or other uses, including enhanced recovery of oil, gas and other minerals."
A. (BY MR. SKAARE) So as I mentioned before, right, these recitals are codified to a large extent under 38-22-01 which also reads, "Further geologic storage of carbon dioxide, a potentially

108

valuable commodity, may allow for its ready availability if needed for commercial, industrial or other uses, including enhanced oil recovery" -- excuse me -- "including enhanced recovery of oil, gas and other minerals." And as I testified earlier, the recitals are talking about the policy as issued by the North Dakota State Legislature in 38-22-01.
Q. With the implication being that they apply to your project, though; right?
A. Sure.
Q. And that one doesn't? That's a question. Sorry. It's a bad question. Does anything in the recitals, Section B, apply to your Summit project?
A. (BY MR. BOESHANS) Well, in reading it, it says, "To further geologic storage of carbon dioxide," which we are doing.
Q. And is the carbon dioxide that is going to be stored by the Summit project going to be readily available for commercial, industrial or other uses, including enhanced oil -- recovery of oil, gas and other minerals?
A. Not under the current sets of agreements, but potentially it could be.
Q. If you change the law?

109

A. If I change the law? Excuse me. I don't understand the question.
Q. Meaning that -- well, let me back up. In order to get your tax credits for your project, you have to permanently sequester the $CO_2$ underground; right?
A. Yes, for the -- for the current customers, yes, or partners, if you will.
Q. At what point are you going to switch your 45Q credits over the EOR credits?
A. We don't have any plans to do that.
Q. When do you think you will?
A. Again, I said we don't have any plans to do that.
Q. So you're going to do the first 20 years and then do that?
A. I would just say we don't have any plans to do that.
Q. Have you talked about it?
A. Have we talked about?
Q. Switching to the EOR credit?
A. We have not.
Q. Are you going to pull the $CO_2$ being sequestered in your project back out of the ground at some point?

110

A. That's not the plan.
Q. Could be the plan, though, if it changes?
A. I would say it's -- it's -- the current contracts require us to permanently store it.
Q. Which contracts?
A. What's that? Our agreements.
Q. Agreements with who, though?
A. With our -- our -- with our plant partners.
Q. Is that because they need it to be permanently sequestered in order to get their low-carbon fuel standard credits?
A. That's my understanding.
Q. How long are those agreements locked in for?
MR. BENDER: Can you speak up just a little bit?
Q. (MR. BRAATEN CONTINUING) Sorry. How long are those agreement terms?
A. I have not seen all the agreements so I don't know the terms.
Q. Would it be fair to say that the $CO_2$ is going to get stored there until 2040?
A. I don't -- I don't know that that's fair.
Q. Okay. Is it possible that you will

111

withdraw $CO_2$ from the reservoir before the year 2040?

**A.** Again, it's not part of our plan. It might be technically possible. I believe it would be economically prohibitive and it's not part of our plan.

Q. Are there any legal barriers that you have identified that would prevent you from doing that other than your contracts with the partners?

**A.** I haven't analyzed that to determine. Again, not part of our plan.

Q. If you made a plan to withdraw $CO_2$ from the reservoir, would the landowners receive any additional compensation?

MR. BOESHANS: I'm going to defer to you, Jeff.

**A.** (BY MR. SKAARE) Sure. Again, not our plan, as Wade testified. Under the existing contract, there is no additional compensation for the removal of $CO_2$.

Q. Have you ever reviewed any gas storage agreements?

**A.** Nothing specific or lately.

Q. Have you seen gas storage agreements with pricing structures that require payments both for

112

things being injected into and taken out of the storage facility?

**A.** I have not.

Q. Are you aware that that's the most common price structure for a gas storage agreement in the United States?

**A.** Sure.

Q. Does Summit intend to compensate the landowners for the withdrawals of gases at any point if it starts withdrawing $CO_2$?

MR. BENDER: Asked and answered.

HEARING EXAMINER GARNER: Sustained.

Q. (MR. BRAATEN CONTINUING) Have you done technical feasibility studies on your ability to withdraw $CO_2$ from the reservoir after injection?

**A.** (BY MR. BOESHANS) We have not.

Q. Have you done any kind of research or study on that?

**A.** We have not.

Q. Why do you say that you think it would not be feasible to withdraw the $CO_2$ then?

**A.** I say that I believe it would not be feasible because when you withdrew the $CO_2$, you'd have to separate it from the rest of the -- you know, from the fluids and -- and separate out the

113

$CO_2$, compress it, transport it, and then reinject the other fluids. And so from that perspective, you'd take the $CO_2$ from the line first. But, again, we haven't -- I haven't done any studies on it to validate costs or -- it's just my -- from my general knowledge or understanding of how this, you know, would work under the question you were asking.

Q. Is it your understanding that after 20 years these facilities will stop taking further injections?

**A.** It's my understanding that we are permitting these facilities for -- for 20 years. That those permits will be reviewed and updated every 5 years, and the time frame, you know, could change if CCS continues to be a commercial -- commercially viable solution.

Q. But the facilities are still going to fill up at some point; right?

**A.** Yes. At some point the facilities would be full.

Q. What do you do with all the $CO_2$ coming through that pipeline when they're full?

**A.** Well, then we would permit additional facilities or -- assuming we needed additional

114

storage, at that point we would proceed to permit additional facilities.

Q. Might those facilities include things other than storage?

**A.** Your question is "might they"?

Q. Correct.

**A.** I guess that's possible.

Q. Would it be accurate to say there are no plans to shut down the flow into that pipeline when these storage facilities are full?

**A.** I would say that we have designed the project around 20 years. We haven't contemplated plans to shut it down afterwards. It's just that is the estimated project life at this point, but there are no plans to shut it down when the facilities are full. Again, I think it would come back to a -- you know, commercial considerations that are viable options at that point in time.

Q. Do you have a permanent required offtake agreement as a term of the agreements you have with your partners?

**A.** Say that one more time.

Q. Yeah. That was bad. Let me start over.

Do you have any contracts with your partners that require you to permanently take all

115

of the $CO_2$ coming out of their ethanol plants for the life of their facility?

**A.** Again, I'm not aware of all the details of those contracts. I haven't reviewed them, so I can't answer that question.

Q. Well, this is just a general question, too, though. Is the idea or the commitment being made by Summit that they're committing to take all the $CO_2$ from these plants for the life of those plants or is it just for a 20-year project period?

**A.** I don't know the term of how long.

Q. That's pretty fundamental to the entire project, though; right?

**A.** Certainly the offtake agreements I would say, yes, I would agree are fundamental to the project. What I'm telling you is I don't know the specific duration of 57 different contracts because I haven't reviewed them.

Q. Okay. I'll have you go to the definitions in the storage agreement.

Real quick on the last question, have you had any of your partners renew any contracts at this point for offtake?

**A.** Yes, I'm aware of renewals.

Q. How many?

116

**A.** I don't know. I'm just generally aware that we've renewed. I don't know how many.

Q. Have you discussed plans to expand the geographic area of your storage facilities where they exist right now in the future as a way to increase your storage capacity?

**A.** So we have secured agreements with landowners that own about 145,000 or over 145,000 acres. Our project is much like a mine-mouth coal plant operation in that we have a very large capital investment, $8 billion, that's depending on utilizing every resource at the end of the line, much like a coal plant has -- mine-mouth coal plant is dependent on the lignite coal resource. And so they in those operations, you know, have secured, generally leased hundreds of millions of tons adjacent to the plant.

Initially, they'll permit a portion of that, develop it. As they continue through operations, they'll permit incremental reserves over time. I would anticipate -- you know, that's why we lease such a large area, and we don't have current plans in terms of an application or a specific design, but we secured pore space leases over a larger area with the -- with the intent at

117

some point in time having the optionality to permit additional areas and develop additional resources. But we don't have specific plans, which I believe is what your question was.

Q. But if you wanted to, for example, simply expand the boundary of one of these storage units, what is the limiting factor on how much more $CO_2$ you can put in? Is it simply the geographic size of what is permitted or is it related to the pressures at which you're injecting?

**A.** Yeah, that's going to -- I would say that's perhaps a better question for the reservoir engineers, but certainly there's a variety of factors that would come to play there. It would be the design of the facility, the geologic characteristics, the reservoir performance and all of these different factors.

Q. Have you done modeling to determine how much further out from the injectors past the boundaries of the current storage facility you could extend the plume in those storage facilities?

**A.** We have not. We ran our simulations for 20 years.

Q. On page 3 of the storage agreement in the definitions -- this is back to Exhibit 1A --

118

there's a definition at 1.10 for storage expense. It states it's all costs, expenses or indebtedness incurred by the storage operator pursuant to this agreement for or on account of storage operations. Can you tell me generally what costs, expenses and indebtedness would be covered by this definition with respect to Summit's actual costs, expenses and indebtedness for this project?

**A.** (BY MR. SKAARE) Is it -- is it referenced elsewhere in the agreement besides the definition?

Q. I don't know.

MR. BENDER: Do you mind if I help?

MR. BRAATEN: Oh, no. Go ahead.

MR. BENDER: Take a look at 11.3.

MR. SKAARE: Yeah, almost there. Yeah, 11.3 references under Article 11, Relationship of Parties, 11.3, Pore Space Owners Free of Cost. "This Agreement is not intended to impose and shall not be construed to impose upon any Pore Space Owner any obligation to pay any Storage Expense unless such Pore Space Owner is otherwise obligated." So I would suggest or -- that it was a definition intended to come back to reference that section, which is, "All costs, expenses or indebtedness incurred by the Storage Operator," as

119

sort of a comprehensive definition of any expenses that are not allocated to the pore space owner.

Q. (MR. BRAATEN CONTINUING) Can you give me a few examples of costs and expenses or indebtedness incurred by the storage operator pursuant to this agreement for or on account of storage operations?

**A.** Sure. Lease operating costs or other things are not intended to be imposed upon the pore space owners.

Q. What are the lease operating costs for the leases here?

**A.** So a lease operator would be someone who's working on the project or other sort of expenses in relation to the operation of the facilities are what I consider storage expenses.

Q. Okay. So the lease operator, you're referring to the pore space leases with the landowner and Summit as the operator?

**A.** Yes.

Q. Okay. And those are the expenses for the operations related to those pore space leases; right?

**A.** That is correct.

Q. And so storage expense as used here

120

doesn't cover the amounts paid for the pipeline easements for the Midwest Carbon Express; correct?

**A.** I don't know that that's correct. Can you repeat that question?

Q. Well, let me ask it -- I thought I knew the answer so let me ask it. Do storage expenses as defined in the storage agreement as all costs, expense or indebtedness incurred by the storage operator pursuant to this agreement for or on account of storage operations refer to the payments made for easements for the Midwest Carbon Express Pipeline?

**A.** I'm sorry. I need it again. I want to be clear on this one.

MR. BRAATEN: Steph, would you mind reading it?

(Record read as requested.)

MR. SKAARE: Your question is confusing. I can answer it this way: I believe that the definition is comprehensive, and that pursuant to Article 11.3 that it is not intended to impose any of those costs upon the pore space owners.

Q. (MR. BRAATEN CONTINUING) What confuses you about the question?

**A.** The length, for starters.

121

Q. Okay. I can shorten it up for you.

**A.** Sure.

Q. Lease operating expenses, you're referring to that as the expenses of the operator; right?

**A.** Well, I -- you asked for an example.

Q. Okay. And you're saying lease operating expenses.

**A.** So I was not comprehensive at all.

Q. Right. But that's one?

**A.** Sure.

Q. Okay. Has Summit paid money for easements for the Midwest Carbon Express Pipeline?

**A.** Yes.

Q. Is that money that you paid for those easements something you would consider a storage expense as defined under Section 1.10 of the storage agreement?

**A.** I believe it falls under the overall costs and expenses of a storage operator.

Q. How about the cost of the pipe?

MR. BENDER: Are you talking about the costs of the pipe for the pipeline or are you talking about costs of the pipe for the flowlines?

Q. (MR. BRAATEN CONTINUING) That's a fair question. I mean for the main pipeline, the

122

Midwest Carbon Express Pipeline.

MR. BENDER: If you know.

MR. SKAARE: I don't know.

Q. (MR. BRAATEN CONTINUING) You don't know if the cost for the pipe for the Midwest Carbon Express Pipeline would be considered part of the storage expenses as they are defined in the storage agreement, Section 1.10?

**A.** I don't know that I'm the best person to answer the question with respect to all things that would be considered a storage expense.

Q. Did you draft that definition?

**A.** I worked and oversaw the development of this, yes.

Q. Well, what did you mean when you wrote it?

**A.** I think as I was testifying earlier, it was intended to create, as listed in 11.3, cost free to the pore space owners, much like an oil and gas lease, that they're not intended to pay for the expenses of the injection operations.

Q. But there's never a question that any of those oil and gas lessors need to pay for the Dakota Access Pipeline, is there?

**A.** No.

Q. So why would the people in the storage

123

facility have any concern with the pipeline from Iowa?

Let me ask you a different question. Are you telling me that all the expenses for your pipeline are included in the storage expenses for the storage facility?

**A.** I guess I'm not sure I'm understanding the line of questioning.

Q. Do you understand that question?

**A.** Can you rephrase it?

Q. Are all of your expenses for the Midwest Carbon Express Pipeline considered expenses incurred by the storage operator on account of the storage operations?

**A.** I would say yes.

Q. So is that pipeline part of what you're asking the Commission to give you a permit for today?

**A.** No. If you're referring to the pipeline in front of the PSC, the answer is no.

Q. Well, I don't mean the siting permit. I'm asking you when you refer to the storage facilities you're asking the Commission to permit, are you including your pipeline to Iowa in that?

**A.** No.

124

HEARING EXAMINER GARNER: Okay. Why don't we stop here and take an hour for lunch.

MR. BRAATEN: Okay.

(Recessed at 12:08 p.m. and reconvened at 1:10 p.m.)

HEARING EXAMINER GARNER: We are back on the record. Mr. Braaten, I believe you were questioning Summit's witnesses.

MR. BRAATEN: Thank you, Your Honor.

Q. (MR. BRAATEN CONTINUING) There was a short discussion, Mr. Boeshans, about mine-mouth plants, and I think you were explaining how North Dakota's mine-mouth plants work as an analogy for the Summit project; is that a fair statement?

**A.** (BY MR. BOESHANS) That's correct.

Q. Okay. Is it your testimony that the lignite mines and the mine-mouth plants in North Dakota are a single source?

**A.** I can't testify to the agreements that exist between all of the mines and all of the plants because they all have contracts -- different contracts and contract terms. My point is those utilities and/or co-ops made significant investments and entered into relationships with -- or contracts with their coal providers that

125

required the coal provider to provide them the fuel they needed to run the plant or the resource, said differently, for decades. And many of those have survived for now greater than 50 years.

The similarity to the Summit situation is that we were investing $8 billion to move $CO_2$ to Oliver and Mercer County and so, consequently, you know, we've secured to date over 145,000 acres of pore space and today we're considering permits to develop 90,000 acres.

Q. You were an executive at a coal mine; right?

**A.** I was.

Q. Do the coal power plants and the coal mines have different industrial classification codes?

**A.** I don't recall what their industrial classification codes are.

Q. If they used different industrial classification codes, would that indicate to you that perhaps Summit should consider something similar by way of analogy?

**A.** I -- again, I'm not an expert in those codes and classification codes in terms of how they're used for tracking. I really can't answer

126

your question.

Q. Do the words "other nonhazardous waste treatment and disposal" describe the storage facilities?

**A.** Say that again. Repeat that again.

Q. "Other nonhazardous treatment and disposal."

**A.** Again, I'd have to look at all of the codes to say which one fits the best.

Q. Well, and I'm not asking what fits the best, but do those words describe the Summit storage facility?

Let's break it down. The emissions -- the $CO_2$ is coming from emissions from ethanol plants; right?

**A.** Correct.

Q. Would they consider that a waste stream coming out of their emissions stack?

**A.** Coming out of their stack they would, yes, I presume.

Q. Are you -- and we've talked about how you don't have any plans to pull the $CO_2$ back out; right?

**A.** Correct. Back out of the reservoir, you're saying?

127

Q. Correct.
Could we agree that $CO_2$ is nonhazardous?
A. In -- yes, in the atmosphere, for sure.
Q. So other nonhazardous treatment and disposal, do those words just generally describe what Summit's doing with its storage facilities?
A. I would say the way you've described it, yes.
Q. Okay. Are you aware that 221112 is the industrial classification code for fossil fuel generation?
A. I'm not.
Q. Are you aware that 212114 is the industrial classification code for surface coal mining?
A. I am not.
Q. Does fossil fuel generation describe the lignite power plants in North Dakota, generally speaking?
A. Yes, generally speaking.
Q. And does surface coal mining describe the lignite mines at the mine-mouth plants in North Dakota, generally speaking?
A. Yes. Generally speaking, yes.
Q. And you'd agree that a fossil fuel

128

generation plant is a different facility than a surface coal mine?
A. Yes.
Q. There was testimony earlier that you would do your level best to not put surface facilities on an unleased landowner. Why can't you just put into the Exhibit D lease no surface access for the unleased landowners?
A. The Exhibit D in the storage agreement?
Q. Sorry. Yes.
MR. BOESHANS: Go ahead, Jeff.
A. (BY MR. SKAARE) Sure. To the extent that we had a clause for no surface facilities, I don't know that it would be that difficult to add that to the -- to the lease.
Q. Can --
A. We know that some access may be necessary for things such as seismic or other things.
Q. Is that something that you would know well in advance?
A. I think that's safe to say.
Q. So is it also safe to say that the Industrial Commission could include a provision allowing no surface access for unleased mineral -- or unleased surface owners, and if you needed any

129

relief from that, say, to conduct seismic, you could always come back and ask for that; right?
A. To be clear, you used the term no surface access, and I probably should be clear about it's a no surface-facilities clause.
Q. What can you do other than put facilities on the surface with a no surface-access clause that you have in your leases?
A. To the extent we'd be required, we would continue to negotiate and work with landowners for purposes of seismic or other times we would need to enter into the land, thus access.
Q. So if you had agreed to a no surface-access provision with a landowner -- sorry. Let me start over.
With respect to the provision you've referenced that is a no surface-access provision that was included in some of Summit's pore space leases, is it your testimony that Summit would still be allowed to conduct seismic operations on those properties even with the applicability of that no surface-access clause?
A. This may be a good time to make sure that my testimony is straight. I may have used the term no surface access in general terms. What it is is

130

a no surface facilities that we've offered to the landowners across the -- across the board. So to the extent that I said that differently, that was not intentional.
Q. Specifically, does the provision state, "Unless otherwise agreed in writing, lessee agrees that there will be no facilities, including well sites, pipelines, power lines, or other surface facilities on the following described real property," and then it would go on to describe whatever lease --
A. Yes. That's correct. Thank you for bringing that up. That's the clause.
Q. And so what -- the version I have at least states as the title before what I just read No Surface Occupancy. And so is it a fair statement that the no surface-access or no surface-facilities clause that we've discussed, let's call it a no surface occupancy clause for the moment, regardless of what we call it, we're still always talking about the same clause; right?
A. Yes.
Q. And with respect to that clause and the leases in which it appears with Summit and then the pore space owners, is it your position that Summit

131

still has the right to go on and conduct seismic operations even on property with a lease that has that no surface occupancy clause?

**A.** Yes.

Q. Did you hear concerns from landowners about seismic operations?

**A.** Yes.

Q. And what were those concerns?

**A.** Concerns about distances from existing water wells.

Q. With respect to the storage facilities, is Summit asking to amalgamate the interests of just the unleased owners?

**A.** That is correct.

Q. But is it intending to impose the provisions of the storage agreement with the attached pore space lease on all owners, leased or unleased?

**A.** So, Mr. Braaten, as I testified before, I do believe that, yes, it does, but it also -- you know, we have written agreements with the existing lease owners that we feel would govern with respect to the -- the terms of the lease.

Q. Can I have you look at Section 3.3 of the storage agreement?

132

**A.** Sure.

Q. And so you're able to testify that you're going to honor those other leases because in Section 3.3 of the storage agreement you're going to impose on everyone, leased or unleased, it states that the provisions of the various leases, agreements, or other instruments pertaining to respective tracts or the storage and storage substances therein, including the pore space leases attached hereto as Exhibit D, are amended to the extent necessary to make them conform to the provisions of this agreement.

Did I read that right?

**A.** You did read that correctly.

Q. So anyone who signed a lease is having their lease conformed to this storage agreement no matter what they negotiated with you and that's what you're asking the Industrial Commission to do right here, right now. Did I get any of that wrong?

**A.** I don't necessarily agree with that.

Q. What do you disagree with?

**A.** I think the two work hand in hand still.

Q. What two?

**A.** The storage agreement and the pore space

133

leases that we've entered into.

Q. How so?

**A.** Because it says that they shall otherwise remain in effect.

Q. But only to the extent they are now in perfect conformance with the lease that you have submitted to the Industrial Commission to impose; right?

**A.** Perhaps, but I don't -- I know that Summit's intention is to honor the lease agreements that we've entered into.

Q. Then why doesn't it put that intent in writing that it's asking the Commission to do today?

**A.** I'm not sure.

Q. Would you like to ask the Commission to do that, then?

**A.** I would think so.

Q. Yeah?

**A.** I think it would be fair.

Q. So we're going to amend this provision to allow all of the pore space leases signed to remain in full force and effect and not be abridged in any way by the storage agreement submitted here?

**A.** I think I'll defer to counsel on the best

134

way to amend it rather than testify to it.

Q. Okay. Up above in the definitions there's a storage facility participation, the term, and then that refers to -- well, I'll just read it to start. It says "Storage Facility Participation" -- sorry, I'm on page 4.

**A.** Mm-hmm.

Q. -- "is the percentage shown on Exhibit 'C' for allocating payments for use of the Pore Space under each Tract identified in Exhibit 'B'."

So I think I will start with Exhibit C, if we can.

Would it be accurate to say that when you listed the tracts -- let me start that over.

Would it be accurate to say that the tracts listed were identified as all of the acreage that is both in the storage facility and in any given section and that would be one tract?

**A.** I think so.

Q. That was a bad question. Sorry. So let me just -- tract number 1 includes all lands in Section 27 that are also in the storage facility; is that right?

**A.** I'm -- the one I'm looking at is maybe different. I'm looking at --

135

Q. Oh, sorry.
A. -- storage 1, but I anticipate that your question is -- the answer is yes.
Q. Yeah. Let me grab the one you're on real quick. Okay. So tract 1 refers to Section 34 on the application you're looking at in Exhibit C to the storage agreement; is that right?
A. It does.
Q. Okay. And so it's only 120 acres, and I'm presuming that that is because tract 1 includes all acreage from Section 34 that is also in the storage facility; is that accurate?
A. That is accurate.
Q. And is that how you determined each separate tract would essentially be a separate section and all of the land from that separate section then is also within the storage facility?
A. That is correct.
Q. Okay. And so just as one example, tract number 1 refers to Section 34, Township 142 North, Range 87 West, and that has 120 acres and a tract participation factor of 0.40754336 percent. Would it be fair to say that that is the percentage of the total acreage that tract 1 makes up of the storage facility?

136

A. Yes.
Q. Okay. And so if we go up to Exhibit B.
MR. BENDER: Did you say B or D?
MR. BRAATEN: Exhibit B, as in boy.
MR. BENDER: Okay. Thank you.
MR. BRAATEN: And it is the tract summary.
Q. (MR. BRAATEN CONTINUING) And there, again, we have tract number 1, Section 34, Township 142 North, Range 87 West, 120 acres, but we have three different owners of interest each with, we'll just say, 40 acres each.
A. Mm-hmm.
Q. And so they each have 33.3 percent tract participation and that is the tract participation factor for that tract number 1 and their interest in it; is that accurate?
A. Yes.
Q. Okay. And then the storage facility participation would essentially -- well, let's just go straight across the top line for Gerald. So essentially what this means, then, is for tract 1 -- and I don't know, Gerald may have other tracts, but let's say that Gerald just owns tract 1 -- what this says is that Gerald's interest in that tract is 33 percent and therefore you would

137

multiply that -- well, actually, how do you get from the tract participation to the storage facility participation?
A. Sure. Let me grab one number and I can explain it. May I see Exhibit 5A? I think we had it below us here. I have it. Exhibit 5A shows that the total acreage for the Summit Carbon -- or for the SCS1, TB Leingang, as 29,444.72 acres. If you were to divide 40 by that number, you would see that Gerald -- he pronounces his name Gerald --
Q. Thank you.
A. -- at .00135848 or .13584799 -- or 779 --
Q. Okay.
A. Sorry.
-- percent.
Q. So the storage facility participation number would be the proportionate share of the acreage for that individual landowner based on their interest in that tract if we are following their name across the row in your Exhibit B? That was bad. Let me start over.
So let's start with Gerald. If we go across, that storage facility participation number is .13584779?
A. Correct.

138

Q. That would be his -- and putting aside potential other interests, but if we assume this is his only interest, what that is indicating is that's his proportionate interest in the storage facility based on his percentage interest in tract 1?
A. That is right.
Q. Okay. How did Summit determine which landowners it would ask the Commission to amalgamate for its projects? And just so I'm not confusing you, I'm not trying to ask for names here. What I mean is not -- not the people, but how did you decide which tracts of property or what land you needed to amalgamate for purposes of the project and the applications?
A. Sure. The unleased landowners inside the storage facility boundary.
Q. Okay. Why the ones that are inside the storage facility boundary?
A. So development of $CO_2$ or $CO_2$ storage projects requires the cooperation of multiple parties, and because their land is internal or inside of that boundary, we know that it will be impacted, or said differently, have $CO_2$ stored in it and that's why we're seeking to amalgamate that

139

interest to develop the rights of the other 93 percent on average.

Q. How was the storage facility boundary determined?

**A.** By the geologic model.

Q. Based on landowners that need to be amalgamated or what was the basis for the boundaries as set?

**A.** (BY MR. BOESHANS) Yeah. So maybe I can help with that one. So the storage facility design, or said different, simulation determines the boundary or the plume extents at the end of 20 years of injection. Then we also modeled the stabilized plume and then established the boundary outside of that generally following describable lines. It would have curved lines. We followed a describable boundary that included buffer around that.

Q. How far did you place the storage facility boundary from the extent of the modeled plume?

**A.** The boundary was not always consistent. In other words, we didn't just use the same buffer everywhere.

Q. What's the range?

**A.** Don't recall specifically. I would say it

140

ranges between 500 feet, thousand feet, somewhere in that neighborhood per my recollection, and maybe as much as half a mile or so.

Q. With respect to the modeled $CO_2$ plume --

**A.** Mm-hmm.

Q. -- that line was drawn based on literally what the model generated for the external boundaries of that plume; right?

**A.** Yeah. I'll let Amanda testify more specifically to that, but that was my understanding is we were looking at the -- the model output for the plume boundary at the end of 20 years of injection. And then, additionally, the plume boundary -- or the stabilized plume boundary approximately 16 years later or I forget exactly the name, but the stabilized plume boundary, and that's what -- then we developed a storage boundary outside of that.

Q. Did someone at EERC make the decisions on the extent of the buffer area between the stabilized plume boundary and the buffer zone -- or the storage facility boundary?

**A.** No. They had -- they had input on it, but we made the decisions -- Summit made the decisions.

Q. Based on what considerations?

141

**A.** Based on all the things I mentioned, along with kind of the -- the -- which included, you know, describable boundaries, reasonable buffer and participating landowners.

Q. So you didn't draw the boundaries to exclude unleased owners that you weren't able to get leases from?

**A.** So if we had adequate buffer, we would -- we would not -- try to -- try to minimize the amalgamation or the force --

Q. How do you determine whether the buffer is adequate?

**A.** Basically, we know that the boundaries, if you will, that are identified, you know, by the modeling are at -- on thousand-foot blocks, thousand-foot grid cells, and 5 percent saturation, so we know what we start out with. It's fairly thick to begin with. And then ultimately from that we look at what is a reasonable boundary or buffer that we have -- I would describe it as confidence the plume will stay -- plume will stay inside of and have included margin for error.

Q. What was the range of the buffer area from the plume limit?

**A.** As I recall, it was around 500 feet to a

142

half mile, maybe more. Again, I'd have to go back and look specifically or we'd have to look specifically at those. I don't recall them off the top of my head.

Q. But you're saying the model was using thousand-foot blocks?

**A.** Yes. The grid cell size was a thousand feet, as I recall it.

Q. Why 5 percent saturation and not something lower?

**A.** I'm going to defer that one to the -- to the EERC team.

Q. Why did you use 5 percent?

**A.** I used 5 percent because that's what the standard that EERC had indicated had been used in other permits, to my knowledge.

Q. Do you have any actual testing?

**A.** What kind of testing?

Q. Any.

**A.** Again, I -- what kind of testing?

Q. Testing to determine the saturation.

**A.** No. Testing to determine the saturation, it's predicted by the model from my understanding.

Q. If you're using thousand-foot blocks, how can that model tell you anything about where to put

143

a buffer in a 500--to-2,000-foot range?
**A.** Again, I'm going to defer that to the reservoir engineering and geoscience team that is more knowledgeable on the model and the software and its reliability and predictability and how it's been used.
Q. Is it your understanding that a change in the 5 percent saturation could change the extent of the plume model?
**A.** Again, that's outside of my specific area of expertise and knowledge on how the model works, but I would anticipate change of saturation would -- potentially could change the boundary, push it into a different cell.
Q. And it's your testimony that EERC is the one who made the decision on -- well, let me start that over.
With respect to the saturation percentage, generally speaking, is it your testimony that the folks at EERC made the decisions related to that percentage and the modeling?
**A.** The EERC team of experts made a recommendation to us on percentage saturation that as I understand was consistent with what other projects had done, and that's what we used in

144

developing the -- the permit application. But, again, they'll be testifying later. They can speak more specifically to the exact methodologies and workings of the software.
Q. Is there any reason you would want to hide that data from further review?
**A.** Hide what data?
Q. The data used by EERC to create the model.
**A.** Not to my knowledge. I believe it's submitted to the -- to the DMR.
Q. The raw data for the model is submitted to the DMR?
**A.** I'm going to let them testify specifically, but that's my understanding is that the model itself has been submitted to the DMR.
Q. Do you know when?
**A.** I don't know exactly the date.
Q. Was it within the last four weeks?
**A.** No. It would have been prior to that.
Q. And you're testifying that the data -- the data decks and the model itself were all submitted to the DMR?
**A.** Again, I'll have to, you know, defer to the team that put all of the submittals into the DMR. It is my understanding that the geologic

145

model was submitted to the DMR.
Q. Is there a reason that you would not want people to have the data to assess that model?
**A.** No, I don't -- I don't think so. I -- it's my understanding that that, once submitted to the DMR, is publicly available. But, again, my understanding.
Q. Can I have you turn to Section 1.15 and the definition of Storage Reservoir.
I'll ask a quick question first. I was going to ask some questions about, for example, the variation or range of vertical depth of pore space throughout the reservoir. Would those be better for the EERC folks?
**A.** Yes.
Q. Okay. Let's go down to 1.16 for Storage Rights, then. From where does Summit obtain storage rights to explore, develop and operate lands within the facility area?
MR. BOESHANS: Jeff, I'll defer to you.
**A.** (BY MR. SKAARE) So I'm a little confused by the question. Are you wondering -- well, maybe you can ask it in a different way so I can understand the question.
Q. Does Summit have any rights to explore,

146

develop and operate lands within the facility area for the storage of storage substances as those words are used in Section 1.16 of the storage agreement?
**A.** Yes. Under the terms of the lease.
Q. Which lease?
**A.** To the extent that we have leased owners, and then this would tie back, of course, to the lease that we're -- we've attached as Exhibit D.
Q. Okay. So as defined, storage rights are the rights to explore, develop and operate lands within the facility area for the storage of storage substances, and your testimony is that the source of those rights is the -- or are the leases signed with the individual pore space owners as well as the lease attached as Exhibit D to the storage agreement; is that accurate?
**A.** I think that's fair.
Q. When you sign a lease -- one of the pore space leases with one of the landowners who signed, how is it that you get rights from signing a contract with them?
**A.** Well, I think the question's basic, and I don't mean this to sound -- we've entered into a property right agreement --

147

Q. Yeah.
A. -- through the terms of a lease.
Q. Yep.
A. Is that the question you're asking me?
Q. And are they conveying property rights to you in exchange for money?
A. Yes.
Q. And so in that situation, there's a consensual transaction by which that landowner transfers specific property rights to Summit?
A. That is correct.
Q. In the case of Exhibit D attached to the storage agreement, there's no consent from any landowners, so by what power is that imposed on a landowner if not by his consent?
A. If the Commission were to enforce Exhibit D, the rights to inject and store carbon dioxide under the terms of that lease would exist in paragraph 4, but I understand that that's an imposed lease.
Q. And what power does the Commission have to impose a contractual document on a North Dakota citizen?
A. I think that's more of a legal question.
Q. Are you a lawyer?

148

A. I am. So that's -- the powers granted by the legislature in 38-22 to allow for the amalgamation is the power that is granted to the Commission through the legislature.
Q. And what is the Commission doing when it amalgamates property rights?
A. Again, not trying to be flippant, I mean, they're amalgamating the rights -- i mean, they're -- can you expand on the question? I'm not sure I understand the next --
Q. After the Commission amalgamates property rights, does Summit end up with some property rights that previously belonged to a landowner?
A. I would say yes, that's fair.
Q. Because the Commission took it from them and gave it to you?
A. I wouldn't characterize it like that. I think the Commission's working under the authority granted to it by the State legislature.
Q. Authority to take private property; right?
A. To amalgamate interests across multiple owners for the development of $CO_2$. I understand the question, yes, it is the property --
Q. In order to amalgamate the owners, what you're doing is taking their property rights and

149

telling them you no longer have the right to exclude me from your property. I'm coming on whether you like it or not, and that means that you now have a property right, the right to exclude, that they used to have, but now they don't have and you do have, all by virtue of the Commission order; is that accurate?
MR. BENDER: Objection. Argumentative. Compound.
HEARING EXAMINER GARNER: Sustained.
Q. (MR. BRAATEN CONTINUING) Can Summit operate the storage facility without amalgamating it?
A. No.
Q. Why not?
A. Much like oil and gas, in order to develop a resource, in this case pore space, would require the cooperation of multiple landowners for development into that formation.
Q. And what happens if they don't cooperate?
A. The same thing we've just discussed which is an order for amalgamation.
Q. What happens in oil and gas when they don't cooperate?
A. An unleased landowner has certain

150

statutory rights regarding the development of oil and gas.
Q. And you do oil and gas law; right?
A. I do.
Q. They get their just and equitable and their proportionate share in the reservoir; right?
A. So a nonleased landowner in North Dakota who decides to go nonconsent to a well is subject to a risk penalty, and upon completion of that risk penalty, they are entitled to their proportionate share of the minerals that they reserved or own in that particular unit, and I believe there's a statutory provision for a royalty along the way.
Q. So essentially what they get is a 16 percent interest cost free, meaning on gross, and the remainder 84 percent on net revenue?
A. After the imposed risk penalty.
Q. Which is statutorily prescribed to be just for oil and gas?
A. Yes. That's true.
Q. So if we want to apply oil and gas law to the Summit project, let's go up to Exhibit B, specifically Exhibit B, the Tract Summary attached to the storage agreement. Gerald's just and proportionate equitable share if we were talking

151

about an oil and gas reservoir would be .13584779 percent; right?
**A.** Yes.
Q. And under the oil and gas laws you were just talking about, it would be that percentage split out into a 16 percent on gross and an 84 percent on net revenue?
**A.** In oil and gas when it is the extraction of an existing mineral, yes.
Q. Right. Because that mineral isn't owned by the operator necessarily; it's owned by the mineral owners?
**A.** That's right.
Q. Just like the pore space is owned by the surface owners?
**A.** I understand. Yes.
Q. Can I have you turn to Section 2.4 of the storage agreement in the application, Exhibit 1A. There's a Section 2.4 on correcting errors, and the second sentence says, "If it subsequently appears that any Tract, mechanical miscalculation or clerical error has been made, Storage Operator, with the approval of Pore Space Owners ... shall correct the mistake."
Can you just tell me what is meant by a

152

"mechanical miscalculation"?
MR. BENDER: Can I help?
MR. BRAATEN: Yeah, please.
MR. BENDER: I think that's a typo. I think that should say mathematical.
MR. BRAATEN: Okay. That makes more sense.
Q. (MR. BRAATEN CONTINUING) Okay. So in the same exhibit, at Section 3.1 we had some discussion of this, but it states that any pore space owner in the storage facility who owns a pore space interest in the storage reservoir that is not leased for the purposes of this agreement and during the term hereof, shall be treated as if it were subject to the pore space lease attached hereto as Exhibit D.
Is Summit willing to adjust that Exhibit D to ensure there is no surface occupancy as it has done for some of the signed lease owners?
**A.** Yes, we would do that.
Q. Okay. Can I have you go down to Section 8.1 of the storage agreement. 8.1 states, "Grant of Easement. Storage Operator shall have the right to use as much of the surface of the land within the Facility Area as may be reasonably necessary for Storage Operations in the injection of Storage

153

Substances."
Does that apply to unleased lands, surface lands?
**A.** As written today, it does.
Q. And would Summit also change that provision so that it does not apply to unleased surface lands?
**A.** Yes. I -- I think it was implied in my answer that consistent with the leases that we sent to everybody in the spring of -- excuse me -- the fall of '23 and again in the spring of '24, we've included that no surface-facilities clause and so it's an easy thing to provide. And so we can add that to the Exhibit D pore space lease.
Q. Okay.
**A.** And -- and then it would have its impact in here as well, if that's the question, subject to Exhibit D.
Q. Okay. As it's written right now, with the landowners who have signed leases with Summit --
**A.** Mm-hmm.
Q. -- do their leases give Summit explicitly the right to use as much of the surface of the land within the facilities area as may be reasonably necessary for operations?

154

**A.** No, it does not.
Q. Okay. So this is granting additional rights to Summit to use the surface of property that is leased as well as unleased?
**A.** So as I testified earlier in direct, we do not anticipate additional surface usage specifically towards facilities, roads, pipelines, et cetera. There may be needs for ingress and egress for purposes of various studies or otherwise.
Q. And are you saying that if your existing leases and agreements with the landowners don't give you those rights of ingress and egress, you're asking the Commission here to grant those rights to you regardless of whether you have them in the private contracts; is that accurate?
**A.** No. Our existing leases do have rights of ingress and egress.
Q. Okay. So I want to back up, though. Do you think that this provision 8.1 gives Summit any rights on the surface of landowners who have signed leases that aren't already explicitly in the lease?
**A.** So it -- in its language it states "as may be reasonably necessary."
Q. In the lease or in this?

155

**A.** In this clause.
Q. Okay. And that --
**A.** So --
Q. Sorry. Go ahead.
**A.** I'm sorry too. The storage operator shall have the right to use as much of the surface of the land within the facility area as may be reasonably necessary for storage operations and the injection of stored substances. I read that sentence in its entirety, and there is an imposed reasonableness standard on what's there. So unless it's reasonably necessary, I -- I think it's limited by "reasonably necessary."
Q. Does the grant of an easement to do what is reasonably necessary for your operations expand your rights to use the surface of any of the lands that are leased?
**A.** I don't believe it expands the rights when we have an existing lease. We have an existing written contract when there is a lease.
Q. So it's not your intent to obtain any rights to use the surface beyond the rights explicitly granted in your leases with respect to the properties that are under lease?
**A.** With respect to the properties that are

156

under lease, that is correct.
Q. Okay. And with respect to the unleased properties, would it be accurate to say that you're asking the Commission to give you the property rights necessary to do what is reasonably necessary for your storage operations on the surface of those unleased lands?
**A.** Yes. That's correct.
Q. By what authority do you think the North Dakota Industrial Commission can grant anyone the right to use the surface?
MR. BENDER: I'm going to object with respect to his characterization of "anybody." We're not talking about anybody. We're talking about the operator of the pore -- of the storage unit.
MR. BRAATEN: That's fair. I'll withdraw the question and reask.
Q. (MR. BRAATEN CONTINUING) By what authority do you think the North Dakota Industrial Commission can grant Summit property rights sufficient to allow it to do what is reasonably necessary for storage operations on the property of the intervenor landowners I represent?
**A.** So the North Dakota Industrial Commission

157

is operating under North Dakota Century Code Chapter 38-22 and its administrative rules which I believe are 43-01-05. I might have that backwards.
Q. Two -- 2-05.
**A.** Oh, 2-05? Allow me to look. 43-05-01.
Q. Oh, we're both wrong.
**A.** And so I think that the authority, to answer your question, comes both from the legislature and the Century Code and then based on the rules that they've developed.
Q. What provision of Chapter 38-22 provides any authority to do anything, amalgamation or otherwise, to the surface lands as opposed to the pore space?
**A.** I would say under 38-22-03 entitled Commission Authority, which reads, "The Commission has authority over all persons and property necessary to administer and enforce this chapter and its objectives."
Q. And so are there no limits on the Commission's authority as long as that's what they're doing?
**A.** I think that's a mischaracterization.
Q. Well, I'm asking. I'm not saying that's what you said.

158

**A.** Certainly there are limitations, much like the reasonableness standard that's in the draft storage agreement.
Q. And what are those limitations?
**A.** I would say limited to the extent necessary to develop and store $CO_2$ under Century Code.
Q. Would you agree it's also limited by the mandates and prohibitions of the constitution of North Dakota?
**A.** So I'm not a constitutional lawyer. I don't know that I have an opinion on that.
Q. Well, as a lawyer, do you support and uphold the constitution --
**A.** I do.
Q. -- as a practicing lawyer?
**A.** Yes, I do.
Q. Does that trump the other law?
**A.** Does -- when you say "that" --
Q. The constitution?
MR. BENDER: Mr. Examiner, I think we're getting into areas now where we're arguing legal issues, and I don't think this is the appropriate way to make those legal arguments.
HEARING EXAMINER GARNER: Sustained.

159

Q. (MR. BRAATEN CONTINUING) Can I have you turn to Section 8.4 of the agreement that we're looking at. There's a reference to the surface and subsurface operating rights, and it references use of water. Can you explain the ways that you understand Summit intends to use water from the reservoir in the formation?

**A.** (BY MR. BOESHANS) Yes. I would say this is more of a question for the drilling operations and that team. My understanding is that as we drill the well and maintain the well, we have needs to pull samples or move fluids in or out of the reservoir during the drilling and completion process, but they can speak more specifically to that.

Q. Are the drilling folks the folks from EERC?

**A.** No. They're members of our team.

Q. Okay. And is it like a separate drilling, like, consultant or they're actual employees of Summit?

**A.** We have employees of Summit that will --

Q. Okay.

**A.** -- be testifying here.

Q. Okay. Are you asking in this provision

160

for the Commission to grant property rights or ownership rights to the water or just the ability to use the water in the drilling operation?

**A.** I would defer to Jeff here as well. My understanding is that we're requesting the permission to use the water as needed to facilitate operation and injection of $CO_2$.

Q. So I'll ask a couple questions just to kind of explain what I'm getting at here.

**A.** Sure.

Q. The -- are you aware that, generally speaking, until put to beneficial use, water in North Dakota is generally all considered waters of the state?

**A.** Mm-hmm.

Q. And to the extent any waters in the reservoir have not been put to any kind of beneficial use, they may be deemed to be waters of the state. And so my question is simply in here are you asking to be able to use the waters in the reservoir as necessary for your operation, or are you asking for the State to actually grant you the right to that water in that reservoir to use however you please?

MR. BOESHANS: Sure. Jeff, I'll let you

161

take that. That's more of a definition.

**A.** (BY MR. SKAARE) Sure. "Except to the extent modified in this Agreement, Storage Operator" -- "Operator shall have the same rights to use the surface and sub-surface and use of water and any other rights granted to Storage Operator in any lease covering the Pore Space Interests." I understand that to mean the rights to use water where necessary. Our needs for water will be privately contracted for drilling.

Q. So just to use perhaps a slightly ridiculous example, you don't have plans and it's not your intent that you would be able to, then, open up a water depot and start pumping water out and selling it?

**A.** That would not be commercially reasonable. It would not -- no. Absolutely.

Q. Okay. And so if we were in the oil and gas context -- and you can object -- but generally what you're saying is what you're asking for is the ability to use the water in the reservoir as reasonably necessary for your operations; is that a fair statement?

**A.** That is correct.

Q. Okay. Turn down now to Exhibit D, the

162

Form of Pore Space Lease, that we've referred to a few times. It's in the application.

**A.** I am there.

Q. In Section No. 2 under the Term, there's a reference to bonus payment of $20 per acre and an annual rental of $4 per acre for the initial term.

MR. BENDER: I think you may have misread that, Mr. Braaten. Mine says $25.

MR. SKAARE: So does mine.

MR. BRAATEN: What did I say?

MR. SKAARE: 20.

MR. BENDER: You said 20.

Q. (MR. BRAATEN CONTINUING) Sorry. Let me start that over. So I read this to say they're paying a bonus payment of $25 per acre and it states that's a single one-time bonus payment. And an annual rental of $4 per acre for the initial term. How did Summit decide upon those numbers for the bonus and rental?

**A.** (BY MR. BOESHANS) Yeah, I would say kind of two ways. We initially started with numbers that were consistent with coal leases and coal leasing that I had familiarity with in obviously my previous experience. They were then adjusted from there based on negotiations with the landowners.

163

Those are some of the terms that changed during the -- the negotiations.
Q. And then just to follow up on that, there's a Section 3, Royalty, that has a 50 cent per metric ton and then later percentage increases. Did you decide on those numbers the same way as the bonus and the rental?
**A.** That's what we ultimately started with.
Q. Okay.
**A.** And then, again, same deal as -- through negotiations, they were adjusted.
Q. And the coal leases, are those with just one operator or numerous operators?
**A.** You're -- you're asking me for my points of -- point of reference?
Q. Yeah.
**A.** Yeah. With numerous.
Q. Okay. And those were North Dakota coal leases?
**A.** Correct.
Q. Were any of them new leases signed within the last 50 years?
**A.** Yes. Haven't been in the business 50 years.
Q. What companies are still leasing coal in

164

North Dakota?
**A.** I don't know specifically who's actively leasing or not leasing. We were leasing when I was at BNI.
Q. When you were leasing at BNI, had you adjusted the rates you were paying since the 1930s?
**A.** We had.
Q. How much, just percentagewise?
**A.** Well, I wasn't there in the 1930s.
Q. No. That's fair. Sorry. I didn't mean to imply you were.
**A.** I know I'm getting gray, but -- I am gray.
Q. Okay. So how many times did you adjust or change the bonus or rental or royalty amount that you were offering landowners for a pore space lease? And I'm speaking now -- sorry. We were talking about BNI. So I'm talking Summit now. In the time with Summit, how often did Summit adjust the bonus, rental or royalty in response to their negotiations with the landowners?
MR. BOESHANS: Maybe I could defer to Jeff here as well. We -- I don't recall specifically the order in which the changes were made, but we were moving those around or adjusting them through the negotiations, but I don't recall was it all at

165

once or multiple steps. My recollection is it was multiple steps, but I'm going to defer to Jeff and his -- his --
**A.** (BY MR. SKAARE) Sure. So we began negotiations in September of '21, made significant offers -- and when I say "significant," we reached out to a large number of landowners. We started to see some of these leases come in. We received feedback from a number of people, including some of your clients, regarding multiple terms. Those terms included annual rental, and I'm going off of memory. They included increase in royalty, an increase in the extension term bonus. They included percentage increase year over year. They included favored nations. And perhaps others that I'm not recalling at the moment.
Q. And, I'm sorry, I should have asked that question more specifically, but what I -- what I'd intended was just -- and let me actually start -- break it down and ask some different questions.
Is the $25-an-acre bonus, $4-an-acre rental and 50 cent per metric ton the monetary offer made by Summit in the first pore space leases you mentioned that were set out -- sent out?
**A.** No.

166

Q. And what was the opening offer that Summit made to landowners?
**A.** If my memory serves me correct, the bonus payment of $25 an acre is consistent. The royalty was 25 cents. The annual rental was $2 per acre. And the reason the majority of the changes came together, though discussed with multiple landowners, is primarily due to the favored nations clause, at which point we sent out a first amendment to our pore space agreements to anyone who had signed prior to provide them with the same terms as what we eventually came to from the negotiations on -- as I testified was 450-plus different landowners.
Q. And so once you had given all of the landowners that most favored nations clause, you were unable to modify things for any additional landowners negotiating with you without changing all the other agreements. Is that your testimony?
**A.** With respect to compensation, yes. Well, may I qualify that? Any change applied to everyone.
Q. And so other than the change such as the no surface-facilities clause we discussed, what were the changes to the compensation level you just

167

mentioned, you simply didn't make changes for other landowners in individual negotiations; is that right?

**A.** I think that's correct, yes.

MR. BOESHANS: Change to compensation.

MR. BRAATEN: I included that, yeah.

Q. (MR. BRAATEN CONTINUING) So other than the coal leases you say you looked at when you started developing this, did you gather any information or do any research or investigation other than that to arrive on monetary amounts to put into the leases?

**A.** (BY MR. BOESHANS) With my -- you know, in my former role I was aware of compensation related to Minnkota's project, but other than that, at the time there weren't any other public available references, if you will, lease terms around $CO_2$ projects that I was -- had access to. And so the only thing from a $CO_2$ perspective, market perspective that I had was the one project that I was familiar with. And --

Q. But -- I'm sorry. Go ahead.

**A.** So, yeah, that was kind of the -- that was what I would describe as the extent of it.

Q. Okay. Can I have you turn to Section 17

168

of Exhibit D to the storage agreement in the application, Exhibit 1A. Sorry, we've got exhibits within exhibits. That got a little long. But we are looking at Exhibit 1A, the application. Within that exhibit there is a storage agreement, and attached to that storage agreement is Exhibit D which is the Form of Pore Space lease.

**A.** (BY MR. SKAARE) Yep.

Q. Within that Exhibit D, Section 17 I'd like to direct your attention to.

**A.** I am there.

Q. Thank you. So this section states that the bonus and royalty amounts contemplated and paid to lessor hereunder is compensation for, among other things, damages sustained by lessor for lost land value, lost use of and access to lessor's land and lost value of improvements, if any, and to the extent applicable.

So if Summit needs to access some of its facilities and it drives across the farm field planted with wheat and takes out part of a farmer's crop and that farmer is unleased, this provision says they don't get damages for the part of their crop that was destroyed and they've already been compensated with the royalty?

169

**A.** That is incorrect.

Q. Okay. Explain how that's wrong.

**A.** So under paragraph 11 on page D-4, we have our Hold Harmless and Indemnification. The intent of paragraph 17 is essentially acknowledgment that the bonus and royalties are compensation for the use of, in this case, the real property or the pore space. So acknowledging that if we did permanent storage, that that particular reservoir may be unusable in the future, so the clause was intended to be acknowledgment that the compensation would utilize and use that pore space.

Q. So then in 17 would it be accurate to say that the intent is to limit that language as if we added to the end "rising out of the ordinary and reasonable operations of Summit"? And I'm not asking to amend it. I'm just trying to make myself understood here that when you say that the bonus and the royalty amounts are compensation for lost land value, lost use of access, you're saying it's compensation for lost land value, lost use and access arising from exercising the rights to inject into the pore space but not I accidentally started a fire in your field?

**A.** You are correct. We are not seeking --

170

your characterization is correct.

Q. Okay. So in Section 16 there's a force majeure clause. When a force majeure clause is signed between two parties to a contract, generally speaking we understand how that's going to work if there's a dispute, but in the event of force majeure here if -- well, let me start over.

In the event of a force majeure event to which Section 16 would apply, who would make the determination as to whether it was a legitimate force majeure event for an unleased mineral owner -- or an unleased surface owner on whom this contract is being imposed by the Commission?

**A.** I'm sorry to ask the qualifying question. Who would make the decision that the force majeure event happened in an unleased landowner scenario?

Q. Yeah. Maybe a better way to ask it is to whom should the landowner go to for relief in that scenario, the Commission or a court?

**A.** I don't know.

Q. Okay. Let's look at Section 18. If a landowner gives Summit a warranty of title and someone else sues Summit saying I own that property, not Joe over there, does a warranty of title require that landowner to step in and defend

171

Summit and hire lawyers to defend them?
**A.** Technically, perhaps, but I'm not sure that's how it works in general practice.
Q. But as a matter of law, that landowner who gave the warranty of title is legally obligated to provide a defense to Summit because that's literally what the warranty is; right?
**A.** Sure. Yes.
Q. And Summit is asking the North Dakota Industrial Commission to impose an obligation to warrant title on a landowner; is that right?
**A.** I understand the question. Yes.
Q. That is right?
**A.** It is right.
Q. Do you understand how that would even be possible as a lawyer? Because it starts to sound like indentured servitude, doesn't it?
**A.** Wouldn't characterize it that far.
Q. On that spectrum?
**A.** My answer to warranty of title is generally that, to be clear, common property law in my experience in property law is that while, yes, it does suggest that there be a duty to defend, it means that your ownership, that you would stand by that and support in the form of documentation or

172

otherwise that would show your ownership. So if there was recorded deeds and everything was in place, that would stand to -- you know, that would stand as record title. If there were things such as dresser-drawer deeds or deeds to others, late filed or after death filed -- excuse me -- recorded, I think we're looking at those types of warranties that they don't exist or that to the extent that they're aware.
Q. But if you simply said the lessor hereby represents that to the best of his knowledge he has no dresser deeds or stray deeds and is not aware of any unrecorded documents, that would all mean exactly what you just said.
**A.** Mm-hmm.
Q. But then when you used the word "lessor represents and warrants," that triggers all the warranties of title and covenants of title that includes a title warranty, that includes the obligation to defend, that includes the obligation to hire lawyers to defend Summit; right?
**A.** Fair.
Q. Does Summit believe that the Commission can impose a warranty of title on an unwilling landowner to warrant title to another person or

173

company or anyone? Is that what you're asking for?
**A.** I think it would make sense that to the extent the lease indicates what you're suggesting, a modification would make sense. That is not our intention.
Q. But you agree that is what it says?
**A.** I don't necessarily agree. I would need to look at it closely. I don't believe that was the intention, but I understand the argument.
Q. I mean, it says, "Lessor hereby warrants and agrees to defend title."
**A.** Yes, it does.
Q. Real quick, I just want to note that we had a discussion just now about the warranty of title and I didn't address that, but there is a warranty as well in the storage agreement at 7.1. Would you agree that similarly there it was not the intent to impose a title warranty on individual landowners to defend title for Summit?
**A.** Yeah. I think that's fair. And -- and for the sake of the Commission to know and understand that, typically the warranty and -- and, again, this is in practice. If somebody else claims that they own your land, we are asking that you would stand up alongside us and say, no, I own

174

my land. And so that was the intention. I understand the adjustments that may need to be made for that purpose.
Q. Before I leave it again, in the storage agreement at 10.1, there's a provision on Transfer of Title. I'll let you get there.
**A.** Thank you. I'm sorry, I was taking notes. Can you tell me where we're going?
Q. I think I sent us to the wrong place anyway so that worked out. I'll come back to it, but I do want to check on also to 10.2. It's on page 13. Oh, sorry, I'm on a different one. I don't know if my page numbers are the same, but Section 10.2, Waiver of Rights to Partition.
Sort of a similar question, but with respect to Section 10.2, are you asking the Commission to issue an order that landowners have no further rights in perpetuity to bring a partition action of property?
**A.** No. So a modification may be required there.
Q. And you'd agree that even if the Commission had jurisdiction over an individual, it doesn't have jurisdiction to bar partition actions in perpetuity for a piece of property?

175

**A.** That's correct.
Q. Are you familiar with the process, just generally, that occurs at the end of project and upon certification to the State of North Dakota?
**A.** Yes.
MR. BOESHANS: Generally, yes.
Q. So in the Century Code 38-22-17, it says that once a certificate is issued, title to the storage facility and to the stored carbon dioxide transfers without payment of any compensation to the State. Are you just generally familiar with that provision and what it means?
**A.** I am.
Q. And when that provision states title to the storage facility and to the stored carbon dioxide transfers, can you tell me how you understand, and you not as a lawyer but you as Summit, how -- or let me ask it better. How does Summit understand the phrase "title to the storage facility" and what that means?
**A.** I would say it is a transfer of the leasehold rights as well as the stored $CO_2$.
Q. And so would another way to say that be to say that it transfers all property rights Summit has in the storage facility to the State as well as

176

the stored $CO_2$?
**A.** That is fair.
Q. Okay. Could one of the unleased landowners market the $CO_2$ being stored?
**A.** No.
Q. Why not?
**A.** Under the terms of the lease and also under the terms of the lease that we intend to ask for in Exhibit D, ownership to the $CO_2$ in exchange for the compensation belongs to Summit or in that case the State.
Q. And if there were no lease, would the $CO_2$ being put under land of an objecting landowner eventually be abandoned there as a matter of law? Well, let me ask a different question.
You indicated that a landowner couldn't commercialize or market the $CO_2$ being stored there and it's because of the provisions of the pore space leases signed by individuals or by the provisions of the Form of Pore Space Lease. If the Commission didn't impose that Form of Pore Space Lease on a landowner, would there be any barrier to them pulling the $CO_2$ out and marketing it?
**A.** Legally or technically?
Q. Both. And I understand you can't

177

necessarily speak to all of them, but just whatever you know.
**A.** To the extent -- so the storage and in this case the removal would require the cooperation of multiple landowners, and so I don't believe technically they could without other agreements.
Q. Why couldn't a landowner put a well directly under their own property into their own pore space and just pull up whatever's there?
**A.** Because it would likely impact the surrounding landowners depending upon -- I understand the question. Yes, assuming it didn't impact other landowners.
Q. Can I have you turn to Exhibit 1A to the storage agreement and specifically to Exhibit D, the Form of Pore Space Lease to the storage agreement, and then specifically Section 25.
**A.** I am there.
Q. And 25 states Confidentiality and says, "Lessor shall maintain in the strictest confidence, for the benefit of Lessee, all information pertaining to the compensation paid under this Lease, any information regarding Lessee and its business or operations on the Leased Premises or on any other lands, the capacity and suitability of

178

any Reservoir or reservoirs and subsurface pore spaces, stratum or strata unitized or amalgamated therewith, and any other information that is deemed proprietary or that Lessee requests or identifies to be held confidential, in each such case whether disclosed by Lessee or discovered by Lessor."
Is Summit asking the North Dakota Industrial Commission to impose that prohibition on free speech on unleased mineral owners and surface owners?
**A.** We would strike that clause.
Q. Section 34 of that same document has an insurance clause.
MR. BENDER: We'd be willing to strike that.
MR. BRAATEN: Okay. I guess that gets rid of all my questions.
Q. (MR. BRAATEN CONTINUING) No. So I have a specific one. Is the intent here that the million dollar limit is a limit in place with respect to that tract in that lease or a million dollar limit for the entire project?
**A.** I'm not sure.
Q. Okay. Is Summit only maintaining an insurance policy with a million dollar limit for

179

this project?
A. (BY MR. BOESHANS) No.
Q. Okay. And so just to follow up, this provision is not indicative of what Summit's actual insurance levels are but rather what they're providing within a contract as a contractual obligation that they will take on for a landowner; is that fair?
A. I think that's fair, yes.
Q. Okay.
HEARING EXAMINER GARNER: I think now's probably a good time to take another ten-minute break.
MR. BRAATEN: Sure. Thank you.
HEARING EXAMINER GARNER: We're off the record.
(Recessed at 3:03 p.m. and reconvened at 3:18 p.m.)
HEARING EXAMINER GARNER: We are back on the record. Mr. Braaten, you were questioning Summit's witnesses.
MR. BRAATEN: Thank you, Your Honor.
Q. (MR. BRAATEN CONTINUING) So back to the insurance provision. Would Summit do a waiver of subrogation with respect to the insurance it's

180

carrying for the landowners?
A. (BY MR. SKAARE) Yeah, I believe we could.
Q. And would that apply to both the landowners and their renters?
A. Well, so waiving rights of subrogation would prevent any insurance company from recovering from who is legally held liable.
Q. But just as to the landowner and their renter is what I'm asking.
A. I think we could consider that, yes.
Q. And would that be a change, then, to the -- both the Exhibit D form lease as well as the section in the storage agreement we talked about? Wait. Now I confused myself. Never mind.
I'm just talking about Section 34 of the Exhibit D. Is that a change that could be made there?
A. I believe we could present something to that effect.
Q. Would the commercial general liability insurance cover -- that's referenced in Section 34 here cover pollution events or contamination events?
A. I am not sure.
Q. Is that something that Summit is willing

181

to have insurance for that covers the landowners?
A. I believe we've indemnified under paragraph 11 --
Q. Okay.
A. -- for those same purposes.
Q. If that's true, is it fair to assume that you do have insurance for that?
A. I would believe we do, yes.
Q. And so with respect to whatever insurance policy Summit has for pollution and contamination events, can it add the landowners who own the property as additional insureds on those policies?
A. Subject to that language, I think we could add as additional named insureds. Let me verify that with my team.
Q. I understand.
A. There is a legal term of art there that I would need to address with my legal team.
Q. Okay. Is there a reason for -- well, let me ask: With respect to Section 34 and the million dollar liability limit, is Summit putting in place a separate insurance policy for each tract?
A. No, I don't believe that to be the case.
Q. Okay. So is there one insurance policy covering all tracts of land with a million dollar

182

limit?
A. I believe the limit's -- yes, there is a policy.
Q. Okay. And can Summit add the landowners to its general liability policy as additional insureds?
A. I would need to talk to our legal team.
Q. Okay. Does that seem like a fair thing to do if you're forcing those landowners into this facility to take on that risk without any choice in the matter?
A. I think it seems fair, yeah.
Q. We were looking at the application earlier at I think PS-5. Yeah, if you could look at the application, page PS-5 with the diagram on it. It's Figure PS-3, project summary map. We talked a little bit about the facilities and I'm going to talk about the facilities after the terminus point, and when I say that, what I mean is essentially everything downstream from the Midwest Carbon Express Pipeline.
So after that terminus point, we talked about flowlines. We talked about a valve station at the terminus point and obviously there's the Class VI injector wells. What other surface

183

facilities will you have, if any, other than the ones I just mentioned downstream from that terminus point?

**A.** (BY MR. BOESHANS) Sure. There's -- that's going to be covered in Section 5 of the application and there's a diagram in there. It'll be testified here later when we get to that section. But, generally speaking, there's a launcher receiver there. There's metering and measurement, there's -- as well as -- as I recall, but, anyway, we'll get into the system layout in Section 5.

Q. And is that one of the folks from EERC that'll be covering that?

**A.** It will be a person from EERC along with Jimmy Powell, our chief operating officer.

Q. Okay. And I see that you have positive manual shutoff valves, emergency shutoff valves, a blow-down, a pressure control valve, some check valves and block valves. Have you done any kind of modeling or investigation or research into the safety aspects of those valves and what happens with a valve failure?

**A.** Yeah, again, I'm going to defer those to Jimmy and the team that comes up here for that

184

specific section.

Q. If I have questions about performing LOPA, or level of protection analysis, or hazard and operability study, would those also be questions for those same folks?

**A.** That's correct.

Q. I'm going to have you go back up to Section 3.9 of the storage agreement within the application. We were talking earlier about Exhibits B and C to the storage agreement and the tract participation factors, and I think I was asking if the participation factor was the percentage of acreage owned proportionately within the storage facility. Is that the proportionate acreage owned in that particular storage facility, being the Hintz or the Leingang or the BK Fischer?

**A.** (BY MR. SKAARE) I believe I understood your question. I believe the answer is yes. That was a little long.

Q. So in Sections 3.7, 3.8 and 3.9 of the storage agreement, there's a discussion of transfer of storage substances from one storage facility to another. And it says that this is allowed when the ownership between the storage facility and the transfer storage facility is common. What do you

185

mean by -- or what does this contract or storage agreement mean when it says the ownership between the storage facility and the transfer storage facility is common?

**A.** It's not intended to talk about a storage facility that is adjacent to each other. It is intended to talk about the storage facilities that may be in a stacked play.

Q. Okay. Makes a lot more sense that way.

**A.** It does.

Q. And so this provision doesn't -- or wouldn't have any applicability unless and until Summit were to permit an additional storage facility in a formation above or below the formation it's targeting with these proceedings?

**A.** That is correct.

Q. Okay. Did any of the landowners attempt to limit the scope of their lease vertically based on the formation being targeted?

**A.** If you recall, that was a request that you made.

Q. Okay. Did -- did any other landowners make a request to limit vertically the scope of the lease with Summit?

**A.** No.

186

Q. Okay. Do you have all of the agreements and rights under contract necessary for any surface facilities planned at present?

**A.** Yes.

Q. There was some discussion earlier about the boundary lines for both the $CO_2$ plume as well as the storage facility boundaries.

**A.** Mm-hmm.

Q. Do you have an understanding of why the storage facility boundary is required to be drawn outside of the $CO_2$ plume?

**A.** (BY MR. BOESHANS) Yes. My understanding of why the storage boundary is outside of the $CO_2$ is so that, you know, kind of per the requirements of the permit, we're required to operate within the boundary that we're permitted to operate in. Okay. And so we use the methodology described to determine a boundary, you know, with the understanding there's five-year review and renewal and adjustment. So we've identified the boundary in our case of outside of the post-injection stabilized plume area, so --

Q. Is it your position or belief that the area of the reservoir in which you are operating is confined to the area of the reservoir into which

187

you are physically injecting $CO_2$ and it is existing in the reservoir thereafter?

**A.** Say that again so I under -- make sure I got the question.

MR. BRAATEN: Could I have you read it back.

(Record read as requested.)

MR. BENDER: I don't think that the question's clear. I think it's ambiguous. You aren't talking about whether you're talking about the areal extent, you're talking about vertical. So I don't know that he can answer without you being specific.

Q. (MR. BRAATEN CONTINUING) Okay. Well, let me just take another run at it.

MR. BENDER: What I'm getting at is there's vertical limits and horizontal limits, and --

MR. BRAATEN: Right.

MR. BENDER: -- you haven't defined -- perhaps you want him to answer both. I don't know.

MR. BRAATEN: Yeah. No. That's fair.

Q. (MR. BRAATEN CONTINUING) So let's confine my question to within -- in between -- vertically in between the confining layers as defined by the

188

application. So when I am talking about the reservoir for this question, it's in between the confining layers. And we'll call that the target reservoir.

**A.** Mm-hmm.

Q. Is it your position or belief that Summit's operations are confined to that part of the target reservoir containing actual $CO_2$ that was injected by Summit?

**A.** It's my understanding and belief that in our application we're requesting a permit to store $CO_2$ in that -- in this case the Broom Creek Formation and the confining layers above and below. If that's what you mean by operations is the storage of $CO_2$, then I would say yes.

Q. What else constitutes your operations other than the storage of $CO_2$ downhole from the well injectors?

**A.** So we have monitoring of various, you know, reservoir formations, monitoring equipment along the well, monitoring of the plume using 3D seismic, for example, and so those are all parts of what I would say the operations is the monitoring of the activities of the well which we're monitoring outside of the storage horizons.

189

Q. Why are you monitoring outside of the storage horizon?

**A.** To confirm -- confirm storage or permits, if you will.

Q. Are you monitoring anything other than the chemical makeup of the fluids in the reservoir, the target reservoir?

**A.** So we're going to get into that, you know, extensively in the monitoring plan, of course. You know, we're -- we're monitoring, you know, water quality at various horizons which will be identified in the monitoring plan. We are monitoring the plume movement over time, and that's covered in the monitoring plan as well.

Q. How do you monitor --

**A.** We're monitoring the -- or monitoring the wellbore and doing inspections on the wellbore, those kinds of things.

Q. How do you monitor the movement of the plume?

**A.** We're proposing again in our monitor plan, which we'll get into that in detail, but we're planning to monitor it incrementally using -- or periodically using 3D seismic as our current -- current proposal.

190

Q. Does any of your monitoring look at the pressures in the formation?

**A.** Yes. There is -- or there are pressure temperature sensors within the -- within the wellbore.

Q. Do you get data on temperature and pressure anywhere other than at the wellbore?

**A.** We will also get that in the deep subsurface monitoring wells, stratigraphic wells that are identified on -- what is it, PS-3 or 4.

Q. How many of those do you have?

**A.** We have three.

Q. Three stratigraphic -- stratigraphic test wells?

**A.** Well, monitoring wells, yeah.

Q. Okay. How many total monitors do you have for temperature and pressure within the reservoir?

**A.** So I'll defer that to the discussion on monitoring because I don't -- but we have them on the stratigraphic wells, as I mentioned, deep stratigraphic monitoring wells.

Q. Why are you monitoring the temperature and pressures in the reservoir?

**A.** Again, I'm going to defer to the -- to the team that presents the monitoring plan to give you

191

the specifics on the recommendations and why we're doing that.

Q. Do you know what the Safe Drinking Water Act says about where to place the boundaries for your storage facility?

**A.** I do not specifically.

Q. Do you think that the boundaries as defined by the Safe Drinking Water Act for the protection of freshwater aquifers is the same as the area within which you need to obtain property rights for your project?

**A.** Say that again.

Q. Do you believe that the area required to be used for a storage facility in the Safe Drinking Water Act is the same as the area within which you need to acquire property rights for your project?

**A.** I would say I don't specifically know that.

Q. Who would know that?

**A.** (BY MR. SKAARE) So if I can ask, are you asking if the Safe Water Drinking Act applies?

Q. No. I'm asking if the boundaries required by the Safe Drinking Water Act are the same as the boundary around the property rights that you needed to acquire for your project?

192

MR. BENDER: We have another witness that we're going to call who will be able to answer that question.

Q. (MR. BRAATEN CONTINUING) You guys don't know the answer?

**A.** I'm not sure I understand the question.

MR. BRAATEN: I have nothing further.

HEARING EXAMINER GARNER: Any questions from the staff?

**EXAMINATION**

**BY MS. MADCHE:**

Q. I'll jump in here first. Just as a preamble before I start asking my questions, because we are listening to these as combined cases for all three applications, if I ask a question and it applies to all three, by all means provide the answer for each individual one. I'll try to clarify if I think there's going to be a question that would be more consistent across all three or an individual question.

And to start out, my questions here I'm going to be talking about are within the Project Summary section of the three applications.

So in your Exhibit 2A through 2C that you had provided showing the business structure for the

193

three LLCs, I just want to have you clarify that when you have SCS Carbon Transport LLC listed as the flowline operator, that you are intending to mean that the three flowlines for these three facilities will be operated by SCS Carbon Transport LLC but the ownership will still be under the individual Summit Carbon Storage, LLCs; is that correct?

**A.** (BY MR. BOESHANS) That's correct.

Q. You currently stated that you have 57 ethanol plants with contracts on. Is it fair to state at this time all of those ethanol plants are currently emitting all of their $CO_2$ production that they make?

**A.** Yes, to the best of my knowledge.

Q. How many miles of MCE pipeline, the transmission pipeline, is within the PSC jurisdiction in North Dakota?

**A.** So there's -- okay. You're asking how many miles within the --

Q. Of the transmission pipeline, how many miles are in North Dakota that would be under PSC jurisdiction?

**A.** I'm going to defer to Jimmy on that question. My recollection is it's 352 miles, but,

194

again, that -- I want to make sure that we get the right number.

Q. On page PS-3 of all three applications, you report that the three storage facilities combined over a 20-year proposed injection period were modeled to be able to store approximately 352 million metric tons of carbon dioxide which would be on average around 17.6 million metric tons a year. Additionally, later on on that page you state that the Midwest Carbon Express, the MCE transmission pipeline, is being designed to transport 18 million metric tons a year. Can you provide approximately how many metric tons you currently have contracts for?

**A.** Yes. Couple of things there. The current design of the MCE pipeline system is 18 and a half million metric tons. With the 57 plants we have approximately 16 million tons -- or they emit approximately 16 million tons that could be captured.

Q. And as a follow-up to that, if you ended up getting to a point where you have contracts with a value that is up to what your current design is for the MCE pipeline, would you just be looking at additional storage facilities to be permitted to

195

take on the additional capacity?
**A.** That's correct.
MS. MADCHE: Those are the only questions I have for this group. Thank you.

**EXAMINATION**

**BY MR. STOLLDORF:**

Q. I'm going to talk a little bit about Section 1 of the pore space to start off with, and, again, some of these answers may relate to SCS2 and 3. Please answer for all of them if you can.
Within the proposed storage facility area shown, it's both Figure 1-1 on page 1-2, or it's Exhibit A, the tract map of the storage agreement. In relation to that, has any pore space been severed from the surface estate since April 9, 2009?
**A.** (BY MR. SKAARE) No.
Q. Is that the case for SCS2 and 3 -- 1, 2 and 3?
**A.** That is the case for all three units.
Q. Was any pore space leased from the surface owner prior to Summit leasing of the storage facility?
**A.** No, for all three units.
Q. Is the storage facility and proposed well

196

sites, testing and monitor equipment, flowline -- and flowline located on or proposed to be located on any Indian lands, historic or archeological sites?
**A.** (BY MR. BOESHANS) No.
Q. Okay. And is that for all of them?
**A.** Yes, for all three.
Q. Have you guys seen the written comments from the North Dakota State Historical Preservation Office that was sent on May 15, 2024?
**A.** (BY MR. SKAARE) I have.
Q. And do you intend to meet their requests?
**A.** We do.
Q. Will the development or operations of the storage facility affect hydrocarbons, coal reserves or any other potential mineral zones?
MR. BENDER: The next witness will handle that question.
Q. (MR. STOLLDORF CONTINUING) Okay. I will defer -- based on that answer, I will defer a couple questions and go to a couple of errors we found on the land descriptions.
**A.** Okay.
Q. The -- provided as part of the storage facility area, a document called the Unit Legal

197

Description for KJ Hintz, we'll need an amended copy. The errors are in Township 142 North, Range 85 West, Section 7. It's listed as all of this section is within the storage facility area. This instead appears to be the west half and the west half of the northeast quarter, the northwest quarter of the southeast quarter and the south half of the southeast quarter. Did you catch all that?
MR. BENDER: Do you have tract numbers?
MR. STOLLDORF: No, but we could pull them up.
Q. (MR. STOLLDORF CONTINUING) And then the second one is Township 142 North, Range 86 West, Section 25 where it states the east half of the northeast quarter. This instead appears to be the west half of the northeast quarter.
**A.** Understood.
Q. And that is all for that section. Oh, no. No. I've got a couple more.
MR. STOLLDORF: Did you find that tract?
MS. MADCHE: I'll keep looking.
MR. STOLLDORF: Okay.
Q. (MR. STOLLDORF CONTINUING) Now we'll move on to the storage agreement. And Article 1.1 defines carbon dioxide as including incidental

198

associated substances following the definition of carbon dioxide stream from North Dakota Administrative Code Chapter 43-05-01. In the pore space lease section, 3, royalty, page D-2, carbon dioxides -- $CO_2$ or carbon dioxides is called out.
Is -- the question is is payment based on the mass of the $CO_2$ component of the stream only or the full injection stream mass including incidental?
**A.** I believe it is on the full stream, but there is someone better able to answer that question.
Q. Okay. Can you briefly explain why you used the Milton Flemmer 1 as the type log in Article 1.15 for all three storage agreements?
MR. BENDER: We'll have another witness who can answer that question.
MR. STOLLDORF: Okay. I think that's -- sorry, I'm moving to a different question based on your answer.
Q. (MR. STOLLDORF CONTINUING) I'm going to move to Article 5, Tract Participations. In the storage agreement you indicate the tract participation is based a hundred percent upon the ratio of surface acreage within the facility area.

199

Can you explain the reasoning behind using land basis rather than pore volume?

**A.** Sure. We believe that using a tract basis provides an equitable method for compensating all landowners based upon the life of the project.

Q. In Article 8, you touched on some of these things earlier in cross-examination. Just a couple things I wanted to clarify. That this use of the -- the activities this is going to cover includes like the location of monitoring equipment for soil, gas, Fox Hills groundwater wells and also any seismic equipment or activity?

**A.** That is correct.

Q. Okay.

**A.** And for the Commission's understanding, we'll continue to work as we have with willing landowners for every opportunity.

MR. STOLLDORF: Okay. I think that's all I have for that section and you guys.

MS. MADCHE: So just to jump in, for the two corrections, the first one was in tract 23. The second one is tract 56.

MR. BENDER: Thank you for that.

200

**FURTHER EXAMINATION**

**BY MS. MADCHE:**

Q. And just one additional item in the storage agreement and the pore space lease agreement. There is a note, so in Article 1.15 you're currently defining the storage reservoir is including both the upper and lower confining zone in addition to the injection zone, and then in Article 3.6 where you talk about injection rights, it states, The storage operator is granted to inject into the storage reservoir any storage substances in whatever amounts the storage operator may deem necessary.

I just want to clarify, again, that the injection and storage of $CO_2$ should only occur within the injection zone and not within the confining zones.

**A.** (BY MR. BOESHANS) Yeah. Understood.

MS. MADCHE: Thank you.

**EXAMINATION**

**BY MR. SUGGS:**

Q. All right. I'll try to bat cleanup here. A couple of things. First, there were a number of items that were discussed through the surface use agreement and the lease attached to Exhibit D as

201

possible amendments to language within both. I guess at this time I'm going to ask that whatever that amended language is proposed to be, that it be worked up and submitted as a supplemental.

And that -- I've got a -- I don't know if it's a complete list, but there was a discussion on -- so in the surface agreement it would be 3.3, 2.4, 7.1, 10.2 and 8.1, and then I think 25 and 34 of Exhibit D is what I caught. I might have missed a couple.

**A.** (BY MR. SKAARE) Would you mind repeating that so I can cross-reference my notes?

Q. Okay. All right. So I had notes on 3.3 -- so surface agreement -- I'll start with surface agreement, 3.3, 2.4, 7.1, 10.2 and 8.1.

**A.** That matches.

Q. And then in the Exhibit D, I had Article 24 and 34?

**A.** That matches my notes.

Q. I'm also going to request -- the court reporter is currently working up a transcript. I'm going to request that the transcript be provided as a supplemental exhibit after the hearing.

Wade, specifically, there was a fair amount of discussion as to the economics and the

202

effect that this project would have on the North Dakota economy. And per your preamble in the project summary on PS-3, you indicate that the $CO_2$ storage is critical to both agriculture and energy industries in North Dakota. Is it your intent at this time that the Commission will make a determination with respect to 43-05-01-17 and the fees required for submission -- or for injection of $CO_2$ and whether or not those fees shall be charged pursuant to part A of that or part B, part A being they contribute to the North Dakota energy or agricultural economies, and part B, they don't? Is it your -- so the question is are you requesting that that determination be made as a part of this hearing?

**A.** (BY MR. BOESHANS) Yeah, our request is that the Commission make the determination on Summit's project part A or part B.

Q. And you understand that if the determination were to be that it did not contribute and was subject to 1B, that we would need a supplemental -- or not a supplemental -- subsequent hearing to determine what those fees should be set at?

**A.** I do understand that, yes.

203

Q. With respect to that request, I'm going to ask for another supplement of what you provided as Exhibit 3A identifying, I guess, each of the capture facilities that you have identified there and where their locations are. It's probably sufficient just to indicate which states they're in or just number them and give us the name so we can determine whether or not they're -- where exactly they are.

**A.** Understood.

Q. With respect to the cases on the docket for the establishment of the pool and field boundaries associated with these facilities, does -- does Summit have any opposition or any concern if the field boundaries are established as the facility area boundaries, and the storage reservoir or pool defined in those would be equivalent to the storage area as proposed in the surface use agreement?

**A.** No.

Q. I'm going to ask this here, though it may be appropriate for another witness. On your Figure 1-1, page 1-2, this is the map illustrating the pore space. Looking at Section 35 and 141-88, it would look like the plume boundary is almost

204

equivalent if not at the exact same point as the storage facility boundary. The line appears to be at the same spot.

**A.** So can you say the diagram you're looking at again?

Q. So Figure 1-1, it's on page 1-2 of the application.

**A.** Okay. Yes. I have it now.

Q. And, again, so Township 141, Range 88, Section 35, there's a little portion of the identified stabilized $CO_2$ plume extent that is at the same point as the storage facility area -- at the line that the storage facility area identifies. So it looks like there's no buffer there. Is that intentional or is that something that should be directed at another witness?

**A.** Yeah, we have another witness that can testify to the specifics, but there is a buffer there.

Q. Okay. Do you know what that buffer is?

**A.** We'll have another witness testify exactly the buffer.

Q. And would the other witness also be the person to direct the odd shape of the plume? So when I say "the odd shape of the plume," there's a

205

little carveout in the middle. It looks like no $CO_2$ is going to affect that central area.

**A.** Yes. I think we'll defer that to the next section here --

Q. Next group.

**A.** -- the geologic modeling and simulations, to answer that.

Q. Okay. There was a fair bit of discussion on Section 8 of the storage agreement. And I just want to point out that, I guess, there's -- Article 8.3 within -- within there indicates that the damages will be paid to any surface owners disturbed at the surface; is that correct?

**A.** (BY MR. SKAARE) That is correct.

Q. One minor typo in the surface use agreement, Article 15.1, I believe the title of that section should be bolded and underlined.

**A.** (BY MR. BOESHANS) Oh, Term?

Q. Yep. Single word.

Article 16.2 on page 15 of the storage agreement, I'm not a lawyer so I'm just looking for what this language means. The joinder and dual capacity language here, I don't really want to quote it at you -- I think you can read it yourself -- but what is the intent of that article

206

and specifically with respect to the "and any additional interest thereafter acquired" language?

MR. BENDER: Do you want me to take a crack at it?

MR. SUGGS: I don't care who answers it.

MR. BENDER: You don't have any objection?

MR. BRAATEN: No.

MR. BENDER: If there were a situation where the operator, Summit, who is the operator, and also owned an interest in the pore space, by executing the storage agreement, they'd be executing basically as both parties, both as an operator and as an owner of the pore space.

MR. SUGGS: So with that explanation, it would have nothing to do with anything that a landowner acquired after the point at which they executed?

MR. BENDER: I don't believe so. It would be -- it -- it would apply to a situation, though, if Summit were to sign this as a -- as a joint owner and then acquired additional surface interests, that surface interest would then be basically agreed upon with this language. If -- if that's something you -- I don't know that it's -- it's certainly not necessary in -- in this

207

agreement, so it's something that I can speak with my clients and see if we can't get it resolved.

MR. SUGGS: Okay. Add that to the list of supplemental language adjustments.

MR. BENDER: Okay.

MR. SUGGS: Okay. That's all I've got. Thank you.

**EXAMINATION**

**BY MR. BOHRER:**

Q. Just a couple quick questions, Jeff, on Exhibit 5A, if you go to page B-3. That would be as good as any.

**A.** (BY MR. SKAARE) And what page was that?

Q. B-3. On the very right column there's blank columns, and we'll look at tract number 8, in the life estate those columns are filled out all the way across, and then there's four blank ones there. What's the -- what's the meaning of that -- those interests or whatever they are with basically zero participation?

**A.** Sure. So as you look specifically on page B-3, tract number 8, JoAnne Skalsky owns a life estate. The -- the parties listed below her are the remaindermen such that upon her death, they gain the interest in the property.

208

Q. Okay.

**A.** And so we joined them in our pore space lease because they own a future interest.

Q. Okay. And then with your no surface facility, no surface occupancy discussion and any amendments that may take place with that, would it be your intent that that language would not preclude Summit from conducting future seismic operations?

**A.** That is correct. It is a no surface facilities.

MR. BOHRER: Thank you.

MR. SUGGS: Apologies, I do have two more things to address.

**FURTHER EXAMINATION**

**BY MR. SUGGS:**

Q. There was a fair bit of discussion about the NAICS code, the industrial codes. The provision in the rules, 43-05-01-07, it's part 3.c indicates that four standard industrial classification codes which best reflect the principal products or services provided by the facility shall be provided as part of the application. To date, the codes that have been provided for other facilities have listed either

209

the ethanol facility -- that have been related to the ethanol facility that was being used or the industrial entity as the source of the $CO_2$ in the case of DGC. I don't recall what it was, but it was related to the synfuels plant.

The code you provided would indicate it was pipeline related as the source of the $CO_2$ as far as the sequestration facilities were concerned. Do you have the code or do you know what it is or can you supply it for ethanol facilities as the source of the $CO_2$?

**A.** (BY MR. BOESHANS) We could supply it. I don't have it.

Q. We'll probably request that. If another witness doesn't have it available, we'll request that that probably be provided as well as the potential -- well, at this time you're not including the alternate source of the $CO_2$ as the --

MR. BENDER: Mr. Suggs, one of our witnesses is going to talk about Section 12 in the -- in the application. He would be the witness to address the question about the codes.

MR. SUGGS: Okay. That's fine. We'll -- we'll hit it there then.

Q. (MR. SUGGS CONTINUING) And then one --

210

one more, I guess, piece of clarification. When you were being questioned, Wade, regarding the model and what was submitted to the Commission, you indicated that the model had been submitted to the Commission, the whole model. Point of just clarification, what is submitted to the Commission is the numerical simulation in the GEM software which includes the model as it was imported from the geologic model that the EERC developed in Petre -- or Petrel. Sorry. So we don't have the whole geologic model. What we have is the version of it that comes in through the numerical simulation. So just a point of clarification on that testimony.

**A.** Yeah. That's my understanding as well, and certainly Amanda can testify on more specifics as needed related to what was submitted to the DMR in that regard.

MR. SUGGS: And that's all I've got. Thank you.

HEARING EXAMINER GARNER: Any redirect, Attorney Bender?

MR. BENDER: No redirect.

HEARING EXAMINER GARNER: Okay. Call your next witness.

211

MR. BENDER: Okay. We'll be calling Amanda Douglas and Caitlin Olsen.

HEARING EXAMINER GARNER: Okay. Ms. Douglas, please raise your right hand.

**AMANDA DOUGLAS,**

being first duly sworn, was examined and testified as follows:

**DIRECT EXAMINATION**

**BY MR. BENDER:**

Q. Amanda, state your full name for the record, please.

**A.** Amanda Jordan Douglas. I'd just like to note that I do go by Amanda Livers-Douglas, so you may hear that as well today.

Q. And, Amanda, by whom are you employed by?

**A.** The Energy & Environmental Research Center at the University of North Dakota.

Q. In what capacity?

**A.** So I'm an assistant director for integrated subsurface projects.

Q. Can you explain just very briefly what that title includes in terms of your role with EERC?

**A.** Yes. So I oversee and manage the collection of geophysical and geologic

212

characterization data. I also manage and serve as an advisor on commercial, carbon capture and storage development projects. I also oversee and manage a team of geoscientists, including ten geologic modelers.

Q. Okay. And I'd like you to highlight for us your educational background and work experience.

**A.** I have a bachelor's from -- in physics from Concordia College in Moorhead, Minnesota, and I have a master's in geology from the University of Kansas.

My work experience includes three years as a graduate research assistant at the Kansas Geological Survey where I worked on a professional seismic crew, and eight years of employment at the EERC.

Q. Amanda, what are some of your duties and responsibilities with respect to your employment with EERC generally and specifically with respect to the project that's before us today -- or projects?

**A.** So as previously stated, my roles at the EERC with respect to this project in particular, I oversaw the development of several sections of the storage facility permit application. I also

213

advised on data collection as well as geologic modeling and simulation.

Q. And it's my understanding that you had direct involvement in Sections 2 and 3 as well as Appendix C; is that correct?

**A.** That's correct.

Q. Okay. Let's turn your attention to Sections 2 and 3 of the application. Can you provide us with a brief overview of what your testimony will cover?

**A.** Yes. So I'll be providing a high-level overview of the key takeaways from Section 2, 3 and associated appendices which are Appendix A and C.

Q. Okay. And Wade provided us with sort of a high-level overview of the project. What I'd like you to do is provide the Commission with a more detailed overview of the project.

**A.** Okay.

Q. You'll do that?

**A.** Yeah.

Q. Okay. Let's start, how was the project area selected?

**A.** So as Wade previously testified to, there are several factors with respect to the technical considerations related to the suitability of the

214

geology for determining the site location.

Previous state and federal funded projects suggested that this region of North Dakota has suitable geology for $CO_2$ storage. Through this project, acquisition of site-specific data confirmed the viability of the subsurface geology for safe and permanent storage of $CO_2$.

Q. Can you explain for the Commission staff and opposing counsel why the Broom Creek Formation in this area is a good candidate for $CO_2$ storage?

**A.** Yes. So the Broom Creek in this area has sufficient thickness and porosity and permeability for the injection and storage of large volumes of $CO_2$. It's also at a depth at which $CO_2$ would stay in a super-critical state which is conducive for the efficient use of pore space.

I'd also like to point to figure 2.9 on page 2-16. So this is a map of the extent of the Broom Creek Formation in North Dakota showing that the Broom Creek is laterally extensive across this project site. The Broom Creek is also overlain by an upper confining zone that is devoid of transmissive faults and fractures with sufficient vertical extent and permeability to serve as fluid migration pathways, and that upper confining zone

215

is laterally continuous over the storage facility areas.

Q. Amanda, now I'd like you to discuss a bit the confining zones of the Broom Creek Formation. You explained for us why the Broom Creek Formation was selected from the standpoint of it being prevalent in the area. Can you now discuss for us the confining zones above and below the Broom Creek?

**A.** Yes. So the upper confining zone is considered to be all of the formations from the top of the Spearfish Formation down to the top of the Broom Creek Formation. And so I'd like to point you guys to page 2-19. So we're showing on Figure 2-11 a well log display, and I'd just like to point you to the upper confining zone which is labeled as the Opeche/Spearfish.

So this is log data from the Milton Flemmer 1 well, and so at the Milton Flemmer 1 well the upper confining zone consists of the Spearfish, Minnekahta and the Opeche. The Minnekahta is typically used to differentiate between the Spearfish and the Opeche. At the Milton Flemmer well, the Minnekahta is approximately 23 feet thick, but the Minnekahta pinches out. And so

216

that's why we'll refer to the upper confining zone here as the Opeche/Spearfish because in most places for this specific storage facility area and the other two storage facility areas, the Opeche/Spearfish is undifferentiated due to the absence of the Minnekahta.

Q. Now, what properties in the upper confining zone that you just discussed make it a good seal?

**A.** So the upper confining zone has a low permeability and porosity. It also has a high relative permeability -- or sorry -- a high capillary entry pressure relative to the injection zone. It is devoid, as I mentioned, of faults and fractures with sufficient permeability and vertical extent to act as a fluid migration pathway. And it's laterally extensive across the storage facility areas.

Q. And what data did you use to validate suitability of the storage complex for $CO_2$ injection and long-term storage?

**A.** So I'm going to point you to the two maps on page 2-5 and 2-6, which is Figure 2-3 and Figure 2-4. So these maps are showing the data used for our evaluation as well as the construction of the

217

geologic model. So this includes 2D and 3D seismic data. It includes site-specific well log, core, fluid sampling and formation testing data as well as regional logs, core, fluid samples and formation testing data.

Q. And, Amanda, what are the mechanisms for geologic confinement?

**A.** So initially as -- after the $CO_2$ is injected, it will be contained by the upper confining zone itself. So the $CO_2$ is a buoyant fluid and it will be contained under the effects of relative permeability.

So laterally the $CO_2$ will be contained via residual gas trapping, and as $CO_2$ dissolves in the formation brine, it'll be confined through solubility trapping. As mentioned after the -- as the $CO_2$ dissolves, the brine it dissolves into will become more dense and that will eventually sink lower in the Broom Creek Formation. And over a much longer period of time, hundreds of years, mineralization will start to occur and that will also become a trapping mechanism.

Q. Amanda, in your expert opinion, will geochemical interaction impact seal integrity or injectivity?

218

**A.** So, no, geochemical interactions of injected $CO_2$ with the upper confining zone will not impact the integrity of the confining zone. So we did an analysis using geochemical modeling. So the upper confining zones, as I mentioned, are low porosity and low permeability. We don't expect the $CO_2$ to have much interaction with the upper confining zone, but we wanted to look at an extreme case or a conservative case what would happen if the $CO_2$ did have interactions with the upper confining zone, would there be any adverse geochemical reactions that would impact the ability of the confining zone to contain the $CO_2$.

So what we did is we used a software called PHREEQC to do modeling of the upper confining zone. So the PHREEQC software doesn't -- it uses a transport mechanism of dispersion to allow $CO_2$ to flow through the model cells. It doesn't use permeability to dictate flow in the model. And so this is a conservative case where we're able to expose the model cells to that $CO_2$.

So to populate the model, we used site-specific geochemical analysis of fluids, of mineralogy from the core data and $CO_2$ composition. So it should be noted for the $CO_2$ composition we

219

also took a conservative approach where we modeled the $CO_2$ stream of 95 percent $CO_2$ and 2 percent oxygen. So this is more oxygen -- higher oxygen amount than is in the anticipated $CO_2$ stream, as Wade testified to earlier. We chose to use this composition for modeling as oxygen is known to be more reactive, and so we wanted to look at an extreme case.

And even in this extreme case where we're ignoring permeability, we're allowing $CO_2$ to contact the upper confining zone, we're using a $CO_2$ composition with higher $O_2$, the modeling demonstrated that action with the $CO_2$ to the upper confining zone would result in no adverse effects. So there is little to no porosity change due to precipitation or dissolution from the model.

Additionally -- sorry --

Q. No. You're fine.

**A.** Additionally, related to injection we also did geochemical modeling of the injection reservoir using CMG's GEM software where we simulated $CO_2$ injection into the reservoir, again using that 95 percent $CO_2$ and 2 percent oxygen case, and we saw, similarly, little to no effect on porosity due to precipitation or dissolution of minerals due to

220

the interaction of the $CO_2$, so we don't anticipate geochemical reactions will impact injectivity adversely.

Q. Okay. When the two previous witnesses were up here testifying, there were some questions about what sort of impact injection could have on underground sources of drinking water. In your -- in your expert opinion, will there be any adverse effects?

**A.** No. There will be no adverse effects on underground sources of drinking water. As I previously mentioned, the Broom Creek is overlain by a competent confining zone that is devoid of transmissive faults and fractures that could serve as fluid migration pathways.

I'd also like to note that above that primary confining zone there is approximately a thousand feet of additional low permeability rock that will contain the $CO_2$. In addition to that thousand feet, there is another 2,000-plus feet of impermeable rock below the lowest USDW which we're defining as the Fox Hills Formation.

Q. Now, you indicated that there was no evidence of fluid migration pathways. How did you determine an absence of fluid migration pathways?

221

**A.** So we looked at several data sets, including 3D seismic data. We looked at formation image logs in terms of fracture analysis. We also did fracture analysis of the whole core that was collected from the project. Additionally, we looked at fluid samples to evaluate if the Broom Creek Formation was hydraulically isolated from the next porous and permeable zone, which is the Inyan Kara Formation.

Q. Let's talk a little bit about seismicity. In your expert opinion, is there a risk that seismicity will interfere with the containment of the $CO_2$?

**A.** There is little risk that seismicity will interfere with containment of $CO_2$. So I'm referring to both naturally and induced seismicity. So there is a lack of historical earthquakes in North Dakota. So we've looked at historical earthquake data. Just one study in the permit that references this, a study done by Anderson and others in 2016, on page 2-69, Figure 2-44, shows -- the dots on this map reflect the historical earthquakes from the late 1800s to 2015, and there's fewer than 20 historical earthquakes during this time frame.

And so this can be attributed to the

222

general geologic stability of the formation. So in addition to this stability of the -- the region, we'll be operating the project under the fracture pressure gradient of the Broom Creek Formation which is also lower than the fracture pressure gradient of the upper confining zone which reduces risks of induced seismicity.

Q. Now, Commission staff had some questions of the past two witnesses about commercially valuable minerals. Do any of the three proposed storage facilities contain commercially valuable minerals?

**A.** Yes. So there is lignite coal reserves within each storage facility.

Q. And are there any oil-bearing formations or other hydrocarbon reserves located within the boundaries of the storage facilities?

**A.** So the North Dakota Geological Survey recognizes the Spearfish Formation as the only hydrocarbon-bearing formation above the Broom Creek Formation, and that is devoid of hydrocarbons in the project area. We also found no evidence of hydrocarbons in formations below the Broom Creek Formation or within the Broom Creek Formation.

We evaluated this through review of legacy

223

wellbores, existing oil and gas exploration studies, historical production data which are discussed in the permit, as well as evaluation of the mud logs for the three stratigraphic test wells.

Q. What if hydrocarbons were ultimately discovered within the storage facility area? Is there some way to develop those hydrocarbons?

**A.** Yes. So engineering controls could be used to produce hydrocarbons located below the injected $CO_2$ at each storage facility area. These may include, you know, increased mud weight to account for increased pressure in the reservoir due to injection. Also, you could potentially drill horizontally underneath the plume to produce any potential hydrocarbons that are discovered in the future.

Q. And directional as well; is that correct?

**A.** Yes.

Q. Okay. I don't know if you covered this so I'm going to go back to it just for a moment. I think you indicated that there were some reclaimed coal mines in the area. Are there any -- are there any plans to mine any coal that's in the area?

**A.** So there's a map on page 2-77. It's

224

Figure 2-51. So 2-51 is showing the future and reclaimed mining areas for the Coyote Creek and the Beulah Mine, so those are the two mines closest to the three storage facility areas. So within the storage facility areas themselves, there is no -- currently there's no future mining plans from either of these wells.

Additionally, operation of the storage facility area wouldn't preclude future production of the coal. And the areas where there's surface facilities for this project, there are no active coal leases that are known.

Q. And since the storage zone is quite a bit deeper than the coal in this area, is it a possibility of mining the coal even though you have a storage facility in place?

**A.** Yes.

Q. Okay. Let's -- let's switch now to Section 3 of the application. And can you briefly provide an explanation of which permit requirements are addressed in Section 3?

**A.** Yes. So Section 3 provides an overview of the geologic modeling and dynamic reservoir simulation activities that were conducted to define the vertical and lateral extents and migration of

225

injected $CO_2$ as well as the associated pressure front, the stabilized $CO_2$ plume and the area of review.

Q. And can you talk a little bit about the geologic modeling activities that were conducted with respect to these three applications?

**A.** So geologic modeling was conducted using industry standard methods and Petrel software. So this included the evaluation of geologic data, the construction of a structural framework and distribution of rock and petrophysical properties.

Q. How was the geologic model utilized to address the permit requirements?

**A.** The geologic model served as inputs for the dynamic reservoir simulations. So the dynamic reservoir simulations were done using industry standard methods and CMG software.

As mentioned, the dynamic reservoir simulations were conducted to determine the lateral and vertical extents of the injected $CO_2$ to define the project boundaries.

Q. And how was the area of review delineated?

**A.** The area of review was delineated using a risk-based approach developed by the EERC and published in Matt Burton-Kelly 2021.

226

Q. Amanda, before I get to the statutory questions, there were some questions about previously filed information that ultimately resulted in what I'm going to call the final form of the application. Can you just enlighten us as to when you started working on this project, when you started filing things with the Commission and give us a little bit of an idea of what you filed?

**A.** Previously or --

Q. Yeah.

**A.** -- the final form?

Q. Yeah.

**A.** So EERC was -- submitted a contract to Summit, I believe Wade mentioned, in early 2020. We began work on collecting the site-specific data. We helped prepare permit applications and we submitted draft permit applications to the DMR, I believe, late spring, early summer of 2023.

Q. And there was some discussion about some of the data that was submitted and the modeling that was done. Could you describe just a little bit of that and what was submitted to the Commission in terms of the data and providing the Commission an opportunity to review that data and do simulations?

227

**A.** Yep. So as requested by the DMR, we supplied all the shapefiles associated with the project. We also provided the geologic model in the form of the output that was used for dynamic reservoir simulations.

Q. And is it your understanding that all that information that was submitted to the Commission was available to the public?

**A.** Yes. And in addition to that, the -- the majority of the input data for the model is publicly available. A lot of the data -- or majority of the data used in the geologic model can be found on the NDIC's website which included, you know, core data, well logs, fluid sample analysis, as well as formation tests.

Q. Okay. Now, the statutory questions. In your opinion, Amanda, is the storage facility suitable and feasible for carbon dioxide injection and storage?

**A.** Yes. As I previously mentioned, the Broom Creek Formation has characteristics that are conducive for geologic storage of $CO_2$, including being overlain by a competent confining zone.

Q. And in your opinion is the carbon dioxide to be stored of a quality that allows it to be

228

safely and efficiently stored in the storage reservoir?

**A.** Yes. So we conducted geochemical modeling that demonstrated that the anticipated $CO_2$ stream will not have adverse geochemical interactions on the upper confining zone.

Q. And, in your opinion, will substances that compromise the integrity of the storage reservoir, will they not enter the storage reservoir?

**A.** Yes. So the anticipated $CO_2$ stream to be used for the project is not anticipated to have adverse impact due to geochemical interactions.

Q. Okay. And to get a conclusion from you with respect to some of the things you discussed having to do with minerals in the area, do the storage facilities contain commercially valuable minerals?

**A.** Yes. As previously mentioned, all three storage facilities contain lignite coal reserves.

Q. And as you testified previously, that doesn't prohibit that this storage facility or these storage facilities won't prohibit the mining of those -- of that coal if it's economically possible to do so; is that correct?

**A.** Yes. That's correct.

229

Q. Okay. In your opinion, will issuance of a storage facility permit adversely affect mineral owners or mineral lessees?

**A.** No. As previously stated, if there's hydrocarbon reserves discovered in the future, there is engineering controls and other methods for the extraction of those minerals.

Q. And, in your opinion, can the proposed storage facility be operated in a manner that will not adversely affect surface waters or formations containing fresh water?

**A.** Yes. So as mentioned, the storage formation is overlain by a competent upper confining zone that's devoid of transmissive faults and fractures with sufficient permeability and vertical extent that could act as a fluid migration pathway.

Q. And you touched on this in your testimony, but just a question to confirm. In your opinion, can the proposed storage facility be operated so that carbon dioxide will not escape from the storage reservoir?

**A.** Yes. As mentioned, it's -- the storage reservoir is overlain by a competent upper confining zone that is devoid of -- sorry -- devoid

230

of potential fluid migration pathways.

Q. And based on your study and review of the testimony and exhibits that you've testified here today and your knowledge of the project as a whole, in your expert opinion are the horizontal and vertical boundaries of the storage reservoir adequately defined and include buffer areas to ensure that the storage facility is operated safely?

**A.** Yes. So geologic modeling and dynamic reservoir simulations were used to define the vertical and horizontal boundaries of the storage facility area, and the storage facility area includes an appropriate buffer.

MR. BENDER: That's all the questions I have for this witness. We'd like to move to Caitlin Olsen, if we may.

HEARING EXAMINER GARNER: Ms. Olsen, please raise your right hand.

**CAITLIN OLSEN,**

being first duly sworn, was examined and testified as follows:

**DIRECT EXAMINATION**

**BY MR. BENDER:**

Q. Caitlin, can you state your full name for

231

the record, please?
**A.** Caitlin Olsen.
Q. And, Caitlin, by whom are you employed?
**A.** The Energy & Environmental Research Center.
Q. In what capacity?
**A.** I am a principal policy and regulatory strategist.
Q. And like Amanda did, what I'd like you to do is briefly highlight for us your educational background and work experience.
**A.** I graduated with a bachelor's of science degree in geology with an emphasis in hydrogeology from the University of Wisconsin, River Falls. I started work for the Department of Mineral Resources where I started as a petroleum engineer field inspector. I ended here with the Department of Mineral Resources as a production supervisor.

In 2022 -- I held those positions for eight years, and in 2022 I started working for the EERC where I -- my position was a senior regulatory and permitting specialist. My position today with the EERC is a principal policy and regulatory strategist.
Q. Caitlin, what I'd like you now to discuss

232

for us is what some of your duties and responsibility are with respect to your employment with the EERC generally and specifically with respect to the projects that are before the Commission today.
**A.** Sure. So generally I oversee commercial $CO_2$ storage projects and development of their permits. I also work in oil and gas regulations and provide policy advisement there. Specific to this storage facility permit, I oversaw the creation of the storage facility permit and compliance with regulations.
Q. Okay. So Amanda spent some time discussing Sections 2 and 3 in the application. Let me direct your attention to Section 4 of the applications. Can you briefly explain how the AOR was used to evaluate the region and to meet specific permit requirements?
**A.** Sure. The area of review, as you'll see on page 4-1, is defined as the region surrounding the geologic storage project where underground sources of drinking water may be endangered. The AOR in this case contains the storage facility area boundary, and that is based on the simulation extent of the stabilized plume. It includes a

233

one-mile buffer outside of the storage facility area to encompass the entire area of review.
Q. So can you direct your attention to the map in the application that depicts the AOR. And give everyone a little time to get there.
**A.** If you'll look at Figure 4-3, that map shows the area of review on the outside in purple. In farther is the storage facility area denoted as a black line. And in even farther is the stabilized $CO_2$ plume extent. Within this map, you'll see groundwater wells and one spring. You'll see the stratigraphic reservoir monitoring well, the Milton Flemmer 1. You'll see the two proposed injection wells. And if there were legacy oil and gas wells present, they would be shown here, but there are no legacy oil and gas wells present in this particular permit.
Q. So, Caitlin, after you identified the AOR, what type of evaluation was conducted by you and other staff members of EERC?
**A.** A review of data of public record was performed where -- for all wells within the storage facility area and the AOR itself, and included in that review was any wells that penetrate the overlying seal, the Opeche/Spearfish Formation and

234

any other wells that might exist in the area of review.
Q. So the first step of evaluating the AOR is you look for any wells that are drilled in the area; is that correct?
**A.** That's correct.
Q. Okay. And did you identify any wells?
**A.** We did. There's one particular well that -- only one well in this area of review that penetrates the upper confining seal, the Opeche/Spearfish Formation, and that well is described as the Milton Flemmer 1, which was drilled specifically for this project as a stratigraphic test well and as the monitoring well.

Figure 4-4 further explains the Milton Flemmer 1 and how it's constructed. So the Milton Flemmer 1, during this review process by a geologist and an engineer, was found to be properly isolated which prevents the migration of any fluids into USDWs, and a determination was made that no corrective action is needed for this well.
Q. Now, Caitlin, it's -- it's my understanding that a reevaluation of the AOR and corrective action plan period is proposed not to exceed five years. In your opinion, what would

235

trigger reevaluation prior to the five years and what sort of reevaluation would that address?

**A.** Yeah. So Summit will comply with North Dakota rules which is to reevaluate the storage facility area every five years. Any triggers prior to that five years where Summit would be required to reevaluate the area of review and storage facility area would be if monitoring operational data requires it or if there's a significant enough change found in the area of review that would warrant it.

Q. If there were significant changes, what would happen next, in your opinion?

**A.** Summit would update the model using history match data or the site-specific data that they found through injection activities. And then based on that updated model would work with the DMR to perform any corrective action if required or if needed.

Q. Now, in addition to the matters that were discussed by Amanda with respect to confining zones, what other information and data was used to assess protection of underground sources of drinking water within the AOR?

**A.** So aside from looking at the DMR database

236

for the Milton Flemmer 1 well and using Summit's own records -- alongside using Summit's records and DMR records for the Milton Flemmer 1 stratigraphic test well, other data sources were used. Those data sources to review these wells within the area of review include the USGS database, the U.S. Geological Survey database, the Public Service Commission and the Department of Water Resources.

Q. And did you examine freshwater zones?

**A.** We did.

Q. Can you explain to us what the lowest freshwater zone was that you examined?

**A.** So described on page 4-12, the lowest USDW in the AOR is the Fox Hills Formation, and together that comprises -- includes the Hell Creek Formation to comprise the confined aquifer system that includes both. The Fox Hills Formation in the AOR is about 1500 feet deep here and about 250 to 300 feet thick.

Q. Are there any Fox Hills wells in the AOR?

**A.** There is one Fox Hills well existing in the area of review. That's included in a map on the next page -- nope -- on Figure 4-10 on page 4-17. That well is included to be in the testing and monitoring plan during the life of the

237

Summit project and is included in the baseline testing and monitoring plan.

Q. So other than the Fox Hills, did you look at any other freshwater zones?

**A.** Yes. So Summit worked with landowners in the area to identify any other potential freshwater zones above the Fox Hills where testing could be performed. They ground-truthed the area based on the groundwater well maps that you'll see in Figure 4-3, and during those ground-truthing efforts and based on depth of wells, a final determination of the baseline testing and monitoring plan with respect to groundwater monitoring and the life of the injection project groundwater monitoring plan was determined, and the final wells to be included is shown on Figure 4-10.

Q. So other than what you've discussed so far, what additional protections are in place or will be in place for underground sources of drinking water?

**A.** There are multiple impermeable layers throughout the -- this area. So as Amanda testified to, directly above the Broom Creek is the Opeche/Spearfish Formation, and then directly below the Fox Hill Formation is the Pierre Shale which is

238

an impermeable shale that provides the -- the protection directly beneath the Fox Hills, and in between those two impermeable layers are multiple confining layers that provide protection to USDWs.

Q. Caitlin, in your expert opinion, can the storage facility be operated so that it will not endanger human health nor unduly endanger the environment?

**A.** Yes. Engineering safeguards are in place, and the site consists of ideal geologic confinement and geologic mechanisms that will protect human health and the environment from any $CO_2$ injection activity.

MR. BENDER: No further questions of Ms. Olsen.

HEARING EXAMINER GARNER: Mr. Braaten.

MR. BRAATEN: Thank you, Your Honor.

**CROSS-EXAMINATION**

**BY MR. BRAATEN:**

Q. Is there a lower porosity in the lower confining zone than the upper confining zone?

**A.** (BY MS. DOUGLAS) So Table 2-7b on page 2-32 contains ranges for permeability as well as averages from core analysis as well as the simulation model. With respect to the -- the

239

Amsden Formation, typically the Opeche/Spearfish, which is the upper confining zone, has lower permeability than the Amsden Formation, which is the lower confining zone.

Q. You discussed the Fox Hills freshwater aquifer. Is that the only freshwater aquifer that you studied with respect to the application?

**A.** No. As Caitlin mentioned, we identified several other freshwater aquifers in the project area. Additionally, I'll point you to Appendix B which includes some of the fluid sample analyses. So one of the other horizon samples listed on page B-1 includes the Tongue River.

Q. Do you have a depth for where that sample came from?

**A.** I don't have one in front of me at this time.

Q. Is -- do you know whether the Mission Canyon or Lodgepole or anything in the Minnelusa Group contains a freshwater aquifer within North Dakota, as defined by the Safe Drinking Water Act?

**A.** (BY MS. OLSEN) Are you asking if those are USDWs?

Q. Correct.

**A.** The lowermost USDW is the Fox Hills

240

Formation, so nothing below that would be considered a USDW.

Q. Based on the criteria in the Safe Drinking Water Act or just classification?

**A.** Yeah, based on -- I mean, specific -- what specifically in the Safe Water Drinking Act are you referring to?

Q. Does it -- does -- are these freshwater aquifers pursuant to the criteria for a U.S. drinking water in the Safe Drinking Water Act?

**A.** (BY MS. DOUGLAS) I can't speak to the entirety of the Williston Basin or North Dakota, but within the storage facility area, I do not believe that they are below 10,000 parts per million.

Q. How does the permeability of the Spearfish or the other impermeable zones compare to the Bakken or the Three Forks?

**A.** I don't have data from those formations on hand.

Q. Do you know how it compares generally, though?

MR. BENDER: Objection. Relevance.

HEARING EXAMINER GARNER: Overruled.

MS. DOUGLAS: I'd say it's comparable.

241

Q. (MR. BRAATEN CONTINUING) Did you take any water samples from any areas within the Minnelusa Group or the Madison Group?

**A.** We did not. I'm basing that answer on regional salinity maps.

Q. And based on regional salinity maps, those -- you're saying the total dissolved solids for those are above the thresholds in the Safe Drinking Water Act or below?

**A.** Above. So they're above 10,000 parts per million.

Q. Do you know what they are?

**A.** I don't have those maps on hand, no.

Q. Do you know if they're between 10 and 15 thousand?

**A.** I don't know that.

Q. Where would that information be contained?

**A.** Several of those maps can be found publicly available. I believe the North Dakota Geological Survey has published some of those online.

Q. Do you know whether -- well, do you know for certain whether the total dissolved solids in any of those -- in any of the water in those formations -- let me start over.

242

With respect to any waters in the Minnelusa Group or the Madison Group, do you know sitting here today that they are below 10,000 total dissolved solids?

**A.** I do not know that. We did not sample that as part of this data characterization plan regarding potential leakage pathways from the storage reservoir into those zones. The Amsden is also devoid of transmissive faults and fractures that have sufficient vertical extent of permeability for $CO_2$ to leak from the Amsden into lower formations.

Q. Would you make any suggestions on alternative ways to conduct operations here if you discovered that there was a U.S. drinking water and a freshwater aquifer under the Safe Drinking Water Act in the Minnelusa or Madison Group?

**A.** So for the operation we'd potentially want to add additional monitoring of those zones as well, but I don't believe the injection operations as a -- in my opinion, I would not recommend any changes to injection operations besides additional monitoring.

Q. And when you say you wouldn't recommend any changes to injection operations, are you

243

referring primarily to the injection pressures and the max pressure of injection?
**A.** Correct. And targeting the Broom Creek itself for injection.
Could you clarify your earlier question? You talked about the Madison Group. Did you also mention the Minnelusa Group?
Q. I did.
**A.** So the Broom Creek itself is within the Minnelusa Group, and so we've sampled that and it is over 10,000 parts per million.
Q. And that sample was from above the Amsden Formation?
**A.** Correct.
Q. So as part of developing this application, you ran a model in the Petrel software?
**A.** I personally did not, but the EERC team did, yes.
Q. Okay. And ran a model in the GEM software?
**A.** So I'd say we constructed the model in the Petrel software and then we used it to run dynamic reservoir simulations in CMG.
Q. And you also used the PHREEQC model for the geochemical interaction modeling?

244

**A.** That's correct.
Q. And did you submit the data decks for each of those three models to the oil and gas division?
**A.** So all of the data that was used is either described in the permit, was provided to the DMR, or is publicly available outside of the seismic data.
Q. Did you say that all of the data provided to the DMR is what is in the permit application? No. I misheard that.
Did you, EERC, provide the data decks for those three models to the oil and gas division?
**A.** Can you define "data decks"?
Q. What do you understand a data deck to be?
**A.** So the -- the raw data we use is publicly available. Any assumptions used have been detailed in the permit. It -- for example, geochemical modeling, we list the mineralogy from the specific sample that was used. We listed the $CO_2$ composition. We listed the -- some of the additional other input data, including -- just one second -- including parameters such as exposure level and things like that.
So we believe that in the case of geochemical modeling, they would have all the

245

information they would need to evaluate or replicate the modeling.
Q. You say they would have the data they need to replicate the modeling. Who's "they"?
**A.** The DMR. In the case of the geochemical modeling, all the information is publicly available, so anyone could potentially replicate these results.
Q. Is your education and professional background in geology or engineering or both?
**A.** So I have a master's in geology with an emphasis in geophysics, and I have a bachelor's in physics.
Q. Okay. Do you ever talk to coworkers and other colleagues about the models that we just discussed?
**A.** That's correct. So as I mentioned earlier, I actually oversee the EERC's geologic modeling team.
Q. And have you ever heard someone at EERC use the phrase "data deck"?
**A.** No, we don't use that term.
Q. Have you ever heard anyone doing petroleum reservoir engineering use the term "data deck"?
**A.** The term's familiar.

246

Q. Do you know what a data deck is?
**A.** I think the definition's subjective.
Q. Is the well testing data that you used to tune and develop the permeability model publicly available?
**A.** The well testing data from the Milton Flemmer 1 well is publicly available on the NDIC website, yes.
Q. The .DAT file?
**A.** I'm uncertain of the format that's online.
Q. What would you do with a PDF file with that information? It's not really usable; right?
**A.** Depending if it's in tabular or table format or if it's graphical.
HEARING EXAMINER GARNER: You know, now's a good time to take our last ten-minute break and then we'll come back and finish up.
(Recessed at 5:11 p.m. and reconvened at 5:23 p.m.)
HEARING EXAMINER GARNER: We are back on the record. Mr. Braaten, you were questioning Summit's witnesses.
MR. BRAATEN: Thank you, Your Honor.
Q. (MR. BRAATEN CONTINUING) You said that the data to run the geologic model is publicly

247

available; right?
**A.** (BY MS. DOUGLAS) Everything except the 3D seismic and interpretative volumes from the 3D seismic.
Q. Can you do it without the 3D seismic?
**A.** Can we replicate the exact model?
Q. Yeah.
**A.** No. Actually let me correct that. So based on what's in the permit, yes, because with the 3D seismic, we used the seismic to interpret variograms, and the variograms links interpreted from the seismic were listed here. The -- the one thing you might not be able to replicate is that we used interpreted seismic horizons from the seismic data for the structural model. So that would be not duplicatable without the 3D seismic.
Q. If you were asked to analyze the models that you created here, as a third party and given the data you're saying is publicly available but knowing nothing about the project going in, how long would it take you by yourself to replicate these models by going through all of the publicly available data and reconstructing it, collating it, organizing it, choosing it, picking your tops? How long would it take you to recreate that model?

248

**A.** Typically our modeling workflow for a model of this size and scale with this amount of data would be approximately six to eight weeks to go through that process. Keeping in mind with the formation tops, there are publicly available formation tops out there. It's a matter of QC'ing them.
Q. Is that what you did?
**A.** Yes.
Q. But you chose the formation tops used in your model; right?
**A.** So we went through the publicly available ones and quality controlled them.
Q. How did you do that?
**A.** So our method is based on core analysis. So we also looked at core analysis to determine where we thought the top of the Broom Creek was, and so we've reported in the permit how we picked the top of the Broom Creek. So if someone wanted to pick how we picked it, we report where we pick it on gamma ray log signatures. That's -- that's in the permit. And so we evaluate whether the publicly available picks match that specific signature in the logs to determine if we're going to use that top or adjust it.

249

Q. Without the impedance data, you could not recreate the model to the same degree of accuracy as you did; right?
**A.** The models would be different.
Q. And you said if you had to start from scratch knowing nothing, you think you could get it done in -- was it six to eight weeks?
**A.** Six to eight weeks with the -- with what's published in the permit and the publicly available data. I think what's published in the permit provides a lot of time savings.
Q. And is that time estimate for you and your team to do that?
**A.** If we were to replicate this with all the things in the permit, it would be significantly quicker.
Q. Meaning it would be quicker if you had your whole team doing it?
**A.** No. Quicker if we're replicating using assumptions, using the variogram links that we report and stuff like that because we're not interpreting the data to come up with new variogram links. So if we wanted to replicate the model using the -- the permit -- what's in the permit and the publicly available data, it -- it'd be

250

considerably faster than six to eight weeks.
Q. And, again, is that for you and your team to do that?
**A.** That would be for one or two individuals, correct.
Q. Working full-time?
**A.** Yes.
Q. All day, every day?
**A.** Eight hours a day.
Q. If we didn't have the impedance data, how would the model be different?
**A.** So as I mentioned, the main difference would be the structural surfaces. So your structural surfaces would be confined with your well control, so there would be slight variations on the structure of the formations. Petrophysical property distribution might be slightly different as well.
Q. Different meaning less accurate?
**A.** Is -- is your -- so --
Q. It results in a less predictive model?
MR. BENDER: Which question do you want her to answer, Derrick?
MR. BRAATEN: Well, I was clarifying my prior one.

251

MR. BENDER: Okay.
MS. DOUGLAS: So I'd say the models are different. I think it's subjective how you define model accuracy.
Q. (MR. BRAATEN CONTINUING) But if we define it as how predictive it is, it would be less predictive if we didn't have the impedance data?
**A.** It would have potentially less detail in it.
Q. Are you familiar with the PHREEQCi input files?
**A.** Generally.
Q. Did you create one for the PHREEQC model you ran here?
**A.** Yes, an input file was generated.
Q. And did you give that to the oil and gas division?
**A.** No.
Q. Why not?
**A.** The DMR staff did not request it directly.
Q. Did you submit that to the EPA's portal?
**A.** What EPA portal are you referring to? The --
Q. Did you file it with the EPA?
**A.** No.

252

Q. Did you have some kind of an input file that was created for the other two models?
**A.** The other two models being the geochemical model for GEM and the geologic model?
Q. Correct.
**A.** Those models use multiple sources of input data, so it's not a specific input file.
Q. It's a data deck?
**A.** You could confine it as a data deck.
Q. Do you have a data package that contains all of the input files in one zip file or something similar that can then be used as a load file with the software programs?
**A.** Yes. The Petrel project itself can be saved as a file. One thing to note about that, while all the data is publicly available, that Petrel file, as it is now, does contain some digitized well logs that were purchased from a data broker and are deemed confidential under a license agreement. So that would have to be -- those specific digitized logs would have to be stripped from that Petrel project.
Q. Or simply paid for by someone else to get a license? Why do you say they would have to be stripped? For what purpose would you strip them from the package?
**A.** They're governed by a specific license agreement, so I don't have those terms available now. But there are potential ways that someone else could purchase those digitized logs for those specific wells.
Q. And if they had a license, you could give your copy to them?
**A.** Again, I'm not sure the specific license terms for the logs in question.
Q. Are you aware of the GEM model having a single file called -- with a file extension .DAT that you can use to run a model on the program?
**A.** Correct.
Q. Do you have one of those .DAT files that would allow us to run the model you ran in that program?
**A.** For the $CO_2$ simulations or the geochemical simulations?
Q. $CO_2$ simulation.
**A.** Yes, I believe that was provided to the Commission already.
Q. And that could just be taken and loaded into the GEM program to run the model that you ran?
**A.** That's my understanding, yes.

253

254

Q. Any idea why Summit won't provide that to the intervenors?
**A.** I believe it was already provided to the DMR so it's publicly available.
Q. Any idea why the DMR would refuse to provide that to the intervenors?
**A.** I can't speak to that.
Q. Did EERC in your -- to your knowledge tell the DMR not to provide those files to the intervenors?
**A.** Not the specific files we provided to DMR, no.
Q. Did the EERC tell the DMR not to provide anything to the intervenors?
**A.** No.
Q. Okay. Did the EERC tell the DMR not to disclose any information that it was providing to the DMR?
**A.** No.
Q. And there is a .DAT file that can be used to run that GEM model for the $CO_2$ dispersion that was provided to the DMR? That's your testimony?
**A.** That is my understanding, yes.
Q. I'm going to have you turn to Exhibit 1A, which was a copy of the application we were using.

255

**A.** What page?
Q. Can I have you turn to page 3-15?
**A.** I'm there.
Q. Can I have you just review the first full paragraph I think that starts, "The simulation model permeability."
**A.** I've reviewed it.
Q. Can you explain what you did when you say that the simulation model permeability was tuned globally by applying a permeability multiplier to match the reservoir properties estimated from the well-testing data on the Milton Flemmer?
**A.** Yep. So the injection test from the Milton Flemmer 1 well resulted in an estimation of permeability for the Broom Creek Formation, so that permeability was significantly higher than the permeability determined through well log interpretation core analysis. So based on those results, a 2.5 X multiplier was applied to the permeability of the model globally.
Q. And is 2.5 essentially the delta between what you had in your model and what you saw in the Milton Flemmer, or does that represent the delta?
**A.** Yes. I believe the injection well data suggested slightly higher. We thought 2.5 was

256

reasonable.
Q. Does that affect your ultimate injection pressure limit?
**A.** Permeability is a factor that could impact predicted pressure. Yes.
Q. Would you describe the permeability in these storage facilities in the Broom Creek as heterogenous or homogenous?
MS. DOUGLAS: Could you repeat the question?
(Record read as requested.)
MS. DOUGLAS: They're heterogenous.
Q. (MR. BRAATEN CONTINUING) Did you consider looking for a heterogenous cause rather than applying a multiplier across the entire reservoir?
**A.** So the model already represented heterogenous distribution of permeability as distributed by the well log controls, the -- from seismic data as well as the variograms used to distribute properties, so applying the 2.5 multiplier would increase -- or it would increase the -- the permeability for the full range of permeabilities.
And so a single multiplier was applied as we felt, you know, the -- that test covers a large

257

area as determined by the radius of investigation. And so the response of the reservoir to determine permeability we felt is representative of the response that we're going to encounter during operations.
Q. But even taking all that, it's possible that what you saw there was simply the result of heterogenous permeability and it didn't require an adjustment to the model at all; right?
**A.** That's a possibility. There have also been previous studies that have published results from injection tests that have also seen similarly higher permeability as determined by injection tests. So in our technical opinion and experience with the Broom Creek Formation, we felt 2.5 was adequate to apply.
Q. Those other studies that did the injection tests, were those done in oil fields?
**A.** No. The other study I'm referring to is the injection test published in the Tundra SGS storage facility permits.
Q. Did you try running the adjustment on models for each of the facilities individually versus across the entire reservoir?
**A.** No. The way we set up the model, we

258

didn't have an indicator that would allow us to multiply permeabilities for individual regions.
Q. The simulation model permeability that you had to begin with, was that based on the core logs?
**A.** It was based on evaluation of several well logs, site-specific core analysis, as well as regional core data. It was also informed from rock properties derived from inversion of the 3D seismic data.
Q. And you changed all that based on one injection well test?
**A.** Yes.
Q. Can I have you go to page 3-7 and Figure 3-4?
**A.** I'm there.
Q. Can you describe what we're looking at in this Figure 3-4?
**A.** So this is an aerial view for one layer of the simulation model showing the permeability within the Broom Creek.
Q. And can you explain the units being used in the legend with the various colors on the right and the numbers indicating which color is which number?
**A.** Yeah. So permeability is being displayed

259

here in millidarcies.
Q. Are these pre or post application of multiplier?
**A.** Post application.
Q. I'm sorry. You said post application?
**A.** Mm-hmm. Yep. So the 2.5 permeability multiplier is already applied, and then it's hard to view at this scale but -- so the top there we're looking at is 5,000 millidarcies. That's a decimal place.
Q. Does that map look like a reasonable range in distribution of millidarcies?
**A.** Yes. So one thing that should be noted about the Broom Creek and one thing that supports the use of applying a permeability multiplier is the fact that the Broom Creek contains several unconsolidated sands, so these are poorly cemented sands with extremely high porosity and permeability. Because of the unconsolidated nature of the sands, we're unable to perform core analysis in them.
And so the geologic model that's based on the well log data, the core analysis and the seismic is -- typically underpredicts the permeability because we aren't able to capture data

260

from these unconsolidated sands. And so that's one of the reasons that we believe applying the 2.5 permeability multiplier is reasonable in this case.
Q. What was the max perm you observed in the cores?
**A.** So on page 2-24, Table 2-6 has the range of permeabilities from core analysis. So permeability for the high range is 2,700 millidarcies.
Q. Sorry. I'm just finding it. Did you say 2,700?
**A.** Yep. So --
Q. Oh, I see. Got it.
So your model has 10 to 20 percent at what appears to be 5,000 millidarcies. Does that seem reasonable?
**A.** Given the unconsolidated nature of the Broom Creek, yes. One thing to be noted, I gave you the max range for the TB Leingang permit. The other permits have slightly different data sets, some of which are higher from the core data for those specific stratigraphic test wells.
Q. Higher perm?
**A.** Higher permeability. So if I can point you to Exhibit -- the Fischer storage facility

261

permit, similar on page 2-24, Table 2-6. The maximum permeability from the core analysis for the Archie Erickson well is over 3,700 millidarcies.
Q. When you say the 2.5 multiplier, are you literally saying that you're increasing the perm across the entire reservoir by two and a half times?
**A.** Correct.
Q. Based on one injection test?
**A.** Correct. So, again, on our years of experience studying the -- the Broom Creek in multiple forms with core log analysis, well log analysis -- sorry -- core analysis, well log analysis, seismic interpretation, we believe that's reasonable. One thing that should be noted, you know, we felt confident in using that value from this test. We will be using actual operational data to validate our model every five years as part of the reevaluation.
Q. Does an overall increase in the modeled permeability across the reservoir allow you in the end to inject higher -- at higher pressures thus resulting in the ability to inject more $CO_2$ into the ground?
**A.** So the pressure you can inject at is

262

constrained by 90 percent of the fracture pressure gradient, so you can't inject higher than that. If you had higher permeability, you would be able -- you'd likely be able to inject higher volumes of $CO_2$ before reaching that.
Q. Okay. Can I have you go to page 2-18 and Figure -- sorry, I mean 2-19.
**A.** I'm there.
Q. Okay. You have an isopach map indicated on the prior page and the well log of the formation. Other than this data, did you do any kind of research or study of the depositional environments for the formation?
**A.** Yes.
Q. And what did you do?
**A.** So the EERC has studied the Broom Creek way back into the early 2000s, so we produced a formation outline in the Broom Creek. Regarding the depositional environment, the gold standard published study on that is a thesis by an author named Rygh that details the depositional environment. EERC has been a part of projects that have drilled and collected core from numerous wells, Broom Creek core, and our evaluation of those core data as well as the 3D seismic confirmed

263

Rygh's interpretation of the depositional environment.

Q. Was Rygh looking at certain rock types?

**A.** Offhand, I can't recall. You know, his thesis focused on the depositional environment and he also looked at type logs through those means. Yes, he would have looked at rock types.

Q. Eolian sand dunes and interbedded marine and lacustrine limestones, are those part of the depositional environment in the Broom Creek?

**A.** Are you referring to a specific paragraph or page from the formation -- or from the -- sorry -- from the permit?

Q. No. I'm asking if those are depositional -- if those are rock types in the depositional environment studied by Rygh.

**A.** I don't believe that there is limestone within the Broom Creek. I know he describes it eolian dunes as well as interbedded carbonates which consist mostly of dolostone as well as anhydrite.

Q. Did you put a description of the depositional environment into the application?

**A.** Yes. It can be found on page 2-16 in the second sentence under -- in the text at the top.

264

We talk about how the formation comprises of interbedded eolian/nearshore marine sandstone and dolostone layers with minor amounts of siltstones and anhydrites.

Q. How did your analysis of the depositional environment affect your analysis of the variability of the permeability across the reservoir?

**A.** So I'll speak to -- interpret depositional environment which is -- can be prevalently seen on the 3D seismic with attribute analysis. From the 3D seismic, you can actually see dune forms. You can also see indication of interbedded carbonates and anhydrites in that.

Through evaluation of -- of the 3D seismic as well as correlation to well logs in the area analysis of that core, we have an understanding of the lateral distribution of the different lithologies within the Broom Creek, particularly as I mentioned those unconsolidated sands. The Broom Creek sands come in several different forms. We have those very unconsolidated sands. We also have high-angle crossbedded sandstones and things like that.

So all those data sets gave us a better understanding of the heterogeneity in the

265

reservoir; the depositional environment; how those different reservoir lithologies, particularly the sands, were distributed across the area; and what was reasonable and prudent in terms of applying for rock and petrophysic properties as well as the multiplier.

Q. Are you familiar with the Broom Creek Formation in Wyoming?

**A.** I am not.

Q. Okay. Are you familiar with how wind direction can influence deposition and produce sand dunes elongated in one direction?

**A.** Yes, I am.

Q. And have you seen that phenomenon in the Broom Creek in North Dakota?

**A.** Yes, we have. As inferred, we can see that orientation in the 3D seismic data, and that orientation was accounted for with using the acoustic impedance derived from the seismic data for variograms which are used to distribute properties in the model.

Q. How useful would your model be if you did not account for the deposition that we just discussed?

**A.** Define "useful."

266

Q. Would it have had utility to create the application for Summit for this proceeding?

**A.** Yes. So there are multiple ways to create geologic models. The EPA has a guidance document out there where they suggest modeling best practices. Some modeling best practices also include recommendations for simplified models. That might just include well log data. So even simple models can have utilities to define storage -- or define vertical and horizontal boundaries. Uncertainties with those different types of models need to be accounted for when determining appropriate buffers and things of that nature.

Q. Can I have you turn back to page 3-7 and specifically the Figure 3-4?

**A.** I'm there.

Q. Would you expect a map showing the range of permeability of the formation to reflect the deposition of the elongated sand dunes in the Broom Creek that we just discussed?

**A.** Yeah. So to -- one comment to make about that is some of these dunes are reworked. So while we can see elongated dunes, if you're looking at a particular slice, there might be difference in

267

cementation of the sands and things like that. As being a part of the team that interpreted the 3D seismic, I can tell you that the elongated dunes more orientated northeast to the southwest. And based on that orientation, to my trained eye, I can see that reflected here on Figure 3-4.

Q. But only because you had access to that seismic data and the 3D modeling that was done with it?

**A.** Correct.

Q. How would we replicate the permeability distribution without the 3D seismic and the attribute analysis?

**A.** So if you turn to page 3-2, Section 3.2.3 talks about the variograms derived from the 3D seismic data. These variograms are what were used to distribute properties. So the only difference in a model made without using acoustic impedance derived from the seismic is that you wouldn't have that as a control point.

Q. What would you do without the control point?

**A.** You would still have the log data and the variograms to distribute properties.

Q. In 3.2.3.2 it states, "Seismic data were

268

resampled to the geologic model grid."

Can you explain what that means?

**A.** Yes. The seismic data were sampled at intervals related to the bin spacing, which I believe were on the order of 80 to 120 feet in this case. So we have a data point from each one of those bins, and so the seismic data from those bins had to be upscaled to the modeled grid cell size.

Q. And if we use the variograms, we wouldn't be able to double-check your interpretations of the 3D seismic; right?

**A.** Correct.

Q. I'll have you go to page 3-4. My electronic copy is marked at least a little weird, but --

**A.** I'm there.

Q. Let me start by having you just describe what we're looking at here.

**A.** On page 3-4 we're looking at Figure 3-1. Is that what you're looking at; correct?

Q. Yes.

**A.** So this is a west-east cross-section of the geologic model showing the PHIE property from the model that was used to distribute permeability through the model.

269

Q. Are you able to look at this picture and find something that you would interpret to be undulating sand dunes?

**A.** So the high porosity zones in yellow and red represent those reservoir sands. The dunes here in the Broom Creek is a dune complex where there is deposition of sediments and formation of the dunes. When sea level rose, there was reworking of the dunes. When sea level fell, there is again deposition and reworking of -- deposition sediments, reworking of -- of the sands to form dune complexes. So it's a stacked dune complex.

Interpretation from a cross-section alone makes it difficult to interpret the dune complex. That's why a plainer view would be required to interpret dune complexes with more certainty.

Q. Is there anything you see on Figure 3-1 that would be an indication to you of those types of undulating sand dunes?

**A.** Yes. Again, based on my involvement and experience with interpretation of the larger data set, my trained eye can -- can pick out the dune forms or the stacked dune complexes.

Q. Based on the knowledge and information you have from reviewing the seismic data?

270

**A.** Correct.

Q. What were the actual test results from the injection well that you used to make the adjustment to the model on the permeability?

**A.** The results from the injection tests were a calculated permeability.

Q. Calculated from what data derived from the injection test?

**A.** I'll defer that question to a later witness.

Q. Do you know where in the application it's referenced?

**A.** Outside of the paragraph you previously had me review about the 2.5 X multiplier, I do not believe that test is discussed in terms of interpretation.

Q. Okay. I apologize. I needed to find my place here. But back on 3-15, that paragraph I referred to earlier, it says, "The permeability multiplier was calculated based on the area of study during the injectivity test, the radius of investigation, and the permeability thickness (transmissibility) values from the pressure transient analysis."

Were you involved in determining or

271

assessing the area of study during the injectivity test?
**A.** I was not, but we have a witness coming up that was involved with this testing.
Q. And were you involved in determining the radius of investigation?
**A.** I was not involved in interpretation of the well test results.
Q. Okay. And I don't know what this means so I don't know if it's that, but were you involved in permeability thickness (transmissibility) values from the pressure transient analysis?
**A.** No.
Q. Okay. Were you involved in deciding on whether or not the global multiplier should be the number 2.5?
**A.** Yes.
Q. Okay. What data did you review in order to assess what that number should be, in your opinion?
**A.** Results of the well tests were presented to me. I've also been involved or aware of previous studies with similar injection tests as previously discussed, as well as knowledge, again, of the Broom Creek and the other data sets that

272

support use of a permeability multiplier.
Q. And the studies you reference is just the one well in Project Tundra when that was done?
**A.** Correct.
Q. And when you say you were given the results of the injection well test, does that -- I don't know if I got that right. Is that right?
**A.** I was presented the results by subject matter experts.
Q. Okay. And, generally speaking, what did they present to you as the results?
**A.** What's listed in the paragraph. Their interpretation from the injection tests of those different parameters, including radius of investigation, permeability thickness and such.
Q. And how did you use those, then, to determine a multiplier of 2.5?
**A.** So the -- the permeability -- the summary of those results was the -- the permeability was higher, on the order of 2.7 or so times higher than permeability from some of the laboratory analysis.
Q. Are you aware of what a calculated KH was?
**A.** I don't recall at this time.
Q. Were you given that number at some point?
**A.** I -- I don't recall at this time. I know

273

we've looked at KH in terms of -- of the model. I was given the permeability thickness.
Q. And what was that?
**A.** I don't recall at this time.
Q. Do you have the time height?
**A.** I don't have the test results in front of me.
Q. Okay. But were you given those -- that information?
**A.** I don't recall specifically, but I believe that information is in the well testing report that's on the NDIC website.
Q. All of the information included the -- including the calculated KH is all on the NDIC website?
**A.** I would have to review it. I can't speak to that level of specifics.
Q. And can you explain -- you've said that it was -- the difference in the perm was calculated at 2.7 and you went with 2.5. Can you explain why? And actually let me back up.
The number calculated from the injection test was 2.7; right?
**A.** On the order -- approximately. I don't recall the exact value.

274

Q. Okay. And you decided to go with a multiplier of 2.5. Why use 2.5 instead of the actual value?
**A.** We felt it was a conservative assumption.
Q. Why do you describe it with the word "conservative"? How is it conservative?
**A.** It's lower than the -- the test results reflected.
Q. Is there any reason to assume it's more likely that the perm is lower than the test result than higher?
**A.** So I don't think we have data that would indicate which is the appropriate choice to go, higher or lower. We chose 2.5 based on our knowledge of the Broom Creek. We believe that was a conservative estimate to use in the model. As we discussed previously, higher permeability might result in higher volume of $CO_2$ but also potential higher pressure. So using the more conservative, going on a lesser number, helps ensure that we're not overestimating $CO_2$ plume size.
Q. And are you being conservative because you're concerned about the risk of having that number be 2.7 -- having a delta of 2.7 between the injection test and your modeled perm?

275

**A.** There's -- there's not a concern with using the exact value. We wanted to be conservative in what we chose in terms of how we defined the horizontal and the vertical boundaries.

Q. But isn't the actual data the best data that you have?

**A.** I -- again, it's not the only data set we have.

Q. Okay. So you're putting less weight on the data derived from the injection well test than from the projected permeability from the other data you've used?

**A.** Not less weight. We just chose to choose a conservative value.

Q. But when you say the word "conservative," why is it more conservative to go to 2.5 from 2.7 rather than going to 2.9 from 2.7?

**A.** Can you repeat the last part of the question?

Q. Well, when you say that you were choosing 2.5 rather than 2.7 because you're being conservative, I'm asking why it's conservative to adjust down to 2.5 versus adjusting up to 2.9. Why is that conservative?

**A.** Again, as you mentioned, this is a single

276

test and it was -- this permeability multiplier applied to the model which the model was used to define the storage facility boundaries. In then the development of the project, we felt it was prudent not to overpredict the plume size if the reservoir doesn't act like that. Then we've permitted an area much larger than would be needed.

HEARING EXAMINER GARNER: Okay. I think this is a good place to stop. We will resume tomorrow morning at 9 a.m. So that will, I guess, conclude our hearings for the day. Off the record at 6:30 p.m.

(Recessed at 6:30 p.m., Tuesday, the 11th day of June, 2024.)

## #

**#3** [2] - 8:16, 62:23

## $

**$20** [1] - 162:5
**$25** [3] - 162:8, 162:15, 166:4

## '

**'21** [1] - 165:5
**'23** [2] - 86:19, 153:11
**'24** [2] - 86:19, 153:11
**'C'** [1] - 134:8

## 0

**0.40754336** [1] - 135:22
**00135848** [1] - 137:12

## 1

**1** [77] - 1:4, 1:8, 1:12, 1:15, 1:19, 1:21, 2:1, 2:6, 2:10, 2:14, 2:21, 3:1, 3:4, 3:12, 3:16, 4:1, 4:5, 4:14, 4:18, 4:23, 5:4, 5:15, 5:16, 6:4, 6:5, 6:17, 6:18, 7:4, 7:5, 7:16, 8:14, 13:24, 14:6, 14:13, 14:22, 15:3, 15:7, 16:12, 16:17, 17:25, 18:1, 23:14, 25:1, 25:18, 26:8, 37:10, 49:9, 62:5, 62:8, 62:11, 62:22, 81:18, 82:19, 134:21, 135:2, 135:5, 135:10, 135:20, 135:24, 136:8, 136:15, 136:22, 136:24, 138:6, 195:8, 195:18, 198:14, 215:19, 233:13, 234:12, 234:16, 234:17, 236:1, 236:3, 246:7, 255:14
**1-1** [3] - 195:12, 203:23, 204:6
**1-2** [3] - 195:12, 203:23, 204:6
**1-billion-gallon** [1] - 65:8
**1.1** [1] - 197:24
**1.10** [3] - 118:1, 121:16, 122:8
**1.15** [3] - 145:8, 198:15, 200:5
**1.16** [2] - 145:16, 146:3
**1.7** [1] - 29:18
**10** [18] - 1:10, 1:23, 2:12, 2:23, 3:12, 4:2, 4:14, 4:24, 5:16, 6:6, 6:19, 7:6, 13:17, 14:25, 16:12, 18:2, 241:14, 260:14
**10,000** [4] - 240:14, 241:10, 242:3, 243:11
**10.1** [1] - 174:5
**10.2** [5] - 174:11, 174:14, 174:16, 201:8, 201:15
**100** [2] - 8:20, 60:10
**1000** [1] - 7:19
**109** [1] - 8:20
**10:08** [1] - 61:12
**10:20** [1] - 61:13
**11** [32] - 1:8, 1:10, 1:21, 1:23, 2:10, 2:12, 2:21, 2:23, 3:12, 4:2, 4:14, 4:24, 5:15, 5:16, 6:4, 6:6, 6:17, 6:19, 7:4, 7:6, 7:20, 9:4, 11:7, 14:22, 14:25, 16:12, 17:25, 18:2, 40:8, 118:16, 169:3, 181:3
**11.3** [5] - 118:14, 118:16, 118:17, 120:21, 122:17
**11th** [2] - 11:3, 276:13
**12** [27] - 1:8, 1:12, 1:21, 2:2, 2:10, 2:14, 2:21, 3:1, 3:12, 4:2, 4:15, 4:24, 5:15, 5:17, 6:5, 6:6, 6:17, 6:19, 7:5, 7:6, 11:11, 14:23, 15:3, 16:12, 17:25, 18:2, 209:20
**120** [4] - 135:9, 135:21, 136:9, 268:5
**12:08** [1] - 124:4
**13** [21] - 1:8, 1:21, 2:10, 2:21, 3:12, 4:2, 4:15, 4:24, 5:15, 5:17, 6:5, 6:6, 6:17, 6:19, 7:5, 7:6, 14:23, 16:12, 17:25, 18:2, 174:12
**13584779** [2] - 137:24, 151:2
**13584799** [1] - 137:12
**14** [26] - 1:8, 1:10, 1:21, 1:23, 2:11, 2:12, 2:21, 2:23, 3:12, 4:2, 4:15, 5:1, 5:15, 5:17, 6:5, 6:6, 6:17, 6:19, 7:5, 7:6, 13:18, 14:23, 14:25, 16:12, 17:25, 18:2
**140** [10] - 1:12, 1:13, 2:2, 2:3, 2:15, 2:16, 3:2, 3:3, 15:3, 15:4
**140,000-acre** [1] - 38:16
**141** [17] - 1:9, 1:11, 1:22, 2:1, 2:11, 2:14, 2:22, 3:1, 3:16, 4:6, 4:18, 5:4, 14:24, 15:2, 16:17, 49:9, 204:9
**141-88** [1] - 203:24
**142** [34] - 1:7, 1:20, 2:10, 2:20, 3:14, 3:15, 4:3, 4:5, 4:16, 4:18, 5:2, 5:3, 5:15, 5:18, 5:19, 6:5, 6:8, 6:9, 6:18, 6:20, 6:21, 7:5, 7:8, 7:9, 14:22, 16:14, 16:16, 18:1, 18:4, 18:6, 135:20, 136:9, 197:2, 197:13
**143** [17] - 3:11, 4:1, 4:13, 4:23, 5:13, 5:14, 6:2, 6:4, 6:15, 6:16, 7:2, 7:4, 16:11, 17:22, 17:24, 49:12, 49:14
**145,000** [3] - 116:8, 116:9, 125:8
**146,000** [1] - 96:23
**146,500** [1] - 95:7
**15** [25] - 1:8, 1:10, 1:21, 1:23, 2:11, 2:12, 2:21, 2:23, 3:13, 4:2, 4:15, 5:1, 5:17, 6:6, 6:19, 7:6, 14:23, 14:25, 16:12, 18:2, 33:16, 196:10, 205:20, 241:14
**15.1** [1] - 205:16
**150-mile** [1] - 34:8
**1500** [1] - 236:18
**158** [1] - 30:1
**16** [23] - 1:10, 1:23, 2:12, 2:23, 3:13, 4:2, 4:15, 5:1, 5:17, 6:6, 6:19, 7:6, 14:25, 16:13, 18:2, 95:7, 140:15, 150:15, 151:6, 170:2, 170:9, 194:18, 194:19
**16.2** [1] - 205:20
**17** [29] - 1:10, 1:23, 2:12, 2:23, 3:13, 3:15, 4:2, 4:4, 4:15, 4:17, 5:1, 5:3, 5:17, 5:19, 6:6, 6:8, 6:19, 6:21, 7:6, 7:8, 14:25, 16:13, 16:15, 18:3, 18:5, 167:25, 168:9, 169:5, 169:13
**17.6** [1] - 194:8
**170,000** [1] - 38:12
**18** [28] - 1:10, 1:23, 2:13, 2:23, 3:13, 3:15, 4:2, 4:4, 4:15, 4:17, 5:1, 5:3, 5:17, 5:19, 6:6, 6:8, 6:19, 6:21, 7:6, 7:8, 14:25, 16:13, 16:16, 18:3, 18:5, 170:21, 194:12, 194:16
**1800s** [1] - 221:23
**1855** [1] - 11:20
**19** [31] - 1:10, 1:23, 2:13, 2:23, 3:13, 3:15, 4:2, 4:4, 4:15, 4:17, 5:1, 5:3, 5:13, 5:17, 5:19, 6:3, 6:6, 6:8, 6:16, 6:19, 6:21, 7:3, 7:6, 7:8, 14:25, 16:13, 16:16, 17:23, 18:3, 18:5, 40:10
**192** [1] - 9:12
**1930s** [2] - 164:6, 164:9
**195** [1] - 9:13
**1997** [1] - 44:13
**1:10** [1] - 124:5
**1A** [23] - 10:5, 23:11, 23:13, 31:13, 35:3, 37:6, 39:5, 39:8, 52:20, 52:24, 53:7, 53:9, 56:4, 81:19, 81:20, 99:25, 100:2, 117:25, 151:18, 168:2, 168:4, 177:14, 254:24
**1B** [5] - 10:5, 23:11, 23:16, 31:13, 202:21
**1C** [4] - 10:6, 23:11, 23:20, 31:13

## 2

**2** [59] - 1:9, 1:12, 1:22, 2:2, 2:12, 2:14, 2:22, 3:1, 3:8, 3:12, 3:16, 3:19, 3:23, 4:1, 4:5, 4:8, 4:9, 4:14, 4:18, 4:23, 5:4, 5:6, 5:15, 5:16, 6:4, 6:6, 6:17, 6:18, 7:4, 7:6, 8:15, 14:24, 15:3, 15:12, 15:19, 15:24, 16:3, 16:12, 16:17, 16:20, 17:25, 18:1, 23:18, 25:19, 26:8, 62:5, 62:8, 62:11, 62:23, 100:8, 162:4, 166:5, 195:18, 213:4, 213:8, 213:12, 219:2, 219:23, 232:14
**2(a)** [1] - 58:4
**2,000-plus** [1] - 220:20
**2,500** [1] - 28:12
**2,700** [2] - 260:8, 260:11
**2-05** [2] - 157:4, 157:5
**2-11** [1] - 215:15
**2-16** [2] - 214:18, 263:24
**2-18** [1] - 262:6
**2-19** [2] - 215:14, 262:7
**2-24** [2] - 260:6, 261:1
**2-3** [1] - 216:23
**2-32** [1] - 238:23
**2-4** [1] - 216:24
**2-44** [1] - 221:21
**2-5** [1] - 216:23
**2-51** [2] - 224:1
**2-6** [3] - 216:23, 260:6, 261:1
**2-69** [1] - 221:21
**2-77** [1] - 223:25
**2-7b** [1] - 238:22
**2.4** [4] - 151:17, 151:19, 201:8, 201:15
**2.5** [18] - 255:19, 255:21, 255:25, 256:20, 257:15, 259:6, 260:2, 261:4, 270:14, 271:16, 272:17, 273:20, 274:2, 274:14, 275:16, 275:21, 275:23
**2.7** [8] - 272:20, 273:20, 273:23, 274:24, 275:16, 275:17, 275:21
**2.9** [3] - 214:17, 275:17,

275:23
**20** [46] - 1:10, 1:23, 2:13, 2:23, 3:13, 3:15, 4:2, 4:4, 4:15, 4:17, 5:1, 5:3, 5:13, 5:17, 5:19, 6:3, 6:7, 6:9, 6:16, 6:19, 6:21, 7:3, 7:7, 7:9, 9:9, 15:1, 16:13, 16:16, 17:23, 18:3, 18:5, 21:14, 33:17, 95:17, 106:23, 109:15, 113:10, 113:13, 114:12, 117:23, 139:13, 140:12, 162:11, 162:12, 221:23, 260:14
**20-year** [2] - 115:10, 194:5
**200** [2] - 9:14, 9:15
**2000** [1] - 44:15
**2000s** [1] - 262:17
**2009** [1] - 195:16
**2015** [1] - 221:23
**2016** [1] - 221:20
**2020** [1] - 226:14
**2021** [4] - 22:25, 66:24, 71:10, 225:25
**2022** [2] - 231:19, 231:20
**2023** [2] - 50:12, 226:18
**2024** [5] - 7:20, 11:3, 50:14, 196:10, 276:14
**2030** [1] - 30:4
**2040** [2] - 110:23, 111:2
**207** [1] - 9:16
**208** [1] - 9:17
**21** [20] - 1:10, 1:23, 2:13, 2:23, 3:13, 4:2, 4:15, 5:1, 5:14, 5:17, 6:3, 6:7, 6:16, 6:19, 7:3, 7:7, 15:1, 16:13, 17:23, 18:3
**211** [1] - 9:20
**212114** [1] - 127:13
**22** [20] - 1:8, 1:10, 1:21, 1:23, 2:11, 2:13, 2:21, 2:23, 3:13, 4:2, 4:15, 5:1, 5:17, 6:7, 6:19, 7:7, 14:23, 15:1, 16:13, 18:3
**221112** [1] - 127:9
**23** [25] - 1:8, 1:10, 1:21, 1:24, 2:11, 2:13, 2:21, 2:23, 3:13, 4:2, 4:15, 5:1, 5:17, 6:7, 6:19, 7:7, 10:5, 10:5, 10:6, 14:23, 15:1, 16:13, 18:3, 199:21, 215:24
**230** [1] - 9:21
**238** [1] - 9:22
**24** [24] - 1:8, 1:21, 2:11, 2:21, 3:13, 4:2, 4:15, 5:1, 5:15, 5:17, 6:5, 6:7, 6:17, 6:19, 7:5, 7:7, 10:5, 10:5, 10:6, 14:23, 16:13, 17:25, 18:3, 201:18
**24-inch** [1] - 27:24
**24/7** [1] - 28:20
**25** [31] - 1:8, 1:10, 1:22, 1:24, 2:11, 2:13, 2:21, 2:23, 3:13, 4:2, 4:15, 5:1, 5:17, 6:7, 6:19, 7:7, 10:6, 10:7, 10:7, 14:23, 15:1, 16:13, 18:3, 166:5, 177:17, 177:19, 197:14, 201:8
**25-an-acre** [1] - 165:21
**250** [2] - 36:23, 236:18
**26** [20] - 1:8, 1:10, 1:22, 1:24, 2:11, 2:13, 2:21, 2:23, 3:13, 4:3, 4:15, 5:1, 5:17, 6:7, 6:20, 7:7, 14:23, 15:1, 16:13, 18:3
**27** [21] - 1:10, 1:24, 2:13, 2:23, 3:11, 3:13, 3:23, 4:3, 4:13, 4:15, 4:22, 5:1, 5:17, 6:7, 6:20, 7:7, 15:1, 16:10, 16:13, 18:3, 134:22
**276** [1] - 7:16
**28** [25] - 1:10, 1:24, 2:13, 2:23, 3:11, 3:13, 3:24, 4:3, 4:13, 4:16, 4:22, 5:1, 5:14, 5:18, 6:3, 6:7, 6:16, 6:20, 7:3, 7:7, 15:1, 16:10, 16:13, 17:23, 18:3
**29** [30] - 1:11, 1:24, 2:13, 2:24, 3:11, 3:13, 3:15, 3:24, 4:3, 4:4, 4:13, 4:16, 4:17, 4:22, 5:1, 5:3, 5:14, 5:18, 6:3, 6:7, 6:16, 6:20, 7:3, 7:7, 15:1, 16:10, 16:14, 16:16, 17:23, 18:3
**29,444.72** [1] - 137:8
**2A** [5] - 10:6, 24:19, 24:24, 69:8, 192:24
**2B** [5] - 10:7, 24:19, 25:14, 26:11, 69:8
**2C** [6] - 10:7, 24:19, 25:14, 26:11, 69:8, 192:24
**2D** [1] - 217:1

## 3

**3** [57] - 1:9, 1:12, 1:23, 2:2, 2:12, 2:14, 2:22, 3:1, 3:12, 3:16, 4:1, 4:5, 4:14, 4:18, 4:23, 5:4, 5:10, 5:16, 5:21, 6:1, 6:6, 6:11, 6:18, 7:6, 7:10, 14:24, 15:3, 16:12, 16:17, 16:25, 17:6, 17:11, 17:15, 18:2, 18:8, 26:8, 40:14, 48:12, 48:13, 58:6, 62:5, 62:9, 62:12, 95:8, 117:24, 163:4, 195:10, 195:18, 195:19, 198:4, 213:4, 213:8, 213:12, 224:19, 224:21, 224:22, 232:14
**3,700** [1] - 261:3
**3-1** [2] - 268:19, 269:17
**3-15** [2] - 255:2, 270:18
**3-2** [1] - 267:14
**3-4** [6] - 258:14, 258:17, 266:16, 267:6, 268:13, 268:19
**3-7** [2] - 258:13, 266:15
**3.1** [1] - 152:9
**3.2.3** [1] - 267:14
**3.2.3.2** [1] - 267:25
**3.3** [6] - 30:4, 131:24, 132:4, 201:7, 201:14, 201:15
**3.6** [1] - 200:9
**3.7** [1] - 184:20
**3.8** [1] - 184:20
**3.9** [2] - 184:8, 184:20
**3.c** [1] - 208:19
**30** [29] - 1:11, 1:24, 2:13, 2:24, 3:13, 3:15, 4:3, 4:4, 4:16, 4:17, 5:2, 5:3, 5:14, 5:18, 6:3, 6:7, 6:16, 6:20, 7:3, 7:7, 10:8, 15:1, 16:14, 16:16, 17:23, 18:4, 29:18, 29:19
**300** [1] - 236:19
**304** [1] - 8:12
**30869** [2] - 1:3, 13:22
**30870** [2] - 1:4, 14:3
**30871** [1] - 1:4
**30872** [2] - 1:5, 14:18
**30873** [2] - 1:5, 15:9
**30874** [2] - 1:6, 15:16
**30875** [2] - 1:6, 15:25
**30876** [2] - 1:7, 16:7
**30877** [2] - 1:7, 16:22
**30878** [2] - 1:8, 17:3
**30879** [2] - 1:8, 17:12
**30880** [2] - 1:9, 17:19
**31** [20] - 1:7, 1:11, 1:20, 1:24, 2:9, 2:13, 2:20, 2:24, 3:15, 4:4, 4:17, 5:3, 5:14, 6:3, 6:16, 7:3, 14:21, 15:1, 16:16, 17:23
**32** [31] - 1:7, 1:11, 1:20, 2:1, 2:9, 2:13, 2:20, 2:24, 3:11, 3:14, 3:24, 4:3, 4:13, 4:16, 4:22, 5:2, 5:14, 5:18, 6:3, 6:7, 6:16, 6:20, 7:3, 7:7, 14:21, 15:1, 16:10, 16:14, 17:23, 18:4, 49:12
**33** [31] - 1:7, 1:11, 1:20, 2:1, 2:9, 2:13, 2:20, 2:24, 3:11, 3:14, 3:24, 4:3, 4:13, 4:16, 4:22, 5:2, 5:14, 5:18, 6:3, 6:7, 6:16, 6:20, 7:3, 7:7, 14:21, 15:1, 16:10, 16:14, 17:24, 18:4, 136:25
**33.3** [1] - 136:13
**34** [40] - 1:7, 1:11, 1:20, 2:1, 2:10, 2:13, 2:20, 2:24, 3:11, 3:14, 3:24, 4:3, 4:13, 4:16, 4:23, 5:2, 5:14, 5:18, 6:3, 6:7, 6:16, 6:20, 7:3, 7:7, 14:21, 15:2, 16:10, 16:14, 17:24, 18:4, 135:5, 135:11, 135:20, 136:8, 178:12, 180:15, 180:21, 181:20, 201:8, 201:18
**35** [32] - 1:8, 1:11, 1:22, 2:1, 2:11, 2:14, 2:21, 2:24, 3:11, 3:14, 3:24, 4:3, 4:13, 4:16, 4:23, 5:2, 5:14, 5:18, 6:4, 6:7, 6:16, 6:20, 7:4, 7:7, 14:23, 15:2, 16:11, 16:14, 17:24, 18:4, 203:24, 204:10
**350** [1] - 33:14
**352** [2] - 193:25, 194:6
**36** [22] - 1:8, 1:22, 2:11, 2:21, 3:14, 4:3, 4:16, 5:2, 5:13, 5:14, 6:2, 6:4, 6:15, 6:16, 7:2, 7:4, 14:23, 16:14, 17:22, 17:24, 49:10, 49:14
**360,000** [1] - 29:13
**38** [1] - 16:15
**38-22** [3] - 148:2, 157:2, 157:11
**38-22-01** [3] - 104:11, 107:24, 108:8
**38-22-03** [1] - 157:15
**38-22-17** [1] - 175:7
**3:03** [1] - 179:17
**3:18** [1] - 179:18
**3A** [7] - 10:8, 30:10, 30:12, 30:23, 31:23, 32:8, 203:3
**3D** [20] - 188:21, 189:24, 217:1, 221:2, 247:2, 247:3, 247:5, 247:10, 247:16, 258:8, 262:25, 264:10, 264:11, 264:14, 265:17, 267:2, 267:8, 267:12, 267:15, 268:11

## 4

**4** [27] - 1:9, 1:13, 1:23, 2:2, 2:12, 2:15, 2:22, 3:2, 3:12, 4:1, 4:14, 4:24, 5:16, 6:6, 6:18, 7:6, 14:25, 15:4, 16:12, 18:2, 28:14, 134:6, 147:19, 162:6, 162:17, 190:10, 232:15
**4-1** [1] - 232:20
**4-10** [2] - 236:23, 237:16
**4-12** [1] - 236:13
**4-17** [1] - 236:24
**4-3** [2] - 233:6, 237:10
**4-4** [1] - 234:15
**4-an-acre** [1] - 165:21

**40** [3] - 10:8, 136:11, 137:9
**400** [2] - 8:12, 33:14
**41** [1] - 10:8
**43** [1] - 9:10
**43-01-05** [1] - 157:3
**43-05-01** [2] - 157:5, 198:3
**43-05-01-07** [1] - 208:19
**43-05-01-17** [1] - 202:7
**45** [1] - 29:14
**450** [2] - 95:6, 96:20
**450-plus** [1] - 166:13
**45Q** [1] - 109:10
**486990** [5] - 42:23, 76:18, 77:17, 77:24, 80:8
**4A** [6] - 10:8, 39:21, 39:22, 40:24, 65:25, 68:20

## 5

**5** [35] - 1:9, 1:13, 1:23, 2:2, 2:12, 2:15, 2:22, 3:2, 3:12, 3:15, 4:1, 4:4, 4:14, 4:17, 4:24, 5:3, 5:16, 6:6, 6:18, 7:6, 13:12, 14:25, 15:4, 16:12, 16:15, 18:2, 113:15, 141:16, 142:9, 142:13, 142:14, 143:8, 183:5, 183:12, 198:22
**5,000** [3] - 37:1, 259:9, 260:15
**5.7** [1] - 29:16
**50** [6] - 96:2, 125:4, 163:4, 163:22, 163:24, 165:22
**500** [3] - 140:1, 141:25, 143:1
**55** [3] - 10:9, 10:9, 10:10
**56** [4] - 10:9, 10:9, 10:10, 199:22
**57** [9] - 29:7, 29:15, 29:16, 31:3, 31:10, 31:22, 115:17, 193:10, 194:17
**58501** [1] - 8:21
**58504** [1] - 8:13
**5:11** [1] - 246:18
**5:23** [1] - 246:19
**5A** [9] - 10:9, 54:22, 55:1, 55:9, 55:11, 55:23, 137:5, 137:6, 207:11
**5B** [4] - 10:9, 55:1, 55:18, 55:23
**5C** [4] - 10:10, 55:1, 55:18, 55:23

## 6

**6** [30] - 1:9, 1:13, 1:23, 2:3, 2:12, 2:15, 2:22, 3:2, 3:12, 3:15, 4:1, 4:4, 4:14, 4:17, 4:24, 5:3, 5:16, 5:19, 6:6, 6:8, 6:18, 6:21, 7:6, 7:8, 14:25, 15:4, 16:12, 16:15, 18:2, 18:5
**60** [3] - 33:13, 52:4, 52:11
**61** [1] - 9:11
**6:30** [2] - 276:12, 276:13

## 7

**7** [31] - 1:9, 1:13, 1:23, 2:3, 2:12, 2:15, 2:22, 3:2, 3:12, 3:15, 4:1, 4:4, 4:14, 4:17, 4:24, 5:3, 5:16, 5:19, 6:6, 6:8, 6:18, 6:21, 7:6, 7:8, 14:25, 15:4, 16:12, 16:15, 18:2, 18:5, 197:3
**7.1** [3] - 173:16, 201:8, 201:15
**70** [1] - 33:8
**779** [1] - 137:12

## 8

**8** [29] - 1:9, 1:23, 2:12, 2:22, 3:12, 3:15, 4:1, 4:4, 4:14, 4:17, 4:24, 5:3, 5:16, 6:6, 6:18, 7:6, 14:25, 16:12, 16:15, 18:2, 28:22, 58:11, 58:21, 116:11, 125:6, 199:6, 205:9, 207:15, 207:22
**8.1** [5] - 152:21, 154:20, 201:8, 201:15
**8.3** [1] - 205:11
**8.4** [1] - 159:2
**80** [1] - 268:5
**84** [2] - 150:16, 151:7
**85** [6] - 5:20, 6:9, 6:22, 7:9, 18:6, 197:3
**86** [11] - 5:15, 5:18, 6:4, 6:8, 6:17, 6:21, 7:4, 7:8, 17:24, 18:5, 197:13
**87** [33] - 1:7, 1:11, 1:13, 1:21, 2:1, 2:3, 2:10, 2:14, 2:16, 2:20, 3:1, 3:3, 3:16, 4:5, 4:18, 5:4, 5:13, 5:16, 6:3, 6:5, 6:15, 6:18, 7:3, 7:5, 14:22, 15:2, 15:5, 16:17, 17:23, 18:1, 49:14, 135:21, 136:9
**88** [28] - 1:9, 1:12, 1:22, 2:2, 2:12, 2:15, 2:22, 3:2, 3:12, 3:14, 3:17, 4:1, 4:4, 4:6, 4:14, 4:16, 4:19, 4:23, 5:2, 5:5, 14:24, 15:4, 16:11, 16:15, 16:18, 49:9, 49:12, 204:9

## 9

**9** [18] - 1:9, 1:23, 2:12, 2:22, 3:12, 4:2, 4:14, 4:24, 5:16, 6:6, 6:19, 7:6, 11:10, 14:25, 16:12, 18:2, 195:15, 276:10
**90** [5] - 48:8, 51:13, 51:15, 55:14, 262:1
**90,000** [1] - 125:10
**92** [2] - 48:9, 51:20
**93** [2] - 101:16, 139:2
**95** [5] - 35:22, 35:24, 38:16, 219:2, 219:23
**97** [2] - 48:14, 51:22
**98.25** [2] - 35:11, 36:1
**9:00** [1] - 11:2

## A

**a.m** [5] - 11:2, 11:10, 61:12, 61:13, 276:10
**abandoned** [1] - 176:14
**ability** [7] - 83:8, 84:12, 112:14, 160:2, 161:21, 218:12, 261:23
**able** [23] - 51:3, 53:15, 64:5, 64:20, 64:22, 64:23, 65:17, 78:20, 98:20, 132:2, 141:6, 160:20, 161:13, 192:2, 194:6, 198:11, 218:21, 247:13, 259:25, 262:3, 262:4, 268:10, 269:1
**abridged** [1] - 133:23
**absence** [2] - 216:6, 220:25
**absolutely** [2] - 94:24, 161:17
**abundance** [1] - 36:15
**accepted** [1] - 74:9
**access** [19] - 90:5, 102:7, 128:7, 128:17, 128:24, 129:4, 129:7, 129:12, 129:14, 129:17, 129:22, 129:25, 130:17, 167:18, 168:16, 168:19, 169:20, 169:22, 267:7
**Access** [1] - 122:23
**accidentally** [1] - 169:23
**accommodate** [1] - 50:22
**according** [4] - 34:6, 76:4, 76:6, 76:7
**accordingly** [1] - 42:4
**account** [6] - 118:4, 119:6, 120:10, 123:13, 223:13, 265:23
**accounted** [2] - 265:18, 266:12
**accuracy** [2] - 249:2, 251:4
**accurate** [18] - 68:13, 79:7, 80:3, 82:7, 87:14, 93:9, 114:8, 134:13, 134:15, 135:12, 135:13, 136:16, 146:17, 149:7, 154:16, 156:3, 169:13, 250:19
**acknowledging** [1] - 169:8
**acknowledgment** [2] - 169:5, 169:11
**acoustic** [2] - 265:19, 267:18
**acquire** [4] - 49:20, 57:8, 191:16, 191:25
**acquired** [6] - 48:13, 95:6, 96:23, 206:2, 206:16, 206:21
**acquiring** [2] - 48:6, 87:1
**acquisition** [2] - 44:22, 214:5
**acquisitions** [1] - 45:1
**acre** [6] - 162:5, 162:6, 162:15, 162:17, 166:4, 166:5
**acreage** [17] - 48:18, 48:21, 48:24, 51:24, 54:9, 55:7, 55:20, 83:14, 83:16, 134:16, 135:11, 135:24, 137:7, 137:18, 184:13, 184:15, 198:25
**acres** [15] - 29:19, 38:12, 54:9, 56:20, 95:7, 96:23, 116:9, 125:8, 125:10, 135:9, 135:21, 136:9, 136:11, 137:8
**acronym** [2] - 76:12, 76:13
**act** [3] - 216:16, 229:16, 276:6
**Act** [11] - 191:4, 191:8, 191:15, 191:21, 191:23, 239:21, 240:4, 240:6, 240:10, 241:9, 242:17
**action** [5] - 174:19, 219:13, 234:21, 234:24, 235:18
**actions** [1] - 174:24
**active** [3] - 71:18, 71:19, 224:11
**actively** [3] - 49:21, 99:10, 164:2
**activities** [7] - 59:9, 59:12, 188:24, 199:9, 224:24, 225:5, 235:16
**activity** [2] - 199:12, 238:13
**actual** [9] - 118:7, 142:17, 159:20, 179:4, 188:8, 261:17, 270:2, 274:3, 275:5
**add** [7] - 128:14, 153:13, 181:11, 181:14, 182:4, 207:3, 242:19
**added** [1] - 169:15
**addition** [10] - 19:10, 50:15, 53:15, 55:5, 58:4, 200:8,

220:19, 222:2, 227:9, 235:20
**additional** [33] - 35:19, 54:15, 55:12, 55:19, 85:22, 92:3, 92:4, 93:16, 94:8, 111:14, 111:19, 113:24, 113:25, 114:2, 117:2, 154:2, 154:6, 166:17, 181:12, 181:14, 182:5, 185:13, 194:25, 195:1, 200:3, 206:2, 206:21, 220:18, 237:18, 242:19, 242:22, 244:21
**additionally** [10] - 29:22, 33:19, 105:14, 140:13, 194:9, 219:17, 219:19, 221:5, 224:8, 239:10
**address** [9] - 47:14, 47:15, 93:17, 173:15, 181:18, 208:14, 209:22, 225:13, 235:2
**addressed** [1] - 224:21
**adequate** [3] - 141:8, 141:12, 257:16
**adequately** [1] - 230:7
**adhere** [1] - 91:15
**adjacent** [2] - 116:17, 185:6
**adjust** [6] - 42:3, 152:16, 164:13, 164:18, 248:25, 275:23
**adjusted** [4] - 101:21, 162:24, 163:11, 164:6
**adjusting** [2] - 164:24, 275:23
**adjustment** [4] - 186:20, 257:9, 257:22, 270:3
**adjustments** [4] - 41:21, 98:1, 174:2, 207:4
**administer** [1] - 157:18
**administered** [2] - 84:4, 99:4
**administration** [1] - 44:12
**administrative** [1] - 157:2
**Administrative** [1] - 198:3
**admission** [1] - 23:23
**admitted** [5] - 24:15, 25:11, 30:21, 41:4, 56:2
**admitting** [1] - 24:11
**advance** [2] - 21:23, 128:20
**advantage** [10] - 63:21, 64:1, 64:2, 64:5, 64:14, 64:17, 64:20, 64:25, 65:1, 65:17
**advantageous** [1] - 64:12
**adverse** [6] - 218:11, 219:14, 220:8, 220:10, 228:5, 228:12
**adversely** [3] - 220:3, 229:2, 229:10
**advice** [2] - 79:10, 79:25
**advised** [1] - 213:1
**advisement** [1] - 232:9
**advisor** [1] - 212:2
**advisors** [1] - 72:22
**aerial** [1] - 258:18
**affairs** [1] - 44:6
**affect** [6] - 196:15, 205:2, 229:2, 229:10, 256:2, 264:6
**affiliates** [3] - 71:16, 71:23, 72:10
**afternoon** [1] - 54:16
**afterwards** [1] - 114:13
**ago** [3] - 21:14, 54:14, 85:6
**agree** [13] - 63:20, 64:1, 64:3, 82:9, 115:15, 127:2, 127:25, 132:21, 158:8, 173:6, 173:7, 173:17, 174:22
**agreed** [5] - 84:10, 101:16, 129:13, 130:6, 206:23
**Agreement** [2] - 118:18, 161:3
**agreement** [104] - 29:22, 52:25, 53:3, 53:6, 53:8, 53:18, 53:25, 58:12, 58:17, 84:11, 84:15, 84:22, 85:4, 86:14, 86:18, 87:7, 87:11, 87:20, 90:3, 90:20, 91:2, 91:7, 91:17, 91:20, 92:5, 92:12, 92:14, 92:25, 93:14, 93:19, 94:1, 94:4, 94:7, 94:9, 94:18, 94:22, 95:9, 95:12, 98:25, 99:7, 99:11, 100:6, 110:19, 112:5, 114:20, 115:20, 117:24, 118:4, 118:10, 119:6, 120:7, 120:9, 121:17, 122:8, 128:9, 131:16, 131:25, 132:4, 132:12, 132:16, 132:25, 133:24, 135:7, 146:4, 146:17, 146:25, 147:13, 150:24, 151:18, 152:13, 152:21, 158:3, 159:2, 168:1, 168:5, 168:6, 173:16, 174:5, 177:15, 177:17, 180:13, 184:8, 184:10, 184:21, 185:2, 195:13, 197:24, 198:23, 200:4, 200:5, 200:25, 201:7, 201:14, 201:15, 203:19, 205:9, 205:16, 205:21, 206:11, 207:1, 252:20, 253:3
**agreements** [27] - 26:7, 63:10, 75:8, 88:5, 88:9, 94:19, 96:21, 108:23, 110:6, 110:7, 110:14, 110:20, 111:22, 111:24, 114:20, 115:14, 116:7, 124:19, 131:21, 132:7, 133:10, 154:12, 166:10, 166:19, 177:6, 186:1, 198:15
**agrees** [2] - 130:6, 173:11
**agricultural** [4] - 34:11, 101:11, 103:2, 202:12
**agriculture** [5] - 22:20, 33:7, 34:11, 34:13, 202:4
**ahead** [4] - 118:13, 128:11, 155:4, 167:22
**air** [6] - 35:13, 103:19, 103:20, 103:25, 104:1, 104:4
**airline** [1] - 30:3
**ALBERTSON** [1] - 8:7
**Allen** [1] - 12:6
**ALLETE** [1] - 21:17
**allocated** [1] - 119:2
**allocating** [1] - 134:9
**allow** [13] - 75:1, 96:24, 107:11, 107:19, 108:1, 133:22, 148:2, 156:22, 157:5, 218:18, 253:16, 258:1, 261:21
**allowed** [2] - 129:20, 184:23
**allowing** [2] - 128:24, 219:10
**allows** [5] - 31:25, 102:4, 102:5, 105:1, 227:25
**almost** [2] - 118:15, 203:25
**alone** [2] - 33:16, 269:13
**alongside** [2] - 173:25, 236:2
**alternate** [1] - 209:18
**alternative** [1] - 242:14
**amalgamate** [11] - 51:8, 51:25, 83:23, 84:4, 99:8, 131:12, 138:10, 138:14, 138:25, 148:21, 148:24
**amalgamated** [2] - 139:7, 178:2
**amalgamates** [3] - 59:7, 148:6, 148:11
**amalgamating** [3] - 99:4, 148:8, 149:12
**amalgamation** [14] - 1:16, 3:19, 5:22, 14:6, 15:19, 17:6, 46:23, 58:16, 86:15, 90:10, 141:10, 148:3, 149:22, 157:12
**AMANDA** [2] - 9:19, 211:5
**Amanda** [25] - 66:18, 66:19, 66:20, 66:21, 67:3, 68:3, 68:12, 140:9, 210:16, 211:2, 211:10, 211:12, 211:13, 211:15, 212:17, 215:3, 217:6, 217:23, 226:1, 227:17, 231:9, 232:13, 235:21, 237:22
**Amanda's** [1] - 66:25
**ambiguous** [1] - 187:9
**amend** [3] - 133:21, 134:1, 169:17
**amended** [3] - 132:10, 197:1, 201:3
**amendment** [1] - 166:10
**amendments** [3] - 42:5, 201:1, 208:6
**American** [1] - 22:21
**Ames** [2] - 28:19, 83:10
**amount** [12] - 2:7, 4:10, 6:12, 14:14, 16:4, 17:16, 21:21, 74:11, 164:14, 201:25, 219:4, 248:2
**amounts** [8] - 35:11, 100:24, 120:1, 167:11, 168:13, 169:19, 200:12, 264:3
**Amsden** [5] - 239:1, 239:3, 242:8, 242:11, 243:12
**analogy** [2] - 124:13, 125:22
**analyses** [1] - 239:11
**analysis** [27] - 184:3, 218:4, 218:23, 221:3, 221:4, 227:14, 238:24, 248:15, 248:16, 255:18, 258:6, 259:20, 259:23, 260:7, 261:2, 261:12, 261:13, 261:14, 264:5, 264:6, 264:10, 264:16, 267:13, 270:24, 271:12, 272:21
**analyze** [1] - 247:17
**analyzed** [1] - 111:10
**AND** [3] - 1:2, 8:15, 8:24
**Anderson** [1] - 221:20
**angle** [1] - 264:22
**anhydrite** [1] - 263:21
**anhydrites** [2] - 264:4, 264:13
**announced** [1] - 22:25
**annual** [4] - 162:6, 162:17, 165:11, 166:5
**annually** [3] - 29:14, 29:17, 33:18
**answer** [36] - 13:4, 33:5, 73:23, 76:16, 76:23, 77:3, 84:6, 89:9, 91:11, 93:9, 97:17, 97:20, 115:5, 120:6, 120:19, 122:10, 123:20, 125:25, 135:3, 153:9, 157:8, 171:20, 184:18, 187:12, 187:21, 192:2, 192:5, 192:17, 195:10, 196:20, 198:11, 198:17, 198:20, 205:7, 241:4, 250:23
**answered** [2] - 88:19, 112:11
**answers** [3] - 89:18, 195:9, 206:5
**anticipate** [5] - 116:21, 135:2, 143:12, 154:6, 220:1
**anticipated** [4] - 219:4, 228:4, 228:10, 228:11

**anticipating** [2] - 59:13, 84:12
**anyway** [3] - 98:14, 174:10, 183:11
**AOR** [11] - 232:16, 232:23, 233:4, 233:18, 233:23, 234:3, 234:23, 235:24, 236:14, 236:17, 236:20
**apart** [2] - 40:14, 50:21
**apologies** [1] - 208:13
**apologize** [2] - 59:19, 270:17
**apparent** [1] - 21:18
**appear** [1] - 57:16
**appearance** [3] - 11:17, 11:18, 18:12
**appearing** [2] - 11:14, 11:25
**appendices** [1] - 213:13
**Appendix** [3] - 213:5, 213:13, 239:10
**applicability** [3] - 93:20, 129:21, 185:12
**applicable** [2] - 82:5, 168:18
**applicant** [3] - 37:13, 62:10, 62:11
**APPLICANT'S** [2] - 9:6, 10:2
**applicants** [1] - 26:13
**application** [80] - 1:3, 1:15, 2:5, 3:4, 3:7, 3:18, 4:8, 4:9, 5:6, 5:9, 5:21, 6:11, 7:10, 13:24, 14:5, 14:13, 15:6, 15:11, 15:18, 16:2, 16:19, 16:24, 17:5, 17:14, 18:7, 18:22, 19:12, 19:17, 19:21, 23:13, 23:15, 23:17, 23:21, 24:12, 26:22, 31:10, 39:25, 46:20, 54:13, 63:13, 63:18, 75:22, 82:11, 93:15, 99:24, 100:3, 100:7, 106:2, 116:23, 135:6, 144:1, 151:18, 162:2, 168:2, 168:4, 182:13, 182:15, 183:6, 184:9, 188:1, 188:11, 204:7, 208:24, 209:21, 212:25, 213:8, 224:19, 226:5, 232:14, 233:4, 239:7, 243:15, 244:9, 254:25, 259:2, 259:4, 259:5, 263:23, 266:2, 270:11
**applications** [26] - 18:14, 24:5, 24:10, 24:11, 26:6, 26:20, 28:3, 49:5, 54:19, 61:21, 61:24, 62:7, 62:13, 70:14, 71:1, 71:5, 81:25, 82:1, 138:15, 192:15, 192:23, 194:3, 225:6, 226:16, 226:17, 232:16
**applied** [5] - 166:21, 255:19, 256:24, 259:7, 276:2
**applies** [5] - 77:1, 94:5, 101:25, 191:21, 192:16
**apply** [11] - 94:1, 107:14, 108:9, 108:14, 150:21, 153:2, 153:6, 170:9, 180:3, 206:19, 257:16
**applying** [6] - 255:10, 256:15, 256:20, 259:15, 260:2, 265:4
**appointed** [2] - 84:9, 99:11
**approach** [3] - 60:21, 219:1, 225:24
**appropriate** [11] - 11:19, 12:20, 28:8, 76:22, 80:1, 80:2, 158:23, 203:22, 230:14, 266:13, 274:13
**approval** [1] - 151:23
**approximate** [2] - 31:3, 31:6
**April** [1] - 195:15
**aquifer** [5] - 236:16, 239:6, 239:20, 242:16
**aquifers** [3] - 191:9, 239:9, 240:9
**archeological** [1] - 196:3
**Archie** [1] - 261:3
**Area** [1] - 152:24
**area** [90] - 27:25, 31:5, 37:17, 37:23, 38:3, 38:4, 38:7, 38:10, 38:11, 38:21, 39:16, 39:18, 41:25, 45:17, 47:18, 51:24, 53:13, 55:15, 116:4, 116:22, 116:25, 140:20, 141:23, 143:10, 145:19, 146:1, 146:12, 153:24, 155:7, 186:22, 186:24, 186:25, 191:10, 191:13, 191:15, 195:11, 196:25, 197:4, 198:25, 203:16, 203:18, 204:12, 204:13, 205:2, 213:22, 214:10, 214:11, 215:7, 216:3, 222:22, 223:7, 223:11, 223:23, 223:24, 224:9, 224:14, 225:2, 225:22, 225:23, 228:15, 230:13, 232:19, 232:23, 233:2, 233:7, 233:8, 233:23, 234:1, 234:5, 234:9, 235:5, 235:7, 235:8, 235:10, 236:5, 236:22, 237:6, 237:8, 237:22, 239:10, 240:13, 257:1, 264:15, 265:3, 270:20, 271:1, 276:7
**areal** [2] - 36:9, 187:11
**areas** [17] - 41:18, 42:10, 45:15, 50:18, 59:14, 83:14, 117:2, 158:22, 215:2, 216:4, 216:18, 224:2, 224:4, 224:5, 224:10, 230:7, 241:2
**argue** [1] - 62:16
**arguing** [1] - 158:22
**argument** [1] - 173:9
**argumentative** [1] - 149:8
**arguments** [1] - 158:24
**arising** [1] - 169:22
**Arizona** [1] - 21:9
**arrive** [1] - 167:11
**art** [1] - 181:17
**article** [2] - 205:20, 205:25
**Article** [13] - 58:11, 58:21, 118:16, 120:21, 197:24, 198:15, 198:22, 199:6, 200:5, 200:9, 201:17, 205:10, 205:16
**ASHLEIGH** [1] - 8:6
**aside** [3] - 103:4, 138:1, 235:25
**aspects** [1] - 183:22
**assess** [3] - 145:3, 235:23, 271:19
**assessing** [1] - 271:1
**assist** [2] - 84:9, 99:12
**assistant** [2] - 211:19, 212:13
**associated** [6] - 39:4, 198:1, 203:13, 213:13, 225:1, 227:2
**assume** [4] - 88:12, 138:2, 181:6, 274:9
**assuming** [2] - 113:25, 177:12
**assumption** [1] - 274:4
**assumptions** [3] - 42:3, 244:16, 249:20
**atmosphere** [2] - 23:5, 127:3
**attached** [9] - 131:17, 132:10, 146:9, 146:16, 147:12, 150:23, 152:15, 168:6, 200:25
**attachments** [1] - 87:24
**attempt** [1] - 185:17
**attempting** [1] - 49:19
**attention** [9] - 23:11, 30:9, 37:4, 37:5, 100:6, 168:10, 213:7, 232:15, 233:3
**Attorney** [3] - 61:16, 87:8, 210:22
**attorney** [3] - 13:12, 99:11, 99:17
**Attorneys** [2] - 8:11, 8:19
**attribute** [2] - 264:10, 267:13
**attributed** [1] - 221:25
**author** [1] - 262:20
**Authority** [1] - 157:16
**authority** [8] - 148:18, 148:20, 156:9, 156:20, 157:7, 157:12, 157:17, 157:21
**automatic** [1] - 28:17
**availability** [4] - 38:24, 107:12, 107:19, 108:2
**available** [25] - 37:24, 46:20, 108:20, 145:6, 167:16, 209:15, 227:8, 227:11, 241:19, 244:6, 244:16, 245:7, 246:5, 246:7, 247:1, 247:19, 247:23, 248:5, 248:12, 248:23, 249:9, 249:25, 252:16, 253:3, 254:4
**Avenue** [2] - 7:19, 8:12
**average** [2] - 139:2, 194:8
**averages** [1] - 238:24
**aviation** [6] - 29:23, 29:24, 30:2, 32:4, 35:16, 63:2
**avoid** [1] - 83:15
**aware** [28] - 69:13, 69:23, 70:2, 70:12, 70:17, 70:19, 70:21, 70:24, 71:2, 71:4, 72:14, 75:9, 87:17, 88:8, 88:23, 112:4, 115:3, 115:24, 116:1, 127:9, 127:13, 160:11, 167:14, 172:9, 172:12, 253:11, 271:22, 272:22

## B

**B'** [1] - 134:10
**B-1** [1] - 239:13
**B-3** [3] - 207:11, 207:14, 207:22
**B-o-e-s-h-a-n-s** [1] - 20:6
**B.S** [1] - 21:2
**bachelor** [1] - 44:11
**bachelor's** [3] - 212:8, 231:12, 245:12
**background** [7] - 21:1, 21:7, 22:15, 44:10, 212:7, 231:11, 245:10
**backup** [1] - 83:9
**backwards** [1] - 157:3
**bad** [5] - 88:7, 108:13, 114:23, 134:20, 137:21
**Bakken** [1] - 240:18
**bar** [1] - 174:24
**barrier** [1] - 176:22
**barriers** [1] - 111:7
**based** [48] - 22:7, 28:19, 38:11, 38:18, 38:20, 58:8, 76:8, 79:9, 79:25, 96:25, 97:12, 105:6, 137:18, 138:5, 139:6, 140:6, 140:25, 141:1, 157:9, 162:25, 185:18, 196:20, 198:6, 198:19, 198:24, 199:5, 225:24, 230:2, 232:24, 235:17, 237:8,

237:11, 240:3, 240:5, 241:6, 247:9, 248:15, 255:18, 258:4, 258:5, 258:10, 259:22, 261:9, 267:5, 269:20, 269:24, 270:20, 274:14
**baseline** [2] - 237:1, 237:12
**basic** [2] - 68:3, 146:23
**Basin** [4] - 21:13, 36:23, 44:17, 240:12
**basin** [1] - 32:15
**basing** [1] - 241:4
**basis** [3] - 139:7, 199:2, 199:3
**bat** [1] - 200:22
**Bauman** [1] - 12:3
**BAUMAN** [1] - 8:23
**bearing** [2] - 222:15, 222:20
**became** [1] - 21:18
**become** [3] - 18:18, 217:18, 217:22
**BEFORE** [1] - 7:22
**beforehand** [1] - 24:3
**began** [2] - 165:4, 226:15
**begin** [4] - 20:23, 82:1, 141:18, 258:4
**begins** [1] - 82:13
**behalf** [3] - 12:1, 62:7, 88:25
**behind** [1] - 199:1
**belief** [3] - 186:23, 188:6, 188:10
**belonged** [1] - 148:13
**belongs** [1] - 176:10
**below** [14] - 23:8, 137:6, 185:14, 188:13, 207:23, 215:8, 220:21, 222:23, 223:10, 237:24, 240:1, 240:14, 241:9, 242:3
**Belt** [2] - 32:9, 32:10
**BENDER** [76] - 8:10, 11:17, 12:19, 13:14, 13:16, 18:12, 19:25, 20:5, 20:9, 20:15, 23:23, 24:6, 24:16, 24:17, 25:7, 25:12, 30:17, 30:22, 33:5, 37:3, 37:22, 40:24, 41:5, 43:3, 43:11, 43:17, 43:23, 55:22, 56:3, 61:6, 62:15, 72:18, 75:17, 78:18, 81:19, 99:25, 100:4, 110:16, 112:11, 118:12, 118:14, 121:21, 122:2, 136:3, 136:5, 149:8, 152:2, 152:4, 156:12, 158:21, 162:7, 162:12, 178:14, 187:8, 187:16, 187:20, 192:1, 196:17, 197:9, 198:16, 199:23, 206:3, 206:6, 206:8, 206:18, 207:5, 209:19, 210:23, 211:1, 211:9, 230:15, 230:24, 238:14, 240:23, 250:22, 251:1
**Bender** [3] - 11:19, 13:12, 210:22
**Bender.....** [4] - 9:9, 9:10, 9:20, 9:21
**beneath** [2] - 64:6, 238:2
**beneficial** [2] - 160:12, 160:18
**benefit** [16] - 34:11, 34:21, 64:25, 100:13, 100:17, 100:19, 100:25, 102:3, 102:15, 103:6, 103:13, 103:14, 104:14, 105:19, 105:20, 177:21
**benefits** [10] - 29:11, 32:18, 32:24, 33:2, 34:13, 103:11, 104:7, 104:18, 104:21, 105:15
**best** [15] - 59:8, 73:16, 98:15, 122:9, 126:9, 126:11, 128:5, 133:25, 172:11, 193:15, 208:21, 266:5, 266:6, 275:5
**better** [8] - 68:7, 75:19, 117:12, 145:13, 170:17, 175:18, 198:11, 264:24
**between** [20] - 19:20, 26:7, 33:14, 40:6, 40:13, 71:9, 124:20, 140:1, 140:20, 170:4, 184:24, 185:2, 187:24, 187:25, 188:2, 215:22, 238:3, 241:14, 255:21, 274:24
**Beulah** [3] - 21:11, 50:20, 224:3
**beyond** [3] - 85:13, 85:18, 155:22
**bid** [1] - 73:23
**bids** [2] - 72:10, 73:4
**bigger** [2] - 106:17, 106:18
**biggest** [2] - 32:5, 105:8
**billion** [8] - 28:22, 29:14, 29:16, 29:18, 30:4, 36:23, 116:11, 125:6
**bin** [1] - 268:4
**bins** [2] - 268:7
**Bismarck** [7] - 7:19, 8:13, 8:21, 11:20, 11:25, 22:8, 60:25
**bit** [25] - 22:1, 26:19, 27:8, 27:17, 34:25, 36:17, 41:10, 49:2, 49:23, 51:11, 56:18, 56:22, 57:18, 62:24, 110:17, 182:17, 195:7, 205:8, 208:17, 215:3, 221:10, 224:13, 225:4, 226:8, 226:22
**BK** [11] - 23:19, 25:21, 26:24, 37:12, 39:15, 40:2, 48:10, 49:11, 51:18, 51:19, 184:16
**black** [1] - 233:9
**blank** [2] - 207:15, 207:17
**block** [2] - 38:16, 183:20
**blocks** [3] - 141:15, 142:6, 142:24
**blow** [1] - 183:19
**blow-down** [1] - 183:19
**Blue** [1] - 29:3
**BNI** [5] - 21:15, 164:4, 164:5, 164:17
**board** [1] - 130:2
**Boeshans** [5] - 20:2, 20:5, 20:10, 20:18, 124:11
**BOESHANS** [33] - 20:11, 36:21, 61:23, 72:20, 75:18, 76:10, 77:3, 81:20, 100:22, 105:6, 108:15, 111:15, 112:16, 124:15, 128:11, 139:9, 145:20, 159:8, 160:25, 162:20, 164:21, 167:5, 167:13, 175:6, 179:2, 183:4, 186:12, 193:9, 196:5, 200:18, 202:16, 205:18, 209:12
**BOESHANS/JEFFREY** [1] - 9:8
**BOHRER** [3] - 8:4, 207:9, 208:12
**Bohrer.....** [1] - 9:16
**bolded** [1] - 205:17
**Bonnie** [1] - 12:4
**bonus** [16] - 57:20, 58:1, 162:5, 162:15, 162:16, 162:19, 163:7, 164:14, 164:19, 165:13, 165:21, 166:3, 168:13, 169:6, 169:18
**boom** [1] - 88:18
**boost** [1] - 22:20
**booster** [1] - 82:23
**bottom** [1] - 25:17
**boundaries** [24] - 39:2, 40:13, 41:25, 67:11, 117:20, 139:8, 140:8, 141:3, 141:5, 141:13, 186:7, 191:4, 191:7, 191:22, 203:13, 203:15, 203:16, 222:17, 225:21, 230:6, 230:12, 266:11, 275:4, 276:3
**boundary** [32] - 46:6, 46:9, 53:13, 117:6, 138:17, 138:19, 138:23, 139:3, 139:12, 139:14, 139:17, 139:20, 139:21, 140:12, 140:14, 140:16, 140:17, 140:21, 140:22, 141:19, 143:13, 186:6, 186:10, 186:13, 186:16, 186:18, 186:20, 191:24, 203:25, 204:2, 232:24
**Box** [1] - 11:20
**box** [1] - 81:21
**boy** [1] - 136:4
**BRAATEN** [73] - 8:18, 11:24, 24:1, 24:7, 25:9, 30:19, 32:21, 36:19, 37:20, 41:1, 43:14, 55:25, 61:18, 61:20, 62:18, 73:2, 75:21, 78:22, 79:5, 81:24, 89:5, 89:11, 93:10, 93:18, 99:23, 100:1, 100:5, 110:18, 112:13, 118:13, 119:3, 120:15, 120:23, 121:24, 122:4, 124:3, 124:9, 124:10, 136:4, 136:6, 136:7, 149:11, 152:3, 152:6, 152:8, 156:17, 156:19, 159:1, 162:10, 162:13, 167:6, 167:7, 178:16, 178:18, 179:14, 179:22, 179:23, 187:5, 187:14, 187:19, 187:22, 187:23, 192:4, 192:7, 206:7, 238:17, 238:19, 241:1, 246:23, 246:24, 250:24, 251:5, 256:13
**Braaten** [13] - 8:19, 11:24, 13:8, 19:4, 61:17, 95:5, 124:7, 131:19, 162:8, 179:20, 238:16, 246:21
**Braaten.....** [2] - 9:11, 9:22
**break** [5] - 61:11, 126:13, 165:20, 179:13, 246:16
**breathing** [1] - 103:25
**brief** [2] - 47:23, 213:9
**briefly** [14] - 20:24, 24:22, 28:9, 30:23, 31:22, 35:6, 35:14, 44:8, 49:24, 198:13, 211:21, 224:19, 231:10, 232:16
**brine** [2] - 217:15, 217:17
**bring** [2] - 32:19, 174:18
**bringing** [1] - 130:13
**brings** [1] - 69:22
**broad** [2] - 72:22, 104:20
**broker** [1] - 252:19
**Broom** [63] - 1:5, 2:4, 2:17, 3:5, 3:9, 4:7, 4:19, 5:7, 5:11, 6:10, 6:22, 7:11, 14:1, 15:8, 15:13, 16:21, 17:1, 18:9, 28:2, 188:12, 214:9, 214:11, 214:19, 214:20, 214:21, 215:4, 215:5, 215:8, 215:13, 217:19, 220:12, 221:6, 222:4, 222:20, 222:23, 222:24, 227:20, 237:23,

243:3, 243:9, 248:17, 248:19, 255:15, 256:7, 257:15, 258:20, 259:14, 259:16, 260:18, 261:11, 262:16, 262:18, 262:24, 263:10, 263:18, 264:18, 264:19, 265:7, 265:15, 266:20, 269:6, 271:25, 274:15
**brought** [1] - 79:2
**buffer** [19] - 45:16, 50:19, 139:17, 139:22, 140:20, 140:21, 141:3, 141:8, 141:11, 141:19, 141:23, 143:1, 204:14, 204:18, 204:20, 204:22, 230:7, 230:14, 233:1
**buffers** [1] - 266:13
**build** [4] - 23:1, 38:19, 38:20, 105:12
**building** [1] - 105:14
**bunch** [2] - 19:1, 19:2
**buoyant** [1] - 217:10
**burdens** [1] - 93:16
**Burton** [1] - 225:25
**Burton-Kelly** [1] - 225:25
**bushels** [3] - 29:18, 33:13, 33:15
**Business** [1] - 21:6
**business** [7] - 24:25, 25:1, 25:16, 44:12, 163:23, 177:24, 192:25
**busy** [2] - 84:7, 85:5
**BY** [55] - 20:15, 43:23, 61:20, 61:23, 76:11, 77:3, 83:17, 100:22, 104:9, 105:6, 107:22, 108:15, 111:17, 112:16, 118:9, 124:15, 128:12, 139:9, 145:21, 159:8, 161:2, 162:20, 165:4, 167:13, 168:8, 179:2, 180:2, 183:4, 184:17, 186:12, 191:20, 192:11, 193:9, 195:6, 195:17, 196:5, 196:11, 200:2, 200:18, 200:21, 201:11, 202:16, 205:14, 205:18, 207:9, 207:13, 208:16, 209:12, 211:9, 230:24, 238:19, 238:22, 239:22, 240:11, 247:2
**Byron** [1] - 8:11

## C

**Caitlin** [10] - 211:2, 230:17, 230:25, 231:2, 231:3, 231:25, 233:18, 234:22, 238:5, 239:8
**CAITLIN** [1] - 230:20
**calculated** [10] - 67:13, 67:18, 67:20, 270:6, 270:7, 270:20, 272:22, 273:14, 273:19, 273:22
**CALEB** [1] - 8:7
**Calgary** [1] - 7:19
**candidate** [1] - 214:10
**Canyon** [1] - 239:19
**capable** [3] - 83:11, 84:13, 106:1
**capacity** [8] - 20:21, 44:4, 116:6, 177:25, 195:1, 205:23, 211:18, 231:6
**capillary** [1] - 216:13
**capital** [1] - 116:11
**capture** [12] - 21:25, 23:4, 27:11, 27:13, 29:2, 29:3, 29:5, 32:13, 35:24, 203:4, 212:2, 259:25
**captured** [3] - 27:18, 27:20, 194:20
**capturing** [2] - 29:5, 81:3
**Carbon** [108] - 1:4, 1:6, 1:15, 1:19, 2:6, 2:8, 3:4, 3:8, 3:10, 3:19, 3:23, 4:8, 4:9, 4:12, 5:6, 5:10, 5:12, 5:21, 6:1, 6:11, 6:14, 7:10, 13:24, 14:2, 14:5, 14:13, 14:17, 15:7, 15:11, 15:14, 15:18, 15:24, 16:2, 16:6, 16:20, 16:24, 17:2, 17:5, 17:11, 17:14, 17:18, 18:8, 20:20, 22:3, 22:15, 22:16, 23:2, 23:14, 23:18, 25:2, 25:18, 25:19, 25:24, 26:1, 26:2, 26:7, 26:8, 26:9, 27:8, 27:10, 44:3, 48:12, 49:8, 61:22, 61:25, 62:2, 62:3, 62:5, 62:6, 62:8, 62:9, 62:11, 62:14, 62:20, 62:21, 62:22, 69:3, 69:8, 69:20, 71:10, 71:22, 72:9, 80:12, 80:14, 80:19, 80:21, 80:24, 80:25, 81:2, 81:9, 81:12, 81:22, 82:14, 82:21, 120:2, 120:11, 121:12, 122:1, 122:5, 123:12, 137:7, 182:20, 193:2, 193:5, 193:7, 194:10
**CARBON** [3] - 8:14, 8:15, 8:15
**carbon** [55] - 1:5, 2:8, 3:5, 3:9, 4:11, 5:7, 5:11, 6:13, 7:11, 14:1, 14:16, 15:8, 15:13, 16:5, 16:21, 17:1, 17:17, 18:9, 21:20, 21:25, 22:24, 27:11, 28:15, 28:16, 29:2, 29:3, 32:1, 32:3, 34:15, 70:22, 71:6, 79:8, 100:13, 104:13, 105:3, 106:10, 107:10, 107:17, 107:25, 108:16, 108:18, 110:12, 147:17, 175:9, 175:15, 194:7, 197:25, 198:2, 198:4, 198:5, 212:2, 227:18, 227:24, 229:21
**carbonates** [2] - 263:19, 264:12
**card** [2] - 47:4, 47:10
**care** [1] - 206:5
**career** [4] - 21:8, 21:11, 44:15, 89:3
**carefully** [1] - 19:17
**Carlson** [1] - 21:6
**carrier** [1] - 34:16
**carrying** [1] - 180:1
**carveout** [1] - 205:1
**case** [28] - 24:5, 60:18, 101:16, 102:4, 102:5, 147:12, 149:17, 169:7, 176:11, 177:4, 178:5, 181:23, 186:21, 188:12, 195:18, 195:20, 209:4, 218:9, 218:20, 219:8, 219:9, 219:23, 232:23, 244:24, 245:5, 260:3, 268:6
**Case** [11] - 1:3, 13:21, 14:3, 14:18, 15:9, 15:16, 15:25, 16:7, 16:22, 17:3, 17:12
**cases** [6] - 11:11, 12:9, 12:21, 13:21, 192:14, 203:11
**Casselton** [1] - 34:8
**Cassie** [1] - 12:7
**catch** [1] - 197:8
**category** [1] - 78:6
**caught** [1] - 201:9
**CCS** [7] - 34:14, 34:18, 101:4, 101:5, 105:7, 105:10, 113:16
**cell** [3] - 142:7, 143:14, 268:8
**cells** [3] - 141:16, 218:18, 218:21
**cementation** [1] - 267:1
**cemented** [1] - 259:17
**cent** [2] - 163:4, 165:22
**center** [4] - 28:18, 83:8, 83:9, 83:10
**Center** [5] - 21:16, 66:8, 66:10, 211:16, 231:5
**central** [1] - 205:2
**cents** [1] - 166:5
**Century** [6] - 46:4, 104:11, 157:1, 157:9, 158:6, 175:7
**certain** [6] - 87:5, 90:11, 94:7, 149:25, 241:23, 263:3
**certainly** [9] - 45:13, 54:7, 64:11, 88:2, 115:14, 117:13, 158:1, 206:25, 210:16
**certainty** [1] - 269:16
**certificate** [1] - 175:8
**certification** [1] - 175:4
**certified** [7] - 46:11, 46:25, 47:2, 47:5, 50:11, 50:13, 86:18
**cetera** [5] - 38:25, 64:11, 67:11, 154:8
**challenge** [2] - 32:7, 105:8
**change** [19] - 94:25, 96:25, 101:18, 108:25, 109:1, 113:16, 143:7, 143:8, 143:12, 143:13, 153:5, 164:14, 166:21, 166:23, 167:5, 180:11, 180:16, 219:15, 235:10
**changed** [3] - 101:20, 163:1, 258:10
**changes** [21] - 85:14, 85:15, 95:4, 95:9, 95:12, 95:19, 95:22, 96:5, 96:7, 96:8, 97:8, 97:11, 97:23, 110:2, 164:23, 166:6, 166:25, 167:1, 235:12, 242:22, 242:25
**changing** [1] - 166:18
**Chapter** [4] - 104:11, 157:2, 157:11, 198:3
**chapter** [1] - 157:18
**characteristics** [3] - 63:16, 117:16, 227:21
**characterization** [8] - 38:15, 94:17, 98:17, 98:20, 156:13, 170:1, 212:1, 242:6
**characterize** [6] - 45:7, 92:17, 102:19, 102:20, 148:17, 171:18
**charged** [3] - 74:11, 74:13, 202:9
**charges** [1] - 72:16
**Charmayne** [1] - 12:5
**check** [3] - 174:11, 183:19, 268:10
**chemical** [1] - 189:6
**chief** [2] - 63:14, 183:16
**choice** [2] - 182:10, 274:13
**choose** [3] - 74:4, 101:14, 275:13
**choosing** [2] - 247:24, 275:20
**chose** [5] - 219:5, 248:10, 274:14, 275:3, 275:13
**Christy** [1] - 12:6
**CI** [2] - 32:14, 64:24
**circulated** [2] - 30:10, 96:6
**citizen** [1] - 147:23

**citizens** [4] - 22:22, 100:18, 101:9, 103:24
**civil** [1] - 21:3
**claim** [1] - 77:1
**claims** [1] - 173:24
**clarification** [4] - 24:2, 210:1, 210:6, 210:13
**clarify** [5] - 192:18, 193:1, 199:8, 200:14, 243:5
**clarifying** [1] - 250:24
**Class** [1] - 182:25
**classification** [19] - 42:20, 75:25, 76:3, 76:15, 77:1, 77:7, 77:18, 77:24, 80:2, 80:7, 82:5, 125:15, 125:18, 125:20, 125:24, 127:10, 127:14, 208:21, 240:4
**classified** [1] - 76:8
**classify** [1] - 82:7
**clause** [26] - 86:12, 86:20, 96:13, 98:8, 98:13, 101:25, 128:13, 129:5, 129:7, 129:22, 130:13, 130:18, 130:19, 130:21, 130:23, 131:3, 153:12, 155:1, 166:9, 166:16, 166:24, 169:10, 170:3, 178:11, 178:13
**cleanup** [1] - 200:22
**clear** [6] - 28:5, 120:14, 129:3, 129:4, 171:21, 187:9
**clearly** [1] - 100:22
**clerical** [1] - 151:22
**client** [1] - 97:5
**clients** [3] - 70:14, 165:10, 207:2
**climate** [1] - 107:7
**closely** [1] - 173:8
**closest** [2] - 40:7, 224:3
**CMG** [2] - 225:17, 243:23
**CMG's** [1] - 219:21
**co** [1] - 124:23
**CO** [1] - 32:14
**co-ops** [1] - 124:23
**CO2** [160] - 12:23, 22:6, 23:4, 26:15, 26:16, 27:1, 27:2, 27:4, 27:13, 27:14, 27:18, 27:20, 27:25, 28:2, 28:25, 29:5, 32:13, 32:15, 33:24, 35:2, 35:9, 35:11, 35:15, 35:19, 35:22, 35:24, 36:1, 36:3, 36:13, 36:25, 37:18, 38:5, 41:14, 62:25, 63:12, 63:15, 64:5, 64:21, 64:23, 65:3, 65:17, 67:24, 79:11, 81:4, 81:5, 100:24, 101:7, 103:19, 103:21, 104:3, 105:14, 106:23, 109:5, 109:23, 110:22, 111:1, 111:12, 111:20, 112:10, 112:15, 112:21, 112:23, 113:1, 113:3, 113:22, 115:1, 115:9, 117:7, 125:6, 126:14, 126:22, 127:2, 138:20, 138:24, 140:4, 148:22, 158:6, 160:7, 167:17, 167:19, 175:22, 176:1, 176:4, 176:9, 176:12, 176:17, 176:23, 186:6, 186:11, 186:13, 187:1, 188:8, 188:12, 188:15, 188:17, 193:13, 198:5, 198:7, 200:15, 202:3, 202:9, 204:11, 205:1, 209:3, 209:7, 209:11, 209:18, 214:4, 214:7, 214:10, 214:14, 216:20, 217:8, 217:10, 217:13, 217:14, 217:17, 218:2, 218:7, 218:10, 218:13, 218:18, 218:21, 218:24, 218:25, 219:2, 219:4, 219:10, 219:11, 219:13, 219:21, 219:23, 220:1, 220:19, 221:13, 221:15, 223:11, 225:1, 225:2, 225:20, 227:22, 228:4, 228:10, 232:7, 233:10, 238:12, 242:11, 244:19, 253:18, 253:20, 254:21, 261:23, 262:4, 274:18, 274:21
**coal** [35] - 21:11, 78:3, 78:5, 100:16, 105:5, 105:7, 105:18, 116:10, 116:13, 116:14, 124:25, 125:1, 125:11, 125:14, 127:14, 127:21, 128:2, 162:22, 163:12, 163:18, 163:25, 167:8, 196:15, 222:13, 223:23, 223:24, 224:10, 224:12, 224:14, 224:15, 228:19, 228:23
**Coal** [1] - 21:15
**Coast** [1] - 21:12
**Code** [7] - 46:5, 104:11, 157:1, 157:9, 158:7, 175:7, 198:3
**code** [17] - 42:20, 42:23, 75:25, 76:3, 76:13, 76:15, 77:1, 77:7, 77:18, 77:24, 79:1, 79:2, 127:10, 127:14, 208:18, 209:6, 209:9
**codes** [10] - 125:16, 125:18, 125:20, 125:24, 126:9, 208:18, 208:21, 208:24, 209:22
**codified** [1] - 107:23
**collating** [1] - 247:23
**colleagues** [1] - 245:15
**collected** [2] - 221:5, 262:23
**collecting** [1] - 226:15
**collection** [2] - 211:25, 213:1
**College** [1] - 212:9
**color** [1] - 258:23
**colors** [1] - 258:22
**column** [4] - 55:5, 55:12, 55:19, 207:14
**columns** [2] - 207:15, 207:16
**combination** [1] - 81:3
**combined** [2] - 192:14, 194:5
**coming** [12] - 27:3, 27:4, 34:1, 62:25, 101:8, 113:22, 115:1, 126:14, 126:18, 126:19, 149:2, 271:3
**commencing** [1] - 11:2
**comment** [1] - 266:22
**Comments** [1] - 9:4
**comments** [3] - 46:21, 75:24, 196:8
**commercial** [19] - 26:14, 26:23, 63:8, 63:14, 63:17, 101:4, 105:7, 105:10, 105:11, 105:21, 107:12, 107:20, 108:2, 108:20, 113:16, 114:17, 180:20, 212:2, 232:6
**commercialize** [1] - 176:17
**commercializing** [2] - 21:25, 101:4
**commercially** [6] - 34:17, 113:17, 161:16, 222:9, 222:11, 228:16
**commingled** [1] - 35:25
**Commission** [103] - 1:17, 2:6, 3:20, 4:10, 4:21, 5:23, 6:12, 7:1, 11:6, 12:16, 12:25, 13:23, 14:4, 14:8, 14:12, 14:14, 14:19, 15:10, 15:17, 15:21, 16:1, 16:3, 16:8, 16:23, 17:4, 17:8, 17:13, 17:15, 17:20, 18:17, 20:25, 28:7, 30:11, 34:1, 41:20, 42:4, 42:9, 42:14, 42:19, 43:6, 44:9, 51:8, 51:25, 53:20, 58:15, 59:6, 61:25, 83:22, 84:3, 90:9, 91:2, 91:20, 93:4, 99:2, 99:3, 99:7, 123:17, 123:23, 128:23, 132:18, 133:7, 133:13, 133:16, 138:9, 147:16, 147:21, 148:4, 148:5, 148:11, 148:15, 149:6, 154:14, 156:4, 156:10, 156:21, 156:25, 157:16, 160:1, 170:13, 170:19, 171:10, 172:23, 173:21, 174:17, 174:23, 176:21, 178:8, 202:6, 202:17, 210:3, 210:5, 210:6, 213:16, 214:8, 222:8, 226:7, 226:23, 226:24, 227:7, 232:5, 236:8, 253:22
**Commission's** [3] - 148:18, 157:21, 199:15
**commitment** [1] - 115:7
**commitments** [2] - 22:23, 30:4
**committed** [1] - 22:17
**committing** [1] - 115:8
**commodity** [7] - 30:8, 101:10, 102:22, 103:2, 107:11, 107:18, 108:1
**common** [5] - 34:16, 112:4, 171:21, 184:25, 185:4
**communities** [1] - 22:22
**companies** [1] - 163:25
**company** [5] - 21:17, 22:17, 22:25, 173:1, 180:6
**comparable** [3] - 72:23, 99:19, 240:25
**comparables** [1] - 74:6
**compare** [4] - 19:19, 28:24, 73:18, 240:17
**compares** [1] - 240:21
**comparison** [1] - 73:17
**compel** [1] - 13:11
**compensate** [3] - 57:15, 74:18, 112:8
**compensated** [1] - 168:25
**compensating** [1] - 199:4
**compensation** [19] - 84:16, 84:18, 84:20, 84:25, 99:21, 111:14, 111:19, 166:20, 166:25, 167:5, 167:14, 168:14, 169:6, 169:11, 169:19, 169:21, 175:10, 176:10, 177:22
**competent** [4] - 220:13, 227:23, 229:13, 229:24
**competitive** [4] - 72:16, 73:1, 73:12, 74:5
**competitively** [1] - 73:23
**competitors** [1] - 73:5
**complete** [4] - 45:14, 84:12, 98:18, 201:6
**completed** [2] - 21:4, 38:14
**completion** [2] - 150:9, 159:13
**complex** [4] - 216:20, 269:6, 269:12, 269:14
**complexes** [3] - 269:12, 269:16, 269:23
**compliance** [1] - 232:12
**comply** [1] - 235:3
**component** [2] - 80:23, 198:7
**composition** [7] - 35:1, 35:2,

218:24, 218:25, 219:6, 219:12, 244:20
**compound** [1] - 149:9
**comprehensive** [3] - 119:1, 120:20, 121:8
**compress** [1] - 113:1
**comprise** [1] - 236:16
**comprises** [2] - 236:15, 264:1
**compromise** [1] - 228:8
**computer** [1] - 19:5
**computers** [1] - 18:25
**concentration** [1] - 103:21
**concern** [4] - 36:15, 123:1, 203:15, 275:1
**concerned** [2] - 209:8, 274:23
**concerns** [9] - 36:12, 96:9, 96:25, 97:13, 97:17, 106:2, 131:5, 131:8, 131:9
**conclude** [1] - 276:11
**conclusion** [1] - 228:13
**Concordia** [1] - 212:9
**conditions** [1] - 87:5
**conducive** [2] - 214:15, 227:22
**conduct** [4] - 129:1, 129:20, 131:1, 242:14
**conducted** [6] - 224:24, 225:5, 225:7, 225:19, 228:3, 233:19
**conducting** [1] - 208:8
**confidence** [2] - 141:20, 177:20
**confident** [1] - 261:16
**confidential** [3] - 75:12, 178:5, 252:19
**Confidentiality** [1] - 177:19
**confine** [2] - 187:23, 252:9
**confined** [5] - 186:25, 188:7, 217:15, 236:16, 250:14
**confinement** [2] - 217:7, 238:10
**confining** [40] - 36:8, 187:25, 188:3, 188:13, 200:7, 200:17, 214:22, 214:25, 215:4, 215:8, 215:10, 215:16, 215:20, 216:1, 216:8, 216:10, 217:10, 218:2, 218:3, 218:5, 218:8, 218:11, 218:13, 218:16, 219:11, 219:14, 220:13, 220:17, 222:6, 227:23, 228:6, 229:14, 229:25, 234:10, 235:21, 238:4, 238:21, 239:2, 239:4
**confirm** [5] - 55:13, 77:9, 189:3, 229:19
**confirmed** [2] - 214:6, 262:25
**conflict** [2] - 91:16, 92:25
**conform** [1] - 132:11
**conformance** [1] - 133:6
**conformed** [1] - 132:16
**confuse** [1] - 56:23
**confused** [2] - 145:21, 180:14
**confuses** [1] - 120:23
**confusing** [3] - 53:7, 120:18, 138:11
**connect** [3] - 29:15, 63:6, 64:22
**connected** [1] - 65:20
**connecting** [3] - 27:23, 63:3, 63:4
**connects** [1] - 32:12
**consensual** [1] - 147:9
**consent** [2] - 147:13, 147:15
**consequently** [1] - 125:7
**conservative** [16] - 218:9, 218:20, 219:1, 274:4, 274:6, 274:16, 274:19, 274:22, 275:3, 275:14, 275:15, 275:16, 275:22, 275:24
**conservatively** [1] - 35:20
**consider** [35] - 1:16, 2:18, 3:19, 4:9, 4:21, 5:21, 7:1, 13:23, 14:5, 14:6, 14:12, 14:20, 15:18, 15:19, 16:2, 16:9, 16:24, 17:5, 17:6, 17:14, 17:20, 41:6, 41:8, 82:13, 82:15, 85:16, 85:18, 85:20, 86:24, 119:16, 121:15, 125:21, 126:17, 180:10, 256:13
**considerably** [1] - 250:1
**consideration** [9] - 1:4, 3:8, 5:10, 13:25, 15:12, 16:25, 39:17, 81:25, 97:14
**considerations** [6] - 35:17, 41:11, 94:8, 114:17, 140:25, 213:25
**considered** [7] - 87:9, 122:6, 122:11, 123:12, 160:13, 215:11, 240:2
**considering** [3] - 15:11, 38:23, 125:9
**consist** [1] - 263:20
**consistent** [12] - 46:4, 46:16, 58:3, 58:22, 85:1, 104:16, 139:21, 143:24, 153:9, 162:22, 166:4, 192:19
**consists** [2] - 215:20, 238:10
**consolidated** [1] - 11:12
**consolidating** [2] - 12:21, 19:10
**constant** [1] - 107:6
**constituents** [2] - 35:12, 35:13
**constitutes** [1] - 188:16
**constitution** [3] - 158:9, 158:14, 158:20
**constitutional** [1] - 158:11
**constrained** [1] - 262:1
**constructed** [6] - 28:13, 106:4, 106:5, 106:7, 234:16, 243:21
**construction** [4] - 22:10, 28:9, 216:25, 225:10
**constructs** [1] - 106:22
**construed** [1] - 118:19
**consultant** [1] - 159:20
**consulting** [4] - 21:8, 72:11, 73:20, 74:23
**consume** [1] - 29:17
**consumes** [3] - 33:13, 33:16, 33:20
**Cont'd** [1] - 10:1
**contact** [2] - 51:4, 219:10
**contain** [6] - 218:13, 220:19, 222:11, 228:16, 228:19, 252:17
**contained** [8] - 24:9, 30:24, 35:7, 46:15, 217:9, 217:11, 217:13, 241:17
**containing** [2] - 188:8, 229:11
**containment** [2] - 221:12, 221:15
**contains** [5] - 232:23, 238:23, 239:20, 252:10, 259:16
**contamination** [2] - 180:22, 181:10
**contemplated** [2] - 114:12, 168:13
**context** [1] - 161:19
**continue** [7] - 60:12, 78:19, 102:6, 102:25, 116:19, 129:10, 199:16
**continued** [2] - 52:15, 102:5
**continues** [1] - 113:16
**continuing** [3] - 39:14, 42:14, 102:8
**CONTINUING** [44] - 24:17, 25:12, 30:22, 33:5, 37:3, 37:22, 41:5, 56:3, 62:18, 73:2, 75:21, 79:5, 81:24, 89:11, 93:18, 100:5, 110:18, 112:13, 119:3, 120:23, 121:24, 122:4, 124:10, 136:7, 149:11, 152:8, 156:19, 159:1, 162:13, 167:7, 178:18, 179:23, 187:14, 187:23, 192:4, 196:19, 197:12, 197:23, 198:21, 209:25, 241:1, 246:24, 251:5, 256:13
**continuous** [1] - 215:1
**contract** [26] - 69:4, 69:6, 69:12, 71:9, 71:19, 71:24, 72:6, 74:19, 74:22, 75:11, 89:21, 90:25, 91:13, 91:14, 92:7, 94:6, 111:19, 124:22, 146:22, 155:20, 170:4, 170:13, 179:6, 185:1, 186:2, 226:13
**contracted** [2] - 72:12, 161:10
**contracting** [1] - 71:4
**contracts** [26] - 69:13, 69:19, 69:23, 70:2, 71:13, 71:15, 71:20, 71:23, 72:4, 75:1, 75:5, 91:8, 110:4, 110:5, 111:9, 114:24, 115:4, 115:17, 115:22, 124:21, 124:22, 124:25, 154:16, 193:11, 194:14, 194:22
**contractual** [3] - 93:4, 147:22, 179:6
**contribute** [2] - 202:11, 202:20
**contributes** [1] - 29:13
**control** [16] - 25:4, 28:18, 30:15, 40:20, 45:23, 47:21, 49:6, 50:1, 66:4, 83:8, 83:9, 83:10, 183:19, 250:15, 267:20, 267:21
**controlled** [1] - 248:13
**controls** [4] - 93:1, 223:9, 229:6, 256:18
**conversations** [1] - 34:6
**conveying** [1] - 147:5
**cooperate** [2] - 149:20, 149:24
**cooperation** [4] - 38:22, 138:21, 149:18, 177:4
**copies** [3] - 19:1, 19:2, 75:5
**copy** [14] - 18:23, 19:4, 19:6, 46:19, 50:10, 50:23, 54:24, 65:25, 86:17, 197:2, 253:8, 254:25, 268:14
**core** [23] - 217:2, 217:4, 218:24, 221:4, 227:14, 238:24, 248:15, 248:16, 255:18, 258:4, 258:6, 258:7, 259:20, 259:23, 260:7, 260:21, 261:2, 261:12, 261:13, 262:23, 262:24, 262:25, 264:16
**cores** [1] - 260:5
**Corn** [2] - 32:9, 32:10
**corn** [21] - 29:18, 29:21, 29:25, 30:6, 33:10, 33:13, 33:15, 33:17, 33:20, 33:22, 34:5, 34:7, 34:21, 34:24, 101:9, 102:12, 102:16, 102:21, 103:3

**corns** [1] - 33:14
**correct** [95] - 24:6, 31:13, 31:17, 31:18, 34:2, 42:7, 42:8, 42:11, 42:12, 42:17, 45:5, 45:6, 45:24, 45:25, 46:25, 47:1, 51:9, 51:10, 51:14, 51:16, 53:22, 53:23, 55:16, 55:21, 56:6, 58:9, 58:10, 58:18, 58:19, 59:5, 62:12, 66:5, 67:6, 68:15, 78:15, 79:20, 89:11, 90:10, 91:6, 101:24, 114:6, 119:24, 120:2, 120:3, 124:15, 126:16, 126:24, 127:1, 130:12, 131:14, 135:18, 137:25, 147:11, 151:24, 156:1, 156:8, 161:24, 163:20, 166:3, 167:4, 169:25, 170:1, 175:1, 184:6, 185:16, 193:8, 193:9, 195:2, 199:13, 205:13, 205:14, 208:10, 213:5, 213:6, 223:18, 228:24, 228:25, 234:5, 234:6, 239:24, 243:3, 243:14, 244:1, 245:17, 247:8, 250:5, 252:5, 253:14, 261:8, 261:10, 267:10, 268:12, 268:20, 270:1, 272:4
**correcting** [1] - 151:19
**corrections** [1] - 199:21
**corrective** [3] - 234:21, 234:24, 235:18
**correctly** [2] - 91:10, 132:14
**correlation** [1] - 264:15
**Cost** [1] - 118:17
**cost** [5] - 28:21, 121:20, 122:5, 122:17, 150:15
**costs** [14] - 64:10, 113:5, 118:2, 118:5, 118:7, 118:24, 119:4, 119:8, 119:11, 120:7, 120:22, 121:18, 121:22, 121:23
**counsel** [7] - 20:25, 30:11, 43:6, 44:9, 77:12, 133:25, 214:9
**Counties** [13] - 1:14, 2:4, 2:17, 3:3, 3:17, 4:6, 4:19, 5:5, 15:6, 16:18, 28:1, 37:12, 38:4
**counties** [2] - 38:10, 95:8
**country** [1] - 21:12
**County** [10] - 5:20, 6:9, 6:22, 7:9, 18:6, 37:14, 37:15, 37:16, 39:11, 125:7
**county** [1] - 60:12
**couple** [9] - 160:8, 194:15, 196:21, 197:19, 199:7, 200:23, 201:10, 207:10
**course** [8] - 41:19, 44:25, 54:8, 60:1, 84:22, 87:3, 146:8, 189:9
**court** [3] - 48:1, 170:19, 201:20
**covenants** [1] - 172:18
**cover** [9] - 36:9, 71:11, 72:4, 87:24, 120:1, 180:21, 180:22, 199:9, 213:10
**covered** [6] - 84:17, 84:19, 118:6, 183:5, 189:14, 223:20
**covering** [4] - 95:7, 161:7, 181:25, 183:14
**covers** [3] - 96:21, 181:1, 256:25
**coworkers** [1] - 245:14
**Coyote** [1] - 224:2
**crack** [1] - 206:4
**create** [7] - 67:4, 102:23, 122:17, 144:8, 251:13, 266:1, 266:3
**created** [3] - 68:4, 247:18, 252:2
**creates** [2] - 64:24, 93:16
**creating** [2] - 48:2, 101:12
**creation** [2] - 44:24, 232:11
**credit** [1] - 109:21
**credits** [4] - 109:4, 109:10, 110:12
**Creek** [65] - 1:5, 2:4, 2:17, 3:5, 3:9, 4:7, 4:20, 5:7, 5:11, 6:10, 6:22, 7:11, 14:1, 15:8, 15:14, 16:21, 17:1, 18:9, 28:2, 188:12, 214:9, 214:11, 214:19, 214:20, 214:21, 215:4, 215:5, 215:9, 215:13, 217:19, 220:12, 221:7, 222:4, 222:20, 222:23, 222:24, 224:2, 227:21, 236:15, 237:23, 243:3, 243:9, 248:17, 248:19, 255:15, 256:7, 257:15, 258:20, 259:14, 259:16, 260:18, 261:11, 262:16, 262:18, 262:24, 263:10, 263:18, 264:18, 264:20, 265:7, 265:15, 266:21, 269:6, 271:25, 274:15
**crew** [1] - 212:15
**criteria** [3] - 83:15, 240:3, 240:9
**critical** [3] - 22:21, 202:4, 214:15
**crop** [2] - 168:22, 168:24
**Cross** [2] - 9:11, 9:22
**cross** [8] - 43:10, 61:10, 61:16, 78:23, 199:7, 201:12, 268:22, 269:13
**CROSS** [2] - 61:19, 238:18
**cross-exam** [1] - 78:23
**Cross-Examination** [2] - 9:11, 9:22
**cross-examination** [2] - 61:16, 199:7
**CROSS-EXAMINATION** [2] - 61:19, 238:18
**cross-reference** [1] - 201:12
**cross-section** [2] - 268:22, 269:13
**crossbedded** [1] - 264:22
**crude** [3] - 78:9, 78:12, 79:6
**current** [10] - 83:9, 108:23, 109:7, 110:3, 116:23, 117:20, 189:24, 189:25, 194:15, 194:23
**curved** [1] - 139:16
**customers** [1] - 109:7

## D

**D-2** [1] - 198:4
**D-4** [1] - 169:3
**DAKOTA** [1] - 1:1
**Dakota** [96] - 7:19, 8:13, 8:21, 11:6, 11:25, 16:19, 18:7, 21:3, 21:10, 21:13, 23:6, 27:6, 27:15, 27:19, 27:25, 29:24, 31:5, 32:16, 32:19, 33:6, 33:8, 33:9, 33:18, 33:23, 34:12, 34:14, 36:2, 36:4, 36:7, 36:14, 36:16, 36:25, 44:13, 46:4, 49:7, 49:22, 61:25, 63:21, 63:23, 65:2, 65:7, 65:22, 70:11, 70:24, 71:3, 84:2, 84:9, 84:21, 87:2, 99:1, 100:18, 101:10, 102:3, 103:7, 103:13, 103:15, 103:24, 104:11, 104:22, 106:11, 108:7, 122:23, 124:18, 127:18, 127:23, 147:22, 150:7, 156:10, 156:20, 156:25, 157:1, 158:10, 160:13, 163:18, 164:1, 171:9, 175:4, 178:7, 193:18, 193:22, 196:9, 198:2, 202:2, 202:5, 202:11, 211:17, 214:3, 214:19, 221:18, 222:18, 235:4, 239:21, 240:12, 241:19, 265:15
**Dakota's** [3] - 33:20, 101:6, 124:13
**damages** [3] - 168:15, 168:23, 205:12
**DAT** [4] - 246:9, 253:12, 253:15, 254:20
**data** [109] - 68:5, 75:2, 75:12, 144:6, 144:7, 144:8, 144:11, 144:20, 144:21, 145:3, 190:6, 212:1, 213:1, 214:5, 215:18, 216:19, 216:24, 217:2, 217:3, 217:5, 218:24, 221:1, 221:2, 221:19, 223:2, 225:9, 226:15, 226:20, 226:23, 226:24, 227:10, 227:11, 227:12, 227:14, 233:21, 235:9, 235:15, 235:22, 236:4, 236:5, 240:19, 242:6, 244:2, 244:4, 244:7, 244:8, 244:11, 244:13, 244:14, 244:15, 244:21, 245:3, 245:21, 245:24, 246:1, 246:3, 246:6, 246:25, 247:15, 247:19, 247:23, 248:3, 249:1, 249:10, 249:22, 249:25, 250:10, 251:7, 252:7, 252:8, 252:9, 252:10, 252:16, 252:18, 255:12, 255:24, 256:19, 258:7, 258:9, 259:23, 259:25, 260:20, 260:21, 261:18, 262:11, 262:25, 264:24, 265:17, 265:19, 266:8, 267:8, 267:16, 267:23, 267:25, 268:3, 268:6, 268:7, 269:21, 269:25, 270:7, 271:18, 271:25, 274:12, 275:5, 275:7, 275:10, 275:11
**database** [3] - 235:25, 236:6, 236:7
**date** [4] - 46:18, 125:8, 144:17, 208:24
**David** [1] - 11:7
**DAVID** [2] - 7:22, 8:6
**days** [2] - 13:17, 13:18
**DCC** [9] - 40:3, 40:4, 40:7, 40:9, 40:10, 40:13, 41:9, 70:20
**deal** [2] - 84:1, 163:10
**death** [2] - 172:6, 207:24
**decades** [1] - 125:3
**decide** [3] - 138:13, 162:18, 163:6
**decided** [1] - 274:1
**decides** [1] - 150:8
**deciding** [1] - 271:14
**decimal** [1] - 259:9
**decision** [2] - 143:16, 170:15
**decisions** [5] - 68:22, 140:19, 140:24, 143:20
**deck** [6] - 244:14, 245:21, 245:24, 246:1, 252:8, 252:9

**decks** [4] - 144:21, 244:2, 244:11, 244:13
**deeds** [5] - 172:2, 172:5, 172:12
**deem** [1] - 200:13
**deemed** [3] - 160:18, 178:3, 252:19
**deems** [1] - 42:15
**deep** [4] - 23:7, 190:8, 190:20, 236:18
**deeper** [1] - 224:14
**defend** [7] - 170:25, 171:1, 171:23, 172:20, 172:21, 173:11, 173:19
**defense** [1] - 171:6
**defer** [17] - 111:15, 133:25, 142:11, 143:2, 144:23, 145:20, 160:4, 164:21, 165:2, 183:24, 190:18, 190:24, 193:24, 196:20, 205:3, 270:9
**define** [10] - 224:24, 225:20, 230:11, 244:13, 251:3, 251:5, 265:25, 266:9, 266:10, 276:3
**defined** [12] - 120:7, 121:16, 122:7, 146:10, 187:20, 187:25, 191:8, 203:17, 230:7, 232:20, 239:21, 275:4
**defines** [1] - 197:25
**defining** [2] - 200:6, 220:22
**definition** [10] - 118:1, 118:6, 118:10, 118:23, 119:1, 120:20, 122:12, 145:9, 161:1, 198:1
**definition's** [1] - 246:2
**definitions** [3] - 115:19, 117:25, 134:2
**degree** [4] - 44:12, 44:14, 231:13, 249:2
**delineated** [2] - 225:22, 225:23
**deliver** [1] - 27:24
**delivered** [4] - 30:2, 35:25, 47:3, 50:25
**delta** [3] - 255:21, 255:23, 274:24
**demand** [4] - 33:22, 34:23, 65:10, 102:23
**demonstrate** [1] - 105:25
**demonstrated** [2] - 219:13, 228:4
**demonstrating** [2] - 101:4, 106:9
**demonstration** [1] - 105:21
**denoted** [1] - 233:8
**dense** [1] - 217:18
**Department** [17] - 11:9, 84:2, 84:5, 84:9, 85:9, 85:24, 86:23, 87:13, 87:18, 88:8, 88:17, 89:1, 99:1, 99:18, 231:15, 231:17, 236:8
**dependent** [1] - 116:14
**depicted** [1] - 31:23
**depicts** [2] - 24:25, 233:4
**deploying** [1] - 105:10
**deploys** [1] - 34:18
**deposition** [6] - 265:11, 265:23, 266:20, 269:7, 269:10
**depositional** [12] - 262:12, 262:19, 262:21, 263:1, 263:5, 263:10, 263:15, 263:16, 263:23, 264:5, 264:8, 265:1
**depot** [1] - 161:14
**depth** [5] - 28:14, 145:12, 214:14, 237:11, 239:14
**derived** [6] - 258:8, 265:19, 267:15, 267:19, 270:7, 275:10
**Derrick** [2] - 11:24, 250:23
**DERRICK** [1] - 8:18
**describable** [3] - 139:15, 139:17, 141:3
**describe** [21] - 24:22, 27:22, 28:9, 45:10, 54:5, 74:9, 77:23, 77:25, 126:3, 126:11, 127:5, 127:17, 127:21, 130:10, 141:20, 167:24, 226:21, 256:6, 258:16, 268:17, 274:5
**described** [6] - 127:7, 130:9, 186:17, 234:12, 236:13, 244:5
**describes** [3] - 80:5, 80:6, 263:18
**describing** [1] - 26:11
**Description** [1] - 197:1
**description** [5] - 46:17, 54:8, 79:8, 80:4, 263:22
**descriptions** [1] - 196:22
**design** [6] - 22:9, 116:24, 117:15, 139:11, 194:16, 194:23
**designed** [4] - 28:13, 35:21, 114:11, 194:11
**DESIRAE** [1] - 8:18
**destroyed** [1] - 168:24
**detail** [8] - 19:12, 19:14, 26:19, 27:8, 27:18, 99:5, 189:22, 251:8
**detailed** [2] - 213:17, 244:16
**details** [3] - 94:8, 115:3, 262:21
**determination** [9] - 77:11, 77:17, 170:10, 202:7, 202:14, 202:17, 202:20, 234:20, 237:11
**determine** [21] - 45:17, 66:25, 67:21, 68:5, 68:13, 98:20, 111:10, 117:18, 138:8, 141:11, 142:21, 142:22, 186:18, 202:23, 203:8, 220:25, 225:19, 248:16, 248:24, 257:2, 272:17
**determined** [6] - 135:14, 139:4, 237:15, 255:17, 257:1, 257:13
**determines** [1] - 139:11
**determining** [11] - 2:7, 4:10, 6:12, 14:14, 16:3, 17:15, 50:4, 214:1, 266:13, 270:25, 271:5
**develop** [11] - 116:19, 117:2, 125:10, 139:1, 145:18, 146:1, 146:11, 149:16, 158:6, 223:8, 246:4
**developed** [7] - 88:23, 89:1, 96:12, 140:17, 157:10, 210:9, 225:24
**developing** [4] - 66:24, 144:1, 167:9, 243:15
**development** [13] - 21:9, 65:14, 88:16, 122:13, 138:20, 148:22, 149:19, 150:1, 196:14, 212:3, 212:24, 232:7, 276:4
**develops** [1] - 34:14
**devoid** [8] - 214:22, 216:14, 220:13, 222:21, 229:14, 229:25, 242:9
**DGC** [1] - 209:4
**diagram** [7] - 26:2, 32:8, 39:10, 82:19, 182:15, 183:6, 204:4
**diamonds** [1] - 31:6
**dictate** [1] - 218:19
**difference** [7] - 29:7, 85:19, 85:21, 250:12, 266:25, 267:17, 273:19
**differences** [2] - 19:20, 94:21
**different** [40] - 50:19, 54:3, 72:4, 72:8, 72:21, 80:18, 84:8, 85:10, 88:4, 96:20, 96:21, 97:16, 115:17, 117:17, 123:3, 124:21, 125:15, 125:19, 128:1, 134:25, 136:10, 139:11, 143:14, 145:23, 165:20, 166:14, 174:12, 176:15, 198:19, 249:4, 250:11, 250:17, 250:19, 251:3, 260:20, 264:17, 264:20, 265:2, 266:11, 272:14
**differentiate** [1] - 215:22
**differently** [3] - 125:3, 130:3, 138:24
**difficult** [2] - 128:14, 269:14
**difficulty** [1] - 50:9
**digitized** [3] - 252:18, 252:21, 253:5
**dioxide** [35] - 1:5, 2:8, 3:5, 3:9, 4:11, 5:7, 5:11, 6:13, 7:11, 14:1, 14:16, 15:8, 15:13, 16:5, 16:21, 17:1, 17:17, 18:9, 100:13, 104:14, 107:10, 107:18, 107:25, 108:17, 108:18, 147:18, 175:9, 175:16, 194:7, 197:25, 198:2, 227:18, 227:24, 229:21
**dioxides** [2] - 198:5
**Direct** [4] - 9:9, 9:10, 9:20, 9:21
**direct** [15] - 30:9, 37:4, 37:5, 66:12, 79:2, 81:16, 100:6, 103:23, 106:10, 154:5, 168:10, 204:24, 213:4, 232:15, 233:3
**DIRECT** [4] - 20:14, 43:22, 211:8, 230:23
**directed** [3] - 66:14, 67:4, 204:16
**direction** [6] - 49:7, 66:4, 77:11, 90:12, 265:11, 265:12
**directional** [1] - 223:18
**directly** [8] - 50:25, 64:6, 65:18, 177:8, 237:23, 237:24, 238:2, 251:20
**director** [2] - 44:5, 211:19
**disagree** [4] - 89:23, 90:22, 92:15, 132:22
**disclose** [1] - 254:17
**disclosed** [1] - 178:6
**discovered** [6] - 78:23, 178:6, 223:7, 223:16, 229:5, 242:15
**discuss** [11] - 11:14, 11:16, 28:24, 30:23, 39:5, 49:24, 57:23, 63:4, 215:3, 215:7, 231:25
**discussed** [21] - 52:6, 55:4, 57:9, 116:3, 130:18, 149:21, 166:7, 166:24, 200:24, 216:8, 223:3, 228:14, 235:21, 237:17, 239:5, 245:16, 265:24, 266:21, 270:15, 271:24, 274:17
**discussing** [3] - 31:19, 56:4, 232:14
**discussion** [14] - 63:1, 80:10, 124:11, 152:9, 173:14, 184:21, 186:5, 190:18, 201:6, 201:25,

205:8, 208:5, 208:17, 226:19
**discussions** [6] - 49:21, 63:8, 63:11, 63:17, 86:1, 97:15
**dispersion** [2] - 218:17, 254:21
**display** [1] - 215:15
**displayed** [1] - 258:25
**disposal** [3] - 126:3, 126:7, 127:5
**dispute** [1] - 170:6
**dissolution** [2] - 219:16, 219:25
**dissolved** [3] - 241:7, 241:23, 242:4
**dissolves** [3] - 217:14, 217:17
**distances** [1] - 131:9
**distribute** [5] - 256:20, 265:20, 267:17, 267:24, 268:24
**distributed** [2] - 256:18, 265:3
**distribution** [6] - 225:11, 250:17, 256:17, 259:12, 264:17, 267:12
**disturbed** [1] - 205:13
**diversified** [1] - 21:17
**divide** [1] - 137:9
**DIVISION** [1] - 1:2
**Division** [1] - 11:10
**division** [4] - 88:15, 244:3, 244:12, 251:17
**divisions** [1] - 88:16
**DMR** [25] - 144:10, 144:12, 144:15, 144:22, 144:25, 145:1, 145:6, 210:17, 226:17, 227:1, 235:17, 235:25, 236:3, 244:5, 244:9, 245:5, 251:20, 254:4, 254:5, 254:9, 254:11, 254:13, 254:16, 254:18, 254:22
**docket** [5] - 11:7, 11:11, 18:16, 24:5, 203:11
**doctorate** [1] - 44:14
**document** [6] - 44:24, 54:8, 147:22, 178:12, 196:25, 266:4
**documentation** [1] - 171:25
**documents** [3] - 18:17, 48:3, 172:13
**dollar** [5] - 178:20, 178:21, 178:25, 181:21, 181:25
**dolostone** [2] - 263:20, 264:3
**done** [24] - 18:20, 18:23, 47:20, 52:14, 71:11, 73:21, 84:13, 105:9, 105:22, 112:13, 112:17, 113:4, 117:18, 143:25, 152:18, 183:20, 221:20, 225:16, 226:21, 249:7, 257:18, 267:8, 272:3
**dots** [1] - 221:21
**double** [1] - 268:10
**double-check** [1] - 268:10
**Douglas** [6] - 66:20, 66:21, 211:2, 211:4, 211:12, 211:13
**DOUGLAS** [8] - 211:5, 238:22, 240:11, 240:25, 247:2, 251:2, 256:9, 256:12
**DOUGLAS/CAITLIN** [1] - 9:19
**down** [14] - 35:15, 60:25, 97:20, 114:9, 114:13, 114:15, 126:13, 145:16, 152:20, 161:25, 165:20, 183:19, 215:12, 275:23
**downhole** [1] - 188:17
**downstream** [2] - 182:20, 183:2
**draft** [3] - 122:12, 158:2, 226:17
**drafting** [1] - 53:2
**drafts** [1] - 88:9
**draw** [1] - 141:5
**drawer** [1] - 172:5
**drawn** [3] - 67:24, 140:6, 186:10
**dresser** [2] - 172:5, 172:12
**dresser-drawer** [1] - 172:5
**drill** [2] - 159:11, 223:14
**drilled** [3] - 234:4, 234:13, 262:23
**drilling** [7] - 38:2, 159:9, 159:13, 159:16, 159:19, 160:3, 161:10
**drinking** [7] - 220:7, 220:11, 232:22, 235:24, 237:20, 240:10, 242:15
**Drinking** [11] - 191:3, 191:8, 191:14, 191:21, 191:23, 239:21, 240:3, 240:6, 240:10, 241:9, 242:16
**drives** [1] - 168:20
**driving** [1] - 22:18
**dual** [1] - 205:22
**due** [7] - 166:8, 216:5, 219:15, 219:24, 219:25, 223:13, 228:12
**duly** [4] - 20:12, 43:20, 211:6, 230:21
**dune** [8] - 264:11, 269:6, 269:12, 269:14, 269:16, 269:22, 269:23
**dunes** [12] - 263:8, 263:19, 265:12, 266:20, 266:23, 266:24, 267:3, 269:3, 269:5, 269:8, 269:9, 269:19
**duplicatable** [1] - 247:16
**duration** [1] - 115:17
**during** [11] - 101:21, 152:13, 159:13, 163:1, 221:24, 234:17, 236:25, 237:10, 257:4, 270:21, 271:1
**duties** [5] - 22:2, 44:18, 44:21, 212:17, 232:1
**duty** [1] - 171:23
**dwellings** [1] - 38:25
**dynamic** [8] - 67:20, 224:23, 225:15, 225:18, 227:4, 230:10, 243:22

## E

**early** [4] - 51:2, 226:14, 226:18, 262:17
**earth** [1] - 64:6
**earthquake** [1] - 221:18
**earthquakes** [3] - 221:17, 221:22, 221:24
**Easement** [1] - 152:22
**easement** [10] - 84:11, 84:22, 85:8, 85:13, 85:18, 85:20, 85:24, 86:23, 87:19, 155:14
**easements** [8] - 60:11, 60:19, 60:22, 61:5, 120:2, 120:11, 121:11, 121:15
**easier** [2] - 35:4, 39:5
**east** [2] - 197:14, 268:22
**East** [5] - 7:19, 8:12, 40:4, 40:10, 41:9
**easy** [1] - 153:13
**economic** [5] - 22:18, 32:24, 63:21, 64:4, 100:17
**economically** [2] - 111:5, 228:23
**economics** [2] - 64:9, 201:25
**economies** [1] - 202:12
**economist** [1] - 32:25
**economy** [6] - 29:11, 29:20, 31:20, 33:7, 33:8, 202:2
**education** [3] - 21:2, 75:2, 245:9
**educational** [4] - 21:1, 44:10, 212:7, 231:10
**EERC** [63] - 38:19, 66:14, 66:16, 66:17, 68:17, 68:24, 69:2, 69:4, 69:6, 69:11, 69:13, 69:18, 70:2, 70:7, 70:9, 70:25, 71:10, 71:11, 71:14, 71:16, 71:25, 72:12, 72:13, 72:16, 73:4, 73:19, 74:4, 74:11, 74:18, 74:25, 75:11, 75:20, 75:22, 140:19, 142:12, 142:15, 143:15, 143:20, 143:22, 144:8, 145:14, 159:17, 183:13, 183:15, 210:9, 211:23, 212:16, 212:19, 212:23, 225:24, 226:13, 231:21, 231:23, 232:3, 233:20, 243:17, 244:11, 245:20, 254:8, 254:13, 254:16, 262:16, 262:22
**EERC's** [2] - 73:11, 245:18
**effect** [5] - 133:4, 133:23, 180:19, 202:1, 219:24
**effective** [1] - 58:17
**effects** [4] - 217:11, 219:14, 220:9, 220:10
**efficient** [1] - 214:16
**efficiently** [1] - 228:1
**efforts** [3] - 44:23, 51:3, 237:10
**egress** [3] - 154:9, 154:13, 154:18
**eight** [7] - 212:15, 231:20, 248:3, 249:7, 249:8, 250:1, 250:9
**either** [4] - 25:4, 208:25, 224:7, 244:4
**elaborate** [1] - 99:16
**electronic** [1] - 268:14
**electronically** [1] - 18:18
**elongated** [4] - 265:12, 266:20, 266:24, 267:3
**elsewhere** [1] - 118:10
**emergency** [1] - 183:18
**emerging** [1] - 32:2
**emissions** [20] - 22:19, 64:6, 100:15, 100:21, 100:23, 101:2, 102:2, 103:6, 103:9, 103:13, 103:15, 104:1, 104:3, 104:8, 104:16, 104:23, 126:13, 126:14, 126:18
**emit** [1] - 194:18
**emitted** [1] - 23:4
**emitting** [1] - 193:13
**emphasis** [2] - 231:13, 245:12
**employed** [5] - 20:19, 44:2, 47:13, 211:15, 231:3
**employees** [2] - 159:20, 159:22
**employment** [5] - 22:3, 44:20, 212:15, 212:18, 232:2
**enables** [1] - 32:2
**enact** [3] - 3:6, 5:7, 7:12
**encompass** [1] - 233:2
**encounter** [2] - 86:13, 257:4

**encountered** [1] - 87:2
**end** [15] - 41:16, 41:18, 42:1, 81:10, 81:12, 81:23, 90:8, 116:12, 139:12, 140:12, 148:12, 169:15, 175:3, 261:22
**endanger** [2] - 238:7
**endangered** [1] - 232:22
**ended** [2] - 194:21, 231:17
**ends** [1] - 82:2
**Energy** [8] - 21:16, 29:2, 64:4, 64:9, 66:7, 66:9, 211:16, 231:4
**energy** [9] - 21:17, 21:20, 21:22, 22:20, 33:7, 34:11, 34:13, 202:4, 202:11
**enforce** [2] - 147:16, 157:18
**engage** [5] - 48:3, 48:4, 58:23, 60:12, 105:2
**engaged** [3] - 38:19, 49:21, 72:21
**engagements** [1] - 50:9
**engineer** [2] - 231:16, 234:18
**engineering** [12] - 21:3, 21:8, 21:24, 22:9, 73:15, 74:23, 143:3, 223:9, 229:6, 238:9, 245:10, 245:24
**engineers** [2] - 68:17, 117:13
**enhanced** [5] - 107:13, 107:21, 108:3, 108:4, 108:21
**enlighten** [1] - 226:5
**ensure** [6] - 100:16, 105:4, 106:19, 152:17, 230:8, 274:20
**enter** [4] - 86:14, 99:6, 129:12, 228:9
**entered** [9] - 94:6, 94:17, 94:20, 99:7, 101:24, 124:24, 133:1, 133:11, 146:24
**entering** [1] - 90:2
**entire** [7] - 97:15, 115:12, 178:22, 233:2, 256:15, 257:24, 261:6
**entirety** [2] - 155:10, 240:12
**entities** [2] - 27:2, 69:7
**entitled** [3] - 78:25, 150:10, 157:15
**entity** [1] - 209:3
**entry** [1] - 216:13
**environment** [16] - 100:14, 100:20, 101:1, 104:15, 238:8, 238:12, 262:19, 262:22, 263:2, 263:5, 263:10, 263:16, 263:23, 264:6, 264:9, 265:1
**Environmental** [4] - 66:7, 66:9, 211:16, 231:4
**environments** [1] - 262:13
**eolian** [2] - 263:8, 263:19
**eolian/nearshore** [1] - 264:2
**EOR** [2] - 109:10, 109:21
**EPA** [3] - 251:22, 251:24, 266:4
**EPA's** [1] - 251:21
**equally** [3] - 57:17, 96:4, 97:10
**equipment** [4] - 188:20, 196:1, 199:10, 199:12
**equitable** [3] - 150:5, 150:25, 199:4
**equivalent** [3] - 36:24, 203:18, 204:1
**Erickson** [1] - 261:3
**error** [2] - 141:22, 151:22
**errors** [3] - 151:19, 196:21, 197:2
**escape** [1] - 229:21
**essence** [3] - 31:15, 32:5, 105:11
**essentially** [15] - 27:21, 29:25, 44:22, 47:13, 48:2, 48:5, 50:19, 86:13, 135:15, 136:19, 136:21, 150:14, 169:5, 182:19, 255:21
**established** [2] - 139:14, 203:15
**establishing** [6] - 2:19, 4:21, 7:1, 14:20, 16:9, 17:21
**establishment** [1] - 203:12
**estate** [3] - 195:15, 207:16, 207:23
**estimate** [2] - 249:12, 274:16
**estimated** [3] - 36:22, 114:14, 255:11
**estimates** [1] - 73:19
**estimation** [1] - 255:14
**et** [5] - 38:25, 64:10, 64:11, 67:11, 154:8
**Ethanol** [3] - 33:12, 34:2, 34:5
**ethanol** [32] - 23:1, 29:2, 29:3, 29:6, 29:12, 29:15, 29:17, 31:3, 31:22, 31:25, 32:1, 32:8, 33:19, 63:1, 64:4, 64:15, 64:18, 65:2, 65:20, 102:6, 102:10, 102:17, 105:2, 106:10, 115:1, 126:14, 193:11, 193:12, 209:1, 209:2, 209:10
**evaluate** [4] - 221:6, 232:17, 245:1, 248:22
**evaluated** [1] - 222:25
**evaluating** [1] - 234:3
**evaluation** [7] - 216:25, 223:3, 225:9, 233:19, 258:5, 262:24, 264:14
**event** [6] - 90:3, 170:6, 170:8, 170:11, 170:16
**events** [3] - 180:22, 180:23, 181:11
**eventually** [4] - 72:12, 166:12, 176:14, 217:18
**everywhere** [2] - 103:19, 139:23
**evidence** [2] - 220:24, 222:22
**exact** [14] - 73:25, 74:8, 88:25, 95:14, 95:16, 95:18, 95:21, 96:18, 97:25, 144:3, 204:1, 247:6, 273:25, 275:2
**exactly** [7] - 66:15, 95:1, 140:15, 144:17, 172:14, 203:8, 204:21
**exam** [1] - 78:23
**Examination** [12] - 9:9, 9:10, 9:11, 9:12, 9:13, 9:14, 9:15, 9:16, 9:17, 9:20, 9:21, 9:22
**examination** [2] - 61:16, 199:7
**EXAMINATION** [12] - 20:14, 43:22, 61:19, 192:10, 195:5, 200:1, 200:20, 207:8, 208:15, 211:8, 230:23, 238:18
**examine** [1] - 236:9
**examined** [5] - 20:12, 43:20, 211:6, 230:21, 236:12
**Examiner** [2] - 9:4, 11:18
**examiner** [9] - 11:8, 12:19, 18:13, 19:9, 20:24, 43:4, 61:8, 78:18, 158:21
**EXAMINER** [50] - 7:23, 11:4, 11:23, 12:8, 13:10, 13:15, 13:20, 19:24, 20:3, 20:7, 20:10, 23:25, 24:14, 25:8, 25:10, 30:18, 30:20, 33:4, 36:20, 37:21, 40:25, 41:3, 43:9, 43:12, 43:15, 43:18, 55:24, 56:1, 61:9, 61:14, 72:19, 79:4, 112:12, 124:1, 124:6, 149:10, 158:25, 179:11, 179:15, 179:19, 192:8, 210:21, 210:24, 211:3, 230:18, 238:16, 240:24, 246:15, 246:20, 276:8
**example** [10] - 87:17, 92:6, 98:8, 117:5, 121:5, 135:19, 145:11, 161:12, 188:22, 244:17
**examples** [1] - 119:4
**exceed** [1] - 234:25
**except** [5] - 78:9, 78:12, 79:6, 161:2, 247:2
**exceptions** [2] - 98:7, 98:10
**excess** [1] - 95:7
**exchange** [2] - 147:6, 176:9
**exclude** [3] - 141:6, 149:2, 149:4
**excuse** [19] - 11:18, 26:9, 32:14, 33:11, 47:18, 54:1, 61:23, 62:22, 66:20, 73:9, 80:20, 81:7, 81:18, 104:2, 104:13, 108:4, 109:1, 153:10, 172:6
**execute** [1] - 93:14
**executed** [2] - 96:18, 206:17
**executing** [2] - 206:11, 206:12
**executive** [4] - 20:22, 21:4, 22:5, 125:11
**exercising** [1] - 169:22
**exhaust** [1] - 78:25
**exhibit** [24] - 24:20, 25:16, 30:17, 30:25, 31:1, 31:8, 39:23, 39:24, 40:20, 41:4, 41:14, 52:24, 53:18, 56:5, 66:15, 67:2, 67:5, 67:8, 67:9, 68:12, 81:14, 152:9, 168:5, 201:23
**Exhibit** [98] - 10:4, 23:13, 23:16, 23:20, 24:19, 30:10, 30:12, 30:23, 31:23, 32:8, 35:3, 37:4, 37:6, 37:10, 39:5, 39:8, 39:21, 39:22, 40:24, 52:20, 53:6, 53:7, 53:8, 53:11, 53:24, 53:25, 54:2, 54:18, 54:22, 55:1, 56:4, 56:5, 56:8, 56:10, 56:16, 56:18, 57:6, 57:7, 57:12, 57:16, 65:25, 68:20, 81:18, 81:20, 82:19, 90:20, 91:21, 93:19, 94:10, 94:14, 94:21, 100:2, 117:25, 128:7, 128:9, 132:10, 134:8, 134:10, 134:11, 135:6, 136:2, 136:4, 137:5, 137:6, 137:20, 146:9, 146:16, 147:12, 147:17, 150:22, 150:23, 151:18, 152:15, 152:16, 153:14, 153:18, 161:25, 168:1, 168:2, 168:4, 168:6, 168:9, 176:9, 177:14, 177:15, 180:12, 180:16, 192:24, 195:13, 200:25, 201:9, 201:17, 203:3, 207:11, 254:24, 260:25
**exhibit's** [1] - 30:20
**Exhibits** [6] - 23:11, 25:14, 26:11, 55:23, 69:8, 184:10
**EXHIBITS** [1] - 10:2
**exhibits** [20] - 23:12, 23:24, 24:3, 24:15, 24:23, 24:24, 25:3, 25:7, 25:10, 31:13,

52:19, 55:2, 55:18, 56:1, 81:17, 87:23, 98:3, 168:2, 168:3, 230:3
**exist** [8] - 58:25, 59:1, 92:2, 116:5, 124:20, 147:18, 172:8, 234:1
**existing** [14] - 58:2, 85:1, 91:8, 111:18, 131:9, 131:21, 151:9, 154:11, 154:17, 155:19, 187:1, 223:1, 236:21
**expand** [4] - 116:3, 117:6, 148:9, 155:15
**expands** [1] - 155:18
**expect** [2] - 218:6, 266:18
**expedites** [1] - 13:2
**expediting** [2] - 12:22, 13:7
**expense** [6] - 72:15, 118:1, 119:25, 120:8, 121:16, 122:11
**Expense** [1] - 118:20
**expenses** [20] - 118:2, 118:5, 118:7, 118:24, 119:1, 119:4, 119:14, 119:16, 119:21, 120:6, 121:3, 121:4, 121:7, 121:19, 122:7, 122:20, 123:4, 123:5, 123:11, 123:12
**experience** [12] - 21:1, 44:10, 87:1, 105:7, 162:24, 171:22, 212:7, 212:12, 231:11, 257:14, 261:11, 269:21
**expert** [7] - 32:23, 125:23, 217:23, 220:8, 221:11, 230:5, 238:5
**expertise** [1] - 143:11
**experts** [4] - 66:16, 69:2, 143:22, 272:9
**explain** [18] - 25:14, 27:7, 41:10, 137:5, 159:5, 160:9, 169:2, 198:13, 199:1, 211:21, 214:8, 232:16, 236:11, 255:8, 258:21, 268:2, 273:18, 273:20
**explained** [2] - 61:1, 215:5
**explaining** [2] - 32:18, 124:12
**explains** [1] - 234:15
**explanation** [3] - 46:21, 206:14, 224:20
**explicitly** [3] - 153:22, 154:22, 155:23
**exploration** [1] - 223:1
**explore** [3] - 145:18, 145:25, 146:11
**expose** [1] - 218:21
**exposure** [1] - 244:22
**Express** [35] - 1:6, 2:8, 3:10, 4:12, 5:12, 6:14, 14:2, 14:17, 15:14, 16:6, 17:2, 17:18, 23:2, 27:9, 27:10, 80:12, 80:14, 80:19, 80:21, 80:24, 80:25, 81:2, 81:9, 81:12, 81:23, 82:14, 82:21, 120:2, 120:11, 121:12, 122:1, 122:6, 123:12, 182:21, 194:10
**express** [1] - 106:2
**expressed** [2] - 96:9, 97:18
**extend** [1] - 117:21
**extension** [5] - 30:6, 64:23, 105:23, 165:13, 253:12
**extensive** [3] - 36:7, 214:20, 216:17
**extensively** [1] - 189:9
**extent** [42] - 24:10, 32:22, 36:9, 41:14, 42:7, 67:10, 67:13, 67:17, 67:20, 67:21, 67:25, 68:11, 68:18, 85:12, 102:24, 107:24, 128:12, 129:9, 130:3, 132:11, 133:5, 139:20, 140:20, 143:8, 146:7, 158:5, 160:16, 161:3, 167:24, 168:18, 172:9, 173:3, 177:3, 187:11, 204:11, 214:18, 214:24, 216:16, 229:16, 232:25, 233:10, 242:10
**extents** [3] - 139:12, 224:25, 225:20
**external** [1] - 140:7
**extraction** [2] - 151:8, 229:7
**extreme** [3] - 218:8, 219:8, 219:9
**extremely** [1] - 259:18
**eye** [2] - 267:5, 269:22

## F

**facilitate** [1] - 160:6
**facilities** [78] - 12:16, 22:10, 25:23, 27:13, 28:1, 31:7, 33:25, 37:11, 40:1, 40:3, 40:7, 41:7, 45:1, 46:18, 63:11, 77:2, 81:6, 81:7, 82:6, 82:10, 86:5, 86:12, 86:20, 90:6, 96:13, 98:24, 113:10, 113:13, 113:18, 113:20, 113:25, 114:2, 114:3, 114:10, 114:16, 116:4, 117:21, 119:15, 123:22, 126:4, 127:6, 128:5, 128:13, 129:5, 129:6, 130:1, 130:7, 130:9, 130:17, 131:11, 153:12, 153:24, 154:7, 166:24, 168:20, 182:17, 182:18, 183:1, 185:7, 186:3, 193:5, 194:4, 194:25, 203:4, 203:13, 208:11, 208:25, 209:8, 209:10, 222:11, 222:17, 224:11, 228:16, 228:19, 228:22, 256:7, 257:23
**Facility** [2] - 134:5, 152:24
**facility** [141] - 1:6, 1:20, 2:9, 3:10, 3:23, 4:12, 5:12, 6:2, 6:14, 15:24, 17:11, 23:18, 23:22, 25:21, 25:22, 26:6, 26:24, 26:25, 27:1, 29:23, 35:16, 37:16, 43:1, 45:15, 47:18, 50:18, 53:13, 54:4, 54:12, 63:2, 64:7, 65:18, 77:23, 77:25, 78:2, 78:4, 78:16, 79:8, 79:23, 80:4, 80:15, 80:22, 93:14, 100:3, 112:2, 115:2, 117:15, 117:20, 123:1, 123:6, 126:12, 128:1, 134:3, 134:17, 134:22, 135:12, 135:17, 135:25, 136:18, 137:3, 137:16, 137:23, 138:5, 138:17, 138:19, 139:3, 139:10, 139:19, 140:22, 145:19, 146:1, 146:12, 149:12, 152:11, 155:7, 175:9, 175:15, 175:20, 175:25, 182:10, 184:14, 184:15, 184:22, 184:24, 184:25, 185:3, 185:4, 185:6, 185:14, 186:7, 186:10, 191:5, 191:14, 195:11, 195:23, 195:25, 196:15, 196:25, 197:4, 198:25, 203:16, 204:2, 204:12, 204:13, 208:5, 208:23, 209:1, 209:2, 212:25, 215:1, 216:3, 216:4, 216:18, 222:14, 223:7, 223:11, 224:4, 224:5, 224:9, 224:16, 227:17, 228:21, 229:2, 229:9, 229:20, 230:8, 230:13, 232:10, 232:11, 232:23, 233:1, 233:8, 233:23, 235:5, 235:8, 238:6, 240:13, 257:21, 260:25, 276:3
**fact** [3] - 54:14, 86:10, 259:16
**factor** [5] - 117:7, 135:22, 136:15, 184:12, 256:4
**factors** [4] - 117:14, 117:17, 184:11, 213:24
**failure** [1] - 183:23
**fair** [36] - 40:15, 40:19, 48:19, 48:20, 59:9, 59:11, 67:22, 68:8, 68:14, 88:6, 94:16, 110:22, 110:24, 121:24, 124:14, 130:16, 133:20, 135:23, 146:18, 148:14, 156:17, 161:23, 164:10, 172:22, 173:20, 176:2, 179:8, 179:9, 181:6, 182:8, 182:12, 187:22, 193:11, 201:24, 205:8, 208:17
**fairly** [1] - 141:17
**faith** [2] - 95:5, 97:19
**fall** [3] - 50:12, 86:18, 153:11
**falls** [2] - 78:6, 121:18
**Falls** [1] - 231:14
**familiar** [12] - 40:16, 74:22, 87:12, 87:15, 89:17, 167:21, 175:2, 175:11, 245:25, 251:10, 265:7, 265:10
**familiarity** [1] - 162:23
**far** [6] - 58:22, 68:11, 139:19, 171:18, 209:7, 237:18
**farm** [1] - 168:20
**farmer** [1] - 168:22
**farmer's** [1] - 168:21
**faster** [1] - 250:1
**faults** [5] - 214:23, 216:14, 220:14, 229:14, 242:9
**favored** [5] - 97:4, 101:25, 165:15, 166:8, 166:16
**feasibility** [1] - 112:14
**feasible** [3] - 112:21, 112:23, 227:18
**federal** [5] - 48:18, 48:21, 83:13, 83:16, 214:2
**fee** [1] - 49:24
**feedback** [1] - 165:9
**fees** [3] - 202:8, 202:9, 202:23
**feet** [12] - 28:14, 140:1, 141:25, 142:8, 215:24, 220:18, 220:20, 236:18, 236:19, 268:5
**fell** [1] - 269:9
**felt** [6] - 256:25, 257:3, 257:15, 261:16, 274:4, 276:4
**few** [6] - 54:14, 70:22, 96:5, 98:7, 119:4, 162:2
**fewer** [1] - 221:23
**field** [15] - 2:19, 3:6, 4:21, 5:8, 7:1, 7:12, 14:20, 16:9, 17:21, 83:12, 168:20, 169:24, 203:12, 203:15, 231:17
**fields** [1] - 257:18
**Figure** [23] - 31:9, 39:7, 81:21, 182:16, 195:12, 203:22, 204:6, 215:14, 216:23, 221:21, 224:1, 233:6, 236:23, 237:9,

237:16, 258:13, 258:17, 262:7, 266:16, 267:6, 268:19, 269:17
**figure** [3] - 37:9, 214:17, 234:15
**file** [13] - 246:9, 246:11, 251:15, 251:24, 252:1, 252:7, 252:11, 252:12, 252:15, 252:17, 253:12, 254:20
**filed** [7] - 18:17, 54:14, 62:18, 172:6, 226:3, 226:8
**files** [5] - 251:11, 252:11, 253:15, 254:9, 254:11
**filing** [1] - 226:7
**fill** [1] - 113:18
**filled** [2] - 65:14, 207:16
**final** [10] - 18:21, 18:23, 23:14, 23:17, 23:21, 55:7, 226:4, 226:11, 237:11, 237:15
**financial** [7] - 2:7, 4:11, 6:13, 14:15, 16:4, 17:16, 102:16
**fine** [3] - 56:24, 209:23, 219:18
**finish** [3] - 19:18, 102:14, 246:17
**fire** [1] - 169:24
**Firm** [2] - 8:19, 11:25
**firm** [1] - 11:20
**firms** [4] - 72:11, 73:20, 74:14, 74:23
**first** [18] - 20:4, 20:12, 43:20, 49:8, 59:18, 71:24, 109:15, 113:3, 145:10, 165:23, 166:9, 192:12, 199:21, 200:23, 211:6, 230:21, 234:3, 255:4
**Fischer** [15] - 19:15, 19:20, 23:19, 25:22, 26:25, 37:12, 39:15, 40:2, 48:11, 49:11, 51:18, 51:19, 53:22, 184:16, 260:25
**fits** [2] - 126:9, 126:10
**fitted** [1] - 28:17
**five** [22] - 27:5, 27:14, 41:15, 41:16, 41:18, 41:21, 42:1, 42:7, 42:11, 42:15, 67:10, 67:13, 67:17, 67:25, 70:24, 95:13, 186:19, 234:25, 235:1, 235:5, 235:6, 261:18
**five-state** [1] - 27:14
**five-year** [2] - 41:21, 186:19
**Flemmer** [14] - 198:14, 215:19, 215:23, 233:13, 234:12, 234:16, 234:17, 236:1, 236:3, 246:7, 255:12, 255:14, 255:23
**flexibility** [1] - 26:16
**Flint** [1] - 29:3
**flippant** [1] - 148:7
**flow** [5] - 103:11, 104:7, 114:9, 218:18, 218:19
**flowing** [1] - 102:17
**flowline** [6] - 26:4, 45:1, 82:10, 193:3, 196:1, 196:2
**flowlines** [11] - 39:3, 39:9, 39:12, 60:2, 60:11, 60:19, 60:23, 82:12, 121:23, 182:23, 193:4
**fluid** [13] - 214:24, 216:16, 217:3, 217:4, 217:11, 220:15, 220:24, 220:25, 221:6, 227:14, 229:16, 230:1, 239:11
**fluids** [6] - 112:25, 113:2, 159:12, 189:6, 218:23, 234:19
**focus** [1] - 18:21
**focused** [1] - 263:5
**folks** [6] - 143:20, 145:14, 159:16, 183:13, 184:5
**follow** [7] - 19:5, 19:6, 35:4, 105:13, 163:3, 179:3, 194:21
**follow-up** [1] - 194:21
**followed** [1] - 139:16
**following** [5] - 11:1, 130:9, 137:19, 139:15, 198:1
**follows** [4] - 20:13, 43:21, 211:7, 230:22
**foot** [4] - 141:15, 141:16, 142:6, 142:24
**footprint** [2] - 27:14, 97:15
**FOR** [2] - 8:14, 8:22
**force** [8] - 133:23, 141:10, 170:2, 170:3, 170:6, 170:8, 170:11, 170:15
**forcing** [1] - 182:9
**forget** [1] - 140:15
**forgive** [1] - 87:4
**Forks** [1] - 240:18
**Form** [7] - 57:7, 58:7, 162:1, 168:7, 176:20, 176:21, 177:16
**form** [14] - 18:22, 18:24, 23:14, 23:17, 23:21, 86:25, 87:2, 97:11, 171:25, 180:12, 226:4, 226:11, 227:4, 269:11
**format** [2] - 246:10, 246:14
**Formation** [50] - 1:5, 2:4, 2:17, 3:6, 3:9, 4:7, 4:20, 5:7, 5:11, 6:10, 6:23, 7:11, 14:1, 15:8, 15:14, 16:21, 17:2, 18:9, 28:3, 188:13, 214:9, 214:19, 215:4, 215:5, 215:12, 215:13, 217:19, 220:22, 221:7, 221:9, 222:4, 222:19, 222:21, 222:24, 227:21, 233:25, 234:11, 236:14, 236:15, 236:17, 237:24, 237:25, 239:1, 239:3, 240:1, 243:13, 255:15, 257:15, 265:8
**formation** [24] - 149:19, 159:7, 185:14, 185:15, 185:19, 190:2, 217:3, 217:4, 217:15, 221:2, 222:1, 222:20, 227:15, 229:13, 248:5, 248:6, 248:10, 262:11, 262:13, 262:18, 263:12, 264:1, 266:19, 269:7
**formations** [9] - 188:20, 215:11, 222:15, 222:23, 229:10, 240:19, 241:25, 242:12, 250:16
**former** [1] - 167:14
**forms** [12] - 87:13, 87:19, 87:23, 88:10, 88:16, 88:23, 89:1, 89:16, 261:12, 264:11, 264:20, 269:23
**FORSBERG** [1] - 8:8
**forth** [1] - 43:8
**forward** [3] - 18:11, 48:6, 86:15
**fossil** [3] - 127:10, 127:17, 127:25
**foundation** [4] - 32:23, 36:19, 37:20, 41:2
**four** [5] - 72:1, 72:4, 144:18, 207:17, 208:20
**Fourth** [1] - 8:20
**Fox** [12] - 199:11, 220:22, 236:14, 236:17, 236:20, 236:21, 237:3, 237:7, 237:25, 238:2, 239:5, 239:25
**fracture** [5] - 221:3, 221:4, 222:3, 222:5, 262:1
**fractures** [5] - 214:23, 216:15, 220:14, 229:15, 242:9
**frame** [3] - 85:7, 113:15, 221:24
**framework** [1] - 225:10
**frameworks** [1] - 21:24
**Fredrikson** [2] - 8:11, 11:20
**Free** [1] - 118:17
**free** [3] - 122:18, 150:15, 178:9
**fresh** [1] - 229:11
**freshwater** [11] - 191:9, 236:9, 236:12, 237:4, 237:6, 239:5, 239:6, 239:9, 239:20, 240:8, 242:16
**FRIED** [1] - 8:7
**front** [6] - 66:1, 100:8, 123:20, 225:2, 239:16, 273:6
**Front** [1] - 8:12
**fuel** [9] - 29:25, 32:3, 35:16, 105:3, 110:12, 125:1, 127:10, 127:17, 127:25
**fuels** [4] - 29:25, 30:2, 32:3, 32:4
**fulfill** [1] - 22:23
**full** [14] - 20:16, 43:24, 113:21, 113:23, 114:10, 114:16, 133:23, 198:8, 198:10, 211:10, 230:25, 250:6, 255:4, 256:22
**full-time** [1] - 250:6
**fully** [1] - 106:1
**fundamental** [2] - 115:12, 115:15
**funded** [4] - 70:7, 70:9, 70:11, 214:2
**FURTHER** [2] - 200:1, 208:15
**furthest** [1] - 55:6
**future** [11] - 21:19, 32:4, 116:5, 169:10, 208:3, 208:8, 223:17, 224:1, 224:6, 224:9, 229:5

## G

**gain** [2] - 90:5, 207:25
**gallons** [3] - 29:17, 30:1, 30:4
**gamma** [1] - 248:21
**Garner** [2] - 11:7, 28:5
**GARNER** [50] - 7:22, 11:4, 11:23, 12:8, 13:10, 13:15, 13:20, 19:24, 20:3, 20:7, 20:10, 23:25, 24:14, 25:8, 25:10, 30:18, 30:20, 33:4, 36:20, 37:21, 40:25, 41:3, 43:9, 43:12, 43:15, 43:18, 55:24, 56:1, 61:9, 61:14, 72:19, 79:4, 112:12, 124:1, 124:6, 149:10, 158:25, 179:11, 179:15, 179:19, 192:8, 210:21, 210:24, 211:3, 230:18, 238:16, 240:24, 246:15, 246:20, 276:8
**Garner.....** [1] - 9:4
**Gary** [1] - 12:7
**gas** [45] - 38:1, 44:16, 78:10, 78:13, 79:7, 100:15, 100:21, 100:23, 102:2, 103:6, 103:9, 103:12, 103:15, 103:18, 104:8, 104:15, 104:23, 107:14,

107:21, 108:5, 108:21, 111:21, 111:24, 112:5, 122:19, 122:22, 149:16, 149:23, 150:2, 150:3, 150:19, 150:21, 151:1, 151:4, 151:8, 161:19, 199:11, 217:14, 223:1, 232:8, 233:15, 233:16, 244:3, 244:12, 251:16
**Gas** [1] - 11:9
**GAS** [1] - 1:2
**gases** [1] - 112:9
**gather** [1] - 167:9
**GDP** [1] - 29:14
**gears** [1] - 52:18
**GEM** [7] - 210:7, 219:21, 243:19, 252:4, 253:11, 253:24, 254:21
**general** [9] - 21:15, 38:10, 113:6, 115:6, 129:25, 171:3, 180:20, 182:5, 222:1
**generally** [33] - 33:1, 57:24, 59:18, 59:23, 59:25, 74:2, 74:24, 87:15, 116:1, 116:16, 118:5, 127:5, 127:18, 127:20, 127:23, 127:24, 139:15, 143:19, 160:11, 160:13, 161:19, 170:4, 171:21, 175:3, 175:6, 175:11, 183:8, 212:19, 232:3, 232:6, 240:21, 251:12, 272:10
**generated** [2] - 140:7, 251:15
**generation** [3] - 127:11, 127:17, 128:1
**geochemical** [16] - 217:24, 218:1, 218:4, 218:12, 218:23, 219:20, 220:2, 228:3, 228:5, 228:12, 243:25, 244:17, 244:25, 245:5, 252:3, 253:18
**geographic** [2] - 116:4, 117:8
**geologic** [68] - 1:4, 1:18, 2:8, 3:5, 3:8, 3:22, 4:11, 5:6, 5:10, 5:24, 6:13, 7:11, 13:25, 14:9, 14:15, 15:7, 15:13, 15:23, 16:5, 16:20, 16:25, 17:10, 17:17, 18:8, 23:18, 32:11, 32:15, 36:10, 38:20, 64:12, 100:12, 104:13, 107:10, 107:17, 107:25, 108:16, 117:15, 139:5, 144:25, 205:6, 210:9, 210:11, 211:25, 212:5, 213:1, 217:1, 217:7, 222:1, 224:23, 225:5, 225:7, 225:9, 225:12, 225:14, 227:3, 227:12, 227:22, 230:10, 232:21, 238:10, 238:11, 245:18, 246:25, 252:4, 259:22, 266:4, 268:1, 268:23
**Geologic** [1] - 36:21
**Geological** [4] - 212:14, 222:18, 236:7, 241:20
**geologist** [1] - 234:18
**geology** [11] - 36:4, 36:6, 38:21, 63:22, 212:10, 214:1, 214:4, 214:6, 231:13, 245:10, 245:11
**geophysical** [1] - 211:25
**geophysics** [1] - 245:12
**geoscience** [3] - 68:16, 69:2, 143:3
**geoscientists** [1] - 212:4
**Gerald** [6] - 136:20, 136:22, 136:23, 137:10, 137:22
**Gerald's** [2] - 136:24, 150:24
**GERVING** [1] - 8:23
**Gerving** [1] - 12:3
**given** [11] - 46:11, 65:7, 78:25, 134:18, 166:15, 247:18, 260:17, 272:5, 272:24, 273:2, 273:8
**gladly** [1] - 47:25
**glass** [1] - 78:13
**Glenn** [1] - 12:3
**global** [8] - 96:6, 97:9, 100:14, 100:20, 100:25, 104:15, 106:24, 271:15
**globally** [6] - 30:3, 101:23, 102:21, 103:21, 255:10, 255:20
**Gludt** [1] - 11:21
**GLUDT** [1] - 8:10
**gold** [1] - 262:19
**good-faith** [1] - 95:5
**govern** [1] - 131:22
**governed** [1] - 253:2
**grab** [2] - 135:4, 137:4
**gradient** [3] - 222:4, 222:6, 262:2
**graduate** [1] - 212:13
**graduated** [1] - 231:12
**graduating** [1] - 21:7
**Grant** [1] - 152:21
**grant** [8] - 98:12, 98:22, 154:14, 155:14, 156:10, 156:21, 160:1, 160:22
**granted** [7] - 98:9, 148:1, 148:3, 148:19, 155:23, 161:6, 200:10
**granting** [1] - 154:2
**grants** [1] - 58:15
**graphical** [1] - 246:14
**gray** [3] - 31:5, 164:12
**great** [1] - 19:12
**greater** [7] - 35:10, 35:22, 35:24, 36:1, 54:12, 65:8, 125:4
**green** [2] - 47:3, 47:10
**greenhouse** [12] - 100:15, 100:21, 100:23, 102:2, 103:6, 103:9, 103:12, 103:15, 103:17, 104:8, 104:15, 104:22
**grid** [4] - 141:16, 142:7, 268:1, 268:8
**gross** [2] - 150:15, 151:6
**ground** [4] - 109:24, 237:8, 237:10, 261:24
**ground-truthed** [1] - 237:8
**ground-truthing** [1] - 237:10
**groundwater** [5] - 199:11, 233:11, 237:9, 237:13, 237:14
**Group** [9] - 239:20, 241:3, 242:2, 242:17, 243:6, 243:7, 243:10
**group** [4] - 61:4, 89:15, 195:4, 205:5
**groups** [2] - 12:25, 13:1
**grow** [1] - 33:14
**grown** [1] - 33:23
**growth** [2] - 22:18
**guess** [11] - 50:8, 53:20, 76:7, 114:7, 123:7, 178:16, 201:2, 203:3, 205:10, 210:1, 276:10
**guidance** [1] - 266:4
**Gulf** [1] - 21:12
**guys** [5] - 76:18, 192:4, 196:8, 199:19, 215:14

## H

**half** [13] - 33:20, 45:16, 46:6, 50:18, 140:3, 142:1, 194:16, 197:5, 197:6, 197:7, 197:14, 197:16, 261:6
**half-mile** [1] - 50:18
**hand** [6] - 132:23, 211:4, 230:19, 240:20, 241:13
**handed** [2] - 24:20, 39:20
**handle** [1] - 196:17
**hard** [2] - 50:23, 259:7
**Harmless** [1] - 169:4
**HAUPT** [1] - 8:23
**Haupt** [3] - 12:4, 88:21, 89:14
**hazard** [1] - 184:3
**head** [1] - 142:4
**health** [2] - 238:7, 238:12
**healthier** [1] - 104:4
**hear** [4] - 36:5, 36:12, 131:5, 211:14
**heard** [2] - 245:20, 245:23
**HEARING** [51] - 7:15, 7:23, 11:4, 11:23, 12:8, 13:10, 13:15, 13:20, 19:24, 20:3, 20:7, 20:10, 23:25, 24:14, 25:8, 25:10, 30:18, 30:20, 33:4, 36:20, 37:21, 40:25, 41:3, 43:9, 43:12, 43:15, 43:18, 55:24, 56:1, 61:9, 61:14, 72:19, 79:4, 112:12, 124:1, 124:6, 149:10, 158:25, 179:11, 179:15, 179:19, 192:8, 210:21, 210:24, 211:3, 230:18, 238:16, 240:24, 246:15, 246:20, 276:8
**hearing** [33] - 11:6, 11:7, 11:8, 11:12, 12:15, 12:16, 13:2, 13:8, 13:9, 13:22, 14:4, 14:11, 14:19, 15:10, 15:17, 16:1, 16:8, 16:23, 17:4, 17:13, 17:19, 28:6, 28:7, 30:25, 45:5, 46:19, 50:16, 83:23, 84:14, 90:8, 201:23, 202:15, 202:23
**Hearing** [1] - 9:4
**hearings** [8] - 11:5, 11:8, 12:22, 51:2, 80:11, 84:8, 99:12, 276:11
**hearsay** [3] - 24:8
**height** [1] - 273:5
**held** [5] - 50:20, 50:21, 178:5, 180:7, 231:19
**Hell** [1] - 236:15
**HELMS** [1] - 8:3
**help** [7] - 78:21, 100:16, 105:4, 106:19, 118:12, 139:10, 152:2
**helped** [1] - 226:16
**helpful** [1] - 12:22
**helping** [2] - 70:25, 71:5
**helps** [1] - 274:20
**hereby** [2] - 172:10, 173:10
**herein** [1] - 11:2
**hereof** [1] - 152:14
**hereto** [2] - 132:10, 152:15
**hereunder** [1] - 168:14
**heterogeneity** [1] - 264:25
**heterogenous** [5] - 256:8, 256:12, 256:14, 256:17, 257:8
**hide** [2] - 144:5, 144:7
**high** [11] - 28:15, 28:16, 52:8, 213:11, 213:15, 216:11, 216:12, 259:18, 260:8, 264:22, 269:4
**high-angle** [1] - 264:22
**high-level** [2] - 213:11, 213:15

**high-strength** [1] - 28:16
**higher** [20] - 219:3, 219:12, 255:16, 255:25, 257:13, 260:21, 260:23, 260:24, 261:22, 262:2, 262:3, 262:4, 272:20, 274:11, 274:14, 274:17, 274:18, 274:19
**highlight** [4] - 20:24, 44:8, 212:6, 231:10
**Hill** [1] - 237:25
**Hills** [11] - 199:11, 220:22, 236:14, 236:17, 236:20, 236:21, 237:3, 237:7, 238:2, 239:5, 239:25
**Hintz** [20] - 19:16, 19:21, 23:22, 25:22, 26:25, 37:15, 39:13, 40:2, 40:8, 40:9, 40:11, 40:14, 48:13, 49:13, 51:21, 51:22, 53:20, 53:22, 184:16, 197:1
**hire** [2] - 171:1, 172:21
**historic** [1] - 196:3
**historical** [5] - 221:17, 221:18, 221:22, 221:24, 223:2
**Historical** [1] - 196:9
**history** [1] - 235:15
**hit** [1] - 209:24
**hmm** [11] - 92:21, 92:23, 134:7, 136:12, 140:5, 153:21, 160:15, 172:15, 186:8, 188:5, 259:6
**Hold** [1] - 169:4
**hold** [1] - 107:6
**holding** [1] - 45:5
**homogenous** [1] - 256:8
**honestly** [1] - 85:4
**honor** [4] - 92:7, 93:2, 132:3, 133:10
**Honor** [6] - 32:22, 61:18, 124:9, 179:22, 238:17, 246:23
**honored** [1] - 92:13
**hopefully** [1] - 19:23
**horizon** [2] - 189:2, 239:12
**horizons** [3] - 188:25, 189:11, 247:14
**horizontal** [5] - 187:17, 230:5, 230:12, 266:10, 275:4
**horizontally** [1] - 223:15
**hour** [1] - 124:2
**hourly** [1] - 74:16
**hours** [1] - 250:9
**housekeeping** [2] - 11:15, 18:13
**huge** [1] - 63:21
**human** [2] - 238:7, 238:11
**hundred** [2] - 95:20, 198:24
**hundreds** [2] - 116:16, 217:20
**hydraulically** [1] - 221:7
**hydrocarbon** [3] - 222:16, 222:20, 229:5
**hydrocarbon-bearing** [1] - 222:20
**hydrocarbons** [7] - 196:15, 222:21, 222:23, 223:6, 223:8, 223:10, 223:16
**hydrogeology** [1] - 231:13

I

**idea** [4] - 115:7, 226:8, 254:1, 254:5
**ideal** [2] - 36:4, 238:10
**identified** [19] - 38:2, 38:9, 38:11, 39:1, 46:1, 59:15, 60:7, 78:20, 111:8, 134:10, 134:16, 141:14, 186:20, 189:12, 190:10, 203:4, 204:11, 233:18, 239:8
**identifies** [2] - 178:4, 204:13
**identify** [3] - 47:14, 234:7, 237:6
**identifying** [4] - 45:11, 45:20, 48:1, 203:3
**ignoring** [1] - 219:10
**illustrating** [1] - 203:23
**image** [1] - 221:3
**immediately** [1] - 11:22
**impact** [15] - 30:7, 58:24, 58:25, 103:1, 103:24, 153:16, 177:10, 177:13, 217:24, 218:3, 218:12, 220:2, 220:6, 228:12, 256:4
**impacted** [2] - 60:24, 138:24
**impacts** [2] - 41:6, 103:20
**impedance** [5] - 249:1, 250:10, 251:7, 265:19, 267:18
**impermeable** [5] - 220:21, 237:21, 238:1, 238:3, 240:17
**implemented** [1] - 101:5
**implication** [1] - 108:9
**implied** [1] - 153:8
**imply** [1] - 164:11
**importance** [1] - 30:24
**important** [1] - 101:9
**imported** [1] - 210:8
**impose** [18] - 91:20, 91:21, 91:25, 93:4, 94:9, 94:14, 118:18, 118:19, 120:21, 131:15, 132:5, 133:7, 147:22, 171:10, 172:24, 173:18, 176:21, 178:8
**imposed** [7] - 98:5, 119:9, 147:14, 147:20, 150:17, 155:10, 170:13
**imposes** [1] - 94:11
**improvements** [1] - 168:17
**incidental** [2] - 197:25, 198:9
**include** [9] - 44:22, 86:21, 114:3, 128:23, 223:12, 230:7, 236:6, 266:7, 266:8
**included** [36] - 1:18, 3:21, 5:24, 14:9, 15:22, 17:9, 26:5, 38:3, 44:23, 46:16, 46:21, 50:8, 50:23, 86:19, 87:7, 101:25, 104:17, 123:5, 129:18, 139:17, 141:2, 141:22, 153:12, 165:11, 165:12, 165:14, 165:15, 167:6, 225:9, 227:13, 233:23, 236:22, 236:24, 237:1, 237:15, 273:13
**includes** [20] - 29:8, 39:24, 87:3, 134:21, 135:10, 172:19, 172:20, 199:10, 210:8, 211:22, 212:12, 217:1, 217:2, 230:14, 232:25, 236:15, 236:17, 239:11, 239:13
**including** [28] - 12:2, 38:15, 38:24, 55:12, 84:18, 84:25, 95:24, 96:22, 107:13, 107:20, 108:3, 108:4, 108:21, 123:24, 130:7, 132:9, 165:9, 197:25, 198:8, 200:7, 209:18, 212:4, 221:2, 227:22, 244:21, 244:22, 272:14, 273:14
**incorrect** [1] - 169:1
**increase** [9] - 95:25, 96:2, 116:6, 165:12, 165:13, 165:14, 256:21, 261:20
**increased** [2] - 223:12, 223:13
**increases** [1] - 163:5
**increasing** [1] - 261:5
**incremental** [1] - 116:20
**incrementally** [1] - 189:23
**incurred** [5] - 118:3, 118:25, 119:5, 120:8, 123:13
**indebtedness** [6] - 118:2, 118:6, 118:8, 118:25, 119:5, 120:8
**Indemnification** [1] - 169:4
**indemnified** [1] - 181:2
**indentured** [1] - 171:17
**independent** [2] - 67:23, 68:1
**INDEX** [1] - 9:2
**Indian** [1] - 196:3
**indicate** [8] - 54:10, 67:24, 125:20, 198:23, 202:3, 203:6, 209:6, 274:13
**indicated** [13] - 19:4, 19:7, 41:6, 46:24, 66:3, 83:13, 83:18, 142:15, 176:16, 210:4, 220:23, 223:22, 262:9
**indicates** [7] - 35:8, 41:14, 41:24, 81:22, 173:3, 205:11, 208:20
**indicating** [3] - 55:19, 138:3, 258:23
**indication** [2] - 264:12, 269:18
**indicative** [1] - 179:4
**indicator** [1] - 258:1
**individual** [16] - 13:4, 83:19, 91:8, 94:18, 94:19, 96:10, 96:20, 137:18, 146:15, 167:2, 173:18, 174:23, 192:17, 192:20, 193:7, 258:2
**individually** [2] - 61:4, 257:23
**individuals** [6] - 13:3, 46:1, 47:8, 96:14, 176:19, 250:4
**induced** [2] - 221:16, 222:7
**industrial** [23] - 26:17, 27:4, 27:13, 36:25, 42:20, 62:25, 75:25, 76:15, 76:25, 77:18, 82:5, 107:12, 107:20, 108:2, 108:20, 125:15, 125:17, 125:19, 127:10, 127:14, 208:18, 208:20, 209:3
**Industrial** [14] - 11:6, 12:15, 28:6, 61:25, 91:19, 93:3, 128:23, 132:18, 133:7, 156:10, 156:20, 156:25, 171:10, 178:8
**industries** [5] - 22:21, 100:17, 101:7, 106:20, 202:5
**industry** [15] - 21:11, 21:22, 29:12, 30:3, 33:19, 70:14, 70:25, 71:5, 102:9, 105:5, 105:8, 105:18, 225:8, 225:16
**inferred** [1] - 265:16
**influence** [1] - 265:11
**information** [25] - 31:16, 37:25, 38:2, 38:12, 38:19, 42:19, 46:14, 67:23, 68:21, 167:10, 177:21, 177:23, 178:3, 226:3, 227:7, 235:22, 241:17, 245:1, 245:6, 246:12, 254:17, 269:24, 273:9, 273:11, 273:13

**informational** [1] - 50:19
**informed** [1] - 258:7
**infrastructure** [3] - 34:15, 34:16, 38:24
**ingress** [3] - 154:8, 154:13, 154:18
**initial** [2] - 162:6, 162:17
**inject** [11] - 23:6, 28:2, 64:21, 147:17, 169:22, 200:11, 261:22, 261:23, 261:25, 262:2, 262:4
**injected** [8] - 27:16, 112:1, 188:9, 217:9, 218:2, 223:11, 225:1, 225:20
**injecting** [2] - 117:10, 187:1
**injection** [71] - 23:8, 26:15, 27:1, 37:23, 38:7, 39:1, 39:4, 40:9, 40:10, 40:11, 58:9, 59:16, 60:8, 67:10, 67:25, 81:5, 82:10, 106:10, 112:15, 122:20, 139:13, 140:13, 152:25, 155:8, 160:7, 186:21, 194:5, 198:8, 200:8, 200:9, 200:15, 200:16, 202:8, 214:13, 216:13, 216:20, 219:19, 219:20, 219:22, 220:6, 223:14, 227:18, 233:14, 235:16, 237:14, 238:12, 242:20, 242:22, 242:25, 243:1, 243:2, 243:4, 255:13, 255:24, 256:2, 257:12, 257:13, 257:17, 257:20, 258:11, 261:9, 270:3, 270:5, 270:8, 271:23, 272:6, 272:13, 273:22, 274:25, 275:10
**injections** [1] - 113:11
**injectivity** [4] - 217:25, 220:2, 270:21, 271:1
**injector** [1] - 182:25
**injectors** [2] - 117:19, 188:18
**injects** [1] - 106:23
**input** [9] - 140:23, 227:10, 244:21, 251:10, 251:15, 252:1, 252:6, 252:7, 252:11
**inputs** [1] - 225:14
**inside** [6] - 45:15, 46:5, 138:16, 138:18, 138:23, 141:21
**inspections** [1] - 189:17
**inspector** [1] - 231:17
**instead** [6] - 13:6, 85:17, 197:5, 197:15, 274:2
**institution** [2] - 70:8, 75:15
**institutions** [2] - 72:11, 73:20
**instruments** [1] - 132:7
**insurance** [12] - 178:13, 178:25, 179:5, 179:24, 179:25, 180:6, 180:21, 181:1, 181:7, 181:9, 181:22, 181:24
**insureds** [3] - 181:12, 181:14, 182:6
**integrated** [3] - 27:11, 28:11, 211:20
**integrity** [3] - 217:24, 218:3, 228:8
**intend** [4] - 58:23, 112:8, 176:8, 196:12
**intended** [10] - 118:18, 118:23, 119:9, 120:21, 122:17, 122:19, 165:19, 169:10, 185:5, 185:7
**intending** [3] - 98:14, 131:15, 193:3
**intends** [1] - 159:6
**intensity** [1] - 32:1
**intent** [11] - 116:25, 133:12, 155:21, 161:13, 169:4, 169:14, 173:18, 178:19, 202:5, 205:25, 208:7
**intention** [5] - 99:9, 133:10, 173:5, 173:9, 174:1
**intentional** [2] - 130:4, 204:15
**interaction** [4] - 217:24, 218:7, 220:1, 243:25
**interactions** [4] - 218:1, 218:10, 228:5, 228:12
**interbedded** [4] - 263:8, 263:19, 264:2, 264:12
**interest** [20] - 12:10, 43:1, 49:16, 100:12, 104:12, 136:10, 136:15, 136:24, 137:19, 138:3, 138:4, 138:5, 139:1, 150:15, 152:11, 206:2, 206:10, 206:22, 207:25, 208:3
**interested** [1] - 18:10
**interests** [6] - 51:9, 131:12, 138:2, 148:21, 206:22, 207:19
**Interests** [1] - 161:7
**interfere** [2] - 221:12, 221:15
**internal** [1] - 138:22
**interpret** [5] - 247:10, 264:8, 269:2, 269:14, 269:16
**interpretation** [8] - 255:18, 261:14, 263:1, 269:13, 269:21, 270:16, 271:7, 272:13
**interpretations** [1] - 268:10
**interpretative** [1] - 247:3
**interpreted** [3] - 247:11, 247:14, 267:2
**interpreting** [1] - 249:22
**interrupted** [1] - 40:12
**interrupting** [1] - 59:20
**intervals** [1] - 268:4
**intervenor** [1] - 156:24
**intervenors** [5] - 12:2, 254:2, 254:6, 254:10, 254:14
**INTERVENORS** [1] - 8:22
**inversion** [1] - 258:8
**investigation** [6] - 167:10, 183:21, 257:1, 270:22, 271:6, 272:15
**investing** [2] - 21:21, 125:6
**investment** [1] - 116:11
**investments** [1] - 124:24
**invitation** [1] - 50:16
**invited** [1] - 60:24
**involved** [14] - 45:3, 45:19, 47:16, 48:15, 53:2, 66:23, 87:16, 270:25, 271:4, 271:5, 271:7, 271:10, 271:14, 271:22
**involvement** [2] - 213:4, 269:20
**Inyan** [1] - 221:8
**Iowa** [7] - 27:6, 28:19, 83:10, 103:16, 104:1, 123:2, 123:24
**isolated** [2] - 221:7, 234:19
**isopach** [1] - 262:9
**issuance** [1] - 229:1
**issue** [4] - 84:20, 99:3, 102:18, 174:17
**issued** [2] - 108:7, 175:8
**issues** [4] - 84:18, 91:2, 99:2, 158:23
**it'd** [1] - 249:25
**it'll** [2] - 183:6, 217:15
**item** [1] - 200:3
**items** [1] - 200:24
**itself** [8] - 54:11, 144:15, 144:21, 217:10, 233:23, 243:4, 243:9, 252:14

## J

**Jay** [3] - 77:9, 77:15, 77:16
**Jeff** [21] - 20:2, 20:9, 43:24, 44:2, 44:8, 46:15, 47:16, 52:19, 54:25, 59:20, 61:6, 76:10, 101:20, 111:16, 128:11, 145:20, 160:4, 160:25, 164:21, 165:2, 207:10
**JEFFREY** [1] - 43:19
**Jeffrey** [1] - 44:1
**jet** [1] - 29:25
**Jimmy** [3] - 183:16, 183:25, 193:24
**JoAnne** [1] - 207:22
**job** [1] - 22:18
**jobs** [1] - 29:13
**JOCHIM** [1] - 8:23
**Jochim** [1] - 12:4
**Joe** [1] - 170:24
**John** [1] - 12:4
**joinder** [1] - 205:22
**joined** [1] - 208:2
**joint** [1] - 206:20
**JoLene** [1] - 12:6
**Jordan** [1] - 211:12
**judge** [1] - 73:1
**jump** [2] - 192:12, 199:20
**June** [4] - 7:20, 11:3, 11:7, 276:14
**juris** [1] - 44:14
**jurisdiction** [5] - 42:14, 174:23, 174:24, 193:18, 193:23

## K

**Kansas** [2] - 212:11, 212:13
**Kara** [1] - 221:9
**keep** [3] - 12:13, 12:17, 197:21
**keeping** [1] - 248:4
**Kelly** [1] - 225:25
**Kevin** [1] - 12:4
**key** [1] - 213:12
**KH** [3] - 272:22, 273:1, 273:14
**Kimberly** [1] - 12:5
**kind** [21] - 24:8, 32:23, 32:24, 38:18, 40:6, 93:4, 94:25, 105:23, 112:17, 141:2, 142:18, 142:20, 160:9, 160:17, 162:20, 167:23, 183:20, 186:14, 252:1, 262:12
**kinds** [2] - 73:15, 189:18
**Kirk** [1] - 12:5
**KJ** [15] - 23:22, 25:22, 26:25, 37:15, 39:13, 40:2, 40:8, 40:9, 40:11, 40:14, 48:13, 49:13, 51:21, 51:22, 197:1
**knowing** [2] - 247:20, 249:6
**knowledge** [12] - 69:11, 113:6, 142:16, 143:11, 144:9, 172:11, 193:15, 230:4, 254:8, 269:24, 271:24, 274:15
**knowledgeable** [1] - 143:4
**known** [4] - 23:2, 48:10, 219:6, 224:12
**knows** [1] - 75:8
**Kraft** [1] - 12:5
**KRAFT** [1] - 8:23

## L

**labeled** [2] - 39:10, 215:16
**laboratory** [1] - 272:21
**lack** [1] - 221:17
**lacustrine** [1] - 263:9
**laid** [1] - 37:9
**Land** [1] - 85:24
**land** [24] - 30:7, 38:14, 44:5, 49:3, 49:6, 56:19, 101:11, 129:12, 135:16, 138:14, 138:22, 152:23, 153:23, 155:7, 168:16, 169:20, 169:21, 173:24, 174:1, 176:13, 181:25, 196:22, 199:1
**landman** [1] - 44:17
**landmen** [1] - 50:5
**landowner** [36] - 12:2, 38:21, 86:11, 90:14, 90:15, 90:18, 91:22, 92:12, 92:19, 93:5, 93:20, 94:2, 96:24, 119:19, 128:6, 129:14, 137:18, 147:9, 147:15, 148:13, 149:25, 150:7, 170:16, 170:18, 170:22, 170:25, 171:4, 171:11, 172:25, 176:13, 176:16, 176:22, 177:7, 179:7, 180:8, 206:16
**landowners** [83] - 48:1, 48:3, 48:4, 48:8, 48:10, 50:6, 50:17, 51:4, 57:22, 58:24, 60:9, 60:25, 83:20, 85:2, 85:11, 86:8, 88:25, 89:21, 89:24, 91:8, 91:14, 91:25, 93:16, 94:5, 94:7, 94:10, 94:12, 94:15, 94:18, 94:20, 95:6, 96:4, 97:12, 97:16, 97:21, 98:4, 98:13, 101:17, 111:13, 112:9, 116:8, 128:8, 129:10, 130:2, 131:5, 138:9, 138:16, 139:6, 141:4, 146:20, 147:14, 149:18, 153:20, 154:12, 154:21, 156:24, 162:25, 164:15, 164:20, 165:7, 166:2, 166:8, 166:14, 166:16, 166:18, 167:2, 173:19, 174:17, 176:4, 177:5, 177:11, 177:13, 180:1, 180:4, 181:1, 181:11, 182:4, 182:9, 185:17, 185:22, 199:5, 199:17, 237:5
**landowners'** [1] - 97:17
**lands** [25] - 2:19, 4:22, 7:2, 14:21, 16:10, 17:21, 49:17, 59:9, 84:3, 84:4, 86:6, 99:4, 99:8, 134:21, 145:19, 146:1, 146:11, 153:2, 153:3, 153:7, 155:16, 156:7, 157:13, 177:25, 196:3
**Lands** [15] - 49:7, 49:22, 84:2, 84:5, 84:10, 84:22, 85:10, 86:23, 87:13, 87:18, 88:9, 88:17, 89:2, 99:1, 99:18
**language** [14] - 86:21, 88:4, 89:20, 154:23, 169:14, 181:13, 201:1, 201:3, 205:22, 205:23, 206:2, 206:23, 207:4, 208:7
**large** [9] - 36:9, 96:22, 105:9, 107:23, 116:11, 116:22, 165:7, 214:13, 256:25
**largely** [1] - 57:8
**larger** [5] - 13:1, 29:8, 116:25, 269:21, 276:7
**largest** [1] - 101:7
**last** [13] - 13:12, 19:1, 30:1, 50:12, 52:16, 55:5, 55:11, 70:24, 115:21, 144:18, 163:22, 246:16, 275:18
**lastly** [4] - 46:22, 48:11, 49:13, 51:1
**late** [5] - 51:2, 66:24, 172:5, 221:23, 226:18
**lately** [1] - 111:23
**lateral** [4] - 27:22, 224:25, 225:19, 264:17
**laterally** [4] - 214:20, 215:1, 216:17, 217:13
**launcher** [1] - 183:9
**Law** [4] - 8:11, 8:19, 8:19, 11:25
**law** [11] - 11:20, 44:13, 108:25, 109:1, 150:3, 150:21, 158:18, 171:4, 171:21, 171:22, 176:14
**LAWRENCE** [1] - 8:10
**Lawrence** [2] - 11:19, 99:23
**laws** [1] - 151:4
**lawyer** [7] - 147:25, 158:11, 158:13, 158:16, 171:16, 175:17, 205:21
**lawyers** [2] - 171:1, 172:21
**layer** [1] - 258:18
**layers** [9] - 36:8, 187:25, 188:3, 188:13, 237:21, 238:3, 238:4, 264:3
**layout** [1] - 183:11
**lead** [3] - 22:7, 66:14, 66:17
**leaders** [2] - 21:23
**leadership** [1] - 21:5
**leading** [1] - 51:1
**leak** [1] - 242:11
**leakage** [1] - 242:7
**lease** [96] - 48:7, 49:20, 50:11, 50:24, 57:16, 58:1, 60:16, 84:11, 84:24, 85:13, 85:17, 85:20, 85:24, 86:17, 86:18, 89:10, 89:12, 91:21, 92:1, 92:19, 92:24, 93:2, 93:5, 93:17, 93:21, 94:2, 94:10, 94:18, 94:19, 95:1, 95:4, 96:6, 96:7, 96:8, 96:9, 97:9, 97:11, 97:23, 98:2, 98:4, 98:5, 98:6, 116:22, 119:8, 119:11, 119:13, 119:17, 121:3, 121:6, 122:19, 128:7, 128:15, 130:11, 131:2, 131:17, 131:22, 131:23, 132:15, 132:16, 133:6, 133:10, 146:5, 146:6, 146:9, 146:16, 146:19, 147:2, 147:18, 147:20, 152:15, 152:18, 153:14, 154:22, 154:25, 155:19, 155:20, 155:24, 156:1, 161:7, 164:16, 167:17, 168:7, 173:3, 176:7, 176:8, 176:12, 178:21, 180:12, 185:18, 185:24, 198:4, 200:4, 200:25, 208:3
**Lease** [7] - 57:8, 58:7, 162:1, 176:20, 176:22, 177:16, 177:23
**Leased** [1] - 177:24
**leased** [20] - 51:5, 51:7, 51:13, 51:24, 55:7, 55:15, 55:20, 57:17, 58:2, 59:3, 85:1, 94:15, 116:16, 131:17, 132:5, 146:7, 152:12, 154:4, 155:17, 195:21
**leasehold** [2] - 55:7, 175:22
**leases** [46] - 38:23, 47:17, 48:17, 50:2, 52:7, 52:12, 52:16, 54:15, 83:19, 85:10, 88:24, 91:9, 92:3, 96:17, 116:24, 119:12, 119:18, 119:22, 129:8, 129:19, 130:24, 132:3, 132:6, 132:9, 133:1, 133:22, 141:7, 146:14, 146:20, 153:9, 153:20, 153:22, 154:12, 154:17, 154:22, 155:23, 162:22, 163:12, 163:19, 163:21, 165:8, 165:23, 167:8, 167:12, 176:19, 224:12
**leasing** [9] - 52:9, 98:17, 162:23, 163:25, 164:3, 164:5, 195:22
**leasings** [1] - 47:17
**least** [2] - 130:14, 268:14
**leave** [1] - 174:4
**left** [1] - 11:22
**legacy** [3] - 222:25, 233:14, 233:16
**Legal** [1] - 196:25
**legal** [11] - 44:5, 46:17, 54:8, 94:6, 111:7, 147:24, 158:22, 158:24, 181:17, 181:18, 182:7
**legally** [3] - 171:5, 176:24, 180:7
**legend** [1] - 258:22
**Legislature** [1] - 108:7
**legislature** [4] - 148:2, 148:4, 148:19, 157:9
**legitimate** [1] - 170:10
**Leingang** [17] - 19:13, 19:17, 19:20, 23:15, 25:21, 26:24, 37:14, 39:14, 40:2, 48:9, 49:8, 51:12, 53:21, 100:3, 137:8, 184:16, 260:19
**length** [1] - 120:25
**lengthy** [1] - 18:14
**less** [10] - 74:12, 95:15, 95:17, 95:20, 250:19, 250:21, 251:6, 251:8, 275:9, 275:13
**Lessee** [4] - 177:21, 177:23, 178:4, 178:6
**lessee** [2] - 46:9, 130:6
**lessees** [2] - 46:8, 229:3
**lesser** [1] - 274:20
**Lessor** [1] - 178:6
**lessor** [6] - 168:14, 168:15, 172:10, 172:16, 173:10, 177:20
**lessor's** [1] - 168:16
**lessors** [1] - 122:22
**level** [11] - 59:7, 59:8, 128:5, 166:25, 184:3, 213:11, 213:15, 244:23, 269:8, 269:9, 273:17
**levels** [1] - 179:5
**liability** [3] - 180:20, 181:21, 182:5
**liable** [1] - 180:7
**license** [5] - 252:19, 252:24, 253:2, 253:7, 253:9
**LIEBELT** [1] - 8:24
**Liebelt** [1] - 12:5
**life** [8] - 114:14, 115:2, 115:9, 199:5, 207:16, 207:22, 236:25, 237:13
**lignite** [8] - 21:11, 21:19, 116:14, 124:17, 127:18, 127:22, 222:13, 228:19
**likely** [5] - 65:11, 103:1, 177:10, 262:4, 274:10
**limestone** [1] - 263:17
**limestones** [1] - 263:9

**limit** [11] - 141:24, 169:14, 178:20, 178:21, 178:25, 181:21, 182:1, 185:18, 185:23, 256:3
**limit's** [1] - 182:2
**limitations** [2] - 158:1, 158:4
**limited** [4] - 12:17, 155:12, 158:5, 158:8
**limiting** [1] - 117:7
**limits** [10] - 2:19, 4:22, 7:2, 14:20, 16:9, 17:21, 41:16, 157:20, 187:17
**Linda** [1] - 12:5
**line** [15] - 27:24, 67:14, 67:18, 67:24, 68:6, 81:23, 113:3, 116:13, 123:8, 136:20, 140:6, 204:2, 204:13, 233:9
**lines** [10] - 27:22, 67:1, 68:3, 68:5, 68:23, 69:1, 130:8, 139:16, 186:6
**links** [3] - 247:11, 249:20, 249:23
**Lisa** [1] - 12:3
**list** [3] - 201:6, 207:3, 244:18
**listed** [17] - 11:5, 35:12, 56:20, 69:7, 100:9, 122:17, 134:14, 134:16, 193:2, 197:3, 207:23, 208:25, 239:12, 244:19, 244:20, 247:12, 272:12
**listening** [1] - 192:14
**literally** [3] - 140:6, 171:7, 261:5
**lithologies** [2] - 264:18, 265:2
**livelihoods** [1] - 22:22
**Livers** [1] - 211:13
**Livers-Douglas** [1] - 211:13
**Living** [1] - 12:2
**LIVING** [1] - 8:22
**LLC** [57] - 1:4, 1:15, 1:19, 2:6, 3:4, 3:8, 3:19, 3:23, 4:8, 4:9, 5:6, 5:10, 5:21, 6:1, 6:11, 7:10, 13:24, 14:6, 14:13, 15:7, 15:12, 15:19, 15:24, 16:3, 16:25, 17:6, 17:11, 17:15, 18:8, 23:14, 25:1, 25:18, 25:19, 25:25, 26:8, 26:9, 48:13, 61:22, 62:1, 62:2, 62:5, 62:8, 62:9, 62:11, 62:12, 62:14, 62:22, 69:3, 69:9, 71:10, 71:22, 72:9, 193:2, 193:6
**LLCs** [2] - 193:1, 193:7
**load** [1] - 252:12
**loaded** [1] - 253:23
**locate** [1] - 51:4
**located** [26] - 1:6, 1:20, 2:9, 2:19, 3:10, 3:23, 4:13, 4:22, 5:12, 6:2, 6:15, 7:2, 14:21, 16:10, 17:22, 37:13, 37:14, 37:16, 49:3, 64:2, 64:11, 98:21, 196:2, 222:16, 223:10
**locating** [1] - 50:9
**location** [7] - 31:6, 37:8, 46:18, 60:8, 60:11, 199:10, 214:1
**locations** [7] - 31:3, 37:10, 38:25, 59:16, 60:1, 60:10, 203:5
**locked** [1] - 110:14
**Lodgepole** [1] - 239:19
**log** [14] - 198:14, 215:15, 215:18, 217:2, 248:21, 255:17, 256:18, 259:23, 261:12, 261:13, 262:10, 266:8, 267:23
**logs** [13] - 217:4, 221:3, 223:4, 227:14, 248:24, 252:18, 252:21, 253:5, 253:10, 258:4, 258:6, 263:6, 264:15
**long-term** [1] - 216:21
**look** [26] - 30:22, 72:23, 73:13, 74:2, 100:2, 118:14, 126:8, 131:24, 141:19, 142:2, 157:5, 170:21, 173:8, 182:14, 190:1, 203:25, 207:15, 207:21, 218:8, 219:7, 233:6, 234:4, 237:3, 259:11, 269:1
**looked** [12] - 37:24, 74:6, 89:17, 167:8, 221:1, 221:2, 221:6, 221:18, 248:16, 263:6, 263:7, 273:1
**looking** [26] - 35:4, 39:5, 39:7, 74:16, 134:24, 134:25, 135:6, 140:11, 159:3, 168:4, 172:7, 182:13, 194:24, 197:21, 203:24, 204:4, 205:21, 235:25, 256:14, 258:16, 259:9, 263:3, 266:24, 268:18, 268:19, 268:20
**looks** [2] - 204:14, 205:1
**LOPA** [1] - 184:2
**lost** [7] - 168:15, 168:16, 168:17, 169:19, 169:20, 169:21
**low** [8] - 32:3, 65:10, 105:3, 110:12, 216:10, 218:5, 218:6, 220:18
**low-carbon** [2] - 105:3, 110:12
**lower** [15] - 31:25, 32:13, 64:23, 142:10, 200:7, 217:19, 222:5, 238:20, 239:2, 239:4, 242:12, 274:7, 274:10, 274:14
**lowermost** [1] - 239:25
**lowest** [3] - 220:21, 236:11, 236:13
**lunch** [1] - 124:2
**LYNN** [1] - 8:3

## M

**MADCHE** [7] - 8:5, 192:11, 195:3, 197:21, 199:20, 200:2, 200:19
**Madche.....** [1] - 9:14
**Madche.....** [1] - 9:12
**Madison** [5] - 14:2, 241:3, 242:2, 242:17, 243:6
**magnitude** [1] - 63:25
**mail** [5] - 46:12, 46:25, 50:11, 50:13, 86:18
**mailing** [1] - 47:5
**mailings** [1] - 47:2
**main** [4] - 83:8, 83:10, 121:25, 250:12
**mainline** [2] - 27:23, 39:9
**maintain** [3] - 75:12, 159:11, 177:20
**maintaining** [1] - 178:24
**MAIZE** [1] - 8:24
**Maize** [2] - 12:6
**majeure** [6] - 170:3, 170:7, 170:8, 170:11, 170:15
**major** [1] - 105:1
**majority** [4] - 44:15, 166:6, 227:10, 227:12
**makeup** [1] - 189:6
**manage** [3] - 211:24, 212:1, 212:4
**management** [1] - 22:24
**manager** [1] - 21:15
**mandates** [1] - 158:9
**manner** [4] - 75:12, 100:13, 100:15, 229:9
**manual** [1] - 183:18
**manually** [1] - 83:11
**map** [22] - 30:13, 31:2, 53:12, 53:13, 67:1, 67:14, 67:18, 105:24, 182:16, 195:13, 203:23, 214:18, 221:22, 223:25, 233:4, 233:6, 233:10, 236:22, 259:11, 262:9, 266:18
**mapping** [1] - 37:25
**maps** [7] - 216:22, 216:24, 237:9, 241:5, 241:6, 241:13, 241:18
**margin** [1] - 141:22
**marine** [2] - 263:8, 264:2
**MARK** [1] - 8:4
**marked** [7] - 24:19, 39:22, 54:22, 55:1, 65:25, 81:17, 268:14
**market** [8] - 29:21, 33:22, 65:8, 65:10, 65:12, 167:19, 176:4, 176:17
**marketing** [1] - 176:23
**markets** [9] - 30:7, 32:3, 33:22, 34:22, 101:9, 102:7, 102:12, 103:2, 105:3
**marking** [1] - 24:10
**mass** [2] - 198:7, 198:8
**massive** [1] - 65:10
**master's** [2] - 212:10, 245:11
**match** [3] - 235:15, 248:23, 255:11
**matches** [2] - 201:16, 201:19
**material** [11] - 30:7, 33:22, 94:21, 94:23, 94:25, 95:4, 95:23, 96:10, 96:25, 97:11, 97:23
**mathematical** [1] - 152:5
**Matt** [1] - 225:25
**matter** [26] - 12:18, 13:11, 13:22, 14:3, 14:11, 14:18, 15:9, 15:16, 15:25, 16:7, 16:22, 17:3, 17:12, 17:19, 18:13, 69:21, 72:5, 72:7, 82:1, 90:13, 132:17, 171:4, 176:14, 182:11, 248:6, 272:9
**matters** [4] - 11:5, 11:15, 12:24, 235:20
**max** [3] - 243:2, 260:4, 260:19
**maximum** [1] - 261:2
**MCE** [4] - 193:16, 194:10, 194:16, 194:24
**mean** [23] - 35:1, 48:12, 62:15, 84:19, 86:3, 121:25, 122:15, 123:21, 138:12, 146:24, 148:7, 148:8, 161:8, 164:10, 172:13, 173:10, 182:19, 185:1, 185:2, 188:14, 193:4, 240:5, 262:7
**meaning** [5] - 109:3, 150:15, 207:18, 249:17, 250:19
**means** [11] - 57:19, 136:21, 149:3, 171:24, 175:12, 175:20, 192:16, 205:22, 263:6, 268:2, 271:9
**meant** [1] - 151:25
**measurement** [1] - 183:10
**mechanical** [2] - 151:21, 152:1
**mechanism** [2] - 217:22, 218:17
**mechanisms** [2] - 217:6, 238:11

**meet** [2] - 196:12, 232:17
**meeting** [1] - 50:6
**meetings** [4] - 50:5, 50:20, 97:21, 97:24
**members** [2] - 159:18, 233:20
**memory** [3] - 87:4, 165:12, 166:3
**mention** [1] - 243:7
**mentioned** [27] - 12:20, 25:17, 28:11, 31:23, 54:14, 69:20, 107:22, 141:1, 165:24, 167:1, 183:2, 190:20, 216:14, 217:16, 218:5, 220:12, 225:18, 226:14, 227:20, 228:18, 229:12, 229:23, 239:8, 245:17, 250:12, 264:19, 275:25
**Mercer** [15] - 1:13, 2:3, 2:16, 3:3, 3:17, 4:6, 4:19, 5:5, 15:5, 16:18, 28:1, 37:11, 37:13, 38:3, 125:7
**met** [1] - 61:3
**metering** [1] - 183:9
**method** [2] - 199:4, 248:15
**methodologies** [1] - 144:3
**methodology** [1] - 186:17
**methods** [3] - 225:8, 225:17, 229:6
**metric** [7] - 163:5, 165:22, 194:7, 194:8, 194:12, 194:13, 194:17
**Metz** [1] - 12:6
**METZ** [1] - 8:24
**Michael** [2] - 12:3, 12:4
**middle** [1] - 205:1
**Midwest** [36] - 1:6, 2:8, 3:10, 4:12, 5:12, 6:14, 14:17, 15:14, 16:5, 17:2, 17:17, 22:19, 23:2, 27:5, 27:8, 27:10, 80:12, 80:14, 80:19, 80:21, 80:23, 80:25, 81:2, 81:9, 81:11, 81:22, 82:14, 82:20, 120:2, 120:11, 121:12, 122:1, 122:5, 123:11, 182:20, 194:10
**might** [14] - 28:8, 35:3, 99:20, 111:4, 114:3, 114:5, 157:3, 201:9, 234:1, 247:13, 250:17, 266:8, 266:25, 274:17
**migration** [9] - 214:25, 216:16, 220:15, 220:24, 220:25, 224:25, 229:16, 230:1, 234:19
**Mike** [2] - 88:21, 89:14
**mile** [7] - 23:7, 45:16, 46:6, 50:18, 140:3, 142:1, 233:1
**miles** [8] - 28:12, 40:8, 40:10, 40:14, 193:16, 193:20, 193:22, 193:25
**millidarcies** [6] - 259:1, 259:9, 259:12, 260:9, 260:15, 261:3
**million** [19] - 29:19, 30:1, 33:13, 33:14, 178:19, 178:21, 178:25, 181:20, 181:25, 194:7, 194:8, 194:12, 194:17, 194:18, 194:19, 240:15, 241:11, 243:11
**millions** [1] - 116:17
**Milton** [14] - 198:14, 215:18, 215:19, 215:23, 233:13, 234:12, 234:15, 234:16, 236:1, 236:3, 246:6, 255:12, 255:14, 255:23
**mind** [10] - 19:25, 89:5, 92:9, 93:8, 93:10, 118:12, 120:15, 180:14, 201:11, 248:4
**Mine** [1] - 224:3
**mine** [12] - 21:16, 116:10, 116:13, 124:11, 124:13, 124:17, 125:11, 127:22, 128:2, 162:8, 162:9, 223:24
**mine-mouth** [6] - 116:10, 116:13, 124:11, 124:13, 124:17, 127:22
**mineral** [13] - 44:23, 45:14, 46:7, 46:8, 128:24, 151:9, 151:10, 151:12, 170:11, 178:9, 196:16, 229:2, 229:3
**Mineral** [3] - 11:9, 231:15, 231:18
**mineralization** [1] - 217:21
**mineralogy** [2] - 218:24, 244:18
**minerals** [11] - 107:14, 107:21, 108:5, 108:22, 150:11, 219:25, 222:10, 222:12, 228:15, 228:17, 229:7
**mines** [6] - 124:17, 124:20, 125:15, 127:22, 223:23, 224:3
**minimize** [2] - 58:25, 141:9
**minimum** [1] - 28:14
**mining** [6] - 127:15, 127:21, 224:2, 224:6, 224:15, 228:22
**Minnekahta** [5] - 215:21, 215:24, 215:25, 216:6
**Minnelusa** [6] - 239:19, 241:2, 242:2, 242:17, 243:7, 243:10
**Minnesota** [2] - 27:6, 212:9
**Minnesota's** [1] - 21:6
**Minnkota** [6] - 19:21, 40:3, 69:24, 70:20, 105:25, 106:3
**Minnkota's** [1] - 167:15
**minor** [3] - 98:7, 205:15, 264:3
**minute** [5] - 37:5, 54:23, 61:11, 179:12, 246:16
**miscalculation** [2] - 151:21, 152:1
**mischaracterization** [3] - 92:16, 97:2, 157:23
**misheard** [1] - 244:10
**misread** [1] - 162:7
**missed** [1] - 201:9
**Mission** [1] - 239:18
**mistake** [1] - 151:24
**mixture** [1] - 87:25
**mixtures** [1] - 87:6
**model** [86] - 38:20, 67:20, 68:18, 139:5, 140:7, 140:11, 142:5, 142:23, 142:25, 143:4, 143:9, 143:11, 144:8, 144:11, 144:15, 144:21, 145:1, 145:3, 210:3, 210:4, 210:5, 210:8, 210:9, 210:11, 217:1, 218:18, 218:20, 218:21, 218:22, 219:16, 225:12, 225:14, 227:3, 227:10, 227:12, 235:14, 235:17, 238:25, 243:16, 243:19, 243:21, 243:24, 246:4, 246:25, 247:6, 247:15, 247:25, 248:2, 248:11, 249:2, 249:23, 250:11, 250:21, 251:4, 251:13, 252:4, 253:11, 253:13, 253:16, 253:24, 254:21, 255:6, 255:9, 255:20, 255:22, 256:16, 257:9, 257:25, 258:3, 258:19, 259:22, 260:14, 261:18, 265:21, 265:22, 267:18, 268:1, 268:23, 268:24, 268:25, 270:4, 273:1, 274:16, 276:2
**modeled** [8] - 139:13, 139:20, 140:4, 194:6, 219:1, 261:20, 268:8, 274:25
**modelers** [1] - 212:5
**modeling** [31] - 42:3, 69:1, 73:15, 117:18, 141:15, 143:21, 183:21, 205:6, 213:2, 218:4, 218:15, 219:6, 219:12, 219:20, 224:23, 225:5, 225:7, 226:20, 228:3, 230:10, 243:25, 244:18, 244:25, 245:2, 245:4, 245:6, 245:19, 248:1, 266:5, 266:6, 267:8
**models** [16] - 68:24, 244:3, 244:12, 245:15, 247:17, 247:22, 249:4, 251:2, 252:2, 252:3, 252:6, 257:23, 266:4, 266:7, 266:9, 266:12
**modification** [2] - 173:4, 174:20
**modified** [1] - 161:3
**modify** [1] - 166:17
**moment** [3] - 130:19, 165:16, 223:21
**moments** [1] - 54:14
**monetary** [2] - 165:22, 167:11
**monetize** [1] - 101:13
**money** [3] - 121:11, 121:14, 147:6
**monitor** [5] - 189:15, 189:19, 189:21, 189:23, 196:1
**monitored** [1] - 28:19
**monitoring** [32] - 188:19, 188:20, 188:21, 188:23, 188:25, 189:1, 189:5, 189:9, 189:10, 189:12, 189:13, 189:14, 189:16, 190:1, 190:9, 190:15, 190:19, 190:21, 190:22, 190:25, 199:10, 233:12, 234:14, 235:8, 236:25, 237:2, 237:12, 237:13, 237:14, 242:19, 242:23
**monitors** [1] - 190:16
**Moorhead** [1] - 212:9
**morning** [2] - 52:17, 276:10
**Morton** [6] - 1:14, 2:3, 2:16, 3:3, 15:5, 38:4
**most** [8] - 19:16, 21:14, 32:8, 32:10, 52:16, 112:4, 166:16, 216:2
**mostly** [2] - 44:17, 263:20
**motion** [17] - 2:18, 4:21, 7:1, 13:11, 13:13, 13:23, 14:4, 14:12, 14:19, 15:10, 15:17, 16:1, 16:8, 16:23, 17:4, 17:13, 17:20
**mouth** [6] - 116:10, 116:13, 124:11, 124:13, 124:17, 127:22
**move** [10] - 22:11, 23:23, 43:5, 60:5, 61:10, 125:6, 159:12, 197:23, 198:22, 230:16
**moved** [1] - 48:5
**movement** [2] - 189:13, 189:19

**moving** [2] - 164:24, 198:19
**MR** [237] - 8:3, 8:4, 8:4, 8:5, 8:6, 8:7, 8:7, 8:10, 8:10, 8:18, 11:17, 11:24, 12:19, 13:14, 13:16, 18:12, 19:25, 20:5, 20:9, 20:15, 23:23, 24:1, 24:6, 24:7, 24:16, 24:17, 25:7, 25:9, 25:12, 30:17, 30:19, 30:22, 32:21, 33:5, 36:19, 36:21, 37:3, 37:20, 37:22, 40:24, 41:1, 41:5, 43:3, 43:11, 43:14, 43:17, 43:23, 55:22, 55:25, 56:3, 61:6, 61:18, 61:20, 61:23, 62:15, 62:18, 72:18, 72:20, 73:2, 75:17, 75:18, 75:21, 76:10, 76:11, 77:3, 78:18, 78:22, 79:5, 81:19, 81:20, 81:24, 83:17, 89:5, 89:8, 89:11, 93:10, 93:13, 93:18, 99:23, 99:25, 100:1, 100:4, 100:5, 100:22, 104:9, 105:6, 107:22, 108:15, 110:16, 110:18, 111:15, 111:17, 112:11, 112:13, 112:16, 118:9, 118:12, 118:13, 118:14, 118:15, 119:3, 120:15, 120:18, 120:23, 121:21, 121:24, 122:2, 122:3, 122:4, 124:3, 124:9, 124:10, 124:15, 128:11, 128:12, 136:3, 136:4, 136:5, 136:6, 136:7, 139:9, 145:20, 145:21, 149:8, 149:11, 152:2, 152:3, 152:4, 152:6, 152:8, 156:12, 156:17, 156:19, 158:21, 159:1, 159:8, 160:25, 161:2, 162:7, 162:9, 162:10, 162:11, 162:12, 162:13, 162:20, 164:21, 165:4, 167:5, 167:6, 167:7, 167:13, 168:8, 175:6, 178:14, 178:16, 178:18, 179:2, 179:14, 179:22, 179:23, 180:2, 183:4, 184:17, 186:12, 187:5, 187:8, 187:14, 187:16, 187:19, 187:20, 187:22, 187:23, 191:20, 192:1, 192:4, 192:7, 193:9, 195:6, 195:17, 196:5, 196:11, 196:17, 196:19, 197:9, 197:10, 197:12, 197:20, 197:22, 197:23, 198:16, 198:18, 198:21, 199:18, 199:23, 200:18, 200:21, 201:11, 202:16, 205:14, 205:18, 206:3, 206:5, 206:6, 206:7, 206:8, 206:14, 206:18, 207:3, 207:5, 207:6, 207:9, 207:13, 208:12, 208:13, 208:16, 209:12, 209:19, 209:23, 209:25, 210:19, 210:23, 211:1, 211:9, 230:15, 230:24, 238:14, 238:17, 238:19, 240:23, 241:1, 246:23, 246:24, 250:22, 250:24, 251:1, 251:5, 256:13
**MS** [18] - 8:5, 8:6, 8:8, 8:18, 192:11, 195:3, 197:21, 199:20, 200:2, 200:19, 238:22, 239:22, 240:11, 240:25, 247:2, 251:2, 256:9, 256:12
**mud** [2] - 223:4, 223:12
**multiple** [17] - 50:8, 71:13, 96:21, 97:21, 138:21, 148:21, 149:18, 165:1, 165:2, 165:10, 166:7, 177:5, 237:21, 238:3, 252:6, 261:12, 266:3
**multiplier** [18] - 255:10, 255:19, 256:15, 256:21, 256:24, 259:3, 259:7, 259:15, 260:3, 261:4, 265:6, 270:14, 270:20, 271:15, 272:1, 272:17, 274:2, 276:1
**multiply** [2] - 137:1, 258:2

## N

**NAICS** [7] - 42:20, 42:23, 75:24, 76:15, 76:25, 77:18, 208:18
**name** [12] - 20:4, 20:16, 43:24, 77:14, 97:3, 104:23, 137:10, 137:20, 140:16, 203:7, 211:10, 230:25
**named** [2] - 181:14, 262:21
**names** [1] - 138:11
**nations** [5] - 97:4, 101:25, 165:15, 166:8, 166:16
**natural** [4] - 78:10, 78:13, 79:6
**naturally** [1] - 221:16
**nature** [4] - 74:16, 259:19, 260:17, 266:14
**ND** [12] - 1:14, 2:4, 2:17, 3:3, 3:17, 4:7, 4:19, 5:5, 5:20, 6:9, 6:22, 7:9
**NDIC** [6] - 8:2, 46:20, 62:19, 246:7, 273:12, 273:14
**NDIC's** [1] - 227:13
**NDL-325** [1] - 39:15
**NDL-326** [1] - 39:13
**NDL-327** [1] - 39:13
**NDM-106** [1] - 39:10
**near** [1] - 21:11
**Nebraska** [1] - 27:6
**necessarily** [4] - 132:21, 151:11, 173:7, 177:1
**necessary** [25] - 3:6, 5:8, 7:12, 42:15, 48:3, 128:17, 132:11, 152:24, 153:25, 154:24, 155:8, 155:12, 155:13, 155:15, 156:5, 156:23, 157:18, 158:6, 160:21, 161:9, 161:22, 186:2, 200:13, 206:25
**necessity** [1] - 87:9
**need** [23] - 11:15, 21:20, 51:25, 52:11, 55:10, 60:1, 87:10, 110:10, 120:13, 122:22, 129:11, 139:6, 173:7, 174:2, 181:18, 182:7, 191:10, 191:16, 197:1, 202:21, 245:1, 245:3, 266:12
**needed** [16] - 60:12, 90:4, 107:12, 107:19, 108:2, 113:25, 125:2, 128:25, 138:14, 160:6, 191:24, 210:17, 234:21, 235:19, 270:17, 276:7
**needs** [5] - 59:3, 154:8, 159:11, 161:9, 168:19
**negate** [1] - 87:10
**negotiate** [3] - 94:25, 95:3, 129:10
**negotiated** [1] - 132:17
**negotiating** [4] - 85:9, 88:15, 99:18, 166:18
**negotiations** [13] - 44:25, 95:6, 97:1, 97:12, 101:22, 162:25, 163:2, 163:11, 164:20, 164:25, 165:5, 166:13, 167:2
**neighborhood** [1] - 140:2
**net** [2] - 150:16, 151:7
**network** [1] - 105:15
**never** [2] - 122:21, 180:14
**New** [1] - 50:21
**new** [7] - 35:23, 70:15, 71:1, 71:6, 102:7, 163:21, 249:22
**next** [16] - 20:7, 27:19, 43:5, 44:8, 46:3, 48:4, 56:5, 106:23, 148:10, 196:17, 205:3, 205:5, 210:25, 221:8, 235:13, 236:23
**night** [1] - 13:12
**nitrogen** [1] - 35:13
**No(s)** [1] - 1:3
**nonconsent** [2] - 57:10, 150:8
**nonconsenting** [6] - 1:18, 3:21, 5:23, 14:9, 15:22, 17:9
**none** [1] - 95:23
**nonethanol** [1] - 35:19
**nonetheless** [1] - 74:2
**nonhazardous** [4] - 126:2, 126:6, 127:2, 127:4
**nonleased** [1] - 150:7
**NORTH** [1] - 1:1
**North** [171] - 1:7, 1:9, 1:11, 1:12, 1:13, 1:21, 1:22, 2:1, 2:2, 2:3, 2:10, 2:11, 2:14, 2:15, 2:16, 2:20, 2:22, 3:1, 3:2, 3:3, 3:11, 3:14, 3:15, 3:16, 4:1, 4:3, 4:5, 4:6, 4:14, 4:16, 4:18, 4:19, 4:23, 5:2, 5:4, 5:4, 5:13, 5:14, 5:16, 5:18, 5:19, 6:2, 6:4, 6:5, 6:8, 6:9, 6:15, 6:17, 6:18, 6:20, 6:22, 7:2, 7:4, 7:5, 7:8, 7:9, 7:19, 8:13, 8:20, 8:21, 11:6, 11:25, 14:22, 14:24, 15:2, 15:3, 15:5, 16:11, 16:14, 16:16, 16:18, 16:19, 17:22, 17:24, 18:1, 18:4, 18:6, 18:7, 21:3, 21:10, 21:13, 23:6, 27:5, 27:14, 27:19, 27:25, 31:5, 32:16, 32:19, 33:6, 33:8, 33:9, 33:17, 33:20, 33:23, 34:12, 34:14, 36:2, 36:4, 36:7, 36:14, 36:16, 36:25, 44:13, 46:4, 49:7, 49:22, 61:25, 63:21, 63:23, 65:1, 65:6, 65:21, 70:10, 70:23, 71:3, 84:2, 84:9, 84:21, 87:1, 99:1, 100:17, 101:6, 101:10, 102:3, 103:7, 103:13, 103:15, 103:24, 104:10, 104:22, 106:11, 108:7, 124:12, 124:17, 127:18, 127:22, 135:20, 136:9, 147:22, 150:7, 156:9, 156:20, 156:25, 157:1, 158:10, 160:13, 163:18, 164:1, 171:9, 175:4, 178:7, 193:18, 193:22, 196:9, 197:2, 197:13, 198:2, 202:1, 202:5, 202:11, 211:17, 214:3, 214:19, 221:17, 222:18, 235:3, 239:20, 240:12, 241:19, 265:15
**northeast** [4] - 197:6, 197:15, 197:16, 267:4
**northwest** [1] - 197:6
**note** [6] - 12:9, 173:13,

200:5, 211:13, 220:16, 252:15
**noted** [6] - 24:15, 82:20, 218:25, 259:13, 260:18, 261:15
**notes** [4] - 174:7, 201:12, 201:13, 201:19
**nothing** [7] - 92:9, 111:23, 192:7, 206:15, 240:1, 247:20, 249:6
**notice** [16] - 45:3, 45:7, 45:12, 46:2, 46:5, 46:6, 46:11, 46:15, 46:19, 46:22, 47:8, 47:9, 47:10, 47:15, 48:16
**noticed** [1] - 88:3
**now's** [2] - 179:11, 246:15
**Number** [10] - 13:21, 14:3, 14:18, 15:9, 15:16, 15:25, 16:7, 16:22, 17:3, 17:12
**number** [39] - 12:1, 31:10, 51:4, 76:18, 76:21, 84:8, 84:25, 95:14, 95:16, 95:18, 95:21, 96:13, 96:18, 97:25, 99:24, 101:2, 101:3, 134:21, 135:20, 136:8, 136:15, 137:4, 137:9, 137:17, 137:23, 165:7, 165:9, 194:2, 200:23, 203:7, 207:15, 207:22, 258:24, 271:16, 271:19, 272:24, 273:22, 274:20, 274:24
**numbering** [1] - 53:16
**numbers** [7] - 57:21, 162:18, 162:21, 163:6, 174:13, 197:9, 258:23
**numerical** [2] - 210:7, 210:12
**numerous** [4] - 18:16, 163:13, 163:17, 262:23

## O

**O2** [1] - 219:12
**object** [7] - 24:7, 32:21, 36:19, 37:20, 41:1, 156:12, 161:19
**objecting** [1] - 176:13
**objection** [13] - 23:25, 24:13, 24:14, 25:8, 25:9, 30:19, 33:3, 55:24, 55:25, 72:18, 149:8, 206:6, 240:23
**objections** [3] - 30:18, 40:25, 43:12
**objectives** [1] - 157:19
**obligated** [2] - 118:22, 171:5
**obligation** [5] - 118:20, 171:10, 172:20, 179:7
**observed** [1] - 260:4
**obtain** [4] - 64:20, 145:17, 155:21, 191:10
**obtained** [1] - 47:15
**obviated** [1] - 92:5
**obviously** [5] - 12:12, 101:7, 103:19, 162:23, 182:24
**Occupancy** [1] - 130:16
**occupancy** [10] - 87:10, 89:24, 92:7, 92:11, 98:8, 98:12, 130:19, 131:3, 152:17, 208:5
**occur** [2] - 200:15, 217:21
**occurred** [1] - 70:23
**occurs** [1] - 175:3
**odd** [2] - 204:24, 204:25
**OF** [2] - 7:15, 9:2
**offer** [8] - 19:3, 25:7, 30:17, 40:24, 55:22, 86:7, 165:23, 166:1
**offered** [5] - 32:22, 86:11, 89:23, 96:12, 130:1
**Offered** [1] - 10:4
**offering** [1] - 164:15
**offers** [2] - 84:25, 165:6
**offhand** [1] - 263:4
**Office** [1] - 196:10
**office** [1] - 60:25
**officer** [2] - 63:14, 183:16
**official** [2] - 18:24, 19:8
**offtake** [3] - 114:19, 115:14, 115:23
**often** [1] - 164:18
**Oil** [1] - 11:9
**OIL** [1] - 1:2
**oil** [34] - 38:1, 44:16, 78:10, 78:12, 79:6, 87:20, 88:18, 107:13, 107:21, 108:3, 108:4, 108:21, 122:18, 122:22, 149:16, 149:23, 150:1, 150:3, 150:19, 150:21, 151:1, 151:4, 151:8, 161:18, 222:15, 223:1, 232:8, 233:15, 233:16, 244:3, 244:12, 251:16, 257:18
**oil-bearing** [1] - 222:15
**Oliver** [22] - 1:14, 2:4, 2:16, 3:3, 3:17, 4:6, 4:19, 5:5, 5:20, 6:9, 6:22, 7:9, 15:5, 16:18, 18:6, 28:1, 37:11, 37:15, 37:16, 38:3, 39:11, 125:7
**OLSEN** [3] - 9:19, 230:20, 239:22
**Olsen** [5] - 211:2, 230:17, 230:18, 231:2, 238:15
**once** [6] - 50:3, 98:23, 145:5, 165:1, 166:15, 175:8
**one** [103] - 11:12, 13:3, 13:10, 18:13, 19:3, 20:7, 23:7, 27:23, 31:12, 45:16, 46:6, 49:8, 49:11, 50:7, 50:20, 50:21, 52:16, 52:19, 53:18, 53:21, 54:18, 55:2, 55:10, 65:21, 66:16, 67:15, 69:20, 71:18, 81:17, 89:14, 89:15, 97:3, 101:2, 101:18, 103:18, 103:20, 104:23, 105:1, 107:16, 108:12, 114:22, 117:6, 120:14, 121:9, 126:9, 134:18, 134:24, 135:4, 135:19, 137:4, 139:10, 142:11, 143:16, 146:19, 146:20, 162:16, 163:13, 167:20, 174:12, 176:3, 178:19, 181:24, 183:13, 184:22, 192:17, 197:13, 199:21, 199:22, 200:3, 205:15, 209:19, 209:25, 210:1, 221:19, 233:1, 233:11, 234:8, 234:9, 236:21, 239:12, 239:16, 244:21, 247:12, 250:4, 250:25, 251:13, 252:11, 252:15, 253:15, 258:10, 258:18, 259:13, 259:14, 260:1, 260:18, 261:9, 261:15, 265:12, 266:22, 268:6, 272:3
**one-half** [2] - 45:16, 46:6
**one-mile** [1] - 233:1
**one-time** [1] - 162:16
**ones** [5] - 65:3, 138:18, 183:2, 207:17, 248:13
**online** [2] - 241:21, 246:10
**Opeche** [2] - 215:21, 215:23
**Opeche/Spearfish** [7] - 215:17, 216:2, 216:5, 233:25, 234:11, 237:24, 239:1
**open** [2] - 75:15, 161:14
**opening** [1] - 166:1
**Opening** [1] - 9:4
**operability** [1] - 184:4
**operate** [13] - 1:19, 3:22, 6:1, 15:23, 17:10, 26:24, 102:25, 145:18, 146:1, 146:11, 149:12, 186:15, 186:16
**operated** [11] - 28:13, 28:18, 28:19, 83:6, 83:8, 83:11, 193:5, 229:9, 229:20, 230:8, 238:6
**operating** [14] - 21:16, 26:7, 29:2, 41:15, 64:10, 119:8, 119:11, 121:3, 121:6, 157:1, 159:4, 183:16, 186:24, 222:3
**operation** [7] - 116:10, 119:15, 160:3, 160:7, 160:21, 224:8, 242:18
**operational** [2] - 235:8, 261:17
**Operations** [1] - 152:25
**operations** [33] - 26:15, 28:18, 116:15, 116:20, 118:4, 119:7, 119:22, 120:10, 122:20, 123:14, 129:20, 131:2, 131:6, 153:25, 155:8, 155:15, 156:6, 156:23, 159:9, 161:22, 169:16, 177:24, 188:7, 188:14, 188:16, 188:23, 196:14, 208:9, 242:14, 242:20, 242:22, 242:25, 257:5
**Operator** [6] - 118:25, 151:22, 152:22, 161:4, 161:6
**operator** [21] - 26:3, 26:4, 118:3, 119:5, 119:13, 119:17, 119:19, 120:9, 121:4, 121:19, 123:13, 151:11, 155:5, 156:15, 163:13, 193:3, 200:10, 200:12, 206:9, 206:13
**operators** [2] - 25:21, 163:13
**opinion** [20] - 34:10, 34:20, 42:25, 158:12, 217:23, 220:8, 221:11, 227:17, 227:24, 228:7, 229:1, 229:8, 229:19, 230:5, 234:25, 235:13, 238:5, 242:21, 257:14, 271:20
**opportunities** [1] - 105:16
**opportunity** [15] - 11:14, 13:13, 30:5, 32:12, 42:2, 42:10, 43:6, 54:17, 61:2, 90:5, 93:7, 101:12, 105:2, 199:17, 226:24
**opposed** [1] - 157:13
**opposing** [5] - 20:25, 30:11, 43:6, 44:9, 214:9
**opposition** [1] - 203:14
**ops** [1] - 124:23
**option** [4] - 48:7, 50:10, 50:24, 86:17
**optionality** [1] - 117:1
**options** [1] - 114:18
**order** [25] - 2:6, 4:10, 6:12, 14:14, 16:3, 17:15, 68:13, 68:21, 83:15, 91:3, 99:2, 99:3, 99:7, 109:4, 110:11, 148:24, 149:6, 149:16, 149:22, 164:23, 174:17, 268:5, 271:18, 272:20, 273:24
**ordinary** [1] - 169:15
**organizing** [1] - 247:24

**orientated** [1] - 267:4
**orientation** [3] - 265:17, 265:18, 267:5
**originated** [1] - 101:8
**otherwise** [7] - 90:7, 118:21, 130:6, 133:3, 154:10, 157:13, 172:1
**outline** [2] - 54:4, 262:18
**output** [2] - 140:11, 227:4
**outside** [19] - 41:17, 45:16, 59:3, 65:21, 70:22, 71:3, 71:6, 139:15, 140:18, 143:10, 186:11, 186:13, 186:21, 188:25, 189:1, 233:1, 233:7, 244:6, 270:13
**overall** [6] - 72:25, 73:16, 103:2, 103:21, 121:18, 261:20
**overestimating** [1] - 274:21
**overlain** [5] - 214:21, 220:12, 227:23, 229:13, 229:24
**overlying** [1] - 233:25
**overpredict** [1] - 276:5
**overrides** [1] - 91:7
**overruled** [7] - 33:4, 36:20, 37:21, 41:3, 72:19, 79:4, 240:24
**oversaw** [4] - 45:25, 122:13, 212:24, 232:10
**oversee** [4] - 211:24, 212:3, 232:6, 245:18
**overview** [8] - 30:13, 31:2, 37:7, 213:9, 213:12, 213:15, 213:17, 224:22
**own** [13] - 54:9, 64:5, 67:23, 116:8, 150:11, 170:23, 173:24, 173:25, 177:8, 181:11, 208:3, 236:2
**owned** [17] - 1:17, 3:21, 5:23, 14:8, 15:21, 17:8, 25:2, 25:23, 25:25, 84:3, 84:4, 151:10, 151:11, 151:14, 184:13, 184:15, 206:10
**owner** [13] - 46:9, 47:4, 54:6, 59:1, 62:4, 86:16, 119:2, 152:10, 170:12, 195:22, 206:13, 206:21
**Owner** [2] - 118:20, 118:21
**owners** [53] - 1:18, 3:21, 5:24, 14:9, 15:22, 17:9, 25:20, 45:11, 45:12, 45:17, 45:20, 46:7, 46:8, 49:24, 50:2, 50:13, 50:17, 51:6, 52:7, 54:3, 54:9, 57:11, 57:15, 57:17, 58:2, 58:18, 58:20, 59:5, 59:7, 60:16, 83:23, 101:12, 119:10, 120:22, 122:18, 128:25, 130:25, 131:13, 131:17, 131:22, 136:10, 141:6, 146:7, 146:15, 148:22, 148:24, 151:12, 151:15, 152:18, 178:9, 178:10, 205:12, 229:3
**Owners** [2] - 118:17, 151:23
**ownership** [7] - 160:2, 171:24, 172:1, 176:9, 184:24, 185:2, 193:6
**owns** [3] - 136:23, 152:11, 207:22
**oxygen** [6] - 35:13, 219:3, 219:6, 219:23

## P

**P.A** [1] - 8:11
**p.m** [9] - 13:12, 124:4, 124:5, 179:17, 179:18, 246:18, 246:19, 276:12, 276:13
**P.O** [1] - 11:19
**package** [2] - 252:10, 253:1
**pad** [1] - 87:20
**pads** [3] - 60:14, 60:22, 83:2
**page** [53] - 31:16, 35:3, 35:5, 35:7, 35:8, 37:6, 37:10, 39:8, 55:8, 55:11, 81:21, 100:7, 100:8, 117:24, 134:6, 169:3, 174:12, 174:13, 182:15, 194:3, 194:9, 195:12, 198:4, 203:23, 204:6, 205:20, 207:11, 207:13, 207:21, 214:18, 215:14, 216:23, 221:21, 223:25, 232:20, 236:13, 236:23, 236:24, 238:23, 239:12, 255:1, 255:2, 258:13, 260:6, 261:1, 262:6, 262:10, 263:12, 263:24, 266:15, 267:14, 268:13, 268:19
**Page** [13] - 9:3, 9:9, 9:10, 9:11, 9:12, 9:13, 9:14, 9:15, 9:16, 9:17, 9:20, 9:21, 9:22
**Pages** [1] - 7:16
**paid** [7] - 120:1, 121:11, 121:14, 168:13, 177:22, 205:12, 252:23
**paper** [4] - 18:18, 18:23, 19:4, 19:6
**paragraph** [10] - 58:6, 147:19, 169:3, 169:5, 181:3, 255:5, 263:11, 270:13, 270:18, 272:12
**Paralegal** [1] - 8:18
**parameters** [3] - 63:12, 244:22, 272:14
**parent** [4] - 62:3, 62:4, 62:21
**part** [35] - 18:18, 19:16, 31:4, 33:12, 70:10, 74:3, 80:23, 82:11, 85:25, 93:15, 111:3, 111:5, 111:11, 122:6, 123:16, 168:21, 168:23, 188:7, 196:24, 202:10, 202:12, 202:14, 202:18, 208:19, 208:23, 242:6, 243:15, 261:18, 262:22, 263:9, 267:2, 275:18
**participants** [3] - 33:21, 70:25, 71:5
**participate** [1] - 32:2
**participating** [1] - 141:4
**Participation** [1] - 134:5
**participation** [21] - 38:22, 54:6, 54:10, 54:12, 54:17, 55:3, 56:15, 56:22, 134:3, 135:22, 136:14, 136:19, 137:2, 137:3, 137:16, 137:23, 184:11, 184:12, 198:24, 207:20
**Participations** [1] - 198:22
**particular** [15] - 31:16, 45:17, 52:24, 56:21, 60:13, 67:1, 87:7, 90:12, 150:12, 169:9, 184:15, 212:23, 233:17, 234:8, 266:25
**particularly** [4] - 37:6, 37:25, 264:18, 265:2
**parties** [10] - 18:10, 69:14, 69:16, 69:17, 69:19, 70:3, 138:22, 170:4, 206:12, 207:23
**Parties** [1] - 118:17
**Partition** [1] - 174:14
**partition** [2] - 174:19, 174:24
**partners** [7] - 102:22, 109:8, 110:9, 111:9, 114:21, 114:25, 115:22
**partnership** [2] - 23:1, 23:3
**parts** [4] - 188:22, 240:14, 241:10, 243:11
**party** [2] - 47:13, 247:18
**past** [5] - 13:6, 42:18, 50:14, 117:19, 222:9
**patch** [1] - 87:20
**pathway** [3] - 105:12, 216:16, 229:17
**pathways** [6] - 214:25, 220:15, 220:24, 220:25, 230:1, 242:7
**Paul** [1] - 12:6
**pay** [5] - 58:2, 74:20, 118:20, 122:19, 122:22
**paying** [2] - 162:15, 164:6
**payment** [6] - 162:5, 162:15, 162:16, 166:4, 175:10, 198:6
**payments** [3] - 111:25, 120:10, 134:9
**PDF** [1] - 246:11
**Pelham** [2] - 84:7, 87:8
**penalty** [3] - 150:9, 150:10, 150:17
**penetrate** [1] - 233:24
**penetrates** [1] - 234:10
**people** [4] - 122:25, 138:12, 145:3, 165:9
**per** [17] - 28:3, 28:13, 33:15, 63:18, 140:2, 162:5, 162:6, 162:15, 162:17, 163:5, 165:22, 166:5, 186:14, 202:2, 240:14, 241:10, 243:11
**percent** [42] - 33:8, 33:16, 33:17, 35:11, 35:22, 35:24, 36:1, 38:16, 48:8, 48:9, 48:14, 51:13, 51:20, 51:22, 52:4, 52:11, 55:14, 60:10, 96:2, 101:16, 135:22, 136:13, 136:25, 137:15, 139:2, 141:16, 142:9, 142:13, 142:14, 143:8, 150:15, 150:16, 151:2, 151:6, 151:7, 198:24, 219:2, 219:23, 260:14, 262:1
**percentage** [12] - 55:6, 55:20, 134:8, 135:23, 138:5, 143:18, 143:21, 143:23, 151:5, 163:5, 165:14, 184:13
**percentages** [3] - 52:8, 57:9, 57:21
**percentagewise** [1] - 164:8
**perfect** [1] - 133:6
**perform** [2] - 235:18, 259:20
**performance** [1] - 117:16
**performed** [2] - 233:22, 237:8
**performing** [1] - 184:2
**perhaps** [16] - 35:2, 36:13, 39:20, 52:20, 57:2, 60:3, 60:4, 87:9, 104:9, 117:12, 125:21, 133:9, 161:11, 165:15, 171:2, 187:21
**period** [7] - 13:17, 41:22, 42:2, 115:10, 194:5, 217:20, 234:24
**periodically** [1] - 189:24
**perm** [6] - 260:4, 260:23, 261:5, 273:19, 274:10, 274:25
**Permanent** [2] - 25:24, 62:3
**permanent** [5] - 23:9, 28:3, 114:19, 169:8, 214:7
**permanently** [5] - 27:16, 109:5, 110:4, 110:11, 114:25

**permeabilities** [3] - 256:23, 258:2, 260:7
**permeability** [61] - 214:12, 214:24, 216:11, 216:12, 216:15, 217:12, 218:6, 218:19, 219:10, 220:18, 229:15, 238:23, 239:3, 240:16, 242:11, 246:4, 255:6, 255:9, 255:10, 255:15, 255:16, 255:17, 255:20, 256:4, 256:6, 256:17, 256:22, 257:3, 257:8, 257:13, 258:3, 258:19, 258:25, 259:6, 259:15, 259:19, 259:25, 260:3, 260:8, 260:24, 261:2, 261:21, 262:3, 264:7, 266:19, 267:11, 268:24, 270:4, 270:6, 270:19, 270:22, 271:11, 272:1, 272:15, 272:18, 272:19, 272:21, 273:2, 274:17, 275:11, 276:1
**permeable** [1] - 221:8
**permission** [1] - 160:6
**permissions** [1] - 38:13
**permit** [48] - 23:15, 23:19, 23:22, 26:6, 31:8, 35:22, 40:17, 41:21, 46:19, 47:18, 113:24, 114:1, 116:18, 116:20, 117:1, 123:17, 123:21, 123:23, 144:1, 185:13, 186:15, 188:11, 212:25, 221:19, 223:3, 224:20, 225:13, 226:16, 226:17, 229:2, 232:10, 232:11, 232:18, 233:17, 244:5, 244:9, 244:17, 247:9, 248:18, 248:22, 249:9, 249:10, 249:15, 249:24, 260:19, 261:1, 263:13
**permits** [15] - 26:14, 26:23, 41:9, 42:5, 45:15, 70:14, 71:1, 71:6, 113:14, 125:9, 142:16, 189:3, 232:8, 257:21, 260:20
**permitted** [10] - 39:17, 40:3, 40:16, 41:7, 41:15, 117:9, 186:16, 194:25, 276:7
**permitting** [6] - 22:9, 73:15, 81:6, 81:8, 113:13, 231:22
**perpetuity** [2] - 174:18, 174:25
**person** [6] - 76:22, 78:20, 122:9, 172:25, 183:15, 204:24
**personally** [2] - 51:3, 243:17
**persons** [1] - 157:17
**perspective** [5] - 72:21, 74:17, 113:2, 167:19, 167:20
**pertaining** [2] - 132:7, 177:22
**Petre** [1] - 210:10
**Petrel** [7] - 210:10, 225:8, 243:16, 243:22, 252:14, 252:17, 252:22
**petroleum** [5] - 78:10, 78:13, 79:7, 231:16, 245:23
**petrophysic** [1] - 265:5
**petrophysical** [2] - 225:11, 250:16
**phenomenon** [1] - 265:14
**PHIE** [1] - 268:23
**PHMSA** [1] - 28:13
**Phoenix** [1] - 21:9
**phone** [2] - 50:5, 51:4
**phrase** [2] - 175:19, 245:21
**PHREEQC** [4] - 218:15, 218:16, 243:24, 251:13
**PHREEQCi** [1] - 251:10
**physically** [1] - 187:1
**physics** [2] - 212:8, 245:13
**pick** [3] - 248:20, 269:22
**picked** [2] - 248:18, 248:20
**picking** [1] - 247:24
**picks** [1] - 248:23
**picture** [1] - 269:1
**piece** [2] - 174:25, 210:1
**Pierre** [1] - 237:25
**pinches** [1] - 215:25
**pipe** [7] - 28:14, 28:15, 121:20, 121:22, 121:23, 122:5
**pipeline** [49] - 12:15, 23:6, 26:3, 27:15, 27:21, 28:10, 28:12, 34:15, 42:24, 78:3, 78:5, 78:7, 78:9, 78:12, 78:16, 79:6, 79:12, 79:16, 79:17, 79:21, 79:22, 79:24, 80:22, 81:5, 81:10, 81:15, 82:2, 82:8, 82:13, 82:16, 87:19, 90:6, 113:23, 114:9, 120:1, 121:22, 121:25, 123:1, 123:5, 123:16, 123:19, 123:24, 193:16, 193:17, 193:21, 194:11, 194:16, 194:24, 209:7
**Pipeline** [23] - 1:6, 2:9, 3:10, 4:12, 5:12, 6:14, 14:2, 14:17, 15:15, 16:6, 17:2, 17:18, 81:12, 81:23, 82:14, 82:21, 120:12, 121:12, 122:1, 122:6, 122:23, 123:12, 182:21
**pipelines** [5] - 28:8, 86:5, 86:25, 130:8, 154:7
**place** [15] - 36:2, 139:19, 172:3, 174:9, 178:20, 181:21, 191:4, 208:6, 224:16, 237:18, 237:19, 238:9, 259:10, 270:18, 276:9
**places** [1] - 216:2
**plainer** [1] - 269:15
**plan** [19] - 19:9, 110:1, 110:2, 111:3, 111:6, 111:11, 111:12, 111:18, 189:9, 189:12, 189:14, 189:21, 190:25, 234:24, 236:25, 237:2, 237:12, 237:14, 242:6
**planned** [2] - 106:23, 186:3
**planning** [3] - 27:3, 29:5, 189:23
**plans** [18] - 63:6, 63:9, 83:9, 86:1, 86:9, 109:11, 109:13, 109:17, 114:9, 114:13, 114:15, 116:3, 116:23, 117:3, 126:22, 161:12, 223:24, 224:6
**plant** [14] - 33:12, 33:15, 34:2, 34:5, 34:8, 64:4, 110:8, 116:10, 116:13, 116:14, 116:17, 125:2, 128:1, 209:5
**planted** [1] - 168:21
**plants** [41] - 23:1, 23:5, 29:6, 29:7, 29:16, 31:4, 31:10, 31:22, 31:25, 32:9, 32:11, 32:13, 63:1, 64:15, 64:18, 65:2, 65:7, 65:20, 81:4, 86:6, 102:5, 102:6, 102:8, 102:10, 102:17, 105:2, 115:1, 115:9, 115:10, 124:12, 124:13, 124:17, 124:21, 125:14, 126:14, 127:18, 127:22, 193:11, 193:12, 194:17
**play** [2] - 117:14, 185:8
**plume** [39] - 41:25, 42:7, 67:10, 67:13, 67:17, 67:19, 68:11, 68:18, 117:21, 139:12, 139:14, 139:20, 140:4, 140:8, 140:12, 140:13, 140:14, 140:16, 140:21, 141:21, 141:24, 143:9, 186:6, 186:11, 186:22, 188:21, 189:13, 189:20, 203:25, 204:11, 204:24, 204:25, 223:15, 225:2, 232:25, 233:10, 274:21, 276:5
**plumes** [2] - 41:14, 41:17
**point** [47] - 11:16, 18:15, 24:1, 39:11, 39:12, 51:7, 61:11, 82:20, 82:24, 83:4, 86:3, 103:20, 104:5, 109:9, 109:25, 112:10, 113:19, 113:20, 114:1, 114:14, 114:18, 115:23, 117:1, 124:22, 163:15, 166:9, 182:18, 182:22, 182:24, 183:3, 194:22, 204:1, 204:12, 205:10, 206:16, 210:5, 210:13, 214:17, 215:13, 215:15, 216:22, 239:10, 260:24, 267:20, 267:22, 268:6, 272:24
**points** [3] - 99:14, 99:19, 163:14
**policies** [1] - 181:12
**policy** [11] - 104:11, 108:6, 178:25, 181:10, 181:22, 181:24, 182:3, 182:5, 231:7, 231:23, 232:9
**pollution** [2] - 180:22, 181:10
**pool** [8] - 2:19, 4:22, 7:2, 14:20, 16:9, 17:21, 203:12, 203:17
**poorly** [1] - 259:17
**populate** [1] - 218:22
**Pore** [13] - 57:7, 58:7, 118:17, 118:19, 118:21, 134:9, 151:23, 161:7, 162:1, 168:7, 176:20, 176:21, 177:16
**pore** [85] - 1:16, 1:17, 3:20, 3:21, 5:23, 14:7, 14:8, 15:20, 15:21, 17:7, 17:8, 44:22, 47:17, 48:6, 48:17, 49:17, 49:20, 50:1, 50:11, 50:23, 50:24, 51:13, 52:7, 52:15, 54:6, 57:15, 57:25, 60:16, 63:23, 83:18, 84:23, 85:10, 85:16, 91:9, 91:21, 92:22, 94:2, 101:12, 116:24, 119:2, 119:9, 119:18, 119:22, 120:22, 122:18, 125:9, 129:18, 130:25, 131:17, 132:9, 132:25, 133:22, 145:12, 146:15, 146:19, 149:17, 151:14, 152:10, 152:11, 152:15, 153:14, 156:15, 157:14, 164:15, 165:23, 166:10, 169:7, 169:12, 169:23, 176:18, 177:9, 178:1, 195:8, 195:14, 195:21, 198:3, 199:2, 200:4, 203:24, 206:10, 206:13, 208:2, 214:16
**porosity** [8] - 214:12, 216:11, 218:6, 219:15, 219:24, 238:20, 259:18, 269:4
**porous** [1] - 221:8
**portal** [2] - 251:21, 251:22
**portion** [3] - 52:1, 116:18,

204:10
**position** [6] - 52:10, 130:25, 186:23, 188:6, 231:21, 231:22
**positions** [1] - 231:19
**positive** [2] - 103:1, 183:17
**possibility** [2] - 224:15, 257:10
**possible** [8] - 75:9, 110:25, 111:4, 114:7, 171:16, 201:1, 228:24, 257:6
**possibly** [1] - 35:15
**post** [4] - 186:21, 259:2, 259:4, 259:5
**post-injection** [1] - 186:21
**potential** [10] - 63:16, 138:2, 196:16, 209:17, 223:16, 230:1, 237:6, 242:7, 253:4, 274:18
**potentially** [11] - 35:18, 65:15, 107:10, 107:18, 107:25, 108:24, 143:13, 223:14, 242:18, 245:7, 251:8
**Powder** [1] - 21:13
**Powell** [1] - 183:16
**power** [9] - 38:25, 100:17, 106:20, 125:14, 127:18, 130:8, 147:14, 147:21, 148:3
**powers** [1] - 148:1
**practice** [2] - 171:3, 173:23
**practices** [3] - 58:22, 266:6
**practicing** [1] - 158:16
**pre** [1] - 259:2
**preamble** [2] - 192:13, 202:2
**precipitation** [2] - 219:16, 219:25
**preclude** [2] - 208:8, 224:9
**predictability** [1] - 143:5
**predicted** [2] - 142:23, 256:5
**predictive** [3] - 250:21, 251:6, 251:7
**preferred** [1] - 87:24
**Premises** [1] - 177:24
**prepare** [2] - 66:15, 226:16
**prepared** [6] - 25:4, 30:14, 40:20, 66:3, 66:6, 66:10
**prescribed** [1] - 150:18
**PRESENT** [1] - 8:2
**present** [6] - 42:4, 180:18, 186:3, 233:15, 233:17, 272:11
**presented** [3] - 84:24, 271:21, 272:8
**presents** [1] - 190:25
**Preservation** [1] - 196:9
**president** [3] - 20:22, 21:15, 22:5
**pressure** [17] - 183:19, 190:3, 190:7, 190:17, 216:13, 222:4, 222:5, 223:13, 225:1, 243:2, 256:3, 256:5, 261:25, 262:1, 270:23, 271:12, 274:19
**pressures** [5] - 117:9, 190:2, 190:23, 243:1, 261:22
**presume** [1] - 126:20
**presuming** [1] - 135:10
**pretty** [4] - 13:6, 19:22, 28:5, 115:12
**prevalent** [1] - 215:7
**prevalently** [1] - 264:9
**prevent** [2] - 111:8, 180:6
**prevents** [1] - 234:19
**previous** [7] - 38:1, 54:3, 162:24, 214:2, 220:4, 257:11, 271:23
**previously** [19] - 24:19, 54:22, 55:1, 55:13, 57:9, 99:9, 148:13, 212:22, 213:23, 220:12, 226:3, 226:9, 227:20, 228:18, 228:20, 229:4, 270:13, 271:24, 274:17
**price** [5] - 99:14, 99:19, 101:14, 102:16, 112:5
**prices** [4] - 30:7, 30:8, 101:10, 101:11
**pricing** [1] - 111:25
**primarily** [6] - 22:12, 29:5, 35:12, 44:16, 166:8, 243:1
**primary** [3] - 85:19, 220:17
**principal** [3] - 208:22, 231:7, 231:23
**private** [7] - 50:2, 52:7, 69:14, 69:19, 74:23, 148:20, 154:16
**privately** [1] - 161:10
**procedure** [1] - 49:25
**procedures** [1] - 49:25
**proceed** [2] - 43:16, 114:1
**proceeded** [1] - 38:13
**proceeding** [1] - 266:2
**proceedings** [2] - 11:1, 185:15
**PROCEEDINGS** [1] - 9:2
**process** [14] - 13:2, 13:8, 47:25, 49:19, 59:19, 59:24, 60:6, 68:25, 74:3, 98:20, 159:14, 175:2, 234:17, 248:4
**produce** [7] - 29:16, 32:1, 33:9, 68:18, 223:10, 223:15, 265:11
**produced** [3] - 29:18, 33:17, 262:17
**producers** [1] - 30:6
**produces** [1] - 69:1
**producing** [2] - 70:13, 102:6
**production** [5] - 64:10, 193:13, 223:2, 224:9, 231:18
**products** [4] - 78:10, 78:14, 79:7, 208:22
**professional** [3] - 74:7, 212:14, 245:9
**program** [4] - 21:5, 253:13, 253:17, 253:24
**programs** [1] - 252:13
**prohibit** [2] - 228:21, 228:22
**prohibition** [1] - 178:8
**prohibitions** [1] - 158:9
**prohibitive** [1] - 111:5
**project** [122] - 22:7, 22:13, 22:14, 27:9, 27:11, 27:12, 28:21, 28:24, 29:3, 29:4, 29:7, 29:10, 29:14, 30:13, 31:1, 31:4, 31:20, 31:21, 31:24, 32:18, 33:2, 33:12, 33:21, 34:10, 34:20, 35:15, 37:23, 45:2, 64:14, 64:17, 66:14, 66:17, 66:22, 66:23, 66:24, 69:15, 69:22, 69:25, 70:2, 70:5, 70:21, 71:12, 71:17, 71:25, 72:25, 73:16, 80:18, 80:24, 81:1, 81:2, 90:19, 96:12, 96:22, 97:22, 98:16, 100:19, 100:22, 101:8, 102:22, 103:8, 103:11, 105:4, 106:3, 106:5, 106:19, 106:22, 107:15, 108:10, 108:14, 108:19, 109:4, 109:24, 114:12, 114:14, 115:10, 115:13, 115:16, 116:9, 118:8, 119:14, 124:14, 138:15, 150:22, 167:15, 167:20, 175:3, 178:22, 179:1, 182:16, 191:11, 191:16, 191:25, 199:5, 202:1, 202:3, 202:18, 212:20, 212:23, 213:15, 213:17, 213:21, 214:5, 214:21, 221:5, 222:3, 222:22, 224:11, 225:21, 226:6, 227:3, 228:11, 230:4, 232:21, 234:13, 237:1, 237:14, 239:9, 247:20, 252:14, 252:22, 276:4
**Project** [2] - 192:22, 272:3
**projected** [1] - 275:11
**projects** [26] - 28:25, 39:17, 41:7, 65:14, 65:16, 70:15, 70:17, 70:20, 70:23, 71:1, 71:2, 71:6, 103:10, 106:7, 138:10, 138:21, 143:25, 167:18, 211:20, 212:3, 212:21, 214:2, 232:4, 232:7, 262:22
**prolific** [1] - 37:1
**promises** [1] - 57:22
**promote** [3] - 100:12, 104:12, 104:13
**pronounces** [1] - 137:10
**properly** [1] - 234:18
**properties** [13] - 129:21, 155:24, 155:25, 156:3, 216:7, 225:11, 255:11, 256:20, 258:8, 265:5, 265:21, 267:17, 267:24
**property** [36] - 83:23, 130:10, 131:2, 138:13, 146:25, 147:5, 147:10, 148:6, 148:11, 148:12, 148:20, 148:23, 148:25, 149:2, 149:4, 154:3, 156:4, 156:21, 156:23, 157:17, 160:1, 169:7, 170:24, 171:21, 171:22, 174:19, 174:25, 175:24, 177:8, 181:12, 191:10, 191:16, 191:24, 207:25, 250:17, 268:23
**proportionate** [6] - 137:17, 138:4, 150:6, 150:10, 150:25, 184:14
**proportionately** [1] - 184:13
**proposal** [3] - 73:25, 74:10, 189:25
**proposals** [4] - 72:10, 73:14, 73:19, 73:24
**propose** [1] - 57:14
**proposed** [20] - 29:24, 37:7, 39:25, 40:17, 42:4, 48:18, 48:22, 48:24, 106:3, 194:5, 195:11, 195:25, 196:2, 201:3, 203:18, 222:10, 229:8, 229:20, 233:14, 234:24
**proposes** [1] - 27:12
**proposing** [4] - 23:3, 29:15, 31:7, 189:21
**proprietary** [1] - 178:4
**protect** [1] - 238:11
**protection** [5] - 184:3, 191:9, 235:23, 238:2, 238:4
**protections** [5] - 85:22, 89:25, 92:3, 92:4, 237:18
**provide** [26] - 22:14, 33:21, 36:9, 36:10, 37:7, 46:2, 47:23, 48:16, 104:9, 105:15, 125:1, 153:13, 166:11, 171:6, 192:16, 194:13, 213:9, 213:16, 224:20, 232:9, 238:4, 244:11, 254:1, 254:6, 254:9, 254:13

**provided** [21] - 18:23, 45:4, 45:12, 46:5, 192:25, 196:24, 201:22, 203:2, 208:22, 208:23, 208:25, 209:6, 209:16, 213:14, 227:3, 244:5, 244:8, 253:21, 254:3, 254:11, 254:22
**provider** [1] - 125:1
**providers** [2] - 72:17, 124:25
**provides** [9] - 32:12, 34:18, 34:23, 105:24, 157:11, 199:4, 224:22, 238:1, 249:11
**providing** [6] - 22:19, 101:3, 179:6, 213:11, 226:23, 254:17
**provision** [19] - 128:23, 129:14, 129:16, 129:17, 130:5, 133:21, 150:13, 153:6, 154:20, 157:11, 159:25, 168:22, 174:5, 175:12, 175:14, 179:4, 179:24, 185:11, 208:19
**provisions** [11] - 57:12, 74:25, 75:4, 75:8, 85:8, 86:8, 131:16, 132:6, 132:12, 176:18, 176:20
**proximity** [2] - 32:6, 40:6
**prudent** [2] - 265:4, 276:5
**PS-1** [1] - 35:8
**PS-2** [2] - 31:9, 31:12
**PS-3** [9] - 35:3, 35:8, 37:9, 39:7, 81:21, 182:16, 190:10, 194:3, 202:3
**PS-5** [8] - 37:6, 37:10, 39:8, 81:21, 82:7, 82:19, 182:14, 182:15
**PSC** [6] - 12:14, 28:6, 80:11, 123:20, 193:17, 193:22
**Public** [1] - 236:7
**public** [8] - 43:1, 48:1, 75:14, 100:12, 104:12, 167:16, 227:8, 233:21
**publicly** [18] - 145:6, 227:11, 241:19, 244:6, 244:15, 245:6, 246:4, 246:7, 246:25, 247:19, 247:22, 248:5, 248:12, 248:23, 249:9, 249:25, 252:16, 254:4
**published** [7] - 225:25, 241:20, 249:9, 249:10, 257:11, 257:20, 262:20
**pull** [5] - 109:23, 126:22, 159:12, 177:9, 197:10
**pulling** [1] - 176:23
**pumping** [2] - 82:23, 161:14
**purchase** [3] - 34:7, 102:25, 253:5
**purchased** [1] - 252:18
**purple** [1] - 233:7
**purpose** [4] - 26:20, 26:22, 174:3, 252:25
**purposes** [7] - 70:4, 75:2, 129:11, 138:14, 152:13, 154:9, 181:5
**pursuant** [6] - 118:3, 119:6, 120:9, 120:20, 202:10, 240:9
**pursuing** [1] - 105:7
**push** [1] - 143:14
**pushback** [1] - 85:2
**put** [23] - 18:16, 67:1, 67:7, 67:9, 67:14, 67:18, 68:3, 68:23, 98:14, 103:4, 117:8, 128:5, 128:6, 129:6, 133:12, 142:25, 144:24, 160:12, 160:17, 167:12, 176:13, 177:7, 263:22
**putting** [4] - 98:24, 138:1, 181:21, 275:9

## Q

**QC'ing** [1] - 248:6
**qualify** [1] - 166:21
**qualifying** [1] - 170:14
**quality** [3] - 189:11, 227:25, 248:13
**quarter** [10] - 49:6, 49:10, 49:12, 49:15, 197:6, 197:7, 197:8, 197:15, 197:16
**question's** [2] - 146:23, 187:9
**questioned** [1] - 210:2
**questioning** [4] - 123:8, 124:8, 179:20, 246:21
**questions** [26] - 43:3, 43:7, 61:3, 61:7, 78:19, 78:25, 97:18, 145:11, 160:8, 165:20, 178:17, 184:2, 184:4, 192:8, 192:13, 192:21, 195:3, 196:21, 207:10, 220:5, 222:8, 226:2, 227:16, 230:15, 238:14
**quick** [5] - 115:21, 135:5, 145:10, 173:13, 207:10
**quicker** [4] - 12:12, 249:16, 249:17, 249:19
**quickly** [2] - 13:19, 56:16
**quite** [2] - 85:4, 224:13
**quote** [2] - 63:25, 205:24

## R

**radius** [5] - 34:8, 257:1, 270:21, 271:6, 272:14
**raise** [2] - 211:4, 230:19
**ran** [8] - 68:17, 68:24, 117:22, 243:16, 243:19, 251:14, 253:16, 253:24
**Range** [78] - 1:7, 1:9, 1:11, 1:12, 1:13, 1:21, 1:22, 2:1, 2:2, 2:3, 2:10, 2:11, 2:14, 2:15, 2:16, 2:20, 2:22, 3:1, 3:2, 3:3, 3:11, 3:14, 3:16, 3:16, 4:1, 4:4, 4:5, 4:6, 4:14, 4:16, 4:18, 4:19, 4:23, 5:2, 5:4, 5:5, 5:13, 5:15, 5:16, 5:18, 5:20, 6:3, 6:4, 6:5, 6:8, 6:9, 6:15, 6:17, 6:18, 6:20, 6:22, 7:3, 7:4, 7:5, 7:8, 7:9, 14:22, 14:24, 15:2, 15:3, 15:5, 16:11, 16:15, 16:17, 16:18, 17:22, 17:24, 18:1, 18:4, 18:6, 49:9, 49:12, 49:14, 135:21, 136:9, 197:2, 197:13, 204:9
**range** [10] - 139:24, 141:23, 143:1, 145:12, 256:22, 259:11, 260:6, 260:8, 260:19, 266:18
**ranges** [3] - 53:14, 140:1, 238:23
**rate** [4] - 95:25, 96:2, 101:15, 101:21
**rates** [7] - 72:23, 73:11, 74:2, 74:5, 74:13, 74:17, 164:6
**rather** [11] - 54:2, 61:10, 84:22, 84:23, 85:20, 134:1, 179:5, 199:2, 256:14, 275:17, 275:21
**ratio** [1] - 198:25
**raw** [2] - 144:11, 244:15
**ray** [1] - 248:21
**re** [13] - 1:3, 1:15, 2:5, 2:18, 3:7, 3:18, 4:8, 4:21, 5:9, 5:21, 6:11, 7:1, 93:7
**re-review** [1] - 93:7
**reach** [1] - 98:25
**reached** [3] - 50:4, 84:1, 165:6
**reaching** [1] - 262:5
**reactions** [2] - 218:12, 220:2
**reactive** [1] - 219:7
**read** [15] - 89:7, 93:8, 93:12, 107:16, 120:17, 130:15, 132:13, 132:14, 134:4, 155:9, 162:14, 187:5, 187:7, 205:24, 256:11
**readily** [1] - 108:19
**reading** [4] - 89:5, 93:11, 108:15, 120:16
**reads** [3] - 104:12, 107:24, 157:16
**ready** [3] - 107:11, 107:19, 108:1
**real** [5] - 115:21, 130:9, 135:4, 169:7, 173:13
**really** [5] - 90:13, 104:4, 125:25, 205:23, 246:12
**reask** [1] - 156:18
**reason** [6] - 95:1, 144:5, 145:2, 166:6, 181:19, 274:9
**reasonable** [10] - 141:3, 141:19, 161:16, 169:16, 256:1, 259:11, 260:3, 260:16, 261:15, 265:4
**reasonableness** [2] - 155:10, 158:2
**reasonably** [10] - 152:24, 153:24, 154:24, 155:7, 155:12, 155:13, 155:15, 156:5, 156:22, 161:22
**reasoning** [1] - 199:1
**reasons** [1] - 260:2
**recalling** [1] - 165:16
**receipt** [2] - 46:12, 46:25
**receive** [6] - 26:16, 26:23, 47:9, 47:10, 111:13
**received** [8] - 44:11, 44:14, 47:12, 85:2, 86:17, 89:10, 89:15, 165:8
**Received** [1] - 10:4
**receiver** [1] - 183:9
**recent** [1] - 52:16
**recently** [2] - 21:14, 54:15
**Recessed** [5] - 61:12, 124:4, 179:17, 246:18, 276:13
**recital** [1] - 100:11
**recitals** [7] - 100:9, 104:10, 104:17, 107:9, 107:23, 108:6, 108:14
**reclaimed** [2] - 223:22, 224:2
**reclamation** [3] - 85:23, 86:8, 86:22
**recognizes** [1] - 222:19
**recollection** [3] - 140:2, 165:1, 193:25
**recommend** [2] - 242:21, 242:24
**recommendation** [1] - 143:23
**recommendations** [2] - 191:1, 266:7
**reconstructing** [1] - 247:23
**reconvened** [4] - 61:12, 124:4, 179:17, 246:18
**Record** [5] - 89:7, 93:12, 120:17, 187:7, 256:11
**record** [20] - 11:2, 11:5, 18:19, 18:24, 19:8, 20:17, 24:12, 43:24, 45:17, 46:9, 61:15, 124:7, 172:4, 179:16, 179:20, 211:11,

231:1, 233:21, 246:21, 276:11
**recorded** [3] - 36:22, 172:2, 172:7
**records** [5] - 48:2, 75:15, 236:2, 236:3
**recovering** [1] - 180:6
**recovery** [5] - 107:13, 107:21, 108:3, 108:4, 108:21
**recreate** [2] - 247:25, 249:2
**red** [3] - 31:2, 81:21, 269:5
**Red** [7] - 29:2, 33:10, 33:11, 64:3, 64:9, 70:21, 106:9
**redirect** [2] - 210:21, 210:23
**reduce** [2] - 103:15, 106:24
**reduces** [3] - 100:23, 103:8, 222:6
**reducing** [14] - 22:19, 100:14, 100:20, 101:2, 102:2, 103:6, 103:12, 103:20, 104:2, 104:3, 104:7, 104:15, 104:22
**reevaluate** [2] - 235:4, 235:7
**reevaluation** [6] - 41:20, 41:22, 234:23, 235:1, 235:2, 261:19
**refer** [6] - 18:21, 22:13, 81:21, 120:10, 123:22, 216:1
**reference** [6] - 118:23, 159:3, 162:5, 163:15, 201:12, 272:2
**referenced** [4] - 118:9, 129:17, 180:21, 270:12
**references** [4] - 118:16, 159:4, 167:17, 221:19
**referencing** [1] - 89:10
**referred** [2] - 162:1, 270:19
**referring** [11] - 24:3, 71:22, 119:18, 121:3, 123:19, 221:15, 240:7, 243:1, 251:22, 257:19, 263:11
**refers** [4] - 77:22, 134:4, 135:5, 135:20
**refined** [3] - 78:10, 78:13, 79:7
**reflect** [4] - 31:6, 208:21, 221:22, 266:19
**reflected** [3] - 98:2, 267:6, 274:8
**reflects** [1] - 25:16
**refuse** [2] - 94:24, 254:5
**regard** [1] - 210:18
**regarding** [12] - 60:9, 60:13, 65:24, 80:11, 85:2, 86:25, 150:1, 165:10, 177:23, 210:2, 242:7, 262:18
**regardless** [4] - 74:4, 90:18, 130:19, 154:15
**region** [4] - 214:3, 222:2, 232:17, 232:20
**regional** [8] - 29:20, 34:21, 34:24, 217:4, 241:5, 241:6, 258:7
**regions** [1] - 258:2
**regularly** [1] - 70:13
**regulations** [2] - 232:8, 232:12
**regulatory** [6] - 21:24, 44:6, 102:18, 231:7, 231:21, 231:23
**reinject** [1] - 113:1
**relate** [3] - 69:14, 69:21, 195:9
**related** [17] - 69:16, 69:24, 70:1, 70:4, 71:17, 86:21, 117:9, 119:22, 143:20, 167:14, 209:1, 209:5, 209:7, 210:17, 213:25, 219:19, 268:4
**relation** [2] - 119:15, 195:14
**Relationship** [1] - 118:16
**relationship** [1] - 102:24
**relationships** [1] - 124:24
**relative** [3] - 216:12, 216:13, 217:12
**relatively** [1] - 19:11
**relevance** [2] - 72:18, 240:23
**reliability** [1] - 143:5
**relief** [2] - 129:1, 170:18
**rely** [2] - 68:12, 68:16
**remain** [2] - 133:4, 133:22
**remainder** [1] - 150:16
**remaindermen** [1] - 207:24
**remaining** [2] - 52:1, 85:3
**reminder** [1] - 12:14
**remote** [1] - 28:17
**removal** [2] - 111:20, 177:4
**renew** [1] - 115:22
**renewal** [2] - 42:2, 186:19
**renewals** [2] - 72:6, 115:24
**renewed** [1] - 116:2
**rental** [9] - 162:6, 162:17, 162:19, 163:7, 164:14, 164:19, 165:11, 165:22, 166:5
**renter** [1] - 180:9
**renters** [1] - 180:4
**repeat** [8] - 12:11, 20:3, 89:4, 93:25, 120:4, 126:5, 256:9, 275:18
**repeating** [1] - 201:11
**rephrase** [2] - 57:11, 123:10
**replicate** [9] - 245:2, 245:4, 245:7, 247:6, 247:13, 247:21, 249:14, 249:23, 267:11
**replicating** [2] - 106:15, 249:19
**report** [4] - 194:4, 248:20, 249:21, 273:11
**reported** [2] - 30:1, 248:18
**reporter** [1] - 201:21
**represent** [4] - 33:7, 156:24, 255:23, 269:5
**representative** [1] - 257:3
**represented** [1] - 256:16
**representing** [1] - 12:1
**represents** [3] - 68:20, 172:11, 172:17
**request** [12] - 58:15, 73:25, 97:4, 185:20, 185:23, 201:20, 201:22, 202:16, 203:1, 209:14, 209:15, 251:20
**requested** [9] - 25:15, 42:19, 46:12, 89:7, 93:12, 120:17, 187:7, 227:1, 256:11
**requesting** [12] - 1:4, 3:8, 5:10, 13:25, 15:12, 16:25, 26:13, 26:14, 51:8, 160:5, 188:11, 202:13
**requests** [3] - 75:15, 178:4, 196:12
**require** [15] - 1:17, 3:20, 5:23, 14:8, 15:21, 17:8, 32:25, 75:11, 110:4, 111:25, 114:25, 149:17, 170:25, 177:4, 257:8
**required** [20] - 1:19, 3:22, 6:1, 15:23, 17:10, 46:23, 63:18, 98:17, 114:19, 125:1, 129:9, 174:20, 186:10, 186:15, 191:13, 191:22, 202:8, 235:6, 235:18, 269:15
**requirement** [2] - 45:4, 51:23
**requirements** [9] - 35:18, 35:23, 45:8, 86:4, 87:25, 186:14, 224:20, 225:13, 232:18
**requires** [3] - 41:20, 138:21, 235:9
**resampled** [1] - 268:1
**research** [7] - 21:23, 75:2, 112:17, 167:10, 183:21, 212:13, 262:12
**Research** [4] - 66:7, 66:10, 211:16, 231:4
**reserved** [1] - 150:11
**reserves** [6] - 116:20, 196:15, 222:13, 222:16, 228:19, 229:5
**Reservoir** [2] - 145:9, 178:1
**reservoir** [74] - 1:16, 3:20, 5:22, 14:7, 15:20, 17:7, 36:10, 68:17, 79:19, 79:21, 79:22, 79:24, 111:1, 111:13, 112:15, 117:12, 117:16, 126:24, 143:3, 145:13, 150:6, 151:1, 152:12, 159:7, 159:13, 160:17, 160:21, 160:23, 161:21, 169:9, 186:24, 186:25, 187:2, 188:2, 188:4, 188:8, 188:20, 189:6, 189:7, 190:17, 190:23, 200:6, 200:11, 203:17, 219:20, 219:22, 223:13, 224:23, 225:15, 225:16, 225:18, 227:5, 228:2, 228:8, 228:9, 229:22, 229:24, 230:6, 230:11, 233:12, 242:8, 243:23, 245:24, 255:11, 256:15, 257:2, 257:24, 261:6, 261:21, 264:7, 265:1, 265:2, 269:5, 276:6
**reservoirs** [1] - 178:1
**residential** [1] - 21:9
**residual** [1] - 217:14
**resolved** [1] - 207:2
**resource** [7] - 36:22, 37:2, 101:13, 116:12, 116:15, 125:2, 149:17
**resources** [1] - 117:2
**Resources** [4] - 11:9, 231:16, 231:18, 236:8
**respect** [48] - 22:3, 30:25, 35:18, 44:19, 44:21, 47:8, 51:6, 51:17, 58:21, 60:14, 73:3, 81:24, 103:25, 118:7, 122:10, 129:16, 130:23, 131:11, 131:22, 140:4, 143:18, 155:23, 155:25, 156:2, 156:13, 166:20, 174:16, 178:20, 179:25, 181:9, 181:20, 202:7, 203:1, 203:11, 206:1, 212:18, 212:19, 212:23, 213:24, 225:6, 228:14, 232:2, 232:4, 235:21, 237:13, 238:25, 239:7, 242:1
**respective** [2] - 26:5, 132:8
**respectively** [1] - 25:20
**respond** [3] - 13:16, 13:18, 13:19
**response** [5] - 96:9, 102:18, 164:19, 257:2, 257:4
**responsibilities** [3] - 22:2, 44:19, 212:18
**responsibility** [8] - 2:7, 4:11, 6:13, 14:15, 16:4, 17:16, 22:6, 232:2
**responsible** [1] - 22:8
**rest** [2] - 36:5, 112:24
**restate** [2] - 64:16, 80:20
**result** [6] - 48:7, 97:24,

219:14, 257:7, 274:10, 274:18
**resulted** [2] - 226:4, 255:14
**resulting** [1] - 261:23
**results** [14] - 245:8, 250:21, 255:19, 257:11, 270:2, 270:5, 271:8, 271:21, 272:6, 272:8, 272:11, 272:19, 273:6, 274:7
**resume** [2] - 61:15, 276:9
**return** [2] - 46:12, 46:25
**revenue** [2] - 150:16, 151:7
**review** [32] - 13:13, 42:10, 42:15, 44:24, 45:14, 93:7, 99:20, 144:6, 186:19, 222:25, 225:3, 225:22, 225:23, 226:24, 230:2, 232:19, 233:2, 233:7, 233:21, 233:24, 234:2, 234:9, 234:17, 235:7, 235:10, 236:5, 236:6, 236:22, 255:4, 270:14, 271:18, 273:16
**reviewed** [5] - 111:21, 113:14, 115:4, 115:18, 255:7
**reviewing** [1] - 269:25
**revises** [2] - 31:9, 31:10
**reworked** [1] - 266:23
**reworking** [3] - 269:9, 269:10, 269:11
**RICHARD** [1] - 8:4
**rid** [1] - 178:16
**ridiculous** [1] - 161:12
**right-of-way** [2] - 87:1, 87:16
**rights** [46] - 38:14, 60:15, 90:11, 139:1, 145:18, 145:25, 146:10, 146:11, 146:14, 146:21, 147:5, 147:10, 147:17, 148:6, 148:8, 148:12, 148:13, 148:25, 150:1, 154:3, 154:13, 154:14, 154:17, 154:21, 155:16, 155:18, 155:22, 156:5, 156:21, 159:4, 160:1, 160:2, 161:4, 161:6, 161:8, 169:22, 174:18, 175:22, 175:24, 180:5, 186:2, 191:11, 191:16, 191:24, 200:9
**Rights** [2] - 145:17, 174:14
**rising** [1] - 169:15
**risk** [9] - 41:24, 150:9, 150:17, 182:10, 221:11, 221:14, 225:24, 274:23
**risk-based** [1] - 225:24
**risks** [1] - 222:7
**River** [3] - 21:13, 231:14, 239:13
**road** [3] - 35:15, 60:13, 105:24
**roads** [6] - 38:24, 60:3, 60:4, 60:23, 90:6, 154:7
**rock** [8] - 220:18, 220:21, 225:11, 258:7, 263:3, 263:7, 263:15, 265:5
**role** [3] - 71:2, 167:14, 211:22
**roles** [1] - 212:22
**roots** [1] - 22:17
**rose** [1] - 269:8
**roughly** [1] - 38:16
**row** [1] - 137:20
**royalties** [1] - 169:6
**Royalty** [1] - 163:4
**royalty** [17] - 57:20, 58:4, 58:5, 58:6, 95:25, 96:2, 101:15, 101:21, 150:13, 164:14, 164:19, 165:12, 166:4, 168:13, 168:25, 169:19, 198:4
**rules** [7] - 3:6, 5:8, 7:12, 157:2, 157:10, 208:19, 235:4
**run** [9] - 38:20, 125:2, 187:15, 243:22, 246:25, 253:13, 253:16, 253:24, 254:21
**running** [1] - 257:22
**rural** [1] - 22:21
**RUST** [1] - 8:24
**Rust** [1] - 12:7
**Rygh** [3] - 262:21, 263:3, 263:16
**Rygh's** [1] - 263:1

## S

**S-k-a-a-r-e** [1] - 20:9
**Safe** [11] - 191:3, 191:8, 191:14, 191:21, 191:23, 239:21, 240:3, 240:6, 240:10, 241:8, 242:16
**safe** [3] - 128:21, 128:22, 214:7
**safeguards** [1] - 238:9
**safely** [2] - 228:1, 230:9
**safety** [1] - 183:22
**sake** [1] - 173:21
**Salem** [1] - 50:21
**salinity** [2] - 241:5, 241:6
**sample** [6] - 227:14, 239:11, 239:14, 242:5, 243:12, 244:19
**sampled** [2] - 243:10, 268:3
**samples** [5] - 159:12, 217:4, 221:6, 239:12, 241:2
**sampling** [1] - 217:3
**sand** [7] - 36:8, 37:25, 263:8, 265:11, 266:20, 269:3, 269:19
**sands** [11] - 259:17, 259:18, 259:20, 260:1, 264:19, 264:20, 264:21, 265:3, 267:1, 269:5, 269:11
**sandstone** [1] - 264:2
**sandstones** [1] - 264:22
**Sara** [2] - 18:24, 19:7
**SARA** [1] - 8:8
**sat** [2] - 60:25, 97:20
**saturation** [8] - 141:16, 142:9, 142:21, 142:22, 143:8, 143:12, 143:18, 143:23
**saved** [2] - 19:22, 252:15
**savings** [1] - 249:11
**saw** [4] - 74:12, 219:24, 255:22, 257:7
**scale** [8] - 29:8, 72:22, 105:10, 105:11, 105:21, 106:16, 248:2, 259:8
**scenario** [2] - 170:16, 170:19
**schedule** [1] - 56:15
**schedules** [1] - 50:22
**School** [1] - 21:6
**school** [1] - 44:14
**science** [3] - 21:23, 44:11, 231:12
**scientist** [1] - 107:7
**scope** [9] - 22:6, 71:11, 72:5, 72:22, 73:5, 73:25, 96:22, 185:18, 185:23
**scopes** [2] - 72:8, 72:25
**score** [3] - 32:1, 32:14, 64:24
**scratch** [1] - 249:6
**SCS** [8] - 25:1, 26:2, 26:9, 48:11, 48:12, 69:7, 193:2, 193:5
**SCS1** [3] - 26:21, 37:14, 137:8
**SCS1/TB** [1] - 48:9
**SCS2** [6] - 26:21, 37:13, 48:10, 49:11, 195:9, 195:18
**SCS3** [2] - 26:21, 37:15
**sea** [2] - 269:8, 269:9
**seal** [4] - 216:9, 217:24, 233:25, 234:10
**search** [2] - 47:13, 83:15
**searching** [2] - 48:15, 48:16
**second** [10] - 43:10, 47:15, 50:20, 91:2, 105:23, 151:20, 197:13, 199:22, 244:22, 263:25
**section** [19] - 56:19, 56:21, 118:24, 134:18, 135:16, 135:17, 168:12, 180:13, 183:8, 184:1, 192:23, 197:4, 197:18, 198:4, 199:19, 205:4, 205:17, 268:22, 269:13
**Section** [55] - 5:13, 6:2, 6:15, 7:2, 49:10, 49:12, 49:14, 58:4, 108:14, 121:16, 122:8, 131:24, 132:4, 134:22, 135:5, 135:11, 135:20, 136:8, 145:8, 146:3, 151:17, 151:19, 152:9, 152:20, 159:2, 162:4, 163:4, 167:25, 168:9, 170:2, 170:9, 170:21, 174:14, 174:16, 177:17, 178:12, 180:15, 180:21, 181:20, 183:5, 183:12, 184:8, 195:8, 197:3, 197:14, 203:24, 204:10, 205:9, 209:20, 213:12, 224:19, 224:21, 224:22, 232:15, 267:14
**sections** [3] - 16:11, 53:14, 212:24
**Sections** [69] - 1:7, 1:8, 1:9, 1:12, 1:13, 1:20, 1:21, 1:22, 2:1, 2:2, 2:9, 2:10, 2:12, 2:14, 2:15, 2:20, 2:21, 2:22, 3:1, 3:2, 3:11, 3:12, 3:14, 3:16, 3:23, 4:1, 4:4, 4:5, 4:13, 4:14, 4:17, 4:18, 4:22, 4:23, 5:3, 5:4, 5:13, 5:15, 5:16, 5:19, 6:3, 6:4, 6:5, 6:8, 6:15, 6:17, 6:18, 6:21, 7:3, 7:4, 7:5, 7:8, 14:21, 14:22, 14:24, 15:3, 15:4, 16:10, 16:15, 16:17, 17:22, 17:23, 17:25, 18:1, 18:5, 184:20, 213:4, 213:8, 232:14
**sector** [2] - 44:16, 101:11
**secure** [5] - 35:23, 38:13, 38:14, 50:1, 52:15
**secured** [9] - 49:16, 54:15, 60:10, 60:15, 60:19, 116:7, 116:16, 116:24, 125:8
**securing** [2] - 52:7, 60:22
**sediments** [2] - 269:7, 269:11
**see** [34] - 25:17, 26:2, 31:5, 32:7, 35:9, 37:9, 37:10, 37:12, 39:8, 39:9, 40:5, 41:17, 53:14, 53:15, 54:7, 58:3, 82:6, 137:5, 137:9, 165:8, 183:17, 207:2, 232:19, 233:11, 233:12, 233:13, 237:9, 260:13, 264:11, 264:12, 265:16, 266:24, 267:6, 269:17
**seed** [2] - 87:5, 87:25
**seeing** [1] - 41:13
**seeking** [2] - 138:25, 169:25

**seem** [2] - 182:8, 260:15
**segregations** [1] - 87:5
**seismic** [44] - 38:15, 128:18, 129:1, 129:11, 129:20, 131:1, 131:6, 188:22, 189:24, 199:12, 208:8, 212:15, 217:1, 221:2, 244:6, 247:3, 247:4, 247:5, 247:10, 247:12, 247:14, 247:16, 256:19, 258:8, 259:24, 261:14, 262:25, 264:10, 264:11, 264:14, 265:17, 265:19, 267:3, 267:8, 267:12, 267:16, 267:19, 267:25, 268:3, 268:7, 268:11, 269:25
**seismicity** [5] - 221:10, 221:12, 221:14, 221:16, 222:7
**select** [2] - 37:23, 38:8
**selected** [2] - 213:22, 215:6
**selecting** [1] - 39:16
**sell** [2] - 64:14, 64:17
**selling** [2] - 102:7, 161:15
**send** [1] - 50:10
**senior** [1] - 231:21
**sense** [4] - 152:7, 173:2, 173:4, 185:9
**sensors** [1] - 190:4
**sent** [9] - 46:24, 47:5, 47:15, 50:15, 153:9, 165:24, 166:9, 174:9, 196:10
**sentence** [3] - 151:20, 155:9, 263:25
**separate** [12] - 72:3, 86:14, 90:3, 90:24, 94:6, 112:24, 112:25, 135:15, 135:16, 159:19, 181:22
**separation** [1] - 86:22
**September** [1] - 165:5
**sequester** [5] - 29:6, 36:3, 64:5, 65:17, 109:5
**sequestered** [2] - 109:24, 110:11
**sequestration** [14] - 12:24, 22:6, 23:9, 28:25, 35:25, 36:5, 44:6, 65:3, 70:23, 71:7, 79:8, 82:6, 83:14, 209:8
**serve** [3] - 212:1, 214:24, 220:14
**served** [1] - 225:14
**serves** [1] - 166:3
**Service** [1] - 236:7
**services** [2] - 74:21, 208:22
**servitude** [1] - 171:17
**set** [6] - 139:8, 165:24, 202:23, 257:25, 269:22, 275:7
**sets** [5] - 108:23, 221:1, 260:20, 264:24, 271:25
**setting** [1] - 50:5
**several** [8] - 212:24, 213:24, 221:1, 239:9, 241:18, 258:5, 259:16, 264:20
**severed** [1] - 195:15
**SGS** [1] - 257:20
**shaded** [1] - 31:5
**Shale** [1] - 237:25
**shale** [1] - 238:1
**shall** [10] - 118:18, 133:3, 151:23, 152:14, 152:22, 155:5, 161:4, 177:20, 202:9, 208:23
**shape** [2] - 204:24, 204:25
**shapefiles** [1] - 227:2
**share** [4] - 137:17, 150:6, 150:11, 150:25
**shared** [2] - 99:14, 99:19
**short** [1] - 124:11
**shorten** [1] - 121:1
**shortly** [1] - 84:12
**show** [4] - 39:21, 54:21, 100:8, 172:1
**showing** [11] - 53:12, 55:6, 56:19, 192:25, 214:19, 215:14, 216:24, 224:1, 258:19, 266:18, 268:23
**shown** [4] - 134:8, 195:12, 233:15, 237:16
**shows** [5] - 42:6, 81:15, 137:6, 221:21, 233:7
**shut** [3] - 114:9, 114:13, 114:15
**shutoff** [2] - 183:18
**sic** [2] - 14:2, 25:20
**sign** [2] - 146:19, 206:20
**signaling** [1] - 86:12
**signature** [1] - 248:24
**signatures** [2] - 96:20, 248:21
**signed** [34] - 38:23, 47:4, 48:7, 52:16, 61:5, 71:9, 71:21, 71:24, 83:18, 85:11, 90:14, 91:25, 92:12, 92:19, 93:5, 93:20, 94:2, 96:4, 96:8, 96:17, 97:9, 98:4, 98:6, 132:15, 133:22, 146:14, 146:20, 152:18, 153:20, 154:21, 163:21, 166:11, 170:4, 176:19
**significance** [1] - 31:8
**significant** [14] - 21:21, 29:20, 30:5, 33:10, 34:23, 59:2, 85:14, 100:24, 102:23, 124:23, 165:5, 165:6, 235:9, 235:12
**significantly** [2] - 249:15, 255:16
**signing** [1] - 146:21
**signs** [1] - 90:18
**siltstones** [1] - 264:3
**similar** [20] - 29:1, 29:4, 53:17, 53:18, 55:4, 72:7, 72:24, 73:14, 74:2, 74:9, 74:12, 74:16, 89:17, 106:15, 125:22, 174:15, 252:12, 261:1, 271:23
**similarities** [1] - 89:19
**similarity** [1] - 125:5
**similarly** [3] - 173:17, 219:24, 257:12
**simple** [1] - 266:9
**simplified** [1] - 266:7
**simply** [9] - 89:21, 103:12, 117:5, 117:8, 160:19, 167:1, 172:10, 252:23, 257:7
**simulated** [1] - 219:21
**simulation** [14] - 41:24, 67:21, 139:11, 210:7, 210:13, 213:2, 224:24, 232:24, 238:25, 253:20, 255:5, 255:9, 258:3, 258:19
**simulations** [12] - 38:20, 117:22, 205:6, 225:15, 225:16, 225:19, 226:25, 227:5, 230:11, 243:23, 253:18, 253:19
**single** [11] - 49:6, 93:5, 96:24, 96:25, 101:18, 124:18, 162:16, 205:19, 253:12, 256:24, 275:25
**singly** [1] - 13:7
**sink** [1] - 217:18
**site** [23] - 37:12, 38:14, 39:13, 39:14, 39:15, 40:8, 40:9, 40:10, 40:11, 60:1, 79:14, 98:17, 98:19, 214:1, 214:5, 214:21, 217:2, 218:23, 226:15, 235:15, 238:10, 258:6
**site-specific** [7] - 38:14, 214:5, 217:2, 218:23, 226:15, 235:15, 258:6
**sites** [12] - 36:1, 37:23, 38:8, 39:1, 39:25, 40:16, 40:17, 41:12, 41:15, 130:8, 196:1, 196:4
**siting** [1] - 123:21
**sitting** [1] - 242:3
**situated** [2] - 32:9, 32:10
**situation** [4] - 125:5, 147:8, 206:8, 206:19
**six** [4] - 248:3, 249:7, 249:8, 250:1
**size** [7] - 65:7, 117:8, 142:7, 248:2, 268:8, 274:21, 276:5
**SKAARE** [28] - 9:8, 43:19, 76:11, 83:17, 89:8, 93:13, 104:9, 107:22, 111:17, 118:9, 118:15, 120:18, 122:3, 128:12, 145:21, 161:2, 162:9, 162:11, 165:4, 168:8, 180:2, 184:17, 191:20, 195:17, 196:11, 201:11, 205:14, 207:13
**Skaare** [6] - 20:2, 20:9, 43:16, 43:17, 43:18, 44:1
**Skalsky** [1] - 207:22
**slice** [1] - 266:25
**slight** [1] - 250:15
**slightly** [5] - 72:8, 161:11, 250:17, 255:25, 260:20
**slurry** [1] - 78:7
**smaller** [1] - 27:22
**Smith** [1] - 12:7
**SMITH** [1] - 8:24
**software** [12] - 143:4, 144:4, 210:7, 218:14, 218:16, 219:21, 225:8, 225:17, 243:16, 243:20, 243:22, 252:13
**soil** [5] - 86:22, 87:4, 87:25, 199:11
**soils** [1] - 85:23
**solids** [3] - 241:7, 241:23, 242:4
**solubility** [1] - 217:16
**solution** [2] - 21:20, 113:17
**Solutions** [19] - 20:20, 22:4, 22:15, 22:16, 26:1, 44:3, 48:12, 61:22, 62:1, 62:2, 62:6, 62:14, 62:21, 69:3, 69:9, 69:21, 71:10, 71:22, 72:9
**solutions** [1] - 22:24
**solves** [1] - 32:6
**someone** [8] - 119:13, 140:19, 170:23, 198:11, 245:20, 248:19, 252:23, 253:4
**sometimes** [1] - 36:12
**somewhat** [1] - 45:8
**somewhere** [2] - 76:14, 140:1
**sorry** [37] - 40:12, 43:9, 43:18, 76:17, 90:15, 102:13, 102:14, 108:13, 110:18, 120:13, 128:10, 129:14, 134:6, 134:20, 135:1, 137:14, 155:4, 155:5, 162:13, 164:10, 164:16, 165:17, 167:22, 168:2, 170:14, 174:7, 174:12, 198:19, 210:10, 216:12, 219:17, 229:25,

259:5, 260:10, 261:13, 262:7, 263:13
**sort** [10] - 32:25, 41:11, 60:23, 87:10, 119:1, 119:14, 174:15, 213:14, 220:6, 235:2
**sound** [2] - 146:24, 171:16
**sounds** [1] - 78:15
**source** [6] - 124:18, 146:13, 209:3, 209:7, 209:10, 209:18
**sources** [19] - 26:17, 27:4, 27:23, 31:11, 35:19, 35:23, 36:25, 62:25, 63:3, 63:7, 63:16, 220:7, 220:11, 232:22, 235:23, 236:4, 236:5, 237:19, 252:6
**South** [2] - 27:6, 29:24
**south** [1] - 197:7
**southeast** [2] - 197:7, 197:8
**southwest** [4] - 49:10, 49:13, 49:14, 267:4
**Space** [13] - 57:7, 58:7, 118:17, 118:19, 118:21, 134:9, 151:23, 161:7, 162:1, 168:7, 176:20, 176:21, 177:16
**space** [84] - 1:16, 1:17, 3:20, 3:21, 5:22, 5:23, 14:7, 14:8, 15:20, 15:21, 17:7, 17:8, 36:16, 44:22, 47:17, 48:6, 48:17, 49:17, 49:20, 50:2, 50:11, 50:24, 51:13, 52:7, 52:15, 54:6, 57:15, 57:25, 60:16, 63:23, 83:19, 84:23, 85:10, 85:17, 91:9, 91:21, 92:22, 94:2, 101:12, 116:24, 119:2, 119:10, 119:18, 119:22, 120:22, 122:18, 125:9, 129:18, 130:25, 131:17, 132:9, 132:25, 133:22, 145:12, 146:15, 146:20, 149:17, 151:14, 152:10, 152:11, 152:15, 153:14, 157:14, 164:15, 165:23, 166:10, 169:8, 169:12, 169:23, 176:19, 177:9, 195:8, 195:14, 195:21, 198:4, 200:4, 203:24, 206:10, 206:13, 208:2, 214:16
**spaces** [1] - 178:2
**spacing** [1] - 268:4
**speaking** [10] - 127:19, 127:20, 127:23, 127:24, 143:19, 160:12, 164:16, 170:5, 183:8, 272:10
**Spearfish** [5] - 215:12, 215:20, 215:23, 222:19, 240:16
**spec** [1] - 35:10
**special** [3] - 3:6, 5:8, 7:12
**specialist** [1] - 231:22
**specific** [42] - 38:11, 38:14, 39:1, 50:6, 57:19, 64:9, 69:16, 73:23, 79:1, 86:4, 87:23, 103:5, 106:8, 111:23, 115:17, 116:24, 117:3, 143:10, 147:10, 178:19, 184:1, 187:13, 214:5, 216:3, 217:2, 218:23, 226:15, 232:9, 232:18, 235:15, 240:5, 244:18, 248:23, 252:7, 252:21, 253:2, 253:6, 253:9, 254:11, 258:6, 260:22, 263:11
**specifically** [40] - 34:15, 36:7, 45:19, 58:23, 66:11, 69:14, 74:15, 75:3, 77:12, 89:9, 89:13, 92:10, 95:11, 103:3, 130:5, 139:25, 140:10, 142:2, 142:3, 144:3, 144:14, 150:23, 154:7, 159:14, 164:2, 164:22, 165:18, 177:15, 177:17, 191:6, 191:17, 201:24, 206:1, 207:21, 212:19, 232:3, 234:13, 240:6, 266:16, 273:10
**specification** [2] - 35:9, 63:19
**specifics** [6] - 63:15, 104:19, 191:1, 204:18, 210:16, 273:17
**specify** [1] - 69:17
**spectrum** [1] - 171:19
**speculate** [2] - 106:25, 107:2
**speculating** [1] - 88:19
**speculative** [1] - 102:15
**speech** [1] - 178:9
**spend** [3] - 19:11, 25:13, 32:17
**spent** [3] - 31:19, 44:15, 232:13
**split** [1] - 151:6
**spot** [1] - 204:3
**spring** [7] - 50:14, 51:2, 86:19, 153:10, 153:11, 226:18, 233:11
**squares** [1] - 31:2
**stability** [2] - 222:1, 222:2
**stabilized** [9] - 139:14, 140:14, 140:16, 140:21, 186:22, 204:11, 225:2, 232:25, 233:10
**stack** [2] - 126:18, 126:19
**stacked** [3] - 185:8, 269:12, 269:23
**staff** [9] - 20:25, 30:11, 44:9, 88:12, 192:9, 214:8, 222:8, 233:20, 251:20
**STAFF** [1] - 8:2
**stand** [4] - 171:24, 172:3, 172:4, 173:25
**standard** [8] - 110:12, 142:15, 155:11, 158:2, 208:20, 225:8, 225:17, 262:19
**standardized** [3] - 86:25, 87:13, 87:18
**standards** [1] - 28:14
**standpoint** [1] - 215:6
**stands** [1] - 59:1
**start** [26] - 24:24, 95:8, 97:22, 103:14, 114:23, 129:15, 134:5, 134:11, 134:14, 137:21, 137:22, 141:17, 143:16, 161:14, 162:14, 165:19, 170:7, 192:13, 192:21, 195:8, 201:14, 213:21, 217:21, 241:25, 249:5, 268:17
**started** [17] - 21:8, 21:10, 21:21, 45:13, 47:25, 66:24, 98:16, 162:21, 163:8, 165:7, 167:9, 169:23, 226:6, 226:7, 231:15, 231:16, 231:20
**starters** [1] - 120:25
**starts** [3] - 112:10, 171:16, 255:5
**state** [23] - 20:16, 27:14, 34:12, 34:18, 36:13, 43:24, 62:25, 100:14, 102:3, 103:7, 103:13, 103:14, 103:18, 107:9, 130:5, 160:14, 160:19, 193:12, 194:10, 211:10, 214:2, 214:15, 230:25
**State** [27] - 21:3, 48:24, 49:17, 70:7, 84:3, 84:4, 84:21, 85:5, 86:1, 87:18, 89:1, 89:2, 89:17, 89:20, 89:22, 99:4, 100:20, 104:14, 104:22, 108:7, 148:19, 160:22, 175:4, 175:11, 175:25, 176:11, 196:9
**state's** [3] - 100:16, 105:5, 106:20
**State-funded** [1] - 70:7
**State-owned** [2] - 84:3, 84:4
**statement** [11] - 40:15, 40:19, 48:19, 48:20, 59:10, 59:11, 63:20, 88:6, 124:14, 130:16, 161:23
**statements** [1] - 24:9
**States** [1] - 112:6
**states** [20] - 27:5, 36:14, 63:23, 64:15, 64:18, 100:11, 118:2, 130:15, 132:6, 152:10, 152:21, 154:23, 162:16, 168:12, 175:14, 177:19, 197:14, 200:10, 203:6, 267:25
**station** [3] - 83:3, 83:6, 182:23
**stations** [1] - 82:23
**status** [1] - 59:24
**statute** [2] - 45:4, 104:16
**statutorily** [1] - 150:18
**statutory** [4] - 150:1, 150:13, 226:1, 227:16
**stay** [3] - 141:21, 214:14
**steel** [1] - 28:16
**step** [3] - 50:7, 170:25, 234:3
**Steph** [2] - 89:6, 120:15
**STEPHEN** [1] - 8:7
**steps** [4] - 47:7, 50:8, 165:1, 165:2
**still** [9] - 66:1, 113:18, 129:20, 130:20, 131:1, 132:23, 163:25, 193:6, 267:23
**STOLLDORF** [11] - 8:5, 195:6, 196:19, 197:10, 197:12, 197:20, 197:22, 197:23, 198:18, 198:21, 199:18
**Stolldorf.....** [1] - 9:13
**stop** [4] - 59:17, 113:10, 124:2, 276:9
**stopped** [1] - 52:9
**Storage** [57] - 1:4, 1:15, 1:19, 2:6, 3:4, 3:8, 3:19, 3:23, 4:8, 4:9, 5:6, 5:10, 5:21, 6:1, 6:11, 7:10, 13:24, 14:5, 14:13, 15:7, 15:12, 15:18, 15:24, 16:2, 16:20, 16:24, 17:5, 17:11, 17:14, 18:8, 23:14, 23:18, 25:2, 25:18, 25:19, 25:24, 26:7, 49:9, 62:3, 62:8, 62:9, 62:11, 62:21, 62:22, 118:20, 118:25, 134:5, 145:9, 145:16, 151:22, 152:25, 161:3, 161:6, 193:7
**STORAGE** [3] - 8:14, 8:15, 8:15
**storage** [358] - 1:5, 1:6, 1:16, 1:18, 1:19, 2:8, 2:9, 3:5, 3:9, 3:10, 3:20, 3:22, 3:23, 4:11, 4:12, 5:7, 5:11, 5:12, 5:22, 6:1, 6:2, 6:13, 6:14, 7:11, 12:16, 13:25, 14:7, 14:10, 14:16, 15:7, 15:13, 15:20, 15:23, 15:24, 16:5, 16:20, 17:1, 17:7, 17:10,

17:11, 17:17, 18:8, 19:13, 19:15, 21:25, 22:10, 23:9, 23:18, 23:22, 25:21, 25:22, 26:5, 26:24, 26:25, 27:12, 27:25, 28:4, 31:7, 32:11, 32:15, 33:25, 36:11, 36:16, 36:22, 37:1, 37:11, 37:15, 38:5, 38:6, 39:2, 39:15, 40:1, 40:6, 40:13, 41:17, 41:25, 42:10, 42:11, 43:1, 45:15, 46:17, 47:18, 48:13, 50:18, 51:24, 52:25, 53:3, 53:6, 53:8, 53:13, 53:18, 53:19, 53:25, 54:4, 54:12, 54:19, 55:15, 58:12, 58:16, 58:17, 59:6, 59:14, 63:22, 64:2, 64:12, 67:11, 77:2, 78:2, 78:16, 79:23, 80:15, 80:22, 80:23, 81:7, 90:20, 91:1, 91:7, 91:16, 91:20, 92:5, 92:13, 92:25, 93:14, 93:18, 93:19, 94:1, 94:4, 94:9, 94:22, 100:6, 100:12, 104:13, 107:10, 107:17, 107:25, 108:16, 111:21, 111:24, 112:2, 112:5, 114:1, 114:4, 114:10, 115:20, 116:4, 116:6, 117:6, 117:20, 117:21, 117:24, 118:1, 118:3, 118:4, 119:5, 119:7, 119:16, 119:25, 120:6, 120:7, 120:8, 120:10, 121:15, 121:17, 121:19, 122:7, 122:11, 122:25, 123:5, 123:6, 123:13, 123:14, 123:22, 126:3, 126:12, 127:6, 128:9, 131:11, 131:16, 131:25, 132:4, 132:8, 132:16, 132:25, 133:24, 134:3, 134:17, 134:22, 135:2, 135:7, 135:11, 135:17, 135:25, 136:18, 137:2, 137:16, 137:23, 138:4, 138:17, 138:19, 138:20, 139:3, 139:10, 139:19, 140:17, 140:22, 145:18, 146:2, 146:3, 146:10, 146:12, 146:16, 147:13, 149:12, 150:24, 151:18, 152:11, 152:12, 152:21, 152:22, 155:5, 155:8, 156:6, 156:15, 156:23, 158:3, 168:1, 168:5, 168:6, 169:9, 173:16, 174:4, 175:9, 175:15, 175:19, 175:25, 177:3, 177:15, 177:16, 180:13, 184:8, 184:10, 184:14, 184:15, 184:21, 184:22, 184:24, 184:25, 185:1, 185:3, 185:5, 185:7, 185:13, 186:7, 186:10, 186:13, 188:15, 188:17, 188:25, 189:2, 189:3, 191:5, 191:14, 194:4, 194:25, 195:11, 195:13, 195:22, 195:25, 196:15, 196:24, 197:4, 197:24, 198:15, 198:23, 200:4, 200:6, 200:10, 200:11, 200:12, 200:15, 202:4, 203:16, 203:18, 204:2, 204:12, 204:13, 205:9, 205:20, 206:11, 212:3, 212:25, 214:4, 214:7, 214:10, 214:13, 215:1, 216:3, 216:4, 216:17, 216:20, 216:21, 222:11, 222:14, 222:17, 223:7, 223:11, 224:4, 224:5, 224:8, 224:13, 224:16, 227:17, 227:19, 227:22, 228:1, 228:8, 228:9, 228:16, 228:19, 228:21, 228:22, 229:2, 229:9, 229:12, 229:20, 229:22, 229:23, 230:6, 230:8, 230:12, 230:13, 232:7, 232:10, 232:11, 232:21, 232:23, 233:1, 233:8, 233:22, 235:4, 235:7, 238:6, 240:13, 242:8, 256:7, 257:21, 260:25, 266:10, 276:3

**store** [10] - 27:3, 36:3, 37:18, 64:23, 79:11, 110:4, 147:17, 158:6, 188:11, 194:6

**stored** [13] - 27:16, 108:19, 110:23, 138:24, 155:9, 175:9, 175:15, 175:22, 176:1, 176:4, 176:17, 227:25, 228:1

**storing** [4] - 36:13, 36:24, 81:5, 100:23

**straight** [2] - 129:24, 136:20

**strata** [1] - 178:2

**strategist** [2] - 231:8, 231:24

**stratigraphic** [11] - 38:1, 190:9, 190:13, 190:20, 190:21, 223:4, 233:12, 234:14, 236:3, 260:22

**stratum** [1] - 178:2

**stray** [1] - 172:12

**stream** [12] - 34:25, 63:12, 63:16, 126:17, 198:2, 198:7, 198:8, 198:10, 219:2, 219:4, 228:4, 228:10

**Street** [1] - 8:20

**strength** [1] - 28:16

**strictest** [1] - 177:20

**strike** [2] - 178:11, 178:14

**stringent** [1] - 45:8

**strip** [1] - 252:25

**stripped** [2] - 252:21, 252:25

**stripping** [1] - 87:25

**structural** [4] - 225:10, 247:15, 250:13, 250:14

**structure** [6] - 24:25, 25:1, 25:17, 112:5, 192:25, 250:16

**structures** [1] - 111:25

**studied** [3] - 239:7, 262:16, 263:16

**studies** [8] - 112:14, 113:4, 154:9, 223:2, 257:11, 257:17, 271:23, 272:2

**study** [10] - 112:18, 184:4, 221:19, 221:20, 230:2, 257:19, 262:12, 262:20, 270:21, 271:1

**studying** [1] - 261:11

**stuff** [1] - 249:21

**sub** [1] - 161:5

**sub-surface** [1] - 161:5

**subject** [20] - 3:4, 5:5, 7:9, 12:17, 15:6, 16:19, 18:7, 57:11, 69:21, 72:5, 72:7, 75:15, 82:1, 90:20, 150:8, 152:14, 153:17, 181:13, 202:21, 272:8

**subjective** [2] - 246:2, 251:3

**submission** [1] - 202:8

**submit** [2] - 244:2, 251:21

**submittals** [1] - 144:24

**submitted** [27] - 13:11, 46:22, 61:21, 61:24, 62:6, 62:13, 62:16, 85:5, 88:24, 133:7, 133:24, 144:10, 144:11, 144:15, 144:21, 145:1, 145:5, 201:4, 210:3, 210:4, 210:6, 210:17, 226:13, 226:17, 226:20, 226:22, 227:7

**submitting** [1] - 24:4

**subrogation** [2] - 179:25, 180:5

**subsequent** [1] - 202:22

**subsequently** [1] - 151:20

**subsidiaries** [4] - 25:24, 71:16, 71:23, 72:10

**subsidiary** [3] - 21:17, 25:2, 25:25

**substances** [8] - 132:9, 146:2, 146:13, 155:9, 184:22, 198:1, 200:12, 228:7

**Substances** [1] - 153:1

**substantial** [2] - 22:20, 103:23

**substantive** [2] - 84:10, 84:17

**subsurface** [6] - 23:7, 159:4, 178:1, 190:9, 211:20, 214:6

**success** [2] - 102:17, 106:9

**sues** [1] - 170:23

**sufficient** [7] - 156:22, 203:6, 214:12, 214:23, 216:15, 229:15, 242:10

**suggest** [4] - 90:2, 118:22, 171:23, 266:5

**suggested** [2] - 214:3, 255:25

**suggesting** [1] - 173:3

**suggestions** [1] - 242:13

**SUGGS** [11] - 8:4, 200:21, 206:5, 206:14, 207:3, 207:6, 208:13, 208:16, 209:23, 209:25, 210:19

**Suggs** [1] - 209:19

**Suggs.....** [1] - 9:17

**Suggs.....** [1] - 9:15

**suitability** [3] - 177:25, 213:25, 216:20

**suitable** [7] - 32:11, 32:15, 36:10, 38:4, 64:2, 214:4, 227:18

**Suite** [2] - 8:12, 8:20

**summarize** [3] - 19:19, 35:6, 59:4

**summary** [12] - 22:14, 47:23, 54:2, 54:18, 55:3, 55:5, 56:19, 56:22, 136:6, 182:16, 202:3, 272:18

**Summary** [2] - 150:23, 192:23

**summer** [2] - 51:2, 226:18

**Summit** [176] - 1:3, 1:15, 1:19, 2:5, 3:4, 3:7, 3:18, 3:22, 4:8, 4:9, 5:6, 5:9, 5:21, 6:1, 6:11, 7:10, 13:24, 14:5, 14:13, 15:6, 15:11, 15:18, 15:23, 16:2, 16:19, 16:24, 17:5, 17:10, 17:14, 18:7, 20:20, 22:3, 22:15, 22:16, 23:18, 25:2, 25:18, 25:19, 25:24, 25:25, 26:7, 26:8, 35:17, 37:22, 39:16, 39:25, 40:1, 41:6, 41:8, 44:3, 44:20, 44:21, 48:12, 49:8, 49:16, 49:25, 55:14, 57:14, 59:8, 59:12, 60:5, 61:22, 61:25, 62:2, 62:3, 62:5, 62:6, 62:7, 62:8, 62:9, 62:11, 62:14, 62:20, 62:21, 62:22, 69:3, 69:7, 69:8, 69:20, 69:22,

70:3, 70:4, 71:10, 71:12, 71:15, 71:22, 72:9, 72:21, 74:18, 74:22, 88:24, 92:20, 94:3, 100:19, 105:4, 106:19, 106:22, 107:15, 108:14, 108:19, 112:8, 115:8, 119:19, 121:11, 124:14, 125:5, 125:21, 126:11, 129:19, 130:24, 130:25, 131:12, 137:7, 138:8, 140:24, 145:17, 145:25, 147:10, 148:12, 149:11, 150:22, 152:16, 153:5, 153:20, 153:22, 154:3, 154:20, 156:21, 159:6, 159:21, 159:22, 162:18, 164:17, 164:18, 165:23, 166:1, 168:19, 169:16, 170:22, 170:23, 171:1, 171:6, 171:9, 172:21, 172:23, 173:19, 175:18, 175:19, 175:24, 176:10, 178:7, 178:24, 179:24, 180:25, 181:10, 181:21, 182:4, 185:13, 185:24, 188:9, 193:7, 195:22, 203:14, 206:9, 206:20, 208:8, 226:14, 235:3, 235:6, 235:14, 237:1, 237:5, 254:1, 266:2

**SUMMIT** [3] - 8:14, 8:14, 8:15

**Summit's** [13] - 22:7, 118:7, 124:8, 127:6, 129:18, 133:10, 179:4, 179:21, 188:7, 202:18, 236:1, 236:2, 246:22

**super** [1] - 214:15

**super-critical** [1] - 214:15

**superseded** [2] - 91:1, 92:5

**supervision** [6] - 25:5, 30:15, 40:21, 45:23, 47:21, 50:1

**supervisor** [1] - 231:18

**supplement** [1] - 203:2

**supplemental** [5] - 201:4, 201:23, 202:22, 207:4

**supplied** [1] - 227:2

**supply** [5] - 65:10, 65:12, 65:13, 209:10, 209:12

**supply/demand** [1] - 102:24

**support** [8] - 34:19, 65:7, 65:8, 65:12, 75:22, 158:13, 171:25, 272:1

**supporting** [4] - 101:6, 101:10, 102:11, 102:12

**supports** [2] - 29:13, 259:14

**surface** [97] - 23:8, 38:23, 44:24, 44:25, 45:14, 46:7, 50:17, 58:24, 59:1, 59:3, 59:9, 59:13, 59:23, 59:25, 60:15, 60:22, 86:2, 86:6, 86:9, 86:11, 86:13, 86:20, 87:9, 88:15, 88:16, 89:24, 89:25, 90:6, 92:7, 92:11, 96:13, 98:8, 98:12, 127:14, 127:21, 128:2, 128:5, 128:7, 128:13, 128:24, 128:25, 129:3, 129:5, 129:7, 129:14, 129:17, 129:22, 129:25, 130:1, 130:8, 130:17, 130:19, 131:3, 151:15, 152:17, 152:23, 153:2, 153:7, 153:12, 153:23, 154:3, 154:6, 154:21, 155:6, 155:16, 155:22, 156:6, 156:11, 157:13, 159:3, 161:5, 166:24, 170:12, 178:9, 182:25, 186:2, 195:15, 195:21, 198:25, 200:24, 201:7, 201:14, 201:15, 203:19, 205:12, 205:13, 205:15, 206:21, 206:22, 208:4, 208:5, 208:10, 224:10, 229:10

**Surface** [1] - 130:16

**surface-access** [5] - 129:7, 129:14, 129:17, 129:22, 130:17

**surface-facilities** [5] - 96:13, 129:5, 130:17, 153:12, 166:24

**surfaces** [2] - 250:13, 250:14

**surrounded** [1] - 36:8

**surrounding** [2] - 177:11, 232:20

**Survey** [5] - 36:22, 212:14, 222:18, 236:7, 241:20

**survey** [2] - 38:13, 38:15

**survived** [1] - 125:4

**sustainable** [4] - 29:23, 29:24, 30:2, 32:4

**sustained** [5] - 35:16, 112:12, 149:10, 158:25, 168:15

**SWENSON** [1] - 8:22

**Swenson** [2] - 12:2, 89:15

**switch** [4] - 43:7, 52:18, 109:9, 224:18

**switching** [1] - 109:21

**sworn** [4] - 20:12, 43:20, 211:6, 230:21

**synfuels** [1] - 209:5

**system** [25] - 23:2, 23:6, 26:4, 27:15, 27:21, 27:24, 28:12, 28:16, 28:17, 29:9, 34:16, 35:9, 35:10, 35:21, 39:9, 53:16, 63:4, 63:7, 64:22, 65:9, 65:21, 76:8, 183:11, 194:16, 236:16

**systems** [1] - 26:5

## T

**Table** [4] - 35:8, 238:22, 260:6, 261:1

**table** [2] - 35:12, 246:13

**TABOR** [1] - 8:6

**tabular** [1] - 246:13

**takeaways** [1] - 213:12

**talks** [1] - 267:15

**TAMARA** [1] - 8:5

**target** [4] - 38:4, 188:3, 188:8, 189:7

**targeted** [1] - 185:19

**targeting** [2] - 185:15, 243:3

**tax** [1] - 109:4

**TB** [11] - 23:14, 25:21, 26:24, 37:14, 39:14, 40:1, 49:8, 51:12, 53:21, 137:8, 260:19

**team** [26] - 22:7, 36:6, 45:25, 66:25, 68:17, 69:2, 79:10, 79:25, 142:12, 143:3, 143:22, 144:24, 159:10, 159:18, 181:15, 181:18, 182:7, 183:25, 190:25, 212:4, 243:17, 245:19, 249:13, 249:18, 250:2, 267:2

**technical** [3] - 112:14, 213:24, 257:14

**technically** [4] - 111:4, 171:2, 176:24, 177:6

**temperature** [5] - 106:24, 190:4, 190:6, 190:17, 190:22

**ten** [5] - 61:11, 95:15, 179:12, 212:4, 246:16

**ten-minute** [3] - 61:11, 179:12, 246:16

**tends** [1] - 88:5

**term** [14] - 58:3, 114:20, 115:11, 129:3, 129:24, 134:3, 152:13, 162:6, 162:18, 165:13, 181:17, 216:21, 245:22, 245:24

**Term** [2] - 162:4, 205:18

**term's** [1] - 245:25

**terminus** [11] - 39:11, 81:15, 81:22, 82:14, 82:20, 82:24, 83:4, 182:18, 182:22, 182:24, 183:2

**terms** [49] - 13:7, 18:14, 26:19, 27:18, 29:10, 45:11, 48:5, 51:24, 52:6, 57:19, 57:25, 59:13, 59:19, 61:5, 70:11, 84:25, 85:3, 85:4, 92:24, 92:25, 93:4, 94:14, 99:10, 110:19, 110:21, 116:23, 124:22, 125:24, 129:25, 131:23, 146:5, 147:2, 147:18, 163:1, 165:10, 165:11, 166:12, 167:17, 176:7, 176:8, 211:22, 221:3, 226:23, 253:3, 253:10, 265:4, 270:15, 273:1, 275:3

**test** [25] - 190:13, 223:4, 234:14, 236:4, 255:13, 256:25, 257:20, 258:11, 260:22, 261:9, 261:17, 270:2, 270:8, 270:15, 270:21, 271:2, 271:8, 272:6, 273:6, 273:23, 274:7, 274:10, 274:25, 275:10, 276:1

**testified** [25] - 20:12, 43:20, 50:3, 51:12, 52:9, 55:13, 56:14, 65:24, 68:20, 78:22, 96:11, 101:20, 108:5, 111:18, 131:19, 154:5, 166:13, 183:7, 211:6, 213:23, 219:5, 228:20, 230:3, 230:21, 237:23

**testify** [13] - 63:25, 64:8, 67:3, 75:22, 77:12, 124:19, 132:2, 134:1, 140:9, 144:13, 204:18, 204:21, 210:16

**testifying** [8] - 74:1, 75:7, 77:10, 122:16, 144:2, 144:20, 159:24, 220:5

**testimony** [19] - 12:11, 12:17, 19:14, 32:23, 58:14, 86:16, 124:16, 128:4, 129:19, 129:24, 143:15, 143:19, 146:13, 166:19, 210:14, 213:10, 229:18, 230:3, 254:22

**testing** [17] - 142:17, 142:18, 142:20, 142:21, 142:22, 196:1, 217:3, 217:5, 236:25, 237:2, 237:7, 237:12, 246:3, 246:6, 255:12, 271:4, 273:11

**tests** [8] - 227:15, 257:12, 257:14, 257:18, 270:5, 271:21, 271:23, 272:13

**text** [1] - 263:25

**Tharaldson** [5] - 33:11, 33:15, 34:2, 34:4, 34:7

**that'll** [1] - 183:14

**THE** [2] - 8:22, 8:22

**themselves** [2] - 65:9, 224:5

**thereafter** [2] - 187:2, 206:2

**therefore** [3] - 102:11, 136:25

**therein** [1] - 132:9

**therewith** [1] - 178:3
**thesis** [2] - 262:20, 263:5
**they've** [2] - 157:10, 168:24
**thick** [3] - 141:18, 215:25, 236:19
**thickness** [5] - 214:12, 270:22, 271:11, 272:15, 273:2
**thicknesses** [1] - 38:1
**THIEL** [1] - 8:6
**third** [2] - 47:13, 247:18
**third-party** [1] - 47:13
**thousand** [9] - 140:1, 141:15, 141:16, 142:6, 142:7, 142:24, 220:18, 220:20, 241:15
**thousand-foot** [4] - 141:15, 141:16, 142:6, 142:24
**Three** [1] - 240:18
**three** [33] - 23:23, 26:5, 38:10, 39:25, 40:1, 54:19, 60:8, 62:7, 82:6, 136:10, 190:12, 190:13, 192:15, 192:16, 192:19, 192:23, 193:1, 193:4, 194:3, 194:4, 195:20, 195:24, 196:7, 198:15, 212:12, 222:10, 223:4, 224:4, 225:6, 228:18, 244:3, 244:12
**thresholds** [1] - 241:8
**throughout** [6] - 44:17, 45:1, 88:4, 88:17, 145:13, 237:22
**tie** [1] - 146:8
**Title** [1] - 174:6
**title** [27] - 44:24, 45:14, 48:2, 48:16, 50:4, 130:15, 170:22, 170:25, 171:5, 171:11, 171:20, 172:4, 172:18, 172:19, 172:24, 172:25, 173:11, 173:15, 173:18, 173:19, 175:8, 175:14, 175:19, 205:16, 211:22
**to-2,000-foot** [1] - 143:1
**today** [32] - 11:21, 12:23, 18:20, 19:9, 22:12, 28:6, 28:24, 34:1, 40:17, 53:20, 59:2, 59:15, 69:15, 69:22, 71:17, 71:18, 75:7, 77:10, 80:16, 81:6, 81:8, 81:25, 123:18, 125:9, 133:14, 153:4, 211:14, 212:20, 230:4, 231:22, 232:5, 242:3
**together** [3] - 61:3, 166:7, 236:14
**tomorrow** [1] - 276:10
**ton** [2] - 163:5, 165:22
**Tongue** [1] - 239:13
**tonnage** [1] - 58:8
**tons** [9] - 36:23, 116:17, 194:7, 194:8, 194:12, 194:13, 194:17, 194:18, 194:19
**took** [8] - 19:2, 50:7, 51:3, 60:21, 97:14, 104:1, 148:15, 219:1
**top** [13] - 28:15, 64:2, 64:12, 100:9, 136:20, 142:4, 215:11, 215:12, 248:17, 248:19, 248:25, 259:8, 263:25
**tops** [4] - 247:24, 248:5, 248:6, 248:10
**total** [9] - 54:9, 55:7, 56:21, 135:24, 137:7, 190:16, 241:7, 241:23, 242:3
**touch** [1] - 51:15
**touched** [7] - 26:18, 52:5, 56:7, 56:9, 57:2, 199:6, 229:18
**towards** [1] - 154:7
**Township** [78] - 1:7, 1:9, 1:11, 1:12, 1:13, 1:20, 1:22, 2:1, 2:2, 2:3, 2:10, 2:11, 2:14, 2:15, 2:16, 2:20, 2:22, 3:1, 3:1, 3:2, 3:11, 3:14, 3:15, 3:16, 4:1, 4:3, 4:5, 4:6, 4:13, 4:16, 4:17, 4:18, 4:23, 5:2, 5:3, 5:4, 5:13, 5:14, 5:15, 5:18, 5:19, 6:2, 6:4, 6:5, 6:8, 6:9, 6:15, 6:16, 6:18, 6:20, 6:21, 7:2, 7:4, 7:5, 7:8, 7:9, 14:22, 14:24, 15:2, 15:3, 15:4, 16:11, 16:14, 16:16, 16:17, 17:22, 17:24, 18:1, 18:4, 18:6, 49:9, 49:12, 49:14, 135:20, 136:8, 197:2, 197:13, 204:9
**townships** [2] - 53:14, 95:7
**trace** [1] - 35:11
**tracking** [1] - 125:25
**tract** [43] - 53:12, 53:15, 54:1, 54:2, 54:5, 54:11, 54:17, 55:3, 55:4, 56:15, 56:20, 56:21, 134:18, 134:21, 135:5, 135:10, 135:15, 135:19, 135:21, 135:24, 136:6, 136:8, 136:13, 136:14, 136:15, 136:21, 136:23, 136:25, 137:2, 137:19, 138:6, 178:21, 181:22, 184:11, 195:13, 197:9, 197:20, 198:23, 199:3, 199:21, 199:22, 207:15, 207:22
**Tract** [4] - 134:10, 150:23, 151:21, 198:22
**tract's** [1] - 54:11
**tracts** [6] - 132:8, 134:14, 134:16, 136:23, 138:13, 181:25
**traded** [1] - 102:21
**Trail** [7] - 29:2, 33:10, 33:11, 64:3, 64:9, 70:21, 106:9
**trained** [2] - 267:5, 269:22
**transaction** [1] - 147:9
**transactions** [2] - 99:15, 99:20
**TRANSCRIPT** [1] - 7:15
**transcript** [2] - 201:21, 201:22
**Transfer** [1] - 174:5
**transfer** [4] - 175:21, 184:21, 184:25, 185:3
**transfers** [4] - 147:10, 175:10, 175:16, 175:24
**transient** [2] - 270:24, 271:12
**transmissibility** [2] - 270:23, 271:11
**transmission** [3] - 193:17, 193:21, 194:11
**transmissive** [4] - 214:23, 220:14, 229:14, 242:9
**Transport** [5] - 26:3, 26:8, 26:9, 193:2, 193:5
**transport** [8] - 23:5, 27:14, 32:14, 79:13, 79:15, 113:1, 194:12, 218:17
**transportation** [11] - 27:12, 29:9, 32:3, 42:24, 78:3, 78:7, 78:9, 78:12, 78:17, 79:6, 105:15
**transported** [1] - 27:21
**transporting** [1] - 81:4
**trapping** [3] - 217:14, 217:16, 217:22
**TRAVIS** [1] - 8:5
**treated** [3] - 58:21, 97:10, 152:14
**treatment** [3] - 126:3, 126:6, 127:4
**tricky** [2] - 68:2, 90:16
**trigger** [1] - 235:1
**triggers** [2] - 172:17, 235:5
**true** [4] - 60:20, 95:2, 150:20, 181:6
**trump** [1] - 158:18
**trunk** [1] - 27:24
**TRUST** [1] - 8:23
**Trust** [17] - 12:3, 49:7, 49:22, 84:2, 84:5, 84:10, 84:21, 85:9, 85:24, 86:23, 87:13, 87:18, 88:9, 88:17, 89:2, 99:1, 99:18
**truthed** [1] - 237:8
**truthing** [1] - 237:10
**try** [8] - 12:10, 58:25, 59:4, 141:9, 192:17, 200:22, 257:22
**trying** [10] - 62:16, 68:2, 68:8, 90:16, 92:16, 92:17, 92:18, 138:11, 148:7, 169:17
**Tuesday** [2] - 11:3, 276:13
**Tundra** [2] - 257:20, 272:3
**tune** [1] - 246:4
**tuned** [1] - 255:9
**turn** [17] - 23:10, 24:18, 35:3, 52:23, 52:24, 54:25, 145:8, 151:17, 159:2, 161:25, 167:25, 177:14, 213:7, 254:24, 255:2, 266:15, 267:14
**two** [26] - 13:1, 13:3, 20:1, 21:10, 25:3, 50:19, 55:17, 101:3, 132:23, 132:24, 157:4, 162:21, 170:4, 199:21, 208:13, 216:4, 216:22, 220:4, 222:9, 224:3, 233:13, 238:3, 250:4, 252:2, 252:3, 261:6
**Ty** [1] - 11:21
**TYLER** [1] - 8:10
**type** [6] - 59:23, 74:8, 76:8, 198:14, 233:19, 263:6
**types** [11] - 59:12, 72:24, 73:14, 74:3, 74:12, 172:7, 263:3, 263:7, 263:15, 266:12, 269:18
**typically** [6] - 13:1, 173:22, 215:22, 239:1, 248:1, 259:24
**typo** [2] - 152:4, 205:15

## U

**U.S** [10] - 22:16, 22:17, 29:11, 29:12, 29:14, 31:20, 36:21, 236:6, 240:9, 242:15
**ultimate** [1] - 256:2
**ultimately** [9] - 22:9, 32:12, 38:2, 57:16, 105:20, 141:18, 163:8, 223:6, 226:3
**unable** [3] - 99:6, 166:17, 259:20
**uncertain** [1] - 246:10
**uncertainties** [1] - 266:11
**unconsolidated** [6] - 259:17, 259:19, 260:1, 260:17, 264:19, 264:21
**UND** [1] - 44:14
**under** [49] - 25:4, 30:15, 40:20, 45:23, 47:20, 49:6,

50:1, 51:15, 57:25, 64:6, 66:3, 74:19, 77:10, 81:25, 90:10, 107:24, 108:23, 111:18, 113:7, 118:16, 121:16, 121:18, 134:10, 146:5, 147:18, 148:18, 151:4, 155:24, 156:1, 157:1, 157:15, 158:6, 162:4, 169:3, 176:7, 176:8, 176:13, 177:8, 177:22, 181:2, 186:2, 187:3, 193:6, 193:22, 217:11, 222:3, 242:16, 252:19, 263:25
**underground** [7] - 79:12, 109:5, 220:7, 220:11, 232:21, 235:23, 237:19
**underlined** [1] - 205:17
**underneath** [2] - 65:18, 223:15
**underpredicts** [1] - 259:24
**understood** [6] - 98:23, 169:18, 184:17, 197:17, 200:18, 203:10
**Underwood** [1] - 29:4
**undifferentiated** [1] - 216:5
**undulating** [2] - 269:3, 269:19
**unduly** [1] - 238:7
**Unit** [1] - 196:25
**unit** [5] - 19:13, 50:7, 59:6, 150:12, 156:16
**United** [1] - 112:6
**unitized** [1] - 178:2
**units** [11] - 19:15, 42:11, 48:18, 48:22, 48:25, 53:19, 54:19, 117:6, 195:20, 195:24, 258:21
**University** [7] - 21:4, 21:5, 44:13, 70:10, 211:17, 212:10, 231:14
**unleased** [33] - 50:13, 51:9, 57:11, 57:15, 58:20, 59:5, 83:23, 86:11, 86:16, 89:23, 91:22, 94:12, 128:6, 128:8, 128:24, 128:25, 131:13, 131:18, 132:5, 138:16, 141:6, 149:25, 153:2, 153:6, 154:4, 156:2, 156:7, 168:22, 170:11, 170:12, 170:16, 176:3, 178:9
**unless** [5] - 91:16, 118:21, 130:6, 155:11, 185:12
**unrecorded** [1] - 172:13
**unsigned** [1] - 47:11
**unsupported** [1] - 24:9
**unusable** [1] - 169:10
**unwilling** [1] - 172:24
**up** [38] - 13:3, 21:16, 29:4, 50:5, 69:12, 79:2, 100:7, 109:3, 110:16, 113:19, 121:1, 130:13, 134:2, 135:24, 136:2, 148:12, 150:22, 154:19, 161:14, 163:3, 173:25, 177:9, 179:3, 183:25, 184:7, 194:21, 194:22, 194:23, 197:11, 201:4, 201:21, 220:5, 246:17, 249:22, 257:25, 271:3, 273:21, 275:23
**update** [2] - 54:17, 235:14
**updated** [6] - 24:25, 31:15, 47:14, 113:14, 235:17
**uphold** [1] - 158:14
**uplift** [1] - 102:16
**upper** [25] - 27:5, 200:7, 214:22, 214:25, 215:10, 215:16, 215:20, 216:1, 216:7, 216:10, 217:9, 218:2, 218:5, 218:7, 218:10, 218:15, 219:11, 219:13, 222:6, 228:6, 229:13, 229:24, 234:10, 238:21, 239:2
**upscaled** [1] - 268:8
**usable** [1] - 246:12
**usage** [1] - 154:6
**USDW** [4] - 220:21, 236:13, 239:25, 240:2
**USDWs** [3] - 234:20, 238:4, 239:23
**useful** [2] - 265:22, 265:25
**uses** [5] - 107:13, 107:20, 108:3, 108:20, 218:17
**USGS** [1] - 236:6
**utilities** [2] - 124:23, 266:9
**utility** [1] - 266:1
**utilize** [1] - 169:12
**utilized** [2] - 49:25, 225:12
**utilizing** [2] - 38:18, 116:12

## V

**validate** [4] - 42:3, 113:5, 216:19, 261:18
**valuable** [6] - 107:11, 107:18, 108:1, 222:10, 222:11, 228:16
**value** [11] - 101:13, 168:16, 168:17, 169:20, 169:21, 194:23, 261:16, 273:25, 274:3, 275:2, 275:14
**values** [2] - 270:23, 271:11
**valve** [5] - 83:3, 83:6, 182:23, 183:19, 183:23
**valves** [7] - 28:17, 83:7, 183:18, 183:20, 183:22
**variability** [1] - 264:6
**variation** [1] - 145:12
**variations** [1] - 250:15
**variety** [2] - 26:16, 117:13
**variogram** [2] - 249:20, 249:22
**variograms** [8] - 247:11, 256:19, 265:20, 267:15, 267:16, 267:24, 268:9
**various** [5] - 132:6, 154:9, 188:19, 189:11, 258:22
**verify** [1] - 181:14
**verifying** [1] - 48:2
**version** [2] - 130:14, 210:11
**versus** [4] - 19:20, 85:13, 257:24, 275:23
**vertical** [13] - 145:12, 187:11, 187:17, 214:24, 216:15, 224:25, 225:20, 229:16, 230:6, 230:12, 242:10, 266:10, 275:4
**vertically** [3] - 185:18, 185:23, 187:24
**VI** [1] - 182:25
**via** [8] - 23:6, 27:15, 27:21, 50:11, 50:12, 81:4, 86:18, 217:13
**viability** [5] - 100:16, 102:8, 105:5, 106:20, 214:6
**viable** [2] - 113:17, 114:18
**vice** [2] - 20:22, 22:5
**view** [3] - 258:18, 259:8, 269:15
**violates** [1] - 92:13
**virtue** [1] - 149:6
**Volk** [1] - 77:9
**volume** [4] - 33:10, 102:25, 199:2, 274:18
**VOLUME** [1] - 7:16
**volumes** [3] - 214:13, 247:3, 262:4
**voluntary** [1] - 60:10

## W

**WADE** [2] - 9:8, 20:11
**Wade** [26] - 20:1, 20:5, 20:16, 20:18, 20:23, 22:1, 23:10, 24:18, 24:22, 25:13, 30:9, 30:23, 36:2, 36:12, 37:3, 39:3, 41:5, 42:18, 75:17, 111:18, 201:24, 210:2, 213:14, 213:23, 219:5, 226:14
**wait** [2] - 37:4, 180:14
**waiver** [1] - 179:24
**Waiver** [1] - 174:14
**waiving** [1] - 180:5
**warrant** [3] - 171:11, 172:25, 235:11
**warranties** [2] - 172:8, 172:18
**warrants** [2] - 172:17, 173:10
**warranty** [11] - 170:22, 170:24, 171:5, 171:7, 171:20, 172:19, 172:24, 173:14, 173:16, 173:18, 173:22
**waste** [3] - 78:19, 126:2, 126:17
**wasting** [1] - 43:8
**Water** [12] - 191:3, 191:8, 191:15, 191:21, 191:23, 236:8, 239:21, 240:4, 240:6, 240:10, 241:9, 242:16
**water** [25] - 131:10, 159:5, 159:6, 160:2, 160:3, 160:6, 160:12, 160:23, 161:5, 161:8, 161:9, 161:14, 161:21, 189:10, 220:7, 220:11, 229:11, 232:22, 235:24, 237:20, 240:10, 241:2, 241:24, 242:15
**waters** [6] - 160:13, 160:16, 160:18, 160:20, 229:10, 242:1
**Wayne** [1] - 20:18
**ways** [5] - 159:5, 162:21, 242:14, 253:4, 266:3
**website** [4] - 227:13, 246:8, 273:12, 273:15
**week** [1] - 50:21
**weeks** [5] - 144:18, 248:3, 249:7, 249:8, 250:1
**weight** [3] - 223:12, 275:9, 275:13
**weird** [1] - 268:14
**well-testing** [1] - 255:12
**wellbore** [6] - 79:16, 79:18, 189:17, 190:5, 190:7
**wellbores** [1] - 223:1
**wellhead** [1] - 79:18
**wells** [29] - 39:4, 60:8, 131:10, 182:25, 190:9, 190:14, 190:15, 190:20, 190:21, 199:11, 223:5, 224:7, 233:11, 233:14, 233:15, 233:16, 233:22, 233:24, 234:1, 234:4, 234:7, 236:5, 236:20, 237:11, 237:15, 253:6, 260:22, 262:24
**West** [79] - 1:7, 1:9, 1:11, 1:12, 1:13, 1:21, 1:22, 2:1, 2:2, 2:3, 2:10, 2:12, 2:14, 2:15, 2:16, 2:20, 2:22, 3:1, 3:2, 3:3, 3:12, 3:14, 3:16, 3:17, 4:1, 4:4, 4:5, 4:6, 4:14, 4:17, 4:18, 4:19, 4:23, 5:2, 5:4, 5:5, 5:13,

5:15, 5:16, 5:19, 5:20, 6:3, 6:4, 6:5, 6:8, 6:9, 6:15, 6:17, 6:18, 6:21, 6:22, 7:3, 7:4, 7:5, 7:8, 7:9, 14:22, 14:24, 15:2, 15:4, 15:5, 16:11, 16:15, 16:17, 16:18, 17:23, 17:25, 18:1, 18:5, 18:6, 40:3, 40:9, 40:14, 41:9, 135:21, 136:9, 197:3, 197:13
**west** [5] - 39:14, 197:5, 197:16, 268:22
**west-east** [1] - 268:22
**whatever's** [1] - 177:9
**wheat** [1] - 168:21
**wherein** [1] - 51:3
**whole** [6] - 89:2, 210:5, 210:11, 221:4, 230:4, 249:18
**wholly** [3] - 25:2, 25:23, 25:25
**willing** [6] - 58:23, 98:22, 152:16, 178:14, 180:25, 199:16
**Williston** [3] - 36:23, 44:17, 240:12
**wind** [1] - 265:10
**Wisconsin** [1] - 231:14
**withdraw** [5] - 111:1, 111:12, 112:15, 112:21, 156:17
**withdrawals** [1] - 112:9
**withdrawing** [1] - 112:10
**withdrew** [1] - 112:23
**witness** [20] - 13:5, 19:6, 19:19, 43:4, 43:5, 43:10, 192:1, 196:17, 198:16, 203:22, 204:16, 204:17, 204:21, 204:23, 209:15, 209:21, 210:25, 230:16, 270:10, 271:3
**witnesses** [10] - 12:10, 12:25, 20:1, 61:16, 124:8, 179:21, 209:20, 220:4, 222:9, 246:22
**WITNESSES** [1] - 9:6
**wondering** [1] - 145:22
**word** [4] - 172:16, 205:19, 274:5, 275:15
**words** [6] - 47:3, 126:2, 126:11, 127:5, 139:22, 146:3
**workflow** [1] - 248:1
**workings** [1] - 144:4
**works** [3] - 77:10, 143:11, 171:3
**writing** [2] - 130:6, 133:13
**written** [9] - 86:14, 90:3, 90:24, 91:13, 131:21, 153:4, 153:19, 155:20, 196:8
**wrote** [1] - 122:15
**Wyoming** [1] - 265:8

## Y

**year** [11] - 30:1, 33:13, 33:15, 41:21, 85:6, 111:1, 165:14, 186:19, 194:9, 194:12
**years** [37] - 21:10, 21:14, 37:1, 41:16, 41:18, 42:1, 42:7, 42:11, 42:16, 67:10, 67:13, 67:17, 67:25, 70:24, 106:23, 109:15, 113:10, 113:13, 113:15, 114:12, 117:23, 125:4, 139:13, 140:12, 140:15, 163:22, 163:24, 212:12, 212:15, 217:20, 231:20, 234:25, 235:1, 235:5, 235:6, 261:10, 261:18
**yellow** [1] - 269:4
**yesterday** [3] - 52:17, 54:16, 83:19
**yourself** [2] - 205:25, 247:21

## Z

**Zack** [1] - 84:7
**ZASTE** [1] - 8:18
**zero** [1] - 207:20
**zip** [1] - 252:11
**zone** [36] - 140:21, 200:7, 200:8, 200:16, 214:22, 214:25, 215:10, 215:16, 215:20, 216:1, 216:8, 216:10, 216:14, 217:10, 218:2, 218:3, 218:8, 218:11, 218:13, 218:16, 219:11, 219:14, 220:13, 220:17, 221:8, 222:6, 224:13, 227:23, 228:6, 229:14, 229:25, 236:12, 238:21, 239:2, 239:4
**zones** [13] - 196:16, 200:17, 215:4, 215:8, 218:5, 235:22, 236:9, 237:4, 237:7, 240:17, 242:8, 242:19, 269:4

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

| | | |
|---|---|---|
| In re application of Summit | : Case No(s). | 30869 |
| Carbon Storage #1, LLC requesting | : | 30870 |
| consideration for the geologic | : | 30871 |
| storage of carbon dioxide in the | : | 30872 |
| Broom Creek Formation from the | : | 30873 |
| Midwest Carbon Express Pipeline in | : | 30874 |
| the storage facility located in | : | 30875 |
| Sections 31, 32, 33, and 34, | : | 30876 |
| Township 142 North, Range 87 West, | : | 30877 |
| Sections 1, 11, 12, 13, 14, 15, | : | 30878 |
| 22, 23, 24, 25, 26, 35, and 36, | : | 30879 |
| Township 141 North, Range 88 West, | : | 30880 |
| Sections 2, 3, 4, 5, 6, 7, 8, 9, | : | |
| 10, 11, 14, 15, 16, 17, 18, 19, | : | |
| 20, 21, 22, 23, 25, 26, 27, 28, | : | |
| 29, 30, 31, 32, 33, 34, and 35, | : | |
| Township 141 North, Range 87 West, | : | |
| Sections 1, 2, 3, and 12, Township | : | |
| 140 North, Range 88 West and | : | |
| Sections 4, 5, 6, and 7, Township | : | |
| 140 North, Range 87 West, Mercer, | : | |
| Morton, and Oliver Counties, ND. | : | |
| | | |
| In re application of Summit | : | |
| Carbon Storage #1, LLC to | : | |
| consider the amalgamation of the | : | |
| storage reservoir pore space, in | : | |
| which the Commission may require | : | |
| that the pore space owned by | : | |
| nonconsenting owners be included | : | |
| in the geologic storage, as | : | |
| required to operate the Summit | : | |
| Carbon Storage #1, LLC storage | : | |
| facility located in Sections 31, | : | |
| 32, 33, and 34, Township 142 | : | |
| North, Range 87 West, Sections 1, | : | |
| 11, 12, 13, 14, 15, 22, 23, 24, | : | |
| 25, 26, 35, and 36, Township 141 | : | |
| North, Range 88 West, Sections 2, | : | |
| 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, | : | |
| 15, 16, 17, 18, 19, 20, 21, 22, | : | |
| 23, 25, 26, 27, 28, 29, 30, 31, | : | |

32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re application of Summit Carbon Storage #1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35,

Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

In re application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND.

In re application of Summit Carbon Storage #2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35,

Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.

In re application of Summit Carbon Storage #2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.

In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13,

14, 15, 16, 17, 18, 19, 20, 21, :
22, 23, 24, 25, 26, 27, 28, 29, :
30, 32, 33, 34, 35, and 36, :
Township 142 North, Range 88 West,:
Sections 5, 6, 7, 8, 17, 18, 19, :
20, 29, 30, and 31, Township 142 :
North, Range 87 West, and Sections:
1, 2, and 3, Township 141 North, :
Range 88 West, Mercer and Oliver :
Counties, ND, subject to the :
application of Summit Carbon :
Storage #2, LLC for the geologic :
storage of carbon dioxide in the :
Broom Creek Formation, and enact :
such special field rules as may :
be necessary. :

In re application of Summit :
Carbon Storage #3, LLC requesting :
consideration for the geologic :
storage of carbon dioxide in the :
Broom Creek Formation from the :
Midwest Carbon Express Pipeline in:
the storage facility located in :
Section 36, Township 143 North, :
Range 87 West, Sections 19, 20, :
21, 28, 29, 30, 31, 32, 33, 34, :
35, and 36, Township 143 North, :
Range 86 West, Sections 1, 2, 11, :
12, 13, 14, and 24, Township 142 :
North, Range 87 West, Sections 1, :
2, 3, 4, 5, 6, 7, 8, 9, 10, 11, :
12, 13, 14, 15, 16, 17, 18, 19, :
20, 21, 22, 23, 24, 25, 26, 27, :
28, 29, 30, 32, 33, 34, and 35, :
Township 142 North, Range 86 :
West, and Sections 6, 7, 17, 18, :
19, and 20, Township 142 North, :
Range 85 West, Oliver County, ND. :

In re application of Summit :
Carbon Storage #3, LLC to consider:
the amalgamation of the storage :
reservoir space, in which the :
Commission may require that the :
pore space owned by nonconsenting :
owners be included in the geologic:

storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.

In re application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation.

In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

**TRANSCRIPT OF HEARING**

**VOLUME II - (Pages 277 - 552)**

**Taken At**
**1000 East Calgary Avenue**
**Bismarck, North Dakota**
**June 12, 2024**

**BEFORE DAVID P. GARNER**
**-- HEARING EXAMINER --**

# A P P E A R A N C E S

NDIC STAFF PRESENT:

MR. LYNN HELMS
MR. MARK BOHRER
MR. RICHARD SUGGS
MS. TAMARA MADCHE
MR. TRAVIS STOLLDORF
MS. ASHLEIGH THIEL
MR. DAVID TABOR
MR. STEPHEN FRIED
MR. CALEB ALBERTSON
MS. SARA FORSBERG

---

MR. LAWRENCE BENDER
MR. TYLER J. GLUDT
Fredrikson & Byron, P.A.
Attorneys at Law
Suite 400
304 East Front Avenue
Bismarck, North Dakota 58504

-- and --

MR. S. THOMAS THRONE
Throne Law Office, P.C.
Attorneys at Law
P.O. Drawer 6590
Sheridan, Wyoming 82801

FOR THE SUMMIT CARBON STORAGE #1, SUMMIT CARBON STORAGE #2 AND SUMMIT CARBON STORAGE #3.

---

**A P P E A R A N C E S (Cont'd)**

MR. DERRICK BRAATEN
MS. DESIRAE ZASTE, Paralegal
Braaten Law Firm
Attorneys at Law
Suite 100
109 North Fourth Street
Bismarck, North Dakota 58501

FOR THE INTERVENORS, THE SWENSON LIVING TRUST, BAUMAN, GERVING, HAUPT, JOCHIM, KRAFT, LIEBELT, MAIZE, METZ, RUST, AND SMITH.

---

# TABLE OF CONTENTS

## INDEX OF PROCEEDINGS

Page

Opening Discussion..... 289

---

CERTIFICATE

Certificate of Court Reporter.....Page 552

---

APPLICANT'S WITNESSES

AMANDA DOUGLAS/CAITLIN OLSEN

Continued Cross-Examination by Mr. Braaten..... Page 291

Examination by Ms. Madche..... Page 355

Examination by Mr. Stolldorf..... Page 370

Examination by Mr. Suggs..... Page 371

Redirect Examination by Mr. Bender..... Page 389

Further Examination by Mr. Suggs..... Page 393

JAMES POWELL/JOHN HUNT/JAY VOLK/JEAN ODDY

Direct Examination by Mr. Bender..... Page 396

Direct Examination by Mr. Bender..... Page 398

Direct Examination by Mr. Bender..... Page 403

Direct Examination by Mr. Bender..... Page 408

T A B L E  O F  C O N T E N T S (Cont'd)

Examination by Ms. Madche..... Page 411
Examination by Mr. Stolldorf..... Page 432
Examination by Mr. Suggs..... Page 441

CAITLIN OLSEN/WADE BOESHANS/AMANDA DOUGLAS/JAMEY BACKUS

Redirect Examination by Mr. Bender..... Page 448
Redirect Examination by Mr. Bender..... Page 458
Redirect Examination by Mr. Bender..... Page 461
Direct Examination by Mr. Bender..... Page 467
Examination by Ms. Madche..... Page 470
Recross-Examination by Mr. Braaten..... Page 473

JEAN ODDY/CAITLIN OLSEN/JIMMY POWELL/WADE BOESHANS

Cross-Examination by Mr. Braaten..... Page 484

---

INTERVENORS' WITNESSES

SHANE BOFTO

Direct Examination by Mr. Braaten..... Page 503
Cross-Examination by Mr. Bender..... Page 513
Examination by Mr. Helms..... Page 525
Redirect Examination by Mr. Braaten..... Page 526

T A B L E  O F  C O N T E N T S (Cont'd)

P. TED DOUGHTY

Direct Examination by Mr. Braaten..... Page 527

Cross-Examination by Mr. Bender..... Page 532

PAUL BUTTON

Direct Examination by Mr. Braaten..... Page 537

Cross-Examination by Mr. Bender..... Page 545

---

CLAIMANT'S EXHIBITS

| Exhibit No. | Offered | Received |
|---|---|---|
| 1C-1 | 461 | 461 |
| 8B | 457 | 458 |

---

INTERVENORS' EXHIBITS

| Exhibit No. | Offered | Received |
|---|---|---|
| LO-18 | 511 | 511 |
| LO-19 | 511 | 511 |
| LO-20 | 511 | 511 |
| LO-56 | 505 | 505 |
| LO-57 | 540 | 540 |
| LO-58 | 530 | 530 |
| LO-82 | 511 | 511 |
| LO-83 | 333 | 333 |

---

(The following proceedings were had and made of record herein, commencing at 9:06 a.m., Wednesday, the 12th day of June, 2024:)

HEARING EXAMINER GARNER: We are on the record for hearings in the matters listed in the North Dakota Industrial Commission Hearing Docket for June 12. I'm David Garner, hearing examiner for these hearings. We're at the hearing room for the Department of Mineral Resources, Oil & Gas Division, and it is 9:08 a.m.

We will resume our hearings for Case Numbers 30869 through 30880. I notice new counsel appeared at the table, so I'll give everyone an opportunity for all interested parties to please come forward again.

MR. BENDER: Thank you, Mr. Examiner. I'll introduce Tom. He doesn't need any introduction, but with us today is Tom Throne. He's going to be assisting with Summit in this application.

HEARING EXAMINER GARNER: Okay.

MR. BRAATEN: Derrick Braaten, Braaten Law Firm, on behalf of the landowner intervenors. With me is my paralegal, Desirae Zaste, and client Kirk Swenson.

MR. BENDER: I apologize. I thought you were just looking for an introduction of the new counsel.

HEARING EXAMINER GARNER: No, that's --

MR. BENDER: Did you want me to make another appearance or --

HEARING EXAMINER GARNER: No. That's fine.

MR. BENDER: Okay.

HEARING EXAMINER GARNER: That's fine. Just a quick note. We're going to resume with the cross-examination of the two witnesses that were being crossed by Mr. Braaten yesterday. Change, though. We're going to then at that point in time allow Summit to call its remaining witnesses, give the Commission a chance to respond to them -- or question them. And then you'll have the remainder of the time to cross-examine those witnesses.

MR. BRAATEN: Okay. And, Your Honor, I don't want to be difficult or take up time. I just want to put on the record that I do object to that process.

HEARING EXAMINER GARNER: Okay.

MR. HELMS: 6:30.

HEARING EXAMINER GARNER: Oh, I'm sorry.

And we're going to have a deadline today again of 6:30 p.m., and if we are not done, we will be back here tomorrow morning at 9 a.m.

Okay. With that, I think we can proceed.

MR. HELMS: They're still under oath.

HEARING EXAMINER GARNER: They're still under oath.

**CONTINUED CROSS-EXAMINATION**

**BY MR. BRAATEN:**

Q. I wasn't going to ask this, but since it came up, do you understand that you're still under oath?

A. (BY MS. DOUGLAS) I do.

Q. Okay. We were discussing the $CO_2$ plume model yesterday, and I want to start by just asking if you have an understanding within the regulatory framework for Class 6 wells why a plume model is constructed?

A. I do.

Q. And what is that understanding?

A. So under the North Dakota UIC Class VI regulations, a geologic model is constructed to help define the horizontal and vertical boundaries of a storage reservoir.

Q. For what purpose or reason?

A. The purpose of this is to define the boundaries of the storage reservoir, in this case which would be the storage facility, which the regulations require pore space owners within that storage facility to be equitably compensated. Also, the modeling and simulation, it's constructed to help delineate the area of review, which is also a requirement of the statutes to delineate the area of review.

Q. And the delineation of the area of review is also the primary requirement or reason for creating that model under the Safe Drinking Water Act?

A. So we're talking about two sets of regulations here. So in -- in North Dakota UIC Class VI regulations, as I mentioned, the modeling is a tool to determine the AOR in the storage facility area. The Safe Water Drinking Act, under that, I believe, the EOA has its own set of UIC Class VI rules, which the North Dakota UIC Class VI rules are based on and are more stringent than. In the EPA rules, it is my understanding that modeling and simulation is used to define an area of review as well.

Q. Is North Dakota's underground injection

control program regulation for Class VI wells adopted pursuant to the Safe Drinking Water Act?

A. It is, and it is more stringent in terms that it goes above and beyond and also has stipulations for a storage facility area, pore space leasing, which the EPA UIC Class VI rules do not.

Q. And when the EPA promulgated its Class VI rules, the methodologies it used for delineating -- delineating an area of review were focused on the purpose and function of protecting USDWs; right?

A. That's correct, and North Dakota Administrative Code is as well. So they define the area of review as the region surrounding the geologic sequestration project where underground sources of drinking water may be endangered by the $CO_2$ injection activities.

Q. And so you're modeling the areal extent of the $CO_2$ plume because the regulations require you to do that in order to protect drinking water sources?

A. Modeling the simulation is required to evaluate potential impact and endangerment on any underground sources of drinking water in which you're required to define an area of review where you're required to monitor and ensure that you're

not endangering any underground sources of drinking water.

Q. You've noticed -- you've noted a couple of times that North Dakota's regulations are more stringent than the EPA regulations. That's because the EPA regulations require that any state being granted primacy have a set of regulations that are more stringent than EPA's?

A. I'm not familiar with the specific requirements. I know that they can't be any lesser.

Q. Okay. I've handed you what has been marked as Exhibit LO-83. Can you tell me if you've seen that document before?

A. I personally have not.

Q. And when you say "I personally have not," are you aware of others who have that you're thinking of?

A. Not specifically, no.

Q. If you look at the bullet points in the middle, you'll notice a number of descriptions of various data and input files. Is there anything in those bullet points that you can identify that was not provided to the Industrial Commission by EERC?

A. Upon request from the Commission, the EERC

had provided the DMR with the .DAT file, which is our simulation model input file for CMG, as well as our results file in the form of a .SR3, as well as shapefiles for the maps that were generated. Outside of those data sets, we did not provide any additional data to the DMR.

Q. You said for the maps that were provided outside of the data. What maps are you referring to?

A. The maps in the storage facility area. So we provided shapefiles for the storage facility boundary, the area of review boundary and such.

Q. Okay. And you're saying you provided the shapefiles but not necessarily the particular maps you generated from them?

A. Correct.

Q. Okay.

A. Let me correct for that. The maps are provided in the permit itself, so we didn't provide maps separately. They're within the permit itself.

Q. Okay. That's fair.

So this first one, all of the input files for the PHREEQC model were provided to the Commission?

A. No. As I stated, just the .DAT file for

the numerical simulations which were used to define the horizontal and the vertical boundaries of the reservoir.

Q. You didn't give them an input file for the PHREEQC model?

A. We did not, no. It was not requested.

Q. It's in your possession, though?

A. The EERC has the data.

Q. Sorry. Yes. EERC.

And EERC is Summit's agent and representative with respect to that data?

A. The ownership of the data is governed under our specific contracts with Summit including our NDA with them that govern data ownership.

Q. EERC has a nondisclosure agreement with Summit?

A. Yes.

Q. Who proposed that?

A. I was not involved in those discussions. It's a standard -- standard practice we have with most of our clients, though.

Q. Is that because your licenses for the computer modeling programs are academic licenses?

A. No. Commercial licenses were procured for this project as this was a commercially contracted

project.

Q. Did Summit compensate for the cost of the subscriptions for the programs on a commercial basis?

A. The EERC procured commercial licenses and the costs of those commercial licenses were billed to Summit. Yes.

Q. Okay. Were they temporary subscriptions?

A. Yes. So the licenses have a time period associated with them. Commonly, we procure licenses on the order of a month, two-month, three-month licenses, depending on the duration of the time period in the project we need the license to perform the scope.

Q. So I want to go back to my prior question. Other than the input model for the PHREEQC model -- sorry. Let me start over.

Other than the input file for the PHREEQC model, is there anything listed in these bullet points that was not provided by EERC to the Industrial Commission?

A. Yes. As I mentioned, the only input data that was provided can be found in your last bullet point in terms of what I would call the simulation -- or the numerical reservoir simulation

model data decks and the output files. Those were the two pieces of data which I am saying is the .DAT file and the .SR3 file. Those are the only two data sets from this list that were provided.

Q. So if you look at the third bullet point, is there anything there that was provided to the Industrial Commission?

A. Yes. Thank you for correcting me. So all core analysis data was provided to the Industrial Commission as well as the North Dakota Geological Survey through submission to the North Dakota core library staff. And as required, all well log data, formation testing, fluid analysis was provided as -- as part of completions reports for the three stratigraphic test wells that were drilled. So those were technically provided.

Q. When you look through these bullet points on this letter, do you have an understanding of what is being referenced in all of these? Is there anything you don't understand what is being referenced?

A. No. I understand.

Q. If I asked you to go back to EERC today and sit down and pull together an external hard drive and put this data on that external hard drive

and give it to me, approximately how long would it take you to do that?

A. That would involve the procurement of commercial licenses to access.

Q. No. Assuming that you have a commercial license, which you do for all of this, if you needed to go to your office, take all of this data and put it on an external hard drive, how long would that take you?

A. Days to weeks.

Q. It would take you weeks to put this data on a hard drive? You're telling me that?

A. To ensure that we have the proper data, QC it, and we ran multiple iterations.

Q. No. I'm asking you to take this data that you understand what all of it is, export it, transfer those files onto an external hard drive, how long?

A. One to two weeks.

Q. It would take you one to two weeks to transfer those files to a hard drive, but you can start from scratch with publicly available data and replicate and recreate that entire model in four weeks?

A. So the publicly available data would be

coming from single data bases. The way the EERC's file structure and the iterations of our models, the amount of data we have, it's my opinion knowing our data storage, the amount of data we have, the different iterations of modeling simulations done for this project, I would estimate it would take our staff that amount of time to ensure that we had the proper data to be transferred.

Q. But you keep saying -- you're saying ensure we have the proper data to be transferred. I'm saying physically how long does it take to click the buttons on the computer to tell the files in the computer to transfer them to an external hard drive and how long does it take the computer to process that file transfer and get it onto the external hard drive? I'm not talking about quality control or review.

A. Okay. I can't speculate. I don't know the size of the data in terms of megabytes, gigabytes or the speed to upload it.

Q. So you have no idea how long it would take to put this on an external hard drive and send it to us?

A. I gave you an estimated range of what I believe it would take.

Q. Three weeks?
A. I believe I said one to two.
Q. One to two weeks.
And you're still saying that you could also replicate the entire model yourself from public data in just four weeks? Can you explain that?
A. I believe I did already answer that.
Q. Why does it only take two weeks to transfer the files onto a hard drive but you can take and recreate everything in four weeks?
A. I believe I already answered that.
Q. And you think that sounds plausible?
A. I gave a range and in my opinion of what it would take.
Q. Okay. Were you asked to do that at any point?
A. No.
Q. Were you at any point advised that you might need to make data available to an opposing party in any kind of legal proceeding for Summit?
A. I was made aware that data may be requested. Not specifically that it would need to be provided.
Q. Were you told that it would not need to be

provided?

MR. BENDER: I'm going to object insofar as it might get into issues on attorney/client privilege. So if any of this was discussed with you while I was present on the phone or whatever or Ty, I'd instruct you not to answer it.

MR. BRAATEN: Are you asserting the privilege on behalf of Summit or EERC?

MR. BENDER: Summit.

Q. (MR. BRAATEN CONTINUING) At any time when there was no representative of Summit, other than Mr. Bender, were you told that -- or there was no representative of Summit present for the conversation, at any point were you told that you would not need to provide data?

A. No. I was involved in discussions to determine what it would take for us to provide that data. I was not told we would not have to provide it. I was told as a potential we may have to.

Q. Who were you told that by?

A. Mr. Lonny Jacobson who is our direct point of communication with the Summit team.

Q. Is he with EERC or Summit?

MR. BENDER: Your Honor, I'm going to object. We're getting into issues having to do

with discovery. These issues are before the Commission in a motion to compel. I don't think it's appropriate to try to litigate that here. We haven't had an opportunity to respond to that motion to compel, so I'm going to object to this whole line of questioning.

HEARING EXAMINER GARNER: I'm going to overrule.

MR. BENDER: Okay. Thank you.

Q. (MR. BRAATEN CONTINUING) Who does Lonny -- did you say Lonny Jacobson?

A. Yeah.

Q. Who does he work for?

A. The Energy & Environmental Research Center.

Q. Okay. When did you talk to him about the potential of having to provide data?

A. Can you clarify "provide data"? To whom?

Q. We just talked about a conversation you had had with Lonny in which you indicated that you had not been told that you would not need to provide data. Do you recall that conversation?

A. I do. It was after discovery was submitted.

Q. And when you say "after discovery was

submitted," are you referring to the request for data and information that were sent by me on behalf of the intervenors?

A. Correct.

Q. Okay. What did he ask you about that data?

A. What effort and software licenses would be needed to compile that data.

Q. And just tell me fully what your response to that was when you talked to him at that time?

A. We provided him with a specific list of the software licenses needed, the data as well as things, like I discussed yesterday, about some of the data sets being acquired from data brokers that the specific digitized logs in question are governed by a license agreement.

Q. Did you make a determination that because of those license agreements you were unwilling to provide those data sets?

A. EERC did not make that determination. We provided information to Summit on what it would take for us to produce those data sets.

Q. With respect to everything that's listed in Exhibit 83 in those bullet points, first, EERC has itself all of that data related to Summit's

project; right?

A. Yes.

Q. And has EERC provided all of that data to Summit itself?

A. I'm unsure. I don't believe we have provided every piece of data yet.

Q. So Summit doesn't even have all of the data that EERC has?

A. I can't comment on that with certainty.

Q. Well, did you just say that EERC has not provided all of this data to Summit?

MS. DOUGLAS: Could you read back what I stated?

(Record read as requested.)

MS. DOUGLAS: So I believe I said I'm unsure, I'm uncertain about that. I don't have a definitive answer.

Q. (MR. BRAATEN CONTINUING) Okay. What did Lonny tell you about his conversations with Summit about it?

A. That we would just not have to provide it at this time. A determination was not made on whether we would be providing it or not.

Q. At any point were you asked to start compiling the data in the potential event that you

did have to provide it?

A. No, because as I mentioned, we'd be required to procure software licenses.

Q. For what?

A. To open the model, take out any data. For example, to open the Petrel model, we'd need a Petrel license in order to take out the digitized well logs that are governed by that license agreement.

Q. So the temporary subscriptions you had for the models, have those lapsed at this point?

A. They have.

Q. Okay. So you didn't want to export the data because in order to do that, you would have had to buy another subscription just to export the data out of the models?

A. Again, the EERC's contracted to perform this scope by Summit Carbon Storage, and so they would have had to approve and authorize us to procure the software.

Q. And they didn't want to pay for the software?

MR. BENDER: If you know.

MS. DOUGLAS: I -- I don't know. I was not involved in those discussions.

Q. (MR. BRAATEN CONTINUING) Well, you're the one that just told me that the need to procure new licenses was part of the reason for not exporting or starting on the export of the data; right?

A. We would need to be authorized by Summit to start those activities.

Q. And they never did that?

A. No.

Q. Did Lonny ask them if they would like to authorize that?

A. I'm not privy to those discussions.

Q. The PHREEQC model is a free model, though, that anyone can use and there would be no barrier with subscriptions to putting all that data together; right?

A. Correct. As I testified, though, yesterday, I believe that all of the input data used for that is described in the permit itself.

Q. Have you personally had any direct communications with the employees or members of the North Dakota Industrial Commission about this matter in the last two weeks?

A. I have not, no.

Q. Do you know if Lonny has?

A. I'm not aware if he has or not, but I do

not believe he has.

Q. As part of your work on the -- the Summit project, did you do any work related to the surface facilities?

A. No, I did not.

Q. There was a comment yesterday that I believe -- and you can correct me if I'm wrong, but I believe you said that these injection wells will not endanger human health. Would you agree with that?

A. I believe Caitlin testified to human health.

Q. Okay. And did I hear it right or do you agree that the testimony was that these injection wells, the Class VI wells, will not endanger human health?

A. (BY MS. OLSEN) I believe I testified to the injection wells have engineering protocol in place that would not endanger human health or the environment in relation to $CO_2$ injection activities.

Q. Thank you. In making that statement, did you consider the potential of $CO_2$ releases from those surface facilities such as valves, blowouts, things of that nature?

A. That was discussed later on in the permit.

So my references to that are in relation to the injection well and the review that was done on the injection well specifically.

Q. Would it also be accurate to say specifically with respect to the things that happen downhole at the injection well?

A. The engineering safeguards in place downhole are such that they would prevent migration of $CO_2$ into USDWs or the atmosphere.

Q. What about the engineering safeguards between the terminus point of the Midwest Carbon Express Pipeline and the wellhead?

A. (BY MS. DOUGLAS) We believe we have witnesses coming up who are better suited to testify to that.

Q. Okay. We had a discussion yesterday about the permeability adjustment with the 2.5 multiplier. Do you recall that?

A. I do.

Q. Did you or Lonny have conversations with Summit at any point regarding that issue?

A. We did.

Q. And what were those conversations?

A. So as I testified yesterday, the results showed a slightly higher permeability that could

have been used to justify a higher multiplier. In discussions with EERC and Summit, EERC providing technical advisement to use a lower value, those discussions included discussions with Summit from a business case. They wanted to permit the site to take a certain amount of $CO_2$ and store $CO_2$ within a certain area.

And so through sensitivity modeling and business considerations, it was a joint determination to use 2.5. Additionally, the Commission has approved a permit for the Broom Creek Formation that has used 2.5 as well.

Q. What were the business considerations Summit expressed regarding the use of the 2.5 factor?

A. Again, I just discussed the amount of $CO_2$ they were targeting and the area -- the area to be permitted for $CO_2$. I discussed a little bit yesterday I didn't want to overestimate the storage facility area and then not inject that amount of $CO_2$ to where we would be over-leasing the area and not using it.

Q. So Summit was -- Summit's preference would be that that perm adjustment be a lower number based on that business consideration?

A. Through discussions with EERC and Summit, the 2.5 multiplier was selected.

Q. But specifically because in part of Summit's business considerations of wanting to keep the storage facility as small as possible for the amount of $CO_2$ they want to inject; right?

A. I wouldn't say it's as small as possible. There's just some consideration to not overestimate the area needed.

Q. Because if they reduce the size or the boundary of that storage facility, then if there are people just on the other side of that, they don't need to pay for any property rights for that; is that accurate?

A. Can you repeat that?

Q. If they reduce the geographic areal extent of the storage facility boundary, it reduces the number of landowners for whom they need to compensate for the use of the property rights and that's the business consideration; right?

A. It's a fact a smaller storage facility area would result in less landowners having to be permitted. The -- the business consideration wasn't related to number of landowners as it was area.

Q. What business interest does Summit have in reducing the size or boundary of that storage facility if it's not related to not having to compensate landowners?

A. I --

MR. BENDER: If you know the answer.

MS. DOUGLAS: I don't know that. I'd have to defer to Summit.

Q. (MR. BRAATEN CONTINUING) And so the compensation of landowners is the only thing you know of as a business consideration that they would have been thinking about in --

MR. BENDER: I think that's a mischaracterization of her testimony. Can you ask the question again?

Q. (MR. BRAATEN CONTINUING) Sure. You've testified to the business consideration of the need to lease landowners; right?

A. Yes.

Q. And that's the only business consideration that you've testified to related to Summit's consideration of which permeability adjustment factor to use?

A. Yes, but it's not the only business consideration. There's also operational costs

associated with monitoring. If they -- they use a permeability multiplier in a larger permeability multiplier as we discussed, it may result in a larger plume, likely a larger associated pressure front, larger AOR that would require additional acreage to monitor, meaning additional monitoring costs.

Q. And every five years or so Summit is going to rerun the models based on the data acquired thus far from that monitoring; right?

A. Yeah. So the regulations require a reevaluation of the AOR determination, no less than every five years, meaning that Summit will be using operational and monitoring data to history match, calibrate their models and confirm their permitted AOR and storage facility area are still sufficient.

Q. What if they found out it wasn't?

A. So the North Dakota Century Code 43-05-01-12 --

MR. BENDER: Let me -- let me correct you. That's the Administrative Code.

MS. DOUGLAS: Thank you for that correction.

Q. (MR. BRAATEN CONTINUING) 43-05-01, and what was the next one?

A. 12. Dash 12.

Q. Okay.

A. Okay. This contains the -- the regulation language regarding any changes to the storage facility area on that reevaluation. If it was deemed that the $CO_2$ would potentially go outside the boundaries and Summit determined they needed to expand the area, they would need to go through the modification process.

Q. And the result being potentially an adjustment to the boundaries of the storage facility?

A. That would require a major modification which I believe requires an additional hearing at that point if they needed to modify the permitted boundaries.

Q. But if the data indicated that the storage facility boundary had not been modeled in a way that was accurately reflecting the conditions in the last five years, that is a potential result of the five-year review, that you redraw the storage facility boundary; right?

A. Potentially.

Q. And if you did that, what do you do about all the payments you've made to the landowners so

far?

A. I can't speak to that.

Q. Is there any process you're aware of that would address that?

A. Again, I believe it would be addressed in that major modification proceedance, which would be a hearing just like the one we're in today.

Q. Were there any communications about using the 2.5 multiplier between EERC and the Industrial Commission?

A. I can't recall specifically. Potentially in their review of initial permit drafts submitted, it could have been discussed.

Q. If you had used 2.7 for the factor instead of 2.5, how many more acres of property would have been included in the storage facility?

A. I can't speak to that. We did not run that case.

Q. Okay. Do you have any sense of what that might be?

A. I do not because simulations are a complex, multi-physics approach, and so adjusting the permeability is not a straight ratio to plume size.

Q. Would you agree that it would result in

some additional acreage?

A. Yes, I believe I stated that.

Q. Just a couple minutes ago you made a reference to sensitivity analysis. Do you recall that?

A. Yes.

Q. What do you mean by "sensitivity analysis"?

A. So the EERC performs sensitivity analysis. Some of that is discussed in -- in the permit as well. We looked at parameters that affectively -- or could affect simulation results. In addition to that, to the sensitivity analysis, we also did uncertainty analysis to look at how various properties and distribution of properties, such as permeability, could potentially impact the -- the model and the simulation results.

Q. And that's essentially doing quality control to test the predictive utility of your model?

A. I wouldn't classify it as testing the utility of our model. We did those things to determine what parameters we thought were appropriate and justifiable for use in the model.

Q. Could you do that assessment of the

parameters chosen without running sensitivity analysis on the model?

A. Could you repeat that?

Q. Could you assess the propriety of the parameters used in the model without running any sensitivity analysis on it? Let me ask a different question.

What properties did you run sensitivity analysis on?

A. Sensitivity analysis, you said?

Q. Yep.

A. So we ran sensitivity analysis on injection rates, bottomhole pressure conditions, wellhead temperatures, wellhead pressures.

Q. For what purpose?

A. So on page 3-15, we have a paragraph talking about sensitivity analysis.

Q. And you indicate that because of the availability of data in the form of well logs, core sample data and rock fluid properties, the need for typical sensitivity studies of influential reservoir parameters has been reduced. Has it been eliminated?

A. No, which is why we ran a sensitivity analysis.

Q. What's the difference between the sensitivity analysis you ran and what you would refer to here as typical sensitivity studies?

A. Typical sensitivity studies would vary more parameters potentially. So we felt confident in site-specific data to define limits of certain variables so we didn't need to test those.

Q. Up until you ran the injection test?

A. I -- I don't understand the question.

Q. Well, what were the parameters you were comfortable with that you didn't need to run sensitivity analysis on?

A. Things like model size, grid cell size, boundary conditions. We ran certainty cases on property distribution. We didn't necessarily run sensitivity cases on property distribution.

Q. Would you have been confident using your model to develop this application for Summit with running zero sensitivity analysis?

A. I think it points back to your questions earlier where you asked about what is the intent of running these models to define the storage facility area in an area of review taking into consideration the required five-year reevaluation, the amount of $CO_2$ that would be injected in -- in that time. I

believe running a model without sensitivity analysis would -- would still provide enough insight to be able to safely inject for those -- at least those five years until the reevaluation time period.

Q. So you're comfortable with a larger margin of error in the first five years?

A. Given the amount of $CO_2$ that will be injected, the proposed $CO_2$ plume size, other variables such as the area of review evaluation that looked at proximity of legacy wellbores and things like that, given the testing and monitoring plan, yes.

Q. Because ultimately what we're talking about here are pressures and the extent of the plume, and given what's going to be injected in the first five years, you don't have those same safety concerns in those first five years; would that be fair?

A. Could you restate that?

Q. You're comfortable with a greater margin of error in the first five years; right?

A. Given the amount of $CO_2$ that would be injected, that's -- that's correct, because we're -- the model as a whole was used to define a

boundary which is for 20 years of injection plus a period of postinjection plus a buffer. So within that five years, we're talking about a much smaller area.

Q. And if it's not exact, it's not going to be problematic because you're not going to have injected enough to get out to that boundary by that time anyway?

A. That's my belief. Correct.

Q. Except that you're treating all of the landowners inside that boundary exactly the same with the first ton that goes down that well and everyone on the outside of that line exactly the same, meaning they get nothing; right?

MR. BENDER: If -- if you understand how the allocation formula works for paying royalties, you can answer the question, but if you don't, I would not -- I would not answer it if I were you.

MS. DOUGLAS: Could you restate your question?

MR. BRAATEN: I can't even remember. May I have you read it back, please?

(Record read as requested.)

Q. (MR. BRAATEN CONTINUING) With respect to compensation.

A. I guess I don't understand your question. If the $CO_2$'s still in the boundaries, you're in compliance with your permit and you're compensating those within the boundary.

Q. Regardless of where that $CO_2$ is actually?

A. I guess to Mr. Bender's point, I'm not comfortable talking on the compensation rates for landowners or how that's going to be distributed across owners within the area.

Q. And so to the extent you ran sensitivity analysis on the model and to the extent you're comfortable with the predictive utility of the model in the ways that you used it for this application, it was never a consideration to you how that would affect how landowners get compensated?

A. This modeling and simulation was done to define the boundaries. Summit made decisions related to compensation of pore space owners.

HEARING EXAMINER GARNER: Why don't we take a ten-minute break.

(Recessed at 10:00 a.m. and reconvened at 10:12 a.m.)

HEARING EXAMINER GARNER: We are back on the record. Mr. Braaten, you can resume your

questioning.

Q. (MR. BRAATEN CONTINUING) You had mentioned that the Industrial Commission had previously accepted the use of a 2.5 factor. Was that for the Project Tundra project?

A. For those permits, correct.

Q. And was the EERC similarly involved with developing those applications?

A. We were involved, but they had -- we were involved.

Q. Did someone from EERC make that determination in the prior case? That was a bad question. Let me ask it again.

Did someone from EERC make the determination to use the 2.5 permeability adjustment factor in the prior proceedings related to Project Tundra in which EERC was involved?

A. I can say we participated in those discussions. I can't provide more details on who made the determination and the parties involved as that project is -- is still actively being conducted and is governed by an NDA with Minnkota.

Q. If you were going to assess someone else's work developing the same models that EERC developed for Summit's application, how would you go about

assessing those models that were developed by others?

MR. BENDER: Do you understand what he's talking about when he says "assess"?

MS. DOUGLAS: I was just going to ask, assessing for what purposes?

Q. (MR. BRAATEN CONTINUING) If you were asked to determine if the inputs and parameters and ways in which the models were set up and run would be acceptable to you in your professional experience such that they would support an application for Class VI wells.

A. The EERC's been contracted in this capacity before, so I'm speaking from direct experience here. Typically, that review process would come in the form of presentations about inputs and assumptions used in the model by those that created the model. We would evaluate their inputs and assumptions for reasonability and if they're justifiable based on the data sets that they had available to them, and we'd take into considerations Class VI requirements related to compliance. But EERC has not in these roles -- where we've been contracted to perform this work before, we have not reviewed people's models or

rerun their simulations to -- to double-check things in that manner. We've reviewed their inputs and assumptions through presentations, reviews of reports, that type of thing.

Q. Presentations by whom?

A. As I mentioned, those that generated the models presented to us their inputs and assumptions. A lot of the information that would have been in those presentations is captured -- for our models that information is similarly captured in the storage facility permits.

Q. Did you run the model at a 2.7 adjustment factor for permeability?

A. I just previously mentioned earlier today that we did not.

Q. Why not?

A. We didn't feel it was necessary. We made a decision to run it with 2.5 and so we ran it with 2.5.

Q. Would it have cost you anything to run it at 2.7?

A. Yes, it would have cost us time, so --

Q. How much time?

A. -- hours, and it would have cost us time running it with the model license. So we only

have -- we pay for a model license for a month. Running the model would tie up that license for a week or so.

Q. Because that's how long it takes to run the model?

A. A model this size typically could be anywhere from two days to a week of run time, depending on if any errors are encountered and you have to restart the model.

Q. Meaning that if you had to restart the model, it could take up to a week?

A. Potentially.

Q. Could it take longer than a week?

A. Potentially, if there are model errors which can't be necessarily predicted when the simulator is going to experience a numerical error and give an error file.

Q. But you think an engineer could replicate it in four weeks?

A. You asked me how much time it would take to -- to build a model and I said four weeks to build the model. That's different than running the simulations.

Q. Okay. So several weeks to replicate the model and then at least another week to run it?

A. Correct.

Q. So it's your testimony that another engineer could both replicate and run that model in five weeks?

A. If the model they built ran and didn't experience any numerical errors that they would have to troubleshoot.

Q. Have you ever set up and run a model that didn't have any numerical errors that had to be troubleshooted?

A. Myself personally, no.

Q. There's a binder directly in front of you there with a number of tabbed exhibits. If you don't mind, can I have you open it to landowner -- or LO-63.

A. I'm there.

Q. Are there features on this map that you recognize from the shapefiles submitted by Summit to the DMR?

A. These appear to be the storage facility boundaries and the AOR for the three permits.

Q. Are you also familiar with the maps that were produced to indicate the 5-, 10- and 20-year pressure increases in the area of the injectors?

A. Yes, I'm familiar with those.

Q. And does it appear that one of those is also overlaid on this exhibit?

A. It does appear that way, but it's difficult to see given the color scale for that layer.

Q. You are familiar with the maps that were generated to indicate the areal extent of the pressure increases in the reservoir that were in the application; right?

A. I am.

Q. And so you'd agree that there will be increases in the pressure in the formation well outside the boundaries of the storage facility?

A. Yes. If we may, I'd like to speak off page 4-2 of the permit.

Q. Okay.

A. Figure 4-1.

Q. And just for the record, the permit being referenced is Exhibit 1A?

A. Correct. So this map is showing the predicted maximum subsurface pressure due to injection from the three sites. So this is at 20 years is where -- of injection is where we see the maximum. And as you can see, the pressure increase extends beyond the proposed facility

boundaries in the area of review.

Q. What variable of Darcy's law limits the amount and rate at which you can inject $CO_2$?

A. I don't think I could speak to that without the equation in front of me.

Q. What limits your ability to inject $CO_2$ into these Class VI wells? Let me ask that again.

What limits the rate and amount of $CO_2$ that you can inject into that reservoir through these Class VI wells?

A. So the bottomhole pressure constraint is the -- the regulatory constraint that dictates the amount of $CO_2$ that can be injected into these wells. So that bottomhole pressure constraint is derived as 90 percent of the fracture pressure gradient. So bottomhole pressure is the regulatory constraint for the Class VI.

Q. And the bottomhole pressure is obviously directly impacted by existing pressures in the formation; right?

A. That's correct.

Q. Are you familiar with the intervention by Minnkota in this proceeding?

A. Generally.

Q. Are you familiar with where the well is

that they had concerns about?

A. Yes.

Q. Is Summit's project going to affect the ultimate bottomhole pressure that limits Minnkota's project?

A. There will be pressure interference.

Q. Can I have you go back to Exhibit LO-63?

A. I'm there.

Q. Do you see in the legend there there's a number of different colors, and I'll agree with you the color scale's a bit off, but down near the bottom next to Swenson there's a white color. Do you see that?

A. Yep.

Q. Do you see the land that sits right in between the areas of review of the three different storage facilities?

A. Yes.

Q. Is there going to be pressure interference with Mr. Swenson's lands and pore space?

A. Define "pressure interference with."

Q. From the Class VI injectors that Summit is going to inject $CO_2$ into.

A. There will be a pressure increase in the reservoir due to injection. The map does show the

pressure increase will be in the pore space below that land.

Q. Which would similarly limit the ability to inject into the pore space in that part of the reservoir based on limits to bottomhole pressure that are being affected by that pressure interference by Summit's Class VI wells?

A. Yes, potentially.

Q. How much is Summit compensating for that?

A. They're not required to compensate based on North Dakota Class VI laws. They're required to compensate for use of pore space for $CO_2$ storage. Injection will cause pressure increase.

Q. Which reduces the availability of pore space for storage of substances?

A. No. The pore space is still there. It's not taking the pore space away.

Q. It reduces the availability of the pore space for the storage of substances?

A. I don't agree with that characterization.

Q. Why not?

A. An operator could come in and still develop that and store $CO_2$ in that pore space.

Q. Subject to a bottomhole pressure limitation that has been significantly impacted by

the three Class VI wells surrounding him; right?

A. For the amount. Bottomhole pressure might impact potential injection rates, not necessarily the volumes that could be stored there. So one thing to note that while injection operations will increase pressure, when injection stops or if injection rates are limited, after injection stops pressure will die off in the reservoir, and we have a map that demonstrates that.

During operations, you know, if Summit's injecting at a lower rate, there will be a lower pressure increase. It could also, you know, shut in wells which would result -- or decrease -- which would result in additional pressure decreasing there. The pressure increase is temporary, but a developer could come in and still inject $CO_2$ there.

Q. And you show equilibrium of pressures ten years after operations; right?

A. The permit has a map that demonstrates this pressure decrease. It doesn't represent pressure equilibrium.

Q. What would you project that to be in time from the end of operations?

A. We did not simulate that.

Q. Would you expect it to be more than

20 years?

A. We'd have to simulate that.

Q. Significant pressure interference for at least 30 years of Mr. Swenson's pore space caused by the Summit project?

A. Again, it would limit injection rates. It wouldn't limit the total volumes that could be stored on his land. So to answer your question, there would be a pressure increase of approximately 500 psi up to a thousand psi increase over the current pressure of the Broom Creek today for up to 30 years.

Q. What's the economic incentive for injecting $CO_2$ into the pore space?

A. Can you clarify that question?

Q. Is Summit being paid in the form of tax credits by the federal government to inject $CO_2$ in the pore space?

A. I believe Wade testified yesterday as to the -- the economic drivers behind their project. I can't answer questions on that.

Q. Will the 45Q credits be in place in the same form and amount 30 years from now?

MR. BENDER: Objection. Calls for speculation.

HEARING EXAMINER GARNER: Overruled.

MS. DOUGLAS: As written today?

Q. (MR. BRAATEN CONTINUING) Correct.

A. No. But as I mentioned, while Summit's operating, there's nothing that would preclude an operator from coming in and injecting to store $CO_2$. The same amount of pore space would still exist. They would just have to inject at lower injection rates, but they could still get the same amount of $CO_2$ in that pore space over time.

Q. How much longer amount of time?

A. We have not run that model.

MR. BRAATEN: Real quick, I apologize, on the prior exhibit, LO-83, I did not move to admit, and I would move to admit LO-83.

MR. BENDER: Did you say 83 or 63?

MR. BRAATEN: 83.

MR. BENDER: Oh, that one. I'm sorry.

MR. BRAATEN: I'm skipping back.

HEARING EXAMINER GARNER: Any objections?

MR. BENDER: No objection.

HEARING EXAMINER GARNER: The exhibit is admitted.

Q. (MR. BRAATEN CONTINUING) You talked yesterday briefly about the area of review and

corrective action. Did you look at the old wells that have been P and A'd around the area of the storage facilities?

A. (BY MS. OLSEN) We did.

Q. What did you look at in those wells?

A. Particular to this permit, there are no legacy wells in this area.

Q. Within the area of review?

A. Within the area of review for the TB Leingang, that's correct.

Q. Did you look at the legacy wells that are closest but not within your area of review?

A. We did not evaluate wells outside of the area of review.

Q. Okay. Are you aware of the Fritz-Lutz 1 well?

A. I don't believe that was in the area of review.

Q. Are you aware of where it is in relation to the area of review?

A. Which area of review?

Q. Any of them.

A. Not at this moment.

Q. And are you familiar with the Richter 1 well?

A. I recall the Richter 1 well.

Q. Did you assess that well in any way as part of your work on the Summit project?

A. No. Class VI rules only require evaluation of wells within the area of review.

Q. Can I have you turn to Figure 4-1, the pressure map we were taking a look at a moment ago.

A. (BY MS. DOUGLAS) We're there.

Q. Are the dots on this pressure map indicative of wells?

A. Yes.

Q. Are you generally familiar with the two wells I mentioned being to the southwest of the storage facility represented on this map? Sorry. I don't know who I'm talking to. Either of you who knows.

A. Not based on the current map. They're not labeled or have well names, so I can't identify them based on this map.

Q. And just based on your familiarity with your location, does it appear that the -- let me ask a different question.

Based on your familiarity with the Richter 1 well, is it your understanding that that well is generally to the south or southwest of the storage

facilities?

A. (BY MS. OLSEN) I don't recall that information, but if you say it is.

Q. So if we look directly south from the SCS1 injection wells that is indicated on the map with the green triangle, if you go south of that until you're outside of the area of review and storage facility boundaries, almost directly south in blue there is a dot and it is a dot directly south of the green triangle and within the area that I believe is indicated as a 400 psi pressure differential. Do you see where I'm pointing at that?

A. I do.

Q. Does that well have surface casing below the depth of the uppermost freshwater aquifer or U.S. drinking water aquifer?

A. I don't have that information in front of me.

Q. Have you assessed the integrity of the plugs on that well?

A. For this permit, only wells within the area of review are required to be assessed.

Q. I understand. But as a factual matter regardless of a requirement, did you assess the

integrity of the plugs on that well?

A. I did not.

Q. And did EERC assess that?

A. I don't recall.

Q. Do you know if Summit assessed that?

A. I don't know.

Q. You'd agree that the reservoir pressures in the area of that well are going to increase by 400 psi based on your modeling as indicated on this map at Figure 4-1?

A. That's correct.

Q. Did you run an MIT on the well?

A. We did not. I assume the well is plugged.

Q. When was it plugged?

A. I don't know. Most of the wells in this area are vintage and drilled in the '70s. That's my assumption.

Q. Or even earlier?

A. Sure.

Q. Some of them plugged before the 1950s even?

A. Perhaps.

Q. So plug job that's 70 years old now?

A. Seven years?

Q. 70.

A. Perhaps.

Q. And it was plugged before we had the oil and gas conservation laws on the books in North Dakota we have now?

A. Plugging rules were different, yep.

Q. How much time and expense would be required to pressure up an MIT and run it at 400 psi on that well?

A. (BY MS. DOUGLAS) That -- that well's abandoned and so it's -- it's not accessible at the surface. You'd have to redrill out the plugs and recomplete it to get any information out of it.

Q. Was there an assessment of whether that might need to be replugged?

A. No. Again, Caitlin's testified and stated here a couple times we're only required to evaluate the wells in our AOR.

I would like to say -- point out, we did look at potential leakage or ribbing of leakage in that well. So if I could direct you to page 3-41 to map -- to the map in Figure 3-2. So we modeled a case here assuming hypothetical leakage pathways, again, hypothetical leakage pathways, meaning that there's a leakage pathway through plugs for this model. If there was a leakage pathway due to the

pressure increase -- maximum pressure increase from injection, we're estimating over the life of the project only .005 meters cubed of formation fluid could leak up through that well, again assuming it's leaking, into overlying formations.

So, again, we have not evaluated that particular well. It's outside of our AOR. We don't believe that there is endangerment of USDWs due to leakage.

Q. But if the plugs were bad, your modeling indicates that fluids from the formation would travel up that well in some amount to the freshwater drinking aquifer that is not protected by a surface casing?

A. The Broom Creek as it sits today is overpressurized. If those plugs were bad because the Broom Creek is overpressurized, fluids would already be flowing.

Q. How much psi would it take to bust those plugs?

A. I don't have that calculation.

Q. So you don't know if the pressure formation would cause those plugs to burst right now?

A. (BY MS. OLSEN) Class G cement is

typically rated to 5,000 psi.

Q. Is that what they used in 1945?

A. I'd have to look at the plugging records to look at that specific well.

Q. Do they have plugging records?

A. I don't know.

Q. Do you have any familiarity with how wells were plugged in North Dakota in the 1940s?

A. Generally, yes.

Q. Based on what?

A. My experience working for the Department of Mineral Resources.

Q. If you put a Class VI injector on the Swenson land and ran it at the same rates and volumes that Summit is going to run its wells, would that have any impact on Summit's project?

A. (BY MS. DOUGLAS) Yes, potentially.

Q. Do you think Mr. Swenson could get a Class II disposal well into the Broom Creek Formation permitted on his land in between the three Class VI injectors?

A. So my understanding is that the -- the Commission -- and I might not be using the proper terms -- but if they grant this permit, they will define this as a field, and so my understanding is

Mr. Swenson could permit the Class II or a Class VI well on his land. He would have to work with the Commission and make sure that he abides by any Commission orders related to those field rights.

Q. Given your knowledge of the technical feasibility of that, do you think the Commission's going to grant that permit?

A. I think development of any subsurface resources in the state require the cooperation of many entities, including landowners and project developers.

Q. How is Summit cooperating with Mr. Swenson to allow him to develop his pore space subject to the pressure increases caused by Summit's Class VI wells?

A. Is Mr. Swenson actively trying to develop those?

Q. Do you have the answer to my question?

A. I don't have any knowledge of Mr. Swenson actively trying to develop those.

Q. And so if Summit is preventing him from developing those, what does it matter if he's actively trying to develop them right now or not?

A. Could you clarify how Summit's --

Q. Why are you saying it's significant or

relevant whether or not Mr. Swenson is actively trying to develop a Class II well?

A. Your question you asked me, I believe -- and it can be repeated back here, but I believe you asked why is Summit preventing Mr. Swenson from developing his pore space.

Q. Okay. Well, if I asked that, I apologize. My intended question is has Summit worked with Mr. Swenson or reached out or talked to him about how their operations are going to affect his ability to use his pore space?

A. I was not privy to the discussions between Summit and Mr. Swenson.

Q. Would you agree there's going to be about a 900 psi pressure increase in the pore space in the reservoir under Mr. Swenson's land?

A. Approximately, yes.

Q. Is the max bottomhole pressure about 3,000, 3,500? What's the max bottomhole pressure on the BK Fischer?

A. It's on the range of, yeah, 3,600 psi to 3,800 psi, depending on what site-specific data --

Q. So you're going to increase the pressure in his pore space by approximately 25 percent of the max bottomhole pressure?

A. I've not done the specific calculations, but if you're saying that's what it is --

Q. Is 900 approximately one-fourth of 3600?

A. Yep.

Q. There was testimony yesterday about the delineation of the $CO_2$ plume boundary, and I believe the testimony was that it was determined to be at a 5 percent concentration of $CO_2$ in the aquifer as the edge of the $CO_2$ plume; is that right?

A. That's correct.

Q. And can you tell me again why 5 percent?

A. Yes. So there's several studies out there that suggest that 5 percent is the detection limit for monitoring techniques, particularly 3D seismic.

Q. Would it be fair and accurate to say that at the bottom of the injector, bottomhole, you've got about a hundred percent $CO_2$ in the formation, would that be fair, during injections?

A. Right -- right at the injection well?

Q. Right. I'm just saying if you start aground like right at -- where you're injecting, we can make an assumption that the $CO_2$ is a hundred percent of the fluid right there; right? Within one inch of the bottom of the well -- actually, let me ask you something. Are they perforating the

well?

A. They will be perforating the well.

Q. Okay.

A. Or -- yes, they will be perforating the well.

Q. Is there going to be a lateral?

A. No.

Q. Okay. So within the wellbore we're at a hundred percent $CO_2$?

A. Correct.

Q. And you're indicating the edge of the plume is 5 percent $CO_2$?

A. Correct.

Q. Does the concentration of $CO_2$ become more diluted in a linear manner as you move away from the wellbore?

A. No, not necessarily. I'd like to point you to page 3-25 and 3-26.

Q. Okay.

A. So these are showing cross-sections through the simulated plume. These are representing the gas saturation in the model cells. So saturation of $CO_2$ is also dictated by the porosity and permeability of the rock, so you'll note -- so, again, this has the 5 percent

saturation cutoff. You'll note along the wellbore you see an area of white, so this is on Figure 3-15a. Even at the wellbore saturation is below 5 percent due to the porosity and permeability in that model layer.

So it's -- it's dependent on porosity and permeability and how the $CO_2$ would flow in the formation.

And just a point of clarification, saturation will never be a hundred percent. $CO_2$ injection can never move all of the formation fluid out of -- out of the rock.

Q. Okay. Thank you. If we held constant permeability and porosity, would the $CO_2$ become more diluted in a linear or logarithmic function as you move away from the wellbore?

A. Not directly linear or logarithmic, but generally it would. At the edges of the plume is where you see more mixing of $CO_2$ with -- with brine.

Q. So, generally speaking, if we were to plot the reduction in $CO_2$ concentration on a linear scale out to 1 percent, and let's pretend we can measure, would the area of that line representing 6 percent to 1 percent be much longer than the rest of the line?

A. Based on the volumes being simulated here, no, it would be much, much smaller because you'd have a larger area with higher saturation.

Q. Would the area over which the saturation changes from 10 percent to 0 percent be significantly longer than the area over which it changes from 20 percent to 10 percent?

A. I can't really make an educated guess on that --

Q. What would you expect?

A. -- at this time.

Q. Would you expect that area from 10 to 0 percent to take longer or be longer than the area from 10 to -- or 20 to 10 percent based on what you know about how it dilutes as it moves away from the wellbore as an engineer?

A. Again, I don't think I could -- could speak on that.

Q. Okay. And the 5 percent, again, though, was chosen because that's essentially the detection limit and that's the lowest limit you can detect with running the models? Sorry. Let me start over.

The 5 percent is used because that is the detection limit from the seismic?

A. Correct. Based on published studies --

Q. Okay.

A. -- from other carbon capture and storage sites that are in operation.

Q. But you agree that's not actually the border or the edge of where the actual $CO_2$ being injected is traveling to?

A. As discussed, it's the boundary we can detect.

Q. How?

A. With seismic.

Q. But only to a 5 percent concentration of $CO_2$; right?

A. Yep.

Q. So we know that there is $CO_2$ outside of that boundary if that boundary is set at 5 percent. It sure doesn't go from 5 percent to 0 within a millimeter; right?

A. There's the potential for $CO_2$ to be --

Q. It's not just potential. Just as a matter of physics, there's obviously $CO_2$ outside of that boundary; right?

A. Yeah.

Q. Is there a plan to put two different wellbores in at each injector site?

A. That's my understanding.
Q. Is the intent to do any kind of directional drilling with the wellbores?
A. I believe so, but I can defer questions of that to a witness who can answer in more detail.
Q. Okay. Did someone generate a PHI-H map for the reservoir in the area -- areas of review?
A. I don't believe one was provided in the permit and I'm not sure if one was produced.
Q. Would the -- would EERC have produced the PHI-H map if one was produced?
A. Yes.
Q. Can I have you look at Figure 3-1?
A. I'm there.
Q. It says the distributed PHIE property along a roughly west-east cross-section. It seems obvious, but I want to make sure I understand. The little callout in the upper left with the red line, does that indicate the cross-section?
A. That does. The red line's the path of the cross-section.
Q. Okay. Do you see the vertical line for the Archie Erickson 2?
A. I do.
Q. And do you see just to the left of that

there's a couple areas with some fairly significant pockets of red, I'll call them?

A. Yep.

Q. And then if we look over at the Milton Flemmer, just to the right of that there's an area that is mostly blue and green with just a little yellow. Do you see where that is?

A. I do.

Q. If we took a hundred-foot diameter core in that area with the red splotches just to the left of the Archie Erickson and then we took a hundred-foot diameter core in that area with the blue and green just to the right of the Milton Flemmer, would one of those cores contain more available pore space for the storage of substances than the other?

A. Yes. If we're -- we're -- in a hypothetical case if we're assuming that this model is a hundred percent accurate and represents the rocks there, where you have higher porosity, you're going to have more pore space just mathematically.

Q. And there's also a difference -- if we did that same exercise, there's also a difference in the amount of pore space available for storage based on the vertical extent of the formation;

right?

A. You're saying based on the thickness?

Q. Correct.

A. Yes. That would be a factor in that calculation -- sorry. That would be a factor of the calculation, would be height, if you're calculating volume.

Q. And would a PHI-H map show us geographically what the various values were, taking into account the porosity as well as the thickness?

A. It would for the realization of the model in the permit. One thing to understand, while we use site-specific data as controls, we used variograms and other means to distribute properties to the best of our ability. It doesn't mean that the model will be a hundred percent accurate, which is why we have that five-year reevaluation period in case our model -- or the actual subsurface geology is slightly different than our model, so that we can account for those differences in how bottomhole pressure is responding to injection as well as how the $CO_2$ plume is migrating in the reservoir.

Q. But if we look at Figure 3-1 in that area of red just to the left of the Archie Erickson,

you're not saying that the model just randomly allocated an area of higher porosity to that specific location based on, you know, a factor of variability. It's doing that because it is predicting that that actually has more porosity there in that specific location; right?

A. It's being informed by control points, but we did uncertainty analysis looking at a hundred different cases for property distribution -- sorry, not a hundred -- a thousand different cases for property distribution. We chose the one P50 case which we feel is the most likely.

Q. And you couldn't have done that unless you were able to do sensitivity analysis?

A. Uncertainty analysis.

Q. Sorry.

A. But, yes, that's correct. Those are the steps we performed to determine which model we had the highest confidency in being the most probable case.

Q. And it's important to do that; right?

A. When you're the operator looking to define the boundaries of your storage facility area, it's important as you will be obligated to operate and $CO_2$ must stay within those bounds.

Q. What if you're the landowner with pore space on the outside of that boundary, is it important for them?

A. I don't understand what context it would be important for them. The operator's required to keep $CO_2$ within their boundaries. If $CO_2$ is going to go outside their boundaries, they're in noncompliance with their permit. If they have to adjust their boundaries, they are going to have to amalgamate or acquire that additional pore space outside, go through this major modification and hearing process to get that approved.

Q. With respect to the compensation being paid to the landowners whose property is being used by Summit, is there any consideration given to the actual porosity or actual thickness of their pore space?

A. I believe Summit chose to treat all landowners within the storage facility area equally, meaning that the compensation is based by a total amount of $CO_2$ injected and they're given the proportional payment for the amount of land they have within the storage facility area. They did not use a volumetric approach. So in a volumetric approach landowners would be paid for the actual

amount of $CO_2$. Why that's not done is it -- it would -- it would benefit the landowners directly around the injection well, so Summit chose to treat all landowners within the storage facility area equally instead of --

Q. Accurately?

A. I don't agree with that classification.

Q. Well, they're not paying the landowners based on the amount of $CO_2$ being stored in their pore space; right?

A. Summit's paying for the use of the pore space, so they are leasing the pore space.

Q. Are they leasing the pore space from my clients?

A. My understanding is that your clients are outside of the storage facility area boundary, so their pore space is not being leased for storage of $CO_2$.

Q. Can I have you flip back to Landowner 63.

A. I'm there.

Q. If you see the different colors next to the names and you look at the map, there are blocks of colors both within and without the storage areas, areas of review and outside of those boundaries?

A. Yep.

Q. I apologize. Bear with me one moment. I think I may be done.

Is there a place in the permit application where thickness or porosity is broken down by landowner or tract?

A. No.

Q. Okay. Whether it's in the application or not, was that ever done or attempted by EERC, to your knowledge?

A. No.

Q. How does it affect the accuracy of your 3D seismic if you are not doing it on certain tracts?

A. It has the potential to reduce the resolution and quality of the seismic data.

Q. And does it reduce the resolution and quality just for that area specifically or does that lack of seismic in that area impact the quality of the other data?

A. So the quality of the seismic data is dependent on the fold as well as the source receiver offsets, so it's dependent -- the quality of the image is dependent on the fold within each area. Fold is lower when you aren't allowed to have source and receivers in a specific tract.

However, if you have sufficient source receiver offset, the quality of data will be lesser for shallower formations, but you would -- depending on the side of the land where you don't have source and receivers, you may still have source -- sufficient source and receiver offset to produce high-quality images with a seismic of the deeper formations.

Again, that's going to be dependent on the depth of the reservoir, the source receiver offset and the area where receivers and source weren't allowed to be placed or operated.

MR. BRAATEN: I don't have any further questions.

HEARING EXAMINER GARNER: Any questions from the staff?

**EXAMINATION**

**BY MS. MADCHE:**

Q. I have some questions. I would like to start out with some of the questions that were deferred to this group from earlier. Let's see here.

So you had given testimony on the location of coal reserves and coal leases within the three storage facility permits. Would you be able to

answer approximately how close mining activity currently is from proposed equipment, aboveground infrastructure for the three facilities? So to repeat, for each three storage facility permits, what's the proximity to current mining activity to date from the aboveground surface infrastructure? And if you need to defer that, that's fine. Just let me know.

A. (BY MS. DOUGLAS) All right. I'm going to point you to the Exhibit 2.

MR. BENDER: It's 1B.

MS. DOUGLAS: 1B. Exhibit 1B, page 280. This is the Archie Erickson/BK Fischer permit.

Q. (MS. MADCHE CONTINUING) Yep.

A. Figure 2-50. So these reflect the closest mining operations from the Coyote Creek and Beulah Mine which are the closest mining operations to any of the three storage facility areas. And you can see on this map green shows future mining activities and brown shows mined out -- or areas where mining has already taken place. And you can see the approximate distance from those to the proposed injection sites as well as the flowlines. So here the scale we're looking at, I believe those are townships. So it's approximately three to

four miles, the surface facilities are, from the future mining activities.

Q. And just to confirm, yesterday in your testimony you had stated that there were no active coal leases where surface infrastructure was planned for the three facilities; correct?

A. Correct.

Q. So earlier I had asked a question on why the Milton Flemmer 1 was used as the type log in Article 1.15 for all three storage agreements. Could you elaborate as to why?

A. I can. So the Milton Flemmer well penetrates the entire thickness of the Amsden, so it was used as the type log so that we could accurately represent the depth to the top and the bottom of the Amsden and the thickness. The other two stratigraphic test wells drilled for the other storage facility areas do not penetrate the entire Amsden. That is why the Milton Flemmer 1 well was used as the type log for all three storage facilities.

Q. When it comes to the royalty payments, would you agree that due to the lack of history matching data that we have that there would be more uncertainties to allocating via volumetric versus

the tract participation as Summit has chosen to go forward with?

A. I would agree with that. I'd also add that there are limitations for using monitoring methods to quantify the amount of $CO_2$ in a given area in the subsurface. Monitoring methods such as 3D seismic and time lapse changes that can be captured in 3D seismic are susceptible to both changes in pressure and changes in fluid saturation, so you would not be able to accurately separate out effects of pressure from $CO_2$ saturation in order to assure you're compensating landowners using a volumetric approach.

Q. So now I'm going to move forward to questions that I have from Section 2 on the geologic exhibits. For the storage facility permit for the TB Leingang, what was the maximum pressure applied during the microfracture testing in the Milton Flemmer 1 well within the Spearfish/Opeche Formation?

A. I'll defer that question to a later witness who was involved in those tests.

Q. Would you be able to state who it's being deferred to specifically?

A. Ms. Jean Oddy.

Q. Okay. As it pertains to all three of the storage facility permits and to their stratigraphic test wells, can you explain how you determined which sand package within the Broom Creek you target for your microfracture in situ stress test to determine the fracture propagation pressure gradient?

A. I'll also have to defer that to Ms. Oddy.

Q. Okay. For all three of the applications and the three stratigraphic test wells, was the next dissipation zone above the injection zone, so your Inyan Kara, sampled at all three facilities?

A. I believe so, yes.

Q. And did those samples show evidence that the formations are currently hydraulically separated?

A. That's our interpretation of the data, yes.

Q. And in all three storage facility permits, has any Fox Hills wells been sampled?

A. (BY MS. OLSEN) There's historical groundwater sampling data in Appendix B throughout each of the three permits. Plans to test those wells in the baseline sampling plan are described in Section 5 and will be testified to later.

Q. So just to confirm, you reviewed any data that already existed which would be in Appendix B, but no baseline sampling has started in the Fox Hills?

A. That's correct.

Q. Core plugs taken from the base of the upper confining zone in the Milton Flemmer 1 well had a fairly high anhydrite weight percentage, around 86 to 98 percent. Similar in the Archie Erickson, there was around 95 and a half percent shown. Did geochemical modeling indicate that it was likely that the boundary between the two formations would dissolve due to that percentage of anhydrite?

A. (BY MS. DOUGLAS) Geochemical modeling done for the upper confining zone showed little to no dissolution of anhydrite due to geochemical reactions with the modeled $CO_2$.

Q. And would that apply for both the TB Leingang and the BK Fischer?

A. That's correct.

Q. So I'm going to ask some questions related to the formation imaging logs. Would you be the correct witness to answer for all three storage facility permit applications? I only ask because

it was discussed that you were going to have another witness at the end that would talk about differences between the three facilities, or are you good with answering them?

A. We're good with answering the questions to all three.

Q. Okay. So in the Milton Flemmer 1 well, both in the formation imaging logs and within the thin sections specifically where high anhydrite content existed, there were a handful of fractures that were shown. Can you please explain why these fractures don't pose a risk to the storage facility?

A. You said for the upper confining zone?

Q. Yes.

A. Could you point to specifically what depth interval?

Q. So in figure 2-33 and into 2-34 in the TB Leingang application, it shows that there are a handful of resistive litho-bound fractures present in the Opeche/Spearfish interval. Why are these fractures not a concern as far as containment?

A. They're not a concern for containment because they're commonly filled. In the case of the resistive bound fractures, they're commonly

filled with anhydrite.

Q. So they wouldn't have transmissibility to have $CO_2$ move through them?

A. Correct. They wouldn't have transmissibility in the sense of they wouldn't have sufficient permeability.

Q. So now in the BK Fischer application, similarly in the Archie Erickson 2 well, the investigation also found fractures, including one minor fault. I would have the same questions for that one. I'll let you get to the -- the figure here. So Figure 2-30 (c) specifically would show some of the fractures and the minor fault that was found within the Opeche/Spearfish interval.

A. For this well the fractures were also commonly filled either with anhydrite or clay. In the case of the minor fault, it -- it appears to be isolated. It doesn't appear to transect a sufficient vertical extent to -- to serve as a fluid migration pathway or to be transmissible. Meaning it's a minor fault and it doesn't cut through the entirety of the upper confining zone.

Q. And similarly in the last application, in the Slash Lazy H 5 well there were fractures found and a minor fault in the Amsden Formation.

A. Again, the minor fault -- or the fractures are commonly filled, in this case commonly with anhydrite. Similarly, given the geometry of this minor fault, it appears to be isolated and does not have properties to -- for it to serve as a fluid migration pathway.

Q. So I want to go back to the BK Fischer application. In the 3D seismic survey that was done across these three storage facilities, was the Stanton fault that was suspected to run through the northwest corner of the BK Fischer storage facility area found in the 3D seismic?

A. No. The proposed location of the Stanton fault is on the edge of the 3D seismic survey. We saw no indication of the fault or any deformation associated with the fault.

Q. So now I'm going to move to questions related to Section 3 for the model and simulation. Do you know what the geographical projection was used in Petrel for the geologic model?

A. I don't have that information on hand, but perhaps I could provide it after a break.

Q. Okay. And what is the cell size in the model both within and outside of the refinement grid?

A. Outside the refinement grid, it's a thousand by a thousand feet. Within the refinement grid, I believe it's 250 feet by 250 feet.

Q. So on Figure 2-3 on page 2-5 that shows a boundary for the simulation model, could you explain why the boundary was centered as shown in that figure within the geologic model?

A. Are you asking why the simulation model extent was centered within the geologic model extent?

Q. Yes. Or how it was determined as far as placement for the centering with it?

A. So the -- the simulation model extent was selected to cover Summit's sites and have enough of a boundary -- or have enough cells as to model the pressure plume and not have artifacts due to boundary conditions. Additionally, we wanted to incorporate the nearest site, the DCC West site, to evaluate potential pressure interference.

Q. In the numerical simulation, are all three facilities injecting across the same 20-year injection period?

A. Yes. That's what was modeled.

Q. In this section it's stated that the TDS value of the Broom Creek measured from the Milton

Flemmer 1 was used as the input for the numerical simulation. Can you explain why the Milton Flemmer 1 sample was chosen out of the three?

A. Yes. So the Milton 1 sample was the -- the meeting of the three values. We selected that as it was a site-specific value close to what could be considered an average between the three.

Q. And could you explain what effect the TDS input would have on the $CO_2$ plume?

A. Yeah. A higher TDS could potentially result in a smaller plume.

Q. Similarly, it's stated that the temperature and pressure gradients derived from the Milton Flemmer 1 were used in the simulation. Similarly the reasoning behind why the Milton Flemmer 1 was chosen?

A. One of the reasons being wanting to apply the same reservoir conditions associated with the salinity value.

Q. And could you explain what effect temperature has on the $CO_2$ plume? Movement, to clarify.

A. A difference in temperature could result in either a larger or smaller plume.

Q. So let's say like an increase in

temperature.

A. I can't recall at the moment. I could provide that answer potentially after a break.

Q. You had noted earlier that the $CO_2$ stream used in the geochemical modeling was done at 95 percent $CO_2$ and 2 percent oxygen to be more conservative because oxygen is likely what's going to be most reactive. Could you explain additionally -- so in earlier testimony with group one, they had stated that the minimum requirement for the $CO_2$ purity would be 95 percent to be able to take $CO_2$ from sources to send to these storage facilities. Can you explain why in the numerical simulation 98.25 percent was used instead of 95 percent? 95 percent being the minimum cutoff for Summit to take $CO_2$ from third-party sources.

A. Just to clarify, that's what Wade testified to, 95 not 98.

Q. Correct. But the model uses 98.25 percent. I'm just asking why 98.25 percent was used in the numerical simulation.

A. Sure. So 98 percent is the expected operational composition.

Q. And could you just explain what effect $CO_2$ purity also has on the $CO_2$ plume movement? So like

a higher $CO_2$ purity would have what influence on $CO_2$ plume movement?

A. In this case because of the compositions where we're talking about, the potential would be changes in plume size, but they -- it would be very minimal.

Q. As proposed well injectors are drilled, so for the three applications the six injectors haven't been drilled yet. As they are drilled and logging and coring and testing data is gathered, that planned to be incorporated into the geologic model and an updated simulation ran prior to starting injection?

A. I don't know specific plans to update the model, but I believe regulations require validation of the proposed model inputs with the injection well data, including the injection test that's required for each injection well.

Q. So to confirm, if -- if the results indicated a substantial change and the regulatory group requested that it be done, at that time it would likely be done?

A. By the regulatory group you mean the DMR?

Q. DMR.

A. Yes, we would.

Q. At what frequency will plume predictions be updated once operations are underway?

A. No less than every five years.

Q. So I'd like to go to Figure 3-6 on page 3-10 in the TB Leingang application.

A. I'm there.

Q. For all of the applications when showing the permeability curves used for siltstone and anhydrite, they were used equivalently. Could you explain why you're using the same? So to clarify, can you explain why the same permeability curve is used for siltstone and anhydrite?

A. Sure. That's related in part to the core analysis sampling and the data points available. Because siltstone and anhydrite are expected to be low permeability and porosity lithologies, we felt it was sufficient to apply this data set to both lithologies in the model.

Q. So I'd like to move to Table 3-5 on page 3-35.

A. I'm there.

Q. So for all of the applications when having this table shown for the EPA Method 1, you are using the proposed locations of one of the injection wells, being the TB Leingang 1, the BK

Fischer 1 and the KJ Hintz 1. Considering these wells haven't been drilled yet, can you explain how these values are derived?

A. Sure. So these values are taken from the geologic model and the simulation model.

Q. And can you explain why it was chosen to use these rather than the three stratigraphic test wells?

A. Given that we modeled to populate these, you'll note that, for example -- so I'd -- just trying to find a map I'd like to point you to. So I'd like to point you to page 3-22. So here is a map of the -- the average pressure change after 20 years of injection. Again, the AOR was defined using pressure data from the simulations. If you look at -- here in this case the green triangle represents the injection well and just to the southwest of that, that gray triangle represents the Milton Flemmer well, and you can see that there is a large difference in pressure between those two locations. So in that sense it was more appropriate to use data from the injection well location to be able to evaluate pressure change.

MS. MADCHE: That is all the questions I have. Thank you.

**EXAMINATION**

**BY MR. STOLLDORF:**

Q. Moving on to Section 4, I have some questions about locations. If you guys can't answer these, just let me know who can. Start on page 4-4, Figure 4-2. Just an AOR map showing occupied structures, among other things. How far exactly -- or approximately how far away from the facility are -- are occupied structures?

MR. BENDER: We have another witness who can provide that unless you know.

MR. STOLLDORF: Do you know who just so I know who to ask?

MR. BENDER: It will be Jimmy Powell.

MR. STOLLDORF: Jimmy.

Q. (MR. STOLLDORF CONTINUING) For the TB Leingang, BK Fischer and KJ Hintz wells, have any baseline samples been taken from these wells to date?

A. (BY MS. OLSEN) Not in this part of the Summit project.

Q. Okay.

A. Water -- Fox Hill -- you mean groundwater monitoring wells; correct?

Q. Correct.

A. Yep.

Q. This one is just related to the KJ Hintz facility area of review. The Raymond Jensen 1-34 well, File No. 4942, is a plugged and abandoned well within that facility. Can you briefly explain the protective measures that are being made to monitor the $CO_2$ plume movement near that well?

A. 3D seismic surveys will be taken at least every five years as part of the testing and monitoring plan to track the plume. And at or around year 19, Summit proposes putting in an additional groundwater monitoring well in the Fox Hills Formation nearby that legacy wellbore.

Q. Do you know how -- approximately how close?

A. I don't think the final location has been determined yet.

MR. STOLLDORF: Okay. That's all I have.

**EXAMINATION**

**BY MR. SUGGS:**

Q. Okay. Bear with me. A lot of my questions have been asked at different levels, so I'm going to have to pan through this as I go.

But I'm also going to start with a couple of questions that were deferred. One being the --

looking at Figure 1-1 on 1-2 -- on page 1-2 of the Leingang application. Okay. I'll start with the odd shape of the $CO_2$ plume as it exists in the modeled stabilized $CO_2$ extent. Is there any explanation for why we don't see $CO_2$ in that central area, the southwest central area?

A. (BY MS. DOUGLAS) Yeah. In this region of the model, we had low porosity and permeability layers. That's why you don't see predicted migration of $CO_2$ plume there.

Q. The low PHIE and perm, I guess, layers that exist in that area, were they arbitrarily -- and when I say "arbitrarily," just purely due to the variograms were they assessed or was there additional seismic evaluation that supported that low porosity/perm area?

A. There is additional seismic data that was used as control points and to -- to support the distribution of properties, but it should be noted that seismic data has resolution images for resolving thicknesses of different porosity and permeability layers, so there's potentially some uncertainty.

Q. Okay. So I guess in that explanation, did it just -- I'm going to tie this back to some of

the discussion on the depositional environment. Would the seismic in that area indicate it was partially interdunal or do you see the dune structures there or not?

A. Correct. That would suggest the low porosity and permeabilities typically associated with those interdunal dolomites as well as anhydrite deposits.

Q. Okay. And then I asked this as well earlier, but in Township 141 North, Range 88 West, Section 35, you'll note that on this exhibit, at least, the stabilized $CO_2$ plume extent does appear to contact the storage facility area border. Do you know what the distance is between there? What kind of buffer is applied at approximately around that area?

A. Yes. So regarding the stabilized $CO_2$ plume extent, it's a short distance, you know, on the order of 10 feet, but I would like to point out the red line is the $CO_2$ extent at the end of injection. So we feel that that buffer is reasonable, and we will, you know, reevaluate the predicted plume movement and our storage facility area boundaries no less than every five years to confirm that.

Q. So just to clarify, the red line is the

extent of the $CO_2$ migration at the end of the 20-year injection cycle?

A. Correct.

Q. And the gray that goes outside of that would be where the model is predicting that $CO_2$ to migrate during a ten-year postinjection phase?

A. Correct.

Q. Okay. Moving on to Sections 2 and 3, on page 2-17 -- I've got to get there myself. The narrative right above the figure indicates that the net sandstone thickness in the simulation model area ranges from 6 feet to 397 feet with an average of 140 feet. Can you point me at -- somewhere on the figure below, Figure 2-10a where it would approach 6, or is that a typo in any way?

A. I believe the typo should say -- I believe those values are from the geologic model extent, not the simulation model extent, so that is an error.

Q. Okay. So that wouldn't be -- so what should that read, then?

A. Because it's sandstone thickness, I'd have to calculate that from the model. I can't derive that from the thickness map.

Q. I guess looking at the isopach of the

Broom Creek, then, do you see anywhere on that map that you're presenting where the thickness would approach 6 feet? I mean in glancing at it, I thought the -- the thinnest that was represented was on the order of a hundred feet.

A. Yes. That's why I believe that that's an error. It should say those values are from the geologic model extent where the Broom Creek actually --

Q. Oh.

A. -- does pinch out, not the simulation model.

Q. Got you. So not the simulation, but the whole --

A. Correct.

Q. -- geologic?

A. So that -- I believe that sentence is in error.

Q. And that'd be where it would punch out to the northeast and the Broom Creek wouldn't exist --

A. Correct.

Q. -- far northeast of the whole model area?

A. Correct.

Q. Okay. Page 2-22. At the bottom of that page you indicate that there's, I guess, a sample

bias towards the sandstones that were sampled. Does that sample bias affect the overall model in any way?

A. No. So the core samples were used to calibrate petrophysical logs of porosity -- calculated porosity and permeability, and those logs were what were used to help derive model properties. So I -- I don't believe that that bias impacted the model in a significant fashion.

Q. Figure 2-16 on page 2-25.

A. I'm there.

Q. At the very top of the Broom Creek here, you have an anhydrite facies identified in column 7 on that figure. And then in column 8 when you upscale those for the modeling purposes, it's being applied the siltstone facies. Is there any effect on the modeling due to that or is there a reason that was applied instead of the anhydrite facies?

A. There is not an effect of that. Both the anhydrite and siltstone are populated as low porosity and permeability.

Q. So functionally they both act as confining layers in the modeling?

A. That's correct.

Q. That drives me to the geochemical side of

this so I'm going to jump probably largely over into Appendix C, but bear with me. The -- the narrative -- so I'm looking at C-15 and 16 here -- or sorry -- Figures C-15 and 16. I think I'm on C-12.

A. Figure C-15 and 16 or page --

Q. So the narrative that I'm asking about is on page C-12 where you reference Figures C-9 and 10, which those figures are on pages C-15 and C-16.

A. Okay.

Q. This narrative indicates that dolomite is the primary entity in dissolution and that anhydrite is precipitating it. I just want to confirm that.

A. That's correct.

Q. Okay. So in previous applications, the anhydrite has been identified as a primary dissolving element in those models, in those geochemical analyses. So I guess my questions here are what is different about the modeling that was done here or the chemistry of the water or the chemistry of the rock that is causing anhydrite to be a precipitant instead of a dissolving --

A. I don't have that answer readily available.

Q. Is that something that may be provideable in short term or is that something I might need a supplemental response on?

A. I could potentially provide it after a break.

Q. Okay. I guess I'll -- I guess I'll ask that if it's not something that can be answered in testimony after a break, that it would be submitted as explanation in supplemental.

A. Okay.

Q. Still on C-12 here -- bear with me. So actually on page C-14, Figure C-8. In this figure, the bottom figure, shows that mineral trapping is still on the negative side of the equation so more dissolution has taken place than precipitation at this point through the extent of what's presented on this figure; correct?

A. Yes. So what this figure is showing is why there's negative amount for mineral trapping. It's because of that dolomite being dissolved and that those dissolved carbonates are being attributed to as carbon that was added into the system.

Q. Okay. In previous testimony you indicated that it would be on the order of hundreds of years

before true mineralization started happening for $CO_2$ in the storage reservoir. Have you projected that out? Do you know a rough time frame when that negative trend starts moving the other way?

A. We have not modeled that.

Q. Okay. C-18.

A. Maybe just one point very quickly. Sorry, we're going back to Figure C-8. You can see by the slope of the curve, after $CO_2$ injection ends, we have less of that mineral trapping and that slows down over time.

Q. But you still haven't taken it to the point of when that actually reverses? It's just --

A. That's correct.

Q. -- expected or anticipated that it does reverse?

A. Correct.

Q. Okay. Going on to page C-18, the -- the narrative here for your PHREEQC model, and you've testified to this earlier, that you used the diffusion process for the mechanism by which the $CO_2$ would enter. And, conversely, if you look at later in the -- in the appendix when you're talking about the lower confining zone and the simulation that was done there, you're talking about advection and

dispersion. Can you elaborate a little bit on why the two different mechanisms are used for the two different confining zones?

A. Yes. So diffusion was used for the upper confining zone as $CO_2$ is a buoyant fluid which is -- so $CO_2$ is a buoyant fluid which is why we needed to use advection and dispersion which allowed the $CO_2$ to dissolve in -- in -- in brine and the density to allow it to enter the model cells for the lower confining zone.

Q. So for the lower confining zone -- sorry, I'm going to have to ask you to clarify that. Focus on why diffusion was used for the upper confining zone modeling.

A. I don't think I can elaborate and provide that specific answer at this time, but I could potentially provide it after a break.

Q. Okay. Probably the same situation, if I don't get that answer as part of testimony, I might want it as a supplemental.

A. Correct. We would be able to provide that.

Q. Page C-18 still. The formation brine for the simulation that was done on the Opeche and as well as the -- or the Opeche/Spearfish as well as

what was done on the Amsden for the lower confining zone, in both cases you used the brine composition as it was determined from Broom Creek samples?

A. That's correct.

Q. Can you elaborate on why?

A. Just let me confirm something real quickly.

So it's my understanding given the porosity and permeability of at least the Opeche/Spearfish, we weren't able to collect a fluid sample due to the immobility of the water due to low permeability. Therefore, we used the Broom Creek as a representative sample as we don't believe the composition will vary greatly.

Q. Okay. Still on page C-18, Table C-4 the average mineral composition of the Opeche/Spearfish that was used here, can you confirm which facies within the Spearfish that would represent -- or the Opeche/Spearfish?

A. This sample -- the average sample here is approximately 60 percent mineral weight anhydrite, so I'd interpret that as anhydrite.

Q. On page C-19, middle paragraph there when you're discussing Figure C-13, you indicate that the net change due to precipitation or dissolution,

in this case you're referencing C2, which is a cell within the model that was done, has less than 5 kilograms per cubic meter net change. That net change, is that positive or negative?

A. I'd have to clarify how that was calculated and provide that as a supplement.

Q. I don't think I could confirm or guesstimate with the figure in front of me which way that would be going, so if we could confirm that as well.

A. Yep. We could provide that as a supplement.

Q. Page C-25, similar question. This happens to be the -- Table C-6 on page C-25 -- averaged mineral composition for the Amsden formation that's being presented in this table. Could you elaborate and confirm which facies that were represented in your modeling?

A. I'd characterize that as a -- well, it would be represented as a dolostone in our model.

Q. Okay. I guess a similar question on page C-28. The narrative at the -- in the bottom paragraph, again you're referencing an overall net porosity change as less than 2 percent. And can you tell me whether that's a positive change or a

negative?

A. I would like to provide that as a supplement.

Q. Okay. Then back up to Section 3, page 3-7, I believe. The bottom paragraph on page 3-7 you discuss the distances from the edge of the model and the volume modifiers that were applied as boundary conditions. Can you spend just a few moments confirming what those distances are measured from and to within the model? And then -- well, I'll let you do that first.

A. So those distances are measured from the Broom Creek extent interpreted by the EERC which is shown on page 2-16 in Figure 2-9.

Q. So the distance you're referencing there is the distance from the edge of the Broom Creek to the edge of the modeled area?

A. To the edge of the simulation modeled --

Q. The whole simulation.

A. -- area. That is correct.

Q. Okay. And then when applying your volume modifiers as boundary conditions, can you elaborate on what the effect of those are within the model?

A. Yes. So we applied the volume modifiers to represent the fact that we don't have an

infinitely acting aquifer where the Broom Creek pinches out. Because we don't have an infinitely acting aquifer, there will be differences in how pressure responds in the reservoir due to that pinch-out. And so these modifiers were applied to take into account that difference in boundary condition between an infinitely acting aquifer and the closed boundary.

And so the volume modifier is used in the CMG calculations with the boundary condition to account for the specific distance beyond the model where that pinch-out occurs, and so that is accounted for with the boundary conditions as it relates to the simulated pressure.

Q. So the -- the cell -- the modifier being applied to a boundary cell allows -- allows that cell to act as if it has a larger volume than its individual cell size?

A. That's correct. To allow the computational simulator to account for how that pressure would respond outside of the model.

Q. So the smaller values have less distance or less volume in the reservoir in that direction --

A. Correct.

Q. -- towards a pinch-out or towards a boundary of the -- the -- I guess the Broom Creek as a whole as opposed to what's actually simulated within the model?

A. That's correct.

Q. So this was asked a little bit, so I'm on page 3-8, the description your capillary pressure curves, and you indicate that they were derived from mercury capture -- mercury injection capillary pressure testing on the cores; right?

A. Correct.

Q. But then that they were modified. Can you elaborate on the need why they were -- why it was necessary to modify those core-derived values and what that process looked like?

A. So those values were calculated using data for -- from a single sample, so we looked at the porosity and permeability from that sample to upscale it to the ranges of the porosity and permeability reflected in our model.

Q. Okay. When you say that, was that -- when you say the single sample, you're referring to the single sample that was used to derive the two confining zones, being anhydrite facies values and siltstone facies values, or am I -- yeah, siltstone

and anhydrite.

A. We took capillary entry pressure data from a single sample from those units to derive these curves.

Q. Okay. And so, I guess, the modification of that mercury -- mercury-injection-derived data to be representative for $CO_2$ injection, what was done to, I guess, adjust the mercury fluid properties to the $CO_2$ fluid properties?

A. I could provide that answer after a break.

Q. Okay. Same, I guess, question or same response, then, if it's something that doesn't come as part of direct testimony, we'll want supplemental explanation for it.

Down in the AOR page 4-14, it was actually referenced in a number of locations, including on page 4-12 in Table 4-6, but there's a reference that's being used to the Tongue River Formation for a freshwater aquifer. I just -- I guess I'm just going to point out and confirm that Tongue River isn't a formation recognized on the North Dakota stratigraphic column at this time. There's an RI 59 -- Report of Investigation 59 that was published in 1977 that proposed renaming the Tongue River and the Ludlow as they correlate from Montana and

Wyoming to the Slope and -- drawing a blank on the other one and I don't have it written here -- but rename those two formations. The Tongue River as you're referencing here would be equivalent to those two formations that are represented on the geologic strat column in North Dakota; correct? Or can we confirm that?

A. (BY MS. OLSEN) We can confirm that.

Q. Okay. On page 4-16, there's a line here in your narrative that reads, "The Pierre Formation is the thickest shale formation in the AOR and primary geologic barrier between the USDWs and the injection zone."

The primary barrier would be the upper confining zone; correct?

A. (BY MS. DOUGLAS) That's correct. So that's a misstatement.

Q. It would just be an additional barrier --

A. Correct.

Q. -- of significant thickness as what's indicated?

A. Yeah. We -- we consider it as a tertiary confining zone because there's the primary confining zone, a secondary confining zone, and then we consider the -- everything between the

Inyan Kara Formation and the Fox Hills as a tertiary confining zone.

Q. One last item I'm going to jump -- it kind of mixes between the AOR and the -- and Section 3. It's actually on 3-42 I think where the -- page 3-42 where the narrative is. Right at the bottom of this page there's a statement, "Therefore, the AOR is delineated as the storage facility area plus a 1-mile buffer."

This immediately follows a discussion of the risk-based AOR approach that was taken, but the one-mile buffer that's applied for that AOR, is that -- is there any importance to the one mile that's being used or is that just a value that is chosen?

A. I can confirm during break, but to my understanding, that the AOR at a minimum has to be the storage facility area plus a one-mile buffer, but I will confirm that my understanding is correct during the break.

MR. SUGGS: Okay. That'll be all I've got on these sections.

HEARING EXAMINER GARNER: Okay. At this time why don't we take a break for lunch for an hour.

(Recessed at 12:29 p.m. and reconvened at 1:30 p.m.)

HEARING EXAMINER GARNER: Okay. We are back on the record.

Attorney Bender, how would you like to proceed? Are we going to answer some questions that were pending?

MR. BENDER: Yes. I don't know if I should say we'll recall -- we'll bring back Amanda Douglas who -- and there were some questions posed for her and she said she needed a little time during the break to research those answers. What we were proposing, perhaps to save some time, is she can read what she believes to be the question and then she can give the answer. And then there was a question or two also that Caitlin Olsen got that needed a little time to respond to. So I can just ask Amanda a few questions and proceed that way, if that's okay with you, Mr. Examiner.

HEARING EXAMINER GARNER: Is that okay? That's fine.

**REDIRECT EXAMINATION**

**BY MR. BENDER:**

Q. All right. Amanda, before we took the break, when you were answering some questions that

were posed to you by the Commission staff, I believe it was your testimony that if you had a little time during the break, you could take a look at some of your notes and some of the documents you have and respond to those questions; is that correct?

A. (BY MS. DOUGLAS) That's correct.

Q. Do you want to just walk through the questions as you understood them and then provide us with the responses?

A. Yes.

Q. Okay.

A. With respect to the projection system used, it was NAD27 North Dakota State Plane South U.S. feet.

The Commission had a question about generally how would having a higher reservoir temperature impact plume size. So it should be noted that temperature isn't the main driver in dictating plume size. There's other parameters that are more sensitive or the -- the -- the $CO_2$ plume size is more sensitive to other parameters. But generally a higher temperature could result in a bigger plume.

I had a question on why we saw

precipitation of anhydrite and dissolution of dolomite and what constituents in the water chemistry or the mineralogy used for those models was different than previous permit submitted that would cause this. We would like to provide that answer as a supplement.

I had questions about the transport mechanisms for the PHREEQC modeling. For the upper confining zone, diffusion is expected to be the dominant transport mechanism due to the buoyancy of the $CO_2$. At the boundary between the reservoir and the confining zone, the reservoir will have a higher $CO_2$ concentration, so diffusion will allow the movement of gas from an area of high concentration to an area of low concentration.

So with respect to advection and dispersion, these are the expected dominant transport mechanisms for the lower confining zone. So dispersion in the sense of the $CO_2$ mixing and forming saturated brine and that saturated brine mixing with unsaturated CO -- brine that's unsaturated with $CO_2$ and the different densities between the two and that mixing by dispersion, so between that and advection, those are the expected dominant transport mechanisms, and that's why those

were used for the lower confining zone.

And there was a question on the use of MICP data and calculated relative permeability data, and we'd like to provide that as a supplement.

Q. That's all you have? Those were the questions you received; is that correct? Those are the questions?

A. Those are the questions I received. There is one more question that I received that Ms. Olsen will be providing the answer to.

MR. BENDER: Mr. Examiner, unless there's other questions from the staff of Ms. Douglas, I would move to Ms. Olsen.

HEARING EXAMINER GARNER: Okay. That's fine.

Q. (MR. BENDER CONTINUING) Caitlin, can you recite for us what the question was that you're going to address for us now?

A. (BY MS. OLSEN) Yeah. The first question, Rich, I believe you asked -- I don't remember the order in the questions, but you had asked about the nomenclature for some of those aquifers and namely the Tongue River. The new name that is more recently used is Bullion Creek, and so that is the

same formation. We're talking about the same thing there, just to clarify.

And then the second question you had asked about the AOR and the minimum one-mile buffer outside of the storage facility area. That language comes from 43-05-01-05 and it's -- that language is outside throughout that rule, and it references it -- the area several times. And just to give an example, it will say something like the evaluation must do X, Y, Z in the facility area and within one mile of its outside boundaries.

So the AOR, when we talk about reviewing wells and items inside of the AOR, is the storage facility area and one-mile boundary pursuant to 43-05-01-05.

MR. BENDER: Okay. If there's no questions from the staff, Mr. Examiner, we're ready to move forward with our next witness as we talked. Oh, I'm sorry.

MR. SUGGS: I did have a couple questions that weren't addressed.

**FURTHER EXAMINATION**

**BY MR. SUGGS:**

Q. The net positive or net negative?

A. (BY MS. DOUGLAS) I had stated earlier

that we'd like to provide those, too, as supplements.

Q. Okay. As a supplement still. Okay. And then I apologize, but I did have one set of questions that I forgot to hit and I have to find it again in my notes. Page 2-66.

MR. BRAATEN: Of Exhibit 1A?

MR. SUGGS: Yes.

MR. BRAATEN: Thank you.

Q. (MR. SUGGS CONTINUING) And I guess the narrative actually starts on page 2-65 regarding your Mohr-Coulomb Critical Stress Analysis of Faults. The faults that you have depicted in Figure 2-42, can you identify what depths those were identified at or what range of -- there's been testimony that there's no faults in the injection reservoir or the confining zones. So where are these faults coming from? How were they identified?

A. Yes. So the 3D seismic survey acquired over the project area led to the identification of several deep faults within the storage -- all three storage facility areas. These faults originate within the Precambrian basement and all of them terminate below the top of the Interlake Formation,

which is approximately 3,000 feet below the Broom Creek Formation.

Q. So they're all deep --

A. Correct.

Q. -- features?

Okay. And those are some of the items that are identified or at least visibly identifiable on Figure 2-41 on page 2-64?

A. That's correct.

MR. SUGGS: Okay. Thank you.

MR. BENDER: Okay. Mr. Examiner, if there aren't any further questions, our plan now is to call four new witnesses, and then we will recall Caitlin Olsen to do the comparison between what we've discussed in great detail, which is the Leingang with the Fischer and the Hintz. And then we're going to recall Wade Boeshans to talk about the amendment that the Commission received a letter on from Minnkota.

HEARING EXAMINER GARNER: Okay.

MR. BENDER: So our first witness will be James Powell.

HEARING EXAMINER GARNER: Mr. Powell, please raise your right hand.

**JAMES POWELL,**

being first duly sworn, was examined and testified as follows:

**DIRECT EXAMINATION**

**BY MR. BENDER:**

Q. You go by Jimmy; is that correct?

A. Yes, sir.

Q. Will you state your full name for the record?

A. James Earnest Powell.

Q. And, Jimmy, by whom are you employed?

A. Summit Carbon Solutions.

Q. And in what capacity?

A. Chief operating officer.

Q. What I'd like you to do is briefly highlight for the examiner, Commission staff and opposing counsel your educational background and work experience.

A. Okay. I have a bachelor of science in engineering, and I have about 35 years of experience in the energy industry, predominantly upstream/midstream, with the last 25 leading large projects such as this, both internationally and in the U.S.

Q. Okay. So I'm just going to have a

question or two for you having to do with engineering and operational design. To what standard will the flowlines be constructed?

A. The flowlines, like the remainder of the pipeline system, will be constructed -- designed, constructed and operated in accordance with DOT regulations, CFR 49, 195.

Q. Okay. And can you explain how the three entities that have made application for the storage permits are going to work together and monitor this system and utilize the data that's provided throughout the SCADA system?

A. Yeah. So from receipt of the $CO_2$ molecules at the capture facilities through transportation of the pipeline system and through -- to the sequestration system to the injection site and subsurface, it will all be operated as one integrated system under one supervisory control and data acquisition system, and it will be controlled from a single control center.

MR. BENDER: And, Mr. Examiner, after I finish with a few questions of these other witnesses, Mr. Powell will be available for questions from the staff. So if I can move to the next witness, I'll do so.

HEARING EXAMINER GARNER: Sure.

MR. BENDER: Next witness is John Hunt.

HEARING EXAMINER GARNER: Mr. Hunt. Please raise your right hand.

**JOHN HUNT,**

being first duly sworn, was examined and testified as follows:

**DIRECT EXAMINATION**

**BY MR. BENDER:**

Q. John, would you state your name for the record, please?

A. (BY MR. HUNT) John Hunt.

Q. And, John, by whom are you employed?

A. By EERC.

Q. And in what capacity?

A. I'm a senior geoscientist and measurement reporting verification, or MRV, specialist.

Q. And can you briefly provide for the Commission staff your educational background and work experience?

A. Sure. So I hold bachelor of science and master of science degrees in geology. I'm a licensed professional geologist. And prior to the EERC, I worked at Chesapeake Energy as a petroleum geologist.

Q. Okay. And you're going to talk just a little bit about -- at least from questions from me, about Section 5 of the application which is -- has to do with testing and monitoring; is that correct?

A. That's correct.

Q. Okay. And my first question is can you provide a brief summary of Table 5-2 in the application?

A. Yes. So Table 5-2 begins on page 5-4 of the TB Leingang application or Exhibit 1A. And let me back up here just a little bit. So the testing and monitoring plan, the full plan is laid out between Tables 5-1, 5-2 and 6-1. So 5-1 being the preinjection plan, 5-2 is the operational plan and 6-1 is the postinjection plan. We're hitting the highlights of Table 5-2 simply because this makes up the bulk of testing and monitoring and includes all of the different various activities that Summit will -- will perform.

And so let's -- yeah, again, let's go to Table 5-2. This is an overview of the operational testing and monitoring plan. And just to start us off, a brief description of the -- of really what's contained in this table. So if we're looking at

the columns and we're stepping left to right, we see the first thing is the Monitoring Type. I'll touch on that a little bit more in a minute, but essentially, you know, whether it's a $CO_2$ stream or surface facilities, the wellbores or the environment, those generally make up the monitoring types.

Then we step over and we have the Parameter, so what parameters are we interested in measuring. And then the next column describes the activity that will collect those data. Then we have the primary purpose of the activity listed, the equipment and any tests associated with gathering that data. The location where that data will be gathered and a sampling frequency described.

Finally, in the last three columns, we have how that data -- what data will make its way into the reporting to DMR. So we have the Report Content, the Reporting Method and then the Reporting Schedule specified.

So how I like to think about this plan overall is you're really following the $CO_2$ stream as it enters the sequestration facility, and you're first and foremost analyzing the $CO_2$ stream in terms

of composition and end-to-end metering. So those are some of the things highlighted in the rows within the $CO_2$ Stream Analysis section. There's also the Surface Facilities Leakage Detected -- Detection Plan as well as the Corrosion Prevention and Detection Plan. Those generally at a high level have already been touched on a little bit so I won't go into great detail there.

And then we move to the wellbore sections. Now the $CO_2$ stream has traveled through the surface facilities and it's entered the wellbore, so here we're primarily focused on activities that look at monitoring wellbore integrity. So, for example, pressure, temperature gauges, fiberoptic cable, all of which provide continuous readings to monitor the -- the operations of those wells, of the injection wells.

And, finally, we have -- I guess continuing on the wellbore monitoring part, we also include a Downhole Corrosion Detection Plan, and the key activity there is the pulse neutron log which is also feeding into the wellbore mechanical and integrity piece where we have periodic pulse neutron logs planned to be acquired throughout the life of the project.

And then, finally, the -- so now we've injected the $CO_2$ into the storage reservoir and what we're interested in is monitoring the volume in a targeted way as that $CO_2$ expands within the storage reservoir and ultimately that volume contained within the area of review boundary. So we have a Near Surface monitoring plan, which is primarily made up of soil, gas and groundwater -- I guess wholly made up of soil, gas and groundwater sampling, and then an Above-Zone Monitoring Interval, which is defined as the Opeche/Spearfish to the Skull Creek. Again, pulse neutron logging for logging saturations, and then the fiberoptic cable to look at temperature.

And -- and then, finally, we end with the monitoring of the storage reservoir itself which, again, will be conducted with the fiberoptic cable to monitor the temperature profile of the storage reservoir as well as casing-conveyed pressure temperature gauges on the injection wells and -- and also a downhole pressure temperature gauge installed in the reservoir monitoring well. And then we have planned 3D seismic surveys as has been testified to a little bit prior to this point, as well as a plan for monitoring seismicity with a

surface array of seismometers.

MR. BENDER: No further questions of this witness. And the next witness will be -- yeah, next witness is going to be Jay Volk.

HEARING EXAMINER GARNER: Jay Volk. Mr. Volk, please raise your right hand.

**JAY VOLK,**

being first duly sworn, was examined and testified as follows:

**DIRECT EXAMINATION**

**BY MR. BENDER:**

Q. Jay, can you state your full name for the record, please?

A. (BY MR. VOLK) Yes. Thank you, Lawrence. Jay Volk.

Q. And, Jay, by whom are you employed?

A. Summit Carbon Storage.

Q. In what capacity?

A. I am the sequestration director of health, safety, environmental.

Q. Okay. And can you provide for us briefly your educational background and work experience?

A. Yes. Lawrence, I have a bachelor's degree, master's degree and PhD -- PhD from North Dakota State University. My PhD is in the

department of natural resources with range sciences. My work history has largely been through BNI Coal. Spent approximately 17 years there working on permitting, compliance, testing and monitoring, financial assurance plans and site closures. The last two years I've been employed with Summit Carbon Solutions working within the Class VI regulations.

Q. You're going to have to slow down a little bit.

A. I apologize. Thank you for the reminder.

Q. And, Jay, you're here today to discuss Section 7, which is emergency and remedial response plans; is that correct?

A. That is correct.

Q. As well as financial assurance which appears in Section 12; is that correct?

A. That is correct.

Q. Okay. So you'll be able to handle questions from the Commission staff on those two subject areas; is that correct?

A. That is correct.

Q. Okay. Let me just ask you a question or two, first with respect to emergency and remedial response. Can you tell us generally what is the

purpose of emergency and remedial response plans?

A. Yes. Lawrence, the purpose of the ERRP in Section 7 is really to provide guidance for a quick, safe and effective response plan to keep the community and -- community, workers and the environment safe. Items that we look at included in there are definitions and reviews of local resources --

Q. Slow down a little bit.

A. I am sorry for a second time.

Looking at areas such as what are the local resources in the areas, identification of potential events, as well as the response to the events.

Q. And can you explain for us, slowly, the interactions that you've had with local first responders in Oliver, Mercer and Morton Counties?

A. Yes. Our interactions between the three counties have really included a multilayered approach to outreach. We've engaged all three counties with LEPC meetings. We've worked within dispersion methodology of meetings. We've worked individually with LEC portfolio holders, as well as with local responders on an individual basis through safety tours or landowner meetings.

Q. Okay. Jay, let's shift gears a bit and talk a little bit about Section 12, which is Financial Assurance Demonstration Plan. Can you provide for us a brief overview of the methodologies used to determine the financial assurance? And if you have to direct the Commission's attention to any part of the application, that'd be great.

A. Thank you, Lawrence. And I would direct you to Table 12 -- or excuse me -- 12-1 on page 12-2. The methodology that we used in developing the financial assurance plan really consisted of known cost, which included areas such as plugging in injection wells, the PISC -- the PISC plans, testing and monitoring, as well as site closures and the flowline abandonment sections.

Other areas we looked at were estimated costs, and that was used to determine the ERRP as well as endangerment to USDWs. We also looked at previous literature as well as previous Class VI permits in developing the financial assurance plan.

Q. Okay. And can you provide for us an overview of the cost estimates associated with the financial assurances?

A. Yes. So, again, referring to Table 12-1,

for the TB Leingang, the plugging and injection well cost was 1,166,000. Likewise, the PISC storage and facility monitoring was 4,225,000, as well as the flowline plugged and abandoned at 243,000.

And, I apologize, I'd have to ask -- the PISC and storage facility is 4,225,000 if I misspoke on that. The ERRP is 11,100,000. And the endangerment of USDW is 2,695,000. And that gives a total of 20,316,000 between the three -- or excuse me -- between the TB Leingang.

I do want to make a quick reference before I move on to the other two sites is what is covered by the surety bond versus pollution liability policies is also outlaid in Table 12-1 in which the plugging of injection wells, PISC storage facility and monitoring, flowline plugged and abandonment cost, as well a site closure and remediation will be covered under a surety. Whereas, an ERRP as well as the endangerment of USDWs, a pollution liability policy will be used.

Again, there is minor differences between SCS2 and SCS3 in which the total bond for SCS2 proposed is $20,868,800 as well as the KJ Hintz at $20,817,800.

Cumulatively, the three are bonded at just over $62 million.

MR. BENDER: Mr. Examiner, that's all the questions I have for this witness. We do have another witness that we'd like to call at this time, Jean Oddy.

HEARING EXAMINER GARNER: Ms. Oddy, please raise your right hand.

**JEAN ODDY,**

being first duly sworn, was examined and testified as follows:

**DIRECT EXAMINATION**

**BY MR. BENDER:**

Q. Jean, would you state your full name for the record, please?

A. (BY MS. ODDY) Jean Oddy.

Q. And by whom are you employed?

A. Summit Carbon Solutions.

Q. In what capacity?

A. Sequestration project engineer.

Q. And could you briefly highlight for the Commission staff your educational background and work experience?

A. Yes. I have a bachelor of science in petroleum engineering from Montana Technological

University. Before Summit I worked for Neset, which is an engineering and geological consulting firm, in which most of my responsibilities was around drilling engineering, design and operations, as well as plugging and abandonment projects in the Williston Basin, including wells such as Class II saltwater disposal wells. And I joined Summit last year in January.

Q. Okay. And you're here to discuss any questions the Commission staff might have about well design, casing, cementing, plugging and completion; is that correct?

A. That's correct.

Q. Okay. A question or two having to do with well design and casing. Can you -- excuse me. With respect to Section 9, can you describe the well construction plan design? And if you have to refer to a particular figure or exhibit, please do so.

A. Yes. I'd like to direct your attention to Figure 9-1 on page 9-2. So in this well construction program, starting with the surface section, the surface hole will be drilled with freshwater-based drilling fluid down to a depth within the Pierre Formation. Surface casing will

then be set and placed at least 50 feet below the base of the lowest underground source of drinking water. Surface casing will then be set and cemented in place from the surface casing shoe all the way to the surface of the ground to provide isolation to and from the underground source of drinking water.

Moving on to the next section, we've got the long string casing, so that section will be drilled and cored at specific intervals. And then in accordance to Class VI regulations and administrative code, corrosion resistant alloy casing will be set in place to a depth below the Broom Creek Formation which is in the Amsden. The long string casing will then be cemented in place with $CO_2$ resistant cement from the shoe all the way through the Mowry Formation, then cemented to surface.

MR. BENDER: Mr. Examiner, that's all the questions I have for this witness.

I would point out that at this point in time, given the space that we have here for witnesses to sit, I would like to give the Commission an opportunity to ask these witnesses questions, and then also point out that we do have

two other individuals who are in the audience. And in the event these witnesses have some questions that they feel can be better answered by someone else, I would bring those people up. One is Jamey Backus, B-a-k-k-e-s [sic], and the other is Luis -- how do I pronounce that?

MR. POWELL: Piasco.

MR. BENDER: Piasco, P-i-a-s-o [sic].

HEARING EXAMINER GARNER: Okay. Any questions from the staff?

**EXAMINATION**

**BY MS. MADCHE:**

Q. I will go ahead and start. As before I'm going to start with what I think are deferred questions for this group. Early on Richard Suggs had asked on whether or not you would be able to provide industrial codes that best reflect the capture sources, such as the ethanol facilities. Is that something that you can provide at this time?

A. (BY MR. VOLK) Yes. The ethanol NAICS is 325193 reflecting as asked for the capture NAICS code, and that is for ethanol.

Q. Earlier an answer was provided for approximately how many miles of the MCE pipeline

transmission pipeline system is within the North Dakota PSC jurisdiction. 352 miles was provided, but I believe, Jimmy, you would be able to confirm that number?

A. (BY MR. POWELL) Yes. It's 3 -- approximately 332 miles are in the jurisdiction of the Public Service Commission. In the delta roughly 19 miles is within the NDIC jurisdiction. So Wade had it accurate and correct. But the PSC is 332.

Q. Okay. I had asked earlier on with the first group yesterday on whether or not royalties were being paid on the full $CO_2$ stream or just the $CO_2$ mass of the stream. Is there anyone in this group that can confirm that or is that something that would need to be a supplemental?

MR. BENDER: No one can answer that. We'll have to supply you with supplemental information on that one.

MS. MADCHE: Okay.

Q. (MS. MADCHE CONTINUING) In Section 2 earlier I had asked what the maximum pressure was applied during the microfracture testing in the Milton Flemmer 1 that was done across the Spearfish/Opeche Formation.

A. (BY MS. ODDY) Yes. I would like to direct your attention to Figure 2-7 on the TB Leingang 1 permit.

Q. I'm ready.

A. So relative to Milton Flemmer 1, the maximum injection pressure is highlighted with the black square box on the image on the upper section there, and from that graph it looks like around 5580 psi was -- was pumped as a maximum. However, after evaluation, there was no breakdown pressure observed at that maximum pressure injected.

And then referring to Table 2-4, we do have a summary on the Opeche/Spearfish microfracture stress test breaking down your breakdown pressure as well as your propagation pressure.

Q. So some additional questions as it pertains to the microfracture testing that was done. A question that I had posed earlier was how do you determine which sand package within the Broom Creek to target for these tests?

A. So prior to the micro in situ stress tests, we ran logs such as your magnetic resonance log as well as an FMI log and sonic log, and in combination of that along with the core photos that

we observed, along with some field description, were able to pick the representative sand package within the Broom Creek Formation and pick the test steps.

Q. Could you elaborate a little bit more on what makes a representative sample?

A. Yes. So I'm going to go back here to another figure. Figure 2-5. We looked at the sonic log, and on column 7 we've got the facies there, so we looked at, you know, a good, thick sandstone package. And then looking at the magnetic resonance log, that showed us good porosity in that test point. Then looking at making sure there are no visible bedding or fractures within the core photos that was -- that was collected and any field description that was noted by the geologists on site.

Q. So just to confirm, you're looking for a sand package that would represent good porosity and permeability but without fractures that could possibly affect the results of the MBT test?

A. That's right.

Q. So as a follow-up to that, on average to date across the Broom Creek on previous applications, the frac grading has between 0.69 psi

per foot to 0.712 psi per foot. Could you explain why we're seeing a larger variation across these three facilities, specifically as it relates to the Slash Lazy H 5 which was at 0.784 psi per foot which would be above that range, or what you anticipate might have caused it to be higher than what we've seen to date on past applications?

A. So with that for the KJH -- or sorry -- the Slash Lazy H 5, cause of that could potentially be activities during the drilling operation that may impact. Also could be some bedding within the FMI logs that was observed.

However, we are willing to, you know, work with the DMR on solutions on confirming that -- that value at the KJH sites. It is also part of our plan to perform an in situ stress test in the KJH, at least on one of the wells. In addition, we are planning on performing an injectivity test in the injection wells again to confirm these values, and that also applies in all six injection wells.

Q. Would you be able to explain what effect the frac gradient has on the $CO_2$ plume size?

MR. BENDER: That's probably a question that we'll have to recall Amanda to answer.

MS. MADCHE: Okay. And am I correct that

we'll want to do that at the end as far as recalling?

MR. BENDER: Yeah. What I thought we'd do is after we finish with this group, once again, because of the size of the group, we're going --

MS. MADCHE: Sure.

MR. BENDER: -- to have to recall Wade Boeshans and also Caitlin, and perhaps we could bring Amanda up at the same time and get that done if the examiner's okay with that.

HEARING EXAMINER GARNER: I am okay with that. I was going to allow cross of these four before they go to sit down and bring them back up and sit down and bring them back up. Does that work? Is that fine?

MR. BENDER: I mean, there's a lot of people. I think it's a lot of cross. We can finish our -- the remaining witnesses, I think, very quickly. That's kind of what I had in mind this morning, but it's certainly your call, Mr. Examiner.

HEARING EXAMINER GARNER: Mr. Braaten, any input? Are you okay waiting with the other witnesses to be called and then we can -- then you'll have an opportunity to cross any one of the

witnesses and recall them up here.

MR. BRAATEN: Yeah. I think with respect to that, I just want to be clear on record that specifically because what I'm running into now is difficulty with scheduling with experts and when they're going to be here, but thinking about what Mr. Bender is saying whether I cross these folks now or cross all of these folks right after, I don't think that's going to help me on anything else, so --

HEARING EXAMINER GARNER: Okay.

MR. BRAATEN: -- I'm okay with that --

HEARING EXAMINER GARNER: Okay.

MR. BRAATEN: -- but reserving my prior objections --

HEARING EXAMINER GARNER: Sure.

MR. BRAATEN: -- on the scheduling.

HEARING EXAMINER GARNER: Your objection's noted, so we'll go then with your witnesses.

MR. BENDER: Thank you.

Q. (MS. MADCHE CONTINUING) Okay. Just to continue on the microfracture testing which you've already given some testimony on, just confirming that we would want to see a microfracture test done on either the KJ Hintz 1 or 2 just to confirm that

value which was proposed in the testing and monitoring plan.

Let's see here. So as it pertains to the -- how the microfracture test data is used in the simulation to calculate the bottomhole pressure constraints that are used in the model, if the results do come out substantially different on the KJ Hintz 1 or 2, whichever you decide to do to confirm that result, it is likely DMR would want the model reran because of the bottomhole pressure constraint being affected by that frac gradient.

A. Understood.

Q. Okay. I'm now moving into Section 5, so I would like to go to Table 5-3. So on this table you have the $CO_2$ stream composition specification that must be met for you to, I believe, accept a third-party source. My question related to this is whether or not all the sources you currently have contracts with have had samples taken or FEED studies completed to confirm they meet or exceed that stream composition?

A. (BY MR. POWELL) So the individual quality spec for each course is greater than 95 percent --

Q. Okay.

A. -- carbon dioxide, and we did -- we had

done a stack test at each facility, and that will be done -- the plants typically do them annually. Unless we have a reason to do them intermittently, we'll follow their schedule, but the individual spec is not greater than 95 percent $CO_2$.

Q. Yeah. I think the confusion was the narrative right above Table 5-3 since it states, "Any new $CO_2$ streams from third-party entities not accounted for at the time of permitting must also meet or exceed the specification once commingled."

And you're saying at a minimum at the source side they would be greater than 95 percent with the anticipation that the commingled stream would be greater than 98.25 percent; correct?

A. Correct. And it's my recollection I think all but one of the 57 sources were 98 percent or higher. There was one facility that was about 96. So commingled, yes, it would be greater than the 98 percent.

Q. And for any new sources that might come down the line, I'm guessing additionally you would want a stack test done before to confirm that they're going to meet the specifications to take that source?

A. You're correct.

Q. Could you -- yeah, we would require that that data be submitted to us before we would approve new sources too.

A. Okay.

Q. Could you elaborate on how the baseline isotopic signature of the $CO_2$ stream will be resampled if new sources are added later on?

MR. HUNT: So I think I can respond.

MR. POWELL: Okay. Go ahead because I was just going to read a paragraph, but go ahead, John.

A. (BY MR. HUNT) Okay. So in the event that a new source is added and approved by DMR, Summit would sample that new commingled $CO_2$ stream within one year after adding that additional $CO_2$ source to get its composition and isotopic signature.

Q. (MS. MADCHE CONTINUING) Let's see. Will the meters that exist -- or sorry. Let me rephrase that.

Will meters exist at all the outlets at the $CO_2$ source facilities, both in state and out of state, to be able to account for how much $CO_2$ mass and total injection stream volumes each individual source is contributing?

A. (BY MR. POWELL) Yes. So Coriolis meters will be installed consistently throughout the

system.

Q. And how do you plan to ratio those mass and volumes back to the individual three storage facility permits for reporting?

A. So I'm not the measurement expert, but it would be reconciled. We'll have custody transfer from the -- on the outlet or discharge side of the capture facilities, and then we'll have -- we'll have a measurement station at the terminus of the main line. And then we'll have Coriolis meters or measurement facilities at each of the injection sites. And so it'll be a mass balance from volume in from each of the 57 source plants all the way through what's injected at each of the well sites and that'll be reconciled.

Q. So I want to move us to Figure 5-3 on page 5-12 of the TB Leingang application. So this figure shows a generalized flow diagram. Could you walk us through this figure specifically as it relates to the capabilities to isolate individual flowlines from each other and how pigging of the flowline system will take place?

A. Yes, and I'd -- this is a difficult diagram to do that from. If you start from right to left -- so each line segment on the discharge

side of a capture facility will have a launcher. And so -- and then each pipe diameter change within the pipeline system will also have a launcher and receiver. And then when you get to the sequestration site, there will be a receiver at each of the well sites.

So if you're looking right to left, so in a common pipeline diameter size, you know, the launcher will be the initiation of that pipe segment, and then it'll go through right to left and then you will be -- for instance, at the sequestration site before it reaches the injection facility, then it will go through a receiver, and then downstream will be a meter or measurement station which will include a gas chromatograph, Coriolis meter and pump. And then the -- the -- the line of demarcation will be on the inlet valve upstream of the shutdown valve at the injection facility.

Q. So just to confirm, with the three -- with the three individual flowlines, are you able to pig those separately?

A. Yes. Each pipe diameter will be able to be pigged independently. So in the sequestration where we have 16, 20 and 24, each of those diameter

changes, the entire segment will be able to be pigged independently.

Q. And as a follow-up, are there any plans for an isolation valve at the junction of where the BK Fischer flowline, called NDL-325, splits off from the TB Leingang flowline known as NDL-327?

A. I may -- may need help from Jamey if that's a diameter change.

MR. BENDER: Okay. We'll bring him up later.

Q. (MS. MADCHE CONTINUING) Can you confirm the land description of where that junction occurs at those two flowlines? Looking at the prior figure, Figure 5-2 it looks like it's Section 5, Township 141 North, Range 87, but it's pretty small scale on the map.

A. It looks correct to me as well, but it is small scale.

MR. POWELL: And, again, perhaps Jamey can confirm, Lawrence.

Q. (MS. MADCHE CONTINUING) So now I'd like to go to Table 5-4 on page 5-14. In this table the flowline has a maximum rate of 936 million standard cubic feet per day, approximately equivalent to 18 million metric tons a year. Earlier on in the

project summary, the modeling had shown that this facility, the TB Leingang specifically, would be able to take 124.4 million metric tons over a 20-year period which would average around 6.22 million metric tons annually. Can you please confirm there's no intent to send -- even though the line has the capacity to send the full 18 million metric tons, there's no intent to send it all to this one facility?

A. That is correct. There is no intent.

Q. And on average, what do you anticipate the flow rate to be on this flowline?

MR. POWELL: Again, I'm going to have to defer to Jamey for that, Lawrence. Sorry.

Q. (MS. MADCHE CONTINUING) Similarly, on the BK Fischer application instead, and on its Table 5-4 on page 5-14, it has a maximum rate of 314.5 million standard cubic feet per day, equivalent to around 6 million metric tons a year, and its modeling had more of an annual amount of 4.92 million metric tons.

So, again, just confirming again that you would not be exceeding what the modeling had showed in those bottomhole pressure constraints even if the flowline capacity would allow you to?

A. That's correct.

Q. And I'm interested in what the average flow rates will be for all three flowlines for when that gets deferred.

MR. BENDER: That's another Jamey question?

MR. POWELL: Yes.

Q. (MS. MADCHE CONTINUING) So, additionally, on that table, for all three of the applications a typical operating pressure has a 900 psi range, roughly, going from 1250 to 2150 psi. And this might be a question that you need to defer again. I'm wanting to know why such a big range was given and whether or not you have -- kind of more within that range where you actually typically plan to be for all three facilities.

A. The range is just -- it's to keep the $CO_2$ in super critical state, and so that's the range from 1250 to 2150, and it's really applicable over the -- predominantly over the pipeline system because over the 2500 miles we have about -- including -- excluding the pumps at the discharge site of the capture facilities, we have 17, I believe -- if I recollect properly, 17 intermediate pump stations, so you have that pressure gradient

from the discharge down to the suction side of the -- of the next intermediate pump station, so that's the range of pressures.

As it says, the maximum operating pressure is 28 -- 2183, but the discharge set points will be 2160, and then we'd run the surge analysis and, of course, you know that's 110 percent so that's, according to the math off the top of my head, about 2400.

Q. So a couple follow-ups to that. In the modeling, the model was done as being pressure constrained both on bottomhole pressure and wellhead pressure and not weight constrained. I'm curious as to why you have a maximum discharge pressure of 2160 psi when the wellhead pressure constraint in the model was only 2100 psi.

A. Yeah, I might have to defer that one.

MR. BENDER: Jamey again.

Q. (MS. MADCHE CONTINUING) And just a statement, because this isn't a weight-constrained model, typically DMR would be going forward with setting a wellhead pressure constraint based on the model and not on operating conditions.

When it comes to kind of the fluctuation that you had mentioned that you have on the

pressure to keep it in a super critical state, will the metering that you're planning to use be able to handle those fluctuations knowing that the density of $CO_2$ is affected greatly by both temperature and pressure and both the temperature and pressure on this Table 5-4 is a fairly substantial range?

A. Yes, it is. It will. The Coriolis meters can handle that variation.

Q. And are those mass flow meters or volumetric meters?

A. Again, I'm not the measurement expert, but I believe that they're mass flow meters.

MR. BENDER: Do you have the answer?

MR. HUNT: No.

MR. BENDER: Okay.

Q. (MS. MADCHE CONTINUING) So some questions related to the corrosion prevention and monitoring detection that's being implemented for all three storage facilities. Can you elaborate a little bit more on the ER -- the ER probes that are proposed and the impressed current cathodic protection system that's going to be used along the flowline system?

A. (BY MR. HUNT) Yes. So for the ER probe, DMR can think of those as -- you know, you guys are

familiar with a corrosion coupon. So imagine this as a miniaturized corrosion coupon that is then attached to a probe that's then attached to the -- to the flowline where it's subjugated to the -- the stream continuously, and in real time there will be continuous measurements of the electrical resistance of that -- of that miniaturized coupon or -- or that probe, said another way. Those -- those resistivity measurements are sensitive to changes in mass and thickness in particular.

Q. What material is the composition of the ER probes?

A. So they will be of the flowline material as well as the wellbore material.

Q. So there will be two probes at at least each injection site?

A. That is my understanding.

Q. And with the impressed current cathodic protection system, is that combined as far as the same system that's going to be across the flowline and the transmission pipeline operated as a continuous protection?

A. (BY MR. POWELL) It is.

Q. Referencing back to that Figure 5-2, I'm just looking for confirmation on what the land

description would be for the terminus point. Again, on this one it looks like it's Section 5, Township 141 North, Range 86 West.

MR. BENDER: Is that something we can supply you in a supplement?

MS. MADCHE: Yeah. Both of those locations could be confirmed in a supplement. That would be fine.

Q. (MS. MADCHE CONTINUING) So a question on the seal pot system that is planned to be used to maintain the tubing/casing annulus pressure to approximately 300 psi. Are you anticipating any on-site tank storage such as vessels needing to be on site for that system that would be holding, like, packer fluid or brine, not necessarily a nitrogen vessel?

A. (BY MS. ODDY) At this time I don't believe we plan on having storage tanks for corrosion-inhibited fluid, but we will have the nitrogen seal pot like you said adjacent to the wellhead.

Q. I guess just a note. If at any point those plans do change, secondary containment such as a dike would be required around any brine storage or the packer fluid.

And also a note that a Sundry variance would be required to have the 300 psi annulus pressure just because currently as rule requires, it's to be greater than the injection pressure.

A. Understood.

Q. I believe this has already been answered earlier in part, but just to confirm, no baseline soil, gas sampling or groundwater sampling has taken place yet; correct?

A. (BY MR. HUNT) That is correct.

Q. And that would be anticipated to begin approximately a year in advance of injection operations beginning?

A. That is also correct.

Q. So this question is specific to the KJ Hintz and it may need to be deferred. I'm just looking for how that year 19 was determined for the year to install the Fox Hills monitoring well next to the Raymond Jensen 1-34 P&A well.

A. Yeah. So in general the idea there was, as has been testified to, you know, previously, seismic surveys will be acquired at least every five years, so, you know, year 2, year 4, year 9, year 14, year 19. And so the idea there was that as Summit is monitoring the $CO_2$ plume expanding in

the storage reservoir, we don't anticipate at this time that that legacy wellbore will see $CO_2$ and certainly within that time frame.

But, you know, taking a proactive approach and after taking the seismic data and then reviewing that data to see how is the $CO_2$ plume progressing, is it conforming to expectations, so that year 19 really just allows some of the opportunity, the -- the optionality to wait to install that well until, you know, it is needed. And, of course, if it's determined that it may be needed prior to then, then they have that option as well.

Q. So I want to reference Section 5.7.2. Let me get a page number. So that would be page 5-26 in the TB Leingang application. And it's paragraph 4, and this language is in all three applications. There's a statement that Summit reserves the right to evaluate and modify, if necessary, appropriate groundwater sampling locations and frequency. Just a note that any changes to the frequency or locations should go through DMR for approval and review.

A. Yes. Acknowledged.

Q. And that would apply as well as far as any

changes made to the near surface monitoring during the PISC period.

A. Understood.

Q. Could you give a little more testimony on the local passive seismicity array that's planned to monitor for potential induced seismicity?

A. Sure. So at this time Summit has plans to install multiple seismometers at the site. At this time -- well, a specific layout or design or number of stations is unknown, but prior to injection Summit would request bids from vendors to put together a site-specific strategy.

We understand today that by multiple -- in order to properly triangulate and locate any seismicity events, you would need at least three seismometer stations as a minimum.

Q. Just a statement that once a layout's known, that information should be provided to DMR.

A. Understood.

MS. MADCHE: Let's see. I think that's all I have currently. Thank you.

**EXAMINATION**

**BY MR. STOLLDORF:**

Q. Jimmy, I asked a question earlier that they punted to you, so I'll ask it again. At its

closest, approximately how far away is the facility for the TB Leingang from an occupied dwelling?

A. (BY MR. POWELL) I apologize because I don't have each site memorized, but I believe the closest dwelling to either -- any of the well sites is about 4400 feet -- I'm sorry -- 2200 feet. 2200 feet. I believe the furthest is about 4100 feet. But it's 2200 feet. And we can clarify if that's Leingang or if that's one of the other two.

MS. MADCHE: I think we might just ask that a supplemental is provided as far as the proximity of how close the flowline is for each individual one to the closest dwelling.

MR. POWELL: Okay. And I believe the closest dwelling to a flowline at either location is 700 feet, but we could provide the exact distances for all three.

MS. MADCHE: Could you add to that also closest distance to a wind turbine, specifically for the TB Leingang application?

MR. POWELL: Yes, we can do that.

MS. MADCHE: Sorry to jump in.

Q. (MR. STOLLDORF CONTINUING) So Section 7, the Emergency Remedial and Response Plan, that's

you, Jay; is that correct?

A. (BY MR. VOLK) Yes.

Q. Under the Section 7.6 -- I'll let everybody get there. It indicates that the company organizational structure is still in flux and in development. Do you know -- I'd note that it's expected that we -- to complete that before being provided authorization to inject. We would expect that to be nailed down.

A. Without a doubt. We're continuing to work on, as the rest of the project continues to develop, an integrated response plan as well which will be consistent with this one, and we will supply that when done and prior to injection.

Q. Okay. So this is in the PISC section. Hopefully one of you can answer this. For all three applications on Figure 6-2 -- give me a second and I'll get a page number for you. That is page 6-6 in Exhibit 1A for the TB Leingang application.

Can you -- oh, sorry. Are you guys there?

Explain how the $CO_2$ extent ten-year postinjection boundary was determined?

A. (BY MR. HUNT) I think we would want to bring one of the other witnesses up to answer that.

MR. STOLLDORF: Probably Amanda?

MR. BENDER: (Nods head.)

Q. (MR. STOLLDORF CONTINUING) What's the setback being proposed for the flowlines?

A. (BY MR. POWELL) Again, the setbacks for the flowlines, similar to the -- to the pipeline in North Dakota that's under PSC jurisdiction, complies with State law, 500 feet as a minimum.

Q. What type of notification system's in place should residents or -- and/or businesses need to be notified in an emergency?

A. (BY MR. VOLK) We've had numerous conversations with Oliver County, Mercer County and Morton County, and this is an area we've determined to work cumulatively on and develop. So right now there's multiple systems being used between Mercer County and Morton County. I believe Mercer County and Oliver are both using reverse 911. Morton County is using that as well as I believe some secondary options.

So we have committed to continuing working with all three counties to provide the data needed to make sure the notification system is -- is going to be consistent throughout all three counties.

Q. How often do you plan on doing training

with these local emergency response teams?

A. On an annual basis at minimum. I believe it's not to exceed 15 months, but it is on the annual basis.

MR. POWELL: Yeah. I'll just add that since we know that North Dakota -- and I'm not sure of a specific -- Jay, you could help me on Mercer or Morton or Oliver, but a lot of the counties have volunteer fire departments and sometimes those personnel interchange or are unavailable, so we've committed to providing training on a more frequent basis as needed.

Q. (MR. STOLLDORF CONTINUING) I hope you guys will -- someone here at the table will be able to answer this one, but this has come up in the past, but are there any special considerations for DMR field inspection staff to be coming onto the sites? Do you have -- or do you have any -- are you aware of any issues that might bring up, having a DMR inspector on site -- some of the sites?

A. (BY MR. VOLK) As expected, unrestricted access for any regulatory items such as DMR access. With that being said, previous work I've done has always provided on-site hazard training for and up to and including inspectors so they have the proper

notices of what is out there or what needs to be out there. And if any special training would be required for those inspectors, we will make sure that's available.

Q. Would you be able to provide us --

MR. SUGGS: Sorry.

MR. STOLLDORF: Oh, go ahead.

MR. SUGGS: On that note, if there is anything anticipated, at this time I would ask that it be provided as a supplemental for what you'd anticipate the DMR inspection staff needing to have under their belt or have training for accessing your facilities.

MR. VOLK: We will provide that.

MR. SUGGS: Thank you.

Q. (MR. STOLLDORF CONTINUING) As it relates to Sections 9, 10 and 11, the construction plugging and completion plans for the Class VI wells and monitoring wells, we just want to note that it will require typical DMR approvals prior to executing, just so you understand.

A. (BY MS. ODDY) Understood.

Q. I want to move to Section 11, the injection well. I have one question -- or a couple questions. Can I -- okay. Then we'll go to 12.

Sorry. Excuse me.

You're approximating it'll cost about $583,000 to plug one injection well. Are you guys considering that it's going to probably require a big rig to handle that size of tubing?

A. That's correct. With a 7-inch tubing, we will need a bigger workover rig. In addition to that, the anticipation of the plugging plan is also to set $CO_2$ resistant cement. So those estimated costs are included in the plugging costs.

Q. Okay. And you touched on this earlier about the surety bonds, but you're proposing to use a surety bond for the injection well plugging phase and the PISC phase. Are you planning to have one surety bond or two separate bonds for each phase?

A. (BY MR. VOLK) At this point in time we have not one -- allocated -- or we have not committed to a certain provider, so that'll be forthcoming, at minimum 30 to 60 days prior to injection it would be submitted to you. We know we will be using the surety and the pollution liability for those, and I can't today tell you in certainty if those will be split between the phases you asked.

MS. MADCHE: I'm just going to jump in,

and not necessarily a recommendation but something to consider is clearly as you work through closing one of these facilities, plugging the injection wells is going to be the first item. If they are on separate sureties, that would allow you the ability to request one to be released while maintaining the other one for continued PISC monitoring. So, again, just something to consider.

MR. VOLK: Appreciate that, and we will provide additional information to you.

Q. (MR. STOLLDORF CONTINUING) Can you elaborate a little more on the emergency and remedial response plan and how the endangerment to USW -- or underground sources of drinking water costs were determined?

A. I just want to make sure I'm getting to the right figure. If you bear with me for one second. There it is. So I'm going to direct your reference to page 12-10 and Table 12-7. So, first of all, I want to start off with what the actual scenario was used to determine the estimated cost on ERRP as well as to your specific question the USDWs.

The scenario that was used was a well failure or integrity issue with the well in which a

containment -- loss in containment event happened. To get into more specific details on that, I will have Jean talk through that. But to the specific cost as it relates to the USDWs, it is broken out between -- in Table 12-7, the general response actions, delineation and water replacement at 1.89 million as well as the quarterly monitoring which is dictated on a ten-year period for 750,000. And then the plugging and abandonment cost of the groundwater -- groundwater monitoring wells in that area is another 55,000, which came up to 2.6 million.

Q. And you did mention that the failure mechanism is a loss of a containment event?

A. That's correct.

Q. Okay. Just want to note that the average -- okay. I don't need to. All right. Never mind.

MS. MADCHE: No. I do have a follow-up on that. Clearly, the costs are slightly different for all three facilities for the emergency remedial response. Can you just kind of go over what parameters were used to determine those costs that would cause that fluctuation?

MR. VOLK: Yes. The difference largely

comes into on the general response delineation and water replacement line item. What we tried to do is look at more site-specific characterizations in those areas, how many wells, what would be their water replacement cost, and that was the distinguishing difference that drove the number up or down.

MR. STOLLDORF: Nothing further for me.

**EXAMINATION**

**BY MR. SUGGS:**

Q. Just a couple of additional items. I'm going to jump back up to 5-13. The second-to-last paragraph on that page related to custody transfer of the $CO_2$, the way that's described is that the $CO_2$ when it reaches the terminus point will become the custody of SCS1 and it will remain that way until it goes down the hole at any of the three different facilities. Am I understanding that intention correctly?

A. (BY MR. POWELL) So that's page 5-15?

Q. Page 5-13, the second-to-last paragraph.

A. Oh, sorry. All right. That's my understanding.

Q. Okay. As the flowlines are anticipated to be owned by the individual storage facilities,

SCS1, 2 and 3, would Summit be opposed to a requirement that would require a flow meter at each -- I guess at the beginning of each of the individual flowlines and an actual custody transfer happening as it moves from one line into the other?

A. So versus having measurement at the terminus of the main line for the -- sorry. As opposed to just having the single meter at the terminus of the main line at the -- at the jurisdiction breakpoint and then an individual meter at each well pad or well site, you're suggesting or recommending that we'd have an intermediate meter, then, at the beginning of each of the laterals from that segment of main line, flowline to each well site.

Q. (MR. SUGGS CONTINUING) Yeah. I think you would end up with at least two additional meters in play, one being where the $CO_2$ would go north to the KJ Hintz facility and one at the point where it goes west from the Leingang to the Fischer.

A. I'm not opposed to that.

Q. Okay. With respect to the cathodic protection system that's being proposed, has that already been designed at this point?

A. It hasn't been -- the impressed current

cathodic protection system?

Q. Yeah.

A. Generally. We're going to have to -- since we've added additional source points and additional laterals along the whole system, we're going to have to go back and rebalance the system and figure out if the location of the ground well -- the ground beds have changes, where they need to be expanded, et cetera. So it needs to be reconfigured upstream of the sequestration area.

Q. Okay.

A. As far as the sequestration area, it's generally been designed but we'll refine.

Q. Okay. So that is still under works and will be refined?

A. Correct.

Q. Okay. So when that is determined, we'll want the location of the ano beds identified, and pursuant -- there's -- on page 5-15 in Section 5.3.1, there's indication of -- what am I reading -- Summit Carbon Solutions will supply DMR with a map of cathodic protection boreholes to meet the requirements of 43-05-01-5. Do you anticipate actually drilling any cathodic protection boreholes or will this system entirely utilize ano beds?

A. It's my understanding ano beds. We'll clarify.

Q. Okay. And so, regardless, we'd want those locations identified.

A. Yeah.

Q. And I think, John, you testified to this earlier, but there's some narrative on 5-29 that indicates that you will be running 3D seismic at years two, four and nine. It is the intent to run 3D seismic as early as year two after injection?

A. (BY MR. HUNT) That's -- yes. Yeah, and in the narrative it says "by year two," so just to be clear.

Q. Okay. But my point -- my confirmation is that there will be a sequence of 3D seismic run shortly after beginning injection and another one prior to the five-year review?

A. Correct.

Q. Okay. I'll point out that if anything looks significantly off at that two-year mark, it is expected that you will report that and we'll begin the determination whether or not we need to accelerate that hearing.

A. Understood.

Q. On page 5-32 there's the narrative about

the traffic light system for the passive seismicity, and you have the cutoff points of 2.7, 4.0 and 4.5. Can you elaborate on what the significance of those values as cutoff points are?

A. So 2.7 is the point at which humans can begin to feel seismicity, and so that's why that one is listed there. For events 4 and 4.5, I don't have off by memory -- I would need to go and refer back to the team on that one.

Q. Okay. If that's something that can't be provided in short notice or short period as part of this testimony, possibly a supplemental just confirming what the importance of those values is in that system.

A. Understood.

Q. And I think this one is for Jay. On 7-17, the last sentence under the 5 -- sorry -- 7.5.1 section, it reads, "In addition, assistance has been secured from local emergency services to implement this ERRP."

Which emergency services have you specifically worked with and secured their assistance in execution?

A. (BY MR. VOLK) So we continue to develop this. This is an overarching plan. We have

reached out to, as I've said, Morton County, Oliver County as well as Mercer County, including the fire departments in numerous of the surrounding towns. A couple of them are Beulah, Hazen, Center, Zap. So without having what I would call -- and I'm going to say maybe that statement today is not totally defined as the ERRP isn't, but continued working agreements with -- or continued working with them to commit to: One, I understand there's a memorandum of understanding of mutual aid between all of them or actually statewide now. So they have recognized that. Two is they've recognized that we will continue to work together in developing that plan and know they have different capabilities between the units. And that is what we're going to continue to work on to supply what I would call as an integrated plan between all three counties.

Q. So in -- I guess with respect to this statement in the application --

A. We have not secured an agreement, so I would say that wording probably should be changed at this point.

Q. Okay.

A. I would say commitment's a better word

than agreement.

MR. SUGGS: That's all I need. Thank you.

HEARING EXAMINER GARNER: Okay. Before we recall those witnesses, why don't we take a ten-minute break.

MR. BENDER: Okay.

(Recessed at 2:56 p.m. and reconvened at 3:12 p.m.)

HEARING EXAMINER GARNER: We are back on the record. Attorney Bender, you wanted to recall some witnesses.

MR. BENDER: Yes. We're going to recall Caitlin Olsen.

HEARING EXAMINER GARNER: Microphone.

MR. BENDER: Oh, sorry. We're going to recall Caitlin Olsen. We're going to recall Wade Boeshans. And then to answer some of the questions that came up from staff, we'll be recalling Amanda Douglas, and then we'll have one new witness. As you may recall, there were questions to the previous group and they were deferred to Jamey Backus.

And I apologize, I misspelled his name earlier when there was a question on it. It's B-a-c-k-u-s.

So with that in mind, we'll call Caitlin Olsen back.

HEARING EXAMINER GARNER: Ms. Olsen, just a reminder, you're still under oath.

**REDIRECT EXAMINATION**

**BY MR. BENDER:**

Q. Caitlin, I'm going to show you what's been previously marked as Exhibit 8B. Can you tell me what 8B is?

A. (BY MS. OLSEN) 8B is the Storage Facility Permit Application Comparison Summary Table.

Q. And when we started the hearings, I briefly explained to the --

MR. SUGGS: Lawrence, have you handed that out yet?

HEARING EXAMINER GARNER: Do you have one?

MR. SUGGS: No.

Q. (MR. BENDER CONTINUING) When we started the hearing, Caitlin, you may recall me talking very briefly about the fact that we were going to spend a lot of time on the Leingang application and then we were going to sort of do -- contrast and compare Leingang with Fischer and Hintz after that. Do you recall that?

A. I do.

Q. Okay. And is 8B sort of a visual aid and you being able to go through and make those comparisons?

A. That's right.

Q. Okay. Let's start -- I'm not going to interrupt you much, but why don't you start by first talking about the various columns and what your method was for laying this out and then you can explain it to the Commission.

A. Sure. So the intent of this comparison summary table was just to lay out the differences between all three permits. Listening to the hearings today, I feel like most of those points have been covered by DMR or otherwise in testimony.

But you'll see here across the top the column named SFP Permit Section, that relates to the section of the permit that we're talking about. Then you'll see Summit Carbon Storage #1, TB Leingang/Milton Flemmer 1, that's referring to permit number one, the TB Leingang permit. Likewise, the second column is the BK Fischer permit. And the third column is the KJ Hintz permit.

Q. Okay. Then let's -- why don't we start out first with the Project Summary, and what I'll

probably do is have you explain that in detail, and then we can kind of walk through the -- the other sections and you can probably more abbreviate your discussion of it.

A. Sure. So as Wade testified to the project summary earlier today, the only material difference in the three permits in relation to the project summary is the applicant name listed. All other aspects of Wade's testimony apply to the TB Leingang, the BK Fischer and the KJ Hintz as you'll see noted in that row.

Q. Okay. Let's go to the next column -- or not the next column, the next row.

A. Section 1, Pore Space Access. There's minimal content changes between the permits, as you'll see noted. There is one thing to specify in the BK Fischer permit and that is that there is Coyote Creek -- Coyote Creek mining -- mine land located within the hearing notification area.

Q. And I think as a result of some questions that came to Amanda, she pointed that out in one of the exhibits; is that correct?

A. That's right.

Q. Let's go on then to Section 2.

A. That's the geologic exhibits portion of

the storage facility permit. You'll remember as Amanda testified to yesterday and earlier today that the model extents used across all three permits are the same. Logging efforts are the same. Microfracture in situ stress tests were performed in all three wells and all three -- excuse me -- all three permits, and all three permits used the same 2D and 3D seismic surveys.

The differences that we'll talk about here mainly have to do with site-specific characterization work. You'll note that in the TB Leingang permit the Minnekahta Formation is present as Amanda had testified to earlier. The Minnekahta Formation is absent in the BK Fischer permit and in the KJ Hintz permit.

Again, site-specific storage complex formation data is -- varies between all three permits as noted here. That includes core data, log testing, things like that.

And the last point to make sure on Section 2, Geologic Exhibits, is that the number of borehole image logs varies between all three permits.

Q. All right. Then let's go to Section 3, please.

A. Section 3 discusses the geologic model construction and numerical simulation of $CO_2$ as Amanda had testified to previously. The same data inputs were used. Again, as described in Section 2, the same model was used across all three permits. The same simulation was performed where all three well sites were simulated as injecting at the same time. You'll note here that there are minor variations in Section 3 where site-specific data is used to derive individual injection pressures, rates, temperatures and critical threshold pressure estimations. Those are the only differences of material value.

Q. All right. Then we'll go -- the next row is Section 4, the Area of Review. Can you briefly discuss what's contained in that row?

A. Area of review, as I testified to earlier, uses the same groundwater sampling method across all three permits. The methodology remains the same. There are site-specific differences that have to do with the number of wells based on the specific area of review and what wells exist there.

Other differences include other site-specific surface features which may include springs, mining land as I discussed previously, and

any legacy oil or gas wells. To note, there are no legacy oil and gas present in the TB Leingang or BK Fischer area of review. There is one KJ -- there is one legacy oil and gas well in the KJ Hintz permit as I had testified to earlier.

Q. I'm going to try to get some points here with the court reporter, so can you slow down just a little bit?

A. I thought I was.

Q. Let's go to the next section, Section 5.

A. Section 5 discusses the testing and monitoring plan. Across all three permits, leak detection plans are similar. Flowline corrosion, prevention plans are similar, and baseline testing and logging plans are similar. There are minimal differences for mechanical integrity testing across all three permits.

You'll note that in the TB Leingang permit the Milton Flemmer 1 will use tubing-conveyed gauges, as Jean had previously testified to in Section 9. The other two stratigraphic monitoring -- excuse me -- stratigraphic test/monitoring wells will use casing-conveyed gauges. Environmental monitoring plans, again, are site specific but the methodology remains the same.

Q. Okay. The next section, please.

A. Section 6, the Postinjection Site Care and Facility Closure Plan. The monitoring programs are similar across all three storage facility permits. There are minimal differences related to monitoring well-specific details, for example, the maximum pressures seen across each storage facility.

Q. All right. And then Section 7 I have labeled on my exhibit Emergency and Remedial Response Plan. Can you discuss that for us, please?

A. The content between all three permits is the same materially.

Q. Okay. And Section 8?

A. Again, the material content is the same and there are no -- no large differences.

Q. And Section 9?

A. All three storage facility permits abide by the same North Dakota rules and regulations, such as requiring surface casing 50 foot below the lowermost USDW and $CO_2$ resistant cement casing within the injection reservoir zones.

You'll note that the biggest differences are that the Milton Flemmer 1 stratigraphic test well and monitoring well was drilled deeper. It

was drilled to 12,000 feet. The other two wells, the Archie Erickson and the Slash Lazy H, were drilled to approximately around 6,000 feet. That would result in just differences in cementing. Some are two stages for the shorter wells and some are three stages in those completions.

Q. All right. Let's go to Section 10, the plugging plan.

A. There are no material differences in the plugging plans across all three permits. Plug placement will vary based on formation depths, you know, depending on where those formations exist within each specific wellbore.

Q. And Section 11, Injection Well and Storage Operations?

A. Again, the Milton Flemmer 1 well, since it will be using tubing-conveyed pressure gauges, tubing will be installed in the Milton Flemmer 1 well. Prior to injection operations beginning in that storage facility permit in the TB Leingang, that well will be plugged back. It's currently drilled to about 12,000 feet.

There will be no tubing installed in either the Archie Erickson monitoring well or the Slash Lazy H monitoring well.

There are site-specific differences in maximum bottomhole pressures, injection amounts, et cetera, as seen in Table 11-1.

Q. Okay. And Jay spent some time comparing and contrasting the financial assurance. So keeping that in mind, can you just discuss Section 12 for us?

A. Yeah. Jay did a great job testifying to the differences already. There are minimal differences between all three storage facility permits. The total bond amount between the three storage facility permits varies slightly, and those minimal differences are related to the cost estimates of the postinjection site care and facilities plan, and namely the number of monitoring wells at each site, the reservoir monitoring well design characteristics, flowline lengths and costs associated with endangerment of USDWs.

Q. All right. Now let's spend a little time with the appendices that are attached to each one of the applications. Let's start with Appendix A.

A. There are no material differences between all three permits other than they use site-specific information.

Q. And Appendix B?

A. There are, again, no material differences in Appendix B, Freshwater Well Sampling Analysis, other than the results are site specific.

Q. And Appendix C?

A. There are no material differences in Appendix C across all three storage facility permits. You'll note here that site-specific information, namely XRD data, was used to inform mineralogical compositions for injection zone and confining zones. Again, stratigraphic well-specific water ionic compositions were used and, therefore, the simulation results are site specific.

Q. And Appendix D?

A. There are no material differences between the three storage facility permits. You'll note that TB Leingang does list information for those tubing-conveyed pressure temperature gauges.

Q. And then finally Appendix E?

A. There's no material differences. The differences relate to the permits themselves.

MR. BENDER: Mr. Examiner, you know, I don't -- I think I'll offer the exhibit, and I don't have any other further -- I don't have any

further questions for Ms. Olsen.

HEARING EXAMINER GARNER: Any objections?

MR. BRAATEN: No objection.

HEARING EXAMINER GARNER: Exhibit is admitted.

You can proceed to your next witness.

MR. BENDER: Next witness is Wade Boeshans.

HEARING EXAMINER GARNER: And just a reminder, Mr. Boeshans, you're still under oath.

MR. BOESHANS: Yes.

**REDIRECT EXAMINATION**

**BY MR. BENDER:**

Q. Wade, while we're handing out the exhibits, I'm just going to have you direct your attention to what's been previously marked as Exhibit 1C-1.

MR. BENDER: Derrick, can you tell me when you get a copy?

MR. BRAATEN: Sure. Okay. I'm ready.

MR. BENDER: Okay. Thank you.

Q. (MR. BENDER CONTINUING) Wade, can you tell me what Exhibit 1C-1 is?

A. (BY MR. BOESHANS) It is the storage agreement for SCS3 for the KJ Hintz storage site.

Q. And can you briefly describe the amendment to the Hintz storage unit that Summit is proposing with this exhibit?

A. Yes. So in this exhibit it includes an amendment in what is labeled in here as Section 3.12.

Q. And can you explain to the Commission staff why Summit is proposing the addition of Section 3.12 to the Hintz storage agreement?

A. Yes. So as you're aware in the -- from the previous -- or my testimony yesterday, the KJ Hintz is in proximity to the DCC facilities. I think I mentioned yesterday -- or I did mention yesterday that approximately, you know, three miles between the storage boundary of -- storage area boundary of the KJ Hintz and the DCC West facility. And so Summit and Minnkota have been in discussions around a border agreement in terms of how we would work together to, you know, manage our storage operations or cooperate in storage operations. And so this amendment outlines what we have agreed to in terms of general terms, and those discussions have advanced to this point.

Q. It's my understanding, Wade, that the -- the Hintz storage agreement already has language

for a border agreement -- for the parties to enter into a boarding -- border -- I'm having trouble talking here -- border agreement. Why was it necessary to add Section 3.12?

A. Yeah. So you're correct in that the application or the border -- the storage agreement in the application includes border agreements. This section is specific to a border agreement between Summit SCS3 and the DCC facilities.

And so we thought it was prudent at this time given our discussions to lay out the general terms that we've agreed to at this point in anticipation of finalizing that border agreement of coming here, but this would set forth in essence the -- call it general terms and expectations of the border agreement which the parties have agreed to work together on. We believe it's in our best interest to do so, and so we're submitting it here today.

Q. So it's Summit's request and Minnkota's request that the storage agreement for the Hintz storage facility be amended to include the language which is set forth in 3.12; is that a fair statement?

A. Yes. That's correct.

MR. BENDER: That's all the questions I have for this witness. Offer that exhibit which is Exhibit 1C-1.

HEARING EXAMINER GARNER: Any objection?

MR. BRAATEN: I don't have an objection to the admission of the exhibit. I have an objection to the amendment itself to the application at this point given the circumstances, but not to the admission of that exhibit into the record.

HEARING EXAMINER GARNER: We will note your objection and admit the exhibit.

MR. BENDER: Mr. Examiner, we'd now like to move to Amanda Douglas. If you recall, there were some questions when we had the larger group up here that we believe Amanda can respond to. So I believe she's still sworn.

HEARING EXAMINER GARNER: Yeah. Just a reminder you're still under oath.

MS. DOUGLAS: Understood.

**REDIRECT EXAMINATION**

**BY MR. BENDER:**

Q. Do you want to handle it the way you did last time, Amanda, where you indicate what the question is and then respond?

A. (BY MS. DOUGLAS) Yes. And DMR staff, if

I -- I miss any, please let me know.

The first question I believe that was asked and deferred was how a fracture pressure gradient influenced $CO_2$ plume size. Generally, the fracture pressure gradient is used to calculate the bottomhole pressure constraint, so 90 percent of the fracture pressure gradient is used to define the bottomhole pressure constraint as required by regulations. A higher fracture pressure gradient would result in a higher bottomhole pressure allowing for more injection of $CO_2$ which would generally result in a larger plume.

However, I'd like to point out in the modeling cases that we ran in the permits in Section 3, the 2100 psi wellhead pressure constraint was met prior to the bottomhole pressure constraint being met. So in this case the higher fracture pressure gradient at one of the sites is not dictating a larger plume size for the case -- simulation case presented in the permit application.

Q. That's -- I believe that's the only question that -- oh, there's another one?

A. I was just pausing. Sorry.

Q. Oh, okay.

A. Waiting for --

Q. That was a long pause, so --

A. Waiting for the Commission to -- to write their notes.

Another question I believe -- Travis, you asked a question on stabilized plume. Could you please restate your question, or postinjection period?

MR. STOLLDORF: Oh, okay. Hang on one second. Yeah. On Figure 6-2, can you explain the $CO_2$ extent ten-year postinjection -- how that ten-year postinjection boundary was determined? It's on page 6-6 or 6, dash, 6.

MS. DOUGLAS: Yep. So the simulation model was used to simulate the 20 years of injection and several years postinjection. And so the plume as labeled here is showing the $CO_2$ plume extent at ten years postinjection as determined -- as predicted by that modeling simulation.

MR. STOLLDORF: Okay. What parameters are used to determine when the plume is stable -- when the plume is stabilized?

MS. DOUGLAS: So plume stabilization is determined by looking at the rate of change in plume area over time. So the rate of change in the

plume area over time decreases, and so we used -- we calculated the rate of change over one-year time steps and looked at the point in time where rate of change slowed down. And in that case the cutoff was determined to be less than two square miles of change per year in plume area, and that was used as our cutoff to determine when the $CO_2$ plume stabilized. .2 -- .2 miles, sorry, if I misstated.

MS. MADCHE: And that's using the 5 percent saturation cutoff as well within those square footage movements?

MS. DOUGLAS: That's correct.

MR. STOLLDORF: Thank you. That's all I had.

MS. DOUGLAS: So, Tammy, you asked a question about the pressure from the flowlines and the wellhead pressure used in modeling. Could you restate that question?

MS. MADCHE: Yes. So on Table 11-1 on page 11-2, for all three applications there's a note that maximum injection pressure during operations will be limited to surface equipment pressure ratings and the maximum bottomhole pressure constraint. In Table 11-1 and in Section 3 in the model you report that you used a wellhead

pressure constraint of 2100 psi alongside the bottomhole pressure constraints. However, in the testing and monitoring section in Table 5-4, the flowline maximum operating pressure is listed at 2183 psi along with a maximum discharge pressure of 2160 psi. So my question was why those operational values on the flowline are higher than the wellhead pressure constraint that was used in the model.

MS. DOUGLAS: So can you restate the value? Did you say it was 2,160?

MS. MADCHE: 2183 for max operating pressure, 2160 for max discharge pressure.

MR. BENDER: Do you want to hand that off to Jamey or --

MS. DOUGLAS: Yes.

MR. BENDER: Reluctantly?

MS. DOUGLAS: So before Lawrence introduces Jamey, then, you guys had a question on the stoplight system and the magnitude of earthquakes used in that stoplight system. So John described 2.7 is the low value for that stoplight system. Again, that's the threshold for a felt earthquake.

Greater than a magnitude of 4 was chosen essentially for that next step in the stoplight

system. At an earthquake magnitude level 4, that's where the magnitude of the earthquake would be sufficient to -- it's generally described by the USGS as shake or rattle dishes. That's how the USGS describes it. So at that point the stoplight system states that SCS will stop injection, perform inspection on surface facilities and wells to ensure there's no damage, and then reduce operations while a detailed analysis is done to determine whether or not injection operations caused that or that could have been a natural earthquake that their monitoring array is just picking up.

And then over 4.5 is the cutoff for complete stop of operations and working with the regulator to determine if any changes to injection operations are needed.

MR. SUGGS: So why the 4.5? What's the significance of that transition?

MS. DOUGLAS: So as you get from 4 moving up till 5, so earthquake magnitude 5 -- as described by the USGS, at earthquake magnitude 5, that's where you might start seeing potential damages to structure, such as cracked drywall, things like that. And so 4.5 is below that 5

threshold to provide that safeguard to make sure that operations are shut down before any earthquakes are induced that could cause damage.

MR. SUGGS: Okay. Thank you.

MS. DOUGLAS: Were there any other questions that you recalled that were deferred?

MS. MADCHE: No.

MS. DOUGLAS: Okay.

MR. BENDER: We'll now call Jamey Backus, I think, who can respond to the remaining questions. Jamey will -- and Jamey has not been sworn.

HEARING EXAMINER GARNER: I'm going to swear him in.

MR. BENDER: Okay.

**JAMEY BACKUS,**

being first duly sworn, was examined and testified as follows:

**DIRECT EXAMINATION**

**BY MR. BENDER:**

Q. Jamey, state your full name for the record.

A. Jamey Backus.

Q. And, Jamey, I misspelled your name earlier, so will you spell your last name?

A. B-a-c-k-u-s.
Q. And, Jamey, by whom are you employed?
A. Summit Carbon Solutions.
Q. In what capacity?
A. Project manager of topside facilities.
Q. Okay. And can you spend just a few moments providing us with a summary of your educational background and work experience?
A. Bachelor's degree in mechanical engineering. I worked at DGC for a number of years, which is the chemical plant up near Beulah, and then I also worked in coal-fired power generation in roles such as engineer, maintenance superintendent and plant manager.
Q. And what are some of your duties and responsibilities with respect to your employment at Summit?
A. That would be design of the topside facilities and equipment selection.
Q. Okay. I don't have any other questions. He's available for the questions that -- I don't remember exactly what they were, but I think Tammy may have had a few, or do you recall the questions?
A. Well, I think I can -- I'll go through all the ones I have and then let me know if I forgot

any.

So if we begin with the max pressure one that Amanda referenced, the max operating pressure of the pipe is set by thickness, flange ratings, et cetera. The maximum output pressure of the pump is set by the pump manufacturer, but we will have controls in place so that the wellhead pressure never exceeds the 2100 psi.

MS. MADCHE: Sounds good.

MR. BACKUS: Okay. The other question, the block valve where NDL-327 breaks off to NDL-325, we did not have intentions of putting a block valve there. Now, with the discussion of potentially putting a Coriolis meter there, we may revisit that, but we did not originally have intentions of putting one there because the mileage of the pipeline in that area did not require it.

MS. MADCHE: So I guess I would just state we would probably highly recommend it just because it gives you that extra ability to isolate between the facilities since they are owned by separate LLCs.

MR. BACKUS: You'd asked about location of where NDL-327 goes to 325, that is 141 North, 87 West, Section 5. The terminus point is 141 North,

86 West, Section 5.

MS. MADCHE: Okay.

MR. BACKUS: Those were the ones that I had.

**EXAMINATION**

**BY MS. MADCHE:**

Q. Okay. So additional ones I have were what you anticipate the average flow rate to be for the three individual flowlines?

A. Yeah. So I would -- I would reference the Section 11 for each one of the applications, and our average -- average injection rate between the two wells utilizing the 2100 psi wellhead constraint, I would -- I would utilize the total of that number as to what will actually flow through the line to the -- to the well site.

Q. So just to confirm, you plan to maximize right up until the 2100 psi wellhead pressure constraint?

A. Depending on flow coming in from the capture facilities --

Q. Sure.

A. -- you know, the 16 -- I'll talk in rough numbers -- the 16 million tons that is currently slated.

MS. MADCHE: Okay. I'm just checking to make sure I don't have anything else here. I think that's all I have for deferred questions. I'll let anyone else go. I do have one question on the Exhibit 8B afterwards, so --

MR. BENDER: When you say "afterwards," I'm sorry, I don't mean to question you, but --

MS. MADCHE: Anyone else in DMR that --

MR. BENDER: Oh, I see.

MS. MADCHE: -- has --

MR. BENDER: Okay.

MS. MADCHE: -- deferred questions. Sorry.

MR. BENDER: Okay. Thank you.

HEARING EXAMINER GARNER: I think you can ask, Tammy.

Q. (MS. MADCHE CONTINUING) All right. So on Exhibit 8B, on page 5 of 6 I think there might be a typo on the KJ Hintz column under Section 12, number 2. It states, "Additional groundwater monitoring well and soil gas profile station has been added at legacy well 4942." Based on the figure in the application it's an additional Fox Hills monitoring, not a soil gas station, just to confirm. And that would be figure -- give me a

second.

A. (BY MS. OLSEN) You're correct. That's a typo. There is not a soil gas station planned near that additional legacy well. Just a Fox Hills monitoring well.

MS. MADCHE: Okay. Thank you.

HEARING EXAMINER GARNER: Well, at this time I guess we'll move to cross-examination unless there's anything else.

MR. BENDER: Yeah. And I will -- I'll accommodate Derrick in any way. If you would prefer the -- that other group of people that we had up a few moments ago and have -- and do your -- conduct your cross-examination on those witnesses first or if you want to use this group, whatever you prefer, I'll try to accommodate you.

MR. BRAATEN: Give me just one moment, please. Maybe for efficiency, if you don't mind, I can just start with some of the questions I had for these witnesses and then finish that and recall any that I need that were up prior.

MR. BENDER: I guess I'll try not to object, but I would hope you would keep it to --

MR. BRAATEN: Yeah. I have questions based on this testimony.

MR. BENDER: On the direct we just had?

MR. BRAATEN: Yeah.

MR. BENDER: Okay. Fine.

**RECROSS-EXAMINATION**

**BY MR. BRAATEN:**

Q. Ms. Douglas, I think you had testified about the plume stabilization parameters and indicated that the stabilization cutoff was determined to be when less than .2 square miles of change occurred in any given year at the 5 percent saturation cutoff; do I have that right?

A. (BY MS. DOUGLAS) Correct.

Q. Did you also model -- let me start over.

Did you run the model to determine the total duration over which the plume would keep moving regardless of rate?

A. I can't recall off of the top of my head. I know we modeled it for a significant postinjection duration. I was not directly involved in determination of stabilized plume so I don't have that information readily available.

Q. Who made the determination for stabilized plume or who was involved with that?

A. Apologies, I don't have those names readily available.

Q. Was it people at EERC?

A. Yes.

Q. Okay. There was some discussion of the stoplight system. Why not notify DMR of events between a 4 and a 4.5?

A. That's not included here as written, but I think that'd be prudent to add that.

Q. Okay. Ms. Olsen, you testified on Exhibit 8B regarding the different depths for the three wells. Do you have an understanding as to why they drilled the three different wells to those specific depths?

A. (BY MS. OLSEN) Generally, yes.

Q. And just generally, what is your understanding?

A. My understanding is they were drilling the Milton Flemmer to get core data from deeper formations.

Q. Okay. Did they complete or are there plans to complete that at a higher interval at some point with a plug?

A. There are no plans, to my knowledge.

MR. BRAATEN: I have some questions, Lawrence, related to surface facilities, and Mr. Volk did some testifying but it sounds like

Mr. Backus has an understanding as well. Do you mind if I ask him the questions, and if he can't answer, we can call Jay Volk up?

MR. BENDER: I have no problem with that. It may save time if you just try that approach.

Q. (MR. BRAATEN CONTINUING) Okay. Mr. Backus, can I have you turn to the generalized flow diagram on page 5-12 of Exhibit 1A?

A. (BY MR. BACKUS) Okay.

Q. Can you describe the purpose of the blowdown which is indicated on the generalized flow diagram?

A. Thank you. In hopes of not getting called up, I didn't bring my glasses.

Oh, the blowdown on the receiver?

Q. Correct.

A. Yes. That would be for when the -- when a pig is received in there and the receiver is isolated, that blows down the pressure and $CO_2$ so that the pig can be removed and data can be retrieved from it.

Q. Are there emergency pressure relief valves on the system anywhere as far as what we're looking at in the generalized flow diagram?

A. There is a thermal relief valve, but not

emergency pressure relief valve.

Q. How do you deal with an unexpected spike in pressures coming through this system?

A. I think that is dealt with through controls of the pipeline pump pressure control valves to maintain pressures that are -- that can be withheld within the existing facility.

Q. Can you explain that a little more?

A. In order to have a pressure spike, something would need to do that, and a pump would be the obvious thing, and there are controls on the pump, be it vari -- variable frequency drive or just the nature of the pump that would keep it underneath of the failure pressure of the piping -- or the maximum operating pressure, I should say. I'm sorry.

Q. Do you believe there's a 0 percent chance of pressure causing some kind of a release from the surface facilities post Midwest Carbon Express' terminus point?

A. I don't know that I can say there is a 0 percent chance of that ever happening.

Q. Have you done any kind of dispersion modeling to determine the areas in which you would need to provide notice to people if you did have a

release in one of those sites?

MR. BENDER: Before you answer that question, I want to caution you that there's been some -- there's been a dispersion model that's been prepared and it's been submitted to the Public Service Commission and it's confidential. So you can answer the question, but be very careful that you don't answer it in a way that provides information with the model that was supplied to the PSC.

MR. BACKUS: I can say that I was not personally involved with any of the dispersion modeling that has been done.

MR. BRAATEN: And fair objection, Lawrence. I'm actually not trying to get into that.

MR. BENDER: I appreciate that.

Q. (MR. BRAATEN CONTINUING) But my understanding of the dispersion model with the PSC is that that relates to the main line and to that, and I'm asking just specifically if there was any dispersion modeling done post main line on the flowlines in those facilities?

A. I was not involved in any of that.

Q. Okay. And so you're not saying there

wasn't one done. You're just saying you don't know?

A. Yes. That's what I'm saying.

Q. Okay. Is there -- do you know of anyone else that's testifying that would know whether or not one was done?

A. You could ask Mr. Powell.

Q. Okay. If Mr. Powell didn't know, is there anyone else that would?

A. He would be the one to ask that question to.

Q. Okay. What is the purpose of the thermal relief valve?

A. So in cases where you can isolate a section of pipe and it would be full of $CO_2$ at pressure, if it heats up through whatever means, say the sun is shining on that pipe, the $CO_2$ will expand and this -- the thermal relief makes sure it does not exceed safe operating limits.

Q. How does the thermal relief valve do that?

A. More than likely it would be the type of thermal relief valve that is spring operated, so as the pressure would increase, it would relieve that and then close again.

Q. Is the valve opened based on temperature

or pressure?

A. The valve would open based on pressure.

Q. What pressure?

A. I believe that number is 5 percent over maximum operating pressure.

Q. Wouldn't that risk a failure if the max operating pressure is based on the manufacturer's recommendations?

A. No, I don't believe it would. That -- that is a normal thing when you talk about, say, a vessel. Normally they operate -- the pressure safety valve in that case is normally set 10 percent over -- 5 to 10 percent over the operating pressure.

Q. And when you say "the operating pressure," are you saying the max operating pressure as established by the manufacturer of the pipe?

A. I'm saying the 900-pound class standard we are working off of, that operating pressure, as set by ASME, I believe.

Q. Okay. Does the valve, then, close by itself automatically once it gets back down below that pressure?

A. It does.

Q. Okay. So I asked you earlier about a

dispersion model, but are you aware of any testing done on predicted maximum release from the line through that valve?

A. Because -- because of that thermal relief valve?

Q. Correct.

A. Yes, I am.

Q. And what -- what kind of studies were done to determine what the maximum release would be from that thermal relief valve?

A. It was -- a third party performed a study based on a temperature rise in that line and the thermal expansion of the $CO_2$ given the size of the line and the volume contained in, how much it would need to relieve.

Q. As well as the intended flow rate?

A. Yes.

Q. And operating pressure?

A. Yes. Well, it -- when you say flow rate, do you mean through the valve or through the line?

Q. I don't know.

A. I can say this: If that would happen, it is because everything is stopped. There is no flow through the line and valves are closed.

Q. Okay. Yeah, so through the valve.

What was the maximum amount of $CO_2$ predicted to be released from the thermal valve in the scenario you described?

A. Approximately .136 tons per minute.

Q. And did they determine the maximum length of time they thought such a release would potentially occur under those parameters?

A. Based on the largest segment of line that one of these exists on, I think there would be approximately three tons of $CO_2$. That would be if you emptied the line completely, which would be highly unlikely, but that would be if you emptied the line completely.

Q. So when the thermal valve is released, does that trigger other valves to stop flow in the line or do you have to manually shut that off?

A. Well, as I said for -- for that to trip, that means that there is no injection going into that well. We have isolated the valves because it is only as the temperature warms up, the pressure would increase to release that. So there would be no replacement $CO_2$ coming into that line. It's simply to protect the line.

Q. Okay. Do you have an understanding of how far three tons of $CO_2$ would disperse under natural

wind and weather conditions?

A. I do not.

Q. I'm not sure who this question is for, but I think there was some testimony about who would be operating the flowlines, so not the main line, Midwest Carbon Express, but the flowlines. Was there testimony that the flowlines would be owned by the storage facilities but operated by SCS Transport?

A. (BY MR. BOESHANS) That's correct.

Q. And when did that arrangement -- when was that arrangement decided upon?

A. That -- I don't know that I can give you a specific timeline in which that decision was made.

Q. Was it within --

A. I think it was generally that the intent that -- from my recollection, it was always the intent that it would be an integrated system operated -- connected with a common control system as Jamey described earlier.

Q. Are there any contracts signed between the various entities to formalize that relationship for operating the flowlines?

A. We do not have interoperating agreements in place today between the entities.

Q. Or any other kinds of contracts to govern that?

A. Not at this time.

Q. I apologize, I'm jumping around a little now, but, Ms. Douglas, I think you had talked about this traffic light system, and under the event of greater than 4.01 one of the plans is to continue operations at a reduced rate and/or below a revised maximum operation pressure. How would you make those determinations as to how much to reduce the rate or the maximum operation pressure?

A. (BY MS. DOUGLAS) At this time what's specified is injection rate would be reduced to no less than 50 percent.

Q. How do you decide if it'll be 50 or 55 or 60, for example?

A. So as part of this stoplight system and as this traffic light system is part of this seismic monitoring, we'd be acquiring continuous seismic data. So we'd take into account not just that larger event but if there were other events, how many, their magnitude, time duration, as well as their epicenters.

Q. Mr. Backus, do you know what the diameter is of the thermal valve?

A. (BY MR. BACKUS) 1 inch, I believe.

Q. Okay. Are there any other pressure relief systems post terminus of the Midwest Carbon Express that we haven't discussed?

MR. BENDER: I think I'd rather have you address that question to Jimmy. He's more familiar with those things, and he'll be coming up after this.

MR. BRAATEN: Okay. Okay. I think that's all the questions I have for these witnesses. I have a few, I think, for Mr. Powell and Ms. -- one -- well, a couple quick ones for Ms. Oddy.

MR. BENDER: Do you want the whole group or --

MR. BRAATEN: No, I think -- well, I think we can start here. I think that they may be able to answer them all.

MR. BENDER: Okay.

**CROSS-EXAMINATION**

**BY MR. BRAATEN:**

Q. Ms. Oddy -- am I saying that right, Oddy?

A. (BY MS. ODDY) Yes. Oddy.

Q. You made a reference to $CO_2$ resistant cement. Can you describe what that is?

A. Yep. So as part of the design plan, we

have consulted with contractors who specialize on cementing design in the basin, and part of that is evaluating the downhole pressures and temperatures as well as the interactions between the $CO_2$ stream as well as the formation water in accordance to the regulations. And so we're not looking at your conventional oil and gas cement, primary cement. The cementing system is tailored to provide resistance to $CO_2$ with additions to different chemicals and different formulations within the cement.

Q. Other than the pH, are there other properties of the cement that are specific to $CO_2$ resistant cement that make it different than your regular cement used for plugging wells in the oil patch?

A. So -- yeah, so for both plugging as well as primary cementing in our -- in our injection wells and monitoring wells, some parameters I can name off the top of my head is the permeability would be significantly reduced in the formulation. Those -- I can't recall any other parameters. Like I said, we contracted specialized cementing contractors.

Q. So just as a general matter, would the

lower permeability in that cement result from a greater clay content?

A. So it would just mean that, generally speaking, there'd be less chances on interactions with, you know, potential oxidation or any chemical reactions downhole.

Q. What do they add to the cement to prevent oxidation or chemical reactions downhole that is different than the cement used for normal cementing or plugs in the oil patch?

A. I'm not privy to the specific additives by the contractor.

Q. Do you know if anyone at Summit or EERC is?

A. Again, we've contracted technical experts from a cementing company and so they would know the -- they, as in the contractor, have, you know, a proprietary formulation of the cement system, and then it would just be our responsibility to make sure that those are rated for the bottomhole pressures that we expect.

Q. What is the name of the contractor?

A. So the two commonly contracted out for carbon portfolios would be either Schlumberger or Halliburton.

Q. Okay. Is there any requirement to use $CO_2$ resistant cement in these wells?

A. So under Administrative Code 43-05-1-11 -- this would be in my own summarization, but in the selection of casing and cement, you know, where -- some of the factors that we need to take into place in the design is bottomhole pressures, temperatures, as well as the potential corrosiveness when $CO_2$ is introduced with formation water.

Q. And the cement both used to cement in a casing as well as the plugs interacts with $CO_2$ in the reservoir with these wells, the injectors?

A. With respect to the injection wells, yes, it would be -- yep, because it'd be isolating the injection zone. So it would -- the $CO_2$ would be going through the casing into the cement into the reservoir.

Q. Did they use $CO_2$ resistant cement to cement in the casing or plug the Raymond Jensen well?

A. I don't have the details of what type of grade of cement that was used in the Raymond Jensen well.

Q. Why wouldn't that be as important as knowing the cement in the injector wells?

A. We don't anticipate, as per Caitlin or Amanda -- I can't remember which one, but we don't anticipate the $CO_2$ plume at this time to reach the Raymond Jensen well. However, it is part of the area of review and therefore that was reviewed as -- as Caitlin testified to.

Q. Okay. And the surface casing for the Raymond Jensen well is not 50 feet below the lowest USDW; right?

A. I'd have to -- I'd have to refer to that diagram.

Q. Would you mind taking a look?

A. Oh, this is the TB Leingang.

Q. You know, I might be able to speed this up. Are you confident that the depth of the casing of the Raymond Jensen is in the application?

A. I do not know. I'd have to refer back to the --

Q. Okay. I'll have you go ahead and look.

A. Can you repeat your question, please?

Q. Is the surface casing for the Raymond Jensen well 50 feet -- at least 50 feet below the lowest USDW?

A. According to the diagram here, I guess I'm not sure in this area what would be considered what

the lowest underground source of drinking water is.

Q. What's the depth of the surface casing?

A. On the diagram it's 330 -- 330 feet.

Q. Okay.

MR. BENDER: Mr. Braaten, if you don't mind, I think Caitlin can address that question, if you want.

MR. BRAATEN: Oh, okay. Thank you.

MS. OLSEN: Can you repeat the question? Sorry.

Q. (MR. BRAATEN CONTINUING) Is the surface casing of the Raymond Jensen at least 50 feet below the lowest USDW?

A. (BY MS. OLSEN) It's not.

Q. Okay. When you did the model for the leaky well scenario, were you doing that based on the location of the Raymond Jensen well?

A. No, we did that leaky well scenario to delineate the AOR using the risk-based AOR method.

Q. Okay. I'm going to -- just a couple more here, and I'm not sure who this one's for, but it relates to the -- the valves in the surface facilities we discussed. And, Mr. Powell, I think these were for you.

But the first question is have you

designed that system to accommodate a situation with a blocked flow in the system?

A. (BY MR. POWELL) Yes. So the general flow diagram is not the piping and instrument diagram. So the thermal relief was just to relieve pressure in that bypass on that valve. So, yes, in all segments where the -- a segment could be isolated by a valve or shut in, yes, there is pressure relief in those segments.

As far as design pressure, the pipe is designed for 195. It's hydro tested to 125 percent of that maximum operating pressure. The valves were designed at Class 900 and bench-tested to 150 percent of pressure.

THE REPORTER: Can I have you speak up, please?

MR. POWELL: Oh, sorry. I'll repeat it.

So as far as the design pressure of the pipeline, it's per 195 regulation and then it's hydro tested to 125 percent of the MAOP, which would be 125 percent of the 2183. The valves are designed to Class 900 and that pressure value and then they're bench-tested at 150 percent of that.

Q. (MR. BRAATEN CONTINUING) Why was the piping and instrumentation diagram not provided as

part of the application?

A. I can't answer that question.

Q. Can it be provided?

A. Yes.

Q. Rather than asking you to identify the location and size of every valve in there, would you be willing to simply provide the piping and instrumentation diagram?

A. Yes.

Q. Oh, what is the diameter of those other valves that you just discussed?

A. Again, we'll reference them on the piping and instrument diagram. To Jamey's testimony, they're typically 1-inch to 2-inch valves.

Q. But the diameter of those valves will be listed on the piping and instrumentation?

A. Not the diameter of the valve. The size of the valve. The valves themselves are standard, at least in my experience, but the connections to the piping, to the carrier pipe, that's typically three-quarter inch to 1 inch, but we'll have that on the P&I data.

Q. Okay.

A. And just to clarify, any relief of pressure would not be external to the pipe. It

would be relieved into the pipeline. So if it's -- if you've got pressure relief between two segments -- a segment of the pipe that could be isolated with two closed valves, the pressure would be iso -- or relieved downstream. It would not be released to the atmosphere. So that wasn't clear from what I heard before.

Q. Okay. Thank you. So the only valve that would release to the atmosphere would be the temperature valve --

A. No. The temperature.

Q. -- or thermal valve? Sorry.

A. The thermal relief should be -- should be via tubing connected downstream. So if you have those two -- if there's pressure built up in that valve bypass, which would typically be closed in normal operation, then you could -- to Mr. Backus' testimony, you could have a thermal pressure buildup, and if that's the case, there's a set point on that valve, 110 percent, whatever it is -- we'll have that set point and that should be indicated on the P&ID, at least at this point. Then when it reaches that set point, it relieves downstream of that closed valve so it relieves the pressure on that piping, that segment of piping.

Q. The thermal valve releases the pressure downstream?

A. That thermal relief valve relieves the pressure from that small segment of bypass piping downstream of the closed valve.

Q. So it doesn't release anything to the atmosphere?

A. No. The only thing that would be released to the atmosphere is where you saw the blowdown referenced. That would be a controlled blowdown or release to the atmosphere if that were needed for normal or abnormal operating conditions.

Q. What kind of a spike in pressure would you expect if you had a valve shutdown at the wellhead?

A. Again, these -- these set points -- I'll back up.

I mentioned earlier in previous testimony about a surge analysis. So that surge analysis is -- was conducted on every -- or every main line valve, including in the flowline segments, was evaluated for an inadvertent closing. And the regulation is 110 percent of maximum operating pressure so it cannot exceed that. And in our case I believe the maximum was 107 percent. We can tell you exactly what the segments were in the

flowlines, I don't remember off the top of my head, but they were less than 110 percent.

Q. What was the time duration that was modeled over?

A. The -- the valves themselves are all actuated and have the capability to close in seconds, and we can confirm, but I believe the time frame was minutes, two to five minutes.

Q. So if all of your pressure relief systems relieves pressure within the line downstream and you have a valve unexpectedly shut at the wellhead, how do you relieve that pressure?

A. You're talking about upstream of the wellhead --

Q. Right.

A. -- to the inlet valve?

Q. Right. Yeah.

A. If it's the segment up -- well, let me back up.

Because there's -- remember, this is all automatically or automated or controlled by a control center, and there are -- there will be tight operating pressure boundaries. So they're continually seeing when any pressure changes may happen in a line, so -- and if -- there will be set

points, and I can't tell you what they are at this ten seconds, but there will be an alarm and then there will be a secondary alarm. And so the control center operator will have notification if there's a -- if there's a pressure increase, and so there will be procedures or protocol they take to relieve that pressure before there's a buildup that would overpressure any equipment, whether it's that inlet valve to the wellhead or that segment of piping. So there shouldn't be a situation even in an abnormal operating condition where that equipment will be overpressured.

Q. But the protocol you mention for ensuring that that doesn't get overpressured relies on human judgment?

A. No. There will be an automatic -- or you can't have automatic set points, but, yes, the first -- the first response would be from an individual in the control center. That's correct. Per procedures on what to do in a what-if situation.

Q. Will there be protocols provided to the DMR or any regulatory bodies with respect to the decision tree for the person making that decision?

A. Those will be in the standard operating

procedures. So I'm not -- I don't have the experience with the DMR to see if that's something that they are -- that they want to audit or interested in reviewing. If they do, they would be available. They're not confidential or will not be confidential.

Let me clarify. We're not going to publish them on the website, but if a regulatory body wants to see our operating procedures, absolutely.

Q. Mr. Powell, were you here during my questioning of, I believe, Ms. Douglas when I was asking about what Summit would do if after, for example, the five-year review you determined that you needed to change the boundaries of the storage facility and then my questions following that were about how you would allocate compensation in that event? Did you -- were you here during that testimony?

A. I was.

Q. So let's just take as a hypothetical a situation where Summit makes the determination after five years that the data on the ground justifies adjusting those storage facility boundaries. What is Summit's plan with respect to

how to adjust the compensation to the landowners that has been paid up until that point?

A. I don't have that knowledge of how the -- how the compensation may or may not be adjusted to landowners.

Q. Is there anyone else in the company that would have that knowledge?

A. I'll defer to Mr. Boeshans.

Q. Okay.

MR. BRAATEN: I'm not trying to get out of order, Lawrence, but do you mind -- this is like right near the end. Do you mind if we have Mr. Boeshans come up?

MR. BENDER: If you're getting close to the end, I don't have any problem with that.

Q. (MR. BRAATEN CONTINUING) Mr. Boeshans, do you have an under -- well, I'll just start over.

In the hypothetical scenario that five years down the road Summit determines that it wants to adjust the boundary of the storage facility based on the data it gets from its monitoring activities, how would it allocate or reallocate payments already made to the owners in the storage facility?

A. (BY MR. BOESHANS) So in that situation,

what I would see is, you know, it's an it-depends answer. It depends on what the adjustment is to the boundary. And then if we were going to make an adjustment to the boundary, it would be -- you know, be decided, you know, by hearing like this with the Commission because that would be a major modification to the permit.

And so at that time we would have more information around what the change is, the adjustment is, how much -- how long it's been operated and have a -- probably have -- we'd have a recommendation in terms of how to do that. We don't have a plan exactly today in terms of how that would happen.

Q. If you expand the storage facility after five years, the boundary of the -- I'm going to start over.

If Summit were to make a major modification and expand the border of the storage facility through a hearing with the DMR, would you agree that you need to pay the new owners now being included in the storage facility for prior injections?

MR. BENDER: I'm going to object because I think you're asking for a legal conclusion.

MR. BRAATEN: That's fair.

Q. (MR. BRAATEN CONTINUING) But what I'm actually asking is what Summit's opinion would be on that issue. Not whether they need to, just whether you would.

A. So you're asking me if there was an adjustment -- your situation, if there was an adjustment after five years and we had been injecting, would we pay the landowners that were added to the unit?

Q. For the past injections.

A. For the past injections. I don't know that I can answer that. It's a -- I think you'd have to understand more about that situation, what led to the changing of the units.

Q. What more do you want to understand? What information are you missing to make the determination?

A. Well, I'm missing the historical operation and what led to the need for a change.

Q. Well, let's presume -- sorry. This was implied, but I should be explicit. You're going to change the size of the storage facility because you've determined that it was inaccurate and that the plume is going to move further than you

originally anticipated such that you need to expand the boundary of the storage facility.

MR. BENDER: And I'm going to object. You've asked that question previously in a little bit different manner and he said he needs to know more information before he can answer the question -- answer the question. So I'm going to object.

HEARING EXAMINER GARNER: I'm going to let him answer if he knows.

MR. BOESHANS: I don't know.

Q. (MR. BRAATEN CONTINUING) You don't know what?

A. I don't know the answer to your question right now.

Q. So Summit won't make a commitment to pay owners added into an expanded storage facility for prior injections?

MR. BENDER: Objection. Asked and answered.

HEARING EXAMINER GARNER: Sustained.

Q. (MR. BRAATEN CONTINUING) Was the answer no?

MR. BENDER: He said he didn't know.

Q. (MR. BRAATEN CONTINUING) Okay. But if

you don't know whether or not Summit will make a commitment to do that, then the answer is that they're not making a commitment right now to do that; right?

MR. BENDER: Objection. I mean, we've covered this ground now three times.

HEARING EXAMINER GARNER: Sustained.

Q. (MR. BRAATEN CONTINUING) Does anyone at Summit know the answer to that question?

MR. BENDER: Objection.

MR. BRAATEN: What's the objection?

HEARING EXAMINER GARNER: He can -- he can answer that one.

MR. BOESHANS: I don't know. It's not a question that I've raised with anybody at Summit.

Q. (MR. BRAATEN CONTINUING) Has anyone else at Summit raised the question with you or anyone else that you're aware of?

A. Not that I'm aware of.

Q. I apologize if someone did ask this, but there was a question earlier -- Mr. Powell, I think it might have been deferred to you, but -- or Mr. Boeshans -- with respect to the payments being made to landowners on the $CO_2$ stream, is that -- are those payments being made based on the full stream

or the actual $CO_2$ mass in the stream?

MR. BENDER: I'm going to object. You seem to be using the past tense. You said that we have paid or am I misunderstanding you?

MR. BRAATEN: Well, I can -- I'll just change it to avoid that.

MR. BENDER: Okay.

MR. BRAATEN: I see what you're saying.

Q. (MR. BRAATEN CONTINUING) So when you go to pay landowners for injections, is it your intent to pay based on the full stream of substances injected or the $CO_2$ mass in the stream?

A. The intent is to pay on the -- the full stream as it's defined in the storage agreement --

Q. Okay.

A. -- which is associated substances.

MR. BRAATEN: Okay. No further questions.

HEARING EXAMINER GARNER: I believe the staff might have some questions. Already answered?

Okay. Lawrence, any further witnesses?

MR. BENDER: Not at this time.

HEARING EXAMINER GARNER: Okay.

MR. BRAATEN: Could we take a break?

HEARING EXAMINER GARNER: Take a break before you call?

MR. BRAATEN: Yeah.

HEARING EXAMINER GARNER: Sure. Take a ten-minute break.

(Recessed at 4:42 p.m. and reconvened at 4:59 p.m.)

HEARING EXAMINER GARNER: We are back on the record. Attorney Braaten, you can proceed with your first witness.

MR. BRAATEN: All right. We are calling Shane Bofto to appear by phone. Shane, can you hear me okay?

MR. BOFTO: I can hear you.

HEARING EXAMINER GARNER: Okay. Let me swear him in real quick.

MR. BRAATEN: Okay. Shane, the hearing examiner is going to swear you in.

**SHANE BOFTO,**

being first duly sworn, was examined and testified as follows:

**DIRECT EXAMINATION**

**BY MR. BRAATEN:**

Q. Shane, can you state your full name and spell your last name for us?

A. My name is Shane Bofto. Last name is B-o-f-t-o.

Q. And by whom are you employed?

A. HydroSolutions, Incorporated.

Q. And just generally speaking, what kind of company is HydroSolutions, Incorporated?

A. We're a services, disabled veteran-owned, small business associated with consulting and environmental and water resources.

Q. Okay. Can you describe your educational background, please?

A. Sure. I have a bachelor of science in chemical engineering from Montana State University and an M.B.A. from the University of Mary in Bismarck.

Q. And can you give us a description of your professional experience from college up until you began with HydroSolutions?

A. Sure. I initially out of college worked at a petroleum refinery in the environmental health and safety department. I then went to work out in Seattle where I focused on mining internationally, consulting primarily in water quality, acid rock drainage and treatment.

Following that, I moved back to Montana and was a general environmental engineering consultant and went through several companies till

I ended up here at HydroSolutions.

Q. And approximately how long have you been working at HydroSolutions?

A. Since -- since 2004.

Q. And can I have you pull up Exhibit No. LO-56, Shane?

A. I have it.

MR. BENDER: Can you just give me a minute to get there?

MR. BRAATEN: It's his résumé.

MR. BENDER: Okay. I'm there. Thank you.

Q. (MR. BRAATEN CONTINUING) Does this curriculum vitae accurately reflect your educational and professional qualifications and experience, Mr. Bofto?

A. Yes, it does.

MR. BRAATEN: Move to admit Exhibit LO-56.

HEARING EXAMINER GARNER: Any objections?

MR. BENDER: No objection.

HEARING EXAMINER GARNER: Motion granted.

Q. (MR. BRAATEN CONTINUING) And, Shane, can you describe for us with respect to your work at HydroSolutions the kinds of clients and the kinds of work that you've been involved in?

A. At HydroSolutions, clients mainly consist

of private individuals, ag and ranching clients, federal, state and local governments and municipalities. We have a GSA contract with the federal government. We work with developers, conservation groups and other NGOs and then companies including mining, oil and gas pipelines, and we also work with attorneys.

Q. And as a general matter, you mentioned environmental consulting services, but can you give us just some specific examples of the kinds of projects and the kinds of consult -- different kinds of consulting work that the folks at HydroSolutions do?

A. Generally, we provide independent services and environmental engineering, hydrogeology, remedial investigations, remediation, permitting, water resource development, compliance, due diligence, environmental impact statements and expert work.

Q. And, Mr. Bofto, are you familiar with the applications and the Class VI well permit applications that bring us to the hearing today?

A. Yes, I've briefly reviewed them.

Q. And do you have any -- we've talked generally about the experience of HydroSolutions

and your experience. Do you have any experience on particular or specific projects that you think informs your ability to work on -- or work in this proceeding or on this matter?

A. Yes. Several projects come to mind. In 2011, the Wyoming Land Quality Division issued an RFP that resulted in a competitive bid, and HydroSolutions was hired where I was the project manager to look at mining regulations in Wyoming, specifically with respect to rare earth elements in mining. And we reviewed all of the regulations and permitting process with respect to Wyoming and implications of kind of a different mining type that the state wasn't used to seeing. It was out of the ordinary.

And following that, the Montana Board of Oil and Gas Conservation issued an RFP and we were awarded that to explore primacy for the Class VI program in 2014. They were looking at setting up a program and reviewing it as an exploratory project to see if they wanted to gain primacy, and this was about the time -- a little after the time North Dakota did that same pursuit, so we followed it very closely.

Q. And so did Montana end up submitting an

application to obtain primacy for its Class VI program?

A. We provided the State with a draft program and we went back and forth with them, and ultimately they had an administrative decision at that time to not submit for primacy.

Q. And as you were working on the -- drafting the Class VI program for Montana, did you review any documents or guidance that informed your understanding of how to develop a Class VI program?

A. Yes. I heavily relied on a lot of BPA documents. Specifically for the Class VI program, there were a lot of guidance documents associated with implementing programs, well characterization, area of review, recordkeeping, to name a few.

Q. Can I have you turn to Exhibit LO-18?

A. I have it.

Q. Is this one of the guidance documents you just referenced that helped inform your understanding of the Class VI program while you were drafting Montana's regulations?

A. Yes, it was one of the documents I used to understand and outline our draft program.

Q. And can you just describe briefly the topic of this guidance?

A. Sure. The guidance generally provides information regarding modeling and recommendations for delineating the area of review. It also describes the circumstances under which the AOR or area of review is to be reevaluated, and also describes how to perform an AOR reevaluation and development of corrective actions.

Q. Okay. Let me have you turn to Exhibit LO-19.

A. All right. I have it.

Q. Is this also one of the documents you referenced that you reviewed to inform your understanding of Class VI regulatory regimes?

A. Yes, it was one of the documents I used to understand and so outline the draft program.

Q. And can you just describe generally what the topic of this document is and what it covers?

A. It provided a basic framework for the permitting process and the required activities through the Class VI injection well and activities associated with that.

Q. Okay. Can I have you turn to Exhibit LO-20?

A. I have it up.

Q. Is this also one of the guidance documents

you referenced a moment ago that informed your understanding of the Class VI well program when you were drafting Montana's regulations?

A. Yes. I used it similar to the others.

Q. Okay. And just generally speaking, what does this guidance document cover topically?

A. I would say it provides a general outline of the data to be collected and how to use the data to identify potential risks and eliminate unacceptable sites. It also provides information for inputs into whatever geologic model is chosen for use to evaluate any geological modeling.

Q. Okay. And now I'm going to have you -- it's marked a little out of order here, but there's an Exhibit LO-82. I'll have you switch -- or flip to Exhibit LO-82.

MR. BRAATEN: And, Lawrence this one didn't get into the binder. I've got an extra copy.

MR. BOFTO: Okay. I'm pulling it up. Yes, I have this one.

Q. (MR. BRAATEN CONTINUING) I'm sorry, Mr. Bofto, I might have missed it. Did you get yourself to that exhibit?

A. Yes, I have -- have that exhibit, the one

for recordkeeping and reporting, generally.

Q. And specifically Exhibit 82 that indicates it's the Underground Injection Control Program Class VI Well Recordkeeping, Reporting, and Data Management Guidance for Owners and Operators. Is that the exhibit you have up?

A. Yes.

Q. Okay. Is this also one of the guidance documents that you reviewed that informs your understanding of the Class VI program that you used in developing Montana's regulation?

A. Yes.

Q. Okay.

MR. BRAATEN: Move to admit Exhibits 18, 19, 20 and 82.

HEARING EXAMINER GARNER: Any objections?

MR. BENDER: No objection.

HEARING EXAMINER GARNER: Exhibits are admitted.

Q. (MR. BRAATEN CONTINUING) Mr. Bofto, can I have you now open up -- or turn to Exhibit No. 21?

A. I have that up.

Q. Do you have an understanding of what the first two sentences of this data tool mean?

A. Yes.

Q. And can you tell us what that is?

A. Under the rule that's cited there, that the owners and operators must submit the project information -- their geological sequestration project information directly to the EPA and I take it through the geologic sequestration data tool in that this requirement applies regardless of primacy, whether it's still EPA or a particular state or entity has primacy.

Q. Mr. Bofto, are you ready, willing and able and have you been ready, willing and able for the past three weeks to assist in running and analyzing models related to these Class VI well applications had you received data and input files to do so?

A. I'm capable and ready to run the geochemical model PHREEQ, given that if I had the input files and the right thermal dynamic database or a reference to it if -- if the reference one that comes with the model, is unaltered.

MR. BRAATEN: No further questions.

HEARING EXAMINER GARNER: Mr. Bender, any questions?

MR. BENDER: Yeah, I do.

**CROSS-EXAMINATION**

**BY MR. BENDER:**

Q. Mr. Bofoto [sic], my name is Lawrence Bender and I represent the applicant, Summit, in this case. Nice to meet you today.

A. Nice to meet you.

Q. Okay.

A. My name is Bofto.

Q. Okay. Thank you for correcting me. I appreciate that. Do you mind if I call --

A. No problem.

Q. Do you mind if I call you Shane?

A. Please do.

Q. Okay. Thank you. I want to just delve a bit into your discussion about what you did for the State of Montana. First of all, what was the time period in which you were working on that? I think you said it was about the time that North Dakota was adopting its rules, but I want to make sure that I understood that correctly.

A. Yes. I believe I started it in 2012, but a lot of these documents that I had just referenced were in draft form, so a lot of it we waited for the final versions of the EPA guidance documents to be issued. And I believe my last final draft was

submitted to the Board of Oil and Gas following discussions with them in mid to late 2014.

Q. Okay. And when you -- when you referred to these documents were in draft form, I'm sure you're talking about Exhibits LO-18, 19 -- let's see here -- looks like 20 and is it 83?

MR. BRAATEN: 82.

Q. (MR. BENDER CONTINUING) 82. Is that correct?

A. They may have included some of those, but there were also some other guidance documents and some of the things I'm trying to recall with the environmental justice, bonding, things like that. So that was why we waited a little while longer so we could work with final documents that were included. I think they're currently included on EPA's Class VI website.

Q. And what was it that you were requested to do by the Montana Oil and Gas Conservation Commission?

A. To review that type of information and draft a program that the State could use for their primacy application should they desire to go after primacy for the Class VI program.

Q. And were involved in drafting the statutes

that were necessary for the Montana Board of Oil and Gas to adopt the rules or were you -- was that statutory enactment already in place and all you were asked to do was prepare the regulations?

A. I was asked -- I was not involved with the statutes or anything like that. I was just involved with gathering information that the board needed to get the primacy application in place.

Q. Are the statutes already in place in Montana and that all they're lacking at this point in time is the regulations?

A. I believe at that time there was a statute associated with it that was in place.

Q. Okay.

A. It's been a while, but I seem to recall it was in place prior to them issuing approval for us to do this work.

Q. Okay. And I believe you said you started in 2012, probably finished in 2014; is that correct?

A. That sounds about right.

Q. Okay. Approximately -- well, strike that.

During that period of time, were you working full-time on this project?

A. No.

Q. Okay. Were you working on the project by yourself?

A. No. I was part of a team of other consultants and internal people. We had an attorney because there was a portion where we had to draft a letter from I believe the attorney general or something to EPA and there were several other documents that needed to be drafted that were best suited for an attorney. And I had another company that had petroleum engineers and petroleum geologists associated that were reviewing some of the draft documents at that time as well.

Q. Okay. Well, thank you for that. I had misunderstood your testimony. I thought that you were primarily responsible for doing all the work. But since it was a team, let me ask you a couple questions about that. What were -- what were your specific responsibilities on that team?

A. I was the project manager, and areas -- I would collect information as well as derive information that I could and I put them into the draft program. I took and I followed a lot of the guidance to establish, you know, a general procedure for permitting.

Q. And did you ultimately draft some rules

that were submitted to the Oil and Gas Conservation Commission?

A. Not at that time.

Q. When you say "not at that time," you're talking about the period from 2012 to 2014?

A. I'm talking -- well, I never drafted any rules based on the draft program.

Q. Okay. I misunderstood you then. I -- I had understood you to testify when Mr. Braaten was asking you questions that you drafted the rules but the -- the board ultimately made a decision that it was not going to adopt the rules. Did I misunderstand?

A. I drafted a permitting program for somebody that we could run past EPA so someone could get a permit for a Class VI well should Montana get primacy.

Q. Okay.

A. Does that make sense?

Q. I think so.

Do you know why the board never went forward with the rules?

A. No, that was an administrative decision far above my pay grade.

Q. Okay. Let's talk a little bit more about

your experience. You've explained to us that as a result of reviewing these guidance documents that have now been entered into the record, I think it was 17, 18, 19, 20 and also 82, you were involved in this project. Have you ever been involved in making application in a state that has primacy for a Class VI permit?

A. No.

Q. Okay. You haven't been -- I apologize. I wasn't listening to my question very well when I asked it. Did I -- well, let me rephrase it.

Have you ever been involved in any way in making a Class VI application to a state that has primacy?

A. No.

Q. Okay. Have you ever reviewed an application, other than the one before the Commission -- or the ones that are before the Commission today, for a Class VI permit?

A. I'm trying to recall. I may have looked at some when I was drafting a program. I have a faint recollection that I tried to look at others that had gone through EPA at the time. I just cannot recall the specifics.

Q. Yeah. And I apologize, I think I said

this, but I asked -- my question was specific to being involved in an application with a state that had primacy.

A. None with a state that had primacy.

Q. Other than the applications that are before the Commission today, have you ever reviewed an application for a Class VI well?

A. Back to my previous statement, I believe I did when I was drafting the program to look at what an application looks like. I just don't recall because it was so long ago on what it was.

Q. That would have been back in the 2012 period, 2014 period; is that right?

A. Somewhere in there.

Q. And would those have been applications before the EPA?

A. Yes.

Q. Okay. When were you hired by the intervenors in this case?

A. Oh, it's been a month or so.

Q. Okay. You don't know the exact date? I mean, today is the 11th. Would it have been probably May 11?

A. It could have been about that time, but I don't know specifics.

Q. What were you asked to do on May -- on May 11?

MR. BRAATEN: I'm going to object to that characterization of testimony. I don't believe he testified to doing something on the 11th.

HEARING EXAMINER GARNER: Overruled.

Q. (MR. BENDER CONTINUING) Okay. What -- okay. I guess you can answer the question.

A. What was I -- could you repeat that question again?

Q. What were you asked to do when you were hired for this project?

MR. BRAATEN: I'm going to object to questions eliciting communications between me and the experts.

HEARING EXAMINER GARNER: Overruled.

MR. BRAATEN: You can go ahead, Shane.

MR. BOFTO: Oh, okay. Just to provide my experience with the Class VI guidance and programs that I had early on and just my general environmental background information.

Q. (MR. BENDER CONTINUING) And how many hours do you believe you've worked on this project since you were retained?

A. Outside of this, probably 15 reviewing

documents and such and --

Q. And have you had an opportunity to review each one of the -- what I'm going to refer to as the final form of applications for the three applications that are before the Commission?

A. I've generally reviewed them, yes, and -- I'm trying to think if I've done any others. So I'd say I generally reviewed the three applications.

Q. Okay. And when you say reviewed them, did you just -- did you just read them or did you do anything beyond reading? Did you do any independent research?

A. I looked closely at some of the models on what were being used and what they did exactly.

Q. Okay. And if I -- and please correct me if I'm wrong, Shane, but I understood your testimony when Mr. Braaten was asking you some questions that you -- if you'd had the materials that he requested from the Industrial Commission, you could have run a model in a relatively short period of time. Was that your testimony?

A. Yes. I specifically referenced the PHREEQC model by U -- that is put out by the USGS.

Q. Okay. And do you have the necessary

software packages that you would need to run the model?

A. Yes, I do. It's on my computer now.

Q. Okay. Can you tell me what some of those programs are?

A. I'm specifically talking about the PHREEQC model. It's downloaded freely from the USGS, and I have routinely used the program through my career and have used it to write specific reports.

Q. And do you believe that that's the only software you would need to analyze the information that Summit has filed with the Industrial Commission on this matter?

A. It's the only one that I'm focused on.

Q. Okay. Do you agree with me that there are other software programs?

MR. BRAATEN: I'm going to object to the form of the question.

MR. BENDER: What's that?

MR. BRAATEN: I object to the form of the question. There are.

MR. BENDER: Well, let him answer.

HEARING EXAMINER GARNER: If he can understand it, he can answer it.

MR. BOFTO: There are numerous geochemical

models outside of PHREEQ. There's Geochem Workbench® that I've used and several others, but the application specifically said they used PHREEQC and that was the one I was focused on.

Q. (MR. BENDER CONTINUING) But you don't know if this PHREEQC is the only program that would be necessary to evaluate the information that's been supplied to the Commission, do you?

MR. BRAATEN: For the --

MR. BOFTO: I'm just going off the application that said that was the program that they used.

Q. (MR. BENDER CONTINUING) Okay.

A. I did not see any other geochemical programs to evaluate the upper and lower confining units.

Q. Okay. Tell me a little bit about your experience working in North Dakota. I know you said you went to the University of Mary. Have you done any work in your current role with -- I believe it's HydroSolutions. Have you worked in North Dakota with that company?

A. Yes. I've had probably -- probably six or seven projects in the last ten years in North Dakota.

Q. What were those projects?

A. Some of them were work with attorneys for oil and gas impacted sites. Done some incidental air quality work there from facilities. Trying to think. Looked at different reviewing remediation plans for cleanup for saline impacts or produced water impacts.

Q. Okay. So it sounds to me, and please correct me if I'm wrong, that most of that work that you've done in North Dakota has been from the standpoint of surface issues; is that a -- is that a fair statement?

A. No. There's been other issues associated with contaminated groundwater and cleanup.

Q. Okay. Have you ever been involved in North Dakota in making application to the Commission relative to saltwater disposal wells or Class II wells?

A. I've been part of such projects exploring commercial Class II saltwater disposal wells.

Q. Ever prepare an application to the Commission for a saltwater disposal well?

A. I've provided information for somebody else to submit a Class II application.

Q. Okay. What sort of information did you

supply?

A. Looked at things like deriving maximum pressure at the wellhead. Working with other geologists in my company, suitable formations. Looking at areas of review for other wells that could be within the area of review, things along that line.

Q. But you never were involved in a saltwater disposal application in North Dakota where you were the lead individual in making that application; isn't that correct?

A. That'd be fair to say.

MR. BENDER: No further questions.

HEARING EXAMINER GARNER: Any questions from the staff? Any redirect, Mr. Braaten? Oh, I'm sorry, you do.

**EXAMINATION**

**BY MR. HELMS:**

Q. Shane, this is Lynn Helms with the Industrial Commission. Nice to meet you, maybe some day face-to-face.

A. Nice to meet you.

Q. Yes.

North Dakota made its application for Class VI primacy on June 21 of 2013 and received

final approval April 24 of 2018. Shane, did you comment on North Dakota's application?

A. No, I did not.

Q. Did you review the North Dakota documents when you were preparing Montana's prospective documents?

A. I seem to recall that we were following at that time whether North Dakota was going to draft their own specific rules or adopt it by rule, and that was -- we had a lot of discussions about that on whether Montana should or shouldn't, and I seem to recall North Dakota going back and forth maybe once on what the appropriate action was, and we were going to try to learn at that point from you.

MR. HELMS: Okay. Thank you.

**REDIRECT EXAMINATION**

**BY MR. BRAATEN:**

Q. Mr. Bofto, do you have a copy of -- well, do you recall signing an engagement letter for this matter?

A. Yes.

Q. And do you recall the date of that?

A. May 1.

MR. BRAATEN: Okay. No further questions.

HEARING EXAMINER GARNER: Okay. You can

call your next witness. Can I get the name?

MR. BRAATEN: Ted Doughty.

HEARING EXAMINER GARNER: Doughty. Okay.

MR. BRAATEN: Yeah.

MS. ZASTE: He has a first initial, P, but he goes by Ted. So it's P. Ted Doughty.

HEARING EXAMINER GARNER: Gotcha.

MR. BRAATEN: Mr. Doughty, we're getting some feedback from you. Can you mute -- well, no, we're still getting feedback. Can you mute -- what was it -- what did you -- okay.

**P. TED DOUGHTY,**

being first duly sworn, was examined and testified as follows:

**DIRECT EXAMINATION**

**BY MR. BRAATEN:**

Q. Mr. Doughty, can you state your full name and spell your last name for us, please?

A. It's Paul Ted Doughty, D-o-u-g-h-t-y.

Q. And you go by Ted; right?

A. Yes, I do.

Q. Okay. Can you tell me briefly your educational background?

A. I have a bachelor's in geology from Washington University in St. Louis, a master's in

geophysics from the University of Montana, and a PhD from Queen's University in Ontario, Canada.

Q. And can you start by just briefly describing your professional background?

A. Yes, sir. So I've worked with Exxon -- I worked in the Exxon research lab for four years in the late '90s. I taught at Eastern Washington University for eight years as a professor. And since 2008 I've been a consultant on my own working for various companies like Talisman Energy, Halliburton, various other companies in the Rockies.

Q. Can you tell us a little bit about the kinds of work you did with your time at Exxon?

A. Yes. So at Exxon I was in the fault -- fault seal group, also did -- which is analyzing how fault seal in the various environments in the -- in the -- we did a whole research project looking at fault seal across the entire -- all the basins that Exxon worked in.

I also did 3D seismic interpretation in various basins across the world. Did a lot of field research on the Bakken and various other groups in the western U.S. as analogs for subsurface formations.

Q. And can I have you pull up in front of you, Ted, the Exhibit LO-58?

A. I'm not in the office, so if you describe it to me, though, I can do that.

Q. Do you recall the information contained on your curriculum vitae?

A. Your -- can you repeat the question?

Q. So I'll tell you Exhibit 58 is your curriculum vitae. Are you familiar with --

A. Oh.

Q. -- the contents of your curriculum vitae?

A. Oh, yes. Yes, sir. Yes.

Q. Okay. And does that accurately describe your educational and professional background and experience.

A. Yes, sir. With the exception of several items that I left off that I did recently. I actually was the well site geologist on the J-Loc Minnkota well that was drilled as part of their carbon sequestration project. I logged -- personally logged 1600 feet of core on site for that project.

Q. Okay.

A. And I've also done a lot of helium exploration in the last, oh, six months.

MR. BRAATEN: Okay. Move to admit LO-58.

HEARING EXAMINER GARNER: Any objection?

MR. BENDER: No objection. Oh, thank you. No objection.

HEARING EXAMINER GARNER: The exhibit is admitted.

MR. BENDER: My mike was off.

HEARING EXAMINER GARNER: Exhibit is admitted.

Q. (MR. BRAATEN CONTINUING) And, Ted, did you review the applications submitted by EERC and Summit that bring us here today?

A. Yes, I have, in extensive detail.

Q. And can you start by just describing to us the areas of those applications regarding which you would have particular expertise?

A. Yes. So they have core data on the Broom Creek Formation of which I mentioned I personally logged all the J-Loc wells. So I'm familiar with that. Also I have expertise in 3D seismic interpretation. I haven't seen their 3D seismic, but it's a critical part of their application, as well as the formation mechanical integrity work that they did doing the testing in their test well.

Q. What data would you need in order to

create a PHI-H map to map out the porosity and permeability of a reservoir?

A. So from what I've seen of their applications, the -- there's only one -- no, there's three -- I think there's three -- there's two wells that are close together and another well in their AOR which encompasses about -- actually, I'm not sure how big the AOR is, but if you take their simulation area, there's 26 wells in the simulation area -- or the simulation area, there's 26 wells. It's about a well per 55 square miles which is not very many data points. So within the AOR there's only 3 data points. There's no legacy wells.

So you would need to coordinate it, which they provided, but as well it appears like the seismic data was a critical part of how they defined the reservoir properties in the AOR. There's only -- like I mentioned, there's very few wells within the AOR. So we'd need access to the 3D seismic to actually do a facies analysis to determine what the seismic data tells you about the reservoir within that AOR.

And within that application, there's only one map that shows the permeability distribution

within their stimulation -- their simulation area. Excuse me. So there's very little data within their application with which to evaluate exactly how they derive their permeability parameters for the AOR that they're applying for.

Q. Mr. Doughty, do you recall approximately how long ago you were asked about the possibility of working on this matter?

A. It was, what, a month ago, maybe three weeks ago, something like that.

Q. And are you ready, willing and able to conduct additional review and particularly review of seismic data if you receive it?

A. Yes, I am.

MR. BRAATEN: No further questions.

HEARING EXAMINER GARNER: Attorney Bender.

**CROSS-EXAMINATION**

**BY MR. BENDER:**

Q. Mr. Doughty, are you -- Mr. Doughty, are you in a position today to make any recommendations to the Commission as to whether this application should be approved or denied?

A. I am.

Q. And what are your conclusions?

A. I would recommend that it's denied on the

basis that the applicant did not -- has not provided enough of the data from which the Commission or another party could evaluate how they came up with some of their reservoir properties.

Q. Okay.

A. Without the 3D seismic, you cannot determine the distribution of permeability and porosity across the AOR.

Q. Okay. And I believe it was your testimony at this point in time all you have reviewed is the three applications; is that correct?

A. That is correct. And --

Q. And you haven't reviewed -- you haven't reviewed the other data that's on file with the Commission?

A. I've reviewed the data that's publicly available.

Q. Okay.

A. Yes.

Q. Did you -- have you seen a letter dated May 15, 2024, from Mr. Braaten to the Commission requesting certain information?

A. I have not seen the letter. I've heard that there's a motion to compel.

Q. Okay. Do you know if the Commission

indicates that they supplied that information to Mr. Braaten?

A. I do not.

Q. Okay. You talked a little bit about a PHI-H map, and I don't want to put -- I don't want to testify for you, but I understood you to say that a PHI-H map would have been important for the Commission in this case. Is that a -- is that a fair statement of your testimony?

A. Yes, that is a fair statement. If you -- if you want to understand where the $CO_2$'s going as you inject it, you need a PHI-H map to determine the -- the storage capacity to the formation.

Q. Okay. And you --

A. And like I -- like I said earlier, there's only three data points within the AOR. So I'm -- I don't quite understand how the EERC came up with such a complex map of permeability and porosity without having additional data. It should have been provided in their submittal.

Q. Okay. And I think you also indicated that you were involved -- you sat the -- the well for Minnkota's -- the J-Loc?

A. The J-Loc.

Q. Yeah, the J-Loc.

A. Yep. J-Loc. Yep.

Q. So you know somewhat about that -- you know some things about that application that was made to the Commission for a Class VI well; is that correct?

A. I -- no. I don't -- I set the well. I described the core. I was not involved in anything after they drilled the well.

Q. You knew the --

A. But I.

Q. -- you know the Commission granted the application; correct?

A. Yes.

Q. Do --

A. But I wasn't involved in it. I do know what the core looked like and somewhat of the reservoir properties of the Broom Creek.

Q. And, you know, thank you for all that, but we can get through this a little bit quicker if you just answer my questions.

Do you know --

MR. BRAATEN: I think he did.

MR. BENDER: Well, I think he went on a little bit more than he needed to, but I'll move on.

Q. (MR. BENDER CONTINUING) Do you know if Minnkota submitted a PHI-H map in its application?

A. I do not.

Q. Are you familiar with the application that was filed by Blue Flint?

A. No.

Q. Do you know if they submitted a PHI-H map?

A. I do not.

Q. Are you familiar with the application that was submitted by Dakota Gasification?

A. No.

Q. Do you know if they submitted a PHI map -- PHI-H map?

A. No.

Q. Are you familiar with the application that was filed by Red Trail?

A. No.

Q. Do you know if they submitted a PHI-H map?

A. No.

Q. Do you know all those applications were granted by the Commission?

A. No.

MR. BENDER: No further questions.

HEARING EXAMINER GARNER: Any questions from the staff?

Redirect, Attorney Braaten?

MR. BRAATEN: No, I don't have any further questions. Thank you very much, Mr. Doughty.

MR. DOUGHTY: Thank you.

HEARING EXAMINER GARNER: Okay. You can call your next witness.

MR. BRAATEN: We are calling Paul Button.

HEARING EXAMINER GARNER: Button?

MR. BRAATEN: Yes.

**PAUL BUTTON,**

being first duly sworn, was examined and testified as follows:

**DIRECT EXAMINATION**

**BY MR. BRAATEN:**

Q. Mr. Button, can you state your full name and tell us -- well, let's start there. Just state your full name, please.

A. My name is Paul Michael Button.

Q. And can you give us a business or residential address?

A. My residential address is 1119 South Ophir Street in Butte, Montana.

Q. All right. Can you tell us just a little bit about your educational background?

A. I have a bachelor of science degree in

petroleum engineering from Montana Tech.

Q. All right. And tell us a bit about your professional experience.

A. My professional experience is I've worked 26 years as a petroleum engineer. I started off my career as a reservoir engineer for Marathon Oil Company working the Yates Field in West Texas doing simulation on gas oil gravity drainage with nitrogen injection and then converting it over to $CO_2$ injection.

From there I moved to -- on to Kinder Morgan when they acquired the Yates asset. I did a little bit of reservoir simulation on Yates, and then I worked the SACROC $CO_2$ flood unit in Scurry County, Texas.

After I left Kinder Morgan, I worked for SM Energy in Billings, Montana, for a number of years doing enhanced oil recovery studies on fields in the state of Wyoming. Also worked several water floods and shale development wells within the Powder River Basin, Richland County, Montana, and a little bit of experience in Divide County, North Dakota.

From there I left SM Energy and I went out on my own as a consultant. I did numerous

consulting jobs for multiple clients, including purchase and acquisition, evaluation, State evaluations and reservoir simulation for enhanced oil recovery on the Poplar Dome in Montana.

I then joined a company called Poplar Resources as a vice president where we implemented a pilot for enhanced -- a nitrogen injection flood. And I have been with that ever since.

And then I also started a startup for a battery energy storage corporation. We do compressed air energy storage. And I'm currently working both the Poplar job, the consulting job, and battery energy storage job.

Q. Okay. Can I have you turn in the exhibits to what we marked as LO-57?

A. Yes.

Q. Let me know, do you have that in front of you now?

A. Yes, I do.

Q. And what is Exhibit 57?

A. I would call it my résumé or CV.

Q. Okay. And does this CV accurately reflect your educational and professional experience and qualifications?

A. I would probably -- I caught a couple of

errors in here. The Button Petroleum Management, it was no longer active until recently again, so I would add that through 2024.

Q. Okay.

A. And I believe the name of the -- my educational school is no longer accurate because it's no longer Montana Tech of the University of Montana. I believe it's the Montana Technological University.

Q. Okay. Other than those, does the Exhibit 57 accurately reflect your professional and educational experience and qualifications?

A. Yes.

MR. BRAATEN: Move to admit Exhibit 57.

MR. BENDER: No objection.

HEARING EXAMINER GARNER: Exhibit is admitted.

Q. (MR. BRAATEN CONTINUING) Mr. Button, can you tell me if you have any experience with Class II wells or permitting Class II wells?

A. Yes. I have permitted a num -- a number of Class II wells in the state of Montana.

Q. And with respect to any of those Class II wells, was it necessary to obtain an aquifer exemption?

A. Yes. We worked on an aquifer exemption for one of the wells within the Poplar unit, east Poplar unit.

Q. Okay. Was there any kind of a volumetric limit imposed as part of that aquifer exemption?

A. Yes, I believe so.

MR. BENDER: Objection. Relevance.

HEARING EXAMINER GARNER: Overruled.

Q. (MR. BRAATEN CONTINUING) And are you familiar with the manner in which the volumetric limits are calculated for aquifer exemptions by either the EPA or state authorities?

A. I am familiar with how the volumetric extensions were calculated and approved for the permits that I worked on. Yes.

Q. Okay. And so with respect to the permits you worked on, can you just provide a general description of how those volumetric limits are calculated for the aquifer exemptions?

A. Basically, these were pretty simple calculations in that you would calculate the -- the volume within a given X number of foot radius that you believe you'll affect with the water injection, you know, so you get a volume of a cylinder, multiply it by your porosity, divide it by your

formation volume factor of water and that is the volume that will be affected.

Q. Do you have experience with reservoir modeling and -- well, you've already talked about this. Can you tell us a little bit about the experience you have with EOR and water floods with respect specifically to field development analysis?

A. Yes. I've had several major modeling projects over my career. The first one was for Yates field. We spent quite a few years looking at and running sensitivities on gas oil gravity drainage, enhanced oil recovery process as far as looking at gas oil contact movement speed versus the drainage of oil from the matrix in the reservoir. We also looked at viscosity effects with the injection of different gases and the swelling effects in the oil with different composition of injected gases, whether it was nitrogen, $CO_2$ or a mixture of recycled gas to determine the most effective recovery and most economic recovery mechanism with an EOR process.

My other major modeling project which I've worked on most recently is developing a full-field simulation model to model the history and also the enhanced oil recovery potential for Poplar Dome in

Montana, the East Poplar unit. That is a 70-year-old field that's probably undergone primary depletion with a strong natural water drive where I deal with gas on the top of it and expose the matrix to gas oil gravity drainage and determine if that was an economically feasible project.

Q. And can you tell us about any other specific experiences you have related to doing reservoir modeling and analysis?

A. I'm currently working on setting up the parameters to look at natural -- or compressed air storage in salt caverns and looking at the pressure volume and temperature effects and the rock stress effects within salt caverns to determine the feasibility for the active storage reservoirs.

Q. Mr. Button, do you have an understanding of different ways that pore space can be used in a commercial manner?

A. Yes, I do.

Q. And if a landowner wants to make a commercial use of pore space, can you tell us what you understand to be the options for making that commercial use of pore space?

A. It's basically three options of which there can be multiple derivatives of each option,

but either you remove fluid and market it as a -- as a quantity, you temporarily store something in your pore space, or you permanently sequester something in your pore space.

Q. And how would you assess the degree to which the pore space of a given landowner is being used in a way that forecloses other commercial uses?

A. I guess I would attempt to evaluate the change in the pressure volume temperature of the fluids contained within the pore space, and knowing that there are certain constraints on the upper end of the pressure and certain constraints on the lower end of the pressure and try to determine what the current impacts, what the proposed impacts and what the -- the final limits were of that pore space.

Q. Mr. Button, if you were provided with the data decks and input files required to run models in CMG and Schlumberger's Petrel software for this project, would you be ready, willing and able to run those models and analyze them for the intervenors?

A. The CMG model, I would be ready to upload those and run those and do some sensitivity

analysis on those models. As far as the Petrel model, the Petrel model is a static model. It's basically a geologic database, so those -- unless you're trying to redistribute properties or something like that, there's -- it's not a dynamic model where the answer changes, so I don't think there's nothing -- there's nothing to run there.

MR. BRAATEN: Understood. No further questions.

HEARING EXAMINER GARNER: Attorney Bender.

**CROSS-EXAMINATION**

**BY MR. BENDER:**

Q. Mr. Button, you -- you spent some time describing your experience as an engineer and involved in various enhanced oil recovery projects around the country. Is that a fair statement?

A. Yes.

Q. And you also talked about a compressed air project that you're working on. Do you recall that?

A. Yes.

Q. And in those projects, both the enhanced oil recovery projects and the compressed air project, you were involved in running some models; is that a fair statement?

A. Yes.

Q. Okay. Would you agree with me that running -- preparing and running models for enhanced oil recovery projects and a compressed air project is different than preparing and running a model for $CO_2$ storage?

A. Can you clarify what you mean by "different"?

Q. Well, if you've run -- or prepared and run models for $CO_2$ on a number of projects, are you going to have more knowledge and experience than someone who has not run models for $CO_2$, only for enhanced oil recovery and compressed air?

A. Well, the models that I've ran for enhanced oil recovery, especially for when I worked the Yates field, those directly involved the injection of $CO_2$ in the pore space --

Q. Okay.

A. -- so they're not too dissimilar. The only -- the main dissimilar between those two models is that in the carbon sequestration, the $CO_2$'s interaction is primarily with water, where in those other models it was with both water and oil. So they were actually more complex.

Q. Okay. Are you familiar with the data

requests that Mr. Braaten made to the Industrial Commission?

A. I --

Q. Pardon me?

A. Yes, I am.

Q. Okay.

A. Yes, I am.

Q. Okay. And are you familiar with the type of data that would be contained within a CMG data file?

A. Yes, I am.

Q. Could someone produce a PHI-H map if they had a CMG data file?

A. I believe that within CMG's program you could get that, yes.

Q. Okay. And are you aware that it's the -- in the Commission's position that they provided a CMG data file to Mr. Braaten?

A. I am not aware of the CMG data file, if Mr. Braaten is in possession of it or -- I am certainly not in possession of that CMG data file.

Q. He didn't provide it to you?

A. I have not seen it, no.

Q. Is it a fair statement that -- well, let me back -- strike that.

A. Let me --
Q. How many hours -- just let me ask the questions. Just let me ask the questions.
A. Okay.
Q. How many hours of time have you spent working on this project?
A. I have -- up until the start of this hearing, I spent 14-and-a-half hours working on it.
Q. Okay. And what were you asked to do?
MR. BRAATEN: Same objection to privileged communications with experts.
HEARING EXAMINER GARNER: Overruled.
MR. BUTTON: What was I asked to do?
Q. (MR. BENDER CONTINUING) Yes.
A. I was asked by Mr. Braaten to evaluate the impact of the pore space of his clients.
Q. Okay. And to do that at this point in time, all you have done is reviewed the applications that were submitted to the Commission; is that correct?
A. No.
Q. You didn't review the applications?
A. I did review the applications, but that is not all that I've done.
Q. What else did you do in the 15 hours that

you've spent on this project?

A. I have looked through the well files of the wells in the immediate area to see what information was available.

Q. How many hours did you spend reviewing the applications?

A. Probably the majority of the 14 hours.

Q. Okay.

A. But I don't have a specific number, but I could get that number for you.

Q. More than ten?

A. I would say yes. Probably in the ten range.

Q. Well, you said more than 10. Would it be 11 or 12?

A. We'll go with more than ten.

Q. Okay. And then the other -- the only other time you would have -- well, strike that.

The additional time you would have spent between 10 hours and 15 hours would have been to review some logs; is that what you said?

A. I did not say I reviewed logs. I said I reviewed the well files on the Commission website.

Q. Okay. What are in the well files?

A. The well files contain the core reports

and some of that type of information. They have like casing size and the drilling completion information, things like that.

Q. Okay. Would you agree with me that you really haven't reviewed enough to make any sort of recommendation to the Commission whether this application should be granted or denied?

A. Absolutely.

MR. BENDER: Okay. No further questions.

HEARING EXAMINER GARNER: Any questions from the staff?

Mr. Braaten, any redirect?

MR. BUTTON: Are you waiting for a response from me?

MR. BRAATEN: Sorry. No, Mr. Button, that was on me. I'm just taking a moment to review my notes to see if I have anything else to ask. Give me one moment, please.

I have nothing further.

HEARING EXAMINER GARNER: Okay. I know you said you only expected to get through three witnesses, but you still have 20 minutes.

MR. BRAATEN: I'm -- yeah, I'm sorry, I have one more, but he is no longer available.

HEARING EXAMINER GARNER: He's not

available right now?

MR. BRAATEN: Right.

HEARING EXAMINER GARNER: Let's go off the record for a minute.

(Recessed at 6:10 p.m. and reconvened at 6:11 p.m.)

HEARING EXAMINER GARNER: Okay. We are back on the record, and we are going to recess these hearings and resume tomorrow morning at 9 a.m. That concludes our hearings for the day.

(Recessed at 6:12 p.m., Wednesday, the 12th day of June, 2024.)

--------

CERTIFICATE OF COURT REPORTER

I, Stephanie A. Smith, a Registered Professional Reporter,

DO HEREBY CERTIFY that I recorded in shorthand the foregoing proceedings had and made of record at the time and place hereinbefore indicated.

I DO HEREBY FURTHER CERTIFY that the foregoing typewritten pages contain an accurate transcript of my shorthand notes then and there taken.

Dated at Bismarck, North Dakota, this 3rd day of July, 2024.

_____
Stephanie A. Smith
Registered Professional Reporter

## #

**#3** [1] - 284:20

## $

**$20,817,800** [1] - 407:25
**$20,868,800** [1] - 407:24
**$583,000** [1] - 438:3
**$62** [1] - 408:2

## '

**'70s** [1] - 337:16
**'90s** [1] - 528:7

## 0

**0** [5] - 346:5, 346:13, 347:17, 476:17, 476:22
**0.69** [1] - 414:25
**0.712** [1] - 415:1
**0.784** [1] - 415:4
**005** [1] - 339:3

## 1

**1** [65] - 277:4, 277:8, 277:12, 277:15, 277:19, 277:21, 278:1, 278:6, 278:10, 278:14, 278:21, 279:1, 279:4, 279:12, 279:16, 280:1, 280:5, 280:14, 280:18, 280:23, 281:4, 281:15, 281:16, 282:4, 282:5, 282:17, 282:18, 283:4, 283:5, 284:18, 334:15, 334:24, 335:1, 335:24, 345:22, 345:24, 357:9, 357:19, 358:19, 360:7, 361:7, 365:1, 365:3, 365:4, 365:14, 365:16, 368:23, 368:25, 369:1, 412:24, 413:3, 413:5, 417:25, 418:8, 449:18, 449:19, 450:14, 453:19, 454:24, 455:16, 455:18, 484:1, 491:21, 526:23
**1,166,000** [1] - 407:2
**1-1** [1] - 372:1
**1-2** [2] - 372:1
**1-34** [2] - 371:3, 430:19
**1-inch** [1] - 491:14
**1-mile** [1] - 388:9
**1.15** [1] - 357:10
**1.89** [1] - 440:7
**10** [26] - 277:10, 277:23, 278:12, 278:23, 279:12, 280:2, 280:14, 280:24, 281:16, 282:6, 282:19, 283:6, 326:23, 346:5, 346:7, 346:12, 346:14, 373:19, 377:9, 437:17, 455:7, 479:12, 479:13, 549:14, 549:20
**100** [1] - 285:4
**1000** [1] - 283:19
**107** [1] - 493:24
**109** [1] - 285:5
**10:00** [1] - 321:22
**10:12** [1] - 321:23
**11** [27] - 277:8, 277:10, 277:21, 277:23, 278:10, 278:12, 278:21, 278:23, 279:12, 280:2, 280:14, 280:24, 281:15, 281:16, 282:4, 282:6, 282:17, 282:19, 283:4, 283:6, 437:17, 437:23, 455:14, 470:11, 519:23, 520:2, 549:15
**11,100,000** [1] - 407:8
**11-1** [3] - 456:3, 464:19, 464:24
**11-2** [1] - 464:20
**110** [4] - 426:7, 492:20, 493:22, 494:2
**1119** [1] - 537:21
**11th** [2] - 519:22, 520:5
**12** [31] - 277:8, 277:12, 277:21, 278:2, 278:10, 278:14, 278:21, 279:1, 279:12, 280:2, 280:15, 280:24, 281:15, 281:17, 282:5, 282:6, 282:17, 282:19, 283:5, 283:6, 283:20, 289:7, 314:1, 404:17, 406:2, 406:10, 437:25, 456:7, 471:19, 549:15
**12,000** [2] - 455:1, 455:22
**12-1** [3] - 406:10, 406:25, 407:15
**12-10** [1] - 439:19
**12-2** [1] - 406:11
**12-7** [2] - 439:19, 440:5
**124.4** [1] - 424:3
**125** [3] - 490:11, 490:20, 490:21
**1250** [2] - 425:11, 425:19
**12:29** [1] - 389:1
**12th** [2] - 289:3, 551:11
**13** [16] - 277:8, 277:21, 278:10, 278:21, 279:12, 280:2, 280:15, 280:24, 281:15, 281:17, 282:5, 282:6, 282:17, 282:19, 283:5, 283:6
**136** [1] - 481:4
**14** [22] - 277:8, 277:10, 277:21, 277:23, 278:11, 278:12, 278:21, 278:23, 279:12, 280:2, 280:15, 281:1, 281:15, 281:17, 282:5, 282:6, 282:17, 282:19, 283:5, 283:6, 430:24, 549:7
**14-and-a-half** [1] - 548:8
**140** [9] - 277:12, 277:13, 278:2, 278:3, 278:15, 278:16, 279:2, 279:3, 374:13
**141** [17] - 277:9, 277:11, 277:22, 278:1, 278:11, 278:14, 278:22, 279:1, 279:16, 280:6, 280:18, 281:4, 373:10, 423:15, 429:3, 469:24, 469:25
**142** [24] - 277:7, 277:20, 278:10, 278:20, 279:14, 279:15, 280:3, 280:5, 280:16, 280:18, 281:2, 281:3, 281:15, 281:18, 281:19, 282:5, 282:8, 282:9, 282:18, 282:20, 282:21, 283:5, 283:8, 283:9
**143** [12] - 279:11, 280:1, 280:13, 280:23, 281:13, 281:14, 282:2, 282:4, 282:15, 282:16, 283:2, 283:4
**15** [21] - 277:8, 277:10, 277:21, 277:23, 278:11, 278:12, 278:21, 278:23, 279:13, 280:2, 280:15, 281:1, 281:17, 282:6, 282:19, 283:6, 436:3, 520:25, 533:21, 548:25, 549:20
**150** [2] - 490:13, 490:23
**16** [18] - 277:10, 277:23, 278:12, 278:23, 279:13, 280:2, 280:15, 281:1, 281:17, 282:6, 282:19, 283:6, 377:3, 377:4, 377:6, 422:25, 470:23, 470:24
**1600** [1] - 529:21
**17** [24] - 277:10, 277:23, 278:12, 278:23, 279:13, 279:15, 280:2, 280:4, 280:15, 280:17, 281:1, 281:3, 281:17, 281:19, 282:6, 282:8, 282:19, 282:21, 283:6, 283:8, 404:3, 425:23, 425:24, 518:4
**18** [24] - 277:10, 277:23, 278:13, 278:23, 279:13, 279:15, 280:2, 280:4, 280:15, 280:17, 281:1, 281:3, 281:17, 281:19, 282:6, 282:8, 282:19, 282:21, 283:6, 283:8, 423:24, 424:7, 511:14, 518:4
**19** [32] - 277:10, 277:23, 278:13, 278:23, 279:13, 279:15, 280:2, 280:4, 280:15, 280:17, 281:1, 281:3, 281:13, 281:17, 281:19, 282:3, 282:6, 282:8, 282:16, 282:19, 282:21, 283:3, 283:6, 283:8, 371:11, 412:8, 430:17, 430:24, 431:8, 511:15, 514:5, 518:4
**1940s** [1] - 340:8
**1945** [1] - 340:2
**195** [3] - 397:7, 490:11, 490:19
**1950s** [1] - 337:20
**1977** [1] - 386:24
**1:30** [1] - 389:2
**1A** [5] - 327:19, 394:7, 399:11, 434:19, 475:8
**1B** [3] - 356:11, 356:12
**1C-1** [4] - 288:13, 458:17, 458:23, 461:3

## 2

**2** [50] - 277:9, 277:12, 277:22, 278:2, 278:12, 278:14, 278:22, 279:1, 279:8, 279:12, 279:16, 279:19, 279:23, 280:1, 280:5, 280:8, 280:9, 280:14, 280:18, 280:23, 281:4, 281:6, 281:15, 281:16, 282:4, 282:6, 282:17, 282:18, 283:4, 283:6, 284:19, 348:23, 356:10, 358:15, 362:8, 366:6, 374:8, 382:24, 412:21, 417:25, 418:8, 430:23, 442:1, 450:24, 451:21, 452:5, 464:8, 471:20, 473:9
**2,160** [1] - 465:10
**2,695,000** [1] - 407:9
**2-10a** [1] - 374:14
**2-16** [2] - 376:10, 383:14
**2-17** [1] - 374:9
**2-22** [1] - 375:24
**2-25** [1] - 376:10

**2-3** [1] - 364:4
**2-30** [1] - 362:12
**2-33** [1] - 361:18
**2-34** [1] - 361:18
**2-4** [1] - 413:12
**2-41** [1] - 395:8
**2-42** [1] - 394:14
**2-5** [2] - 364:4, 414:8
**2-50** [1] - 356:15
**2-64** [1] - 395:8
**2-65** [1] - 394:11
**2-66** [1] - 394:6
**2-7** [1] - 413:2
**2-9** [1] - 383:14
**2-inch** [1] - 491:14
**2.5** [11] - 309:17, 310:10, 310:12, 310:14, 311:2, 315:9, 315:15, 322:4, 322:15, 324:18, 324:19
**2.6** [1] - 440:12
**2.7** [6] - 315:14, 324:12, 324:21, 445:2, 445:5, 465:21
**20** [36] - 277:10, 277:23, 278:13, 278:23, 279:13, 279:15, 280:2, 280:4, 280:15, 280:17, 281:1, 281:3, 281:13, 281:17, 281:19, 282:3, 282:7, 282:9, 282:16, 282:19, 282:21, 283:3, 283:7, 283:9, 320:1, 327:23, 332:1, 346:7, 346:14, 369:14, 422:25, 463:15, 511:15, 514:6, 518:4, 550:22
**20,316,000** [1] - 407:10
**20-year** [4] - 326:23, 364:21, 374:2, 424:4
**2004** [1] - 505:4
**2008** [1] - 528:9
**2011** [1] - 507:6
**2012** [4] - 513:21, 515:19, 517:5, 519:12
**2013** [1] - 525:25
**2014** [5] - 507:19, 514:2, 515:19, 517:5, 519:13
**2018** [1] - 526:1
**2024** [6] - 283:20, 289:3, 533:21, 540:3, 551:12, 552:14
**21** [18] - 277:10, 277:23, 278:13, 278:23, 279:13, 280:2, 280:15, 281:1, 281:14, 281:17, 282:3, 282:7, 282:16, 282:19, 283:3, 283:7, 511:21, 525:25
**2100** [6] - 426:16, 462:15, 465:1, 469:8, 470:13, 470:18
**2150** [2] - 425:11, 425:19
**2160** [4] - 426:6, 426:15, 465:6, 465:12
**2183** [4] - 426:5, 465:5, 465:11, 490:21
**22** [16] - 277:8, 277:10, 277:21, 277:23, 278:11, 278:13, 278:21, 278:23, 279:13, 280:2, 280:15, 281:1, 281:17, 282:7, 282:19, 283:7
**2200** [3] - 433:6, 433:7, 433:8
**23** [16] - 277:8, 277:10, 277:21, 277:24, 278:11, 278:13, 278:21, 278:23, 279:13, 280:2, 280:15, 281:1, 281:17, 282:7, 282:19, 283:7
**24** [18] - 277:8, 277:21, 278:11, 278:21, 279:13, 280:2, 280:15, 281:1, 281:15, 281:17, 282:5, 282:7, 282:17, 282:19, 283:5, 283:7, 422:25, 526:1
**2400** [1] - 426:9
**243,000** [1] - 407:5
**25** [18] - 277:8, 277:10, 277:22, 277:24, 278:11, 278:13, 278:21, 278:23, 279:13, 280:2, 280:15, 281:1, 281:17, 282:7, 282:19, 283:7, 342:24, 396:22
**250** [2] - 364:3
**2500** [1] - 425:21
**26** [19] - 277:8, 277:10, 277:22, 277:24, 278:11, 278:13, 278:21, 278:23, 279:13, 280:3, 280:15, 281:1, 281:17, 282:7, 282:20, 283:7, 531:9, 531:11, 538:5
**27** [16] - 277:10, 277:24, 278:13, 278:23, 279:11, 279:13, 279:23, 280:3, 280:13, 280:15, 280:22, 281:1, 281:17, 282:7, 282:20, 283:7
**277** [1] - 283:16
**28** [21] - 277:10, 277:24, 278:13, 278:23, 279:11, 279:13, 279:24, 280:3, 280:13, 280:16, 280:22, 281:1, 281:14, 281:18, 282:3, 282:7, 282:16, 282:20, 283:3, 283:7, 426:5
**280** [1] - 356:12
**289** [1] - 286:4
**29** [24] - 277:11, 277:24, 278:13, 278:24, 279:11, 279:13, 279:15, 279:24, 280:3, 280:4, 280:13, 280:16, 280:17, 280:22, 281:1, 281:3, 281:14, 281:18, 282:3, 282:7, 282:16, 282:20, 283:3, 283:7
**291** [1] - 286:12
**2:56** [1] - 447:7
**2D** [1] - 451:8

## 3

**3** [37] - 277:9, 277:12, 277:23, 278:2, 278:12, 278:14, 278:22, 279:1, 279:12, 279:16, 280:1, 280:5, 280:14, 280:18, 280:23, 281:4, 281:10, 281:16, 281:21, 282:1, 282:6, 282:11, 282:18, 283:6, 283:10, 363:18, 374:8, 383:4, 388:4, 412:5, 442:1, 451:24, 452:1, 452:9, 462:15, 464:25, 531:13
**3,000** [2] - 342:19, 395:1
**3,500** [1] - 342:19
**3,600** [1] - 342:21
**3,800** [1] - 342:22
**3-1** [2] - 348:13, 350:24
**3-10** [1] - 368:5
**3-15** [1] - 317:16
**3-15a** [1] - 345:3
**3-2** [1] - 338:21
**3-22** [1] - 369:12
**3-25** [1] - 344:18
**3-26** [1] - 344:18
**3-35** [1] - 368:20
**3-41** [1] - 338:20
**3-42** [2] - 388:5, 388:6
**3-5** [1] - 368:19
**3-6** [1] - 368:4
**3-7** [2] - 383:5, 383:6
**3-8** [1] - 385:7
**3.12** [4] - 459:6, 459:9, 460:4, 460:23
**30** [24] - 277:11, 277:24, 278:13, 278:24, 279:13, 279:15, 280:3, 280:4, 280:16, 280:17, 281:2, 281:3, 281:14, 281:18, 282:3, 282:7, 282:16, 282:20, 283:3, 283:7, 332:4, 332:12, 332:23, 438:19
**300** [2] - 429:12, 430:2
**304** [1] - 284:12
**30869** [2] - 277:3, 289:12
**30870** [1] - 277:4
**30871** [1] - 277:4
**30872** [1] - 277:5
**30873** [1] - 277:5
**30874** [1] - 277:6
**30875** [1] - 277:6
**30876** [1] - 277:7
**30877** [1] - 277:7
**30878** [1] - 277:8
**30879** [1] - 277:8
**30880** [2] - 277:9, 289:12
**31** [16] - 277:7, 277:11, 277:20, 277:24, 278:9, 278:13, 278:20, 278:24, 279:15, 280:4, 280:17, 281:3, 281:14, 282:3, 282:16, 283:3
**314.5** [1] - 424:18
**32** [24] - 277:7, 277:11, 277:20, 278:1, 278:9, 278:13, 278:20, 278:24, 279:11, 279:14, 279:24, 280:3, 280:13, 280:16, 280:22, 281:2, 281:14, 281:18, 282:3, 282:7, 282:16, 282:20, 283:3, 283:7
**325** [1] - 469:24
**325193** [1] - 411:22
**33** [24] - 277:7, 277:11, 277:20, 278:1, 278:9, 278:13, 278:20, 278:24, 279:11, 279:14, 279:24, 280:3, 280:13, 280:16, 280:22, 281:2, 281:14, 281:18, 282:3, 282:7, 282:16, 282:20, 283:3, 283:7
**330** [2] - 489:3
**332** [2] - 412:6, 412:10
**333** [2] - 288:22
**34** [24] - 277:7, 277:11, 277:20, 278:1, 278:10, 278:13, 278:20, 278:24, 279:11, 279:14, 279:24, 280:3, 280:13, 280:16, 280:23, 281:2, 281:14, 281:18, 282:3, 282:7, 282:16, 282:20, 283:3, 283:7
**35** [26] - 277:8, 277:11, 277:22, 278:1, 278:11, 278:14, 278:21, 278:24, 279:11, 279:14, 279:24, 280:3, 280:13, 280:16, 280:23, 281:2, 281:14, 281:18, 282:4, 282:7,

282:16, 282:20, 283:4, 283:7, 373:11, 396:20
**352** [1] - 412:2
**355** [1] - 286:13
**36** [16] - 277:8, 277:22, 278:11, 278:21, 279:14, 280:3, 280:16, 281:2, 281:13, 281:14, 282:2, 282:4, 282:15, 282:16, 283:2, 283:4
**3600** [1] - 343:3
**370** [1] - 286:14
**371** [1] - 286:15
**389** [1] - 286:16
**393** [1] - 286:17
**396** [1] - 286:21
**397** [1] - 374:12
**398** [1] - 286:22
**3:12** [1] - 447:8
**3D** [19] - 343:14, 354:12, 358:7, 358:8, 363:8, 363:12, 363:14, 371:8, 394:20, 402:23, 444:8, 444:10, 444:15, 451:8, 528:21, 530:20, 530:21, 531:21, 533:6
**3rd** [1] - 552:13

## 4

**4** [25] - 277:9, 277:13, 277:23, 278:2, 278:12, 278:15, 278:22, 279:2, 279:12, 280:1, 280:14, 280:24, 281:16, 282:6, 282:18, 283:6, 370:3, 430:23, 431:17, 445:7, 452:15, 465:24, 466:1, 466:20, 474:5
**4,225,000** [2] - 407:3, 407:7
**4-1** [3] - 327:17, 335:6, 337:10
**4-12** [1] - 386:17
**4-14** [1] - 386:15
**4-16** [1] - 387:9
**4-2** [2] - 327:15, 370:6
**4-4** [1] - 370:6
**4-6** [1] - 386:17
**4.0** [1] - 445:3
**4.01** [1] - 483:7
**4.5** [6] - 445:3, 445:7, 466:14, 466:18, 466:25, 474:5
**4.92** [1] - 424:21
**400** [4] - 284:12, 336:11, 337:9, 338:7
**403** [1] - 286:23
**408** [1] - 286:24
**4100** [1] - 433:8
**411** [1] - 287:3
**43-05-01** [1] - 313:24
**43-05-01-05** [2] - 393:6, 393:15
**43-05-01-12** [1] - 313:19
**43-05-01-5** [1] - 443:23
**43-05-1-11** [1] - 487:3
**432** [1] - 287:4
**4400** [1] - 433:6
**441** [1] - 287:5
**448** [1] - 287:8
**457** [1] - 288:14
**458** [2] - 287:9, 288:14
**45Q** [1] - 332:22
**461** [3] - 287:10, 288:13
**467** [1] - 287:11
**470** [1] - 287:12
**473** [1] - 287:13
**484** [1] - 287:17
**49** [1] - 397:7
**4942** [2] - 371:4, 471:22
**4:42** [1] - 503:4
**4:59** [1] - 503:5

## 5

**5** [55] - 277:9, 277:13, 277:23, 278:2, 278:12, 278:15, 278:22, 279:2, 279:12, 279:15, 280:1, 280:4, 280:14, 280:17, 280:24, 281:3, 281:16, 282:6, 282:18, 283:6, 326:23, 343:8, 343:11, 343:13, 344:12, 344:25, 345:4, 346:19, 346:24, 347:12, 347:16, 347:17, 359:25, 362:24, 382:2, 399:3, 415:4, 415:9, 418:13, 423:14, 429:2, 445:17, 453:10, 453:11, 464:10, 466:21, 466:22, 466:25, 469:25, 470:1, 471:18, 473:10, 479:4, 479:13
**5,000** [1] - 340:1
**5-1** [2] - 399:14
**5-12** [2] - 421:17, 475:8
**5-13** [2] - 441:12, 441:21
**5-14** [2] - 423:22, 424:17
**5-15** [2] - 441:20, 443:19
**5-2** [8] - 399:8, 399:10, 399:14, 399:15, 399:17, 399:22, 423:14, 428:24
**5-26** [1] - 431:15
**5-29** [1] - 444:7
**5-3** [3] - 418:14, 419:7, 421:16
**5-32** [1] - 444:25
**5-4** [5] - 399:10, 423:22, 424:17, 427:6, 465:3
**5.3.1** [1] - 443:20
**5.7.2** [1] - 431:14
**50** [8] - 410:1, 454:20, 483:14, 483:15, 488:8, 488:22, 489:12
**500** [2] - 332:10, 435:8
**503** [1] - 287:22
**505** [2] - 288:20
**511** [8] - 288:18, 288:19, 288:19, 288:21
**513** [1] - 287:23
**525** [1] - 287:24
**526** [1] - 287:25
**527** [1] - 288:4
**530** [2] - 288:21
**532** [1] - 288:5
**537** [1] - 288:8
**540** [2] - 288:20
**545** [1] - 288:9
**55** [2] - 483:15, 531:11
**55,000** [1] - 440:11
**552** [2] - 283:16, 286:8
**5580** [1] - 413:9
**57** [5] - 419:16, 421:13, 539:20, 540:11, 540:14
**58** [1] - 529:8
**58501** [1] - 285:5
**58504** [1] - 284:13
**59** [2] - 386:23

## 6

**6** [34] - 277:9, 277:13, 277:23, 278:3, 278:12, 278:15, 278:22, 279:2, 279:12, 279:15, 280:1, 280:4, 280:14, 280:17, 280:24, 281:3, 281:16, 281:19, 282:6, 282:8, 282:18, 282:21, 283:6, 283:8, 291:17, 345:23, 374:12, 374:15, 375:3, 424:19, 454:2, 463:13, 471:18
**6,000** [1] - 455:3
**6-1** [2] - 399:14, 399:16
**6-2** [2] - 434:17, 463:10
**6-6** [2] - 434:19, 463:13
**6.22** [1] - 424:5
**60** [3] - 381:21, 438:19, 483:16
**63** [2] - 333:16, 353:19
**6590** [1] - 284:16
**6:10** [1] - 551:5
**6:11** [1] - 551:6
**6:12** [1] - 551:11
**6:30** [2] - 290:24, 291:2

## 7

**7** [30] - 277:9, 277:13, 277:23, 278:3, 278:12, 278:15, 278:22, 279:2, 279:12, 279:15, 280:1, 280:4, 280:14, 280:17, 280:24, 281:3, 281:16, 281:19, 282:6, 282:8, 282:18, 282:21, 283:6, 283:8, 376:13, 404:13, 405:3, 414:9, 433:24, 454:8
**7-17** [1] - 445:16
**7-inch** [1] - 438:6
**7.5.1** [1] - 445:17
**7.6** [1] - 434:3
**70** [2] - 337:23, 337:25
**70-year-old** [1] - 543:2
**700** [1] - 433:17
**750,000** [1] - 440:8

## 8

**8** [18] - 277:9, 277:23, 278:12, 278:22, 279:12, 279:15, 280:1, 280:4, 280:14, 280:17, 280:24, 281:3, 281:16, 282:6, 282:18, 283:6, 376:14, 454:14
**82** [5] - 511:2, 511:15, 514:7, 514:8, 518:4
**82801** [1] - 284:17
**83** [4] - 304:24, 333:16, 333:17, 514:6
**85** [4] - 281:20, 282:9, 282:22, 283:9
**86** [11] - 281:15, 281:18, 282:4, 282:8, 282:17, 282:21, 283:4, 283:8, 360:9, 429:3, 470:1
**87** [26] - 277:7, 277:11, 277:13, 277:21, 278:1, 278:3, 278:10, 278:14, 278:16, 278:20, 279:1, 279:3, 279:16, 280:5, 280:18, 281:4, 281:13, 281:16, 282:3, 282:5, 282:15, 282:18, 283:3, 283:5, 423:15, 469:24
**88** [21] - 277:9, 277:12, 277:22, 278:2, 278:12, 278:15, 278:22, 279:2, 279:12, 279:14, 279:17, 280:1, 280:4, 280:6, 280:14, 280:16, 280:19, 280:23, 281:2, 281:5, 373:10

**8B** [8] - 288:14, 448:8, 448:9, 448:10, 449:1, 471:5, 471:18, 474:9

## 9

**9** [19] - 277:9, 277:23, 278:12, 278:22, 279:12, 280:2, 280:14, 280:24, 281:16, 282:6, 282:19, 283:6, 291:3, 409:16, 430:23, 437:17, 453:21, 454:17, 551:10
**9-1** [1] - 409:21
**9-2** [1] - 409:21
**90** [2] - 328:15, 462:6
**900** [5] - 342:15, 343:3, 425:10, 490:13, 490:22
**900-pound** [1] - 479:18
**911** [1] - 435:18
**936** [1] - 423:23
**95** [9] - 360:10, 366:6, 366:11, 366:15, 366:18, 418:23, 419:5, 419:12
**96** [1] - 419:17
**98** [5] - 360:9, 366:18, 366:22, 419:16, 419:19
**98.25** [4] - 366:14, 366:20, 419:14
**9:06** [1] - 289:2
**9:08** [1] - 289:10

## A

**A'd** [1] - 334:2
**a.m** [6] - 289:2, 289:10, 291:3, 321:22, 321:23, 551:10
**abandoned** [3] - 338:10, 371:4, 407:4
**abandonment** [4] - 406:16, 407:17, 409:5, 440:9
**abbreviate** [1] - 450:3
**abide** [1] - 454:18
**abides** [1] - 341:3
**ability** [7] - 328:6, 330:3, 342:11, 350:15, 439:6, 469:20, 507:3
**able** [29] - 319:3, 351:14, 355:25, 358:10, 358:23, 366:11, 369:23, 380:21, 381:10, 404:19, 411:16, 412:3, 414:2, 415:21, 420:21, 422:21, 422:23, 423:1, 424:3, 427:2, 436:14, 437:5, 449:2, 484:16, 488:14, 512:10, 512:11, 532:11, 544:21
**abnormal** [2] - 493:12, 495:11
**Above-Zone** [1] - 402:10
**aboveground** [2] - 356:2, 356:6
**absent** [1] - 451:14
**absolutely** [2] - 496:10, 550:8
**academic** [1] - 296:23
**accelerate** [1] - 444:23
**accept** [1] - 418:16
**acceptable** [1] - 323:10
**accepted** [1] - 322:4
**access** [4] - 299:4, 436:22, 531:20
**Access** [1] - 450:14
**accessible** [1] - 338:10
**accessing** [1] - 437:12
**accommodate** [3] - 472:11, 472:16, 490:1
**accordance** [3] - 397:6, 410:11, 485:5
**according** [2] - 426:8, 488:24
**account** [7] - 350:10, 350:20, 384:6, 384:11, 384:20, 420:21, 483:20
**accounted** [2] - 384:13, 419:9
**accuracy** [1] - 354:12
**accurate** [8] - 309:4, 311:14, 343:15, 349:19, 350:16, 412:9, 540:6, 552:10
**accurately** [8] - 314:19, 353:6, 357:15, 358:10, 505:13, 529:13, 539:22, 540:11
**acid** [1] - 504:21
**acknowledged** [1] - 431:24
**acquire** [1] - 352:10
**acquired** [6] - 304:14, 313:9, 394:20, 401:24, 430:22, 538:12
**acquiring** [1] - 483:19
**acquisition** [2] - 397:19, 539:2
**acreage** [2] - 313:6, 316:1
**acres** [1] - 315:15
**Act** [3] - 292:13, 292:18, 293:2
**act** [2] - 376:22, 384:17
**acting** [3] - 384:1, 384:3, 384:7
**action** [2] - 334:1, 526:13
**actions** [2] - 440:6, 509:7
**active** [3] - 357:4, 540:2, 543:15
**actively** [5] - 322:21, 341:16, 341:20, 341:23, 342:1
**activities** [11] - 293:17, 307:6, 308:20, 356:20, 357:2, 399:19, 401:12, 415:10, 497:22, 509:19, 509:20
**activity** [5] - 356:1, 356:5, 400:11, 400:12, 401:21
**actual** [8] - 347:6, 350:18, 352:16, 352:25, 439:20, 442:4, 502:1
**actuated** [1] - 494:6
**add** [7] - 358:3, 433:19, 436:5, 460:4, 474:7, 486:7, 540:3
**added** [7] - 378:22, 420:7, 420:12, 443:4, 471:22, 499:10, 500:17
**adding** [1] - 420:14
**addition** [5] - 316:12, 415:17, 438:7, 445:18, 459:8
**additional** [25] - 295:6, 313:5, 313:6, 314:14, 316:1, 331:14, 352:10, 371:12, 372:15, 372:17, 387:18, 413:17, 420:14, 439:10, 441:11, 442:17, 443:4, 443:5, 470:7, 471:20, 471:23, 472:4, 532:12, 534:19, 549:19
**additionally** [5] - 310:10, 364:17, 366:9, 419:21, 425:8
**additions** [1] - 485:9
**additives** [1] - 486:11
**address** [6] - 315:4, 392:19, 484:6, 489:6, 537:20, 537:21
**addressed** [2] - 315:5, 393:21
**adjacent** [1] - 429:20
**adjust** [4] - 352:9, 386:8, 497:1, 497:20
**adjusted** [1] - 497:4
**adjusting** [2] - 315:22, 496:24
**adjustment** [11] - 309:17, 310:24, 312:22, 314:11, 322:16, 324:12, 498:2, 498:4, 498:10, 499:7, 499:8
**administrative** [3] - 410:12, 508:5, 517:23
**Administrative** [3] - 293:13, 313:21, 487:3
**admission** [2] - 461:6, 461:9
**admit** [7] - 333:14, 333:15, 461:11, 505:17, 511:14, 530:1, 540:14
**admitted** [6] - 333:23, 458:5, 511:19, 530:6, 530:9, 540:17
**adopt** [3] - 515:2, 517:12, 526:9
**adopted** [1] - 293:2
**adopting** [1] - 513:19
**advance** [1] - 430:12
**advanced** [1] - 459:23
**advection** [4] - 379:25, 380:7, 391:16, 391:24
**advised** [1] - 301:19
**advisement** [1] - 310:3
**affect** [8] - 316:12, 321:15, 329:3, 342:10, 354:12, 376:2, 414:21, 541:23
**affected** [4] - 330:6, 418:11, 427:4, 542:2
**affectively** [1] - 316:11
**afterwards** [2] - 471:5, 471:6
**ag** [1] - 506:1
**agent** [1] - 296:10
**ago** [8] - 316:3, 335:7, 472:13, 510:1, 519:11, 532:7, 532:9, 532:10
**agree** [16] - 308:9, 308:14, 315:25, 327:11, 329:10, 330:20, 337:7, 342:14, 347:5, 353:7, 357:23, 358:3, 498:21, 522:15, 546:2, 550:4
**agreed** [3] - 459:21, 460:12, 460:16
**agreement** [17] - 296:15, 304:16, 306:9, 446:21, 447:1, 458:25, 459:9, 459:18, 459:25, 460:1, 460:3, 460:6, 460:8, 460:13, 460:16, 460:21, 502:14
**agreements** [5] - 304:18, 357:10, 446:8, 460:7, 482:24
**aground** [1] - 343:21
**ahead** [6] - 411:13, 420:9, 420:10, 437:7, 488:19, 520:17
**aid** [2] - 446:10, 449:1
**air** [7] - 524:4, 539:11, 543:11, 545:18, 545:23, 546:4, 546:13
**alarm** [2] - 495:2, 495:3
**ALBERTSON** [1] - 284:7
**allocate** [2] - 496:17, 497:22
**allocated** [2] - 351:2, 438:17
**allocating** [1] - 357:25
**allocation** [1] - 320:16
**allow** [8] - 290:15, 341:13, 380:9, 384:19, 391:13, 416:12, 424:25, 439:5
**allowed** [3] - 354:24, 355:12, 380:7
**allowing** [1] - 462:11
**allows** [3] - 384:16, 431:8

**alloy** [1] - 410:12
**almost** [1] - 336:8
**alongside** [1] - 465:1
**amalgamate** [1] - 352:10
**amalgamation** [3] - 277:16, 279:19, 281:22
**Amanda** [16] - 389:9, 389:18, 389:24, 415:24, 416:9, 435:1, 447:18, 450:21, 451:2, 451:13, 452:3, 461:13, 461:15, 461:23, 469:3, 488:2
**AMANDA** [1] - 286:11
**amended** [1] - 460:22
**amendment** [5] - 395:18, 459:1, 459:5, 459:21, 461:7
**amount** [32] - 278:7, 280:10, 282:12, 300:3, 300:4, 300:7, 310:6, 310:16, 310:20, 311:6, 318:24, 319:8, 319:23, 328:3, 328:8, 328:13, 331:2, 332:23, 333:7, 333:9, 333:11, 339:12, 349:24, 352:21, 352:22, 353:1, 353:9, 358:5, 378:19, 424:20, 456:11, 481:1
**amounts** [1] - 456:2
**Amsden** [7] - 357:13, 357:16, 357:19, 362:25, 381:1, 382:15, 410:14
**analogs** [1] - 528:24
**analyses** [1] - 377:19
**Analysis** [3] - 394:12, 401:3, 457:3
**analysis** [31] - 298:9, 298:13, 316:4, 316:8, 316:9, 316:13, 316:14, 317:2, 317:6, 317:9, 317:10, 317:12, 317:17, 317:25, 318:2, 318:12, 318:19, 319:2, 321:11, 351:8, 351:14, 351:15, 368:14, 426:6, 466:9, 493:18, 531:21, 542:7, 543:9, 545:1
**analyze** [2] - 522:11, 544:22
**analyzing** [3] - 400:25, 512:12, 528:16
**AND** [3] - 277:2, 284:19, 285:9
**anhydrite** [22] - 360:8, 360:14, 360:17, 361:9, 362:1, 362:16, 363:3, 368:9, 368:12, 368:15, 373:8, 376:13, 376:18, 376:20, 377:13, 377:17, 377:22, 381:21, 381:22, 385:24, 386:1, 391:1
**annual** [3] - 424:20, 436:2, 436:4
**annually** [2] - 419:2, 424:5
**annulus** [2] - 429:11, 430:2
**ano** [3] - 443:18, 443:25, 444:1
**answer** [51] - 301:8, 302:6, 305:17, 312:6, 320:17, 320:18, 332:8, 332:21, 341:18, 348:5, 356:1, 360:24, 366:3, 370:5, 377:24, 380:16, 380:19, 386:10, 389:6, 389:15, 391:6, 392:11, 411:24, 412:17, 415:24, 427:13, 434:16, 434:25, 436:15, 447:17, 475:3, 477:2, 477:7, 477:8, 484:17, 491:2, 498:2, 499:13, 500:6, 500:7, 500:10, 500:14, 500:22, 501:2, 501:9, 501:13, 520:8, 522:22, 522:24, 535:20, 545:6
**answered** [6] - 301:12, 378:7, 411:3, 430:6, 500:20, 502:19
**answering** [3] - 361:4, 361:5, 389:25
**answers** [1] - 389:12
**anticipate** [8] - 415:6, 424:11, 431:1, 437:11, 443:23, 470:8, 488:1, 488:3
**anticipated** [5] - 379:15, 430:11, 437:9, 441:24, 500:1
**anticipating** [1] - 429:12
**anticipation** [3] - 419:13, 438:8, 460:13
**anyway** [1] - 320:8
**AOR** [32] - 292:17, 313:5, 313:12, 313:16, 326:21, 338:17, 339:7, 369:14, 370:6, 386:15, 387:11, 388:4, 388:8, 388:11, 388:12, 388:17, 393:4, 393:12, 393:13, 489:19, 509:4, 509:6, 531:7, 531:8, 531:13, 531:18, 531:20, 531:23, 532:5, 533:8, 534:16
**apologies** [1] - 473:24
**apologize** [13] - 290:1, 333:13, 342:7, 354:2, 394:4, 404:11, 407:6, 433:3, 447:23, 483:4, 501:20, 518:9, 518:25
**appear** [7] - 326:20, 327:1, 327:3, 335:21, 362:18, 373:12, 503:10
**appearance** [1] - 290:6
**appeared** [1] - 289:13
**appendices** [1] - 456:21
**Appendix** [10] - 359:22, 360:2, 377:2, 456:22, 457:1, 457:3, 457:5, 457:7, 457:15, 457:20
**appendix** [1] - 379:23
**applicable** [1] - 425:19
**applicant** [3] - 450:8, 513:4, 533:1
**APPLICANT'S** [1] - 286:10
**application** [75] - 277:3, 277:15, 278:5, 279:4, 279:7, 279:18, 280:8, 280:9, 281:6, 281:9, 281:21, 282:11, 283:10, 289:20, 318:18, 321:14, 322:25, 323:12, 327:9, 354:4, 354:8, 361:19, 362:7, 362:23, 363:8, 368:5, 372:2, 397:9, 399:3, 399:9, 399:11, 406:8, 421:17, 424:16, 431:16, 433:21, 434:20, 446:20, 448:21, 460:6, 460:7, 461:7, 462:21, 471:23, 488:16, 491:1, 508:1, 514:23, 515:8, 518:6, 518:13, 518:17, 519:2, 519:7, 519:10, 523:3, 523:11, 524:16, 524:21, 524:24, 525:9, 525:10, 525:24, 526:2, 530:22, 531:24, 532:3, 532:21, 535:3, 535:12, 536:2, 536:4, 536:9, 536:15, 550:7
**Application** [1] - 448:11
**applications** [32] - 322:8, 359:9, 360:25, 367:8, 368:7, 368:22, 377:16, 414:25, 415:7, 425:9, 431:17, 434:17, 456:22, 464:20, 470:11, 506:21, 506:22, 512:13, 519:5, 519:15, 521:4, 521:5, 521:9, 530:11, 530:15, 531:4, 533:11, 536:20, 548:19, 548:22, 548:23, 549:6
**applied** [10] - 358:18, 373:15, 376:16, 376:18, 383:7, 383:24, 384:5, 384:16, 388:12, 412:23
**applies** [2] - 415:20, 512:7
**apply** [5] - 360:19, 365:17, 368:17, 431:25, 450:9
**applying** [2] - 383:21, 532:5
**appreciate** [3] - 439:9, 477:17, 513:10
**approach** [10] - 315:22, 352:24, 352:25, 358:13, 374:15, 375:3, 388:11, 405:20, 431:4, 475:5
**appropriate** [5] - 303:3, 316:24, 369:22, 431:19, 526:13
**approval** [3] - 431:22, 515:16, 526:1
**approvals** [1] - 437:20
**approve** [2] - 306:19, 420:3
**approved** [5] - 310:11, 352:12, 420:12, 532:22, 541:14
**approximate** [1] - 356:22
**approximating** [1] - 438:2
**April** [1] - 526:1
**aquifer** [13] - 336:16, 336:17, 339:13, 343:8, 384:1, 384:3, 384:7, 386:19, 540:24, 541:1, 541:5, 541:11, 541:19
**aquifers** [1] - 392:23
**arbitrarily** [2] - 372:12, 372:13
**Archie** [8] - 348:23, 349:11, 350:25, 356:13, 360:9, 362:8, 455:2, 455:24
**Area** [1] - 452:15
**area** [116] - 292:7, 292:8, 292:10, 292:18, 292:23, 293:5, 293:10, 293:14, 293:24, 295:10, 295:12, 310:7, 310:17, 310:20, 310:21, 311:9, 311:22, 311:25, 313:16, 314:5, 314:8, 318:23, 319:10, 320:4, 321:9, 326:24, 328:1, 333:25, 334:2, 334:7, 334:8, 334:9, 334:12, 334:14, 334:17, 334:20, 334:21, 335:5, 336:7, 336:10, 336:23, 337:8, 337:16, 345:2, 345:23, 346:3, 346:4, 346:6, 346:12, 346:13, 348:7, 349:5, 349:10, 349:12, 350:24, 351:2, 351:23, 352:19, 352:23, 353:4, 353:16, 354:17, 354:18, 354:24, 355:11, 358:6, 363:12, 371:3, 372:6, 372:12, 372:16, 373:2, 373:13, 373:16, 373:23, 374:12, 375:22, 383:17, 383:20, 388:9, 388:18, 391:14, 391:15, 393:5, 393:8, 393:10,

393:14, 394:21, 402:6, 435:14, 440:11, 443:10, 443:12, 450:19, 452:17, 452:22, 453:3, 459:15, 463:25, 464:1, 464:6, 469:17, 488:5, 488:25, 508:15, 509:3, 509:5, 525:6, 531:9, 531:10, 532:1, 549:3
**areal** [3] - 293:18, 311:16, 327:7
**areas** [19] - 329:16, 348:7, 349:1, 353:24, 356:18, 356:20, 357:18, 394:23, 404:21, 405:11, 405:12, 406:13, 406:17, 441:4, 476:24, 516:19, 525:5, 530:15
**arrangement** [2] - 482:11, 482:12
**array** [3] - 403:1, 432:5, 466:12
**Article** [1] - 357:10
**artifacts** [1] - 364:16
**ASHLEIGH** [1] - 284:6
**ASME** [1] - 479:20
**aspects** [1] - 450:9
**asserting** [1] - 302:7
**assess** [7] - 317:4, 322:23, 323:4, 335:2, 336:25, 337:3, 544:5
**assessed** [4] - 336:20, 336:23, 337:5, 372:14
**assessing** [2] - 323:1, 323:6
**assessment** [2] - 316:25, 338:13
**asset** [1] - 538:12
**assist** [1] - 512:12
**assistance** [2] - 445:18, 445:23
**assisting** [1] - 289:19
**associated** [16] - 297:10, 313:1, 313:4, 363:16, 365:18, 373:6, 400:13, 406:23, 456:18, 502:16, 504:6, 508:13, 509:21, 515:13, 516:11, 524:13
**assume** [1] - 337:13
**assuming** [4] - 299:5, 338:22, 339:4, 349:18
**assumption** [2] - 337:17, 343:22
**assumptions** [4] - 323:17, 323:19, 324:3, 324:8
**assurance** [6] - 404:5, 404:16, 406:6, 406:12, 406:21, 456:5
**Assurance** [1] - 406:3
**assurances** [1] - 406:24
**assure** [1] - 358:12
**atmosphere** [6] - 309:9, 492:6, 492:9, 493:7, 493:9, 493:11
**attached** [3] - 428:3, 456:21
**attempt** [1] - 544:9
**attempted** [1] - 354:9
**attention** [4] - 406:7, 409:20, 413:2, 458:16
**attorney** [3] - 516:5, 516:6, 516:9
**Attorney** [6] - 389:5, 447:10, 503:7, 532:16, 537:1, 545:10
**attorney/client** [1] - 302:3
**attorneys** [2] - 506:7, 524:2
**Attorneys** [3] - 284:11, 284:16, 285:4
**attributed** [1] - 378:22
**audience** [1] - 411:1
**audit** [1] - 496:3
**authorities** [1] - 541:12
**authorization** [1] - 434:8
**authorize** [2] - 306:19, 307:10
**authorized** [1] - 307:5
**automated** [1] - 494:21
**automatic** [2] - 495:16, 495:17
**automatically** [2] - 479:22, 494:21
**availability** [3] - 317:19, 330:14, 330:18
**available** [18] - 299:22, 299:25, 301:20, 323:21, 349:15, 349:24, 368:14, 377:25, 397:23, 437:4, 468:21, 473:21, 473:25, 496:5, 533:17, 549:4, 550:24, 551:1
**Avenue** [2] - 283:19, 284:12
**average** [13] - 365:7, 369:13, 374:12, 381:16, 381:20, 414:23, 424:4, 424:11, 425:2, 440:17, 470:8, 470:12
**averaged** [1] - 382:14
**avoid** [1] - 502:6
**awarded** [1] - 507:18
**aware** [13] - 294:17, 301:22, 307:25, 315:3, 334:15, 334:19, 436:19, 459:10, 480:1, 501:18, 501:19, 547:16, 547:19

## B

**B-a-c-k-u-s** [2] - 447:25, 468:1
**B-o-f-t-o** [1] - 503:25
**bachelor** [5] - 396:19, 398:21, 408:24, 504:10, 537:25
**bachelor's** [3] - 403:23, 468:9, 527:24
**background** [11] - 396:17, 398:19, 403:22, 408:22, 468:8, 504:9, 520:21, 527:23, 528:4, 529:14, 537:24
**Backus** [7] - 411:5, 447:22, 467:9, 467:23, 475:1, 475:7, 483:24
**BACKUS** [8] - 287:7, 467:16, 469:10, 469:23, 470:3, 475:9, 477:11, 484:1
**Backus'** [1] - 492:17
**bad** [3] - 322:12, 339:10, 339:16
**Bakken** [1] - 528:23
**BAKKES** [1] - 411:5
**balance** [1] - 421:12
**barrier** [4] - 307:13, 387:12, 387:14, 387:18
**base** [2] - 360:6, 410:2
**based** [38] - 292:21, 310:25, 313:9, 323:20, 330:5, 330:10, 335:17, 335:19, 335:20, 335:23, 337:9, 340:10, 346:1, 346:14, 347:1, 349:25, 350:2, 351:3, 352:20, 353:9, 388:11, 409:24, 426:22, 452:21, 455:11, 471:22, 472:25, 478:25, 479:2, 479:7, 480:12, 481:8, 489:16, 489:19, 497:21, 501:25, 502:11, 517:7
**baseline** [6] - 359:24, 360:3, 370:18, 420:5, 430:7, 453:14
**basement** [1] - 394:24
**bases** [1] - 300:1
**basic** [1] - 509:18
**basin** [1] - 485:2
**Basin** [2] - 409:6, 538:21
**basins** [2] - 528:20, 528:22
**basis** [6] - 297:4, 405:24, 436:2, 436:4, 436:12, 533:1
**battery** [2] - 539:10, 539:13
**BAUMAN** [1] - 285:7
**bear** [5] - 354:2, 371:21, 377:2, 378:11, 439:17
**become** [3] - 344:14, 345:14, 441:15
**bedding** [2] - 414:14, 415:11
**beds** [4] - 443:8, 443:18, 443:25, 444:1
**BEFORE** [1] - 283:22
**began** [1] - 504:16
**begin** [4] - 430:11, 444:22, 445:6, 469:2
**beginning** [5] - 430:13, 442:3, 442:13, 444:16, 455:19
**begins** [1] - 399:10
**behalf** [3] - 289:23, 302:8, 304:2
**behind** [2] - 332:20, 365:15
**belief** [1] - 320:9
**believes** [1] - 389:14
**below** [15] - 330:1, 336:15, 345:3, 374:14, 394:25, 395:1, 410:1, 410:13, 454:20, 466:25, 479:22, 483:8, 488:8, 488:22, 489:12
**belt** [1] - 437:12
**bench** [2] - 490:13, 490:23
**bench-tested** [2] - 490:13, 490:23
**BENDER** [121] - 284:10, 289:16, 290:1, 290:5, 290:9, 302:2, 302:9, 302:24, 303:9, 306:23, 312:6, 312:13, 313:20, 320:15, 323:3, 332:24, 333:16, 333:18, 333:21, 356:11, 370:10, 370:14, 389:8, 389:23, 392:12, 392:17, 393:16, 395:11, 395:21, 396:5, 397:21, 398:2, 398:9, 403:2, 403:11, 408:3, 408:13, 410:19, 411:8, 412:17, 415:23, 416:3, 416:7, 416:16, 417:20, 423:9, 425:5, 426:18, 427:13, 427:15, 429:4, 435:2, 447:6, 447:12, 447:15, 448:6, 448:18, 457:23, 458:7, 458:13, 458:18, 458:21, 458:22, 461:1, 461:12, 461:21, 465:13, 465:16, 467:9, 467:15, 467:20, 471:6, 471:9, 471:11, 471:14, 472:10, 472:22, 473:1, 473:3, 475:4, 477:2, 477:17, 484:5, 484:13, 484:18, 489:5, 497:14, 498:24, 500:3, 500:19, 500:24, 501:5, 501:10, 502:2, 502:7, 502:21, 505:8, 505:11, 505:19, 511:17, 512:23, 513:2, 514:8, 520:7, 520:22, 522:19, 522:22, 523:5, 523:13, 525:13, 530:3, 530:7,

532:18, 535:23, 536:1, 536:23, 540:15, 541:7, 545:12, 548:14, 550:9
**Bender** [8] - 302:12, 389:5, 417:7, 447:10, 512:21, 513:4, 532:16, 545:10
**Bender's** [1] - 321:6
**Bender.....** [4] - 286:16, 287:8, 287:9, 287:10
**Bender.....** [5] - 286:21, 286:22, 286:23, 286:24, 287:11
**Bender.....** [3] - 287:23, 288:5, 288:9
**benefit** [1] - 353:2
**best** [4] - 350:15, 411:17, 460:17, 516:9
**better** [3] - 309:14, 411:3, 446:25
**between** [52] - 309:11, 315:9, 318:1, 329:16, 340:20, 342:12, 360:12, 361:3, 365:7, 369:20, 373:14, 384:7, 387:12, 387:25, 388:4, 391:11, 391:23, 391:24, 395:14, 399:14, 405:18, 407:10, 407:11, 407:22, 414:25, 435:16, 438:23, 440:5, 446:10, 446:15, 446:17, 449:12, 450:15, 451:17, 451:22, 454:12, 456:10, 456:11, 456:23, 457:16, 459:15, 460:9, 469:20, 470:12, 474:5, 482:21, 482:25, 485:4, 492:2, 520:14, 546:20, 549:20
**Beulah** [3] - 356:16, 446:4, 468:11
**beyond** [4] - 293:4, 327:25, 384:11, 521:12
**bias** [3] - 376:1, 376:2, 376:8
**bid** [1] - 507:7
**bids** [1] - 432:11
**big** [3] - 425:13, 438:5, 531:8
**bigger** [2] - 390:24, 438:7
**biggest** [1] - 454:23
**billed** [1] - 297:6
**Billings** [1] - 538:17
**binder** [2] - 326:12, 510:18
**Bismarck** [5] - 283:19, 284:13, 285:5, 504:13, 552:13
**bit** [29] - 310:18, 329:11, 380:1, 385:6, 399:2, 399:12, 400:3, 401:7, 402:24, 404:10, 405:9, 406:1, 406:2, 414:5, 427:19, 453:8, 500:5, 513:15, 517:25, 523:17, 528:13, 534:4, 535:19, 535:24, 537:24, 538:2, 538:13, 538:22, 542:5
**BK** [14] - 342:20, 360:20, 362:7, 363:7, 363:11, 368:25, 370:17, 423:5, 424:16, 449:21, 450:10, 450:17, 451:14, 453:2
**black** [1] - 413:7
**blank** [1] - 387:1
**block** [2] - 469:11, 469:13
**blocked** [1] - 490:2
**blocks** [1] - 353:22
**blowdown** [4] - 475:11, 475:15, 493:9, 493:10
**blowouts** [1] - 308:23
**blows** [1] - 475:19
**Blue** [1] - 536:5
**blue** [3] - 336:8, 349:6, 349:13
**BNI** [1] - 404:3
**Board** [3] - 507:16, 514:1, 515:1
**board** [3] - 515:7, 517:11, 517:21
**boarding** [1] - 460:2
**bodies** [1] - 495:23
**body** [1] - 496:9
**Boeshans** [9] - 395:17, 416:8, 447:17, 458:8, 458:10, 497:8, 497:13, 497:16, 501:23
**BOESHANS** [7] - 287:15, 458:11, 458:24, 482:10, 497:25, 500:11, 501:14
**BOESHANS/AMANDA** [1] - 287:6
**Bofoto** [1] - 513:3
**Bofto** [9] - 503:10, 503:24, 505:15, 506:20, 510:23, 511:20, 512:10, 513:8, 526:18
**BOFTO** [7] - 287:20, 503:12, 503:17, 510:20, 520:18, 522:25, 523:10
**BOHRER** [1] - 284:4
**bond** [5] - 407:14, 407:23, 438:13, 438:15, 456:11
**bonded** [1] - 408:1
**bonding** [1] - 514:13
**bonds** [2] - 438:12, 438:15
**books** [1] - 338:3
**border** [12] - 347:6, 373:13, 459:18, 460:1, 460:2, 460:3, 460:6, 460:7, 460:8, 460:13, 460:16, 498:19
**borehole** [1] - 451:22
**boreholes** [2] - 443:22, 443:24
**bottom** [9] - 329:12, 343:16, 343:24, 357:16, 375:24, 378:13, 382:22, 383:5, 388:7
**bottomhole** [27] - 317:13, 328:11, 328:14, 328:16, 328:18, 329:4, 330:5, 330:24, 331:2, 342:18, 342:19, 342:25, 343:16, 350:21, 418:5, 418:10, 424:24, 426:12, 456:2, 462:6, 462:8, 462:10, 462:16, 464:23, 465:2, 486:20, 487:7
**bound** [2] - 361:20, 361:25
**boundaries** [22] - 291:23, 292:2, 296:2, 314:7, 314:11, 314:16, 321:2, 321:18, 326:21, 327:13, 328:1, 336:8, 351:23, 352:6, 352:7, 352:9, 353:25, 373:23, 393:11, 494:23, 496:15, 496:25
**boundary** [44] - 295:12, 311:11, 311:17, 312:2, 314:18, 314:22, 318:14, 320:1, 320:7, 320:11, 321:4, 343:6, 347:8, 347:16, 347:22, 352:2, 353:16, 360:12, 364:5, 364:6, 364:15, 364:17, 383:8, 383:22, 384:6, 384:8, 384:10, 384:13, 384:16, 385:2, 391:11, 393:14, 402:6, 434:23, 459:15, 459:16, 463:12, 497:20, 498:3, 498:4, 498:16, 500:2
**bounds** [1] - 351:25
**box** [1] - 413:7
**BPA** [1] - 508:11
**BRAATEN** [102] - 285:2, 289:22, 290:19, 291:9, 302:7, 302:10, 303:10, 305:18, 307:1, 312:9, 312:16, 313:24, 320:21, 320:24, 322:2, 323:7, 333:3, 333:13, 333:17, 333:19, 333:24, 355:13, 394:7, 394:9, 417:2, 417:12, 417:14, 417:17, 458:3, 458:20, 461:5, 472:17, 472:24, 473:2, 473:5, 474:23, 475:6, 477:14, 477:18, 484:9, 484:15, 484:20, 489:8, 489:11, 490:24, 497:10, 497:16, 499:1, 499:2, 500:12, 500:22, 500:25, 501:8, 501:11, 501:16, 502:5, 502:8, 502:9, 502:17, 502:23, 503:1, 503:9, 503:15, 503:21, 505:10, 505:12, 505:17, 505:21, 510:17, 510:22, 511:14, 511:20, 512:20, 514:7, 520:3, 520:13, 520:17, 522:17, 522:20, 523:9, 526:17, 526:24, 527:2, 527:4, 527:8, 527:16, 530:1, 530:10, 532:15, 535:22, 537:2, 537:7, 537:9, 537:14, 540:14, 540:18, 541:9, 545:8, 548:10, 550:15, 550:23, 551:2
**Braaten** [19] - 285:3, 289:22, 290:13, 321:25, 416:22, 489:5, 503:7, 517:9, 521:18, 525:15, 533:21, 534:2, 537:1, 547:1, 547:18, 547:20, 548:15, 550:12
**Braaten....** [1] - 287:25
**Braaten.....** [1] - 287:13
**Braaten.....** [3] - 287:22, 288:4, 288:8
**Braaten.....** [1] - 287:17
**Braaten.....** [1] - 286:12
**break** [17] - 321:21, 363:22, 366:3, 378:5, 378:8, 380:17, 386:10, 388:16, 388:20, 388:24, 389:12, 389:25, 390:3, 447:5, 502:23, 502:24, 503:3
**breakdown** [2] - 413:10, 413:15
**breaking** [1] - 413:14
**breakpoint** [1] - 442:10
**breaks** [1] - 469:11
**brief** [3] - 399:8, 399:24, 406:4
**briefly** [14] - 333:25, 371:5, 396:15, 398:18, 403:21, 408:21, 448:13, 448:20, 452:15, 459:1, 506:23, 508:24, 527:22, 528:3
**brine** [9] - 345:19, 380:8, 380:23, 381:2, 391:20, 391:21, 429:15, 429:24
**bring** [11] - 389:9, 411:4, 416:9, 416:13, 416:14, 423:9, 434:25, 436:19, 475:14, 506:22, 530:12
**broken** [2] - 354:5, 440:4
**brokers** [1] - 304:14
**Broom** [36] - 277:5, 278:4, 278:17, 279:5, 279:9, 280:7, 280:19, 281:7, 281:11, 282:10, 282:22,

283:11, 310:11, 332:11, 339:15, 339:17, 340:19, 359:4, 364:25, 375:1, 375:8, 375:20, 376:12, 381:3, 381:12, 383:13, 383:16, 384:1, 385:2, 395:1, 410:14, 413:21, 414:3, 414:24, 530:17, 535:17
**brown** [1] - 356:20
**buffer** [7] - 320:2, 373:15, 373:21, 388:9, 388:12, 388:18, 393:4
**build** [2] - 325:21, 325:22
**buildup** [2] - 492:19, 495:7
**built** [2] - 326:5, 492:15
**bulk** [1] - 399:18
**bullet** [7] - 294:20, 294:23, 297:19, 297:23, 298:5, 298:17, 304:24
**Bullion** [1] - 392:25
**buoyancy** [1] - 391:10
**buoyant** [2] - 380:5, 380:6
**burst** [1] - 339:23
**business** [14] - 310:5, 310:9, 310:13, 310:25, 311:4, 311:20, 311:23, 312:1, 312:11, 312:17, 312:20, 312:24, 504:6, 537:19
**businesses** [1] - 435:10
**bust** [1] - 339:19
**Butte** [1] - 537:22
**BUTTON** [4] - 288:7, 537:10, 548:13, 550:13
**Button** [3] - 537:7, 537:18, 540:1
**button** [7] - 537:8, 537:15, 540:18, 543:16, 544:18, 545:13, 550:15
**buttons** [1] - 300:12
**buy** [1] - 306:15
**BY** [85] - 291:9, 291:13, 308:17, 309:13, 334:4, 335:8, 336:2, 338:9, 339:25, 340:17, 355:18, 356:9, 359:21, 360:15, 370:2, 370:20, 371:20, 372:7, 387:8, 387:16, 389:23, 390:7, 392:20, 393:23, 393:25, 396:5, 398:9, 398:12, 403:11, 403:14, 408:13, 408:16, 411:12, 411:21, 412:5, 413:1, 418:22, 420:11, 420:24, 427:24, 428:23, 429:17, 430:10, 432:23, 433:3, 434:2, 434:24, 435:5, 435:12, 436:21, 437:22, 438:16, 441:10, 441:20, 444:11, 445:24, 448:6, 448:10, 458:13, 458:24, 461:21, 461:25, 467:20, 470:6, 472:2, 473:5, 473:12, 474:13, 475:9, 482:10, 483:12, 484:1, 484:20, 484:22, 489:14, 490:3, 497:25, 503:21, 513:2, 525:18, 526:17, 527:16, 532:18, 537:14, 545:12
**bypass** [3] - 490:6, 492:16, 493:4
**Byron** [1] - 284:11

## C

**C-12** [3] - 377:5, 377:8, 378:11
**C-13** [1] - 381:24
**C-14** [1] - 378:12
**C-15** [4] - 377:3, 377:4, 377:6, 377:9
**C-16** [1] - 377:9
**C-18** [4] - 379:6, 379:18, 380:23, 381:15
**C-19** [1] - 381:23
**C-25** [2] - 382:13, 382:14
**C-28** [1] - 382:22
**C-4** [1] - 381:15
**C-6** [1] - 382:14
**C-8** [2] - 378:12, 379:8
**C-9** [1] - 377:8
**C2** [1] - 382:1
**cable** [3] - 401:14, 402:14, 402:17
**CAITLIN** [1] - 287:6
**Caitlin** [13] - 308:11, 389:16, 392:17, 395:14, 416:8, 447:13, 447:16, 448:1, 448:7, 448:19, 488:1, 488:6, 489:6
**Caitlin's** [1] - 338:15
**calculate** [4] - 374:23, 418:5, 462:5, 541:21
**calculated** [8] - 376:6, 382:6, 385:16, 392:3, 464:2, 541:11, 541:14, 541:19
**calculating** [1] - 350:7
**calculation** [3] - 339:21, 350:5, 350:6
**calculations** [3] - 343:1, 384:10, 541:21
**CALEB** [1] - 284:7
**Calgary** [1] - 283:19
**calibrate** [2] - 313:15, 376:5
**callout** [1] - 348:18
**Canada** [1] - 528:2
**cannot** [3] - 493:23, 518:24, 533:6
**capabilities** [2] - 421:20, 446:15
**capability** [1] - 494:6
**capable** [1] - 512:15
**capacity** [9] - 323:14, 396:13, 398:15, 403:18, 408:19, 424:7, 424:25, 468:4, 534:13
**capillary** [3] - 385:7, 385:9, 386:2
**capture** [9] - 347:3, 385:9, 397:14, 411:18, 411:22, 421:8, 422:1, 425:23, 470:21
**captured** [3] - 324:9, 324:10, 358:8
**CARBON** [3] - 284:18, 284:19, 284:19
**Carbon** [34] - 277:4, 277:6, 277:15, 277:19, 278:6, 278:8, 279:4, 279:8, 279:10, 279:19, 279:23, 280:8, 280:9, 280:12, 281:6, 281:10, 281:12, 281:21, 282:1, 282:11, 282:14, 283:10, 306:18, 309:11, 396:12, 403:17, 404:7, 408:18, 443:21, 449:18, 468:3, 476:19, 482:6, 484:3
**carbon** [15] - 277:5, 278:8, 279:5, 279:9, 280:11, 281:7, 281:11, 282:13, 283:11, 347:3, 378:22, 418:25, 486:24, 529:20, 546:21
**carbonates** [1] - 378:21
**Care** [1] - 454:2
**care** [1] - 456:14
**career** [3] - 522:8, 538:6, 542:9
**careful** [1] - 477:7
**carrier** [1] - 491:20
**case** [25] - 292:2, 310:5, 315:18, 322:12, 338:22, 349:18, 350:18, 351:11, 351:20, 361:24, 362:17, 363:2, 367:3, 369:16, 382:1, 462:17, 462:19, 462:20, 464:4, 479:12, 492:19, 493:23, 513:5, 519:19, 534:8
**Case** [2] - 277:3, 289:11
**cases** [7] - 318:14, 318:16, 351:9, 351:10, 381:2, 462:14, 478:14
**casing** [24] - 336:15, 339:14, 402:19, 409:11, 409:15, 409:25, 410:3, 410:4, 410:9, 410:13, 410:15, 453:23, 454:20, 454:21, 487:5, 487:12, 487:17, 487:20, 488:7, 488:15, 488:21, 489:2, 489:12, 550:2
**casing-conveyed** [2] - 402:19, 453:23
**cathodic** [6] - 427:21, 428:18, 442:22, 443:1, 443:22, 443:24
**caught** [1] - 539:25
**caused** [4] - 332:4, 341:14, 415:6, 466:11
**causing** [2] - 377:22, 476:18
**caution** [1] - 477:3
**caverns** [2] - 543:12, 543:14
**cell** [7] - 318:13, 363:23, 382:1, 384:15, 384:16, 384:17, 384:18
**cells** [3] - 344:22, 364:15, 380:9
**cement** [24] - 339:25, 410:16, 438:9, 454:21, 484:24, 485:7, 485:11, 485:13, 485:14, 485:15, 486:1, 486:7, 486:9, 486:18, 487:2, 487:5, 487:11, 487:17, 487:19, 487:22, 487:25
**cemented** [3] - 410:4, 410:15, 410:17
**cementing** [8] - 409:11, 455:4, 485:2, 485:8, 485:18, 485:23, 486:9, 486:16
**center** [4] - 397:20, 494:22, 495:4, 495:19
**Center** [2] - 303:15, 446:4
**centered** [2] - 364:6, 364:9
**centering** [1] - 364:12
**central** [2] - 372:5, 372:6
**Century** [1] - 313:18
**certain** [8] - 310:6, 310:7, 318:6, 354:13, 438:18, 533:22, 544:12, 544:13
**certainly** [3] - 416:20, 431:3, 547:21
**certainty** [3] - 305:9, 318:14, 438:23
**CERTIFICATE** [2] - 286:6, 552:1
**Certificate** [1] - 286:8
**CERTIFY** [2] - 552:5, 552:9
**cetera** [3] - 443:9, 456:3, 469:5
**CFR** [1] - 397:7
**chance** [3] - 290:16, 476:17, 476:22
**chances** [1] - 486:4
**change** [24] - 290:13, 367:20,

369:13, 369:23, 381:25, 382:3, 382:4, 382:24, 382:25, 422:2, 423:8, 429:23, 463:24, 463:25, 464:2, 464:4, 464:6, 473:10, 496:15, 498:9, 499:20, 499:23, 502:6, 544:10
**changed** [1] - 446:22
**changes** [16] - 314:4, 346:5, 346:7, 358:7, 358:9, 367:5, 423:1, 428:10, 431:21, 432:1, 443:8, 450:15, 466:16, 494:24, 545:6
**changing** [1] - 499:15
**characteristics** [1] - 456:17
**characterization** [4] - 330:20, 451:11, 508:14, 520:4
**characterizations** [1] - 441:3
**characterize** [1] - 382:19
**check** [1] - 324:1
**checking** [1] - 471:1
**chemical** [4] - 468:11, 486:5, 486:8, 504:11
**chemicals** [1] - 485:10
**chemistry** [3] - 377:21, 377:22, 391:3
**Chesapeake** [1] - 398:24
**chief** [1] - 396:14
**chose** [3] - 351:11, 352:18, 353:3
**chosen** [9] - 317:1, 346:20, 358:1, 365:3, 365:16, 369:6, 388:15, 465:24, 510:11
**chromatograph** [1] - 422:15
**circumstances** [2] - 461:8, 509:4
**cited** [1] - 512:2
**CLAIMANT'S** [1] - 288:11
**clarification** [1] - 345:9
**clarify** [15] - 303:18, 332:15, 341:24, 365:22, 366:17, 368:10, 373:25, 380:12, 382:5, 393:2, 433:8, 444:2, 491:24, 496:7, 546:7
**Class** [63] - 291:17, 291:21, 292:16, 292:20, 293:1, 293:6, 293:8, 308:15, 323:12, 323:22, 328:7, 328:10, 328:17, 329:22, 330:7, 330:11, 331:1, 335:4, 340:13, 340:18, 340:20, 341:1, 341:14, 342:2, 404:8, 406:20, 409:6, 410:11, 437:18, 490:13, 490:22, 506:21, 507:18, 508:1, 508:8, 508:10, 508:12, 508:20, 509:13, 509:20, 510:2, 511:4, 511:10, 512:13, 514:17, 514:24, 517:16, 518:7, 518:13, 518:19, 519:7, 520:19, 524:18, 524:20, 524:24, 525:25, 535:4, 540:19, 540:20, 540:22, 540:23
**class** [2] - 339:25, 479:18
**classification** [1] - 353:7
**classify** [1] - 316:21
**clay** [2] - 362:16, 486:2
**cleanup** [2] - 524:6, 524:14
**clear** [3] - 417:3, 444:13, 492:6
**clearly** [2] - 439:2, 440:20
**click** [1] - 300:12
**client** [1] - 289:24
**clients** [8] - 296:21, 353:14, 353:15, 505:23, 505:25, 506:1, 539:1, 548:16
**close** [9] - 356:1, 365:6, 371:15, 433:13, 478:24, 479:21, 494:6, 497:14, 531:6
**closed** [6] - 384:8, 480:24, 492:4, 492:16, 492:24, 493:5
**closely** [2] - 507:24, 521:14
**closest** [8] - 334:12, 356:15, 356:17, 433:1, 433:5, 433:14, 433:16, 433:20
**closing** [2] - 439:2, 493:21
**closure** [1] - 407:18
**Closure** [1] - 454:3
**closures** [2] - 404:6, 406:16
**CMG** [9] - 295:2, 384:10, 544:20, 544:24, 547:9, 547:13, 547:18, 547:19, 547:21
**CMG's** [1] - 547:14
**CO** [1] - 391:21
**CO2** [160] - 291:14, 293:17, 293:19, 308:20, 308:22, 309:9, 310:6, 310:16, 310:18, 310:20, 311:6, 314:6, 318:25, 319:8, 319:9, 319:23, 321:5, 328:3, 328:6, 328:8, 328:13, 329:23, 330:12, 330:23, 331:16, 332:14, 332:17, 333:6, 333:10, 343:6, 343:8, 343:9, 343:17, 343:22, 344:9, 344:12, 344:14, 344:23, 345:7, 345:10, 345:14, 345:19, 345:21, 347:6, 347:13, 347:15, 347:19, 347:21, 350:22, 351:25, 352:6, 352:21, 353:1, 353:9, 353:18, 358:5, 358:11, 360:18, 362:3, 365:9, 365:21, 366:4, 366:6, 366:11, 366:12, 366:16, 366:24, 366:25, 367:1, 371:7, 372:3, 372:4, 372:5, 372:10, 373:12, 373:17, 373:20, 374:1, 374:5, 379:1, 379:9, 379:21, 380:5, 380:6, 380:7, 386:7, 386:9, 390:21, 391:11, 391:13, 391:19, 391:22, 397:13, 400:4, 400:23, 400:25, 401:3, 401:10, 402:2, 402:4, 410:16, 412:13, 412:14, 415:22, 418:15, 419:5, 419:8, 420:6, 420:13, 420:14, 420:20, 420:21, 425:17, 427:4, 430:25, 431:2, 431:6, 434:22, 438:9, 441:14, 442:18, 452:2, 454:21, 462:4, 462:11, 463:11, 463:17, 464:7, 475:19, 478:15, 478:17, 480:13, 481:1, 481:10, 481:22, 481:25, 484:23, 485:4, 485:9, 485:13, 487:1, 487:9, 487:12, 487:16, 487:19, 488:3, 501:24, 502:1, 502:12, 538:10, 538:14, 542:19, 546:6, 546:10, 546:12, 546:17
**CO2's** [3] - 321:2, 534:11, 546:22
**coal** [4] - 355:24, 357:5, 468:12
**Coal** [1] - 404:3
**coal-fired** [1] - 468:12
**code** [2] - 410:12, 411:23
**Code** [4] - 293:13, 313:18, 313:21, 487:3
**codes** [1] - 411:17
**collect** [3] - 381:10, 400:11, 516:20
**collected** [2] - 414:16, 510:8
**college** [2] - 504:15, 504:17
**color** [3] - 327:4, 329:11, 329:12
**colors** [3] - 329:10, 353:21, 353:23
**column** [12] - 376:13, 376:14, 386:22, 387:6, 400:10, 414:9, 449:16, 449:21, 449:22, 450:12, 450:13, 471:19
**columns** [3] - 400:1, 400:17, 449:7
**combination** [1] - 413:25
**combined** [1] - 428:19
**comfortable** [5] - 318:11, 319:6, 319:21, 321:7, 321:12
**coming** [10] - 300:1, 309:14, 333:6, 394:18, 436:17, 460:14, 470:20, 476:3, 481:22, 484:7
**commencing** [1] - 289:2
**comment** [3] - 305:9, 308:6, 526:2
**commercial** [11] - 296:24, 297:3, 297:5, 297:6, 299:4, 299:5, 524:20, 543:18, 543:21, 543:23, 544:7
**commercially** [1] - 296:25
**commingled** [4] - 419:10, 419:13, 419:18, 420:13
**Commission** [64] - 277:17, 278:6, 279:20, 280:10, 280:21, 281:23, 282:12, 283:1, 289:6, 290:16, 294:24, 294:25, 295:24, 297:21, 298:7, 298:10, 303:2, 307:21, 310:11, 315:10, 322:3, 340:23, 341:3, 341:4, 390:1, 390:16, 395:18, 396:16, 398:19, 404:20, 408:22, 409:10, 410:24, 412:7, 449:9, 459:7, 463:3, 477:6, 498:6, 514:20, 517:2, 518:18, 518:19, 519:6, 521:5, 521:20, 522:13, 523:8, 524:17, 524:22, 525:20, 532:21, 533:3, 533:15, 533:21, 533:25, 534:8, 535:4, 535:11, 536:21, 547:2, 548:19, 549:23, 550:6
**Commission's** [3] - 341:6, 406:7, 547:17
**commit** [1] - 446:9
**commitment** [3] - 500:16, 501:2, 501:3
**commitment's** [1] - 446:25
**committed** [3] - 435:21, 436:11, 438:18
**common** [2] - 422:8, 482:19
**commonly** [7] - 297:10, 361:24, 361:25, 362:16, 363:2, 486:23
**communication** [1] - 302:22
**communications** [4] - 307:20, 315:8, 520:14, 548:11
**community** [2] - 405:5
**companies** [4] - 504:25, 506:6, 528:10, 528:11
**Company** [1] - 538:7

**company** [8] - 434:4, 486:16, 497:6, 504:4, 516:10, 523:22, 525:4, 539:5
**compare** [1] - 448:23
**comparing** [1] - 456:4
**comparison** [2] - 395:14, 449:10
**Comparison** [1] - 448:11
**comparisons** [1] - 449:3
**compel** [3] - 303:2, 303:5, 533:24
**compensate** [5] - 297:2, 311:19, 312:4, 330:10, 330:12
**compensated** [2] - 292:5, 321:16
**compensating** [3] - 321:3, 330:9, 358:12
**compensation** [9] - 312:10, 320:25, 321:7, 321:19, 352:13, 352:20, 496:17, 497:1, 497:4
**competitive** [1] - 507:7
**compile** [1] - 304:8
**compiling** [1] - 305:25
**complete** [4] - 434:7, 466:15, 474:19, 474:20
**completed** [1] - 418:20
**completely** [2] - 481:11, 481:13
**completion** [3] - 409:12, 437:18, 550:2
**completions** [2] - 298:14, 455:6
**complex** [4] - 315:22, 451:16, 534:18, 546:24
**compliance** [4] - 321:3, 323:23, 404:4, 506:17
**complies** [1] - 435:8
**composition** [11] - 366:23, 381:2, 381:14, 381:16, 382:15, 401:1, 418:15, 418:21, 420:15, 428:11, 542:18
**compositions** [3] - 367:3, 457:10, 457:12
**compressed** [6] - 539:11, 543:11, 545:18, 545:23, 546:4, 546:13
**computational** [1] - 384:20
**computer** [5] - 296:23, 300:12, 300:13, 300:14, 522:3
**concentration** [7] - 343:8, 344:14, 345:21, 347:12, 391:13, 391:15
**concern** [2] - 361:22, 361:23
**concerns** [2] - 319:18, 329:1
**concludes** [1] - 551:10
**conclusion** [1] - 498:25
**conclusions** [1] - 532:24
**condition** [3] - 384:7, 384:10, 495:11
**conditions** [11] - 314:19, 317:13, 318:14, 364:17, 365:18, 383:8, 383:22, 384:13, 426:23, 482:1, 493:12
**conduct** [2] - 472:14, 532:12
**conducted** [3] - 322:22, 402:17, 493:19
**confidency** [1] - 351:19
**confident** [3] - 318:5, 318:17, 488:15
**confidential** [3] - 477:6, 496:5, 496:6
**confining** [25] - 360:7, 360:16, 361:14, 362:22, 376:22, 379:24, 380:3, 380:5, 380:10, 380:11, 380:14, 381:1, 385:24, 387:15, 387:23, 387:24, 388:2, 391:9, 391:12, 391:18, 392:1, 394:17, 457:11, 523:15
**confirm** [32] - 313:15, 357:3, 360:1, 367:19, 373:24, 377:14, 381:6, 381:17, 382:7, 382:9, 382:17, 386:20, 387:7, 387:8, 388:16, 388:19, 412:3, 412:15, 414:18, 415:19, 417:25, 418:9, 418:20, 419:22, 422:20, 423:11, 423:20, 424:6, 430:7, 470:17, 471:25, 494:7
**confirmation** [2] - 428:25, 444:14
**confirmed** [1] - 429:7
**confirming** [5] - 383:9, 415:14, 417:23, 424:22, 445:13
**conforming** [1] - 431:7
**confusion** [1] - 419:6
**connected** [2] - 482:19, 492:14
**connections** [1] - 491:19
**Conservation** [3] - 507:17, 514:19, 517:1
**conservation** [2] - 338:3, 506:5
**conservative** [1] - 366:7
**consider** [12] - 277:16, 278:18, 279:19, 280:9, 280:21, 281:21, 283:1, 308:22, 387:22, 387:25, 439:2, 439:8
**consideration** [15] - 277:4, 279:8, 281:10, 310:25, 311:8, 311:20, 311:23, 312:11, 312:17, 312:20, 312:22, 312:25, 318:23, 321:14, 352:15
**considerations** [5] - 310:9, 310:13, 311:4, 323:22, 436:16
**considered** [2] - 365:7, 488:25
**considering** [2] - 369:1, 438:4
**consist** [1] - 505:25
**consisted** [1] - 406:13
**consistent** [2] - 434:13, 435:24
**consistently** [1] - 420:25
**constant** [1] - 345:13
**constituents** [1] - 391:2
**constrained** [3] - 426:12, 426:13, 426:20
**constraint** [16] - 328:11, 328:12, 328:14, 328:16, 418:11, 426:16, 426:22, 462:6, 462:8, 462:16, 462:17, 464:24, 465:1, 465:8, 470:14, 470:19
**constraints** [5] - 418:6, 424:24, 465:2, 544:12, 544:13
**constructed** [6] - 291:18, 291:22, 292:6, 397:3, 397:5, 397:6
**construction** [4] - 409:17, 409:22, 437:17, 452:2
**consult** [1] - 506:11
**consultant** [3] - 504:25, 528:9, 538:25
**consultants** [1] - 516:4
**consulted** [1] - 485:1
**consulting** [7] - 409:2, 504:6, 504:21, 506:9, 506:12, 539:1, 539:12
**Cont'd** [3] - 285:1, 287:1, 288:1
**contact** [2] - 373:13, 542:13
**contain** [3] - 349:14, 549:25, 552:10
**contained** [7] - 399:25, 402:5, 452:16, 480:14, 529:5, 544:11, 547:9
**containment** [6] - 361:22, 361:23, 429:23, 440:1, 440:14
**contains** [1] - 314:3
**contaminated** [1] - 524:14
**content** [5] - 361:10, 450:15, 454:12, 454:15, 486:2
**Content** [1] - 400:20
**contents** [1] - 529:11
**context** [1] - 352:4
**continually** [1] - 494:24
**continue** [5] - 417:22, 445:24, 446:13, 446:16, 483:7
**CONTINUED** [1] - 291:8
**continued** [3] - 439:7, 446:7, 446:8
**Continued** [1] - 286:12
**continues** [1] - 434:11
**continuing** [3] - 401:19, 434:10, 435:21
**CONTINUING** [61] - 302:10, 303:10, 305:18, 307:1, 312:9, 312:16, 313:24, 320:24, 322:2, 323:7, 333:3, 333:24, 356:14, 370:16, 392:17, 394:10, 412:21, 417:21, 420:16, 423:11, 423:21, 424:15, 425:8, 426:19, 427:16, 429:9, 433:24, 435:3, 436:13, 437:16, 439:11, 442:16, 448:18, 458:22, 471:17, 475:6, 477:18, 489:11, 490:24, 497:16, 499:2, 500:12, 500:22, 500:25, 501:8, 501:16, 502:9, 505:12, 505:21, 510:22, 511:20, 514:8, 520:7, 520:22, 523:5, 523:13, 530:10, 536:1, 540:18, 541:9, 548:14
**continuous** [4] - 401:15, 428:6, 428:22, 483:19
**continuously** [1] - 428:5
**contract** [1] - 506:3
**contracted** [7] - 296:25, 306:17, 323:13, 323:24, 485:23, 486:15, 486:23
**contractor** [3] - 486:12, 486:17, 486:22
**contractors** [2] - 485:1, 485:24
**contracts** [4] - 296:13, 418:19, 482:21, 483:1
**contrast** [1] - 448:22
**contrasting** [1] - 456:5
**contributing** [1] - 420:23
**control** [12] - 293:1, 300:17, 316:19, 351:7, 372:18, 397:18, 397:20, 476:5, 482:19, 494:22, 495:4, 495:19
**Control** [1] - 511:3
**controlled** [3] - 397:19, 493:10, 494:21
**controls** [4] - 350:13, 469:7, 476:5, 476:11
**conventional** [1] - 485:7
**conversation** [3] - 302:14, 303:19, 303:22

**conversations** [4] - 305:19, 309:20, 309:23, 435:13
**conversely** [1] - 379:22
**converting** [1] - 538:9
**conveyed** [5] - 402:19, 453:19, 453:23, 455:17, 457:19
**cooperate** [1] - 459:20
**cooperating** [1] - 341:12
**cooperation** [1] - 341:9
**coordinate** [1] - 531:15
**copy** [3] - 458:19, 510:19, 526:18
**core** [18] - 298:9, 298:11, 317:19, 349:9, 349:12, 360:6, 368:13, 376:4, 385:14, 413:25, 414:15, 451:18, 474:17, 529:21, 530:17, 535:7, 535:16, 549:25
**core-derived** [1] - 385:14
**cored** [1] - 410:10
**cores** [2] - 349:14, 385:10
**coring** [1] - 367:10
**Coriolis** [5] - 420:24, 421:10, 422:16, 427:7, 469:14
**corner** [1] - 363:11
**corporation** [1] - 539:10
**correct** [106] - 293:12, 295:16, 295:18, 304:4, 307:16, 308:7, 313:20, 319:24, 320:9, 322:6, 326:1, 327:20, 328:21, 333:3, 334:10, 337:11, 343:10, 344:10, 344:13, 347:1, 350:3, 351:17, 357:6, 357:7, 360:5, 360:21, 360:24, 362:4, 366:19, 370:24, 370:25, 373:5, 374:3, 374:7, 375:15, 375:21, 375:23, 376:24, 377:15, 378:17, 379:14, 379:17, 380:21, 381:4, 383:20, 384:19, 384:25, 385:5, 385:11, 387:6, 387:15, 387:16, 387:19, 388:19, 390:6, 390:7, 392:7, 395:4, 395:9, 396:6, 399:5, 399:6, 404:14, 404:15, 404:17, 404:18, 404:21, 404:22, 409:12, 409:13, 412:9, 415:25, 419:14, 419:15, 419:25, 423:17, 424:10, 425:1, 430:9, 430:10, 430:14, 434:1, 438:6, 440:15, 443:16, 444:18, 450:22, 460:5, 460:25, 464:12, 472:2, 473:12, 475:16, 480:6, 482:10, 495:19, 514:9, 515:20, 521:16, 524:9, 525:11, 533:11, 533:12, 535:5, 535:12, 548:20
**correcting** [2] - 298:8, 513:9
**correction** [1] - 313:23
**corrective** [2] - 334:1, 509:7
**correctly** [2] - 441:19, 513:20
**correlate** [1] - 386:25
**corrosion** [6] - 410:12, 427:17, 428:1, 428:2, 429:19, 453:13
**Corrosion** [2] - 401:5, 401:20
**corrosion-inhibited** [1] - 429:19
**corrosiveness** [1] - 487:9
**cost** [14] - 297:2, 324:20, 324:22, 324:24, 406:13, 406:23, 407:2, 407:18, 438:2, 439:21, 440:4, 440:9, 441:5, 456:13
**costs** [10] - 297:6, 312:25, 313:7, 406:18, 438:10, 439:15, 440:20, 440:23, 456:18
**Coulomb** [1] - 394:12
**counsel** [3] - 289:12, 290:3, 396:17
**Counties** [9] - 277:14, 278:4, 278:17, 279:3, 279:17, 280:6, 280:19, 281:5, 405:17
**counties** [6] - 405:19, 405:21, 435:22, 435:24, 436:8, 446:18
**country** [1] - 545:16
**County** [17] - 281:20, 282:9, 282:22, 283:9, 435:13, 435:14, 435:17, 435:19, 446:1, 446:2, 538:15, 538:21, 538:22
**couple** [14] - 294:3, 316:3, 338:16, 349:1, 371:24, 393:20, 426:10, 437:24, 441:11, 446:4, 484:12, 489:20, 516:16, 539:25
**coupon** [3] - 428:1, 428:2, 428:7
**course** [3] - 418:23, 426:7, 431:11
**Court** [1] - 286:8
**court** [1] - 453:7
**COURT** [1] - 552:1
**cover** [2] - 364:14, 510:6
**covered** [4] - 407:13, 407:19, 449:14, 501:6
**covers** [1] - 509:17
**Coyote** [3] - 356:16, 450:18
**cracked** [1] - 466:24
**create** [1] - 531:1
**created** [1] - 323:18
**creating** [1] - 292:12
**credits** [2] - 332:17, 332:22
**Creek** [41] - 277:5, 278:4, 278:17, 279:5, 279:9, 280:7, 280:20, 281:7, 281:11, 282:10, 282:22, 283:11, 310:12, 332:11, 339:15, 339:17, 340:19, 356:16, 359:4, 364:25, 375:1, 375:8, 375:20, 376:12, 381:3, 381:13, 383:13, 383:16, 384:1, 385:2, 392:25, 395:2, 402:12, 410:14, 413:21, 414:3, 414:24, 450:18, 530:18, 535:17
**critical** [5] - 425:18, 427:1, 452:11, 530:22, 531:17
**Critical** [1] - 394:12
**Cross** [5] - 286:12, 287:17, 287:23, 288:5, 288:9
**cross** [13] - 290:12, 290:18, 344:20, 348:16, 348:19, 348:21, 416:12, 416:17, 416:25, 417:7, 417:8, 472:8, 472:14
**CROSS** [5] - 291:8, 484:19, 513:1, 532:17, 545:11
**Cross-Examination** [5] - 286:12, 287:17, 287:23, 288:5, 288:9
**cross-examination** [3] - 290:12, 472:8, 472:14
**CROSS-EXAMINATION** [5] - 291:8, 484:19, 513:1, 532:17, 545:11
**cross-examine** [1] - 290:18
**cross-section** [3] - 348:16, 348:19, 348:21
**cross-sections** [1] - 344:20
**crossed** [1] - 290:13
**cubed** [1] - 339:3
**cubic** [3] - 382:3, 423:24, 424:18
**cumulatively** [2] - 408:1, 435:15
**curious** [1] - 426:14
**current** [8] - 332:11, 335:17, 356:5, 427:21, 428:18, 442:25, 523:20, 544:15
**curriculum** [4] - 505:13, 529:6, 529:9, 529:11
**curve** [2] - 368:11, 379:9
**curves** [3] - 368:8, 385:8, 386:4
**custody** [4] - 421:6, 441:13, 441:16, 442:4
**cut** [1] - 362:21
**cutoff** [10] - 345:1, 366:15, 445:2, 445:4, 464:4, 464:7, 464:10, 466:14, 473:8, 473:11
**CV** [2] - 539:21, 539:22
**cycle** [1] - 374:2
**cylinder** [1] - 541:24

## D

**D-o-u-g-h-t-y** [1] - 527:19
**Dakota** [38] - 283:19, 284:13, 285:5, 289:6, 291:21, 292:15, 292:20, 293:12, 298:10, 298:11, 307:21, 313:18, 330:11, 338:4, 340:8, 386:21, 387:6, 390:14, 403:25, 412:2, 435:7, 436:6, 454:19, 507:23, 513:18, 523:18, 523:22, 523:25, 524:10, 524:16, 525:9, 525:24, 526:4, 526:8, 526:12, 536:10, 538:23, 552:13
**DAKOTA** [1] - 277:1
**Dakota's** [3] - 292:25, 294:4, 526:2
**damage** [2] - 466:8, 467:3
**damages** [1] - 466:24
**Darcy's** [1] - 328:2
**dash** [2] - 314:1, 463:13
**DAT** [3] - 295:1, 295:25, 298:3
**Data** [1] - 511:4
**data** [135] - 294:22, 295:5, 295:6, 295:8, 296:8, 296:11, 296:12, 296:14, 297:22, 298:1, 298:2, 298:4, 298:9, 298:12, 298:25, 299:7, 299:11, 299:13, 299:15, 299:22, 299:25, 300:1, 300:3, 300:4, 300:8, 300:10, 300:19, 301:6, 301:20, 301:22, 302:15, 302:18, 303:17, 303:18, 303:22, 304:2, 304:6, 304:8, 304:12, 304:14, 304:19, 304:22, 304:25, 305:3, 305:6, 305:8, 305:11, 305:25, 306:5, 306:14, 306:16, 307:4, 307:14, 307:17, 313:9, 313:14, 314:17, 317:19, 317:20, 318:6, 323:20, 342:22, 350:13, 354:15, 354:19, 354:20, 355:2, 357:24, 359:17, 359:22, 360:1, 367:10, 367:17, 368:14, 368:17, 369:15, 369:22,

372:17, 372:20, 385:16, 386:2, 386:6, 392:3, 392:4, 397:11, 397:19, 400:11, 400:14, 400:18, 418:4, 420:2, 431:5, 431:6, 435:22, 451:17, 451:18, 452:3, 452:10, 457:9, 474:17, 475:20, 483:20, 491:22, 496:23, 497:21, 510:8, 511:24, 512:6, 512:14, 530:17, 530:25, 531:12, 531:13, 531:17, 531:22, 532:2, 532:13, 533:2, 533:14, 533:16, 534:16, 534:19, 544:19, 546:25, 547:9, 547:13, 547:18, 547:19, 547:21
**database** [2] - 512:17, 545:3
**date** [6] - 356:6, 370:19, 414:24, 415:7, 519:21, 526:22
**Dated** [1] - 552:13
**dated** [1] - 533:20
**David** [1] - 289:7
**DAVID** [2] - 283:22, 284:6
**days** [3] - 299:10, 325:7, 438:19
**DCC** [4] - 364:18, 459:12, 459:16, 460:9
**deadline** [1] - 291:1
**deal** [2] - 476:2, 543:4
**dealt** [1] - 476:4
**decide** [2] - 418:8, 483:15
**decided** [2] - 482:12, 498:5
**decision** [7] - 324:18, 482:14, 495:24, 508:5, 517:11, 517:23
**decisions** [1] - 321:18
**decks** [2] - 298:1, 544:19
**decrease** [2] - 331:13, 331:20
**decreases** [1] - 464:1
**decreasing** [1] - 331:14
**deemed** [1] - 314:6
**deep** [2] - 394:22, 395:3
**deeper** [3] - 355:7, 454:25, 474:17
**defer** [9] - 312:8, 348:4, 356:7, 358:21, 359:8, 424:14, 425:12, 426:17, 497:8
**deferred** [12] - 355:21, 358:24, 371:25, 411:14, 425:4, 430:16, 447:21, 462:3, 467:6, 471:3, 471:12, 501:22
**define** [14] - 291:23, 292:1, 292:23, 293:13, 293:24, 296:1, 318:6, 318:22, 319:25, 321:18, 329:21, 340:25, 351:22, 462:7
**defined** [5] - 369:14, 402:11, 446:7, 502:14, 531:18
**definitions** [1] - 405:7
**definitive** [1] - 305:17
**deformation** [1] - 363:15
**degree** [5] - 403:24, 468:9, 537:25, 544:5
**degrees** [1] - 398:22
**delineate** [3] - 292:7, 292:8, 489:19
**delineated** [1] - 388:8
**delineating** [3] - 293:9, 293:10, 509:3
**delineation** [4] - 292:10, 343:6, 440:6, 441:1
**delta** [1] - 412:7
**delve** [1] - 513:14
**demarcation** [1] - 422:17
**demonstrates** [2] - 331:9, 331:19
**Demonstration** [1] - 406:3
**denied** [3] - 532:22, 532:25, 550:7
**densities** [1] - 391:22
**density** [2] - 380:8, 427:3
**department** [2] - 404:1, 504:19
**Department** [2] - 289:9, 340:11
**departments** [2] - 436:9, 446:3
**dependent** [5] - 345:6, 354:21, 354:22, 354:23, 355:9
**depicted** [1] - 394:13
**depletion** [1] - 543:3
**depositional** [1] - 373:1
**deposits** [1] - 373:8
**depth** [8] - 336:16, 355:10, 357:15, 361:16, 409:24, 410:13, 488:15, 489:2
**depths** [4] - 394:14, 455:11, 474:9, 474:12
**derivatives** [1] - 543:25
**derive** [7] - 374:23, 376:7, 385:23, 386:3, 452:10, 516:20, 532:4
**derived** [6] - 328:14, 365:13, 369:3, 385:8, 385:14, 386:6
**deriving** [1] - 525:2
**DERRICK** [1] - 285:2
**Derrick** [2] - 289:22, 472:11
**derrick** [1] - 458:18
**describe** [10] - 409:16, 459:1, 475:10, 484:24, 504:8, 505:22, 508:24, 509:16, 529:3, 529:13
**described** [11] - 307:18, 359:24, 400:16, 441:14, 452:4, 465:21, 466:3, 466:22, 481:3, 482:20, 535:7
**describes** [4] - 400:10, 466:5, 509:4, 509:6
**describing** [3] - 528:4, 530:14, 545:14
**description** [8] - 385:7, 399:24, 414:1, 414:16, 423:12, 429:1, 504:14, 541:18
**descriptions** [1] - 294:21
**design** [13] - 397:2, 409:4, 409:11, 409:15, 409:17, 432:9, 456:17, 468:18, 484:25, 485:2, 487:7, 490:10, 490:18
**designed** [7] - 397:5, 442:24, 443:13, 490:1, 490:11, 490:13, 490:22
**DESIRAE** [1] - 285:3
**Desirae** [1] - 289:24
**desire** [1] - 514:23
**detail** [5] - 348:5, 395:15, 401:8, 450:1, 530:13
**detailed** [1] - 466:9
**details** [4] - 322:19, 440:2, 454:6, 487:21
**detect** [2] - 346:21, 347:9
**Detected** [1] - 401:4
**detection** [5] - 343:13, 346:20, 346:25, 427:18, 453:13
**Detection** [3] - 401:5, 401:6, 401:20
**determination** [13] - 304:17, 304:20, 305:22, 310:10, 313:12, 322:12, 322:15, 322:20, 444:22, 473:20, 473:22, 496:22, 499:18
**determinations** [1] - 483:10
**determine** [26] - 292:17, 302:17, 316:23, 323:8, 351:18, 359:6, 406:5, 406:18, 413:20, 439:21, 440:23, 463:21, 464:7, 466:10, 466:16, 473:14, 476:24, 480:9, 481:5, 531:22, 533:7, 534:12, 542:20, 543:5, 543:14, 544:14
**determined** [19] - 314:7, 343:7, 359:3, 364:11, 371:17, 381:3, 430:17, 431:11, 434:23, 435:14, 439:15, 443:17, 463:12, 463:18, 463:24, 464:5, 473:9, 496:14, 499:24
**determines** [1] - 497:19
**determining** [3] - 278:7, 280:10, 282:12
**develop** [11] - 318:18, 330:23, 341:13, 341:16, 341:20, 341:23, 342:2, 434:12, 435:15, 445:24, 508:10
**developed** [2] - 322:24, 323:1
**developer** [1] - 331:16
**developers** [2] - 341:11, 506:4
**developing** [9] - 322:8, 322:24, 341:22, 342:6, 406:12, 406:21, 446:14, 511:11, 542:23
**development** [6] - 341:8, 434:6, 506:17, 509:7, 538:20, 542:7
**DGC** [1] - 468:10
**diagram** [13] - 421:18, 421:24, 475:8, 475:12, 475:24, 488:11, 488:24, 489:3, 490:4, 490:25, 491:8, 491:13
**diameter** [11] - 349:9, 349:12, 422:2, 422:8, 422:23, 422:25, 423:8, 483:24, 491:10, 491:15, 491:17
**dictated** [2] - 344:23, 440:8
**dictates** [1] - 328:12
**dictating** [2] - 390:20, 462:19
**die** [1] - 331:8
**difference** [9] - 318:1, 349:22, 349:23, 365:23, 369:20, 384:6, 440:25, 441:6, 450:6
**differences** [25] - 350:20, 361:3, 384:3, 407:22, 449:11, 451:9, 452:13, 452:20, 452:23, 453:16, 454:5, 454:16, 454:23, 455:4, 455:9, 456:1, 456:9, 456:10, 456:13, 456:23, 457:2, 457:6, 457:16, 457:21, 457:22
**different** [39] - 300:5, 317:6, 325:22, 329:10, 329:16, 335:22, 338:5, 347:24, 350:19, 351:9, 351:10, 353:21, 371:22, 372:21, 377:20, 380:2, 380:3, 391:4, 391:22, 399:19, 418:7, 440:20, 441:17, 446:14, 474:9, 474:11, 485:9, 485:10, 485:14, 486:9, 500:5, 506:11, 507:13, 524:5, 542:16, 542:17, 543:17, 546:5,

546:8
**differential** [1] - 336:12
**difficult** [3] - 290:20, 327:4, 421:23
**difficulty** [1] - 417:5
**diffusion** [5] - 379:21, 380:4, 380:13, 391:9, 391:13
**digitized** [2] - 304:15, 306:7
**dike** [1] - 429:24
**diligence** [1] - 506:18
**diluted** [2] - 344:15, 345:15
**dilutes** [1] - 346:15
**dioxide** [10] - 277:5, 278:8, 279:5, 279:9, 280:11, 281:7, 281:11, 282:13, 283:11, 418:25
**DIRECT** [8] - 396:4, 398:8, 403:10, 408:12, 467:19, 503:20, 527:15, 537:13
**direct** [12] - 302:21, 307:19, 323:14, 338:20, 386:13, 406:6, 406:9, 409:20, 413:2, 439:18, 458:15, 473:1
**Direct** [8] - 286:21, 286:22, 286:23, 286:24, 287:11, 287:22, 288:4, 288:8
**direction** [1] - 384:24
**directional** [1] - 348:3
**directly** [10] - 326:12, 328:19, 336:4, 336:8, 336:9, 345:17, 353:2, 473:19, 512:5, 546:16
**director** [1] - 403:19
**disabled** [1] - 504:5
**discharge** [8] - 421:7, 421:25, 425:22, 426:1, 426:5, 426:14, 465:5, 465:12
**discovery** [3] - 303:1, 303:23, 303:25
**discuss** [6] - 383:6, 404:12, 409:9, 452:16, 454:10, 456:6
**discussed** [15] - 302:4, 304:13, 308:25, 310:16, 310:18, 313:3, 315:13, 316:10, 347:8, 361:1, 395:15, 452:25, 484:4, 489:23, 491:11
**discusses** [2] - 452:1, 453:11
**discussing** [2] - 291:14, 381:24
**discussion** [7] - 309:16, 373:1, 388:10, 450:4, 469:13, 474:3, 513:15
**Discussion.....** [1] - 286:4
**discussions** [15] - 296:19, 302:16, 306:25, 307:11, 310:2, 310:4, 311:1, 322:19, 342:12, 459:17, 459:22, 460:11, 514:2, 526:10
**dishes** [1] - 466:4
**disperse** [1] - 481:25
**dispersion** [12] - 380:1, 380:7, 391:17, 391:19, 391:23, 405:22, 476:23, 477:4, 477:12, 477:19, 477:22, 480:1
**disposal** [6] - 340:19, 409:7, 524:17, 524:20, 524:22, 525:9
**dissimilar** [2] - 546:19, 546:20
**dissipation** [1] - 359:11
**dissolution** [5] - 360:17, 377:12, 378:15, 381:25, 391:1
**dissolve** [2] - 360:13, 380:8
**dissolved** [2] - 378:20, 378:21
**dissolving** [2] - 377:18, 377:23
**distance** [8] - 356:22, 373:14, 373:18, 383:15, 383:16, 384:11, 384:22, 433:20
**distances** [4] - 383:6, 383:9, 383:12, 433:18
**distinguishing** [1] - 441:6
**distribute** [1] - 350:14
**distributed** [2] - 321:8, 348:15
**distribution** [8] - 316:15, 318:15, 318:16, 351:9, 351:11, 372:19, 531:25, 533:7
**Divide** [1] - 538:22
**divide** [1] - 541:25
**DIVISION** [1] - 277:2
**Division** [2] - 289:10, 507:6
**DMR** [26] - 295:1, 295:6, 326:19, 367:23, 367:24, 400:19, 415:14, 418:9, 420:12, 426:21, 427:25, 431:22, 432:18, 436:17, 436:20, 436:22, 437:11, 437:20, 443:21, 449:14, 461:25, 471:8, 474:4, 495:23, 496:2, 498:20
**DO** [2] - 552:5, 552:9
**Docket** [1] - 289:6
**document** [3] - 294:14, 509:17, 510:6
**documents** [21] - 390:4, 508:9, 508:12, 508:13, 508:18, 508:22, 509:11, 509:14, 509:25, 511:9, 513:22, 513:24, 514:4, 514:11, 514:15, 516:8, 516:12, 518:2, 521:1, 526:4, 526:6
**dolomite** [3] - 377:11, 378:20, 391:2
**dolomites** [1] - 373:7
**dolostone** [1] - 382:20
**Dome** [2] - 539:4, 542:25
**dominant** [3] - 391:10, 391:17, 391:25
**done** [45] - 291:2, 300:5, 309:2, 321:17, 343:1, 351:13, 353:1, 354:3, 354:9, 360:16, 363:9, 366:5, 367:21, 367:22, 377:21, 379:25, 380:24, 381:1, 382:2, 386:8, 412:24, 413:19, 416:9, 417:24, 419:1, 419:2, 419:22, 426:11, 434:14, 436:23, 466:9, 476:23, 477:13, 477:22, 478:1, 478:6, 480:2, 480:8, 521:7, 523:20, 524:3, 524:10, 529:24, 548:18, 548:24
**dot** [2] - 336:9
**DOT** [1] - 397:6
**dots** [1] - 335:9
**double** [1] - 324:1
**double-check** [1] - 324:1
**doubt** [1] - 434:10
**Doughty** [9] - 527:2, 527:6, 527:8, 527:17, 527:19, 532:6, 532:19, 537:3
**DOUGHTY** [3] - 288:3, 527:12, 537:4
**doughty** [1] - 527:3
**Douglas** [7] - 389:10, 392:13, 447:19, 461:13, 473:6, 483:5, 496:12
**DOUGLAS** [34] - 291:13, 305:12, 305:15, 306:24, 309:13, 312:7, 313:22, 320:19, 323:5, 333:2, 335:8, 338:9, 340:17, 356:9, 356:12, 360:15, 372:7, 387:16, 390:7, 393:25, 461:19, 461:25, 463:14, 463:23, 464:12, 464:15, 465:9, 465:15, 465:17, 466:20, 467:5, 467:8, 473:12, 483:12
**DOUGLAS/CAITLIN** [1] - 286:11
**DOUGLAS/JAMEY** [1] - 287:7
**down** [23] - 298:24, 320:12, 329:11, 354:5, 379:11, 386:15, 404:9, 405:9, 409:24, 413:14, 416:13, 416:14, 419:21, 426:1, 434:9, 441:7, 441:17, 453:7, 464:4, 467:2, 475:19, 479:22, 497:19
**downhole** [6] - 309:6, 309:8, 402:21, 485:3, 486:6, 486:8
**Downhole** [1] - 401:20
**downloaded** [1] - 522:7
**downstream** [7] - 422:14, 492:5, 492:14, 492:24, 493:2, 493:5, 494:10
**draft** [13] - 508:3, 508:23, 509:15, 513:23, 513:25, 514:4, 514:22, 516:6, 516:12, 516:22, 516:25, 517:7, 526:8
**drafted** [4] - 516:8, 517:6, 517:10, 517:14
**drafting** [6] - 508:7, 508:21, 510:3, 514:25, 518:21, 519:9
**drafts** [1] - 315:12
**drainage** [5] - 504:22, 538:8, 542:12, 542:14, 543:5
**Drawer** [1] - 284:16
**drawing** [1] - 387:1
**drilled** [16] - 298:15, 337:16, 357:17, 367:7, 367:9, 369:2, 409:23, 410:10, 454:25, 455:1, 455:3, 455:22, 474:11, 529:19, 535:8
**drilling** [7] - 348:3, 409:4, 409:24, 415:10, 443:24, 474:16, 550:2
**Drinking** [3] - 292:12, 292:18, 293:2
**drinking** [10] - 293:16, 293:20, 293:23, 294:1, 336:17, 339:13, 410:2, 410:7, 439:14, 489:1
**drive** [12] - 298:25, 299:8, 299:12, 299:17, 299:21, 300:14, 300:16, 300:22, 301:10, 476:12, 543:3
**driver** [1] - 390:19
**drivers** [1] - 332:20
**drives** [1] - 376:25
**drove** [1] - 441:6
**drywall** [1] - 466:24
**due** [17] - 327:21, 329:25, 338:25, 339:9, 345:4, 357:23, 360:13, 360:17, 364:16, 372:13, 376:17, 381:11, 381:25, 384:4, 391:10, 506:17
**duly** [8] - 396:2, 398:6,

403:8, 408:10, 467:17, 503:18, 527:13, 537:11
**dune** [1] - 373:3
**duration** [5] - 297:12, 473:15, 473:19, 483:22, 494:3
**during** [15] - 331:10, 343:18, 358:18, 374:6, 388:16, 388:20, 389:12, 390:3, 412:23, 415:10, 432:1, 464:21, 496:11, 496:18, 515:23
**duties** [1] - 468:15
**dwelling** [4] - 433:2, 433:5, 433:14, 433:16
**dynamic** [2] - 512:17, 545:5

## E

**early** [3] - 411:15, 444:10, 520:20
**Earnest** [1] - 396:10
**earth** [1] - 507:10
**earthquake** [6] - 465:23, 466:1, 466:2, 466:12, 466:21, 466:22
**earthquakes** [2] - 465:20, 467:3
**east** [2] - 348:16, 541:2
**East** [3] - 283:19, 284:12, 543:1
**Eastern** [1] - 528:7
**economic** [3] - 332:13, 332:20, 542:21
**economically** [1] - 543:6
**edge** [8] - 343:9, 344:11, 347:6, 363:14, 383:6, 383:16, 383:17, 383:18
**edges** [1] - 345:18
**educated** [1] - 346:8
**educational** [13] - 396:17, 398:19, 403:22, 408:22, 468:8, 504:8, 505:14, 527:23, 529:14, 537:24, 539:23, 540:6, 540:12
**EERC** [37] - 294:24, 294:25, 296:8, 296:9, 296:10, 296:15, 297:5, 297:20, 298:23, 302:8, 302:23, 304:20, 304:24, 305:3, 305:8, 305:10, 310:2, 311:1, 315:9, 316:9, 322:7, 322:11, 322:14, 322:17, 322:24, 323:23, 337:3, 348:10, 354:9, 383:13, 398:14, 398:24, 474:1, 486:13, 530:11, 534:17
**EERC's** [3] - 300:1, 306:17, 323:13
**effect** [7] - 365:8, 365:20, 366:24, 376:16, 376:19, 383:23, 415:21
**effective** [2] - 405:4, 542:20
**effects** [5] - 358:11, 542:15, 542:17, 543:13, 543:14
**efficiency** [1] - 472:18
**effort** [1] - 304:7
**efforts** [1] - 451:4
**eight** [1] - 528:8
**either** [10] - 335:15, 362:16, 365:24, 417:25, 433:5, 433:16, 455:24, 486:24, 541:12, 544:1
**elaborate** [12] - 357:11, 380:1, 380:15, 381:5, 382:16, 383:22, 385:13, 414:5, 420:5, 427:19, 439:12, 445:3
**electrical** [1] - 428:6
**element** [1] - 377:18
**elements** [1] - 507:10
**eliciting** [1] - 520:14
**eliminate** [1] - 510:9
**eliminated** [1] - 317:23
**Emergency** [2] - 433:25, 454:9
**emergency** [11] - 404:13, 404:24, 405:1, 435:11, 436:1, 439:12, 440:21, 445:19, 445:21, 475:22, 476:1
**employed** [7] - 396:11, 398:13, 403:16, 404:6, 408:17, 468:2, 504:1
**employees** [1] - 307:20
**employment** [1] - 468:16
**emptied** [2] - 481:11, 481:12
**enact** [3] - 279:6, 281:7, 283:12
**enactment** [1] - 515:3
**encompasses** [1] - 531:7
**encountered** [1] - 325:8
**end** [14] - 331:23, 361:2, 373:20, 374:1, 401:1, 402:15, 416:1, 442:17, 497:12, 497:15, 507:25, 544:12, 544:14
**end-to-end** [1] - 401:1
**endanger** [3] - 308:9, 308:15, 308:19
**endangered** [1] - 293:16
**endangering** [1] - 294:1
**endangerment** [7] - 293:22, 339:8, 406:19, 407:9, 407:20, 439:13, 456:18
**ended** [1] - 505:1
**ends** [1] - 379:9
**energy** [4] - 396:21, 539:10, 539:11, 539:13
**Energy** [5] - 303:14, 398:24, 528:10, 538:17, 538:24
**engaged** [1] - 405:20
**engagement** [1] - 526:19
**engineer** [8] - 325:18, 326:3, 346:16, 408:20, 468:13, 538:5, 538:6, 545:14
**engineering** [13] - 308:18, 309:7, 309:10, 396:20, 397:2, 408:25, 409:2, 409:4, 468:10, 504:11, 504:24, 506:15, 538:1
**engineers** [1] - 516:10
**enhanced** [10] - 538:18, 539:3, 539:7, 542:12, 542:25, 545:15, 545:22, 546:4, 546:13, 546:15
**ensure** [5] - 293:25, 299:13, 300:7, 300:10, 466:8
**ensuring** [1] - 495:13
**enter** [3] - 379:22, 380:9, 460:1
**entered** [2] - 401:11, 518:3
**enters** [1] - 400:24
**entire** [6] - 299:23, 301:5, 357:13, 357:18, 423:1, 528:19
**entirely** [1] - 443:25
**entirety** [1] - 362:22
**entities** [5] - 341:10, 397:9, 419:8, 482:22, 482:25
**entity** [2] - 377:12, 512:9
**entry** [1] - 386:2
**environment** [4] - 308:20, 373:1, 400:6, 405:6
**environmental** [10] - 403:20, 453:24, 504:7, 504:18, 504:24, 506:9, 506:15, 506:18, 514:13, 520:21
**Environmental** [1] - 303:14
**environments** [1] - 528:17
**EOA** [1] - 292:19
**EOR** [2] - 542:6, 542:21
**EPA** [14] - 292:22, 293:6, 293:8, 294:5, 294:6, 368:23, 512:5, 512:8, 513:24, 516:7, 517:15, 518:23, 519:16, 541:12
**EPA's** [2] - 294:8, 514:17
**epicenters** [1] - 483:23
**equally** [2] - 352:20, 353:5
**equation** [2] - 328:5, 378:14
**equilibrium** [2] - 331:17, 331:21
**equipment** [6] - 356:2, 400:13, 464:22, 468:19, 495:8, 495:12
**equitably** [1] - 292:5
**equivalent** [3] - 387:4, 423:24, 424:19
**equivalently** [1] - 368:9
**ER** [4] - 427:20, 427:24, 428:11
**Erickson** [7] - 348:23, 349:11, 350:25, 360:10, 362:8, 455:2, 455:24
**Erickson/BK** [1] - 356:13
**error** [7] - 319:7, 319:22, 325:16, 325:17, 374:19, 375:7, 375:18
**errors** [5] - 325:8, 325:14, 326:6, 326:9, 540:1
**ERRP** [7] - 405:2, 406:18, 407:8, 407:19, 439:22, 445:20, 446:7
**especially** [1] - 546:15
**essence** [1] - 460:14
**essentially** [4] - 316:18, 346:20, 400:4, 465:25
**establish** [1] - 516:23
**established** [1] - 479:17
**establishing** [3] - 278:19, 280:21, 283:1
**estimate** [1] - 300:6
**estimated** [4] - 300:24, 406:17, 438:9, 439:21
**estimates** [2] - 406:23, 456:14
**estimating** [1] - 339:2
**estimations** [1] - 452:12
**et** [3] - 443:9, 456:2, 469:4
**ethanol** [3] - 411:18, 411:21, 411:23
**evaluate** [14] - 293:22, 323:18, 334:13, 338:16, 364:19, 369:23, 431:19, 510:12, 523:7, 523:15, 532:3, 533:3, 544:9, 548:15
**evaluated** [2] - 339:6, 493:21
**evaluating** [1] - 485:3
**evaluation** [6] - 319:10, 335:5, 372:15, 393:10, 413:10, 539:2
**evaluations** [1] - 539:3
**event** [8] - 305:25, 411:2, 420:11, 440:1, 440:14, 483:6, 483:21, 496:18
**events** [6] - 405:13, 405:14, 432:15, 445:7, 474:4, 483:21
**evidence** [1] - 359:14
**exact** [3] - 320:5, 433:17, 519:21
**exactly** [8] - 320:11, 320:13, 370:8, 468:22, 493:25, 498:13, 521:15, 532:3
**examination** [3] - 290:12, 472:8, 472:14
**Examination** [28] - 286:12,

286:13, 286:14, 286:15, 286:16, 286:17, 286:21, 286:22, 286:23, 286:24, 287:3, 287:4, 287:5, 287:8, 287:9, 287:10, 287:11, 287:12, 287:13, 287:17, 287:22, 287:23, 287:24, 287:25, 288:4, 288:5, 288:8, 288:9
**EXAMINATION** [28] - 291:8, 355:17, 370:1, 371:19, 389:22, 393:22, 396:4, 398:8, 403:10, 408:12, 411:11, 432:22, 441:9, 448:5, 458:12, 461:20, 467:19, 470:5, 473:4, 484:19, 503:20, 513:1, 525:17, 526:16, 527:15, 532:17, 537:13, 545:11
**examine** [1] - 290:18
**examined** [8] - 396:2, 398:6, 403:8, 408:10, 467:17, 503:18, 527:13, 537:11
**Examiner** [1] - 461:12
**examiner** [13] - 289:7, 289:16, 389:19, 392:12, 393:17, 395:11, 396:16, 397:21, 408:3, 410:19, 416:21, 457:23, 503:16
**EXAMINER** [85] - 283:23, 289:4, 289:21, 290:4, 290:7, 290:10, 290:23, 290:25, 291:6, 303:7, 321:20, 321:24, 333:1, 333:20, 333:22, 355:15, 388:23, 389:3, 389:20, 392:15, 395:20, 395:23, 398:1, 398:3, 403:5, 408:7, 411:9, 416:11, 416:22, 417:11, 417:13, 417:16, 417:18, 447:3, 447:9, 447:14, 448:3, 448:16, 458:2, 458:4, 458:9, 461:4, 461:10, 461:17, 467:13, 471:15, 472:7, 500:9, 500:21, 501:7, 501:12, 502:18, 502:22, 502:24, 503:2, 503:6, 503:13, 505:18, 505:20, 511:16, 511:18, 512:21, 520:6, 520:16, 522:23, 525:14, 526:25, 527:3, 527:7, 530:2, 530:5, 530:8, 532:16, 536:24, 537:5, 537:8, 540:16, 541:8, 545:10, 548:12, 550:10, 550:20, 550:25, 551:3, 551:7
**examiner's** [1] - 416:10
**example** [7] - 306:6, 369:10, 393:9, 401:13, 454:6, 483:16, 496:14
**examples** [1] - 506:10
**exceed** [5] - 418:20, 419:10, 436:3, 478:19, 493:23
**exceeding** [1] - 424:23
**exceeds** [1] - 469:8
**except** [1] - 320:10
**exception** [1] - 529:16
**excluding** [1] - 425:22
**excuse** [7] - 406:10, 407:11, 409:15, 438:1, 451:7, 453:22, 532:2
**executing** [1] - 437:20
**execution** [1] - 445:23
**exemption** [3] - 540:25, 541:1, 541:5
**exemptions** [2] - 541:11, 541:19
**exercise** [1] - 349:23
**exhibit** [19] - 327:2, 333:14, 333:22, 373:11, 409:18, 454:9, 457:24, 458:4, 459:3, 459:4, 461:2, 461:6, 461:9, 461:11, 510:24, 510:25, 511:6, 530:5, 540:16
**Exhibit** [34] - 288:12, 288:17, 294:13, 304:24, 327:19, 329:7, 356:10, 356:12, 394:7, 399:11, 434:19, 448:8, 458:17, 458:23, 461:3, 471:5, 471:18, 474:9, 475:8, 505:5, 505:17, 508:16, 509:9, 509:23, 510:15, 510:16, 511:2, 511:21, 529:2, 529:8, 530:8, 539:20, 540:11, 540:14
**Exhibits** [3] - 451:21, 511:14, 514:5
**EXHIBITS** [2] - 288:11, 288:16
**exhibits** [7] - 326:13, 358:16, 450:22, 450:25, 458:15, 511:18, 539:14
**exist** [7] - 333:7, 372:12, 375:20, 420:17, 420:19, 452:22, 455:12
**existed** [2] - 360:2, 361:10
**existing** [2] - 328:19, 476:7
**exists** [2] - 372:3, 481:9
**expand** [5] - 314:8, 478:18, 498:15, 498:19, 500:1
**expanded** [2] - 443:9, 500:17
**expanding** [1] - 430:25
**expands** [1] - 402:4
**expansion** [1] - 480:13
**expect** [6] - 331:25, 346:10, 346:12, 434:8, 486:21, 493:14
**expectations** [2] - 431:7, 460:15
**expected** [10] - 366:22, 368:15, 379:15, 391:9, 391:17, 391:24, 434:7, 436:21, 444:21, 550:21
**expense** [1] - 338:6
**experience** [32] - 323:11, 323:15, 325:16, 326:6, 340:11, 396:18, 396:21, 398:20, 403:22, 408:23, 468:8, 491:19, 496:2, 504:15, 505:15, 506:25, 507:1, 518:1, 520:19, 523:18, 529:15, 538:3, 538:4, 538:22, 539:23, 540:12, 540:19, 542:3, 542:6, 545:14, 546:11
**experiences** [1] - 543:8
**expert** [3] - 421:5, 427:11, 506:19
**expertise** [2] - 530:16, 530:20
**experts** [4] - 417:5, 486:15, 520:15, 548:11
**explain** [25] - 301:6, 359:3, 361:11, 364:6, 365:2, 365:8, 365:20, 366:8, 366:13, 366:24, 368:10, 368:11, 369:2, 369:6, 371:5, 397:8, 405:15, 415:1, 415:21, 434:22, 449:9, 450:1, 459:7, 463:10, 476:8
**explained** [2] - 448:13, 518:1
**explanation** [4] - 372:5, 372:24, 378:9, 386:14
**explicit** [1] - 499:22
**exploration** [1] - 529:25
**exploratory** [1] - 507:20
**explore** [1] - 507:18
**exploring** [1] - 524:19
**export** [4] - 299:16, 306:13, 306:15, 307:4
**exporting** [1] - 307:3
**expose** [1] - 543:4
**Express** [9] - 277:6, 278:8, 279:10, 280:12, 281:12, 282:14, 309:12, 482:6, 484:3
**Express'** [1] - 476:19
**expressed** [1] - 310:14
**extends** [1] - 327:25
**extensions** [1] - 541:14
**extensive** [1] - 530:13
**extent** [24] - 293:18, 311:16, 319:15, 321:10, 321:11, 327:7, 349:25, 362:19, 364:9, 364:10, 364:13, 372:4, 373:12, 373:18, 373:20, 374:1, 374:17, 374:18, 375:8, 378:16, 383:13, 434:22, 463:11, 463:18
**extents** [1] - 451:3
**external** [8] - 298:24, 298:25, 299:8, 299:17, 300:13, 300:16, 300:22, 491:25
**extra** [2] - 469:20, 510:18
**Exxon** [5] - 528:5, 528:6, 528:14, 528:15, 528:20

## F

**face** [2] - 525:21
**face-to-face** [1] - 525:21
**facies** [9] - 376:13, 376:16, 376:18, 381:17, 382:17, 385:24, 385:25, 414:9, 531:21
**Facilities** [1] - 401:4
**facilities** [44] - 308:4, 308:23, 329:17, 334:3, 336:1, 356:3, 357:1, 357:6, 357:21, 359:12, 361:3, 363:9, 364:21, 366:13, 397:14, 400:5, 401:11, 411:18, 415:3, 420:20, 421:8, 421:11, 425:16, 425:23, 427:19, 437:13, 439:3, 440:21, 441:18, 441:25, 456:15, 459:12, 460:9, 466:7, 468:5, 468:19, 469:21, 470:21, 474:24, 476:19, 477:23, 482:8, 489:23, 524:4
**Facility** [2] - 448:10, 454:3
**facility** [96] - 277:6, 277:20, 278:9, 279:10, 279:23, 280:12, 281:12, 282:2, 282:14, 292:3, 292:5, 292:18, 293:5, 295:10, 295:11, 310:20, 311:5, 311:11, 311:17, 311:21, 312:3, 313:16, 314:5, 314:12, 314:18, 314:22, 315:16, 318:22, 324:11, 326:20, 327:13, 327:25, 335:14, 336:8, 351:23, 352:19, 352:23, 353:4, 353:16, 355:25, 356:4, 356:18, 357:18, 358:16, 359:2, 359:19, 360:25, 361:13, 363:11, 370:9, 371:3, 371:5, 373:13, 373:23, 388:9, 388:18, 393:5, 393:10, 393:14, 394:23, 400:24, 407:3, 407:7, 407:16, 419:1,

419:17, 421:4, 422:1, 422:13, 422:19, 424:2, 424:9, 433:1, 442:19, 451:1, 454:4, 454:7, 454:18, 455:20, 456:10, 456:12, 457:7, 457:17, 459:16, 460:22, 476:7, 496:16, 496:24, 497:20, 497:24, 498:15, 498:20, 498:22, 499:23, 500:2, 500:17
**fact** [3] - 311:21, 383:25, 448:20
**factor** [10] - 310:15, 312:23, 315:14, 322:4, 322:16, 324:13, 350:4, 350:5, 351:3, 542:1
**factors** [1] - 487:6
**factual** [1] - 336:24
**failure** [4] - 439:25, 440:13, 476:14, 479:6
**faint** [1] - 518:22
**fair** [14] - 295:21, 319:19, 343:15, 343:18, 460:23, 477:14, 499:1, 524:12, 525:12, 534:9, 534:10, 545:16, 545:25, 547:24
**fairly** [3] - 349:1, 360:8, 427:6
**familiar** [20] - 294:9, 326:22, 326:25, 327:6, 328:22, 328:25, 334:24, 335:12, 428:1, 484:6, 506:20, 529:9, 530:19, 536:4, 536:9, 536:15, 541:10, 541:13, 546:25, 547:8
**familiarity** [3] - 335:20, 335:23, 340:7
**far** [20] - 313:10, 315:1, 361:22, 364:11, 370:7, 370:8, 375:22, 416:1, 428:19, 431:25, 433:1, 433:12, 443:12, 475:23, 481:25, 490:10, 490:18, 517:24, 542:12, 545:1
**fashion** [1] - 376:9
**fault** [15] - 362:10, 362:13, 362:17, 362:21, 362:25, 363:1, 363:4, 363:10, 363:14, 363:15, 363:16, 528:15, 528:16, 528:17, 528:19
**Faults** [1] - 394:13
**faults** [5] - 394:13, 394:16, 394:18, 394:22, 394:23
**feasibility** [2] - 341:6, 543:15
**feasible** [1] - 543:6
**features** [3] - 326:17, 395:5, 452:24
**federal** [3] - 332:17, 506:2, 506:4
**FEED** [1] - 418:19
**feedback** [2] - 527:9, 527:10
**feeding** [1] - 401:22
**feet** [30] - 364:2, 364:3, 373:19, 374:12, 374:13, 375:3, 375:5, 390:15, 395:1, 410:1, 423:24, 424:18, 433:6, 433:7, 433:8, 433:17, 435:8, 455:1, 455:3, 455:22, 488:8, 488:22, 489:3, 489:12, 529:21
**felt** [3] - 318:5, 368:16, 465:22
**few** [10] - 383:8, 389:18, 397:22, 468:6, 468:23, 472:13, 484:11, 508:15, 531:19, 542:10
**fiberoptic** [3] - 401:14, 402:13, 402:17
**Field** [1] - 538:7
**field** [17] - 278:19, 279:6, 280:21, 281:8, 283:1, 283:12, 340:25, 341:4, 414:1, 414:16, 436:17, 528:23, 542:7, 542:10, 542:23, 543:2, 546:16
**fields** [1] - 538:18
**Figure** [25] - 335:6, 337:10, 338:21, 345:2, 348:13, 350:24, 362:12, 364:4, 368:4, 370:6, 372:1, 374:14, 378:12, 379:8, 381:24, 383:14, 394:14, 395:8, 409:21, 413:2, 421:16, 423:14, 428:24, 434:17, 463:10
**figure** [25] - 327:17, 356:15, 361:18, 362:11, 364:7, 374:10, 374:14, 376:10, 376:14, 377:6, 378:12, 378:13, 378:17, 378:18, 382:8, 409:18, 414:8, 421:18, 421:19, 423:14, 439:17, 443:7, 471:23, 471:25
**Figures** [2] - 377:4, 377:8
**figures** [1] - 377:9
**File** [1] - 371:4
**file** [17] - 295:1, 295:2, 295:3, 295:25, 296:4, 297:18, 298:3, 300:2, 300:15, 325:17, 533:14, 547:10, 547:13, 547:18, 547:19, 547:21
**filed** [3] - 522:12, 536:5, 536:16
**files** [14] - 294:22, 295:22, 298:1, 299:17, 299:21, 300:12, 301:10, 512:14, 512:17, 544:19, 549:2, 549:23, 549:24, 549:25
**filled** [4] - 361:24, 362:1, 362:16, 363:2
**final** [7] - 371:16, 513:24, 513:25, 514:15, 521:4, 526:1, 544:16
**finalizing** [1] - 460:13
**finally** [5] - 400:17, 401:18, 402:1, 402:15, 457:20
**Financial** [1] - 406:3
**financial** [10] - 278:7, 280:11, 282:13, 404:5, 404:16, 406:5, 406:12, 406:21, 406:24, 456:5
**fine** [8] - 290:8, 290:10, 356:7, 389:21, 392:16, 416:15, 429:8, 473:3
**finish** [4] - 397:22, 416:4, 416:18, 472:20
**finished** [1] - 515:19
**fire** [2] - 436:9, 446:2
**fired** [1] - 468:12
**firm** [1] - 409:3
**Firm** [2] - 285:3, 289:23
**first** [38] - 295:22, 304:24, 319:7, 319:17, 319:18, 319:22, 320:12, 383:11, 392:20, 395:21, 396:2, 398:6, 399:7, 400:2, 400:25, 403:8, 404:24, 405:16, 408:10, 412:12, 439:4, 439:19, 449:7, 449:25, 462:2, 467:17, 472:15, 489:25, 495:18, 503:8, 503:18, 511:24, 513:16, 527:5, 527:13, 537:11, 542:9
**Fischer** [18] - 342:20, 356:13, 360:20, 362:7, 363:7, 363:11, 369:1, 370:17, 395:16, 423:5, 424:16, 442:20, 448:23, 449:21, 450:10, 450:17, 451:14, 453:3
**five** [24] - 313:8, 313:13, 314:20, 314:21, 318:24, 319:4, 319:7, 319:17, 319:18, 319:22, 320:3, 326:4, 350:17, 368:3, 371:9, 373:24, 430:23, 444:17, 494:8, 496:14, 496:23, 497:18, 498:16, 499:8
**five-year** [5] - 314:21, 318:24, 350:17, 444:17, 496:14
**flange** [1] - 469:4
**Flemmer** [21] - 349:5, 349:14, 357:9, 357:12, 357:19, 358:19, 360:7, 361:7, 365:1, 365:2, 365:14, 365:16, 369:19, 412:24, 413:5, 449:19, 453:19, 454:24, 455:16, 455:18, 474:17
**Flint** [1] - 536:5
**flip** [2] - 353:19, 510:15
**flood** [2] - 538:14, 539:7
**floods** [2] - 538:20, 542:6
**flow** [19] - 345:7, 421:18, 424:12, 425:3, 427:9, 427:12, 442:2, 470:8, 470:15, 470:20, 475:8, 475:11, 475:24, 480:16, 480:19, 480:23, 481:15, 490:2, 490:3
**flowing** [1] - 339:18
**flowline** [21] - 406:16, 407:4, 407:17, 421:22, 423:5, 423:6, 423:23, 424:12, 424:25, 427:22, 428:4, 428:13, 428:20, 433:13, 433:16, 442:15, 453:13, 456:17, 465:4, 465:7, 493:20
**flowlines** [19] - 356:23, 397:3, 397:4, 421:21, 422:21, 423:13, 425:3, 435:4, 435:6, 441:24, 442:4, 464:16, 470:9, 477:23, 482:5, 482:6, 482:7, 482:23, 494:1
**fluctuation** [2] - 426:24, 440:24
**fluctuations** [1] - 427:3
**fluid** [18] - 298:13, 317:20, 339:3, 343:23, 345:11, 358:9, 362:20, 363:5, 380:5, 380:6, 381:11, 386:8, 386:9, 409:24, 429:15, 429:19, 429:25, 544:1
**fluids** [3] - 339:11, 339:17, 544:11
**flux** [1] - 434:5
**FMI** [2] - 413:24, 415:12
**focus** [1] - 380:13
**focused** [5] - 293:10, 401:12, 504:20, 522:14, 523:4
**fold** [3] - 354:21, 354:23, 354:24
**folks** [3] - 417:7, 417:8, 506:12
**follow** [5] - 414:23, 419:4, 423:3, 426:10, 440:19
**follow-up** [3] - 414:23, 423:3, 440:19
**follow-ups** [1] - 426:10

**followed** [2] - 507:23, 516:22
**following** [7] - 289:1, 400:23, 496:16, 504:23, 507:16, 514:1, 526:7
**follows** [9] - 388:10, 396:3, 398:7, 403:9, 408:11, 467:18, 503:19, 527:14, 537:12
**foot** [7] - 349:9, 349:12, 415:1, 415:4, 454:20, 541:22
**footage** [1] - 464:11
**FOR** [2] - 284:18, 285:6
**forecloses** [1] - 544:7
**foregoing** [2] - 552:6, 552:10
**foremost** [1] - 400:25
**forgot** [2] - 394:5, 468:25
**form** [10] - 295:3, 317:19, 323:16, 332:16, 332:23, 513:23, 514:4, 521:4, 522:18, 522:20
**formalize** [1] - 482:22
**Formation** [30] - 277:5, 278:4, 278:17, 279:6, 279:9, 280:7, 280:20, 281:7, 281:11, 282:10, 282:23, 283:11, 310:12, 340:19, 358:20, 362:25, 371:13, 386:18, 387:10, 388:1, 394:25, 395:2, 409:25, 410:14, 410:17, 412:25, 414:3, 451:12, 451:14, 530:18
**formation** [24] - 298:13, 327:12, 328:20, 339:3, 339:11, 339:23, 343:17, 345:8, 345:11, 349:25, 360:23, 361:8, 380:23, 382:15, 386:21, 387:11, 393:1, 451:17, 455:11, 485:5, 487:9, 530:23, 534:13, 542:1
**formations** [11] - 339:5, 355:3, 355:8, 359:15, 360:13, 387:3, 387:5, 455:12, 474:18, 525:4, 528:25
**forming** [1] - 391:20
**formula** [1] - 320:16
**formulation** [2] - 485:21, 486:18
**formulations** [1] - 485:10
**FORSBERG** [1] - 284:8
**forth** [4] - 460:14, 460:23, 508:4, 526:12
**forthcoming** [1] - 438:19
**forward** [6] - 289:15, 358:2, 358:14, 393:18, 426:21, 517:22
**four** [10] - 299:23, 301:6, 301:11, 325:19, 325:21, 357:1, 395:13, 416:12, 444:9, 528:6
**fourth** [1] - 343:3
**Fourth** [1] - 285:5
**Fox** [8] - 359:20, 360:3, 370:23, 371:12, 388:1, 430:18, 471:23, 472:4
**frac** [3] - 414:25, 415:22, 418:11
**fracture** [7] - 328:15, 359:6, 462:3, 462:5, 462:7, 462:9, 462:18
**fractures** [12] - 361:10, 361:12, 361:20, 361:22, 361:25, 362:9, 362:13, 362:15, 362:24, 363:1, 414:15, 414:20
**frame** [3] - 379:3, 431:3, 494:8
**framework** [2] - 291:17, 509:18
**Fredrikson** [1] - 284:11
**free** [1] - 307:12
**freely** [1] - 522:7
**frequency** [5] - 368:1, 400:15, 431:20, 431:21, 476:12
**frequent** [1] - 436:11
**Freshwater** [1] - 457:3
**freshwater** [4] - 336:16, 339:13, 386:19, 409:24
**freshwater-based** [1] - 409:24
**FRIED** [1] - 284:7
**Fritz** [1] - 334:15
**Fritz-Lutz** [1] - 334:15
**front** [7] - 313:5, 326:12, 328:5, 336:18, 382:8, 529:1, 539:17
**Front** [1] - 284:12
**full** [17] - 396:8, 399:13, 403:12, 408:14, 412:13, 424:7, 467:21, 478:15, 501:25, 502:11, 502:13, 503:22, 515:24, 527:17, 537:15, 537:17, 542:23
**full-field** [1] - 542:23
**full-time** [1] - 515:24
**fully** [1] - 304:9
**function** [2] - 293:11, 345:15
**functionally** [1] - 376:22
**FURTHER** [2] - 393:22, 552:9
**furthest** [1] - 433:7
**future** [2] - 356:19, 357:2

## G

**gain** [1] - 507:21
**Garner** [1] - 289:7
**GARNER** [85] - 283:22, 289:4, 289:21, 290:4, 290:7, 290:10, 290:23, 290:25, 291:6, 303:7, 321:20, 321:24, 333:1, 333:20, 333:22, 355:15, 388:23, 389:3, 389:20, 392:15, 395:20, 395:23, 398:1, 398:3, 403:5, 408:7, 411:9, 416:11, 416:22, 417:11, 417:13, 417:16, 417:18, 447:3, 447:9, 447:14, 448:3, 448:16, 458:2, 458:4, 458:9, 461:4, 461:10, 461:17, 467:13, 471:15, 472:7, 500:9, 500:21, 501:7, 501:12, 502:18, 502:22, 502:24, 503:2, 503:6, 503:13, 505:18, 505:20, 511:16, 511:18, 512:21, 520:6, 520:16, 522:23, 525:14, 526:25, 527:3, 527:7, 530:2, 530:5, 530:8, 532:16, 536:24, 537:5, 537:8, 540:16, 541:8, 545:10, 548:12, 550:10, 550:20, 550:25, 551:3, 551:7
**GAS** [1] - 277:2
**Gas** [6] - 289:9, 507:17, 514:1, 514:19, 515:2, 517:1
**gas** [22] - 338:3, 344:22, 391:14, 402:8, 402:9, 422:15, 430:8, 453:1, 453:2, 453:4, 471:21, 471:24, 472:3, 485:7, 506:6, 524:3, 538:8, 542:11, 542:13, 542:19, 543:4, 543:5
**gases** [2] - 542:16, 542:18
**Gasification** [1] - 536:10
**gathered** [2] - 367:10, 400:15
**gathering** [2] - 400:14, 515:7
**gauge** [1] - 402:21
**gauges** [6] - 401:14, 402:20, 453:20, 453:24, 455:17, 457:19
**gears** [1] - 406:1
**general** [15] - 430:20, 440:5, 441:1, 459:22, 460:11, 460:15, 485:25, 490:3, 504:24, 506:8, 510:7, 516:7, 516:23, 520:20, 541:17
**generalized** [4] - 421:18, 475:7, 475:11, 475:24
**generally** [29] - 328:24, 335:12, 335:25, 340:9, 345:18, 345:20, 390:17, 390:23, 400:6, 401:6, 404:25, 443:3, 443:13, 462:4, 462:12, 466:3, 474:13, 474:14, 482:16, 486:3, 504:3, 506:14, 506:25, 509:1, 509:16, 510:5, 511:1, 521:6, 521:8
**generate** [1] - 348:6
**generated** [4] - 295:4, 295:15, 324:6, 327:7
**generation** [1] - 468:13
**Geochem** [1] - 523:1
**geochemical** [9] - 360:11, 360:15, 360:17, 366:5, 376:25, 377:19, 512:16, 522:25, 523:14
**geographic** [1] - 311:16
**geographical** [1] - 363:19
**geographically** [1] - 350:9
**geologic** [30] - 277:4, 277:18, 278:8, 279:5, 279:8, 279:22, 280:11, 281:6, 281:10, 281:24, 282:13, 283:11, 291:22, 293:15, 358:16, 363:20, 364:7, 364:9, 367:11, 369:5, 374:17, 375:8, 375:16, 387:6, 387:12, 450:25, 452:1, 510:11, 512:6, 545:3
**Geologic** [1] - 451:21
**geological** [3] - 409:2, 510:12, 512:4
**Geological** [1] - 298:10
**geologist** [3] - 398:23, 398:25, 529:18
**geologists** [3] - 414:17, 516:11, 525:4
**geology** [3] - 350:19, 398:22, 527:24
**geometry** [1] - 363:3
**geophysics** [1] - 528:1
**geoscientist** [1] - 398:16
**GERVING** [1] - 285:7
**gigabytes** [1] - 300:20
**given** [23] - 319:8, 319:12, 319:16, 319:23, 327:4, 341:5, 352:15, 352:21, 355:23, 358:5, 363:3, 369:9, 381:8, 410:22, 417:23, 425:13, 460:11, 461:8, 473:10, 480:13, 512:16, 541:22, 544:6
**glancing** [1] - 375:3
**glasses** [1] - 475:14
**GLUDT** [1] - 284:10
**gotcha** [1] - 527:7

**govern** [2] - 296:14, 483:1
**governed** [4] - 296:12, 304:16, 306:8, 322:22
**government** [2] - 332:17, 506:4
**governments** [1] - 506:2
**grade** [2] - 487:22, 517:24
**gradient** [10] - 328:15, 359:7, 415:22, 418:11, 425:25, 462:4, 462:5, 462:7, 462:9, 462:18
**gradients** [1] - 365:13
**grading** [1] - 414:25
**grant** [2] - 340:24, 341:7
**granted** [5] - 294:7, 505:20, 535:11, 536:21, 550:7
**graph** [1] - 413:8
**gravity** [3] - 538:8, 542:11, 543:5
**gray** [2] - 369:18, 374:4
**great** [4] - 395:15, 401:8, 406:8, 456:8
**greater** [10] - 319:21, 418:23, 419:5, 419:12, 419:14, 419:18, 430:4, 465:24, 483:7, 486:2
**greatly** [2] - 381:14, 427:4
**green** [6] - 336:6, 336:10, 349:6, 349:13, 356:19, 369:16
**grid** [4] - 318:13, 363:25, 364:1, 364:3
**ground** [5] - 410:5, 443:7, 443:8, 496:23, 501:6
**groundwater** [12] - 359:22, 370:23, 371:12, 402:8, 402:9, 430:8, 431:20, 440:10, 452:18, 471:20, 524:14
**group** [15] - 355:21, 366:9, 367:21, 367:23, 411:15, 412:12, 412:15, 416:4, 416:5, 447:21, 461:14, 472:12, 472:15, 484:13, 528:16
**groups** [2] - 506:5, 528:24
**GSA** [1] - 506:3
**guess** [28] - 321:1, 321:6, 346:8, 372:11, 372:24, 374:25, 375:25, 377:19, 378:6, 382:21, 385:2, 386:5, 386:8, 386:11, 386:19, 394:10, 401:18, 402:8, 429:22, 442:3, 446:19, 469:18, 472:8, 472:22, 488:24, 520:8, 544:9
**guessing** [1] - 419:21
**guesstimate** [1] - 382:8
**guidance** [14] - 405:3, 508:9, 508:13, 508:18, 508:25, 509:1, 509:25, 510:6, 511:8, 513:24, 514:11, 516:23, 518:2, 520:19
**Guidance** [1] - 511:5
**guys** [6] - 370:4, 427:25, 434:21, 436:14, 438:3, 465:18

## H

**half** [1] - 360:10
**Halliburton** [2] - 486:25, 528:11
**hand** [6] - 363:21, 395:24, 398:4, 403:6, 408:8, 465:13
**handed** [2] - 294:12, 448:14
**handful** [2] - 361:10, 361:20
**handing** [1] - 458:14
**handle** [5] - 404:19, 427:3, 427:8, 438:5, 461:22
**hang** [1] - 463:9
**hard** [10] - 298:24, 298:25, 299:8, 299:12, 299:17, 299:21, 300:14, 300:16, 300:22, 301:10
**HAUPT** [1] - 285:8
**hazard** [1] - 436:24
**Hazen** [1] - 446:4
**head** [5] - 426:8, 435:2, 473:17, 485:20, 494:1
**health** [6] - 308:9, 308:12, 308:16, 308:19, 403:19, 504:18
**hear** [3] - 308:13, 503:11, 503:12
**heard** [2] - 492:7, 533:23
**HEARING** [86] - 283:15, 283:23, 289:4, 289:21, 290:4, 290:7, 290:10, 290:23, 290:25, 291:6, 303:7, 321:20, 321:24, 333:1, 333:20, 333:22, 355:15, 388:23, 389:3, 389:20, 392:15, 395:20, 395:23, 398:1, 398:3, 403:5, 408:7, 411:9, 416:11, 416:22, 417:11, 417:13, 417:16, 417:18, 447:3, 447:9, 447:14, 448:3, 448:16, 458:2, 458:4, 458:9, 461:4, 461:10, 461:17, 467:13, 471:15, 472:7, 500:9, 500:21, 501:7, 501:12, 502:18, 502:22, 502:24, 503:2, 503:6, 503:13, 505:18, 505:20, 511:16, 511:18, 512:21, 520:6, 520:16, 522:23, 525:14, 526:25, 527:3, 527:7, 530:2, 530:5, 530:8, 532:16, 536:24, 537:5, 537:8, 540:16, 541:8, 545:10, 548:12, 550:10, 550:20, 550:25, 551:3, 551:7
**Hearing** [1] - 289:6
**hearing** [13] - 289:7, 289:8, 314:14, 315:7, 352:12, 444:23, 448:19, 450:19, 498:5, 498:20, 503:15, 506:22, 548:8
**hearings** [7] - 289:5, 289:8, 289:11, 448:12, 449:13, 551:9, 551:10
**heats** [1] - 478:16
**heavily** [1] - 508:11
**height** [1] - 350:6
**held** [1] - 345:13
**helium** [1] - 529:24
**HELMS** [5] - 284:3, 290:24, 291:5, 525:18, 526:15
**Helms** [1] - 525:19
**Helms.....** [1] - 287:24
**help** [6] - 291:23, 292:7, 376:7, 417:9, 423:7, 436:7
**helped** [1] - 508:19
**HEREBY** [2] - 552:5, 552:9
**herein** [1] - 289:2
**hereinbefore** [1] - 552:7
**high** [5] - 355:7, 360:8, 361:9, 391:14, 401:6
**high-quality** [1] - 355:7
**higher** [17] - 309:25, 310:1, 346:3, 349:20, 351:2, 365:10, 367:1, 390:17, 390:23, 391:13, 415:6, 419:17, 462:9, 462:10, 462:17, 465:7, 474:20
**highest** [1] - 351:19
**highlight** [2] - 396:16, 408:21
**highlighted** [2] - 401:2, 413:6
**highlights** [1] - 399:17
**highly** [2] - 469:19, 481:12
**Hill** [1] - 370:23
**Hills** [7] - 359:20, 360:4, 371:13, 388:1, 430:18, 471:24, 472:4
**Hintz** [22] - 369:1, 370:17, 371:2, 395:16, 407:24, 417:25, 418:8, 430:16, 442:19, 448:23, 449:22, 450:10, 451:15, 453:4, 458:25, 459:2, 459:9, 459:12, 459:16, 459:25, 460:21, 471:19
**hired** [3] - 507:8, 519:18, 520:12
**historical** [2] - 359:21, 499:19
**history** [4] - 313:14, 357:23, 404:2, 542:24
**hit** [1] - 394:5
**hitting** [1] - 399:16
**hold** [1] - 398:21
**holders** [1] - 405:23
**holding** [1] - 429:14
**hole** [2] - 409:23, 441:17
**Honor** [2] - 290:19, 302:24
**hope** [2] - 436:13, 472:23
**hopefully** [1] - 434:16
**hopes** [1] - 475:13
**horizontal** [2] - 291:23, 296:2
**hour** [1] - 388:25
**hours** [10] - 324:24, 520:23, 548:2, 548:5, 548:8, 548:25, 549:5, 549:7, 549:20
**human** [5] - 308:9, 308:11, 308:15, 308:19, 495:14
**humans** [1] - 445:5
**hundred** [11] - 343:17, 343:22, 344:9, 345:10, 349:9, 349:12, 349:19, 350:16, 351:8, 351:10, 375:5
**hundred-foot** [2] - 349:9, 349:12
**hundreds** [1] - 378:25
**Hunt** [2] - 398:2, 398:12
**hunt** [1] - 398:3
**HUNT** [9] - 398:5, 398:12, 420:8, 420:11, 427:14, 427:24, 430:10, 434:24, 444:11
**HUNT/JAY** [1] - 286:19
**hydraulically** [1] - 359:15
**hydro** [2] - 490:11, 490:20
**hydrogeology** [1] - 506:15
**HydroSolutions** [11] - 504:2, 504:4, 504:16, 505:1, 505:3, 505:23, 505:25, 506:13, 506:25, 507:8, 523:21
**hypothetical** [5] - 338:22, 338:23, 349:18, 496:21, 497:18

## I

**idea** [3] - 300:21, 430:20, 430:24
**identifiable** [1] - 395:8

**identification** [2] - 394:21, 405:12
**identified** [7] - 376:13, 377:17, 394:15, 394:19, 395:7, 443:18, 444:4
**identify** [5] - 294:23, 335:18, 394:14, 491:5, 510:9
**II** [12] - 283:16, 340:19, 341:1, 342:2, 409:6, 524:18, 524:20, 524:24, 540:20, 540:22, 540:23
**image** [3] - 354:23, 413:7, 451:22
**images** [2] - 355:7, 372:20
**imagine** [1] - 428:1
**imaging** [2] - 360:23, 361:8
**immediate** [1] - 549:3
**immediately** [1] - 388:10
**immobility** [1] - 381:11
**impact** [9] - 293:22, 316:16, 331:3, 340:16, 354:18, 390:18, 415:11, 506:18, 548:16
**impacted** [4] - 328:19, 330:25, 376:9, 524:3
**impacts** [4] - 524:6, 524:7, 544:15
**implement** [1] - 445:20
**implemented** [2] - 427:18, 539:6
**implementing** [1] - 508:14
**implications** [1] - 507:13
**implied** [1] - 499:22
**importance** [2] - 388:13, 445:13
**important** [6] - 351:21, 351:24, 352:3, 352:5, 487:24, 534:7
**imposed** [1] - 541:5
**impressed** [3] - 427:21, 428:18, 442:25
**inaccurate** [1] - 499:24
**inadvertent** [1] - 493:21
**incentive** [1] - 332:13
**inch** [4] - 343:24, 484:1, 491:21
**incidental** [1] - 524:3
**include** [5] - 401:20, 422:15, 452:23, 452:24, 460:22
**included** [14] - 277:18, 279:21, 281:24, 310:4, 315:16, 405:6, 405:19, 406:13, 438:10, 474:6, 498:22, 514:10, 514:16
**includes** [4] - 399:18, 451:18, 459:4, 460:7
**including** [12] - 296:13, 341:10, 362:9, 367:17, 386:16, 409:6, 425:22, 436:25, 446:2, 493:20, 506:6, 539:1
**incorporate** [1] - 364:18
**incorporated** [1] - 367:11
**Incorporated** [2] - 504:2, 504:4
**increase** [18] - 327:25, 329:24, 330:1, 330:13, 331:6, 331:12, 331:15, 332:9, 332:10, 337:8, 339:1, 342:15, 342:23, 365:25, 478:23, 481:21, 495:5
**increases** [4] - 326:24, 327:8, 327:12, 341:14
**independent** [2] - 506:14, 521:13
**independently** [2] - 422:24, 423:2
**INDEX** [1] - 286:2
**indicate** [10] - 317:18, 326:23, 327:7, 348:19, 360:11, 373:2, 375:25, 381:24, 385:8, 461:23
**indicated** [13] - 303:20, 314:17, 336:5, 336:11, 337:9, 367:20, 378:24, 387:21, 473:8, 475:11, 492:22, 534:21, 552:8
**indicates** [7] - 339:11, 374:10, 377:11, 434:4, 444:8, 511:2, 534:1
**indicating** [1] - 344:11
**indication** [2] - 363:15, 443:20
**indicative** [1] - 335:10
**individual** [16] - 384:18, 405:24, 418:22, 419:4, 420:22, 421:3, 421:20, 422:21, 433:14, 441:25, 442:4, 442:10, 452:10, 470:9, 495:19, 525:10
**individually** [1] - 405:23
**individuals** [2] - 411:1, 506:1
**induced** [2] - 432:6, 467:3
**Industrial** [12] - 289:6, 294:24, 297:21, 298:7, 298:9, 307:21, 315:9, 322:3, 521:20, 522:12, 525:20, 547:1
**industrial** [1] - 411:17
**industry** [1] - 396:21
**infinitely** [3] - 384:1, 384:2, 384:7
**influence** [1] - 367:1
**influenced** [1] - 462:4
**influential** [1] - 317:21
**inform** [3] - 457:9, 508:19, 509:12
**information** [38] - 304:2, 304:21, 324:8, 324:10, 336:3, 336:18, 338:12, 363:21, 412:19, 432:18, 439:10, 456:25, 457:9, 457:18, 473:21, 477:9, 498:9, 499:17, 500:6, 509:2, 510:10, 512:4, 512:5, 514:21, 515:7, 516:20, 516:21, 520:21, 522:11, 523:7, 524:23, 524:25, 529:5, 533:22, 534:1, 549:4, 550:1, 550:3
**informed** [3] - 351:7, 508:9, 510:1
**informs** [2] - 507:3, 511:9
**infrastructure** [3] - 356:3, 356:6, 357:5
**inhibited** [1] - 429:19
**initial** [2] - 315:12, 527:5
**initiation** [1] - 422:9
**inject** [13] - 310:20, 311:6, 319:3, 328:3, 328:6, 328:9, 329:23, 330:4, 331:16, 332:17, 333:8, 434:8, 534:12
**injected** [13] - 318:25, 319:9, 319:16, 319:24, 320:7, 328:13, 347:7, 352:21, 402:2, 413:11, 421:14, 502:12, 542:18
**injecting** [7] - 331:11, 332:14, 333:6, 343:21, 364:21, 452:7, 499:9
**Injection** [2] - 455:14, 511:3
**injection** [97] - 292:25, 293:17, 308:8, 308:14, 308:18, 308:20, 309:2, 309:3, 309:6, 317:13, 318:8, 320:1, 327:22, 327:23, 329:25, 330:13, 331:3, 331:5, 331:6, 331:7, 332:6, 333:8, 336:5, 339:2, 343:19, 345:11, 350:21, 353:3, 356:23, 359:11, 364:22, 367:13, 367:16, 367:17, 367:18, 368:25, 369:14, 369:17, 369:22, 373:20, 374:2, 379:9, 385:9, 386:6, 386:7, 387:13, 394:16, 397:16, 401:17, 402:20, 406:14, 407:1, 407:16, 413:6, 415:19, 415:20, 420:22, 421:11, 422:12, 422:18, 428:16, 430:4, 430:12, 432:10, 434:14, 437:24, 438:3, 438:13, 438:20, 439:3, 444:10, 444:16, 452:10, 454:22, 455:19, 456:2, 457:10, 462:11, 463:16, 464:21, 466:6, 466:10, 466:16, 470:12, 481:18, 483:13, 485:18, 487:14, 487:16, 509:20, 538:9, 538:10, 539:7, 541:23, 542:16, 546:17
**injections** [6] - 343:18, 498:23, 499:11, 499:12, 500:18, 502:10
**injectivity** [1] - 415:18
**injector** [4] - 340:13, 343:16, 347:25, 487:25
**injectors** [6] - 326:24, 329:22, 340:21, 367:7, 367:8, 487:13
**inlet** [3] - 422:17, 494:16, 495:9
**input** [14] - 294:22, 295:2, 295:22, 296:4, 297:16, 297:18, 297:22, 307:17, 365:1, 365:9, 416:23, 512:14, 512:17, 544:19
**inputs** [8] - 323:8, 323:17, 323:19, 324:2, 324:7, 367:16, 452:4, 510:11
**inside** [2] - 320:11, 393:13
**insight** [1] - 319:3
**insofar** [1] - 302:2
**inspection** [3] - 436:17, 437:11, 466:7
**inspector** [1] - 436:20
**inspectors** [2] - 436:25, 437:3
**install** [3] - 430:18, 431:10, 432:8
**installed** [4] - 402:22, 420:25, 455:18, 455:23
**instance** [1] - 422:11
**instead** [6] - 315:14, 353:5, 366:14, 376:18, 377:23, 424:16
**instruct** [1] - 302:6
**instrument** [2] - 490:4, 491:13
**instrumentation** [3] - 490:25, 491:8, 491:16
**integrated** [4] - 397:18, 434:12, 446:17, 482:18
**integrity** [7] - 336:20, 337:1, 401:13, 401:23, 439:25, 453:16, 530:23
**intended** [2] - 342:8, 480:16
**intent** [11] - 318:21, 348:2, 424:6, 424:8, 424:10, 444:9, 449:10, 482:16, 482:18, 502:10, 502:13
**intention** [1] - 441:18
**intentions** [2] - 469:12, 469:16
**interaction** [1] - 546:22
**interactions** [4] - 405:16,

405:18, 485:4, 486:4
**interacts** [1] - 487:12
**interchange** [1] - 436:10
**interdunal** [2] - 373:3, 373:7
**interest** [2] - 312:1, 460:18
**interested** [5] - 289:14, 400:9, 402:3, 425:2, 496:4
**interference** [6] - 329:6, 329:19, 329:21, 330:7, 332:3, 364:19
**Interlake** [1] - 394:25
**intermediate** [3] - 425:24, 426:2, 442:13
**intermittently** [1] - 419:3
**internal** [1] - 516:4
**internationally** [2] - 396:23, 504:20
**interoperating** [1] - 482:24
**interpret** [1] - 381:22
**interpretation** [3] - 359:17, 528:21, 530:21
**interpreted** [1] - 383:13
**interrupt** [1] - 449:6
**Interval** [1] - 402:11
**interval** [4] - 361:17, 361:21, 362:14, 474:20
**intervals** [1] - 410:10
**INTERVENORS** [1] - 285:6
**intervenors** [4] - 289:23, 304:3, 519:19, 544:23
**INTERVENORS'** [2] - 287:19, 288:16
**intervention** [1] - 328:22
**introduce** [1] - 289:17
**introduced** [1] - 487:9
**introduces** [1] - 465:18
**introduction** [2] - 289:18, 290:2
**investigation** [1] - 362:9
**Investigation** [1] - 386:23
**investigations** [1] - 506:16
**involve** [1] - 299:3
**involved** [29] - 296:19, 302:16, 306:25, 322:7, 322:9, 322:10, 322:17, 322:20, 358:22, 473:20, 473:23, 477:12, 477:24, 505:24, 514:25, 515:5, 515:7, 518:4, 518:5, 518:12, 519:2, 524:15, 525:8, 534:22, 535:7, 535:15, 545:15, 545:24, 546:16
**Inyan** [2] - 359:12, 388:1
**ionic** [1] - 457:12
**iso** [1] - 492:5
**isolate** [3] - 421:20, 469:20, 478:14
**isolated** [6] - 362:18, 363:4, 475:19, 481:19, 490:7, 492:4
**isolating** [1] - 487:15
**isolation** [2] - 410:6, 423:4
**isopach** [1] - 374:25
**isotopic** [2] - 420:6, 420:15
**issue** [3] - 309:21, 439:25, 499:4
**issued** [3] - 507:6, 507:17, 513:25
**issues** [6] - 302:3, 302:25, 303:1, 436:19, 524:11, 524:13
**issuing** [1] - 515:16
**it'd** [1] - 487:15
**it'll** [4] - 421:12, 422:10, 438:2, 483:15
**it-depends** [1] - 498:1
**item** [3] - 388:3, 439:4, 441:2
**items** [6] - 393:13, 395:6, 405:6, 436:22, 441:11, 529:17
**iterations** [3] - 299:14, 300:2, 300:5
**itself** [8] - 295:19, 295:20, 304:25, 305:4, 307:18, 402:16, 461:7, 479:22

## J

**J-Loc** [6] - 529:18, 530:19, 534:23, 534:24, 534:25, 535:1
**Jacobson** [2] - 302:21, 303:11
**James** [2] - 395:22, 396:10
**JAMES** [2] - 286:19, 396:1
**JAMEY** [1] - 467:16
**Jamey** [17] - 411:4, 423:7, 423:19, 424:14, 425:5, 426:18, 447:21, 465:14, 465:18, 467:9, 467:11, 467:21, 467:23, 467:24, 468:2, 482:20
**Jamey's** [1] - 491:13
**January** [1] - 409:8
**Jay** [13] - 403:4, 403:5, 403:12, 403:15, 403:16, 404:12, 406:1, 434:1, 436:7, 445:16, 456:4, 456:8, 475:3
**JAY** [1] - 403:7
**JEAN** [2] - 287:15, 408:9
**Jean** [6] - 358:25, 408:6, 408:14, 408:16, 440:3, 453:20
**Jensen** [10] - 371:3, 430:19, 487:20, 487:22, 488:4, 488:8, 488:16, 488:22, 489:12, 489:17
**Jimmy** [7] - 370:14, 370:15, 396:6, 396:11, 412:3, 432:24, 484:6
**job** [5] - 337:23, 456:8, 539:12, 539:13
**jobs** [1] - 539:1
**JOCHIM** [1] - 285:8
**John** [7] - 398:2, 398:10, 398:12, 398:13, 420:10, 444:6, 465:20
**JOHN** [1] - 398:5
**joined** [2] - 409:7, 539:5
**joint** [1] - 310:9
**judgment** [1] - 495:15
**July** [1] - 552:14
**jump** [5] - 377:1, 388:3, 433:23, 438:25, 441:12
**jumping** [1] - 483:4
**junction** [2] - 423:4, 423:12
**June** [5] - 283:20, 289:3, 289:7, 525:25, 551:12
**jurisdiction** [5] - 412:2, 412:6, 412:8, 435:7, 442:10
**justice** [1] - 514:13
**justifiable** [2] - 316:24, 323:20
**justifies** [1] - 496:24
**justify** [1] - 310:1

## K

**Kara** [2] - 359:12, 388:1
**keep** [9] - 300:9, 311:4, 352:6, 405:4, 425:17, 427:1, 472:23, 473:15, 476:13
**keeping** [1] - 456:6
**key** [1] - 401:21
**kilograms** [1] - 382:3
**kind** [16] - 301:21, 348:2, 373:15, 388:3, 416:19, 425:14, 426:24, 440:22, 450:2, 476:18, 476:23, 480:8, 493:13, 504:3, 507:13, 541:4
**Kinder** [2] - 538:11, 538:16
**kinds** [7] - 483:1, 505:23, 506:10, 506:11, 506:12, 528:14
**Kirk** [1] - 289:24
**KJ** [17] - 369:1, 370:17, 371:2, 407:24, 417:25, 418:8, 430:15, 442:19, 449:22, 450:10, 451:15, 453:3, 453:4, 458:25, 459:11, 459:16, 471:19
**KJH** [3] - 415:8, 415:15, 415:17
**knowing** [4] - 300:3, 427:3, 487:25, 544:11
**knowledge** [7] - 341:5, 341:19, 354:10, 474:22, 497:3, 497:7, 546:11
**known** [3] - 406:13, 423:6, 432:18
**knows** [2] - 335:16, 500:10
**KRAFT** [1] - 285:8

## L

**lab** [1] - 528:6
**labeled** [4] - 335:18, 454:9, 459:5, 463:17
**lack** [2] - 354:18, 357:23
**lacking** [1] - 515:10
**laid** [1] - 399:13
**Land** [1] - 507:6
**land** [13] - 329:15, 330:2, 332:8, 340:14, 340:20, 341:2, 342:16, 352:22, 355:4, 423:12, 428:25, 450:18, 452:25
**Landowner** [1] - 353:19
**landowner** [7] - 289:23, 326:14, 352:1, 354:6, 405:25, 543:20, 544:6
**landowners** [23] - 311:18, 311:22, 311:24, 312:4, 312:10, 312:18, 314:25, 320:11, 321:8, 321:15, 341:10, 352:14, 352:19, 352:25, 353:2, 353:4, 353:8, 358:12, 497:1, 497:5, 499:9, 501:24, 502:10
**lands** [4] - 278:19, 280:22, 283:2, 329:20
**language** [6] - 314:4, 393:6, 393:7, 431:17, 459:25, 460:22
**lapse** [1] - 358:7
**lapsed** [1] - 306:11
**large** [3] - 369:20, 396:22, 454:16
**largely** [3] - 377:1, 404:2, 440:25
**larger** [13] - 313:2, 313:4, 313:5, 319:6, 346:3, 365:24, 384:17, 415:2, 461:14, 462:12, 462:19, 483:21
**largest** [1] - 481:8
**last** [21] - 297:23, 307:22, 314:20, 362:23, 388:3, 396:22, 400:17, 404:6, 409:7, 441:12, 441:21, 445:17, 451:20, 461:23,

467:25, 503:23, 503:24, 513:25, 523:24, 527:18, 529:25
**late** [2] - 514:2, 528:7
**lateral** [1] - 344:6
**laterals** [2] - 442:14, 443:5
**launcher** [3] - 422:1, 422:3, 422:9
**Law** [6] - 284:11, 284:15, 284:16, 285:3, 285:4, 289:22
**law** [2] - 328:2, 435:8
**LAWRENCE** [1] - 284:10
**Lawrence** [14] - 403:14, 403:23, 405:2, 406:9, 423:20, 424:14, 448:14, 465:17, 474:24, 477:15, 497:11, 502:20, 510:17, 513:3
**laws** [2] - 330:11, 338:3
**lay** [2] - 449:11, 460:11
**layer** [2] - 327:5, 345:5
**layers** [4] - 372:9, 372:11, 372:22, 376:23
**laying** [1] - 449:8
**layout** [1] - 432:9
**layout's** [1] - 432:17
**Lazy** [5] - 362:24, 415:4, 415:9, 455:2, 455:25
**lead** [1] - 525:10
**leading** [1] - 396:22
**leak** [2] - 339:4, 453:12
**Leakage** [1] - 401:4
**leakage** [7] - 338:19, 338:22, 338:23, 338:24, 338:25, 339:9
**leaking** [1] - 339:5
**leaky** [2] - 489:16, 489:18
**learn** [1] - 526:14
**lease** [1] - 312:18
**leased** [1] - 353:17
**leases** [2] - 355:24, 357:5
**leasing** [4] - 293:6, 310:21, 353:12, 353:13
**least** [18] - 319:4, 325:25, 332:4, 371:8, 373:12, 381:9, 395:7, 399:2, 410:1, 415:17, 428:15, 430:22, 432:15, 442:17, 488:22, 489:12, 491:19, 492:22
**LEC** [1] - 405:23
**led** [3] - 394:21, 499:15, 499:20
**left** [11] - 348:18, 348:25, 349:10, 350:25, 400:1, 421:25, 422:7, 422:10, 529:17, 538:16, 538:24
**legacy** [11] - 319:11, 334:7, 334:11, 371:13, 431:2, 453:1, 453:2, 453:4, 471:22, 472:4, 531:13
**legal** [2] - 301:21, 498:25
**legend** [1] - 329:9
**Leingang** [32] - 334:10, 358:17, 360:20, 361:19, 368:5, 368:25, 370:17, 372:2, 395:16, 399:11, 407:1, 407:11, 413:3, 421:17, 423:6, 424:2, 431:16, 433:2, 433:9, 433:21, 434:19, 442:20, 448:21, 448:23, 449:20, 450:10, 451:12, 453:2, 453:18, 455:20, 457:18, 488:13
**Leingang/Milton** [1] - 449:19
**length** [1] - 481:5
**lengths** [1] - 456:18
**LEPC** [1] - 405:21
**less** [14] - 311:22, 313:12, 368:3, 373:24, 379:10, 382:2, 382:24, 384:22, 384:23, 464:5, 473:9, 483:14, 486:4, 494:2
**lesser** [2] - 294:11, 355:2
**letter** [6] - 298:18, 395:18, 516:6, 526:19, 533:20, 533:23
**level** [2] - 401:7, 466:1
**levels** [1] - 371:22
**liability** [3] - 407:14, 407:21, 438:22
**library** [1] - 298:12
**license** [9] - 297:13, 299:6, 304:16, 304:18, 306:7, 306:8, 324:25, 325:1, 325:2
**licensed** [1] - 398:23
**licenses** [13] - 296:22, 296:23, 296:24, 297:5, 297:6, 297:9, 297:11, 297:12, 299:4, 304:7, 304:12, 306:3, 307:3
**LIEBELT** [1] - 285:8
**life** [2] - 339:2, 401:25
**light** [3] - 445:1, 483:6, 483:18
**likely** [7] - 313:4, 351:12, 360:12, 366:7, 367:22, 418:9, 478:21
**likewise** [2] - 407:2, 449:21
**limit** [8] - 330:3, 332:6, 332:7, 343:13, 346:21, 346:25, 541:5
**limitation** [1] - 330:25
**limitations** [1] - 358:4
**limited** [2] - 331:7, 464:22
**limits** [13] - 278:19, 280:22, 283:2, 318:6, 328:2, 328:6, 328:8, 329:4, 330:5, 478:19, 541:11, 541:18, 544:16
**line** [38] - 303:6, 320:13, 345:23, 345:25, 348:18, 348:22, 373:20, 373:25, 387:9, 419:21, 421:10, 421:25, 422:17, 424:7, 441:2, 442:5, 442:7, 442:9, 442:14, 470:16, 477:20, 477:22, 480:2, 480:12, 480:14, 480:20, 480:24, 481:8, 481:11, 481:13, 481:16, 481:22, 481:23, 482:5, 493:19, 494:10, 494:25, 525:7
**line's** [1] - 348:20
**linear** [4] - 344:15, 345:15, 345:17, 345:21
**list** [3] - 298:4, 304:11, 457:18
**listed** [8] - 289:5, 297:19, 304:23, 400:12, 445:7, 450:8, 465:4, 491:16
**listening** [2] - 449:12, 518:10
**literature** [1] - 406:20
**litho** [1] - 361:20
**litho-bound** [1] - 361:20
**lithologies** [2] - 368:16, 368:18
**litigate** [1] - 303:3
**LIVING** [1] - 285:7
**LLC** [16] - 277:4, 277:15, 277:19, 278:6, 279:4, 279:8, 279:19, 279:23, 280:8, 280:9, 281:6, 281:10, 281:21, 282:1, 282:11, 283:10
**LLCs** [1] - 469:22
**LO-18** [3] - 288:18, 508:16, 514:5
**LO-19** [2] - 288:19, 509:9
**LO-20** [2] - 288:19, 509:23
**LO-56** [3] - 288:20, 505:6, 505:17
**LO-57** [2] - 288:20, 539:15
**LO-58** [3] - 288:21, 529:2, 530:1
**LO-63** [2] - 326:15, 329:7
**LO-82** [3] - 288:21, 510:15, 510:16
**LO-83** [4] - 288:22, 294:13, 333:14, 333:15
**Loc** [6] - 529:18, 530:19, 534:23, 534:24, 534:25, 535:1
**local** [8] - 405:7, 405:12, 405:16, 405:24, 432:5, 436:1, 445:19, 506:2
**locate** [1] - 432:14
**located** [13] - 277:6, 277:20, 278:9, 278:19, 279:10, 279:23, 280:13, 280:22, 281:12, 282:2, 282:15, 283:2, 450:19
**location** [14] - 335:21, 351:3, 351:6, 355:23, 363:13, 369:23, 371:16, 400:14, 433:16, 443:7, 443:18, 469:23, 489:17, 491:6
**locations** [8] - 368:24, 369:21, 370:4, 386:16, 429:7, 431:20, 431:22, 444:4
**log** [11] - 298:12, 357:9, 357:14, 357:20, 401:21, 413:24, 414:9, 414:12, 451:19
**logarithmic** [2] - 345:15, 345:17
**logged** [3] - 529:20, 529:21, 530:19
**logging** [5] - 367:10, 402:12, 402:13, 451:4, 453:15
**logs** [13] - 304:15, 306:8, 317:19, 360:23, 361:8, 376:5, 376:7, 401:24, 413:23, 415:12, 451:22, 549:21, 549:22
**Lonny** [8] - 302:21, 303:11, 303:20, 305:19, 307:9, 307:24, 309:20
**look** [29] - 294:20, 298:5, 298:17, 316:14, 334:1, 334:5, 334:11, 335:7, 336:4, 338:19, 340:3, 340:4, 348:13, 349:4, 350:24, 353:22, 369:16, 379:22, 390:3, 401:12, 402:14, 405:6, 441:3, 488:12, 488:19, 507:9, 518:22, 519:9, 543:11
**looked** [16] - 316:11, 319:11, 385:15, 385:17, 406:17, 406:19, 414:8, 414:10, 464:3, 518:20, 521:14, 524:5, 525:2, 535:16, 542:15, 549:2
**looking** [25] - 290:2, 351:8, 351:22, 356:24, 372:1, 374:25, 377:3, 399:25, 405:11, 414:11, 414:13, 414:18, 422:7, 423:13, 428:25, 430:17, 463:24, 475:23, 485:6, 507:19, 525:5, 528:19, 542:10, 542:13, 543:12
**looks** [7] - 413:8, 423:14, 423:17, 429:2, 444:20, 514:6, 519:10
**loss** [2] - 440:1, 440:14

**Louis** [1] - 527:25
**low** [9] - 368:16, 372:8, 372:11, 372:16, 373:5, 376:20, 381:12, 391:15, 465:21
**lower** [15] - 310:3, 310:24, 331:11, 333:8, 354:24, 379:24, 380:9, 380:11, 381:1, 391:18, 392:1, 486:1, 523:15, 544:14
**lowermost** [1] - 454:21
**lowest** [6] - 346:21, 410:2, 488:8, 488:23, 489:1, 489:13
**Ludlow** [1] - 386:25
**Luis** [1] - 411:5
**lunch** [1] - 388:24
**Lutz** [1] - 334:15
**LYNN** [1] - 284:3
**Lynn** [1] - 525:19

## M

**M.B.A** [1] - 504:12
**MADCHE** [39] - 284:5, 355:18, 356:14, 369:24, 411:12, 412:20, 412:21, 415:25, 416:6, 417:21, 420:16, 423:11, 423:21, 424:15, 425:8, 426:19, 427:16, 429:6, 429:9, 432:20, 433:11, 433:19, 433:23, 438:25, 440:19, 464:9, 464:19, 465:11, 467:7, 469:9, 469:18, 470:2, 470:6, 471:1, 471:8, 471:10, 471:12, 471:17, 472:6
**Madche.....** [3] - 286:13, 287:3, 287:12
**magnetic** [2] - 413:23, 414:12
**magnitude** [7] - 465:19, 465:24, 466:1, 466:2, 466:21, 466:22, 483:22
**main** [10] - 390:19, 421:10, 442:7, 442:9, 442:14, 477:20, 477:22, 482:5, 493:19, 546:20
**maintain** [2] - 429:11, 476:6
**maintaining** [1] - 439:7
**maintenance** [1] - 468:13
**MAIZE** [1] - 285:8
**major** [7] - 314:13, 315:6, 352:11, 498:6, 498:18, 542:8, 542:22
**majority** [1] - 549:7
**manage** [1] - 459:19
**Management** [2] - 511:5, 540:1
**manager** [4] - 468:5, 468:14, 507:9, 516:19
**manner** [5] - 324:2, 344:15, 500:5, 541:10, 543:18
**manually** [1] - 481:16
**manufacturer** [2] - 469:6, 479:17
**manufacturer's** [1] - 479:7
**MAOP** [1] - 490:20
**map** [39] - 326:17, 327:20, 329:25, 331:9, 331:19, 335:7, 335:9, 335:14, 335:17, 335:19, 336:5, 337:10, 338:21, 348:6, 348:11, 350:8, 353:22, 356:19, 369:11, 369:13, 370:6, 374:24, 375:1, 423:16, 443:22, 531:1, 531:25, 534:5, 534:7, 534:12, 534:18, 536:2, 536:7, 536:12, 536:13, 536:18, 547:12
**maps** [9] - 295:4, 295:7, 295:8, 295:10, 295:14, 295:18, 295:20, 326:22, 327:6
**Marathon** [1] - 538:6
**margin** [2] - 319:6, 319:21
**mark** [1] - 444:20
**MARK** [1] - 284:4
**marked** [5] - 294:13, 448:8, 458:16, 510:14, 539:15
**market** [1] - 544:1
**Mary** [2] - 504:12, 523:19
**mass** [9] - 412:14, 420:21, 421:2, 421:12, 427:9, 427:12, 428:10, 502:1, 502:12
**master** [1] - 398:22
**master's** [2] - 403:24, 527:25
**match** [1] - 313:14
**matching** [1] - 357:24
**material** [12] - 428:11, 428:13, 428:14, 450:6, 452:13, 454:15, 455:9, 456:23, 457:2, 457:6, 457:16, 457:21
**materially** [1] - 454:13
**materials** [1] - 521:19
**math** [1] - 426:8
**mathematically** [1] - 349:21
**matrix** [2] - 542:14, 543:5
**matter** [10] - 307:22, 336:24, 341:22, 347:20, 485:25, 506:8, 507:4, 522:13, 526:20, 532:8
**matters** [1] - 289:5
**max** [9] - 342:18, 342:19, 342:25, 465:11, 465:12, 469:2, 469:3, 479:6, 479:16
**maximize** [1] - 470:17
**maximum** [31] - 327:21, 327:24, 339:1, 358:17, 412:22, 413:6, 413:9, 413:11, 423:23, 424:17, 426:4, 426:14, 454:6, 456:2, 464:21, 464:23, 465:4, 465:5, 469:5, 476:15, 479:5, 480:2, 480:9, 481:1, 481:5, 483:9, 483:11, 490:12, 493:22, 493:24, 525:2
**MBT** [1] - 414:21
**MCE** [1] - 411:25
**mean** [13] - 316:7, 350:15, 367:23, 370:23, 375:3, 416:16, 471:7, 480:20, 486:3, 501:5, 511:24, 519:22, 546:7
**meaning** [7] - 313:6, 313:13, 320:14, 325:10, 338:23, 352:20, 362:21
**means** [3] - 350:14, 478:16, 481:18
**measure** [1] - 345:22
**measured** [3] - 364:25, 383:10, 383:12
**measurement** [7] - 398:16, 421:5, 421:9, 421:11, 422:14, 427:11, 442:6
**measurements** [2] - 428:6, 428:9
**measures** [1] - 371:6
**measuring** [1] - 400:10
**mechanical** [4] - 401:22, 453:16, 468:9, 530:23
**mechanism** [4] - 379:21, 391:10, 440:14, 542:21
**mechanisms** [4] - 380:2, 391:8, 391:18, 391:25
**meet** [8] - 418:20, 419:10, 419:23, 443:22, 513:5, 513:6, 525:20, 525:22
**meeting** [1] - 365:5
**meetings** [3] - 405:21, 405:22, 405:25
**megabytes** [1] - 300:19
**members** [1] - 307:20
**memorandum** [1] - 446:10
**memorized** [1] - 433:4
**memory** [1] - 445:8
**mention** [3] - 440:13, 459:13, 495:13
**mentioned** [14] - 292:16, 297:22, 306:2, 322:3, 324:6, 324:14, 333:4, 335:13, 426:25, 459:13, 493:17, 506:8, 530:18, 531:19
**Mercer** [14] - 277:13, 278:3, 278:16, 279:3, 279:17, 280:6, 280:19, 281:5, 405:17, 435:13, 435:16, 435:17, 436:7, 446:2
**mercury** [5] - 385:9, 386:6, 386:8
**mercury-injection-derived** [1] - 386:6
**met** [3] - 418:16, 462:16, 462:17
**meter** [8] - 382:3, 422:14, 422:16, 442:2, 442:8, 442:11, 442:13, 469:14
**metering** [2] - 401:1, 427:2
**meters** [10] - 339:3, 420:17, 420:19, 420:24, 421:10, 427:7, 427:9, 427:10, 427:12, 442:17
**method** [3] - 449:8, 452:18, 489:19
**Method** [2] - 368:23, 400:20
**methodologies** [2] - 293:9, 406:5
**methodology** [4] - 405:22, 406:11, 452:19, 453:25
**methods** [2] - 358:5, 358:6
**metric** [6] - 423:25, 424:3, 424:5, 424:8, 424:19, 424:21
**METZ** [1] - 285:8
**Michael** [1] - 537:18
**MICP** [1] - 392:3
**micro** [1] - 413:22
**microfracture** [9] - 358:18, 359:5, 412:23, 413:14, 413:18, 417:22, 417:24, 418:4, 451:5
**microphone** [1] - 447:14
**mid** [1] - 514:2
**middle** [2] - 294:21, 381:23
**Midwest** [10] - 277:6, 278:8, 279:10, 280:12, 281:12, 282:14, 309:11, 476:19, 482:6, 484:3
**might** [21] - 301:20, 302:3, 315:20, 331:2, 338:14, 340:23, 378:2, 380:19, 409:10, 415:6, 419:20, 425:12, 426:17, 433:11, 436:19, 466:23, 471:18, 488:14, 501:22, 502:19, 510:23
**migrate** [1] - 374:6
**migrating** [1] - 350:22
**migration** [5] - 309:8, 362:20, 363:6, 372:10, 374:1
**mike** [1] - 530:7

**mile** [6] - 388:12, 388:13, 388:18, 393:4, 393:11, 393:14
**mileage** [1] - 469:16
**miles** [11] - 357:1, 411:25, 412:2, 412:6, 412:8, 425:21, 459:14, 464:5, 464:8, 473:9, 531:11
**millimeter** [1] - 347:18
**million** [12] - 408:2, 423:23, 423:25, 424:3, 424:5, 424:8, 424:18, 424:19, 424:21, 440:7, 440:12, 470:24
**Milton** [21] - 349:4, 349:13, 357:9, 357:12, 357:19, 358:19, 360:7, 361:7, 364:25, 365:2, 365:4, 365:14, 365:15, 369:19, 412:24, 413:5, 453:19, 454:24, 455:16, 455:18, 474:17
**mind** [14] - 326:14, 416:19, 440:18, 448:1, 456:6, 472:18, 475:2, 488:12, 489:6, 497:11, 497:12, 507:5, 513:10, 513:12
**mine** [1] - 450:18
**Mine** [1] - 356:17
**mined** [1] - 356:20
**Mineral** [2] - 289:9, 340:12
**mineral** [6] - 378:13, 378:19, 379:10, 381:16, 381:21, 382:15
**mineralization** [1] - 379:1
**mineralogical** [1] - 457:10
**mineralogy** [1] - 391:3
**miniaturized** [2] - 428:2, 428:7
**minimal** [6] - 367:6, 450:15, 453:15, 454:5, 456:9, 456:13
**minimum** [9] - 366:10, 366:15, 388:17, 393:4, 419:11, 432:16, 435:8, 436:2, 438:19
**mining** [14] - 356:1, 356:5, 356:16, 356:17, 356:19, 356:21, 357:2, 450:18, 452:25, 504:20, 506:6, 507:9, 507:11, 507:13
**Minnekahta** [2] - 451:12, 451:13
**Minnkota** [6] - 322:22, 328:23, 395:19, 459:17, 529:19, 536:2
**Minnkota's** [3] - 329:4, 460:20, 534:23
**minor** [9] - 362:10, 362:13, 362:17, 362:21, 362:25, 363:1, 363:4, 407:22, 452:9
**minute** [7] - 321:21, 400:3, 447:5, 481:4, 503:3, 505:8, 551:4
**minutes** [4] - 316:3, 494:8, 550:22
**mischaracterization** [1] - 312:14
**miss** [1] - 462:1
**missed** [1] - 510:23
**missing** [2] - 499:17, 499:19
**misspelled** [2] - 447:23, 467:24
**misspoke** [1] - 407:8
**misstated** [1] - 464:8
**misstatement** [1] - 387:17
**misunderstand** [1] - 517:13
**misunderstanding** [1] - 502:4
**misunderstood** [2] - 516:14, 517:8
**MIT** [2] - 337:12, 338:7
**mixes** [1] - 388:4
**mixing** [4] - 345:19, 391:19, 391:21, 391:23
**mixture** [1] - 542:19
**model** [130] - 291:15, 291:17, 291:22, 292:12, 295:2, 295:23, 296:5, 297:16, 297:19, 298:1, 299:23, 301:5, 306:5, 306:6, 307:12, 316:17, 316:20, 316:22, 316:24, 317:2, 317:5, 318:13, 318:18, 319:1, 319:25, 321:11, 321:13, 323:17, 323:18, 324:12, 324:25, 325:1, 325:2, 325:5, 325:6, 325:9, 325:11, 325:14, 325:21, 325:22, 325:25, 326:3, 326:5, 326:8, 333:12, 338:25, 344:22, 345:5, 349:18, 350:11, 350:16, 350:18, 350:19, 351:1, 351:18, 363:18, 363:20, 363:24, 364:5, 364:7, 364:8, 364:9, 364:13, 364:15, 366:19, 367:12, 367:15, 367:16, 368:18, 369:5, 372:8, 374:5, 374:11, 374:17, 374:18, 374:23, 375:8, 375:12, 375:22, 376:2, 376:7, 376:9, 379:19, 380:9, 382:2, 382:20, 383:7, 383:10, 383:23, 384:11, 384:21, 385:4, 385:20, 418:6, 418:10, 426:11, 426:16, 426:21, 426:23, 451:3, 452:1, 452:5, 463:15, 464:25, 465:8, 473:13, 473:14, 477:4, 477:9, 477:19, 480:1, 489:15, 510:11, 512:16, 512:19, 521:21, 521:24, 522:2, 522:7, 542:24, 544:24, 545:2, 545:6, 546:6
**modeled** [11] - 314:18, 338:21, 360:18, 364:23, 369:9, 372:4, 379:5, 383:17, 383:18, 473:18, 494:4
**modeling** [37] - 292:6, 292:16, 292:22, 293:18, 293:21, 296:23, 300:5, 310:8, 321:17, 337:9, 339:10, 360:11, 360:15, 366:5, 376:15, 376:17, 376:23, 377:20, 380:14, 382:18, 391:8, 424:1, 424:20, 424:23, 426:11, 462:14, 463:19, 464:17, 476:24, 477:13, 477:22, 509:2, 510:12, 542:4, 542:8, 542:22, 543:9
**models** [28] - 300:2, 306:11, 306:16, 313:9, 313:15, 318:22, 322:24, 323:1, 323:9, 323:25, 324:7, 324:10, 346:22, 377:18, 391:3, 512:13, 521:14, 523:1, 544:19, 544:22, 545:1, 545:24, 546:3, 546:10, 546:12, 546:14, 546:21, 546:23
**modification** [7] - 314:9, 314:13, 315:6, 352:11, 386:5, 498:7, 498:19
**modified** [1] - 385:12
**modifier** [2] - 384:9, 384:15
**modifiers** [4] - 383:7, 383:22, 383:24, 384:5
**modify** [3] - 314:15, 385:14, 431:19
**Mohr** [1] - 394:12
**Mohr-Coulomb** [1] - 394:12
**molecules** [1] - 397:13
**moment** [8] - 334:23, 335:7, 354:2, 366:2, 472:17, 510:1, 550:16, 550:18
**moments** [3] - 383:9, 468:7, 472:13
**monitor** [7] - 293:25, 313:6, 371:7, 397:10, 401:15, 402:18, 432:6
**Monitoring** [2] - 400:2, 402:10
**monitoring** [54] - 313:1, 313:6, 313:10, 313:14, 319:12, 343:14, 358:4, 358:6, 370:24, 371:10, 371:12, 399:4, 399:13, 399:18, 399:23, 400:6, 401:13, 401:19, 402:3, 402:7, 402:16, 402:22, 402:25, 404:5, 406:15, 407:3, 407:17, 418:2, 427:17, 430:18, 430:25, 432:1, 437:19, 439:8, 440:7, 440:10, 453:12, 453:22, 453:24, 454:3, 454:5, 454:25, 455:24, 455:25, 456:16, 456:17, 465:3, 466:12, 471:21, 471:24, 472:5, 483:19, 485:19, 497:21
**Montana** [24] - 386:25, 408:25, 504:11, 504:23, 507:16, 507:25, 508:8, 513:16, 514:19, 515:1, 515:10, 517:17, 526:11, 528:1, 537:22, 538:1, 538:17, 538:21, 539:4, 540:7, 540:8, 540:22, 543:1
**Montana's** [4] - 508:21, 510:3, 511:11, 526:5
**month** [6] - 297:11, 297:12, 325:1, 519:20, 532:9
**months** [2] - 436:3, 529:25
**Morgan** [2] - 538:12, 538:16
**morning** [3] - 291:3, 416:20, 551:9
**Morton** [10] - 277:14, 278:3, 278:16, 279:3, 405:17, 435:14, 435:17, 435:18, 436:8, 446:1
**most** [11] - 296:21, 337:15, 351:12, 351:19, 366:8, 409:3, 449:13, 524:9, 542:20, 542:23
**mostly** [1] - 349:6
**motion** [7] - 278:18, 280:21, 283:1, 303:2, 303:5, 505:20, 533:24
**move** [24] - 333:14, 333:15, 344:15, 345:11, 345:16, 358:14, 362:3, 363:17, 368:19, 392:14, 393:18, 397:24, 401:9, 407:13, 421:16, 437:23, 461:13, 472:8, 499:25, 505:17, 511:14, 530:1, 535:24, 540:14
**moved** [2] - 504:23, 538:11
**movement** [7] - 365:21, 366:25, 367:2, 371:7, 373:23, 391:14, 542:13

**movements** [1] - 464:11
**moves** [2] - 346:15, 442:5
**moving** [7] - 370:3, 374:8, 379:4, 410:8, 418:13, 466:20, 473:16
**Mowry** [1] - 410:17
**MR** [325] - 284:3, 284:4, 284:4, 284:5, 284:6, 284:7, 284:7, 284:10, 284:10, 284:15, 285:2, 289:16, 289:22, 290:1, 290:5, 290:9, 290:19, 290:24, 291:5, 291:9, 302:2, 302:7, 302:9, 302:10, 302:24, 303:9, 303:10, 305:18, 306:23, 307:1, 312:6, 312:9, 312:13, 312:16, 313:20, 313:24, 320:15, 320:21, 320:24, 322:2, 323:3, 323:7, 332:24, 333:3, 333:13, 333:16, 333:17, 333:18, 333:19, 333:21, 333:24, 355:13, 356:11, 370:2, 370:10, 370:12, 370:14, 370:15, 370:16, 371:18, 371:20, 388:21, 389:8, 389:23, 392:12, 392:17, 393:16, 393:20, 393:23, 394:7, 394:8, 394:9, 394:10, 395:10, 395:11, 395:21, 396:5, 397:21, 398:2, 398:9, 398:12, 403:2, 403:11, 403:14, 408:3, 408:13, 410:19, 411:7, 411:8, 411:21, 412:5, 412:17, 415:23, 416:3, 416:7, 416:16, 417:2, 417:12, 417:14, 417:17, 417:20, 418:22, 420:8, 420:9, 420:11, 420:24, 423:9, 423:19, 424:13, 425:5, 425:7, 426:18, 427:13, 427:14, 427:15, 427:24, 428:23, 429:4, 430:10, 432:23, 433:3, 433:15, 433:22, 433:24, 434:2, 434:24, 435:1, 435:2, 435:3, 435:5, 435:12, 436:5, 436:13, 436:21, 437:6, 437:7, 437:8, 437:14, 437:15, 437:16, 438:16, 439:9, 439:11, 440:25, 441:8, 441:10, 441:20, 442:16, 444:11, 445:24, 447:2, 447:6, 447:12, 447:15, 448:6, 448:14, 448:17, 448:18, 457:23, 458:3, 458:7, 458:11, 458:13, 458:18, 458:20, 458:21, 458:22, 458:24, 461:1, 461:5, 461:12, 461:21, 463:9, 463:20, 464:13, 465:13, 465:16, 466:18, 467:4, 467:9, 467:15, 467:20, 469:10, 469:23, 470:3, 471:6, 471:9, 471:11, 471:14, 472:10, 472:17, 472:22, 472:24, 473:1, 473:2, 473:3, 473:5, 474:23, 475:4, 475:6, 475:9, 477:2, 477:11, 477:14, 477:17, 477:18, 482:10, 484:1, 484:5, 484:9, 484:13, 484:15, 484:18, 484:20, 489:5, 489:8, 489:11, 490:3, 490:17, 490:24, 497:10, 497:14, 497:16, 497:25, 498:24, 499:1, 499:2, 500:3, 500:11, 500:12, 500:19, 500:22, 500:24, 500:25, 501:5, 501:8, 501:10, 501:11, 501:14, 501:16, 502:2, 502:5, 502:7, 502:8, 502:9, 502:17, 502:21, 502:23, 503:1, 503:9, 503:12, 503:15, 503:21, 505:8, 505:10, 505:11, 505:12, 505:17, 505:19, 505:21, 510:17, 510:20, 510:22, 511:14, 511:17, 511:20, 512:20, 512:23, 513:2, 514:7, 514:8, 520:3, 520:7, 520:13, 520:17, 520:18, 520:22, 522:17, 522:19, 522:20, 522:22, 522:25, 523:5, 523:9, 523:10, 523:13, 525:13, 525:18, 526:15, 526:17, 526:24, 527:2, 527:4, 527:8, 527:16, 530:1, 530:3, 530:7, 530:10, 532:15, 532:18, 535:22, 535:23, 536:1, 536:23, 537:2, 537:4, 537:7, 537:9, 537:14, 540:14, 540:15, 540:18, 541:7, 541:9, 545:8, 545:12, 548:10, 548:13, 548:14, 550:9, 550:13, 550:15, 550:23, 551:2
**MRV** [1] - 398:17
**MS** [95] - 284:5, 284:6, 284:8, 285:3, 291:13, 305:12, 305:15, 306:24, 308:17, 309:13, 312:7, 313:22, 320:19, 323:5, 333:2, 334:4, 335:8, 336:2, 338:9, 339:25, 340:17, 355:18, 356:9, 356:12, 356:14, 359:21, 360:15, 369:24, 370:20, 372:7, 387:8, 387:16, 390:7, 392:20, 393:25, 408:16, 411:12, 412:20, 412:21, 413:1, 415:25, 416:6, 417:21, 420:16, 423:11, 423:21, 424:15, 425:8, 426:19, 427:16, 429:6, 429:9, 429:17, 432:20, 433:11, 433:19, 433:23, 437:22, 438:25, 440:19, 448:10, 461:19, 461:25, 463:14, 463:23, 464:9, 464:12, 464:15, 464:19, 465:9, 465:11, 465:15, 465:17, 466:20, 467:5, 467:7, 467:8, 469:9, 469:18, 470:2, 470:6, 471:1, 471:8, 471:10, 471:12, 471:17, 472:2, 472:6, 473:12, 474:13, 483:12, 484:22, 489:9, 489:14, 527:5
**multi** [1] - 315:22
**multi-physics** [1] - 315:22
**multilayered** [1] - 405:19
**multiple** [6] - 299:14, 432:8, 432:13, 435:16, 539:1, 543:25
**multiplier** [6] - 309:18, 310:1, 311:2, 313:2, 313:3, 315:9
**multiply** [1] - 541:25
**municipalities** [1] - 506:3
**must** [5] - 351:25, 393:10, 418:16, 419:9, 512:3
**mute** [2] - 527:9, 527:10
**mutual** [1] - 446:10

## N

**NAD27** [1] - 390:14
**NAICS** [2] - 411:21, 411:22
**nailed** [1] - 434:9
**name** [26] - 392:24, 396:8, 398:10, 403:12, 408:14, 447:23, 450:8, 467:21, 467:24, 467:25, 485:20, 486:22, 503:22, 503:23, 503:24, 508:15, 513:3, 513:8, 527:1, 527:17, 527:18, 537:15, 537:17, 537:18, 540:5
**named** [1] - 449:16
**namely** [3] - 392:23, 456:15, 457:9
**names** [3] - 335:18, 353:22, 473:24
**narrative** [13] - 374:10, 377:3, 377:7, 377:11, 379:19, 382:22, 387:10, 388:6, 394:11, 419:7, 444:7, 444:12, 444:25
**natural** [5] - 404:1, 466:11, 481:25, 543:3, 543:11
**nature** [2] - 308:24, 476:13
**ND** [12] - 277:14, 278:4, 278:17, 279:3, 279:17, 280:7, 280:19, 281:5, 281:20, 282:9, 282:22, 283:9
**NDA** [2] - 296:14, 322:22
**NDIC** [2] - 284:2, 412:8
**NDL-325** [2] - 423:5, 469:12
**NDL-327** [3] - 423:6, 469:11, 469:24
**Near** [1] - 402:7
**near** [6] - 329:11, 371:7, 432:1, 468:11, 472:3, 497:12
**nearby** [1] - 371:13
**nearest** [1] - 364:18
**necessarily** [7] - 295:14, 318:15, 325:15, 331:3, 344:17, 429:15, 439:1
**necessary** [11] - 279:6, 281:8, 283:12, 324:17, 385:14, 431:19, 460:4, 515:1, 521:25, 523:7, 540:24
**need** [48] - 289:17, 297:13, 301:20, 301:23, 301:25, 302:15, 303:21, 306:6, 307:2, 307:5, 311:13, 311:18, 312:17, 314:8, 317:20, 318:7, 318:11, 338:14, 356:7, 378:2, 385:13, 412:16, 423:7, 425:12, 430:16, 432:15, 435:10, 438:7, 440:17, 443:9, 444:22, 445:8, 447:2, 472:21, 476:10, 476:25, 480:15, 487:6, 498:21, 499:4, 499:20, 500:1, 522:1, 522:11, 530:25, 531:15, 531:20, 534:12
**needed** [19] - 299:7, 304:8, 304:12, 311:9, 314:7, 314:15, 380:6, 389:11, 389:17, 431:10, 431:12, 435:22, 436:12, 466:17, 493:11, 496:15, 515:8, 516:8, 535:24
**needing** [2] - 429:13, 437:11
**needs** [3] - 437:1, 443:9, 500:5

**negative** [6] - 378:14, 378:19, 379:4, 382:4, 383:1, 393:24
**Neset** [1] - 409:1
**net** [7] - 374:11, 381:25, 382:3, 382:23, 393:24
**neutron** [3] - 401:21, 401:24, 402:12
**never** [9] - 307:7, 321:14, 345:10, 345:11, 440:18, 469:8, 517:6, 517:21, 525:8
**new** [13] - 289:12, 290:2, 307:2, 392:24, 395:13, 419:8, 419:20, 420:3, 420:7, 420:12, 420:13, 447:19, 498:21
**next** [24] - 313:25, 329:12, 353:21, 359:11, 393:18, 397:25, 398:2, 400:10, 403:3, 403:4, 410:8, 426:2, 430:18, 450:12, 450:13, 452:14, 453:10, 454:1, 458:6, 458:7, 465:25, 527:1, 537:6
**NGOs** [1] - 506:5
**nice** [4] - 513:5, 513:6, 525:20, 525:22
**nine** [1] - 444:9
**nitrogen** [5] - 429:16, 429:20, 538:9, 539:7, 542:19
**No(s)** [1] - 277:3
**nomenclature** [1] - 392:23
**noncompliance** [1] - 352:8
**nonconsenting** [3] - 277:18, 279:21, 281:23
**nondisclosure** [1] - 296:15
**none** [1] - 519:4
**normal** [4] - 479:10, 486:9, 492:17, 493:12
**normally** [2] - 479:11, 479:12
**north** [1] - 442:18
**NORTH** [1] - 277:1
**North** [102] - 277:7, 277:9, 277:11, 277:12, 277:13, 277:21, 277:22, 278:1, 278:2, 278:3, 278:10, 278:11, 278:14, 278:15, 278:16, 278:20, 278:22, 279:1, 279:2, 279:3, 279:11, 279:14, 279:15, 279:16, 280:1, 280:3, 280:5, 280:6, 280:14, 280:16, 280:18, 280:19, 280:23, 281:2, 281:4, 281:4, 281:13, 281:14, 281:16, 281:18, 281:19, 282:2, 282:4, 282:5, 282:8, 282:9, 282:15, 282:17, 282:18, 282:20, 282:22, 283:2, 283:4, 283:5, 283:8, 283:9, 283:19, 284:13, 285:5, 285:5, 289:6, 291:21, 292:15, 292:20, 292:25, 293:12, 294:4, 298:10, 298:11, 307:21, 313:18, 330:11, 338:3, 340:8, 373:10, 386:21, 387:6, 390:14, 403:24, 412:1, 423:15, 429:3, 435:7, 436:6, 454:19, 469:24, 469:25, 507:22, 513:18, 523:18, 523:22, 523:24, 524:10, 524:16, 525:9, 525:24, 526:2, 526:4, 526:8, 526:12, 538:22, 552:13
**northeast** [2] - 375:20, 375:22
**northwest** [1] - 363:11
**note** [22] - 290:11, 331:5, 344:25, 345:1, 369:10, 373:11, 429:22, 430:1, 431:21, 434:6, 437:8, 437:19, 440:16, 451:11, 452:8, 453:1, 453:18, 454:23, 457:8, 457:17, 461:10, 464:21
**noted** [9] - 294:3, 366:4, 372:19, 390:19, 414:17, 417:19, 450:11, 450:16, 451:18
**notes** [5] - 390:4, 394:6, 463:4, 550:17, 552:11
**nothing** [6] - 320:14, 333:5, 441:8, 545:7, 550:19
**notice** [4] - 289:12, 294:21, 445:11, 476:25
**noticed** [1] - 294:3
**notices** [1] - 437:1
**notification** [4] - 435:9, 435:23, 450:19, 495:4
**notified** [1] - 435:11
**notify** [1] - 474:4
**num** [1] - 540:21
**number** [26] - 294:21, 310:24, 311:18, 311:24, 326:13, 329:10, 386:16, 412:4, 431:15, 432:9, 434:18, 441:6, 449:20, 451:21, 452:21, 456:15, 468:10, 470:15, 471:20, 479:4, 538:17, 540:21, 541:22, 546:10, 549:9, 549:10
**Numbers** [1] - 289:12
**numbers** [1] - 470:24
**numerical** [10] - 296:1, 297:25, 325:16, 326:6, 326:9, 364:20, 365:1, 366:13, 366:21, 452:2
**numerous** [4] - 435:12, 446:3, 522:25, 538:25

## O

**oath** [6] - 291:5, 291:7, 291:12, 448:4, 458:10, 461:18
**object** [13] - 290:21, 302:2, 302:25, 303:5, 472:23, 498:24, 500:3, 500:8, 502:2, 520:3, 520:13, 522:17, 522:20
**objection** [20] - 332:24, 333:21, 458:3, 461:4, 461:5, 461:6, 461:11, 477:14, 500:19, 501:5, 501:10, 501:11, 505:19, 511:17, 530:2, 530:3, 530:4, 540:15, 541:7, 548:10
**objection's** [1] - 417:18
**objections** [5] - 333:20, 417:15, 458:2, 505:18, 511:16
**obligated** [1] - 351:24
**observed** [3] - 413:11, 414:1, 415:12
**obtain** [2] - 508:1, 540:24
**obvious** [2] - 348:17, 476:11
**obviously** [2] - 328:18, 347:21
**occupied** [3] - 370:7, 370:9, 433:2
**occur** [1] - 481:7
**occurred** [1] - 473:10
**occurs** [2] - 384:12, 423:12
**odd** [1] - 372:3
**ODDY** [7] - 286:19, 408:9, 408:16, 413:1, 429:17, 437:22, 484:22
**Oddy** [9] - 358:25, 359:8, 408:6, 408:7, 408:16, 484:12, 484:21, 484:22
**ODDY/CAITLIN** [1] - 287:15
**OF** [3] - 283:15, 286:2, 552:1
**offer** [2] - 457:24, 461:2
**Offered** [2] - 288:12, 288:17
**Office** [1] - 284:15
**office** [2] - 299:7, 529:3
**officer** [1] - 396:14
**offset** [3] - 355:2, 355:6, 355:10
**offsets** [1] - 354:22
**often** [1] - 435:25
**OIL** [1] - 277:2
**oil** [25] - 338:2, 453:1, 453:2, 453:4, 485:7, 485:15, 486:10, 506:6, 524:3, 538:8, 538:18, 539:4, 542:11, 542:12, 542:13, 542:14, 542:17, 542:25, 543:5, 545:15, 545:23, 546:4, 546:13, 546:15, 546:23
**Oil** [7] - 289:9, 507:17, 514:1, 514:19, 515:1, 517:1, 538:6
**old** [2] - 334:1, 337:23
**Oliver** [17] - 277:14, 278:4, 278:16, 279:3, 279:17, 280:6, 280:19, 281:5, 281:20, 282:9, 282:22, 283:9, 405:17, 435:13, 435:18, 436:8, 446:1
**OLSEN** [14] - 286:11, 308:17, 334:4, 336:2, 339:25, 359:21, 370:20, 387:8, 392:20, 448:10, 472:2, 474:13, 489:9, 489:14
**Olsen** [10] - 389:16, 392:10, 392:14, 395:14, 447:13, 447:16, 448:2, 448:3, 458:1, 474:8
**OLSEN/JIMMY** [1] - 287:15
**OLSEN/WADE** [1] - 287:6
**on-site** [2] - 429:13, 436:24
**once** [6] - 368:2, 416:4, 419:10, 432:17, 479:22, 526:13
**one** [119] - 295:22, 299:19, 299:20, 301:2, 301:3, 307:2, 313:25, 315:7, 327:1, 331:4, 333:18, 343:3, 343:24, 348:8, 348:9, 348:11, 349:14, 350:12, 351:11, 354:2, 362:9, 362:11, 365:17, 366:10, 368:24, 371:2, 371:25, 379:7, 387:2, 388:3, 388:12, 388:13, 388:18, 392:10, 393:4, 393:11, 393:14, 394:4, 397:17, 397:18, 411:4, 412:17, 412:19, 415:17, 416:25, 419:16, 419:17, 420:14, 424:9, 426:17, 429:2, 433:9, 433:14, 434:13, 434:16, 434:25, 436:15, 437:24, 438:3, 438:14, 438:17, 439:3, 439:6, 439:7, 439:17, 442:5, 442:18, 442:19, 444:16, 445:7, 445:9, 445:16, 446:9, 447:19, 448:16, 449:20, 450:16, 450:21, 453:3, 453:4,

456:21, 462:18, 462:23, 463:9, 464:2, 469:2, 469:16, 470:11, 471:4, 472:17, 477:1, 478:1, 478:6, 478:10, 481:9, 483:7, 484:12, 488:2, 501:13, 508:18, 508:22, 509:11, 509:14, 509:25, 510:17, 510:21, 510:25, 511:8, 512:18, 518:17, 521:3, 522:14, 523:4, 531:4, 531:25, 541:2, 542:9, 550:18, 550:24
**one's** [1] - 489:21
**one-fourth** [1] - 343:3
**one-mile** [4] - 388:12, 388:18, 393:4, 393:14
**one-year** [1] - 464:2
**ones** [5] - 468:25, 470:3, 470:7, 484:12, 518:18
**Ontario** [1] - 528:2
**Opeche** [1] - 380:24
**Opeche/Spearfish** [8] - 361:21, 362:14, 380:25, 381:10, 381:16, 381:19, 402:11, 413:13
**open** [5] - 306:5, 306:6, 326:14, 479:2, 511:21
**opened** [1] - 478:25
**Opening** [1] - 286:4
**operate** [5] - 277:19, 279:22, 282:1, 351:24, 479:11
**operated** [8] - 355:12, 397:6, 397:17, 428:21, 478:22, 482:8, 482:19, 498:11
**operating** [26] - 333:5, 396:14, 425:10, 426:4, 426:23, 465:4, 465:11, 469:3, 476:15, 478:19, 479:5, 479:7, 479:13, 479:15, 479:16, 479:19, 480:18, 482:5, 482:23, 490:12, 493:12, 493:22, 494:23, 495:11, 495:25, 496:9
**operation** [6] - 347:4, 415:10, 483:9, 483:11, 492:17, 499:19
**operational** [7] - 312:25, 313:14, 366:23, 397:2, 399:15, 399:22, 465:6
**operations** [21] - 331:5, 331:10, 331:18, 331:23, 342:10, 356:16, 356:17, 368:2, 401:16, 409:4, 430:13, 455:19, 459:20, 464:22, 466:9, 466:10, 466:15, 466:17, 467:2, 483:8
**Operations** [1] - 455:15
**operator** [4] - 330:22, 333:6, 351:22, 495:4
**operator's** [1] - 352:5
**Operators** [1] - 511:5
**operators** [1] - 512:3
**Ophir** [1] - 537:21
**opinion** [3] - 300:3, 301:14, 499:3
**opportunity** [6] - 289:14, 303:4, 410:24, 416:25, 431:9, 521:2
**opposed** [4] - 385:3, 442:1, 442:8, 442:21
**opposing** [2] - 301:20, 396:17
**option** [2] - 431:12, 543:25
**optionality** [1] - 431:9
**options** [3] - 435:20, 543:22, 543:24
**order** [17] - 278:6, 280:10, 282:12, 293:20, 297:11, 306:7, 306:14, 358:12, 373:19, 375:5, 378:25, 392:22, 432:14, 476:9, 497:11, 510:14, 530:25
**orders** [1] - 341:4
**ordinary** [1] - 507:15
**organizational** [1] - 434:5
**originally** [2] - 469:15, 500:1
**originate** [1] - 394:23
**otherwise** [1] - 449:14
**outlaid** [1] - 407:15
**outlet** [1] - 421:7
**outlets** [1] - 420:19
**outline** [3] - 508:23, 509:15, 510:7
**outlines** [1] - 459:21
**output** [2] - 298:1, 469:5
**outreach** [1] - 405:20
**outside** [24] - 295:5, 295:8, 314:6, 320:13, 327:13, 334:13, 336:7, 339:7, 347:15, 347:21, 352:2, 352:7, 352:11, 353:16, 353:24, 363:24, 364:1, 374:4, 384:21, 393:5, 393:7, 393:11, 520:25, 523:1
**over-leasing** [1] - 310:21
**overall** [3] - 376:2, 382:23, 400:23
**overarching** [1] - 445:25
**overestimate** [2] - 310:19, 311:8
**overlaid** [1] - 327:2
**overlying** [1] - 339:5
**overpressure** [1] - 495:8
**overpressured** [2] - 495:12, 495:14
**overpressurized** [2] - 339:16, 339:17
**overrule** [1] - 303:8
**overruled** [5] - 333:1, 520:6, 520:16, 541:8, 548:12
**overview** [3] - 399:22, 406:4, 406:23
**own** [5] - 292:19, 487:4, 526:9, 528:9, 538:25
**owned** [7] - 277:17, 279:21, 281:23, 441:25, 469:21, 482:7, 504:5
**Owners** [1] - 511:5
**owners** [10] - 277:18, 279:21, 281:24, 292:4, 321:9, 321:19, 497:23, 498:21, 500:17, 512:3
**ownership** [2] - 296:12, 296:14
**oxidation** [2] - 486:5, 486:8
**oxygen** [2] - 366:6, 366:7

## P

**P&A** [1] - 430:19
**P&I** [1] - 491:22
**P&ID** [1] - 492:22
**P.A** [1] - 284:11
**P.C** [1] - 284:15
**p.m** [10] - 291:2, 389:1, 389:2, 447:7, 447:8, 503:4, 503:5, 551:5, 551:6, 551:11
**P.O** [1] - 284:16
**P50** [1] - 351:11
**package** [5] - 359:4, 413:20, 414:2, 414:11, 414:19
**packages** [1] - 522:1
**packer** [2] - 429:15, 429:25
**pad** [1] - 442:11
**page** [57] - 317:16, 327:15, 338:20, 344:18, 356:12, 364:4, 368:5, 368:20, 369:12, 370:6, 372:1, 374:9, 375:24, 375:25, 376:10, 377:6, 377:8, 378:12, 379:18, 380:23, 381:15, 381:23, 382:13, 382:14, 382:21, 383:5, 383:14, 385:7, 386:15, 386:17, 387:9, 388:6, 388:7, 394:6, 394:11, 395:8, 399:10, 406:11, 409:21, 421:17, 423:22, 424:17, 431:15, 434:18, 434:19, 439:19, 441:13, 441:20, 441:21, 443:19, 444:25, 463:13, 464:20, 471:18, 475:8
**Page** [30] - 286:3, 286:8, 286:12, 286:13, 286:14, 286:15, 286:16, 286:17, 286:21, 286:22, 286:23, 286:24, 287:3, 287:4, 287:5, 287:8, 287:9, 287:10, 287:11, 287:12, 287:13, 287:17, 287:22, 287:23, 287:24, 287:25, 288:4, 288:5, 288:8, 288:9
**pages** [2] - 377:9, 552:10
**Pages** [1] - 283:16
**paid** [6] - 332:16, 352:14, 352:25, 412:13, 497:2, 502:4
**pan** [1] - 371:23
**paragraph** [8] - 317:16, 381:23, 382:23, 383:5, 420:10, 431:16, 441:13, 441:21
**paralegal** [1] - 289:24
**Paralegal** [1] - 285:3
**Parameter** [1] - 400:9
**parameters** [19] - 316:11, 316:23, 317:1, 317:5, 317:22, 318:5, 318:10, 323:8, 390:20, 390:22, 400:9, 440:23, 463:20, 473:7, 481:7, 485:19, 485:22, 532:4, 543:11
**pardon** [1] - 547:4
**part** [28] - 298:14, 307:3, 308:2, 311:3, 330:4, 335:3, 368:13, 370:20, 371:9, 380:19, 386:13, 401:19, 406:7, 415:15, 430:7, 445:11, 483:17, 483:18, 484:25, 485:2, 488:4, 491:1, 516:3, 524:19, 529:19, 530:22, 531:17, 541:5
**partially** [1] - 373:3
**participated** [1] - 322:18
**participation** [1] - 358:1
**particular** [8] - 295:14, 334:6, 339:7, 409:18, 428:10, 507:2, 512:8, 530:16
**particularly** [2] - 343:14, 532:12
**parties** [4] - 289:14, 322:20, 460:1, 460:16
**party** [6] - 301:21, 366:16, 418:17, 419:8, 480:11, 533:3
**passive** [2] - 432:5, 445:1
**past** [7] - 415:7, 436:16, 499:11, 499:12, 502:3, 512:12, 517:15
**patch** [2] - 485:16, 486:10
**path** [1] - 348:20

**pathway** [4] - 338:24, 338:25, 362:20, 363:6
**pathways** [2] - 338:22, 338:23
**Paul** [3] - 527:19, 537:7, 537:18
**PAUL** [2] - 288:7, 537:10
**pause** [1] - 463:2
**pausing** [1] - 462:24
**pay** [10] - 306:21, 311:13, 325:1, 498:21, 499:9, 500:16, 502:10, 502:11, 502:13, 517:24
**paying** [3] - 320:16, 353:8, 353:11
**payment** [1] - 352:22
**payments** [5] - 314:25, 357:22, 497:23, 501:23, 501:25
**pending** [1] - 389:7
**penetrate** [1] - 357:18
**penetrates** [1] - 357:13
**people** [7] - 311:12, 411:4, 416:17, 472:12, 474:1, 476:25, 516:4
**people's** [1] - 323:25
**per** [12] - 382:3, 415:1, 415:4, 423:24, 424:18, 464:6, 481:4, 488:1, 490:19, 495:20, 531:11
**percent** [66] - 328:15, 342:24, 343:8, 343:11, 343:13, 343:17, 343:23, 344:9, 344:12, 344:25, 345:4, 345:10, 345:22, 345:23, 345:24, 346:5, 346:7, 346:13, 346:14, 346:19, 346:24, 347:12, 347:16, 347:17, 349:19, 350:16, 360:9, 360:10, 366:6, 366:11, 366:14, 366:15, 366:20, 366:22, 381:21, 382:24, 418:23, 419:5, 419:12, 419:14, 419:16, 419:19, 426:7, 462:6, 464:10, 473:10, 476:17, 476:22, 479:4, 479:13, 483:14, 490:11, 490:14, 490:20, 490:21, 490:23, 492:20, 493:22, 493:24, 494:2
**percentage** [2] - 360:8, 360:13
**perforating** [3] - 343:25, 344:2, 344:4
**perform** [7] - 297:14, 306:17, 323:24, 399:20, 415:16, 466:6, 509:6
**performed** [4] - 351:18, 451:6, 452:6, 480:11
**performing** [1] - 415:18
**performs** [1] - 316:9
**perhaps** [6] - 337:22, 338:1, 363:22, 389:13, 416:8, 423:19
**period** [17] - 297:9, 297:13, 319:5, 320:2, 350:17, 364:22, 424:4, 432:2, 440:8, 445:11, 463:8, 513:17, 515:23, 517:5, 519:13, 521:22
**periodic** [1] - 401:23
**perm** [2] - 310:24, 372:11
**permanently** [1] - 544:3
**permeabilities** [1] - 373:6
**permeability** [34] - 309:17, 309:25, 312:22, 313:2, 315:23, 316:16, 322:15, 324:13, 344:24, 345:4, 345:7, 345:14, 362:6, 368:8, 368:11, 368:16, 372:8, 372:22, 376:6, 376:21, 381:9, 381:12, 385:18, 385:20, 392:3, 414:20, 485:20, 486:1, 531:2, 531:25, 532:4, 533:7, 534:18
**permit** [45] - 295:19, 295:20, 307:18, 308:25, 310:5, 310:11, 315:12, 316:10, 321:3, 327:15, 327:18, 331:19, 334:6, 336:22, 340:24, 341:1, 341:7, 348:9, 350:12, 352:8, 354:4, 356:13, 358:16, 360:25, 391:4, 413:3, 449:17, 449:20, 449:22, 449:23, 450:17, 451:1, 451:12, 451:14, 451:15, 453:5, 453:18, 455:20, 462:20, 498:7, 506:21, 517:16, 518:7, 518:19
**Permit** [2] - 448:11, 449:16
**permits** [36] - 322:6, 324:11, 326:21, 355:25, 356:4, 359:2, 359:19, 359:23, 397:10, 406:21, 421:4, 449:12, 450:7, 450:15, 451:4, 451:7, 451:8, 451:18, 451:23, 452:6, 452:19, 453:12, 453:17, 454:4, 454:12, 454:18, 455:10, 456:11, 456:12, 456:24, 457:8, 457:17, 457:22, 462:14, 541:15, 541:16
**permitted** [6] - 310:18, 311:23, 313:15, 314:15, 340:20, 540:21
**permitting** [8] - 404:4, 419:9, 506:16, 507:12, 509:19, 516:24, 517:14, 540:20
**person** [1] - 495:24
**personally** [7] - 294:15, 294:16, 307:19, 326:11, 477:12, 529:21, 530:18
**personnel** [1] - 436:10
**pertains** [3] - 359:1, 413:18, 418:3
**Petrel** [6] - 306:6, 306:7, 363:20, 544:20, 545:1, 545:2
**Petroleum** [1] - 540:1
**petroleum** [7] - 398:24, 408:25, 504:18, 516:10, 538:1, 538:5
**petrophysical** [1] - 376:5
**pH** [1] - 485:12
**phase** [4] - 374:6, 438:13, 438:14, 438:15
**phases** [1] - 438:23
**PhD** [4] - 403:24, 403:25, 528:2
**PHI** [13] - 348:6, 348:11, 350:8, 531:1, 534:5, 534:7, 534:12, 536:2, 536:7, 536:12, 536:13, 536:18, 547:12
**PHI-H** [12] - 348:6, 348:11, 350:8, 531:1, 534:5, 534:7, 534:12, 536:2, 536:7, 536:13, 536:18, 547:12
**PHIE** [2] - 348:15, 372:11
**phone** [2] - 302:5, 503:10
**photos** [2] - 413:25, 414:15
**PHREEQ** [2] - 512:16, 523:1
**PHREEQC** [11] - 295:23, 296:5, 297:16, 297:18, 307:12, 379:19, 391:8, 521:24, 522:6, 523:3, 523:6
**physically** [1] - 300:11
**physics** [2] - 315:22, 347:21
**Piasco** [2] - 411:7, 411:8
**PIASO** [1] - 411:8
**pick** [2] - 414:2, 414:3
**picking** [1] - 466:13
**piece** [2] - 305:6, 401:23
**pieces** [1] - 298:2
**Pierre** [2] - 387:10, 409:25
**pig** [3] - 422:21, 475:18, 475:20
**pigged** [2] - 422:24, 423:2
**pigging** [1] - 421:21
**pilot** [1] - 539:7
**pinch** [4] - 375:11, 384:5, 384:12, 385:1
**pinch-out** [3] - 384:5, 384:12, 385:1
**pinches** [1] - 384:2
**pipe** [11] - 422:2, 422:9, 422:23, 469:4, 478:15, 478:17, 479:17, 490:10, 491:20, 491:25, 492:3
**Pipeline** [7] - 277:6, 278:9, 279:10, 280:12, 281:12, 282:14, 309:12
**pipeline** [13] - 397:5, 397:15, 411:25, 412:1, 422:3, 422:8, 425:20, 428:21, 435:6, 469:17, 476:5, 490:19, 492:1
**pipelines** [1] - 506:6
**piping** [11] - 476:14, 490:4, 490:25, 491:7, 491:12, 491:16, 491:20, 492:25, 493:4, 495:10
**PISC** [9] - 406:14, 406:15, 407:2, 407:7, 407:16, 432:2, 434:15, 438:14, 439:7
**place** [21] - 308:19, 309:7, 332:22, 354:4, 356:21, 378:15, 410:4, 410:13, 410:15, 421:22, 430:9, 435:10, 469:7, 482:25, 487:6, 515:3, 515:8, 515:9, 515:13, 515:16, 552:7
**placed** [2] - 355:12, 410:1
**placement** [2] - 364:12, 455:11
**plan** [37] - 319:13, 347:24, 359:24, 371:10, 395:12, 399:13, 399:15, 399:16, 399:23, 400:22, 402:7, 402:25, 405:4, 406:12, 406:21, 409:17, 415:16, 418:2, 421:2, 425:15, 429:18, 434:12, 435:25, 438:8, 439:13, 445:25, 446:14, 446:17, 453:12, 455:8, 456:15, 470:17, 484:25, 496:25, 498:13
**Plan** [7] - 401:5, 401:6, 401:20, 406:3, 433:25, 454:3, 454:10
**Plane** [1] - 390:14
**planned** [7] - 357:6, 367:11, 401:24, 402:23, 429:10, 432:5, 472:3
**planning** [3] - 415:18, 427:2, 438:14
**plans** [19] - 359:23, 367:14, 404:5, 404:14, 405:1, 406:15, 423:3, 429:23, 432:7, 437:18, 453:13, 453:14, 453:15, 453:24, 455:10, 474:20, 474:22, 483:7, 524:6
**plant** [2] - 468:11, 468:14

**plants** [2] - 419:2, 421:13
**plausible** [1] - 301:13
**play** [1] - 442:18
**plot** [1] - 345:20
**plug** [5] - 337:23, 438:3, 455:10, 474:21, 487:20
**plugged** [9] - 337:13, 337:14, 337:20, 338:2, 340:8, 371:4, 407:4, 407:17, 455:21
**plugging** [18] - 338:5, 340:3, 340:5, 406:14, 407:1, 407:16, 409:5, 409:11, 437:17, 438:8, 438:10, 438:13, 439:3, 440:9, 455:8, 455:10, 485:15, 485:17
**plugs** [11] - 336:21, 337:1, 338:11, 338:24, 339:10, 339:16, 339:20, 339:23, 360:6, 486:10, 487:12
**plume** [55] - 291:14, 291:17, 293:19, 313:4, 315:23, 319:9, 319:16, 343:6, 343:9, 344:12, 344:21, 345:18, 350:22, 364:16, 365:9, 365:11, 365:21, 365:24, 366:25, 367:2, 367:5, 368:1, 371:7, 371:10, 372:3, 372:10, 373:12, 373:17, 373:22, 390:18, 390:20, 390:22, 390:24, 415:22, 430:25, 431:6, 462:4, 462:12, 462:19, 463:6, 463:17, 463:21, 463:22, 463:23, 463:25, 464:1, 464:6, 464:7, 473:7, 473:15, 473:20, 473:23, 488:3, 499:25
**plus** [4] - 320:1, 320:2, 388:9, 388:18
**pockets** [1] - 349:2
**point** [60] - 290:14, 297:24, 298:5, 301:17, 301:19, 302:14, 302:21, 305:24, 306:11, 309:11, 309:21, 314:15, 321:6, 338:18, 344:17, 345:9, 356:10, 361:16, 369:11, 369:12, 373:19, 374:13, 378:16, 379:7, 379:13, 386:20, 402:24, 410:21, 410:25, 414:13, 429:1, 429:22, 438:16, 441:15, 442:19, 442:24, 444:14, 444:19, 445:5, 446:23, 451:20, 459:23, 460:12, 461:8, 462:13, 464:3, 466:5, 469:25, 474:21, 476:20, 492:20, 492:21, 492:22, 492:23, 497:2, 515:10, 526:14, 533:10, 548:17
**pointed** [1] - 450:21
**pointing** [1] - 336:12
**points** [21] - 294:20, 294:23, 297:20, 298:17, 304:24, 318:20, 351:7, 368:14, 372:18, 426:5, 443:4, 445:2, 445:4, 449:13, 453:6, 493:15, 495:1, 495:17, 531:12, 531:13, 534:16
**policies** [1] - 407:15
**policy** [1] - 407:21
**pollution** [3] - 407:14, 407:20, 438:21
**pool** [3] - 278:19, 280:22, 283:2
**Poplar** [7] - 539:4, 539:5, 539:12, 541:2, 541:3, 542:25, 543:1
**populate** [1] - 369:9
**populated** [1] - 376:20
**pore** [48] - 277:16, 277:17, 279:20, 279:21, 281:23, 292:4, 293:5, 321:19, 329:20, 330:1, 330:4, 330:12, 330:14, 330:16, 330:17, 330:18, 330:23, 332:4, 332:14, 332:18, 333:7, 333:10, 341:13, 342:6, 342:11, 342:15, 342:24, 349:15, 349:21, 349:24, 352:1, 352:10, 352:16, 353:10, 353:11, 353:12, 353:13, 353:17, 543:17, 543:21, 543:23, 544:3, 544:4, 544:6, 544:11, 544:16, 546:17, 548:16
**Pore** [1] - 450:14
**porosity** [27] - 344:24, 345:4, 345:6, 345:14, 349:20, 350:10, 351:2, 351:5, 352:16, 354:5, 368:16, 372:8, 372:21, 373:6, 376:5, 376:6, 376:21, 381:9, 382:24, 385:18, 385:19, 414:13, 414:19, 531:1, 533:8, 534:18, 541:25
**porosity/perm** [1] - 372:16
**portfolio** [1] - 405:23
**portfolios** [1] - 486:24
**portion** [2] - 450:25, 516:5
**pose** [1] - 361:12
**posed** [3] - 389:10, 390:1, 413:19
**position** [2] - 532:20, 547:17
**positive** [3] - 382:4, 382:25, 393:24
**possession** [3] - 296:7, 547:20, 547:21
**possibility** [1] - 532:7
**possible** [2] - 311:5, 311:7
**possibly** [2] - 414:21, 445:12
**post** [3] - 476:19, 477:22, 484:3
**postinjection** [11] - 320:2, 374:6, 399:16, 434:23, 456:14, 463:7, 463:11, 463:12, 463:16, 463:18, 473:19
**Postinjection** [1] - 454:2
**pot** [2] - 429:10, 429:20
**potential** [20] - 293:22, 302:19, 303:17, 305:25, 308:22, 314:20, 331:3, 338:19, 347:19, 347:20, 354:14, 364:19, 367:4, 405:13, 432:6, 466:23, 486:5, 487:8, 510:9, 542:25
**potentially** [18] - 314:6, 314:10, 314:23, 315:11, 316:16, 318:5, 325:12, 325:14, 330:8, 340:17, 365:10, 366:3, 372:22, 378:4, 380:17, 415:9, 469:14, 481:7
**Powder** [1] - 538:21
**POWELL** [18] - 396:1, 411:7, 412:5, 418:22, 420:9, 420:24, 423:19, 424:13, 425:7, 428:23, 433:3, 433:15, 433:22, 435:5, 436:5, 441:20, 490:3, 490:17
**Powell** [11] - 370:14, 395:22, 395:23, 396:10, 397:23, 478:7, 478:8, 484:11, 489:23, 496:11, 501:21
**POWELL/JOHN** [1] - 286:19
**POWELL/WADE** [1] - 287:15
**power** [1] - 468:12
**practice** [1] - 296:20
**Precambrian** [1] - 394:24
**precipitant** [1] - 377:23
**precipitating** [1] - 377:13
**precipitation** [3] - 378:15, 381:25, 391:1
**preclude** [1] - 333:5
**predicted** [7] - 325:15, 327:21, 372:9, 373:22, 463:19, 480:2, 481:2
**predicting** [2] - 351:5, 374:5
**predictions** [1] - 368:1
**predictive** [2] - 316:19, 321:12
**predominantly** [2] - 396:21, 425:20
**prefer** [2] - 472:12, 472:16
**preference** [1] - 310:23
**preinjection** [1] - 399:15
**prepare** [2] - 515:4, 524:21
**prepared** [2] - 477:5, 546:9
**preparing** [3] - 526:5, 546:3, 546:5
**present** [5] - 302:5, 302:13, 361:20, 451:12, 453:2
**PRESENT** [1] - 284:2
**presentations** [4] - 323:16, 324:3, 324:5, 324:9
**presented** [4] - 324:7, 378:16, 382:16, 462:20
**presenting** [1] - 375:2
**president** [1] - 539:6
**pressure** [176] - 313:4, 317:13, 326:24, 327:8, 327:12, 327:21, 327:24, 328:11, 328:14, 328:15, 328:16, 328:18, 329:4, 329:6, 329:19, 329:21, 329:24, 330:1, 330:5, 330:6, 330:13, 330:24, 331:2, 331:6, 331:8, 331:12, 331:14, 331:15, 331:20, 331:21, 332:3, 332:9, 332:11, 335:7, 335:9, 336:11, 338:7, 339:1, 339:22, 341:14, 342:15, 342:18, 342:19, 342:23, 342:25, 350:21, 358:9, 358:11, 358:17, 359:6, 364:16, 364:19, 365:13, 369:13, 369:15, 369:20, 369:23, 384:4, 384:14, 384:21, 385:7, 385:10, 386:2, 401:14, 402:19, 402:21, 412:22, 413:6, 413:10, 413:11, 413:15, 413:16, 418:5, 418:10, 424:24, 425:10, 425:25, 426:4, 426:11, 426:12, 426:13, 426:15, 426:22, 427:1, 427:5, 429:11, 430:3, 430:4, 452:12, 455:17, 457:19, 462:3, 462:5, 462:6, 462:7, 462:8, 462:9, 462:10, 462:15, 462:16, 462:18, 464:16, 464:17, 464:21, 464:23, 464:24, 465:1, 465:2, 465:4, 465:5, 465:8, 465:12, 469:2, 469:3, 469:5, 469:7, 470:18, 475:19, 475:22, 476:1, 476:5, 476:9, 476:14, 476:15, 476:18, 478:16,

478:23, 479:1, 479:2, 479:3, 479:5, 479:7, 479:11, 479:14, 479:15, 479:16, 479:19, 479:23, 480:18, 481:20, 483:9, 483:11, 484:2, 490:5, 490:8, 490:10, 490:12, 490:14, 490:18, 490:22, 491:25, 492:2, 492:4, 492:15, 492:18, 492:25, 493:1, 493:4, 493:13, 493:23, 494:9, 494:10, 494:12, 494:23, 494:24, 495:5, 495:7, 525:3, 543:12, 544:10, 544:13, 544:14
**pressures** [14] - 317:14, 319:15, 328:19, 331:17, 337:7, 426:3, 452:11, 454:7, 456:2, 476:3, 476:6, 485:3, 486:21, 487:7
**presume** [1] - 499:21
**pretend** [1] - 345:22
**pretty** [2] - 423:15, 541:20
**prevent** [2] - 309:8, 486:7
**preventing** [2] - 341:21, 342:5
**prevention** [2] - 427:17, 453:14
**Prevention** [1] - 401:5
**previous** [11] - 377:16, 378:24, 391:4, 406:20, 414:24, 436:23, 447:21, 459:11, 493:17, 519:8
**previously** [9] - 322:4, 324:14, 430:21, 448:8, 452:3, 452:25, 453:20, 458:16, 500:4
**primacy** [16] - 294:7, 507:18, 507:21, 508:1, 508:6, 512:8, 512:9, 514:23, 514:24, 515:8, 517:17, 518:6, 518:14, 519:3, 519:4, 525:25
**primarily** [5] - 401:12, 402:7, 504:21, 516:15, 546:22
**primary** [10] - 292:11, 377:12, 377:17, 387:12, 387:14, 387:23, 400:12, 485:7, 485:18, 543:2
**private** [1] - 506:1
**privilege** [2] - 302:4, 302:8
**privileged** [1] - 548:10
**privy** [3] - 307:11, 342:12, 486:11
**proactive** [1] - 431:4
**probable** [1] - 351:19
**probe** [3] - 427:24, 428:3, 428:8
**probes** [3] - 427:20, 428:12, 428:15
**problem** [3] - 475:4, 497:15, 513:11
**problematic** [1] - 320:6
**procedure** [1] - 516:24
**procedures** [4] - 495:6, 495:20, 496:1, 496:9
**proceed** [5] - 291:4, 389:6, 389:18, 458:6, 503:7
**proceedance** [1] - 315:6
**proceeding** [3] - 301:21, 328:23, 507:4
**PROCEEDINGS** [1] - 286:2
**proceedings** [3] - 289:1, 322:16, 552:6
**process** [12] - 290:22, 300:15, 314:9, 315:3, 323:15, 352:12, 379:21, 385:15, 507:12, 509:19, 542:12, 542:21
**procure** [4] - 297:10, 306:3, 306:20, 307:2
**procured** [2] - 296:24, 297:5
**procurement** [1] - 299:3
**produce** [3] - 304:22, 355:6, 547:12
**produced** [5] - 326:23, 348:9, 348:10, 348:11, 524:6
**Professional** [2] - 552:4, 552:18
**professional** [10] - 323:10, 398:23, 504:15, 505:14, 528:4, 529:14, 538:3, 538:4, 539:23, 540:11
**professor** [1] - 528:8
**profile** [2] - 402:18, 471:21
**program** [25] - 293:1, 409:22, 507:19, 507:20, 508:2, 508:3, 508:8, 508:10, 508:12, 508:20, 508:23, 509:15, 510:2, 511:10, 514:22, 514:24, 516:22, 517:7, 517:14, 518:21, 519:9, 522:8, 523:6, 523:11, 547:14
**Program** [1] - 511:3
**programs** [8] - 296:23, 297:3, 454:3, 508:14, 520:19, 522:5, 522:16, 523:15
**progressing** [1] - 431:7
**Project** [3] - 322:5, 322:17, 449:25
**project** [48] - 293:15, 296:25, 297:1, 297:13, 300:6, 305:1, 308:3, 322:5, 322:21, 329:3, 329:5, 331:22, 332:5, 332:20, 335:3, 339:3, 340:16, 341:10, 370:21, 394:21, 401:25, 408:20, 424:1, 434:11, 450:5, 450:7, 468:5, 507:8, 507:20, 512:3, 512:5, 515:24, 516:1, 516:19, 518:5, 520:12, 520:23, 528:18, 529:20, 529:22, 542:22, 543:6, 544:21, 545:19, 545:24, 546:5, 548:6, 549:1
**projected** [1] - 379:2
**projection** [2] - 363:19, 390:13
**projects** [14] - 396:23, 409:5, 506:11, 507:2, 507:5, 523:24, 524:1, 524:19, 542:9, 545:15, 545:22, 545:23, 546:4, 546:10
**promulgated** [1] - 293:8
**pronounce** [1] - 411:6
**propagation** [2] - 359:6, 413:15
**proper** [5] - 299:13, 300:8, 300:10, 340:23, 436:25
**properly** [2] - 425:24, 432:14
**properties** [15] - 316:15, 317:8, 317:20, 350:14, 363:5, 372:19, 376:8, 386:9, 485:13, 531:18, 533:4, 535:17, 545:4
**property** [9] - 311:13, 311:19, 315:15, 318:15, 318:16, 348:15, 351:9, 351:11, 352:14
**proportional** [1] - 352:22
**proposed** [16] - 296:18, 319:9, 327:25, 356:2, 356:23, 363:13, 367:7, 367:16, 368:24, 386:24, 407:24, 418:1, 427:20, 435:4, 442:23, 544:15
**proposes** [1] - 371:11
**proposing** [4] - 389:13, 438:12, 459:2, 459:8
**proprietary** [1] - 486:18
**propriety** [1] - 317:4
**prospective** [1] - 526:5
**protect** [2] - 293:20, 481:23
**protected** [1] - 339:13
**protecting** [1] - 293:11
**protection** [7] - 427:21, 428:19, 428:22, 442:23, 443:1, 443:22, 443:24
**protective** [1] - 371:6
**protocol** [3] - 308:18, 495:6, 495:13
**protocols** [1] - 495:22
**provide** [51] - 295:5, 295:19, 302:15, 302:17, 302:18, 303:17, 303:18, 303:22, 304:19, 305:21, 306:1, 319:2, 322:19, 363:22, 366:3, 370:11, 378:4, 380:15, 380:17, 380:21, 382:6, 382:11, 383:2, 386:10, 390:9, 391:5, 392:4, 394:1, 398:18, 399:8, 401:15, 403:21, 405:3, 406:4, 406:22, 410:5, 411:17, 411:19, 433:17, 435:22, 437:5, 437:14, 439:10, 467:1, 476:25, 485:8, 491:7, 506:14, 520:18, 541:17, 547:22
**provideable** [1] - 378:1
**provided** [42] - 294:24, 295:1, 295:7, 295:11, 295:13, 295:19, 295:23, 297:20, 297:23, 298:4, 298:6, 298:9, 298:13, 298:16, 301:24, 302:1, 304:11, 304:21, 305:3, 305:6, 305:11, 348:8, 397:11, 411:24, 412:2, 432:18, 433:12, 434:8, 436:24, 437:10, 445:11, 490:25, 491:3, 495:22, 508:3, 509:18, 524:23, 531:16, 533:2, 534:20, 544:18, 547:17
**provider** [1] - 438:18
**provides** [4] - 477:8, 509:1, 510:7, 510:10
**providing** [5] - 305:23, 310:2, 392:11, 436:11, 468:7
**proximity** [4] - 319:11, 356:5, 433:13, 459:12
**prudent** [2] - 460:10, 474:7
**PSC** [5] - 412:2, 412:9, 435:7, 477:10, 477:19
**psi** [27] - 332:10, 336:11, 337:9, 338:8, 339:19, 340:1, 342:15, 342:21, 342:22, 413:9, 414:25, 415:1, 415:4, 425:10, 425:11, 426:15, 426:16, 429:12, 430:2, 462:15, 465:1, 465:5, 465:6, 469:8, 470:13, 470:18
**public** [1] - 301:6
**Public** [2] - 412:7, 477:5
**publicly** [3] - 299:22, 299:25, 533:16
**publish** [1] - 496:8
**published** [2] - 347:1, 386:23
**pull** [3] - 298:24, 505:5, 529:1

**pulling** [1] - 510:20
**pulse** [3] - 401:21, 401:23, 402:12
**pump** [9] - 422:16, 425:25, 426:2, 469:5, 469:6, 476:5, 476:10, 476:12, 476:13
**pumped** [1] - 413:9
**pumps** [1] - 425:22
**punch** [1] - 375:19
**punted** [1] - 432:25
**purchase** [1] - 539:2
**purely** [1] - 372:13
**purity** [3] - 366:11, 366:25, 367:1
**purpose** [9] - 291:25, 292:1, 293:11, 317:15, 400:12, 405:1, 405:2, 475:10, 478:12
**purposes** [2] - 323:6, 376:15
**pursuant** [3] - 293:2, 393:14, 443:19
**pursuit** [1] - 507:23
**put** [11] - 290:21, 298:25, 299:8, 299:11, 300:22, 340:13, 347:24, 432:11, 516:21, 521:24, 534:5
**putting** [5] - 307:14, 371:11, 469:12, 469:14, 469:16

## Q

**QC** [1] - 299:13
**qualifications** [3] - 505:14, 539:24, 540:12
**quality** [12] - 300:16, 316:18, 354:15, 354:17, 354:19, 354:20, 354:22, 355:2, 355:7, 418:22, 504:21, 524:4
**Quality** [1] - 507:6
**quantify** [1] - 358:5
**quantity** [1] - 544:2
**quarter** [1] - 491:21
**quarterly** [1] - 440:7
**Queen's** [1] - 528:2
**questioning** [3] - 303:6, 322:1, 496:12
**questions** [88] - 318:20, 332:21, 348:4, 355:14, 355:15, 355:19, 355:20, 358:15, 360:22, 361:5, 362:10, 363:17, 369:24, 370:4, 371:22, 371:25, 377:19, 389:6, 389:10, 389:18, 389:25, 390:5, 390:9, 391:7, 392:7, 392:8, 392:9, 392:13, 392:22, 393:17, 393:20, 394:5, 395:12, 397:22, 397:24, 399:2, 403:2, 404:20, 408:4, 409:10, 410:20, 410:25, 411:2, 411:10, 411:15, 413:17, 427:16, 437:25, 447:17, 447:20, 450:20, 458:1, 461:1, 461:14, 467:6, 467:11, 468:20, 468:21, 468:23, 471:3, 471:12, 472:19, 472:24, 474:23, 475:2, 484:10, 496:16, 502:17, 502:19, 512:20, 512:22, 516:17, 517:10, 520:14, 521:19, 525:13, 525:14, 526:24, 532:15, 535:20, 536:23, 536:24, 537:3, 545:9, 548:3, 550:9, 550:10
**quick** [6] - 290:11, 333:13, 405:4, 407:12, 484:12, 503:14
**quicker** [1] - 535:19
**quickly** [3] - 379:7, 381:7, 416:19
**quite** [2] - 534:17, 542:10

## R

**radius** [1] - 541:22
**raise** [4] - 395:24, 398:4, 403:6, 408:8
**raised** [2] - 501:15, 501:17
**ran** [14] - 299:14, 317:12, 317:24, 318:2, 318:8, 318:14, 321:10, 324:18, 326:5, 340:14, 367:12, 413:23, 462:14, 546:14
**ranching** [1] - 506:1
**randomly** [1] - 351:1
**Range** [59] - 277:7, 277:9, 277:11, 277:12, 277:13, 277:21, 277:22, 278:1, 278:2, 278:3, 278:10, 278:11, 278:14, 278:15, 278:16, 278:20, 278:22, 279:1, 279:2, 279:3, 279:11, 279:14, 279:16, 279:16, 280:1, 280:4, 280:5, 280:6, 280:14, 280:16, 280:18, 280:19, 280:23, 281:2, 281:4, 281:5, 281:13, 281:15, 281:16, 281:18, 281:20, 282:3, 282:4, 282:5, 282:8, 282:9, 282:15, 282:17, 282:18, 282:20, 282:22, 283:3, 283:4, 283:5, 283:8, 283:9, 373:10, 423:15, 429:3
**range** [14] - 300:24, 301:14, 342:21, 394:15, 404:1, 415:5, 425:10, 425:13, 425:15, 425:17, 425:18, 426:3, 427:6, 549:13
**ranges** [2] - 374:12, 385:19
**rare** [1] - 507:10
**rate** [18] - 328:3, 328:8, 331:11, 423:23, 424:12, 424:17, 463:24, 463:25, 464:2, 464:3, 470:8, 470:12, 473:16, 480:16, 480:19, 483:8, 483:11, 483:13
**rated** [2] - 340:1, 486:20
**rates** [9] - 317:13, 321:7, 331:3, 331:7, 332:6, 333:9, 340:14, 425:3, 452:11
**rather** [3] - 369:7, 484:5, 491:5
**ratings** [2] - 464:23, 469:4
**ratio** [2] - 315:23, 421:2
**rattle** [1] - 466:4
**Raymond** [10] - 371:3, 430:19, 487:20, 487:22, 488:4, 488:8, 488:16, 488:21, 489:12, 489:17
**re** [12] - 277:3, 277:15, 278:5, 278:18, 279:7, 279:18, 280:8, 280:21, 281:9, 281:21, 282:11, 283:1
**reach** [1] - 488:3
**reached** [2] - 342:9, 446:1
**reaches** [3] - 422:12, 441:15, 492:23
**reactions** [3] - 360:18, 486:6, 486:8
**reactive** [1] - 366:8
**read** [8] - 305:12, 305:14, 320:22, 320:23, 374:21, 389:14, 420:10, 521:11
**readily** [3] - 377:24, 473:21, 473:25
**reading** [2] - 443:21, 521:12
**readings** [1] - 401:15
**reads** [2] - 387:10, 445:18
**ready** [9] - 393:17, 413:4, 458:20, 512:10, 512:11, 512:15, 532:11, 544:21, 544:24
**real** [4] - 333:13, 381:6, 428:5, 503:14
**realization** [1] - 350:11
**reallocate** [1] - 497:22
**really** [9] - 346:8, 399:24, 400:23, 405:3, 405:19, 406:12, 425:19, 431:8, 550:5
**reason** [5] - 291:25, 292:11, 307:3, 376:17, 419:3
**reasonability** [1] - 323:19
**reasonable** [1] - 373:21
**reasoning** [1] - 365:15
**reasons** [1] - 365:17
**rebalance** [1] - 443:6
**recalled** [1] - 467:6
**recalling** [2] - 416:2, 447:18
**receipt** [1] - 397:13
**receive** [1] - 532:13
**Received** [2] - 288:12, 288:17
**received** [7] - 392:7, 392:9, 392:10, 395:18, 475:18, 512:14, 525:25
**receiver** [9] - 354:22, 355:1, 355:6, 355:10, 422:4, 422:5, 422:13, 475:15, 475:18
**receivers** [3] - 354:25, 355:5, 355:11
**recently** [4] - 392:25, 529:17, 540:2, 542:23
**recess** [1] - 551:8
**Recessed** [6] - 321:22, 389:1, 447:7, 503:4, 551:5, 551:11
**recite** [1] - 392:18
**recognize** [1] - 326:18
**recognized** [3] - 386:21, 446:12
**recollect** [1] - 425:24
**recollection** [3] - 419:15, 482:17, 518:22
**recommend** [2] - 469:19, 532:25
**recommendation** [3] - 439:1, 498:12, 550:6
**recommendations** [3] - 479:8, 509:2, 532:20
**recommending** [1] - 442:12
**recomplete** [1] - 338:12
**reconciled** [2] - 421:6, 421:15
**reconfigured** [1] - 443:10
**reconvened** [5] - 321:22, 389:1, 447:7, 503:4, 551:5
**record** [19] - 289:2, 289:5, 290:21, 321:25, 327:18, 389:4, 396:9, 398:11, 403:13, 408:15, 417:3, 447:10, 461:9, 467:22, 503:7, 518:3, 551:4, 551:8, 552:7
**Record** [2] - 305:14, 320:23
**recorded** [1] - 552:5
**recordkeeping** [2] - 508:15, 511:1
**Recordkeeping** [1] - 511:4
**records** [2] - 340:3, 340:5
**recovery** [11] - 538:18, 539:4, 542:12, 542:20,

542:21, 542:25, 545:15, 545:23, 546:4, 546:13, 546:15
**recreate** [2] - 299:23, 301:11
**Recross** [1] - 287:13
**RECROSS** [1] - 473:4
**Recross-Examination** [1] - 287:13
**RECROSS-EXAMINATION** [1] - 473:4
**recycled** [1] - 542:19
**Red** [1] - 536:16
**red** [7] - 348:18, 348:20, 349:2, 349:10, 350:25, 373:20, 373:25
**REDIRECT** [5] - 389:22, 448:5, 458:12, 461:20, 526:16
**Redirect** [5] - 286:16, 287:8, 287:9, 287:10, 287:25
**redirect** [3] - 525:15, 537:1, 550:12
**redistribute** [1] - 545:4
**redraw** [1] - 314:21
**redrill** [1] - 338:11
**reduce** [6] - 311:10, 311:16, 354:14, 354:16, 466:8, 483:10
**reduced** [4] - 317:22, 483:8, 483:13, 485:21
**reduces** [3] - 311:17, 330:14, 330:18
**reducing** [1] - 312:2
**reduction** [1] - 345:21
**reevaluate** [1] - 373:22
**reevaluated** [1] - 509:5
**reevaluation** [6] - 313:12, 314:5, 318:24, 319:4, 350:17, 509:6
**refer** [6] - 318:3, 409:18, 445:8, 488:10, 488:17, 521:3
**reference** [11] - 316:4, 377:8, 386:17, 407:12, 431:14, 439:19, 470:10, 484:23, 491:12, 512:18
**referenced** [11] - 298:19, 298:21, 327:19, 386:16, 469:3, 493:10, 508:19, 509:12, 510:1, 513:22, 521:23
**references** [2] - 309:1, 393:8
**referencing** [5] - 382:1, 382:23, 383:15, 387:4, 428:24
**referred** [1] - 514:3
**referring** [6] - 295:8, 304:1, 385:22, 406:25, 413:12, 449:19
**refine** [1] - 443:13
**refined** [1] - 443:15
**refinement** [3] - 363:24, 364:1, 364:2
**refinery** [1] - 504:18
**reflect** [5] - 356:15, 411:17, 505:13, 539:22, 540:11
**reflected** [1] - 385:20
**reflecting** [2] - 314:19, 411:22
**regarding** [8] - 309:21, 310:14, 314:4, 373:17, 394:11, 474:9, 509:2, 530:15
**regardless** [5] - 321:5, 336:25, 444:3, 473:16, 512:7
**regimes** [1] - 509:13
**region** [2] - 293:14, 372:7
**Registered** [2] - 552:3, 552:18
**regular** [1] - 485:15
**regulation** [5] - 293:1, 314:3, 490:19, 493:22, 511:11
**regulations** [23] - 291:22, 292:4, 292:15, 292:16, 293:19, 294:4, 294:5, 294:6, 294:7, 313:11, 367:15, 397:7, 404:8, 410:11, 454:19, 462:9, 485:6, 507:9, 507:11, 508:21, 510:3, 515:4, 515:11
**regulator** [1] - 466:16
**regulatory** [9] - 291:16, 328:12, 328:16, 367:20, 367:23, 436:22, 495:23, 496:8, 509:13
**relate** [1] - 457:22
**related** [21] - 304:25, 308:3, 311:24, 312:3, 312:21, 321:19, 322:16, 323:22, 341:4, 360:22, 363:18, 368:13, 371:2, 418:17, 427:17, 441:13, 454:5, 456:13, 474:24, 512:13, 543:8
**relates** [8] - 384:14, 415:3, 421:20, 437:16, 440:4, 449:16, 477:20, 489:22
**relation** [4] - 308:20, 309:1, 334:19, 450:7
**relationship** [1] - 482:22
**relative** [3] - 392:3, 413:5, 524:17
**relatively** [1] - 521:21
**release** [9] - 476:18, 477:1, 480:2, 480:9, 481:6, 481:21, 492:9, 493:6, 493:11
**released** [5] - 439:6, 481:2, 481:14, 492:6, 493:8
**releases** [2] - 308:22, 493:1
**relevance** [1] - 541:7
**relevant** [1] - 342:1
**relied** [1] - 508:11
**relief** [17] - 475:22, 475:25, 476:1, 478:13, 478:18, 478:20, 478:22, 480:4, 480:10, 484:2, 490:5, 490:9, 491:24, 492:2, 492:13, 493:3, 494:9
**relies** [1] - 495:14
**relieve** [5] - 478:23, 480:15, 490:5, 494:12, 495:7
**relieved** [2] - 492:1, 492:5
**relieves** [4] - 492:23, 492:24, 493:3, 494:10
**reluctantly** [1] - 465:16
**remain** [1] - 441:16
**remainder** [2] - 290:17, 397:4
**remaining** [3] - 290:15, 416:18, 467:10
**remains** [2] - 452:19, 453:25
**remedial** [6] - 404:13, 404:24, 405:1, 439:13, 440:21, 506:16
**Remedial** [2] - 433:25, 454:9
**remediation** [3] - 407:18, 506:16, 524:5
**remember** [7] - 320:21, 392:21, 451:1, 468:22, 488:2, 494:1, 494:20
**reminder** [4] - 404:11, 448:4, 458:10, 461:18
**remove** [1] - 544:1
**removed** [1] - 475:20
**rename** [1] - 387:3
**renaming** [1] - 386:24
**repeat** [8] - 311:15, 317:3, 356:4, 488:20, 489:9, 490:17, 520:9, 529:7
**repeated** [1] - 342:4
**rephrase** [2] - 420:17, 518:11
**replacement** [4] - 440:6, 441:2, 441:5, 481:22
**replicate** [5] - 299:23, 301:5, 325:18, 325:24, 326:3
**replugged** [1] - 338:14
**Report** [2] - 386:23, 400:19
**report** [2] - 444:21, 464:25
**REPORTER** [2] - 490:15, 552:1
**reporter** [1] - 453:7
**Reporter** [2] - 552:4, 552:18
**Reporter.....** [1] - 286:8
**reporting** [4] - 398:17, 400:19, 421:4, 511:1
**Reporting** [3] - 400:20, 400:21, 511:4
**reports** [4] - 298:14, 324:4, 522:9, 549:25
**represent** [6] - 331:20, 357:15, 381:18, 383:25, 414:19, 513:4
**representative** [7] - 296:11, 302:11, 302:13, 381:13, 386:7, 414:2, 414:6
**represented** [5] - 335:14, 375:4, 382:17, 382:20, 387:5
**representing** [2] - 344:22, 345:23
**represents** [3] - 349:19, 369:17, 369:18
**request** [6] - 294:25, 304:1, 432:11, 439:6, 460:20, 460:21
**requested** [7] - 296:6, 301:23, 305:14, 320:23, 367:21, 514:18, 521:20
**requesting** [4] - 277:4, 279:8, 281:10, 533:22
**requests** [1] - 547:1
**require** [17] - 277:17, 279:20, 281:23, 292:4, 293:19, 294:6, 313:5, 313:11, 314:13, 335:4, 341:9, 367:15, 420:1, 437:20, 438:4, 442:2, 469:17
**required** [22] - 277:19, 279:22, 282:1, 293:21, 293:24, 293:25, 298:12, 306:3, 318:24, 330:10, 330:11, 336:23, 338:7, 338:16, 352:5, 367:18, 429:24, 430:2, 437:3, 462:8, 509:19, 544:19
**requirement** [7] - 292:8, 292:11, 336:25, 366:10, 442:2, 487:1, 512:7
**requirements** [3] - 294:10, 323:22, 443:23
**requires** [2] - 314:14, 430:3
**requiring** [1] - 454:20
**reran** [1] - 418:10
**rerun** [2] - 313:9, 324:1
**resampled** [1] - 420:7
**Research** [1] - 303:14
**research** [5] - 389:12, 521:13, 528:6, 528:18, 528:23
**reserves** [2] - 355:24, 431:18
**reserving** [1] - 417:14
**reservoir** [47] - 277:16, 279:20, 281:22, 291:24, 292:2, 296:3, 297:25, 317:22, 327:8, 328:9, 329:25, 330:5, 331:8, 337:7, 342:16, 348:7,

350:23, 355:10, 365:18, 379:2, 384:4, 384:23, 390:17, 391:11, 391:12, 394:17, 402:2, 402:5, 402:16, 402:19, 402:22, 431:1, 454:22, 456:16, 487:13, 487:18, 531:2, 531:18, 531:23, 533:4, 535:17, 538:6, 538:13, 539:3, 542:3, 542:15, 543:9
**reservoirs** [1] - 543:15
**residential** [2] - 537:20, 537:21
**residents** [1] - 435:10
**resistance** [2] - 428:7, 485:9
**resistant** [8] - 410:12, 410:16, 438:9, 454:21, 484:23, 485:14, 487:2, 487:19
**resistive** [2] - 361:20, 361:25
**resistivity** [1] - 428:9
**resolution** [3] - 354:15, 354:16, 372:20
**resolving** [1] - 372:21
**resonance** [2] - 413:23, 414:12
**resource** [1] - 506:17
**Resources** [3] - 289:9, 340:12, 539:6
**resources** [5] - 341:9, 404:1, 405:8, 405:12, 504:7
**respect** [23] - 296:11, 304:23, 309:5, 320:24, 352:13, 390:13, 391:16, 404:24, 409:16, 417:2, 442:22, 446:19, 468:16, 487:14, 495:23, 496:25, 501:23, 505:22, 507:10, 507:12, 540:23, 541:16, 542:7
**respond** [9] - 290:16, 303:4, 384:21, 389:17, 390:5, 420:8, 461:15, 461:24, 467:10
**responders** [2] - 405:17, 405:24
**responding** [1] - 350:21
**responds** [1] - 384:4
**response** [16] - 304:9, 378:3, 386:12, 404:13, 404:25, 405:1, 405:4, 405:13, 434:12, 436:1, 439:13, 440:5, 440:22, 441:1, 495:18, 550:14
**Response** [2] - 433:25, 454:10
**responses** [1] - 390:10
**responsibilities** [3] - 409:3, 468:16, 516:18
**responsibility** [4] - 278:7, 280:11, 282:13, 486:19
**responsible** [1] - 516:15
**rest** [2] - 345:24, 434:11
**restart** [2] - 325:9, 325:10
**restate** [5] - 319:20, 320:19, 463:7, 464:18, 465:9
**result** [17] - 311:22, 313:3, 314:10, 314:20, 315:25, 331:13, 331:14, 365:11, 365:23, 390:23, 418:9, 450:20, 455:4, 462:10, 462:12, 486:1, 518:2
**resulted** [1] - 507:7
**results** [9] - 295:3, 309:24, 316:12, 316:17, 367:19, 414:21, 418:7, 457:4, 457:13
**resume** [4] - 289:11, 290:11, 321:25, 551:9
**retained** [1] - 520:24
**retrieved** [1] - 475:21
**reverse** [2] - 379:16, 435:18
**reverses** [1] - 379:13
**review** [55] - 292:7, 292:9, 292:10, 292:23, 293:10, 293:14, 293:24, 295:12, 300:17, 309:2, 314:21, 315:12, 318:23, 319:10, 323:15, 328:1, 329:16, 333:25, 334:8, 334:9, 334:12, 334:14, 334:18, 334:20, 334:21, 335:5, 336:7, 336:23, 348:7, 353:24, 371:3, 402:6, 431:23, 444:17, 452:17, 452:22, 453:3, 488:5, 496:14, 508:8, 508:15, 509:3, 509:5, 514:21, 521:2, 525:5, 525:6, 526:4, 530:11, 532:12, 548:22, 548:23, 549:21, 550:16
**Review** [1] - 452:15
**reviewed** [21] - 323:25, 324:2, 360:1, 488:5, 506:23, 507:11, 509:12, 511:9, 518:16, 519:6, 521:6, 521:8, 521:10, 533:10, 533:13, 533:14, 533:16, 548:18, 549:22, 549:23, 550:5
**reviewing** [9] - 393:12, 431:6, 496:4, 507:20, 516:11, 518:2, 520:25, 524:5, 549:5
**reviews** [2] - 324:3, 405:7
**revised** [1] - 483:8
**revisit** [1] - 469:15
**RFP** [2] - 507:7, 507:17
**RI** [1] - 386:22
**ribbing** [1] - 338:19
**Rich** [1] - 392:21
**Richard** [1] - 411:15
**RICHARD** [1] - 284:4
**Richland** [1] - 538:21
**Richter** [3] - 334:24, 335:1, 335:23
**rig** [2] - 438:5, 438:7
**rights** [3] - 311:13, 311:19, 341:4
**rise** [1] - 480:12
**risk** [4] - 361:12, 388:11, 479:6, 489:19
**risk-based** [2] - 388:11, 489:19
**risks** [1] - 510:9
**River** [6] - 386:18, 386:20, 386:24, 387:3, 392:24, 538:21
**road** [1] - 497:19
**rock** [6] - 317:20, 344:24, 345:12, 377:22, 504:21, 543:13
**Rockies** [1] - 528:12
**rocks** [1] - 349:20
**role** [1] - 523:20
**roles** [2] - 323:23, 468:13
**room** [1] - 289:8
**rough** [2] - 379:3, 470:23
**roughly** [3] - 348:16, 412:8, 425:11
**routinely** [1] - 522:8
**row** [4] - 450:11, 450:13, 452:14, 452:16
**rows** [1] - 401:2
**royalties** [2] - 320:16, 412:12
**royalty** [1] - 357:22
**rule** [4] - 393:7, 430:3, 512:2, 526:9
**rules** [19] - 279:6, 281:8, 283:12, 292:20, 292:21, 292:22, 293:6, 293:9, 335:4, 338:5, 454:19, 513:19, 515:2, 516:25, 517:7, 517:10, 517:12, 517:22, 526:9
**run** [33] - 315:17, 317:8, 318:11, 318:15, 323:9, 324:12, 324:18, 324:20, 325:4, 325:7, 325:25, 326:3, 326:8, 333:12, 337:12, 338:7, 340:15, 363:10, 426:6, 444:9, 444:15, 473:14, 512:15, 517:15, 521:21, 522:1, 544:19, 544:22, 544:25, 545:7, 546:9, 546:12
**running** [17] - 317:1, 317:5, 318:19, 318:22, 319:1, 324:25, 325:2, 325:22, 346:22, 417:4, 444:8, 512:12, 542:11, 545:24, 546:3, 546:5
**RUST** [1] - 285:9
**résumé** [2] - 505:10, 539:21

## S

**SACROC** [1] - 538:14
**safe** [3] - 405:4, 405:6, 478:19
**Safe** [3] - 292:12, 292:18, 293:2
**safeguard** [1] - 467:1
**safeguards** [2] - 309:7, 309:10
**safely** [1] - 319:3
**safety** [5] - 319:17, 403:20, 405:25, 479:12, 504:19
**saline** [1] - 524:6
**salinity** [1] - 365:19
**salt** [2] - 543:12, 543:14
**saltwater** [5] - 409:7, 524:17, 524:20, 524:22, 525:8
**sample** [16] - 317:20, 365:3, 365:4, 375:25, 376:2, 381:11, 381:13, 381:20, 385:17, 385:18, 385:22, 385:23, 386:3, 414:6, 420:13
**sampled** [3] - 359:12, 359:20, 376:1
**samples** [5] - 359:14, 370:18, 376:4, 381:3, 418:19
**Sampling** [1] - 457:3
**sampling** [10] - 359:22, 359:24, 360:3, 368:14, 400:15, 402:10, 430:8, 431:20, 452:18
**sand** [4] - 359:4, 413:20, 414:2, 414:19
**sandstone** [3] - 374:11, 374:22, 414:11
**sandstones** [1] - 376:1
**SARA** [1] - 284:8
**sat** [1] - 534:22
**saturated** [2] - 391:20
**saturation** [11] - 344:22, 344:23, 345:1, 345:3, 345:10, 346:3, 346:4, 358:10, 358:11, 464:10, 473:11
**saturations** [1] - 402:13
**save** [2] - 389:13, 475:5
**saw** [3] - 363:15, 390:25, 493:9
**SCADA** [1] - 397:12
**scale** [5] - 327:4, 345:21,

356:24, 423:16, 423:18
**scale's** [1] - 329:11
**scenario** [6] - 439:21, 439:24, 481:3, 489:16, 489:18, 497:18
**Schedule** [1] - 400:21
**schedule** [1] - 419:4
**scheduling** [2] - 417:5, 417:17
**Schlumberger** [1] - 486:24
**Schlumberger's** [1] - 544:20
**school** [1] - 540:6
**science** [6] - 396:19, 398:21, 398:22, 408:24, 504:10, 537:25
**sciences** [1] - 404:2
**scope** [2] - 297:14, 306:18
**scratch** [1] - 299:22
**SCS** [2] - 466:6, 482:8
**SCS1** [3] - 336:4, 441:16, 442:1
**SCS2** [2] - 407:23
**SCS3** [3] - 407:23, 458:25, 460:9
**Scurry** [1] - 538:14
**seal** [5] - 429:10, 429:20, 528:16, 528:17, 528:19
**Seattle** [1] - 504:20
**second** [9] - 393:3, 405:10, 434:18, 439:18, 441:12, 441:21, 449:21, 463:10, 472:1
**second-to-last** [2] - 441:12, 441:21
**secondary** [4] - 387:24, 429:23, 435:20, 495:3
**seconds** [2] - 494:7, 495:2
**section** [19] - 348:16, 348:19, 348:21, 364:24, 401:3, 409:23, 410:8, 410:9, 413:7, 434:15, 445:18, 449:17, 450:14, 453:10, 454:1, 454:2, 460:8, 465:3, 478:15
**Section** [52] - 281:13, 282:2, 282:15, 283:2, 358:15, 359:25, 363:18, 370:3, 373:11, 383:4, 388:4, 399:3, 404:13, 404:17, 405:3, 406:2, 409:16, 412:21, 418:13, 423:14, 429:2, 431:14, 433:24, 434:3, 437:23, 443:19, 449:16, 450:24, 451:20, 451:24, 452:1, 452:4, 452:9, 452:15, 453:10, 453:11, 453:21, 454:8, 454:14, 454:17, 455:7, 455:14, 456:6, 459:5, 459:9, 460:4, 462:15, 464:24, 469:25, 470:1, 470:11, 471:19
**sections** [6] - 344:20, 361:9, 388:22, 401:9, 406:16, 450:3
**Sections** [54] - 277:7, 277:8, 277:9, 277:12, 277:13, 277:20, 277:21, 277:22, 278:1, 278:2, 278:9, 278:10, 278:12, 278:14, 278:15, 278:20, 278:21, 278:22, 279:1, 279:2, 279:11, 279:12, 279:14, 279:16, 279:23, 280:1, 280:4, 280:5, 280:13, 280:14, 280:17, 280:18, 280:22, 280:23, 281:3, 281:4, 281:13, 281:15, 281:16, 281:19, 282:3, 282:4, 282:5, 282:8, 282:15, 282:17, 282:18, 282:21, 283:3, 283:4, 283:5, 283:8, 374:8, 437:17
**secured** [3] - 445:19, 445:22, 446:21
**see** [43] - 327:4, 327:23, 327:24, 329:9, 329:13, 329:15, 336:12, 345:2, 345:19, 348:22, 348:25, 349:7, 353:21, 355:21, 356:19, 356:22, 369:19, 372:5, 372:9, 373:3, 375:1, 379:8, 400:2, 417:24, 418:3, 420:16, 431:2, 431:6, 432:20, 449:15, 449:18, 450:11, 450:16, 471:9, 496:2, 496:9, 498:1, 502:8, 507:21, 514:6, 523:14, 549:3, 550:17
**seeing** [4] - 415:2, 466:23, 494:24, 507:14
**seem** [4] - 502:3, 515:15, 526:7, 526:11
**segment** [11] - 421:25, 422:10, 423:1, 442:14, 481:8, 490:7, 492:3, 492:25, 493:4, 494:18, 495:9
**segments** [5] - 490:7, 490:9, 492:3, 493:20, 493:25
**seismic** [36] - 343:14, 346:25, 347:11, 354:13, 354:15, 354:18, 354:20, 355:7, 358:7, 358:8, 363:8, 363:12, 363:14, 371:8, 372:15, 372:17, 372:20, 373:2, 394:20, 402:23, 430:22, 431:5, 444:8, 444:10, 444:15, 451:8, 483:18, 483:19, 528:21, 530:20, 530:21, 531:17, 531:21, 531:22, 532:13, 533:6
**seismicity** [6] - 402:25, 432:5, 432:6, 432:15, 445:2, 445:6
**seismometer** [1] - 432:16
**seismometers** [2] - 403:1, 432:8
**selected** [3] - 311:2, 364:14, 365:5
**selection** [2] - 468:19, 487:5
**send** [5] - 300:22, 366:12, 424:6, 424:7, 424:8
**senior** [1] - 398:16
**sense** [5] - 315:19, 362:5, 369:21, 391:19, 517:19
**sensitive** [3] - 390:21, 390:22, 428:9
**sensitivities** [1] - 542:11
**sensitivity** [23] - 310:8, 316:4, 316:7, 316:9, 316:13, 317:1, 317:6, 317:8, 317:10, 317:12, 317:17, 317:21, 317:24, 318:2, 318:3, 318:4, 318:12, 318:16, 318:19, 319:1, 321:10, 351:14, 544:25
**sent** [1] - 304:2
**sentence** [2] - 375:17, 445:17
**sentences** [1] - 511:24
**separate** [4] - 358:11, 438:15, 439:5, 469:21
**separated** [1] - 359:16
**separately** [2] - 295:20, 422:22
**sequence** [1] - 444:15
**sequester** [1] - 544:3
**sequestration** [14] - 293:15, 397:16, 400:24, 403:19, 408:20, 422:5, 422:12, 422:24, 443:10, 443:12, 512:4, 512:6, 529:20, 546:21
**serve** [2] - 362:19, 363:5
**Service** [2] - 412:7, 477:6
**services** [5] - 445:19, 445:21, 504:5, 506:9, 506:14
**set** [25] - 292:19, 294:7, 323:9, 326:8, 347:16, 368:17, 394:4, 410:1, 410:3, 410:13, 426:5, 438:9, 460:14, 460:23, 469:4, 469:6, 479:12, 479:19, 492:19, 492:21, 492:23, 493:15, 494:25, 495:17, 535:6
**setback** [1] - 435:4
**setbacks** [1] - 435:5
**sets** [7] - 292:14, 295:5, 298:4, 304:14, 304:19, 304:22, 323:20
**setting** [3] - 426:22, 507:19, 543:10
**seven** [2] - 337:24, 523:24
**several** [12] - 325:24, 343:12, 393:8, 394:22, 463:16, 504:25, 507:5, 516:7, 523:2, 529:16, 538:19, 542:8
**SFP** [1] - 449:16
**shake** [1] - 466:4
**shale** [2] - 387:11, 538:20
**shallower** [1] - 355:3
**Shane** [12] - 503:10, 503:15, 503:22, 503:24, 505:6, 505:21, 513:12, 520:17, 521:17, 525:19, 526:1
**SHANE** [2] - 287:20, 503:17
**shape** [1] - 372:3
**shapefiles** [4] - 295:4, 295:11, 295:14, 326:18
**Sheridan** [1] - 284:17
**shift** [1] - 406:1
**shining** [1] - 478:17
**shoe** [2] - 410:4, 410:16
**short** [5] - 373:18, 378:2, 445:11, 521:21
**shorter** [1] - 455:5
**shorthand** [2] - 552:6, 552:11
**shortly** [1] - 444:16
**show** [6] - 329:25, 331:17, 350:8, 359:14, 362:12, 448:7
**showed** [4] - 309:25, 360:16, 414:12, 424:23
**showing** [6] - 327:20, 344:20, 368:7, 370:6, 378:18, 463:17
**shown** [6] - 360:11, 361:11, 364:6, 368:23, 383:14, 424:1
**shows** [7] - 356:19, 356:20, 361:19, 364:4, 378:13, 421:18, 531:25
**shut** [5] - 331:12, 467:2, 481:16, 490:8, 494:11
**shutdown** [2] - 422:18, 493:14
**sic** [2] - 411:5, 513:3
**sic]** [1] - 411:8
**side** [8] - 311:12, 355:4, 376:25, 378:14, 419:12, 421:7, 422:1, 426:1
**signature** [2] - 420:6, 420:15

**signed** [1] - 482:21
**significance** [2] - 445:4, 466:19
**significant** [6] - 332:3, 341:25, 349:1, 376:9, 387:20, 473:18
**significantly** [4] - 330:25, 346:6, 444:20, 485:21
**signing** [1] - 526:19
**siltstone** [7] - 368:8, 368:12, 368:15, 376:16, 376:20, 385:25
**similar** [9] - 360:9, 382:13, 382:21, 435:6, 453:13, 453:14, 453:15, 454:4, 510:4
**similarly** [9] - 322:7, 324:10, 330:3, 362:8, 362:23, 363:3, 365:12, 365:15, 424:15
**simple** [1] - 541:20
**simply** [3] - 399:17, 481:23, 491:7
**simulate** [3] - 331:24, 332:2, 463:15
**simulated** [5] - 344:21, 346:1, 384:14, 385:3, 452:7
**simulation** [43] - 292:6, 292:23, 293:21, 295:2, 297:25, 316:12, 316:17, 321:17, 363:18, 364:5, 364:8, 364:13, 364:20, 365:2, 365:14, 366:14, 366:21, 367:12, 369:5, 374:11, 374:18, 375:11, 375:13, 379:24, 380:24, 383:18, 383:19, 418:5, 452:2, 452:6, 457:13, 462:20, 463:14, 463:19, 531:9, 531:10, 532:1, 538:8, 538:13, 539:3, 542:24
**simulations** [6] - 296:1, 300:5, 315:21, 324:1, 325:23, 369:15
**simulator** [2] - 325:16, 384:20
**single** [7] - 300:1, 385:17, 385:22, 385:23, 386:3, 397:20, 442:8
**sit** [4] - 298:24, 410:23, 416:13, 416:14
**Site** [1] - 454:2
**site** [44] - 310:5, 318:6, 342:22, 347:25, 350:13, 364:18, 365:6, 397:16, 404:5, 406:15, 407:18, 414:17, 422:5, 422:12, 425:23, 428:16, 429:13, 429:14, 432:8, 432:12, 433:4, 436:20, 436:24, 441:3, 442:11, 442:15, 451:10, 451:16, 452:9, 452:20, 452:24, 453:25, 456:1, 456:14, 456:16, 456:24, 457:4, 457:8, 457:13, 458:25, 470:16, 529:18, 529:21
**site-specific** [14] - 318:6, 342:22, 350:13, 365:6, 432:12, 441:3, 451:10, 451:16, 452:9, 452:20, 452:24, 456:1, 456:24, 457:8
**sites** [17] - 327:22, 347:4, 356:23, 364:14, 407:13, 415:15, 421:12, 421:14, 422:6, 433:5, 436:18, 436:20, 452:7, 462:18, 477:1, 510:10, 524:3
**sits** [2] - 329:15, 339:15
**situ** [4] - 359:5, 413:22, 415:16, 451:5
**situation** [8] - 380:18, 490:1, 495:10, 495:21, 496:22, 497:25, 499:7, 499:14
**six** [4] - 367:8, 415:20, 523:23, 529:25
**size** [25] - 300:19, 311:10, 312:2, 315:24, 318:13, 319:9, 325:6, 363:23, 367:5, 384:18, 390:18, 390:20, 390:22, 415:22, 416:5, 422:8, 438:5, 462:4, 462:19, 480:13, 491:6, 491:17, 499:23, 550:2
**skipping** [1] - 333:19
**Skull** [1] - 402:12
**Slash** [5] - 362:24, 415:4, 415:9, 455:2, 455:25
**slated** [1] - 470:25
**slightly** [4] - 309:25, 350:19, 440:20, 456:12
**Slope** [1] - 387:1
**slope** [1] - 379:9
**slow** [3] - 404:9, 405:9, 453:7
**slowed** [1] - 464:4
**slowly** [1] - 405:15
**slows** [1] - 379:10
**SM** [2] - 538:17, 538:24
**small** [6] - 311:5, 311:7, 423:15, 423:18, 493:4, 504:6
**smaller** [6] - 311:21, 320:3, 346:2, 365:11, 365:24, 384:22
**Smith** [2] - 552:3, 552:17
**SMITH** [1] - 285:9
**software** [9] - 304:7, 304:12, 306:3, 306:20, 306:22, 522:1, 522:11, 522:16, 544:20
**soil** [6] - 402:8, 402:9, 430:8, 471:21, 471:24, 472:3
**solutions** [1] - 415:14
**Solutions** [5] - 396:12, 404:7, 408:18, 443:21, 468:3
**someone** [10] - 322:11, 322:14, 322:23, 348:6, 411:3, 436:14, 501:20, 517:15, 546:12, 547:12
**sometimes** [1] - 436:9
**somewhat** [2] - 535:2, 535:16
**somewhere** [2] - 374:13, 519:14
**sonic** [2] - 413:24, 414:9
**sorry** [39] - 290:25, 296:9, 297:17, 333:18, 335:14, 346:22, 350:5, 351:9, 351:16, 377:4, 379:7, 380:11, 393:19, 405:10, 415:8, 420:17, 424:14, 433:6, 433:23, 434:21, 437:6, 438:1, 441:22, 442:7, 445:17, 447:15, 462:24, 464:8, 471:7, 471:13, 476:16, 489:10, 490:17, 492:12, 499:21, 510:22, 525:16, 550:15, 550:23
**sort** [4] - 448:22, 449:1, 524:25, 550:5
**sounds** [5] - 301:13, 469:9, 474:25, 515:21, 524:8
**source** [20] - 354:21, 354:25, 355:1, 355:4, 355:5, 355:6, 355:10, 355:11, 410:2, 410:6, 418:17, 419:12, 419:24, 420:12, 420:14, 420:20, 420:23, 421:13, 443:4, 489:1
**sources** [13] - 293:16, 293:20, 293:23, 294:1, 366:12, 366:16, 411:18, 418:18, 419:16, 419:20, 420:3, 420:7, 439:14
**South** [2] - 390:14, 537:21
**south** [5] - 335:25, 336:4, 336:6, 336:8, 336:9
**southwest** [4] - 335:13, 335:25, 369:18, 372:6
**space** [50] - 277:16, 277:17, 279:20, 279:21, 281:22, 281:23, 292:4, 293:6, 321:19, 329:20, 330:1, 330:4, 330:12, 330:15, 330:16, 330:17, 330:19, 330:23, 332:4, 332:14, 332:18, 333:7, 333:10, 341:13, 342:6, 342:11, 342:15, 342:24, 349:15, 349:21, 349:24, 352:2, 352:10, 352:17, 353:10, 353:12, 353:13, 353:17, 410:22, 543:17, 543:21, 543:23, 544:3, 544:4, 544:6, 544:11, 544:17, 546:17, 548:16
**Space** [1] - 450:14
**speaking** [5] - 323:14, 345:20, 486:4, 504:3, 510:5
**Spearfish** [1] - 381:18
**Spearfish/Opeche** [2] - 358:19, 412:25
**spec** [2] - 418:23, 419:5
**special** [5] - 279:6, 281:8, 283:12, 436:16, 437:2
**specialist** [1] - 398:17
**specialize** [1] - 485:1
**specialized** [1] - 485:23
**specific** [53] - 294:9, 296:13, 304:11, 304:15, 318:6, 340:4, 342:22, 343:1, 350:13, 351:3, 351:6, 354:25, 365:6, 367:14, 380:16, 384:11, 410:10, 430:15, 432:9, 432:12, 436:7, 439:22, 440:2, 440:3, 441:3, 451:10, 451:16, 452:9, 452:20, 452:22, 452:24, 453:25, 454:6, 455:13, 456:1, 456:24, 457:4, 457:8, 457:12, 457:14, 460:8, 474:12, 482:14, 485:13, 486:11, 506:10, 507:2, 516:18, 519:1, 522:9, 526:9, 543:8, 549:9
**specifically** [25] - 294:19, 301:23, 309:3, 309:5, 311:3, 315:11, 354:17, 358:24, 361:9, 361:16, 362:12, 415:3, 417:4, 421:19, 424:2, 433:20, 445:22, 477:21, 507:10, 508:12, 511:2, 521:23, 522:6, 523:3, 542:7
**specification** [2] - 418:15, 419:10
**specifications** [1] - 419:23
**specifics** [2] - 518:24, 519:25
**specified** [2] - 400:21, 483:13
**specify** [1] - 450:16
**speculate** [1] - 300:18

**speculation** [1] - 332:25
**speed** [3] - 300:20, 488:14, 542:13
**spell** [3] - 467:25, 503:23, 527:18
**spend** [5] - 383:8, 448:21, 456:20, 468:6, 549:5
**spent** [8] - 404:3, 456:4, 542:10, 545:13, 548:5, 548:8, 549:1, 549:19
**spike** [3] - 476:2, 476:9, 493:13
**split** [1] - 438:23
**splits** [1] - 423:5
**splotches** [1] - 349:10
**spring** [1] - 478:22
**springs** [1] - 452:25
**square** [5] - 413:7, 464:5, 464:11, 473:9, 531:11
**SR3** [2] - 295:3, 298:3
**St** [1] - 527:25
**stabilization** [3] - 463:23, 473:7, 473:8
**stabilized** [8] - 372:4, 373:12, 373:17, 463:6, 463:22, 464:8, 473:20, 473:22
**stable** [1] - 463:21
**stack** [2] - 419:1, 419:22
**STAFF** [1] - 284:2
**staff** [22] - 298:12, 300:7, 355:16, 390:1, 392:13, 393:17, 396:16, 397:24, 398:19, 404:20, 408:22, 409:10, 411:10, 436:17, 437:11, 447:18, 459:8, 461:25, 502:19, 525:15, 536:25, 550:11
**stages** [2] - 455:5, 455:6
**standard** [8] - 296:20, 397:3, 423:23, 424:18, 479:18, 491:18, 495:25
**standpoint** [1] - 524:11
**Stanton** [2] - 363:10, 363:13
**start** [30] - 291:15, 297:17, 299:22, 305:24, 307:6, 343:20, 346:22, 355:20, 370:5, 371:24, 372:2, 399:23, 411:13, 411:14, 421:24, 439:20, 449:5, 449:6, 449:24, 456:22, 466:23, 472:19, 473:13, 484:16, 497:17, 498:17, 528:3, 530:14, 537:16, 548:7
**started** [8] - 360:3, 379:1, 448:12, 448:18, 513:21, 515:18, 538:5, 539:9
**starting** [3] - 307:4, 367:13, 409:22
**starts** [2] - 379:4, 394:11
**startup** [1] - 539:9
**State** [8] - 390:14, 403:25, 435:8, 504:11, 508:3, 513:16, 514:22, 539:2
**state** [27] - 294:6, 341:9, 358:23, 396:8, 398:10, 403:12, 408:14, 420:20, 420:21, 425:18, 427:1, 467:21, 469:18, 503:22, 506:2, 507:14, 512:9, 518:6, 518:13, 519:2, 519:4, 527:17, 537:15, 537:16, 538:19, 540:22, 541:12
**statement** [15] - 308:21, 388:7, 426:20, 431:18, 432:17, 446:6, 446:20, 460:24, 519:8, 524:12, 534:9, 534:10, 545:16, 545:25, 547:24
**statements** [1] - 506:18
**states** [3] - 419:7, 466:6, 471:20
**statewide** [1] - 446:11
**static** [1] - 545:2
**station** [6] - 421:9, 422:15, 426:2, 471:21, 471:24, 472:3
**stations** [3] - 425:25, 432:10, 432:16
**statute** [1] - 515:12
**statutes** [4] - 292:8, 514:25, 515:6, 515:9
**statutory** [1] - 515:3
**stay** [1] - 351:25
**step** [2] - 400:8, 465:25
**Stephanie** [2] - 552:3, 552:17
**STEPHEN** [1] - 284:7
**stepping** [1] - 400:1
**steps** [3] - 351:18, 414:4, 464:3
**still** [29] - 291:5, 291:6, 291:11, 301:4, 313:16, 319:2, 321:2, 322:21, 330:16, 330:22, 331:16, 333:7, 333:9, 355:5, 378:11, 378:14, 379:12, 380:23, 381:15, 394:3, 434:5, 443:14, 448:4, 458:10, 461:16, 461:18, 512:8, 527:10, 550:22
**stimulation** [1] - 532:1
**stipulations** [1] - 293:5
**STOLLDORF** [18] - 284:5, 370:2, 370:12, 370:15, 370:16, 371:18, 432:23, 433:24, 435:1, 435:3, 436:13, 437:7, 437:16, 439:11, 441:8, 463:9, 463:20, 464:13
**Stolldorf.....** [2] - 286:14, 287:4
**stop** [3] - 466:6, 466:15, 481:15
**stoplight** [7] - 465:19, 465:20, 465:21, 465:25, 466:5, 474:4, 483:17
**stopped** [1] - 480:23
**stops** [2] - 331:6, 331:7
**Storage** [21] - 277:4, 277:15, 277:19, 278:6, 279:4, 279:8, 279:19, 279:23, 280:8, 280:9, 281:6, 281:10, 281:21, 282:1, 282:11, 283:10, 306:18, 403:17, 448:10, 449:18, 455:14
**STORAGE** [3] - 284:18, 284:19, 284:19
**storage** [146] - 277:5, 277:6, 277:16, 277:18, 277:19, 278:8, 278:9, 279:5, 279:9, 279:10, 279:20, 279:22, 279:23, 280:11, 280:12, 281:7, 281:11, 281:12, 281:22, 282:1, 282:2, 282:13, 282:14, 283:11, 291:24, 292:2, 292:3, 292:5, 292:17, 293:5, 295:10, 295:11, 300:4, 310:19, 311:5, 311:11, 311:17, 311:21, 312:2, 313:16, 314:4, 314:11, 314:17, 314:21, 315:16, 318:22, 324:11, 326:20, 327:13, 329:17, 330:12, 330:15, 330:19, 334:3, 335:14, 335:25, 336:7, 347:3, 349:15, 349:24, 351:23, 352:19, 352:23, 353:4, 353:16, 353:17, 353:23, 355:25, 356:4, 356:18, 357:10, 357:18, 357:20, 358:16, 359:2, 359:19, 360:24, 361:12, 363:9, 363:11, 366:12, 373:13, 373:23, 379:2, 388:8, 388:18, 393:5, 393:13, 394:22, 394:23, 397:9, 402:2, 402:4, 402:16, 402:18, 407:3, 407:7, 407:16, 421:3, 427:19, 429:13, 429:18, 429:25, 431:1, 441:25, 451:1, 451:16, 454:4, 454:7, 454:18, 455:20, 456:10, 456:12, 457:7, 457:17, 458:24, 458:25, 459:2, 459:9, 459:15, 459:19, 459:20, 459:25, 460:6, 460:21, 460:22, 482:8, 496:15, 496:24, 497:20, 497:23, 498:15, 498:19, 498:22, 499:23, 500:2, 500:17, 502:14, 534:13, 539:10, 539:11, 539:13, 543:12, 543:15, 546:6
**store** [4] - 310:6, 330:23, 333:6, 544:2
**stored** [3] - 331:4, 332:8, 353:9
**straight** [1] - 315:23
**strat** [1] - 387:6
**strategy** [1] - 432:12
**stratigraphic** [10] - 298:15, 357:17, 359:2, 359:10, 369:7, 386:22, 453:21, 453:22, 454:24, 457:11
**stream** [21] - 366:4, 400:4, 400:23, 400:25, 401:10, 412:13, 412:14, 418:15, 418:21, 419:13, 420:6, 420:13, 420:22, 428:5, 485:4, 501:24, 501:25, 502:1, 502:11, 502:12, 502:14
**Stream** [1] - 401:3
**streams** [1] - 419:8
**Street** [2] - 285:5, 537:22
**Stress** [1] - 394:12
**stress** [6] - 359:5, 413:14, 413:22, 415:16, 451:5, 543:13
**strike** [3] - 515:22, 547:25, 549:18
**string** [2] - 410:9, 410:15
**stringent** [4] - 292:21, 293:3, 294:5, 294:8
**strong** [1] - 543:3
**structure** [3] - 300:2, 434:5, 466:24
**structures** [3] - 370:7, 370:9, 373:4
**studies** [8] - 317:21, 318:3, 318:4, 343:12, 347:1, 418:20, 480:8, 538:18
**study** [1] - 480:11
**subject** [6] - 279:4, 281:5, 283:9, 330:24, 341:13, 404:21
**subjugated** [1] - 428:4
**submission** [1] - 298:11
**submit** [3] - 508:6, 512:3, 524:24
**submittal** [1] - 534:20
**submitted** [18] - 303:24, 304:1, 315:12, 326:18,

378:8, 391:4, 420:2, 438:20, 477:5, 514:1, 517:1, 530:11, 536:2, 536:7, 536:10, 536:12, 536:18, 548:19
**submitting** [2] - 460:18, 507:25
**subscription** [1] - 306:15
**subscriptions** [4] - 297:3, 297:8, 306:10, 307:14
**substances** [5] - 330:15, 330:19, 349:15, 502:11, 502:16
**substantial** [2] - 367:20, 427:6
**substantially** [1] - 418:7
**subsurface** [6] - 327:21, 341:8, 350:18, 358:6, 397:17, 528:25
**suction** [1] - 426:1
**sufficient** [7] - 313:16, 355:1, 355:6, 362:6, 362:19, 368:17, 466:3
**suggest** [2] - 343:13, 373:5
**suggesting** [1] - 442:12
**Suggs** [1] - 411:15
**SUGGS** [18] - 284:4, 371:20, 388:21, 393:20, 393:23, 394:8, 394:10, 395:10, 437:6, 437:8, 437:15, 441:10, 442:16, 447:2, 448:14, 448:17, 466:18, 467:4
**Suggs.....** [1] - 286:17
**Suggs.....** [2] - 286:15, 287:5
**suitable** [1] - 525:4
**Suite** [2] - 284:12, 285:4
**suited** [2] - 309:14, 516:9
**summarization** [1] - 487:4
**Summary** [2] - 448:11, 449:25
**summary** [7] - 399:8, 413:13, 424:1, 449:11, 450:6, 450:8, 468:7
**Summit** [104] - 277:3, 277:15, 277:19, 278:5, 279:4, 279:7, 279:18, 279:22, 280:8, 280:9, 281:6, 281:9, 281:21, 282:1, 282:11, 283:10, 289:19, 290:15, 296:13, 296:16, 297:2, 297:7, 301:21, 302:8, 302:9, 302:11, 302:13, 302:22, 302:23, 304:21, 305:4, 305:7, 305:11, 305:19, 306:18, 307:5, 308:2, 309:21, 310:2, 310:4, 310:14, 310:23, 311:1, 312:1, 312:8, 313:8, 313:13, 314:7, 318:18, 321:18, 326:18, 329:22, 330:9, 332:5, 332:16, 335:3, 337:5, 340:15, 341:12, 341:21, 342:5, 342:8, 342:13, 352:15, 352:18, 353:3, 358:1, 366:16, 370:21, 371:11, 396:12, 399:19, 403:17, 404:7, 408:18, 409:1, 409:7, 420:12, 430:25, 431:18, 432:7, 432:11, 442:1, 443:21, 449:18, 459:2, 459:8, 459:17, 460:9, 468:3, 468:17, 486:13, 496:13, 496:22, 497:19, 498:18, 500:16, 501:1, 501:9, 501:15, 501:17, 513:4, 522:12, 530:12
**SUMMIT** [3] - 284:18, 284:18, 284:19
**Summit's** [18] - 296:10, 304:25, 310:23, 311:4, 312:21, 322:25, 329:3, 330:7, 331:10, 333:4, 340:16, 341:14, 341:24, 353:11, 364:14, 460:20, 496:25, 499:3
**sun** [1] - 478:17
**Sundry** [1] - 430:1
**super** [2] - 425:18, 427:1
**superintendent** [1] - 468:14
**supervisory** [1] - 397:18
**supplement** [8] - 382:6, 382:12, 383:3, 391:6, 392:5, 394:3, 429:5, 429:7
**supplemental** [9] - 378:3, 378:9, 380:20, 386:14, 412:16, 412:18, 433:12, 437:10, 445:12
**supplements** [1] - 394:2
**supplied** [3] - 477:9, 523:8, 534:1
**supply** [6] - 412:18, 429:5, 434:14, 443:21, 446:16, 525:1
**support** [2] - 323:11, 372:18
**supported** [1] - 372:15
**sureties** [1] - 439:5
**surety** [6] - 407:14, 407:19, 438:12, 438:13, 438:15, 438:21
**Surface** [2] - 401:4, 402:7
**surface** [31] - 308:3, 308:23, 336:15, 338:11, 339:14, 356:6, 357:1, 357:5, 400:5, 401:10, 403:1, 409:22, 409:23, 409:25, 410:3, 410:4, 410:5, 410:18, 432:1, 452:24, 454:20, 464:22, 466:7, 474:24, 476:19, 488:7, 488:21, 489:2, 489:11, 489:22, 524:11
**surge** [3] - 426:6, 493:18
**surrounding** [3] - 293:14, 331:1, 446:3
**Survey** [1] - 298:11
**survey** [3] - 363:8, 363:14, 394:20
**surveys** [4] - 371:8, 402:23, 430:22, 451:8
**susceptible** [1] - 358:8
**suspected** [1] - 363:10
**sustained** [2] - 500:21, 501:7
**swear** [3] - 467:14, 503:14, 503:16
**swelling** [1] - 542:17
**SWENSON** [1] - 285:7
**Swenson** [12] - 289:25, 329:12, 340:14, 340:18, 341:1, 341:12, 341:16, 341:19, 342:1, 342:5, 342:9, 342:13
**Swenson's** [3] - 329:20, 332:4, 342:16
**switch** [1] - 510:15
**sworn** [10] - 396:2, 398:6, 403:8, 408:10, 461:16, 467:12, 467:17, 503:18, 527:13, 537:11
**system** [45] - 378:23, 390:13, 397:5, 397:11, 397:12, 397:15, 397:16, 397:18, 397:19, 412:1, 421:1, 421:22, 422:3, 425:20, 427:22, 427:23, 428:19, 428:20, 429:10, 429:14, 435:23, 442:23, 443:1, 443:5, 443:6, 443:25, 445:1, 445:14, 465:19, 465:20, 465:22, 466:1, 466:6, 474:4, 475:23, 476:3, 482:18, 482:19, 483:6, 483:17, 483:18, 485:8, 486:18, 490:1, 490:2
**system's** [1] - 435:9
**systems** [3] - 435:16, 484:3, 494:9


## T


**tabbed** [1] - 326:13
**table** [9] - 289:13, 368:23, 382:16, 399:25, 418:14, 423:22, 425:9, 436:14, 449:11
**Table** [24] - 368:19, 381:15, 382:14, 386:17, 399:8, 399:10, 399:17, 399:22, 406:10, 406:25, 407:15, 413:12, 418:14, 419:7, 423:22, 424:16, 427:6, 439:19, 440:5, 448:11, 456:3, 464:19, 464:24, 465:3
**Tables** [1] - 399:14
**TABOR** [1] - 284:6
**tailored** [1] - 485:8
**Talisman** [1] - 528:10
**TAMARA** [1] - 284:5
**Tammy** [3] - 464:15, 468:22, 471:16
**tank** [1] - 429:13
**tanks** [1] - 429:18
**target** [2] - 359:5, 413:21
**targeted** [1] - 402:4
**targeting** [1] - 310:17
**taught** [1] - 528:7
**tax** [1] - 332:16
**TB** [27] - 334:9, 358:17, 360:19, 361:18, 368:5, 368:25, 370:16, 399:11, 407:1, 407:11, 413:2, 421:17, 423:6, 424:2, 431:16, 433:2, 433:21, 434:19, 449:18, 449:20, 450:9, 451:11, 453:2, 453:18, 455:20, 457:18, 488:13
**TDS** [3] - 364:24, 365:8, 365:10
**team** [5] - 302:22, 445:9, 516:3, 516:16, 516:18
**teams** [1] - 436:1
**Tech** [2] - 538:1, 540:7
**technical** [3] - 310:3, 341:5, 486:15
**technically** [1] - 298:16
**techniques** [1] - 343:14
**Technological** [2] - 408:25, 540:8
**TED** [2] - 288:3, 527:12
**Ted** [7] - 527:2, 527:6, 527:19, 527:20, 529:2, 530:10
**temperature** [22] - 365:13, 365:21, 365:23, 366:1, 390:18, 390:19, 390:23, 401:14, 402:14, 402:18, 402:20, 402:21, 427:4, 427:5, 457:19, 478:25, 480:12, 481:20, 492:10, 492:11, 543:13, 544:10
**temperatures** [4] - 317:14, 452:11, 485:3, 487:8

**temporarily** [1] - 544:2
**temporary** [3] - 297:8, 306:10, 331:15
**ten** [15] - 321:21, 331:17, 374:6, 434:22, 440:8, 447:5, 463:11, 463:12, 463:18, 495:2, 503:3, 523:24, 549:11, 549:12, 549:16
**ten-minute** [3] - 321:21, 447:5, 503:3
**ten-year** [5] - 374:6, 434:22, 440:8, 463:11, 463:12
**tense** [1] - 502:3
**term** [1] - 378:2
**terminate** [1] - 394:25
**terminus** [9] - 309:11, 421:9, 429:1, 441:15, 442:7, 442:9, 469:25, 476:20, 484:3
**terms** [12] - 293:3, 297:24, 300:19, 340:24, 400:25, 459:18, 459:22, 460:12, 460:15, 498:12, 498:13
**tertiary** [2] - 387:22, 388:2
**test** [23] - 298:15, 316:19, 318:7, 318:8, 357:17, 359:3, 359:5, 359:10, 359:23, 367:17, 369:7, 413:14, 414:3, 414:13, 414:21, 415:16, 415:18, 417:24, 418:4, 419:1, 419:22, 454:24, 530:24
**test/monitoring** [1] - 453:23
**tested** [4] - 490:11, 490:13, 490:20, 490:23
**testified** [33] - 307:16, 308:11, 308:17, 309:24, 312:17, 312:21, 332:19, 338:15, 359:25, 366:18, 379:20, 396:2, 398:6, 402:24, 403:8, 408:10, 430:21, 444:6, 450:5, 451:2, 451:13, 452:3, 452:17, 453:5, 453:20, 467:17, 473:6, 474:8, 488:6, 503:18, 520:5, 527:13, 537:11
**testify** [3] - 309:15, 517:9, 534:6
**testifying** [3] - 456:8, 474:25, 478:5
**testimony** [33] - 308:14, 312:14, 326:2, 343:5, 343:7, 355:23, 357:4, 366:9, 378:8, 378:24, 380:19, 386:13, 390:2, 394:16, 417:23, 432:4, 445:12, 449:14, 450:9, 459:11, 472:25, 482:4, 482:7, 491:13, 492:18, 493:17, 496:19, 516:14, 520:4, 521:18, 521:22, 533:9, 534:9
**testing** [24] - 298:13, 316:21, 319:12, 358:18, 367:10, 371:9, 385:10, 399:4, 399:12, 399:18, 399:23, 404:4, 406:15, 412:23, 413:18, 417:22, 418:1, 451:19, 453:11, 453:14, 453:16, 465:3, 480:1, 530:24
**tests** [5] - 358:22, 400:13, 413:21, 413:23, 451:5
**Texas** [2] - 538:7, 538:15
**that'd** [4] - 375:19, 406:8, 474:7, 525:12
**that'll** [3] - 388:21, 421:15, 438:18
**THE** [4] - 284:18, 285:6, 285:7, 490:15
**themselves** [3] - 457:22, 491:18, 494:5
**there'd** [1] - 486:4
**therefore** [3] - 381:12, 457:13, 488:5
**Therefore** [1] - 388:8
**thermal** [18] - 475:25, 478:12, 478:18, 478:20, 478:22, 480:4, 480:10, 480:13, 481:2, 481:14, 483:25, 490:5, 492:12, 492:13, 492:18, 493:1, 493:3, 512:17
**they've** [1] - 446:12
**thick** [1] - 414:10
**thickest** [1] - 387:11
**thickness** [13] - 350:2, 350:10, 352:16, 354:5, 357:13, 357:16, 374:11, 374:22, 374:24, 375:2, 387:20, 428:10, 469:4
**thicknesses** [1] - 372:21
**THIEL** [1] - 284:6
**thin** [1] - 361:9
**thinking** [3] - 294:18, 312:12, 417:6
**thinnest** [1] - 375:4
**third** [6] - 298:5, 366:16, 418:17, 419:8, 449:22, 480:11
**third-party** [3] - 366:16, 418:17, 419:8
**THOMAS** [1] - 284:15
**thousand** [4] - 332:10, 351:10, 364:2
**three** [99] - 297:12, 298:14, 301:1, 326:21, 327:22, 329:16, 331:1, 340:20, 355:24, 356:3, 356:4, 356:18, 356:25, 357:6, 357:10, 357:20, 359:1, 359:9, 359:10, 359:12, 359:19, 359:23, 360:24, 361:3, 361:6, 363:9, 364:20, 365:3, 365:5, 365:7, 367:8, 369:7, 394:22, 397:8, 400:17, 405:18, 405:20, 407:10, 408:1, 415:3, 421:3, 422:20, 422:21, 425:3, 425:9, 425:16, 427:18, 431:17, 432:15, 433:18, 434:17, 435:22, 435:24, 440:21, 441:17, 446:17, 449:12, 450:7, 451:3, 451:6, 451:7, 451:17, 451:22, 452:5, 452:7, 452:19, 453:12, 453:17, 454:4, 454:12, 454:18, 455:6, 455:10, 456:10, 456:11, 456:24, 457:7, 457:17, 459:14, 464:20, 470:9, 474:10, 474:11, 481:10, 481:25, 491:21, 501:6, 512:12, 521:4, 521:8, 531:5, 532:9, 533:11, 534:16, 543:24, 550:21
**three-month** [1] - 297:12
**three-quarter** [1] - 491:21
**threshold** [3] - 452:12, 465:22, 467:1
**THRONE** [1] - 284:15
**Throne** [2] - 284:15, 289:18
**throughout** [6] - 359:22, 393:7, 397:12, 401:24, 420:25, 435:24
**tie** [2] - 325:2, 372:25
**tight** [1] - 494:23
**timeline** [1] - 482:14
**today** [25] - 289:18, 291:1, 298:23, 315:7, 324:14, 332:11, 333:2, 339:15, 404:12, 432:13, 438:22, 446:6, 449:13, 450:6, 451:2, 460:19, 482:25, 498:13, 506:22, 513:5, 518:19, 519:6, 519:22, 530:12, 532:20
**together** [8] - 298:24, 307:15, 397:10, 432:12, 446:13, 459:19, 460:17, 531:6
**Tom** [2] - 289:17, 289:18
**tomorrow** [2] - 291:3, 551:9
**ton** [1] - 320:12
**Tongue** [5] - 386:18, 386:20, 386:24, 387:3, 392:24
**tons** [10] - 423:25, 424:3, 424:5, 424:8, 424:19, 424:21, 470:24, 481:4, 481:10, 481:25
**took** [5] - 349:9, 349:11, 386:2, 389:24, 516:22
**tool** [3] - 292:17, 511:24, 512:6
**top** [9] - 357:15, 376:12, 394:25, 426:8, 449:15, 473:17, 485:20, 494:1, 543:4
**topic** [2] - 508:25, 509:17
**topically** [1] - 510:6
**topside** [2] - 468:5, 468:18
**total** [8] - 332:7, 352:21, 407:10, 407:23, 420:22, 456:11, 470:14, 473:15
**totally** [1] - 446:7
**touch** [1] - 400:3
**touched** [2] - 401:7, 438:11
**tours** [1] - 405:25
**towards** [3] - 376:1, 385:1
**towns** [1] - 446:3
**Township** [59] - 277:7, 277:9, 277:11, 277:12, 277:13, 277:20, 277:22, 278:1, 278:2, 278:3, 278:10, 278:11, 278:14, 278:15, 278:16, 278:20, 278:22, 279:1, 279:1, 279:2, 279:11, 279:14, 279:15, 279:16, 280:1, 280:3, 280:5, 280:6, 280:13, 280:16, 280:17, 280:18, 280:23, 281:2, 281:3, 281:4, 281:13, 281:14, 281:15, 281:18, 281:19, 282:2, 282:4, 282:5, 282:8, 282:9, 282:15, 282:16, 282:18, 282:20, 282:21, 283:2, 283:4, 283:5, 283:8, 283:9, 373:10, 423:15, 429:3
**townships** [1] - 356:25
**track** [1] - 371:10
**tract** [3] - 354:6, 354:25, 358:1
**tracts** [1] - 354:13
**traffic** [3] - 445:1, 483:6, 483:18
**Trail** [1] - 536:16
**training** [5] - 435:25, 436:11, 436:24, 437:2, 437:12
**TRANSCRIPT** [1] - 283:15
**transcript** [1] - 552:11
**transect** [1] - 362:18
**transfer** [8] - 299:17, 299:21, 300:13, 300:15, 301:10, 421:6, 441:13, 442:4

**transferred** [2] - 300:8, 300:10
**transition** [1] - 466:19
**transmissibility** [2] - 362:2, 362:5
**transmissible** [1] - 362:20
**transmission** [2] - 412:1, 428:21
**transport** [4] - 391:7, 391:10, 391:18, 391:25
**Transport** [1] - 482:9
**transportation** [1] - 397:14
**trapping** [3] - 378:13, 378:19, 379:10
**travel** [1] - 339:12
**traveled** [1] - 401:10
**traveling** [1] - 347:7
**Travis** [1] - 463:5
**TRAVIS** [1] - 284:5
**treat** [2] - 352:18, 353:3
**treating** [1] - 320:10
**treatment** [1] - 504:22
**tree** [1] - 495:24
**trend** [1] - 379:4
**triangle** [4] - 336:6, 336:10, 369:16, 369:18
**triangulate** [1] - 432:14
**tried** [2] - 441:2, 518:22
**trigger** [1] - 481:15
**trip** [1] - 481:17
**trouble** [1] - 460:2
**troubleshoot** [1] - 326:7
**troubleshooted** [1] - 326:10
**true** [1] - 379:1
**TRUST** [1] - 285:7
**try** [7] - 303:3, 453:6, 472:16, 472:22, 475:5, 526:14, 544:14
**trying** [12] - 341:16, 341:20, 341:23, 342:2, 369:11, 477:15, 497:10, 514:12, 518:20, 521:7, 524:4, 545:4
**tubing** [8] - 438:5, 438:6, 453:19, 455:17, 455:18, 455:23, 457:19, 492:14
**tubing-conveyed** [3] - 453:19, 455:17, 457:19
**tubing/casing** [1] - 429:11
**Tundra** [2] - 322:5, 322:17
**turbine** [1] - 433:20
**turn** [7] - 335:6, 475:7, 508:16, 509:8, 509:22, 511:21, 539:14
**two** [54] - 290:12, 292:14, 297:11, 298:2, 298:4, 299:19, 299:20, 301:2, 301:3, 301:9, 307:22, 325:7, 335:12, 347:24, 357:17, 360:12, 369:20, 380:2, 385:23, 387:3, 387:5, 389:16, 391:23, 397:1, 404:6, 404:20, 404:24, 407:13, 409:14, 411:1, 423:13, 428:15, 433:10, 438:15, 442:17, 444:9, 444:10, 444:12, 444:20, 446:12, 453:21, 455:1, 455:5, 464:5, 470:13, 486:23, 492:2, 492:4, 492:15, 494:8, 511:24, 531:6, 546:20
**two-month** [1] - 297:11
**two-year** [1] - 444:20
**Ty** [1] - 302:6
**TYLER** [1] - 284:10
**Type** [1] - 400:2
**type** [11] - 324:4, 357:9, 357:14, 357:20, 435:9, 478:21, 487:21, 507:13, 514:21, 547:8, 550:1
**types** [1] - 400:7
**typewritten** [1] - 552:10
**typical** [5] - 317:21, 318:3, 318:4, 425:10, 437:20
**typically** [10] - 323:15, 325:6, 340:1, 373:6, 419:2, 425:15, 426:21, 491:14, 491:20, 492:16
**typo** [4] - 374:15, 374:16, 471:19, 472:3

## U

**U.S** [4] - 336:17, 390:15, 396:24, 528:24
**UIC** [5] - 291:21, 292:15, 292:19, 292:20, 293:6
**ultimate** [1] - 329:4
**ultimately** [5] - 319:14, 402:5, 508:5, 516:25, 517:11
**unacceptable** [1] - 510:10
**unaltered** [1] - 512:19
**unavailable** [1] - 436:10
**uncertain** [1] - 305:16
**uncertainties** [1] - 357:25
**uncertainty** [4] - 316:14, 351:8, 351:15, 372:23
**under** [26] - 291:5, 291:7, 291:11, 291:21, 292:12, 292:18, 296:13, 342:16, 397:18, 407:19, 434:3, 435:7, 437:12, 443:14, 445:17, 448:4, 458:10, 461:18, 471:19, 481:7, 481:25, 483:6, 487:3, 497:17, 509:4, 512:2
**undergone** [1] - 543:2
**underground** [8] - 292:25, 293:15, 293:23, 294:1, 410:2, 410:6, 439:14, 489:1
**Underground** [1] - 511:3
**underneath** [1] - 476:14
**understood** [14] - 390:9, 418:12, 430:5, 432:3, 432:19, 437:22, 444:24, 445:15, 461:19, 513:20, 517:9, 521:17, 534:6, 545:8
**underway** [1] - 368:2
**unexpected** [1] - 476:2
**unexpectedly** [1] - 494:11
**unit** [6] - 459:2, 499:10, 538:14, 541:2, 541:3, 543:1
**units** [4] - 386:3, 446:15, 499:15, 523:16
**University** [11] - 403:25, 409:1, 504:11, 504:12, 523:19, 527:25, 528:1, 528:2, 528:8, 540:7, 540:9
**unknown** [1] - 432:10
**unless** [6] - 351:13, 370:11, 392:12, 419:3, 472:8, 545:3
**unlikely** [1] - 481:12
**unrestricted** [1] - 436:21
**unsaturated** [2] - 391:21, 391:22
**unsure** [2] - 305:5, 305:16
**unwilling** [1] - 304:18
**up** [72] - 290:20, 291:11, 309:14, 318:8, 323:9, 325:2, 325:11, 326:8, 332:10, 332:11, 338:7, 339:4, 339:12, 383:4, 399:12, 399:18, 400:6, 402:8, 402:9, 411:4, 414:23, 416:9, 416:13, 416:14, 417:1, 423:3, 423:9, 434:25, 436:15, 436:19, 436:24, 440:11, 440:19, 441:6, 441:12, 442:17, 447:18, 461:14, 466:13, 466:21, 468:11, 470:18, 472:13, 472:21, 475:3, 475:14, 478:16, 481:20, 484:7, 488:15, 490:15, 492:15, 493:16, 494:18, 494:19, 497:2, 497:13, 504:15, 505:1, 505:5, 507:19, 507:25, 509:24, 510:20, 511:6, 511:21, 511:22, 529:1, 533:4, 534:17, 543:10, 548:7
**update** [1] - 367:14
**updated** [2] - 367:12, 368:2
**upload** [2] - 300:20, 544:24
**upper** [12] - 348:18, 360:7, 360:16, 361:14, 362:22, 380:4, 380:13, 387:14, 391:8, 413:7, 523:15, 544:12
**uppermost** [1] - 336:16
**ups** [1] - 426:10
**upscale** [2] - 376:15, 385:19
**upstream** [3] - 422:18, 443:10, 494:13
**upstream/midstream** [1] - 396:22
**USDW** [5] - 407:9, 454:21, 488:9, 488:23, 489:13
**USDWs** [9] - 293:11, 309:9, 339:8, 387:12, 406:19, 407:20, 439:23, 440:4, 456:19
**uses** [3] - 366:19, 452:18, 544:8
**USGS** [5] - 466:4, 466:5, 466:22, 521:24, 522:7
**USW** [1] - 439:14
**utility** [3] - 316:19, 316:22, 321:12
**utilize** [3] - 397:11, 443:25, 470:14
**utilizing** [1] - 470:13

## V

**validation** [1] - 367:15
**value** [11] - 310:3, 364:25, 365:6, 365:19, 388:14, 415:15, 418:1, 452:13, 465:10, 465:21, 490:22
**values** [15] - 350:9, 365:5, 369:3, 369:4, 374:17, 375:7, 384:22, 385:14, 385:16, 385:24, 385:25, 415:19, 445:4, 445:13, 465:7
**valve** [41] - 422:17, 422:18, 423:4, 469:11, 469:13, 475:25, 476:1, 478:13, 478:20, 478:22, 478:25, 479:2, 479:12, 479:21, 480:3, 480:5, 480:10, 480:20, 480:25, 481:2, 481:14, 483:25, 490:6, 490:8, 491:6, 491:17, 491:18, 492:8, 492:10, 492:12, 492:16, 492:20, 492:24, 493:1, 493:3, 493:5, 493:14, 493:20, 494:11, 494:16, 495:9
**valves** [15] - 308:23, 475:22,

476:6, 480:24, 481:15, 481:19, 489:22, 490:12, 490:21, 491:11, 491:14, 491:15, 491:18, 492:4, 494:5
**vari** [1] - 476:12
**variability** [1] - 351:4
**variable** [2] - 328:2, 476:12
**variables** [2] - 318:7, 319:10
**variance** [1] - 430:1
**variation** [2] - 415:2, 427:8
**variations** [1] - 452:9
**varies** [3] - 451:17, 451:22, 456:12
**variograms** [2] - 350:14, 372:14
**various** [12] - 294:22, 316:14, 350:9, 399:19, 449:7, 482:22, 528:10, 528:11, 528:17, 528:22, 528:23, 545:15
**vary** [3] - 318:4, 381:14, 455:11
**vendors** [1] - 432:11
**verification** [1] - 398:17
**versions** [1] - 513:24
**versus** [4] - 357:25, 407:14, 442:6, 542:13
**vertical** [5] - 291:23, 296:2, 348:22, 349:25, 362:19
**vessel** [2] - 429:16, 479:11
**vessels** [1] - 429:13
**veteran** [1] - 504:5
**veteran-owned** [1] - 504:5
**VI** [49] - 291:21, 292:16, 292:20, 293:1, 293:6, 293:8, 308:15, 323:12, 323:22, 328:7, 328:10, 328:17, 329:22, 330:7, 330:11, 331:1, 335:4, 340:13, 340:20, 341:1, 341:14, 404:8, 406:20, 410:11, 437:18, 506:21, 507:18, 508:1, 508:8, 508:10, 508:12, 508:20, 509:13, 509:20, 510:2, 511:4, 511:10, 512:13, 514:17, 514:24, 517:16, 518:7, 518:13, 518:19, 519:7, 520:19, 525:25, 535:4
**via** [2] - 357:25, 492:14
**vice** [1] - 539:6
**vintage** [1] - 337:16
**viscosity** [1] - 542:15
**visible** [1] - 414:14
**visibly** [1] - 395:7
**visual** [1] - 449:1
**vitae** [4] - 505:13, 529:6, 529:9, 529:11
**Volk** [6] - 403:4, 403:5, 403:6, 403:15, 474:25, 475:3
**VOLK** [11] - 403:7, 403:14, 411:21, 434:2, 435:12, 436:21, 437:14, 438:16, 439:9, 440:25, 445:24
**VOLK/JEAN** [1] - 286:19
**VOLUME** [1] - 283:16
**volume** [17] - 350:7, 383:7, 383:21, 383:24, 384:9, 384:17, 384:23, 402:3, 402:5, 421:12, 480:14, 541:22, 541:24, 542:1, 542:2, 543:13, 544:10
**volumes** [6] - 331:4, 332:7, 340:15, 346:1, 420:22, 421:3
**volumetric** [9] - 352:24, 357:25, 358:13, 427:10, 541:4, 541:10, 541:13, 541:18
**volunteer** [1] - 436:9

## W

**Wade** [11] - 332:19, 366:17, 395:17, 412:9, 416:7, 447:16, 450:5, 458:7, 458:14, 458:22, 459:24
**Wade's** [1] - 450:9
**wait** [1] - 431:9
**waited** [2] - 513:23, 514:14
**waiting** [4] - 416:23, 463:1, 463:3, 550:13
**walk** [3] - 390:8, 421:19, 450:2
**wants** [3] - 496:9, 497:19, 543:20
**warms** [1] - 481:20
**Washington** [2] - 527:25, 528:7
**Water** [3] - 292:12, 292:18, 293:2
**water** [30] - 293:16, 293:20, 293:23, 294:2, 336:17, 370:23, 377:21, 381:11, 391:2, 410:3, 410:7, 439:14, 440:6, 441:2, 441:5, 457:12, 485:5, 487:10, 489:1, 504:7, 504:21, 506:17, 524:7, 538:19, 541:23, 542:1, 542:6, 543:3, 546:22, 546:23
**ways** [3] - 321:13, 323:9, 543:17
**weather** [1] - 482:1
**website** [3] - 496:8, 514:17, 549:23
**Wednesday** [2] - 289:3, 551:11
**week** [5] - 325:3, 325:7, 325:11, 325:13, 325:25
**weeks** [17] - 299:10, 299:11, 299:19, 299:20, 299:24, 301:1, 301:3, 301:6, 301:9, 301:11, 307:22, 325:19, 325:21, 325:24, 326:4, 512:12, 532:10
**weight** [4] - 360:8, 381:21, 426:13, 426:20
**weight-constrained** [1] - 426:20
**well's** [1] - 338:9
**well-specific** [2] - 454:6, 457:12
**wellbore** [15] - 344:8, 344:16, 345:1, 345:3, 345:16, 346:16, 371:13, 401:9, 401:11, 401:13, 401:19, 401:22, 428:14, 431:2, 455:13
**wellbores** [4] - 319:11, 347:25, 348:3, 400:5
**wellhead** [19] - 309:12, 317:14, 426:13, 426:15, 426:22, 429:21, 462:15, 464:17, 464:25, 465:7, 469:7, 470:13, 470:18, 493:14, 494:11, 494:14, 495:9, 525:3
**wells** [92] - 291:17, 293:1, 298:15, 308:8, 308:15, 308:18, 323:12, 328:7, 328:10, 328:13, 330:7, 331:1, 331:13, 334:1, 334:5, 334:7, 334:11, 334:13, 335:5, 335:10, 335:13, 336:5, 336:22, 337:15, 338:17, 340:7, 340:15, 341:15, 357:17, 359:3, 359:10, 359:20, 359:24, 368:25, 369:2, 369:8, 370:17, 370:18, 370:24, 393:13, 401:16, 401:17, 402:20, 406:14, 407:16, 409:6, 409:7, 415:17, 415:19, 415:20, 437:18, 437:19, 439:4, 440:10, 441:4, 451:6, 452:21, 452:22, 453:1, 453:23, 455:1, 455:5, 456:16, 466:7, 470:13, 474:10, 474:11, 485:15, 485:19, 487:2, 487:13, 487:14, 487:25, 524:17, 524:18, 524:20, 525:5, 530:19, 531:6, 531:9, 531:11, 531:14, 531:20, 538:20, 540:20, 540:22, 540:24, 541:2, 549:3
**west** [2] - 348:16, 442:20
**West** [63] - 277:7, 277:9, 277:11, 277:12, 277:13, 277:21, 277:22, 278:1, 278:2, 278:3, 278:10, 278:12, 278:14, 278:15, 278:16, 278:20, 278:22, 279:1, 279:2, 279:3, 279:12, 279:14, 279:16, 279:17, 280:1, 280:4, 280:5, 280:6, 280:14, 280:17, 280:18, 280:19, 280:23, 281:2, 281:4, 281:5, 281:13, 281:15, 281:16, 281:19, 281:20, 282:3, 282:4, 282:5, 282:8, 282:9, 282:15, 282:17, 282:18, 282:21, 282:22, 283:3, 283:4, 283:5, 283:8, 283:9, 364:18, 373:10, 429:3, 459:16, 469:25, 470:1, 538:7
**west-east** [1] - 348:16
**western** [1] - 528:24
**what-if** [1] - 495:20
**whereas** [1] - 407:19
**whichever** [1] - 418:8
**white** [2] - 329:12, 345:2
**whole** [9] - 303:6, 319:25, 375:14, 375:22, 383:19, 385:3, 443:5, 484:13, 528:18
**wholly** [1] - 402:9
**willing** [6] - 415:13, 491:7, 512:10, 512:11, 532:11, 544:21
**Williston** [1] - 409:6
**wind** [2] - 433:20, 482:1
**withheld** [1] - 476:7
**witness** [22] - 348:5, 358:22, 360:24, 361:2, 370:10, 393:18, 395:21, 397:25, 398:2, 403:3, 403:4, 408:4, 408:5, 410:20, 447:19, 458:6, 458:7, 461:2, 503:8, 527:1, 537:6
**WITNESSES** [2] - 286:10, 287:19
**witnesses** [21] - 290:12, 290:15, 290:18, 309:14, 395:13, 397:23, 410:23, 410:24, 411:2, 416:18, 416:24, 417:1, 417:19, 434:25, 447:4, 447:11, 472:14, 472:20, 484:10, 502:20, 550:22
**word** [1] - 446:25

**wording** [1] - 446:22
**Workbench®** [1] - 523:2
**workers** [1] - 405:5
**workover** [1] - 438:7
**works** [2] - 320:16, 443:14
**world** [1] - 528:22
**write** [2] - 463:3, 522:9
**written** [3] - 333:2, 387:2, 474:6
**Wyoming** [6] - 284:17, 387:1, 507:6, 507:9, 507:12, 538:19

**X**

**XRD** [1] - 457:9

**Y**

**Yates** [5] - 538:7, 538:12, 538:13, 542:10, 546:16
**year** [30] - 314:21, 318:24, 350:17, 371:11, 374:6, 409:8, 420:14, 423:25, 424:19, 430:12, 430:17, 430:18, 430:23, 430:24, 431:8, 434:22, 440:8, 444:10, 444:12, 444:17, 444:20, 463:11, 463:12, 464:2, 464:6, 473:10, 496:14
**years** [42] - 313:8, 313:13, 314:20, 319:4, 319:7, 319:17, 319:18, 319:22, 320:1, 320:3, 327:23, 331:18, 332:1, 332:4, 332:12, 332:23, 337:23, 337:24, 368:3, 369:14, 371:9, 373:24, 378:25, 396:20, 404:3, 404:6, 430:23, 444:9, 463:15, 463:16, 463:18, 468:11, 496:23, 497:19, 498:16, 499:8, 523:24, 528:6, 528:8, 538:5, 538:18, 542:10
**yellow** [1] - 349:7
**yesterday** [17] - 290:13, 291:15, 304:13, 307:17, 308:6, 309:16, 309:24, 310:19, 332:19, 333:25, 343:5, 357:3, 412:12, 451:2, 459:11, 459:13, 459:14
**yourself** [3] - 301:5, 510:24, 516:2

**Z**

**Zap** [1] - 446:4
**ZASTE** [2] - 285:3, 527:5
**Zaste** [1] - 289:24
**zero** [1] - 318:19
**zone** [24] - 359:11, 360:7, 360:16, 361:14, 362:22, 379:24, 380:5, 380:10, 380:11, 380:14, 381:2, 387:13, 387:15, 387:23, 387:24, 388:2, 391:9, 391:12, 391:18, 392:1, 457:10, 487:16
**Zone** [1] - 402:10
**zones** [5] - 380:3, 385:24, 394:17, 454:22, 457:11

**NORTH DAKOTA**

**OIL AND GAS DIVISION**

| | | |
|---|---|---|
| In re application of Summit | : Case No(s). | 30869 |
| Carbon Storage #1, LLC requesting | : | 30870 |
| consideration for the geologic | : | 30871 |
| storage of carbon dioxide in the | : | 30872 |
| Broom Creek Formation from the | : | 30873 |
| Midwest Carbon Express Pipeline in | : | 30874 |
| the storage facility located in | : | 30875 |
| Sections 31, 32, 33, and 34, | : | 30876 |
| Township 142 North, Range 87 West, | : | 30877 |
| Sections 1, 11, 12, 13, 14, 15, | : | 30878 |
| 22, 23, 24, 25, 26, 35, and 36, | : | 30879 |
| Township 141 North, Range 88 West, | : | 30880 |
| Sections 2, 3, 4, 5, 6, 7, 8, 9, | : | |
| 10, 11, 14, 15, 16, 17, 18, 19, | : | |
| 20, 21, 22, 23, 25, 26, 27, 28, | : | |
| 29, 30, 31, 32, 33, 34, and 35, | : | |
| Township 141 North, Range 87 West, | : | |
| Sections 1, 2, 3, and 12, Township | : | |
| 140 North, Range 88 West and | : | |
| Sections 4, 5, 6, and 7, Township | : | |
| 140 North, Range 87 West, Mercer, | : | |
| Morton, and Oliver Counties, ND. | : | |
| | | |
| In re application of Summit | : | |
| Carbon Storage #1, LLC to | : | |
| consider the amalgamation of the | : | |
| storage reservoir pore space, in | : | |
| which the Commission may require | : | |
| that the pore space owned by | : | |
| nonconsenting owners be included | : | |
| in the geologic storage, as | : | |
| required to operate the Summit | : | |
| Carbon Storage #1, LLC storage | : | |
| facility located in Sections 31, | : | |
| 32, 33, and 34, Township 142 | : | |
| North, Range 87 West, Sections 1, | : | |
| 11, 12, 13, 14, 15, 22, 23, 24, | : | |
| 25, 26, 35, and 36, Township 141 | : | |
| North, Range 88 West, Sections 2, | : | |
| 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, | : | |
| 15, 16, 17, 18, 19, 20, 21, 22, | : | |
| 23, 25, 26, 27, 28, 29, 30, 31, | : | |

32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re application of Summit Carbon Storage #1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation.

In re motion to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35,

Township 141 North, Range 87 West,:
Sections 1, 2, 3, and 12, Township:
140 North, Range 88 West and :
Sections 4, 5, 6, and 7, Township :
140 North, Range 87 West, Mercer, :
Morton, and Oliver Counties, ND, :
subject to the application of :
Summit Carbon Storage #1, LLC for :
the geologic storage of carbon :
dioxide in the Broom Creek :
Formation, and enact such special :
field rules as may be necessary. :

In re application of Summit :
Carbon Storage #2, LLC requesting :
consideration for the geologic :
storage of carbon dioxide in the :
Broom Creek Formation from the :
Midwest Carbon Express Pipeline :
in the storage facility located in:
Sections 27, 28, 29, 32, 33, 34, :
and 35, Township 143 North, Range :
88 West, Sections 1, 2, 3, 4, 5, :
6, 7, 8, 9, 10, 11, 12, 13, 14, :
15, 16, 17, 18, 19, 20, 21, 22, :
23, 24, 25, 26, 27, 28, 29, 30, :
32, 33, 34, 35, and 36, Township :
142 North, Range 88 West, Sections:
5, 6, 7, 8, 17, 18, 19, 20, 29, :
30, and 31, Township 142 North, :
Range 87 West, and Sections 1, 2, :
and 3, Township 141 North, Range :
88 West, Mercer and Oliver :
Counties, ND. :

In re application of Summit :
Carbon Storage #2, LLC to :
consider the amalgamation of the :
storage reservoir pore space, in :
which the Commission may require :
that the pore space owned by :
nonconsenting owners be included :
in the geologic storage, as :
required to operate the Summit :
Carbon Storage #2, LLC storage :
facility located in Sections 27, :
28, 29, 32, 33, 34, and 35, :

Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND in the Broom Creek Formation.

In re application of Summit Carbon Storage #2, LLC to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation.

In re motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13,

14, 15, 16, 17, 18, 19, 20, 21, :
22, 23, 24, 25, 26, 27, 28, 29, :
30, 32, 33, 34, 35, and 36, :
Township 142 North, Range 88 West,:
Sections 5, 6, 7, 8, 17, 18, 19, :
20, 29, 30, and 31, Township 142 :
North, Range 87 West, and Sections:
1, 2, and 3, Township 141 North, :
Range 88 West, Mercer and Oliver :
Counties, ND, subject to the :
application of Summit Carbon :
Storage #2, LLC for the geologic :
storage of carbon dioxide in the :
Broom Creek Formation, and enact :
such special field rules as may :
be necessary. :

In re application of Summit :
Carbon Storage #3, LLC requesting :
consideration for the geologic :
storage of carbon dioxide in the :
Broom Creek Formation from the :
Midwest Carbon Express Pipeline in:
the storage facility located in :
Section 36, Township 143 North, :
Range 87 West, Sections 19, 20, :
21, 28, 29, 30, 31, 32, 33, 34, :
35, and 36, Township 143 North, :
Range 86 West, Sections 1, 2, 11, :
12, 13, 14, and 24, Township 142 :
North, Range 87 West, Sections 1, :
2, 3, 4, 5, 6, 7, 8, 9, 10, 11, :
12, 13, 14, 15, 16, 17, 18, 19, :
20, 21, 22, 23, 24, 25, 26, 27, :
28, 29, 30, 32, 33, 34, and 35, :
Township 142 North, Range 86 :
West, and Sections 6, 7, 17, 18, :
19, and 20, Township 142 North, :
Range 85 West, Oliver County, ND. :

In re application of Summit :
Carbon Storage #3, LLC to consider:
the amalgamation of the storage :
reservoir space, in which the :
Commission may require that the :
pore space owned by nonconsenting :
owners be included in the geologic:

storage, as required to operate :
the Summit Carbon Storage #3, LLC :
storage facility located in :
Section 36, Township 143 North, :
Range 87 West, Sections 19, 20, :
21, 28, 29, 30, 31, 32, 33, 34, :
35, and 36, Township 143 North, :
Range 86 West, Sections 1, 2, 11, :
12, 13, 14, and 24, Township 142 :
North, Range 87 West, Sections 1, :
2, 3, 4, 5, 6, 7, 8, 9, 10, 11, :
12, 13, 14, 15, 16, 17, 18, 19, :
20, 21, 22, 23, 24, 25, 26, 27, :
28, 29, 30, 32, 33, 34, and 35, :
Township 142 North, Range 86 West,:
and Sections 6, 7, 17, 18, 19, and:
20, Township 142 North, Range 85 :
West, Oliver County, ND, in the :
Broom Creek Formation. :

In re application of Summit :
Carbon Storage #3, LLC for an :
order of the Commission :
determining the amount of :
financial responsibility for the :
geologic storage of carbon dioxide:
from the Midwest Carbon Express :
Pipeline in the storage facility :
located in Section 36, Township :
143 North, Range 87 West, Sections:
19, 20, 21, 28, 29, 30, 31, 32, :
33, 34, 35, and 36, Township 143 :
North, Range 86 West, Sections 1, :
2, 11, 12, 13, 14, and 24, :
Township 142 North, Range 87 West,:
Sections 1, 2, 3, 4, 5, 6, 7, 8, :
9, 10, 11, 12, 13, 14, 15, 16, 17,:
18, 19, 20, 21, 22, 23, 24, 25, :
26, 27, 28, 29, 30, 32, 33, 34, :
and 35, Township 142 North, Range :
86 West, and Sections 6, 7, 17, :
18, 19, and 20, Township 142 :
North, Range 85 West, Oliver :
County, ND, in the Broom Creek :
Formation. :

In re motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

**TRANSCRIPT OF HEARING**

**VOLUME II - (Pages 277 - 552)**

**Taken At**
**1000 East Calgary Avenue**
**Bismarck, North Dakota**
**June 12, 2024**

**BEFORE DAVID P. GARNER**
**-- HEARING EXAMINER --**

**A P P E A R A N C E S**

NDIC STAFF PRESENT:

MR. LYNN HELMS
MR. MARK BOHRER
MR. RICHARD SUGGS
MS. TAMARA MADCHE
MR. TRAVIS STOLLDORF
MS. ASHLEIGH THIEL
MR. DAVID TABOR
MR. STEPHEN FRIED
MR. CALEB ALBERTSON
MS. SARA FORSBERG

--------

MR. LAWRENCE BENDER
MR. TYLER J. GLUDT
Fredrikson & Byron, P.A.
Attorneys at Law
Suite 400
304 East Front Avenue
Bismarck, North Dakota 58504

-- and --

MR. S. THOMAS THRONE
Throne Law Office, P.C.
Attorneys at Law
P.O. Drawer 6590
Sheridan, Wyoming 82801

FOR THE SUMMIT CARBON STORAGE #1, SUMMIT CARBON STORAGE #2 AND SUMMIT CARBON STORAGE #3.

--------

**A P P E A R A N C E S (Cont'd)**

MR. DERRICK BRAATEN
MS. DESIRAE ZASTE, Paralegal
Braaten Law Firm
Attorneys at Law
Suite 100
109 North Fourth Street
Bismarck, North Dakota 58501

FOR THE INTERVENORS, THE SWENSON LIVING TRUST, BAUMAN, GERVING, HAUPT, JOCHIM, KRAFT, LIEBELT, MAIZE, METZ, RUST, AND SMITH.

---

# TABLE OF CONTENTS

## INDEX OF PROCEEDINGS

Page

Opening Discussion..... 289

---

## CERTIFICATE

Certificate of Court Reporter.....Page 552

---

## APPLICANT'S WITNESSES

AMANDA DOUGLAS/CAITLIN OLSEN

Continued Cross-Examination by Mr. Braaten..... Page 291

Examination by Ms. Madche..... Page 355

Examination by Mr. Stolldorf..... Page 370

Examination by Mr. Suggs..... Page 371

Redirect Examination by Mr. Bender..... Page 389

Further Examination by Mr. Suggs..... Page 393

JAMES POWELL/JOHN HUNT/JAY VOLK/JEAN ODDY

Direct Examination by Mr. Bender..... Page 396

Direct Examination by Mr. Bender..... Page 398

Direct Examination by Mr. Bender..... Page 403

Direct Examination by Mr. Bender..... Page 408

T A B L E O F C O N T E N T S (Cont'd)

Examination by Ms. Madche..... Page 411
Examination by Mr. Stolldorf..... Page 432
Examination by Mr. Suggs..... Page 441

CAITLIN OLSEN/WADE BOESHANS/AMANDA DOUGLAS/JAMEY BACKUS

Redirect Examination by Mr. Bender..... Page 448
Redirect Examination by Mr. Bender..... Page 458
Redirect Examination by Mr. Bender..... Page 461
Direct Examination by Mr. Bender..... Page 467
Examination by Ms. Madche..... Page 470
Recross-Examination by Mr. Braaten..... Page 473

JEAN ODDY/CAITLIN OLSEN/JIMMY POWELL/WADE BOESHANS

Cross-Examination by Mr. Braaten..... Page 484

---

INTERVENORS' WITNESSES

SHANE BOFTO

Direct Examination by Mr. Braaten..... Page 503
Cross-Examination by Mr. Bender..... Page 513
Examination by Mr. Helms..... Page 525
Redirect Examination by Mr. Braaten..... Page 526

T A B L E O F C O N T E N T S (Cont'd)

P. TED DOUGHTY

Direct Examination by Mr. Braaten..... Page 527

Cross-Examination by Mr. Bender..... Page 532

PAUL BUTTON

Direct Examination by Mr. Braaten..... Page 537

Cross-Examination by Mr. Bender..... Page 545

---

CLAIMANT'S EXHIBITS

| Exhibit No. | Offered | Received |
|---|---|---|
| 1C-1 | 461 | 461 |
| 8B | 457 | 458 |

---

INTERVENORS' EXHIBITS

| Exhibit No. | Offered | Received |
|---|---|---|
| LO-18 | 511 | 511 |
| LO-19 | 511 | 511 |
| LO-20 | 511 | 511 |
| LO-56 | 505 | 505 |
| LO-57 | 540 | 540 |
| LO-58 | 530 | 530 |
| LO-82 | 511 | 511 |
| LO-83 | 333 | 333 |

---

289

(The following proceedings were had and made of record herein, commencing at 9:06 a.m., Wednesday, the 12th day of June, 2024:)

HEARING EXAMINER GARNER: We are on the record for hearings in the matters listed in the North Dakota Industrial Commission Hearing Docket for June 12. I'm David Garner, hearing examiner for these hearings. We're at the hearing room for the Department of Mineral Resources, Oil & Gas Division, and it is 9:08 a.m.

We will resume our hearings for Case Numbers 30869 through 30880. I notice new counsel appeared at the table, so I'll give everyone an opportunity for all interested parties to please come forward again.

MR. BENDER: Thank you, Mr. Examiner. I'll introduce Tom. He doesn't need any introduction, but with us today is Tom Throne. He's going to be assisting with Summit in this application.

HEARING EXAMINER GARNER: Okay.

MR. BRAATEN: Derrick Braaten, Braaten Law Firm, on behalf of the landowner intervenors. With me is my paralegal, Desirae Zaste, and client Kirk Swenson.

290

MR. BENDER: I apologize. I thought you were just looking for an introduction of the new counsel.

HEARING EXAMINER GARNER: No, that's --

MR. BENDER: Did you want me to make another appearance or --

HEARING EXAMINER GARNER: No. That's fine.

MR. BENDER: Okay.

HEARING EXAMINER GARNER: That's fine. Just a quick note. We're going to resume with the cross-examination of the two witnesses that were being crossed by Mr. Braaten yesterday. Change, though. We're going to then at that point in time allow Summit to call its remaining witnesses, give the Commission a chance to respond to them -- or question them. And then you'll have the remainder of the time to cross-examine those witnesses.

MR. BRAATEN: Okay. And, Your Honor, I don't want to be difficult or take up time. I just want to put on the record that I do object to that process.

HEARING EXAMINER GARNER: Okay.

MR. HELMS: 6:30.

HEARING EXAMINER GARNER: Oh, I'm sorry.

291

And we're going to have a deadline today again of 6:30 p.m., and if we are not done, we will be back here tomorrow morning at 9 a.m.

Okay. With that, I think we can proceed.

MR. HELMS: They're still under oath.

HEARING EXAMINER GARNER: They're still under oath.

**CONTINUED CROSS-EXAMINATION**

**BY MR. BRAATEN:**

Q. I wasn't going to ask this, but since it came up, do you understand that you're still under oath?

**A.** (BY MS. DOUGLAS) I do.

Q. Okay. We were discussing the $CO_2$ plume model yesterday, and I want to start by just asking if you have an understanding within the regulatory framework for Class 6 wells why a plume model is constructed?

**A.** I do.

Q. And what is that understanding?

**A.** So under the North Dakota UIC Class VI regulations, a geologic model is constructed to help define the horizontal and vertical boundaries of a storage reservoir.

Q. For what purpose or reason?

292

**A.** The purpose of this is to define the boundaries of the storage reservoir, in this case which would be the storage facility, which the regulations require pore space owners within that storage facility to be equitably compensated. Also, the modeling and simulation, it's constructed to help delineate the area of review, which is also a requirement of the statutes to delineate the area of review.

Q. And the delineation of the area of review is also the primary requirement or reason for creating that model under the Safe Drinking Water Act?

**A.** So we're talking about two sets of regulations here. So in -- in North Dakota UIC Class VI regulations, as I mentioned, the modeling is a tool to determine the AOR in the storage facility area. The Safe Water Drinking Act, under that, I believe, the EOA has its own set of UIC Class VI rules, which the North Dakota UIC Class VI rules are based on and are more stringent than. In the EPA rules, it is my understanding that modeling and simulation is used to define an area of review as well.

Q. Is North Dakota's underground injection

293

control program regulation for Class VI wells adopted pursuant to the Safe Drinking Water Act?

**A.** It is, and it is more stringent in terms that it goes above and beyond and also has stipulations for a storage facility area, pore space leasing, which the EPA UIC Class VI rules do not.

Q. And when the EPA promulgated its Class VI rules, the methodologies it used for delineating -- delineating an area of review were focused on the purpose and function of protecting USDWs; right?

**A.** That's correct, and North Dakota Administrative Code is as well. So they define the area of review as the region surrounding the geologic sequestration project where underground sources of drinking water may be endangered by the $CO_2$ injection activities.

Q. And so you're modeling the areal extent of the $CO_2$ plume because the regulations require you to do that in order to protect drinking water sources?

**A.** Modeling the simulation is required to evaluate potential impact and endangerment on any underground sources of drinking water in which you're required to define an area of review where you're required to monitor and ensure that you're

294

not endangering any underground sources of drinking water.

Q. You've noticed -- you've noted a couple of times that North Dakota's regulations are more stringent than the EPA regulations. That's because the EPA regulations require that any state being granted primacy have a set of regulations that are more stringent than EPA's?

**A.** I'm not familiar with the specific requirements. I know that they can't be any lesser.

Q. Okay. I've handed you what has been marked as Exhibit LO-83. Can you tell me if you've seen that document before?

**A.** I personally have not.

Q. And when you say "I personally have not," are you aware of others who have that you're thinking of?

**A.** Not specifically, no.

Q. If you look at the bullet points in the middle, you'll notice a number of descriptions of various data and input files. Is there anything in those bullet points that you can identify that was not provided to the Industrial Commission by EERC?

**A.** Upon request from the Commission, the EERC

295

had provided the DMR with the .DAT file, which is our simulation model input file for CMG, as well as our results file in the form of a .SR3, as well as shapefiles for the maps that were generated. Outside of those data sets, we did not provide any additional data to the DMR.

Q. You said for the maps that were provided outside of the data. What maps are you referring to?

**A.** The maps in the storage facility area. So we provided shapefiles for the storage facility boundary, the area of review boundary and such.

Q. Okay. And you're saying you provided the shapefiles but not necessarily the particular maps you generated from them?

**A.** Correct.

Q. Okay.

**A.** Let me correct for that. The maps are provided in the permit itself, so we didn't provide maps separately. They're within the permit itself.

Q. Okay. That's fair.

So this first one, all of the input files for the PHREEQC model were provided to the Commission?

**A.** No. As I stated, just the .DAT file for

296

the numerical simulations which were used to define the horizontal and the vertical boundaries of the reservoir.

Q. You didn't give them an input file for the PHREEQC model?

**A.** We did not, no. It was not requested.

Q. It's in your possession, though?

**A.** The EERC has the data.

Q. Sorry. Yes. EERC.

And EERC is Summit's agent and representative with respect to that data?

**A.** The ownership of the data is governed under our specific contracts with Summit including our NDA with them that govern data ownership.

Q. EERC has a nondisclosure agreement with Summit?

**A.** Yes.

Q. Who proposed that?

**A.** I was not involved in those discussions. It's a standard -- standard practice we have with most of our clients, though.

Q. Is that because your licenses for the computer modeling programs are academic licenses?

**A.** No. Commercial licenses were procured for this project as this was a commercially contracted

297

project.
Q. Did Summit compensate for the cost of the subscriptions for the programs on a commercial basis?
A. The EERC procured commercial licenses and the costs of those commercial licenses were billed to Summit. Yes.
Q. Okay. Were they temporary subscriptions?
A. Yes. So the licenses have a time period associated with them. Commonly, we procure licenses on the order of a month, two-month, three-month licenses, depending on the duration of the time period in the project we need the license to perform the scope.
Q. So I want to go back to my prior question. Other than the input model for the PHREEQC model -- sorry. Let me start over.
Other than the input file for the PHREEQC model, is there anything listed in these bullet points that was not provided by EERC to the Industrial Commission?
A. Yes. As I mentioned, the only input data that was provided can be found in your last bullet point in terms of what I would call the simulation -- or the numerical reservoir simulation

298

model data decks and the output files. Those were the two pieces of data which I am saying is the .DAT file and the .SR3 file. Those are the only two data sets from this list that were provided.
Q. So if you look at the third bullet point, is there anything there that was provided to the Industrial Commission?
A. Yes. Thank you for correcting me. So all core analysis data was provided to the Industrial Commission as well as the North Dakota Geological Survey through submission to the North Dakota core library staff. And as required, all well log data, formation testing, fluid analysis was provided as -- as part of completions reports for the three stratigraphic test wells that were drilled. So those were technically provided.
Q. When you look through these bullet points on this letter, do you have an understanding of what is being referenced in all of these? Is there anything you don't understand what is being referenced?
A. No. I understand.
Q. If I asked you to go back to EERC today and sit down and pull together an external hard drive and put this data on that external hard drive

299

and give it to me, approximately how long would it take you to do that?
A. That would involve the procurement of commercial licenses to access.
Q. No. Assuming that you have a commercial license, which you do for all of this, if you needed to go to your office, take all of this data and put it on an external hard drive, how long would that take you?
A. Days to weeks.
Q. It would take you weeks to put this data on a hard drive? You're telling me that?
A. To ensure that we have the proper data, QC it, and we ran multiple iterations.
Q. No. I'm asking you to take this data that you understand what all of it is, export it, transfer those files onto an external hard drive, how long?
A. One to two weeks.
Q. It would take you one to two weeks to transfer those files to a hard drive, but you can start from scratch with publicly available data and replicate and recreate that entire model in four weeks?
A. So the publicly available data would be

300

coming from single data bases. The way the EERC's file structure and the iterations of our models, the amount of data we have, it's my opinion knowing our data storage, the amount of data we have, the different iterations of modeling simulations done for this project, I would estimate it would take our staff that amount of time to ensure that we had the proper data to be transferred.
Q. But you keep saying -- you're saying ensure we have the proper data to be transferred. I'm saying physically how long does it take to click the buttons on the computer to tell the files in the computer to transfer them to an external hard drive and how long does it take the computer to process that file transfer and get it onto the external hard drive? I'm not talking about quality control or review.
A. Okay. I can't speculate. I don't know the size of the data in terms of megabytes, gigabytes or the speed to upload it.
Q. So you have no idea how long it would take to put this on an external hard drive and send it to us?
A. I gave you an estimated range of what I believe it would take.

301

Q. Three weeks?
A. I believe I said one to two.
Q. One to two weeks.
And you're still saying that you could also replicate the entire model yourself from public data in just four weeks? Can you explain that?
A. I believe I did already answer that.
Q. Why does it only take two weeks to transfer the files onto a hard drive but you can take and recreate everything in four weeks?
A. I believe I already answered that.
Q. And you think that sounds plausible?
A. I gave a range and in my opinion of what it would take.
Q. Okay. Were you asked to do that at any point?
A. No.
Q. Were you at any point advised that you might need to make data available to an opposing party in any kind of legal proceeding for Summit?
A. I was made aware that data may be requested. Not specifically that it would need to be provided.
Q. Were you told that it would not need to be

302

provided?
MR. BENDER: I'm going to object insofar as it might get into issues on attorney/client privilege. So if any of this was discussed with you while I was present on the phone or whatever or Ty, I'd instruct you not to answer it.
MR. BRAATEN: Are you asserting the privilege on behalf of Summit or EERC?
MR. BENDER: Summit.
Q. (MR. BRAATEN CONTINUING) At any time when there was no representative of Summit, other than Mr. Bender, were you told that -- or there was no representative of Summit present for the conversation, at any point were you told that you would not need to provide data?
A. No. I was involved in discussions to determine what it would take for us to provide that data. I was not told we would not have to provide it. I was told as a potential we may have to.
Q. Who were you told that by?
A. Mr. Lonny Jacobson who is our direct point of communication with the Summit team.
Q. Is he with EERC or Summit?
MR. BENDER: Your Honor, I'm going to object. We're getting into issues having to do

303

with discovery. These issues are before the Commission in a motion to compel. I don't think it's appropriate to try to litigate that here. We haven't had an opportunity to respond to that motion to compel, so I'm going to object to this whole line of questioning.
HEARING EXAMINER GARNER: I'm going to overrule.
MR. BENDER: Okay. Thank you.
Q. (MR. BRAATEN CONTINUING) Who does Lonny -- did you say Lonny Jacobson?
A. Yeah.
Q. Who does he work for?
A. The Energy & Environmental Research Center.
Q. Okay. When did you talk to him about the potential of having to provide data?
A. Can you clarify "provide data"? To whom?
Q. We just talked about a conversation you had had with Lonny in which you indicated that you had not been told that you would not need to provide data. Do you recall that conversation?
A. I do. It was after discovery was submitted.
Q. And when you say "after discovery was

304

submitted," are you referring to the request for data and information that were sent by me on behalf of the intervenors?
A. Correct.
Q. Okay. What did he ask you about that data?
A. What effort and software licenses would be needed to compile that data.
Q. And just tell me fully what your response to that was when you talked to him at that time?
A. We provided him with a specific list of the software licenses needed, the data as well as things, like I discussed yesterday, about some of the data sets being acquired from data brokers that the specific digitized logs in question are governed by a license agreement.
Q. Did you make a determination that because of those license agreements you were unwilling to provide those data sets?
A. EERC did not make that determination. We provided information to Summit on what it would take for us to produce those data sets.
Q. With respect to everything that's listed in Exhibit 83 in those bullet points, first, EERC has itself all of that data related to Summit's

305

project; right?
**A.** Yes.
Q. And has EERC provided all of that data to Summit itself?
**A.** I'm unsure. I don't believe we have provided every piece of data yet.
Q. So Summit doesn't even have all of the data that EERC has?
**A.** I can't comment on that with certainty.
Q. Well, did you just say that EERC has not provided all of this data to Summit?
MS. DOUGLAS: Could you read back what I stated?
(Record read as requested.)
MS. DOUGLAS: So I believe I said I'm unsure, I'm uncertain about that. I don't have a definitive answer.
Q. (MR. BRAATEN CONTINUING) Okay. What did Lonny tell you about his conversations with Summit about it?
**A.** That we would just not have to provide it at this time. A determination was not made on whether we would be providing it or not.
Q. At any point were you asked to start compiling the data in the potential event that you

306

did have to provide it?
**A.** No, because as I mentioned, we'd be required to procure software licenses.
Q. For what?
**A.** To open the model, take out any data. For example, to open the Petrel model, we'd need a Petrel license in order to take out the digitized well logs that are governed by that license agreement.
Q. So the temporary subscriptions you had for the models, have those lapsed at this point?
**A.** They have.
Q. Okay. So you didn't want to export the data because in order to do that, you would have had to buy another subscription just to export the data out of the models?
**A.** Again, the EERC's contracted to perform this scope by Summit Carbon Storage, and so they would have had to approve and authorize us to procure the software.
Q. And they didn't want to pay for the software?
MR. BENDER: If you know.
MS. DOUGLAS: I -- I don't know. I was not involved in those discussions.

307

Q. (MR. BRAATEN CONTINUING) Well, you're the one that just told me that the need to procure new licenses was part of the reason for not exporting or starting on the export of the data; right?
**A.** We would need to be authorized by Summit to start those activities.
Q. And they never did that?
**A.** No.
Q. Did Lonny ask them if they would like to authorize that?
**A.** I'm not privy to those discussions.
Q. The PHREEQC model is a free model, though, that anyone can use and there would be no barrier with subscriptions to putting all that data together; right?
**A.** Correct. As I testified, though, yesterday, I believe that all of the input data used for that is described in the permit itself.
Q. Have you personally had any direct communications with the employees or members of the North Dakota Industrial Commission about this matter in the last two weeks?
**A.** I have not, no.
Q. Do you know if Lonny has?
**A.** I'm not aware if he has or not, but I do

308

not believe he has.
Q. As part of your work on the -- the Summit project, did you do any work related to the surface facilities?
**A.** No, I did not.
Q. There was a comment yesterday that I believe -- and you can correct me if I'm wrong, but I believe you said that these injection wells will not endanger human health. Would you agree with that?
**A.** I believe Caitlin testified to human health.
Q. Okay. And did I hear it right or do you agree that the testimony was that these injection wells, the Class VI wells, will not endanger human health?
**A.** (BY MS. OLSEN) I believe I testified to the injection wells have engineering protocol in place that would not endanger human health or the environment in relation to $CO_2$ injection activities.
Q. Thank you. In making that statement, did you consider the potential of $CO_2$ releases from those surface facilities such as valves, blowouts, things of that nature?
**A.** That was discussed later on in the permit.

309

So my references to that are in relation to the injection well and the review that was done on the injection well specifically.

Q. Would it also be accurate to say specifically with respect to the things that happen downhole at the injection well?

**A.** The engineering safeguards in place downhole are such that they would prevent migration of $CO_2$ into USDWs or the atmosphere.

Q. What about the engineering safeguards between the terminus point of the Midwest Carbon Express Pipeline and the wellhead?

**A.** (BY MS. DOUGLAS) We believe we have witnesses coming up who are better suited to testify to that.

Q. Okay. We had a discussion yesterday about the permeability adjustment with the 2.5 multiplier. Do you recall that?

**A.** I do.

Q. Did you or Lonny have conversations with Summit at any point regarding that issue?

**A.** We did.

Q. And what were those conversations?

**A.** So as I testified yesterday, the results showed a slightly higher permeability that could

310

have been used to justify a higher multiplier. In discussions with EERC and Summit, EERC providing technical advisement to use a lower value, those discussions included discussions with Summit from a business case. They wanted to permit the site to take a certain amount of $CO_2$ and store $CO_2$ within a certain area.

And so through sensitivity modeling and business considerations, it was a joint determination to use 2.5. Additionally, the Commission has approved a permit for the Broom Creek Formation that has used 2.5 as well.

Q. What were the business considerations Summit expressed regarding the use of the 2.5 factor?

**A.** Again, I just discussed the amount of $CO_2$ they were targeting and the area -- the area to be permitted for $CO_2$. I discussed a little bit yesterday I didn't want to overestimate the storage facility area and then not inject that amount of $CO_2$ to where we would be over-leasing the area and not using it.

Q. So Summit was -- Summit's preference would be that that perm adjustment be a lower number based on that business consideration?

311

**A.** Through discussions with EERC and Summit, the 2.5 multiplier was selected.

Q. But specifically because in part of Summit's business considerations of wanting to keep the storage facility as small as possible for the amount of $CO_2$ they want to inject; right?

**A.** I wouldn't say it's as small as possible. There's just some consideration to not overestimate the area needed.

Q. Because if they reduce the size or the boundary of that storage facility, then if there are people just on the other side of that, they don't need to pay for any property rights for that; is that accurate?

**A.** Can you repeat that?

Q. If they reduce the geographic areal extent of the storage facility boundary, it reduces the number of landowners for whom they need to compensate for the use of the property rights and that's the business consideration; right?

**A.** It's a fact a smaller storage facility area would result in less landowners having to be permitted. The -- the business consideration wasn't related to number of landowners as it was area.

312

Q. What business interest does Summit have in reducing the size or boundary of that storage facility if it's not related to not having to compensate landowners?

**A.** I --

MR. BENDER: If you know the answer.

MS. DOUGLAS: I don't know that. I'd have to defer to Summit.

Q. (MR. BRAATEN CONTINUING) And so the compensation of landowners is the only thing you know of as a business consideration that they would have been thinking about in --

MR. BENDER: I think that's a mischaracterization of her testimony. Can you ask the question again?

Q. (MR. BRAATEN CONTINUING) Sure. You've testified to the business consideration of the need to lease landowners; right?

**A.** Yes.

Q. And that's the only business consideration that you've testified to related to Summit's consideration of which permeability adjustment factor to use?

**A.** Yes, but it's not the only business consideration. There's also operational costs

313

associated with monitoring. If they -- they use a permeability multiplier in a larger permeability multiplier as we discussed, it may result in a larger plume, likely a larger associated pressure front, larger AOR that would require additional acreage to monitor, meaning additional monitoring costs.

Q. And every five years or so Summit is going to rerun the models based on the data acquired thus far from that monitoring; right?

**A.** Yeah. So the regulations require a reevaluation of the AOR determination, no less than every five years, meaning that Summit will be using operational and monitoring data to history match, calibrate their models and confirm their permitted AOR and storage facility area are still sufficient.

Q. What if they found out it wasn't?

**A.** So the North Dakota Century Code 43-05-01-12 --

MR. BENDER: Let me -- let me correct you. That's the Administrative Code.

MS. DOUGLAS: Thank you for that correction.

Q. (MR. BRAATEN CONTINUING) 43-05-01, and what was the next one?

314

**A.** 12. Dash 12.

Q. Okay.

**A.** Okay. This contains the -- the regulation language regarding any changes to the storage facility area on that reevaluation. If it was deemed that the $CO_2$ would potentially go outside the boundaries and Summit determined they needed to expand the area, they would need to go through the modification process.

Q. And the result being potentially an adjustment to the boundaries of the storage facility?

**A.** That would require a major modification which I believe requires an additional hearing at that point if they needed to modify the permitted boundaries.

Q. But if the data indicated that the storage facility boundary had not been modeled in a way that was accurately reflecting the conditions in the last five years, that is a potential result of the five-year review, that you redraw the storage facility boundary; right?

**A.** Potentially.

Q. And if you did that, what do you do about all the payments you've made to the landowners so

315

far?

**A.** I can't speak to that.

Q. Is there any process you're aware of that would address that?

**A.** Again, I believe it would be addressed in that major modification proceedance, which would be a hearing just like the one we're in today.

Q. Were there any communications about using the 2.5 multiplier between EERC and the Industrial Commission?

**A.** I can't recall specifically. Potentially in their review of initial permit drafts submitted, it could have been discussed.

Q. If you had used 2.7 for the factor instead of 2.5, how many more acres of property would have been included in the storage facility?

**A.** I can't speak to that. We did not run that case.

Q. Okay. Do you have any sense of what that might be?

**A.** I do not because simulations are a complex, multi-physics approach, and so adjusting the permeability is not a straight ratio to plume size.

Q. Would you agree that it would result in

316

some additional acreage?

**A.** Yes, I believe I stated that.

Q. Just a couple minutes ago you made a reference to sensitivity analysis. Do you recall that?

**A.** Yes.

Q. What do you mean by "sensitivity analysis"?

**A.** So the EERC performs sensitivity analysis. Some of that is discussed in -- in the permit as well. We looked at parameters that affectively -- or could affect simulation results. In addition to that, to the sensitivity analysis, we also did uncertainty analysis to look at how various properties and distribution of properties, such as permeability, could potentially impact the -- the model and the simulation results.

Q. And that's essentially doing quality control to test the predictive utility of your model?

**A.** I wouldn't classify it as testing the utility of our model. We did those things to determine what parameters we thought were appropriate and justifiable for use in the model.

Q. Could you do that assessment of the

317

parameters chosen without running sensitivity analysis on the model?
**A.** Could you repeat that?
Q. Could you assess the propriety of the parameters used in the model without running any sensitivity analysis on it? Let me ask a different question.
What properties did you run sensitivity analysis on?
**A.** Sensitivity analysis, you said?
Q. Yep.
**A.** So we ran sensitivity analysis on injection rates, bottomhole pressure conditions, wellhead temperatures, wellhead pressures.
Q. For what purpose?
**A.** So on page 3-15, we have a paragraph talking about sensitivity analysis.
Q. And you indicate that because of the availability of data in the form of well logs, core sample data and rock fluid properties, the need for typical sensitivity studies of influential reservoir parameters has been reduced. Has it been eliminated?
**A.** No, which is why we ran a sensitivity analysis.

318

Q. What's the difference between the sensitivity analysis you ran and what you would refer to here as typical sensitivity studies?
**A.** Typical sensitivity studies would vary more parameters potentially. So we felt confident in site-specific data to define limits of certain variables so we didn't need to test those.
Q. Up until you ran the injection test?
**A.** I -- I don't understand the question.
Q. Well, what were the parameters you were comfortable with that you didn't need to run sensitivity analysis on?
**A.** Things like model size, grid cell size, boundary conditions. We ran certainty cases on property distribution. We didn't necessarily run sensitivity cases on property distribution.
Q. Would you have been confident using your model to develop this application for Summit with running zero sensitivity analysis?
**A.** I think it points back to your questions earlier where you asked about what is the intent of running these models to define the storage facility area in an area of review taking into consideration the required five-year reevaluation, the amount of $CO_2$ that would be injected in -- in that time. I

319

believe running a model without sensitivity analysis would -- would still provide enough insight to be able to safely inject for those -- at least those five years until the reevaluation time period.
Q. So you're comfortable with a larger margin of error in the first five years?
**A.** Given the amount of $CO_2$ that will be injected, the proposed $CO_2$ plume size, other variables such as the area of review evaluation that looked at proximity of legacy wellbores and things like that, given the testing and monitoring plan, yes.
Q. Because ultimately what we're talking about here are pressures and the extent of the plume, and given what's going to be injected in the first five years, you don't have those same safety concerns in those first five years; would that be fair?
**A.** Could you restate that?
Q. You're comfortable with a greater margin of error in the first five years; right?
**A.** Given the amount of $CO_2$ that would be injected, that's -- that's correct, because we're -- the model as a whole was used to define a

320

boundary which is for 20 years of injection plus a period of postinjection plus a buffer. So within that five years, we're talking about a much smaller area.
Q. And if it's not exact, it's not going to be problematic because you're not going to have injected enough to get out to that boundary by that time anyway?
**A.** That's my belief. Correct.
Q. Except that you're treating all of the landowners inside that boundary exactly the same with the first ton that goes down that well and everyone on the outside of that line exactly the same, meaning they get nothing; right?
MR. BENDER: If -- if you understand how the allocation formula works for paying royalties, you can answer the question, but if you don't, I would not -- I would not answer it if I were you.
MS. DOUGLAS: Could you restate your question?
MR. BRAATEN: I can't even remember. May I have you read it back, please?
(Record read as requested.)
Q. (MR. BRAATEN CONTINUING) With respect to compensation.

321

**A.** I guess I don't understand your question. If the $CO_2$'s still in the boundaries, you're in compliance with your permit and you're compensating those within the boundary.

Q. Regardless of where that $CO_2$ is actually?

**A.** I guess to Mr. Bender's point, I'm not comfortable talking on the compensation rates for landowners or how that's going to be distributed across owners within the area.

Q. And so to the extent you ran sensitivity analysis on the model and to the extent you're comfortable with the predictive utility of the model in the ways that you used it for this application, it was never a consideration to you how that would affect how landowners get compensated?

**A.** This modeling and simulation was done to define the boundaries. Summit made decisions related to compensation of pore space owners.

HEARING EXAMINER GARNER: Why don't we take a ten-minute break.

(Recessed at 10:00 a.m. and reconvened at 10:12 a.m.)

HEARING EXAMINER GARNER: We are back on the record. Mr. Braaten, you can resume your

322

questioning.

Q. (MR. BRAATEN CONTINUING) You had mentioned that the Industrial Commission had previously accepted the use of a 2.5 factor. Was that for the Project Tundra project?

**A.** For those permits, correct.

Q. And was the EERC similarly involved with developing those applications?

**A.** We were involved, but they had -- we were involved.

Q. Did someone from EERC make that determination in the prior case? That was a bad question. Let me ask it again.

Did someone from EERC make the determination to use the 2.5 permeability adjustment factor in the prior proceedings related to Project Tundra in which EERC was involved?

**A.** I can say we participated in those discussions. I can't provide more details on who made the determination and the parties involved as that project is -- is still actively being conducted and is governed by an NDA with Minnkota.

Q. If you were going to assess someone else's work developing the same models that EERC developed for Summit's application, how would you go about

323

assessing those models that were developed by others?

MR. BENDER: Do you understand what he's talking about when he says "assess"?

MS. DOUGLAS: I was just going to ask, assessing for what purposes?

Q. (MR. BRAATEN CONTINUING) If you were asked to determine if the inputs and parameters and ways in which the models were set up and run would be acceptable to you in your professional experience such that they would support an application for Class VI wells.

**A.** The EERC's been contracted in this capacity before, so I'm speaking from direct experience here. Typically, that review process would come in the form of presentations about inputs and assumptions used in the model by those that created the model. We would evaluate their inputs and assumptions for reasonability and if they're justifiable based on the data sets that they had available to them, and we'd take into considerations Class VI requirements related to compliance. But EERC has not in these roles -- where we've been contracted to perform this work before, we have not reviewed people's models or

324

rerun their simulations to -- to double-check things in that manner. We've reviewed their inputs and assumptions through presentations, reviews of reports, that type of thing.

Q. Presentations by whom?

**A.** As I mentioned, those that generated the models presented to us their inputs and assumptions. A lot of the information that would have been in those presentations is captured -- for our models that information is similarly captured in the storage facility permits.

Q. Did you run the model at a 2.7 adjustment factor for permeability?

**A.** I just previously mentioned earlier today that we did not.

Q. Why not?

**A.** We didn't feel it was necessary. We made a decision to run it with 2.5 and so we ran it with 2.5.

Q. Would it have cost you anything to run it at 2.7?

**A.** Yes, it would have cost us time, so --

Q. How much time?

**A.** -- hours, and it would have cost us time running it with the model license. So we only

325

have -- we pay for a model license for a month. Running the model would tie up that license for a week or so.

Q. Because that's how long it takes to run the model?

**A.** A model this size typically could be anywhere from two days to a week of run time, depending on if any errors are encountered and you have to restart the model.

Q. Meaning that if you had to restart the model, it could take up to a week?

**A.** Potentially.

Q. Could it take longer than a week?

**A.** Potentially, if there are model errors which can't be necessarily predicted when the simulator is going to experience a numerical error and give an error file.

Q. But you think an engineer could replicate it in four weeks?

**A.** You asked me how much time it would take to -- to build a model and I said four weeks to build the model. That's different than running the simulations.

Q. Okay. So several weeks to replicate the model and then at least another week to run it?

326

**A.** Correct.

Q. So it's your testimony that another engineer could both replicate and run that model in five weeks?

**A.** If the model they built ran and didn't experience any numerical errors that they would have to troubleshoot.

Q. Have you ever set up and run a model that didn't have any numerical errors that had to be troubleshooted?

**A.** Myself personally, no.

Q. There's a binder directly in front of you there with a number of tabbed exhibits. If you don't mind, can I have you open it to landowner -- or LO-63.

**A.** I'm there.

Q. Are there features on this map that you recognize from the shapefiles submitted by Summit to the DMR?

**A.** These appear to be the storage facility boundaries and the AOR for the three permits.

Q. Are you also familiar with the maps that were produced to indicate the 5-, 10- and 20-year pressure increases in the area of the injectors?

**A.** Yes, I'm familiar with those.

327

Q. And does it appear that one of those is also overlaid on this exhibit?

**A.** It does appear that way, but it's difficult to see given the color scale for that layer.

Q. You are familiar with the maps that were generated to indicate the areal extent of the pressure increases in the reservoir that were in the application; right?

**A.** I am.

Q. And so you'd agree that there will be increases in the pressure in the formation well outside the boundaries of the storage facility?

**A.** Yes. If we may, I'd like to speak off page 4-2 of the permit.

Q. Okay.

**A.** Figure 4-1.

Q. And just for the record, the permit being referenced is Exhibit 1A?

**A.** Correct. So this map is showing the predicted maximum subsurface pressure due to injection from the three sites. So this is at 20 years is where -- of injection is where we see the maximum. And as you can see, the pressure increase extends beyond the proposed facility

328

boundaries in the area of review.

Q. What variable of Darcy's law limits the amount and rate at which you can inject $CO_2$?

**A.** I don't think I could speak to that without the equation in front of me.

Q. What limits your ability to inject $CO_2$ into these Class VI wells? Let me ask that again.

What limits the rate and amount of $CO_2$ that you can inject into that reservoir through these Class VI wells?

**A.** So the bottomhole pressure constraint is the -- the regulatory constraint that dictates the amount of $CO_2$ that can be injected into these wells. So that bottomhole pressure constraint is derived as 90 percent of the fracture pressure gradient. So bottomhole pressure is the regulatory constraint for the Class VI.

Q. And the bottomhole pressure is obviously directly impacted by existing pressures in the formation; right?

**A.** That's correct.

Q. Are you familiar with the intervention by Minnkota in this proceeding?

**A.** Generally.

Q. Are you familiar with where the well is

329

that they had concerns about?
**A.** Yes.
Q. Is Summit's project going to affect the ultimate bottomhole pressure that limits Minnkota's project?
**A.** There will be pressure interference.
Q. Can I have you go back to Exhibit LO-63?
**A.** I'm there.
Q. Do you see in the legend there there's a number of different colors, and I'll agree with you the color scale's a bit off, but down near the bottom next to Swenson there's a white color. Do you see that?
**A.** Yep.
Q. Do you see the land that sits right in between the areas of review of the three different storage facilities?
**A.** Yes.
Q. Is there going to be pressure interference with Mr. Swenson's lands and pore space?
**A.** Define "pressure interference with."
Q. From the Class VI injectors that Summit is going to inject $CO_2$ into.
**A.** There will be a pressure increase in the reservoir due to injection. The map does show the

330

pressure increase will be in the pore space below that land.
Q. Which would similarly limit the ability to inject into the pore space in that part of the reservoir based on limits to bottomhole pressure that are being affected by that pressure interference by Summit's Class VI wells?
**A.** Yes, potentially.
Q. How much is Summit compensating for that?
**A.** They're not required to compensate based on North Dakota Class VI laws. They're required to compensate for use of pore space for $CO_2$ storage. Injection will cause pressure increase.
Q. Which reduces the availability of pore space for storage of substances?
**A.** No. The pore space is still there. It's not taking the pore space away.
Q. It reduces the availability of the pore space for the storage of substances?
**A.** I don't agree with that characterization.
Q. Why not?
**A.** An operator could come in and still develop that and store $CO_2$ in that pore space.
Q. Subject to a bottomhole pressure limitation that has been significantly impacted by

331

the three Class VI wells surrounding him; right?
**A.** For the amount. Bottomhole pressure might impact potential injection rates, not necessarily the volumes that could be stored there. So one thing to note that while injection operations will increase pressure, when injection stops or if injection rates are limited, after injection stops pressure will die off in the reservoir, and we have a map that demonstrates that.
During operations, you know, if Summit's injecting at a lower rate, there will be a lower pressure increase. It could also, you know, shut in wells which would result -- or decrease -- which would result in additional pressure decreasing there. The pressure increase is temporary, but a developer could come in and still inject $CO_2$ there.
Q. And you show equilibrium of pressures ten years after operations; right?
**A.** The permit has a map that demonstrates this pressure decrease. It doesn't represent pressure equilibrium.
Q. What would you project that to be in time from the end of operations?
**A.** We did not simulate that.
Q. Would you expect it to be more than

332

20 years?
**A.** We'd have to simulate that.
Q. Significant pressure interference for at least 30 years of Mr. Swenson's pore space caused by the Summit project?
**A.** Again, it would limit injection rates. It wouldn't limit the total volumes that could be stored on his land. So to answer your question, there would be a pressure increase of approximately 500 psi up to a thousand psi increase over the current pressure of the Broom Creek today for up to 30 years.
Q. What's the economic incentive for injecting $CO_2$ into the pore space?
**A.** Can you clarify that question?
Q. Is Summit being paid in the form of tax credits by the federal government to inject $CO_2$ in the pore space?
**A.** I believe Wade testified yesterday as to the -- the economic drivers behind their project. I can't answer questions on that.
Q. Will the 45Q credits be in place in the same form and amount 30 years from now?
MR. BENDER: Objection. Calls for speculation.

333

HEARING EXAMINER GARNER: Overruled.
MS. DOUGLAS: As written today?
Q. (MR. BRAATEN CONTINUING) Correct.
**A.** No. But as I mentioned, while Summit's operating, there's nothing that would preclude an operator from coming in and injecting to store $CO_2$. The same amount of pore space would still exist. They would just have to inject at lower injection rates, but they could still get the same amount of $CO_2$ in that pore space over time.
Q. How much longer amount of time?
**A.** We have not run that model.
MR. BRAATEN: Real quick, I apologize, on the prior exhibit, LO-83, I did not move to admit, and I would move to admit LO-83.
MR. BENDER: Did you say 83 or 63?
MR. BRAATEN: 83.
MR. BENDER: Oh, that one. I'm sorry.
MR. BRAATEN: I'm skipping back.
HEARING EXAMINER GARNER: Any objections?
MR. BENDER: No objection.
HEARING EXAMINER GARNER: The exhibit is admitted.
Q. (MR. BRAATEN CONTINUING) You talked yesterday briefly about the area of review and

334

corrective action. Did you look at the old wells that have been P and A'd around the area of the storage facilities?
**A.** (BY MS. OLSEN) We did.
Q. What did you look at in those wells?
**A.** Particular to this permit, there are no legacy wells in this area.
Q. Within the area of review?
**A.** Within the area of review for the TB Leingang, that's correct.
Q. Did you look at the legacy wells that are closest but not within your area of review?
**A.** We did not evaluate wells outside of the area of review.
Q. Okay. Are you aware of the Fritz-Lutz 1 well?
**A.** I don't believe that was in the area of review.
Q. Are you aware of where it is in relation to the area of review?
**A.** Which area of review?
Q. Any of them.
**A.** Not at this moment.
Q. And are you familiar with the Richter 1 well?

335

**A.** I recall the Richter 1 well.
Q. Did you assess that well in any way as part of your work on the Summit project?
**A.** No. Class VI rules only require evaluation of wells within the area of review.
Q. Can I have you turn to Figure 4-1, the pressure map we were taking a look at a moment ago.
**A.** (BY MS. DOUGLAS) We're there.
Q. Are the dots on this pressure map indicative of wells?
**A.** Yes.
Q. Are you generally familiar with the two wells I mentioned being to the southwest of the storage facility represented on this map? Sorry. I don't know who I'm talking to. Either of you who knows.
**A.** Not based on the current map. They're not labeled or have well names, so I can't identify them based on this map.
Q. And just based on your familiarity with your location, does it appear that the -- let me ask a different question.
Based on your familiarity with the Richter 1 well, is it your understanding that that well is generally to the south or southwest of the storage

336

facilities?
**A.** (BY MS. OLSEN) I don't recall that information, but if you say it is.
Q. So if we look directly south from the SCS1 injection wells that is indicated on the map with the green triangle, if you go south of that until you're outside of the area of review and storage facility boundaries, almost directly south in blue there is a dot and it is a dot directly south of the green triangle and within the area that I believe is indicated as a 400 psi pressure differential. Do you see where I'm pointing at that?
**A.** I do.
Q. Does that well have surface casing below the depth of the uppermost freshwater aquifer or U.S. drinking water aquifer?
**A.** I don't have that information in front of me.
Q. Have you assessed the integrity of the plugs on that well?
**A.** For this permit, only wells within the area of review are required to be assessed.
Q. I understand. But as a factual matter regardless of a requirement, did you assess the

337

integrity of the plugs on that well?
**A.** I did not.
Q. And did EERC assess that?
**A.** I don't recall.
Q. Do you know if Summit assessed that?
**A.** I don't know.
Q. You'd agree that the reservoir pressures in the area of that well are going to increase by 400 psi based on your modeling as indicated on this map at Figure 4-1?
**A.** That's correct.
Q. Did you run an MIT on the well?
**A.** We did not. I assume the well is plugged.
Q. When was it plugged?
**A.** I don't know. Most of the wells in this area are vintage and drilled in the '70s. That's my assumption.
Q. Or even earlier?
**A.** Sure.
Q. Some of them plugged before the 1950s even?
**A.** Perhaps.
Q. So plug job that's 70 years old now?
**A.** Seven years?
Q. 70.

338

**A.** Perhaps.
Q. And it was plugged before we had the oil and gas conservation laws on the books in North Dakota we have now?
**A.** Plugging rules were different, yep.
Q. How much time and expense would be required to pressure up an MIT and run it at 400 psi on that well?
**A.** (BY MS. DOUGLAS) That -- that well's abandoned and so it's -- it's not accessible at the surface. You'd have to redrill out the plugs and recomplete it to get any information out of it.
Q. Was there an assessment of whether that might need to be replugged?
**A.** No. Again, Caitlin's testified and stated here a couple times we're only required to evaluate the wells in our AOR.
I would like to say -- point out, we did look at potential leakage or ribbing of leakage in that well. So if I could direct you to page 3-41 to map -- to the map in Figure 3-2. So we modeled a case here assuming hypothetical leakage pathways, again, hypothetical leakage pathways, meaning that there's a leakage pathway through plugs for this model. If there was a leakage pathway due to the

339

pressure increase -- maximum pressure increase from injection, we're estimating over the life of the project only .005 meters cubed of formation fluid could leak up through that well, again assuming it's leaking, into overlying formations.
So, again, we have not evaluated that particular well. It's outside of our AOR. We don't believe that there is endangerment of USDWs due to leakage.
Q. But if the plugs were bad, your modeling indicates that fluids from the formation would travel up that well in some amount to the freshwater drinking aquifer that is not protected by a surface casing?
**A.** The Broom Creek as it sits today is overpressurized. If those plugs were bad because the Broom Creek is overpressurized, fluids would already be flowing.
Q. How much psi would it take to bust those plugs?
**A.** I don't have that calculation.
Q. So you don't know if the pressure formation would cause those plugs to burst right now?
**A.** (BY MS. OLSEN) Class G cement is

340

typically rated to 5,000 psi.
Q. Is that what they used in 1945?
**A.** I'd have to look at the plugging records to look at that specific well.
Q. Do they have plugging records?
**A.** I don't know.
Q. Do you have any familiarity with how wells were plugged in North Dakota in the 1940s?
**A.** Generally, yes.
Q. Based on what?
**A.** My experience working for the Department of Mineral Resources.
Q. If you put a Class VI injector on the Swenson land and ran it at the same rates and volumes that Summit is going to run its wells, would that have any impact on Summit's project?
**A.** (BY MS. DOUGLAS) Yes, potentially.
Q. Do you think Mr. Swenson could get a Class II disposal well into the Broom Creek Formation permitted on his land in between the three Class VI injectors?
**A.** So my understanding is that the -- the Commission -- and I might not be using the proper terms -- but if they grant this permit, they will define this as a field, and so my understanding is

341

Mr. Swenson could permit the Class II or a Class VI well on his land. He would have to work with the Commission and make sure that he abides by any Commission orders related to those field rights.

Q. Given your knowledge of the technical feasibility of that, do you think the Commission's going to grant that permit?

**A.** I think development of any subsurface resources in the state require the cooperation of many entities, including landowners and project developers.

Q. How is Summit cooperating with Mr. Swenson to allow him to develop his pore space subject to the pressure increases caused by Summit's Class VI wells?

**A.** Is Mr. Swenson actively trying to develop those?

Q. Do you have the answer to my question?

**A.** I don't have any knowledge of Mr. Swenson actively trying to develop those.

Q. And so if Summit is preventing him from developing those, what does it matter if he's actively trying to develop them right now or not?

**A.** Could you clarify how Summit's --

Q. Why are you saying it's significant or

342

relevant whether or not Mr. Swenson is actively trying to develop a Class II well?

**A.** Your question you asked me, I believe -- and it can be repeated back here, but I believe you asked why is Summit preventing Mr. Swenson from developing his pore space.

Q. Okay. Well, if I asked that, I apologize. My intended question is has Summit worked with Mr. Swenson or reached out or talked to him about how their operations are going to affect his ability to use his pore space?

**A.** I was not privy to the discussions between Summit and Mr. Swenson.

Q. Would you agree there's going to be about a 900 psi pressure increase in the pore space in the reservoir under Mr. Swenson's land?

**A.** Approximately, yes.

Q. Is the max bottomhole pressure about 3,000, 3,500? What's the max bottomhole pressure on the BK Fischer?

**A.** It's on the range of, yeah, 3,600 psi to 3,800 psi, depending on what site-specific data --

Q. So you're going to increase the pressure in his pore space by approximately 25 percent of the max bottomhole pressure?

343

**A.** I've not done the specific calculations, but if you're saying that's what it is --

Q. Is 900 approximately one-fourth of 3600?

**A.** Yep.

Q. There was testimony yesterday about the delineation of the $CO_2$ plume boundary, and I believe the testimony was that it was determined to be at a 5 percent concentration of $CO_2$ in the aquifer as the edge of the $CO_2$ plume; is that right?

**A.** That's correct.

Q. And can you tell me again why 5 percent?

**A.** Yes. So there's several studies out there that suggest that 5 percent is the detection limit for monitoring techniques, particularly 3D seismic.

Q. Would it be fair and accurate to say that at the bottom of the injector, bottomhole, you've got about a hundred percent $CO_2$ in the formation, would that be fair, during injections?

**A.** Right -- right at the injection well?

Q. Right. I'm just saying if you start aground like right at -- where you're injecting, we can make an assumption that the $CO_2$ is a hundred percent of the fluid right there; right? Within one inch of the bottom of the well -- actually, let me ask you something. Are they perforating the

344

well?

**A.** They will be perforating the well.

Q. Okay.

**A.** Or -- yes, they will be perforating the well.

Q. Is there going to be a lateral?

**A.** No.

Q. Okay. So within the wellbore we're at a hundred percent $CO_2$?

**A.** Correct.

Q. And you're indicating the edge of the plume is 5 percent $CO_2$?

**A.** Correct.

Q. Does the concentration of $CO_2$ become more diluted in a linear manner as you move away from the wellbore?

**A.** No, not necessarily. I'd like to point you to page 3-25 and 3-26.

Q. Okay.

**A.** So these are showing cross-sections through the simulated plume. These are representing the gas saturation in the model cells. So saturation of $CO_2$ is also dictated by the porosity and permeability of the rock, so you'll note -- so, again, this has the 5 percent

345

saturation cutoff. You'll note along the wellbore you see an area of white, so this is on Figure 3-15a. Even at the wellbore saturation is below 5 percent due to the porosity and permeability in that model layer.

So it's -- it's dependent on porosity and permeability and how the $CO_2$ would flow in the formation.

And just a point of clarification, saturation will never be a hundred percent. $CO_2$ injection can never move all of the formation fluid out of -- out of the rock.

Q. Okay. Thank you. If we held constant permeability and porosity, would the $CO_2$ become more diluted in a linear or logarithmic function as you move away from the wellbore?

**A.** Not directly linear or logarithmic, but generally it would. At the edges of the plume is where you see more mixing of $CO_2$ with -- with brine.

Q. So, generally speaking, if we were to plot the reduction in $CO_2$ concentration on a linear scale out to 1 percent, and let's pretend we can measure, would the area of that line representing 6 percent to 1 percent be much longer than the rest of the line?

346

**A.** Based on the volumes being simulated here, no, it would be much, much smaller because you'd have a larger area with higher saturation.

Q. Would the area over which the saturation changes from 10 percent to 0 percent be significantly longer than the area over which it changes from 20 percent to 10 percent?

**A.** I can't really make an educated guess on that --

Q. What would you expect?

**A.** -- at this time.

Q. Would you expect that area from 10 to 0 percent to take longer or be longer than the area from 10 to -- or 20 to 10 percent based on what you know about how it dilutes as it moves away from the wellbore as an engineer?

**A.** Again, I don't think I could -- could speak on that.

Q. Okay. And the 5 percent, again, though, was chosen because that's essentially the detection limit and that's the lowest limit you can detect with running the models? Sorry. Let me start over.

The 5 percent is used because that is the detection limit from the seismic?

347

**A.** Correct. Based on published studies --

Q. Okay.

**A.** -- from other carbon capture and storage sites that are in operation.

Q. But you agree that's not actually the border or the edge of where the actual $CO_2$ being injected is traveling to?

**A.** As discussed, it's the boundary we can detect.

Q. How?

**A.** With seismic.

Q. But only to a 5 percent concentration of $CO_2$; right?

**A.** Yep.

Q. So we know that there is $CO_2$ outside of that boundary if that boundary is set at 5 percent. It sure doesn't go from 5 percent to 0 within a millimeter; right?

**A.** There's the potential for $CO_2$ to be --

Q. It's not just potential. Just as a matter of physics, there's obviously $CO_2$ outside of that boundary; right?

**A.** Yeah.

Q. Is there a plan to put two different wellbores in at each injector site?

348

**A.** That's my understanding.

Q. Is the intent to do any kind of directional drilling with the wellbores?

**A.** I believe so, but I can defer questions of that to a witness who can answer in more detail.

Q. Okay. Did someone generate a PHI-H map for the reservoir in the area -- areas of review?

**A.** I don't believe one was provided in the permit and I'm not sure if one was produced.

Q. Would the -- would EERC have produced the PHI-H map if one was produced?

**A.** Yes.

Q. Can I have you look at Figure 3-1?

**A.** I'm there.

Q. It says the distributed PHIE property along a roughly west-east cross-section. It seems obvious, but I want to make sure I understand. The little callout in the upper left with the red line, does that indicate the cross-section?

**A.** That does. The red line's the path of the cross-section.

Q. Okay. Do you see the vertical line for the Archie Erickson 2?

**A.** I do.

Q. And do you see just to the left of that

349

there's a couple areas with some fairly significant pockets of red, I'll call them?

**A.** Yep.

Q. And then if we look over at the Milton Flemmer, just to the right of that there's an area that is mostly blue and green with just a little yellow. Do you see where that is?

**A.** I do.

Q. If we took a hundred-foot diameter core in that area with the red splotches just to the left of the Archie Erickson and then we took a hundred-foot diameter core in that area with the blue and green just to the right of the Milton Flemmer, would one of those cores contain more available pore space for the storage of substances than the other?

**A.** Yes. If we're -- we're -- in a hypothetical case if we're assuming that this model is a hundred percent accurate and represents the rocks there, where you have higher porosity, you're going to have more pore space just mathematically.

Q. And there's also a difference -- if we did that same exercise, there's also a difference in the amount of pore space available for storage based on the vertical extent of the formation;

350

right?

**A.** You're saying based on the thickness?

Q. Correct.

**A.** Yes. That would be a factor in that calculation -- sorry. That would be a factor of the calculation, would be height, if you're calculating volume.

Q. And would a PHI-H map show us geographically what the various values were, taking into account the porosity as well as the thickness?

**A.** It would for the realization of the model in the permit. One thing to understand, while we use site-specific data as controls, we used variograms and other means to distribute properties to the best of our ability. It doesn't mean that the model will be a hundred percent accurate, which is why we have that five-year reevaluation period in case our model -- or the actual subsurface geology is slightly different than our model, so that we can account for those differences in how bottomhole pressure is responding to injection as well as how the $CO_2$ plume is migrating in the reservoir.

Q. But if we look at Figure 3-1 in that area of red just to the left of the Archie Erickson,

351

you're not saying that the model just randomly allocated an area of higher porosity to that specific location based on, you know, a factor of variability. It's doing that because it is predicting that that actually has more porosity there in that specific location; right?

**A.** It's being informed by control points, but we did uncertainty analysis looking at a hundred different cases for property distribution -- sorry, not a hundred -- a thousand different cases for property distribution. We chose the one P50 case which we feel is the most likely.

Q. And you couldn't have done that unless you were able to do sensitivity analysis?

**A.** Uncertainty analysis.

Q. Sorry.

**A.** But, yes, that's correct. Those are the steps we performed to determine which model we had the highest confidency in being the most probable case.

Q. And it's important to do that; right?

**A.** When you're the operator looking to define the boundaries of your storage facility area, it's important as you will be obligated to operate and $CO_2$ must stay within those bounds.

352

Q. What if you're the landowner with pore space on the outside of that boundary, is it important for them?

**A.** I don't understand what context it would be important for them. The operator's required to keep $CO_2$ within their boundaries. If $CO_2$ is going to go outside their boundaries, they're in noncompliance with their permit. If they have to adjust their boundaries, they are going to have to amalgamate or acquire that additional pore space outside, go through this major modification and hearing process to get that approved.

Q. With respect to the compensation being paid to the landowners whose property is being used by Summit, is there any consideration given to the actual porosity or actual thickness of their pore space?

**A.** I believe Summit chose to treat all landowners within the storage facility area equally, meaning that the compensation is based by a total amount of $CO_2$ injected and they're given the proportional payment for the amount of land they have within the storage facility area. They did not use a volumetric approach. So in a volumetric approach landowners would be paid for the actual

353

amount of $CO_2$. Why that's not done is it -- it would -- it would benefit the landowners directly around the injection well, so Summit chose to treat all landowners within the storage facility area equally instead of --

Q. Accurately?

**A.** I don't agree with that classification.

Q. Well, they're not paying the landowners based on the amount of $CO_2$ being stored in their pore space; right?

**A.** Summit's paying for the use of the pore space, so they are leasing the pore space.

Q. Are they leasing the pore space from my clients?

**A.** My understanding is that your clients are outside of the storage facility area boundary, so their pore space is not being leased for storage of $CO_2$.

Q. Can I have you flip back to Landowner 63.

**A.** I'm there.

Q. If you see the different colors next to the names and you look at the map, there are blocks of colors both within and without the storage areas, areas of review and outside of those boundaries?

354

**A.** Yep.

Q. I apologize. Bear with me one moment. I think I may be done.

Is there a place in the permit application where thickness or porosity is broken down by landowner or tract?

**A.** No.

Q. Okay. Whether it's in the application or not, was that ever done or attempted by EERC, to your knowledge?

**A.** No.

Q. How does it affect the accuracy of your 3D seismic if you are not doing it on certain tracts?

**A.** It has the potential to reduce the resolution and quality of the seismic data.

Q. And does it reduce the resolution and quality just for that area specifically or does that lack of seismic in that area impact the quality of the other data?

**A.** So the quality of the seismic data is dependent on the fold as well as the source receiver offsets, so it's dependent -- the quality of the image is dependent on the fold within each area. Fold is lower when you aren't allowed to have source and receivers in a specific tract.

355

However, if you have sufficient source receiver offset, the quality of data will be lesser for shallower formations, but you would -- depending on the side of the land where you don't have source and receivers, you may still have source -- sufficient source and receiver offset to produce high-quality images with a seismic of the deeper formations.

Again, that's going to be dependent on the depth of the reservoir, the source receiver offset and the area where receivers and source weren't allowed to be placed or operated.

MR. BRAATEN: I don't have any further questions.

HEARING EXAMINER GARNER: Any questions from the staff?

**EXAMINATION**

**BY MS. MADCHE:**

Q. I have some questions. I would like to start out with some of the questions that were deferred to this group from earlier. Let's see here.

So you had given testimony on the location of coal reserves and coal leases within the three storage facility permits. Would you be able to

356

answer approximately how close mining activity currently is from proposed equipment, aboveground infrastructure for the three facilities? So to repeat, for each three storage facility permits, what's the proximity to current mining activity to date from the aboveground surface infrastructure? And if you need to defer that, that's fine. Just let me know.

**A.** (BY MS. DOUGLAS) All right. I'm going to point you to the Exhibit 2.

MR. BENDER: It's 1B.

MS. DOUGLAS: 1B. Exhibit 1B, page 280. This is the Archie Erickson/BK Fischer permit.

Q. (MS. MADCHE CONTINUING) Yep.

**A.** Figure 2-50. So these reflect the closest mining operations from the Coyote Creek and Beulah Mine which are the closest mining operations to any of the three storage facility areas. And you can see on this map green shows future mining activities and brown shows mined out -- or areas where mining has already taken place. And you can see the approximate distance from those to the proposed injection sites as well as the flowlines. So here the scale we're looking at, I believe those are townships. So it's approximately three to

357

four miles, the surface facilities are, from the future mining activities.

Q. And just to confirm, yesterday in your testimony you had stated that there were no active coal leases where surface infrastructure was planned for the three facilities; correct?

**A.** Correct.

Q. So earlier I had asked a question on why the Milton Flemmer 1 was used as the type log in Article 1.15 for all three storage agreements. Could you elaborate as to why?

**A.** I can. So the Milton Flemmer well penetrates the entire thickness of the Amsden, so it was used as the type log so that we could accurately represent the depth to the top and the bottom of the Amsden and the thickness. The other two stratigraphic test wells drilled for the other storage facility areas do not penetrate the entire Amsden. That is why the Milton Flemmer 1 well was used as the type log for all three storage facilities.

Q. When it comes to the royalty payments, would you agree that due to the lack of history matching data that we have that there would be more uncertainties to allocating via volumetric versus

358

the tract participation as Summit has chosen to go forward with?

**A.** I would agree with that. I'd also add that there are limitations for using monitoring methods to quantify the amount of $CO_2$ in a given area in the subsurface. Monitoring methods such as 3D seismic and time lapse changes that can be captured in 3D seismic are susceptible to both changes in pressure and changes in fluid saturation, so you would not be able to accurately separate out effects of pressure from $CO_2$ saturation in order to assure you're compensating landowners using a volumetric approach.

Q. So now I'm going to move forward to questions that I have from Section 2 on the geologic exhibits. For the storage facility permit for the TB Leingang, what was the maximum pressure applied during the microfracture testing in the Milton Flemmer 1 well within the Spearfish/Opeche Formation?

**A.** I'll defer that question to a later witness who was involved in those tests.

Q. Would you be able to state who it's being deferred to specifically?

**A.** Ms. Jean Oddy.

359

Q. Okay. As it pertains to all three of the storage facility permits and to their stratigraphic test wells, can you explain how you determined which sand package within the Broom Creek you target for your microfracture in situ stress test to determine the fracture propagation pressure gradient?

**A.** I'll also have to defer that to Ms. Oddy.

Q. Okay. For all three of the applications and the three stratigraphic test wells, was the next dissipation zone above the injection zone, so your Inyan Kara, sampled at all three facilities?

**A.** I believe so, yes.

Q. And did those samples show evidence that the formations are currently hydraulically separated?

**A.** That's our interpretation of the data, yes.

Q. And in all three storage facility permits, has any Fox Hills wells been sampled?

**A.** (BY MS. OLSEN) There's historical groundwater sampling data in Appendix B throughout each of the three permits. Plans to test those wells in the baseline sampling plan are described in Section 5 and will be testified to later.

360

Q. So just to confirm, you reviewed any data that already existed which would be in Appendix B, but no baseline sampling has started in the Fox Hills?

**A.** That's correct.

Q. Core plugs taken from the base of the upper confining zone in the Milton Flemmer 1 well had a fairly high anhydrite weight percentage, around 86 to 98 percent. Similar in the Archie Erickson, there was around 95 and a half percent shown. Did geochemical modeling indicate that it was likely that the boundary between the two formations would dissolve due to that percentage of anhydrite?

**A.** (BY MS. DOUGLAS) Geochemical modeling done for the upper confining zone showed little to no dissolution of anhydrite due to geochemical reactions with the modeled $CO_2$.

Q. And would that apply for both the TB Leingang and the BK Fischer?

**A.** That's correct.

Q. So I'm going to ask some questions related to the formation imaging logs. Would you be the correct witness to answer for all three storage facility permit applications? I only ask because

361

it was discussed that you were going to have another witness at the end that would talk about differences between the three facilities, or are you good with answering them?

**A.** We're good with answering the questions to all three.

Q. Okay. So in the Milton Flemmer 1 well, both in the formation imaging logs and within the thin sections specifically where high anhydrite content existed, there were a handful of fractures that were shown. Can you please explain why these fractures don't pose a risk to the storage facility?

**A.** You said for the upper confining zone?

Q. Yes.

**A.** Could you point to specifically what depth interval?

Q. So in figure 2-33 and into 2-34 in the TB Leingang application, it shows that there are a handful of resistive litho-bound fractures present in the Opeche/Spearfish interval. Why are these fractures not a concern as far as containment?

**A.** They're not a concern for containment because they're commonly filled. In the case of the resistive bound fractures, they're commonly

362

filled with anhydrite.

Q. So they wouldn't have transmissibility to have $CO_2$ move through them?

**A.** Correct. They wouldn't have transmissibility in the sense of they wouldn't have sufficient permeability.

Q. So now in the BK Fischer application, similarly in the Archie Erickson 2 well, the investigation also found fractures, including one minor fault. I would have the same questions for that one. I'll let you get to the -- the figure here. So Figure 2-30 (c) specifically would show some of the fractures and the minor fault that was found within the Opeche/Spearfish interval.

**A.** For this well the fractures were also commonly filled either with anhydrite or clay. In the case of the minor fault, it -- it appears to be isolated. It doesn't appear to transect a sufficient vertical extent to -- to serve as a fluid migration pathway or to be transmissible. Meaning it's a minor fault and it doesn't cut through the entirety of the upper confining zone.

Q. And similarly in the last application, in the Slash Lazy H 5 well there were fractures found and a minor fault in the Amsden Formation.

363

**A.** Again, the minor fault -- or the fractures are commonly filled, in this case commonly with anhydrite. Similarly, given the geometry of this minor fault, it appears to be isolated and does not have properties to -- for it to serve as a fluid migration pathway.

Q. So I want to go back to the BK Fischer application. In the 3D seismic survey that was done across these three storage facilities, was the Stanton fault that was suspected to run through the northwest corner of the BK Fischer storage facility area found in the 3D seismic?

**A.** No. The proposed location of the Stanton fault is on the edge of the 3D seismic survey. We saw no indication of the fault or any deformation associated with the fault.

Q. So now I'm going to move to questions related to Section 3 for the model and simulation. Do you know what the geographical projection was used in Petrel for the geologic model?

**A.** I don't have that information on hand, but perhaps I could provide it after a break.

Q. Okay. And what is the cell size in the model both within and outside of the refinement grid?

364

**A.** Outside the refinement grid, it's a thousand by a thousand feet. Within the refinement grid, I believe it's 250 feet by 250 feet.

Q. So on Figure 2-3 on page 2-5 that shows a boundary for the simulation model, could you explain why the boundary was centered as shown in that figure within the geologic model?

**A.** Are you asking why the simulation model extent was centered within the geologic model extent?

Q. Yes. Or how it was determined as far as placement for the centering with it?

**A.** So the -- the simulation model extent was selected to cover Summit's sites and have enough of a boundary -- or have enough cells as to model the pressure plume and not have artifacts due to boundary conditions. Additionally, we wanted to incorporate the nearest site, the DCC West site, to evaluate potential pressure interference.

Q. In the numerical simulation, are all three facilities injecting across the same 20-year injection period?

**A.** Yes. That's what was modeled.

Q. In this section it's stated that the TDS value of the Broom Creek measured from the Milton

365

Flemmer 1 was used as the input for the numerical simulation. Can you explain why the Milton Flemmer 1 sample was chosen out of the three?

**A.** Yes. So the Milton 1 sample was the -- the meeting of the three values. We selected that as it was a site-specific value close to what could be considered an average between the three.

Q. And could you explain what effect the TDS input would have on the $CO_2$ plume?

**A.** Yeah. A higher TDS could potentially result in a smaller plume.

Q. Similarly, it's stated that the temperature and pressure gradients derived from the Milton Flemmer 1 were used in the simulation. Similarly the reasoning behind why the Milton Flemmer 1 was chosen?

**A.** One of the reasons being wanting to apply the same reservoir conditions associated with the salinity value.

Q. And could you explain what effect temperature has on the $CO_2$ plume? Movement, to clarify.

**A.** A difference in temperature could result in either a larger or smaller plume.

Q. So let's say like an increase in

366

temperature.

**A.** I can't recall at the moment. I could provide that answer potentially after a break.

Q. You had noted earlier that the $CO_2$ stream used in the geochemical modeling was done at 95 percent $CO_2$ and 2 percent oxygen to be more conservative because oxygen is likely what's going to be most reactive. Could you explain additionally -- so in earlier testimony with group one, they had stated that the minimum requirement for the $CO_2$ purity would be 95 percent to be able to take $CO_2$ from sources to send to these storage facilities. Can you explain why in the numerical simulation 98.25 percent was used instead of 95 percent? 95 percent being the minimum cutoff for Summit to take $CO_2$ from third-party sources.

**A.** Just to clarify, that's what Wade testified to, 95 not 98.

Q. Correct. But the model uses 98.25 percent. I'm just asking why 98.25 percent was used in the numerical simulation.

**A.** Sure. So 98 percent is the expected operational composition.

Q. And could you just explain what effect $CO_2$ purity also has on the $CO_2$ plume movement? So like

367

a higher $CO_2$ purity would have what influence on $CO_2$ plume movement?

**A.** In this case because of the compositions where we're talking about, the potential would be changes in plume size, but they -- it would be very minimal.

Q. As proposed well injectors are drilled, so for the three applications the six injectors haven't been drilled yet. As they are drilled and logging and coring and testing data is gathered, that planned to be incorporated into the geologic model and an updated simulation ran prior to starting injection?

**A.** I don't know specific plans to update the model, but I believe regulations require validation of the proposed model inputs with the injection well data, including the injection test that's required for each injection well.

Q. So to confirm, if -- if the results indicated a substantial change and the regulatory group requested that it be done, at that time it would likely be done?

**A.** By the regulatory group you mean the DMR?

Q. DMR.

**A.** Yes, we would.

368

Q. At what frequency will plume predictions be updated once operations are underway?

**A.** No less than every five years.

Q. So I'd like to go to Figure 3-6 on page 3-10 in the TB Leingang application.

**A.** I'm there.

Q. For all of the applications when showing the permeability curves used for siltstone and anhydrite, they were used equivalently. Could you explain why you're using the same? So to clarify, can you explain why the same permeability curve is used for siltstone and anhydrite?

**A.** Sure. That's related in part to the core analysis sampling and the data points available. Because siltstone and anhydrite are expected to be low permeability and porosity lithologies, we felt it was sufficient to apply this data set to both lithologies in the model.

Q. So I'd like to move to Table 3-5 on page 3-35.

**A.** I'm there.

Q. So for all of the applications when having this table shown for the EPA Method 1, you are using the proposed locations of one of the injection wells, being the TB Leingang 1, the BK

369

Fischer 1 and the KJ Hintz 1. Considering these wells haven't been drilled yet, can you explain how these values are derived?

**A.** Sure. So these values are taken from the geologic model and the simulation model.

Q. And can you explain why it was chosen to use these rather than the three stratigraphic test wells?

**A.** Given that we modeled to populate these, you'll note that, for example -- so I'd -- just trying to find a map I'd like to point you to. So I'd like to point you to page 3-22. So here is a map of the -- the average pressure change after 20 years of injection. Again, the AOR was defined using pressure data from the simulations. If you look at -- here in this case the green triangle represents the injection well and just to the southwest of that, that gray triangle represents the Milton Flemmer well, and you can see that there is a large difference in pressure between those two locations. So in that sense it was more appropriate to use data from the injection well location to be able to evaluate pressure change.

MS. MADCHE: That is all the questions I have. Thank you.

370

**EXAMINATION**

**BY MR. STOLLDORF:**

Q. Moving on to Section 4, I have some questions about locations. If you guys can't answer these, just let me know who can. Start on page 4-4, Figure 4-2. Just an AOR map showing occupied structures, among other things. How far exactly -- or approximately how far away from the facility are -- are occupied structures?

MR. BENDER: We have another witness who can provide that unless you know.

MR. STOLLDORF: Do you know who just so I know who to ask?

MR. BENDER: It will be Jimmy Powell.

MR. STOLLDORF: Jimmy.

Q. (MR. STOLLDORF CONTINUING) For the TB Leingang, BK Fischer and KJ Hintz wells, have any baseline samples been taken from these wells to date?

**A.** (BY MS. OLSEN) Not in this part of the Summit project.

Q. Okay.

**A.** Water -- Fox Hill -- you mean groundwater monitoring wells; correct?

Q. Correct.

371

**A.** Yep.

Q. This one is just related to the KJ Hintz facility area of review. The Raymond Jensen 1-34 well, File No. 4942, is a plugged and abandoned well within that facility. Can you briefly explain the protective measures that are being made to monitor the $CO_2$ plume movement near that well?

**A.** 3D seismic surveys will be taken at least every five years as part of the testing and monitoring plan to track the plume. And at or around year 19, Summit proposes putting in an additional groundwater monitoring well in the Fox Hills Formation nearby that legacy wellbore.

Q. Do you know how -- approximately how close?

**A.** I don't think the final location has been determined yet.

MR. STOLLDORF: Okay. That's all I have.

**EXAMINATION**

**BY MR. SUGGS:**

Q. Okay. Bear with me. A lot of my questions have been asked at different levels, so I'm going to have to pan through this as I go.

But I'm also going to start with a couple of questions that were deferred. One being the --

372

looking at Figure 1-1 on 1-2 -- on page 1-2 of the Leingang application. Okay. I'll start with the odd shape of the $CO_2$ plume as it exists in the modeled stabilized $CO_2$ extent. Is there any explanation for why we don't see $CO_2$ in that central area, the southwest central area?

**A.** (BY MS. DOUGLAS) Yeah. In this region of the model, we had low porosity and permeability layers. That's why you don't see predicted migration of $CO_2$ plume there.

Q. The low PHIE and perm, I guess, layers that exist in that area, were they arbitrarily -- and when I say "arbitrarily," just purely due to the variograms were they assessed or was there additional seismic evaluation that supported that low porosity/perm area?

**A.** There is additional seismic data that was used as control points and to -- to support the distribution of properties, but it should be noted that seismic data has resolution images for resolving thicknesses of different porosity and permeability layers, so there's potentially some uncertainty.

Q. Okay. So I guess in that explanation, did it just -- I'm going to tie this back to some of

373

the discussion on the depositional environment. Would the seismic in that area indicate it was partially interdunal or do you see the dune structures there or not?

**A.** Correct. That would suggest the low porosity and permeabilities typically associated with those interdunal dolomites as well as anhydrite deposits.

Q. Okay. And then I asked this as well earlier, but in Township 141 North, Range 88 West, Section 35, you'll note that on this exhibit, at least, the stabilized $CO_2$ plume extent does appear to contact the storage facility area border. Do you know what the distance is between there? What kind of buffer is applied at approximately around that area?

**A.** Yes. So regarding the stabilized $CO_2$ plume extent, it's a short distance, you know, on the order of 10 feet, but I would like to point out the red line is the $CO_2$ extent at the end of injection. So we feel that that buffer is reasonable, and we will, you know, reevaluate the predicted plume movement and our storage facility area boundaries no less than every five years to confirm that.

Q. So just to clarify, the red line is the

374

extent of the $CO_2$ migration at the end of the 20-year injection cycle?

**A.** Correct.

Q. And the gray that goes outside of that would be where the model is predicting that $CO_2$ to migrate during a ten-year postinjection phase?

**A.** Correct.

Q. Okay. Moving on to Sections 2 and 3, on page 2-17 -- I've got to get there myself. The narrative right above the figure indicates that the net sandstone thickness in the simulation model area ranges from 6 feet to 397 feet with an average of 140 feet. Can you point me at -- somewhere on the figure below, Figure 2-10a where it would approach 6, or is that a typo in any way?

**A.** I believe the typo should say -- I believe those values are from the geologic model extent, not the simulation model extent, so that is an error.

Q. Okay. So that wouldn't be -- so what should that read, then?

**A.** Because it's sandstone thickness, I'd have to calculate that from the model. I can't derive that from the thickness map.

Q. I guess looking at the isopach of the

375

Broom Creek, then, do you see anywhere on that map that you're presenting where the thickness would approach 6 feet? I mean in glancing at it, I thought the -- the thinnest that was represented was on the order of a hundred feet.

**A.** Yes. That's why I believe that that's an error. It should say those values are from the geologic model extent where the Broom Creek actually --

Q. Oh.

**A.** -- does pinch out, not the simulation model.

Q. Got you. So not the simulation, but the whole --

**A.** Correct.

Q. -- geologic?

**A.** So that -- I believe that sentence is in error.

Q. And that'd be where it would punch out to the northeast and the Broom Creek wouldn't exist --

**A.** Correct.

Q. -- far northeast of the whole model area?

**A.** Correct.

Q. Okay. Page 2-22. At the bottom of that page you indicate that there's, I guess, a sample

376

bias towards the sandstones that were sampled. Does that sample bias affect the overall model in any way?

**A.** No. So the core samples were used to calibrate petrophysical logs of porosity -- calculated porosity and permeability, and those logs were what were used to help derive model properties. So I -- I don't believe that that bias impacted the model in a significant fashion.

Q. Figure 2-16 on page 2-25.

**A.** I'm there.

Q. At the very top of the Broom Creek here, you have an anhydrite facies identified in column 7 on that figure. And then in column 8 when you upscale those for the modeling purposes, it's being applied the siltstone facies. Is there any effect on the modeling due to that or is there a reason that was applied instead of the anhydrite facies?

**A.** There is not an effect of that. Both the anhydrite and siltstone are populated as low porosity and permeability.

Q. So functionally they both act as confining layers in the modeling?

**A.** That's correct.

Q. That drives me to the geochemical side of

377

this so I'm going to jump probably largely over into Appendix C, but bear with me. The -- the narrative -- so I'm looking at C-15 and 16 here -- or sorry -- Figures C-15 and 16. I think I'm on C-12.

**A.** Figure C-15 and 16 or page --

Q. So the narrative that I'm asking about is on page C-12 where you reference Figures C-9 and 10, which those figures are on pages C-15 and C-16.

**A.** Okay.

Q. This narrative indicates that dolomite is the primary entity in dissolution and that anhydrite is precipitating it. I just want to confirm that.

**A.** That's correct.

Q. Okay. So in previous applications, the anhydrite has been identified as a primary dissolving element in those models, in those geochemical analyses. So I guess my questions here are what is different about the modeling that was done here or the chemistry of the water or the chemistry of the rock that is causing anhydrite to be a precipitant instead of a dissolving --

**A.** I don't have that answer readily available.

378

Q. Is that something that may be provideable in short term or is that something I might need a supplemental response on?

**A.** I could potentially provide it after a break.

Q. Okay. I guess I'll -- I guess I'll ask that if it's not something that can be answered in testimony after a break, that it would be submitted as explanation in supplemental.

**A.** Okay.

Q. Still on C-12 here -- bear with me. So actually on page C-14, Figure C-8. In this figure, the bottom figure, shows that mineral trapping is still on the negative side of the equation so more dissolution has taken place than precipitation at this point through the extent of what's presented on this figure; correct?

**A.** Yes. So what this figure is showing is why there's negative amount for mineral trapping. It's because of that dolomite being dissolved and that those dissolved carbonates are being attributed to as carbon that was added into the system.

Q. Okay. In previous testimony you indicated that it would be on the order of hundreds of years

379

before true mineralization started happening for $CO_2$ in the storage reservoir. Have you projected that out? Do you know a rough time frame when that negative trend starts moving the other way?

**A.** We have not modeled that.

Q. Okay. C-18.

**A.** Maybe just one point very quickly. Sorry, we're going back to Figure C-8. You can see by the slope of the curve, after $CO_2$ injection ends, we have less of that mineral trapping and that slows down over time.

Q. But you still haven't taken it to the point of when that actually reverses? It's just --

**A.** That's correct.

Q. -- expected or anticipated that it does reverse?

**A.** Correct.

Q. Okay. Going on to page C-18, the -- the narrative here for your PHREEQC model, and you've testified to this earlier, that you used the diffusion process for the mechanism by which the $CO_2$ would enter. And, conversely, if you look at later in the -- in the appendix when you're talking about the lower confining zone and the simulation that was done there, you're talking about advection and

380

dispersion. Can you elaborate a little bit on why the two different mechanisms are used for the two different confining zones?

**A.** Yes. So diffusion was used for the upper confining zone as $CO_2$ is a buoyant fluid which is -- so $CO_2$ is a buoyant fluid which is why we needed to use advection and dispersion which allowed the $CO_2$ to dissolve in -- in -- in brine and the density to allow it to enter the model cells for the lower confining zone.

Q. So for the lower confining zone -- sorry, I'm going to have to ask you to clarify that. Focus on why diffusion was used for the upper confining zone modeling.

**A.** I don't think I can elaborate and provide that specific answer at this time, but I could potentially provide it after a break.

Q. Okay. Probably the same situation, if I don't get that answer as part of testimony, I might want it as a supplemental.

**A.** Correct. We would be able to provide that.

Q. Page C-18 still. The formation brine for the simulation that was done on the Opeche and as well as the -- or the Opeche/Spearfish as well as

381

what was done on the Amsden for the lower confining zone, in both cases you used the brine composition as it was determined from Broom Creek samples?

**A.** That's correct.

Q. Can you elaborate on why?

**A.** Just let me confirm something real quickly.

So it's my understanding given the porosity and permeability of at least the Opeche/Spearfish, we weren't able to collect a fluid sample due to the immobility of the water due to low permeability. Therefore, we used the Broom Creek as a representative sample as we don't believe the composition will vary greatly.

Q. Okay. Still on page C-18, Table C-4 the average mineral composition of the Opeche/Spearfish that was used here, can you confirm which facies within the Spearfish that would represent -- or the Opeche/Spearfish?

**A.** This sample -- the average sample here is approximately 60 percent mineral weight anhydrite, so I'd interpret that as anhydrite.

Q. On page C-19, middle paragraph there when you're discussing Figure C-13, you indicate that the net change due to precipitation or dissolution,

382

in this case you're referencing C2, which is a cell within the model that was done, has less than 5 kilograms per cubic meter net change. That net change, is that positive or negative?

**A.** I'd have to clarify how that was calculated and provide that as a supplement.

Q. I don't think I could confirm or guesstimate with the figure in front of me which way that would be going, so if we could confirm that as well.

**A.** Yep. We could provide that as a supplement.

Q. Page C-25, similar question. This happens to be the -- Table C-6 on page C-25 -- averaged mineral composition for the Amsden formation that's being presented in this table. Could you elaborate and confirm which facies that were represented in your modeling?

**A.** I'd characterize that as a -- well, it would be represented as a dolostone in our model.

Q. Okay. I guess a similar question on page C-28. The narrative at the -- in the bottom paragraph, again you're referencing an overall net porosity change as less than 2 percent. And can you tell me whether that's a positive change or a

383

negative?

**A.** I would like to provide that as a supplement.

Q. Okay. Then back up to Section 3, page 3-7, I believe. The bottom paragraph on page 3-7 you discuss the distances from the edge of the model and the volume modifiers that were applied as boundary conditions. Can you spend just a few moments confirming what those distances are measured from and to within the model? And then -- well, I'll let you do that first.

**A.** So those distances are measured from the Broom Creek extent interpreted by the EERC which is shown on page 2-16 in Figure 2-9.

Q. So the distance you're referencing there is the distance from the edge of the Broom Creek to the edge of the modeled area?

**A.** To the edge of the simulation modeled --

Q. The whole simulation.

**A.** -- area. That is correct.

Q. Okay. And then when applying your volume modifiers as boundary conditions, can you elaborate on what the effect of those are within the model?

**A.** Yes. So we applied the volume modifiers to represent the fact that we don't have an

384

infinitely acting aquifer where the Broom Creek pinches out. Because we don't have an infinitely acting aquifer, there will be differences in how pressure responds in the reservoir due to that pinch-out. And so these modifiers were applied to take into account that difference in boundary condition between an infinitely acting aquifer and the closed boundary.

And so the volume modifier is used in the CMG calculations with the boundary condition to account for the specific distance beyond the model where that pinch-out occurs, and so that is accounted for with the boundary conditions as it relates to the simulated pressure.

Q. So the -- the cell -- the modifier being applied to a boundary cell allows -- allows that cell to act as if it has a larger volume than its individual cell size?

**A.** That's correct. To allow the computational simulator to account for how that pressure would respond outside of the model.

Q. So the smaller values have less distance or less volume in the reservoir in that direction --

**A.** Correct.

385

Q. -- towards a pinch-out or towards a boundary of the -- the -- I guess the Broom Creek as a whole as opposed to what's actually simulated within the model?

**A.** That's correct.

Q. So this was asked a little bit, so I'm on page 3-8, the description your capillary pressure curves, and you indicate that they were derived from mercury capture -- mercury injection capillary pressure testing on the cores; right?

**A.** Correct.

Q. But then that they were modified. Can you elaborate on the need why they were -- why it was necessary to modify those core-derived values and what that process looked like?

**A.** So those values were calculated using data for -- from a single sample, so we looked at the porosity and permeability from that sample to upscale it to the ranges of the porosity and permeability reflected in our model.

Q. Okay. When you say that, was that -- when you say the single sample, you're referring to the single sample that was used to derive the two confining zones, being anhydrite facies values and siltstone facies values, or am I -- yeah, siltstone

386

and anhydrite.

**A.** We took capillary entry pressure data from a single sample from those units to derive these curves.

Q. Okay. And so, I guess, the modification of that mercury -- mercury-injection-derived data to be representative for $CO_2$ injection, what was done to, I guess, adjust the mercury fluid properties to the $CO_2$ fluid properties?

**A.** I could provide that answer after a break.

Q. Okay. Same, I guess, question or same response, then, if it's something that doesn't come as part of direct testimony, we'll want supplemental explanation for it.

Down in the AOR page 4-14, it was actually referenced in a number of locations, including on page 4-12 in Table 4-6, but there's a reference that's being used to the Tongue River Formation for a freshwater aquifer. I just -- I guess I'm just going to point out and confirm that Tongue River isn't a formation recognized on the North Dakota stratigraphic column at this time. There's an RI 59 -- Report of Investigation 59 that was published in 1977 that proposed renaming the Tongue River and the Ludlow as they correlate from Montana and

387

Wyoming to the Slope and -- drawing a blank on the other one and I don't have it written here -- but rename those two formations. The Tongue River as you're referencing here would be equivalent to those two formations that are represented on the geologic strat column in North Dakota; correct? Or can we confirm that?

**A.** (BY MS. OLSEN) We can confirm that.

Q. Okay. On page 4-16, there's a line here in your narrative that reads, "The Pierre Formation is the thickest shale formation in the AOR and primary geologic barrier between the USDWs and the injection zone."

The primary barrier would be the upper confining zone; correct?

**A.** (BY MS. DOUGLAS) That's correct. So that's a misstatement.

Q. It would just be an additional barrier --

**A.** Correct.

Q. -- of significant thickness as what's indicated?

**A.** Yeah. We -- we consider it as a tertiary confining zone because there's the primary confining zone, a secondary confining zone, and then we consider the -- everything between the

388

Inyan Kara Formation and the Fox Hills as a tertiary confining zone.

Q. One last item I'm going to jump -- it kind of mixes between the AOR and the -- and Section 3. It's actually on 3-42 I think where the -- page 3-42 where the narrative is. Right at the bottom of this page there's a statement, "Therefore, the AOR is delineated as the storage facility area plus a 1-mile buffer."

This immediately follows a discussion of the risk-based AOR approach that was taken, but the one-mile buffer that's applied for that AOR, is that -- is there any importance to the one mile that's being used or is that just a value that is chosen?

**A.** I can confirm during break, but to my understanding, that the AOR at a minimum has to be the storage facility area plus a one-mile buffer, but I will confirm that my understanding is correct during the break.

MR. SUGGS: Okay. That'll be all I've got on these sections.

HEARING EXAMINER GARNER: Okay. At this time why don't we take a break for lunch for an hour.

389

(Recessed at 12:29 p.m. and reconvened at 1:30 p.m.)

HEARING EXAMINER GARNER: Okay. We are back on the record.

Attorney Bender, how would you like to proceed? Are we going to answer some questions that were pending?

MR. BENDER: Yes. I don't know if I should say we'll recall -- we'll bring back Amanda Douglas who -- and there were some questions posed for her and she said she needed a little time during the break to research those answers. What we were proposing, perhaps to save some time, is she can read what she believes to be the question and then she can give the answer. And then there was a question or two also that Caitlin Olsen got that needed a little time to respond to. So I can just ask Amanda a few questions and proceed that way, if that's okay with you, Mr. Examiner.

HEARING EXAMINER GARNER: Is that okay? That's fine.

**REDIRECT EXAMINATION**

**BY MR. BENDER:**

Q. All right. Amanda, before we took the break, when you were answering some questions that

390

were posed to you by the Commission staff, I believe it was your testimony that if you had a little time during the break, you could take a look at some of your notes and some of the documents you have and respond to those questions; is that correct?

**A.** (BY MS. DOUGLAS) That's correct.

Q. Do you want to just walk through the questions as you understood them and then provide us with the responses?

**A.** Yes.

Q. Okay.

**A.** With respect to the projection system used, it was NAD27 North Dakota State Plane South U.S. feet.

The Commission had a question about generally how would having a higher reservoir temperature impact plume size. So it should be noted that temperature isn't the main driver in dictating plume size. There's other parameters that are more sensitive or the -- the -- the $CO_2$ plume size is more sensitive to other parameters. But generally a higher temperature could result in a bigger plume.

I had a question on why we saw

391

precipitation of anhydrite and dissolution of dolomite and what constituents in the water chemistry or the mineralogy used for those models was different than previous permit submitted that would cause this. We would like to provide that answer as a supplement.

I had questions about the transport mechanisms for the PHREEQC modeling. For the upper confining zone, diffusion is expected to be the dominant transport mechanism due to the buoyancy of the $CO_2$. At the boundary between the reservoir and the confining zone, the reservoir will have a higher $CO_2$ concentration, so diffusion will allow the movement of gas from an area of high concentration to an area of low concentration.

So with respect to advection and dispersion, these are the expected dominant transport mechanisms for the lower confining zone. So dispersion in the sense of the $CO_2$ mixing and forming saturated brine and that saturated brine mixing with unsaturated CO -- brine that's unsaturated with $CO_2$ and the different densities between the two and that mixing by dispersion, so between that and advection, those are the expected dominant transport mechanisms, and that's why those

392

were used for the lower confining zone.

And there was a question on the use of MICP data and calculated relative permeability data, and we'd like to provide that as a supplement.

Q. That's all you have? Those were the questions you received; is that correct? Those are the questions?

**A.** Those are the questions I received. There is one more question that I received that Ms. Olsen will be providing the answer to.

MR. BENDER: Mr. Examiner, unless there's other questions from the staff of Ms. Douglas, I would move to Ms. Olsen.

HEARING EXAMINER GARNER: Okay. That's fine.

Q. (MR. BENDER CONTINUING) Caitlin, can you recite for us what the question was that you're going to address for us now?

**A.** (BY MS. OLSEN) Yeah. The first question, Rich, I believe you asked -- I don't remember the order in the questions, but you had asked about the nomenclature for some of those aquifers and namely the Tongue River. The new name that is more recently used is Bullion Creek, and so that is the

393

same formation. We're talking about the same thing there, just to clarify.

And then the second question you had asked about the AOR and the minimum one-mile buffer outside of the storage facility area. That language comes from 43-05-01-05 and it's -- that language is outside throughout that rule, and it references it -- the area several times. And just to give an example, it will say something like the evaluation must do X, Y, Z in the facility area and within one mile of its outside boundaries.

So the AOR, when we talk about reviewing wells and items inside of the AOR, is the storage facility area and one-mile boundary pursuant to 43-05-01-05.

MR. BENDER: Okay. If there's no questions from the staff, Mr. Examiner, we're ready to move forward with our next witness as we talked. Oh, I'm sorry.

MR. SUGGS: I did have a couple questions that weren't addressed.

**FURTHER EXAMINATION**

**BY MR. SUGGS:**

Q. The net positive or net negative?

**A.** (BY MS. DOUGLAS) I had stated earlier

394

that we'd like to provide those, too, as supplements.

Q. Okay. As a supplement still. Okay. And then I apologize, but I did have one set of questions that I forgot to hit and I have to find it again in my notes. Page 2-66.

MR. BRAATEN: Of Exhibit 1A?

MR. SUGGS: Yes.

MR. BRAATEN: Thank you.

Q. (MR. SUGGS CONTINUING) And I guess the narrative actually starts on page 2-65 regarding your Mohr-Coulomb Critical Stress Analysis of Faults. The faults that you have depicted in Figure 2-42, can you identify what depths those were identified at or what range of -- there's been testimony that there's no faults in the injection reservoir or the confining zones. So where are these faults coming from? How were they identified?

**A.** Yes. So the 3D seismic survey acquired over the project area led to the identification of several deep faults within the storage -- all three storage facility areas. These faults originate within the Precambrian basement and all of them terminate below the top of the Interlake Formation,

395

which is approximately 3,000 feet below the Broom Creek Formation.

Q. So they're all deep --

**A.** Correct.

Q. -- features?

Okay. And those are some of the items that are identified or at least visibly identifiable on Figure 2-41 on page 2-64?

**A.** That's correct.

MR. SUGGS: Okay. Thank you.

MR. BENDER: Okay. Mr. Examiner, if there aren't any further questions, our plan now is to call four new witnesses, and then we will recall Caitlin Olsen to do the comparison between what we've discussed in great detail, which is the Leingang with the Fischer and the Hintz. And then we're going to recall Wade Boeshans to talk about the amendment that the Commission received a letter on from Minnkota.

HEARING EXAMINER GARNER: Okay.

MR. BENDER: So our first witness will be James Powell.

HEARING EXAMINER GARNER: Mr. Powell, please raise your right hand.

396

**JAMES POWELL,**

being first duly sworn, was examined and testified as follows:

**DIRECT EXAMINATION**

**BY MR. BENDER:**

Q. You go by Jimmy; is that correct?

**A.** Yes, sir.

Q. Will you state your full name for the record?

**A.** James Earnest Powell.

Q. And, Jimmy, by whom are you employed?

**A.** Summit Carbon Solutions.

Q. And in what capacity?

**A.** Chief operating officer.

Q. What I'd like you to do is briefly highlight for the examiner, Commission staff and opposing counsel your educational background and work experience.

**A.** Okay. I have a bachelor of science in engineering, and I have about 35 years of experience in the energy industry, predominantly upstream/midstream, with the last 25 leading large projects such as this, both internationally and in the U.S.

Q. Okay. So I'm just going to have a

question or two for you having to do with engineering and operational design. To what standard will the flowlines be constructed?

**A.** The flowlines, like the remainder of the pipeline system, will be constructed -- designed, constructed and operated in accordance with DOT regulations, CFR 49, 195.

Q. Okay. And can you explain how the three entities that have made application for the storage permits are going to work together and monitor this system and utilize the data that's provided throughout the SCADA system?

**A.** Yeah. So from receipt of the $CO_2$ molecules at the capture facilities through transportation of the pipeline system and through -- to the sequestration system to the injection site and subsurface, it will all be operated as one integrated system under one supervisory control and data acquisition system, and it will be controlled from a single control center.

MR. BENDER: And, Mr. Examiner, after I finish with a few questions of these other witnesses, Mr. Powell will be available for questions from the staff. So if I can move to the next witness, I'll do so.



HEARING EXAMINER GARNER: Sure.

MR. BENDER: Next witness is John Hunt.

HEARING EXAMINER GARNER: Mr. Hunt. Please raise your right hand.

**JOHN HUNT,**

being first duly sworn, was examined and testified as follows:

**DIRECT EXAMINATION**

**BY MR. BENDER:**

Q. John, would you state your name for the record, please?

**A.** (BY MR. HUNT) John Hunt.

Q. And, John, by whom are you employed?

**A.** By EERC.

Q. And in what capacity?

**A.** I'm a senior geoscientist and measurement reporting verification, or MRV, specialist.

Q. And can you briefly provide for the Commission staff your educational background and work experience?

**A.** Sure. So I hold bachelor of science and master of science degrees in geology. I'm a licensed professional geologist. And prior to the EERC, I worked at Chesapeake Energy as a petroleum geologist.



Q. Okay. And you're going to talk just a little bit about -- at least from questions from me, about Section 5 of the application which is -- has to do with testing and monitoring; is that correct?

**A.** That's correct.

Q. Okay. And my first question is can you provide a brief summary of Table 5-2 in the application?

**A.** Yes. So Table 5-2 begins on page 5-4 of the TB Leingang application or Exhibit 1A. And let me back up here just a little bit. So the testing and monitoring plan, the full plan is laid out between Tables 5-1, 5-2 and 6-1. So 5-1 being the preinjection plan, 5-2 is the operational plan and 6-1 is the postinjection plan. We're hitting the highlights of Table 5-2 simply because this makes up the bulk of testing and monitoring and includes all of the different various activities that Summit will -- will perform.

And so let's -- yeah, again, let's go to Table 5-2. This is an overview of the operational testing and monitoring plan. And just to start us off, a brief description of the -- of really what's contained in this table. So if we're looking at



the columns and we're stepping left to right, we see the first thing is the Monitoring Type. I'll touch on that a little bit more in a minute, but essentially, you know, whether it's a $CO_2$ stream or surface facilities, the wellbores or the environment, those generally make up the monitoring types.

Then we step over and we have the Parameter, so what parameters are we interested in measuring. And then the next column describes the activity that will collect those data. Then we have the primary purpose of the activity listed, the equipment and any tests associated with gathering that data. The location where that data will be gathered and a sampling frequency described.

Finally, in the last three columns, we have how that data -- what data will make its way into the reporting to DMR. So we have the Report Content, the Reporting Method and then the Reporting Schedule specified.

So how I like to think about this plan overall is you're really following the $CO_2$ stream as it enters the sequestration facility, and you're first and foremost analyzing the $CO_2$ stream in terms

401

of composition and end-to-end metering. So those are some of the things highlighted in the rows within the $CO_2$ Stream Analysis section. There's also the Surface Facilities Leakage Detected -- Detection Plan as well as the Corrosion Prevention and Detection Plan. Those generally at a high level have already been touched on a little bit so I won't go into great detail there.

And then we move to the wellbore sections. Now the $CO_2$ stream has traveled through the surface facilities and it's entered the wellbore, so here we're primarily focused on activities that look at monitoring wellbore integrity. So, for example, pressure, temperature gauges, fiberoptic cable, all of which provide continuous readings to monitor the -- the operations of those wells, of the injection wells.

And, finally, we have -- I guess continuing on the wellbore monitoring part, we also include a Downhole Corrosion Detection Plan, and the key activity there is the pulse neutron log which is also feeding into the wellbore mechanical and integrity piece where we have periodic pulse neutron logs planned to be acquired throughout the life of the project.

402

And then, finally, the -- so now we've injected the $CO_2$ into the storage reservoir and what we're interested in is monitoring the volume in a targeted way as that $CO_2$ expands within the storage reservoir and ultimately that volume contained within the area of review boundary. So we have a Near Surface monitoring plan, which is primarily made up of soil, gas and groundwater -- I guess wholly made up of soil, gas and groundwater sampling, and then an Above-Zone Monitoring Interval, which is defined as the Opeche/Spearfish to the Skull Creek. Again, pulse neutron logging for logging saturations, and then the fiberoptic cable to look at temperature.

And -- and then, finally, we end with the monitoring of the storage reservoir itself which, again, will be conducted with the fiberoptic cable to monitor the temperature profile of the storage reservoir as well as casing-conveyed pressure temperature gauges on the injection wells and -- and also a downhole pressure temperature gauge installed in the reservoir monitoring well. And then we have planned 3D seismic surveys as has been testified to a little bit prior to this point, as well as a plan for monitoring seismicity with a

403

surface array of seismometers.

MR. BENDER: No further questions of this witness. And the next witness will be -- yeah, next witness is going to be Jay Volk.

HEARING EXAMINER GARNER: Jay Volk. Mr. Volk, please raise your right hand.

**JAY VOLK,**

being first duly sworn, was examined and testified as follows:

**DIRECT EXAMINATION**

**BY MR. BENDER:**

Q. Jay, can you state your full name for the record, please?

**A.** (BY MR. VOLK) Yes. Thank you, Lawrence. Jay Volk.

Q. And, Jay, by whom are you employed?

**A.** Summit Carbon Storage.

Q. In what capacity?

**A.** I am the sequestration director of health, safety, environmental.

Q. Okay. And can you provide for us briefly your educational background and work experience?

**A.** Yes. Lawrence, I have a bachelor's degree, master's degree and PhD -- PhD from North Dakota State University. My PhD is in the

404

department of natural resources with range sciences. My work history has largely been through BNI Coal. Spent approximately 17 years there working on permitting, compliance, testing and monitoring, financial assurance plans and site closures. The last two years I've been employed with Summit Carbon Solutions working within the Class VI regulations.

Q. You're going to have to slow down a little bit.

**A.** I apologize. Thank you for the reminder.

Q. And, Jay, you're here today to discuss Section 7, which is emergency and remedial response plans; is that correct?

**A.** That is correct.

Q. As well as financial assurance which appears in Section 12; is that correct?

**A.** That is correct.

Q. Okay. So you'll be able to handle questions from the Commission staff on those two subject areas; is that correct?

**A.** That is correct.

Q. Okay. Let me just ask you a question or two, first with respect to emergency and remedial response. Can you tell us generally what is the

405

purpose of emergency and remedial response plans?
**A.** Yes. Lawrence, the purpose of the ERRP in Section 7 is really to provide guidance for a quick, safe and effective response plan to keep the community and -- community, workers and the environment safe. Items that we look at included in there are definitions and reviews of local resources --
Q. Slow down a little bit.
**A.** I am sorry for a second time.
Looking at areas such as what are the local resources in the areas, identification of potential events, as well as the response to the events.
Q. And can you explain for us, slowly, the interactions that you've had with local first responders in Oliver, Mercer and Morton Counties?
**A.** Yes. Our interactions between the three counties have really included a multilayered approach to outreach. We've engaged all three counties with LEPC meetings. We've worked within dispersion methodology of meetings. We've worked individually with LEC portfolio holders, as well as with local responders on an individual basis through safety tours or landowner meetings.

406

Q. Okay. Jay, let's shift gears a bit and talk a little bit about Section 12, which is Financial Assurance Demonstration Plan. Can you provide for us a brief overview of the methodologies used to determine the financial assurance? And if you have to direct the Commission's attention to any part of the application, that'd be great.
**A.** Thank you, Lawrence. And I would direct you to Table 12 -- or excuse me -- 12-1 on page 12-2. The methodology that we used in developing the financial assurance plan really consisted of known cost, which included areas such as plugging in injection wells, the PISC -- the PISC plans, testing and monitoring, as well as site closures and the flowline abandonment sections.
Other areas we looked at were estimated costs, and that was used to determine the ERRP as well as endangerment to USDWs. We also looked at previous literature as well as previous Class VI permits in developing the financial assurance plan.
Q. Okay. And can you provide for us an overview of the cost estimates associated with the financial assurances?
**A.** Yes. So, again, referring to Table 12-1,

407

for the TB Leingang, the plugging and injection well cost was 1,166,000. Likewise, the PISC storage and facility monitoring was 4,225,000, as well as the flowline plugged and abandoned at 243,000.
And, I apologize, I'd have to ask -- the PISC and storage facility is 4,225,000 if I misspoke on that. The ERRP is 11,100,000. And the endangerment of USDW is 2,695,000. And that gives a total of 20,316,000 between the three -- or excuse me -- between the TB Leingang.
I do want to make a quick reference before I move on to the other two sites is what is covered by the surety bond versus pollution liability policies is also outlaid in Table 12-1 in which the plugging of injection wells, PISC storage facility and monitoring, flowline plugged and abandonment cost, as well a site closure and remediation will be covered under a surety. Whereas, an ERRP as well as the endangerment of USDWs, a pollution liability policy will be used.
Again, there is minor differences between SCS2 and SCS3 in which the total bond for SCS2 proposed is $20,868,800 as well as the KJ Hintz at $20,817,800.

408

Cumulatively, the three are bonded at just over $62 million.
MR. BENDER: Mr. Examiner, that's all the questions I have for this witness. We do have another witness that we'd like to call at this time, Jean Oddy.
HEARING EXAMINER GARNER: Ms. Oddy, please raise your right hand.

**JEAN ODDY,**

being first duly sworn, was examined and testified as follows:

**DIRECT EXAMINATION**

**BY MR. BENDER:**

Q. Jean, would you state your full name for the record, please?
**A.** (BY MS. ODDY) Jean Oddy.
Q. And by whom are you employed?
**A.** Summit Carbon Solutions.
Q. In what capacity?
**A.** Sequestration project engineer.
Q. And could you briefly highlight for the Commission staff your educational background and work experience?
**A.** Yes. I have a bachelor of science in petroleum engineering from Montana Technological

409

University. Before Summit I worked for Neset, which is an engineering and geological consulting firm, in which most of my responsibilities was around drilling engineering, design and operations, as well as plugging and abandonment projects in the Williston Basin, including wells such as Class II saltwater disposal wells. And I joined Summit last year in January.

Q. Okay. And you're here to discuss any questions the Commission staff might have about well design, casing, cementing, plugging and completion; is that correct?

**A.** That's correct.

Q. Okay. A question or two having to do with well design and casing. Can you -- excuse me. With respect to Section 9, can you describe the well construction plan design? And if you have to refer to a particular figure or exhibit, please do so.

**A.** Yes. I'd like to direct your attention to Figure 9-1 on page 9-2. So in this well construction program, starting with the surface section, the surface hole will be drilled with freshwater-based drilling fluid down to a depth within the Pierre Formation. Surface casing will

410

then be set and placed at least 50 feet below the base of the lowest underground source of drinking water. Surface casing will then be set and cemented in place from the surface casing shoe all the way to the surface of the ground to provide isolation to and from the underground source of drinking water.

Moving on to the next section, we've got the long string casing, so that section will be drilled and cored at specific intervals. And then in accordance to Class VI regulations and administrative code, corrosion resistant alloy casing will be set in place to a depth below the Broom Creek Formation which is in the Amsden. The long string casing will then be cemented in place with $CO_2$ resistant cement from the shoe all the way through the Mowry Formation, then cemented to surface.

MR. BENDER: Mr. Examiner, that's all the questions I have for this witness.

I would point out that at this point in time, given the space that we have here for witnesses to sit, I would like to give the Commission an opportunity to ask these witnesses questions, and then also point out that we do have

411

two other individuals who are in the audience. And in the event these witnesses have some questions that they feel can be better answered by someone else, I would bring those people up. One is Jamey Backus, B-a-k-k-e-s [sic], and the other is Luis -- how do I pronounce that?

MR. POWELL: Piasco.

MR. BENDER: Piasco, P-i-a-s-o [sic].

HEARING EXAMINER GARNER: Okay. Any questions from the staff?

**EXAMINATION**

**BY MS. MADCHE:**

Q. I will go ahead and start. As before I'm going to start with what I think are deferred questions for this group. Early on Richard Suggs had asked on whether or not you would be able to provide industrial codes that best reflect the capture sources, such as the ethanol facilities. Is that something that you can provide at this time?

**A.** (BY MR. VOLK) Yes. The ethanol NAICS is 325193 reflecting as asked for the capture NAICS code, and that is for ethanol.

Q. Earlier an answer was provided for approximately how many miles of the MCE pipeline

412

transmission pipeline system is within the North Dakota PSC jurisdiction. 352 miles was provided, but I believe, Jimmy, you would be able to confirm that number?

**A.** (BY MR. POWELL) Yes. It's 3 -- approximately 332 miles are in the jurisdiction of the Public Service Commission. In the delta roughly 19 miles is within the NDIC jurisdiction. So Wade had it accurate and correct. But the PSC is 332.

Q. Okay. I had asked earlier on with the first group yesterday on whether or not royalties were being paid on the full $CO_2$ stream or just the $CO_2$ mass of the stream. Is there anyone in this group that can confirm that or is that something that would need to be a supplemental?

MR. BENDER: No one can answer that. We'll have to supply you with supplemental information on that one.

MS. MADCHE: Okay.

Q. (MS. MADCHE CONTINUING) In Section 2 earlier I had asked what the maximum pressure was applied during the microfracture testing in the Milton Flemmer 1 that was done across the Spearfish/Opeche Formation.

413

**A.** (BY MS. ODDY) Yes. I would like to direct your attention to Figure 2-7 on the TB Leingang 1 permit.

Q. I'm ready.

**A.** So relative to Milton Flemmer 1, the maximum injection pressure is highlighted with the black square box on the image on the upper section there, and from that graph it looks like around 5580 psi was -- was pumped as a maximum. However, after evaluation, there was no breakdown pressure observed at that maximum pressure injected.

And then referring to Table 2-4, we do have a summary on the Opeche/Spearfish microfracture stress test breaking down your breakdown pressure as well as your propagation pressure.

Q. So some additional questions as it pertains to the microfracture testing that was done. A question that I had posed earlier was how do you determine which sand package within the Broom Creek to target for these tests?

**A.** So prior to the micro in situ stress tests, we ran logs such as your magnetic resonance log as well as an FMI log and sonic log, and in combination of that along with the core photos that

414

we observed, along with some field description, were able to pick the representative sand package within the Broom Creek Formation and pick the test steps.

Q. Could you elaborate a little bit more on what makes a representative sample?

**A.** Yes. So I'm going to go back here to another figure. Figure 2-5. We looked at the sonic log, and on column 7 we've got the facies there, so we looked at, you know, a good, thick sandstone package. And then looking at the magnetic resonance log, that showed us good porosity in that test point. Then looking at making sure there are no visible bedding or fractures within the core photos that was -- that was collected and any field description that was noted by the geologists on site.

Q. So just to confirm, you're looking for a sand package that would represent good porosity and permeability but without fractures that could possibly affect the results of the MBT test?

**A.** That's right.

Q. So as a follow-up to that, on average to date across the Broom Creek on previous applications, the frac grading has between 0.69 psi

415

per foot to 0.712 psi per foot. Could you explain why we're seeing a larger variation across these three facilities, specifically as it relates to the Slash Lazy H 5 which was at 0.784 psi per foot which would be above that range, or what you anticipate might have caused it to be higher than what we've seen to date on past applications?

**A.** So with that for the KJH -- or sorry -- the Slash Lazy H 5, cause of that could potentially be activities during the drilling operation that may impact. Also could be some bedding within the FMI logs that was observed.

However, we are willing to, you know, work with the DMR on solutions on confirming that -- that value at the KJH sites. It is also part of our plan to perform an in situ stress test in the KJH, at least on one of the wells. In addition, we are planning on performing an injectivity test in the injection wells again to confirm these values, and that also applies in all six injection wells.

Q. Would you be able to explain what effect the frac gradient has on the $CO_2$ plume size?

MR. BENDER: That's probably a question that we'll have to recall Amanda to answer.

MS. MADCHE: Okay. And am I correct that

416

we'll want to do that at the end as far as recalling?

MR. BENDER: Yeah. What I thought we'd do is after we finish with this group, once again, because of the size of the group, we're going --

MS. MADCHE: Sure.

MR. BENDER: -- to have to recall Wade Boeshans and also Caitlin, and perhaps we could bring Amanda up at the same time and get that done if the examiner's okay with that.

HEARING EXAMINER GARNER: I am okay with that. I was going to allow cross of these four before they go to sit down and bring them back up and sit down and bring them back up. Does that work? Is that fine?

MR. BENDER: I mean, there's a lot of people. I think it's a lot of cross. We can finish our -- the remaining witnesses, I think, very quickly. That's kind of what I had in mind this morning, but it's certainly your call, Mr. Examiner.

HEARING EXAMINER GARNER: Mr. Braaten, any input? Are you okay waiting with the other witnesses to be called and then we can -- then you'll have an opportunity to cross any one of the

417

witnesses and recall them up here.
MR. BRAATEN: Yeah. I think with respect to that, I just want to be clear on record that specifically because what I'm running into now is difficulty with scheduling with experts and when they're going to be here, but thinking about what Mr. Bender is saying whether I cross these folks now or cross all of these folks right after, I don't think that's going to help me on anything else, so --
HEARING EXAMINER GARNER: Okay.
MR. BRAATEN: -- I'm okay with that --
HEARING EXAMINER GARNER: Okay.
MR. BRAATEN: -- but reserving my prior objections --
HEARING EXAMINER GARNER: Sure.
MR. BRAATEN: -- on the scheduling.
HEARING EXAMINER GARNER: Your objection's noted, so we'll go then with your witnesses.
MR. BENDER: Thank you.
Q. (MS. MADCHE CONTINUING) Okay. Just to continue on the microfracture testing which you've already given some testimony on, just confirming that we would want to see a microfracture test done on either the KJ Hintz 1 or 2 just to confirm that

418

value which was proposed in the testing and monitoring plan.
Let's see here. So as it pertains to the -- how the microfracture test data is used in the simulation to calculate the bottomhole pressure constraints that are used in the model, if the results do come out substantially different on the KJ Hintz 1 or 2, whichever you decide to do to confirm that result, it is likely DMR would want the model reran because of the bottomhole pressure constraint being affected by that frac gradient.
**A.** Understood.
Q. Okay. I'm now moving into Section 5, so I would like to go to Table 5-3. So on this table you have the $CO_2$ stream composition specification that must be met for you to, I believe, accept a third-party source. My question related to this is whether or not all the sources you currently have contracts with have had samples taken or FEED studies completed to confirm they meet or exceed that stream composition?
**A.** (BY MR. POWELL) So the individual quality spec for each course is greater than 95 percent --
Q. Okay.
**A.** -- carbon dioxide, and we did -- we had

419

done a stack test at each facility, and that will be done -- the plants typically do them annually. Unless we have a reason to do them intermittently, we'll follow their schedule, but the individual spec is not greater than 95 percent $CO_2$.
Q. Yeah. I think the confusion was the narrative right above Table 5-3 since it states, "Any new $CO_2$ streams from third-party entities not accounted for at the time of permitting must also meet or exceed the specification once commingled."
And you're saying at a minimum at the source side they would be greater than 95 percent with the anticipation that the commingled stream would be greater than 98.25 percent; correct?
**A.** Correct. And it's my recollection I think all but one of the 57 sources were 98 percent or higher. There was one facility that was about 96. So commingled, yes, it would be greater than the 98 percent.
Q. And for any new sources that might come down the line, I'm guessing additionally you would want a stack test done before to confirm that they're going to meet the specifications to take that source?
**A.** You're correct.

420

Q. Could you -- yeah, we would require that that data be submitted to us before we would approve new sources too.
**A.** Okay.
Q. Could you elaborate on how the baseline isotopic signature of the $CO_2$ stream will be resampled if new sources are added later on?
MR. HUNT: So I think I can respond.
MR. POWELL: Okay. Go ahead because I was just going to read a paragraph, but go ahead, John.
**A.** (BY MR. HUNT) Okay. So in the event that a new source is added and approved by DMR, Summit would sample that new commingled $CO_2$ stream within one year after adding that additional $CO_2$ source to get its composition and isotopic signature.
Q. (MS. MADCHE CONTINUING) Let's see. Will the meters that exist -- or sorry. Let me rephrase that.
Will meters exist at all the outlets at the $CO_2$ source facilities, both in state and out of state, to be able to account for how much $CO_2$ mass and total injection stream volumes each individual source is contributing?
**A.** (BY MR. POWELL) Yes. So Coriolis meters will be installed consistently throughout the

421

system.
Q. And how do you plan to ratio those mass and volumes back to the individual three storage facility permits for reporting?
**A.** So I'm not the measurement expert, but it would be reconciled. We'll have custody transfer from the -- on the outlet or discharge side of the capture facilities, and then we'll have -- we'll have a measurement station at the terminus of the main line. And then we'll have Coriolis meters or measurement facilities at each of the injection sites. And so it'll be a mass balance from volume in from each of the 57 source plants all the way through what's injected at each of the well sites and that'll be reconciled.
Q. So I want to move us to Figure 5-3 on page 5-12 of the TB Leingang application. So this figure shows a generalized flow diagram. Could you walk us through this figure specifically as it relates to the capabilities to isolate individual flowlines from each other and how pigging of the flowline system will take place?
**A.** Yes, and I'd -- this is a difficult diagram to do that from. If you start from right to left -- so each line segment on the discharge

422

side of a capture facility will have a launcher. And so -- and then each pipe diameter change within the pipeline system will also have a launcher and receiver. And then when you get to the sequestration site, there will be a receiver at each of the well sites.
So if you're looking right to left, so in a common pipeline diameter size, you know, the launcher will be the initiation of that pipe segment, and then it'll go through right to left and then you will be -- for instance, at the sequestration site before it reaches the injection facility, then it will go through a receiver, and then downstream will be a meter or measurement station which will include a gas chromatograph, Coriolis meter and pump. And then the -- the -- the line of demarcation will be on the inlet valve upstream of the shutdown valve at the injection facility.
Q. So just to confirm, with the three -- with the three individual flowlines, are you able to pig those separately?
**A.** Yes. Each pipe diameter will be able to be pigged independently. So in the sequestration where we have 16, 20 and 24, each of those diameter

423

changes, the entire segment will be able to be pigged independently.
Q. And as a follow-up, are there any plans for an isolation valve at the junction of where the BK Fischer flowline, called NDL-325, splits off from the TB Leingang flowline known as NDL-327?
**A.** I may -- may need help from Jamey if that's a diameter change.
MR. BENDER: Okay. We'll bring him up later.
Q. (MS. MADCHE CONTINUING) Can you confirm the land description of where that junction occurs at those two flowlines? Looking at the prior figure, Figure 5-2 it looks like it's Section 5, Township 141 North, Range 87, but it's pretty small scale on the map.
**A.** It looks correct to me as well, but it is small scale.
MR. POWELL: And, again, perhaps Jamey can confirm, Lawrence.
Q. (MS. MADCHE CONTINUING) So now I'd like to go to Table 5-4 on page 5-14. In this table the flowline has a maximum rate of 936 million standard cubic feet per day, approximately equivalent to 18 million metric tons a year. Earlier on in the

424

project summary, the modeling had shown that this facility, the TB Leingang specifically, would be able to take 124.4 million metric tons over a 20-year period which would average around 6.22 million metric tons annually. Can you please confirm there's no intent to send -- even though the line has the capacity to send the full 18 million metric tons, there's no intent to send it all to this one facility?
**A.** That is correct. There is no intent.
Q. And on average, what do you anticipate the flow rate to be on this flowline?
MR. POWELL: Again, I'm going to have to defer to Jamey for that, Lawrence. Sorry.
Q. (MS. MADCHE CONTINUING) Similarly, on the BK Fischer application instead, and on its Table 5-4 on page 5-14, it has a maximum rate of 314.5 million standard cubic feet per day, equivalent to around 6 million metric tons a year, and its modeling had more of an annual amount of 4.92 million metric tons.
So, again, just confirming again that you would not be exceeding what the modeling had showed in those bottomhole pressure constraints even if the flowline capacity would allow you to?

425

**A.** That's correct.
Q. And I'm interested in what the average flow rates will be for all three flowlines for when that gets deferred.
MR. BENDER: That's another Jamey question?
MR. POWELL: Yes.
Q. (MS. MADCHE CONTINUING) So, additionally, on that table, for all three of the applications a typical operating pressure has a 900 psi range, roughly, going from 1250 to 2150 psi. And this might be a question that you need to defer again. I'm wanting to know why such a big range was given and whether or not you have -- kind of more within that range where you actually typically plan to be for all three facilities.
**A.** The range is just -- it's to keep the $CO_2$ in super critical state, and so that's the range from 1250 to 2150, and it's really applicable over the -- predominantly over the pipeline system because over the 2500 miles we have about -- including -- excluding the pumps at the discharge site of the capture facilities, we have 17, I believe -- if I recollect properly, 17 intermediate pump stations, so you have that pressure gradient

426

from the discharge down to the suction side of the -- of the next intermediate pump station, so that's the range of pressures.
As it says, the maximum operating pressure is 28 -- 2183, but the discharge set points will be 2160, and then we'd run the surge analysis and, of course, you know that's 110 percent so that's, according to the math off the top of my head, about 2400.
Q. So a couple follow-ups to that. In the modeling, the model was done as being pressure constrained both on bottomhole pressure and wellhead pressure and not weight constrained. I'm curious as to why you have a maximum discharge pressure of 2160 psi when the wellhead pressure constraint in the model was only 2100 psi.
**A.** Yeah, I might have to defer that one.
MR. BENDER: Jamey again.
Q. (MS. MADCHE CONTINUING) And just a statement, because this isn't a weight-constrained model, typically DMR would be going forward with setting a wellhead pressure constraint based on the model and not on operating conditions.
When it comes to kind of the fluctuation that you had mentioned that you have on the

427

pressure to keep it in a super critical state, will the metering that you're planning to use be able to handle those fluctuations knowing that the density of $CO_2$ is affected greatly by both temperature and pressure and both the temperature and pressure on this Table 5-4 is a fairly substantial range?
**A.** Yes, it is. It will. The Coriolis meters can handle that variation.
Q. And are those mass flow meters or volumetric meters?
**A.** Again, I'm not the measurement expert, but I believe that they're mass flow meters.
MR. BENDER: Do you have the answer?
MR. HUNT: No.
MR. BENDER: Okay.
Q. (MS. MADCHE CONTINUING) So some questions related to the corrosion prevention and monitoring detection that's being implemented for all three storage facilities. Can you elaborate a little bit more on the ER -- the ER probes that are proposed and the impressed current cathodic protection system that's going to be used along the flowline system?
**A.** (BY MR. HUNT) Yes. So for the ER probe, DMR can think of those as -- you know, you guys are

428

familiar with a corrosion coupon. So imagine this as a miniaturized corrosion coupon that is then attached to a probe that's then attached to the -- to the flowline where it's subjugated to the -- the stream continuously, and in real time there will be continuous measurements of the electrical resistance of that -- of that miniaturized coupon or -- or that probe, said another way. Those -- those resistivity measurements are sensitive to changes in mass and thickness in particular.
Q. What material is the composition of the ER probes?
**A.** So they will be of the flowline material as well as the wellbore material.
Q. So there will be two probes at at least each injection site?
**A.** That is my understanding.
Q. And with the impressed current cathodic protection system, is that combined as far as the same system that's going to be across the flowline and the transmission pipeline operated as a continuous protection?
**A.** (BY MR. POWELL) It is.
Q. Referencing back to that Figure 5-2, I'm just looking for confirmation on what the land

429

description would be for the terminus point. Again, on this one it looks like it's Section 5, Township 141 North, Range 86 West.

MR. BENDER: Is that something we can supply you in a supplement?

MS. MADCHE: Yeah. Both of those locations could be confirmed in a supplement. That would be fine.

Q. (MS. MADCHE CONTINUING) So a question on the seal pot system that is planned to be used to maintain the tubing/casing annulus pressure to approximately 300 psi. Are you anticipating any on-site tank storage such as vessels needing to be on site for that system that would be holding, like, packer fluid or brine, not necessarily a nitrogen vessel?

**A.** (BY MS. ODDY) At this time I don't believe we plan on having storage tanks for corrosion-inhibited fluid, but we will have the nitrogen seal pot like you said adjacent to the wellhead.

Q. I guess just a note. If at any point those plans do change, secondary containment such as a dike would be required around any brine storage or the packer fluid.

430

And also a note that a Sundry variance would be required to have the 300 psi annulus pressure just because currently as rule requires, it's to be greater than the injection pressure.

**A.** Understood.

Q. I believe this has already been answered earlier in part, but just to confirm, no baseline soil, gas sampling or groundwater sampling has taken place yet; correct?

**A.** (BY MR. HUNT) That is correct.

Q. And that would be anticipated to begin approximately a year in advance of injection operations beginning?

**A.** That is also correct.

Q. So this question is specific to the KJ Hintz and it may need to be deferred. I'm just looking for how that year 19 was determined for the year to install the Fox Hills monitoring well next to the Raymond Jensen 1-34 P&A well.

**A.** Yeah. So in general the idea there was, as has been testified to, you know, previously, seismic surveys will be acquired at least every five years, so, you know, year 2, year 4, year 9, year 14, year 19. And so the idea there was that as Summit is monitoring the $CO_2$ plume expanding in

431

the storage reservoir, we don't anticipate at this time that that legacy wellbore will see $CO_2$ and certainly within that time frame.

But, you know, taking a proactive approach and after taking the seismic data and then reviewing that data to see how is the $CO_2$ plume progressing, is it conforming to expectations, so that year 19 really just allows some of the opportunity, the -- the optionality to wait to install that well until, you know, it is needed. And, of course, if it's determined that it may be needed prior to then, then they have that option as well.

Q. So I want to reference Section 5.7.2. Let me get a page number. So that would be page 5-26 in the TB Leingang application. And it's paragraph 4, and this language is in all three applications. There's a statement that Summit reserves the right to evaluate and modify, if necessary, appropriate groundwater sampling locations and frequency. Just a note that any changes to the frequency or locations should go through DMR for approval and review.

**A.** Yes. Acknowledged.

Q. And that would apply as well as far as any

432

changes made to the near surface monitoring during the PISC period.

**A.** Understood.

Q. Could you give a little more testimony on the local passive seismicity array that's planned to monitor for potential induced seismicity?

**A.** Sure. So at this time Summit has plans to install multiple seismometers at the site. At this time -- well, a specific layout or design or number of stations is unknown, but prior to injection Summit would request bids from vendors to put together a site-specific strategy.

We understand today that by multiple -- in order to properly triangulate and locate any seismicity events, you would need at least three seismometer stations as a minimum.

Q. Just a statement that once a layout's known, that information should be provided to DMR.

**A.** Understood.

MS. MADCHE: Let's see. I think that's all I have currently. Thank you.

**EXAMINATION**

**BY MR. STOLLDORF:**

Q. Jimmy, I asked a question earlier that they punted to you, so I'll ask it again. At its

433

closest, approximately how far away is the facility for the TB Leingang from an occupied dwelling?

**A.** (BY MR. POWELL) I apologize because I don't have each site memorized, but I believe the closest dwelling to either -- any of the well sites is about 4400 feet -- I'm sorry -- 2200 feet. 2200 feet. I believe the furthest is about 4100 feet. But it's 2200 feet. And we can clarify if that's Leingang or if that's one of the other two.

MS. MADCHE: I think we might just ask that a supplemental is provided as far as the proximity of how close the flowline is for each individual one to the closest dwelling.

MR. POWELL: Okay. And I believe the closest dwelling to a flowline at either location is 700 feet, but we could provide the exact distances for all three.

MS. MADCHE: Could you add to that also closest distance to a wind turbine, specifically for the TB Leingang application?

MR. POWELL: Yes, we can do that.

MS. MADCHE: Sorry to jump in.

Q. (MR. STOLLDORF CONTINUING) So Section 7, the Emergency Remedial and Response Plan, that's

434

you, Jay; is that correct?

**A.** (BY MR. VOLK) Yes.

Q. Under the Section 7.6 -- I'll let everybody get there. It indicates that the company organizational structure is still in flux and in development. Do you know -- I'd note that it's expected that we -- to complete that before being provided authorization to inject. We would expect that to be nailed down.

**A.** Without a doubt. We're continuing to work on, as the rest of the project continues to develop, an integrated response plan as well which will be consistent with this one, and we will supply that when done and prior to injection.

Q. Okay. So this is in the PISC section. Hopefully one of you can answer this. For all three applications on Figure 6-2 -- give me a second and I'll get a page number for you. That is page 6-6 in Exhibit 1A for the TB Leingang application.

Can you -- oh, sorry. Are you guys there?

Explain how the $CO_2$ extent ten-year postinjection boundary was determined?

**A.** (BY MR. HUNT) I think we would want to bring one of the other witnesses up to answer that.

435

MR. STOLLDORF: Probably Amanda?

MR. BENDER: (Nods head.)

Q. (MR. STOLLDORF CONTINUING) What's the setback being proposed for the flowlines?

**A.** (BY MR. POWELL) Again, the setbacks for the flowlines, similar to the -- to the pipeline in North Dakota that's under PSC jurisdiction, complies with State law, 500 feet as a minimum.

Q. What type of notification system's in place should residents or -- and/or businesses need to be notified in an emergency?

**A.** (BY MR. VOLK) We've had numerous conversations with Oliver County, Mercer County and Morton County, and this is an area we've determined to work cumulatively on and develop. So right now there's multiple systems being used between Mercer County and Morton County. I believe Mercer County and Oliver are both using reverse 911. Morton County is using that as well as I believe some secondary options.

So we have committed to continuing working with all three counties to provide the data needed to make sure the notification system is -- is going to be consistent throughout all three counties.

Q. How often do you plan on doing training

436

with these local emergency response teams?

**A.** On an annual basis at minimum. I believe it's not to exceed 15 months, but it is on the annual basis.

MR. POWELL: Yeah. I'll just add that since we know that North Dakota -- and I'm not sure of a specific -- Jay, you could help me on Mercer or Morton or Oliver, but a lot of the counties have volunteer fire departments and sometimes those personnel interchange or are unavailable, so we've committed to providing training on a more frequent basis as needed.

Q. (MR. STOLLDORF CONTINUING) I hope you guys will -- someone here at the table will be able to answer this one, but this has come up in the past, but are there any special considerations for DMR field inspection staff to be coming onto the sites? Do you have -- or do you have any -- are you aware of any issues that might bring up, having a DMR inspector on site -- some of the sites?

**A.** (BY MR. VOLK) As expected, unrestricted access for any regulatory items such as DMR access. With that being said, previous work I've done has always provided on-site hazard training for and up to and including inspectors so they have the proper

437

notices of what is out there or what needs to be out there. And if any special training would be required for those inspectors, we will make sure that's available.

Q. Would you be able to provide us --

MR. SUGGS: Sorry.

MR. STOLLDORF: Oh, go ahead.

MR. SUGGS: On that note, if there is anything anticipated, at this time I would ask that it be provided as a supplemental for what you'd anticipate the DMR inspection staff needing to have under their belt or have training for accessing your facilities.

MR. VOLK: We will provide that.

MR. SUGGS: Thank you.

Q. (MR. STOLLDORF CONTINUING) As it relates to Sections 9, 10 and 11, the construction plugging and completion plans for the Class VI wells and monitoring wells, we just want to note that it will require typical DMR approvals prior to executing, just so you understand.

**A.** (BY MS. ODDY) Understood.

Q. I want to move to Section 11, the injection well. I have one question -- or a couple questions. Can I -- okay. Then we'll go to 12.

438

Sorry. Excuse me.

You're approximating it'll cost about $583,000 to plug one injection well. Are you guys considering that it's going to probably require a big rig to handle that size of tubing?

**A.** That's correct. With a 7-inch tubing, we will need a bigger workover rig. In addition to that, the anticipation of the plugging plan is also to set $CO_2$ resistant cement. So those estimated costs are included in the plugging costs.

Q. Okay. And you touched on this earlier about the surety bonds, but you're proposing to use a surety bond for the injection well plugging phase and the PISC phase. Are you planning to have one surety bond or two separate bonds for each phase?

**A.** (BY MR. VOLK) At this point in time we have not one -- allocated -- or we have not committed to a certain provider, so that'll be forthcoming, at minimum 30 to 60 days prior to injection it would be submitted to you. We know we will be using the surety and the pollution liability for those, and I can't today tell you in certainty if those will be split between the phases you asked.

MS. MADCHE: I'm just going to jump in,

439

and not necessarily a recommendation but something to consider is clearly as you work through closing one of these facilities, plugging the injection wells is going to be the first item. If they are on separate sureties, that would allow you the ability to request one to be released while maintaining the other one for continued PISC monitoring. So, again, just something to consider.

MR. VOLK: Appreciate that, and we will provide additional information to you.

Q. (MR. STOLLDORF CONTINUING) Can you elaborate a little more on the emergency and remedial response plan and how the endangerment to USW -- or underground sources of drinking water costs were determined?

**A.** I just want to make sure I'm getting to the right figure. If you bear with me for one second. There it is. So I'm going to direct your reference to page 12-10 and Table 12-7. So, first of all, I want to start off with what the actual scenario was used to determine the estimated cost on ERRP as well as to your specific question the USDWs.

The scenario that was used was a well failure or integrity issue with the well in which a

440

containment -- loss in containment event happened. To get into more specific details on that, I will have Jean talk through that. But to the specific cost as it relates to the USDWs, it is broken out between -- in Table 12-7, the general response actions, delineation and water replacement at 1.89 million as well as the quarterly monitoring which is dictated on a ten-year period for 750,000. And then the plugging and abandonment cost of the groundwater -- groundwater monitoring wells in that area is another 55,000, which came up to 2.6 million.

Q. And you did mention that the failure mechanism is a loss of a containment event?

**A.** That's correct.

Q. Okay. Just want to note that the average -- okay. I don't need to. All right. Never mind.

MS. MADCHE: No. I do have a follow-up on that. Clearly, the costs are slightly different for all three facilities for the emergency remedial response. Can you just kind of go over what parameters were used to determine those costs that would cause that fluctuation?

MR. VOLK: Yes. The difference largely

441

comes into on the general response delineation and water replacement line item. What we tried to do is look at more site-specific characterizations in those areas, how many wells, what would be their water replacement cost, and that was the distinguishing difference that drove the number up or down.

MR. STOLLDORF: Nothing further for me.

**EXAMINATION**

**BY MR. SUGGS:**

Q. Just a couple of additional items. I'm going to jump back up to 5-13. The second-to-last paragraph on that page related to custody transfer of the $CO_2$, the way that's described is that the $CO_2$ when it reaches the terminus point will become the custody of SCS1 and it will remain that way until it goes down the hole at any of the three different facilities. Am I understanding that intention correctly?

**A.** (BY MR. POWELL) So that's page 5-15?

Q. Page 5-13, the second-to-last paragraph.

**A.** Oh, sorry. All right. That's my understanding.

Q. Okay. As the flowlines are anticipated to be owned by the individual storage facilities,

442

SCS1, 2 and 3, would Summit be opposed to a requirement that would require a flow meter at each -- I guess at the beginning of each of the individual flowlines and an actual custody transfer happening as it moves from one line into the other?

**A.** So versus having measurement at the terminus of the main line for the -- sorry. As opposed to just having the single meter at the terminus of the main line at the -- at the jurisdiction breakpoint and then an individual meter at each well pad or well site, you're suggesting or recommending that we'd have an intermediate meter, then, at the beginning of each of the laterals from that segment of main line, flowline to each well site.

Q. (MR. SUGGS CONTINUING) Yeah. I think you would end up with at least two additional meters in play, one being where the $CO_2$ would go north to the KJ Hintz facility and one at the point where it goes west from the Leingang to the Fischer.

**A.** I'm not opposed to that.

Q. Okay. With respect to the cathodic protection system that's being proposed, has that already been designed at this point?

**A.** It hasn't been -- the impressed current

443

cathodic protection system?

Q. Yeah.

**A.** Generally. We're going to have to -- since we've added additional source points and additional laterals along the whole system, we're going to have to go back and rebalance the system and figure out if the location of the ground well -- the ground beds have changes, where they need to be expanded, et cetera. So it needs to be reconfigured upstream of the sequestration area.

Q. Okay.

**A.** As far as the sequestration area, it's generally been designed but we'll refine.

Q. Okay. So that is still under works and will be refined?

**A.** Correct.

Q. Okay. So when that is determined, we'll want the location of the ano beds identified, and pursuant -- there's -- on page 5-15 in Section 5.3.1, there's indication of -- what am I reading -- Summit Carbon Solutions will supply DMR with a map of cathodic protection boreholes to meet the requirements of 43-05-01-5. Do you anticipate actually drilling any cathodic protection boreholes or will this system entirely utilize ano beds?

444

**A.** It's my understanding ano beds. We'll clarify.

Q. Okay. And so, regardless, we'd want those locations identified.

**A.** Yeah.

Q. And I think, John, you testified to this earlier, but there's some narrative on 5-29 that indicates that you will be running 3D seismic at years two, four and nine. It is the intent to run 3D seismic as early as year two after injection?

**A.** (BY MR. HUNT) That's -- yes. Yeah, and in the narrative it says "by year two," so just to be clear.

Q. Okay. But my point -- my confirmation is that there will be a sequence of 3D seismic run shortly after beginning injection and another one prior to the five-year review?

**A.** Correct.

Q. Okay. I'll point out that if anything looks significantly off at that two-year mark, it is expected that you will report that and we'll begin the determination whether or not we need to accelerate that hearing.

**A.** Understood.

Q. On page 5-32 there's the narrative about

445

the traffic light system for the passive seismicity, and you have the cutoff points of 2.7, 4.0 and 4.5. Can you elaborate on what the significance of those values as cutoff points are?

**A.** So 2.7 is the point at which humans can begin to feel seismicity, and so that's why that one is listed there. For events 4 and 4.5, I don't have off by memory -- I would need to go and refer back to the team on that one.

Q. Okay. If that's something that can't be provided in short notice or short period as part of this testimony, possibly a supplemental just confirming what the importance of those values is in that system.

**A.** Understood.

Q. And I think this one is for Jay. On 7-17, the last sentence under the 5 -- sorry -- 7.5.1 section, it reads, "In addition, assistance has been secured from local emergency services to implement this ERRP."

Which emergency services have you specifically worked with and secured their assistance in execution?

**A.** (BY MR. VOLK) So we continue to develop this. This is an overarching plan. We have

446

reached out to, as I've said, Morton County, Oliver County as well as Mercer County, including the fire departments in numerous of the surrounding towns. A couple of them are Beulah, Hazen, Center, Zap. So without having what I would call -- and I'm going to say maybe that statement today is not totally defined as the ERRP isn't, but continued working agreements with -- or continued working with them to commit to: One, I understand there's a memorandum of understanding of mutual aid between all of them or actually statewide now. So they have recognized that. Two is they've recognized that we will continue to work together in developing that plan and know they have different capabilities between the units. And that is what we're going to continue to work on to supply what I would call as an integrated plan between all three counties.

Q. So in -- I guess with respect to this statement in the application --

**A.** We have not secured an agreement, so I would say that wording probably should be changed at this point.

Q. Okay.

**A.** I would say commitment's a better word

447

than agreement.

MR. SUGGS: That's all I need. Thank you.

HEARING EXAMINER GARNER: Okay. Before we recall those witnesses, why don't we take a ten-minute break.

MR. BENDER: Okay.

(Recessed at 2:56 p.m. and reconvened at 3:12 p.m.)

HEARING EXAMINER GARNER: We are back on the record. Attorney Bender, you wanted to recall some witnesses.

MR. BENDER: Yes. We're going to recall Caitlin Olsen.

HEARING EXAMINER GARNER: Microphone.

MR. BENDER: Oh, sorry. We're going to recall Caitlin Olsen. We're going to recall Wade Boeshans. And then to answer some of the questions that came up from staff, we'll be recalling Amanda Douglas, and then we'll have one new witness. As you may recall, there were questions to the previous group and they were deferred to Jamey Backus.

And I apologize, I misspelled his name earlier when there was a question on it. It's B-a-c-k-u-s.

448

So with that in mind, we'll call Caitlin Olsen back.

HEARING EXAMINER GARNER: Ms. Olsen, just a reminder, you're still under oath.

**REDIRECT EXAMINATION**

**BY MR. BENDER:**

Q. Caitlin, I'm going to show you what's been previously marked as Exhibit 8B. Can you tell me what 8B is?

**A.** (BY MS. OLSEN) 8B is the Storage Facility Permit Application Comparison Summary Table.

Q. And when we started the hearings, I briefly explained to the --

MR. SUGGS: Lawrence, have you handed that out yet?

HEARING EXAMINER GARNER: Do you have one?

MR. SUGGS: No.

Q. (MR. BENDER CONTINUING) When we started the hearing, Caitlin, you may recall me talking very briefly about the fact that we were going to spend a lot of time on the Leingang application and then we were going to sort of do -- contrast and compare Leingang with Fischer and Hintz after that. Do you recall that?

**A.** I do.

449

Q. Okay. And is 8B sort of a visual aid and you being able to go through and make those comparisons?

**A.** That's right.

Q. Okay. Let's start -- I'm not going to interrupt you much, but why don't you start by first talking about the various columns and what your method was for laying this out and then you can explain it to the Commission.

**A.** Sure. So the intent of this comparison summary table was just to lay out the differences between all three permits. Listening to the hearings today, I feel like most of those points have been covered by DMR or otherwise in testimony.

But you'll see here across the top the column named SFP Permit Section, that relates to the section of the permit that we're talking about. Then you'll see Summit Carbon Storage #1, TB Leingang/Milton Flemmer 1, that's referring to permit number one, the TB Leingang permit. Likewise, the second column is the BK Fischer permit. And the third column is the KJ Hintz permit.

Q. Okay. Then let's -- why don't we start out first with the Project Summary, and what I'll

450

probably do is have you explain that in detail, and then we can kind of walk through the -- the other sections and you can probably more abbreviate your discussion of it.

**A.** Sure. So as Wade testified to the project summary earlier today, the only material difference in the three permits in relation to the project summary is the applicant name listed. All other aspects of Wade's testimony apply to the TB Leingang, the BK Fischer and the KJ Hintz as you'll see noted in that row.

Q. Okay. Let's go to the next column -- or not the next column, the next row.

**A.** Section 1, Pore Space Access. There's minimal content changes between the permits, as you'll see noted. There is one thing to specify in the BK Fischer permit and that is that there is Coyote Creek -- Coyote Creek mining -- mine land located within the hearing notification area.

Q. And I think as a result of some questions that came to Amanda, she pointed that out in one of the exhibits; is that correct?

**A.** That's right.

Q. Let's go on then to Section 2.

**A.** That's the geologic exhibits portion of

451

the storage facility permit. You'll remember as Amanda testified to yesterday and earlier today that the model extents used across all three permits are the same. Logging efforts are the same. Microfracture in situ stress tests were performed in all three wells and all three -- excuse me -- all three permits, and all three permits used the same 2D and 3D seismic surveys.

The differences that we'll talk about here mainly have to do with site-specific characterization work. You'll note that in the TB Leingang permit the Minnekahta Formation is present as Amanda had testified to earlier. The Minnekahta Formation is absent in the BK Fischer permit and in the KJ Hintz permit.

Again, site-specific storage complex formation data is -- varies between all three permits as noted here. That includes core data, log testing, things like that.

And the last point to make sure on Section 2, Geologic Exhibits, is that the number of borehole image logs varies between all three permits.

Q. All right. Then let's go to Section 3, please.

452

**A.** Section 3 discusses the geologic model construction and numerical simulation of $CO_2$ as Amanda had testified to previously. The same data inputs were used. Again, as described in Section 2, the same model was used across all three permits. The same simulation was performed where all three well sites were simulated as injecting at the same time. You'll note here that there are minor variations in Section 3 where site-specific data is used to derive individual injection pressures, rates, temperatures and critical threshold pressure estimations. Those are the only differences of material value.

Q. All right. Then we'll go -- the next row is Section 4, the Area of Review. Can you briefly discuss what's contained in that row?

**A.** Area of review, as I testified to earlier, uses the same groundwater sampling method across all three permits. The methodology remains the same. There are site-specific differences that have to do with the number of wells based on the specific area of review and what wells exist there.

Other differences include other site-specific surface features which may include springs, mining land as I discussed previously, and

453

any legacy oil or gas wells. To note, there are no legacy oil and gas present in the TB Leingang or BK Fischer area of review. There is one KJ -- there is one legacy oil and gas well in the KJ Hintz permit as I had testified to earlier.

Q. I'm going to try to get some points here with the court reporter, so can you slow down just a little bit?

**A.** I thought I was.

Q. Let's go to the next section, Section 5.

**A.** Section 5 discusses the testing and monitoring plan. Across all three permits, leak detection plans are similar. Flowline corrosion, prevention plans are similar, and baseline testing and logging plans are similar. There are minimal differences for mechanical integrity testing across all three permits.

You'll note that in the TB Leingang permit the Milton Flemmer 1 will use tubing-conveyed gauges, as Jean had previously testified to in Section 9. The other two stratigraphic monitoring -- excuse me -- stratigraphic test/monitoring wells will use casing-conveyed gauges. Environmental monitoring plans, again, are site specific but the methodology remains the same.

454

Q. Okay. The next section, please.

**A.** Section 6, the Postinjection Site Care and Facility Closure Plan. The monitoring programs are similar across all three storage facility permits. There are minimal differences related to monitoring well-specific details, for example, the maximum pressures seen across each storage facility.

Q. All right. And then Section 7 I have labeled on my exhibit Emergency and Remedial Response Plan. Can you discuss that for us, please?

**A.** The content between all three permits is the same materially.

Q. Okay. And Section 8?

**A.** Again, the material content is the same and there are no -- no large differences.

Q. And Section 9?

**A.** All three storage facility permits abide by the same North Dakota rules and regulations, such as requiring surface casing 50 foot below the lowermost USDW and $CO_2$ resistant cement casing within the injection reservoir zones.

You'll note that the biggest differences are that the Milton Flemmer 1 stratigraphic test well and monitoring well was drilled deeper. It

455

was drilled to 12,000 feet. The other two wells, the Archie Erickson and the Slash Lazy H, were drilled to approximately around 6,000 feet. That would result in just differences in cementing. Some are two stages for the shorter wells and some are three stages in those completions.

Q. All right. Let's go to Section 10, the plugging plan.

**A.** There are no material differences in the plugging plans across all three permits. Plug placement will vary based on formation depths, you know, depending on where those formations exist within each specific wellbore.

Q. And Section 11, Injection Well and Storage Operations?

**A.** Again, the Milton Flemmer 1 well, since it will be using tubing-conveyed pressure gauges, tubing will be installed in the Milton Flemmer 1 well. Prior to injection operations beginning in that storage facility permit in the TB Leingang, that well will be plugged back. It's currently drilled to about 12,000 feet.

There will be no tubing installed in either the Archie Erickson monitoring well or the Slash Lazy H monitoring well.

456

There are site-specific differences in maximum bottomhole pressures, injection amounts, et cetera, as seen in Table 11-1.

Q. Okay. And Jay spent some time comparing and contrasting the financial assurance. So keeping that in mind, can you just discuss Section 12 for us?

**A.** Yeah. Jay did a great job testifying to the differences already. There are minimal differences between all three storage facility permits. The total bond amount between the three storage facility permits varies slightly, and those minimal differences are related to the cost estimates of the postinjection site care and facilities plan, and namely the number of monitoring wells at each site, the reservoir monitoring well design characteristics, flowline lengths and costs associated with endangerment of USDWs.

Q. All right. Now let's spend a little time with the appendices that are attached to each one of the applications. Let's start with Appendix A.

**A.** There are no material differences between all three permits other than they use site-specific information.

457

Q. And Appendix B?
**A.** There are, again, no material differences in Appendix B, Freshwater Well Sampling Analysis, other than the results are site specific.
Q. And Appendix C?
**A.** There are no material differences in Appendix C across all three storage facility permits. You'll note here that site-specific information, namely XRD data, was used to inform mineralogical compositions for injection zone and confining zones. Again, stratigraphic well-specific water ionic compositions were used and, therefore, the simulation results are site specific.
Q. And Appendix D?
**A.** There are no material differences between the three storage facility permits. You'll note that TB Leingang does list information for those tubing-conveyed pressure temperature gauges.
Q. And then finally Appendix E?
**A.** There's no material differences. The differences relate to the permits themselves.
MR. BENDER: Mr. Examiner, you know, I don't -- I think I'll offer the exhibit, and I don't have any other further -- I don't have any

458

further questions for Ms. Olsen.
HEARING EXAMINER GARNER: Any objections?
MR. BRAATEN: No objection.
HEARING EXAMINER GARNER: Exhibit is admitted.
You can proceed to your next witness.
MR. BENDER: Next witness is Wade Boeshans.
HEARING EXAMINER GARNER: And just a reminder, Mr. Boeshans, you're still under oath.
MR. BOESHANS: Yes.

**REDIRECT EXAMINATION**

**BY MR. BENDER:**

Q. Wade, while we're handing out the exhibits, I'm just going to have you direct your attention to what's been previously marked as Exhibit 1C-1.
MR. BENDER: Derrick, can you tell me when you get a copy?
MR. BRAATEN: Sure. Okay. I'm ready.
MR. BENDER: Okay. Thank you.
Q. (MR. BENDER CONTINUING) Wade, can you tell me what Exhibit 1C-1 is?
**A.** (BY MR. BOESHANS) It is the storage agreement for SCS3 for the KJ Hintz storage site.

459

Q. And can you briefly describe the amendment to the Hintz storage unit that Summit is proposing with this exhibit?
**A.** Yes. So in this exhibit it includes an amendment in what is labeled in here as Section 3.12.
Q. And can you explain to the Commission staff why Summit is proposing the addition of Section 3.12 to the Hintz storage agreement?
**A.** Yes. So as you're aware in the -- from the previous -- or my testimony yesterday, the KJ Hintz is in proximity to the DCC facilities. I think I mentioned yesterday -- or I did mention yesterday that approximately, you know, three miles between the storage boundary of -- storage area boundary of the KJ Hintz and the DCC West facility. And so Summit and Minnkota have been in discussions around a border agreement in terms of how we would work together to, you know, manage our storage operations or cooperate in storage operations. And so this amendment outlines what we have agreed to in terms of general terms, and those discussions have advanced to this point.
Q. It's my understanding, Wade, that the -- the Hintz storage agreement already has language

460

for a border agreement -- for the parties to enter into a boarding -- border -- I'm having trouble talking here -- border agreement. Why was it necessary to add Section 3.12?
**A.** Yeah. So you're correct in that the application or the border -- the storage agreement in the application includes border agreements. This section is specific to a border agreement between Summit SCS3 and the DCC facilities.
And so we thought it was prudent at this time given our discussions to lay out the general terms that we've agreed to at this point in anticipation of finalizing that border agreement of coming here, but this would set forth in essence the -- call it general terms and expectations of the border agreement which the parties have agreed to work together on. We believe it's in our best interest to do so, and so we're submitting it here today.
Q. So it's Summit's request and Minnkota's request that the storage agreement for the Hintz storage facility be amended to include the language which is set forth in 3.12; is that a fair statement?
**A.** Yes. That's correct.

461

MR. BENDER: That's all the questions I have for this witness. Offer that exhibit which is Exhibit 1C-1.

HEARING EXAMINER GARNER: Any objection?

MR. BRAATEN: I don't have an objection to the admission of the exhibit. I have an objection to the amendment itself to the application at this point given the circumstances, but not to the admission of that exhibit into the record.

HEARING EXAMINER GARNER: We will note your objection and admit the exhibit.

MR. BENDER: Mr. Examiner, we'd now like to move to Amanda Douglas. If you recall, there were some questions when we had the larger group up here that we believe Amanda can respond to. So I believe she's still sworn.

HEARING EXAMINER GARNER: Yeah. Just a reminder you're still under oath.

MS. DOUGLAS: Understood.

**REDIRECT EXAMINATION**

**BY MR. BENDER:**

Q. Do you want to handle it the way you did last time, Amanda, where you indicate what the question is and then respond?

**A.** (BY MS. DOUGLAS) Yes. And DMR staff, if

462

I -- I miss any, please let me know.

The first question I believe that was asked and deferred was how a fracture pressure gradient influenced $CO_2$ plume size. Generally, the fracture pressure gradient is used to calculate the bottomhole pressure constraint, so 90 percent of the fracture pressure gradient is used to define the bottomhole pressure constraint as required by regulations. A higher fracture pressure gradient would result in a higher bottomhole pressure allowing for more injection of $CO_2$ which would generally result in a larger plume.

However, I'd like to point out in the modeling cases that we ran in the permits in Section 3, the 2100 psi wellhead pressure constraint was met prior to the bottomhole pressure constraint being met. So in this case the higher fracture pressure gradient at one of the sites is not dictating a larger plume size for the case -- simulation case presented in the permit application.

Q. That's -- I believe that's the only question that -- oh, there's another one?

**A.** I was just pausing. Sorry.

Q. Oh, okay.

463

**A.** Waiting for --

Q. That was a long pause, so --

**A.** Waiting for the Commission to -- to write their notes.

Another question I believe -- Travis, you asked a question on stabilized plume. Could you please restate your question, or postinjection period?

MR. STOLLDORF: Oh, okay. Hang on one second. Yeah. On Figure 6-2, can you explain the $CO_2$ extent ten-year postinjection -- how that ten-year postinjection boundary was determined? It's on page 6-6 or 6, dash, 6.

MS. DOUGLAS: Yep. So the simulation model was used to simulate the 20 years of injection and several years postinjection. And so the plume as labeled here is showing the $CO_2$ plume extent at ten years postinjection as determined -- as predicted by that modeling simulation.

MR. STOLLDORF: Okay. What parameters are used to determine when the plume is stable -- when the plume is stabilized?

MS. DOUGLAS: So plume stabilization is determined by looking at the rate of change in plume area over time. So the rate of change in the

464

plume area over time decreases, and so we used -- we calculated the rate of change over one-year time steps and looked at the point in time where rate of change slowed down. And in that case the cutoff was determined to be less than two square miles of change per year in plume area, and that was used as our cutoff to determine when the $CO_2$ plume stabilized. .2 -- .2 miles, sorry, if I misstated.

MS. MADCHE: And that's using the 5 percent saturation cutoff as well within those square footage movements?

MS. DOUGLAS: That's correct.

MR. STOLLDORF: Thank you. That's all I had.

MS. DOUGLAS: So, Tammy, you asked a question about the pressure from the flowlines and the wellhead pressure used in modeling. Could you restate that question?

MS. MADCHE: Yes. So on Table 11-1 on page 11-2, for all three applications there's a note that maximum injection pressure during operations will be limited to surface equipment pressure ratings and the maximum bottomhole pressure constraint. In Table 11-1 and in Section 3 in the model you report that you used a wellhead

465

pressure constraint of 2100 psi alongside the bottomhole pressure constraints. However, in the testing and monitoring section in Table 5-4, the flowline maximum operating pressure is listed at 2183 psi along with a maximum discharge pressure of 2160 psi. So my question was why those operational values on the flowline are higher than the wellhead pressure constraint that was used in the model.

MS. DOUGLAS: So can you restate the value? Did you say it was 2,160?

MS. MADCHE: 2183 for max operating pressure, 2160 for max discharge pressure.

MR. BENDER: Do you want to hand that off to Jamey or --

MS. DOUGLAS: Yes.

MR. BENDER: Reluctantly?

MS. DOUGLAS: So before Lawrence introduces Jamey, then, you guys had a question on the stoplight system and the magnitude of earthquakes used in that stoplight system. So John described 2.7 is the low value for that stoplight system. Again, that's the threshold for a felt earthquake.

Greater than a magnitude of 4 was chosen essentially for that next step in the stoplight

466

system. At an earthquake magnitude level 4, that's where the magnitude of the earthquake would be sufficient to -- it's generally described by the USGS as shake or rattle dishes. That's how the USGS describes it. So at that point the stoplight system states that SCS will stop injection, perform inspection on surface facilities and wells to ensure there's no damage, and then reduce operations while a detailed analysis is done to determine whether or not injection operations caused that or that could have been a natural earthquake that their monitoring array is just picking up.

And then over 4.5 is the cutoff for complete stop of operations and working with the regulator to determine if any changes to injection operations are needed.

MR. SUGGS: So why the 4.5? What's the significance of that transition?

MS. DOUGLAS: So as you get from 4 moving up till 5, so earthquake magnitude 5 -- as described by the USGS, at earthquake magnitude 5, that's where you might start seeing potential damages to structure, such as cracked drywall, things like that. And so 4.5 is below that 5

467

threshold to provide that safeguard to make sure that operations are shut down before any earthquakes are induced that could cause damage.

MR. SUGGS: Okay. Thank you.

MS. DOUGLAS: Were there any other questions that you recalled that were deferred?

MS. MADCHE: No.

MS. DOUGLAS: Okay.

MR. BENDER: We'll now call Jamey Backus, I think, who can respond to the remaining questions. Jamey will -- and Jamey has not been sworn.

HEARING EXAMINER GARNER: I'm going to swear him in.

MR. BENDER: Okay.

**JAMEY BACKUS,**

being first duly sworn, was examined and testified as follows:

**DIRECT EXAMINATION**

**BY MR. BENDER:**

Q. Jamey, state your full name for the record.

**A.** Jamey Backus.

Q. And, Jamey, I misspelled your name earlier, so will you spell your last name?

468

**A.** B-a-c-k-u-s.

Q. And, Jamey, by whom are you employed?

**A.** Summit Carbon Solutions.

Q. In what capacity?

**A.** Project manager of topside facilities.

Q. Okay. And can you spend just a few moments providing us with a summary of your educational background and work experience?

**A.** Bachelor's degree in mechanical engineering. I worked at DGC for a number of years, which is the chemical plant up near Beulah, and then I also worked in coal-fired power generation in roles such as engineer, maintenance superintendent and plant manager.

Q. And what are some of your duties and responsibilities with respect to your employment at Summit?

**A.** That would be design of the topside facilities and equipment selection.

Q. Okay. I don't have any other questions. He's available for the questions that -- I don't remember exactly what they were, but I think Tammy may have had a few, or do you recall the questions?

**A.** Well, I think I can -- I'll go through all the ones I have and then let me know if I forgot

469

any.
So if we begin with the max pressure one that Amanda referenced, the max operating pressure of the pipe is set by thickness, flange ratings, et cetera. The maximum output pressure of the pump is set by the pump manufacturer, but we will have controls in place so that the wellhead pressure never exceeds the 2100 psi.
MS. MADCHE: Sounds good.
MR. BACKUS: Okay. The other question, the block valve where NDL-327 breaks off to NDL-325, we did not have intentions of putting a block valve there. Now, with the discussion of potentially putting a Coriolis meter there, we may revisit that, but we did not originally have intentions of putting one there because the mileage of the pipeline in that area did not require it.
MS. MADCHE: So I guess I would just state we would probably highly recommend it just because it gives you that extra ability to isolate between the facilities since they are owned by separate LLCs.
MR. BACKUS: You'd asked about location of where NDL-327 goes to 325, that is 141 North, 87 West, Section 5. The terminus point is 141 North,

470

86 West, Section 5.
MS. MADCHE: Okay.
MR. BACKUS: Those were the ones that I had.

**EXAMINATION**

**BY MS. MADCHE:**

Q. Okay. So additional ones I have were what you anticipate the average flow rate to be for the three individual flowlines?

**A.** Yeah. So I would -- I would reference the Section 11 for each one of the applications, and our average -- average injection rate between the two wells utilizing the 2100 psi wellhead constraint, I would -- I would utilize the total of that number as to what will actually flow through the line to the -- to the well site.

Q. So just to confirm, you plan to maximize right up until the 2100 psi wellhead pressure constraint?

**A.** Depending on flow coming in from the capture facilities --

Q. Sure.

**A.** -- you know, the 16 -- I'll talk in rough numbers -- the 16 million tons that is currently slated.

471

MS. MADCHE: Okay. I'm just checking to make sure I don't have anything else here. I think that's all I have for deferred questions. I'll let anyone else go. I do have one question on the Exhibit 8B afterwards, so --
MR. BENDER: When you say "afterwards," I'm sorry, I don't mean to question you, but --
MS. MADCHE: Anyone else in DMR that --
MR. BENDER: Oh, I see.
MS. MADCHE: -- has --
MR. BENDER: Okay.
MS. MADCHE: -- deferred questions. Sorry.
MR. BENDER: Okay. Thank you.
HEARING EXAMINER GARNER: I think you can ask, Tammy.
Q. (MS. MADCHE CONTINUING) All right. So on Exhibit 8B, on page 5 of 6 I think there might be a typo on the KJ Hintz column under Section 12, number 2. It states, "Additional groundwater monitoring well and soil gas profile station has been added at legacy well 4942." Based on the figure in the application it's an additional Fox Hills monitoring, not a soil gas station, just to confirm. And that would be figure -- give me a

472

second.
**A.** (BY MS. OLSEN) You're correct. That's a typo. There is not a soil gas station planned near that additional legacy well. Just a Fox Hills monitoring well.
MS. MADCHE: Okay. Thank you.
HEARING EXAMINER GARNER: Well, at this time I guess we'll move to cross-examination unless there's anything else.
MR. BENDER: Yeah. And I will -- I'll accommodate Derrick in any way. If you would prefer the -- that other group of people that we had up a few moments ago and have -- and do your -- conduct your cross-examination on those witnesses first or if you want to use this group, whatever you prefer, I'll try to accommodate you.
MR. BRAATEN: Give me just one moment, please. Maybe for efficiency, if you don't mind, I can just start with some of the questions I had for these witnesses and then finish that and recall any that I need that were up prior.
MR. BENDER: I guess I'll try not to object, but I would hope you would keep it to --
MR. BRAATEN: Yeah. I have questions based on this testimony.

473

MR. BENDER: On the direct we just had?
MR. BRAATEN: Yeah.
MR. BENDER: Okay. Fine.

**RECROSS-EXAMINATION**

**BY MR. BRAATEN:**

Q. Ms. Douglas, I think you had testified about the plume stabilization parameters and indicated that the stabilization cutoff was determined to be when less than .2 square miles of change occurred in any given year at the 5 percent saturation cutoff; do I have that right?

**A.** (BY MS. DOUGLAS) Correct.

Q. Did you also model -- let me start over.

Did you run the model to determine the total duration over which the plume would keep moving regardless of rate?

**A.** I can't recall off of the top of my head. I know we modeled it for a significant postinjection duration. I was not directly involved in determination of stabilized plume so I don't have that information readily available.

Q. Who made the determination for stabilized plume or who was involved with that?

**A.** Apologies, I don't have those names readily available.

474

Q. Was it people at EERC?

**A.** Yes.

Q. Okay. There was some discussion of the stoplight system. Why not notify DMR of events between a 4 and a 4.5?

**A.** That's not included here as written, but I think that'd be prudent to add that.

Q. Okay. Ms. Olsen, you testified on Exhibit 8B regarding the different depths for the three wells. Do you have an understanding as to why they drilled the three different wells to those specific depths?

**A.** (BY MS. OLSEN) Generally, yes.

Q. And just generally, what is your understanding?

**A.** My understanding is they were drilling the Milton Flemmer to get core data from deeper formations.

Q. Okay. Did they complete or are there plans to complete that at a higher interval at some point with a plug?

**A.** There are no plans, to my knowledge.

MR. BRAATEN: I have some questions, Lawrence, related to surface facilities, and Mr. Volk did some testifying but it sounds like

475

Mr. Backus has an understanding as well. Do you mind if I ask him the questions, and if he can't answer, we can call Jay Volk up?

MR. BENDER: I have no problem with that. It may save time if you just try that approach.

Q. (MR. BRAATEN CONTINUING) Okay. Mr. Backus, can I have you turn to the generalized flow diagram on page 5-12 of Exhibit 1A?

**A.** (BY MR. BACKUS) Okay.

Q. Can you describe the purpose of the blowdown which is indicated on the generalized flow diagram?

**A.** Thank you. In hopes of not getting called up, I didn't bring my glasses.

Oh, the blowdown on the receiver?

Q. Correct.

**A.** Yes. That would be for when the -- when a pig is received in there and the receiver is isolated, that blows down the pressure and $CO_2$ so that the pig can be removed and data can be retrieved from it.

Q. Are there emergency pressure relief valves on the system anywhere as far as what we're looking at in the generalized flow diagram?

**A.** There is a thermal relief valve, but not

476

emergency pressure relief valve.

Q. How do you deal with an unexpected spike in pressures coming through this system?

**A.** I think that is dealt with through controls of the pipeline pump pressure control valves to maintain pressures that are -- that can be withheld within the existing facility.

Q. Can you explain that a little more?

**A.** In order to have a pressure spike, something would need to do that, and a pump would be the obvious thing, and there are controls on the pump, be it vari -- variable frequency drive or just the nature of the pump that would keep it underneath of the failure pressure of the piping -- or the maximum operating pressure, I should say. I'm sorry.

Q. Do you believe there's a 0 percent chance of pressure causing some kind of a release from the surface facilities post Midwest Carbon Express' terminus point?

**A.** I don't know that I can say there is a 0 percent chance of that ever happening.

Q. Have you done any kind of dispersion modeling to determine the areas in which you would need to provide notice to people if you did have a

477

release in one of those sites?
MR. BENDER: Before you answer that question, I want to caution you that there's been some -- there's been a dispersion model that's been prepared and it's been submitted to the Public Service Commission and it's confidential. So you can answer the question, but be very careful that you don't answer it in a way that provides information with the model that was supplied to the PSC.
MR. BACKUS: I can say that I was not personally involved with any of the dispersion modeling that has been done.
MR. BRAATEN: And fair objection, Lawrence. I'm actually not trying to get into that.
MR. BENDER: I appreciate that.
Q. (MR. BRAATEN CONTINUING) But my understanding of the dispersion model with the PSC is that that relates to the main line and to that, and I'm asking just specifically if there was any dispersion modeling done post main line on the flowlines in those facilities?
**A.** I was not involved in any of that.
Q. Okay. And so you're not saying there

478

wasn't one done. You're just saying you don't know?
**A.** Yes. That's what I'm saying.
Q. Okay. Is there -- do you know of anyone else that's testifying that would know whether or not one was done?
**A.** You could ask Mr. Powell.
Q. Okay. If Mr. Powell didn't know, is there anyone else that would?
**A.** He would be the one to ask that question to.
Q. Okay. What is the purpose of the thermal relief valve?
**A.** So in cases where you can isolate a section of pipe and it would be full of $CO_2$ at pressure, if it heats up through whatever means, say the sun is shining on that pipe, the $CO_2$ will expand and this -- the thermal relief makes sure it does not exceed safe operating limits.
Q. How does the thermal relief valve do that?
**A.** More than likely it would be the type of thermal relief valve that is spring operated, so as the pressure would increase, it would relieve that and then close again.
Q. Is the valve opened based on temperature

479

or pressure?
**A.** The valve would open based on pressure.
Q. What pressure?
**A.** I believe that number is 5 percent over maximum operating pressure.
Q. Wouldn't that risk a failure if the max operating pressure is based on the manufacturer's recommendations?
**A.** No, I don't believe it would. That -- that is a normal thing when you talk about, say, a vessel. Normally they operate -- the pressure safety valve in that case is normally set 10 percent over -- 5 to 10 percent over the operating pressure.
Q. And when you say "the operating pressure," are you saying the max operating pressure as established by the manufacturer of the pipe?
**A.** I'm saying the 900-pound class standard we are working off of, that operating pressure, as set by ASME, I believe.
Q. Okay. Does the valve, then, close by itself automatically once it gets back down below that pressure?
**A.** It does.
Q. Okay. So I asked you earlier about a

480

dispersion model, but are you aware of any testing done on predicted maximum release from the line through that valve?
**A.** Because -- because of that thermal relief valve?
Q. Correct.
**A.** Yes, I am.
Q. And what -- what kind of studies were done to determine what the maximum release would be from that thermal relief valve?
**A.** It was -- a third party performed a study based on a temperature rise in that line and the thermal expansion of the $CO_2$ given the size of the line and the volume contained in, how much it would need to relieve.
Q. As well as the intended flow rate?
**A.** Yes.
Q. And operating pressure?
**A.** Yes. Well, it -- when you say flow rate, do you mean through the valve or through the line?
Q. I don't know.
**A.** I can say this: If that would happen, it is because everything is stopped. There is no flow through the line and valves are closed.
Q. Okay. Yeah, so through the valve.

481

What was the maximum amount of $CO_2$ predicted to be released from the thermal valve in the scenario you described?

**A.** Approximately .136 tons per minute.

Q. And did they determine the maximum length of time they thought such a release would potentially occur under those parameters?

**A.** Based on the largest segment of line that one of these exists on, I think there would be approximately three tons of $CO_2$. That would be if you emptied the line completely, which would be highly unlikely, but that would be if you emptied the line completely.

Q. So when the thermal valve is released, does that trigger other valves to stop flow in the line or do you have to manually shut that off?

**A.** Well, as I said for -- for that to trip, that means that there is no injection going into that well. We have isolated the valves because it is only as the temperature warms up, the pressure would increase to release that. So there would be no replacement $CO_2$ coming into that line. It's simply to protect the line.

Q. Okay. Do you have an understanding of how far three tons of $CO_2$ would disperse under natural

482

wind and weather conditions?

**A.** I do not.

Q. I'm not sure who this question is for, but I think there was some testimony about who would be operating the flowlines, so not the main line, Midwest Carbon Express, but the flowlines. Was there testimony that the flowlines would be owned by the storage facilities but operated by SCS Transport?

**A.** (BY MR. BOESHANS) That's correct.

Q. And when did that arrangement -- when was that arrangement decided upon?

**A.** That -- I don't know that I can give you a specific timeline in which that decision was made.

Q. Was it within --

**A.** I think it was generally that the intent that -- from my recollection, it was always the intent that it would be an integrated system operated -- connected with a common control system as Jamey described earlier.

Q. Are there any contracts signed between the various entities to formalize that relationship for operating the flowlines?

**A.** We do not have interoperating agreements in place today between the entities.

483

Q. Or any other kinds of contracts to govern that?

**A.** Not at this time.

Q. I apologize, I'm jumping around a little now, but, Ms. Douglas, I think you had talked about this traffic light system, and under the event of greater than 4.01 one of the plans is to continue operations at a reduced rate and/or below a revised maximum operation pressure. How would you make those determinations as to how much to reduce the rate or the maximum operation pressure?

**A.** (BY MS. DOUGLAS) At this time what's specified is injection rate would be reduced to no less than 50 percent.

Q. How do you decide if it'll be 50 or 55 or 60, for example?

**A.** So as part of this stoplight system and as this traffic light system is part of this seismic monitoring, we'd be acquiring continuous seismic data. So we'd take into account not just that larger event but if there were other events, how many, their magnitude, time duration, as well as their epicenters.

Q. Mr. Backus, do you know what the diameter is of the thermal valve?

484

**A.** (BY MR. BACKUS) 1 inch, I believe.

Q. Okay. Are there any other pressure relief systems post terminus of the Midwest Carbon Express that we haven't discussed?

MR. BENDER: I think I'd rather have you address that question to Jimmy. He's more familiar with those things, and he'll be coming up after this.

MR. BRAATEN: Okay. Okay. I think that's all the questions I have for these witnesses. I have a few, I think, for Mr. Powell and Ms. -- one -- well, a couple quick ones for Ms. Oddy.

MR. BENDER: Do you want the whole group or --

MR. BRAATEN: No, I think -- well, I think we can start here. I think that they may be able to answer them all.

MR. BENDER: Okay.

**CROSS-EXAMINATION**

**BY MR. BRAATEN:**

Q. Ms. Oddy -- am I saying that right, Oddy?

**A.** (BY MS. ODDY) Yes. Oddy.

Q. You made a reference to $CO_2$ resistant cement. Can you describe what that is?

**A.** Yep. So as part of the design plan, we

485

have consulted with contractors who specialize on cementing design in the basin, and part of that is evaluating the downhole pressures and temperatures as well as the interactions between the $CO_2$ stream as well as the formation water in accordance to the regulations. And so we're not looking at your conventional oil and gas cement, primary cement. The cementing system is tailored to provide resistance to $CO_2$ with additions to different chemicals and different formulations within the cement.

Q. Other than the pH, are there other properties of the cement that are specific to $CO_2$ resistant cement that make it different than your regular cement used for plugging wells in the oil patch?

**A.** So -- yeah, so for both plugging as well as primary cementing in our -- in our injection wells and monitoring wells, some parameters I can name off the top of my head is the permeability would be significantly reduced in the formulation. Those -- I can't recall any other parameters. Like I said, we contracted specialized cementing contractors.

Q. So just as a general matter, would the

486

lower permeability in that cement result from a greater clay content?

**A.** So it would just mean that, generally speaking, there'd be less chances on interactions with, you know, potential oxidation or any chemical reactions downhole.

Q. What do they add to the cement to prevent oxidation or chemical reactions downhole that is different than the cement used for normal cementing or plugs in the oil patch?

**A.** I'm not privy to the specific additives by the contractor.

Q. Do you know if anyone at Summit or EERC is?

**A.** Again, we've contracted technical experts from a cementing company and so they would know the -- they, as in the contractor, have, you know, a proprietary formulation of the cement system, and then it would just be our responsibility to make sure that those are rated for the bottomhole pressures that we expect.

Q. What is the name of the contractor?

**A.** So the two commonly contracted out for carbon portfolios would be either Schlumberger or Halliburton.

487

Q. Okay. Is there any requirement to use $CO_2$ resistant cement in these wells?

**A.** So under Administrative Code 43-05-1-11 -- this would be in my own summarization, but in the selection of casing and cement, you know, where -- some of the factors that we need to take into place in the design is bottomhole pressures, temperatures, as well as the potential corrosiveness when $CO_2$ is introduced with formation water.

Q. And the cement both used to cement in a casing as well as the plugs interacts with $CO_2$ in the reservoir with these wells, the injectors?

**A.** With respect to the injection wells, yes, it would be -- yep, because it'd be isolating the injection zone. So it would -- the $CO_2$ would be going through the casing into the cement into the reservoir.

Q. Did they use $CO_2$ resistant cement to cement in the casing or plug the Raymond Jensen well?

**A.** I don't have the details of what type of grade of cement that was used in the Raymond Jensen well.

Q. Why wouldn't that be as important as knowing the cement in the injector wells?

488

**A.** We don't anticipate, as per Caitlin or Amanda -- I can't remember which one, but we don't anticipate the $CO_2$ plume at this time to reach the Raymond Jensen well. However, it is part of the area of review and therefore that was reviewed as -- as Caitlin testified to.

Q. Okay. And the surface casing for the Raymond Jensen well is not 50 feet below the lowest USDW; right?

**A.** I'd have to -- I'd have to refer to that diagram.

Q. Would you mind taking a look?

**A.** Oh, this is the TB Leingang.

Q. You know, I might be able to speed this up. Are you confident that the depth of the casing of the Raymond Jensen is in the application?

**A.** I do not know. I'd have to refer back to the --

Q. Okay. I'll have you go ahead and look.

**A.** Can you repeat your question, please?

Q. Is the surface casing for the Raymond Jensen well 50 feet -- at least 50 feet below the lowest USDW?

**A.** According to the diagram here, I guess I'm not sure in this area what would be considered what

489

the lowest underground source of drinking water is.
Q. What's the depth of the surface casing?
**A.** On the diagram it's 330 -- 330 feet.
Q. Okay.
MR. BENDER: Mr. Braaten, if you don't mind, I think Caitlin can address that question, if you want.
MR. BRAATEN: Oh, okay. Thank you.
MS. OLSEN: Can you repeat the question? Sorry.
Q. (MR. BRAATEN CONTINUING) Is the surface casing of the Raymond Jensen at least 50 feet below the lowest USDW?
**A.** (BY MS. OLSEN) It's not.
Q. Okay. When you did the model for the leaky well scenario, were you doing that based on the location of the Raymond Jensen well?
**A.** No, we did that leaky well scenario to delineate the AOR using the risk-based AOR method.
Q. Okay. I'm going to -- just a couple more here, and I'm not sure who this one's for, but it relates to the -- the valves in the surface facilities we discussed. And, Mr. Powell, I think these were for you.
But the first question is have you

490

designed that system to accommodate a situation with a blocked flow in the system?
**A.** (BY MR. POWELL) Yes. So the general flow diagram is not the piping and instrument diagram. So the thermal relief was just to relieve pressure in that bypass on that valve. So, yes, in all segments where the -- a segment could be isolated by a valve or shut in, yes, there is pressure relief in those segments.
As far as design pressure, the pipe is designed for 195. It's hydro tested to 125 percent of that maximum operating pressure. The valves were designed at Class 900 and bench-tested to 150 percent of pressure.
THE REPORTER: Can I have you speak up, please?
MR. POWELL: Oh, sorry. I'll repeat it.
So as far as the design pressure of the pipeline, it's per 195 regulation and then it's hydro tested to 125 percent of the MAOP, which would be 125 percent of the 2183. The valves are designed to Class 900 and that pressure value and then they're bench-tested at 150 percent of that.
Q. (MR. BRAATEN CONTINUING) Why was the piping and instrumentation diagram not provided as

491

part of the application?
**A.** I can't answer that question.
Q. Can it be provided?
**A.** Yes.
Q. Rather than asking you to identify the location and size of every valve in there, would you be willing to simply provide the piping and instrumentation diagram?
**A.** Yes.
Q. Oh, what is the diameter of those other valves that you just discussed?
**A.** Again, we'll reference them on the piping and instrument diagram. To Jamey's testimony, they're typically 1-inch to 2-inch valves.
Q. But the diameter of those valves will be listed on the piping and instrumentation?
**A.** Not the diameter of the valve. The size of the valve. The valves themselves are standard, at least in my experience, but the connections to the piping, to the carrier pipe, that's typically three-quarter inch to 1 inch, but we'll have that on the P&I data.
Q. Okay.
**A.** And just to clarify, any relief of pressure would not be external to the pipe. It

492

would be relieved into the pipeline. So if it's -- if you've got pressure relief between two segments -- a segment of the pipe that could be isolated with two closed valves, the pressure would be iso -- or relieved downstream. It would not be released to the atmosphere. So that wasn't clear from what I heard before.
Q. Okay. Thank you. So the only valve that would release to the atmosphere would be the temperature valve --
**A.** No. The temperature.
Q. -- or thermal valve? Sorry.
**A.** The thermal relief should be -- should be via tubing connected downstream. So if you have those two -- if there's pressure built up in that valve bypass, which would typically be closed in normal operation, then you could -- to Mr. Backus' testimony, you could have a thermal pressure buildup, and if that's the case, there's a set point on that valve, 110 percent, whatever it is -- we'll have that set point and that should be indicated on the P&ID, at least at this point. Then when it reaches that set point, it relieves downstream of that closed valve so it relieves the pressure on that piping, that segment of piping.

493

Q. The thermal valve releases the pressure downstream?
A. That thermal relief valve relieves the pressure from that small segment of bypass piping downstream of the closed valve.
Q. So it doesn't release anything to the atmosphere?
A. No. The only thing that would be released to the atmosphere is where you saw the blowdown referenced. That would be a controlled blowdown or release to the atmosphere if that were needed for normal or abnormal operating conditions.
Q. What kind of a spike in pressure would you expect if you had a valve shutdown at the wellhead?
A. Again, these -- these set points -- I'll back up.
I mentioned earlier in previous testimony about a surge analysis. So that surge analysis is -- was conducted on every -- or every main line valve, including in the flowline segments, was evaluated for an inadvertent closing. And the regulation is 110 percent of maximum operating pressure so it cannot exceed that. And in our case I believe the maximum was 107 percent. We can tell you exactly what the segments were in the

494

flowlines, I don't remember off the top of my head, but they were less than 110 percent.
Q. What was the time duration that was modeled over?
A. The -- the valves themselves are all actuated and have the capability to close in seconds, and we can confirm, but I believe the time frame was minutes, two to five minutes.
Q. So if all of your pressure relief systems relieves pressure within the line downstream and you have a valve unexpectedly shut at the wellhead, how do you relieve that pressure?
A. You're talking about upstream of the wellhead --
Q. Right.
A. -- to the inlet valve?
Q. Right. Yeah.
A. If it's the segment up -- well, let me back up.
Because there's -- remember, this is all automatically or automated or controlled by a control center, and there are -- there will be tight operating pressure boundaries. So they're continually seeing when any pressure changes may happen in a line, so -- and if -- there will be set

495

points, and I can't tell you what they are at this ten seconds, but there will be an alarm and then there will be a secondary alarm. And so the control center operator will have notification if there's a -- if there's a pressure increase, and so there will be procedures or protocol they take to relieve that pressure before there's a buildup that would overpressure any equipment, whether it's that inlet valve to the wellhead or that segment of piping. So there shouldn't be a situation even in an abnormal operating condition where that equipment will be overpressured.
Q. But the protocol you mention for ensuring that that doesn't get overpressured relies on human judgment?
A. No. There will be an automatic -- or you can't have automatic set points, but, yes, the first -- the first response would be from an individual in the control center. That's correct. Per procedures on what to do in a what-if situation.
Q. Will there be protocols provided to the DMR or any regulatory bodies with respect to the decision tree for the person making that decision?
A. Those will be in the standard operating

496

procedures. So I'm not -- I don't have the experience with the DMR to see if that's something that they are -- that they want to audit or interested in reviewing. If they do, they would be available. They're not confidential or will not be confidential.
Let me clarify. We're not going to publish them on the website, but if a regulatory body wants to see our operating procedures, absolutely.
Q. Mr. Powell, were you here during my questioning of, I believe, Ms. Douglas when I was asking about what Summit would do if after, for example, the five-year review you determined that you needed to change the boundaries of the storage facility and then my questions following that were about how you would allocate compensation in that event? Did you -- were you here during that testimony?
A. I was.
Q. So let's just take as a hypothetical a situation where Summit makes the determination after five years that the data on the ground justifies adjusting those storage facility boundaries. What is Summit's plan with respect to

497

how to adjust the compensation to the landowners that has been paid up until that point?

**A.** I don't have that knowledge of how the -- how the compensation may or may not be adjusted to landowners.

Q. Is there anyone else in the company that would have that knowledge?

**A.** I'll defer to Mr. Boeshans.

Q. Okay.

MR. BRAATEN: I'm not trying to get out of order, Lawrence, but do you mind -- this is like right near the end. Do you mind if we have Mr. Boeshans come up?

MR. BENDER: If you're getting close to the end, I don't have any problem with that.

Q. (MR. BRAATEN CONTINUING) Mr. Boeshans, do you have an under -- well, I'll just start over.

In the hypothetical scenario that five years down the road Summit determines that it wants to adjust the boundary of the storage facility based on the data it gets from its monitoring activities, how would it allocate or reallocate payments already made to the owners in the storage facility?

**A.** (BY MR. BOESHANS) So in that situation,

498

what I would see is, you know, it's an it-depends answer. It depends on what the adjustment is to the boundary. And then if we were going to make an adjustment to the boundary, it would be -- you know, be decided, you know, by hearing like this with the Commission because that would be a major modification to the permit.

And so at that time we would have more information around what the change is, the adjustment is, how much -- how long it's been operated and have a -- probably have -- we'd have a recommendation in terms of how to do that. We don't have a plan exactly today in terms of how that would happen.

Q. If you expand the storage facility after five years, the boundary of the -- I'm going to start over.

If Summit were to make a major modification and expand the border of the storage facility through a hearing with the DMR, would you agree that you need to pay the new owners now being included in the storage facility for prior injections?

MR. BENDER: I'm going to object because I think you're asking for a legal conclusion.

499

MR. BRAATEN: That's fair.

Q. (MR. BRAATEN CONTINUING) But what I'm actually asking is what Summit's opinion would be on that issue. Not whether they need to, just whether you would.

**A.** So you're asking me if there was an adjustment -- your situation, if there was an adjustment after five years and we had been injecting, would we pay the landowners that were added to the unit?

Q. For the past injections.

**A.** For the past injections. I don't know that I can answer that. It's a -- I think you'd have to understand more about that situation, what led to the changing of the units.

Q. What more do you want to understand? What information are you missing to make the determination?

**A.** Well, I'm missing the historical operation and what led to the need for a change.

Q. Well, let's presume -- sorry. This was implied, but I should be explicit. You're going to change the size of the storage facility because you've determined that it was inaccurate and that the plume is going to move further than you

500

originally anticipated such that you need to expand the boundary of the storage facility.

MR. BENDER: And I'm going to object. You've asked that question previously in a little bit different manner and he said he needs to know more information before he can answer the question -- answer the question. So I'm going to object.

HEARING EXAMINER GARNER: I'm going to let him answer if he knows.

MR. BOESHANS: I don't know.

Q. (MR. BRAATEN CONTINUING) You don't know what?

**A.** I don't know the answer to your question right now.

Q. So Summit won't make a commitment to pay owners added into an expanded storage facility for prior injections?

MR. BENDER: Objection. Asked and answered.

HEARING EXAMINER GARNER: Sustained.

Q. (MR. BRAATEN CONTINUING) Was the answer no?

MR. BENDER: He said he didn't know.

Q. (MR. BRAATEN CONTINUING) Okay. But if

501

you don't know whether or not Summit will make a commitment to do that, then the answer is that they're not making a commitment right now to do that; right?

MR. BENDER: Objection. I mean, we've covered this ground now three times.

HEARING EXAMINER GARNER: Sustained.

Q. (MR. BRAATEN CONTINUING) Does anyone at Summit know the answer to that question?

MR. BENDER: Objection.

MR. BRAATEN: What's the objection?

HEARING EXAMINER GARNER: He can -- he can answer that one.

MR. BOESHANS: I don't know. It's not a question that I've raised with anybody at Summit.

Q. (MR. BRAATEN CONTINUING) Has anyone else at Summit raised the question with you or anyone else that you're aware of?

**A.** Not that I'm aware of.

Q. I apologize if someone did ask this, but there was a question earlier -- Mr. Powell, I think it might have been deferred to you, but -- or Mr. Boeshans -- with respect to the payments being made to landowners on the $CO_2$ stream, is that -- are those payments being made based on the full stream

502

or the actual $CO_2$ mass in the stream?

MR. BENDER: I'm going to object. You seem to be using the past tense. You said that we have paid or am I misunderstanding you?

MR. BRAATEN: Well, I can -- I'll just change it to avoid that.

MR. BENDER: Okay.

MR. BRAATEN: I see what you're saying.

Q. (MR. BRAATEN CONTINUING) So when you go to pay landowners for injections, is it your intent to pay based on the full stream of substances injected or the $CO_2$ mass in the stream?

**A.** The intent is to pay on the -- the full stream as it's defined in the storage agreement --

Q. Okay.

**A.** -- which is associated substances.

MR. BRAATEN: Okay. No further questions.

HEARING EXAMINER GARNER: I believe the staff might have some questions. Already answered? Okay. Lawrence, any further witnesses?

MR. BENDER: Not at this time.

HEARING EXAMINER GARNER: Okay.

MR. BRAATEN: Could we take a break?

HEARING EXAMINER GARNER: Take a break before you call?

503

MR. BRAATEN: Yeah.

HEARING EXAMINER GARNER: Sure. Take a ten-minute break.

(Recessed at 4:42 p.m. and reconvened at 4:59 p.m.)

HEARING EXAMINER GARNER: We are back on the record. Attorney Braaten, you can proceed with your first witness.

MR. BRAATEN: All right. We are calling Shane Bofto to appear by phone. Shane, can you hear me okay?

MR. BOFTO: I can hear you.

HEARING EXAMINER GARNER: Okay. Let me swear him in real quick.

MR. BRAATEN: Okay. Shane, the hearing examiner is going to swear you in.

**SHANE BOFTO,**

being first duly sworn, was examined and testified as follows:

**DIRECT EXAMINATION**

**BY MR. BRAATEN:**

Q. Shane, can you state your full name and spell your last name for us?

**A.** My name is Shane Bofto. Last name is B-o-f-t-o.

504

Q. And by whom are you employed?

**A.** HydroSolutions, Incorporated.

Q. And just generally speaking, what kind of company is HydroSolutions, Incorporated?

**A.** We're a services, disabled veteran-owned, small business associated with consulting and environmental and water resources.

Q. Okay. Can you describe your educational background, please?

**A.** Sure. I have a bachelor of science in chemical engineering from Montana State University and an M.B.A. from the University of Mary in Bismarck.

Q. And can you give us a description of your professional experience from college up until you began with HydroSolutions?

**A.** Sure. I initially out of college worked at a petroleum refinery in the environmental health and safety department. I then went to work out in Seattle where I focused on mining internationally, consulting primarily in water quality, acid rock drainage and treatment.

Following that, I moved back to Montana and was a general environmental engineering consultant and went through several companies till

505

I ended up here at HydroSolutions.
Q. And approximately how long have you been working at HydroSolutions?
**A.** Since -- since 2004.
Q. And can I have you pull up Exhibit No. LO-56, Shane?
**A.** I have it.
MR. BENDER: Can you just give me a minute to get there?
MR. BRAATEN: It's his résumé.
MR. BENDER: Okay. I'm there. Thank you.
Q. (MR. BRAATEN CONTINUING) Does this curriculum vitae accurately reflect your educational and professional qualifications and experience, Mr. Bofto?
**A.** Yes, it does.
MR. BRAATEN: Move to admit Exhibit LO-56.
HEARING EXAMINER GARNER: Any objections?
MR. BENDER: No objection.
HEARING EXAMINER GARNER: Motion granted.
Q. (MR. BRAATEN CONTINUING) And, Shane, can you describe for us with respect to your work at HydroSolutions the kinds of clients and the kinds of work that you've been involved in?
**A.** At HydroSolutions, clients mainly consist

506

of private individuals, ag and ranching clients, federal, state and local governments and municipalities. We have a GSA contract with the federal government. We work with developers, conservation groups and other NGOs and then companies including mining, oil and gas pipelines, and we also work with attorneys.
Q. And as a general matter, you mentioned environmental consulting services, but can you give us just some specific examples of the kinds of projects and the kinds of consult -- different kinds of consulting work that the folks at HydroSolutions do?
**A.** Generally, we provide independent services and environmental engineering, hydrogeology, remedial investigations, remediation, permitting, water resource development, compliance, due diligence, environmental impact statements and expert work.
Q. And, Mr. Bofto, are you familiar with the applications and the Class VI well permit applications that bring us to the hearing today?
**A.** Yes, I've briefly reviewed them.
Q. And do you have any -- we've talked generally about the experience of HydroSolutions

507

and your experience. Do you have any experience on particular or specific projects that you think informs your ability to work on -- or work in this proceeding or on this matter?
**A.** Yes. Several projects come to mind. In 2011, the Wyoming Land Quality Division issued an RFP that resulted in a competitive bid, and HydroSolutions was hired where I was the project manager to look at mining regulations in Wyoming, specifically with respect to rare earth elements in mining. And we reviewed all of the regulations and permitting process with respect to Wyoming and implications of kind of a different mining type that the state wasn't used to seeing. It was out of the ordinary.
And following that, the Montana Board of Oil and Gas Conservation issued an RFP and we were awarded that to explore primacy for the Class VI program in 2014. They were looking at setting up a program and reviewing it as an exploratory project to see if they wanted to gain primacy, and this was about the time -- a little after the time North Dakota did that same pursuit, so we followed it very closely.
Q. And so did Montana end up submitting an

508

application to obtain primacy for its Class VI program?
**A.** We provided the State with a draft program and we went back and forth with them, and ultimately they had an administrative decision at that time to not submit for primacy.
Q. And as you were working on the -- drafting the Class VI program for Montana, did you review any documents or guidance that informed your understanding of how to develop a Class VI program?
**A.** Yes. I heavily relied on a lot of BPA documents. Specifically for the Class VI program, there were a lot of guidance documents associated with implementing programs, well characterization, area of review, recordkeeping, to name a few.
Q. Can I have you turn to Exhibit LO-18?
**A.** I have it.
Q. Is this one of the guidance documents you just referenced that helped inform your understanding of the Class VI program while you were drafting Montana's regulations?
**A.** Yes, it was one of the documents I used to understand and outline our draft program.
Q. And can you just describe briefly the topic of this guidance?

509

A. Sure. The guidance generally provides information regarding modeling and recommendations for delineating the area of review. It also describes the circumstances under which the AOR or area of review is to be reevaluated, and also describes how to perform an AOR reevaluation and development of corrective actions.

Q. Okay. Let me have you turn to Exhibit LO-19.

A. All right. I have it.

Q. Is this also one of the documents you referenced that you reviewed to inform your understanding of Class VI regulatory regimes?

A. Yes, it was one of the documents I used to understand and so outline the draft program.

Q. And can you just describe generally what the topic of this document is and what it covers?

A. It provided a basic framework for the permitting process and the required activities through the Class VI injection well and activities associated with that.

Q. Okay. Can I have you turn to Exhibit LO-20?

A. I have it up.

Q. Is this also one of the guidance documents

510

you referenced a moment ago that informed your understanding of the Class VI well program when you were drafting Montana's regulations?

A. Yes. I used it similar to the others.

Q. Okay. And just generally speaking, what does this guidance document cover topically?

A. I would say it provides a general outline of the data to be collected and how to use the data to identify potential risks and eliminate unacceptable sites. It also provides information for inputs into whatever geologic model is chosen for use to evaluate any geological modeling.

Q. Okay. And now I'm going to have you -- it's marked a little out of order here, but there's an Exhibit LO-82. I'll have you switch -- or flip to Exhibit LO-82.

MR. BRAATEN: And, Lawrence this one didn't get into the binder. I've got an extra copy.

MR. BOFTO: Okay. I'm pulling it up. Yes, I have this one.

Q. (MR. BRAATEN CONTINUING) I'm sorry, Mr. Bofto, I might have missed it. Did you get yourself to that exhibit?

A. Yes, I have -- have that exhibit, the one

511

for recordkeeping and reporting, generally.

Q. And specifically Exhibit 82 that indicates it's the Underground Injection Control Program Class VI Well Recordkeeping, Reporting, and Data Management Guidance for Owners and Operators. Is that the exhibit you have up?

A. Yes.

Q. Okay. Is this also one of the guidance documents that you reviewed that informs your understanding of the Class VI program that you used in developing Montana's regulation?

A. Yes.

Q. Okay.

MR. BRAATEN: Move to admit Exhibits 18, 19, 20 and 82.

HEARING EXAMINER GARNER: Any objections?

MR. BENDER: No objection.

HEARING EXAMINER GARNER: Exhibits are admitted.

Q. (MR. BRAATEN CONTINUING) Mr. Bofto, can I have you now open up -- or turn to Exhibit No. 21?

A. I have that up.

Q. Do you have an understanding of what the first two sentences of this data tool mean?

A. Yes.

512

Q. And can you tell us what that is?

A. Under the rule that's cited there, that the owners and operators must submit the project information -- their geological sequestration project information directly to the EPA and I take it through the geologic sequestration data tool in that this requirement applies regardless of primacy, whether it's still EPA or a particular state or entity has primacy.

Q. Mr. Bofto, are you ready, willing and able and have you been ready, willing and able for the past three weeks to assist in running and analyzing models related to these Class VI well applications had you received data and input files to do so?

A. I'm capable and ready to run the geochemical model PHREEQ, given that if I had the input files and the right thermal dynamic database or a reference to it if -- if the reference one that comes with the model, is unaltered.

MR. BRAATEN: No further questions.

HEARING EXAMINER GARNER: Mr. Bender, any questions?

MR. BENDER: Yeah, I do.

513

**CROSS-EXAMINATION**

**BY MR. BENDER:**

Q. Mr. Bofoto [sic], my name is Lawrence Bender and I represent the applicant, Summit, in this case. Nice to meet you today.

**A.** Nice to meet you.

Q. Okay.

**A.** My name is Bofto.

Q. Okay. Thank you for correcting me. I appreciate that. Do you mind if I call --

**A.** No problem.

Q. Do you mind if I call you Shane?

**A.** Please do.

Q. Okay. Thank you. I want to just delve a bit into your discussion about what you did for the State of Montana. First of all, what was the time period in which you were working on that? I think you said it was about the time that North Dakota was adopting its rules, but I want to make sure that I understood that correctly.

**A.** Yes. I believe I started it in 2012, but a lot of these documents that I had just referenced were in draft form, so a lot of it we waited for the final versions of the EPA guidance documents to be issued. And I believe my last final draft was

514

submitted to the Board of Oil and Gas following discussions with them in mid to late 2014.

Q. Okay. And when you -- when you referred to these documents were in draft form, I'm sure you're talking about Exhibits LO-18, 19 -- let's see here -- looks like 20 and is it 83?

MR. BRAATEN: 82.

Q. (MR. BENDER CONTINUING) 82. Is that correct?

**A.** They may have included some of those, but there were also some other guidance documents and some of the things I'm trying to recall with the environmental justice, bonding, things like that. So that was why we waited a little while longer so we could work with final documents that were included. I think they're currently included on EPA's Class VI website.

Q. And what was it that you were requested to do by the Montana Oil and Gas Conservation Commission?

**A.** To review that type of information and draft a program that the State could use for their primacy application should they desire to go after primacy for the Class VI program.

Q. And were involved in drafting the statutes

515

that were necessary for the Montana Board of Oil and Gas to adopt the rules or were you -- was that statutory enactment already in place and all you were asked to do was prepare the regulations?

**A.** I was asked -- I was not involved with the statutes or anything like that. I was just involved with gathering information that the board needed to get the primacy application in place.

Q. Are the statutes already in place in Montana and that all they're lacking at this point in time is the regulations?

**A.** I believe at that time there was a statute associated with it that was in place.

Q. Okay.

**A.** It's been a while, but I seem to recall it was in place prior to them issuing approval for us to do this work.

Q. Okay. And I believe you said you started in 2012, probably finished in 2014; is that correct?

**A.** That sounds about right.

Q. Okay. Approximately -- well, strike that.

During that period of time, were you working full-time on this project?

**A.** No.

516

Q. Okay. Were you working on the project by yourself?

**A.** No. I was part of a team of other consultants and internal people. We had an attorney because there was a portion where we had to draft a letter from I believe the attorney general or something to EPA and there were several other documents that needed to be drafted that were best suited for an attorney. And I had another company that had petroleum engineers and petroleum geologists associated that were reviewing some of the draft documents at that time as well.

Q. Okay. Well, thank you for that. I had misunderstood your testimony. I thought that you were primarily responsible for doing all the work. But since it was a team, let me ask you a couple questions about that. What were -- what were your specific responsibilities on that team?

**A.** I was the project manager, and areas -- I would collect information as well as derive information that I could and I put them into the draft program. I took and I followed a lot of the guidance to establish, you know, a general procedure for permitting.

Q. And did you ultimately draft some rules

517

that were submitted to the Oil and Gas Conservation Commission?
**A.** Not at that time.
Q. When you say "not at that time," you're talking about the period from 2012 to 2014?
**A.** I'm talking -- well, I never drafted any rules based on the draft program.
Q. Okay. I misunderstood you then. I -- I had understood you to testify when Mr. Braaten was asking you questions that you drafted the rules but the -- the board ultimately made a decision that it was not going to adopt the rules. Did I misunderstand?
**A.** I drafted a permitting program for somebody that we could run past EPA so someone could get a permit for a Class VI well should Montana get primacy.
Q. Okay.
**A.** Does that make sense?
Q. I think so.
Do you know why the board never went forward with the rules?
**A.** No, that was an administrative decision far above my pay grade.
Q. Okay. Let's talk a little bit more about

518

your experience. You've explained to us that as a result of reviewing these guidance documents that have now been entered into the record, I think it was 17, 18, 19, 20 and also 82, you were involved in this project. Have you ever been involved in making application in a state that has primacy for a Class VI permit?
**A.** No.
Q. Okay. You haven't been -- I apologize. I wasn't listening to my question very well when I asked it. Did I -- well, let me rephrase it.
Have you ever been involved in any way in making a Class VI application to a state that has primacy?
**A.** No.
Q. Okay. Have you ever reviewed an application, other than the one before the Commission -- or the ones that are before the Commission today, for a Class VI permit?
**A.** I'm trying to recall. I may have looked at some when I was drafting a program. I have a faint recollection that I tried to look at others that had gone through EPA at the time. I just cannot recall the specifics.
Q. Yeah. And I apologize, I think I said

519

this, but I asked -- my question was specific to being involved in an application with a state that had primacy.
**A.** None with a state that had primacy.
Q. Other than the applications that are before the Commission today, have you ever reviewed an application for a Class VI well?
**A.** Back to my previous statement, I believe I did when I was drafting the program to look at what an application looks like. I just don't recall because it was so long ago on what it was.
Q. That would have been back in the 2012 period, 2014 period; is that right?
**A.** Somewhere in there.
Q. And would those have been applications before the EPA?
**A.** Yes.
Q. Okay. When were you hired by the intervenors in this case?
**A.** Oh, it's been a month or so.
Q. Okay. You don't know the exact date? I mean, today is the 11th. Would it have been probably May 11?
**A.** It could have been about that time, but I don't know specifics.

520

Q. What were you asked to do on May -- on May 11?
MR. BRAATEN: I'm going to object to that characterization of testimony. I don't believe he testified to doing something on the 11th.
HEARING EXAMINER GARNER: Overruled.
Q. (MR. BENDER CONTINUING) Okay. What -- okay. I guess you can answer the question.
**A.** What was I -- could you repeat that question again?
Q. What were you asked to do when you were hired for this project?
MR. BRAATEN: I'm going to object to questions eliciting communications between me and the experts.
HEARING EXAMINER GARNER: Overruled.
MR. BRAATEN: You can go ahead, Shane.
MR. BOFTO: Oh, okay. Just to provide my experience with the Class VI guidance and programs that I had early on and just my general environmental background information.
Q. (MR. BENDER CONTINUING) And how many hours do you believe you've worked on this project since you were retained?
**A.** Outside of this, probably 15 reviewing

521

documents and such and --
Q. And have you had an opportunity to review each one of the -- what I'm going to refer to as the final form of applications for the three applications that are before the Commission?
**A.** I've generally reviewed them, yes, and -- I'm trying to think if I've done any others. So I'd say I generally reviewed the three applications.
Q. Okay. And when you say reviewed them, did you just -- did you just read them or did you do anything beyond reading? Did you do any independent research?
**A.** I looked closely at some of the models on what were being used and what they did exactly.
Q. Okay. And if I -- and please correct me if I'm wrong, Shane, but I understood your testimony when Mr. Braaten was asking you some questions that you -- if you'd had the materials that he requested from the Industrial Commission, you could have run a model in a relatively short period of time. Was that your testimony?
**A.** Yes. I specifically referenced the PHREEQC model by U -- that is put out by the USGS.
Q. Okay. And do you have the necessary

522

software packages that you would need to run the model?
**A.** Yes, I do. It's on my computer now.
Q. Okay. Can you tell me what some of those programs are?
**A.** I'm specifically talking about the PHREEQC model. It's downloaded freely from the USGS, and I have routinely used the program through my career and have used it to write specific reports.
Q. And do you believe that that's the only software you would need to analyze the information that Summit has filed with the Industrial Commission on this matter?
**A.** It's the only one that I'm focused on.
Q. Okay. Do you agree with me that there are other software programs?
MR. BRAATEN: I'm going to object to the form of the question.
MR. BENDER: What's that?
MR. BRAATEN: I object to the form of the question. There are.
MR. BENDER: Well, let him answer.
HEARING EXAMINER GARNER: If he can understand it, he can answer it.
MR. BOFTO: There are numerous geochemical

523

models outside of PHREEQ. There's Geochem Workbench® that I've used and several others, but the application specifically said they used PHREEQC and that was the one I was focused on.
Q. (MR. BENDER CONTINUING) But you don't know if this PHREEQC is the only program that would be necessary to evaluate the information that's been supplied to the Commission, do you?
MR. BRAATEN: For the --
MR. BOFTO: I'm just going off the application that said that was the program that they used.
Q. (MR. BENDER CONTINUING) Okay.
**A.** I did not see any other geochemical programs to evaluate the upper and lower confining units.
Q. Okay. Tell me a little bit about your experience working in North Dakota. I know you said you went to the University of Mary. Have you done any work in your current role with -- I believe it's HydroSolutions. Have you worked in North Dakota with that company?
**A.** Yes. I've had probably -- probably six or seven projects in the last ten years in North Dakota.

524

Q. What were those projects?
**A.** Some of them were work with attorneys for oil and gas impacted sites. Done some incidental air quality work there from facilities. Trying to think. Looked at different reviewing remediation plans for cleanup for saline impacts or produced water impacts.
Q. Okay. So it sounds to me, and please correct me if I'm wrong, that most of that work that you've done in North Dakota has been from the standpoint of surface issues; is that a -- is that a fair statement?
**A.** No. There's been other issues associated with contaminated groundwater and cleanup.
Q. Okay. Have you ever been involved in North Dakota in making application to the Commission relative to saltwater disposal wells or Class II wells?
**A.** I've been part of such projects exploring commercial Class II saltwater disposal wells.
Q. Ever prepare an application to the Commission for a saltwater disposal well?
**A.** I've provided information for somebody else to submit a Class II application.
Q. Okay. What sort of information did you

525

supply?
A. Looked at things like deriving maximum pressure at the wellhead. Working with other geologists in my company, suitable formations. Looking at areas of review for other wells that could be within the area of review, things along that line.
Q. But you never were involved in a saltwater disposal application in North Dakota where you were the lead individual in making that application; isn't that correct?
A. That'd be fair to say.
MR. BENDER: No further questions.
HEARING EXAMINER GARNER: Any questions from the staff? Any redirect, Mr. Braaten? Oh, I'm sorry, you do.

**EXAMINATION**

**BY MR. HELMS:**

Q. Shane, this is Lynn Helms with the Industrial Commission. Nice to meet you, maybe some day face-to-face.
A. Nice to meet you.
Q. Yes.
North Dakota made its application for Class VI primacy on June 21 of 2013 and received

526

final approval April 24 of 2018. Shane, did you comment on North Dakota's application?
A. No, I did not.
Q. Did you review the North Dakota documents when you were preparing Montana's prospective documents?
A. I seem to recall that we were following at that time whether North Dakota was going to draft their own specific rules or adopt it by rule, and that was -- we had a lot of discussions about that on whether Montana should or shouldn't, and I seem to recall North Dakota going back and forth maybe once on what the appropriate action was, and we were going to try to learn at that point from you.
MR. HELMS: Okay. Thank you.

**REDIRECT EXAMINATION**

**BY MR. BRAATEN:**

Q. Mr. Bofto, do you have a copy of -- well, do you recall signing an engagement letter for this matter?
A. Yes.
Q. And do you recall the date of that?
A. May 1.
MR. BRAATEN: Okay. No further questions.
HEARING EXAMINER GARNER: Okay. You can

527

call your next witness. Can I get the name?
MR. BRAATEN: Ted Doughty.
HEARING EXAMINER GARNER: Doughty. Okay.
MR. BRAATEN: Yeah.
MS. ZASTE: He has a first initial, P, but he goes by Ted. So it's P. Ted Doughty.
HEARING EXAMINER GARNER: Gotcha.
MR. BRAATEN: Mr. Doughty, we're getting some feedback from you. Can you mute -- well, no, we're still getting feedback. Can you mute -- what was it -- what did you -- okay.

**P. TED DOUGHTY,**

being first duly sworn, was examined and testified as follows:

**DIRECT EXAMINATION**

**BY MR. BRAATEN:**

Q. Mr. Doughty, can you state your full name and spell your last name for us, please?
A. It's Paul Ted Doughty, D-o-u-g-h-t-y.
Q. And you go by Ted; right?
A. Yes, I do.
Q. Okay. Can you tell me briefly your educational background?
A. I have a bachelor's in geology from Washington University in St. Louis, a master's in

528

geophysics from the University of Montana, and a PhD from Queen's University in Ontario, Canada.
Q. And can you start by just briefly describing your professional background?
A. Yes, sir. So I've worked with Exxon -- I worked in the Exxon research lab for four years in the late '90s. I taught at Eastern Washington University for eight years as a professor. And since 2008 I've been a consultant on my own working for various companies like Talisman Energy, Halliburton, various other companies in the Rockies.
Q. Can you tell us a little bit about the kinds of work you did with your time at Exxon?
A. Yes. So at Exxon I was in the fault -- fault seal group, also did -- which is analyzing how fault seal in the various environments in the -- in the -- we did a whole research project looking at fault seal across the entire -- all the basins that Exxon worked in.
I also did 3D seismic interpretation in various basins across the world. Did a lot of field research on the Bakken and various other groups in the western U.S. as analogs for subsurface formations.

529

Q. And can I have you pull up in front of you, Ted, the Exhibit LO-58?
**A.** I'm not in the office, so if you describe it to me, though, I can do that.
Q. Do you recall the information contained on your curriculum vitae?
**A.** Your -- can you repeat the question?
Q. So I'll tell you Exhibit 58 is your curriculum vitae. Are you familiar with --
**A.** Oh.
Q. -- the contents of your curriculum vitae?
**A.** Oh, yes. Yes, sir. Yes.
Q. Okay. And does that accurately describe your educational and professional background and experience.
**A.** Yes, sir. With the exception of several items that I left off that I did recently. I actually was the well site geologist on the J-Loc Minnkota well that was drilled as part of their carbon sequestration project. I logged -- personally logged 1600 feet of core on site for that project.
Q. Okay.
**A.** And I've also done a lot of helium exploration in the last, oh, six months.

530

MR. BRAATEN: Okay. Move to admit LO-58.
HEARING EXAMINER GARNER: Any objection?
MR. BENDER: No objection. Oh, thank you. No objection.
HEARING EXAMINER GARNER: The exhibit is admitted.
MR. BENDER: My mike was off.
HEARING EXAMINER GARNER: Exhibit is admitted.
Q. (MR. BRAATEN CONTINUING) And, Ted, did you review the applications submitted by EERC and Summit that bring us here today?
**A.** Yes, I have, in extensive detail.
Q. And can you start by just describing to us the areas of those applications regarding which you would have particular expertise?
**A.** Yes. So they have core data on the Broom Creek Formation of which I mentioned I personally logged all the J-Loc wells. So I'm familiar with that. Also I have expertise in 3D seismic interpretation. I haven't seen their 3D seismic, but it's a critical part of their application, as well as the formation mechanical integrity work that they did doing the testing in their test well.
Q. What data would you need in order to

531

create a PHI-H map to map out the porosity and permeability of a reservoir?
**A.** So from what I've seen of their applications, the -- there's only one -- no, there's three -- I think there's three -- there's two wells that are close together and another well in their AOR which encompasses about -- actually, I'm not sure how big the AOR is, but if you take their simulation area, there's 26 wells in the simulation area -- or the simulation area, there's 26 wells. It's about a well per 55 square miles which is not very many data points. So within the AOR there's only 3 data points. There's no legacy wells.
So you would need to coordinate it, which they provided, but as well it appears like the seismic data was a critical part of how they defined the reservoir properties in the AOR. There's only -- like I mentioned, there's very few wells within the AOR. So we'd need access to the 3D seismic to actually do a facies analysis to determine what the seismic data tells you about the reservoir within that AOR.
And within that application, there's only one map that shows the permeability distribution

532

within their stimulation -- their simulation area. Excuse me. So there's very little data within their application with which to evaluate exactly how they derive their permeability parameters for the AOR that they're applying for.
Q. Mr. Doughty, do you recall approximately how long ago you were asked about the possibility of working on this matter?
**A.** It was, what, a month ago, maybe three weeks ago, something like that.
Q. And are you ready, willing and able to conduct additional review and particularly review of seismic data if you receive it?
**A.** Yes, I am.
MR. BRAATEN: No further questions.
HEARING EXAMINER GARNER: Attorney Bender.

**CROSS-EXAMINATION**

**BY MR. BENDER:**

Q. Mr. Doughty, are you -- Mr. Doughty, are you in a position today to make any recommendations to the Commission as to whether this application should be approved or denied?
**A.** I am.
Q. And what are your conclusions?
**A.** I would recommend that it's denied on the

533

basis that the applicant did not -- has not provided enough of the data from which the Commission or another party could evaluate how they came up with some of their reservoir properties.

Q. Okay.

**A.** Without the 3D seismic, you cannot determine the distribution of permeability and porosity across the AOR.

Q. Okay. And I believe it was your testimony at this point in time all you have reviewed is the three applications; is that correct?

**A.** That is correct. And --

Q. And you haven't reviewed -- you haven't reviewed the other data that's on file with the Commission?

**A.** I've reviewed the data that's publicly available.

Q. Okay.

**A.** Yes.

Q. Did you -- have you seen a letter dated May 15, 2024, from Mr. Braaten to the Commission requesting certain information?

**A.** I have not seen the letter. I've heard that there's a motion to compel.

Q. Okay. Do you know if the Commission

534

indicates that they supplied that information to Mr. Braaten?

**A.** I do not.

Q. Okay. You talked a little bit about a PHI-H map, and I don't want to put -- I don't want to testify for you, but I understood you to say that a PHI-H map would have been important for the Commission in this case. Is that a -- is that a fair statement of your testimony?

**A.** Yes, that is a fair statement. If you -- if you want to understand where the $CO_2$'s going as you inject it, you need a PHI-H map to determine the -- the storage capacity to the formation.

Q. Okay. And you --

**A.** And like I -- like I said earlier, there's only three data points within the AOR. So I'm -- I don't quite understand how the EERC came up with such a complex map of permeability and porosity without having additional data. It should have been provided in their submittal.

Q. Okay. And I think you also indicated that you were involved -- you sat the -- the well for Minnkota's -- the J-Loc?

**A.** The J-Loc.

Q. Yeah, the J-Loc.

535

**A.** Yep. J-Loc. Yep.

Q. So you know somewhat about that -- you know some things about that application that was made to the Commission for a Class VI well; is that correct?

**A.** I -- no. I don't -- I set the well. I described the core. I was not involved in anything after they drilled the well.

Q. You knew the --

**A.** But I.

Q. -- you know the Commission granted the application; correct?

**A.** Yes.

Q. Do --

**A.** But I wasn't involved in it. I do know what the core looked like and somewhat of the reservoir properties of the Broom Creek.

Q. And, you know, thank you for all that, but we can get through this a little bit quicker if you just answer my questions.

Do you know --

MR. BRAATEN: I think he did.

MR. BENDER: Well, I think he went on a little bit more than he needed to, but I'll move on.

536

Q. (MR. BENDER CONTINUING) Do you know if Minnkota submitted a PHI-H map in its application?

**A.** I do not.

Q. Are you familiar with the application that was filed by Blue Flint?

**A.** No.

Q. Do you know if they submitted a PHI-H map?

**A.** I do not.

Q. Are you familiar with the application that was submitted by Dakota Gasification?

**A.** No.

Q. Do you know if they submitted a PHI map -- PHI-H map?

**A.** No.

Q. Are you familiar with the application that was filed by Red Trail?

**A.** No.

Q. Do you know if they submitted a PHI-H map?

**A.** No.

Q. Do you know all those applications were granted by the Commission?

**A.** No.

MR. BENDER: No further questions.

HEARING EXAMINER GARNER: Any questions from the staff?

537

Redirect, Attorney Braaten?
MR. BRAATEN: No, I don't have any further questions. Thank you very much, Mr. Doughty.
MR. DOUGHTY: Thank you.
HEARING EXAMINER GARNER: Okay. You can call your next witness.
MR. BRAATEN: We are calling Paul Button.
HEARING EXAMINER GARNER: Button?
MR. BRAATEN: Yes.

**PAUL BUTTON,**

being first duly sworn, was examined and testified as follows:

**DIRECT EXAMINATION**

**BY MR. BRAATEN:**

Q. Mr. Button, can you state your full name and tell us -- well, let's start there. Just state your full name, please.

**A.** My name is Paul Michael Button.

Q. And can you give us a business or residential address?

**A.** My residential address is 1119 South Ophir Street in Butte, Montana.

Q. All right. Can you tell us just a little bit about your educational background?

**A.** I have a bachelor of science degree in

538

petroleum engineering from Montana Tech.

Q. All right. And tell us a bit about your professional experience.

**A.** My professional experience is I've worked 26 years as a petroleum engineer. I started off my career as a reservoir engineer for Marathon Oil Company working the Yates Field in West Texas doing simulation on gas oil gravity drainage with nitrogen injection and then converting it over to $CO_2$ injection.

From there I moved to -- on to Kinder Morgan when they acquired the Yates asset. I did a little bit of reservoir simulation on Yates, and then I worked the SACROC $CO_2$ flood unit in Scurry County, Texas.

After I left Kinder Morgan, I worked for SM Energy in Billings, Montana, for a number of years doing enhanced oil recovery studies on fields in the state of Wyoming. Also worked several water floods and shale development wells within the Powder River Basin, Richland County, Montana, and a little bit of experience in Divide County, North Dakota.

From there I left SM Energy and I went out on my own as a consultant. I did numerous

539

consulting jobs for multiple clients, including purchase and acquisition, evaluation, State evaluations and reservoir simulation for enhanced oil recovery on the Poplar Dome in Montana.

I then joined a company called Poplar Resources as a vice president where we implemented a pilot for enhanced -- a nitrogen injection flood. And I have been with that ever since.

And then I also started a startup for a battery energy storage corporation. We do compressed air energy storage. And I'm currently working both the Poplar job, the consulting job, and battery energy storage job.

Q. Okay. Can I have you turn in the exhibits to what we marked as LO-57?

**A.** Yes.

Q. Let me know, do you have that in front of you now?

**A.** Yes, I do.

Q. And what is Exhibit 57?

**A.** I would call it my résumé or CV.

Q. Okay. And does this CV accurately reflect your educational and professional experience and qualifications?

**A.** I would probably -- I caught a couple of

540

errors in here. The Button Petroleum Management, it was no longer active until recently again, so I would add that through 2024.

Q. Okay.

**A.** And I believe the name of the -- my educational school is no longer accurate because it's no longer Montana Tech of the University of Montana. I believe it's the Montana Technological University.

Q. Okay. Other than those, does the Exhibit 57 accurately reflect your professional and educational experience and qualifications?

**A.** Yes.

MR. BRAATEN: Move to admit Exhibit 57.
MR. BENDER: No objection.
HEARING EXAMINER GARNER: Exhibit is admitted.

Q. (MR. BRAATEN CONTINUING) Mr. Button, can you tell me if you have any experience with Class II wells or permitting Class II wells?

**A.** Yes. I have permitted a num -- a number of Class II wells in the state of Montana.

Q. And with respect to any of those Class II wells, was it necessary to obtain an aquifer exemption?

541

**A.** Yes. We worked on an aquifer exemption for one of the wells within the Poplar unit, east Poplar unit.

Q. Okay. Was there any kind of a volumetric limit imposed as part of that aquifer exemption?

**A.** Yes, I believe so.

MR. BENDER: Objection. Relevance.

HEARING EXAMINER GARNER: Overruled.

Q. (MR. BRAATEN CONTINUING) And are you familiar with the manner in which the volumetric limits are calculated for aquifer exemptions by either the EPA or state authorities?

**A.** I am familiar with how the volumetric extensions were calculated and approved for the permits that I worked on. Yes.

Q. Okay. And so with respect to the permits you worked on, can you just provide a general description of how those volumetric limits are calculated for the aquifer exemptions?

**A.** Basically, these were pretty simple calculations in that you would calculate the -- the volume within a given X number of foot radius that you believe you'll affect with the water injection, you know, so you get a volume of a cylinder, multiply it by your porosity, divide it by your

542

formation volume factor of water and that is the volume that will be affected.

Q. Do you have experience with reservoir modeling and -- well, you've already talked about this. Can you tell us a little bit about the experience you have with EOR and water floods with respect specifically to field development analysis?

**A.** Yes. I've had several major modeling projects over my career. The first one was for Yates field. We spent quite a few years looking at and running sensitivities on gas oil gravity drainage, enhanced oil recovery process as far as looking at gas oil contact movement speed versus the drainage of oil from the matrix in the reservoir. We also looked at viscosity effects with the injection of different gases and the swelling effects in the oil with different composition of injected gases, whether it was nitrogen, $CO_2$ or a mixture of recycled gas to determine the most effective recovery and most economic recovery mechanism with an EOR process.

My other major modeling project which I've worked on most recently is developing a full-field simulation model to model the history and also the enhanced oil recovery potential for Poplar Dome in

543

Montana, the East Poplar unit. That is a 70-year-old field that's probably undergone primary depletion with a strong natural water drive where I deal with gas on the top of it and expose the matrix to gas oil gravity drainage and determine if that was an economically feasible project.

Q. And can you tell us about any other specific experiences you have related to doing reservoir modeling and analysis?

**A.** I'm currently working on setting up the parameters to look at natural -- or compressed air storage in salt caverns and looking at the pressure volume and temperature effects and the rock stress effects within salt caverns to determine the feasibility for the active storage reservoirs.

Q. Mr. Button, do you have an understanding of different ways that pore space can be used in a commercial manner?

**A.** Yes, I do.

Q. And if a landowner wants to make a commercial use of pore space, can you tell us what you understand to be the options for making that commercial use of pore space?

**A.** It's basically three options of which there can be multiple derivatives of each option,

544

but either you remove fluid and market it as a -- as a quantity, you temporarily store something in your pore space, or you permanently sequester something in your pore space.

Q. And how would you assess the degree to which the pore space of a given landowner is being used in a way that forecloses other commercial uses?

**A.** I guess I would attempt to evaluate the change in the pressure volume temperature of the fluids contained within the pore space, and knowing that there are certain constraints on the upper end of the pressure and certain constraints on the lower end of the pressure and try to determine what the current impacts, what the proposed impacts and what the -- the final limits were of that pore space.

Q. Mr. Button, if you were provided with the data decks and input files required to run models in CMG and Schlumberger's Petrel software for this project, would you be ready, willing and able to run those models and analyze them for the intervenors?

**A.** The CMG model, I would be ready to upload those and run those and do some sensitivity

545

analysis on those models. As far as the Petrel model, the Petrel model is a static model. It's basically a geologic database, so those -- unless you're trying to redistribute properties or something like that, there's -- it's not a dynamic model where the answer changes, so I don't think there's nothing -- there's nothing to run there.

MR. BRAATEN: Understood. No further questions.

HEARING EXAMINER GARNER: Attorney Bender.

**CROSS-EXAMINATION**

**BY MR. BENDER:**

Q. Mr. Button, you -- you spent some time describing your experience as an engineer and involved in various enhanced oil recovery projects around the country. Is that a fair statement?

**A.** Yes.

Q. And you also talked about a compressed air project that you're working on. Do you recall that?

**A.** Yes.

Q. And in those projects, both the enhanced oil recovery projects and the compressed air project, you were involved in running some models; is that a fair statement?

546

**A.** Yes.

Q. Okay. Would you agree with me that running -- preparing and running models for enhanced oil recovery projects and a compressed air project is different than preparing and running a model for $CO_2$ storage?

**A.** Can you clarify what you mean by "different"?

Q. Well, if you've run -- or prepared and run models for $CO_2$ on a number of projects, are you going to have more knowledge and experience than someone who has not run models for $CO_2$, only for enhanced oil recovery and compressed air?

**A.** Well, the models that I've ran for enhanced oil recovery, especially for when I worked the Yates field, those directly involved the injection of $CO_2$ in the pore space --

Q. Okay.

**A.** -- so they're not too dissimilar. The only -- the main dissimilar between those two models is that in the carbon sequestration, the $CO_2$'s interaction is primarily with water, where in those other models it was with both water and oil. So they were actually more complex.

Q. Okay. Are you familiar with the data

547

requests that Mr. Braaten made to the Industrial Commission?

**A.** I --

Q. Pardon me?

**A.** Yes, I am.

Q. Okay.

**A.** Yes, I am.

Q. Okay. And are you familiar with the type of data that would be contained within a CMG data file?

**A.** Yes, I am.

Q. Could someone produce a PHI-H map if they had a CMG data file?

**A.** I believe that within CMG's program you could get that, yes.

Q. Okay. And are you aware that it's the -- in the Commission's position that they provided a CMG data file to Mr. Braaten?

**A.** I am not aware of the CMG data file, if Mr. Braaten is in possession of it or -- I am certainly not in possession of that CMG data file.

Q. He didn't provide it to you?

**A.** I have not seen it, no.

Q. Is it a fair statement that -- well, let me back -- strike that.

548

**A.** Let me --

Q. How many hours -- just let me ask the questions. Just let me ask the questions.

**A.** Okay.

Q. How many hours of time have you spent working on this project?

**A.** I have -- up until the start of this hearing, I spent 14-and-a-half hours working on it.

Q. Okay. And what were you asked to do?

MR. BRAATEN: Same objection to privileged communications with experts.

HEARING EXAMINER GARNER: Overruled.

MR. BUTTON: What was I asked to do?

Q. (MR. BENDER CONTINUING) Yes.

**A.** I was asked by Mr. Braaten to evaluate the impact of the pore space of his clients.

Q. Okay. And to do that at this point in time, all you have done is reviewed the applications that were submitted to the Commission; is that correct?

**A.** No.

Q. You didn't review the applications?

**A.** I did review the applications, but that is not all that I've done.

Q. What else did you do in the 15 hours that

549

you've spent on this project?
**A.** I have looked through the well files of the wells in the immediate area to see what information was available.
Q. How many hours did you spend reviewing the applications?
**A.** Probably the majority of the 14 hours.
Q. Okay.
**A.** But I don't have a specific number, but I could get that number for you.
Q. More than ten?
**A.** I would say yes. Probably in the ten range.
Q. Well, you said more than 10. Would it be 11 or 12?
**A.** We'll go with more than ten.
Q. Okay. And then the other -- the only other time you would have -- well, strike that.
The additional time you would have spent between 10 hours and 15 hours would have been to review some logs; is that what you said?
**A.** I did not say I reviewed logs. I said I reviewed the well files on the Commission website.
Q. Okay. What are in the well files?
**A.** The well files contain the core reports

550

and some of that type of information. They have like casing size and the drilling completion information, things like that.
Q. Okay. Would you agree with me that you really haven't reviewed enough to make any sort of recommendation to the Commission whether this application should be granted or denied?
**A.** Absolutely.
MR. BENDER: Okay. No further questions.
HEARING EXAMINER GARNER: Any questions from the staff?
Mr. Braaten, any redirect?
MR. BUTTON: Are you waiting for a response from me?
MR. BRAATEN: Sorry. No, Mr. Button, that was on me. I'm just taking a moment to review my notes to see if I have anything else to ask. Give me one moment, please.
I have nothing further.
HEARING EXAMINER GARNER: Okay. I know you said you only expected to get through three witnesses, but you still have 20 minutes.
MR. BRAATEN: I'm -- yeah, I'm sorry, I have one more, but he is no longer available.
HEARING EXAMINER GARNER: He's not

551

available right now?
MR. BRAATEN: Right.
HEARING EXAMINER GARNER: Let's go off the record for a minute.
(Recessed at 6:10 p.m. and reconvened at 6:11 p.m.)
HEARING EXAMINER GARNER: Okay. We are back on the record, and we are going to recess these hearings and resume tomorrow morning at 9 a.m. That concludes our hearings for the day.
(Recessed at 6:12 p.m., Wednesday, the 12th day of June, 2024.)
---

552

CERTIFICATE OF COURT REPORTER

I, Stephanie A. Smith, a Registered Professional Reporter,
DO HEREBY CERTIFY that I recorded in shorthand the foregoing proceedings had and made of record at the time and place hereinbefore indicated.
I DO HEREBY FURTHER CERTIFY that the foregoing typewritten pages contain an accurate transcript of my shorthand notes then and there taken.
Dated at Bismarck, North Dakota, this 3rd day of July, 2024.

_____
Stephanie A. Smith
Registered Professional Reporter

## #

**#3** [1] - 284:20

## $

**$20,817,800** [1] - 407:25
**$20,868,800** [1] - 407:24
**$583,000** [1] - 438:3
**$62** [1] - 408:2

## '

**'70s** [1] - 337:16
**'90s** [1] - 528:7

## 0

**0** [5] - 346:5, 346:13, 347:17, 476:17, 476:22
**0.69** [1] - 414:25
**0.712** [1] - 415:1
**0.784** [1] - 415:4
**005** [1] - 339:3

## 1

**1** [65] - 277:4, 277:8, 277:12, 277:15, 277:19, 277:21, 278:1, 278:6, 278:10, 278:14, 278:21, 279:1, 279:4, 279:12, 279:16, 280:1, 280:5, 280:14, 280:18, 280:23, 281:4, 281:15, 281:16, 282:4, 282:5, 282:17, 282:18, 283:4, 283:5, 284:18, 334:15, 334:24, 335:1, 335:24, 345:22, 345:24, 357:9, 357:19, 358:19, 360:7, 361:7, 365:1, 365:3, 365:4, 365:14, 365:16, 368:23, 368:25, 369:1, 412:24, 413:3, 413:5, 417:25, 418:8, 449:18, 449:19, 450:14, 453:19, 454:24, 455:16, 455:18, 484:1, 491:21, 526:23
**1,166,000** [1] - 407:2
**1-1** [1] - 372:1
**1-2** [2] - 372:1
**1-34** [2] - 371:3, 430:19
**1-inch** [1] - 491:14
**1-mile** [1] - 388:9
**1.15** [1] - 357:10
**1.89** [1] - 440:7
**10** [26] - 277:10, 277:23, 278:12, 278:23, 279:12, 280:2, 280:14, 280:24, 281:16, 282:6, 282:19, 283:6, 326:23, 346:5, 346:7, 346:12, 346:14, 373:19, 377:9, 437:17, 455:7, 479:12, 479:13, 549:14, 549:20
**100** [1] - 285:4
**1000** [1] - 283:19
**107** [1] - 493:24
**109** [1] - 285:5
**10:00** [1] - 321:22
**10:12** [1] - 321:23
**11** [27] - 277:8, 277:10, 277:21, 277:23, 278:10, 278:12, 278:21, 278:23, 279:12, 280:2, 280:14, 280:24, 281:15, 281:16, 282:4, 282:6, 282:17, 282:19, 283:4, 283:6, 437:17, 437:23, 455:14, 470:11, 519:23, 520:2, 549:15
**11,100,000** [1] - 407:8
**11-1** [3] - 456:3, 464:19, 464:24
**11-2** [1] - 464:20
**110** [4] - 426:7, 492:20, 493:22, 494:2
**1119** [1] - 537:21
**11th** [2] - 519:22, 520:5
**12** [31] - 277:8, 277:12, 277:21, 278:2, 278:10, 278:14, 278:21, 279:1, 279:12, 280:2, 280:15, 280:24, 281:15, 281:17, 282:5, 282:6, 282:17, 282:19, 283:5, 283:6, 283:20, 289:7, 314:1, 404:17, 406:2, 406:10, 437:25, 456:7, 471:19, 549:15
**12,000** [2] - 455:1, 455:22
**12-1** [3] - 406:10, 406:25, 407:15
**12-10** [1] - 439:19
**12-2** [1] - 406:11
**12-7** [2] - 439:19, 440:5
**124.4** [1] - 424:3
**125** [3] - 490:11, 490:20, 490:21
**1250** [2] - 425:11, 425:19
**12:29** [1] - 389:1
**12th** [2] - 289:3, 551:11
**13** [16] - 277:8, 277:21, 278:10, 278:21, 279:12, 280:2, 280:15, 280:24, 281:15, 281:17, 282:5, 282:6, 282:17, 282:19, 283:5, 283:6
**136** [1] - 481:4
**14** [22] - 277:8, 277:10, 277:21, 277:23, 278:11, 278:12, 278:21, 278:23, 279:12, 280:2, 280:15, 281:1, 281:15, 281:17, 282:5, 282:6, 282:17, 282:19, 283:5, 283:6, 430:24, 549:7
**14-and-a-half** [1] - 548:8
**140** [9] - 277:12, 277:13, 278:2, 278:3, 278:15, 278:16, 279:2, 279:3, 374:13
**141** [17] - 277:9, 277:11, 277:22, 278:1, 278:11, 278:14, 278:22, 279:1, 279:16, 280:6, 280:18, 281:4, 373:10, 423:15, 429:3, 469:24, 469:25
**142** [24] - 277:7, 277:20, 278:10, 278:20, 279:14, 279:15, 280:3, 280:5, 280:16, 280:18, 281:2, 281:3, 281:15, 281:18, 281:19, 282:5, 282:8, 282:9, 282:18, 282:20, 282:21, 283:5, 283:8, 283:9
**143** [12] - 279:11, 280:1, 280:13, 280:23, 281:13, 281:14, 282:2, 282:4, 282:15, 282:16, 283:2, 283:4
**15** [21] - 277:8, 277:10, 277:21, 277:23, 278:11, 278:12, 278:21, 278:23, 279:13, 280:2, 280:15, 281:1, 281:17, 282:6, 282:19, 283:6, 436:3, 520:25, 533:21, 548:25, 549:20
**150** [2] - 490:13, 490:23
**16** [18] - 277:10, 277:23, 278:12, 278:23, 279:13, 280:2, 280:15, 281:1, 281:17, 282:6, 282:19, 283:6, 377:3, 377:4, 377:6, 422:25, 470:23, 470:24
**1600** [1] - 529:21
**17** [24] - 277:10, 277:23, 278:12, 278:23, 279:13, 279:15, 280:2, 280:4, 280:15, 280:17, 281:1, 281:3, 281:17, 281:19, 282:6, 282:8, 282:19, 282:21, 283:6, 283:8, 404:3, 425:23, 425:24, 518:4
**18** [24] - 277:10, 277:23, 278:13, 278:23, 279:13, 279:15, 280:2, 280:4, 280:15, 280:17, 281:1, 281:3, 281:17, 281:19, 282:6, 282:8, 282:19, 282:21, 283:6, 283:8, 423:24, 424:7, 511:14, 518:4
**19** [32] - 277:10, 277:23, 278:13, 278:23, 279:13, 279:15, 280:2, 280:4, 280:15, 280:17, 281:1, 281:3, 281:13, 281:17, 281:19, 282:3, 282:6, 282:8, 282:16, 282:19, 282:21, 283:3, 283:6, 283:8, 371:11, 412:8, 430:17, 430:24, 431:8, 511:15, 514:5, 518:4
**1940s** [1] - 340:8
**1945** [1] - 340:2
**195** [3] - 397:7, 490:11, 490:19
**1950s** [1] - 337:20
**1977** [1] - 386:24
**1:30** [1] - 389:2
**1A** [5] - 327:19, 394:7, 399:11, 434:19, 475:8
**1B** [3] - 356:11, 356:12
**1C-1** [4] - 288:13, 458:17, 458:23, 461:3

## 2

**2** [50] - 277:9, 277:12, 277:22, 278:2, 278:12, 278:14, 278:22, 279:1, 279:8, 279:12, 279:16, 279:19, 279:23, 280:1, 280:5, 280:8, 280:9, 280:14, 280:18, 280:23, 281:4, 281:6, 281:15, 281:16, 282:4, 282:6, 282:17, 282:18, 283:4, 283:6, 284:19, 348:23, 356:10, 358:15, 362:8, 366:6, 374:8, 382:24, 412:21, 417:25, 418:8, 430:23, 442:1, 450:24, 451:21, 452:5, 464:8, 471:20, 473:9
**2,160** [1] - 465:10
**2,695,000** [1] - 407:9
**2-10a** [1] - 374:14
**2-16** [2] - 376:10, 383:14
**2-17** [1] - 374:9
**2-22** [1] - 375:24
**2-25** [1] - 376:10

**2-3** [1] - 364:4
**2-30** [1] - 362:12
**2-33** [1] - 361:18
**2-34** [1] - 361:18
**2-4** [1] - 413:12
**2-41** [1] - 395:8
**2-42** [1] - 394:14
**2-5** [2] - 364:4, 414:8
**2-50** [1] - 356:15
**2-64** [1] - 395:8
**2-65** [1] - 394:11
**2-66** [1] - 394:6
**2-7** [1] - 413:2
**2-9** [1] - 383:14
**2-inch** [1] - 491:14
**2.5** [11] - 309:17, 310:10, 310:12, 310:14, 311:2, 315:9, 315:15, 322:4, 322:15, 324:18, 324:19
**2.6** [1] - 440:12
**2.7** [6] - 315:14, 324:12, 324:21, 445:2, 445:5, 465:21
**20** [36] - 277:10, 277:23, 278:13, 278:23, 279:13, 279:15, 280:2, 280:4, 280:15, 280:17, 281:1, 281:3, 281:13, 281:17, 281:19, 282:3, 282:7, 282:9, 282:16, 282:19, 282:21, 283:3, 283:7, 283:9, 320:1, 327:23, 332:1, 346:7, 346:14, 369:14, 422:25, 463:15, 511:15, 514:6, 518:4, 550:22
**20,316,000** [1] - 407:10
**20-year** [4] - 326:23, 364:21, 374:2, 424:4
**2004** [1] - 505:4
**2008** [1] - 528:9
**2011** [1] - 507:6
**2012** [4] - 513:21, 515:19, 517:5, 519:12
**2013** [1] - 525:25
**2014** [5] - 507:19, 514:2, 515:19, 517:5, 519:13
**2018** [1] - 526:1
**2024** [6] - 283:20, 289:3, 533:21, 540:3, 551:12, 552:14
**21** [18] - 277:10, 277:23, 278:13, 278:23, 279:13, 280:2, 280:15, 281:1, 281:14, 281:17, 282:3, 282:7, 282:16, 282:19, 283:3, 283:7, 511:21, 525:25
**2100** [6] - 426:16, 462:15, 465:1, 469:8, 470:13, 470:18
**2150** [2] - 425:11, 425:19
**2160** [4] - 426:6, 426:15, 465:6, 465:12
**2183** [4] - 426:5, 465:5, 465:11, 490:21
**22** [16] - 277:8, 277:10, 277:21, 277:23, 278:11, 278:13, 278:21, 278:23, 279:13, 280:2, 280:15, 281:1, 281:17, 282:7, 282:19, 283:7
**2200** [3] - 433:6, 433:7, 433:8
**23** [16] - 277:8, 277:10, 277:21, 277:24, 278:11, 278:13, 278:21, 278:23, 279:13, 280:2, 280:15, 281:1, 281:17, 282:7, 282:19, 283:7
**24** [18] - 277:8, 277:21, 278:11, 278:21, 279:13, 280:2, 280:15, 281:1, 281:15, 281:17, 282:5, 282:7, 282:17, 282:19, 283:5, 283:7, 422:25, 526:1
**2400** [1] - 426:9
**243,000** [1] - 407:5
**25** [18] - 277:8, 277:10, 277:22, 277:24, 278:11, 278:13, 278:21, 278:23, 279:13, 280:2, 280:15, 281:1, 281:17, 282:7, 282:19, 283:7, 342:24, 396:22
**250** [2] - 364:3
**2500** [1] - 425:21
**26** [19] - 277:8, 277:10, 277:22, 277:24, 278:11, 278:13, 278:21, 278:23, 279:13, 280:3, 280:15, 281:1, 281:17, 282:7, 282:20, 283:7, 531:9, 531:11, 538:5
**27** [16] - 277:10, 277:24, 278:13, 278:23, 279:11, 279:13, 279:23, 280:3, 280:13, 280:15, 280:22, 281:1, 281:17, 282:7, 282:20, 283:7
**277** [1] - 283:16
**28** [21] - 277:10, 277:24, 278:13, 278:23, 279:11, 279:13, 279:24, 280:3, 280:13, 280:16, 280:22, 281:1, 281:14, 281:18, 282:3, 282:7, 282:16, 282:20, 283:3, 283:7, 426:5
**280** [1] - 356:12
**289** [1] - 286:4
**29** [24] - 277:11, 277:24, 278:13, 278:24, 279:11, 279:13, 279:15, 279:24, 280:3, 280:4, 280:13, 280:16, 280:17, 280:22, 281:1, 281:3, 281:14, 281:18, 282:3, 282:7, 282:16, 282:20, 283:3, 283:7
**291** [1] - 286:12
**2:56** [1] - 447:7
**2D** [1] - 451:8

## 3

**3** [37] - 277:9, 277:12, 277:23, 278:2, 278:12, 278:14, 278:22, 279:1, 279:12, 279:16, 280:1, 280:5, 280:14, 280:18, 280:23, 281:4, 281:10, 281:16, 281:21, 282:1, 282:6, 282:11, 282:18, 283:6, 283:10, 363:18, 374:8, 383:4, 388:4, 412:5, 442:1, 451:24, 452:1, 452:9, 462:15, 464:25, 531:13
**3,000** [2] - 342:19, 395:1
**3,500** [1] - 342:19
**3,600** [1] - 342:21
**3,800** [1] - 342:22
**3-1** [2] - 348:13, 350:24
**3-10** [1] - 368:5
**3-15** [1] - 317:16
**3-15a** [1] - 345:3
**3-2** [1] - 338:21
**3-22** [1] - 369:12
**3-25** [1] - 344:18
**3-26** [1] - 344:18
**3-35** [1] - 368:20
**3-41** [1] - 338:20
**3-42** [2] - 388:5, 388:6
**3-5** [1] - 368:19
**3-6** [1] - 368:4
**3-7** [2] - 383:5, 383:6
**3-8** [1] - 385:7
**3.12** [4] - 459:6, 459:9, 460:4, 460:23
**30** [24] - 277:11, 277:24, 278:13, 278:24, 279:13, 279:15, 280:3, 280:4, 280:16, 280:17, 281:2, 281:3, 281:14, 281:18, 282:3, 282:7, 282:16, 282:20, 283:3, 283:7, 332:4, 332:12, 332:23, 438:19
**300** [2] - 429:12, 430:2
**304** [1] - 284:12
**30869** [2] - 277:3, 289:12
**30870** [1] - 277:4
**30871** [1] - 277:4
**30872** [1] - 277:5
**30873** [1] - 277:5
**30874** [1] - 277:6
**30875** [1] - 277:6
**30876** [1] - 277:7
**30877** [1] - 277:7
**30878** [1] - 277:8
**30879** [1] - 277:8
**30880** [2] - 277:9, 289:12
**31** [16] - 277:7, 277:11, 277:20, 277:24, 278:9, 278:13, 278:20, 278:24, 279:15, 280:4, 280:17, 281:3, 281:14, 282:3, 282:16, 283:3
**314.5** [1] - 424:18
**32** [24] - 277:7, 277:11, 277:20, 278:1, 278:9, 278:13, 278:20, 278:24, 279:11, 279:14, 279:24, 280:3, 280:13, 280:16, 280:22, 281:2, 281:14, 281:18, 282:3, 282:7, 282:16, 282:20, 283:3, 283:7
**325** [1] - 469:24
**325193** [1] - 411:22
**33** [24] - 277:7, 277:11, 277:20, 278:1, 278:9, 278:13, 278:20, 278:24, 279:11, 279:14, 279:24, 280:3, 280:13, 280:16, 280:22, 281:2, 281:14, 281:18, 282:3, 282:7, 282:16, 282:20, 283:3, 283:7
**330** [2] - 489:3
**332** [2] - 412:6, 412:10
**333** [2] - 288:22
**34** [24] - 277:7, 277:11, 277:20, 278:1, 278:10, 278:13, 278:20, 278:24, 279:11, 279:14, 279:24, 280:3, 280:13, 280:16, 280:23, 281:2, 281:14, 281:18, 282:3, 282:7, 282:16, 282:20, 283:3, 283:7
**35** [26] - 277:8, 277:11, 277:22, 278:1, 278:11, 278:14, 278:21, 278:24, 279:11, 279:14, 279:24, 280:3, 280:13, 280:16, 280:23, 281:2, 281:14, 281:18, 282:4, 282:7,

282:16, 282:20, 283:4, 283:7, 373:11, 396:20
**352** [1] - 412:2
**355** [1] - 286:13
**36** [16] - 277:8, 277:22, 278:11, 278:21, 279:14, 280:3, 280:16, 281:2, 281:13, 281:14, 282:2, 282:4, 282:15, 282:16, 283:2, 283:4
**3600** [1] - 343:3
**370** [1] - 286:14
**371** [1] - 286:15
**389** [1] - 286:16
**393** [1] - 286:17
**396** [1] - 286:21
**397** [1] - 374:12
**398** [1] - 286:22
**3:12** [1] - 447:8
**3D** [19] - 343:14, 354:12, 358:7, 358:8, 363:8, 363:12, 363:14, 371:8, 394:20, 402:23, 444:8, 444:10, 444:15, 451:8, 528:21, 530:20, 530:21, 531:21, 533:6
**3rd** [1] - 552:13

## 4

**4** [25] - 277:9, 277:13, 277:23, 278:2, 278:12, 278:15, 278:22, 279:2, 279:12, 280:1, 280:14, 280:24, 281:16, 282:6, 282:18, 283:6, 370:3, 430:23, 431:17, 445:7, 452:15, 465:24, 466:1, 466:20, 474:5
**4,225,000** [2] - 407:3, 407:7
**4-1** [3] - 327:17, 335:6, 337:10
**4-12** [1] - 386:17
**4-14** [1] - 386:15
**4-16** [1] - 387:9
**4-2** [2] - 327:15, 370:6
**4-4** [1] - 370:6
**4-6** [1] - 386:17
**4.0** [1] - 445:3
**4.01** [1] - 483:7
**4.5** [6] - 445:3, 445:7, 466:14, 466:18, 466:25, 474:5
**4.92** [1] - 424:21
**400** [4] - 284:12, 336:11, 337:9, 338:7
**403** [1] - 286:23
**408** [1] - 286:24
**4100** [1] - 433:8
**411** [1] - 287:3
**43-05-01** [1] - 313:24
**43-05-01-05** [2] - 393:6, 393:15
**43-05-01-12** [1] - 313:19
**43-05-01-5** [1] - 443:23
**43-05-1-11** [1] - 487:3
**432** [1] - 287:4
**4400** [1] - 433:6
**441** [1] - 287:5
**448** [1] - 287:8
**457** [1] - 288:14
**458** [2] - 287:9, 288:14
**45Q** [1] - 332:22
**461** [3] - 287:10, 288:13
**467** [1] - 287:11
**470** [1] - 287:12
**473** [1] - 287:13
**484** [1] - 287:17
**49** [1] - 397:7
**4942** [2] - 371:4, 471:22
**4:42** [1] - 503:4
**4:59** [1] - 503:5

## 5

**5** [55] - 277:9, 277:13, 277:23, 278:2, 278:12, 278:15, 278:22, 279:2, 279:12, 279:15, 280:1, 280:4, 280:14, 280:17, 280:24, 281:3, 281:16, 282:6, 282:18, 283:6, 326:23, 343:8, 343:11, 343:13, 344:12, 344:25, 345:4, 346:19, 346:24, 347:12, 347:16, 347:17, 359:25, 362:24, 382:2, 399:3, 415:4, 415:9, 418:13, 423:14, 429:2, 445:17, 453:10, 453:11, 464:10, 466:21, 466:22, 466:25, 469:25, 470:1, 471:18, 473:10, 479:4, 479:13
**5,000** [1] - 340:1
**5-1** [2] - 399:14
**5-12** [2] - 421:17, 475:8
**5-13** [2] - 441:12, 441:21
**5-14** [2] - 423:22, 424:17
**5-15** [2] - 441:20, 443:19
**5-2** [8] - 399:8, 399:10, 399:14, 399:15, 399:17, 399:22, 423:14, 428:24
**5-26** [1] - 431:15
**5-29** [1] - 444:7
**5-3** [3] - 418:14, 419:7, 421:16
**5-32** [1] - 444:25
**5-4** [5] - 399:10, 423:22, 424:17, 427:6, 465:3
**5.3.1** [1] - 443:20
**5.7.2** [1] - 431:14
**50** [8] - 410:1, 454:20, 483:14, 483:15, 488:8, 488:22, 489:12
**500** [2] - 332:10, 435:8
**503** [1] - 287:22
**505** [2] - 288:20
**511** [8] - 288:18, 288:19, 288:19, 288:21
**513** [1] - 287:23
**525** [1] - 287:24
**526** [1] - 287:25
**527** [1] - 288:4
**530** [2] - 288:21
**532** [1] - 288:5
**537** [1] - 288:8
**540** [2] - 288:20
**545** [1] - 288:9
**55** [2] - 483:15, 531:11
**55,000** [1] - 440:11
**552** [2] - 283:16, 286:8
**5580** [1] - 413:9
**57** [5] - 419:16, 421:13, 539:20, 540:11, 540:14
**58** [1] - 529:8
**58501** [1] - 285:5
**58504** [1] - 284:13
**59** [2] - 386:23

## 6

**6** [34] - 277:9, 277:13, 277:23, 278:3, 278:12, 278:15, 278:22, 279:2, 279:12, 279:15, 280:1, 280:4, 280:14, 280:17, 280:24, 281:3, 281:16, 281:19, 282:6, 282:8, 282:18, 282:21, 283:6, 283:8, 291:17, 345:23, 374:12, 374:15, 375:3, 424:19, 454:2, 463:13, 471:18
**6,000** [1] - 455:3
**6-1** [2] - 399:14, 399:16
**6-2** [2] - 434:17, 463:10
**6-6** [2] - 434:19, 463:13
**6.22** [1] - 424:5
**60** [3] - 381:21, 438:19, 483:16
**63** [2] - 333:16, 353:19
**6590** [1] - 284:16
**6:10** [1] - 551:5
**6:11** [1] - 551:6
**6:12** [1] - 551:11
**6:30** [2] - 290:24, 291:2

## 7

**7** [30] - 277:9, 277:13, 277:23, 278:3, 278:12, 278:15, 278:22, 279:2, 279:12, 279:15, 280:1, 280:4, 280:14, 280:17, 280:24, 281:3, 281:16, 281:19, 282:6, 282:8, 282:18, 282:21, 283:6, 283:8, 376:13, 404:13, 405:3, 414:9, 433:24, 454:8
**7-17** [1] - 445:16
**7-inch** [1] - 438:6
**7.5.1** [1] - 445:17
**7.6** [1] - 434:3
**70** [2] - 337:23, 337:25
**70-year-old** [1] - 543:2
**700** [1] - 433:17
**750,000** [1] - 440:8

## 8

**8** [18] - 277:9, 277:23, 278:12, 278:22, 279:12, 279:15, 280:1, 280:4, 280:14, 280:17, 280:24, 281:3, 281:16, 282:6, 282:18, 283:6, 376:14, 454:14
**82** [5] - 511:2, 511:15, 514:7, 514:8, 518:4
**82801** [1] - 284:17
**83** [4] - 304:24, 333:16, 333:17, 514:6
**85** [4] - 281:20, 282:9, 282:22, 283:9
**86** [11] - 281:15, 281:18, 282:4, 282:8, 282:17, 282:21, 283:4, 283:8, 360:9, 429:3, 470:1
**87** [26] - 277:7, 277:11, 277:13, 277:21, 278:1, 278:3, 278:10, 278:14, 278:16, 278:20, 279:1, 279:3, 279:16, 280:5, 280:18, 281:4, 281:13, 281:16, 282:3, 282:5, 282:15, 282:18, 283:3, 283:5, 423:15, 469:24
**88** [21] - 277:9, 277:12, 277:22, 278:2, 278:12, 278:15, 278:22, 279:2, 279:12, 279:14, 279:17, 280:1, 280:4, 280:6, 280:14, 280:16, 280:19, 280:23, 281:2, 281:5, 373:10

**8B** [8] - 288:14, 448:8, 448:9, 448:10, 449:1, 471:5, 471:18, 474:9

## 9

**9** [19] - 277:9, 277:23, 278:12, 278:22, 279:12, 280:2, 280:14, 280:24, 281:16, 282:6, 282:19, 283:6, 291:3, 409:16, 430:23, 437:17, 453:21, 454:17, 551:10
**9-1** [1] - 409:21
**9-2** [1] - 409:21
**90** [2] - 328:15, 462:6
**900** [5] - 342:15, 343:3, 425:10, 490:13, 490:22
**900-pound** [1] - 479:18
**911** [1] - 435:18
**936** [1] - 423:23
**95** [9] - 360:10, 366:6, 366:11, 366:15, 366:18, 418:23, 419:5, 419:12
**96** [1] - 419:17
**98** [5] - 360:9, 366:18, 366:22, 419:16, 419:19
**98.25** [4] - 366:14, 366:20, 419:14
**9:06** [1] - 289:2
**9:08** [1] - 289:10

## A

**A'd** [1] - 334:2
**a.m** [6] - 289:2, 289:10, 291:3, 321:22, 321:23, 551:10
**abandoned** [3] - 338:10, 371:4, 407:4
**abandonment** [4] - 406:16, 407:17, 409:5, 440:9
**abbreviate** [1] - 450:3
**abide** [1] - 454:18
**abides** [1] - 341:3
**ability** [7] - 328:6, 330:3, 342:11, 350:15, 439:6, 469:20, 507:3
**able** [29] - 319:3, 351:14, 355:25, 358:10, 358:23, 366:11, 369:23, 380:21, 381:10, 404:19, 411:16, 412:3, 414:2, 415:21, 420:21, 422:21, 422:23, 423:1, 424:3, 427:2, 436:14, 437:5, 449:2, 484:16, 488:14, 512:10, 512:11, 532:11, 544:21
**abnormal** [2] - 493:12, 495:11
**Above-Zone** [1] - 402:10
**aboveground** [2] - 356:2, 356:6
**absent** [1] - 451:14
**absolutely** [2] - 496:10, 550:8
**academic** [1] - 296:23
**accelerate** [1] - 444:23
**accept** [1] - 418:16
**acceptable** [1] - 323:10
**accepted** [1] - 322:4
**access** [4] - 299:4, 436:22, 531:20
**Access** [1] - 450:14
**accessible** [1] - 338:10
**accessing** [1] - 437:12
**accommodate** [3] - 472:11, 472:16, 490:1
**accordance** [3] - 397:6, 410:11, 485:5
**according** [2] - 426:8, 488:24
**account** [7] - 350:10, 350:20, 384:6, 384:11, 384:20, 420:21, 483:20
**accounted** [2] - 384:13, 419:9
**accuracy** [1] - 354:12
**accurate** [8] - 309:4, 311:14, 343:15, 349:19, 350:16, 412:9, 540:6, 552:10
**accurately** [8] - 314:19, 353:6, 357:15, 358:10, 505:13, 529:13, 539:22, 540:11
**acid** [1] - 504:21
**acknowledged** [1] - 431:24
**acquire** [1] - 352:10
**acquired** [6] - 304:14, 313:9, 394:20, 401:24, 430:22, 538:12
**acquiring** [1] - 483:19
**acquisition** [2] - 397:19, 539:2
**acreage** [2] - 313:6, 316:1
**acres** [1] - 315:15
**Act** [3] - 292:13, 292:18, 293:2
**act** [2] - 376:22, 384:17
**acting** [3] - 384:1, 384:3, 384:7
**action** [2] - 334:1, 526:13
**actions** [2] - 440:6, 509:7
**active** [3] - 357:4, 540:2, 543:15
**actively** [5] - 322:21, 341:16, 341:20, 341:23, 342:1
**activities** [11] - 293:17, 307:6, 308:20, 356:20, 357:2, 399:19, 401:12, 415:10, 497:22, 509:19, 509:20
**activity** [5] - 356:1, 356:5, 400:11, 400:12, 401:21
**actual** [8] - 347:6, 350:18, 352:16, 352:25, 439:20, 442:4, 502:1
**actuated** [1] - 494:6
**add** [7] - 358:3, 433:19, 436:5, 460:4, 474:7, 486:7, 540:3
**added** [7] - 378:22, 420:7, 420:12, 443:4, 471:22, 499:10, 500:17
**adding** [1] - 420:14
**addition** [5] - 316:12, 415:17, 438:7, 445:18, 459:8
**additional** [25] - 295:6, 313:5, 313:6, 314:14, 316:1, 331:14, 352:10, 371:12, 372:15, 372:17, 387:18, 413:17, 420:14, 439:10, 441:11, 442:17, 443:4, 443:5, 470:7, 471:20, 471:23, 472:4, 532:12, 534:19, 549:19
**additionally** [5] - 310:10, 364:17, 366:9, 419:21, 425:8
**additions** [1] - 485:9
**additives** [1] - 486:11
**address** [6] - 315:4, 392:19, 484:6, 489:6, 537:20, 537:21
**addressed** [2] - 315:5, 393:21
**adjacent** [1] - 429:20
**adjust** [4] - 352:9, 386:8, 497:1, 497:20
**adjusted** [1] - 497:4
**adjusting** [2] - 315:22, 496:24
**adjustment** [11] - 309:17, 310:24, 312:22, 314:11, 322:16, 324:12, 498:2, 498:4, 498:10, 499:7, 499:8
**administrative** [3] - 410:12, 508:5, 517:23
**Administrative** [3] - 293:13, 313:21, 487:3
**admission** [2] - 461:6, 461:9
**admit** [7] - 333:14, 333:15, 461:11, 505:17, 511:14, 530:1, 540:14
**admitted** [6] - 333:23, 458:5, 511:19, 530:6, 530:9, 540:17
**adopt** [3] - 515:2, 517:12, 526:9
**adopted** [1] - 293:2
**adopting** [1] - 513:19
**advance** [1] - 430:12
**advanced** [1] - 459:23
**advection** [4] - 379:25, 380:7, 391:16, 391:24
**advised** [1] - 301:19
**advisement** [1] - 310:3
**affect** [8] - 316:12, 321:15, 329:3, 342:10, 354:12, 376:2, 414:21, 541:23
**affected** [4] - 330:6, 418:11, 427:4, 542:2
**affectively** [1] - 316:11
**afterwards** [2] - 471:5, 471:6
**ag** [1] - 506:1
**agent** [1] - 296:10
**ago** [8] - 316:3, 335:7, 472:13, 510:1, 519:11, 532:7, 532:9, 532:10
**agree** [16] - 308:9, 308:14, 315:25, 327:11, 329:10, 330:20, 337:7, 342:14, 347:5, 353:7, 357:23, 358:3, 498:21, 522:15, 546:2, 550:4
**agreed** [3] - 459:21, 460:12, 460:16
**agreement** [17] - 296:15, 304:16, 306:9, 446:21, 447:1, 458:25, 459:9, 459:18, 459:25, 460:1, 460:3, 460:6, 460:8, 460:13, 460:16, 460:21, 502:14
**agreements** [5] - 304:18, 357:10, 446:8, 460:7, 482:24
**aground** [1] - 343:21
**ahead** [6] - 411:13, 420:9, 420:10, 437:7, 488:19, 520:17
**aid** [2] - 446:10, 449:1
**air** [7] - 524:4, 539:11, 543:11, 545:18, 545:23, 546:4, 546:13
**alarm** [2] - 495:2, 495:3
**ALBERTSON** [1] - 284:7
**allocate** [2] - 496:17, 497:22
**allocated** [2] - 351:2, 438:17
**allocating** [1] - 357:25
**allocation** [1] - 320:16
**allow** [8] - 290:15, 341:13, 380:9, 384:19, 391:13, 416:12, 424:25, 439:5
**allowed** [3] - 354:24, 355:12, 380:7
**allowing** [1] - 462:11
**allows** [3] - 384:16, 431:8

**alloy** [1] - 410:12
**almost** [1] - 336:8
**alongside** [1] - 465:1
**amalgamate** [1] - 352:10
**amalgamation** [3] - 277:16, 279:19, 281:22
**Amanda** [16] - 389:9, 389:18, 389:24, 415:24, 416:9, 435:1, 447:18, 450:21, 451:2, 451:13, 452:3, 461:13, 461:15, 461:23, 469:3, 488:2
**AMANDA** [1] - 286:11
**amended** [1] - 460:22
**amendment** [5] - 395:18, 459:1, 459:5, 459:21, 461:7
**amount** [32] - 278:7, 280:10, 282:12, 300:3, 300:4, 300:7, 310:6, 310:16, 310:20, 311:6, 318:24, 319:8, 319:23, 328:3, 328:8, 328:13, 331:2, 332:23, 333:7, 333:9, 333:11, 339:12, 349:24, 352:21, 352:22, 353:1, 353:9, 358:5, 378:19, 424:20, 456:11, 481:1
**amounts** [1] - 456:2
**Amsden** [7] - 357:13, 357:16, 357:19, 362:25, 381:1, 382:15, 410:14
**analogs** [1] - 528:24
**analyses** [1] - 377:19
**Analysis** [3] - 394:12, 401:3, 457:3
**analysis** [31] - 298:9, 298:13, 316:4, 316:8, 316:9, 316:13, 316:14, 317:2, 317:6, 317:9, 317:10, 317:12, 317:17, 317:25, 318:2, 318:12, 318:19, 319:2, 321:11, 351:8, 351:14, 351:15, 368:14, 426:6, 466:9, 493:18, 531:21, 542:7, 543:9, 545:1
**analyze** [2] - 522:11, 544:22
**analyzing** [3] - 400:25, 512:12, 528:16
**AND** [3] - 277:2, 284:19, 285:9
**anhydrite** [22] - 360:8, 360:14, 360:17, 361:9, 362:1, 362:16, 363:3, 368:9, 368:12, 368:15, 373:8, 376:13, 376:18, 376:20, 377:13, 377:17, 377:22, 381:21, 381:22, 385:24, 386:1, 391:1
**annual** [3] - 424:20, 436:2, 436:4
**annually** [2] - 419:2, 424:5
**annulus** [2] - 429:11, 430:2
**ano** [3] - 443:18, 443:25, 444:1
**answer** [51] - 301:8, 302:6, 305:17, 312:6, 320:17, 320:18, 332:8, 332:21, 341:18, 348:5, 356:1, 360:24, 366:3, 370:5, 377:24, 380:16, 380:19, 386:10, 389:6, 389:15, 391:6, 392:11, 411:24, 412:17, 415:24, 427:13, 434:16, 434:25, 436:15, 447:17, 475:3, 477:2, 477:7, 477:8, 484:17, 491:2, 498:2, 499:13, 500:6, 500:7, 500:10, 500:14, 500:22, 501:2, 501:9, 501:13, 520:8, 522:22, 522:24, 535:20, 545:6
**answered** [6] - 301:12, 378:7, 411:3, 430:6, 500:20, 502:19
**answering** [3] - 361:4, 361:5, 389:25
**answers** [1] - 389:12
**anticipate** [8] - 415:6, 424:11, 431:1, 437:11, 443:23, 470:8, 488:1, 488:3
**anticipated** [5] - 379:15, 430:11, 437:9, 441:24, 500:1
**anticipating** [1] - 429:12
**anticipation** [3] - 419:13, 438:8, 460:13
**anyway** [1] - 320:8
**AOR** [32] - 292:17, 313:5, 313:12, 313:16, 326:21, 338:17, 339:7, 369:14, 370:6, 386:15, 387:11, 388:4, 388:8, 388:11, 388:12, 388:17, 393:4, 393:12, 393:13, 489:19, 509:4, 509:6, 531:7, 531:8, 531:13, 531:18, 531:20, 531:23, 532:5, 533:8, 534:16
**apologies** [1] - 473:24
**apologize** [13] - 290:1, 333:13, 342:7, 354:2, 394:4, 404:11, 407:6, 433:3, 447:23, 483:4, 501:20, 518:9, 518:25
**appear** [7] - 326:20, 327:1, 327:3, 335:21, 362:18, 373:12, 503:10
**appearance** [1] - 290:6
**appeared** [1] - 289:13
**appendices** [1] - 456:21
**Appendix** [10] - 359:22, 360:2, 377:2, 456:22, 457:1, 457:3, 457:5, 457:7, 457:15, 457:20
**appendix** [1] - 379:23
**applicable** [1] - 425:19
**applicant** [3] - 450:8, 513:4, 533:1
**APPLICANT'S** [1] - 286:10
**application** [75] - 277:3, 277:15, 278:5, 279:4, 279:7, 279:18, 280:8, 280:9, 281:6, 281:9, 281:21, 282:11, 283:10, 289:20, 318:18, 321:14, 322:25, 323:12, 327:9, 354:4, 354:8, 361:19, 362:7, 362:23, 363:8, 368:5, 372:2, 397:9, 399:3, 399:9, 399:11, 406:8, 421:17, 424:16, 431:16, 433:21, 434:20, 446:20, 448:21, 460:6, 460:7, 461:7, 462:21, 471:23, 488:16, 491:1, 508:1, 514:23, 515:8, 518:6, 518:13, 518:17, 519:2, 519:7, 519:10, 523:3, 523:11, 524:16, 524:21, 524:24, 525:9, 525:10, 525:24, 526:2, 530:22, 531:24, 532:3, 532:21, 535:3, 535:12, 536:2, 536:4, 536:9, 536:15, 550:7
**Application** [1] - 448:11
**applications** [32] - 322:8, 359:9, 360:25, 367:8, 368:7, 368:22, 377:16, 414:25, 415:7, 425:9, 431:17, 434:17, 456:22, 464:20, 470:11, 506:21, 506:22, 512:13, 519:5, 519:15, 521:4, 521:5, 521:9, 530:11, 530:15, 531:4, 533:11, 536:20, 548:19, 548:22, 548:23, 549:6
**applied** [10] - 358:18, 373:15, 376:16, 376:18, 383:7, 383:24, 384:5, 384:16, 388:12, 412:23
**applies** [2] - 415:20, 512:7
**apply** [5] - 360:19, 365:17, 368:17, 431:25, 450:9
**applying** [2] - 383:21, 532:5
**appreciate** [3] - 439:9, 477:17, 513:10
**approach** [10] - 315:22, 352:24, 352:25, 358:13, 374:15, 375:3, 388:11, 405:20, 431:4, 475:5
**appropriate** [5] - 303:3, 316:24, 369:22, 431:19, 526:13
**approval** [3] - 431:22, 515:16, 526:1
**approvals** [1] - 437:20
**approve** [2] - 306:19, 420:3
**approved** [5] - 310:11, 352:12, 420:12, 532:22, 541:14
**approximate** [1] - 356:22
**approximating** [1] - 438:2
**April** [1] - 526:1
**aquifer** [13] - 336:16, 336:17, 339:13, 343:8, 384:1, 384:3, 384:7, 386:19, 540:24, 541:1, 541:5, 541:11, 541:19
**aquifers** [1] - 392:23
**arbitrarily** [2] - 372:12, 372:13
**Archie** [8] - 348:23, 349:11, 350:25, 356:13, 360:9, 362:8, 455:2, 455:24
**Area** [1] - 452:15
**area** [116] - 292:7, 292:8, 292:10, 292:18, 292:23, 293:5, 293:10, 293:14, 293:24, 295:10, 295:12, 310:7, 310:17, 310:20, 310:21, 311:9, 311:22, 311:25, 313:16, 314:5, 314:8, 318:23, 319:10, 320:4, 321:9, 326:24, 328:1, 333:25, 334:2, 334:7, 334:8, 334:9, 334:12, 334:14, 334:17, 334:20, 334:21, 335:5, 336:7, 336:10, 336:23, 337:8, 337:16, 345:2, 345:23, 346:3, 346:4, 346:6, 346:12, 346:13, 348:7, 349:5, 349:10, 349:12, 350:24, 351:2, 351:23, 352:19, 352:23, 353:4, 353:16, 354:17, 354:18, 354:24, 355:11, 358:6, 363:12, 371:3, 372:6, 372:12, 372:16, 373:2, 373:13, 373:16, 373:23, 374:12, 375:22, 383:17, 383:20, 388:9, 388:18, 391:14, 391:15, 393:5, 393:8, 393:10,

393:14, 394:21, 402:6, 435:14, 440:11, 443:10, 443:12, 450:19, 452:17, 452:22, 453:3, 459:15, 463:25, 464:1, 464:6, 469:17, 488:5, 488:25, 508:15, 509:3, 509:5, 525:6, 531:9, 531:10, 532:1, 549:3
**areal** [3] - 293:18, 311:16, 327:7
**areas** [19] - 329:16, 348:7, 349:1, 353:24, 356:18, 356:20, 357:18, 394:23, 404:21, 405:11, 405:12, 406:13, 406:17, 441:4, 476:24, 516:19, 525:5, 530:15
**arrangement** [2] - 482:11, 482:12
**array** [3] - 403:1, 432:5, 466:12
**Article** [1] - 357:10
**artifacts** [1] - 364:16
**ASHLEIGH** [1] - 284:6
**ASME** [1] - 479:20
**aspects** [1] - 450:9
**asserting** [1] - 302:7
**assess** [7] - 317:4, 322:23, 323:4, 335:2, 336:25, 337:3, 544:5
**assessed** [4] - 336:20, 336:23, 337:5, 372:14
**assessing** [2] - 323:1, 323:6
**assessment** [2] - 316:25, 338:13
**asset** [1] - 538:12
**assist** [1] - 512:12
**assistance** [2] - 445:18, 445:23
**assisting** [1] - 289:19
**associated** [16] - 297:10, 313:1, 313:4, 363:16, 365:18, 373:6, 400:13, 406:23, 456:18, 502:16, 504:6, 508:13, 509:21, 515:13, 516:11, 524:13
**assume** [1] - 337:13
**assuming** [4] - 299:5, 338:22, 339:4, 349:18
**assumption** [2] - 337:17, 343:22
**assumptions** [4] - 323:17, 323:19, 324:3, 324:8
**assurance** [6] - 404:5, 404:16, 406:6, 406:12, 406:21, 456:5
**Assurance** [1] - 406:3
**assurances** [1] - 406:24
**assure** [1] - 358:12
**atmosphere** [6] - 309:9, 492:6, 492:9, 493:7, 493:9, 493:11
**attached** [3] - 428:3, 456:21
**attempt** [1] - 544:9
**attempted** [1] - 354:9
**attention** [4] - 406:7, 409:20, 413:2, 458:16
**attorney** [3] - 516:5, 516:6, 516:9
**Attorney** [6] - 389:5, 447:10, 503:7, 532:16, 537:1, 545:10
**attorney/client** [1] - 302:3
**attorneys** [2] - 506:7, 524:2
**Attorneys** [3] - 284:11, 284:16, 285:4
**attributed** [1] - 378:22
**audience** [1] - 411:1
**audit** [1] - 496:3
**authorities** [1] - 541:12
**authorization** [1] - 434:8
**authorize** [2] - 306:19, 307:10
**authorized** [1] - 307:5
**automated** [1] - 494:21
**automatic** [2] - 495:16, 495:17
**automatically** [2] - 479:22, 494:21
**availability** [3] - 317:19, 330:14, 330:18
**available** [18] - 299:22, 299:25, 301:20, 323:21, 349:15, 349:24, 368:14, 377:25, 397:23, 437:4, 468:21, 473:21, 473:25, 496:5, 533:17, 549:4, 550:24, 551:1
**Avenue** [2] - 283:19, 284:12
**average** [13] - 365:7, 369:13, 374:12, 381:16, 381:20, 414:23, 424:4, 424:11, 425:2, 440:17, 470:8, 470:12
**averaged** [1] - 382:14
**avoid** [1] - 502:6
**awarded** [1] - 507:18
**aware** [13] - 294:17, 301:22, 307:25, 315:3, 334:15, 334:19, 436:19, 459:10, 480:1, 501:18, 501:19, 547:16, 547:19

## B

**B-a-c-k-u-s** [2] - 447:25, 468:1
**B-o-f-t-o** [1] - 503:25
**bachelor** [5] - 396:19, 398:21, 408:24, 504:10, 537:25
**bachelor's** [3] - 403:23, 468:9, 527:24
**background** [11] - 396:17, 398:19, 403:22, 408:22, 468:8, 504:9, 520:21, 527:23, 528:4, 529:14, 537:24
**Backus** [7] - 411:5, 447:22, 467:9, 467:23, 475:1, 475:7, 483:24
**BACKUS** [8] - 287:7, 467:16, 469:10, 469:23, 470:3, 475:9, 477:11, 484:1
**Backus'** [1] - 492:17
**bad** [3] - 322:12, 339:10, 339:16
**Bakken** [1] - 528:23
**BAKKES** [1] - 411:5
**balance** [1] - 421:12
**barrier** [4] - 307:13, 387:12, 387:14, 387:18
**base** [2] - 360:6, 410:2
**based** [38] - 292:21, 310:25, 313:9, 323:20, 330:5, 330:10, 335:17, 335:19, 335:20, 335:23, 337:9, 340:10, 346:1, 346:14, 347:1, 349:25, 350:2, 351:3, 352:20, 353:9, 388:11, 409:24, 426:22, 452:21, 455:11, 471:22, 472:25, 478:25, 479:2, 479:7, 480:12, 481:8, 489:16, 489:19, 497:21, 501:25, 502:11, 517:7
**baseline** [6] - 359:24, 360:3, 370:18, 420:5, 430:7, 453:14
**basement** [1] - 394:24
**bases** [1] - 300:1
**basic** [1] - 509:18
**basin** [1] - 485:2
**Basin** [2] - 409:6, 538:21
**basins** [2] - 528:20, 528:22
**basis** [6] - 297:4, 405:24, 436:2, 436:4, 436:12, 533:1
**battery** [2] - 539:10, 539:13
**BAUMAN** [1] - 285:7
**bear** [5] - 354:2, 371:21, 377:2, 378:11, 439:17
**become** [3] - 344:14, 345:14, 441:15
**bedding** [2] - 414:14, 415:11
**beds** [4] - 443:8, 443:18, 443:25, 444:1
**BEFORE** [1] - 283:22
**began** [1] - 504:16
**begin** [4] - 430:11, 444:22, 445:6, 469:2
**beginning** [5] - 430:13, 442:3, 442:13, 444:16, 455:19
**begins** [1] - 399:10
**behalf** [3] - 289:23, 302:8, 304:2
**behind** [2] - 332:20, 365:15
**belief** [1] - 320:9
**believes** [1] - 389:14
**below** [15] - 330:1, 336:15, 345:3, 374:14, 394:25, 395:1, 410:1, 410:13, 454:20, 466:25, 479:22, 483:8, 488:8, 488:22, 489:12
**belt** [1] - 437:12
**bench** [2] - 490:13, 490:23
**bench-tested** [2] - 490:13, 490:23
**BENDER** [121] - 284:10, 289:16, 290:1, 290:5, 290:9, 302:2, 302:9, 302:24, 303:9, 306:23, 312:6, 312:13, 313:20, 320:15, 323:3, 332:24, 333:16, 333:18, 333:21, 356:11, 370:10, 370:14, 389:8, 389:23, 392:12, 392:17, 393:16, 395:11, 395:21, 396:5, 397:21, 398:2, 398:9, 403:2, 403:11, 408:3, 408:13, 410:19, 411:8, 412:17, 415:23, 416:3, 416:7, 416:16, 417:20, 423:9, 425:5, 426:18, 427:13, 427:15, 429:4, 435:2, 447:6, 447:12, 447:15, 448:6, 448:18, 457:23, 458:7, 458:13, 458:18, 458:21, 458:22, 461:1, 461:12, 461:21, 465:13, 465:16, 467:9, 467:15, 467:20, 471:6, 471:9, 471:11, 471:14, 472:10, 472:22, 473:1, 473:3, 475:4, 477:2, 477:17, 484:5, 484:13, 484:18, 489:5, 497:14, 498:24, 500:3, 500:19, 500:24, 501:5, 501:10, 502:2, 502:7, 502:21, 505:8, 505:11, 505:19, 511:17, 512:23, 513:2, 514:8, 520:7, 520:22, 522:19, 522:22, 523:5, 523:13, 525:13, 530:3, 530:7,

532:18, 535:23, 536:1, 536:23, 540:15, 541:7, 545:12, 548:14, 550:9
**Bender** [8] - 302:12, 389:5, 417:7, 447:10, 512:21, 513:4, 532:16, 545:10
**Bender's** [1] - 321:6
**Bender.....** [4] - 286:16, 287:8, 287:9, 287:10
**Bender.....** [5] - 286:21, 286:22, 286:23, 286:24, 287:11
**Bender.....** [3] - 287:23, 288:5, 288:9
**benefit** [1] - 353:2
**best** [4] - 350:15, 411:17, 460:17, 516:9
**better** [3] - 309:14, 411:3, 446:25
**between** [52] - 309:11, 315:9, 318:1, 329:16, 340:20, 342:12, 360:12, 361:3, 365:7, 369:20, 373:14, 384:7, 387:12, 387:25, 388:4, 391:11, 391:23, 391:24, 395:14, 399:14, 405:18, 407:10, 407:11, 407:22, 414:25, 435:16, 438:23, 440:5, 446:10, 446:15, 446:17, 449:12, 450:15, 451:17, 451:22, 454:12, 456:10, 456:11, 456:23, 457:16, 459:15, 460:9, 469:20, 470:12, 474:5, 482:21, 482:25, 485:4, 492:2, 520:14, 546:20, 549:20
**Beulah** [3] - 356:16, 446:4, 468:11
**beyond** [4] - 293:4, 327:25, 384:11, 521:12
**bias** [3] - 376:1, 376:2, 376:8
**bid** [1] - 507:7
**bids** [1] - 432:11
**big** [3] - 425:13, 438:5, 531:8
**bigger** [2] - 390:24, 438:7
**biggest** [1] - 454:23
**billed** [1] - 297:6
**Billings** [1] - 538:17
**binder** [2] - 326:12, 510:18
**Bismarck** [5] - 283:19, 284:13, 285:5, 504:13, 552:13
**bit** [29] - 310:18, 329:11, 380:1, 385:6, 399:2, 399:12, 400:3, 401:7, 402:24, 404:10, 405:9, 406:1, 406:2, 414:5, 427:19, 453:8, 500:5, 513:15, 517:25, 523:17, 528:13, 534:4, 535:19, 535:24, 537:24, 538:2, 538:13, 538:22, 542:5
**BK** [14] - 342:20, 360:20, 362:7, 363:7, 363:11, 368:25, 370:17, 423:5, 424:16, 449:21, 450:10, 450:17, 451:14, 453:2
**black** [1] - 413:7
**blank** [1] - 387:1
**block** [2] - 469:11, 469:13
**blocked** [1] - 490:2
**blocks** [1] - 353:22
**blowdown** [4] - 475:11, 475:15, 493:9, 493:10
**blowouts** [1] - 308:23
**blows** [1] - 475:19
**Blue** [1] - 536:5
**blue** [3] - 336:8, 349:6, 349:13
**BNI** [1] - 404:3
**Board** [3] - 507:16, 514:1, 515:1
**board** [3] - 515:7, 517:11, 517:21
**boarding** [1] - 460:2
**bodies** [1] - 495:23
**body** [1] - 496:9
**Boeshans** [9] - 395:17, 416:8, 447:17, 458:8, 458:10, 497:8, 497:13, 497:16, 501:23
**BOESHANS** [7] - 287:15, 458:11, 458:24, 482:10, 497:25, 500:11, 501:14
**BOESHANS/AMANDA** [1] - 287:6
**Bofoto** [1] - 513:3
**Bofto** [9] - 503:10, 503:24, 505:15, 506:20, 510:23, 511:20, 512:10, 513:8, 526:18
**BOFTO** [7] - 287:20, 503:12, 503:17, 510:20, 520:18, 522:25, 523:10
**BOHRER** [1] - 284:4
**bond** [5] - 407:14, 407:23, 438:13, 438:15, 456:11
**bonded** [1] - 408:1
**bonding** [1] - 514:13
**bonds** [2] - 438:12, 438:15
**books** [1] - 338:3
**border** [12] - 347:6, 373:13, 459:18, 460:1, 460:2, 460:3, 460:6, 460:7, 460:8, 460:13, 460:16, 498:19
**borehole** [1] - 451:22
**boreholes** [2] - 443:22, 443:24
**bottom** [9] - 329:12, 343:16, 343:24, 357:16, 375:24, 378:13, 382:22, 383:5, 388:7
**bottomhole** [27] - 317:13, 328:11, 328:14, 328:16, 328:18, 329:4, 330:5, 330:24, 331:2, 342:18, 342:19, 342:25, 343:16, 350:21, 418:5, 418:10, 424:24, 426:12, 456:2, 462:6, 462:8, 462:10, 462:16, 464:23, 465:2, 486:20, 487:7
**bound** [2] - 361:20, 361:25
**boundaries** [22] - 291:23, 292:2, 296:2, 314:7, 314:11, 314:16, 321:2, 321:18, 326:21, 327:13, 328:1, 336:8, 351:23, 352:6, 352:7, 352:9, 353:25, 373:23, 393:11, 494:23, 496:15, 496:25
**boundary** [44] - 295:12, 311:11, 311:17, 312:2, 314:18, 314:22, 318:14, 320:1, 320:7, 320:11, 321:4, 343:6, 347:8, 347:16, 347:22, 352:2, 353:16, 360:12, 364:5, 364:6, 364:15, 364:17, 383:8, 383:22, 384:6, 384:8, 384:10, 384:13, 384:16, 385:2, 391:11, 393:14, 402:6, 434:23, 459:15, 459:16, 463:12, 497:20, 498:3, 498:4, 498:16, 500:2
**bounds** [1] - 351:25
**box** [1] - 413:7
**BPA** [1] - 508:11
**BRAATEN** [102] - 285:2, 289:22, 290:19, 291:9, 302:7, 302:10, 303:10, 305:18, 307:1, 312:9, 312:16, 313:24, 320:21, 320:24, 322:2, 323:7, 333:3, 333:13, 333:17, 333:19, 333:24, 355:13, 394:7, 394:9, 417:2, 417:12, 417:14, 417:17, 458:3, 458:20, 461:5, 472:17, 472:24, 473:2, 473:5, 474:23, 475:6, 477:14, 477:18, 484:9, 484:15, 484:20, 489:8, 489:11, 490:24, 497:10, 497:16, 499:1, 499:2, 500:12, 500:22, 500:25, 501:8, 501:11, 501:16, 502:5, 502:8, 502:9, 502:17, 502:23, 503:1, 503:9, 503:15, 503:21, 505:10, 505:12, 505:17, 505:21, 510:17, 510:22, 511:14, 511:20, 512:20, 514:7, 520:3, 520:13, 520:17, 522:17, 522:20, 523:9, 526:17, 526:24, 527:2, 527:4, 527:8, 527:16, 530:1, 530:10, 532:15, 535:22, 537:2, 537:7, 537:9, 537:14, 540:14, 540:18, 541:9, 545:8, 548:10, 550:15, 550:23, 551:2
**Braaten** [19] - 285:3, 289:22, 290:13, 321:25, 416:22, 489:5, 503:7, 517:9, 521:18, 525:15, 533:21, 534:2, 537:1, 547:1, 547:18, 547:20, 548:15, 550:12
**Braaten....** [1] - 287:25
**Braaten.....** [1] - 287:13
**Braaten.....** [3] - 287:22, 288:4, 288:8
**Braaten.....** [1] - 287:17
**Braaten.....** [1] - 286:12
**break** [17] - 321:21, 363:22, 366:3, 378:5, 378:8, 380:17, 386:10, 388:16, 388:20, 388:24, 389:12, 389:25, 390:3, 447:5, 502:23, 502:24, 503:3
**breakdown** [2] - 413:10, 413:15
**breaking** [1] - 413:14
**breakpoint** [1] - 442:10
**breaks** [1] - 469:11
**brief** [3] - 399:8, 399:24, 406:4
**briefly** [14] - 333:25, 371:5, 396:15, 398:18, 403:21, 408:21, 448:13, 448:20, 452:15, 459:1, 506:23, 508:24, 527:22, 528:3
**brine** [9] - 345:19, 380:8, 380:23, 381:2, 391:20, 391:21, 429:15, 429:24
**bring** [11] - 389:9, 411:4, 416:9, 416:13, 416:14, 423:9, 434:25, 436:19, 475:14, 506:22, 530:12
**broken** [2] - 354:5, 440:4
**brokers** [1] - 304:14
**Broom** [36] - 277:5, 278:4, 278:17, 279:5, 279:9, 280:7, 280:19, 281:7, 281:11, 282:10, 282:22,

283:11, 310:11, 332:11, 339:15, 339:17, 340:19, 359:4, 364:25, 375:1, 375:8, 375:20, 376:12, 381:3, 381:12, 383:13, 383:16, 384:1, 385:2, 395:1, 410:14, 413:21, 414:3, 414:24, 530:17, 535:17
**brown** [1] - 356:20
**buffer** [7] - 320:2, 373:15, 373:21, 388:9, 388:12, 388:18, 393:4
**build** [2] - 325:21, 325:22
**buildup** [2] - 492:19, 495:7
**built** [2] - 326:5, 492:15
**bulk** [1] - 399:18
**bullet** [7] - 294:20, 294:23, 297:19, 297:23, 298:5, 298:17, 304:24
**Bullion** [1] - 392:25
**buoyancy** [1] - 391:10
**buoyant** [2] - 380:5, 380:6
**burst** [1] - 339:23
**business** [14] - 310:5, 310:9, 310:13, 310:25, 311:4, 311:20, 311:23, 312:1, 312:11, 312:17, 312:20, 312:24, 504:6, 537:19
**businesses** [1] - 435:10
**bust** [1] - 339:19
**Butte** [1] - 537:22
**BUTTON** [4] - 288:7, 537:10, 548:13, 550:13
**Button** [3] - 537:7, 537:18, 540:1
**button** [7] - 537:8, 537:15, 540:18, 543:16, 544:18, 545:13, 550:15
**buttons** [1] - 300:12
**buy** [1] - 306:15
**BY** [85] - 291:9, 291:13, 308:17, 309:13, 334:4, 335:8, 336:2, 338:9, 339:25, 340:17, 355:18, 356:9, 359:21, 360:15, 370:2, 370:20, 371:20, 372:7, 387:8, 387:16, 389:23, 390:7, 392:20, 393:23, 393:25, 396:5, 398:9, 398:12, 403:11, 403:14, 408:13, 408:16, 411:12, 411:21, 412:5, 413:1, 418:22, 420:11, 420:24, 427:24, 428:23, 429:17, 430:10, 432:23, 433:3, 434:2, 434:24, 435:5, 435:12, 436:21, 437:22, 438:16, 441:10, 441:20, 444:11, 445:24, 448:6, 448:10, 458:13, 458:24, 461:21, 461:25, 467:20, 470:6, 472:2, 473:5, 473:12, 474:13, 475:9, 482:10, 483:12, 484:1, 484:20, 484:22, 489:14, 490:3, 497:25, 503:21, 513:2, 525:18, 526:17, 527:16, 532:18, 537:14, 545:12
**bypass** [3] - 490:6, 492:16, 493:4
**Byron** [1] - 284:11

## C

**C-12** [3] - 377:5, 377:8, 378:11
**C-13** [1] - 381:24
**C-14** [1] - 378:12
**C-15** [4] - 377:3, 377:4, 377:6, 377:9
**C-16** [1] - 377:9
**C-18** [4] - 379:6, 379:18, 380:23, 381:15
**C-19** [1] - 381:23
**C-25** [2] - 382:13, 382:14
**C-28** [1] - 382:22
**C-4** [1] - 381:15
**C-6** [1] - 382:14
**C-8** [2] - 378:12, 379:8
**C-9** [1] - 377:8
**C2** [1] - 382:1
**cable** [3] - 401:14, 402:14, 402:17
**CAITLIN** [1] - 287:6
**Caitlin** [13] - 308:11, 389:16, 392:17, 395:14, 416:8, 447:13, 447:16, 448:1, 448:7, 448:19, 488:1, 488:6, 489:6
**Caitlin's** [1] - 338:15
**calculate** [4] - 374:23, 418:5, 462:5, 541:21
**calculated** [8] - 376:6, 382:6, 385:16, 392:3, 464:2, 541:11, 541:14, 541:19
**calculating** [1] - 350:7
**calculation** [3] - 339:21, 350:5, 350:6
**calculations** [3] - 343:1, 384:10, 541:21
**CALEB** [1] - 284:7
**Calgary** [1] - 283:19
**calibrate** [2] - 313:15, 376:5
**callout** [1] - 348:18
**Canada** [1] - 528:2
**cannot** [3] - 493:23, 518:24, 533:6
**capabilities** [2] - 421:20, 446:15
**capability** [1] - 494:6
**capable** [1] - 512:15
**capacity** [9] - 323:14, 396:13, 398:15, 403:18, 408:19, 424:7, 424:25, 468:4, 534:13
**capillary** [3] - 385:7, 385:9, 386:2
**capture** [9] - 347:3, 385:9, 397:14, 411:18, 411:22, 421:8, 422:1, 425:23, 470:21
**captured** [3] - 324:9, 324:10, 358:8
**CARBON** [3] - 284:18, 284:19, 284:19
**Carbon** [34] - 277:4, 277:6, 277:15, 277:19, 278:6, 278:8, 279:4, 279:8, 279:10, 279:19, 279:23, 280:8, 280:9, 280:12, 281:6, 281:10, 281:12, 281:21, 282:1, 282:11, 282:14, 283:10, 306:18, 309:11, 396:12, 403:17, 404:7, 408:18, 443:21, 449:18, 468:3, 476:19, 482:6, 484:3
**carbon** [15] - 277:5, 278:8, 279:5, 279:9, 280:11, 281:7, 281:11, 282:13, 283:11, 347:3, 378:22, 418:25, 486:24, 529:20, 546:21
**carbonates** [1] - 378:21
**Care** [1] - 454:2
**care** [1] - 456:14
**career** [3] - 522:8, 538:6, 542:9
**careful** [1] - 477:7
**carrier** [1] - 491:20
**case** [25] - 292:2, 310:5, 315:18, 322:12, 338:22, 349:18, 350:18, 351:11, 351:20, 361:24, 362:17, 363:2, 367:3, 369:16, 382:1, 462:17, 462:19, 462:20, 464:4, 479:12, 492:19, 493:23, 513:5, 519:19, 534:8
**Case** [2] - 277:3, 289:11
**cases** [7] - 318:14, 318:16, 351:9, 351:10, 381:2, 462:14, 478:14
**casing** [24] - 336:15, 339:14, 402:19, 409:11, 409:15, 409:25, 410:3, 410:4, 410:9, 410:13, 410:15, 453:23, 454:20, 454:21, 487:5, 487:12, 487:17, 487:20, 488:7, 488:15, 488:21, 489:2, 489:12, 550:2
**casing-conveyed** [2] - 402:19, 453:23
**cathodic** [6] - 427:21, 428:18, 442:22, 443:1, 443:22, 443:24
**caught** [1] - 539:25
**caused** [4] - 332:4, 341:14, 415:6, 466:11
**causing** [2] - 377:22, 476:18
**caution** [1] - 477:3
**caverns** [2] - 543:12, 543:14
**cell** [7] - 318:13, 363:23, 382:1, 384:15, 384:16, 384:17, 384:18
**cells** [3] - 344:22, 364:15, 380:9
**cement** [24] - 339:25, 410:16, 438:9, 454:21, 484:24, 485:7, 485:11, 485:13, 485:14, 485:15, 486:1, 486:7, 486:9, 486:18, 487:2, 487:5, 487:11, 487:17, 487:19, 487:22, 487:25
**cemented** [3] - 410:4, 410:15, 410:17
**cementing** [8] - 409:11, 455:4, 485:2, 485:8, 485:18, 485:23, 486:9, 486:16
**center** [4] - 397:20, 494:22, 495:4, 495:19
**Center** [2] - 303:15, 446:4
**centered** [2] - 364:6, 364:9
**centering** [1] - 364:12
**central** [2] - 372:5, 372:6
**Century** [1] - 313:18
**certain** [8] - 310:6, 310:7, 318:6, 354:13, 438:18, 533:22, 544:12, 544:13
**certainly** [3] - 416:20, 431:3, 547:21
**certainty** [3] - 305:9, 318:14, 438:23
**CERTIFICATE** [2] - 286:6, 552:1
**Certificate** [1] - 286:8
**CERTIFY** [2] - 552:5, 552:9
**cetera** [3] - 443:9, 456:3, 469:5
**CFR** [1] - 397:7
**chance** [3] - 290:16, 476:17, 476:22
**chances** [1] - 486:4
**change** [24] - 290:13, 367:20,

369:13, 369:23, 381:25, 382:3, 382:4, 382:24, 382:25, 422:2, 423:8, 429:23, 463:24, 463:25, 464:2, 464:4, 464:6, 473:10, 496:15, 498:9, 499:20, 499:23, 502:6, 544:10
**changed** [1] - 446:22
**changes** [16] - 314:4, 346:5, 346:7, 358:7, 358:9, 367:5, 423:1, 428:10, 431:21, 432:1, 443:8, 450:15, 466:16, 494:24, 545:6
**changing** [1] - 499:15
**characteristics** [1] - 456:17
**characterization** [4] - 330:20, 451:11, 508:14, 520:4
**characterizations** [1] - 441:3
**characterize** [1] - 382:19
**check** [1] - 324:1
**checking** [1] - 471:1
**chemical** [4] - 468:11, 486:5, 486:8, 504:11
**chemicals** [1] - 485:10
**chemistry** [3] - 377:21, 377:22, 391:3
**Chesapeake** [1] - 398:24
**chief** [1] - 396:14
**chose** [3] - 351:11, 352:18, 353:3
**chosen** [9] - 317:1, 346:20, 358:1, 365:3, 365:16, 369:6, 388:15, 465:24, 510:11
**chromatograph** [1] - 422:15
**circumstances** [2] - 461:8, 509:4
**cited** [1] - 512:2
**CLAIMANT'S** [1] - 288:11
**clarification** [1] - 345:9
**clarify** [15] - 303:18, 332:15, 341:24, 365:22, 366:17, 368:10, 373:25, 380:12, 382:5, 393:2, 433:8, 444:2, 491:24, 496:7, 546:7
**Class** [63] - 291:17, 291:21, 292:16, 292:20, 293:1, 293:6, 293:8, 308:15, 323:12, 323:22, 328:7, 328:10, 328:17, 329:22, 330:7, 330:11, 331:1, 335:4, 340:13, 340:18, 340:20, 341:1, 341:14, 342:2, 404:8, 406:20, 409:6, 410:11, 437:18, 490:13, 490:22, 506:21, 507:18, 508:1, 508:8, 508:10, 508:12, 508:20, 509:13, 509:20, 510:2, 511:4, 511:10, 512:13, 514:17, 514:24, 517:16, 518:7, 518:13, 518:19, 519:7, 520:19, 524:18, 524:20, 524:24, 525:25, 535:4, 540:19, 540:20, 540:22, 540:23
**class** [2] - 339:25, 479:18
**classification** [1] - 353:7
**classify** [1] - 316:21
**clay** [2] - 362:16, 486:2
**cleanup** [2] - 524:6, 524:14
**clear** [3] - 417:3, 444:13, 492:6
**clearly** [2] - 439:2, 440:20
**click** [1] - 300:12
**client** [1] - 289:24
**clients** [8] - 296:21, 353:14, 353:15, 505:23, 505:25, 506:1, 539:1, 548:16
**close** [9] - 356:1, 365:6, 371:15, 433:13, 478:24, 479:21, 494:6, 497:14, 531:6
**closed** [6] - 384:8, 480:24, 492:4, 492:16, 492:24, 493:5
**closely** [2] - 507:24, 521:14
**closest** [8] - 334:12, 356:15, 356:17, 433:1, 433:5, 433:14, 433:16, 433:20
**closing** [2] - 439:2, 493:21
**closure** [1] - 407:18
**Closure** [1] - 454:3
**closures** [2] - 404:6, 406:16
**CMG** [9] - 295:2, 384:10, 544:20, 544:24, 547:9, 547:13, 547:18, 547:19, 547:21
**CMG's** [1] - 547:14
**CO** [1] - 391:21
**CO2** [160] - 291:14, 293:17, 293:19, 308:20, 308:22, 309:9, 310:6, 310:16, 310:18, 310:20, 311:6, 314:6, 318:25, 319:8, 319:9, 319:23, 321:5, 328:3, 328:6, 328:8, 328:13, 329:23, 330:12, 330:23, 331:16, 332:14, 332:17, 333:6, 333:10, 343:6, 343:8, 343:9, 343:17, 343:22, 344:9, 344:12, 344:14, 344:23, 345:7, 345:10, 345:14, 345:19, 345:21, 347:6, 347:13, 347:15, 347:19, 347:21, 350:22, 351:25, 352:6, 352:21, 353:1, 353:9, 353:18, 358:5, 358:11, 360:18, 362:3, 365:9, 365:21, 366:4, 366:6, 366:11, 366:12, 366:16, 366:24, 366:25, 367:1, 371:7, 372:3, 372:4, 372:5, 372:10, 373:12, 373:17, 373:20, 374:1, 374:5, 379:1, 379:9, 379:21, 380:5, 380:6, 380:7, 386:7, 386:9, 390:21, 391:11, 391:13, 391:19, 391:22, 397:13, 400:4, 400:23, 400:25, 401:3, 401:10, 402:2, 402:4, 410:16, 412:13, 412:14, 415:22, 418:15, 419:5, 419:8, 420:6, 420:13, 420:14, 420:20, 420:21, 425:17, 427:4, 430:25, 431:2, 431:6, 434:22, 438:9, 441:14, 442:18, 452:2, 454:21, 462:4, 462:11, 463:11, 463:17, 464:7, 475:19, 478:15, 478:17, 480:13, 481:1, 481:10, 481:22, 481:25, 484:23, 485:4, 485:9, 485:13, 487:1, 487:9, 487:12, 487:16, 487:19, 488:3, 501:24, 502:1, 502:12, 538:10, 538:14, 542:19, 546:6, 546:10, 546:12, 546:17
**CO2's** [3] - 321:2, 534:11, 546:22
**coal** [4] - 355:24, 357:5, 468:12
**Coal** [1] - 404:3
**coal-fired** [1] - 468:12
**code** [2] - 410:12, 411:23
**Code** [4] - 293:13, 313:18, 313:21, 487:3
**codes** [1] - 411:17
**collect** [3] - 381:10, 400:11, 516:20
**collected** [2] - 414:16, 510:8
**college** [2] - 504:15, 504:17
**color** [3] - 327:4, 329:11, 329:12
**colors** [3] - 329:10, 353:21, 353:23
**column** [12] - 376:13, 376:14, 386:22, 387:6, 400:10, 414:9, 449:16, 449:21, 449:22, 450:12, 450:13, 471:19
**columns** [3] - 400:1, 400:17, 449:7
**combination** [1] - 413:25
**combined** [1] - 428:19
**comfortable** [5] - 318:11, 319:6, 319:21, 321:7, 321:12
**coming** [10] - 300:1, 309:14, 333:6, 394:18, 436:17, 460:14, 470:20, 476:3, 481:22, 484:7
**commencing** [1] - 289:2
**comment** [3] - 305:9, 308:6, 526:2
**commercial** [11] - 296:24, 297:3, 297:5, 297:6, 299:4, 299:5, 524:20, 543:18, 543:21, 543:23, 544:7
**commercially** [1] - 296:25
**commingled** [4] - 419:10, 419:13, 419:18, 420:13
**Commission** [64] - 277:17, 278:6, 279:20, 280:10, 280:21, 281:23, 282:12, 283:1, 289:6, 290:16, 294:24, 294:25, 295:24, 297:21, 298:7, 298:10, 303:2, 307:21, 310:11, 315:10, 322:3, 340:23, 341:3, 341:4, 390:1, 390:16, 395:18, 396:16, 398:19, 404:20, 408:22, 409:10, 410:24, 412:7, 449:9, 459:7, 463:3, 477:6, 498:6, 514:20, 517:2, 518:18, 518:19, 519:6, 521:5, 521:20, 522:13, 523:8, 524:17, 524:22, 525:20, 532:21, 533:3, 533:15, 533:21, 533:25, 534:8, 535:4, 535:11, 536:21, 547:2, 548:19, 549:23, 550:6
**Commission's** [3] - 341:6, 406:7, 547:17
**commit** [1] - 446:9
**commitment** [3] - 500:16, 501:2, 501:3
**commitment's** [1] - 446:25
**committed** [3] - 435:21, 436:11, 438:18
**common** [2] - 422:8, 482:19
**commonly** [7] - 297:10, 361:24, 361:25, 362:16, 363:2, 486:23
**communication** [1] - 302:22
**communications** [4] - 307:20, 315:8, 520:14, 548:11
**community** [2] - 405:5
**companies** [4] - 504:25, 506:6, 528:10, 528:11
**Company** [1] - 538:7

**company** [8] - 434:4, 486:16, 497:6, 504:4, 516:10, 523:22, 525:4, 539:5
**compare** [1] - 448:23
**comparing** [1] - 456:4
**comparison** [2] - 395:14, 449:10
**Comparison** [1] - 448:11
**comparisons** [1] - 449:3
**compel** [3] - 303:2, 303:5, 533:24
**compensate** [5] - 297:2, 311:19, 312:4, 330:10, 330:12
**compensated** [2] - 292:5, 321:16
**compensating** [3] - 321:3, 330:9, 358:12
**compensation** [9] - 312:10, 320:25, 321:7, 321:19, 352:13, 352:20, 496:17, 497:1, 497:4
**competitive** [1] - 507:7
**compile** [1] - 304:8
**compiling** [1] - 305:25
**complete** [4] - 434:7, 466:15, 474:19, 474:20
**completed** [1] - 418:20
**completely** [2] - 481:11, 481:13
**completion** [3] - 409:12, 437:18, 550:2
**completions** [2] - 298:14, 455:6
**complex** [4] - 315:22, 451:16, 534:18, 546:24
**compliance** [4] - 321:3, 323:23, 404:4, 506:17
**complies** [1] - 435:8
**composition** [11] - 366:23, 381:2, 381:14, 381:16, 382:15, 401:1, 418:15, 418:21, 420:15, 428:11, 542:18
**compositions** [3] - 367:3, 457:10, 457:12
**compressed** [6] - 539:11, 543:11, 545:18, 545:23, 546:4, 546:13
**computational** [1] - 384:20
**computer** [5] - 296:23, 300:12, 300:13, 300:14, 522:3
**concentration** [7] - 343:8, 344:14, 345:21, 347:12, 391:13, 391:15
**concern** [2] - 361:22, 361:23
**concerns** [2] - 319:18, 329:1
**concludes** [1] - 551:10
**conclusion** [1] - 498:25
**conclusions** [1] - 532:24
**condition** [3] - 384:7, 384:10, 495:11
**conditions** [11] - 314:19, 317:13, 318:14, 364:17, 365:18, 383:8, 383:22, 384:13, 426:23, 482:1, 493:12
**conduct** [2] - 472:14, 532:12
**conducted** [3] - 322:22, 402:17, 493:19
**confidency** [1] - 351:19
**confident** [3] - 318:5, 318:17, 488:15
**confidential** [3] - 477:6, 496:5, 496:6
**confining** [25] - 360:7, 360:16, 361:14, 362:22, 376:22, 379:24, 380:3, 380:5, 380:10, 380:11, 380:14, 381:1, 385:24, 387:15, 387:23, 387:24, 388:2, 391:9, 391:12, 391:18, 392:1, 394:17, 457:11, 523:15
**confirm** [32] - 313:15, 357:3, 360:1, 367:19, 373:24, 377:14, 381:6, 381:17, 382:7, 382:9, 382:17, 386:20, 387:7, 387:8, 388:16, 388:19, 412:3, 412:15, 414:18, 415:19, 417:25, 418:9, 418:20, 419:22, 422:20, 423:11, 423:20, 424:6, 430:7, 470:17, 471:25, 494:7
**confirmation** [2] - 428:25, 444:14
**confirmed** [1] - 429:7
**confirming** [5] - 383:9, 415:14, 417:23, 424:22, 445:13
**conforming** [1] - 431:7
**confusion** [1] - 419:6
**connected** [2] - 482:19, 492:14
**connections** [1] - 491:19
**Conservation** [3] - 507:17, 514:19, 517:1
**conservation** [2] - 338:3, 506:5
**conservative** [1] - 366:7
**consider** [12] - 277:16, 278:18, 279:19, 280:9, 280:21, 281:21, 283:1, 308:22, 387:22, 387:25, 439:2, 439:8
**consideration** [15] - 277:4, 279:8, 281:10, 310:25, 311:8, 311:20, 311:23, 312:11, 312:17, 312:20, 312:22, 312:25, 318:23, 321:14, 352:15
**considerations** [5] - 310:9, 310:13, 311:4, 323:22, 436:16
**considered** [2] - 365:7, 488:25
**considering** [2] - 369:1, 438:4
**consist** [1] - 505:25
**consisted** [1] - 406:13
**consistent** [2] - 434:13, 435:24
**consistently** [1] - 420:25
**constant** [1] - 345:13
**constituents** [1] - 391:2
**constrained** [3] - 426:12, 426:13, 426:20
**constraint** [16] - 328:11, 328:12, 328:14, 328:16, 418:11, 426:16, 426:22, 462:6, 462:8, 462:16, 462:17, 464:24, 465:1, 465:8, 470:14, 470:19
**constraints** [5] - 418:6, 424:24, 465:2, 544:12, 544:13
**constructed** [6] - 291:18, 291:22, 292:6, 397:3, 397:5, 397:6
**construction** [4] - 409:17, 409:22, 437:17, 452:2
**consult** [1] - 506:11
**consultant** [3] - 504:25, 528:9, 538:25
**consultants** [1] - 516:4
**consulted** [1] - 485:1
**consulting** [7] - 409:2, 504:6, 504:21, 506:9, 506:12, 539:1, 539:12
**Cont'd** [3] - 285:1, 287:1, 288:1
**contact** [2] - 373:13, 542:13
**contain** [3] - 349:14, 549:25, 552:10
**contained** [7] - 399:25, 402:5, 452:16, 480:14, 529:5, 544:11, 547:9
**containment** [6] - 361:22, 361:23, 429:23, 440:1, 440:14
**contains** [1] - 314:3
**contaminated** [1] - 524:14
**content** [5] - 361:10, 450:15, 454:12, 454:15, 486:2
**Content** [1] - 400:20
**contents** [1] - 529:11
**context** [1] - 352:4
**continually** [1] - 494:24
**continue** [5] - 417:22, 445:24, 446:13, 446:16, 483:7
**CONTINUED** [1] - 291:8
**continued** [3] - 439:7, 446:7, 446:8
**Continued** [1] - 286:12
**continues** [1] - 434:11
**continuing** [3] - 401:19, 434:10, 435:21
**CONTINUING** [61] - 302:10, 303:10, 305:18, 307:1, 312:9, 312:16, 313:24, 320:24, 322:2, 323:7, 333:3, 333:24, 356:14, 370:16, 392:17, 394:10, 412:21, 417:21, 420:16, 423:11, 423:21, 424:15, 425:8, 426:19, 427:16, 429:9, 433:24, 435:3, 436:13, 437:16, 439:11, 442:16, 448:18, 458:22, 471:17, 475:6, 477:18, 489:11, 490:24, 497:16, 499:2, 500:12, 500:22, 500:25, 501:8, 501:16, 502:9, 505:12, 505:21, 510:22, 511:20, 514:8, 520:7, 520:22, 523:5, 523:13, 530:10, 536:1, 540:18, 541:9, 548:14
**continuous** [4] - 401:15, 428:6, 428:22, 483:19
**continuously** [1] - 428:5
**contract** [1] - 506:3
**contracted** [7] - 296:25, 306:17, 323:13, 323:24, 485:23, 486:15, 486:23
**contractor** [3] - 486:12, 486:17, 486:22
**contractors** [2] - 485:1, 485:24
**contracts** [4] - 296:13, 418:19, 482:21, 483:1
**contrast** [1] - 448:22
**contrasting** [1] - 456:5
**contributing** [1] - 420:23
**control** [12] - 293:1, 300:17, 316:19, 351:7, 372:18, 397:18, 397:20, 476:5, 482:19, 494:22, 495:4, 495:19
**Control** [1] - 511:3
**controlled** [3] - 397:19, 493:10, 494:21
**controls** [4] - 350:13, 469:7, 476:5, 476:11
**conventional** [1] - 485:7
**conversation** [3] - 302:14, 303:19, 303:22

**conversations** [4] - 305:19, 309:20, 309:23, 435:13
**conversely** [1] - 379:22
**converting** [1] - 538:9
**conveyed** [5] - 402:19, 453:19, 453:23, 455:17, 457:19
**cooperate** [1] - 459:20
**cooperating** [1] - 341:12
**cooperation** [1] - 341:9
**coordinate** [1] - 531:15
**copy** [3] - 458:19, 510:19, 526:18
**core** [18] - 298:9, 298:11, 317:19, 349:9, 349:12, 360:6, 368:13, 376:4, 385:14, 413:25, 414:15, 451:18, 474:17, 529:21, 530:17, 535:7, 535:16, 549:25
**core-derived** [1] - 385:14
**cored** [1] - 410:10
**cores** [2] - 349:14, 385:10
**coring** [1] - 367:10
**Coriolis** [5] - 420:24, 421:10, 422:16, 427:7, 469:14
**corner** [1] - 363:11
**corporation** [1] - 539:10
**correct** [106] - 293:12, 295:16, 295:18, 304:4, 307:16, 308:7, 313:20, 319:24, 320:9, 322:6, 326:1, 327:20, 328:21, 333:3, 334:10, 337:11, 343:10, 344:10, 344:13, 347:1, 350:3, 351:17, 357:6, 357:7, 360:5, 360:21, 360:24, 362:4, 366:19, 370:24, 370:25, 373:5, 374:3, 374:7, 375:15, 375:21, 375:23, 376:24, 377:15, 378:17, 379:14, 379:17, 380:21, 381:4, 383:20, 384:19, 384:25, 385:5, 385:11, 387:6, 387:15, 387:16, 387:19, 388:19, 390:6, 390:7, 392:7, 395:4, 395:9, 396:6, 399:5, 399:6, 404:14, 404:15, 404:17, 404:18, 404:21, 404:22, 409:12, 409:13, 412:9, 415:25, 419:14, 419:15, 419:25, 423:17, 424:10, 425:1, 430:9, 430:10, 430:14, 434:1, 438:6, 440:15, 443:16, 444:18, 450:22, 460:5, 460:25, 464:12, 472:2, 473:12, 475:16, 480:6, 482:10, 495:19, 514:9, 515:20, 521:16, 524:9, 525:11, 533:11, 533:12, 535:5, 535:12, 548:20
**correcting** [2] - 298:8, 513:9
**correction** [1] - 313:23
**corrective** [2] - 334:1, 509:7
**correctly** [2] - 441:19, 513:20
**correlate** [1] - 386:25
**corrosion** [6] - 410:12, 427:17, 428:1, 428:2, 429:19, 453:13
**Corrosion** [2] - 401:5, 401:20
**corrosion-inhibited** [1] - 429:19
**corrosiveness** [1] - 487:9
**cost** [14] - 297:2, 324:20, 324:22, 324:24, 406:13, 406:23, 407:2, 407:18, 438:2, 439:21, 440:4, 440:9, 441:5, 456:13
**costs** [10] - 297:6, 312:25, 313:7, 406:18, 438:10, 439:15, 440:20, 440:23, 456:18
**Coulomb** [1] - 394:12
**counsel** [3] - 289:12, 290:3, 396:17
**Counties** [9] - 277:14, 278:4, 278:17, 279:3, 279:17, 280:6, 280:19, 281:5, 405:17
**counties** [6] - 405:19, 405:21, 435:22, 435:24, 436:8, 446:18
**country** [1] - 545:16
**County** [17] - 281:20, 282:9, 282:22, 283:9, 435:13, 435:14, 435:17, 435:19, 446:1, 446:2, 538:15, 538:21, 538:22
**couple** [14] - 294:3, 316:3, 338:16, 349:1, 371:24, 393:20, 426:10, 437:24, 441:11, 446:4, 484:12, 489:20, 516:16, 539:25
**coupon** [3] - 428:1, 428:2, 428:7
**course** [3] - 418:23, 426:7, 431:11
**Court** [1] - 286:8
**court** [1] - 453:7
**COURT** [1] - 552:1
**cover** [2] - 364:14, 510:6
**covered** [4] - 407:13, 407:19, 449:14, 501:6
**covers** [1] - 509:17
**Coyote** [3] - 356:16, 450:18
**cracked** [1] - 466:24
**create** [1] - 531:1
**created** [1] - 323:18
**creating** [1] - 292:12
**credits** [2] - 332:17, 332:22
**Creek** [41] - 277:5, 278:4, 278:17, 279:5, 279:9, 280:7, 280:20, 281:7, 281:11, 282:10, 282:22, 283:11, 310:12, 332:11, 339:15, 339:17, 340:19, 356:16, 359:4, 364:25, 375:1, 375:8, 375:20, 376:12, 381:3, 381:13, 383:13, 383:16, 384:1, 385:2, 392:25, 395:2, 402:12, 410:14, 413:21, 414:3, 414:24, 450:18, 530:18, 535:17
**critical** [5] - 425:18, 427:1, 452:11, 530:22, 531:17
**Critical** [1] - 394:12
**Cross** [5] - 286:12, 287:17, 287:23, 288:5, 288:9
**cross** [13] - 290:12, 290:18, 344:20, 348:16, 348:19, 348:21, 416:12, 416:17, 416:25, 417:7, 417:8, 472:8, 472:14
**CROSS** [5] - 291:8, 484:19, 513:1, 532:17, 545:11
**Cross-Examination** [5] - 286:12, 287:17, 287:23, 288:5, 288:9
**cross-examination** [3] - 290:12, 472:8, 472:14
**CROSS-EXAMINATION** [5] - 291:8, 484:19, 513:1, 532:17, 545:11
**cross-examine** [1] - 290:18
**cross-section** [3] - 348:16, 348:19, 348:21
**cross-sections** [1] - 344:20
**crossed** [1] - 290:13
**cubed** [1] - 339:3
**cubic** [3] - 382:3, 423:24, 424:18
**cumulatively** [2] - 408:1, 435:15
**curious** [1] - 426:14
**current** [8] - 332:11, 335:17, 356:5, 427:21, 428:18, 442:25, 523:20, 544:15
**curriculum** [4] - 505:13, 529:6, 529:9, 529:11
**curve** [2] - 368:11, 379:9
**curves** [3] - 368:8, 385:8, 386:4
**custody** [4] - 421:6, 441:13, 441:16, 442:4
**cut** [1] - 362:21
**cutoff** [10] - 345:1, 366:15, 445:2, 445:4, 464:4, 464:7, 464:10, 466:14, 473:8, 473:11
**CV** [2] - 539:21, 539:22
**cycle** [1] - 374:2
**cylinder** [1] - 541:24

## D

**D-o-u-g-h-t-y** [1] - 527:19
**Dakota** [38] - 283:19, 284:13, 285:5, 289:6, 291:21, 292:15, 292:20, 293:12, 298:10, 298:11, 307:21, 313:18, 330:11, 338:4, 340:8, 386:21, 387:6, 390:14, 403:25, 412:2, 435:7, 436:6, 454:19, 507:23, 513:18, 523:18, 523:22, 523:25, 524:10, 524:16, 525:9, 525:24, 526:4, 526:8, 526:12, 536:10, 538:23, 552:13
**DAKOTA** [1] - 277:1
**Dakota's** [3] - 292:25, 294:4, 526:2
**damage** [2] - 466:8, 467:3
**damages** [1] - 466:24
**Darcy's** [1] - 328:2
**dash** [2] - 314:1, 463:13
**DAT** [3] - 295:1, 295:25, 298:3
**Data** [1] - 511:4
**data** [135] - 294:22, 295:5, 295:6, 295:8, 296:8, 296:11, 296:12, 296:14, 297:22, 298:1, 298:2, 298:4, 298:9, 298:12, 298:25, 299:7, 299:11, 299:13, 299:15, 299:22, 299:25, 300:1, 300:3, 300:4, 300:8, 300:10, 300:19, 301:6, 301:20, 301:22, 302:15, 302:18, 303:17, 303:18, 303:22, 304:2, 304:6, 304:8, 304:12, 304:14, 304:19, 304:22, 304:25, 305:3, 305:6, 305:8, 305:11, 305:25, 306:5, 306:14, 306:16, 307:4, 307:14, 307:17, 313:9, 313:14, 314:17, 317:19, 317:20, 318:6, 323:20, 342:22, 350:13, 354:15, 354:19, 354:20, 355:2, 357:24, 359:17, 359:22, 360:1, 367:10, 367:17, 368:14, 368:17, 369:15, 369:22,

372:17, 372:20, 385:16, 386:2, 386:6, 392:3, 392:4, 397:11, 397:19, 400:11, 400:14, 400:18, 418:4, 420:2, 431:5, 431:6, 435:22, 451:17, 451:18, 452:3, 452:10, 457:9, 474:17, 475:20, 483:20, 491:22, 496:23, 497:21, 510:8, 511:24, 512:6, 512:14, 530:17, 530:25, 531:12, 531:13, 531:17, 531:22, 532:2, 532:13, 533:2, 533:14, 533:16, 534:16, 534:19, 544:19, 546:25, 547:9, 547:13, 547:18, 547:19, 547:21
**database** [2] - 512:17, 545:3
**date** [6] - 356:6, 370:19, 414:24, 415:7, 519:21, 526:22
**Dated** [1] - 552:13
**dated** [1] - 533:20
**David** [1] - 289:7
**DAVID** [2] - 283:22, 284:6
**days** [3] - 299:10, 325:7, 438:19
**DCC** [4] - 364:18, 459:12, 459:16, 460:9
**deadline** [1] - 291:1
**deal** [2] - 476:2, 543:4
**dealt** [1] - 476:4
**decide** [2] - 418:8, 483:15
**decided** [2] - 482:12, 498:5
**decision** [7] - 324:18, 482:14, 495:24, 508:5, 517:11, 517:23
**decisions** [1] - 321:18
**decks** [2] - 298:1, 544:19
**decrease** [2] - 331:13, 331:20
**decreases** [1] - 464:1
**decreasing** [1] - 331:14
**deemed** [1] - 314:6
**deep** [2] - 394:22, 395:3
**deeper** [3] - 355:7, 454:25, 474:17
**defer** [9] - 312:8, 348:4, 356:7, 358:21, 359:8, 424:14, 425:12, 426:17, 497:8
**deferred** [12] - 355:21, 358:24, 371:25, 411:14, 425:4, 430:16, 447:21, 462:3, 467:6, 471:3, 471:12, 501:22
**define** [14] - 291:23, 292:1, 292:23, 293:13, 293:24, 296:1, 318:6, 318:22, 319:25, 321:18, 329:21, 340:25, 351:22, 462:7
**defined** [5] - 369:14, 402:11, 446:7, 502:14, 531:18
**definitions** [1] - 405:7
**definitive** [1] - 305:17
**deformation** [1] - 363:15
**degree** [5] - 403:24, 468:9, 537:25, 544:5
**degrees** [1] - 398:22
**delineate** [3] - 292:7, 292:8, 489:19
**delineated** [1] - 388:8
**delineating** [3] - 293:9, 293:10, 509:3
**delineation** [4] - 292:10, 343:6, 440:6, 441:1
**delta** [1] - 412:7
**delve** [1] - 513:14
**demarcation** [1] - 422:17
**demonstrates** [2] - 331:9, 331:19
**Demonstration** [1] - 406:3
**denied** [3] - 532:22, 532:25, 550:7
**densities** [1] - 391:22
**density** [2] - 380:8, 427:3
**department** [2] - 404:1, 504:19
**Department** [2] - 289:9, 340:11
**departments** [2] - 436:9, 446:3
**dependent** [5] - 345:6, 354:21, 354:22, 354:23, 355:9
**depicted** [1] - 394:13
**depletion** [1] - 543:3
**depositional** [1] - 373:1
**deposits** [1] - 373:8
**depth** [8] - 336:16, 355:10, 357:15, 361:16, 409:24, 410:13, 488:15, 489:2
**depths** [4] - 394:14, 455:11, 474:9, 474:12
**derivatives** [1] - 543:25
**derive** [7] - 374:23, 376:7, 385:23, 386:3, 452:10, 516:20, 532:4
**derived** [6] - 328:14, 365:13, 369:3, 385:8, 385:14, 386:6
**deriving** [1] - 525:2
**DERRICK** [1] - 285:2
**Derrick** [2] - 289:22, 472:11
**derrick** [1] - 458:18
**describe** [10] - 409:16, 459:1, 475:10, 484:24, 504:8, 505:22, 508:24, 509:16, 529:3, 529:13
**described** [11] - 307:18, 359:24, 400:16, 441:14, 452:4, 465:21, 466:3, 466:22, 481:3, 482:20, 535:7
**describes** [4] - 400:10, 466:5, 509:4, 509:6
**describing** [3] - 528:4, 530:14, 545:14
**description** [8] - 385:7, 399:24, 414:1, 414:16, 423:12, 429:1, 504:14, 541:18
**descriptions** [1] - 294:21
**design** [13] - 397:2, 409:4, 409:11, 409:15, 409:17, 432:9, 456:17, 468:18, 484:25, 485:2, 487:7, 490:10, 490:18
**designed** [7] - 397:5, 442:24, 443:13, 490:1, 490:11, 490:13, 490:22
**DESIRAE** [1] - 285:3
**Desirae** [1] - 289:24
**desire** [1] - 514:23
**detail** [5] - 348:5, 395:15, 401:8, 450:1, 530:13
**detailed** [1] - 466:9
**details** [4] - 322:19, 440:2, 454:6, 487:21
**detect** [2] - 346:21, 347:9
**Detected** [1] - 401:4
**detection** [5] - 343:13, 346:20, 346:25, 427:18, 453:13
**Detection** [3] - 401:5, 401:6, 401:20
**determination** [13] - 304:17, 304:20, 305:22, 310:10, 313:12, 322:12, 322:15, 322:20, 444:22, 473:20, 473:22, 496:22, 499:18
**determinations** [1] - 483:10
**determine** [26] - 292:17, 302:17, 316:23, 323:8, 351:18, 359:6, 406:5, 406:18, 413:20, 439:21, 440:23, 463:21, 464:7, 466:10, 466:16, 473:14, 476:24, 480:9, 481:5, 531:22, 533:7, 534:12, 542:20, 543:5, 543:14, 544:14
**determined** [19] - 314:7, 343:7, 359:3, 364:11, 371:17, 381:3, 430:17, 431:11, 434:23, 435:14, 439:15, 443:17, 463:12, 463:18, 463:24, 464:5, 473:9, 496:14, 499:24
**determines** [1] - 497:19
**determining** [3] - 278:7, 280:10, 282:12
**develop** [11] - 318:18, 330:23, 341:13, 341:16, 341:20, 341:23, 342:2, 434:12, 435:15, 445:24, 508:10
**developed** [2] - 322:24, 323:1
**developer** [1] - 331:16
**developers** [2] - 341:11, 506:4
**developing** [9] - 322:8, 322:24, 341:22, 342:6, 406:12, 406:21, 446:14, 511:11, 542:23
**development** [6] - 341:8, 434:6, 506:17, 509:7, 538:20, 542:7
**DGC** [1] - 468:10
**diagram** [13] - 421:18, 421:24, 475:8, 475:12, 475:24, 488:11, 488:24, 489:3, 490:4, 490:25, 491:8, 491:13
**diameter** [11] - 349:9, 349:12, 422:2, 422:8, 422:23, 422:25, 423:8, 483:24, 491:10, 491:15, 491:17
**dictated** [2] - 344:23, 440:8
**dictates** [1] - 328:12
**dictating** [2] - 390:20, 462:19
**die** [1] - 331:8
**difference** [9] - 318:1, 349:22, 349:23, 365:23, 369:20, 384:6, 440:25, 441:6, 450:6
**differences** [25] - 350:20, 361:3, 384:3, 407:22, 449:11, 451:9, 452:13, 452:20, 452:23, 453:16, 454:5, 454:16, 454:23, 455:4, 455:9, 456:1, 456:9, 456:10, 456:13, 456:23, 457:2, 457:6, 457:16, 457:21, 457:22
**different** [39] - 300:5, 317:6, 325:22, 329:10, 329:16, 335:22, 338:5, 347:24, 350:19, 351:9, 351:10, 353:21, 371:22, 372:21, 377:20, 380:2, 380:3, 391:4, 391:22, 399:19, 418:7, 440:20, 441:17, 446:14, 474:9, 474:11, 485:9, 485:10, 485:14, 486:9, 500:5, 506:11, 507:13, 524:5, 542:16, 542:17, 543:17, 546:5,

546:8
**differential** [1] - 336:12
**difficult** [3] - 290:20, 327:4, 421:23
**difficulty** [1] - 417:5
**diffusion** [5] - 379:21, 380:4, 380:13, 391:9, 391:13
**digitized** [2] - 304:15, 306:7
**dike** [1] - 429:24
**diligence** [1] - 506:18
**diluted** [2] - 344:15, 345:15
**dilutes** [1] - 346:15
**dioxide** [10] - 277:5, 278:8, 279:5, 279:9, 280:11, 281:7, 281:11, 282:13, 283:11, 418:25
**DIRECT** [8] - 396:4, 398:8, 403:10, 408:12, 467:19, 503:20, 527:15, 537:13
**direct** [12] - 302:21, 307:19, 323:14, 338:20, 386:13, 406:6, 406:9, 409:20, 413:2, 439:18, 458:15, 473:1
**Direct** [8] - 286:21, 286:22, 286:23, 286:24, 287:11, 287:22, 288:4, 288:8
**direction** [1] - 384:24
**directional** [1] - 348:3
**directly** [10] - 326:12, 328:19, 336:4, 336:8, 336:9, 345:17, 353:2, 473:19, 512:5, 546:16
**director** [1] - 403:19
**disabled** [1] - 504:5
**discharge** [8] - 421:7, 421:25, 425:22, 426:1, 426:5, 426:14, 465:5, 465:12
**discovery** [3] - 303:1, 303:23, 303:25
**discuss** [6] - 383:6, 404:12, 409:9, 452:16, 454:10, 456:6
**discussed** [15] - 302:4, 304:13, 308:25, 310:16, 310:18, 313:3, 315:13, 316:10, 347:8, 361:1, 395:15, 452:25, 484:4, 489:23, 491:11
**discusses** [2] - 452:1, 453:11
**discussing** [2] - 291:14, 381:24
**discussion** [7] - 309:16, 373:1, 388:10, 450:4, 469:13, 474:3, 513:15
**Discussion.....** [1] - 286:4
**discussions** [15] - 296:19, 302:16, 306:25, 307:11, 310:2, 310:4, 311:1, 322:19, 342:12, 459:17, 459:22, 460:11, 514:2, 526:10
**dishes** [1] - 466:4
**disperse** [1] - 481:25
**dispersion** [12] - 380:1, 380:7, 391:17, 391:19, 391:23, 405:22, 476:23, 477:4, 477:12, 477:19, 477:22, 480:1
**disposal** [6] - 340:19, 409:7, 524:17, 524:20, 524:22, 525:9
**dissimilar** [2] - 546:19, 546:20
**dissipation** [1] - 359:11
**dissolution** [5] - 360:17, 377:12, 378:15, 381:25, 391:1
**dissolve** [2] - 360:13, 380:8
**dissolved** [2] - 378:20, 378:21
**dissolving** [2] - 377:18, 377:23
**distance** [8] - 356:22, 373:14, 373:18, 383:15, 383:16, 384:11, 384:22, 433:20
**distances** [4] - 383:6, 383:9, 383:12, 433:18
**distinguishing** [1] - 441:6
**distribute** [1] - 350:14
**distributed** [2] - 321:8, 348:15
**distribution** [8] - 316:15, 318:15, 318:16, 351:9, 351:11, 372:19, 531:25, 533:7
**Divide** [1] - 538:22
**divide** [1] - 541:25
**DIVISION** [1] - 277:2
**Division** [2] - 289:10, 507:6
**DMR** [26] - 295:1, 295:6, 326:19, 367:23, 367:24, 400:19, 415:14, 418:9, 420:12, 426:21, 427:25, 431:22, 432:18, 436:17, 436:20, 436:22, 437:11, 437:20, 443:21, 449:14, 461:25, 471:8, 474:4, 495:23, 496:2, 498:20
**DO** [2] - 552:5, 552:9
**Docket** [1] - 289:6
**document** [3] - 294:14, 509:17, 510:6
**documents** [21] - 390:4, 508:9, 508:12, 508:13, 508:18, 508:22, 509:11, 509:14, 509:25, 511:9, 513:22, 513:24, 514:4, 514:11, 514:15, 516:8, 516:12, 518:2, 521:1, 526:4, 526:6
**dolomite** [3] - 377:11, 378:20, 391:2
**dolomites** [1] - 373:7
**dolostone** [1] - 382:20
**Dome** [2] - 539:4, 542:25
**dominant** [3] - 391:10, 391:17, 391:25
**done** [45] - 291:2, 300:5, 309:2, 321:17, 343:1, 351:13, 353:1, 354:3, 354:9, 360:16, 363:9, 366:5, 367:21, 367:22, 377:21, 379:25, 380:24, 381:1, 382:2, 386:8, 412:24, 413:19, 416:9, 417:24, 419:1, 419:2, 419:22, 426:11, 434:14, 436:23, 466:9, 476:23, 477:13, 477:22, 478:1, 478:6, 480:2, 480:8, 521:7, 523:20, 524:3, 524:10, 529:24, 548:18, 548:24
**dot** [2] - 336:9
**DOT** [1] - 397:6
**dots** [1] - 335:9
**double** [1] - 324:1
**double-check** [1] - 324:1
**doubt** [1] - 434:10
**Doughty** [9] - 527:2, 527:6, 527:8, 527:17, 527:19, 532:6, 532:19, 537:3
**DOUGHTY** [3] - 288:3, 527:12, 537:4
**doughty** [1] - 527:3
**Douglas** [7] - 389:10, 392:13, 447:19, 461:13, 473:6, 483:5, 496:12
**DOUGLAS** [34] - 291:13, 305:12, 305:15, 306:24, 309:13, 312:7, 313:22, 320:19, 323:5, 333:2, 335:8, 338:9, 340:17, 356:9, 356:12, 360:15, 372:7, 387:16, 390:7, 393:25, 461:19, 461:25, 463:14, 463:23, 464:12, 464:15, 465:9, 465:15, 465:17, 466:20, 467:5, 467:8, 473:12, 483:12
**DOUGLAS/CAITLIN** [1] - 286:11
**DOUGLAS/JAMEY** [1] - 287:7
**down** [23] - 298:24, 320:12, 329:11, 354:5, 379:11, 386:15, 404:9, 405:9, 409:24, 413:14, 416:13, 416:14, 419:21, 426:1, 434:9, 441:7, 441:17, 453:7, 464:4, 467:2, 475:19, 479:22, 497:19
**downhole** [6] - 309:6, 309:8, 402:21, 485:3, 486:6, 486:8
**Downhole** [1] - 401:20
**downloaded** [1] - 522:7
**downstream** [7] - 422:14, 492:5, 492:14, 492:24, 493:2, 493:5, 494:10
**draft** [13] - 508:3, 508:23, 509:15, 513:23, 513:25, 514:4, 514:22, 516:6, 516:12, 516:22, 516:25, 517:7, 526:8
**drafted** [4] - 516:8, 517:6, 517:10, 517:14
**drafting** [6] - 508:7, 508:21, 510:3, 514:25, 518:21, 519:9
**drafts** [1] - 315:12
**drainage** [5] - 504:22, 538:8, 542:12, 542:14, 543:5
**Drawer** [1] - 284:16
**drawing** [1] - 387:1
**drilled** [16] - 298:15, 337:16, 357:17, 367:7, 367:9, 369:2, 409:23, 410:10, 454:25, 455:1, 455:3, 455:22, 474:11, 529:19, 535:8
**drilling** [7] - 348:3, 409:4, 409:24, 415:10, 443:24, 474:16, 550:2
**Drinking** [3] - 292:12, 292:18, 293:2
**drinking** [10] - 293:16, 293:20, 293:23, 294:1, 336:17, 339:13, 410:2, 410:7, 439:14, 489:1
**drive** [12] - 298:25, 299:8, 299:12, 299:17, 299:21, 300:14, 300:16, 300:22, 301:10, 476:12, 543:3
**driver** [1] - 390:19
**drivers** [1] - 332:20
**drives** [1] - 376:25
**drove** [1] - 441:6
**drywall** [1] - 466:24
**due** [17] - 327:21, 329:25, 338:25, 339:9, 345:4, 357:23, 360:13, 360:17, 364:16, 372:13, 376:17, 381:11, 381:25, 384:4, 391:10, 506:17
**duly** [8] - 396:2, 398:6,

403:8, 408:10, 467:17, 503:18, 527:13, 537:11
**dune** [1] - 373:3
**duration** [5] - 297:12, 473:15, 473:19, 483:22, 494:3
**during** [15] - 331:10, 343:18, 358:18, 374:6, 388:16, 388:20, 389:12, 390:3, 412:23, 415:10, 432:1, 464:21, 496:11, 496:18, 515:23
**duties** [1] - 468:15
**dwelling** [4] - 433:2, 433:5, 433:14, 433:16
**dynamic** [2] - 512:17, 545:5

## E

**early** [3] - 411:15, 444:10, 520:20
**Earnest** [1] - 396:10
**earth** [1] - 507:10
**earthquake** [6] - 465:23, 466:1, 466:2, 466:12, 466:21, 466:22
**earthquakes** [2] - 465:20, 467:3
**east** [2] - 348:16, 541:2
**East** [3] - 283:19, 284:12, 543:1
**Eastern** [1] - 528:7
**economic** [3] - 332:13, 332:20, 542:21
**economically** [1] - 543:6
**edge** [8] - 343:9, 344:11, 347:6, 363:14, 383:6, 383:16, 383:17, 383:18
**edges** [1] - 345:18
**educated** [1] - 346:8
**educational** [13] - 396:17, 398:19, 403:22, 408:22, 468:8, 504:8, 505:14, 527:23, 529:14, 537:24, 539:23, 540:6, 540:12
**EERC** [37] - 294:24, 294:25, 296:8, 296:9, 296:10, 296:15, 297:5, 297:20, 298:23, 302:8, 302:23, 304:20, 304:24, 305:3, 305:8, 305:10, 310:2, 311:1, 315:9, 316:9, 322:7, 322:11, 322:14, 322:17, 322:24, 323:23, 337:3, 348:10, 354:9, 383:13, 398:14, 398:24, 474:1, 486:13, 530:11, 534:17
**EERC's** [3] - 300:1, 306:17, 323:13
**effect** [7] - 365:8, 365:20, 366:24, 376:16, 376:19, 383:23, 415:21
**effective** [2] - 405:4, 542:20
**effects** [5] - 358:11, 542:15, 542:17, 543:13, 543:14
**efficiency** [1] - 472:18
**effort** [1] - 304:7
**efforts** [1] - 451:4
**eight** [1] - 528:8
**either** [10] - 335:15, 362:16, 365:24, 417:25, 433:5, 433:16, 455:24, 486:24, 541:12, 544:1
**elaborate** [12] - 357:11, 380:1, 380:15, 381:5, 382:16, 383:22, 385:13, 414:5, 420:5, 427:19, 439:12, 445:3
**electrical** [1] - 428:6
**element** [1] - 377:18
**elements** [1] - 507:10
**eliciting** [1] - 520:14
**eliminate** [1] - 510:9
**eliminated** [1] - 317:23
**Emergency** [2] - 433:25, 454:9
**emergency** [11] - 404:13, 404:24, 405:1, 435:11, 436:1, 439:12, 440:21, 445:19, 445:21, 475:22, 476:1
**employed** [7] - 396:11, 398:13, 403:16, 404:6, 408:17, 468:2, 504:1
**employees** [1] - 307:20
**employment** [1] - 468:16
**emptied** [2] - 481:11, 481:12
**enact** [3] - 279:6, 281:7, 283:12
**enactment** [1] - 515:3
**encompasses** [1] - 531:7
**encountered** [1] - 325:8
**end** [14] - 331:23, 361:2, 373:20, 374:1, 401:1, 402:15, 416:1, 442:17, 497:12, 497:15, 507:25, 544:12, 544:14
**end-to-end** [1] - 401:1
**endanger** [3] - 308:9, 308:15, 308:19
**endangered** [1] - 293:16
**endangering** [1] - 294:1
**endangerment** [7] - 293:22, 339:8, 406:19, 407:9, 407:20, 439:13, 456:18
**ended** [1] - 505:1
**ends** [1] - 379:9
**energy** [4] - 396:21, 539:10, 539:11, 539:13
**Energy** [5] - 303:14, 398:24, 528:10, 538:17, 538:24
**engaged** [1] - 405:20
**engagement** [1] - 526:19
**engineer** [8] - 325:18, 326:3, 346:16, 408:20, 468:13, 538:5, 538:6, 545:14
**engineering** [13] - 308:18, 309:7, 309:10, 396:20, 397:2, 408:25, 409:2, 409:4, 468:10, 504:11, 504:24, 506:15, 538:1
**engineers** [1] - 516:10
**enhanced** [10] - 538:18, 539:3, 539:7, 542:12, 542:25, 545:15, 545:22, 546:4, 546:13, 546:15
**ensure** [5] - 293:25, 299:13, 300:7, 300:10, 466:8
**ensuring** [1] - 495:13
**enter** [3] - 379:22, 380:9, 460:1
**entered** [2] - 401:11, 518:3
**enters** [1] - 400:24
**entire** [6] - 299:23, 301:5, 357:13, 357:18, 423:1, 528:19
**entirely** [1] - 443:25
**entirety** [1] - 362:22
**entities** [5] - 341:10, 397:9, 419:8, 482:22, 482:25
**entity** [2] - 377:12, 512:9
**entry** [1] - 386:2
**environment** [4] - 308:20, 373:1, 400:6, 405:6
**environmental** [10] - 403:20, 453:24, 504:7, 504:18, 504:24, 506:9, 506:15, 506:18, 514:13, 520:21
**Environmental** [1] - 303:14
**environments** [1] - 528:17
**EOA** [1] - 292:19
**EOR** [2] - 542:6, 542:21
**EPA** [14] - 292:22, 293:6, 293:8, 294:5, 294:6, 368:23, 512:5, 512:8, 513:24, 516:7, 517:15, 518:23, 519:16, 541:12
**EPA's** [2] - 294:8, 514:17
**epicenters** [1] - 483:23
**equally** [2] - 352:20, 353:5
**equation** [2] - 328:5, 378:14
**equilibrium** [2] - 331:17, 331:21
**equipment** [6] - 356:2, 400:13, 464:22, 468:19, 495:8, 495:12
**equitably** [1] - 292:5
**equivalent** [3] - 387:4, 423:24, 424:19
**equivalently** [1] - 368:9
**ER** [4] - 427:20, 427:24, 428:11
**Erickson** [7] - 348:23, 349:11, 350:25, 360:10, 362:8, 455:2, 455:24
**Erickson/BK** [1] - 356:13
**error** [7] - 319:7, 319:22, 325:16, 325:17, 374:19, 375:7, 375:18
**errors** [5] - 325:8, 325:14, 326:6, 326:9, 540:1
**ERRP** [7] - 405:2, 406:18, 407:8, 407:19, 439:22, 445:20, 446:7
**especially** [1] - 546:15
**essence** [1] - 460:14
**essentially** [4] - 316:18, 346:20, 400:4, 465:25
**establish** [1] - 516:23
**established** [1] - 479:17
**establishing** [3] - 278:19, 280:21, 283:1
**estimate** [1] - 300:6
**estimated** [4] - 300:24, 406:17, 438:9, 439:21
**estimates** [2] - 406:23, 456:14
**estimating** [1] - 339:2
**estimations** [1] - 452:12
**et** [3] - 443:9, 456:2, 469:4
**ethanol** [3] - 411:18, 411:21, 411:23
**evaluate** [14] - 293:22, 323:18, 334:13, 338:16, 364:19, 369:23, 431:19, 510:12, 523:7, 523:15, 532:3, 533:3, 544:9, 548:15
**evaluated** [2] - 339:6, 493:21
**evaluating** [1] - 485:3
**evaluation** [6] - 319:10, 335:5, 372:15, 393:10, 413:10, 539:2
**evaluations** [1] - 539:3
**event** [8] - 305:25, 411:2, 420:11, 440:1, 440:14, 483:6, 483:21, 496:18
**events** [6] - 405:13, 405:14, 432:15, 445:7, 474:4, 483:21
**evidence** [1] - 359:14
**exact** [3] - 320:5, 433:17, 519:21
**exactly** [8] - 320:11, 320:13, 370:8, 468:22, 493:25, 498:13, 521:15, 532:3
**examination** [3] - 290:12, 472:8, 472:14
**Examination** [28] - 286:12,

286:13, 286:14, 286:15, 286:16, 286:17, 286:21, 286:22, 286:23, 286:24, 287:3, 287:4, 287:5, 287:8, 287:9, 287:10, 287:11, 287:12, 287:13, 287:17, 287:22, 287:23, 287:24, 287:25, 288:4, 288:5, 288:8, 288:9
**EXAMINATION** [28] - 291:8, 355:17, 370:1, 371:19, 389:22, 393:22, 396:4, 398:8, 403:10, 408:12, 411:11, 432:22, 441:9, 448:5, 458:12, 461:20, 467:19, 470:5, 473:4, 484:19, 503:20, 513:1, 525:17, 526:16, 527:15, 532:17, 537:13, 545:11
**examine** [1] - 290:18
**examined** [8] - 396:2, 398:6, 403:8, 408:10, 467:17, 503:18, 527:13, 537:11
**Examiner** [1] - 461:12
**examiner** [13] - 289:7, 289:16, 389:19, 392:12, 393:17, 395:11, 396:16, 397:21, 408:3, 410:19, 416:21, 457:23, 503:16
**EXAMINER** [85] - 283:23, 289:4, 289:21, 290:4, 290:7, 290:10, 290:23, 290:25, 291:6, 303:7, 321:20, 321:24, 333:1, 333:20, 333:22, 355:15, 388:23, 389:3, 389:20, 392:15, 395:20, 395:23, 398:1, 398:3, 403:5, 408:7, 411:9, 416:11, 416:22, 417:11, 417:13, 417:16, 417:18, 447:3, 447:9, 447:14, 448:3, 448:16, 458:2, 458:4, 458:9, 461:4, 461:10, 461:17, 467:13, 471:15, 472:7, 500:9, 500:21, 501:7, 501:12, 502:18, 502:22, 502:24, 503:2, 503:6, 503:13, 505:18, 505:20, 511:16, 511:18, 512:21, 520:6, 520:16, 522:23, 525:14, 526:25, 527:3, 527:7, 530:2, 530:5, 530:8, 532:16, 536:24, 537:5, 537:8, 540:16, 541:8, 545:10, 548:12, 550:10, 550:20, 550:25, 551:3, 551:7
**examiner's** [1] - 416:10
**example** [7] - 306:6, 369:10, 393:9, 401:13, 454:6, 483:16, 496:14
**examples** [1] - 506:10
**exceed** [5] - 418:20, 419:10, 436:3, 478:19, 493:23
**exceeding** [1] - 424:23
**exceeds** [1] - 469:8
**except** [1] - 320:10
**exception** [1] - 529:16
**excluding** [1] - 425:22
**excuse** [7] - 406:10, 407:11, 409:15, 438:1, 451:7, 453:22, 532:2
**executing** [1] - 437:20
**execution** [1] - 445:23
**exemption** [3] - 540:25, 541:1, 541:5
**exemptions** [2] - 541:11, 541:19
**exercise** [1] - 349:23
**exhibit** [19] - 327:2, 333:14, 333:22, 373:11, 409:18, 454:9, 457:24, 458:4, 459:3, 459:4, 461:2, 461:6, 461:9, 461:11, 510:24, 510:25, 511:6, 530:5, 540:16
**Exhibit** [34] - 288:12, 288:17, 294:13, 304:24, 327:19, 329:7, 356:10, 356:12, 394:7, 399:11, 434:19, 448:8, 458:17, 458:23, 461:3, 471:5, 471:18, 474:9, 475:8, 505:5, 505:17, 508:16, 509:9, 509:23, 510:15, 510:16, 511:2, 511:21, 529:2, 529:8, 530:8, 539:20, 540:11, 540:14
**Exhibits** [3] - 451:21, 511:14, 514:5
**EXHIBITS** [2] - 288:11, 288:16
**exhibits** [7] - 326:13, 358:16, 450:22, 450:25, 458:15, 511:18, 539:14
**exist** [7] - 333:7, 372:12, 375:20, 420:17, 420:19, 452:22, 455:12
**existed** [2] - 360:2, 361:10
**existing** [2] - 328:19, 476:7
**exists** [2] - 372:3, 481:9
**expand** [5] - 314:8, 478:18, 498:15, 498:19, 500:1
**expanded** [2] - 443:9, 500:17
**expanding** [1] - 430:25
**expands** [1] - 402:4
**expansion** [1] - 480:13
**expect** [6] - 331:25, 346:10, 346:12, 434:8, 486:21, 493:14
**expectations** [2] - 431:7, 460:15
**expected** [10] - 366:22, 368:15, 379:15, 391:9, 391:17, 391:24, 434:7, 436:21, 444:21, 550:21
**expense** [1] - 338:6
**experience** [32] - 323:11, 323:15, 325:16, 326:6, 340:11, 396:18, 396:21, 398:20, 403:22, 408:23, 468:8, 491:19, 496:2, 504:15, 505:15, 506:25, 507:1, 518:1, 520:19, 523:18, 529:15, 538:3, 538:4, 538:22, 539:23, 540:12, 540:19, 542:3, 542:6, 545:14, 546:11
**experiences** [1] - 543:8
**expert** [3] - 421:5, 427:11, 506:19
**expertise** [2] - 530:16, 530:20
**experts** [4] - 417:5, 486:15, 520:15, 548:11
**explain** [25] - 301:6, 359:3, 361:11, 364:6, 365:2, 365:8, 365:20, 366:8, 366:13, 366:24, 368:10, 368:11, 369:2, 369:6, 371:5, 397:8, 405:15, 415:1, 415:21, 434:22, 449:9, 450:1, 459:7, 463:10, 476:8
**explained** [2] - 448:13, 518:1
**explanation** [4] - 372:5, 372:24, 378:9, 386:14
**explicit** [1] - 499:22
**exploration** [1] - 529:25
**exploratory** [1] - 507:20
**explore** [1] - 507:18
**exploring** [1] - 524:19
**export** [4] - 299:16, 306:13, 306:15, 307:4
**exporting** [1] - 307:3
**expose** [1] - 543:4
**Express** [9] - 277:6, 278:8, 279:10, 280:12, 281:12, 282:14, 309:12, 482:6, 484:3
**Express'** [1] - 476:19
**expressed** [1] - 310:14
**extends** [1] - 327:25
**extensions** [1] - 541:14
**extensive** [1] - 530:13
**extent** [24] - 293:18, 311:16, 319:15, 321:10, 321:11, 327:7, 349:25, 362:19, 364:9, 364:10, 364:13, 372:4, 373:12, 373:18, 373:20, 374:1, 374:17, 374:18, 375:8, 378:16, 383:13, 434:22, 463:11, 463:18
**extents** [1] - 451:3
**external** [8] - 298:24, 298:25, 299:8, 299:17, 300:13, 300:16, 300:22, 491:25
**extra** [2] - 469:20, 510:18
**Exxon** [5] - 528:5, 528:6, 528:14, 528:15, 528:20

## F

**face** [2] - 525:21
**face-to-face** [1] - 525:21
**facies** [9] - 376:13, 376:16, 376:18, 381:17, 382:17, 385:24, 385:25, 414:9, 531:21
**Facilities** [1] - 401:4
**facilities** [44] - 308:4, 308:23, 329:17, 334:3, 336:1, 356:3, 357:1, 357:6, 357:21, 359:12, 361:3, 363:9, 364:21, 366:13, 397:14, 400:5, 401:11, 411:18, 415:3, 420:20, 421:8, 421:11, 425:16, 425:23, 427:19, 437:13, 439:3, 440:21, 441:18, 441:25, 456:15, 459:12, 460:9, 466:7, 468:5, 468:19, 469:21, 470:21, 474:24, 476:19, 477:23, 482:8, 489:23, 524:4
**Facility** [2] - 448:10, 454:3
**facility** [96] - 277:6, 277:20, 278:9, 279:10, 279:23, 280:12, 281:12, 282:2, 282:14, 292:3, 292:5, 292:18, 293:5, 295:10, 295:11, 310:20, 311:5, 311:11, 311:17, 311:21, 312:3, 313:16, 314:5, 314:12, 314:18, 314:22, 315:16, 318:22, 324:11, 326:20, 327:13, 327:25, 335:14, 336:8, 351:23, 352:19, 352:23, 353:4, 353:16, 355:25, 356:4, 356:18, 357:18, 358:16, 359:2, 359:19, 360:25, 361:13, 363:11, 370:9, 371:3, 371:5, 373:13, 373:23, 388:9, 388:18, 393:5, 393:10, 393:14, 394:23, 400:24, 407:3, 407:7, 407:16, 419:1,

419:17, 421:4, 422:1, 422:13, 422:19, 424:2, 424:9, 433:1, 442:19, 451:1, 454:4, 454:7, 454:18, 455:20, 456:10, 456:12, 457:7, 457:17, 459:16, 460:22, 476:7, 496:16, 496:24, 497:20, 497:24, 498:15, 498:20, 498:22, 499:23, 500:2, 500:17
**fact** [3] - 311:21, 383:25, 448:20
**factor** [10] - 310:15, 312:23, 315:14, 322:4, 322:16, 324:13, 350:4, 350:5, 351:3, 542:1
**factors** [1] - 487:6
**factual** [1] - 336:24
**failure** [4] - 439:25, 440:13, 476:14, 479:6
**faint** [1] - 518:22
**fair** [14] - 295:21, 319:19, 343:15, 343:18, 460:23, 477:14, 499:1, 524:12, 525:12, 534:9, 534:10, 545:16, 545:25, 547:24
**fairly** [3] - 349:1, 360:8, 427:6
**familiar** [20] - 294:9, 326:22, 326:25, 327:6, 328:22, 328:25, 334:24, 335:12, 428:1, 484:6, 506:20, 529:9, 530:19, 536:4, 536:9, 536:15, 541:10, 541:13, 546:25, 547:8
**familiarity** [3] - 335:20, 335:23, 340:7
**far** [20] - 313:10, 315:1, 361:22, 364:11, 370:7, 370:8, 375:22, 416:1, 428:19, 431:25, 433:1, 433:12, 443:12, 475:23, 481:25, 490:10, 490:18, 517:24, 542:12, 545:1
**fashion** [1] - 376:9
**fault** [15] - 362:10, 362:13, 362:17, 362:21, 362:25, 363:1, 363:4, 363:10, 363:14, 363:15, 363:16, 528:15, 528:16, 528:17, 528:19
**Faults** [1] - 394:13
**faults** [5] - 394:13, 394:16, 394:18, 394:22, 394:23
**feasibility** [2] - 341:6, 543:15
**feasible** [1] - 543:6
**features** [3] - 326:17, 395:5, 452:24
**federal** [3] - 332:17, 506:2, 506:4
**FEED** [1] - 418:19
**feedback** [2] - 527:9, 527:10
**feeding** [1] - 401:22
**feet** [30] - 364:2, 364:3, 373:19, 374:12, 374:13, 375:3, 375:5, 390:15, 395:1, 410:1, 423:24, 424:18, 433:6, 433:7, 433:8, 433:17, 435:8, 455:1, 455:3, 455:22, 488:8, 488:22, 489:3, 489:12, 529:21
**felt** [3] - 318:5, 368:16, 465:22
**few** [10] - 383:8, 389:18, 397:22, 468:6, 468:23, 472:13, 484:11, 508:15, 531:19, 542:10
**fiberoptic** [3] - 401:14, 402:13, 402:17
**Field** [1] - 538:7
**field** [17] - 278:19, 279:6, 280:21, 281:8, 283:1, 283:12, 340:25, 341:4, 414:1, 414:16, 436:17, 528:23, 542:7, 542:10, 542:23, 543:2, 546:16
**fields** [1] - 538:18
**Figure** [25] - 335:6, 337:10, 338:21, 345:2, 348:13, 350:24, 362:12, 364:4, 368:4, 370:6, 372:1, 374:14, 378:12, 379:8, 381:24, 383:14, 394:14, 395:8, 409:21, 413:2, 421:16, 423:14, 428:24, 434:17, 463:10
**figure** [25] - 327:17, 356:15, 361:18, 362:11, 364:7, 374:10, 374:14, 376:10, 376:14, 377:6, 378:12, 378:13, 378:17, 378:18, 382:8, 409:18, 414:8, 421:18, 421:19, 423:14, 439:17, 443:7, 471:23, 471:25
**Figures** [2] - 377:4, 377:8
**figures** [1] - 377:9
**File** [1] - 371:4
**file** [17] - 295:1, 295:2, 295:3, 295:25, 296:4, 297:18, 298:3, 300:2, 300:15, 325:17, 533:14, 547:10, 547:13, 547:18, 547:19, 547:21
**filed** [3] - 522:12, 536:5, 536:16
**files** [14] - 294:22, 295:22, 298:1, 299:17, 299:21, 300:12, 301:10, 512:14, 512:17, 544:19, 549:2, 549:23, 549:24, 549:25
**filled** [4] - 361:24, 362:1, 362:16, 363:2
**final** [7] - 371:16, 513:24, 513:25, 514:15, 521:4, 526:1, 544:16
**finalizing** [1] - 460:13
**finally** [5] - 400:17, 401:18, 402:1, 402:15, 457:20
**Financial** [1] - 406:3
**financial** [10] - 278:7, 280:11, 282:13, 404:5, 404:16, 406:5, 406:12, 406:21, 406:24, 456:5
**fine** [8] - 290:8, 290:10, 356:7, 389:21, 392:16, 416:15, 429:8, 473:3
**finish** [4] - 397:22, 416:4, 416:18, 472:20
**finished** [1] - 515:19
**fire** [2] - 436:9, 446:2
**fired** [1] - 468:12
**firm** [1] - 409:3
**Firm** [2] - 285:3, 289:23
**first** [38] - 295:22, 304:24, 319:7, 319:17, 319:18, 319:22, 320:12, 383:11, 392:20, 395:21, 396:2, 398:6, 399:7, 400:2, 400:25, 403:8, 404:24, 405:16, 408:10, 412:12, 439:4, 439:19, 449:7, 449:25, 462:2, 467:17, 472:15, 489:25, 495:18, 503:8, 503:18, 511:24, 513:16, 527:5, 527:13, 537:11, 542:9
**Fischer** [18] - 342:20, 356:13, 360:20, 362:7, 363:7, 363:11, 369:1, 370:17, 395:16, 423:5, 424:16, 442:20, 448:23, 449:21, 450:10, 450:17, 451:14, 453:3
**five** [24] - 313:8, 313:13, 314:20, 314:21, 318:24, 319:4, 319:7, 319:17, 319:18, 319:22, 320:3, 326:4, 350:17, 368:3, 371:9, 373:24, 430:23, 444:17, 494:8, 496:14, 496:23, 497:18, 498:16, 499:8
**five-year** [5] - 314:21, 318:24, 350:17, 444:17, 496:14
**flange** [1] - 469:4
**Flemmer** [21] - 349:5, 349:14, 357:9, 357:12, 357:19, 358:19, 360:7, 361:7, 365:1, 365:2, 365:14, 365:16, 369:19, 412:24, 413:5, 449:19, 453:19, 454:24, 455:16, 455:18, 474:17
**Flint** [1] - 536:5
**flip** [2] - 353:19, 510:15
**flood** [2] - 538:14, 539:7
**floods** [2] - 538:20, 542:6
**flow** [19] - 345:7, 421:18, 424:12, 425:3, 427:9, 427:12, 442:2, 470:8, 470:15, 470:20, 475:8, 475:11, 475:24, 480:16, 480:19, 480:23, 481:15, 490:2, 490:3
**flowing** [1] - 339:18
**flowline** [21] - 406:16, 407:4, 407:17, 421:22, 423:5, 423:6, 423:23, 424:12, 424:25, 427:22, 428:4, 428:13, 428:20, 433:13, 433:16, 442:15, 453:13, 456:17, 465:4, 465:7, 493:20
**flowlines** [19] - 356:23, 397:3, 397:4, 421:21, 422:21, 423:13, 425:3, 435:4, 435:6, 441:24, 442:4, 464:16, 470:9, 477:23, 482:5, 482:6, 482:7, 482:23, 494:1
**fluctuation** [2] - 426:24, 440:24
**fluctuations** [1] - 427:3
**fluid** [18] - 298:13, 317:20, 339:3, 343:23, 345:11, 358:9, 362:20, 363:5, 380:5, 380:6, 381:11, 386:8, 386:9, 409:24, 429:15, 429:19, 429:25, 544:1
**fluids** [3] - 339:11, 339:17, 544:11
**flux** [1] - 434:5
**FMI** [2] - 413:24, 415:12
**focus** [1] - 380:13
**focused** [5] - 293:10, 401:12, 504:20, 522:14, 523:4
**fold** [3] - 354:21, 354:23, 354:24
**folks** [3] - 417:7, 417:8, 506:12
**follow** [5] - 414:23, 419:4, 423:3, 426:10, 440:19
**follow-up** [3] - 414:23, 423:3, 440:19
**follow-ups** [1] - 426:10

**followed** [2] - 507:23, 516:22
**following** [7] - 289:1, 400:23, 496:16, 504:23, 507:16, 514:1, 526:7
**follows** [9] - 388:10, 396:3, 398:7, 403:9, 408:11, 467:18, 503:19, 527:14, 537:12
**foot** [7] - 349:9, 349:12, 415:1, 415:4, 454:20, 541:22
**footage** [1] - 464:11
**FOR** [2] - 284:18, 285:6
**forecloses** [1] - 544:7
**foregoing** [2] - 552:6, 552:10
**foremost** [1] - 400:25
**forgot** [2] - 394:5, 468:25
**form** [10] - 295:3, 317:19, 323:16, 332:16, 332:23, 513:23, 514:4, 521:4, 522:18, 522:20
**formalize** [1] - 482:22
**Formation** [30] - 277:5, 278:4, 278:17, 279:6, 279:9, 280:7, 280:20, 281:7, 281:11, 282:10, 282:23, 283:11, 310:12, 340:19, 358:20, 362:25, 371:13, 386:18, 387:10, 388:1, 394:25, 395:2, 409:25, 410:14, 410:17, 412:25, 414:3, 451:12, 451:14, 530:18
**formation** [24] - 298:13, 327:12, 328:20, 339:3, 339:11, 339:23, 343:17, 345:8, 345:11, 349:25, 360:23, 361:8, 380:23, 382:15, 386:21, 387:11, 393:1, 451:17, 455:11, 485:5, 487:9, 530:23, 534:13, 542:1
**formations** [11] - 339:5, 355:3, 355:8, 359:15, 360:13, 387:3, 387:5, 455:12, 474:18, 525:4, 528:25
**forming** [1] - 391:20
**formula** [1] - 320:16
**formulation** [2] - 485:21, 486:18
**formulations** [1] - 485:10
**FORSBERG** [1] - 284:8
**forth** [4] - 460:14, 460:23, 508:4, 526:12
**forthcoming** [1] - 438:19
**forward** [6] - 289:15, 358:2, 358:14, 393:18, 426:21, 517:22
**four** [10] - 299:23, 301:6, 301:11, 325:19, 325:21, 357:1, 395:13, 416:12, 444:9, 528:6
**fourth** [1] - 343:3
**Fourth** [1] - 285:5
**Fox** [8] - 359:20, 360:3, 370:23, 371:12, 388:1, 430:18, 471:23, 472:4
**frac** [3] - 414:25, 415:22, 418:11
**fracture** [7] - 328:15, 359:6, 462:3, 462:5, 462:7, 462:9, 462:18
**fractures** [12] - 361:10, 361:12, 361:20, 361:22, 361:25, 362:9, 362:13, 362:15, 362:24, 363:1, 414:15, 414:20
**frame** [3] - 379:3, 431:3, 494:8
**framework** [2] - 291:17, 509:18
**Fredrikson** [1] - 284:11
**free** [1] - 307:12
**freely** [1] - 522:7
**frequency** [5] - 368:1, 400:15, 431:20, 431:21, 476:12
**frequent** [1] - 436:11
**Freshwater** [1] - 457:3
**freshwater** [4] - 336:16, 339:13, 386:19, 409:24
**freshwater-based** [1] - 409:24
**FRIED** [1] - 284:7
**Fritz** [1] - 334:15
**Fritz-Lutz** [1] - 334:15
**front** [7] - 313:5, 326:12, 328:5, 336:18, 382:8, 529:1, 539:17
**Front** [1] - 284:12
**full** [17] - 396:8, 399:13, 403:12, 408:14, 412:13, 424:7, 467:21, 478:15, 501:25, 502:11, 502:13, 503:22, 515:24, 527:17, 537:15, 537:17, 542:23
**full-field** [1] - 542:23
**full-time** [1] - 515:24
**fully** [1] - 304:9
**function** [2] - 293:11, 345:15
**functionally** [1] - 376:22
**FURTHER** [2] - 393:22, 552:9
**furthest** [1] - 433:7
**future** [2] - 356:19, 357:2

## G

**gain** [1] - 507:21
**Garner** [1] - 289:7
**GARNER** [85] - 283:22, 289:4, 289:21, 290:4, 290:7, 290:10, 290:23, 290:25, 291:6, 303:7, 321:20, 321:24, 333:1, 333:20, 333:22, 355:15, 388:23, 389:3, 389:20, 392:15, 395:20, 395:23, 398:1, 398:3, 403:5, 408:7, 411:9, 416:11, 416:22, 417:11, 417:13, 417:16, 417:18, 447:3, 447:9, 447:14, 448:3, 448:16, 458:2, 458:4, 458:9, 461:4, 461:10, 461:17, 467:13, 471:15, 472:7, 500:9, 500:21, 501:7, 501:12, 502:18, 502:22, 502:24, 503:2, 503:6, 503:13, 505:18, 505:20, 511:16, 511:18, 512:21, 520:6, 520:16, 522:23, 525:14, 526:25, 527:3, 527:7, 530:2, 530:5, 530:8, 532:16, 536:24, 537:5, 537:8, 540:16, 541:8, 545:10, 548:12, 550:10, 550:20, 550:25, 551:3, 551:7
**GAS** [1] - 277:2
**Gas** [6] - 289:9, 507:17, 514:1, 514:19, 515:2, 517:1
**gas** [22] - 338:3, 344:22, 391:14, 402:8, 402:9, 422:15, 430:8, 453:1, 453:2, 453:4, 471:21, 471:24, 472:3, 485:7, 506:6, 524:3, 538:8, 542:11, 542:13, 542:19, 543:4, 543:5
**gases** [2] - 542:16, 542:18
**Gasification** [1] - 536:10
**gathered** [2] - 367:10, 400:15
**gathering** [2] - 400:14, 515:7
**gauge** [1] - 402:21
**gauges** [6] - 401:14, 402:20, 453:20, 453:24, 455:17, 457:19
**gears** [1] - 406:1
**general** [15] - 430:20, 440:5, 441:1, 459:22, 460:11, 460:15, 485:25, 490:3, 504:24, 506:8, 510:7, 516:7, 516:23, 520:20, 541:17
**generalized** [4] - 421:18, 475:7, 475:11, 475:24
**generally** [29] - 328:24, 335:12, 335:25, 340:9, 345:18, 345:20, 390:17, 390:23, 400:6, 401:6, 404:25, 443:3, 443:13, 462:4, 462:12, 466:3, 474:13, 474:14, 482:16, 486:3, 504:3, 506:14, 506:25, 509:1, 509:16, 510:5, 511:1, 521:6, 521:8
**generate** [1] - 348:6
**generated** [4] - 295:4, 295:15, 324:6, 327:7
**generation** [1] - 468:13
**Geochem** [1] - 523:1
**geochemical** [9] - 360:11, 360:15, 360:17, 366:5, 376:25, 377:19, 512:16, 522:25, 523:14
**geographic** [1] - 311:16
**geographical** [1] - 363:19
**geographically** [1] - 350:9
**geologic** [30] - 277:4, 277:18, 278:8, 279:5, 279:8, 279:22, 280:11, 281:6, 281:10, 281:24, 282:13, 283:11, 291:22, 293:15, 358:16, 363:20, 364:7, 364:9, 367:11, 369:5, 374:17, 375:8, 375:16, 387:6, 387:12, 450:25, 452:1, 510:11, 512:6, 545:3
**Geologic** [1] - 451:21
**geological** [3] - 409:2, 510:12, 512:4
**Geological** [1] - 298:10
**geologist** [3] - 398:23, 398:25, 529:18
**geologists** [3] - 414:17, 516:11, 525:4
**geology** [3] - 350:19, 398:22, 527:24
**geometry** [1] - 363:3
**geophysics** [1] - 528:1
**geoscientist** [1] - 398:16
**GERVING** [1] - 285:7
**gigabytes** [1] - 300:20
**given** [23] - 319:8, 319:12, 319:16, 319:23, 327:4, 341:5, 352:15, 352:21, 355:23, 358:5, 363:3, 369:9, 381:8, 410:22, 417:23, 425:13, 460:11, 461:8, 473:10, 480:13, 512:16, 541:22, 544:6
**glancing** [1] - 375:3
**glasses** [1] - 475:14
**GLUDT** [1] - 284:10
**gotcha** [1] - 527:7

**govern** [2] - 296:14, 483:1
**governed** [4] - 296:12, 304:16, 306:8, 322:22
**government** [2] - 332:17, 506:4
**governments** [1] - 506:2
**grade** [2] - 487:22, 517:24
**gradient** [10] - 328:15, 359:7, 415:22, 418:11, 425:25, 462:4, 462:5, 462:7, 462:9, 462:18
**gradients** [1] - 365:13
**grading** [1] - 414:25
**grant** [2] - 340:24, 341:7
**granted** [5] - 294:7, 505:20, 535:11, 536:21, 550:7
**graph** [1] - 413:8
**gravity** [3] - 538:8, 542:11, 543:5
**gray** [2] - 369:18, 374:4
**great** [4] - 395:15, 401:8, 406:8, 456:8
**greater** [10] - 319:21, 418:23, 419:5, 419:12, 419:14, 419:18, 430:4, 465:24, 483:7, 486:2
**greatly** [2] - 381:14, 427:4
**green** [6] - 336:6, 336:10, 349:6, 349:13, 356:19, 369:16
**grid** [4] - 318:13, 363:25, 364:1, 364:3
**ground** [5] - 410:5, 443:7, 443:8, 496:23, 501:6
**groundwater** [12] - 359:22, 370:23, 371:12, 402:8, 402:9, 430:8, 431:20, 440:10, 452:18, 471:20, 524:14
**group** [15] - 355:21, 366:9, 367:21, 367:23, 411:15, 412:12, 412:15, 416:4, 416:5, 447:21, 461:14, 472:12, 472:15, 484:13, 528:16
**groups** [2] - 506:5, 528:24
**GSA** [1] - 506:3
**guess** [28] - 321:1, 321:6, 346:8, 372:11, 372:24, 374:25, 375:25, 377:19, 378:6, 382:21, 385:2, 386:5, 386:8, 386:11, 386:19, 394:10, 401:18, 402:8, 429:22, 442:3, 446:19, 469:18, 472:8, 472:22, 488:24, 520:8, 544:9
**guessing** [1] - 419:21
**guesstimate** [1] - 382:8
**guidance** [14] - 405:3, 508:9, 508:13, 508:18, 508:25, 509:1, 509:25, 510:6, 511:8, 513:24, 514:11, 516:23, 518:2, 520:19
**Guidance** [1] - 511:5
**guys** [6] - 370:4, 427:25, 434:21, 436:14, 438:3, 465:18

## H

**half** [1] - 360:10
**Halliburton** [2] - 486:25, 528:11
**hand** [6] - 363:21, 395:24, 398:4, 403:6, 408:8, 465:13
**handed** [2] - 294:12, 448:14
**handful** [2] - 361:10, 361:20
**handing** [1] - 458:14
**handle** [5] - 404:19, 427:3, 427:8, 438:5, 461:22
**hang** [1] - 463:9
**hard** [10] - 298:24, 298:25, 299:8, 299:12, 299:17, 299:21, 300:14, 300:16, 300:22, 301:10
**HAUPT** [1] - 285:8
**hazard** [1] - 436:24
**Hazen** [1] - 446:4
**head** [5] - 426:8, 435:2, 473:17, 485:20, 494:1
**health** [6] - 308:9, 308:12, 308:16, 308:19, 403:19, 504:18
**hear** [3] - 308:13, 503:11, 503:12
**heard** [2] - 492:7, 533:23
**HEARING** [86] - 283:15, 283:23, 289:4, 289:21, 290:4, 290:7, 290:10, 290:23, 290:25, 291:6, 303:7, 321:20, 321:24, 333:1, 333:20, 333:22, 355:15, 388:23, 389:3, 389:20, 392:15, 395:20, 395:23, 398:1, 398:3, 403:5, 408:7, 411:9, 416:11, 416:22, 417:11, 417:13, 417:16, 417:18, 447:3, 447:9, 447:14, 448:3, 448:16, 458:2, 458:4, 458:9, 461:4, 461:10, 461:17, 467:13, 471:15, 472:7, 500:9, 500:21, 501:7, 501:12, 502:18, 502:22, 502:24, 503:2, 503:6, 503:13, 505:18, 505:20, 511:16, 511:18, 512:21, 520:6, 520:16, 522:23, 525:14, 526:25, 527:3, 527:7, 530:2, 530:5, 530:8, 532:16, 536:24, 537:5, 537:8, 540:16, 541:8, 545:10, 548:12, 550:10, 550:20, 550:25, 551:3, 551:7
**Hearing** [1] - 289:6
**hearing** [13] - 289:7, 289:8, 314:14, 315:7, 352:12, 444:23, 448:19, 450:19, 498:5, 498:20, 503:15, 506:22, 548:8
**hearings** [7] - 289:5, 289:8, 289:11, 448:12, 449:13, 551:9, 551:10
**heats** [1] - 478:16
**heavily** [1] - 508:11
**height** [1] - 350:6
**held** [1] - 345:13
**helium** [1] - 529:24
**HELMS** [5] - 284:3, 290:24, 291:5, 525:18, 526:15
**Helms** [1] - 525:19
**Helms.....** [1] - 287:24
**help** [6] - 291:23, 292:7, 376:7, 417:9, 423:7, 436:7
**helped** [1] - 508:19
**HEREBY** [2] - 552:5, 552:9
**herein** [1] - 289:2
**hereinbefore** [1] - 552:7
**high** [5] - 355:7, 360:8, 361:9, 391:14, 401:6
**high-quality** [1] - 355:7
**higher** [17] - 309:25, 310:1, 346:3, 349:20, 351:2, 365:10, 367:1, 390:17, 390:23, 391:13, 415:6, 419:17, 462:9, 462:10, 462:17, 465:7, 474:20
**highest** [1] - 351:19
**highlight** [2] - 396:16, 408:21
**highlighted** [2] - 401:2, 413:6
**highlights** [1] - 399:17
**highly** [2] - 469:19, 481:12
**Hill** [1] - 370:23
**Hills** [7] - 359:20, 360:4, 371:13, 388:1, 430:18, 471:24, 472:4
**Hintz** [22] - 369:1, 370:17, 371:2, 395:16, 407:24, 417:25, 418:8, 430:16, 442:19, 448:23, 449:22, 450:10, 451:15, 453:4, 458:25, 459:2, 459:9, 459:12, 459:16, 459:25, 460:21, 471:19
**hired** [3] - 507:8, 519:18, 520:12
**historical** [2] - 359:21, 499:19
**history** [4] - 313:14, 357:23, 404:2, 542:24
**hit** [1] - 394:5
**hitting** [1] - 399:16
**hold** [1] - 398:21
**holders** [1] - 405:23
**holding** [1] - 429:14
**hole** [2] - 409:23, 441:17
**Honor** [2] - 290:19, 302:24
**hope** [2] - 436:13, 472:23
**hopefully** [1] - 434:16
**hopes** [1] - 475:13
**horizontal** [2] - 291:23, 296:2
**hour** [1] - 388:25
**hours** [10] - 324:24, 520:23, 548:2, 548:5, 548:8, 548:25, 549:5, 549:7, 549:20
**human** [5] - 308:9, 308:11, 308:15, 308:19, 495:14
**humans** [1] - 445:5
**hundred** [11] - 343:17, 343:22, 344:9, 345:10, 349:9, 349:12, 349:19, 350:16, 351:8, 351:10, 375:5
**hundred-foot** [2] - 349:9, 349:12
**hundreds** [1] - 378:25
**Hunt** [2] - 398:2, 398:12
**hunt** [1] - 398:3
**HUNT** [9] - 398:5, 398:12, 420:8, 420:11, 427:14, 427:24, 430:10, 434:24, 444:11
**HUNT/JAY** [1] - 286:19
**hydraulically** [1] - 359:15
**hydro** [2] - 490:11, 490:20
**hydrogeology** [1] - 506:15
**HydroSolutions** [11] - 504:2, 504:4, 504:16, 505:1, 505:3, 505:23, 505:25, 506:13, 506:25, 507:8, 523:21
**hypothetical** [5] - 338:22, 338:23, 349:18, 496:21, 497:18

## I

**idea** [3] - 300:21, 430:20, 430:24
**identifiable** [1] - 395:8

**identification** [2] - 394:21, 405:12
**identified** [7] - 376:13, 377:17, 394:15, 394:19, 395:7, 443:18, 444:4
**identify** [5] - 294:23, 335:18, 394:14, 491:5, 510:9
**II** [12] - 283:16, 340:19, 341:1, 342:2, 409:6, 524:18, 524:20, 524:24, 540:20, 540:22, 540:23
**image** [3] - 354:23, 413:7, 451:22
**images** [2] - 355:7, 372:20
**imagine** [1] - 428:1
**imaging** [2] - 360:23, 361:8
**immediate** [1] - 549:3
**immediately** [1] - 388:10
**immobility** [1] - 381:11
**impact** [9] - 293:22, 316:16, 331:3, 340:16, 354:18, 390:18, 415:11, 506:18, 548:16
**impacted** [4] - 328:19, 330:25, 376:9, 524:3
**impacts** [4] - 524:6, 524:7, 544:15
**implement** [1] - 445:20
**implemented** [2] - 427:18, 539:6
**implementing** [1] - 508:14
**implications** [1] - 507:13
**implied** [1] - 499:22
**importance** [2] - 388:13, 445:13
**important** [6] - 351:21, 351:24, 352:3, 352:5, 487:24, 534:7
**imposed** [1] - 541:5
**impressed** [3] - 427:21, 428:18, 442:25
**inaccurate** [1] - 499:24
**inadvertent** [1] - 493:21
**incentive** [1] - 332:13
**inch** [4] - 343:24, 484:1, 491:21
**incidental** [1] - 524:3
**include** [5] - 401:20, 422:15, 452:23, 452:24, 460:22
**included** [14] - 277:18, 279:21, 281:24, 310:4, 315:16, 405:6, 405:19, 406:13, 438:10, 474:6, 498:22, 514:10, 514:16
**includes** [4] - 399:18, 451:18, 459:4, 460:7
**including** [12] - 296:13, 341:10, 362:9, 367:17, 386:16, 409:6, 425:22, 436:25, 446:2, 493:20, 506:6, 539:1
**incorporate** [1] - 364:18
**incorporated** [1] - 367:11
**Incorporated** [2] - 504:2, 504:4
**increase** [18] - 327:25, 329:24, 330:1, 330:13, 331:6, 331:12, 331:15, 332:9, 332:10, 337:8, 339:1, 342:15, 342:23, 365:25, 478:23, 481:21, 495:5
**increases** [4] - 326:24, 327:8, 327:12, 341:14
**independent** [2] - 506:14, 521:13
**independently** [2] - 422:24, 423:2
**INDEX** [1] - 286:2
**indicate** [10] - 317:18, 326:23, 327:7, 348:19, 360:11, 373:2, 375:25, 381:24, 385:8, 461:23
**indicated** [13] - 303:20, 314:17, 336:5, 336:11, 337:9, 367:20, 378:24, 387:21, 473:8, 475:11, 492:22, 534:21, 552:8
**indicates** [7] - 339:11, 374:10, 377:11, 434:4, 444:8, 511:2, 534:1
**indicating** [1] - 344:11
**indication** [2] - 363:15, 443:20
**indicative** [1] - 335:10
**individual** [16] - 384:18, 405:24, 418:22, 419:4, 420:22, 421:3, 421:20, 422:21, 433:14, 441:25, 442:4, 442:10, 452:10, 470:9, 495:19, 525:10
**individually** [1] - 405:23
**individuals** [2] - 411:1, 506:1
**induced** [2] - 432:6, 467:3
**Industrial** [12] - 289:6, 294:24, 297:21, 298:7, 298:9, 307:21, 315:9, 322:3, 521:20, 522:12, 525:20, 547:1
**industrial** [1] - 411:17
**industry** [1] - 396:21
**infinitely** [3] - 384:1, 384:2, 384:7
**influence** [1] - 367:1
**influenced** [1] - 462:4
**influential** [1] - 317:21
**inform** [3] - 457:9, 508:19, 509:12
**information** [38] - 304:2, 304:21, 324:8, 324:10, 336:3, 336:18, 338:12, 363:21, 412:19, 432:18, 439:10, 456:25, 457:9, 457:18, 473:21, 477:9, 498:9, 499:17, 500:6, 509:2, 510:10, 512:4, 512:5, 514:21, 515:7, 516:20, 516:21, 520:21, 522:11, 523:7, 524:23, 524:25, 529:5, 533:22, 534:1, 549:4, 550:1, 550:3
**informed** [3] - 351:7, 508:9, 510:1
**informs** [2] - 507:3, 511:9
**infrastructure** [3] - 356:3, 356:6, 357:5
**inhibited** [1] - 429:19
**initial** [2] - 315:12, 527:5
**initiation** [1] - 422:9
**inject** [13] - 310:20, 311:6, 319:3, 328:3, 328:6, 328:9, 329:23, 330:4, 331:16, 332:17, 333:8, 434:8, 534:12
**injected** [13] - 318:25, 319:9, 319:16, 319:24, 320:7, 328:13, 347:7, 352:21, 402:2, 413:11, 421:14, 502:12, 542:18
**injecting** [7] - 331:11, 332:14, 333:6, 343:21, 364:21, 452:7, 499:9
**Injection** [2] - 455:14, 511:3
**injection** [97] - 292:25, 293:17, 308:8, 308:14, 308:18, 308:20, 309:2, 309:3, 309:6, 317:13, 318:8, 320:1, 327:22, 327:23, 329:25, 330:13, 331:3, 331:5, 331:6, 331:7, 332:6, 333:8, 336:5, 339:2, 343:19, 345:11, 350:21, 353:3, 356:23, 359:11, 364:22, 367:13, 367:16, 367:17, 367:18, 368:25, 369:14, 369:17, 369:22, 373:20, 374:2, 379:9, 385:9, 386:6, 386:7, 387:13, 394:16, 397:16, 401:17, 402:20, 406:14, 407:1, 407:16, 413:6, 415:19, 415:20, 420:22, 421:11, 422:12, 422:18, 428:16, 430:4, 430:12, 432:10, 434:14, 437:24, 438:3, 438:13, 438:20, 439:3, 444:10, 444:16, 452:10, 454:22, 455:19, 456:2, 457:10, 462:11, 463:16, 464:21, 466:6, 466:10, 466:16, 470:12, 481:18, 483:13, 485:18, 487:14, 487:16, 509:20, 538:9, 538:10, 539:7, 541:23, 542:16, 546:17
**injections** [6] - 343:18, 498:23, 499:11, 499:12, 500:18, 502:10
**injectivity** [1] - 415:18
**injector** [4] - 340:13, 343:16, 347:25, 487:25
**injectors** [6] - 326:24, 329:22, 340:21, 367:7, 367:8, 487:13
**inlet** [3] - 422:17, 494:16, 495:9
**input** [14] - 294:22, 295:2, 295:22, 296:4, 297:16, 297:18, 297:22, 307:17, 365:1, 365:9, 416:23, 512:14, 512:17, 544:19
**inputs** [8] - 323:8, 323:17, 323:19, 324:2, 324:7, 367:16, 452:4, 510:11
**inside** [2] - 320:11, 393:13
**insight** [1] - 319:3
**insofar** [1] - 302:2
**inspection** [3] - 436:17, 437:11, 466:7
**inspector** [1] - 436:20
**inspectors** [2] - 436:25, 437:3
**install** [3] - 430:18, 431:10, 432:8
**installed** [4] - 402:22, 420:25, 455:18, 455:23
**instance** [1] - 422:11
**instead** [6] - 315:14, 353:5, 366:14, 376:18, 377:23, 424:16
**instruct** [1] - 302:6
**instrument** [2] - 490:4, 491:13
**instrumentation** [3] - 490:25, 491:8, 491:16
**integrated** [4] - 397:18, 434:12, 446:17, 482:18
**integrity** [7] - 336:20, 337:1, 401:13, 401:23, 439:25, 453:16, 530:23
**intended** [2] - 342:8, 480:16
**intent** [11] - 318:21, 348:2, 424:6, 424:8, 424:10, 444:9, 449:10, 482:16, 482:18, 502:10, 502:13
**intention** [1] - 441:18
**intentions** [2] - 469:12, 469:16
**interaction** [1] - 546:22
**interactions** [4] - 405:16,

405:18, 485:4, 486:4
**interacts** [1] - 487:12
**interchange** [1] - 436:10
**interdunal** [2] - 373:3, 373:7
**interest** [2] - 312:1, 460:18
**interested** [5] - 289:14, 400:9, 402:3, 425:2, 496:4
**interference** [6] - 329:6, 329:19, 329:21, 330:7, 332:3, 364:19
**Interlake** [1] - 394:25
**intermediate** [3] - 425:24, 426:2, 442:13
**intermittently** [1] - 419:3
**internal** [1] - 516:4
**internationally** [2] - 396:23, 504:20
**interoperating** [1] - 482:24
**interpret** [1] - 381:22
**interpretation** [3] - 359:17, 528:21, 530:21
**interpreted** [1] - 383:13
**interrupt** [1] - 449:6
**Interval** [1] - 402:11
**interval** [4] - 361:17, 361:21, 362:14, 474:20
**intervals** [1] - 410:10
**INTERVENORS** [1] - 285:6
**intervenors** [4] - 289:23, 304:3, 519:19, 544:23
**INTERVENORS'** [2] - 287:19, 288:16
**intervention** [1] - 328:22
**introduce** [1] - 289:17
**introduced** [1] - 487:9
**introduces** [1] - 465:18
**introduction** [2] - 289:18, 290:2
**investigation** [1] - 362:9
**Investigation** [1] - 386:23
**investigations** [1] - 506:16
**involve** [1] - 299:3
**involved** [29] - 296:19, 302:16, 306:25, 322:7, 322:9, 322:10, 322:17, 322:20, 358:22, 473:20, 473:23, 477:12, 477:24, 505:24, 514:25, 515:5, 515:7, 518:4, 518:5, 518:12, 519:2, 524:15, 525:8, 534:22, 535:7, 535:15, 545:15, 545:24, 546:16
**Inyan** [2] - 359:12, 388:1
**ionic** [1] - 457:12
**iso** [1] - 492:5
**isolate** [3] - 421:20, 469:20, 478:14
**isolated** [6] - 362:18, 363:4, 475:19, 481:19, 490:7, 492:4
**isolating** [1] - 487:15
**isolation** [2] - 410:6, 423:4
**isopach** [1] - 374:25
**isotopic** [2] - 420:6, 420:15
**issue** [3] - 309:21, 439:25, 499:4
**issued** [3] - 507:6, 507:17, 513:25
**issues** [6] - 302:3, 302:25, 303:1, 436:19, 524:11, 524:13
**issuing** [1] - 515:16
**it'd** [1] - 487:15
**it'll** [4] - 421:12, 422:10, 438:2, 483:15
**it-depends** [1] - 498:1
**item** [3] - 388:3, 439:4, 441:2
**items** [6] - 393:13, 395:6, 405:6, 436:22, 441:11, 529:17
**iterations** [3] - 299:14, 300:2, 300:5
**itself** [8] - 295:19, 295:20, 304:25, 305:4, 307:18, 402:16, 461:7, 479:22

## J

**J-Loc** [6] - 529:18, 530:19, 534:23, 534:24, 534:25, 535:1
**Jacobson** [2] - 302:21, 303:11
**James** [2] - 395:22, 396:10
**JAMES** [2] - 286:19, 396:1
**JAMEY** [1] - 467:16
**Jamey** [17] - 411:4, 423:7, 423:19, 424:14, 425:5, 426:18, 447:21, 465:14, 465:18, 467:9, 467:11, 467:21, 467:23, 467:24, 468:2, 482:20
**Jamey's** [1] - 491:13
**January** [1] - 409:8
**Jay** [13] - 403:4, 403:5, 403:12, 403:15, 403:16, 404:12, 406:1, 434:1, 436:7, 445:16, 456:4, 456:8, 475:3
**JAY** [1] - 403:7
**JEAN** [2] - 287:15, 408:9
**Jean** [6] - 358:25, 408:6, 408:14, 408:16, 440:3, 453:20
**Jensen** [10] - 371:3, 430:19, 487:20, 487:22, 488:4, 488:8, 488:16, 488:22, 489:12, 489:17
**Jimmy** [7] - 370:14, 370:15, 396:6, 396:11, 412:3, 432:24, 484:6
**job** [5] - 337:23, 456:8, 539:12, 539:13
**jobs** [1] - 539:1
**JOCHIM** [1] - 285:8
**John** [7] - 398:2, 398:10, 398:12, 398:13, 420:10, 444:6, 465:20
**JOHN** [1] - 398:5
**joined** [2] - 409:7, 539:5
**joint** [1] - 310:9
**judgment** [1] - 495:15
**July** [1] - 552:14
**jump** [5] - 377:1, 388:3, 433:23, 438:25, 441:12
**jumping** [1] - 483:4
**junction** [2] - 423:4, 423:12
**June** [5] - 283:20, 289:3, 289:7, 525:25, 551:12
**jurisdiction** [5] - 412:2, 412:6, 412:8, 435:7, 442:10
**justice** [1] - 514:13
**justifiable** [2] - 316:24, 323:20
**justifies** [1] - 496:24
**justify** [1] - 310:1

## K

**Kara** [2] - 359:12, 388:1
**keep** [9] - 300:9, 311:4, 352:6, 405:4, 425:17, 427:1, 472:23, 473:15, 476:13
**keeping** [1] - 456:6
**key** [1] - 401:21
**kilograms** [1] - 382:3
**kind** [16] - 301:21, 348:2, 373:15, 388:3, 416:19, 425:14, 426:24, 440:22, 450:2, 476:18, 476:23, 480:8, 493:13, 504:3, 507:13, 541:4
**Kinder** [2] - 538:11, 538:16
**kinds** [7] - 483:1, 505:23, 506:10, 506:11, 506:12, 528:14
**Kirk** [1] - 289:24
**KJ** [17] - 369:1, 370:17, 371:2, 407:24, 417:25, 418:8, 430:15, 442:19, 449:22, 450:10, 451:15, 453:3, 453:4, 458:25, 459:11, 459:16, 471:19
**KJH** [3] - 415:8, 415:15, 415:17
**knowing** [4] - 300:3, 427:3, 487:25, 544:11
**knowledge** [7] - 341:5, 341:19, 354:10, 474:22, 497:3, 497:7, 546:11
**known** [3] - 406:13, 423:6, 432:18
**knows** [2] - 335:16, 500:10
**KRAFT** [1] - 285:8

## L

**lab** [1] - 528:6
**labeled** [4] - 335:18, 454:9, 459:5, 463:17
**lack** [2] - 354:18, 357:23
**lacking** [1] - 515:10
**laid** [1] - 399:13
**Land** [1] - 507:6
**land** [13] - 329:15, 330:2, 332:8, 340:14, 340:20, 341:2, 342:16, 352:22, 355:4, 423:12, 428:25, 450:18, 452:25
**Landowner** [1] - 353:19
**landowner** [7] - 289:23, 326:14, 352:1, 354:6, 405:25, 543:20, 544:6
**landowners** [23] - 311:18, 311:22, 311:24, 312:4, 312:10, 312:18, 314:25, 320:11, 321:8, 321:15, 341:10, 352:14, 352:19, 352:25, 353:2, 353:4, 353:8, 358:12, 497:1, 497:5, 499:9, 501:24, 502:10
**lands** [4] - 278:19, 280:22, 283:2, 329:20
**language** [6] - 314:4, 393:6, 393:7, 431:17, 459:25, 460:22
**lapse** [1] - 358:7
**lapsed** [1] - 306:11
**large** [3] - 369:20, 396:22, 454:16
**largely** [3] - 377:1, 404:2, 440:25
**larger** [13] - 313:2, 313:4, 313:5, 319:6, 346:3, 365:24, 384:17, 415:2, 461:14, 462:12, 462:19, 483:21
**largest** [1] - 481:8
**last** [21] - 297:23, 307:22, 314:20, 362:23, 388:3, 396:22, 400:17, 404:6, 409:7, 441:12, 441:21, 445:17, 451:20, 461:23,

467:25, 503:23, 503:24, 513:25, 523:24, 527:18, 529:25
**late** [2] - 514:2, 528:7
**lateral** [1] - 344:6
**laterals** [2] - 442:14, 443:5
**launcher** [3] - 422:1, 422:3, 422:9
**Law** [6] - 284:11, 284:15, 284:16, 285:3, 285:4, 289:22
**law** [2] - 328:2, 435:8
**LAWRENCE** [1] - 284:10
**Lawrence** [14] - 403:14, 403:23, 405:2, 406:9, 423:20, 424:14, 448:14, 465:17, 474:24, 477:15, 497:11, 502:20, 510:17, 513:3
**laws** [2] - 330:11, 338:3
**lay** [2] - 449:11, 460:11
**layer** [2] - 327:5, 345:5
**layers** [4] - 372:9, 372:11, 372:22, 376:23
**laying** [1] - 449:8
**layout** [1] - 432:9
**layout's** [1] - 432:17
**Lazy** [5] - 362:24, 415:4, 415:9, 455:2, 455:25
**lead** [1] - 525:10
**leading** [1] - 396:22
**leak** [2] - 339:4, 453:12
**Leakage** [1] - 401:4
**leakage** [7] - 338:19, 338:22, 338:23, 338:24, 338:25, 339:9
**leaking** [1] - 339:5
**leaky** [2] - 489:16, 489:18
**learn** [1] - 526:14
**lease** [1] - 312:18
**leased** [1] - 353:17
**leases** [2] - 355:24, 357:5
**leasing** [4] - 293:6, 310:21, 353:12, 353:13
**least** [18] - 319:4, 325:25, 332:4, 371:8, 373:12, 381:9, 395:7, 399:2, 410:1, 415:17, 428:15, 430:22, 432:15, 442:17, 488:22, 489:12, 491:19, 492:22
**LEC** [1] - 405:23
**led** [3] - 394:21, 499:15, 499:20
**left** [11] - 348:18, 348:25, 349:10, 350:25, 400:1, 421:25, 422:7, 422:10, 529:17, 538:16, 538:24
**legacy** [11] - 319:11, 334:7, 334:11, 371:13, 431:2, 453:1, 453:2, 453:4, 471:22, 472:4, 531:13
**legal** [2] - 301:21, 498:25
**legend** [1] - 329:9
**Leingang** [32] - 334:10, 358:17, 360:20, 361:19, 368:5, 368:25, 370:17, 372:2, 395:16, 399:11, 407:1, 407:11, 413:3, 421:17, 423:6, 424:2, 431:16, 433:2, 433:9, 433:21, 434:19, 442:20, 448:21, 448:23, 449:20, 450:10, 451:12, 453:2, 453:18, 455:20, 457:18, 488:13
**Leingang/Milton** [1] - 449:19
**length** [1] - 481:5
**lengths** [1] - 456:18
**LEPC** [1] - 405:21
**less** [14] - 311:22, 313:12, 368:3, 373:24, 379:10, 382:2, 382:24, 384:22, 384:23, 464:5, 473:9, 483:14, 486:4, 494:2
**lesser** [2] - 294:11, 355:2
**letter** [6] - 298:18, 395:18, 516:6, 526:19, 533:20, 533:23
**level** [2] - 401:7, 466:1
**levels** [1] - 371:22
**liability** [3] - 407:14, 407:21, 438:22
**library** [1] - 298:12
**license** [9] - 297:13, 299:6, 304:16, 304:18, 306:7, 306:8, 324:25, 325:1, 325:2
**licensed** [1] - 398:23
**licenses** [13] - 296:22, 296:23, 296:24, 297:5, 297:6, 297:9, 297:11, 297:12, 299:4, 304:7, 304:12, 306:3, 307:3
**LIEBELT** [1] - 285:8
**life** [2] - 339:2, 401:25
**light** [3] - 445:1, 483:6, 483:18
**likely** [7] - 313:4, 351:12, 360:12, 366:7, 367:22, 418:9, 478:21
**likewise** [2] - 407:2, 449:21
**limit** [8] - 330:3, 332:6, 332:7, 343:13, 346:21, 346:25, 541:5
**limitation** [1] - 330:25
**limitations** [1] - 358:4
**limited** [2] - 331:7, 464:22
**limits** [13] - 278:19, 280:22, 283:2, 318:6, 328:2, 328:6, 328:8, 329:4, 330:5, 478:19, 541:11, 541:18, 544:16
**line** [38] - 303:6, 320:13, 345:23, 345:25, 348:18, 348:22, 373:20, 373:25, 387:9, 419:21, 421:10, 421:25, 422:17, 424:7, 441:2, 442:5, 442:7, 442:9, 442:14, 470:16, 477:20, 477:22, 480:2, 480:12, 480:14, 480:20, 480:24, 481:8, 481:11, 481:13, 481:16, 481:22, 481:23, 482:5, 493:19, 494:10, 494:25, 525:7
**line's** [1] - 348:20
**linear** [4] - 344:15, 345:15, 345:17, 345:21
**list** [3] - 298:4, 304:11, 457:18
**listed** [8] - 289:5, 297:19, 304:23, 400:12, 445:7, 450:8, 465:4, 491:16
**listening** [2] - 449:12, 518:10
**literature** [1] - 406:20
**litho** [1] - 361:20
**litho-bound** [1] - 361:20
**lithologies** [2] - 368:16, 368:18
**litigate** [1] - 303:3
**LIVING** [1] - 285:7
**LLC** [16] - 277:4, 277:15, 277:19, 278:6, 279:4, 279:8, 279:19, 279:23, 280:8, 280:9, 281:6, 281:10, 281:21, 282:1, 282:11, 283:10
**LLCs** [1] - 469:22
**LO-18** [3] - 288:18, 508:16, 514:5
**LO-19** [2] - 288:19, 509:9
**LO-20** [2] - 288:19, 509:23
**LO-56** [3] - 288:20, 505:6, 505:17
**LO-57** [2] - 288:20, 539:15
**LO-58** [3] - 288:21, 529:2, 530:1
**LO-63** [2] - 326:15, 329:7
**LO-82** [3] - 288:21, 510:15, 510:16
**LO-83** [4] - 288:22, 294:13, 333:14, 333:15
**Loc** [6] - 529:18, 530:19, 534:23, 534:24, 534:25, 535:1
**local** [8] - 405:7, 405:12, 405:16, 405:24, 432:5, 436:1, 445:19, 506:2
**locate** [1] - 432:14
**located** [13] - 277:6, 277:20, 278:9, 278:19, 279:10, 279:23, 280:13, 280:22, 281:12, 282:2, 282:15, 283:2, 450:19
**location** [14] - 335:21, 351:3, 351:6, 355:23, 363:13, 369:23, 371:16, 400:14, 433:16, 443:7, 443:18, 469:23, 489:17, 491:6
**locations** [8] - 368:24, 369:21, 370:4, 386:16, 429:7, 431:20, 431:22, 444:4
**log** [11] - 298:12, 357:9, 357:14, 357:20, 401:21, 413:24, 414:9, 414:12, 451:19
**logarithmic** [2] - 345:15, 345:17
**logged** [3] - 529:20, 529:21, 530:19
**logging** [5] - 367:10, 402:12, 402:13, 451:4, 453:15
**logs** [13] - 304:15, 306:8, 317:19, 360:23, 361:8, 376:5, 376:7, 401:24, 413:23, 415:12, 451:22, 549:21, 549:22
**Lonny** [8] - 302:21, 303:11, 303:20, 305:19, 307:9, 307:24, 309:20
**look** [29] - 294:20, 298:5, 298:17, 316:14, 334:1, 334:5, 334:11, 335:7, 336:4, 338:19, 340:3, 340:4, 348:13, 349:4, 350:24, 353:22, 369:16, 379:22, 390:3, 401:12, 402:14, 405:6, 441:3, 488:12, 488:19, 507:9, 518:22, 519:9, 543:11
**looked** [16] - 316:11, 319:11, 385:15, 385:17, 406:17, 406:19, 414:8, 414:10, 464:3, 518:20, 521:14, 524:5, 525:2, 535:16, 542:15, 549:2
**looking** [25] - 290:2, 351:8, 351:22, 356:24, 372:1, 374:25, 377:3, 399:25, 405:11, 414:11, 414:13, 414:18, 422:7, 423:13, 428:25, 430:17, 463:24, 475:23, 485:6, 507:19, 525:5, 528:19, 542:10, 542:13, 543:12
**looks** [7] - 413:8, 423:14, 423:17, 429:2, 444:20, 514:6, 519:10
**loss** [2] - 440:1, 440:14

**Louis** [1] - 527:25
**low** [9] - 368:16, 372:8, 372:11, 372:16, 373:5, 376:20, 381:12, 391:15, 465:21
**lower** [15] - 310:3, 310:24, 331:11, 333:8, 354:24, 379:24, 380:9, 380:11, 381:1, 391:18, 392:1, 486:1, 523:15, 544:14
**lowermost** [1] - 454:21
**lowest** [6] - 346:21, 410:2, 488:8, 488:23, 489:1, 489:13
**Ludlow** [1] - 386:25
**Luis** [1] - 411:5
**lunch** [1] - 388:24
**Lutz** [1] - 334:15
**LYNN** [1] - 284:3
**Lynn** [1] - 525:19

## M

**M.B.A** [1] - 504:12
**MADCHE** [39] - 284:5, 355:18, 356:14, 369:24, 411:12, 412:20, 412:21, 415:25, 416:6, 417:21, 420:16, 423:11, 423:21, 424:15, 425:8, 426:19, 427:16, 429:6, 429:9, 432:20, 433:11, 433:19, 433:23, 438:25, 440:19, 464:9, 464:19, 465:11, 467:7, 469:9, 469:18, 470:2, 470:6, 471:1, 471:8, 471:10, 471:12, 471:17, 472:6
**Madche.....** [3] - 286:13, 287:3, 287:12
**magnetic** [2] - 413:23, 414:12
**magnitude** [7] - 465:19, 465:24, 466:1, 466:2, 466:21, 466:22, 483:22
**main** [10] - 390:19, 421:10, 442:7, 442:9, 442:14, 477:20, 477:22, 482:5, 493:19, 546:20
**maintain** [2] - 429:11, 476:6
**maintaining** [1] - 439:7
**maintenance** [1] - 468:13
**MAIZE** [1] - 285:8
**major** [7] - 314:13, 315:6, 352:11, 498:6, 498:18, 542:8, 542:22
**majority** [1] - 549:7
**manage** [1] - 459:19
**Management** [2] - 511:5, 540:1
**manager** [4] - 468:5, 468:14, 507:9, 516:19
**manner** [5] - 324:2, 344:15, 500:5, 541:10, 543:18
**manually** [1] - 481:16
**manufacturer** [2] - 469:6, 479:17
**manufacturer's** [1] - 479:7
**MAOP** [1] - 490:20
**map** [39] - 326:17, 327:20, 329:25, 331:9, 331:19, 335:7, 335:9, 335:14, 335:17, 335:19, 336:5, 337:10, 338:21, 348:6, 348:11, 350:8, 353:22, 356:19, 369:11, 369:13, 370:6, 374:24, 375:1, 423:16, 443:22, 531:1, 531:25, 534:5, 534:7, 534:12, 534:18, 536:2, 536:7, 536:12, 536:13, 536:18, 547:12
**maps** [9] - 295:4, 295:7, 295:8, 295:10, 295:14, 295:18, 295:20, 326:22, 327:6
**Marathon** [1] - 538:6
**margin** [2] - 319:6, 319:21
**mark** [1] - 444:20
**MARK** [1] - 284:4
**marked** [5] - 294:13, 448:8, 458:16, 510:14, 539:15
**market** [1] - 544:1
**Mary** [2] - 504:12, 523:19
**mass** [9] - 412:14, 420:21, 421:2, 421:12, 427:9, 427:12, 428:10, 502:1, 502:12
**master** [1] - 398:22
**master's** [2] - 403:24, 527:25
**match** [1] - 313:14
**matching** [1] - 357:24
**material** [12] - 428:11, 428:13, 428:14, 450:6, 452:13, 454:15, 455:9, 456:23, 457:2, 457:6, 457:16, 457:21
**materially** [1] - 454:13
**materials** [1] - 521:19
**math** [1] - 426:8
**mathematically** [1] - 349:21
**matrix** [2] - 542:14, 543:5
**matter** [10] - 307:22, 336:24, 341:22, 347:20, 485:25, 506:8, 507:4, 522:13, 526:20, 532:8
**matters** [1] - 289:5
**max** [9] - 342:18, 342:19, 342:25, 465:11, 465:12, 469:2, 469:3, 479:6, 479:16
**maximize** [1] - 470:17
**maximum** [31] - 327:21, 327:24, 339:1, 358:17, 412:22, 413:6, 413:9, 413:11, 423:23, 424:17, 426:4, 426:14, 454:6, 456:2, 464:21, 464:23, 465:4, 465:5, 469:5, 476:15, 479:5, 480:2, 480:9, 481:1, 481:5, 483:9, 483:11, 490:12, 493:22, 493:24, 525:2
**MBT** [1] - 414:21
**MCE** [1] - 411:25
**mean** [13] - 316:7, 350:15, 367:23, 370:23, 375:3, 416:16, 471:7, 480:20, 486:3, 501:5, 511:24, 519:22, 546:7
**meaning** [7] - 313:6, 313:13, 320:14, 325:10, 338:23, 352:20, 362:21
**means** [3] - 350:14, 478:16, 481:18
**measure** [1] - 345:22
**measured** [3] - 364:25, 383:10, 383:12
**measurement** [7] - 398:16, 421:5, 421:9, 421:11, 422:14, 427:11, 442:6
**measurements** [2] - 428:6, 428:9
**measures** [1] - 371:6
**measuring** [1] - 400:10
**mechanical** [4] - 401:22, 453:16, 468:9, 530:23
**mechanism** [4] - 379:21, 391:10, 440:14, 542:21
**mechanisms** [4] - 380:2, 391:8, 391:18, 391:25
**meet** [8] - 418:20, 419:10, 419:23, 443:22, 513:5, 513:6, 525:20, 525:22
**meeting** [1] - 365:5
**meetings** [3] - 405:21, 405:22, 405:25
**megabytes** [1] - 300:19
**members** [1] - 307:20
**memorandum** [1] - 446:10
**memorized** [1] - 433:4
**memory** [1] - 445:8
**mention** [3] - 440:13, 459:13, 495:13
**mentioned** [14] - 292:16, 297:22, 306:2, 322:3, 324:6, 324:14, 333:4, 335:13, 426:25, 459:13, 493:17, 506:8, 530:18, 531:19
**Mercer** [14] - 277:13, 278:3, 278:16, 279:3, 279:17, 280:6, 280:19, 281:5, 405:17, 435:13, 435:16, 435:17, 436:7, 446:2
**mercury** [5] - 385:9, 386:6, 386:8
**mercury-injection-derived** [1] - 386:6
**met** [3] - 418:16, 462:16, 462:17
**meter** [8] - 382:3, 422:14, 422:16, 442:2, 442:8, 442:11, 442:13, 469:14
**metering** [2] - 401:1, 427:2
**meters** [10] - 339:3, 420:17, 420:19, 420:24, 421:10, 427:7, 427:9, 427:10, 427:12, 442:17
**method** [3] - 449:8, 452:18, 489:19
**Method** [2] - 368:23, 400:20
**methodologies** [2] - 293:9, 406:5
**methodology** [4] - 405:22, 406:11, 452:19, 453:25
**methods** [2] - 358:5, 358:6
**metric** [6] - 423:25, 424:3, 424:5, 424:8, 424:19, 424:21
**METZ** [1] - 285:8
**Michael** [1] - 537:18
**MICP** [1] - 392:3
**micro** [1] - 413:22
**microfracture** [9] - 358:18, 359:5, 412:23, 413:14, 413:18, 417:22, 417:24, 418:4, 451:5
**microphone** [1] - 447:14
**mid** [1] - 514:2
**middle** [2] - 294:21, 381:23
**Midwest** [10] - 277:6, 278:8, 279:10, 280:12, 281:12, 282:14, 309:11, 476:19, 482:6, 484:3
**might** [21] - 301:20, 302:3, 315:20, 331:2, 338:14, 340:23, 378:2, 380:19, 409:10, 415:6, 419:20, 425:12, 426:17, 433:11, 436:19, 466:23, 471:18, 488:14, 501:22, 502:19, 510:23
**migrate** [1] - 374:6
**migrating** [1] - 350:22
**migration** [5] - 309:8, 362:20, 363:6, 372:10, 374:1
**mike** [1] - 530:7

**mile** [6] - 388:12, 388:13, 388:18, 393:4, 393:11, 393:14
**mileage** [1] - 469:16
**miles** [11] - 357:1, 411:25, 412:2, 412:6, 412:8, 425:21, 459:14, 464:5, 464:8, 473:9, 531:11
**millimeter** [1] - 347:18
**million** [12] - 408:2, 423:23, 423:25, 424:3, 424:5, 424:8, 424:18, 424:19, 424:21, 440:7, 440:12, 470:24
**Milton** [21] - 349:4, 349:13, 357:9, 357:12, 357:19, 358:19, 360:7, 361:7, 364:25, 365:2, 365:4, 365:14, 365:15, 369:19, 412:24, 413:5, 453:19, 454:24, 455:16, 455:18, 474:17
**mind** [14] - 326:14, 416:19, 440:18, 448:1, 456:6, 472:18, 475:2, 488:12, 489:6, 497:11, 497:12, 507:5, 513:10, 513:12
**mine** [1] - 450:18
**Mine** [1] - 356:17
**mined** [1] - 356:20
**Mineral** [2] - 289:9, 340:12
**mineral** [6] - 378:13, 378:19, 379:10, 381:16, 381:21, 382:15
**mineralization** [1] - 379:1
**mineralogical** [1] - 457:10
**mineralogy** [1] - 391:3
**miniaturized** [2] - 428:2, 428:7
**minimal** [6] - 367:6, 450:15, 453:15, 454:5, 456:9, 456:13
**minimum** [9] - 366:10, 366:15, 388:17, 393:4, 419:11, 432:16, 435:8, 436:2, 438:19
**mining** [14] - 356:1, 356:5, 356:16, 356:17, 356:19, 356:21, 357:2, 450:18, 452:25, 504:20, 506:6, 507:9, 507:11, 507:13
**Minnekahta** [2] - 451:12, 451:13
**Minnkota** [6] - 322:22, 328:23, 395:19, 459:17, 529:19, 536:2
**Minnkota's** [3] - 329:4, 460:20, 534:23
**minor** [9] - 362:10, 362:13, 362:17, 362:21, 362:25, 363:1, 363:4, 407:22, 452:9
**minute** [7] - 321:21, 400:3, 447:5, 481:4, 503:3, 505:8, 551:4
**minutes** [4] - 316:3, 494:8, 550:22
**mischaracterization** [1] - 312:14
**miss** [1] - 462:1
**missed** [1] - 510:23
**missing** [2] - 499:17, 499:19
**misspelled** [2] - 447:23, 467:24
**misspoke** [1] - 407:8
**misstated** [1] - 464:8
**misstatement** [1] - 387:17
**misunderstand** [1] - 517:13
**misunderstanding** [1] - 502:4
**misunderstood** [2] - 516:14, 517:8
**MIT** [2] - 337:12, 338:7
**mixes** [1] - 388:4
**mixing** [4] - 345:19, 391:19, 391:21, 391:23
**mixture** [1] - 542:19
**model** [130] - 291:15, 291:17, 291:22, 292:12, 295:2, 295:23, 296:5, 297:16, 297:19, 298:1, 299:23, 301:5, 306:5, 306:6, 307:12, 316:17, 316:20, 316:22, 316:24, 317:2, 317:5, 318:13, 318:18, 319:1, 319:25, 321:11, 321:13, 323:17, 323:18, 324:12, 324:25, 325:1, 325:2, 325:5, 325:6, 325:9, 325:11, 325:14, 325:21, 325:22, 325:25, 326:3, 326:5, 326:8, 333:12, 338:25, 344:22, 345:5, 349:18, 350:11, 350:16, 350:18, 350:19, 351:1, 351:18, 363:18, 363:20, 363:24, 364:5, 364:7, 364:8, 364:9, 364:13, 364:15, 366:19, 367:12, 367:15, 367:16, 368:18, 369:5, 372:8, 374:5, 374:11, 374:17, 374:18, 374:23, 375:8, 375:12, 375:22, 376:2, 376:7, 376:9, 379:19, 380:9, 382:2, 382:20, 383:7, 383:10, 383:23, 384:11, 384:21, 385:4, 385:20, 418:6, 418:10, 426:11, 426:16, 426:21, 426:23, 451:3, 452:1, 452:5, 463:15, 464:25, 465:8, 473:13, 473:14, 477:4, 477:9, 477:19, 480:1, 489:15, 510:11, 512:16, 512:19, 521:21, 521:24, 522:2, 522:7, 542:24, 544:24, 545:2, 545:6, 546:6
**modeled** [11] - 314:18, 338:21, 360:18, 364:23, 369:9, 372:4, 379:5, 383:17, 383:18, 473:18, 494:4
**modeling** [37] - 292:6, 292:16, 292:22, 293:18, 293:21, 296:23, 300:5, 310:8, 321:17, 337:9, 339:10, 360:11, 360:15, 366:5, 376:15, 376:17, 376:23, 377:20, 380:14, 382:18, 391:8, 424:1, 424:20, 424:23, 426:11, 462:14, 463:19, 464:17, 476:24, 477:13, 477:22, 509:2, 510:12, 542:4, 542:8, 542:22, 543:9
**models** [28] - 300:2, 306:11, 306:16, 313:9, 313:15, 318:22, 322:24, 323:1, 323:9, 323:25, 324:7, 324:10, 346:22, 377:18, 391:3, 512:13, 521:14, 523:1, 544:19, 544:22, 545:1, 545:24, 546:3, 546:10, 546:12, 546:14, 546:21, 546:23
**modification** [7] - 314:9, 314:13, 315:6, 352:11, 386:5, 498:7, 498:19
**modified** [1] - 385:12
**modifier** [2] - 384:9, 384:15
**modifiers** [4] - 383:7, 383:22, 383:24, 384:5
**modify** [3] - 314:15, 385:14, 431:19
**Mohr** [1] - 394:12
**Mohr-Coulomb** [1] - 394:12
**molecules** [1] - 397:13
**moment** [8] - 334:23, 335:7, 354:2, 366:2, 472:17, 510:1, 550:16, 550:18
**moments** [3] - 383:9, 468:7, 472:13
**monitor** [7] - 293:25, 313:6, 371:7, 397:10, 401:15, 402:18, 432:6
**Monitoring** [2] - 400:2, 402:10
**monitoring** [54] - 313:1, 313:6, 313:10, 313:14, 319:12, 343:14, 358:4, 358:6, 370:24, 371:10, 371:12, 399:4, 399:13, 399:18, 399:23, 400:6, 401:13, 401:19, 402:3, 402:7, 402:16, 402:22, 402:25, 404:5, 406:15, 407:3, 407:17, 418:2, 427:17, 430:18, 430:25, 432:1, 437:19, 439:8, 440:7, 440:10, 453:12, 453:22, 453:24, 454:3, 454:5, 454:25, 455:24, 455:25, 456:16, 456:17, 465:3, 466:12, 471:21, 471:24, 472:5, 483:19, 485:19, 497:21
**Montana** [24] - 386:25, 408:25, 504:11, 504:23, 507:16, 507:25, 508:8, 513:16, 514:19, 515:1, 515:10, 517:17, 526:11, 528:1, 537:22, 538:1, 538:17, 538:21, 539:4, 540:7, 540:8, 540:22, 543:1
**Montana's** [4] - 508:21, 510:3, 511:11, 526:5
**month** [6] - 297:11, 297:12, 325:1, 519:20, 532:9
**months** [2] - 436:3, 529:25
**Morgan** [2] - 538:12, 538:16
**morning** [3] - 291:3, 416:20, 551:9
**Morton** [10] - 277:14, 278:3, 278:16, 279:3, 405:17, 435:14, 435:17, 435:18, 436:8, 446:1
**most** [11] - 296:21, 337:15, 351:12, 351:19, 366:8, 409:3, 449:13, 524:9, 542:20, 542:23
**mostly** [1] - 349:6
**motion** [7] - 278:18, 280:21, 283:1, 303:2, 303:5, 505:20, 533:24
**move** [24] - 333:14, 333:15, 344:15, 345:11, 345:16, 358:14, 362:3, 363:17, 368:19, 392:14, 393:18, 397:24, 401:9, 407:13, 421:16, 437:23, 461:13, 472:8, 499:25, 505:17, 511:14, 530:1, 535:24, 540:14
**moved** [2] - 504:23, 538:11
**movement** [7] - 365:21, 366:25, 367:2, 371:7, 373:23, 391:14, 542:13

**movements** [1] - 464:11
**moves** [2] - 346:15, 442:5
**moving** [7] - 370:3, 374:8, 379:4, 410:8, 418:13, 466:20, 473:16
**Mowry** [1] - 410:17
**MR** [325] - 284:3, 284:4, 284:4, 284:5, 284:6, 284:7, 284:7, 284:10, 284:10, 284:15, 285:2, 289:16, 289:22, 290:1, 290:5, 290:9, 290:19, 290:24, 291:5, 291:9, 302:2, 302:7, 302:9, 302:10, 302:24, 303:9, 303:10, 305:18, 306:23, 307:1, 312:6, 312:9, 312:13, 312:16, 313:20, 313:24, 320:15, 320:21, 320:24, 322:2, 323:3, 323:7, 332:24, 333:3, 333:13, 333:16, 333:17, 333:18, 333:19, 333:21, 333:24, 355:13, 356:11, 370:2, 370:10, 370:12, 370:14, 370:15, 370:16, 371:18, 371:20, 388:21, 389:8, 389:23, 392:12, 392:17, 393:16, 393:20, 393:23, 394:7, 394:8, 394:9, 394:10, 395:10, 395:11, 395:21, 396:5, 397:21, 398:2, 398:9, 398:12, 403:2, 403:11, 403:14, 408:3, 408:13, 410:19, 411:7, 411:8, 411:21, 412:5, 412:17, 415:23, 416:3, 416:7, 416:16, 417:2, 417:12, 417:14, 417:17, 417:20, 418:22, 420:8, 420:9, 420:11, 420:24, 423:9, 423:19, 424:13, 425:5, 425:7, 426:18, 427:13, 427:14, 427:15, 427:24, 428:23, 429:4, 430:10, 432:23, 433:3, 433:15, 433:22, 433:24, 434:2, 434:24, 435:1, 435:2, 435:3, 435:5, 435:12, 436:5, 436:13, 436:21, 437:6, 437:7, 437:8, 437:14, 437:15, 437:16, 438:16, 439:9, 439:11, 440:25, 441:8, 441:10, 441:20, 442:16, 444:11, 445:24, 447:2, 447:6, 447:12, 447:15, 448:6, 448:14, 448:17, 448:18, 457:23, 458:3, 458:7, 458:11, 458:13, 458:18, 458:20, 458:21, 458:22, 458:24, 461:1, 461:5, 461:12, 461:21, 463:9, 463:20, 464:13, 465:13, 465:16, 466:18, 467:4, 467:9, 467:15, 467:20, 469:10, 469:23, 470:3, 471:6, 471:9, 471:11, 471:14, 472:10, 472:17, 472:22, 472:24, 473:1, 473:2, 473:3, 473:5, 474:23, 475:4, 475:6, 475:9, 477:2, 477:11, 477:14, 477:17, 477:18, 482:10, 484:1, 484:5, 484:9, 484:13, 484:15, 484:18, 484:20, 489:5, 489:8, 489:11, 490:3, 490:17, 490:24, 497:10, 497:14, 497:16, 497:25, 498:24, 499:1, 499:2, 500:3, 500:11, 500:12, 500:19, 500:22, 500:24, 500:25, 501:5, 501:8, 501:10, 501:11, 501:14, 501:16, 502:2, 502:5, 502:7, 502:8, 502:9, 502:17, 502:21, 502:23, 503:1, 503:9, 503:12, 503:15, 503:21, 505:8, 505:10, 505:11, 505:12, 505:17, 505:19, 505:21, 510:17, 510:20, 510:22, 511:14, 511:17, 511:20, 512:20, 512:23, 513:2, 514:7, 514:8, 520:3, 520:7, 520:13, 520:17, 520:18, 520:22, 522:17, 522:19, 522:20, 522:22, 522:25, 523:5, 523:9, 523:10, 523:13, 525:13, 525:18, 526:15, 526:17, 526:24, 527:2, 527:4, 527:8, 527:16, 530:1, 530:3, 530:7, 530:10, 532:15, 532:18, 535:22, 535:23, 536:1, 536:23, 537:2, 537:4, 537:7, 537:9, 537:14, 540:14, 540:15, 540:18, 541:7, 541:9, 545:8, 545:12, 548:10, 548:13, 548:14, 550:9, 550:13, 550:15, 550:23, 551:2
**MRV** [1] - 398:17
**MS** [95] - 284:5, 284:6, 284:8, 285:3, 291:13, 305:12, 305:15, 306:24, 308:17, 309:13, 312:7, 313:22, 320:19, 323:5, 333:2, 334:4, 335:8, 336:2, 338:9, 339:25, 340:17, 355:18, 356:9, 356:12, 356:14, 359:21, 360:15, 369:24, 370:20, 372:7, 387:8, 387:16, 390:7, 392:20, 393:25, 408:16, 411:12, 412:20, 412:21, 413:1, 415:25, 416:6, 417:21, 420:16, 423:11, 423:21, 424:15, 425:8, 426:19, 427:16, 429:6, 429:9, 429:17, 432:20, 433:11, 433:19, 433:23, 437:22, 438:25, 440:19, 448:10, 461:19, 461:25, 463:14, 463:23, 464:9, 464:12, 464:15, 464:19, 465:9, 465:11, 465:15, 465:17, 466:20, 467:5, 467:7, 467:8, 469:9, 469:18, 470:2, 470:6, 471:1, 471:8, 471:10, 471:12, 471:17, 472:2, 472:6, 473:12, 474:13, 483:12, 484:22, 489:9, 489:14, 527:5
**multi** [1] - 315:22
**multi-physics** [1] - 315:22
**multilayered** [1] - 405:19
**multiple** [6] - 299:14, 432:8, 432:13, 435:16, 539:1, 543:25
**multiplier** [6] - 309:18, 310:1, 311:2, 313:2, 313:3, 315:9
**multiply** [1] - 541:25
**municipalities** [1] - 506:3
**must** [5] - 351:25, 393:10, 418:16, 419:9, 512:3
**mute** [2] - 527:9, 527:10
**mutual** [1] - 446:10

## N

**NAD27** [1] - 390:14
**NAICS** [2] - 411:21, 411:22
**nailed** [1] - 434:9
**name** [26] - 392:24, 396:8, 398:10, 403:12, 408:14, 447:23, 450:8, 467:21, 467:24, 467:25, 485:20, 486:22, 503:22, 503:23, 503:24, 508:15, 513:3, 513:8, 527:1, 527:17, 527:18, 537:15, 537:17, 537:18, 540:5
**named** [1] - 449:16
**namely** [3] - 392:23, 456:15, 457:9
**names** [3] - 335:18, 353:22, 473:24
**narrative** [13] - 374:10, 377:3, 377:7, 377:11, 379:19, 382:22, 387:10, 388:6, 394:11, 419:7, 444:7, 444:12, 444:25
**natural** [5] - 404:1, 466:11, 481:25, 543:3, 543:11
**nature** [2] - 308:24, 476:13
**ND** [12] - 277:14, 278:4, 278:17, 279:3, 279:17, 280:7, 280:19, 281:5, 281:20, 282:9, 282:22, 283:9
**NDA** [2] - 296:14, 322:22
**NDIC** [2] - 284:2, 412:8
**NDL-325** [2] - 423:5, 469:12
**NDL-327** [3] - 423:6, 469:11, 469:24
**Near** [1] - 402:7
**near** [6] - 329:11, 371:7, 432:1, 468:11, 472:3, 497:12
**nearby** [1] - 371:13
**nearest** [1] - 364:18
**necessarily** [7] - 295:14, 318:15, 325:15, 331:3, 344:17, 429:15, 439:1
**necessary** [11] - 279:6, 281:8, 283:12, 324:17, 385:14, 431:19, 460:4, 515:1, 521:25, 523:7, 540:24
**need** [48] - 289:17, 297:13, 301:20, 301:23, 301:25, 302:15, 303:21, 306:6, 307:2, 307:5, 311:13, 311:18, 312:17, 314:8, 317:20, 318:7, 318:11, 338:14, 356:7, 378:2, 385:13, 412:16, 423:7, 425:12, 430:16, 432:15, 435:10, 438:7, 440:17, 443:9, 444:22, 445:8, 447:2, 472:21, 476:10, 476:25, 480:15, 487:6, 498:21, 499:4, 499:20, 500:1, 522:1, 522:11, 530:25, 531:15, 531:20, 534:12
**needed** [19] - 299:7, 304:8, 304:12, 311:9, 314:7, 314:15, 380:6, 389:11, 389:17, 431:10, 431:12, 435:22, 436:12, 466:17, 493:11, 496:15, 515:8, 516:8, 535:24
**needing** [2] - 429:13, 437:11
**needs** [3] - 437:1, 443:9, 500:5

**negative** [6] - 378:14, 378:19, 379:4, 382:4, 383:1, 393:24
**Neset** [1] - 409:1
**net** [7] - 374:11, 381:25, 382:3, 382:23, 393:24
**neutron** [3] - 401:21, 401:24, 402:12
**never** [9] - 307:7, 321:14, 345:10, 345:11, 440:18, 469:8, 517:6, 517:21, 525:8
**new** [13] - 289:12, 290:2, 307:2, 392:24, 395:13, 419:8, 419:20, 420:3, 420:7, 420:12, 420:13, 447:19, 498:21
**next** [24] - 313:25, 329:12, 353:21, 359:11, 393:18, 397:25, 398:2, 400:10, 403:3, 403:4, 410:8, 426:2, 430:18, 450:12, 450:13, 452:14, 453:10, 454:1, 458:6, 458:7, 465:25, 527:1, 537:6
**NGOs** [1] - 506:5
**nice** [4] - 513:5, 513:6, 525:20, 525:22
**nine** [1] - 444:9
**nitrogen** [5] - 429:16, 429:20, 538:9, 539:7, 542:19
**No(s)** [1] - 277:3
**nomenclature** [1] - 392:23
**noncompliance** [1] - 352:8
**nonconsenting** [3] - 277:18, 279:21, 281:23
**nondisclosure** [1] - 296:15
**none** [1] - 519:4
**normal** [4] - 479:10, 486:9, 492:17, 493:12
**normally** [2] - 479:11, 479:12
**north** [1] - 442:18
**NORTH** [1] - 277:1
**North** [102] - 277:7, 277:9, 277:11, 277:12, 277:13, 277:21, 277:22, 278:1, 278:2, 278:3, 278:10, 278:11, 278:14, 278:15, 278:16, 278:20, 278:22, 279:1, 279:2, 279:3, 279:11, 279:14, 279:15, 279:16, 280:1, 280:3, 280:5, 280:6, 280:14, 280:16, 280:18, 280:19, 280:23, 281:2, 281:4, 281:4, 281:13, 281:14, 281:16, 281:18, 281:19, 282:2, 282:4, 282:5, 282:8, 282:9, 282:15, 282:17, 282:18, 282:20, 282:22, 283:2, 283:4, 283:5, 283:8, 283:9, 283:19, 284:13, 285:5, 285:5, 289:6, 291:21, 292:15, 292:20, 292:25, 293:12, 294:4, 298:10, 298:11, 307:21, 313:18, 330:11, 338:3, 340:8, 373:10, 386:21, 387:6, 390:14, 403:24, 412:1, 423:15, 429:3, 435:7, 436:6, 454:19, 469:24, 469:25, 507:22, 513:18, 523:18, 523:22, 523:24, 524:10, 524:16, 525:9, 525:24, 526:2, 526:4, 526:8, 526:12, 538:22, 552:13
**northeast** [2] - 375:20, 375:22
**northwest** [1] - 363:11
**note** [22] - 290:11, 331:5, 344:25, 345:1, 369:10, 373:11, 429:22, 430:1, 431:21, 434:6, 437:8, 437:19, 440:16, 451:11, 452:8, 453:1, 453:18, 454:23, 457:8, 457:17, 461:10, 464:21
**noted** [9] - 294:3, 366:4, 372:19, 390:19, 414:17, 417:19, 450:11, 450:16, 451:18
**notes** [5] - 390:4, 394:6, 463:4, 550:17, 552:11
**nothing** [6] - 320:14, 333:5, 441:8, 545:7, 550:19
**notice** [4] - 289:12, 294:21, 445:11, 476:25
**noticed** [1] - 294:3
**notices** [1] - 437:1
**notification** [4] - 435:9, 435:23, 450:19, 495:4
**notified** [1] - 435:11
**notify** [1] - 474:4
**num** [1] - 540:21
**number** [26] - 294:21, 310:24, 311:18, 311:24, 326:13, 329:10, 386:16, 412:4, 431:15, 432:9, 434:18, 441:6, 449:20, 451:21, 452:21, 456:15, 468:10, 470:15, 471:20, 479:4, 538:17, 540:21, 541:22, 546:10, 549:9, 549:10
**Numbers** [1] - 289:12
**numbers** [1] - 470:24
**numerical** [10] - 296:1, 297:25, 325:16, 326:6, 326:9, 364:20, 365:1, 366:13, 366:21, 452:2
**numerous** [4] - 435:12, 446:3, 522:25, 538:25

## O

**oath** [6] - 291:5, 291:7, 291:12, 448:4, 458:10, 461:18
**object** [13] - 290:21, 302:2, 302:25, 303:5, 472:23, 498:24, 500:3, 500:8, 502:2, 520:3, 520:13, 522:17, 522:20
**objection** [20] - 332:24, 333:21, 458:3, 461:4, 461:5, 461:6, 461:11, 477:14, 500:19, 501:5, 501:10, 501:11, 505:19, 511:17, 530:2, 530:3, 530:4, 540:15, 541:7, 548:10
**objection's** [1] - 417:18
**objections** [5] - 333:20, 417:15, 458:2, 505:18, 511:16
**obligated** [1] - 351:24
**observed** [3] - 413:11, 414:1, 415:12
**obtain** [2] - 508:1, 540:24
**obvious** [2] - 348:17, 476:11
**obviously** [2] - 328:18, 347:21
**occupied** [3] - 370:7, 370:9, 433:2
**occur** [1] - 481:7
**occurred** [1] - 473:10
**occurs** [2] - 384:12, 423:12
**odd** [1] - 372:3
**ODDY** [7] - 286:19, 408:9, 408:16, 413:1, 429:17, 437:22, 484:22
**Oddy** [9] - 358:25, 359:8, 408:6, 408:7, 408:16, 484:12, 484:21, 484:22
**ODDY/CAITLIN** [1] - 287:15
**OF** [3] - 283:15, 286:2, 552:1
**offer** [2] - 457:24, 461:2
**Offered** [2] - 288:12, 288:17
**Office** [1] - 284:15
**office** [2] - 299:7, 529:3
**officer** [1] - 396:14
**offset** [3] - 355:2, 355:6, 355:10
**offsets** [1] - 354:22
**often** [1] - 435:25
**OIL** [1] - 277:2
**oil** [25] - 338:2, 453:1, 453:2, 453:4, 485:7, 485:15, 486:10, 506:6, 524:3, 538:8, 538:18, 539:4, 542:11, 542:12, 542:13, 542:14, 542:17, 542:25, 543:5, 545:15, 545:23, 546:4, 546:13, 546:15, 546:23
**Oil** [7] - 289:9, 507:17, 514:1, 514:19, 515:1, 517:1, 538:6
**old** [2] - 334:1, 337:23
**Oliver** [17] - 277:14, 278:4, 278:16, 279:3, 279:17, 280:6, 280:19, 281:5, 281:20, 282:9, 282:22, 283:9, 405:17, 435:13, 435:18, 436:8, 446:1
**OLSEN** [14] - 286:11, 308:17, 334:4, 336:2, 339:25, 359:21, 370:20, 387:8, 392:20, 448:10, 472:2, 474:13, 489:9, 489:14
**Olsen** [10] - 389:16, 392:10, 392:14, 395:14, 447:13, 447:16, 448:2, 448:3, 458:1, 474:8
**OLSEN/JIMMY** [1] - 287:15
**OLSEN/WADE** [1] - 287:6
**on-site** [2] - 429:13, 436:24
**once** [6] - 368:2, 416:4, 419:10, 432:17, 479:22, 526:13
**one** [119] - 295:22, 299:19, 299:20, 301:2, 301:3, 307:2, 313:25, 315:7, 327:1, 331:4, 333:18, 343:3, 343:24, 348:8, 348:9, 348:11, 349:14, 350:12, 351:11, 354:2, 362:9, 362:11, 365:17, 366:10, 368:24, 371:2, 371:25, 379:7, 387:2, 388:3, 388:12, 388:13, 388:18, 392:10, 393:4, 393:11, 393:14, 394:4, 397:17, 397:18, 411:4, 412:17, 412:19, 415:17, 416:25, 419:16, 419:17, 420:14, 424:9, 426:17, 429:2, 433:9, 433:14, 434:13, 434:16, 434:25, 436:15, 437:24, 438:3, 438:14, 438:17, 439:3, 439:6, 439:7, 439:17, 442:5, 442:18, 442:19, 444:16, 445:7, 445:9, 445:16, 446:9, 447:19, 448:16, 449:20, 450:16, 450:21, 453:3, 453:4,

456:21, 462:18, 462:23, 463:9, 464:2, 469:2, 469:16, 470:11, 471:4, 472:17, 477:1, 478:1, 478:6, 478:10, 481:9, 483:7, 484:12, 488:2, 501:13, 508:18, 508:22, 509:11, 509:14, 509:25, 510:17, 510:21, 510:25, 511:8, 512:18, 518:17, 521:3, 522:14, 523:4, 531:4, 531:25, 541:2, 542:9, 550:18, 550:24
**one's** [1] - 489:21
**one-fourth** [1] - 343:3
**one-mile** [4] - 388:12, 388:18, 393:4, 393:14
**one-year** [1] - 464:2
**ones** [5] - 468:25, 470:3, 470:7, 484:12, 518:18
**Ontario** [1] - 528:2
**Opeche** [1] - 380:24
**Opeche/Spearfish** [8] - 361:21, 362:14, 380:25, 381:10, 381:16, 381:19, 402:11, 413:13
**open** [5] - 306:5, 306:6, 326:14, 479:2, 511:21
**opened** [1] - 478:25
**Opening** [1] - 286:4
**operate** [5] - 277:19, 279:22, 282:1, 351:24, 479:11
**operated** [8] - 355:12, 397:6, 397:17, 428:21, 478:22, 482:8, 482:19, 498:11
**operating** [26] - 333:5, 396:14, 425:10, 426:4, 426:23, 465:4, 465:11, 469:3, 476:15, 478:19, 479:5, 479:7, 479:13, 479:15, 479:16, 479:19, 480:18, 482:5, 482:23, 490:12, 493:12, 493:22, 494:23, 495:11, 495:25, 496:9
**operation** [6] - 347:4, 415:10, 483:9, 483:11, 492:17, 499:19
**operational** [7] - 312:25, 313:14, 366:23, 397:2, 399:15, 399:22, 465:6
**operations** [21] - 331:5, 331:10, 331:18, 331:23, 342:10, 356:16, 356:17, 368:2, 401:16, 409:4, 430:13, 455:19, 459:20, 464:22, 466:9, 466:10, 466:15, 466:17, 467:2, 483:8
**Operations** [1] - 455:15
**operator** [4] - 330:22, 333:6, 351:22, 495:4
**operator's** [1] - 352:5
**Operators** [1] - 511:5
**operators** [1] - 512:3
**Ophir** [1] - 537:21
**opinion** [3] - 300:3, 301:14, 499:3
**opportunity** [6] - 289:14, 303:4, 410:24, 416:25, 431:9, 521:2
**opposed** [4] - 385:3, 442:1, 442:8, 442:21
**opposing** [2] - 301:20, 396:17
**option** [2] - 431:12, 543:25
**optionality** [1] - 431:9
**options** [3] - 435:20, 543:22, 543:24
**order** [17] - 278:6, 280:10, 282:12, 293:20, 297:11, 306:7, 306:14, 358:12, 373:19, 375:5, 378:25, 392:22, 432:14, 476:9, 497:11, 510:14, 530:25
**orders** [1] - 341:4
**ordinary** [1] - 507:15
**organizational** [1] - 434:5
**originally** [2] - 469:15, 500:1
**originate** [1] - 394:23
**otherwise** [1] - 449:14
**outlaid** [1] - 407:15
**outlet** [1] - 421:7
**outlets** [1] - 420:19
**outline** [3] - 508:23, 509:15, 510:7
**outlines** [1] - 459:21
**output** [2] - 298:1, 469:5
**outreach** [1] - 405:20
**outside** [24] - 295:5, 295:8, 314:6, 320:13, 327:13, 334:13, 336:7, 339:7, 347:15, 347:21, 352:2, 352:7, 352:11, 353:16, 353:24, 363:24, 364:1, 374:4, 384:21, 393:5, 393:7, 393:11, 520:25, 523:1
**over-leasing** [1] - 310:21
**overall** [3] - 376:2, 382:23, 400:23
**overarching** [1] - 445:25
**overestimate** [2] - 310:19, 311:8
**overlaid** [1] - 327:2
**overlying** [1] - 339:5
**overpressure** [1] - 495:8
**overpressured** [2] - 495:12, 495:14
**overpressurized** [2] - 339:16, 339:17
**overrule** [1] - 303:8
**overruled** [5] - 333:1, 520:6, 520:16, 541:8, 548:12
**overview** [3] - 399:22, 406:4, 406:23
**own** [5] - 292:19, 487:4, 526:9, 528:9, 538:25
**owned** [7] - 277:17, 279:21, 281:23, 441:25, 469:21, 482:7, 504:5
**Owners** [1] - 511:5
**owners** [10] - 277:18, 279:21, 281:24, 292:4, 321:9, 321:19, 497:23, 498:21, 500:17, 512:3
**ownership** [2] - 296:12, 296:14
**oxidation** [2] - 486:5, 486:8
**oxygen** [2] - 366:6, 366:7

## P

**P&A** [1] - 430:19
**P&I** [1] - 491:22
**P&ID** [1] - 492:22
**P.A** [1] - 284:11
**P.C** [1] - 284:15
**p.m** [10] - 291:2, 389:1, 389:2, 447:7, 447:8, 503:4, 503:5, 551:5, 551:6, 551:11
**P.O** [1] - 284:16
**P50** [1] - 351:11
**package** [5] - 359:4, 413:20, 414:2, 414:11, 414:19
**packages** [1] - 522:1
**packer** [2] - 429:15, 429:25
**pad** [1] - 442:11
**page** [57] - 317:16, 327:15, 338:20, 344:18, 356:12, 364:4, 368:5, 368:20, 369:12, 370:6, 372:1, 374:9, 375:24, 375:25, 376:10, 377:6, 377:8, 378:12, 379:18, 380:23, 381:15, 381:23, 382:13, 382:14, 382:21, 383:5, 383:14, 385:7, 386:15, 386:17, 387:9, 388:6, 388:7, 394:6, 394:11, 395:8, 399:10, 406:11, 409:21, 421:17, 423:22, 424:17, 431:15, 434:18, 434:19, 439:19, 441:13, 441:20, 441:21, 443:19, 444:25, 463:13, 464:20, 471:18, 475:8
**Page** [30] - 286:3, 286:8, 286:12, 286:13, 286:14, 286:15, 286:16, 286:17, 286:21, 286:22, 286:23, 286:24, 287:3, 287:4, 287:5, 287:8, 287:9, 287:10, 287:11, 287:12, 287:13, 287:17, 287:22, 287:23, 287:24, 287:25, 288:4, 288:5, 288:8, 288:9
**pages** [2] - 377:9, 552:10
**Pages** [1] - 283:16
**paid** [6] - 332:16, 352:14, 352:25, 412:13, 497:2, 502:4
**pan** [1] - 371:23
**paragraph** [8] - 317:16, 381:23, 382:23, 383:5, 420:10, 431:16, 441:13, 441:21
**paralegal** [1] - 289:24
**Paralegal** [1] - 285:3
**Parameter** [1] - 400:9
**parameters** [19] - 316:11, 316:23, 317:1, 317:5, 317:22, 318:5, 318:10, 323:8, 390:20, 390:22, 400:9, 440:23, 463:20, 473:7, 481:7, 485:19, 485:22, 532:4, 543:11
**pardon** [1] - 547:4
**part** [28] - 298:14, 307:3, 308:2, 311:3, 330:4, 335:3, 368:13, 370:20, 371:9, 380:19, 386:13, 401:19, 406:7, 415:15, 430:7, 445:11, 483:17, 483:18, 484:25, 485:2, 488:4, 491:1, 516:3, 524:19, 529:19, 530:22, 531:17, 541:5
**partially** [1] - 373:3
**participated** [1] - 322:18
**participation** [1] - 358:1
**particular** [8] - 295:14, 334:6, 339:7, 409:18, 428:10, 507:2, 512:8, 530:16
**particularly** [2] - 343:14, 532:12
**parties** [4] - 289:14, 322:20, 460:1, 460:16
**party** [6] - 301:21, 366:16, 418:17, 419:8, 480:11, 533:3
**passive** [2] - 432:5, 445:1
**past** [7] - 415:7, 436:16, 499:11, 499:12, 502:3, 512:12, 517:15
**patch** [2] - 485:16, 486:10
**path** [1] - 348:20

**pathway** [4] - 338:24, 338:25, 362:20, 363:6
**pathways** [2] - 338:22, 338:23
**Paul** [3] - 527:19, 537:7, 537:18
**PAUL** [2] - 288:7, 537:10
**pause** [1] - 463:2
**pausing** [1] - 462:24
**pay** [10] - 306:21, 311:13, 325:1, 498:21, 499:9, 500:16, 502:10, 502:11, 502:13, 517:24
**paying** [3] - 320:16, 353:8, 353:11
**payment** [1] - 352:22
**payments** [5] - 314:25, 357:22, 497:23, 501:23, 501:25
**pending** [1] - 389:7
**penetrate** [1] - 357:18
**penetrates** [1] - 357:13
**people** [7] - 311:12, 411:4, 416:17, 472:12, 474:1, 476:25, 516:4
**people's** [1] - 323:25
**per** [12] - 382:3, 415:1, 415:4, 423:24, 424:18, 464:6, 481:4, 488:1, 490:19, 495:20, 531:11
**percent** [66] - 328:15, 342:24, 343:8, 343:11, 343:13, 343:17, 343:23, 344:9, 344:12, 344:25, 345:4, 345:10, 345:22, 345:23, 345:24, 346:5, 346:7, 346:13, 346:14, 346:19, 346:24, 347:12, 347:16, 347:17, 349:19, 350:16, 360:9, 360:10, 366:6, 366:11, 366:14, 366:15, 366:20, 366:22, 381:21, 382:24, 418:23, 419:5, 419:12, 419:14, 419:16, 419:19, 426:7, 462:6, 464:10, 473:10, 476:17, 476:22, 479:4, 479:13, 483:14, 490:11, 490:14, 490:20, 490:21, 490:23, 492:20, 493:22, 493:24, 494:2
**percentage** [2] - 360:8, 360:13
**perforating** [3] - 343:25, 344:2, 344:4
**perform** [7] - 297:14, 306:17, 323:24, 399:20, 415:16, 466:6, 509:6
**performed** [4] - 351:18, 451:6, 452:6, 480:11
**performing** [1] - 415:18
**performs** [1] - 316:9
**perhaps** [6] - 337:22, 338:1, 363:22, 389:13, 416:8, 423:19
**period** [17] - 297:9, 297:13, 319:5, 320:2, 350:17, 364:22, 424:4, 432:2, 440:8, 445:11, 463:8, 513:17, 515:23, 517:5, 519:13, 521:22
**periodic** [1] - 401:23
**perm** [2] - 310:24, 372:11
**permanently** [1] - 544:3
**permeabilities** [1] - 373:6
**permeability** [34] - 309:17, 309:25, 312:22, 313:2, 315:23, 316:16, 322:15, 324:13, 344:24, 345:4, 345:7, 345:14, 362:6, 368:8, 368:11, 368:16, 372:8, 372:22, 376:6, 376:21, 381:9, 381:12, 385:18, 385:20, 392:3, 414:20, 485:20, 486:1, 531:2, 531:25, 532:4, 533:7, 534:18
**permit** [45] - 295:19, 295:20, 307:18, 308:25, 310:5, 310:11, 315:12, 316:10, 321:3, 327:15, 327:18, 331:19, 334:6, 336:22, 340:24, 341:1, 341:7, 348:9, 350:12, 352:8, 354:4, 356:13, 358:16, 360:25, 391:4, 413:3, 449:17, 449:20, 449:22, 449:23, 450:17, 451:1, 451:12, 451:14, 451:15, 453:5, 453:18, 455:20, 462:20, 498:7, 506:21, 517:16, 518:7, 518:19
**Permit** [2] - 448:11, 449:16
**permits** [36] - 322:6, 324:11, 326:21, 355:25, 356:4, 359:2, 359:19, 359:23, 397:10, 406:21, 421:4, 449:12, 450:7, 450:15, 451:4, 451:7, 451:8, 451:18, 451:23, 452:6, 452:19, 453:12, 453:17, 454:4, 454:12, 454:18, 455:10, 456:11, 456:12, 456:24, 457:8, 457:17, 457:22, 462:14, 541:15, 541:16
**permitted** [6] - 310:18, 311:23, 313:15, 314:15, 340:20, 540:21
**permitting** [8] - 404:4, 419:9, 506:16, 507:12, 509:19, 516:24, 517:14, 540:20
**person** [1] - 495:24
**personally** [7] - 294:15, 294:16, 307:19, 326:11, 477:12, 529:21, 530:18
**personnel** [1] - 436:10
**pertains** [3] - 359:1, 413:18, 418:3
**Petrel** [6] - 306:6, 306:7, 363:20, 544:20, 545:1, 545:2
**Petroleum** [1] - 540:1
**petroleum** [7] - 398:24, 408:25, 504:18, 516:10, 538:1, 538:5
**petrophysical** [1] - 376:5
**pH** [1] - 485:12
**phase** [4] - 374:6, 438:13, 438:14, 438:15
**phases** [1] - 438:23
**PhD** [4] - 403:24, 403:25, 528:2
**PHI** [13] - 348:6, 348:11, 350:8, 531:1, 534:5, 534:7, 534:12, 536:2, 536:7, 536:12, 536:13, 536:18, 547:12
**PHI-H** [12] - 348:6, 348:11, 350:8, 531:1, 534:5, 534:7, 534:12, 536:2, 536:7, 536:13, 536:18, 547:12
**PHIE** [2] - 348:15, 372:11
**phone** [2] - 302:5, 503:10
**photos** [2] - 413:25, 414:15
**PHREEQ** [2] - 512:16, 523:1
**PHREEQC** [11] - 295:23, 296:5, 297:16, 297:18, 307:12, 379:19, 391:8, 521:24, 522:6, 523:3, 523:6
**physically** [1] - 300:11
**physics** [2] - 315:22, 347:21
**Piasco** [2] - 411:7, 411:8
**PIASO** [1] - 411:8
**pick** [2] - 414:2, 414:3
**picking** [1] - 466:13
**piece** [2] - 305:6, 401:23
**pieces** [1] - 298:2
**Pierre** [2] - 387:10, 409:25
**pig** [3] - 422:21, 475:18, 475:20
**pigged** [2] - 422:24, 423:2
**pigging** [1] - 421:21
**pilot** [1] - 539:7
**pinch** [4] - 375:11, 384:5, 384:12, 385:1
**pinch-out** [3] - 384:5, 384:12, 385:1
**pinches** [1] - 384:2
**pipe** [11] - 422:2, 422:9, 422:23, 469:4, 478:15, 478:17, 479:17, 490:10, 491:20, 491:25, 492:3
**Pipeline** [7] - 277:6, 278:9, 279:10, 280:12, 281:12, 282:14, 309:12
**pipeline** [13] - 397:5, 397:15, 411:25, 412:1, 422:3, 422:8, 425:20, 428:21, 435:6, 469:17, 476:5, 490:19, 492:1
**pipelines** [1] - 506:6
**piping** [11] - 476:14, 490:4, 490:25, 491:7, 491:12, 491:16, 491:20, 492:25, 493:4, 495:10
**PISC** [9] - 406:14, 406:15, 407:2, 407:7, 407:16, 432:2, 434:15, 438:14, 439:7
**place** [21] - 308:19, 309:7, 332:22, 354:4, 356:21, 378:15, 410:4, 410:13, 410:15, 421:22, 430:9, 435:10, 469:7, 482:25, 487:6, 515:3, 515:8, 515:9, 515:13, 515:16, 552:7
**placed** [2] - 355:12, 410:1
**placement** [2] - 364:12, 455:11
**plan** [37] - 319:13, 347:24, 359:24, 371:10, 395:12, 399:13, 399:15, 399:16, 399:23, 400:22, 402:7, 402:25, 405:4, 406:12, 406:21, 409:17, 415:16, 418:2, 421:2, 425:15, 429:18, 434:12, 435:25, 438:8, 439:13, 445:25, 446:14, 446:17, 453:12, 455:8, 456:15, 470:17, 484:25, 496:25, 498:13
**Plan** [7] - 401:5, 401:6, 401:20, 406:3, 433:25, 454:3, 454:10
**Plane** [1] - 390:14
**planned** [7] - 357:6, 367:11, 401:24, 402:23, 429:10, 432:5, 472:3
**planning** [3] - 415:18, 427:2, 438:14
**plans** [19] - 359:23, 367:14, 404:5, 404:14, 405:1, 406:15, 423:3, 429:23, 432:7, 437:18, 453:13, 453:14, 453:15, 453:24, 455:10, 474:20, 474:22, 483:7, 524:6
**plant** [2] - 468:11, 468:14

**plants** [2] - 419:2, 421:13
**plausible** [1] - 301:13
**play** [1] - 442:18
**plot** [1] - 345:20
**plug** [5] - 337:23, 438:3, 455:10, 474:21, 487:20
**plugged** [9] - 337:13, 337:14, 337:20, 338:2, 340:8, 371:4, 407:4, 407:17, 455:21
**plugging** [18] - 338:5, 340:3, 340:5, 406:14, 407:1, 407:16, 409:5, 409:11, 437:17, 438:8, 438:10, 438:13, 439:3, 440:9, 455:8, 455:10, 485:15, 485:17
**plugs** [11] - 336:21, 337:1, 338:11, 338:24, 339:10, 339:16, 339:20, 339:23, 360:6, 486:10, 487:12
**plume** [55] - 291:14, 291:17, 293:19, 313:4, 315:23, 319:9, 319:16, 343:6, 343:9, 344:12, 344:21, 345:18, 350:22, 364:16, 365:9, 365:11, 365:21, 365:24, 366:25, 367:2, 367:5, 368:1, 371:7, 371:10, 372:3, 372:10, 373:12, 373:17, 373:22, 390:18, 390:20, 390:22, 390:24, 415:22, 430:25, 431:6, 462:4, 462:12, 462:19, 463:6, 463:17, 463:21, 463:22, 463:23, 463:25, 464:1, 464:6, 464:7, 473:7, 473:15, 473:20, 473:23, 488:3, 499:25
**plus** [4] - 320:1, 320:2, 388:9, 388:18
**pockets** [1] - 349:2
**point** [60] - 290:14, 297:24, 298:5, 301:17, 301:19, 302:14, 302:21, 305:24, 306:11, 309:11, 309:21, 314:15, 321:6, 338:18, 344:17, 345:9, 356:10, 361:16, 369:11, 369:12, 373:19, 374:13, 378:16, 379:7, 379:13, 386:20, 402:24, 410:21, 410:25, 414:13, 429:1, 429:22, 438:16, 441:15, 442:19, 442:24, 444:14, 444:19, 445:5, 446:23, 451:20, 459:23, 460:12, 461:8, 462:13, 464:3, 466:5, 469:25, 474:21, 476:20, 492:20, 492:21, 492:22, 492:23, 497:2, 515:10, 526:14, 533:10, 548:17
**pointed** [1] - 450:21
**pointing** [1] - 336:12
**points** [21] - 294:20, 294:23, 297:20, 298:17, 304:24, 318:20, 351:7, 368:14, 372:18, 426:5, 443:4, 445:2, 445:4, 449:13, 453:6, 493:15, 495:1, 495:17, 531:12, 531:13, 534:16
**policies** [1] - 407:15
**policy** [1] - 407:21
**pollution** [3] - 407:14, 407:20, 438:21
**pool** [3] - 278:19, 280:22, 283:2
**Poplar** [7] - 539:4, 539:5, 539:12, 541:2, 541:3, 542:25, 543:1
**populate** [1] - 369:9
**populated** [1] - 376:20
**pore** [48] - 277:16, 277:17, 279:20, 279:21, 281:23, 292:4, 293:5, 321:19, 329:20, 330:1, 330:4, 330:12, 330:14, 330:16, 330:17, 330:18, 330:23, 332:4, 332:14, 332:18, 333:7, 333:10, 341:13, 342:6, 342:11, 342:15, 342:24, 349:15, 349:21, 349:24, 352:1, 352:10, 352:16, 353:10, 353:11, 353:12, 353:13, 353:17, 543:17, 543:21, 543:23, 544:3, 544:4, 544:6, 544:11, 544:16, 546:17, 548:16
**Pore** [1] - 450:14
**porosity** [27] - 344:24, 345:4, 345:6, 345:14, 349:20, 350:10, 351:2, 351:5, 352:16, 354:5, 368:16, 372:8, 372:21, 373:6, 376:5, 376:6, 376:21, 381:9, 382:24, 385:18, 385:19, 414:13, 414:19, 531:1, 533:8, 534:18, 541:25
**porosity/perm** [1] - 372:16
**portfolio** [1] - 405:23
**portfolios** [1] - 486:24
**portion** [2] - 450:25, 516:5
**pose** [1] - 361:12
**posed** [3] - 389:10, 390:1, 413:19
**position** [2] - 532:20, 547:17
**positive** [3] - 382:4, 382:25, 393:24
**possession** [3] - 296:7, 547:20, 547:21
**possibility** [1] - 532:7
**possible** [2] - 311:5, 311:7
**possibly** [2] - 414:21, 445:12
**post** [3] - 476:19, 477:22, 484:3
**postinjection** [11] - 320:2, 374:6, 399:16, 434:23, 456:14, 463:7, 463:11, 463:12, 463:16, 463:18, 473:19
**Postinjection** [1] - 454:2
**pot** [2] - 429:10, 429:20
**potential** [20] - 293:22, 302:19, 303:17, 305:25, 308:22, 314:20, 331:3, 338:19, 347:19, 347:20, 354:14, 364:19, 367:4, 405:13, 432:6, 466:23, 486:5, 487:8, 510:9, 542:25
**potentially** [18] - 314:6, 314:10, 314:23, 315:11, 316:16, 318:5, 325:12, 325:14, 330:8, 340:17, 365:10, 366:3, 372:22, 378:4, 380:17, 415:9, 469:14, 481:7
**Powder** [1] - 538:21
**POWELL** [18] - 396:1, 411:7, 412:5, 418:22, 420:9, 420:24, 423:19, 424:13, 425:7, 428:23, 433:3, 433:15, 433:22, 435:5, 436:5, 441:20, 490:3, 490:17
**Powell** [11] - 370:14, 395:22, 395:23, 396:10, 397:23, 478:7, 478:8, 484:11, 489:23, 496:11, 501:21
**POWELL/JOHN** [1] - 286:19
**POWELL/WADE** [1] - 287:15
**power** [1] - 468:12
**practice** [1] - 296:20
**Precambrian** [1] - 394:24
**precipitant** [1] - 377:23
**precipitating** [1] - 377:13
**precipitation** [3] - 378:15, 381:25, 391:1
**preclude** [1] - 333:5
**predicted** [7] - 325:15, 327:21, 372:9, 373:22, 463:19, 480:2, 481:2
**predicting** [2] - 351:5, 374:5
**predictions** [1] - 368:1
**predictive** [2] - 316:19, 321:12
**predominantly** [2] - 396:21, 425:20
**prefer** [2] - 472:12, 472:16
**preference** [1] - 310:23
**preinjection** [1] - 399:15
**prepare** [2] - 515:4, 524:21
**prepared** [2] - 477:5, 546:9
**preparing** [3] - 526:5, 546:3, 546:5
**present** [5] - 302:5, 302:13, 361:20, 451:12, 453:2
**PRESENT** [1] - 284:2
**presentations** [4] - 323:16, 324:3, 324:5, 324:9
**presented** [4] - 324:7, 378:16, 382:16, 462:20
**presenting** [1] - 375:2
**president** [1] - 539:6
**pressure** [176] - 313:4, 317:13, 326:24, 327:8, 327:12, 327:21, 327:24, 328:11, 328:14, 328:15, 328:16, 328:18, 329:4, 329:6, 329:19, 329:21, 329:24, 330:1, 330:5, 330:6, 330:13, 330:24, 331:2, 331:6, 331:8, 331:12, 331:14, 331:15, 331:20, 331:21, 332:3, 332:9, 332:11, 335:7, 335:9, 336:11, 338:7, 339:1, 339:22, 341:14, 342:15, 342:18, 342:19, 342:23, 342:25, 350:21, 358:9, 358:11, 358:17, 359:6, 364:16, 364:19, 365:13, 369:13, 369:15, 369:20, 369:23, 384:4, 384:14, 384:21, 385:7, 385:10, 386:2, 401:14, 402:19, 402:21, 412:22, 413:6, 413:10, 413:11, 413:15, 413:16, 418:5, 418:10, 424:24, 425:10, 425:25, 426:4, 426:11, 426:12, 426:13, 426:15, 426:22, 427:1, 427:5, 429:11, 430:3, 430:4, 452:12, 455:17, 457:19, 462:3, 462:5, 462:6, 462:7, 462:8, 462:9, 462:10, 462:15, 462:16, 462:18, 464:16, 464:17, 464:21, 464:23, 464:24, 465:1, 465:2, 465:4, 465:5, 465:8, 465:12, 469:2, 469:3, 469:5, 469:7, 470:18, 475:19, 475:22, 476:1, 476:5, 476:9, 476:14, 476:15, 476:18, 478:16,

478:23, 479:1, 479:2, 479:3, 479:5, 479:7, 479:11, 479:14, 479:15, 479:16, 479:19, 479:23, 480:18, 481:20, 483:9, 483:11, 484:2, 490:5, 490:8, 490:10, 490:12, 490:14, 490:18, 490:22, 491:25, 492:2, 492:4, 492:15, 492:18, 492:25, 493:1, 493:4, 493:13, 493:23, 494:9, 494:10, 494:12, 494:23, 494:24, 495:5, 495:7, 525:3, 543:12, 544:10, 544:13, 544:14
**pressures** [14] - 317:14, 319:15, 328:19, 331:17, 337:7, 426:3, 452:11, 454:7, 456:2, 476:3, 476:6, 485:3, 486:21, 487:7
**presume** [1] - 499:21
**pretend** [1] - 345:22
**pretty** [2] - 423:15, 541:20
**prevent** [2] - 309:8, 486:7
**preventing** [2] - 341:21, 342:5
**prevention** [2] - 427:17, 453:14
**Prevention** [1] - 401:5
**previous** [11] - 377:16, 378:24, 391:4, 406:20, 414:24, 436:23, 447:21, 459:11, 493:17, 519:8
**previously** [9] - 322:4, 324:14, 430:21, 448:8, 452:3, 452:25, 453:20, 458:16, 500:4
**primacy** [16] - 294:7, 507:18, 507:21, 508:1, 508:6, 512:8, 512:9, 514:23, 514:24, 515:8, 517:17, 518:6, 518:14, 519:3, 519:4, 525:25
**primarily** [5] - 401:12, 402:7, 504:21, 516:15, 546:22
**primary** [10] - 292:11, 377:12, 377:17, 387:12, 387:14, 387:23, 400:12, 485:7, 485:18, 543:2
**private** [1] - 506:1
**privilege** [2] - 302:4, 302:8
**privileged** [1] - 548:10
**privy** [3] - 307:11, 342:12, 486:11
**proactive** [1] - 431:4
**probable** [1] - 351:19
**probe** [3] - 427:24, 428:3, 428:8
**probes** [3] - 427:20, 428:12, 428:15
**problem** [3] - 475:4, 497:15, 513:11
**problematic** [1] - 320:6
**procedure** [1] - 516:24
**procedures** [4] - 495:6, 495:20, 496:1, 496:9
**proceed** [5] - 291:4, 389:6, 389:18, 458:6, 503:7
**proceedance** [1] - 315:6
**proceeding** [3] - 301:21, 328:23, 507:4
**PROCEEDINGS** [1] - 286:2
**proceedings** [3] - 289:1, 322:16, 552:6
**process** [12] - 290:22, 300:15, 314:9, 315:3, 323:15, 352:12, 379:21, 385:15, 507:12, 509:19, 542:12, 542:21
**procure** [4] - 297:10, 306:3, 306:20, 307:2
**procured** [2] - 296:24, 297:5
**procurement** [1] - 299:3
**produce** [3] - 304:22, 355:6, 547:12
**produced** [5] - 326:23, 348:9, 348:10, 348:11, 524:6
**Professional** [2] - 552:4, 552:18
**professional** [10] - 323:10, 398:23, 504:15, 505:14, 528:4, 529:14, 538:3, 538:4, 539:23, 540:11
**professor** [1] - 528:8
**profile** [2] - 402:18, 471:21
**program** [25] - 293:1, 409:22, 507:19, 507:20, 508:2, 508:3, 508:8, 508:10, 508:12, 508:20, 508:23, 509:15, 510:2, 511:10, 514:22, 514:24, 516:22, 517:7, 517:14, 518:21, 519:9, 522:8, 523:6, 523:11, 547:14
**Program** [1] - 511:3
**programs** [8] - 296:23, 297:3, 454:3, 508:14, 520:19, 522:5, 522:16, 523:15
**progressing** [1] - 431:7
**Project** [3] - 322:5, 322:17, 449:25
**project** [48] - 293:15, 296:25, 297:1, 297:13, 300:6, 305:1, 308:3, 322:5, 322:21, 329:3, 329:5, 331:22, 332:5, 332:20, 335:3, 339:3, 340:16, 341:10, 370:21, 394:21, 401:25, 408:20, 424:1, 434:11, 450:5, 450:7, 468:5, 507:8, 507:20, 512:3, 512:5, 515:24, 516:1, 516:19, 518:5, 520:12, 520:23, 528:18, 529:20, 529:22, 542:22, 543:6, 544:21, 545:19, 545:24, 546:5, 548:6, 549:1
**projected** [1] - 379:2
**projection** [2] - 363:19, 390:13
**projects** [14] - 396:23, 409:5, 506:11, 507:2, 507:5, 523:24, 524:1, 524:19, 542:9, 545:15, 545:22, 545:23, 546:4, 546:10
**promulgated** [1] - 293:8
**pronounce** [1] - 411:6
**propagation** [2] - 359:6, 413:15
**proper** [5] - 299:13, 300:8, 300:10, 340:23, 436:25
**properly** [2] - 425:24, 432:14
**properties** [15] - 316:15, 317:8, 317:20, 350:14, 363:5, 372:19, 376:8, 386:9, 485:13, 531:18, 533:4, 535:17, 545:4
**property** [9] - 311:13, 311:19, 315:15, 318:15, 318:16, 348:15, 351:9, 351:11, 352:14
**proportional** [1] - 352:22
**proposed** [16] - 296:18, 319:9, 327:25, 356:2, 356:23, 363:13, 367:7, 367:16, 368:24, 386:24, 407:24, 418:1, 427:20, 435:4, 442:23, 544:15
**proposes** [1] - 371:11
**proposing** [4] - 389:13, 438:12, 459:2, 459:8
**proprietary** [1] - 486:18
**propriety** [1] - 317:4
**prospective** [1] - 526:5
**protect** [2] - 293:20, 481:23
**protected** [1] - 339:13
**protecting** [1] - 293:11
**protection** [7] - 427:21, 428:19, 428:22, 442:23, 443:1, 443:22, 443:24
**protective** [1] - 371:6
**protocol** [3] - 308:18, 495:6, 495:13
**protocols** [1] - 495:22
**provide** [51] - 295:5, 295:19, 302:15, 302:17, 302:18, 303:17, 303:18, 303:22, 304:19, 305:21, 306:1, 319:2, 322:19, 363:22, 366:3, 370:11, 378:4, 380:15, 380:17, 380:21, 382:6, 382:11, 383:2, 386:10, 390:9, 391:5, 392:4, 394:1, 398:18, 399:8, 401:15, 403:21, 405:3, 406:4, 406:22, 410:5, 411:17, 411:19, 433:17, 435:22, 437:5, 437:14, 439:10, 467:1, 476:25, 485:8, 491:7, 506:14, 520:18, 541:17, 547:22
**provideable** [1] - 378:1
**provided** [42] - 294:24, 295:1, 295:7, 295:11, 295:13, 295:19, 295:23, 297:20, 297:23, 298:4, 298:6, 298:9, 298:13, 298:16, 301:24, 302:1, 304:11, 304:21, 305:3, 305:6, 305:11, 348:8, 397:11, 411:24, 412:2, 432:18, 433:12, 434:8, 436:24, 437:10, 445:11, 490:25, 491:3, 495:22, 508:3, 509:18, 524:23, 531:16, 533:2, 534:20, 544:18, 547:17
**provider** [1] - 438:18
**provides** [4] - 477:8, 509:1, 510:7, 510:10
**providing** [5] - 305:23, 310:2, 392:11, 436:11, 468:7
**proximity** [4] - 319:11, 356:5, 433:13, 459:12
**prudent** [2] - 460:10, 474:7
**PSC** [5] - 412:2, 412:9, 435:7, 477:10, 477:19
**psi** [27] - 332:10, 336:11, 337:9, 338:8, 339:19, 340:1, 342:15, 342:21, 342:22, 413:9, 414:25, 415:1, 415:4, 425:10, 425:11, 426:15, 426:16, 429:12, 430:2, 462:15, 465:1, 465:5, 465:6, 469:8, 470:13, 470:18
**public** [1] - 301:6
**Public** [2] - 412:7, 477:5
**publicly** [3] - 299:22, 299:25, 533:16
**publish** [1] - 496:8
**published** [2] - 347:1, 386:23
**pull** [3] - 298:24, 505:5, 529:1

**pulling** [1] - 510:20
**pulse** [3] - 401:21, 401:23, 402:12
**pump** [9] - 422:16, 425:25, 426:2, 469:5, 469:6, 476:5, 476:10, 476:12, 476:13
**pumped** [1] - 413:9
**pumps** [1] - 425:22
**punch** [1] - 375:19
**punted** [1] - 432:25
**purchase** [1] - 539:2
**purely** [1] - 372:13
**purity** [3] - 366:11, 366:25, 367:1
**purpose** [9] - 291:25, 292:1, 293:11, 317:15, 400:12, 405:1, 405:2, 475:10, 478:12
**purposes** [2] - 323:6, 376:15
**pursuant** [3] - 293:2, 393:14, 443:19
**pursuit** [1] - 507:23
**put** [11] - 290:21, 298:25, 299:8, 299:11, 300:22, 340:13, 347:24, 432:11, 516:21, 521:24, 534:5
**putting** [5] - 307:14, 371:11, 469:12, 469:14, 469:16

## Q

**QC** [1] - 299:13
**qualifications** [3] - 505:14, 539:24, 540:12
**quality** [12] - 300:16, 316:18, 354:15, 354:17, 354:19, 354:20, 354:22, 355:2, 355:7, 418:22, 504:21, 524:4
**Quality** [1] - 507:6
**quantify** [1] - 358:5
**quantity** [1] - 544:2
**quarter** [1] - 491:21
**quarterly** [1] - 440:7
**Queen's** [1] - 528:2
**questioning** [3] - 303:6, 322:1, 496:12
**questions** [88] - 318:20, 332:21, 348:4, 355:14, 355:15, 355:19, 355:20, 358:15, 360:22, 361:5, 362:10, 363:17, 369:24, 370:4, 371:22, 371:25, 377:19, 389:6, 389:10, 389:18, 389:25, 390:5, 390:9, 391:7, 392:7, 392:8, 392:9, 392:13, 392:22, 393:17, 393:20, 394:5, 395:12, 397:22, 397:24, 399:2, 403:2, 404:20, 408:4, 409:10, 410:20, 410:25, 411:2, 411:10, 411:15, 413:17, 427:16, 437:25, 447:17, 447:20, 450:20, 458:1, 461:1, 461:14, 467:6, 467:11, 468:20, 468:21, 468:23, 471:3, 471:12, 472:19, 472:24, 474:23, 475:2, 484:10, 496:16, 502:17, 502:19, 512:20, 512:22, 516:17, 517:10, 520:14, 521:19, 525:13, 525:14, 526:24, 532:15, 535:20, 536:23, 536:24, 537:3, 545:9, 548:3, 550:9, 550:10
**quick** [6] - 290:11, 333:13, 405:4, 407:12, 484:12, 503:14
**quicker** [1] - 535:19
**quickly** [3] - 379:7, 381:7, 416:19
**quite** [2] - 534:17, 542:10

## R

**radius** [1] - 541:22
**raise** [4] - 395:24, 398:4, 403:6, 408:8
**raised** [2] - 501:15, 501:17
**ran** [14] - 299:14, 317:12, 317:24, 318:2, 318:8, 318:14, 321:10, 324:18, 326:5, 340:14, 367:12, 413:23, 462:14, 546:14
**ranching** [1] - 506:1
**randomly** [1] - 351:1
**Range** [59] - 277:7, 277:9, 277:11, 277:12, 277:13, 277:21, 277:22, 278:1, 278:2, 278:3, 278:10, 278:11, 278:14, 278:15, 278:16, 278:20, 278:22, 279:1, 279:2, 279:3, 279:11, 279:14, 279:16, 279:16, 280:1, 280:4, 280:5, 280:6, 280:14, 280:16, 280:18, 280:19, 280:23, 281:2, 281:4, 281:5, 281:13, 281:15, 281:16, 281:18, 281:20, 282:3, 282:4, 282:5, 282:8, 282:9, 282:15, 282:17, 282:18, 282:20, 282:22, 283:3, 283:4, 283:5, 283:8, 283:9, 373:10, 423:15, 429:3
**range** [14] - 300:24, 301:14, 342:21, 394:15, 404:1, 415:5, 425:10, 425:13, 425:15, 425:17, 425:18, 426:3, 427:6, 549:13
**ranges** [2] - 374:12, 385:19
**rare** [1] - 507:10
**rate** [18] - 328:3, 328:8, 331:11, 423:23, 424:12, 424:17, 463:24, 463:25, 464:2, 464:3, 470:8, 470:12, 473:16, 480:16, 480:19, 483:8, 483:11, 483:13
**rated** [2] - 340:1, 486:20
**rates** [9] - 317:13, 321:7, 331:3, 331:7, 332:6, 333:9, 340:14, 425:3, 452:11
**rather** [3] - 369:7, 484:5, 491:5
**ratings** [2] - 464:23, 469:4
**ratio** [2] - 315:23, 421:2
**rattle** [1] - 466:4
**Raymond** [10] - 371:3, 430:19, 487:20, 487:22, 488:4, 488:8, 488:16, 488:21, 489:12, 489:17
**re** [12] - 277:3, 277:15, 278:5, 278:18, 279:7, 279:18, 280:8, 280:21, 281:9, 281:21, 282:11, 283:1
**reach** [1] - 488:3
**reached** [2] - 342:9, 446:1
**reaches** [3] - 422:12, 441:15, 492:23
**reactions** [3] - 360:18, 486:6, 486:8
**reactive** [1] - 366:8
**read** [8] - 305:12, 305:14, 320:22, 320:23, 374:21, 389:14, 420:10, 521:11
**readily** [3] - 377:24, 473:21, 473:25
**reading** [2] - 443:21, 521:12
**readings** [1] - 401:15
**reads** [2] - 387:10, 445:18
**ready** [9] - 393:17, 413:4, 458:20, 512:10, 512:11, 512:15, 532:11, 544:21, 544:24
**real** [4] - 333:13, 381:6, 428:5, 503:14
**realization** [1] - 350:11
**reallocate** [1] - 497:22
**really** [9] - 346:8, 399:24, 400:23, 405:3, 405:19, 406:12, 425:19, 431:8, 550:5
**reason** [5] - 291:25, 292:11, 307:3, 376:17, 419:3
**reasonability** [1] - 323:19
**reasonable** [1] - 373:21
**reasoning** [1] - 365:15
**reasons** [1] - 365:17
**rebalance** [1] - 443:6
**recalled** [1] - 467:6
**recalling** [2] - 416:2, 447:18
**receipt** [1] - 397:13
**receive** [1] - 532:13
**Received** [2] - 288:12, 288:17
**received** [7] - 392:7, 392:9, 392:10, 395:18, 475:18, 512:14, 525:25
**receiver** [9] - 354:22, 355:1, 355:6, 355:10, 422:4, 422:5, 422:13, 475:15, 475:18
**receivers** [3] - 354:25, 355:5, 355:11
**recently** [4] - 392:25, 529:17, 540:2, 542:23
**recess** [1] - 551:8
**Recessed** [6] - 321:22, 389:1, 447:7, 503:4, 551:5, 551:11
**recite** [1] - 392:18
**recognize** [1] - 326:18
**recognized** [3] - 386:21, 446:12
**recollect** [1] - 425:24
**recollection** [3] - 419:15, 482:17, 518:22
**recommend** [2] - 469:19, 532:25
**recommendation** [3] - 439:1, 498:12, 550:6
**recommendations** [3] - 479:8, 509:2, 532:20
**recommending** [1] - 442:12
**recomplete** [1] - 338:12
**reconciled** [2] - 421:6, 421:15
**reconfigured** [1] - 443:10
**reconvened** [5] - 321:22, 389:1, 447:7, 503:4, 551:5
**record** [19] - 289:2, 289:5, 290:21, 321:25, 327:18, 389:4, 396:9, 398:11, 403:13, 408:15, 417:3, 447:10, 461:9, 467:22, 503:7, 518:3, 551:4, 551:8, 552:7
**Record** [2] - 305:14, 320:23
**recorded** [1] - 552:5
**recordkeeping** [2] - 508:15, 511:1
**Recordkeeping** [1] - 511:4
**records** [2] - 340:3, 340:5
**recovery** [11] - 538:18, 539:4, 542:12, 542:20,

542:21, 542:25, 545:15, 545:23, 546:4, 546:13, 546:15
**recreate** [2] - 299:23, 301:11
**Recross** [1] - 287:13
**RECROSS** [1] - 473:4
**Recross-Examination** [1] - 287:13
**RECROSS-EXAMINATION** [1] - 473:4
**recycled** [1] - 542:19
**Red** [1] - 536:16
**red** [7] - 348:18, 348:20, 349:2, 349:10, 350:25, 373:20, 373:25
**REDIRECT** [5] - 389:22, 448:5, 458:12, 461:20, 526:16
**Redirect** [5] - 286:16, 287:8, 287:9, 287:10, 287:25
**redirect** [3] - 525:15, 537:1, 550:12
**redistribute** [1] - 545:4
**redraw** [1] - 314:21
**redrill** [1] - 338:11
**reduce** [6] - 311:10, 311:16, 354:14, 354:16, 466:8, 483:10
**reduced** [4] - 317:22, 483:8, 483:13, 485:21
**reduces** [3] - 311:17, 330:14, 330:18
**reducing** [1] - 312:2
**reduction** [1] - 345:21
**reevaluate** [1] - 373:22
**reevaluated** [1] - 509:5
**reevaluation** [6] - 313:12, 314:5, 318:24, 319:4, 350:17, 509:6
**refer** [6] - 318:3, 409:18, 445:8, 488:10, 488:17, 521:3
**reference** [11] - 316:4, 377:8, 386:17, 407:12, 431:14, 439:19, 470:10, 484:23, 491:12, 512:18
**referenced** [11] - 298:19, 298:21, 327:19, 386:16, 469:3, 493:10, 508:19, 509:12, 510:1, 513:22, 521:23
**references** [2] - 309:1, 393:8
**referencing** [5] - 382:1, 382:23, 383:15, 387:4, 428:24
**referred** [1] - 514:3
**referring** [6] - 295:8, 304:1, 385:22, 406:25, 413:12, 449:19
**refine** [1] - 443:13
**refined** [1] - 443:15
**refinement** [3] - 363:24, 364:1, 364:2
**refinery** [1] - 504:18
**reflect** [5] - 356:15, 411:17, 505:13, 539:22, 540:11
**reflected** [1] - 385:20
**reflecting** [2] - 314:19, 411:22
**regarding** [8] - 309:21, 310:14, 314:4, 373:17, 394:11, 474:9, 509:2, 530:15
**regardless** [5] - 321:5, 336:25, 444:3, 473:16, 512:7
**regimes** [1] - 509:13
**region** [2] - 293:14, 372:7
**Registered** [2] - 552:3, 552:18
**regular** [1] - 485:15
**regulation** [5] - 293:1, 314:3, 490:19, 493:22, 511:11
**regulations** [23] - 291:22, 292:4, 292:15, 292:16, 293:19, 294:4, 294:5, 294:6, 294:7, 313:11, 367:15, 397:7, 404:8, 410:11, 454:19, 462:9, 485:6, 507:9, 507:11, 508:21, 510:3, 515:4, 515:11
**regulator** [1] - 466:16
**regulatory** [9] - 291:16, 328:12, 328:16, 367:20, 367:23, 436:22, 495:23, 496:8, 509:13
**relate** [1] - 457:22
**related** [21] - 304:25, 308:3, 311:24, 312:3, 312:21, 321:19, 322:16, 323:22, 341:4, 360:22, 363:18, 368:13, 371:2, 418:17, 427:17, 441:13, 454:5, 456:13, 474:24, 512:13, 543:8
**relates** [8] - 384:14, 415:3, 421:20, 437:16, 440:4, 449:16, 477:20, 489:22
**relation** [4] - 308:20, 309:1, 334:19, 450:7
**relationship** [1] - 482:22
**relative** [3] - 392:3, 413:5, 524:17
**relatively** [1] - 521:21
**release** [9] - 476:18, 477:1, 480:2, 480:9, 481:6, 481:21, 492:9, 493:6, 493:11
**released** [5] - 439:6, 481:2, 481:14, 492:6, 493:8
**releases** [2] - 308:22, 493:1
**relevance** [1] - 541:7
**relevant** [1] - 342:1
**relied** [1] - 508:11
**relief** [17] - 475:22, 475:25, 476:1, 478:13, 478:18, 478:20, 478:22, 480:4, 480:10, 484:2, 490:5, 490:9, 491:24, 492:2, 492:13, 493:3, 494:9
**relies** [1] - 495:14
**relieve** [5] - 478:23, 480:15, 490:5, 494:12, 495:7
**relieved** [2] - 492:1, 492:5
**relieves** [4] - 492:23, 492:24, 493:3, 494:10
**reluctantly** [1] - 465:16
**remain** [1] - 441:16
**remainder** [2] - 290:17, 397:4
**remaining** [3] - 290:15, 416:18, 467:10
**remains** [2] - 452:19, 453:25
**remedial** [6] - 404:13, 404:24, 405:1, 439:13, 440:21, 506:16
**Remedial** [2] - 433:25, 454:9
**remediation** [3] - 407:18, 506:16, 524:5
**remember** [7] - 320:21, 392:21, 451:1, 468:22, 488:2, 494:1, 494:20
**reminder** [4] - 404:11, 448:4, 458:10, 461:18
**remove** [1] - 544:1
**removed** [1] - 475:20
**rename** [1] - 387:3
**renaming** [1] - 386:24
**repeat** [8] - 311:15, 317:3, 356:4, 488:20, 489:9, 490:17, 520:9, 529:7
**repeated** [1] - 342:4
**rephrase** [2] - 420:17, 518:11
**replacement** [4] - 440:6, 441:2, 441:5, 481:22
**replicate** [5] - 299:23, 301:5, 325:18, 325:24, 326:3
**replugged** [1] - 338:14
**Report** [2] - 386:23, 400:19
**report** [2] - 444:21, 464:25
**REPORTER** [2] - 490:15, 552:1
**reporter** [1] - 453:7
**Reporter** [2] - 552:4, 552:18
**Reporter.....** [1] - 286:8
**reporting** [4] - 398:17, 400:19, 421:4, 511:1
**Reporting** [3] - 400:20, 400:21, 511:4
**reports** [4] - 298:14, 324:4, 522:9, 549:25
**represent** [6] - 331:20, 357:15, 381:18, 383:25, 414:19, 513:4
**representative** [7] - 296:11, 302:11, 302:13, 381:13, 386:7, 414:2, 414:6
**represented** [5] - 335:14, 375:4, 382:17, 382:20, 387:5
**representing** [2] - 344:22, 345:23
**represents** [3] - 349:19, 369:17, 369:18
**request** [6] - 294:25, 304:1, 432:11, 439:6, 460:20, 460:21
**requested** [7] - 296:6, 301:23, 305:14, 320:23, 367:21, 514:18, 521:20
**requesting** [4] - 277:4, 279:8, 281:10, 533:22
**requests** [1] - 547:1
**require** [17] - 277:17, 279:20, 281:23, 292:4, 293:19, 294:6, 313:5, 313:11, 314:13, 335:4, 341:9, 367:15, 420:1, 437:20, 438:4, 442:2, 469:17
**required** [22] - 277:19, 279:22, 282:1, 293:21, 293:24, 293:25, 298:12, 306:3, 318:24, 330:10, 330:11, 336:23, 338:7, 338:16, 352:5, 367:18, 429:24, 430:2, 437:3, 462:8, 509:19, 544:19
**requirement** [7] - 292:8, 292:11, 336:25, 366:10, 442:2, 487:1, 512:7
**requirements** [3] - 294:10, 323:22, 443:23
**requires** [2] - 314:14, 430:3
**requiring** [1] - 454:20
**reran** [1] - 418:10
**rerun** [2] - 313:9, 324:1
**resampled** [1] - 420:7
**Research** [1] - 303:14
**research** [5] - 389:12, 521:13, 528:6, 528:18, 528:23
**reserves** [2] - 355:24, 431:18
**reserving** [1] - 417:14
**reservoir** [47] - 277:16, 279:20, 281:22, 291:24, 292:2, 296:3, 297:25, 317:22, 327:8, 328:9, 329:25, 330:5, 331:8, 337:7, 342:16, 348:7,

350:23, 355:10, 365:18, 379:2, 384:4, 384:23, 390:17, 391:11, 391:12, 394:17, 402:2, 402:5, 402:16, 402:19, 402:22, 431:1, 454:22, 456:16, 487:13, 487:18, 531:2, 531:18, 531:23, 533:4, 535:17, 538:6, 538:13, 539:3, 542:3, 542:15, 543:9
**reservoirs** [1] - 543:15
**residential** [2] - 537:20, 537:21
**residents** [1] - 435:10
**resistance** [2] - 428:7, 485:9
**resistant** [8] - 410:12, 410:16, 438:9, 454:21, 484:23, 485:14, 487:2, 487:19
**resistive** [2] - 361:20, 361:25
**resistivity** [1] - 428:9
**resolution** [3] - 354:15, 354:16, 372:20
**resolving** [1] - 372:21
**resonance** [2] - 413:23, 414:12
**resource** [1] - 506:17
**Resources** [3] - 289:9, 340:12, 539:6
**resources** [5] - 341:9, 404:1, 405:8, 405:12, 504:7
**respect** [23] - 296:11, 304:23, 309:5, 320:24, 352:13, 390:13, 391:16, 404:24, 409:16, 417:2, 442:22, 446:19, 468:16, 487:14, 495:23, 496:25, 501:23, 505:22, 507:10, 507:12, 540:23, 541:16, 542:7
**respond** [9] - 290:16, 303:4, 384:21, 389:17, 390:5, 420:8, 461:15, 461:24, 467:10
**responders** [2] - 405:17, 405:24
**responding** [1] - 350:21
**responds** [1] - 384:4
**response** [16] - 304:9, 378:3, 386:12, 404:13, 404:25, 405:1, 405:4, 405:13, 434:12, 436:1, 439:13, 440:5, 440:22, 441:1, 495:18, 550:14
**Response** [2] - 433:25, 454:10
**responses** [1] - 390:10
**responsibilities** [3] - 409:3, 468:16, 516:18
**responsibility** [4] - 278:7, 280:11, 282:13, 486:19
**responsible** [1] - 516:15
**rest** [2] - 345:24, 434:11
**restart** [2] - 325:9, 325:10
**restate** [5] - 319:20, 320:19, 463:7, 464:18, 465:9
**result** [17] - 311:22, 313:3, 314:10, 314:20, 315:25, 331:13, 331:14, 365:11, 365:23, 390:23, 418:9, 450:20, 455:4, 462:10, 462:12, 486:1, 518:2
**resulted** [1] - 507:7
**results** [9] - 295:3, 309:24, 316:12, 316:17, 367:19, 414:21, 418:7, 457:4, 457:13
**resume** [4] - 289:11, 290:11, 321:25, 551:9
**retained** [1] - 520:24
**retrieved** [1] - 475:21
**reverse** [2] - 379:16, 435:18
**reverses** [1] - 379:13
**review** [55] - 292:7, 292:9, 292:10, 292:23, 293:10, 293:14, 293:24, 295:12, 300:17, 309:2, 314:21, 315:12, 318:23, 319:10, 323:15, 328:1, 329:16, 333:25, 334:8, 334:9, 334:12, 334:14, 334:18, 334:20, 334:21, 335:5, 336:7, 336:23, 348:7, 353:24, 371:3, 402:6, 431:23, 444:17, 452:17, 452:22, 453:3, 488:5, 496:14, 508:8, 508:15, 509:3, 509:5, 514:21, 521:2, 525:5, 525:6, 526:4, 530:11, 532:12, 548:22, 548:23, 549:21, 550:16
**Review** [1] - 452:15
**reviewed** [21] - 323:25, 324:2, 360:1, 488:5, 506:23, 507:11, 509:12, 511:9, 518:16, 519:6, 521:6, 521:8, 521:10, 533:10, 533:13, 533:14, 533:16, 548:18, 549:22, 549:23, 550:5
**reviewing** [9] - 393:12, 431:6, 496:4, 507:20, 516:11, 518:2, 520:25, 524:5, 549:5
**reviews** [2] - 324:3, 405:7
**revised** [1] - 483:8
**revisit** [1] - 469:15
**RFP** [2] - 507:7, 507:17
**RI** [1] - 386:22
**ribbing** [1] - 338:19
**Rich** [1] - 392:21
**Richard** [1] - 411:15
**RICHARD** [1] - 284:4
**Richland** [1] - 538:21
**Richter** [3] - 334:24, 335:1, 335:23
**rig** [2] - 438:5, 438:7
**rights** [3] - 311:13, 311:19, 341:4
**rise** [1] - 480:12
**risk** [4] - 361:12, 388:11, 479:6, 489:19
**risk-based** [2] - 388:11, 489:19
**risks** [1] - 510:9
**River** [6] - 386:18, 386:20, 386:24, 387:3, 392:24, 538:21
**road** [1] - 497:19
**rock** [6] - 317:20, 344:24, 345:12, 377:22, 504:21, 543:13
**Rockies** [1] - 528:12
**rocks** [1] - 349:20
**role** [1] - 523:20
**roles** [2] - 323:23, 468:13
**room** [1] - 289:8
**rough** [2] - 379:3, 470:23
**roughly** [3] - 348:16, 412:8, 425:11
**routinely** [1] - 522:8
**row** [4] - 450:11, 450:13, 452:14, 452:16
**rows** [1] - 401:2
**royalties** [2] - 320:16, 412:12
**royalty** [1] - 357:22
**rule** [4] - 393:7, 430:3, 512:2, 526:9
**rules** [19] - 279:6, 281:8, 283:12, 292:20, 292:21, 292:22, 293:6, 293:9, 335:4, 338:5, 454:19, 513:19, 515:2, 516:25, 517:7, 517:10, 517:12, 517:22, 526:9
**run** [33] - 315:17, 317:8, 318:11, 318:15, 323:9, 324:12, 324:18, 324:20, 325:4, 325:7, 325:25, 326:3, 326:8, 333:12, 337:12, 338:7, 340:15, 363:10, 426:6, 444:9, 444:15, 473:14, 512:15, 517:15, 521:21, 522:1, 544:19, 544:22, 544:25, 545:7, 546:9, 546:12
**running** [17] - 317:1, 317:5, 318:19, 318:22, 319:1, 324:25, 325:2, 325:22, 346:22, 417:4, 444:8, 512:12, 542:11, 545:24, 546:3, 546:5
**RUST** [1] - 285:9
**résumé** [2] - 505:10, 539:21

## S

**SACROC** [1] - 538:14
**safe** [3] - 405:4, 405:6, 478:19
**Safe** [3] - 292:12, 292:18, 293:2
**safeguard** [1] - 467:1
**safeguards** [2] - 309:7, 309:10
**safely** [1] - 319:3
**safety** [5] - 319:17, 403:20, 405:25, 479:12, 504:19
**saline** [1] - 524:6
**salinity** [1] - 365:19
**salt** [2] - 543:12, 543:14
**saltwater** [5] - 409:7, 524:17, 524:20, 524:22, 525:8
**sample** [16] - 317:20, 365:3, 365:4, 375:25, 376:2, 381:11, 381:13, 381:20, 385:17, 385:18, 385:22, 385:23, 386:3, 414:6, 420:13
**sampled** [3] - 359:12, 359:20, 376:1
**samples** [5] - 359:14, 370:18, 376:4, 381:3, 418:19
**Sampling** [1] - 457:3
**sampling** [10] - 359:22, 359:24, 360:3, 368:14, 400:15, 402:10, 430:8, 431:20, 452:18
**sand** [4] - 359:4, 413:20, 414:2, 414:19
**sandstone** [3] - 374:11, 374:22, 414:11
**sandstones** [1] - 376:1
**SARA** [1] - 284:8
**sat** [1] - 534:22
**saturated** [2] - 391:20
**saturation** [11] - 344:22, 344:23, 345:1, 345:3, 345:10, 346:3, 346:4, 358:10, 358:11, 464:10, 473:11
**saturations** [1] - 402:13
**save** [2] - 389:13, 475:5
**saw** [3] - 363:15, 390:25, 493:9
**SCADA** [1] - 397:12
**scale** [5] - 327:4, 345:21,

356:24, 423:16, 423:18
**scale's** [1] - 329:11
**scenario** [6] - 439:21, 439:24, 481:3, 489:16, 489:18, 497:18
**Schedule** [1] - 400:21
**schedule** [1] - 419:4
**scheduling** [2] - 417:5, 417:17
**Schlumberger** [1] - 486:24
**Schlumberger's** [1] - 544:20
**school** [1] - 540:6
**science** [6] - 396:19, 398:21, 398:22, 408:24, 504:10, 537:25
**sciences** [1] - 404:2
**scope** [2] - 297:14, 306:18
**scratch** [1] - 299:22
**SCS** [2] - 466:6, 482:8
**SCS1** [3] - 336:4, 441:16, 442:1
**SCS2** [2] - 407:23
**SCS3** [3] - 407:23, 458:25, 460:9
**Scurry** [1] - 538:14
**seal** [5] - 429:10, 429:20, 528:16, 528:17, 528:19
**Seattle** [1] - 504:20
**second** [9] - 393:3, 405:10, 434:18, 439:18, 441:12, 441:21, 449:21, 463:10, 472:1
**second-to-last** [2] - 441:12, 441:21
**secondary** [4] - 387:24, 429:23, 435:20, 495:3
**seconds** [2] - 494:7, 495:2
**section** [19] - 348:16, 348:19, 348:21, 364:24, 401:3, 409:23, 410:8, 410:9, 413:7, 434:15, 445:18, 449:17, 450:14, 453:10, 454:1, 454:2, 460:8, 465:3, 478:15
**Section** [52] - 281:13, 282:2, 282:15, 283:2, 358:15, 359:25, 363:18, 370:3, 373:11, 383:4, 388:4, 399:3, 404:13, 404:17, 405:3, 406:2, 409:16, 412:21, 418:13, 423:14, 429:2, 431:14, 433:24, 434:3, 437:23, 443:19, 449:16, 450:24, 451:20, 451:24, 452:1, 452:4, 452:9, 452:15, 453:10, 453:11, 453:21, 454:8, 454:14, 454:17, 455:7, 455:14, 456:6, 459:5, 459:9, 460:4, 462:15, 464:24, 469:25, 470:1, 470:11, 471:19
**sections** [6] - 344:20, 361:9, 388:22, 401:9, 406:16, 450:3
**Sections** [54] - 277:7, 277:8, 277:9, 277:12, 277:13, 277:20, 277:21, 277:22, 278:1, 278:2, 278:9, 278:10, 278:12, 278:14, 278:15, 278:20, 278:21, 278:22, 279:1, 279:2, 279:11, 279:12, 279:14, 279:16, 279:23, 280:1, 280:4, 280:5, 280:13, 280:14, 280:17, 280:18, 280:22, 280:23, 281:3, 281:4, 281:13, 281:15, 281:16, 281:19, 282:3, 282:4, 282:5, 282:8, 282:15, 282:17, 282:18, 282:21, 283:3, 283:4, 283:5, 283:8, 374:8, 437:17
**secured** [3] - 445:19, 445:22, 446:21
**see** [43] - 327:4, 327:23, 327:24, 329:9, 329:13, 329:15, 336:12, 345:2, 345:19, 348:22, 348:25, 349:7, 353:21, 355:21, 356:19, 356:22, 369:19, 372:5, 372:9, 373:3, 375:1, 379:8, 400:2, 417:24, 418:3, 420:16, 431:2, 431:6, 432:20, 449:15, 449:18, 450:11, 450:16, 471:9, 496:2, 496:9, 498:1, 502:8, 507:21, 514:6, 523:14, 549:3, 550:17
**seeing** [4] - 415:2, 466:23, 494:24, 507:14
**seem** [4] - 502:3, 515:15, 526:7, 526:11
**segment** [11] - 421:25, 422:10, 423:1, 442:14, 481:8, 490:7, 492:3, 492:25, 493:4, 494:18, 495:9
**segments** [5] - 490:7, 490:9, 492:3, 493:20, 493:25
**seismic** [36] - 343:14, 346:25, 347:11, 354:13, 354:15, 354:18, 354:20, 355:7, 358:7, 358:8, 363:8, 363:12, 363:14, 371:8, 372:15, 372:17, 372:20, 373:2, 394:20, 402:23, 430:22, 431:5, 444:8, 444:10, 444:15, 451:8, 483:18, 483:19, 528:21, 530:20, 530:21, 531:17, 531:21, 531:22, 532:13, 533:6
**seismicity** [6] - 402:25, 432:5, 432:6, 432:15, 445:2, 445:6
**seismometer** [1] - 432:16
**seismometers** [2] - 403:1, 432:8
**selected** [3] - 311:2, 364:14, 365:5
**selection** [2] - 468:19, 487:5
**send** [5] - 300:22, 366:12, 424:6, 424:7, 424:8
**senior** [1] - 398:16
**sense** [5] - 315:19, 362:5, 369:21, 391:19, 517:19
**sensitive** [3] - 390:21, 390:22, 428:9
**sensitivities** [1] - 542:11
**sensitivity** [23] - 310:8, 316:4, 316:7, 316:9, 316:13, 317:1, 317:6, 317:8, 317:10, 317:12, 317:17, 317:21, 317:24, 318:2, 318:3, 318:4, 318:12, 318:16, 318:19, 319:1, 321:10, 351:14, 544:25
**sent** [1] - 304:2
**sentence** [2] - 375:17, 445:17
**sentences** [1] - 511:24
**separate** [4] - 358:11, 438:15, 439:5, 469:21
**separated** [1] - 359:16
**separately** [2] - 295:20, 422:22
**sequence** [1] - 444:15
**sequester** [1] - 544:3
**sequestration** [14] - 293:15, 397:16, 400:24, 403:19, 408:20, 422:5, 422:12, 422:24, 443:10, 443:12, 512:4, 512:6, 529:20, 546:21
**serve** [2] - 362:19, 363:5
**Service** [2] - 412:7, 477:6
**services** [5] - 445:19, 445:21, 504:5, 506:9, 506:14
**set** [25] - 292:19, 294:7, 323:9, 326:8, 347:16, 368:17, 394:4, 410:1, 410:3, 410:13, 426:5, 438:9, 460:14, 460:23, 469:4, 469:6, 479:12, 479:19, 492:19, 492:21, 492:23, 493:15, 494:25, 495:17, 535:6
**setback** [1] - 435:4
**setbacks** [1] - 435:5
**sets** [7] - 292:14, 295:5, 298:4, 304:14, 304:19, 304:22, 323:20
**setting** [3] - 426:22, 507:19, 543:10
**seven** [2] - 337:24, 523:24
**several** [12] - 325:24, 343:12, 393:8, 394:22, 463:16, 504:25, 507:5, 516:7, 523:2, 529:16, 538:19, 542:8
**SFP** [1] - 449:16
**shake** [1] - 466:4
**shale** [2] - 387:11, 538:20
**shallower** [1] - 355:3
**Shane** [12] - 503:10, 503:15, 503:22, 503:24, 505:6, 505:21, 513:12, 520:17, 521:17, 525:19, 526:1
**SHANE** [2] - 287:20, 503:17
**shape** [1] - 372:3
**shapefiles** [4] - 295:4, 295:11, 295:14, 326:18
**Sheridan** [1] - 284:17
**shift** [1] - 406:1
**shining** [1] - 478:17
**shoe** [2] - 410:4, 410:16
**short** [5] - 373:18, 378:2, 445:11, 521:21
**shorter** [1] - 455:5
**shorthand** [2] - 552:6, 552:11
**shortly** [1] - 444:16
**show** [6] - 329:25, 331:17, 350:8, 359:14, 362:12, 448:7
**showed** [4] - 309:25, 360:16, 414:12, 424:23
**showing** [6] - 327:20, 344:20, 368:7, 370:6, 378:18, 463:17
**shown** [6] - 360:11, 361:11, 364:6, 368:23, 383:14, 424:1
**shows** [7] - 356:19, 356:20, 361:19, 364:4, 378:13, 421:18, 531:25
**shut** [5] - 331:12, 467:2, 481:16, 490:8, 494:11
**shutdown** [2] - 422:18, 493:14
**sic** [2] - 411:5, 513:3
**sic]** [1] - 411:8
**side** [8] - 311:12, 355:4, 376:25, 378:14, 419:12, 421:7, 422:1, 426:1
**signature** [2] - 420:6, 420:15

**signed** [1] - 482:21
**significance** [2] - 445:4, 466:19
**significant** [6] - 332:3, 341:25, 349:1, 376:9, 387:20, 473:18
**significantly** [4] - 330:25, 346:6, 444:20, 485:21
**signing** [1] - 526:19
**siltstone** [7] - 368:8, 368:12, 368:15, 376:16, 376:20, 385:25
**similar** [9] - 360:9, 382:13, 382:21, 435:6, 453:13, 453:14, 453:15, 454:4, 510:4
**similarly** [9] - 322:7, 324:10, 330:3, 362:8, 362:23, 363:3, 365:12, 365:15, 424:15
**simple** [1] - 541:20
**simply** [3] - 399:17, 481:23, 491:7
**simulate** [3] - 331:24, 332:2, 463:15
**simulated** [5] - 344:21, 346:1, 384:14, 385:3, 452:7
**simulation** [43] - 292:6, 292:23, 293:21, 295:2, 297:25, 316:12, 316:17, 321:17, 363:18, 364:5, 364:8, 364:13, 364:20, 365:2, 365:14, 366:14, 366:21, 367:12, 369:5, 374:11, 374:18, 375:11, 375:13, 379:24, 380:24, 383:18, 383:19, 418:5, 452:2, 452:6, 457:13, 462:20, 463:14, 463:19, 531:9, 531:10, 532:1, 538:8, 538:13, 539:3, 542:24
**simulations** [6] - 296:1, 300:5, 315:21, 324:1, 325:23, 369:15
**simulator** [2] - 325:16, 384:20
**single** [7] - 300:1, 385:17, 385:22, 385:23, 386:3, 397:20, 442:8
**sit** [4] - 298:24, 410:23, 416:13, 416:14
**Site** [1] - 454:2
**site** [44] - 310:5, 318:6, 342:22, 347:25, 350:13, 364:18, 365:6, 397:16, 404:5, 406:15, 407:18, 414:17, 422:5, 422:12, 425:23, 428:16, 429:13, 429:14, 432:8, 432:12, 433:4, 436:20, 436:24, 441:3, 442:11, 442:15, 451:10, 451:16, 452:9, 452:20, 452:24, 453:25, 456:1, 456:14, 456:16, 456:24, 457:4, 457:8, 457:13, 458:25, 470:16, 529:18, 529:21
**site-specific** [14] - 318:6, 342:22, 350:13, 365:6, 432:12, 441:3, 451:10, 451:16, 452:9, 452:20, 452:24, 456:1, 456:24, 457:8
**sites** [17] - 327:22, 347:4, 356:23, 364:14, 407:13, 415:15, 421:12, 421:14, 422:6, 433:5, 436:18, 436:20, 452:7, 462:18, 477:1, 510:10, 524:3
**sits** [2] - 329:15, 339:15
**situ** [4] - 359:5, 413:22, 415:16, 451:5
**situation** [8] - 380:18, 490:1, 495:10, 495:21, 496:22, 497:25, 499:7, 499:14
**six** [4] - 367:8, 415:20, 523:23, 529:25
**size** [25] - 300:19, 311:10, 312:2, 315:24, 318:13, 319:9, 325:6, 363:23, 367:5, 384:18, 390:18, 390:20, 390:22, 415:22, 416:5, 422:8, 438:5, 462:4, 462:19, 480:13, 491:6, 491:17, 499:23, 550:2
**skipping** [1] - 333:19
**Skull** [1] - 402:12
**Slash** [5] - 362:24, 415:4, 415:9, 455:2, 455:25
**slated** [1] - 470:25
**slightly** [4] - 309:25, 350:19, 440:20, 456:12
**Slope** [1] - 387:1
**slope** [1] - 379:9
**slow** [3] - 404:9, 405:9, 453:7
**slowed** [1] - 464:4
**slowly** [1] - 405:15
**slows** [1] - 379:10
**SM** [2] - 538:17, 538:24
**small** [6] - 311:5, 311:7, 423:15, 423:18, 493:4, 504:6
**smaller** [6] - 311:21, 320:3, 346:2, 365:11, 365:24, 384:22
**Smith** [2] - 552:3, 552:17
**SMITH** [1] - 285:9
**software** [9] - 304:7, 304:12, 306:3, 306:20, 306:22, 522:1, 522:11, 522:16, 544:20
**soil** [6] - 402:8, 402:9, 430:8, 471:21, 471:24, 472:3
**solutions** [1] - 415:14
**Solutions** [5] - 396:12, 404:7, 408:18, 443:21, 468:3
**someone** [10] - 322:11, 322:14, 322:23, 348:6, 411:3, 436:14, 501:20, 517:15, 546:12, 547:12
**sometimes** [1] - 436:9
**somewhat** [2] - 535:2, 535:16
**somewhere** [2] - 374:13, 519:14
**sonic** [2] - 413:24, 414:9
**sorry** [39] - 290:25, 296:9, 297:17, 333:18, 335:14, 346:22, 350:5, 351:9, 351:16, 377:4, 379:7, 380:11, 393:19, 405:10, 415:8, 420:17, 424:14, 433:6, 433:23, 434:21, 437:6, 438:1, 441:22, 442:7, 445:17, 447:15, 462:24, 464:8, 471:7, 471:13, 476:16, 489:10, 490:17, 492:12, 499:21, 510:22, 525:16, 550:15, 550:23
**sort** [4] - 448:22, 449:1, 524:25, 550:5
**sounds** [5] - 301:13, 469:9, 474:25, 515:21, 524:8
**source** [20] - 354:21, 354:25, 355:1, 355:4, 355:5, 355:6, 355:10, 355:11, 410:2, 410:6, 418:17, 419:12, 419:24, 420:12, 420:14, 420:20, 420:23, 421:13, 443:4, 489:1
**sources** [13] - 293:16, 293:20, 293:23, 294:1, 366:12, 366:16, 411:18, 418:18, 419:16, 419:20, 420:3, 420:7, 439:14
**South** [2] - 390:14, 537:21
**south** [5] - 335:25, 336:4, 336:6, 336:8, 336:9
**southwest** [4] - 335:13, 335:25, 369:18, 372:6
**space** [50] - 277:16, 277:17, 279:20, 279:21, 281:22, 281:23, 292:4, 293:6, 321:19, 329:20, 330:1, 330:4, 330:12, 330:15, 330:16, 330:17, 330:19, 330:23, 332:4, 332:14, 332:18, 333:7, 333:10, 341:13, 342:6, 342:11, 342:15, 342:24, 349:15, 349:21, 349:24, 352:2, 352:10, 352:17, 353:10, 353:12, 353:13, 353:17, 410:22, 543:17, 543:21, 543:23, 544:3, 544:4, 544:6, 544:11, 544:17, 546:17, 548:16
**Space** [1] - 450:14
**speaking** [5] - 323:14, 345:20, 486:4, 504:3, 510:5
**Spearfish** [1] - 381:18
**Spearfish/Opeche** [2] - 358:19, 412:25
**spec** [2] - 418:23, 419:5
**special** [5] - 279:6, 281:8, 283:12, 436:16, 437:2
**specialist** [1] - 398:17
**specialize** [1] - 485:1
**specialized** [1] - 485:23
**specific** [53] - 294:9, 296:13, 304:11, 304:15, 318:6, 340:4, 342:22, 343:1, 350:13, 351:3, 351:6, 354:25, 365:6, 367:14, 380:16, 384:11, 410:10, 430:15, 432:9, 432:12, 436:7, 439:22, 440:2, 440:3, 441:3, 451:10, 451:16, 452:9, 452:20, 452:22, 452:24, 453:25, 454:6, 455:13, 456:1, 456:24, 457:4, 457:8, 457:12, 457:14, 460:8, 474:12, 482:14, 485:13, 486:11, 506:10, 507:2, 516:18, 519:1, 522:9, 526:9, 543:8, 549:9
**specifically** [25] - 294:19, 301:23, 309:3, 309:5, 311:3, 315:11, 354:17, 358:24, 361:9, 361:16, 362:12, 415:3, 417:4, 421:19, 424:2, 433:20, 445:22, 477:21, 507:10, 508:12, 511:2, 521:23, 522:6, 523:3, 542:7
**specification** [2] - 418:15, 419:10
**specifications** [1] - 419:23
**specifics** [2] - 518:24, 519:25
**specified** [2] - 400:21, 483:13
**specify** [1] - 450:16
**speculate** [1] - 300:18

**speculation** [1] - 332:25
**speed** [3] - 300:20, 488:14, 542:13
**spell** [3] - 467:25, 503:23, 527:18
**spend** [5] - 383:8, 448:21, 456:20, 468:6, 549:5
**spent** [8] - 404:3, 456:4, 542:10, 545:13, 548:5, 548:8, 549:1, 549:19
**spike** [3] - 476:2, 476:9, 493:13
**split** [1] - 438:23
**splits** [1] - 423:5
**splotches** [1] - 349:10
**spring** [1] - 478:22
**springs** [1] - 452:25
**square** [5] - 413:7, 464:5, 464:11, 473:9, 531:11
**SR3** [2] - 295:3, 298:3
**St** [1] - 527:25
**stabilization** [3] - 463:23, 473:7, 473:8
**stabilized** [8] - 372:4, 373:12, 373:17, 463:6, 463:22, 464:8, 473:20, 473:22
**stable** [1] - 463:21
**stack** [2] - 419:1, 419:22
**STAFF** [1] - 284:2
**staff** [22] - 298:12, 300:7, 355:16, 390:1, 392:13, 393:17, 396:16, 397:24, 398:19, 404:20, 408:22, 409:10, 411:10, 436:17, 437:11, 447:18, 459:8, 461:25, 502:19, 525:15, 536:25, 550:11
**stages** [2] - 455:5, 455:6
**standard** [8] - 296:20, 397:3, 423:23, 424:18, 479:18, 491:18, 495:25
**standpoint** [1] - 524:11
**Stanton** [2] - 363:10, 363:13
**start** [30] - 291:15, 297:17, 299:22, 305:24, 307:6, 343:20, 346:22, 355:20, 370:5, 371:24, 372:2, 399:23, 411:13, 411:14, 421:24, 439:20, 449:5, 449:6, 449:24, 456:22, 466:23, 472:19, 473:13, 484:16, 497:17, 498:17, 528:3, 530:14, 537:16, 548:7
**started** [8] - 360:3, 379:1, 448:12, 448:18, 513:21, 515:18, 538:5, 539:9
**starting** [3] - 307:4, 367:13, 409:22
**starts** [2] - 379:4, 394:11
**startup** [1] - 539:9
**State** [8] - 390:14, 403:25, 435:8, 504:11, 508:3, 513:16, 514:22, 539:2
**state** [27] - 294:6, 341:9, 358:23, 396:8, 398:10, 403:12, 408:14, 420:20, 420:21, 425:18, 427:1, 467:21, 469:18, 503:22, 506:2, 507:14, 512:9, 518:6, 518:13, 519:2, 519:4, 527:17, 537:15, 537:16, 538:19, 540:22, 541:12
**statement** [15] - 308:21, 388:7, 426:20, 431:18, 432:17, 446:6, 446:20, 460:24, 519:8, 524:12, 534:9, 534:10, 545:16, 545:25, 547:24
**statements** [1] - 506:18
**states** [3] - 419:7, 466:6, 471:20
**statewide** [1] - 446:11
**static** [1] - 545:2
**station** [6] - 421:9, 422:15, 426:2, 471:21, 471:24, 472:3
**stations** [3] - 425:25, 432:10, 432:16
**statute** [1] - 515:12
**statutes** [4] - 292:8, 514:25, 515:6, 515:9
**statutory** [1] - 515:3
**stay** [1] - 351:25
**step** [2] - 400:8, 465:25
**Stephanie** [2] - 552:3, 552:17
**STEPHEN** [1] - 284:7
**stepping** [1] - 400:1
**steps** [3] - 351:18, 414:4, 464:3
**still** [29] - 291:5, 291:6, 291:11, 301:4, 313:16, 319:2, 321:2, 322:21, 330:16, 330:22, 331:16, 333:7, 333:9, 355:5, 378:11, 378:14, 379:12, 380:23, 381:15, 394:3, 434:5, 443:14, 448:4, 458:10, 461:16, 461:18, 512:8, 527:10, 550:22
**stimulation** [1] - 532:1
**stipulations** [1] - 293:5
**STOLLDORF** [18] - 284:5, 370:2, 370:12, 370:15, 370:16, 371:18, 432:23, 433:24, 435:1, 435:3, 436:13, 437:7, 437:16, 439:11, 441:8, 463:9, 463:20, 464:13
**Stolldorf.....** [2] - 286:14, 287:4
**stop** [3] - 466:6, 466:15, 481:15
**stoplight** [7] - 465:19, 465:20, 465:21, 465:25, 466:5, 474:4, 483:17
**stopped** [1] - 480:23
**stops** [2] - 331:6, 331:7
**Storage** [21] - 277:4, 277:15, 277:19, 278:6, 279:4, 279:8, 279:19, 279:23, 280:8, 280:9, 281:6, 281:10, 281:21, 282:1, 282:11, 283:10, 306:18, 403:17, 448:10, 449:18, 455:14
**STORAGE** [3] - 284:18, 284:19, 284:19
**storage** [146] - 277:5, 277:6, 277:16, 277:18, 277:19, 278:8, 278:9, 279:5, 279:9, 279:10, 279:20, 279:22, 279:23, 280:11, 280:12, 281:7, 281:11, 281:12, 281:22, 282:1, 282:2, 282:13, 282:14, 283:11, 291:24, 292:2, 292:3, 292:5, 292:17, 293:5, 295:10, 295:11, 300:4, 310:19, 311:5, 311:11, 311:17, 311:21, 312:2, 313:16, 314:4, 314:11, 314:17, 314:21, 315:16, 318:22, 324:11, 326:20, 327:13, 329:17, 330:12, 330:15, 330:19, 334:3, 335:14, 335:25, 336:7, 347:3, 349:15, 349:24, 351:23, 352:19, 352:23, 353:4, 353:16, 353:17, 353:23, 355:25, 356:4, 356:18, 357:10, 357:18, 357:20, 358:16, 359:2, 359:19, 360:24, 361:12, 363:9, 363:11, 366:12, 373:13, 373:23, 379:2, 388:8, 388:18, 393:5, 393:13, 394:22, 394:23, 397:9, 402:2, 402:4, 402:16, 402:18, 407:3, 407:7, 407:16, 421:3, 427:19, 429:13, 429:18, 429:25, 431:1, 441:25, 451:1, 451:16, 454:4, 454:7, 454:18, 455:20, 456:10, 456:12, 457:7, 457:17, 458:24, 458:25, 459:2, 459:9, 459:15, 459:19, 459:20, 459:25, 460:6, 460:21, 460:22, 482:8, 496:15, 496:24, 497:20, 497:23, 498:15, 498:19, 498:22, 499:23, 500:2, 500:17, 502:14, 534:13, 539:10, 539:11, 539:13, 543:12, 543:15, 546:6
**store** [4] - 310:6, 330:23, 333:6, 544:2
**stored** [3] - 331:4, 332:8, 353:9
**straight** [1] - 315:23
**strat** [1] - 387:6
**strategy** [1] - 432:12
**stratigraphic** [10] - 298:15, 357:17, 359:2, 359:10, 369:7, 386:22, 453:21, 453:22, 454:24, 457:11
**stream** [21] - 366:4, 400:4, 400:23, 400:25, 401:10, 412:13, 412:14, 418:15, 418:21, 419:13, 420:6, 420:13, 420:22, 428:5, 485:4, 501:24, 501:25, 502:1, 502:11, 502:12, 502:14
**Stream** [1] - 401:3
**streams** [1] - 419:8
**Street** [2] - 285:5, 537:22
**Stress** [1] - 394:12
**stress** [6] - 359:5, 413:14, 413:22, 415:16, 451:5, 543:13
**strike** [3] - 515:22, 547:25, 549:18
**string** [2] - 410:9, 410:15
**stringent** [4] - 292:21, 293:3, 294:5, 294:8
**strong** [1] - 543:3
**structure** [3] - 300:2, 434:5, 466:24
**structures** [3] - 370:7, 370:9, 373:4
**studies** [8] - 317:21, 318:3, 318:4, 343:12, 347:1, 418:20, 480:8, 538:18
**study** [1] - 480:11
**subject** [6] - 279:4, 281:5, 283:9, 330:24, 341:13, 404:21
**subjugated** [1] - 428:4
**submission** [1] - 298:11
**submit** [3] - 508:6, 512:3, 524:24
**submittal** [1] - 534:20
**submitted** [18] - 303:24, 304:1, 315:12, 326:18,

378:8, 391:4, 420:2, 438:20, 477:5, 514:1, 517:1, 530:11, 536:2, 536:7, 536:10, 536:12, 536:18, 548:19
**submitting** [2] - 460:18, 507:25
**subscription** [1] - 306:15
**subscriptions** [4] - 297:3, 297:8, 306:10, 307:14
**substances** [5] - 330:15, 330:19, 349:15, 502:11, 502:16
**substantial** [2] - 367:20, 427:6
**substantially** [1] - 418:7
**subsurface** [6] - 327:21, 341:8, 350:18, 358:6, 397:17, 528:25
**suction** [1] - 426:1
**sufficient** [7] - 313:16, 355:1, 355:6, 362:6, 362:19, 368:17, 466:3
**suggest** [2] - 343:13, 373:5
**suggesting** [1] - 442:12
**Suggs** [1] - 411:15
**SUGGS** [18] - 284:4, 371:20, 388:21, 393:20, 393:23, 394:8, 394:10, 395:10, 437:6, 437:8, 437:15, 441:10, 442:16, 447:2, 448:14, 448:17, 466:18, 467:4
**Suggs.....** [1] - 286:17
**Suggs.....** [2] - 286:15, 287:5
**suitable** [1] - 525:4
**Suite** [2] - 284:12, 285:4
**suited** [2] - 309:14, 516:9
**summarization** [1] - 487:4
**Summary** [2] - 448:11, 449:25
**summary** [7] - 399:8, 413:13, 424:1, 449:11, 450:6, 450:8, 468:7
**Summit** [104] - 277:3, 277:15, 277:19, 278:5, 279:4, 279:7, 279:18, 279:22, 280:8, 280:9, 281:6, 281:9, 281:21, 282:1, 282:11, 283:10, 289:19, 290:15, 296:13, 296:16, 297:2, 297:7, 301:21, 302:8, 302:9, 302:11, 302:13, 302:22, 302:23, 304:21, 305:4, 305:7, 305:11, 305:19, 306:18, 307:5, 308:2, 309:21, 310:2, 310:4, 310:14, 310:23, 311:1, 312:1, 312:8, 313:8, 313:13, 314:7, 318:18, 321:18, 326:18, 329:22, 330:9, 332:5, 332:16, 335:3, 337:5, 340:15, 341:12, 341:21, 342:5, 342:8, 342:13, 352:15, 352:18, 353:3, 358:1, 366:16, 370:21, 371:11, 396:12, 399:19, 403:17, 404:7, 408:18, 409:1, 409:7, 420:12, 430:25, 431:18, 432:7, 432:11, 442:1, 443:21, 449:18, 459:2, 459:8, 459:17, 460:9, 468:3, 468:17, 486:13, 496:13, 496:22, 497:19, 498:18, 500:16, 501:1, 501:9, 501:15, 501:17, 513:4, 522:12, 530:12
**SUMMIT** [3] - 284:18, 284:18, 284:19
**Summit's** [18] - 296:10, 304:25, 310:23, 311:4, 312:21, 322:25, 329:3, 330:7, 331:10, 333:4, 340:16, 341:14, 341:24, 353:11, 364:14, 460:20, 496:25, 499:3
**sun** [1] - 478:17
**Sundry** [1] - 430:1
**super** [2] - 425:18, 427:1
**superintendent** [1] - 468:14
**supervisory** [1] - 397:18
**supplement** [8] - 382:6, 382:12, 383:3, 391:6, 392:5, 394:3, 429:5, 429:7
**supplemental** [9] - 378:3, 378:9, 380:20, 386:14, 412:16, 412:18, 433:12, 437:10, 445:12
**supplements** [1] - 394:2
**supplied** [3] - 477:9, 523:8, 534:1
**supply** [6] - 412:18, 429:5, 434:14, 443:21, 446:16, 525:1
**support** [2] - 323:11, 372:18
**supported** [1] - 372:15
**sureties** [1] - 439:5
**surety** [6] - 407:14, 407:19, 438:12, 438:13, 438:15, 438:21
**Surface** [2] - 401:4, 402:7
**surface** [31] - 308:3, 308:23, 336:15, 338:11, 339:14, 356:6, 357:1, 357:5, 400:5, 401:10, 403:1, 409:22, 409:23, 409:25, 410:3, 410:4, 410:5, 410:18, 432:1, 452:24, 454:20, 464:22, 466:7, 474:24, 476:19, 488:7, 488:21, 489:2, 489:11, 489:22, 524:11
**surge** [3] - 426:6, 493:18
**surrounding** [3] - 293:14, 331:1, 446:3
**Survey** [1] - 298:11
**survey** [3] - 363:8, 363:14, 394:20
**surveys** [4] - 371:8, 402:23, 430:22, 451:8
**susceptible** [1] - 358:8
**suspected** [1] - 363:10
**sustained** [2] - 500:21, 501:7
**swear** [3] - 467:14, 503:14, 503:16
**swelling** [1] - 542:17
**SWENSON** [1] - 285:7
**Swenson** [12] - 289:25, 329:12, 340:14, 340:18, 341:1, 341:12, 341:16, 341:19, 342:1, 342:5, 342:9, 342:13
**Swenson's** [3] - 329:20, 332:4, 342:16
**switch** [1] - 510:15
**sworn** [10] - 396:2, 398:6, 403:8, 408:10, 461:16, 467:12, 467:17, 503:18, 527:13, 537:11
**system** [45] - 378:23, 390:13, 397:5, 397:11, 397:12, 397:15, 397:16, 397:18, 397:19, 412:1, 421:1, 421:22, 422:3, 425:20, 427:22, 427:23, 428:19, 428:20, 429:10, 429:14, 435:23, 442:23, 443:1, 443:5, 443:6, 443:25, 445:1, 445:14, 465:19, 465:20, 465:22, 466:1, 466:6, 474:4, 475:23, 476:3, 482:18, 482:19, 483:6, 483:17, 483:18, 485:8, 486:18, 490:1, 490:2
**system's** [1] - 435:9
**systems** [3] - 435:16, 484:3, 494:9

## T

**tabbed** [1] - 326:13
**table** [9] - 289:13, 368:23, 382:16, 399:25, 418:14, 423:22, 425:9, 436:14, 449:11
**Table** [24] - 368:19, 381:15, 382:14, 386:17, 399:8, 399:10, 399:17, 399:22, 406:10, 406:25, 407:15, 413:12, 418:14, 419:7, 423:22, 424:16, 427:6, 439:19, 440:5, 448:11, 456:3, 464:19, 464:24, 465:3
**Tables** [1] - 399:14
**TABOR** [1] - 284:6
**tailored** [1] - 485:8
**Talisman** [1] - 528:10
**TAMARA** [1] - 284:5
**Tammy** [3] - 464:15, 468:22, 471:16
**tank** [1] - 429:13
**tanks** [1] - 429:18
**target** [2] - 359:5, 413:21
**targeted** [1] - 402:4
**targeting** [1] - 310:17
**taught** [1] - 528:7
**tax** [1] - 332:16
**TB** [27] - 334:9, 358:17, 360:19, 361:18, 368:5, 368:25, 370:16, 399:11, 407:1, 407:11, 413:2, 421:17, 423:6, 424:2, 431:16, 433:2, 433:21, 434:19, 449:18, 449:20, 450:9, 451:11, 453:2, 453:18, 455:20, 457:18, 488:13
**TDS** [3] - 364:24, 365:8, 365:10
**team** [5] - 302:22, 445:9, 516:3, 516:16, 516:18
**teams** [1] - 436:1
**Tech** [2] - 538:1, 540:7
**technical** [3] - 310:3, 341:5, 486:15
**technically** [1] - 298:16
**techniques** [1] - 343:14
**Technological** [2] - 408:25, 540:8
**TED** [2] - 288:3, 527:12
**Ted** [7] - 527:2, 527:6, 527:19, 527:20, 529:2, 530:10
**temperature** [22] - 365:13, 365:21, 365:23, 366:1, 390:18, 390:19, 390:23, 401:14, 402:14, 402:18, 402:20, 402:21, 427:4, 427:5, 457:19, 478:25, 480:12, 481:20, 492:10, 492:11, 543:13, 544:10
**temperatures** [4] - 317:14, 452:11, 485:3, 487:8

**temporarily** [1] - 544:2
**temporary** [3] - 297:8, 306:10, 331:15
**ten** [15] - 321:21, 331:17, 374:6, 434:22, 440:8, 447:5, 463:11, 463:12, 463:18, 495:2, 503:3, 523:24, 549:11, 549:12, 549:16
**ten-minute** [3] - 321:21, 447:5, 503:3
**ten-year** [5] - 374:6, 434:22, 440:8, 463:11, 463:12
**tense** [1] - 502:3
**term** [1] - 378:2
**terminate** [1] - 394:25
**terminus** [9] - 309:11, 421:9, 429:1, 441:15, 442:7, 442:9, 469:25, 476:20, 484:3
**terms** [12] - 293:3, 297:24, 300:19, 340:24, 400:25, 459:18, 459:22, 460:12, 460:15, 498:12, 498:13
**tertiary** [2] - 387:22, 388:2
**test** [23] - 298:15, 316:19, 318:7, 318:8, 357:17, 359:3, 359:5, 359:10, 359:23, 367:17, 369:7, 413:14, 414:3, 414:13, 414:21, 415:16, 415:18, 417:24, 418:4, 419:1, 419:22, 454:24, 530:24
**test/monitoring** [1] - 453:23
**tested** [4] - 490:11, 490:13, 490:20, 490:23
**testified** [33] - 307:16, 308:11, 308:17, 309:24, 312:17, 312:21, 332:19, 338:15, 359:25, 366:18, 379:20, 396:2, 398:6, 402:24, 403:8, 408:10, 430:21, 444:6, 450:5, 451:2, 451:13, 452:3, 452:17, 453:5, 453:20, 467:17, 473:6, 474:8, 488:6, 503:18, 520:5, 527:13, 537:11
**testify** [3] - 309:15, 517:9, 534:6
**testifying** [3] - 456:8, 474:25, 478:5
**testimony** [33] - 308:14, 312:14, 326:2, 343:5, 343:7, 355:23, 357:4, 366:9, 378:8, 378:24, 380:19, 386:13, 390:2, 394:16, 417:23, 432:4, 445:12, 449:14, 450:9, 459:11, 472:25, 482:4, 482:7, 491:13, 492:18, 493:17, 496:19, 516:14, 520:4, 521:18, 521:22, 533:9, 534:9
**testing** [24] - 298:13, 316:21, 319:12, 358:18, 367:10, 371:9, 385:10, 399:4, 399:12, 399:18, 399:23, 404:4, 406:15, 412:23, 413:18, 417:22, 418:1, 451:19, 453:11, 453:14, 453:16, 465:3, 480:1, 530:24
**tests** [5] - 358:22, 400:13, 413:21, 413:23, 451:5
**Texas** [2] - 538:7, 538:15
**that'd** [4] - 375:19, 406:8, 474:7, 525:12
**that'll** [3] - 388:21, 421:15, 438:18
**THE** [4] - 284:18, 285:6, 285:7, 490:15
**themselves** [3] - 457:22, 491:18, 494:5
**there'd** [1] - 486:4
**therefore** [3] - 381:12, 457:13, 488:5
**Therefore** [1] - 388:8
**thermal** [18] - 475:25, 478:12, 478:18, 478:20, 478:22, 480:4, 480:10, 480:13, 481:2, 481:14, 483:25, 490:5, 492:12, 492:13, 492:18, 493:1, 493:3, 512:17
**they've** [1] - 446:12
**thick** [1] - 414:10
**thickest** [1] - 387:11
**thickness** [13] - 350:2, 350:10, 352:16, 354:5, 357:13, 357:16, 374:11, 374:22, 374:24, 375:2, 387:20, 428:10, 469:4
**thicknesses** [1] - 372:21
**THIEL** [1] - 284:6
**thin** [1] - 361:9
**thinking** [3] - 294:18, 312:12, 417:6
**thinnest** [1] - 375:4
**third** [6] - 298:5, 366:16, 418:17, 419:8, 449:22, 480:11
**third-party** [3] - 366:16, 418:17, 419:8
**THOMAS** [1] - 284:15
**thousand** [4] - 332:10, 351:10, 364:2
**three** [99] - 297:12, 298:14, 301:1, 326:21, 327:22, 329:16, 331:1, 340:20, 355:24, 356:3, 356:4, 356:18, 356:25, 357:6, 357:10, 357:20, 359:1, 359:9, 359:10, 359:12, 359:19, 359:23, 360:24, 361:3, 361:6, 363:9, 364:20, 365:3, 365:5, 365:7, 367:8, 369:7, 394:22, 397:8, 400:17, 405:18, 405:20, 407:10, 408:1, 415:3, 421:3, 422:20, 422:21, 425:3, 425:9, 425:16, 427:18, 431:17, 432:15, 433:18, 434:17, 435:22, 435:24, 440:21, 441:17, 446:17, 449:12, 450:7, 451:3, 451:6, 451:7, 451:17, 451:22, 452:5, 452:7, 452:19, 453:12, 453:17, 454:4, 454:12, 454:18, 455:6, 455:10, 456:10, 456:11, 456:24, 457:7, 457:17, 459:14, 464:20, 470:9, 474:10, 474:11, 481:10, 481:25, 491:21, 501:6, 512:12, 521:4, 521:8, 531:5, 532:9, 533:11, 534:16, 543:24, 550:21
**three-month** [1] - 297:12
**three-quarter** [1] - 491:21
**threshold** [3] - 452:12, 465:22, 467:1
**THRONE** [1] - 284:15
**Throne** [2] - 284:15, 289:18
**throughout** [6] - 359:22, 393:7, 397:12, 401:24, 420:25, 435:24
**tie** [2] - 325:2, 372:25
**tight** [1] - 494:23
**timeline** [1] - 482:14
**today** [25] - 289:18, 291:1, 298:23, 315:7, 324:14, 332:11, 333:2, 339:15, 404:12, 432:13, 438:22, 446:6, 449:13, 450:6, 451:2, 460:19, 482:25, 498:13, 506:22, 513:5, 518:19, 519:6, 519:22, 530:12, 532:20
**together** [8] - 298:24, 307:15, 397:10, 432:12, 446:13, 459:19, 460:17, 531:6
**Tom** [2] - 289:17, 289:18
**tomorrow** [2] - 291:3, 551:9
**ton** [1] - 320:12
**Tongue** [5] - 386:18, 386:20, 386:24, 387:3, 392:24
**tons** [10] - 423:25, 424:3, 424:5, 424:8, 424:19, 424:21, 470:24, 481:4, 481:10, 481:25
**took** [5] - 349:9, 349:11, 386:2, 389:24, 516:22
**tool** [3] - 292:17, 511:24, 512:6
**top** [9] - 357:15, 376:12, 394:25, 426:8, 449:15, 473:17, 485:20, 494:1, 543:4
**topic** [2] - 508:25, 509:17
**topically** [1] - 510:6
**topside** [2] - 468:5, 468:18
**total** [8] - 332:7, 352:21, 407:10, 407:23, 420:22, 456:11, 470:14, 473:15
**totally** [1] - 446:7
**touch** [1] - 400:3
**touched** [2] - 401:7, 438:11
**tours** [1] - 405:25
**towards** [3] - 376:1, 385:1
**towns** [1] - 446:3
**Township** [59] - 277:7, 277:9, 277:11, 277:12, 277:13, 277:20, 277:22, 278:1, 278:2, 278:3, 278:10, 278:11, 278:14, 278:15, 278:16, 278:20, 278:22, 279:1, 279:1, 279:2, 279:11, 279:14, 279:15, 279:16, 280:1, 280:3, 280:5, 280:6, 280:13, 280:16, 280:17, 280:18, 280:23, 281:2, 281:3, 281:4, 281:13, 281:14, 281:15, 281:18, 281:19, 282:2, 282:4, 282:5, 282:8, 282:9, 282:15, 282:16, 282:18, 282:20, 282:21, 283:2, 283:4, 283:5, 283:8, 283:9, 373:10, 423:15, 429:3
**townships** [1] - 356:25
**track** [1] - 371:10
**tract** [3] - 354:6, 354:25, 358:1
**tracts** [1] - 354:13
**traffic** [3] - 445:1, 483:6, 483:18
**Trail** [1] - 536:16
**training** [5] - 435:25, 436:11, 436:24, 437:2, 437:12
**TRANSCRIPT** [1] - 283:15
**transcript** [1] - 552:11
**transect** [1] - 362:18
**transfer** [8] - 299:17, 299:21, 300:13, 300:15, 301:10, 421:6, 441:13, 442:4

**transferred** [2] - 300:8, 300:10
**transition** [1] - 466:19
**transmissibility** [2] - 362:2, 362:5
**transmissible** [1] - 362:20
**transmission** [2] - 412:1, 428:21
**transport** [4] - 391:7, 391:10, 391:18, 391:25
**Transport** [1] - 482:9
**transportation** [1] - 397:14
**trapping** [3] - 378:13, 378:19, 379:10
**travel** [1] - 339:12
**traveled** [1] - 401:10
**traveling** [1] - 347:7
**Travis** [1] - 463:5
**TRAVIS** [1] - 284:5
**treat** [2] - 352:18, 353:3
**treating** [1] - 320:10
**treatment** [1] - 504:22
**tree** [1] - 495:24
**trend** [1] - 379:4
**triangle** [4] - 336:6, 336:10, 369:16, 369:18
**triangulate** [1] - 432:14
**tried** [2] - 441:2, 518:22
**trigger** [1] - 481:15
**trip** [1] - 481:17
**trouble** [1] - 460:2
**troubleshoot** [1] - 326:7
**troubleshooted** [1] - 326:10
**true** [1] - 379:1
**TRUST** [1] - 285:7
**try** [7] - 303:3, 453:6, 472:16, 472:22, 475:5, 526:14, 544:14
**trying** [12] - 341:16, 341:20, 341:23, 342:2, 369:11, 477:15, 497:10, 514:12, 518:20, 521:7, 524:4, 545:4
**tubing** [8] - 438:5, 438:6, 453:19, 455:17, 455:18, 455:23, 457:19, 492:14
**tubing-conveyed** [3] - 453:19, 455:17, 457:19
**tubing/casing** [1] - 429:11
**Tundra** [2] - 322:5, 322:17
**turbine** [1] - 433:20
**turn** [7] - 335:6, 475:7, 508:16, 509:8, 509:22, 511:21, 539:14
**two** [54] - 290:12, 292:14, 297:11, 298:2, 298:4, 299:19, 299:20, 301:2, 301:3, 301:9, 307:22, 325:7, 335:12, 347:24, 357:17, 360:12, 369:20, 380:2, 385:23, 387:3, 387:5, 389:16, 391:23, 397:1, 404:6, 404:20, 404:24, 407:13, 409:14, 411:1, 423:13, 428:15, 433:10, 438:15, 442:17, 444:9, 444:10, 444:12, 444:20, 446:12, 453:21, 455:1, 455:5, 464:5, 470:13, 486:23, 492:2, 492:4, 492:15, 494:8, 511:24, 531:6, 546:20
**two-month** [1] - 297:11
**two-year** [1] - 444:20
**Ty** [1] - 302:6
**TYLER** [1] - 284:10
**Type** [1] - 400:2
**type** [11] - 324:4, 357:9, 357:14, 357:20, 435:9, 478:21, 487:21, 507:13, 514:21, 547:8, 550:1
**types** [1] - 400:7
**typewritten** [1] - 552:10
**typical** [5] - 317:21, 318:3, 318:4, 425:10, 437:20
**typically** [10] - 323:15, 325:6, 340:1, 373:6, 419:2, 425:15, 426:21, 491:14, 491:20, 492:16
**typo** [4] - 374:15, 374:16, 471:19, 472:3

## U

**U.S** [4] - 336:17, 390:15, 396:24, 528:24
**UIC** [5] - 291:21, 292:15, 292:19, 292:20, 293:6
**ultimate** [1] - 329:4
**ultimately** [5] - 319:14, 402:5, 508:5, 516:25, 517:11
**unacceptable** [1] - 510:10
**unaltered** [1] - 512:19
**unavailable** [1] - 436:10
**uncertain** [1] - 305:16
**uncertainties** [1] - 357:25
**uncertainty** [4] - 316:14, 351:8, 351:15, 372:23
**under** [26] - 291:5, 291:7, 291:11, 291:21, 292:12, 292:18, 296:13, 342:16, 397:18, 407:19, 434:3, 435:7, 437:12, 443:14, 445:17, 448:4, 458:10, 461:18, 471:19, 481:7, 481:25, 483:6, 487:3, 497:17, 509:4, 512:2
**undergone** [1] - 543:2
**underground** [8] - 292:25, 293:15, 293:23, 294:1, 410:2, 410:6, 439:14, 489:1
**Underground** [1] - 511:3
**underneath** [1] - 476:14
**understood** [14] - 390:9, 418:12, 430:5, 432:3, 432:19, 437:22, 444:24, 445:15, 461:19, 513:20, 517:9, 521:17, 534:6, 545:8
**underway** [1] - 368:2
**unexpected** [1] - 476:2
**unexpectedly** [1] - 494:11
**unit** [6] - 459:2, 499:10, 538:14, 541:2, 541:3, 543:1
**units** [4] - 386:3, 446:15, 499:15, 523:16
**University** [11] - 403:25, 409:1, 504:11, 504:12, 523:19, 527:25, 528:1, 528:2, 528:8, 540:7, 540:9
**unknown** [1] - 432:10
**unless** [6] - 351:13, 370:11, 392:12, 419:3, 472:8, 545:3
**unlikely** [1] - 481:12
**unrestricted** [1] - 436:21
**unsaturated** [2] - 391:21, 391:22
**unsure** [2] - 305:5, 305:16
**unwilling** [1] - 304:18
**up** [72] - 290:20, 291:11, 309:14, 318:8, 323:9, 325:2, 325:11, 326:8, 332:10, 332:11, 338:7, 339:4, 339:12, 383:4, 399:12, 399:18, 400:6, 402:8, 402:9, 411:4, 414:23, 416:9, 416:13, 416:14, 417:1, 423:3, 423:9, 434:25, 436:15, 436:19, 436:24, 440:11, 440:19, 441:6, 441:12, 442:17, 447:18, 461:14, 466:13, 466:21, 468:11, 470:18, 472:13, 472:21, 475:3, 475:14, 478:16, 481:20, 484:7, 488:15, 490:15, 492:15, 493:16, 494:18, 494:19, 497:2, 497:13, 504:15, 505:1, 505:5, 507:19, 507:25, 509:24, 510:20, 511:6, 511:21, 511:22, 529:1, 533:4, 534:17, 543:10, 548:7
**update** [1] - 367:14
**updated** [2] - 367:12, 368:2
**upload** [2] - 300:20, 544:24
**upper** [12] - 348:18, 360:7, 360:16, 361:14, 362:22, 380:4, 380:13, 387:14, 391:8, 413:7, 523:15, 544:12
**uppermost** [1] - 336:16
**ups** [1] - 426:10
**upscale** [2] - 376:15, 385:19
**upstream** [3] - 422:18, 443:10, 494:13
**upstream/midstream** [1] - 396:22
**USDW** [5] - 407:9, 454:21, 488:9, 488:23, 489:13
**USDWs** [9] - 293:11, 309:9, 339:8, 387:12, 406:19, 407:20, 439:23, 440:4, 456:19
**uses** [3] - 366:19, 452:18, 544:8
**USGS** [5] - 466:4, 466:5, 466:22, 521:24, 522:7
**USW** [1] - 439:14
**utility** [3] - 316:19, 316:22, 321:12
**utilize** [3] - 397:11, 443:25, 470:14
**utilizing** [1] - 470:13

## V

**validation** [1] - 367:15
**value** [11] - 310:3, 364:25, 365:6, 365:19, 388:14, 415:15, 418:1, 452:13, 465:10, 465:21, 490:22
**values** [15] - 350:9, 365:5, 369:3, 369:4, 374:17, 375:7, 384:22, 385:14, 385:16, 385:24, 385:25, 415:19, 445:4, 445:13, 465:7
**valve** [41] - 422:17, 422:18, 423:4, 469:11, 469:13, 475:25, 476:1, 478:13, 478:20, 478:22, 478:25, 479:2, 479:12, 479:21, 480:3, 480:5, 480:10, 480:20, 480:25, 481:2, 481:14, 483:25, 490:6, 490:8, 491:6, 491:17, 491:18, 492:8, 492:10, 492:12, 492:16, 492:20, 492:24, 493:1, 493:3, 493:5, 493:14, 493:20, 494:11, 494:16, 495:9
**valves** [15] - 308:23, 475:22,

476:6, 480:24, 481:15, 481:19, 489:22, 490:12, 490:21, 491:11, 491:14, 491:15, 491:18, 492:4, 494:5
**vari** [1] - 476:12
**variability** [1] - 351:4
**variable** [2] - 328:2, 476:12
**variables** [2] - 318:7, 319:10
**variance** [1] - 430:1
**variation** [2] - 415:2, 427:8
**variations** [1] - 452:9
**varies** [3] - 451:17, 451:22, 456:12
**variograms** [2] - 350:14, 372:14
**various** [12] - 294:22, 316:14, 350:9, 399:19, 449:7, 482:22, 528:10, 528:11, 528:17, 528:22, 528:23, 545:15
**vary** [3] - 318:4, 381:14, 455:11
**vendors** [1] - 432:11
**verification** [1] - 398:17
**versions** [1] - 513:24
**versus** [4] - 357:25, 407:14, 442:6, 542:13
**vertical** [5] - 291:23, 296:2, 348:22, 349:25, 362:19
**vessel** [2] - 429:16, 479:11
**vessels** [1] - 429:13
**veteran** [1] - 504:5
**veteran-owned** [1] - 504:5
**VI** [49] - 291:21, 292:16, 292:20, 293:1, 293:6, 293:8, 308:15, 323:12, 323:22, 328:7, 328:10, 328:17, 329:22, 330:7, 330:11, 331:1, 335:4, 340:13, 340:20, 341:1, 341:14, 404:8, 406:20, 410:11, 437:18, 506:21, 507:18, 508:1, 508:8, 508:10, 508:12, 508:20, 509:13, 509:20, 510:2, 511:4, 511:10, 512:13, 514:17, 514:24, 517:16, 518:7, 518:13, 518:19, 519:7, 520:19, 525:25, 535:4
**via** [2] - 357:25, 492:14
**vice** [1] - 539:6
**vintage** [1] - 337:16
**viscosity** [1] - 542:15
**visible** [1] - 414:14
**visibly** [1] - 395:7
**visual** [1] - 449:1
**vitae** [4] - 505:13, 529:6, 529:9, 529:11
**Volk** [6] - 403:4, 403:5, 403:6, 403:15, 474:25, 475:3
**VOLK** [11] - 403:7, 403:14, 411:21, 434:2, 435:12, 436:21, 437:14, 438:16, 439:9, 440:25, 445:24
**VOLK/JEAN** [1] - 286:19
**VOLUME** [1] - 283:16
**volume** [17] - 350:7, 383:7, 383:21, 383:24, 384:9, 384:17, 384:23, 402:3, 402:5, 421:12, 480:14, 541:22, 541:24, 542:1, 542:2, 543:13, 544:10
**volumes** [6] - 331:4, 332:7, 340:15, 346:1, 420:22, 421:3
**volumetric** [9] - 352:24, 357:25, 358:13, 427:10, 541:4, 541:10, 541:13, 541:18
**volunteer** [1] - 436:9

## W

**Wade** [11] - 332:19, 366:17, 395:17, 412:9, 416:7, 447:16, 450:5, 458:7, 458:14, 458:22, 459:24
**Wade's** [1] - 450:9
**wait** [1] - 431:9
**waited** [2] - 513:23, 514:14
**waiting** [4] - 416:23, 463:1, 463:3, 550:13
**walk** [3] - 390:8, 421:19, 450:2
**wants** [3] - 496:9, 497:19, 543:20
**warms** [1] - 481:20
**Washington** [2] - 527:25, 528:7
**Water** [3] - 292:12, 292:18, 293:2
**water** [30] - 293:16, 293:20, 293:23, 294:2, 336:17, 370:23, 377:21, 381:11, 391:2, 410:3, 410:7, 439:14, 440:6, 441:2, 441:5, 457:12, 485:5, 487:10, 489:1, 504:7, 504:21, 506:17, 524:7, 538:19, 541:23, 542:1, 542:6, 543:3, 546:22, 546:23
**ways** [3] - 321:13, 323:9, 543:17
**weather** [1] - 482:1
**website** [3] - 496:8, 514:17, 549:23
**Wednesday** [2] - 289:3, 551:11
**week** [5] - 325:3, 325:7, 325:11, 325:13, 325:25
**weeks** [17] - 299:10, 299:11, 299:19, 299:20, 299:24, 301:1, 301:3, 301:6, 301:9, 301:11, 307:22, 325:19, 325:21, 325:24, 326:4, 512:12, 532:10
**weight** [4] - 360:8, 381:21, 426:13, 426:20
**weight-constrained** [1] - 426:20
**well's** [1] - 338:9
**well-specific** [2] - 454:6, 457:12
**wellbore** [15] - 344:8, 344:16, 345:1, 345:3, 345:16, 346:16, 371:13, 401:9, 401:11, 401:13, 401:19, 401:22, 428:14, 431:2, 455:13
**wellbores** [4] - 319:11, 347:25, 348:3, 400:5
**wellhead** [19] - 309:12, 317:14, 426:13, 426:15, 426:22, 429:21, 462:15, 464:17, 464:25, 465:7, 469:7, 470:13, 470:18, 493:14, 494:11, 494:14, 495:9, 525:3
**wells** [92] - 291:17, 293:1, 298:15, 308:8, 308:15, 308:18, 323:12, 328:7, 328:10, 328:13, 330:7, 331:1, 331:13, 334:1, 334:5, 334:7, 334:11, 334:13, 335:5, 335:10, 335:13, 336:5, 336:22, 337:15, 338:17, 340:7, 340:15, 341:15, 357:17, 359:3, 359:10, 359:20, 359:24, 368:25, 369:2, 369:8, 370:17, 370:18, 370:24, 393:13, 401:16, 401:17, 402:20, 406:14, 407:16, 409:6, 409:7, 415:17, 415:19, 415:20, 437:18, 437:19, 439:4, 440:10, 441:4, 451:6, 452:21, 452:22, 453:1, 453:23, 455:1, 455:5, 456:16, 466:7, 470:13, 474:10, 474:11, 485:15, 485:19, 487:2, 487:13, 487:14, 487:25, 524:17, 524:18, 524:20, 525:5, 530:19, 531:6, 531:9, 531:11, 531:14, 531:20, 538:20, 540:20, 540:22, 540:24, 541:2, 549:3
**west** [2] - 348:16, 442:20
**West** [63] - 277:7, 277:9, 277:11, 277:12, 277:13, 277:21, 277:22, 278:1, 278:2, 278:3, 278:10, 278:12, 278:14, 278:15, 278:16, 278:20, 278:22, 279:1, 279:2, 279:3, 279:12, 279:14, 279:16, 279:17, 280:1, 280:4, 280:5, 280:6, 280:14, 280:17, 280:18, 280:19, 280:23, 281:2, 281:4, 281:5, 281:13, 281:15, 281:16, 281:19, 281:20, 282:3, 282:4, 282:5, 282:8, 282:9, 282:15, 282:17, 282:18, 282:21, 282:22, 283:3, 283:4, 283:5, 283:8, 283:9, 364:18, 373:10, 429:3, 459:16, 469:25, 470:1, 538:7
**west-east** [1] - 348:16
**western** [1] - 528:24
**what-if** [1] - 495:20
**whereas** [1] - 407:19
**whichever** [1] - 418:8
**white** [2] - 329:12, 345:2
**whole** [9] - 303:6, 319:25, 375:14, 375:22, 383:19, 385:3, 443:5, 484:13, 528:18
**wholly** [1] - 402:9
**willing** [6] - 415:13, 491:7, 512:10, 512:11, 532:11, 544:21
**Williston** [1] - 409:6
**wind** [2] - 433:20, 482:1
**withheld** [1] - 476:7
**witness** [22] - 348:5, 358:22, 360:24, 361:2, 370:10, 393:18, 395:21, 397:25, 398:2, 403:3, 403:4, 408:4, 408:5, 410:20, 447:19, 458:6, 458:7, 461:2, 503:8, 527:1, 537:6
**WITNESSES** [2] - 286:10, 287:19
**witnesses** [21] - 290:12, 290:15, 290:18, 309:14, 395:13, 397:23, 410:23, 410:24, 411:2, 416:18, 416:24, 417:1, 417:19, 434:25, 447:4, 447:11, 472:14, 472:20, 484:10, 502:20, 550:22
**word** [1] - 446:25

**wording** [1] - 446:22
**Workbench®** [1] - 523:2
**workers** [1] - 405:5
**workover** [1] - 438:7
**works** [2] - 320:16, 443:14
**world** [1] - 528:22
**write** [2] - 463:3, 522:9
**written** [3] - 333:2, 387:2, 474:6
**Wyoming** [6] - 284:17, 387:1, 507:6, 507:9, 507:12, 538:19

## X

**XRD** [1] - 457:9

## Y

**Yates** [5] - 538:7, 538:12, 538:13, 542:10, 546:16
**year** [30] - 314:21, 318:24, 350:17, 371:11, 374:6, 409:8, 420:14, 423:25, 424:19, 430:12, 430:17, 430:18, 430:23, 430:24, 431:8, 434:22, 440:8, 444:10, 444:12, 444:17, 444:20, 463:11, 463:12, 464:2, 464:6, 473:10, 496:14
**years** [42] - 313:8, 313:13, 314:20, 319:4, 319:7, 319:17, 319:18, 319:22, 320:1, 320:3, 327:23, 331:18, 332:1, 332:4, 332:12, 332:23, 337:23, 337:24, 368:3, 369:14, 371:9, 373:24, 378:25, 396:20, 404:3, 404:6, 430:23, 444:9, 463:15, 463:16, 463:18, 468:11, 496:23, 497:19, 498:16, 499:8, 523:24, 528:6, 528:8, 538:5, 538:18, 542:10
**yellow** [1] - 349:7
**yesterday** [17] - 290:13, 291:15, 304:13, 307:17, 308:6, 309:16, 309:24, 310:19, 332:19, 333:25, 343:5, 357:3, 412:12, 451:2, 459:11, 459:13, 459:14
**yourself** [3] - 301:5, 510:24, 516:2

## Z

**Zap** [1] - 446:4
**ZASTE** [2] - 285:3, 527:5
**Zaste** [1] - 289:24
**zero** [1] - 318:19
**zone** [24] - 359:11, 360:7, 360:16, 361:14, 362:22, 379:24, 380:5, 380:10, 380:11, 380:14, 381:2, 387:13, 387:15, 387:23, 387:24, 388:2, 391:9, 391:12, 391:18, 392:1, 457:10, 487:16
**Zone** [1] - 402:10
**zones** [5] - 380:3, 385:24, 394:17, 454:22, 457:11

ORIGINAL

**In the Matter Of:**

NORTH DAKOTA INDUSTRIAL COMMISSION

# AUDIO TRANSCRIPTION

AUDIO RECORDING

IN RE: NORTH DAKOTA INDUSTRIAL COMMISSION

CASE NOS. 30869 and 30880

(Due to the quality of the recorded media, portions were unable to be transcribed and include inaudible portions. The transcript may also include misinterpreted words and/or unidentified speakers. The transcriber was not present at the time of the recording; therefore, this transcript should not be considered verbatim.)

TRANSCRIBED BY: MELISSA EICKEN

OFFICER GARNER: We are back on the record for hearings in case number 30869 through 30880. I'm David Garner, the hearing examiner for the hearings. We're at the hearing room of the Department of Mineral Resources, Oil & Gas Division, and it is 9:00 a.m. We'll resume where we left off, which I believe was Attorney Braaten is going to call his next witness.

MR. BRAATEN: We'll get them on the phone real quick here.

UNIDENTIFIED FEMALE: Hi, Chris. You ready? Okay. I'll put you on.

OFFICER GARNER: What's his name?

MR. BRAATEN: Well, we are calling Chris Stockness, appraiser with Shenehon Company.

OFFICER GARNER: Stockness is his last name?

MR. BRAATEN: Yes.

OFFICER GARNER: Mr. Stockness.

**THE WITNESS: Good morning.**

OFFICER GARNER: Do you solemnly swear or affirm under the penalties of perjury the testimony you're about to give in this matter be true and correct to the best of your knowledge and belief?

**THE WITNESS: I do.**

DIRECT EXAMINATION

BY MR. BRAATEN:

Q. Mr. Stockness, can you state your full name and spell your last name for us, please?

**A. Yeah. Christopher John Stockness, S-T-O-C-K-N-E-S-S.**

Q. And can you tell us by whom you're employed and your position?

**A. Yeah. I'm employed at Shenehon Company where I am the managing director of real estate.**

Q. Can you tell us just briefly what your educational background is?

**A. Yeah. I attended the University of St. Thomas, and then obtained a degree in real estate, and I'm a certified general real property appraiser, been working in the valuation industry since 2002.**

Q. And can you just provide some general background on your professional experience as an appraiser?

**A. Yeah. As I mentioned, I've been in the valuation industry since 2002, but in college, I actually started at Shenehon Company, initially hired as a valuation analyst, and then currently the vice president, managing director of real estate Shenehon and Shenehon Company is a real estate and business valuation firm that's been in business since 1927.**

**We're based out of Minneapolis, and we routinely complete assignments throughout the upper Midwest. Over the past 20 years, I've been performing a multitude of commercial real estate valuations ranging from -- to all types of commercial real estate. In the course of my work, I'm routinely valuing different property rights, interest, including, you know, fee simple, lease fee, surface right, mineral right, air rights, and various easements. I do also hold a full-time license as a certified general real property appraiser in the State of North Dakota and have testified as an evaluation expert in the state.**

Q. Thank you, Mr. Stockness. We have a -- an exhibit marked as LO-55. Do you have a copy of that in front of you?

**A. Yes, I do.**

Q. And can you tell us what that is?

**A. That's a -- my curriculum vitae.**

Q. And does the curriculum vitae accurately represent your professional work and experience?

**A. Yes, it does.**

MR. BRAATEN: Move to admit Exhibit 55.

OFFICER GARNER: Any objection?

MR. GLUDT: No objection.

OFFICER GARNER: The exhibit will be

admitted.

Q. (By Mr. Braaten:) Mr. Stockness, have you done any valuation projects or appraisal work that are similar or that you think would be helpful to assessing compensation for the matter that brings us here today?

**A. Yeah. Well, as I mentioned, I have a license in North Dakota for -- for appraising real estate, and I work throughout, you know, central North Dakota throughout the Bakken formation, all across the state, really, appraising everything from easements for various pipelines, been involved in some oil production valuation, and surface rights including the impact of surface rights from energy production (inaudible) utilities, and routinely value agricultural land throughout the state as well as that our firm does get involved in doing a lot of mineral rights valuation. One time, in particular, we -- what we're currently working on is a underground natural gas storage assignment that we're working on in the -- in Iowa, and in that particular instance, we are involved in appraising what the value -- what -- what a lease agreement should be for the rights to store natural gas underground.**

Q. And with respect to the intervenor

landowners in this matter, and the time and work you've done, have you had time to put together a full appraisal for the valuation of pore space rights and the proceeding that brings us here today?

**A. No. And this is something when I initially was reached out about this potential assignment, we had discussed given the time frame having to provide a potential report as to the valuation testimony by, you know, today, or by -- you know, from this hearing and that was approximately 30 days ago, and I said, I really am not going to be able to complete any type of credible analysis. And, so what I agreed to do was just begin doing some consulting analysis where we could study some of the appraisal issues related to the pore space in Mercer and Oliver County.**

Q. And you mentioned a moment ago that your firm is working on a valuation and appraisal for pour space rights or for -- I shouldn't say -- you said you were working on a appraisal for a gas storage facility. How long has the firm been working on that project, approximately?

**A. Yeah. We were first engaged on that back last fall. And we are just still kind of in the early stages of what I call kind of the research and fact gathering taking place. And one of the things that's**

particularly challenging with that assignment is finding the market data that you need to really understand, you know, the market, and then apply that to what is, you know, a fair market value on a storage agreement.

Q. And what would you say is the approximate time frame to complete an appraisal on a valuation project as technical and complicated as valuing property rights as needed for a underground storage facility?

A. Well, so just to give you kind of a rough estimate, I mean, we're going to be spending six months here, we're already at six months, probably a year, setting it. Now we're not exclusively setting just that, obviously. I have other assignments going on, but what we have to do is, really, reach out on kind of a national basis and see what kind of gather -- we can gather. And, so we've been working with that and try to find other expert, other stakeholders, people that have been involved in the transaction, and often times when you -- when you find some of these market transactions, it takes a while for you to verify all the information and really understand all of the physical attributes with that particular property and how the -- the compensation or

the -- the payments were determined in a given instance, and then, of course, you have to pool all the data together, study it, and you know, this isn't something where you can just find a few different data points, and then quickly reconcile what a value is. And, so you're looking, and you're trying to find current data, if you can, and also, you know, understand thoroughly as you can, verifying all the transaction came together, was there some threat of evidence of domain or was it truly an open market transaction. And, so that just takes time and a lot of digging to occur. And that kind of mirrors what I'm finding in this -- in this, over the last 30 days, as I started to get into it.

Q. And as -- as you started your -- as you started your work on this assignment, have you had an opportunity to review any transactions that you might end up using in an appraisal analysis?

A. Yeah. So far to date, we've had the -- the opportunity to go through about 10, what I would say, maybe 20 potential transactions that we are beginning to kind of study and analyze. And, so we're at kind of a good starting point. However, as we've got into these agreements, we're seeing a lot of variation. There's some market -- market seems to be merging.

However, there's still a fair amount of variation within them. You know, for example, looking at, you know, what is the appropriate payment on a per metric ton. You know, we're seeing current data, ranging from 25¢ per metric ton to 50¢ on the lower end, all the way up to a $1.50 or more per metric ton on the upper end, and we're trying to really study to understand what are the reasoning behind that. Is there -- you know, what is the physical reasons in terms of how those rates are determined? Are they looking at the quality of the storage space or are they -- you know, the density or volume, metric ability you have of what you can store, and how does that affect the price? We're also trying to extrapolate from that, like, location of characteristics. So in the example of the pore space agreement in Mercer, Oliver County, clearly, you have kind of the infrastructure coming into play. And, so and a lot of ethanol plants in Iowa and the surrounding areas that you're going to be able to utilize the CO2. And, so how does that impact when we're comparing it to a lease that's down in Louisiana or Texas or, you know, somewhere in, like, Illinois, which I'm just citing some of the data points we've been looking at.

Q. And with respect to those agreements that you mentioned, that you've been reviewing, in the exhibits that we've marked, we marked Exhibit Numbers 32 through 53 and excluding Exhibit 50 which is a study that's unrelated that was marked in the middle of those, but excluding Exhibit 50 are Exhibits 32 through 53 copies of the agreements that you've agreed thus far as part of this assignment?

**A. Yeah. That -- that especially is kind of the dataset that we've been working from at this point. And our goal to that would be to collect more of that data, and some of the -- I think the most recent is around 2022. And, so one of the things that I want to try to find is some more current data even through 2022 is relatively recent. We're dealing with an emerging market year. And, so as this market is merging and taking shape, it is very important to kind of study where are deals today. And, so one of the things within that dataset is, as I've said to myself and my team is, we've got to look at more current data to see where are things as of today, and there's also certainly some more stale data in terms of being several years or -- or multiple years as they occurred in the past and that has less relevance. And, so, yeah. Our goal would be to try to get maybe another**

**20 other deals, and then hopefully, we can start to really kind of understand and apply them back to a pore space evaluation we do in Mercer and Oliver County.**

MR. BRAATEN: Move to admit Exhibits 32 through 53 excluding Exhibit 50.

OFFICER GARNER: Any objection?

MR. GLUDT: I'll note our objection on relevance and foundation.

OFFICER GARNER: Objection is noted. The exhibits are admitted.

Q. (By Mr. Braaten:) I'm going to just briefly switch gears here, Mr. Stockness, but in -- in situations where maybe you don't have as a real robust dataset, are there other methodological approaches that you might take to conducting evaluation or appraisal of this nature?

**A. Yeah. So what we -- what we're looking at here is, a market comparison benchmark. And, so we're looking at other market transactions of like kind deals, and the more we can understand those deals and understand the research and the more data we can have in terms of being able to really review it is certainly going to be helpful, but. In any evaluation like this, you -- and really, any real estate**

**evaluation, you're looking at all applicable valuation approaches, and here, you have kind of the market base approach, which I just discussed, and then the other approach that we really haven't even gotten into yet, but that we would certainly be taking a look at is the -- the income evaluation, and what that is, is looking at what is the fair rate of return back to the real estate. In this case, you know, pore space storage based on the anticipated kind of enterprise value of the -- of the larger business operations and try to figure out how do you determine a fair rate of return on the real estate for that use.**

Q. And would it be an accurate characterization to say that when you're looking at the income based approach, ultimately, what you would be considering is the proportionate share of the net revenues that should be going to the landowner based on their property interest in the facility?

**A. That is correct.**

MR. BRAATEN: Okay. No further questions.

OFFICER GARNER: I'm sorry. I don't know your name.

MR. GLUDT: Mr. Examiner, my name is Ty Gludt. I'm with Fredrikson & Byron appearing today on behalf of the applicants.

OFFICER GARNER: Okay. I should have given you an opportunity to appear, I apologize.

MR. GLUDT: I think my appearance was noted by Mr. Bender at -- on the first day.

OFFICER GARNER: Okay. Great. Okay. You can proceed, Attorney Gludt.

MR. GLUDT: Thank you, Mr. Examiner.

CROSS EXAMINATION

BY MR. GLUDT:

Q. Good morning, Mr. Stockness.

**A. Good morning.**

Q. Just a couple of quick questions. Based on my understanding of your testimony, you are not able to provide an opinion on what fair market value or what pore space in Mercer, Oliver, and Morton County, North Dakota, is worth today; is that correct?

**A. That is correct.**

Q. Okay. In fact, you said you weren't able to provide a credible analysis at all today; is that correct?

**A. It is.**

Q. And are you aware that the commission who is reviewing these applications only has jurisdiction or a determination of equitable compensation for nonconsenting owners, and they have no jurisdiction

over the actual compensation paid to pore space owners?

**A. Yes. I understand what you're saying.**

MR. GLUDT: Okay. I have no further questions.

OFFICER GARNER: Any questions from staff? You can call your next witness or you have --

MR. BRAATEN: I just have one quick redirect for Mr. Stockness.

REDIRECT EXAMINATION

BY MR. BRAATEN:

Q. Mr. Stockness, are you ready, willing, and able to complete the work on this appraisal assignment given the time and data to do so?

**A. Yes. If we're able to get the appropriate time, we are ready to do it.**

MR. BRAATEN: No further questions.

OFFICER GARNER: Okay. Now you can call your next witness.

MR. BRAATEN: And Hearing Examiner, I apologize. I know we're just getting underway here, but we need to just get a couple things set up for the next witness, just to prepare. Could we take, like, a couple minutes?

OFFICER GARNER: Sure.

MR. BRAATEN: Okay. Thank you.

OFFICER GARNER: We'll go off the record.

Okay. We're back on the record.

Mr. Braaten, you can proceed.

MR. BRAATEN: Thank you, Your Honor. We call the Swenson Living Trust intervenor by and through its trustee Kurt Swenson.

OFFICER GARNER: Mr. Swenson, please raise your right hand. Do you solemnly swear or affirm under the penalties of perjury the testimony you're about to give in this matter will be truth and correct to the best of your knowledge and belief.

**THE WITNESS: I do.**

DIRECT EXAMINATION

BY MR. BRAATEN:

Q. Can you state your name and address, please?

**A. Kurt Michael Swenson. 5774 21st Street Southwest, Beulah, North Dakota.**

Q. And do you live there with anyone?

**A. I live there with my wife, Fay.**

Q. Okay. And can you give us some background on how -- just how this project affects you in a general way?

**A. Sure. Yeah. We have lived where we live**

since 2008. We moved back to North Dakota then where we wanted to have our kids grow up next to their grandma, Donna, and live on the family farm. We wanted to enjoy our extremely valuable peace and quiet that we have out there. Unfortunately, the last 34 months has been anything but quiet in Oliver and Mercer Counties due to the applicant's actions.

Q. So what land do you own that is impacted by this project proposal?

A. We directly own or have an ownership interest in properties as a trustees for the Swenson Living Trust. It covers approximately 1,400 acres, and I believe there may be an exhibit that shows that.

Q. I'll pull up -- it's in the binders. Exhibit LO-81. All right. Can you tell us what we're looking at on Exhibit 81?

A. Yeah. Exhibit 81 is a -- a map showing the three disposal facility areas for the CO2. The colored boxes are shapes, are land that we have -- own or have ownership interest in, that is being affected by the proceedings or this hearing process. I can walk through the descriptions quickly of -- of what we have. We have the northwest quarter section, 22 tier one, 142 north, range 87 west. We nicknamed that one Thomases for the family that had lived there prior to

my wife's family acquiring it. We have the southeast quarter of Section 15, tier 142 north, range 87 west. That is Fay's Uncle Ralph's, World War II vet. Section 21, tier 142, north, range 87 west, all of that section, that includes the original homestead. That is where our house is. That is where my mother-in-law, Donna, lives. That is where Fay was raised. And where her family has lived for over 110 years.

Since moving back, we have worked to acquire other properties. The other properties would include the west half of the northeast quarter of Section 14, tier 142 north, range 88 west. That was from the Shide (phonetic) family that we acquired that -- and that is inside the BK Fisher disposal facility. We had the opportunity to purchase and acquire land from former secretary of state Jim Kusler's estate. Jim was affected by the pore space options and lease agreements. As he was dying, he asked us to make sure that we worked to advocate for landowners. It's one of the reasons why I'm here today to make sure that there's actually fair treatment to landowners in this process.

So section -- the southwest quarter of section 9, tier 142 north, range 87 west, that's a

windmill quarter where we have Indian rings, and it is just the most beautiful mule deer country you can see. We also have out lot B, the east half of the northwest quarter section 7, tier 142 north, range 87 west. That's where Jim grew up. And my son now owns that house. That's on that property. And we have the southeast quarter, section 27, 143 range, 88. That was Jim's uncle, Ace, that owned that.

So in addition to those properties, we've recently signed a purchase agreement for more land interest in 14, 87, Section 20. We have options on another 480 acres in that area. All of that land is either inside one of the disposal facilities or in between the three disposal facilities that are proposed in this application being heard here today.

Q. Have you had experience with renewable energy developers demanding the use of your land?

A. I have. We have. You know, it seems like everybody wants what isn't theirs. They want our land. We've had relentless developers from wind industry wanting to put up their noisy light flickers, red lights flashing all night in our windows. The solar developers wanting to blanket our native grass prairies and crop fields with silicon derivatives, and now we have the CO2 developers wanting unrestrained

use, not only of our pore space that is one to two miles below the surface but of the surface lands itself. All of these examples used our taxpayer funds to develop our land for the green new deal agenda. The 30 by 30 land grab, all be it the latter is only developer, unfortunately, that's trying to force their private for profit out-of-state enterprise upon our private property without our consent.

Other developers, they seem to respect us, and if we say no, they get the hell off our property. It's not that we're against the applicant or this project. Excuse me. While I do disagree with the use of taxpayer funds to reward their unconstitutional taking of private property, we simply want to be treated as an equal party in a private treaty that is negotiated between a willing seller and a willing buyer. The constitutional law in Century CODE 3822 that allows the applicant to take our private property without our consent making us a subservient party in a private treaty negotiation when the applicant holds the trump card of the heavy hand of government disguised as amalgamation. This private property taken does not allow our constitutionally guaranteed judicial hearing or a trial by a jury of our peers to determine just compensation if we can't arrive at that

private treaty.

Q. Have you had an opportunity to express any of your current concerns to the applicant?

A. We have. Yes. We were initially contacted in August of 2021. I got a notification on a Ring doorbell on my phone, saw the video, didn't quite recognize them, but recognized as our -- one of our neighbors, Jason Ericson. He indicated that -- that he'd like to talk, that we were going to be receiving a letter the next day. This is on a Sunday afternoon when I was running to put that corn planter away. And that they wanted to talk about a lease, and I said, well, I'm heading into town, but you -- I'm driving a tractor. You'll have to catch me, so he caught me. And he explained what was coming in this letter. We received the letter the next day or two. Upon reviewing the letter, we invited Jeff Skaare, the applicant's counsel, to our farm and ranch along with several of our neighbors to learn more about the project -- their project, and to our knowledge, this turned out to be the applicant's first landowner meeting. This is before any community or landowner outreach had taken place, and at this meeting at our farm and ranch with our neighbors we were provided the first hot off the press version of the lease that was

applicant's offer to place an option on our land to lease the pore space for their CO2 disposal allowing them the full use and access of our surface.

As I stated, it takes a willing seller and a willing buyer to reach an agreement. Unless, in this case, the heavy hand of government can be used to take it from one and give to another. Our family wasn't a willing seller that day when the applicant approached us. But we did give them the courtesy of hosting with open arms their first landowner meeting at our farm and ranch. You see we are in favor of development. We recognize that our state relies on industry to provide jobs and develop the resources that we have.

Q. Do you have -- I'm sorry.

A. Well --

Q. Go ahead.

A. I just wanted -- on that, I just wanted to say we're not against the project. We've never been against the project, but we simply don't agree with the terms and conditions. And that's still the case today as I sit here.

Q. And do you have any experience yourself with the energy industry or ethanol industry or with CO2 capture and sequestration?

A. I do.

Q. Can you tell us about that?

A. Sure. After completing, I went to NDSU and completed my engineering degree in 1991. In fact, probably crossed paths with Wade when he was there playing football. I went to work at an oil refinery in Minnesota. I was there for 12 years, filled 11 roles while I was at that refinery. Much of my time was spent in the maintenance and operations of certain process units, one of which was a carbon dioxide production unit. We produced high purity CO2 for multiple markets, sold it. In my final role at my time at the refinery, I was responsible for the total health, safety, environmental performance, and operational reliability of these process units. At that refinery I learned the characteristics and hazards of CO2. And while there are many hazards, the primary one applicable to the applicant's permit that deals with human health is the simple fact that CO2's heavier than air. And it can displace life-sustaining oxygen. In high enough concentrations, it can displace enough oxygen that it will deprive the body and the brain the oxygen needed to live. I left the refinery in 2003. We moved our young family to South Dakota to join a start-up ethanol business. While we

were in South Dakota, I had the opportunity to be a plant manager at the world's largest dry corn ethanol plant that was under construction. As we grew the business, I was promoted to vice president of operations. I was over a -- eventually 16 ethanol plants across the country, and we became the world's largest ethanol producer. Several of those plants that I had in my fleet at that time are now intending to send the CO2 into the proposed pipeline that the applicant has to North Dakota and bury it under our farm and ranch. And isn't that ironic?

While in the ethanol industry, my responsibilities included safe environmental, responsible, and compliant efficient operations. I had corporate wide responsibilities for the safety and health systems for over 1,500 people including employees and contractors. I oversaw complex safety systems. While safety systems included detailed process safety management analysis of risk, injury, and incident analysis, I had a detailed understanding of our feedstocks, our chemicals, and our products which included CO2. Carbon dioxide is a major product of the fermentation of -- as yeast convert the various sugars in the ethanol production process to alcohol, not unlike the distilled moonshine with approximately

a third of kernel of corn becomes CO2 by mass, and then the ethanol plants, traditionally, for the most part, release that CO2 to the atmosphere after scrubbing the pollutants, and then that CO2 was available to be consumed the next year by the corn to start that cycle all over again. In a year's time, we would produce over 5 million tons of CO2. In my tenure, we had to solve many safety risks. It was an emerging industry. One of the specific risks was leaking pressure safety vacuum and relief valves on the fermentation processes as an example. Our employees would need to physically be near or inside a cloud of carbon dioxide to perform maintenance work at times. Obviously, this required a lot of detailed planning, risk assessment, special purpose, personnel protective equipment, and significant oversight. CO2 is nothing to mess around with. I've had to oversee incident analysis of employees who are overcome by CO2 and the vapors that displaced the life sustaining oxygen that they needed to breathe.

I'm professionally qualified through training and experience to understand the actual hazards of carbon dioxide. Carbon dioxide is nothing to be casual about. It is not the same as crude oil. It is not the same as natural gas, refined petroleum

products or other things that the regional media pundits around here would have you believe. Its unique properties make it uniquely hazardous. CO2 can be extremely dangerous, and permitting these disposal facilities should be done with the utmost respect for the specific hazards that CO2 brings and the specific design of the injection facilities at each of the injection sites. The specific topography, potential release point heights, the process data, weather conditions for each of the disposal facilities will need to be considered.

So my other roles in my career have exposed me to detailed process plant design, process hazardous analysis, level of protection analysis, safe design methodologies which always consider requirements for safety systems to be incorporated into facility design training, and operating procedures. We would also review the system for likely leak points such as pump seals, flanges, and worst case scenario breaches. A dispersion analysis may have been conducted depending on what the serial was, and based on a specific set of process, environmental, and topography -- topographic and weather conditions, we would get a wide range of results that we would evaluate on how those gases dispersed. And how far out the concentrations that

were dangerous to our employees or the public. In many cases of those processes, gases may be realized at varying receptor points. Depending on the chemicals that were being released, these receptors could have been initial sources, public roads or rights-of-way, neighboring homes or other culturally or fauna important locations.

Q. So outside of the experience that you just discussed regarding your education as well as the industrial processes and facilities management and the work with the hazardous chemicals, can you tell us if there's any other experience you have that you bring to bear upon your work related to this project and the protection of your property?

A. Sure. Yes. In addition to my 30 plus years regarding process hazards, specifically some of that with carbon dioxide, I've also had 30 years of training and experience in contract negotiations, contract legal review, contract risk management strategies, including detailed insurance coverage analysis. Along with my practical contract experience, I've negotiated over hundreds of contracts. I've also had legal training from Cornell University on how to create effective contracts, how to interpret an effective contract, how to manage risk

in contracts, and enforce those contract terms.

Q. So you mentioned that you received some contract documents from the applicant at one point. What did you do with those contract documents after you received them?

A. So after we received those documents, they were the hot off the press version of the applicant's option and lease agreements. We reviewed them, of course. We shared them with Fay's family who, in many cases, owns interest in the land that we do and collectively after seeing the one-sided nature that in -- was in favor of the applicant with very little protections for the landowner, I decided we should have it reviewed by attorneys. We consulted with multiple attorneys. Every one of them, three, in fact, specifically recommended do not sign. Didn't get anybody to tell us to sign that document. So then it was decided that, you know what? We are in favor of the industry progressing in North Dakota. So what can we do as a family to help this move forward?

So we attempted or decided to attempt to negotiate a contract that would give equal protections to landowners as much as it would allow the developer to do what they needed to do. You see a good contract results when you get what you need, but not everything

you want; yet, you find it acceptable to sign. Initially, we reviewed -- or I should say we initially reviewed our feedback with the applicant on a virtual meeting during COVID, and we did that fairly quickly after receiving it and only to be met in the closing of that meeting with a statement by Mr. Boeshans of, thank you for your criticisms of our agreement. Well, we didn't think they were criticisms. We were thinking we were expressing what we felt we needed to enter into a mutual agreement. Thereafter, we formed a group of landowners in the area that was being targeted by the applicant. We had a common goal of arriving at a contract that could be used as a model contract for the Mason North Dakota CO2 disposal industry. And after, seriously, hundreds of hours of landowner input and attorney input, which they don't give us for free, sorry, Derrick, we invested in that red line of the applicant's initial agreement, and we provided that to the applicant on January 25th, 2022 which was a landowner version of the lease documents that we asked for their consideration of.

Q. All right. We're going to mark an exhibit here, but before I do that, a quick question, Mr. Swenson, did you have -- and I don't want you to talk about communications with attorneys, but did you

hire legal counsel as well when you were developing a response to those contract terms?

**A. We did.**

Q. And was I one of those attorneys?

**A. You were.**

Q. And was there another attorney that was also involved in helping with that effort?

**A. Charles Carvell.**

MR. BRAATEN: Okay. All right. We are marking Landowner Exhibit 87. Do you want to hand me those? I'll start. Thank you.

And Your Honor, I once again was remiss, but while we're paused here, I had discussed a map prior as Exhibit LO-81, and I failed to move to admit, so I move to admit Exhibit 81.

MR. GLUDT: No objection.

OFFICER GARNER: The exhibit is admitted.

Q. (By Mr. Braaten:) And Mr. Swenson, we've now handed out Exhibit LO-87. Can you -- is this a copy of some of the red lines that were generated to respond to the offer from the applicant?

**A. Yes, it is.**

MR. BRAATEN: Move to admit Exhibit 87.

OFFICER GARNER: Any objection?

MR. GLUDT: No objection.

OFFICER GARNER: The exhibit is admitted.

Q. (By Mr. Braaten:) Mr. Swenson, can you tell us about what happened when you sent your counteroffer with your edits and suggestions back to the applicant? What happened next?

**A. Yes. So we sent it to the applicant. Initially, as I normally do, we asked for just more of a, you know, kind of business to business meeting. So I asked to have meetings with Mr. Boeshans. I invited him into my office, conference room, and we had several meetings with him, ultimately, to try to help explain what we had changed from the original document, why we had changed it, and to get a sense of what they might accept, specifically or maybe in concept, and what they would not accept. Some of the meetings were one-on-one. Some we had counsel present. I can tell you all of them we got significant amount of lip service from the applicant's attorney. We took this process very seriously on the landowner side expecting to get a red line version of the lease back from the applicant that would actually give us specific feedback to what they would take or what they would not take. I can swear as of today, we've waited 870 days since submitting the landowner lease versions, and we're still waiting for a contract**

red line to be returned. And if they have one here today, I'd be glad to accept it and review it.

Through this process of learning about the CO2 disposal technology and regulations and legal theories behind this and dedicating hundreds of hours each year, I routinely field calls from my landowners across the country who have similar issues due to the lack of state regulations that provide protections for the landowner. I felt it was necessarily to get involved in the bigger picture of CO2 disposal. As a result, I have right here in this room met with Mr. Helms in his role as North Dakota's oil and gas and Department of Resources where he informed me that I was being faced with the state's perceived lease powers over our property. I was informed by Mr. Helms, and he acknowledged a lack of landowner protections in administrative code including safe setback distances from public receptors. I met with the industry leadership in ag, coal, and gas industries in all of the representative organizations to learn their views on this new disposal industry coming to North Dakota. We also had numerous landowner meetings in Oliver and Mercer Counties along with meetings in Hebron and Glen Ullin. I presented at the Northwest Landowner's Association annual

meeting, provided multiple presentations to state and county level North Dakota Farm Bureau meetings. My expertise and assistance on the topic were requested by a group of landowners between New Salem and Glen Ullin and Morton County was illegally trying to push a special use permit through for another CO2 developer which included a director capture facility.

I've written letters to the editor, co-authored articles for publication and have been interviewed on various TV programs, radio shows. I've advocated for legislative changes in the most recent 2023 session. Unfortunately, learning that most of our reg -- or legislators, they're under the spell of Mr. Helms, and the industry proponents have forgotten about the citizens whom they represent that are adversely affected by unconstitutional elements in our current century code. All of this effort has been done with a genuine overarching goal advocating for regulatory change while educating landowners on this emerging CO2 disposal industry in order to protect, not just my land and Fay's land but all landowners. Hopefully, this had resulted in some improvements for the landowners' ability to negotiate with these well-funded developers that resulted for them contract language that they felt was fair to both parties.

Q. So with all of that experience, did you also then engage with the applicant on negotiation or attempt to work on the suggestions for the contract documents with them?

**A. Yes. I did -- I previously stated that we did -- you know, taken hundreds of landowner attorney hours in that red line to conform their agreement to something that we felt while I believe any North Dakota landowner would consider signing unless they were simply opposed to the applicant to their project. Much of the reclamation and restoration clauses were spearheaded by Mike Koept (phonetic) who was a former Department of Trust lands employee and generally is based on North Dakota Trust Land documents. If you look at our red line, what you're going to see is, it's mostly red or purple in the one that was handed out. So their contract was so poor that it really should have been flushed down the toilet and started new, but to aid in our discussions with the applicant, we narrowed the list town to some major topics.**

Q. And what were the primary points of concern or those topics that you just referenced?

**A. It really started out for us with what are you putting -- wanting to put under our property? What is it? The original versions of the lease were**

very loose on the definitions. It could have been 50 percent carbon dioxide, 50 percent hydrogen sulfide, because it allowed incidental substances or other substances. So we added a definition, a simple one. We put a percentage in of what the purity of the CO2 should be so that we knew based on our knowledge what the hazards would be of what they were putting under our property. We focused on, what are you actually leasing? Because the lease was, we want to lease everything under your surface and more, and we'll get to that. You know, this -- this conference room probably talks more than any other conference room in the world about different subsurface stratum, different share plays, different levels within the share plays, such as a Three Forks or the Madison or the Bakken or whatever there are, and the applicant wanted everything. And we thought, you know, it's really only fair, and it's pretty standard in the oil and gas that, you know, you should just tell us exactly what you want, and you know, we'll agree to that. But no, they wanted everything, so we said, no, you're going to give us a single geological formation, and if that works out for you and you want to lease something else, like an oil and gas lease, you can give us a new lease for that. And, so that's what we

did. They also had these warranties reps, guarantees, things like that. Well, if you're not familiar with contract language, you may not know the importance of those, but those are very important in a contract to -- if you're signing for that.

Q. Can I pause you real quick, Mr. Swenson, though, and ask, so a title warranty clause was contained in Summit's contract, which they agreed yesterday they need to remove, but they weren't willing to remove that for you during the negotiation?

A. I think it was on Tuesday, Derrick, that they agreed to remove it, but yeah. They wouldn't remove it.

Q. Okay. What are the other topics that you had attempted to address with them that they wouldn't?

A. Well, the -- in the option, it included geophysical expiration activities. So as you know, that involves seismograph trucks and maybe some expiration in other ways. My mother-in-law, Donna, had, had a water well that her cattle relied on damaged by in -- earlier, all be it a little older technology seismograph process, that came through and that private property water well never produced water again for her cattle. And she was never compensated for that, so we asked for some setbacks in excess of

what the state rules that they were claiming applied to this gave us. And we felt that, that was fair to make sure that she was comfortable. We asked that in case you damage our water springs that provide life-sustaining water for the cattle or you damage our wells, you're going to do some testing, you're going to test the quality, and the quantity of our water wherever, whatever sources there are that we use and rely on before you do it, and you're going to do it afterwards, and you're going to be accountable. They asked us to indemnify them, and if you're not familiar with indemnifications, but it means that we will defend them and protect them and hold them harmless for actions. Well, we thought it was only fair that they defend us. And protect us and hold us harmless as well. So we asked for that.

What was interesting to me, and you know, Mike helped, especially, was the lease gave the applicant unrestricted full use of our surface, unrestricted full access to our surface lands, and they could put anything they wanted, wherever they wanted on our land. If you signed the document that they put in front of us, and many of our neighbors did, unfortunately. So because of that, Mike's experience said, you know what? We're not necessarily

opposed to things being on our land at that point if we can have some control, but we'd at least like restoration requirements in your -- in your documents so that we know that if you're forcing something on to our land that we know that our land is going to be restored and reclaimed after you leave. So we added those and that makes up a large part of those document red lines.

One of the concerns that we had was that this was a newer company, unproven in North Dakota. We didn't know them before my Ring doorbell went off that day in August of 2021. So we had no idea what their funding was. Are they going to follow through on their commitments? And, so we asked for bonds. We asked for, if you're going to bring people on to our land and have them do geophysical expirations survey activities, build a compression station outside of my bedroom window or whatever it is that you're doing, I want to make sure that you pay them, so they don't put a lien on my property. They didn't have that requirement. And, so we added that, that you would have a payment bond to pay your suppliers and your service providers. In addition, we asked for bonds for restoration. Because as we've seen exhibited in this room in hearings, the state doesn't stand for

landowner rights. The state stands for industry, and they don't make them reclaim wells and plug or -- the abandoned wells where companies have gone broke and left because they don't have a proper bonding program, so we asked for a bond. If you're going to put shit on our land, you're going to take it off our land, eventually, and there's going to be a financial instrument that ensures we have that covered if you go broke or when you sell and flip your company to some foreign country.

I was flabbergasted that they wanted to come on to our land in the option phase without insurance. The option had no insurance requirements for them to drive a major truck on our land, put a bunch of stuff on our surface, have people that we have no idea if they have employers' liability insurance or general liability insurance or pollution insurance for the antifreeze that leaked all over the state trust land that we rent. So we added insurance requirements. We added a significant amount of language that if they wanted to put something on our property again, evidenced by the fact that we put it into the document that if they wanted to put something on our property, we were going to have some control, but they were going to have -- we were going to know

ahead of time what that form of easement was. There was no form of easement included that we would understand what the terms and conditions would be to evaluate with their absolute right to put whatever they want, wherever they want on our land, so we added an easement structure. Because they wanted to use our surface, as I mentioned in my opening statement, we have very valuable, very valuable peace and quiet on our farm and ranch. I was greeted by antelope last night when I left here. Driving into our farm, I was greeted by mule deer and pheasants, and when I got out of my diesel truck, shut it off, so I could hear, you know what I heard? I heard doves cooing, I heard the pheasants cooing and greeting me when I came home. When I woke up this morning, I had two buck mule deer, one eating off the apple tree in our backyard and one eating off a Crataegus tree, having browls {sic} for their breakfast. Because of that, we wanted to have some restrictions on what they could do on our lands and where, so we defined some simple requirements that we would have to give some form of consent, and we wouldn't necessarily unreasonably withhold that, but you know what? You don't get to have lights shining in our bedroom window with your pump station. We don't want that. I like to see the stars. I like to

see the Northern Lights out on our north-facing bedroom. I like to see the Milky Way when I'm in my hot tub sitting on our south patio. I don't want your lights shining in me. I've already had hundreds of those damn red lights flashing to the south of us from those wind developers. I was also very concerned about noise. I'm sure you're all familiar with William Stone and William County lawsuit going on right now with the data center. I don't want to listen to a compressor station or pumping station injecting CO2 when I'm sipping my coffee on my deck in the mornings. I don't need that. I don't have it today. And I don't want it in the future, so we added some noise requirements.

In addition, we asked, because you're going to be paying us based on your injected tons of carbon dioxide and other substances, we want the right to audit your books. That's a standard clause when you're being compensated based on their records. We want to be able to audit it. And as I'm sure they'll tell you, we asked for some financial changes in the structure of the lease document, which you have in front of you. We felt our land and the use of our land was worth more than they were offering. We had started to do research and develop data points on what

our land was worth at that time or our pore space and the use of our surface. In fact, we developed a schedule of consideration, a schedule of consideration that would say, if you're going ahead of time, we will know what you're going to pay us, if you put a pipeline on our -- on our land. We're not going to sign this agreement like you're asking us to do, and then negotiate when you have the absolute right to put it on. We're going to negotiate the price of this up front. I'm not going to sign a contract, and then be held hostage by you. So we added a consideration of values for per rod of pipeline based on its size, per linear foot of communication cabling or devices, per communication towers, and all other surface facilities that at least we could imagine such as roads and -- and surface acres set aside for pumping stations and things like that. So we included that as well.

And you know, we really -- we didn't know what to think initially when we saw the 25¢ royalty based on their lease agreement, their option, and lease agreement for the injected tons, and where I went is, I said, how much -- how much is this project going to make for you? And how -- what are your economics, and what are your costs? And I sat in numerous presentations that ultimately happened and

Mr. Boeshans presented even one time at the Oliver County -- it was either -- I think it was a commission -- commission meeting and shared their economics of what the uplift of the ethanol plants and the revenue sharing agreements would bring them. 29 to 30¢ a gallon was what would be split between the developer and the applicant here. Or the ethanol plant and the applicant.

We saw that -- you know, we obviously understood the 45-Q tax credits, and we researched significantly California or the west coast low carbon fuel standard credit market, which I'm sure many of you know has tanked significantly since the time that this started. And in all of that, you know, we really felt that you're leasing a resource of ours. You're leasing pore space that's ours to develop, not unlike an oil and gas in some manners, and we felt, well, why don't you pay us a royalty, then, based off your profits and that net profits such as an oil and gas lease, so we proposed a three-sixteenth royalty on net profit.

So those were the major lease changes. Obviously, there's a lot of knits and mats in there as well, as you'll see as you walk through that document. I previously mentioned that I have not received a

**formal return red line as a -- as is customary in contract negotiations. Waiting on today 870 days, and I'm still counting.**

**I would acknowledge that the applicant has made some changes in their agreements with landowners based on our feedback, and I'm glad for that. I'm glad that landowners have been made improvements from that first lease version that should have been just ripped up, burned, flushed down the toilet, taken up to the burning barrel at Donna's and just never saw it again.**

Q. So the -- the red lines that were sent back, you indicated that both myself and Charles Carvell had worked on them, in addition to you and Mike Koept. Are you aware of who the attorney was on the task force that helped draft the Class 6 regulations for North Dakota?

**A. I am.**

Q. And who is that?

**A. Charles Carvell.**

Q. Okay. Are you familiar with the policy statements and law related to carbon sequestration in North Dakota?

**A. I almost have them memorized.**

Q. And you're fairly familiar with the project

at this point obviously?

**A. Yes.**

Q. And so I want to talk about --

OFFICER GARNER: Attorney Braaten -- Attorney Braaten, let's just take a 10-minute break right now.

MR. BRAATEN: Okay. Sounds great.

(Silence in audio.)

OFFICER GARNER: We are back on the record. Attorney Braaten, you can continue.

MR. BRAATEN: Thank you, Your Honor.

Q. (By Mr. Braaten:) Mr. Swenson, I was asking about the policy statements and the Class 6 statute and just to direct your attention at the -- the policy statement in 3822 notes, it is in the public interest to promote the geological storage of carbon dioxide, doing so will benefit the state and the global environment by reducing greenhouse gas emissions, doing so will help ensure the viability of the state's coal and power industries to the economic benefit of North Dakota and its citizens. Further, geologic storage of carbon dioxide, a potentially valuable commodity, may allow for its ready availability, if needed, for commercial, industrial or other uses, including enhanced recovery of oil, gas,

and other minerals. Do you feel the applicant would accomplish any of these policy goals with the project proposed for your land?

**A. I do not.**

Q. And why not?

**A. Well, the first one is the whole kind of public interest piece. It's a pretty simple one. Their projects or their permits requested fail on that merit of that policy statement. You know, the legislator puts that in the policy to give cover to their unconstitutional practices of taking our private property without constitutionally mandated due process. The applicant has not just demonstrated with evidence on the record that their project meets the threshold of being in the public interest. They have told publicly that it will create jobs, and I'm sure it will. It will have economic benefits, economic health will improve because of it, and I agree, and they will have increased tax revenues on -- because of their project for the state and local jurisdictions. Unfortunately, these are all constitutionally barred by North Dakota's Constitution when you consider a physical taking of our private property. The only constitutionally allowed physical taking by a private company for a public interest is through a regulated**

public utility or a common carrier. They're neither. They're not a regulated public utility in the disposal facility, and they're not a common carrier in the disposal facility. They stated their pipeline intends to be regulated as a common carrier, and this has no bearing on the pore space. Common carrier regulations are under the purview of the Public Service Commission, not the Industrial Commission. The PSC regulated pipeline ends at a terminus red dot that we discussed in this hearing, miles away, from the disposal facility. And those regulations cannot be applied under the Industrial Commission authorities. Additionally, the applicant has set up a maze of various LLCs and such. They're just a separate company from the pipeline.

Q. What about the other policy statements?

A. Well, let's talk about the environment that we're going to benefit the global environment by reducing greenhouse gas emissions. I can affirmatively state that the applicant has provided no data or evidence or proof on the record in these hearings that the project will meet this policy statement. Mr. Boeshans even testified that it will not change global temperature. Further, as a direct result of the applicant's request for amalgamation

which results in a physical, per se, taking of our private property, this goes in direct conflict with common law. That was handed down in 1976 in the North Dakota Supreme Court case Skjonsby versus Elkin and that opinion confirmed that in a physical taking, the applicant must meet the threshold of a substantial and a direct benefit to the public. Well, the public is a North Dakota citizen. There's clearly no substantial and direct global environmental benefit provided to North Dakota citizens, by the applicant's proposed energy intensive capture transport and disposal of carbon dioxide as they testified to. To meet this policy objective, the applicant should be required to demonstrate by the Industrial Commission to submit a complete carbon dioxide mass balance. The mass balance should include not only the carbon dioxide produced by the energy they use to capture, clean, transport, and dispose of the CO2, but all of their other operations produced by their employee vehicles use to work, office heating and cooling, the steel manufacturing for their pipelines, the transport, the compressors, the buildings. All of the manufactured items that go into it should be included in that CO2 mass balance, if you want to prove and find that it's in the public interest on this policy statement.

**In addition, they really ought to include all the hot air they expel and the CO2 with that, too.**

Q. What about the -- the state's coal and power industries and economic benefits in that regard?

**A. Well, I don't see them tied into a coal power plant with a pipeline. Or a power -- any power plant for that matter. Coal or otherwise. They -- they publicly claim that the carbon dioxide will be disposing of 57 ethanol plants in our area and surrounding our farm and ranch, 56 of which are from out of state. In fact, if you were here, and you may have heard recent statements by Jason Bohrer, the head of the Lignite Energy Council that, you know, that is North Dakota's leading coal and power industry representative group, affirm they have no association with this project. So I don't see how it's benefitting them.**

Q. And based on both your -- your experience as well as your negotiations with Summit, do you have an understanding as to whether they will have a ready availability, if needed, for commercial, industrial or other uses with respect to the CO2 they're putting down?

**A. So I can rely only on what I have heard from others or have researched. I can tell you that**

**John Harju of the EERC and other employees -- Wes Pack is a good example. Wes's daughter went to college with my -- was one of my son's best friends in college, that it's not economically feasible to recover this carbon dioxide from these geological disposal facilities. And Mr. Harju even states specifically that there has been very little work done I'm trying to recover CO2 from injected masses.**

Q. And did Mr. Harju state that at some point in any kind of public forum (inaudible)?

**A. Sorry. Yes. He did.**

Q. And in what forum did he make that statement?

**A. It was in a presentation to the joint -- I lost the video here or -- thing. It was in a presentation to the joint Senate and House, Energy and Natural Resources Committee. We're having technical difficulties here. There you go. I'll play it here.**

UNIDENTIFIED MALE: Is there any effort being made towards recoverable storage?

JOHN HARJU: Sure. So to -- to -- there's really been a -- a representative joint members of the committee. There's been very little work done on trying to recover CO2 from injected masses, so. In essence, when injecting into something like our Broom

Creek Formation, you're injecting into an already water-saturated zone. And, so our expectation would be very, very little ability to recover that CO2.

**THE WITNESS: So I have to rely on others, and I would view that in that presentation that Mr. Harju is an expert on that, and that I don't think that it will be available for enhanced oil recovery. And they're not going to pump it out of my land once they put it in. It'll be there forever. You know, even if it were economically feasible for them to do that, the applicant would end up having to refund a portion of their 45-Q tax credits. They'd lose their revenue sharing along with their customer of any low carbon fuel centered credit price uplift they obtained because -- well, the ethanol producers for the ethanol producers, that LCF credit requires permanence, as Mr. Boeshans testified to in this hearing, and it seemed like in my opinion that the applicant's statement or lack of evidence on this record for this hearing do not meet that public interest threshold.**

Q. As someone who pays state and federal taxes, what's your opinion on the use of your taxpayer funds to promote and fund the applicant's project?

**A. So I think we've affirmed that the weight of the evidence in this hearing shows that the project**

is not meeting North Dakota's policy objectives, so why are they pursuing this project? The simple answer is, to take part in any massive wealth transfer scheme, taking taxpayer dollars or maybe we should say debt of our grandchildren for those of you who may have grandchildren someday, and putting it in their out-of-state silk-lined pockets, all through North Dakota's complicit regulations that the applicant has not met the burden of proof for their projects to be approved.

So in addition to these 45-Q tax credits that are provided to the applicant's investors or finance SEERs at the reported project capacity of 18 billion metric tons per year which has been raised, obviously, since initially we met with them puts 1.5 billion in their foreign, silk-lined pockets of our money and future federal debt obligations. North Dakota, unfortunately, is, you know, they're contributing a bunch of dollars to this as well. You may have heard about the recent $300,000 grant awarded for a carbon dioxide re-education campaign putting more tax money into the silk-lined pockets of local media pundits, and engineering companies that suck it to teat of our government. Our taxpayers' monies would have been better spent putting up billboards

stating North Dakota's open for CO2 disposal. Don't worry. Our citizens are too stupid to understand it. At least that would have provided jobs. Changing the billboards out would have people employed, with that new signage going up. They would have put fuel in their trucks and their equipment. Bought some candy at the gas station. Driving our economy and probably would have had the signs made in North Dakota creating jobs. I'd like that one a lot better.

In addition to the deployment of state-funded EERC program, supporting the development of this applicant's application, the legislator provides a payment in lieu of taxes to the counties for more taxpayer dollars, so the applicant doesn't have to pay property taxes for 10 years on their pipeline infrastructure. You can catch the governor flying down to Iowa to meet with Rastetter or whoever he did. The EERC employees driving to Beulah for the public information meetings and so on and so on. It sickens me that we have bought into this green new deal agenda in North Dakota, and we're now funding it with our taxpayer dollars. I'm sick of it. You should be ashamed.

Q. Will you allow your land to be amalgamated by the Industrial Commission?

A. I can tell you right now the state can try and take it. You're going to end up taking for my cold dead hands. And you're going to see how that works out for you. The state knows good and well that the amalgamation provision in Century Code does not meet the requirements of North Dakota's Constitution. North Dakota private property owners are afforded the due process method of imminent domain in our constitution when the government allows the physical taking. The state knows that amalgamation is a physical taking, not a regulatory taking as they sometimes say by allowing CO2 physically invade our private property of pore space. The state knows in the lawsuit they lost at the North Dakota Supreme Court against the appellant, Northwest Landowners Association. These injection of fluids into pore space is a physical taking. It's not a regulatory taking. They lost. The Court -- the five justices of the Supreme Court of North Dakota affirmed that. The state knows that in the U.S. Supreme Court decision in Cedar Point that even a temporary physical invasion of private property is a physical taking. That's not a regulatory taking. The state knows that by allowing physical property such as pressure to migrate outside of CO2's disposal facility is the same as a physical

taking, and even that pressure, it might dissipate over centuries. I don't know. They couldn't tell us yesterday in testimony that the current and future landowners' ability to use their pore space is damaged as testified here by the applicant. The state knows they're not requiring the applicant -- the applicant to provide any compensation for this transfer of pressure or CO2 outside the bounds of the disposal facility leading to a taking without any compensation. The state is trying with a lot of effort while looking like a great contortionist to convince a judge that while the pore space is private property of the surface owner, it doesn't deserve the same protection as surface lands, and their police powers get to rule the day for pore space. Yet, despite all this great knowledge held to the state on these issues, I believe that their arrogance in the application of unconstitutional law is resulting in the closest thing I've seen in my lifetime to a tyrannical government. It's high time they're checked on this by the citizens with all of our God-given constitutional rights.

Q. Do you believe that equitable compensation that has been defined by Mr. Helms in the Industrial Commission is acceptable?

A. Honestly, I don't know how they've defined

it but absolutely not. I'll disagree, I'm sure, with based on what I've seen in the past. You know, it's common knowledge that when the state does a physical taking of private property, we, as a property owner, are granted certain due process in the form of an imminent domain hearing in front of a judge with the state or their proxy. They have to substantiate that it is in the public interest, and there's a necessity for the taking, and if agreed to by the judge, well, that property owner is granted an option, if they want a jury trial to determine just compensation. That's mandated by the constitution.

Here in this sham of due process, we are not being given an impartial judicial hearing as I mentioned earlier. The oil and gas division is charged with both a regulatory and a promotional nature of their efforts. How can this possibly be impartial when they're charged with industry promotion? A judge is impartial, as they are not tied to industry results. The property owner is, once again, in a subservient position to the applicant in determination of what should be just compensation. Ha. But it gets even better because the unconstitutional law states that the commission doesn't even have to meet the constitutional bar of

that just compensation, that a jury of my peers would determine. They simply determine what's equitable. Unfortunately, for that property owner, there is no definition in statute of what equitable means, and it's up to interpretation of this room. And clearly, we have heard testimony from the applicant that landowners are not being equitably compensated. They're not.

In fact, in an open records request from February 14th of 2023, the state has put on record that they do not have any records that would be used to determine how non compensating landowners are or will be equitably compensated as required by statute for the Minnkota Power Project Tundra and Retro Energy Carbon Sequestration Projects under 38220814. If the state has a burden of proof to determine that nonconsenting pore space owners are or will be equitably compensated as a requirement of this Century Code, wouldn't you think they have records of how they did that, how did you determine, and how did they meet that statutory requirement?

Q. We're going to hand out Exhibit LO-88.

**A. Thank you.**

Q. Mr. Swenson, we've handed out Exhibit LO-88. Can you walk us through what we are looking at

in this exhibit?

A. I can. The first page of the exhibit is a letter written by Mike Koept, February 9th, 2023, to the public information officer requesting to inspect or obtain copies of public records which is an open records request of how nonconsenting pore space owners are or will be equitably compensated for the Minnkota Power Project Tundra and Retro Energy Carbon Sequestration Projects under 38220814. So that's the first page. Now, the second page is internal to the DMR sent to a group that we're not sure who the actual recipients are. Please see below the open records request. If there are any questions, let me know. And the action requested was if less than one hour of time, please place documents here, and they gave a -- an internal file share description of where to put them. If more than that time, please let me know of an estimate by the end of day Monday, February 13th. The third page is the response that Mr. Koept got which is actually dated February 14th, 2023, so a prompt response. Thank you for that. It says, the records -- box is checked. The records you requested cannot be provided because there's no such records exist. Huh. Or the records are not records of this agency. And then it was typed in there, all

**negotiations for compensation were private conversations with pore space owners. So how did you figure that one out? How did you figure that the landowners would be equitably compensated if you have no records?**

MR. BRAATEN: Move to admit Exhibit 88.

OFFICER GARNER: Objections?

MR. GLUDT: No objection.

OFFICER GARNER: Exhibit is admitted.

Q. (By Mr. Braaten:) So Mr. Swenson, do you have concerns about how the compensation is being determined in these proceedings by the commission, if it is?

**A. Huh. I do. You know, as it relates to this hearing, and again, just to be on the record again, we have been severely prejudiced by the state's lack of enforcement of North Dakota Rules of Civil Procedure that are required in a hearing of this matter. We have been denied the opportunity to dispose or depose -- I'm not going to dispose of you Jeff; okay? To depose or receive any discovery in this matter. None. Not one thing. Not one deposition. Not one piece of discovery. Given to us. Zero. That's zilch, nada. Setting aside this lack of due process by the state, the real matter is here,**

**what is equitable? Since the state doesn't define it, and it's not a constitutional term, I don't know what it means. Who really knows.**

**Now, Mr. Helms will tell you that equitable and just compensation are pretty much the same thing. Just as he did on February -- or Friday, January 13th, 2023, in a presentation to a joint meeting of the North Dakota House and Senate, Energy & Natural Resources Committee. Mr. Helms states, if there is just or equitable compensation, it's not a taking. And in the absence of it, of that it is. You know that's wrong. Of course, it's still a taking. Just because somebody gets compensation, it's still a taking.**

Q. Can you play that video from Mr. Helms for us making that statement?

**A. I'll find it here. Yep.**

LYNN HELMS: My conclusion and my attorney's conclusion is that if there is just or equitable compensation, it is not a taking. In the absence of that, it is. But if there is just or equitable compensation, it is not a taking. That would --

Q. (By Mr. Braaten:) What's your response to that, Mr. Swenson?

A. Huh. Just compensation is required by and only granted in a taking. Mr. Helms knows this. That's a lie, what he did or a misleading statement or you're just as incompetent as the director of this agency. I'm not sure which it is. Furthermore, you admit that you don't know what the value is. Just that everybody gets paid the same. How can you possibly not consider pore space value under this pretend undefined by statute made-up term of equitable compensation that you state that you have no records of in this agency on how you evaluate if equitable compensation is being paid?

Q. Well, how do you feel about the compensation being offered by the applicant and proposed by the applicant?

A. In an agreement, there's usually an exchange of compensation. The compensation normally gets determined by mutual negotiation. In this case of the applicant, there was zero negotiation on compensation. One that Mr. Boeshans testified to was originally set on a value of freaking coal leases of all things. And then nothing to do with the actual value of my pore space. Their approach has been, take it or leave it. But we'll take your pore space through this freakin amalgamation clause if you don't

**take our offer.**

OFFICER GARNER: Okay. I'm going to ask you to refrain from swearing, please.

**THE WITNESS: You left the rules of civil procedure when you swindled our --**

OFFICER GARNER: I'm just asking you not to use the word freakin.

Q. (By Mr. Braaten:) Okay. What was the amount that the applicant was offering in that initial agreement?

**A. 25¢ per ton disposed of under our native grass prairies, and then when the Inflation Reduction Act was passed by the federal government giving them more of our federal tax dollars and federal debt for our grandchildren to pay, they gave us an extra 25¢, making it 50¢ per metric ton for the landowner, a whopping 0.7 percent of their increase of $35 that they got for no additional cost on their part. Is that equitable? Or just? I don't think so.**

**In a meeting with the applicant's North Dakota leadership team, it was stated by Mr. Boeshans, well, he didn't have any market data that showed that they should pay more. While market data may be difficult to obtain or ascertain in this nascent industry, we did provide them examples. We had found**

them. I'm not sure why they couldn't. On leases that were paying on different terms. All higher than the applicant.

So we received no counteroffer to our red line of their agreement in which we had proposed paying the landowner similar to how this agency normally sees things paid on a royalty model based on a share of net profits to which Mr. Boeshans turned this method untenable. It was untenable. I guess he won't have a career in oil and gas. But there are lease examples available.

Q. Can you --

A. Oh, go ahead.

Q. Well, I was just going to ask you, if you can give us a couple of examples of the available transactions you just mentioned.

A. Dakota Gasification Company. Just north of Beulah is offering a 1.70 per metric ton, 3.4 times higher than the applicant.

Q. Can I have you take a look at Exhibit LO-53? Sorry that's in the binder, everyone. All right. Looking at Exhibit 53, this has been previously marked. Is that the lease you reference with respect to the Dakota Gasification --

A. It is.

Q. Okay. And other than the Dakota Gasification at the $1.70 per metric ton 3.4 times higher than the applicant's, any other agreements that you think are more appropriate compensation?

**A. Publicly available, the State of Louisiana entered into an agreement with Air Products Blue Energy, LLC, which shows royalty payments of 1.50 a ton. While the 45-Q was at $50 per metric ton. But it also included an escalation clause because they thought that value might go up, that the partner or their -- their other party on that agreement might receive, and in that case that escalation clause included a 9 percent escalator of any increases above 50 -- $50. That 9 percent versus Summit's measly 0.7 percent that they offered us, for no extra cost to them. So when the $50 per metric ton 45-Q payment went to $85, presumably, with that 9 percent escalator, that increased payment would be $4.65 per metric ton. 9.3 times higher than the applicant's offer.**

Q. And is that agreement that you were just referencing contained in the record at Exhibit LO-45?

**A. It is.**

Q. Any other agreements you think are more appropriate context for considering the compensation

here?

**A. The Permanent School Fund of the State of Texas entered into a transportation and storage lease in April 2022, with Bayou Bend CCS, LLC. This lease was structured much more like what we had been proposing as landowners in this case. They took it as a form of a percentage of facility proceeds which ranged between 3 and 6 percent versus our net profit, three-sixteenths offer that we provided them. In their case, facility proceeds were to find and include any consideration paid or delivered to the lessee, meaning the person that's injecting, including the value of the carbon credits on a cash paid basis or after tax valuation, very similar to what we had proposed just that they had a lower number on gross, and we had a bigger number on net.**

Q. And is the lease you were just talking about in referencing Exhibit LO-43 in the record?

**A. It is.**

Q. And, so what are these -- these three agreements tell you about the compensation?

**A. Well, I am -- I am disheartened that this hearing is considering forcing our private property into a lease that is undervalued by financial --**

MR. GLUDT: Mr. Examiner -- Mr. Examiner,

I'm going to make an objection at this point on relevance. We're discussing compensation and leases that have nothing to do with this project and over which the commission has no jurisdiction. Second, this is all being done to lay a -- making a constitutional argument before this commission over which they have no jurisdiction.

OFFICER GARNER: The objection is noted. I'm going to allow him to continue.

**THE WITNESS: I'll restate that. Why should we, as landowners, be subjected to a lease that is undervalued by national standards? Simply because that's what the applicant offered without any negotiation on their part. Do we not have the right to advocate for the best financial result for the use of our private property? I sure think we do. But not here. Not in the North Dakota apparently. Somehow that law got -- you know, that right got lost.**

**So they've demonstrated through the evidence of this hearing that they are not certain how far this CO2 even extends under the lines they drew on the map that show an arbitrary concentration cutoff level of 5 percent carbon dioxide in the aquifer. Ugh. They admitted on the record that carbon dioxide will extend beyond this line, and they're not able to**

attest on the record to how far carbon dioxide will extend beyond that arbitrary 5 percent line. They've admitted that it will go out there, and eventually may invade neighboring properties that may or may not be leased, but in neither case, they're not going to compensate them. So how can the state possibly know if the pore space owners are being compensated equitably by statute when they don't know how far the CO2 will actually extend onto neighboring properties at which pore space owners actually should receive compensation for disposal of their CO2 in their pore space? But there is no plan or commitment by the applicant to pay them as testified to yesterday by Mr. Boeshans. How can this oil and gas division let us, as landowners, even evaluate the accuracy, the sensitivities or the completeness of the applicant's application when they didn't even ask for or receive the seismograph data as was testified to yesterday? Nor did we.

Q. (By Mr. Braaten:) And do you have property that is not located within the areas of review but is still being impacted by this proposed project?

A. We do.

Q. And can you explain that?

A. So the state is playing fast and loose with

their inconsistent application of intervenor rights by stating in your order, Mr. Garner, to our trust that the commission will not consider the trust position, insofar, as it fails or it falls outside the consideration of Summit Carbon storage number two. Much of our land was intentionally skipped over by the applicant surrounding these lands of ours with injection wells due to the applicant's simultaneous injection plans in these six wells. Their models predict that much of our property, as we saw on the record, will see an increase in pressure gradient of 8 to 900 pounds over the ambient conditions of today after their 20 years of injection rendering our pore space unable to realize the same net present value cash flow for any commercial use that we engage in and possibly risking our ability to modify -- monetize the 45-Q tax credits as was testified to by the applicant as our rates of injection will be reduced to the applicant's pressured by the applicant's trespass of their pressure onto our property ultimately reducing the volume of CO2 we could inject in limited 12 years for the 45-Q tax credits.

Q. Can we have everyone look at Exhibit LO-63? And Mr. Swenson, can you explain to us on this map that this illustrates in any way what you're

discussing now? Yeah.

A. As you'll see, these are the three disposal facility areas proposed by the applicant. The upper left one being the BK Fisher well. The green border around that well is the current boundary being proposed for the disposal facility. The orange surrounding that is the area of review. The right well is a JK Hence well, again, surrounded by a green line for the border of their proposed disposal facility, and then the, what, orange -- I'm not sure what color that is -- around that is the area of review, and then the bottom center well is a TB line gang well. The blue line is the proposed border by the applicant of the storage disposal facility, and the purple is the surrounding area of review. You'll see all of the intervenor lands marked on there in colored blocks. You'll see the white ones which are specific to our trust fall in between a lot of the storage disposal facility boundaries and areas of review even, but the boundaries are what's important. And overlaid on this map is the pressure gradient that the EERC, through the applicant, has provided of what the pressures will be after 20 years of injection by those three wells at their planned rates, and what you'll see is, much of our land will have pressure

**trespass in our pore space rendering it unable to realize what we could realize today for a net cash flow, but yet, we're not being paid, but our pore space is being damaged.**

MR. BRAATEN: Move to admit Exhibit 63.

OFFICER GARNER: Any objection?

MR. GLUDT: Yes. Mr. Examiner, foundation. We don't know who produced this map, how it was produced. If the witness's able to give us a little bit more foundation in those respects, we may be able to remove our objection.

OFFICER GARNER: Mr. Braaten.

Q. (By Mr. Braaten:) Do you have an understanding of the program in which this map was created, Mr. Swenson?

**A. The Google Earth program?**

Q. Correct.

**A. I do.**

Q. Is it your understanding that the images of the pressure maps produced by the applicant as well as the boundaries produced by the applicant are on this map alongside of the properties that are owned by the other intervenors?

**A. Yes, it is.**

Q. And all of those images are then compiled

on to a KMZ file within Google Earth that then produces the map that we're looking at in Exhibit 63?

**A. It does.**

MR. BRAATEN: Move to admit.

OFFICER GARNER: Do you have any objection?

MR. GLUDT: No objection.

OFFICER GARNER: The exhibit will be admitted.

Q. (By Mr. Braaten:) I'm going to take a look now at Exhibit 86.

**A. Is that one --**

Q. And this is the one that we e-mailed around to everyone, and I gave a flash drive to Judge Garner and to Mr. Bender. Mr. Swenson, can you tell us what we're looking at on Exhibit 86?

**A. This map is a -- well, I'll call it a snippet, but a copy taken from Minnkota Power's -- I guess their process of -- the documents that they submitted, and then were ultimately replied on and stuff in their petition to intervene in this hearing. I added myself the red line and the letterings or words that are called Swenson Trust Land and Minnkota Power well.**

Q. And what was your intent with creating this map, and what were you trying to illustrate here?

A. So as I previously mentioned, we were denied our petition to intervene on lands that we didn't have an interest in, and for some reason, for the same reason, of that potential increased pressure on their case of only 2 to 300, but in our case 8 to 900 in their leased pore space. Minnkota was granted their petition to intervene in all three of these disposal facilities of the applicant. But yet, we only get one. And we're affected by them way more than they are. How is this remotely fair? Once again, in the example of the state favoring the industry over the citizen.

MR. BRAATEN: Move to admit Exhibit 86.

MR. GLUDT: No objection.

OFFICER GARNER: The exhibit is admitted.

THE WITNESS: You know, one can only -- sorry. I can only get one conclusion from this, I believe, that the state is either trying to lay down some evidence in this action by evaluating correlative rights to prop up their unsubstantiated defense in an ongoing lawsuit with the Northwest Landowners Association or they're just simply prejudicing us in this hearing. Prejudicing us in this hearing with more lack of due process in this hearing by denying our ability to intervene on damaging our private

**property due to the pressurization of pore space while allowing Minnkota to intervene, which is it? Unfortunately, as a state has refused to enforce North Dakota's Rules of Civil Procedure. We, as a petitioner, have not been given our discovery requests. We have not been able to depose anybody that would have allowed us to substantiate or refute the above-claimed pressure gradient data by the applicant and impact by the applicant's uncompensated use of our pore space. As well we have heard even more testimony by the applicant's experts, well, they're intentionally, influenced model perimeters resulting in smaller projected CO2 plume results, resulting in a voidance of signing up landowners, and keeping the money in their pockets.**

Q. (By Mr. Braaten:) Did you review the storage agreement that is part of the application?

**A. I did.**

Q. And do you understand that you're going to be subject to the terms of that agreement in whether you've ever signed a contract with the applicant or not?

**A. That's what it says, yes.**

Q. Do you have any concerns with that or with the pore space lease -- pore space lease attached to

it that is purportedly going to be imposed upon you?

A. Well, as you've heard or seen, I should say, in testimony at this hearing, the resulting material changes agreed to by the applicant in the agreement that they committed to in this room this week, you're darn right I have concerns. We've been asking for some of that for 31 months. Yet, the only way to get them to change the insurance provision of all silly things, something they have, they just didn't want to give us was to publicly shame them in this room, in this hearing. What is up with that? Is that good faith negotiations? I don't know.

The applicant's project does not meet the threshold for public interest as it pertains to a physical invasion resulting in a physical taking of our land. They have failed to provide any evidence of the mass balance of greenhouse gas emissions reduced by their project, if any. And substantiate that the direct and substantial impact to North Dakota citizens are required by law for a physical taking. The applicant has not provided testimony of a direct impact on coal and power industries. The applicant has publicly stated that they will not be using the requested disposal facilities for enhanced oil recovery or other beneficial uses. They don't meet

the policy recitals, and because of that, the storage agreement and these permit requests should be denied, specifically in the unleased pore space interest 3.1 section, any pore space owner in the storage facility who owns a pore space interest in the storage reservoir that is not leased for the purpose of this agreement, and during the term here of shall be treated as if it were subject to the pore space lease attached to, hereto, as Exhibit D.

So I am a pore space owner, along with my wife, Fay. We own interest in one of the storage disposal facilities, and it's not leased for the purposes of this agreement. What gives the state the right to make me an indentured servant to them? Subjecting me to a private agreement that I don't agree to.

Mr. Helms, are you the king, and I'm the subject now? Once again, in your statements to the legislator on Friday, January 13th, 2023, you stated, our future orders are going to be a little bit different. We're not going to incorporate the storage facility agreement.

LYNN HELMS: Use of the service. Now, we've learned through the asking of that question that our future orders are going to be a little bit

different. We're not just going to incorporate the storage facility agreement that, you know, was privately worked out with the ratification people in total in there. We're going to address some of those issues. We're all --

**THE WITNESS: Sure (inaudible) to be included in this current storage agreement by my reading.**

Q. (By Mr. Braaten:) Do you have an understanding of whether you are going to have the same or a different lease as the North Dakota Department of Trust Lands?

**A. My understanding is that a -- the North Dakota Trust Lands has not signed an agreement to date with the applicant, but I do know that the lease version under consideration today is not the one in the storage agreement. So do we not have equal protection under the law? Or is it the whole, rule for thee, but not for me. Typical of the king. Why does the state get a different lease agreement than I do?**

**So we've heard over the years starting in this room that they're simply trying to regulate our private property, but here, they give the applicant the right to use as much of our land without requiring**

**an easement that I've signed without constitutional due process and without that imminent domain hearing, jury trial. This is a blatant physical taking of our private property unconstitutional. They're not setbacks. There's not safety considerations, noise, light restoration, reclamation or other written into the agreement.**

**Yet, Mr. Helms, you told us that we would have that.**

**Well, Derrick, I might have lost it again. There we go. That's what's doing it; huh? All right. There we go.**

LYNN HELMS: So very robust regulatory paradigm that you created, but it treats people fairly, it respects them, it runs things through multiple hearings. Man, have I learned a lot, so. You know, one of the questions that's been asked is, do these Industrial Commission orders actually allow use of the surface? Putting a pipe or a pump or -- or something like that on the surface, and yes, they do. The statute allows for reasonable and necessary use of the surface. Now, we've learned through the asking of that question that our future orders are going to be a little bit different. We're not just going to incorporate the storage facility agreement that, you

know, was privately worked out with the ratification people in total. In there, we're going to address some of those issues. We're also planning a rule change to make sure people understand that there are going to be setbacks that -- that you've got to keep this infrastructure that's on the surface away from people's homes and their businesses and roads and streets and streams and things like that, so. So there will be some rule changes. Am I looking forward to that? Guess what? Those rule changes have to go through EPA and be published in the federal register. How long will that take? I don't know. But if we're going to do this job right, we have to do it right. So that's our regulation paradigm.

**THE WITNESS: So I'd asked, are we being treated fairly? I'd say the obvious lack of due process would say no. Favoring Minnkota over landowners is another egregious example of unfairness. Are we being respected? Well, I'd say no. The lack of reciprocal negotiations would say no. When are the other hearings scheduled that were mentioned? I only know of one. What are -- what statute references reasonable and necessary use of our surface? Where are these rule changes that Mr. Helms references? It's been 17 months since this legislative**

presentation telling the legislators, so they wouldn't vote favorably on our senate bill we had in process. What progress has been made to establish setbacks to keep these things away from our homes, our roads, and streams as mentioned in the video. You seem to put a lot of things in these storage agreements that aren't required by law. You certainly could put setbacks in it. I've reviewed the legislative history on 3822. That was a lot of fun. It's clear that the legislator did not intend in any legislative testimony or hearing to make us as non-compensated landowners subject to a private agreement we didn't sign. They just wanted us to get paid for use of our pore space in an equal manner. That's -- that's it.

They also never intended the commission to require us to give up our surface lands. As the Century Code specifically limits the authority to pore space as stated in Century Code 382210, amalgamating property interest. If a storage operator does not obtain the consent of all persons who own the storage reservoirs pore space, the commission may require that the pore space owned by nonconsenting owners be included in the storage facility and subject to geologic storage. I don't see anything in there about surface lands. Not a thing. I don't see anything

about our surface lands in that on which Fay's mom had to learn to do all the farming and ranching by herself, and those activities after Fay's dad died while she was in high school, that same surface land provided wheat, oats, hay, and beef that were monetized to pay for Fay to go to college where I met the love of my life. Those surface lands were where my sons shot their first deer, their first pheasants, and their first grouse. The same surface lands that we host youth and veterans hunts every year on for our community. Those surface lands that the high school classes came out. Just this last month at 5:00 in the morning to sit in the cold and watch the sharp tail grouse dance on their lek within feet of their eyes, an experience they will remember for the rest of their lives. The surface lands on which we almost lost one of our boys, in a winter blizzard, as he ran out to an open prairie field disoriented from the hellacious winds and blinding snow not able to see his mom standing in the garage door waiting for him. And it's the same surface lands that I buried two of my best friends on. I don't -- I did not hear anything about giving up access or use of our surface lands in that legislative directive. And it's not just the surface lands. You're affecting real people with your

**decisions from this hearing. Do you even know their names? Fay Beth Swenson, Joseph Oliver Swenson, Olivia Wazwek (phonetic), Warren Wayne Swenson, Courtney Geizer (phonetic), Donna May Smith, July Dawn Silvernagle (phonetic), Dean Silvernagle, Craig Bolinski (phonetic), Amanda Bolinski, Camden Bolinski, Mack Bolinski, Megan Summers-Butler, Jeff Butler, Lauren Summers-Gilmer, Chad Gilmer, Tammy Summers, Michael Boman (phonetic), Glen Gerving (phonetic), Lisa Gerving, Michael Hought, Bonnie Hought, Johnny Yocumb (phonetic), Kevin Craft, Kimberly Craft, Sharmaine Lee Belt, Charlotte Lee Belt, Kirk Mays, Linda Mays, Allen Mays, Paul Metz, Christy Metz, Gary Smith, Cassie Smith, and I can keep going all day if you'd like. But how many of them do you know, and do you know that your decisions will irreparably impact their land from your decisions from the sham of a hearing?**

MR. BRAATEN: Can we take a break, Your Honor?

OFFICER GARNER: Yeah. We can take a five-minute break. We'll go off the record.

We are back on the record. Attorney Braaten, you can proceed.

MR. BRAATEN: Thank you, Your Honor.

Q. (By Mr. Braaten:) Mr. Swenson, can you talk about any -- you talked earlier about your experience with safety protocols and industrial settings. Can you talk about any safety concerns you have about the applicant's permit requests?

**A. I can, and I'm not here to talk about the pipeline that's been given all the attention from a safety perspective. That's different, you know. They -- their -- everybody's worked -- worried about land shifting and the impact of the pipeline faulty construction, whatever. I just want to make sure that it's on the record that CO2 is an odorless and colorless oxygen displacing gas that can be deadly at certain levels, and just to re-enforce on the record that North Dakota Century Code 322808 states that before issuing a permit, the commission shall find that the storage facility shall not endanger human health. That's an absolute -- there's no variation that they provide you. That's an absolute requirement to not endanger human health. High burden of proof. Shouldn't be taken lightly. For the protection of human health. Unfortunately, the applicant has not submitted any evidence of a potential vapor release model, concentration gradients of the oxygen robbing CO2 that may be released, and its potential impact to**

public receptors into the record. Whether it's from an unplanned release or one of these little pressure valves or whatever we talked about yesterday, without that, how can the state possibly say that they've met the statutory requirement and that burden, absolute burden, of finding these disposal facilities shall not endanger human health. Simply put. You can't. It's not possible.

Q. Do you feel comfortable just trusting that after the process the Industrial Commission is going to ensure that there are safety standards at some point?

A. I don't -- I don't know if I do. Probably not. I'm not sure that I have faith that, you know, even if the applicant were to have provided basic concentration gradients from a release with their application, even if it was under confidential seal that the state would even know what to do with it as evidenced by Mr. Helms' e-mail dated January 15th, 2023, addressed to the North Dakota Senate, Energy & Natural Resources Committee, as those members were considering numerous bills related to carbon dioxide pipelines disposal facilities and safety in general as -- of a CO2 release. In this e-mail, it appears to be an attempt to share his knowledge and expertise on

**modelling and release from a CO2 pipeline.**

Q. I'm going to hand you what we have marked as LO -- as Exhibit LO-89. Mr. Swenson, I've handed you what we've marked as Exhibit LO-89. Is this a copy of the e-mail you were just referencing?

**A. It is.**

Q. And how did you obtain a copy of that e-mail?

**A. From one of the members noted on there, Mr. -- senator Jeffrey Magrum.**

MR. BRAATEN: Move to admit LO-89.

OFFICER GARNER: Any objections?

MR. GLUDT: No objection.

OFFICER GARNER: Exhibit is admitted.

Q. (By Mr. Braaten:) Did you have a chance to review the information that was being conveyed to the legislators by Mr. Helms in this e-mail, Mr. Swenson?

**A. I did.**

Q. And did you do an assessment of whether you agreed with whether this was a -- an accurate or predictive or even relevant model to be using in this situation?

**A. I did. So at this time which was during the 2023 legislative session, as I mentioned before, there were numerous bills going through the**

legislator, and as you can see in the way Mr. Helms introduces this, that it was, you know, carbon dioxide pipeline information. There was discussion about the Satartia, Mississippi, pipeline break that occurred which caused a vapor cloud, and then there was -- and has been and continues to this day a significant amount of concern about the vapor concentrations that were released, and how they impacted the residents of Satartia, and I'm not here to discuss that, but what I am here to discuss is that Mr. Helms then under that pretense of, we're going to talk about vapor concentrations in an air dispersion model. Unfortunately, what Mr. Helms did is, he used a risk management program over pressure model. That's not a vapor concentration model. It's not an air dispersion model, as he promotes in his e-mail to our senators, that were making decisions on bills to protect public safety. That model is used for regulated substances and is used to determine offsite consequences to populations after an explosion, not a vapor release. But an explosion. So instead of predicting safe concentrations in the air of vapors, this model predicts what are called pressure rings from an explosion and determines a safe distance where the resulting blast ring is at 1 pound per square inch or

less. This can be a very useful tool. I've used this tool in the refinery explosion scenarios where we looked at where should we build our maintenance shop or how thick of concrete walls should we put on a building where our control room operators were where they could experience a 5 PSI blast, where a 1 PSI blast get them. How about the public that's driving by on the roadway? That's what this model is used from. And it's very useful in the right application, and unfortunately, this has zero, zilch, not a thing to do with carbon dioxide vapor concentrations in air which may affect human health.

I don't know if there was a lack of critical thinking skills needed to realize that when the model didn't allow carbon dioxide which is a nonflammable, i.e., it won't explode chemical compound. In fact, it's used to put fires out as a choice. He intentionally chose a different chemical, carbonyl sulfide. That's not carbon dioxide, but he does say that in the model that's predicting a whole separate type of safety risk that CO2 doesn't pose. How can we possibly trust the state to find that these storage facilities shall not endanger human health if they don't even know what model to run? The state fails miserably on this point.

UNIDENTIFIED MALE: Mr. Braaten, I don't know if this is appropriate at this time, but could you possibly that -- you could add to LO-89 and include the e-mail that went to Mr. Helms so we know what he's responding to?

MR. BRAATEN: I don't know what e-mail you're referring to.

MR. GLUDT: It's because it's not on there.

UNIDENTIFIED MALE: I mean, that's the point. This is an e-mail from Mr. Helms to Jeffrey Magrum.

MR. BRAATEN: I don't see anything that indicates it's a response to anything, particularly an e-mail.

UNIDENTIFIED MALE: Okay. You're probably right. I thought it was a response to an e-mail. Maybe I'm wrong.

MR. BRAATEN: I don't know.

UNIDENTIFIED MALE: Okay. I'm sorry to interrupt you.

OFFICER GARNER: That's okay.

**THE WITNESS: You know, the sad part is in addition to using the wrong type of model, they -- in this permit application process, they don't even ask for the data on a release scenario. In an open**

records request to the state, they admit they do not receive information to evaluate this important topic on a prior permit application.

Q. (By Mr. Braaten:) Can I have you take a look at landowner or Exhibit LO-90? Mr. Swenson, we've handed out Exhibit LO-90. Can you tell us what this exhibit is?

A. I can. It is an open records request submitted January 20th -- or I'm sorry, February 25th of '24 to the oil and gas open records request e-mail. Specifically the e-mail asked on those open records request for all records relating to a carbon dioxide release to atmosphere from the storage facility and related equipment including flow lines, compression, and well bore. That supports the finding that the commission made that the storage facility will not endanger human health as required by statute on the Blue Flint permit that was issued on May 31st of '23. It asks for the means and method of analysis, the scenarios model such as releases from any pressure relief valves, the maximum release, downstream of compression facilities due to flow line pipe, flange or valve failure. The weather assumptions for the scenario such as temperature, humidity, wind speed, and direction, the name of the software utilized, the

**name, the employer, the certifications of the North Dakota professional engineering license of the person that did the modelling, and the CO2 concentration level delineation at which the commission determined is safe for human health, if there is a relief -- release and the geographic topography assumed.**

Q. And what was the response from the DMR to that request?

**A. On February 29th of 2024, a response was provided. That dispersion models for specific release scenarios from the storage facility isn't information that is provided to our office, but it does include an emergency and remedial response plan which discusses the necessary actions that the storage operator will take during a potential emergency event including the release of carbon dioxide from the storage facility whether it be from well bore, integrity failure, flow line leak or other storage equipment.**

MR. BRAATEN: Move to admit LO-90.

OFFICER GARNER: Any objections?

MR. GLUDT: Object on relevance, foundation, and Mr. Koept isn't here to ask -- answer any questions of ours.

OFFICER GARNER: The objections are noted. The exhibit is admitted.

Q. (By Mr. Braaten:) Do you have any concerns about this response to the record request and the positions taken by the state regarding human safety?

**A. Well, obviously, it's important to have an emergency response and remediation or remedial response plan, sorry, but that just tells you how you're going to respond to where the dead bodies are from a vapor concentration that exceeds the IDLH standards that our federal government sets. It doesn't tell you, are you designing the facility properly. It doesn't tell you what my setback should be. It just says, here's where the ambulance should go, and here's who we're going to call to go gurney out the dead bodies. The applicant did not include in this hearing process any data with these applications under consideration for this matter, and the state presumably has not asked for it. We haven't received it, and we can't verify this as well as our deposition requests and discovery requests have been ignored by the applicant and unenforced by the State of North Dakota.**

MR. GLUDT: Objection to that, Your Honor. The request had not been ignored. There's currently motions pending, and the applicant intends to respond.

OFFICER GARNER: Overruled.

THE WITNESS: The state will tell you they have a setback of 500 feet, and that's highly adequate as they have used it for oil and gas wells for many years; yet, what they won't tell you, this setback was determined from a study of idling diesel trucks that has nothing to do with a natural gas or crude oil release, let alone a deadly CO2 vapor hugging the ground looking for the children playing in our creek bottom while they're hunting for frogs. For these safety reasons, these permit applications should be denied.

Q. (By Mr. Braaten:) And in general, Mr. Swenson, do you believe that the applicant's request should be approved?

A. I think they should be denied. We've been highly prejudiced due to the lack of adherence due to North Dakota Rules of Civil Procedure, and the state's failure to hold the applicant accountable to our request. And honestly, Mr. Braaten, they're simply setting themselves up to waste more taxpayer money on a due process lawsuit pending their decisions made by the people in this room. On these permits.

So as I discussed earlier, the applicant has refused our depositions and discovery requests. We have had no information provided from them for us

to properly prepare for this hearing. While in bed with Summit, the state has denied us, as intervenors, a fair hearing, and our rights of due process guaranteed in law. While they are asleep at the wheel, our game clock was run down to 20 percent of the time remaining, severely prejudicing us with lack of due process. We put our petition to intervene in two days after the notice came out, and you wasted 80 percent of our time to prepare by not granting us our petition to intervene. How is that a fair hearing process? How is that due process under the state's procedures?

The applicant has testified they intentionally adjusted model perimeters to reduce the size of the CO2 plume? Additionally, they intentionally set the boundaries of the storage facility smaller than where CO2 will be present. When they find that the storage facility is too small, the applicant has testified that they have no plan and they wouldn't commit yesterday by Mr. Boeshans to even compensate these new landowners.

MR. GLUDT: Objection. Mischaracterization of Mr. Boeshans' testimony.

**THE WITNESS: Read the record.**

OFFICER GARNER: Any response?

MR. BRAATEN: The record will speak for itself. We'll have a transcript.

OFFICER GARNER: Overruled.

**THE WITNESS: For these reasons, the commission can't possibly find as statutorily required that pore space owners are compensated equitably because they don't even know who all the pore space owners are and that they should be -- who should be paid, and the applicant has no plans to pay for them. Let them -- let alone be paid just compensation guaranteed by our constitution. On this physical taking of private property, the commission can't possibly find that these disposal facilities shall not endanger human health when the applicant hasn't provided CO2 vapor dispersion modelling from a release at each of the disposal facilities. They have no idea how far a major leak will travel, potentially endangering human health at public receptors. Hopefully someone in the state can find someone to run a dispersion model with the correct chemical compounds and a model that predicts vapor concentrations and not blast ring pressures. The applicant has failed to fulfill its obligation of proving the requested permits are in the public interest.**

**And finally, I'm gravely concerned about**

**the sham of a due process that our state has allowed, not only has the applicant put forward tremendous effort to get here today, but North Dakota, the State of North Dakota has put in tremendous time, resources, effort, taxpayer monies into laying the framework out for this industry that could lead to great things for our North Dakota industries, the workforce economy, citizens, but unfortunately, due to the state's lack of action, denial of our due process, as an affected party, as an intervenor, you're jeopardizing a future lawsuit that's going to likely end in the EPA removing North Dakota's primacy for Class 6 injection well programs. Is this a legacy you want as you go into retirement? Is this your swan song? I fucking hope not.**

UNIDENTIFIED MALE: Whoa.

OFFICER GARNER: Whoa.

MR. BRAATEN: I don't have any further questions for this witness at this time.

OFFICER GARNER: Okay. We're going to break here for lunch. Attorney Braaten, I would hope that on cross examination you can control the witness.

MR. BRAATEN: Yes, Your Honor.

OFFICER GARNER: We'll break here for lunch. Off the record.

Okay. We are back on the record, and we will begin with cross examination of the previous witness. However, there's been a request for a statement.

MR. BRAATEN: Yeah. Mr. Swenson would just like to say something briefly before the cross examination.

**THE WITNESS: Thank you. I'd like to just apologize to the oil and gas folks that are here and to -- to you, Mr. Garner, for my choice of words at the end of my testimony. And any condescending tone that I had towards individuals. As you can imagine, this has been a very emotional experience for us, personally for me, the family that I love and will protect until the end, our land, and the landowners that have been affected. So thank you for allowing me to make this statement.**

OFFICER GARNER: Thank you. Attorney Gludt. You may proceed.

MR. GLUDT: Thank you, Mr. Examiner. We have no questions.

OFFICER GARNER: Any questions from the staff?

CROSS EXAMINATION

BY UNIDENTIFIED MALE:

Q. Kurt, in your experience working for different industrial companies, do you believe in a company like Summit can operate this facility safely?

**A. You know, I've been a part of start-up companies a couple of times. Like, they have built businesses in, like, they're trying to build, not pipeline, I -- I don't know enough about the people in the company that they're hiring to operate. Thank you. But I do -- it is possible we did -- we have done it ourselves, and I think they have every chance to do it if they put the right people in place, the right procedures, and design and all that.**

Q. Okay. Thank you.

CROSS EXAMINATION

BY MR. HELMS:

Q. Kurt, I'm looking at your Exhibit LO-89. Did you have a conversation with Senator Magrum about this e-mail?

**A. As you'll see, Mr. Helms, on the exhibit, it's dated Monday, June 10th, 2024. So he -- I had talked with him on Monday. And he had forwarded it to me on Monday. It wasn't actually -- I had asked him for some other information, and he sent me this one that was related, yes. So I did talk with him.**

Q. And what did he tell you about the context

or the -- what initiated the e-mail?

**A. What he generally -- and I'm not quoting him here, but generally, what I was left with was that it was in regards to the time when there was pipeline bills being introduced in the legislator and that it was in relationship to the safety of the pipeline being proposed in this case by the applicant, and the Public Service Commission, ultimately, and the rules that were -- or the senate bills at that time that were trying to be passed that affected setbacks and county ability to adopt ordinances or changes that they desired. So it was kind of in that context, Mr. Helms. And it was -- it was about, you know, how far does one have to be to be safe from the pipeline is the impression that I was left with from that conversation. But you may have to ask him specifically, but.**

Q. Were you present at the January 15th, 2023 Senate and House Ag & Energy Resources Committee meeting?

**A. I was not at the joint -- the joint one that we played.**

Q. Yes.

**A. Video from that one, I was not personally present. I had watched it in its entirety on the**

**legislative website that allows you to see those things. But I was not present.**

Q. Your exhibit LO-63, you indicated that we could see some white areas, but my copy doesn't show any white areas. But --

**A. Is that the -- I'm sorry, is that the map?**

Q. It's a map.

**A. Yeah.**

Q. LO intervenor properties.

MR. BRAATEN: It might be a cream color.

**THE WITNESS: Oh, okay. My vision color might be slightly off, but we'll take a look here.**

MR. BRAATEN: I think it's how it printed.

**THE WITNESS: Oh, that looks different than the electronic one, slightly, color wise.**

MR. BRAATEN: Yeah. Let's look at the difference here. Oh, okay. Yeah.

**THE WITNESS: So the white areas that I was referring to, Mr. Helms, if you were to look on the legend down where it says Swenson --**

MR. HELMS: Yep.

**THE WITNESS: -- towards the bottom, that, in particular, looks white.**

MR. HELMS: Uh-huh.

**THE WITNESS: And that's what I was**

**referring to. What -- when the over -- I'm guessing what happened is, when the overlays went on, it slightly changed because of the multiple layers. And, so the areas, if you'd like me to point them out, that I was referring to, I can.**

Q. (By Mr. Helms:) Well, either that or submit a supplement that brings those to the -- to the front --

**A. So.**

Q. Like, the way it is, it isn't useful for your testimony.

MR. BRAATEN: You don't need to say anything.

MR. HELMS: Can you submit it electronically?

MR. BRAATEN: We're not going to submit any supplements.

MR. HELMS: All right.

MR. BRAATEN: The legal descriptions for each intervenor landowner are itemized in declarations with the deeds attached. Every incumbrance on the property and the legal description.

**THE WITNESS: Yeah.**

MR. HELMS: That's all I got.

**THE WITNESS: Okay.**

OFFICER GARNER: Okay. Mr. Braaten, call your next witness.

MR. BRAATEN: I'm not going to call any more witnesses. I'm not going to rest my case. I renew my objection to the time table on which this hearing was held. The lack of notice, the inability to get information from both the agency and the applicant, so. I move once again to continue this hearing until a later date after we have had time to obtain the data and to prepare for a hearing. And given that the applicant, apparently, doesn't have a complete application yet, I think that's going to be required anyway. So I'm not trying to be difficult, and I know everybody wants to go home, and I do, too, so I'm not trying to make people stay here, but I'm not going to rest. I'm going to put my objection on record and move to continue.

OFFICER GARNER: Your objection is noted, and your motion is denied. At this time, then, I think we can move with public comment.

UNIDENTIFIED MALE 2: (Inaudible).

OFFICER GARNER: Okay. Let's try to keep this as orderly as possible. Do we have a sign-in sheet?

UNIDENTIFIED MALE 2: (Inaudible) there was

one at the table.

OFFICER GARNER: Because I can call people individually. Nothing? Okay. At this point I will open the floor to anyone that would like to come up and make a public comment. Okay. I'll note for the record that no one --

UNIDENTIFIED MALE 2: He's coming.

OFFICER GARNER: Oh, I'm sorry.

KENNETH HENSE: I'm kind of slow.

OFFICER GARNER: No. That's fine. Please state your name for the record.

KENNETH HENSE: Kenneth Hemel (phonetic) Hense.

OFFICER GARNER: Okay. You may proceed.

KENNETH HENSE: Kenneth Hemel Hense. I'm a landowner in Oliver County. Would you like the legal description on my property in Oliver County? Is that necessary?

OFFICER GARNER: Sure.

KENNETH HENSE: Okay. So the legal description on my property is the northeast quarter of Section 9, 142, 86, in the northeast quarter of Section 17, 142, 86. As a landowner in Oliver County, I support the Summit Carbon Solutions project. The project will provide new industry for North Dakota,

supplement income for farmers and ranchers and tax dollars for the county. I have dealt with them since 2021, and the overall experience has always been very good and open. Thank you.

OFFICER GARNER: Thank you. Anybody else? Okay. Then before we go off the record, we have a number of supplementals that we're going to need to keep the record open for. Attorney Bender and Braaten, how long do you think you need to keep the record open?

MR. BENDER: I think we can have all the supplementals into the commission by June 24th.

OFFICER GARNER: And one of those includes an amended storage agreement which is probably going to require you to work in conjunction. How long -- can you have that in the same time frame?

MR. BENDER: Yes. We can have everything to you by June 24th.

OFFICER GARNER: Attorney Braaten.

MR. BRAATEN: I presume so.

OFFICER GARNER: June 24th. All right. We'll leave the record open until June 20th -- oh, go ahead.

UNIDENTIFIED MALE: I just want to make sure you're going to address the written comments --

OFFICER GARNER: Oh.

UNIDENTIFIED MALE: -- and --

OFFICER GARNER: Yes. I did receive two e-mails, one in support of the application, one in opposition. I note that the e-mails came in after 5:00 o'clock on Monday, on June 10th. Any objection to admitting those into the record?

MR. BENDER: I don't have any objection, Your Honor.

MR. BRAATEN: No objection, Your Honor.

OFFICER GARNER: Then we will admit those e-mails into the record as well.

UNIDENTIFIED MALE: Okay.

OFFICER GARNER: Anything further?

MR. BENDER: Go ahead.

UNIDENTIFIED MALE: There was also the number of written comments received prior to. I guess, is there a response from either party to any of the written comments received prior to the hearing?

MR. BENDER: I'm not sure that I understood what you're saying, I'm sorry.

UNIDENTIFIED MALE: Any objection to them in the record or response to any of the content within those?

MR. BENDER: Well, I don't know. I haven't

had an opportunity to review them carefully. Perhaps, you could leave the record open additionally for responding to the letters that are coming into the record until June 24th as well. That's not inappropriate, Mr. Examiner. That's what we would propose.

OFFICER GARNER: Any problem with that? Okay. Then we will leave the record open until June 24th for that purpose as well.

MR. BENDER: I don't think you're going to get a lot of response from us, but it does give us that opportunity, obviously.

OFFICER GARNER: Okay.

MR. BENDER: I do have one matter, Mr. Examiner. This is probably because of my poor recordkeeping, but I did put together a list of the exhibits that we discussed. I could give Mr. Braaten a copy and you a copy as well, and you know, maybe it's something we can all look over in the next day or so. And I don't know if Mr. Braaten plans on providing us with one, and then we can decide if all the exhibits are in. I don't want a situation where, you know, we talked about an exhibit, it's clear that it could be entered, but we forgot to offer it, and it wasn't admitted. So if Mr. Braaten doesn't have any

problem with that, I can provide my list now, and I don't have any problem with, if Mr. Braaten wants to provide -- supply his with a copy to me in the next couple of days so I have an opportunity to respond.

MR. BRAATEN: I think that's a great idea. I agree.

OFFICER GARNER: Okay. That's fine.

UNIDENTIFIED MALE: I guess to the effect that there were supplementals requested by commission staff, are you confident you have a -- a list of the items that were requested and -- and/or indicated would be submitted as supplementals?

MR. BENDER: I am. But I am prepared to provide you with a list of what we believe needs to be supplied. I can submit that to you and copy Mr. Braaten, and obviously, if you think we missed something, perhaps, you can just respond in an e-mail, certainly copy Mr. Braaten.

MR. BRAATEN: Yeah. That works for me. I appreciate that.

UNIDENTIFIED MALE: Okay. Thank you.

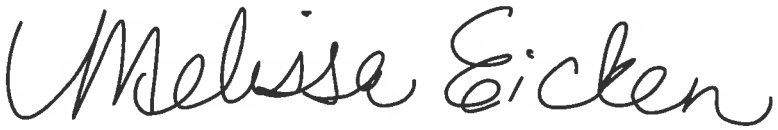
OFFICER GARNER: Anything further? Okay. That concludes our hearings for case numbers 30869 through 30880. It concludes our hearings for the day.

(Audio ended.)

CERTIFICATE OF REPORTER

I, Melissa J. Eicken, Certified Court Reporter of Missouri, Certified Shorthand Reporter of Illinois and Registered Professional Reporter, do hereby certify that I was asked to prepare a transcript of proceedings had in the above-mentioned case, which proceedings were held with no court reporter present utilizing an open microphone system of preserving the record.

I further certify that the foregoing pages constitute a true and accurate reproduction of the proceedings as transcribed by me to the best of my ability and may include inaudible sections or misidentified speakers of said open microphone recording.



Melissa J. Eicken, CCR, CSR, RPR

Date:

$

**$1.50** 9:6
**$1.70** 63:2
**$300,000** 51:20
**$35** 61:17
**$4.65** 63:18
**$50** 63:8,14,16
**$85** 63:17

0

**0.7** 61:17 63:15

1

**1** 84:25 85:6
**1,400** 16:12
**1,500** 23:16
**1.5** 51:16
**1.50** 63:7
**1.70** 62:18
**10** 8:20 52:15
**10-minute** 44:5
**10th** 95:20
**11** 22:7
**110** 17:9
**12** 22:7 67:21
**13th** 57:18 59:6 74:19
**14** 17:13 18:11
**142** 16:24 17:2,4, 13,25 18:4
**143** 18:7
**14th** 56:10 57:20
**15** 17:2
**15th** 82:19 96:18
**16** 23:5
**17** 77:25
**18** 51:13
**1927** 3:25
**1976** 47:3
**1991** 22:4

2

**2** 71:5 99:21,25
**20** 4:3 8:21 11:1 18:11 67:13 68:23 91:5
**2002** 3:15,20
**2003** 22:24
**2008** 16:1
**2021** 20:5 37:12
**2022** 10:13,15 28:19 64:4
**2023** 32:12 56:10 57:3,20 59:7 74:19 82:20 83:24 96:18
**2024** 88:9 95:20
**20th** 87:9
**21** 17:4
**21st** 15:18
**22** 16:23
**23** 87:18
**24** 87:10
**25th** 28:19 87:9
**25¢** 9:5 41:19 61:11,15
**27** 18:7
**29** 42:5
**29th** 88:9

3

**3** 64:8
**3.1** 74:3
**3.4** 62:18 63:2
**30** 6:10 8:13 19:5 26:15,17
**300** 71:5
**30869** 2:2
**30880** 2:2
**30¢** 42:6
**31** 73:7
**31st** 87:18
**32** 10:4,6 11:5
**322808** 81:15
**34** 16:6
**3822** 19:17 44:15 78:8
**38220814** 56:15 57:9
**382210** 78:18

4

**45-Q** 42:10 50:12 51:11 63:8,16 67:17,22
**480** 18:12

5

**5** 24:7 65:23 66:2 85:6
**50** 10:4,6 11:6 34:2 63:14
**500** 90:2
**50¢** 9:5 61:16
**53** 10:4,7 11:6 62:22
**55** 4:22
**56** 48:10
**57** 48:9
**5774** 15:18
**5:00** 79:12

6

**6** 43:16 44:13 64:8 93:12
**63** 69:5 70:2

7

**7** 18:4

8

**8** 67:11 71:5
**80** 91:9
**81** 16:16,17 29:15
**86** 70:10,15 71:13
**87** 16:24 17:2,4,25 18:4,11 29:10,23
**870** 30:24 43:2
**88** 17:13 18:7 58:6

9

**9** 17:25 63:13,14, 17
**9.3** 63:19
**900** 67:12 71:6
**9:00** 2:5
**9th** 57:3

A

**a.m.** 2:5

**abandoned** 38:3

**ability** 9:13 32:23 50:3 54:4 67:16 71:25 96:11

**above-claimed** 72:8

**absence** 59:11,21

**absolute** 39:4 41:8 81:18,19 82:5

**absolutely** 55:1

**accept** 30:14,15 31:2

**acceptable** 28:1 54:24

**access** 21:3 36:20 79:23

**accomplish** 45:2

**accountable** 36:10 90:18

**accuracy** 66:15

**accurate** 12:13 83:20

**accurately** 4:19

**Ace** 18:8

**acknowledge** 43:4

**acknowledged** 31:16

**acquire** 17:11,17

**acquired** 17:14

**acquiring** 17:1

**acres** 16:12 18:12 41:16

**Act** 61:13

**action** 57:14 71:19 93:9

**actions** 16:7 36:14 88:14

**activities** 35:17 37:17 79:3

**actual** 14:1 24:22 57:11 60:22

**add** 86:3

**added** 34:4 37:6, 21 38:19,20 39:5 40:13 41:11 70:21

**addition** 18:9 26:15 37:23 40:15 43:14 48:1 51:11 52:10 86:23

**additional** 61:18

**Additionally** 46:13 91:15

**address** 15:16 35:15 75:4 77:2

**addressed** 82:20

**adequate** 90:2

**adherence** 90:16

**adjusted** 91:14

**administrative** 31:17

**admit** 4:22 11:5 29:14,15,23 58:6 60:6 69:5 70:4 71:13 83:11 87:1 88:19

**admitted** 5:1 11:11 29:17 30:1 58:9 65:24 66:3 70:8 71:15 83:14 88:25

**adopt** 96:11

**adversely** 32:16

**advocate** 17:20 65:15

**advocated** 32:11

**advocating** 32:18

**affect** 9:14 85:12

**affected** 16:20 17:18 32:16 71:9 93:9 94:16 96:10

**affecting** 79:25

**affects** 15:23

**affirm** 2:21 15:9 48:15

**affirmatively** 46:20

**affirmed** 50:24 53:19

**afforded** 53:7

**afternoon** 20:10

**ag** 31:19 96:19

**agency** 57:25 60:5,11 62:6 99:7

**agenda** 19:4 52:21

**agree** 21:20 34:20 45:18 74:16

**agreed** 6:12 10:7 35:8,12 55:9 73:4 83:20

**agreement** 5:23 7:5 9:17 18:10 21:5 28:7,10,18 33:7 41:7,20,21 60:16 61:10 62:5 63:6,11,21 72:17, 20 73:5 74:2,7,13, 15,22 75:2,7,14, 17,20 76:7,25 78:12

**agreements** 8:24 10:1,7 17:19 27:8 42:5 43:5 63:3,24 64:21 78:6

**agricultural** 5:16

**ahead** 21:17 39:1 41:4 62:13

**aid** 33:19

**air** 4:8 22:20 48:2 63:6 84:12,15,22 85:11

**alcohol** 23:24

**Allen** 80:13

**allowed** 34:3 45:24 72:7 93:1

**allowing** 21:2 53:12,23 72:2 94:16

**alongside** 69:22

**amalgamated** 52:24

**amalgamating** 78:18

**amalgamation** 19:22 46:25 53:5, 10 60:25

**Amanda** 80:6

**ambient** 67:12

**ambulance** 89:12

**amount** 9:1 30:18 38:20 61:9 84:7

**analysis** 6:12,13 8:18 13:19 23:19, 20 24:18 25:14,20 26:21 87:19

**analyst** 3:22

**analyze** 8:22

**annual** 31:25

**antelope** 39:9

**anticipated** 12:9

**antifreeze** 38:18
**apologize** 13:2 14:21 94:9
**apparently** 65:17 99:11
**appearance** 13:3
**appearing** 12:24
**appears** 82:24
**appellant** 53:15
**apple** 39:16
**applicable** 12:1 22:18
**applicant** 19:11, 18,20 20:3 21:8 23:10 27:3,12 28:3,12,19 29:21 30:5,6,21 33:2,10, 19 34:16 36:19 42:7,8 43:4 45:1, 13 46:13,20 47:6, 13 50:11 51:8 52:14 54:5,6 55:21 56:6 60:14, 15,19 61:9 62:3, 19 65:13 66:13 67:7,17 68:3,14, 22 69:20,21 71:8 72:9,21 73:4,21, 22 75:15,24 81:22 82:15 89:14,20,24 90:18,23 91:13,19 92:9,14,22 93:2 96:7 99:8,11
**applicant's** 16:7 20:18,21 21:1 22:18 27:7 28:18 30:18 46:25 47:10 50:18,23 51:12 52:12 61:20 63:3, 19 66:16 67:8,19 72:9,11 73:13 81:5 90:13
**applicants** 12:25
**application** 18:15 52:12 54:17 66:17 67:1 72:17 82:17 85:9 86:24 87:3 99:12
**applications** 13:23 89:15 90:10
**applied** 36:1 46:12
**apply** 7:3 11:2
**appraisal** 5:3 6:3, 14,17,19 7:7 8:18 11:17 14:13
**appraiser** 2:14 3:14,18 4:11
**appraising** 5:8,11, 22
**approach** 12:3,4, 15 60:23
**approached** 21:9
**approaches** 11:15 12:2
**approved** 51:10 90:14
**approximate** 7:6
**approximately** 6:10,21 16:12 23:25
**April** 64:4
**aquifer** 65:23
**arbitrary** 65:22 66:2
**area** 18:12 28:11 48:9 68:7,11,15
**areas** 9:20 16:18 66:21 68:3,19 97:4,5,18 98:4
**argument** 65:6
**arms** 21:10
**arrive** 19:25
**arriving** 28:13
**arrogance** 54:17
**articles** 32:9
**ascertain** 61:24
**ashamed** 52:23
**asks** 87:19
**asleep** 91:4
**assessing** 5:5
**assessment** 24:15 83:19
**assignment** 5:20 6:6 7:1 8:16 10:8 14:13
**assignments** 4:2 7:15
**assistance** 32:3
**association** 31:25 48:15 53:16 71:22
**assumed** 88:6
**assumptions** 87:23
**atmosphere** 24:3 87:13
**attached** 72:25 74:9 98:21
**attempt** 27:21 33:3 82:25
**attempted** 27:21 35:15
**attended** 3:12
**attention** 44:14 81:7
**attest** 66:1
**attorney** 2:7 13:6 28:16 29:6 30:19 33:6 43:15 44:4,5, 10 80:23 93:21 94:18
**attorney's** 59:19
**attorneys** 27:14, 15 28:25 29:4
**attributes** 7:24
**audio** 44:8
**audit** 40:18,20
**August** 20:5 37:12
**authorities** 46:12
**authority** 78:17
**availability** 44:24 48:21
**awarded** 51:20
**aware** 13:22 43:15

## B

**back** 2:1 6:22 11:2 12:7 15:3 16:1 17:10 30:4,21 43:13 44:9 80:23 94:1
**background** 3:11, 17 15:22
**backyard** 39:16
**Bakken** 5:10 34:16
**balance** 47:15,16, 24 73:17
**bar** 55:25
**barred** 45:21
**barrel** 43:10
**base** 12:2
**based** 4:1 12:9,15, 17 13:12 25:21 33:14 34:6 40:16, 19 41:12,20 42:18 43:6 48:18 55:2

62:7
**basic** 82:15
**basis** 7:17 64:13
**Bayou** 64:4
**bear** 26:13
**bearing** 46:6
**beautiful** 18:2
**bed** 91:1
**bedroom** 37:18 39:24 40:2
**beef** 79:5
**begin** 6:13 94:2
**beginning** 8:21
**behalf** 12:25
**belief** 2:23 15:12
**Belt** 80:12
**benchmark** 11:19
**Bend** 64:4
**Bender** 13:4 70:14
**beneficial** 73:25
**benefit** 44:17,21 46:18 47:7,9
**benefits** 45:17 48:4
**benefitting** 48:17
**Beth** 80:2
**Beulah** 15:19 52:18 62:18
**bigger** 31:10 64:16
**bill** 78:2
**billboards** 51:25 52:4
**billion** 51:14,16
**bills** 82:22 83:25 84:17 96:5,9
**binder** 62:21
**binders** 16:14
**bit** 69:10 74:20,25 76:24
**BK** 17:15 68:4
**blanket** 18:23
**blast** 84:25 85:6,7 92:22
**blatant** 76:3
**blinding** 79:19
**blizzard** 79:17
**blocks** 68:17
**blue** 63:6 68:13 87:18
**bodies** 89:7,14
**body** 22:22
**Boeshans** 28:6 30:9 42:1 46:23 50:17 60:20 61:21 62:8 66:14 91:20
**Boeshans'** 91:23
**Bohrer** 48:12
**Bolinski** 80:6,7
**Boman** 80:9
**bond** 37:22 38:5
**bonding** 38:4
**bonds** 37:14,23
**Bonnie** 80:10
**books** 40:18
**border** 68:4,9,13
**bore** 87:15 88:17
**bottom** 68:12 90:9 97:22
**bought** 52:6,20
**boundaries** 68:19, 20 69:21 91:16
**boundary** 68:5
**bounds** 54:8
**box** 57:22
**boxes** 16:19
**boys** 79:17
**Braaten** 2:7,8,13, 17 3:1 4:22 5:2 11:5,12 12:20 14:8,11,17,20 15:1,4,5,15 29:9, 18,23 30:2 44:4,5, 7,10,11,12 58:6, 10 59:24 61:8 66:20 69:5,12,13 70:4,9 71:13 72:16 75:9 80:19, 24,25 81:1 83:11, 15 86:1,6,12,18 87:4 88:19 89:1 90:12,19 92:1 93:18,21,23 94:5 97:10,13,16 98:12,16,19 99:1, 3
**brain** 22:23
**breaches** 25:19
**break** 44:5 80:19, 22 84:4 93:21,24
**breakfast** 39:18
**breathe** 24:20
**briefly** 3:10 11:13 94:6
**bring** 26:12 37:15 42:5
**brings** 5:5 6:4 25:6 98:7
**broke** 38:3,9
**Broom** 49:25
**browls** 39:17
**buck** 39:15
**build** 37:17 85:3 95:6
**building** 85:5
**buildings** 47:22
**built** 95:5
**bunch** 38:15 51:19
**burden** 51:9 56:16 81:20 82:5,6
**Bureau** 32:2
**buried** 79:21
**burned** 43:9
**burning** 43:10
**bury** 23:10
**business** 3:24,25 12:10 22:25 23:4 30:8
**businesses** 77:7 95:6
**Butler** 80:7
**buyer** 19:17 21:5
**Byron** 12:24

## C

**cabling** 41:13
**California** 42:11
**call** 2:7 6:24 14:7, 18 15:6 70:16 89:13 99:1,3
**called** 70:22 84:23
**calling** 2:13
**calls** 31:6
**Camden** 80:6
**campaign** 51:21
**candy** 52:6
**capacity** 51:13

**capture** 21:25 32:7 47:11,17
**carbon** 22:10 23:22 24:13,23 26:17 34:2 40:16 42:11 43:22 44:17,22 47:12, 15,16 48:8 49:5 50:14 51:21 56:15 57:8 64:13 65:23, 24 66:1 67:5 82:22 84:2 85:11, 15,19 87:12 88:16
**carbonyl** 85:19
**card** 19:21
**career** 25:12 62:10
**carrier** 46:1,3,5,6
**Carvell** 29:8 43:14,20
**case** 2:2 12:8 21:6,21 25:19 36:4 47:4 60:18 63:12 64:6,10 66:5 71:5 96:7 99:4
**cases** 26:2 27:10
**cash** 64:13 67:15 69:2
**Cassie** 80:14
**casual** 24:24
**catch** 20:14 52:16
**cattle** 35:20,24 36:5
**caught** 20:14
**caused** 84:5
**CCS** 64:4
**Cedar** 53:21
**center** 40:9 68:12
**centered** 50:14
**central** 5:9
**centuries** 54:2
**century** 19:17 32:17 53:5 56:18 78:17,18 81:15
**certifications** 88:1
**certified** 3:14 4:10
**Chad** 80:8
**challenging** 7:1
**chance** 83:15 95:10
**change** 32:19 46:24 73:8 77:4
**changed** 30:12,13 98:3
**Changing** 52:3
**characteristics** 9:16 22:16
**characterization** 12:14
**charged** 55:16,18
**Charles** 29:8 43:13,20
**Charlotte** 80:12
**checked** 54:20 57:22
**chemical** 85:16,18 92:20
**chemicals** 23:21 26:4,11
**children** 90:8
**choice** 85:18 94:10
**chose** 85:18
**Chris** 2:10,13
**Christopher** 3:4
**Christy** 80:13
**citing** 9:24
**citizen** 47:8 71:12
**citizens** 32:15 44:21 47:10 52:2 54:20 73:19 93:8
**civil** 58:17 61:4 72:4 90:17
**claim** 48:8
**claiming** 36:1
**Class** 43:16 44:13 93:12
**classes** 79:12
**clause** 35:7 40:18 60:25 63:9,12
**clauses** 33:11
**clean** 47:17
**clear** 78:9
**clock** 91:5
**closest** 54:18
**closing** 28:5
**cloud** 24:13 84:5
**co-authored** 32:9
**CO2** 9:21 16:18 18:25 21:2,25 22:11,17 23:9,22 24:1,3,4,7,16,18 25:3,6 28:14 31:4, 10 32:6,20 34:6 40:11 47:18,23 48:2,22 49:8,24 50:3 52:1 53:12 54:8 65:21 66:9, 11 67:21 72:13 81:12,25 82:24 83:1 85:21 88:3 90:7 91:15,17 92:15
**CO2's** 22:19 53:25
**coal** 31:19 44:20
48:3,5,7,14 60:21 73:22
**coast** 42:11
**code** 19:17 31:17 32:17 53:5 56:19 78:17,18 81:15
**coffee** 40:11
**cold** 53:3 79:13
**collect** 10:11
**collectively** 27:11
**college** 3:20 49:2, 4 79:6
**color** 68:11 97:10, 11,15
**colored** 16:19 68:17
**colorless** 81:13
**comfortable** 36:3 82:9
**comment** 99:20
**commercial** 4:4,5 44:24 48:21 67:15
**commission** 13:22 42:3 46:8, 12 47:14 52:25 54:24 55:24 58:12 65:4,6 67:3 76:18 78:15,21 81:16 82:10 87:16 88:4 92:5,12 96:8
**commit** 91:20
**commitment** 66:12
**commitments** 37:14
**committed** 73:5
**committee** 49:17, 23 59:9 82:21 96:19

**commodity** 44:23
**common** 28:12 46:1,3,5,6 47:3 55:3
**communication** 41:13,14
**communications** 28:25
**community** 20:22 79:11
**companies** 38:3 51:23 95:2,5
**company** 2:14 3:8, 21,24 37:10 38:9 45:25 46:15 62:17 95:3,8
**comparing** 9:22
**comparison** 11:19
**compensate** 66:6 91:21
**compensated** 35:24 40:19 56:7, 13,18 57:7 58:4 66:7 92:6
**compensating** 56:12
**compensation** 5:5 7:25 13:24 14:1 19:25 54:7,9,22 55:11,22 56:1 58:1,11 59:5,10, 13,20,22 60:1,10, 12,14,17,20 63:4, 25 64:21 65:2 66:11 92:10
**compiled** 69:25
**complete** 4:2 6:11 7:7 14:13 47:15 99:12
**completed** 22:4
**completeness** 66:16
**completing** 22:3
**complex** 23:17
**compliant** 23:14
**complicated** 7:8
**complicit** 51:8
**compound** 85:17
**compounds** 92:20
**compression** 37:17 87:14,22
**compressor** 40:10
**compressors** 47:22
**concentration** 65:22 81:24 82:16 84:15 88:3 89:8
**concentrations** 22:21 25:25 84:7, 12,22 85:11 92:21
**concept** 30:15
**concern** 33:21 84:7
**concerned** 40:6 92:25
**concerns** 20:3 37:9 58:11 72:24 73:6 81:4 89:1
**conclusion** 59:18, 19 71:17
**concrete** 85:4
**condescending** 94:11
**conditions** 21:21 25:10,23 39:3 67:12
**conducted** 25:20
**conducting** 11:16
**conference** 30:10 34:11,12
**confidential** 82:17
**confirmed** 47:5
**conflict** 47:2
**conform** 33:7
**consent** 19:8,19 39:21 78:20
**consequences** 84:19
**consideration** 28:21 41:3,11 64:11 67:5 75:16 89:16
**considerations** 76:5
**considered** 25:11
**constitution** 45:22 53:6,9 55:12 92:11
**constitutional** 19:17 54:21 55:25 59:2 65:6 76:1
**constitutionally** 19:23 45:12,21,24
**construction** 23:3 81:11
**consulted** 27:14
**consulting** 6:13
**consumed** 24:5
**contacted** 20:4
**contained** 35:8 63:22
**context** 63:25 95:25 96:12
**continue** 44:10 65:9 99:8,17
**continues** 84:6
**contortionist** 54:11
**contract** 26:18,19, 21,25 27:1,3,4,22, 24 28:13,14 29:2 30:25 32:24 33:3, 17 35:3,4,8 41:10 43:2 72:21
**contractors** 23:17
**contracts** 26:23, 24 27:1
**contributing** 51:19
**control** 37:2 38:24 85:5 93:22
**conversation** 95:17 96:16
**conversations** 58:2
**convert** 23:23
**conveyed** 83:16
**convince** 54:11
**cooing** 39:13,14
**cooling** 47:20
**copies** 10:7 57:5
**copy** 4:14 29:20 70:17 83:5,7 97:4
**corn** 20:11 23:2 24:1,5
**Cornell** 26:23
**corporate** 23:15
**correct** 2:23 12:19 13:16,17,20 15:11 69:17 92:20
**correlative** 71:19
**cost** 61:18 63:15
**costs** 41:24
**Council** 48:13

**counsel** 20:18 29:1 30:16
**counteroffer** 30:4 62:4
**counties** 16:7 31:23 52:13
**counting** 43:3
**country** 18:2 23:6 31:7 38:10
**county** 6:15 9:17 11:4 13:15 32:2,5 40:8 42:2 96:11
**couple** 13:12 14:22,24 62:15 95:5
**Court** 47:4 53:15, 18,19,20
**courtesy** 21:9
**Courtney** 80:4
**cover** 45:10
**coverage** 26:20
**covered** 38:8
**covers** 16:12
**COVID** 28:4
**Craft** 80:11
**Craig** 80:5
**Crataegus** 39:17
**cream** 97:10
**create** 26:24 45:16
**created** 69:15 76:14
**creating** 52:8 70:24
**credible** 6:12 13:19
**credit** 42:12 50:14, 16
**credits** 42:10 50:12 51:11 64:13 67:17,22
**creek** 50:1 90:8
**critical** 85:14
**criticisms** 28:7,8
**crop** 18:24
**cross** 13:8 93:22 94:2,6,24 95:14
**crossed** 22:5
**crude** 24:24 90:6
**culturally** 26:6
**current** 8:7 9:4 10:14,20 20:3 32:17 54:3 68:5 75:7
**curriculum** 4:18, 19
**customary** 43:1
**customer** 50:13
**cutoff** 65:22
**cycle** 24:6

D

**dad** 79:3
**Dakota** 4:11 5:8, 10 13:16 15:19 16:1 22:25 23:1, 10 27:19 28:14 31:22 32:2 33:9, 14 37:10 43:17,23 44:21 47:4,8,10 51:18 52:8,21 53:7,14,19 58:17 59:8 61:21 62:17, 24 63:1 65:17 73:19 75:11,14 81:15 82:20 88:2 89:21 90:17 93:3, 4,7
**Dakota's** 31:12 45:22 48:14 51:1, 8 52:1 53:6 72:4 93:12
**damage** 36:4,5
**damaged** 35:21 54:4 69:4
**damaging** 71:25
**damn** 40:5
**dance** 79:14
**dangerous** 25:4 26:1
**darn** 73:6
**data** 7:2 8:3,4,7 9:4,24 10:12,14, 20,22 11:22 14:14 25:9 40:9,25 46:21 61:22,23 66:18 72:8 86:25 89:15 99:10
**dataset** 10:10,19 11:15
**date** 8:19 75:14 99:9
**dated** 57:20 82:19 95:20
**daughter** 49:2
**David** 2:3
**Dawn** 80:4
**day** 13:4 20:10,16 21:8 37:12 54:15 57:18 80:14 84:6
**days** 6:10 8:13 30:24 43:2 91:8
**dead** 53:3 89:7,14
**deadly** 81:13 90:7
**deal** 19:4 52:21
**dealing** 10:15
**deals** 10:18 11:1, 21 22:19
**Dean** 80:5
**debt** 51:5,17 61:14
**decided** 27:13,18, 21
**decision** 53:20
**decisions** 80:1,16, 17 84:17 90:21
**deck** 40:11
**declarations** 98:20
**dedicating** 31:5
**deeds** 98:21
**deer** 18:2 39:11,15 79:8
**defend** 36:13,15
**defense** 71:20
**define** 59:1
**defined** 39:20 54:23,25
**definition** 34:4 56:4
**definitions** 34:1
**degree** 3:13 22:4
**delineation** 88:4
**delivered** 64:11
**demanding** 18:17
**demonstrate** 47:14
**demonstrated** 45:13 65:19
**denial** 93:9
**denied** 58:19 71:2 74:2 90:11,15 91:2 99:19

**density** 9:12
**denying** 71:24
**Department** 2:4 31:13 33:13 75:12
**depending** 25:20 26:3
**deployment** 52:10
**depose** 58:20,21 72:6
**deposition** 58:23 89:18
**depositions** 90:24
**deprive** 22:22
**derivatives** 18:24
**Derrick** 28:17 35:11 76:10
**description** 57:16 98:22
**descriptions** 16:22 98:19
**deserve** 54:13
**design** 25:7,13,14, 16 95:12
**designing** 89:10
**desired** 96:12
**detailed** 23:18,20 24:14 25:13 26:20
**determination** 13:24 55:22
**determine** 12:11 19:25 55:11 56:2, 12,16,20 84:19
**determined** 8:1 9:10 58:12 60:18 88:4 90:5
**determines** 84:24
**develop** 19:4 21:13 40:25 42:16
**developed** 41:2
**developer** 19:6 27:23 32:6 42:7
**developers** 18:17, 20,23,25 19:9 32:24 40:6
**developing** 29:1
**development** 21:12 52:11
**devices** 41:13
**died** 79:3
**diesel** 39:12 90:5
**difference** 97:17
**difficult** 61:24 99:13
**difficulties** 49:18
**digging** 8:12
**dioxide** 22:10 23:22 24:13,23 26:17 34:2 40:17 44:17,22 47:12, 15,16 48:8 49:5 51:21 65:23,24 66:1 82:22 84:2 85:11,15,19 87:12 88:16
**direct** 2:25 15:14 44:14 46:24 47:2, 7,9 73:19,21
**direction** 87:25
**directive** 79:24
**directly** 16:10
**director** 3:9,23 32:7 60:4
**disagree** 19:12 55:1
**discovery** 58:21, 23 72:5 89:19 90:24
**discuss** 84:9,10
**discussed** 6:7 12:3 26:9 29:13 46:10 90:23
**discusses** 88:13
**discussing** 65:2 68:1
**discussion** 84:3
**discussions** 33:19
**disguised** 19:22
**disheartened** 64:22
**disoriented** 79:18
**dispersed** 25:25
**dispersion** 25:20 84:12,15 88:10 92:15,20
**displace** 22:20,22
**displaced** 24:19
**displacing** 81:13
**disposal** 16:18 17:15 18:13,14 21:2 25:4,10 28:14 31:4,10,21 32:20 46:2,4,11 47:11 49:6 52:1 53:25 54:8 66:11 68:2,6,9,14,19 71:8 73:24 74:12 82:6,23 92:13,16
**dispose** 47:18 58:20
**disposed** 61:11
**disposing** 48:9
**dissipate** 54:1
**distance** 84:24
**distances** 31:18
**distilled** 23:25
**division** 2:5 55:15 66:14
**DMR** 57:11 88:7
**document** 27:17 30:13 36:22 37:7 38:23 40:22 42:24
**documents** 27:3, 4,6 28:20 33:4,14 37:3 57:15 70:18
**dollars** 51:4,19 52:14,22 61:14
**domain** 8:10 53:8 55:6 76:2
**Donna** 16:3 17:7 35:19 80:4
**Donna's** 43:10
**door** 79:20
**doorbell** 20:6 37:11
**dot** 46:9
**doves** 39:13
**downstream** 87:21
**draft** 43:16
**drew** 65:21
**drive** 38:14 70:13
**driving** 20:13 39:10 52:7,18 85:7
**dry** 23:2
**due** 16:7 31:7 45:12 53:8 55:5, 13 58:25 67:8 71:24 72:1 76:2 77:16 87:22 90:16,21 91:3,7, 11 93:1,8,9
**dying** 17:19

E

**e-mail** 82:19,24 83:5,8,17 84:16 86:4,6,10,14,16 87:10,11 95:18 96:1

**e-mailed** 70:12

**earlier** 35:21 55:15 81:2 90:23

**early** 6:23

**Earth** 69:16 70:1

**easement** 39:1,2,6 76:1

**easements** 4:9 5:11

**east** 18:3

**eating** 39:16,17

**economic** 44:20 45:17 48:4

**economically** 49:4 50:10

**economics** 41:24 42:4

**economy** 52:7 93:7

**editor** 32:8

**edits** 30:4

**educating** 32:19

**education** 26:9

**educational** 3:11

**EERC** 49:1 52:11, 18 68:22

**effective** 26:24,25

**efficient** 23:14

**effort** 29:7 32:17 49:19 54:10 93:3, 5

**efforts** 55:17

**egregious** 77:18

**electronic** 97:15

**electronically** 98:15

**elements** 32:16

**Elkin** 47:4

**emergency** 88:13, 15 89:5

**emerging** 10:16 24:9 32:20

**emissions** 44:19 46:19 73:17

**emotional** 94:13

**employed** 3:6,8 52:4

**employee** 33:13 47:19

**employees** 23:17 24:12,18 26:1 49:1 52:18

**employer** 88:1

**employers'** 38:16

**end** 8:18 9:5,7 50:11 53:2 57:18 93:11 94:11,15

**endanger** 81:17, 20 82:7 85:23 87:17 92:14

**endangering** 92:18

**ends** 46:9

**energy** 5:14 18:17 21:24 47:11,17 48:13 49:16 56:14 57:8 59:8 63:7 82:20 96:19

**enforce** 27:1 72:3

**enforcement** 58:17

**engage** 33:2 67:15

**engaged** 6:22

**engineering** 22:4 51:23 88:2

**enhanced** 44:25 50:7 73:24

**enjoy** 16:4

**ensure** 44:19 82:11

**ensures** 38:8

**enter** 28:10

**entered** 63:6 64:3

**enterprise** 12:9 19:7

**entirety** 96:25

**environment** 44:18 46:17,18

**environmental** 22:14 23:13 25:22 47:9

**EPA** 77:11 93:11

**equal** 19:15 27:22 75:17 78:13

**equipment** 24:16 52:6 87:14 88:18

**equitable** 13:24 54:22 56:2,4 59:1, 4,10,20,22 60:9, 11 61:19

**equitably** 56:7,13, 18 57:7 58:4 66:8 92:6

**Ericson** 20:8

**escalation** 63:9,12

**escalator** 63:13,18

**essence** 49:25

**establish** 78:3

**estate** 3:9,13,23, 24 4:4,5 5:9 11:25 12:8,12 17:18

**estimate** 7:12 57:18

**ethanol** 9:19 21:24 22:25 23:2,5,7,12, 24 24:2 42:4,7 48:9 50:15

**evaluate** 25:24 39:4 60:11 66:15 87:2

**evaluating** 71:19

**evaluation** 4:12 11:3,16,24 12:1,6

**event** 88:15

**eventually** 23:5 38:7 66:3

**everybody's** 81:9

**evidence** 8:10 45:14 46:21 50:19,25 65:20 71:19 73:16 81:23

**evidenced** 38:22 82:19

**examination** 2:25 13:8 14:10 15:14 93:22 94:2,7,24 95:14

**examiner** 2:3 12:23 13:7 14:20 64:25 69:7 94:20

**examples** 19:3 61:25 62:11,15

**exceeds** 89:8

**excess** 35:25

**exchange** 60:17

**excluding** 10:4,6 11:6

**exclusively** 7:14
**Excuse** 19:12
**exhibit** 4:14,22,25 10:3,4,6 11:6 16:13,15,16,17 28:22 29:10,14, 15,17,19,23 30:1 56:22,24 57:1,2 58:6,9 62:20,22 63:22 64:18 67:23 69:5 70:2,7,10,15 71:13,15 74:9 83:3,4,14 87:5,6,7 88:25 95:16,19 97:3
**exhibited** 37:24
**exhibits** 10:3,6 11:5,11
**exist** 57:24
**expectation** 50:2
**expecting** 30:20
**expel** 48:2
**experience** 3:17 4:20 18:16 21:23 24:22 26:8,12,18, 22 33:1 36:25 48:18 79:15 81:3 85:6 94:13 95:1
**expert** 4:12 7:19 50:6
**expertise** 32:3 82:25
**experts** 72:11
**expiration** 35:17, 19
**expirations** 37:16
**explain** 30:12 66:24 67:24
**explained** 20:15
**explode** 85:16
**explosion** 84:20, 21,24 85:2
**exposed** 25:12
**express** 20:2
**expressing** 28:9
**extend** 65:25 66:2, 9
**extends** 65:21
**extra** 61:15 63:15
**extrapolate** 9:15
**extremely** 16:4 25:4
**eyes** 79:14

F

**faced** 31:14
**facilities** 18:13,14 25:5,7,10 26:10 41:14 49:6 71:8 73:24 74:12 82:6, 23 85:23 87:22 92:13,16
**facility** 6:20 7:10 12:18 16:18 17:16 25:16 32:7 46:3,4, 11 53:25 54:9 64:7,10 68:3,6,10, 14,19 74:4,22 75:2 76:25 78:23 81:17 87:13,16 88:11,16 89:10 91:17,18 95:3
**fact** 6:24 13:18 22:4,19 27:16 38:22 41:2 48:11 56:9 85:17
**fail** 45:8
**failed** 29:14 73:16 92:22
**fails** 67:4 85:25
**failure** 87:23 88:17 90:18
**fair** 7:4 9:1 12:7,11 13:14 17:22 32:25 34:18 36:2,14 71:10 91:3,10
**fairly** 28:4 43:25 76:15 77:16
**faith** 73:12 82:14
**fall** 6:23 68:18
**falls** 67:4
**familiar** 35:2 36:11 40:7 43:21,25
**family** 16:3,25 17:1,8,14 21:7 22:24 27:9,20 94:14
**farm** 16:3 20:18,24 21:11 23:11 32:2 39:9,10 48:10
**farming** 79:2
**fast** 66:25
**faulty** 81:10
**fauna** 26:7
**favor** 21:11 27:12, 18
**favorably** 78:2
**favoring** 71:11 77:17
**Fay** 15:21 17:7 74:11 79:6 80:2
**Fay's** 17:3 27:9 32:21 79:1,3
**feasible** 49:4 50:10
**February** 56:10 57:3,18,20 59:6 87:9 88:9
**federal** 50:21 51:17 61:13,14 77:11 89:9
**fee** 4:7,8
**feedback** 28:3 30:22 43:6
**feedstocks** 23:21
**feel** 45:1 60:13 82:9
**feet** 79:14 90:2
**felt** 28:9 31:9 32:25 33:8 36:2 40:23 42:15,17
**FEMALE** 2:10
**fermentation** 23:23 24:11
**field** 31:6 79:18
**fields** 18:24
**figure** 12:11 58:3
**file** 57:16 70:1
**filled** 22:7
**final** 22:12
**finally** 92:25
**finance** 51:13
**financial** 38:7 40:21 64:24 65:15
**find** 7:19,21 8:4,6 10:14 28:1 47:24 59:17 64:10 81:16 85:22 91:18 92:5, 13,19
**finding** 7:2 8:13 82:6 87:15
**fires** 85:17
**firm** 3:25 5:17 6:17,20
**Fisher** 17:15 68:4

**five-minute** 80:22
**flabbergasted** 38:11
**flange** 87:22
**flanges** 25:19
**flash** 70:13
**flashing** 18:22 40:5
**fleet** 23:8
**flickers** 18:21
**Flint** 87:18
**flip** 38:9
**flow** 67:15 69:3 87:14,22 88:17
**fluids** 53:16
**flushed** 33:18 43:9
**flying** 52:17
**focused** 34:8
**folks** 94:9
**follow** 37:13
**foot** 41:13
**football** 22:6
**force** 19:6 43:16
**forcing** 37:4 64:23
**foreign** 38:10 51:16
**forever** 50:9
**forgotten** 32:14
**Forks** 34:15
**form** 39:1,2,21 55:5 64:7
**formal** 43:1
**formation** 5:10 34:22 50:1
**formed** 28:10
**forum** 49:10,12
**forward** 27:20 77:9 93:2
**forwarded** 95:21
**found** 61:25
**foundation** 11:9 69:7,10 88:22
**frame** 6:7 7:7
**framework** 93:5
**freakin** 60:25 61:7
**freaking** 60:21
**Fredrikson** 12:24
**free** 28:17
**Friday** 59:6 74:19
**friends** 49:3 79:22
**frogs** 90:9
**front** 4:15 36:23 40:23 41:10 55:6 98:8
**fucking** 93:14
**fuel** 42:12 50:14 52:5
**fulfill** 92:23
**full** 3:2 6:2 21:3 36:19,20
**full-time** 4:10
**fun** 78:9
**fund** 50:23 64:2
**funding** 37:13 52:21
**funds** 19:3,13 50:23
**future** 40:13 51:17 54:3 74:20,25 76:23 93:10

G

**gallon** 42:6
**game** 91:5
**gang** 68:13
**garage** 79:20
**Garner** 2:1,3,12, 15,18,20 4:23,25 11:7,10 12:21 13:1,5 14:6,18,25 15:2,8 29:17,24 30:1 44:4,9 58:7,9 61:2,6 65:8 67:2 69:6,12 70:5,7,13 71:15 80:21 83:12,14 86:21 88:20,24 89:25 91:25 92:3 93:17, 20,24 94:10,18,22 99:1,18,22
**Gary** 80:13
**gas** 2:5 5:20,24 6:19 24:25 31:12, 19 34:19,24 42:17,19 44:18,25 46:19 52:7 55:15 62:10 66:14 73:17 81:13 87:10 90:3, 6 94:9
**gases** 25:24 26:2
**Gasification** 62:17,24 63:2
**gather** 7:18
**gathering** 6:25
**gave** 36:2,18 57:15 61:15 70:13
**gears** 11:13
**Geizer** 80:4
**general** 3:14,16 4:10 15:24 38:17 82:23 90:12
**generally** 33:13 96:2,3
**generated** 29:20
**genuine** 32:18
**geographic** 88:6
**geologic** 44:22 78:24
**geological** 34:22 44:16 49:5
**geophysical** 35:17 37:16
**Gerving** 80:9,10
**Gilmer** 80:8
**give** 2:22 7:11 15:11,22 21:7,9 27:22 28:17 30:22 34:22,25 39:21 45:10 62:15 69:9 73:10 75:24 78:16
**giving** 61:13 79:23
**glad** 31:2 43:6,7
**Glen** 31:24 32:4 80:9
**global** 44:18 46:18,24 47:9
**Gludt** 4:24 11:8 12:23,24 13:3,6,7, 9 14:4 29:16,25 58:8 64:25 69:7 70:6 71:14 83:13 86:8 88:21 89:22 91:22 94:19,20
**goal** 10:11,25 28:12 32:18
**goals** 45:2
**God-given** 54:21
**good** 2:19 8:23 13:10,11 27:24 49:2 53:4 73:12

**Google** 69:16 70:1
**government** 19:21 21:6 51:24 53:9 54:19 61:13 89:9
**governor** 52:16
**grab** 19:5
**gradient** 67:11 68:21 72:8
**gradients** 81:24 82:16
**grandchildren** 51:5,6 61:15
**grandma** 16:3
**grant** 51:20
**granted** 55:5,10 60:2 71:6
**granting** 91:9
**grass** 18:23 61:12
**gravely** 92:25
**great** 13:5 44:7 54:11,15 93:6
**green** 19:4 52:20 68:4,8
**greenhouse** 44:18 46:19 73:17
**greeted** 39:9,11
**greeting** 39:14
**grew** 18:5 23:3
**gross** 64:15
**ground** 90:8
**group** 28:11 32:4 48:15 57:11
**grouse** 79:9,14
**grow** 16:2
**guaranteed** 19:23 91:4 92:11
**guarantees** 35:1
**guess** 62:9 70:18 77:10
**guessing** 98:1
**gurney** 89:13

H

**Ha** 55:23
**half** 17:12 18:3
**hand** 15:9 19:21 21:6 29:10 56:22 83:2
**handed** 29:19 33:16 47:3 56:24 83:3 87:6
**hands** 53:3
**happened** 30:3,5 41:25 98:2
**Harju** 49:1,6,9,21 50:6
**harmless** 36:13,15
**hay** 79:5
**hazardous** 25:3, 13 26:11
**hazards** 22:17 24:23 25:6 26:16 34:7
**head** 48:12
**heading** 20:13
**health** 22:14,19 23:16 45:18 81:18,20,22 82:7 85:12,23 87:17 88:5 92:14,18
**hear** 39:12 79:22
**heard** 18:15 39:13 48:12,24 51:20 56:6 72:10 73:2 75:22
**hearing** 2:3,4 6:9 14:20 16:21 19:24 46:10 50:17,20,25 55:6,14 58:15,18 64:23 65:20 70:20 71:23,24 73:3,11 76:2 78:10 80:1, 18 89:15 91:1,3, 10 99:6,9,10
**hearings** 2:2,3 37:25 46:22 76:16 77:21
**heating** 47:20
**heavier** 22:20
**heavy** 19:21 21:6
**Hebron** 31:24
**heights** 25:9
**held** 41:11 54:16 99:6
**hell** 19:10
**hellacious** 79:18
**Helms** 31:12,16 32:14 54:23 59:4, 9,15,18 60:2 74:17,23 76:8,13 77:24 83:17 84:1, 10,13 86:4,10 95:15,19 96:13 97:19,21,24 98:6, 14,18,24
**Helms'** 82:19
**helped** 36:18 43:16
**helpful** 5:4 11:24
**helping** 29:7
**hereto** 74:9
**high** 22:11,21 54:20 79:4,11 81:20
**higher** 62:2,19 63:3,19
**highly** 90:2,16
**hire** 29:1
**hired** 3:21
**hiring** 95:8
**history** 78:8
**hold** 4:9 36:13,15 90:18
**holds** 19:20
**home** 39:14 99:14
**homes** 26:6 77:7 78:4
**homestead** 17:5
**honestly** 54:25 90:19
**Honor** 15:5 29:12 44:11 80:20,25 89:22 93:23
**hope** 93:14,21
**host** 79:10
**hostage** 41:11
**hosting** 21:10
**hot** 20:25 27:7 40:3 48:2
**Hought** 80:10
**hour** 57:14
**hours** 28:15 31:5 33:7
**house** 17:6 18:6 49:16 59:8 96:19
**hugging** 90:7
**human** 22:19 81:17,20,22 82:7 85:12,23 87:17 88:5 89:3 92:14, 18

**humidity** 87:24
**hundreds** 26:22 28:15 31:5 33:6 40:4
**hunting** 90:9
**hunts** 79:10
**hydrogen** 34:2

I

**i.e.** 85:16
**idea** 37:12 38:16 92:16
**IDLH** 89:8
**idling** 90:5
**II** 17:3
**illegally** 32:5
**Illinois** 9:23
**illustrate** 70:25
**illustrates** 67:25
**images** 69:19,25
**imagine** 41:15 94:12
**imminent** 53:8 55:6 76:2
**impact** 5:14 9:21 72:9 73:19,22 80:16 81:10,25
**impacted** 16:8 66:22 84:8
**impartial** 55:14, 18,19
**importance** 35:3
**important** 10:17 26:7 35:4 68:20 87:2 89:4
**imposed** 73:1
**impression** 96:15
**improve** 45:18
**improvements** 32:22 43:7
**inability** 99:6
**inaudible** 5:15 49:10 75:6 99:21, 25
**inch** 84:25
**incident** 23:20 24:18
**incidental** 34:3
**include** 17:12 47:16 48:1 64:10 86:4 88:12 89:14
**included** 23:13,18, 22 32:7 35:16 39:2 41:17 47:23 63:9,13 75:7 78:23
**includes** 17:5
**including** 4:7 5:13 23:16 26:20 31:17 44:25 64:12 87:14 88:15
**income** 12:6,15
**incompetent** 60:4
**inconsistent** 67:1
**incorporate** 74:21 75:1 76:25
**incorporated** 25:16
**increase** 61:17 67:11
**increased** 45:19 63:18 71:4
**increases** 63:13
**incumbrance** 98:21
**indemnifications** 36:12
**indemnify** 36:11
**indentured** 74:14
**Indian** 18:1
**individuals** 94:12
**industrial** 26:10 44:24 46:8,12 47:14 48:21 52:25 54:23 76:18 81:3 82:10 95:2
**industries** 31:20 44:20 48:4 73:22 93:7
**industry** 3:15,20 18:21 21:13,24 23:12 24:9 27:19 28:15 31:19,21 32:14,20 38:1 48:14 55:18,20 61:25 71:12 93:6
**Inflation** 61:12
**influenced** 72:12
**information** 7:23 52:19 57:4 83:16 84:3 87:2 88:11 90:25 95:23 99:7
**informed** 31:13,15
**infrastructure** 9:18 52:16 77:6
**initial** 26:5 28:18 61:9
**initially** 3:21 6:5 20:4 28:2 30:7 41:19 51:15
**initiated** 96:1
**inject** 67:21
**injected** 40:16 41:21 49:8,24
**injecting** 40:11 49:25 50:1 64:12
**injection** 25:7,8 53:16 67:8,9,13, 18 68:23 93:12
**injury** 23:19
**input** 28:16
**inside** 17:15 18:13 24:12
**inspect** 57:4
**instance** 5:21 8:2
**instrument** 38:8
**insurance** 26:20 38:13,17,18,19 73:8
**integrity** 88:17
**intend** 78:10
**intended** 78:15
**intending** 23:8
**intends** 46:4 89:24
**intensive** 47:11
**intent** 70:24
**intentionally** 67:6 72:12 85:18 91:14,16
**interest** 4:7 12:18 16:11,20 18:11 27:10 44:16 45:7, 15,25 47:25 50:20 55:8 71:3 73:14 74:3,5,11 78:19 92:24
**interesting** 36:17
**internal** 57:10,16
**interpret** 26:25
**interpretation** 56:5
**interrupt** 86:20

**intervene** 70:20 71:2,7,25 72:2 91:7,10

**intervenor** 5:25 15:6 67:1 68:16 93:10 97:9 98:20

**intervenors** 69:23 91:2

**interviewed** 32:10

**introduced** 96:5

**introduces** 84:2

**invade** 53:12 66:4

**invasion** 53:21 73:15

**invested** 28:17

**investors** 51:12

**invited** 20:17 30:9

**involved** 5:12,17, 22 7:20 29:7 31:10

**involves** 35:18

**Iowa** 5:21 9:19 52:17

**ironic** 23:11

**irreparably** 80:16

**issued** 87:18

**issues** 6:14 31:7 54:16 75:5 77:3

**issuing** 81:16

**itemized** 98:20

**items** 47:23

J

**January** 28:19 59:6 74:19 82:19 87:9 96:18

**Jason** 20:8 48:12

**Jeff** 20:17 58:21 80:7

**Jeffrey** 83:10 86:10

**jeopardizing** 93:10

**Jim** 17:17,18 18:5

**Jim's** 18:8

**JK** 68:8

**job** 77:13

**jobs** 21:13 45:16 52:3,9

**John** 3:4 49:1,21

**Johnny** 80:10

**join** 22:25

**joint** 49:14,16,22 59:7 96:21

**Joseph** 80:2

**judge** 54:11 55:6, 9,19 70:13

**judicial** 19:24 55:14

**July** 80:4

**June** 95:20

**jurisdiction** 13:23, 25 65:4,7

**jurisdictions** 45:20

**jury** 19:24 55:11 56:1 76:3

**justices** 53:18

K

**keeping** 72:15

**kernel** 24:1

**Kevin** 80:11

**kids** 16:2

**Kimberly** 80:11

**kind** 6:23,24 7:11, 17 8:12,22 9:18 10:9,17 11:2,20 12:2,9 30:8 45:6 49:10 96:12

**king** 74:17 75:19

**Kirk** 80:12

**KMZ** 70:1

**knew** 34:6

**knits** 42:23

**knowledge** 2:23 15:12 20:20 34:6 54:16 55:3 82:25

**Koept** 33:12 43:15 57:3,19 88:22

**Kurt** 15:7,18 95:1, 16

**Kusler's** 17:18

L

**lack** 31:8,16 50:19 58:17,24 71:24 77:16,19 85:13 90:16 91:6 93:8 99:6

**land** 5:16 16:8,19 17:17 18:10,12, 17,20 19:4,5 21:1 27:10 32:21 33:14 36:22 37:1,5,16 38:6,12,14,19 39:5 40:23,24 41:1,6 45:3 50:8 52:24 67:6 68:25 70:22 73:16 75:25 79:4 80:17 81:10 94:15

**landowner** 12:17 20:21,22 21:10 27:13 28:16,20 29:10 30:20,24 31:9,16,23 33:6,9 38:1 61:16 62:6 87:5 98:20

**Landowner's** 31:25

**landowners** 6:1 17:21,23 27:23 28:11 31:6 32:4, 19,21 43:5,7 53:15 56:7,12 58:4 64:6 65:11 66:15 71:21 72:14 77:18 78:11 91:21 94:15

**landowners'** 32:23 54:4

**lands** 19:2 33:13 36:20 39:19 54:14 67:7 68:16 71:2 75:12,14 78:16,25 79:1,7,9,11,16,21, 23,25

**language** 32:25 35:3 38:21

**large** 37:7

**larger** 12:10

**largest** 23:2,7

**Lauren** 80:8

**law** 19:17 43:22 47:3 54:18 55:24 65:18 73:20 75:18 78:7 91:4

**lawsuit** 40:8 53:14 71:21 90:21 93:11

**lay** 65:5 71:18

**layers** 98:3

**laying** 93:5

**LCF** 50:16

**lead** 93:6
**leadership** 31:19 61:21
**leading** 48:14 54:9
**leak** 25:18 88:18 92:17
**leaked** 38:18
**leaking** 24:10
**learn** 20:19 31:21 79:2
**learned** 22:16 74:24 76:16,22
**learning** 31:3 32:12
**lease** 4:8 5:23 9:22 17:19 20:12, 25 21:2 27:8 28:20 30:21,25 31:14 33:25 34:9, 10,23,24,25 36:18 40:22 41:20,21 42:20,22 43:8 62:11,23 64:3,4, 17,24 65:11 72:25 74:8 75:11,15,20
**leased** 66:5 71:6 74:6,12
**leases** 60:21 62:1 65:2
**leasing** 34:9 42:15,16
**leave** 37:6 60:24
**Lee** 80:12
**left** 2:6 22:23 38:4 39:10 61:4 68:4 96:3,15
**legacy** 93:13
**legal** 26:19,23 29:1 31:4 98:19, 22
**legend** 97:20
**legislative** 32:11 77:25 78:8,10 79:24 83:24 97:1
**legislator** 45:10 52:12 74:19 78:9 84:1 96:5
**legislators** 32:13 78:1 83:17
**lek** 79:14
**lessee** 64:11
**let alone** 90:7 92:10
**letter** 20:10,15,16, 17 57:3
**letterings** 70:21
**letters** 32:8
**level** 25:14 32:2 65:23 88:4
**levels** 34:14 81:14
**liability** 38:16,17
**license** 4:10 5:8 88:2
**lie** 60:3
**lien** 37:20
**lieu** 52:13
**life** 24:19 79:7
**life-sustaining** 22:20 36:5
**lifetime** 54:19
**light** 18:21 76:6
**lightly** 81:21
**lights** 18:22 39:23 40:1,4,5
**Lignite** 48:13
**limited** 67:21
**limits** 78:17
**Linda** 80:13
**linear** 41:13
**lines** 29:20 37:8 43:12 65:21 87:14
**lip** 30:18
**Lisa** 80:10
**list** 33:20
**listen** 40:10
**live** 15:20,21,25 16:3 22:23
**lived** 15:25 16:25 17:8
**lives** 17:7 79:16
**Living** 15:6 16:12
**LLC** 63:7 64:4
**LLCS** 46:14
**LO** 83:3 97:9
**LO-43** 64:18
**LO-45** 63:22
**LO-53** 62:21
**LO-55** 4:14
**LO-63** 67:23 97:3
**LO-81** 16:15 29:14
**LO-87** 29:19
**LO-88** 56:22,25
**LO-89** 83:3,4,11 86:3 95:16
**LO-90** 87:5,6 88:19
**local** 45:20 51:22
**located** 66:21
**location** 9:15
**locations** 26:7
**long** 6:20 77:12
**looked** 85:3
**loose** 34:1 66:25
**lose** 50:12
**lost** 49:15 53:14, 18 65:18 76:10 79:16
**lot** 5:17 8:11,24 9:19 18:3 24:14 42:23 52:9 54:10 68:18 76:16 78:6, 9
**Louisiana** 9:22 63:5
**love** 79:7 94:14
**low** 42:11 50:13
**lower** 9:5 64:15
**lunch** 93:21,25
**LYNN** 59:18 74:23 76:13

## M

**Mack** 80:7
**made** 43:5,7 49:20 52:8 78:3 87:16 90:21
**made-up** 60:9
**Madison** 34:15
**Magrum** 83:10 86:11 95:17
**maintenance** 22:9 24:13 85:3
**major** 23:22 33:20 38:14 42:22 92:17
**make** 17:20,22 25:3 36:3 37:19 38:2 41:23 49:12 65:1 74:14 77:4 78:11 81:11 94:17 99:15

**makes** 37:7
**making** 19:19 59:16 61:16 65:5 84:17
**MALE** 49:19 86:1, 9,15,19 93:16 94:25 99:21,25
**Man** 76:16
**manage** 26:25
**management** 23:19 26:10,19 84:14
**manager** 23:2
**managing** 3:9,23
**mandated** 45:12 55:12
**manner** 78:14
**manners** 42:17
**manufactured** 47:22
**manufacturing** 47:21
**map** 16:17 29:13 65:22 67:24 68:21 69:8,14,22 70:2, 16,25 97:6,7
**maps** 69:20
**mark** 28:22
**marked** 4:14 10:3, 5 62:23 68:16 83:2,4
**market** 7:2,3,4,22 8:10,25 10:16 11:19,20 12:2 13:14 42:12 61:22,23
**markets** 22:12
**marking** 29:10
**Mason** 28:14
**mass** 24:1 47:15, 24 73:17
**masses** 49:8,24
**massive** 51:3
**material** 73:4
**mats** 42:23
**matter** 2:22 5:5 6:1 15:11 48:7 58:19,22,25 89:16
**maximum** 87:21
**Mays** 80:12,13
**maze** 46:13
**meaning** 64:12
**means** 36:12 56:4 59:3 87:19
**measly** 63:14
**media** 25:1 51:23
**meet** 46:22 47:6, 12 50:20 52:17 53:6 55:25 56:20 73:13,25
**meeting** 20:22,23 21:10 28:4,6 30:8 32:1 42:3 51:1 59:7 61:20 96:20
**meetings** 30:9,11, 16 31:23,24 32:2 52:19
**meets** 45:14
**Megan** 80:7
**members** 49:22 82:21 83:9
**memorized** 43:24
**mentioned** 3:19 5:7 6:16 10:2 27:2 39:7 42:25 55:15 62:16 71:1 77:21 78:5 83:24
**Mercer** 6:15 9:17 11:3 13:15 16:7 31:23
**merging** 8:25 10:17
**merit** 45:9
**mess** 24:17
**met** 28:5 31:11,18 51:9,15 79:6 82:4
**method** 53:8 62:9 87:19
**methodological** 11:15
**methodologies** 25:15
**metric** 9:3,5,6,12 51:14 61:16 62:18 63:2,8,16,19
**Metz** 80:13
**Michael** 15:18 80:9,10
**middle** 10:5
**Midwest** 4:2
**migrate** 53:24
**Mike** 33:12 36:18 43:15 57:3
**Mike's** 36:24
**miles** 19:2 46:10
**Milky** 40:2
**million** 24:7
**mineral** 2:4 4:8 5:17
**minerals** 45:1
**Minneapolis** 4:1
**Minnesota** 22:7
**Minnkota** 56:14 57:7 70:17,22 71:6 72:2 77:17
**minutes** 14:24
**mirrors** 8:12
**Mischaracterization** 91:22
**miserably** 85:25
**misleading** 60:3
**Mississippi** 84:4
**model** 28:13 62:7 72:12 81:24 83:21 84:12,14,15,16, 18,22 85:8,15,20, 24 86:23 87:20 91:14 92:20,21
**modelling** 83:1 88:3 92:15
**models** 67:9 88:10
**modify** 67:16
**mom** 79:1,19
**moment** 6:16
**Monday** 57:18 95:20,21,22
**monetize** 67:16
**monetized** 79:6
**money** 51:17,22 72:15 90:20
**monies** 51:24 93:5
**month** 79:12
**months** 7:13 16:6 73:7 77:25
**moonshine** 23:25
**morning** 2:19 13:10,11 39:15 79:13
**mornings** 40:12
**Morton** 13:15 32:5
**mother-in-law** 17:7 35:19

**motion** 99:19
**motions** 89:24
**move** 4:22 11:5 27:20 29:14,15,23 58:6 69:5 70:4 71:13 83:11 88:19 99:8,17,20
**moved** 16:1 22:24
**moving** 17:10
**mule** 18:2 39:11, 15
**multiple** 10:23 22:12 27:15 32:1 76:16 98:3
**multitude** 4:4
**mutual** 28:10 60:18

**N**

**nada** 58:24
**names** 80:2
**narrowed** 33:20
**nascent** 61:24
**national** 7:17 65:12
**native** 18:23 61:11
**natural** 5:19,24 24:25 49:17 59:8 82:21 90:6
**nature** 11:17 27:11 55:17
**NDSU** 22:3
**necessarily** 31:9 36:25 39:22
**necessity** 55:8
**needed** 7:9 22:23 24:20 27:24 28:9 44:24 48:21 85:14
**negotiate** 27:22 32:23 41:8,9
**negotiated** 19:16 26:22
**negotiation** 19:20 33:2 35:10 60:18, 19 65:14
**negotiations** 26:18 43:2 48:19 58:1 73:12 77:20
**neighboring** 26:6 66:4,9
**neighbors** 20:8, 19,24 36:23
**net** 12:16 42:19,20 62:8 64:8,16 67:14 69:2
**newer** 37:10
**nicknamed** 16:24
**night** 18:22 39:10
**noise** 40:7,14 76:5
**noisy** 18:21
**non-compensated** 78:11
**nonconsenting** 13:25 56:17 57:6 78:22
**nonflammable** 85:16
**north** 4:11 5:8,9 13:16 15:19 16:1, 24 17:2,4,13,25 18:4 23:10 27:19 28:14 31:12,22 32:2 33:8,14 37:10 43:17,23 44:21 45:22 47:3, 8,10 48:14 51:1,7, 17 52:1,8,21 53:6, 7,14,19 58:17 59:8 61:20 62:17 65:17 72:3 73:19 75:11,13 81:15 82:20 88:1 89:20 90:17 93:3,4,7,12
**north-facing** 40:1
**northeast** 17:12
**Northern** 40:1
**northwest** 16:23 18:3 31:25 53:15 71:21
**note** 11:8
**noted** 11:10 13:3 65:8 83:9 88:24 99:18
**notes** 44:15
**notice** 91:8 99:6
**notification** 20:5
**number** 2:2 64:15, 16 67:5
**Numbers** 10:3
**numerous** 31:22 41:25 82:22 83:25

**O**

**oats** 79:5
**Object** 88:21
**objection** 4:23,24 11:7,8,10 29:16, 24,25 58:8 65:1,8 69:6,11 70:5,6 71:14 83:13 89:22 91:22 99:5,16,18
**objections** 58:7 83:12 88:20,24
**objective** 47:13
**objectives** 51:1
**obligation** 92:23
**obligations** 51:17
**obtain** 57:5 61:24 78:20 83:7 99:10
**obtained** 3:13 50:14
**obvious** 77:16
**occur** 8:12
**occurred** 10:23 84:4
**odorless** 81:12
**offer** 21:1 29:21 61:1 63:20 64:9
**offered** 60:14 63:15 65:13
**offering** 40:24 61:9 62:18
**office** 30:10 47:20 88:12
**officer** 2:1,12,15, 18,20 4:23,25 11:7,10 12:21 13:1,5 14:6,18,25 15:2,8 29:17,24 30:1 44:4,9 57:4 58:7,9 61:2,6 65:8 69:6,12 70:5,7 71:15 80:21 83:12,14 86:21 88:20,24 89:25 91:25 92:3 93:17, 20,24 94:18,22 99:1,18,22
**offsite** 84:19
**oil** 2:5 5:12 22:6 24:24 31:12 34:18,24 42:17,19 44:25 50:7 55:15 62:10 66:14 73:24 87:10 90:3,6 94:9
**older** 35:21
**Oliver** 6:15 9:17 11:3 13:15 16:6

31:23 42:1 80:2
**Olivia** 80:3
**one-on-one** 30:16
**one-sided** 27:11
**ongoing** 71:21
**open** 8:10 21:10 52:1 56:9 57:5,12 79:18 86:25 87:8, 10,11
**opening** 39:7
**operate** 95:3,8
**operating** 25:17
**operational** 22:15
**operations** 12:10 22:9 23:5,14 47:19
**operator** 78:19 88:14
**operators** 85:5
**opinion** 13:14 47:5 50:18,22
**opportunity** 8:17, 20 13:2 17:16 20:2 23:1 58:19
**opposed** 33:10 37:1
**option** 21:1 27:8 35:16 38:12,13 41:20 55:10
**options** 17:19 18:11
**orange** 68:6,10
**order** 32:20 67:2
**orderly** 99:23
**orders** 74:20,25 76:18,23
**ordinances** 96:11
**organizations** 31:20
**original** 17:5 30:12 33:25
**originally** 60:21
**out-of-state** 19:7 51:7
**outreach** 20:23
**overarching** 32:18
**overcome** 24:18
**overlaid** 68:21
**overlays** 98:2
**Overruled** 89:25 92:3
**oversaw** 23:17
**oversee** 24:17
**oversight** 24:16
**owned** 18:8 69:22 78:22
**owner** 54:13 55:4, 10,20 56:3 74:4, 10
**owners** 13:25 14:2 53:7 56:17 57:6 58:2 66:7,10 78:22 92:6,8
**ownership** 16:10, 20
**owns** 18:5 27:10 74:5
**oxygen** 22:21,22, 23 24:20 81:13,24

**P**

**Pack** 49:1
**paid** 14:1 60:7,12 62:7 64:11,13 69:3 78:13 92:9, 10
**paradigm** 76:14 77:14
**part** 10:8 24:3 37:7 51:3 61:18 65:14 72:17 86:22 95:4
**parties** 32:25
**partner** 63:10
**party** 19:15,19 63:11 93:10
**passed** 61:13 96:10
**past** 4:3 10:24 55:2
**paths** 22:5
**patio** 40:3
**Paul** 80:13
**pause** 35:6
**paused** 29:13
**pay** 37:19,22 41:5 42:18 52:15 61:15,23 66:13 79:6 92:9
**paying** 40:16 62:2, 6
**payment** 9:3 37:22 52:13 63:16,18
**payments** 8:1 63:7
**pays** 50:21
**peace** 16:4 39:8
**peers** 19:24 56:1
**penalties** 2:21 15:10
**pending** 89:24 90:21
**people** 7:20 23:16 37:15 38:15 52:4 75:3 76:14 77:2,4 79:25 90:22 95:7, 11 99:15
**people's** 77:7
**perceived** 31:14
**percent** 34:2 61:17 63:13,14, 15,17 64:8 65:23 66:2 91:5,9
**percentage** 34:5 64:7
**perform** 24:13
**performance** 22:14
**performing** 4:3
**perimeters** 72:12 91:14
**perjury** 2:21 15:10
**permanence** 50:16
**Permanent** 64:2
**permit** 22:18 32:6 74:2 81:5,16 86:24 87:3,18 90:10
**permits** 45:8 90:22 92:24
**permitting** 25:4
**person** 64:12 88:2
**personally** 94:14 96:24
**personnel** 24:15
**persons** 78:20
**perspective** 81:8
**pertains** 73:14
**petition** 70:20 71:2,7 91:7,10
**petitioner** 72:5

**petroleum** 24:25
**phase** 38:12
**pheasants** 39:11, 14 79:8
**phone** 2:8 20:6
**phonetic** 17:14 33:12 80:3,4,5,6, 9,11
**physical** 7:24 9:9 45:23,24 47:1,5 53:9,11,17,21,22, 24,25 55:3 73:15, 20 76:3 92:11
**physically** 24:12 53:12
**picture** 31:10
**piece** 45:7 58:23
**pipe** 76:19 87:22
**pipeline** 23:9 41:6, 12 46:4,9,15 48:6 52:16 81:7,10 83:1 84:3,4 95:7 96:4,6,14
**pipelines** 5:12 47:21 82:23
**place** 6:25 20:23 21:1 57:15 95:11
**plan** 66:12 88:13 89:6 91:19
**planned** 68:24
**planning** 24:15 77:3
**plans** 67:9 92:9
**plant** 23:2,3 25:13 42:8 48:6,7
**planter** 20:11
**plants** 9:19 23:6,7 24:2 42:4 48:9
**play** 9:18 49:18 59:15
**played** 96:22
**playing** 22:6 66:25 90:8
**plays** 34:14,15
**plug** 38:2
**plume** 72:13 91:15
**pockets** 51:7,16, 22 72:15
**point** 8:23 10:11 25:9 27:3 37:1 44:1 49:9 53:21 65:1 82:12 85:25 86:10 98:4
**points** 8:5 9:24 25:18 26:3 33:21 40:25
**police** 54:14
**policy** 43:21 44:13,15 45:2,9, 10 46:16,22 47:13,25 51:1 74:1
**pollutants** 24:4
**pollution** 38:17
**pool** 8:2
**poor** 33:17
**populations** 84:20
**pore** 6:3,15 9:16 11:3 12:8 13:15 14:1 17:18 19:1 21:2 41:1 42:16 46:6 53:13,16 54:4,12,15 56:17 57:6 58:2 60:8,23, 24 66:7,10,11 67:13 69:1,3 71:6 72:1,10,25 74:3,4, 5,8,10 78:13,17, 21,22 92:6,7
**portion** 50:12
**pose** 85:21
**position** 3:7 55:21 67:3
**positions** 89:3
**possibly** 55:17 60:8 66:6 67:16 82:4 85:22 86:3 92:5,13
**potential** 6:6,8 8:21 25:8 71:4 81:23,25 88:15
**potentially** 44:22 92:17
**pound** 84:25
**pounds** 67:12
**pour** 6:17
**power** 44:20 48:4, 6,14 56:14 57:8 70:23 73:22
**Power's** 70:17
**powers** 31:15 54:14
**practical** 26:21
**practices** 45:11
**prairie** 79:18
**prairies** 18:24 61:12
**predict** 67:10
**predicting** 84:21 85:20
**predictive** 83:21
**predicts** 84:23 92:21
**prejudiced** 58:16 90:16
**prejudicing** 71:22, 23 91:6
**prepare** 14:23 91:1,9 99:10
**present** 30:17 67:14 91:17 96:18,25 97:2
**presentation** 49:14,16 50:5 59:7 78:1
**presentations** 32:1 41:25
**presented** 31:24 42:1
**president** 3:23 23:4
**press** 20:25 27:7
**pressure** 24:10 53:24 54:1,8 67:11,20 68:21,25 69:20 71:4 72:8 82:2 84:14,23 87:20
**pressured** 67:19
**pressures** 68:23 92:22
**pressurization** 72:1
**pretend** 60:9
**pretense** 84:11
**pretty** 34:18 45:7 59:5
**previous** 94:2
**previously** 33:5 42:25 62:23 71:1
**price** 9:14 41:9 50:14
**primacy** 93:12
**primary** 22:18 33:21
**printed** 97:13

**prior** 16:25 29:14 87:3

**private** 19:7,8,14, 15,18,20,22 20:1 35:23 45:11,23,24 47:2 53:7,13,22 54:12 55:4 58:1 64:23 65:16 71:25 74:15 75:24 76:4 78:12 92:12

**privately** 75:3 77:1

**procedure** 58:18 61:5 72:4 90:17

**procedures** 25:17 91:12 95:12

**proceed** 13:6 15:4 80:24 94:19

**proceeding** 6:4

**proceedings** 16:21 58:12

**proceeds** 64:7,10

**process** 16:21 17:23 22:10,15 23:19,24 25:9,13, 22 26:16 30:19 31:3 35:22 45:13 53:8 55:5,13 58:25 70:18 71:24 76:2 77:17 78:2 82:10 86:24 89:15 90:21 91:3,7,11 93:1,9

**processes** 24:11 26:2,10

**produce** 24:7

**produced** 22:11 35:23 47:17,19 69:8,9,20,21

**producer** 23:7

**producers** 50:15, 16

**produces** 70:2

**product** 23:22

**production** 5:13, 14 22:11 23:24

**products** 23:21 25:1 63:6

**professional** 3:17 4:20 88:2

**professionally** 24:21

**profit** 19:7 42:21 64:8

**profits** 42:19 62:8

**program** 38:4 52:11 69:14,16 84:14

**programs** 32:10 93:13

**progress** 78:3

**progressing** 27:19

**project** 6:21 7:8 15:23 16:9 19:12 20:20 21:19,20 26:13 33:10 41:22 43:25 45:2,14,20 46:22 48:16 50:23,25 51:2,13 56:14 57:8 65:3 66:22 73:13,18

**projected** 72:13

**projects** 5:3 45:8 51:9 56:15 57:9

**promote** 44:16 50:23

**promoted** 23:4

**promotes** 84:16

**promotion** 55:19

**promotional** 55:16

**prompt** 57:21

**proof** 46:21 51:9 56:16 81:20

**prop** 71:20

**proper** 38:4

**properly** 89:11 91:1

**properties** 16:11 17:11 18:9 25:3 66:4,9 69:22 97:9

**property** 3:14 4:7, 10 7:9,25 12:18 18:6 19:8,10,14, 18,22 26:14 31:15 33:24 34:8 35:23 37:20 38:22,24 45:12,23 47:2 52:15 53:7,13,22, 24 54:12 55:4,10, 20 56:3 64:23 65:16 66:20 67:10,20 72:1 75:24 76:4 78:19 92:12 98:22

**proponents** 32:14

**proportionate** 12:16

**proposal** 16:9

**proposed** 18:15 23:9 42:20 45:3 47:10 60:15 62:5 64:15 66:22 68:3, 6,9,13 96:7

**proposing** 64:6

**protect** 32:20 36:13,15 84:17 94:15

**protection** 25:14 26:14 54:13 75:18 81:21

**protections** 27:13, 22 31:8,17

**protective** 24:16

**protocols** 81:3

**prove** 47:24

**provide** 3:16 6:7 13:14,19 21:13 31:8 36:4 54:7 61:25 73:16 81:19

**provided** 20:24 28:19 32:1 46:20 47:9 51:12 52:3 57:23 64:9 68:22 73:21 79:5 82:15 88:10,12 90:25 92:15

**providers** 37:23

**proving** 92:23

**provision** 53:5 73:8

**proxy** 55:7

**PSC** 46:8

**PSI** 85:6

**public** 26:1,5 31:18 44:16 45:7, 15,25 46:1,2,7 47:7,25 49:10 50:20 52:19 55:8 57:4,5 73:14 82:1 84:17 85:7 92:18, 24 96:8 99:20

**publication** 32:9

**publicly** 45:16 48:8 63:5 73:10, 23

**published** 77:11

**pull** 16:14

**pump** 25:18 39:24 50:8 76:19

**pumping** 40:10 41:16

**pundits** 25:2 51:23
**purchase** 17:16 18:10
**purity** 22:11 34:5
**purple** 33:16 68:15
**purportedly** 73:1
**purpose** 24:15 74:6
**purposes** 74:13
**pursuing** 51:2
**purview** 46:7
**push** 32:5
**put** 2:11 6:2 18:21 20:11 33:24 34:5 36:21,23 37:19 38:5,14,21,22,23 39:4 41:5,8 50:9 52:5 56:10 57:16 78:5,7 82:7 85:4, 17 91:7 93:2,4 95:11 99:16
**puts** 45:10 51:15
**putting** 33:24 34:7 48:22 51:6,21,25 76:19

Q

**qualified** 24:21
**quality** 9:11 36:7
**quantity** 36:7
**quarter** 16:23 17:2,12,24 18:1,4, 7
**question** 28:23 74:24 76:23
**questions** 12:20 13:12 14:5,6,17 57:13 76:17 88:23 93:19 94:21,22
**quick** 2:9 13:12 14:8 28:23 35:6
**quickly** 8:5 16:22 28:4
**quiet** 16:4,6 39:8
**quoting** 96:2

R

**radio** 32:10
**raise** 15:8
**raised** 17:8 51:14
**Ralph's** 17:3
**ran** 79:17
**ranch** 20:18,24 21:11 23:11 39:9 48:10
**ranching** 79:2
**range** 16:24 17:2, 4,13,25 18:4,7 25:23
**ranged** 64:8
**ranging** 4:4 9:4
**Rastetter** 52:17
**rate** 12:7,11
**rates** 9:10 67:18 68:24
**ratification** 75:3 77:1
**re-education** 51:21
**re-enforce** 81:14
**reach** 7:16 21:5
**reached** 6:6
**Read** 91:24
**reading** 75:8
**ready** 2:11 14:12, 16 44:23 48:20
**real** 2:9 3:9,13,14, 23,24 4:4,5,10 5:8 11:14,25 12:8,12 35:6 58:25 79:25
**realize** 67:14 69:2 85:14
**realized** 26:2
**reason** 71:3,4
**reasonable** 76:21 77:23
**reasoning** 9:8
**reasons** 9:9 17:21 90:10 92:4
**receive** 58:21 63:12 66:10,17 87:2
**received** 20:16 27:2,5,6 42:25 62:4 89:17
**receiving** 20:9 28:5
**recent** 10:13,15 32:11 48:12 51:20
**recently** 18:10
**receptor** 26:3
**receptors** 26:4 31:18 82:1 92:18
**recipients** 57:12
**reciprocal** 77:20
**recitals** 74:1
**reclaim** 38:2
**reclaimed** 37:6
**reclamation** 33:11 76:6
**recognize** 20:7 21:12
**recognized** 20:7
**recommended** 27:16
**reconcile** 8:5
**record** 2:1 15:2,3 44:9 45:14 46:21 50:19 56:10 58:15 63:22 64:18 65:24 66:1 67:11 80:22, 23 81:12,14 82:1 89:2 91:24 92:1 93:25 94:1 99:17
**records** 40:19 56:9,11,19 57:5,6, 12,22,23,24 58:5 60:10 87:1,8,10, 11,12
**recover** 49:5,8,24 50:3
**recoverable** 49:20
**recovery** 44:25 50:7 73:25
**red** 18:22 28:18 29:20 30:20 31:1 33:7,15,16 37:8 40:5 43:1,12 46:9 62:4 70:21
**redirect** 14:9,10
**reduce** 91:14
**reduced** 67:18 73:17
**reducing** 44:18 46:19 67:20
**Reduction** 61:12
**reference** 62:23
**referenced** 33:22
**references** 77:22, 24

**referencing** 63:22 64:18 83:5
**referring** 86:7 97:19 98:1,5
**refined** 24:25
**refinery** 22:6,8,13, 16,24 85:2
**refrain** 61:3
**refund** 50:11
**refused** 72:3 90:24
**refute** 72:7
**reg** 32:13
**regard** 48:4
**regional** 25:1
**register** 77:11
**regulate** 75:23
**regulated** 45:25 46:2,5,9 84:18
**regulation** 77:14
**regulations** 31:4,8 43:17 46:6,11 51:8
**regulatory** 32:19 53:11,17,23 55:16 76:13
**related** 6:14 26:13 43:22 82:22 87:14 95:24
**relates** 58:14
**relating** 87:12
**relationship** 96:6
**release** 24:3 25:9 81:23 82:2,16,24 83:1 84:20 86:25 87:13,21 88:6,10, 16 90:7 92:15
**released** 26:4 81:25 84:8
**releases** 87:20
**relentless** 18:20
**relevance** 10:24 11:9 65:2 88:21
**relevant** 83:21
**reliability** 22:15
**relied** 35:20
**relief** 24:10 87:21 88:5
**relies** 21:12
**rely** 36:9 48:24 50:4
**remaining** 91:6
**remedial** 88:13 89:5
**remediation** 89:5
**remember** 79:15
**remiss** 29:12
**remotely** 71:10
**remove** 35:9,10, 12,13 69:11
**removing** 93:11
**rendering** 67:13 69:1
**renew** 99:5
**renewable** 18:16
**rent** 38:19
**replied** 70:19
**report** 6:8
**reported** 51:13
**represent** 4:20 32:15
**representative** 31:20 48:15 49:22
**reps** 35:1
**request** 46:25 56:9 57:6,13 87:1, 8,10,12 88:8 89:2, 23 90:14,19 94:3
**requested** 32:3 45:8 57:14,22 73:24 92:23
**requesting** 57:4
**requests** 72:6 74:2 81:5 89:19 90:24
**require** 78:16,21
**required** 24:14 47:13 56:13 58:18 60:1 73:20 78:7 87:17 92:5 99:13
**requirement** 37:21 56:18,21 81:19 82:5
**requirements** 25:15 37:3 38:13, 20 39:20 40:14 53:6
**requires** 50:16
**requiring** 54:6 75:25
**research** 6:24 11:22 40:25
**researched** 42:10 48:25
**reservoir** 74:6
**reservoirs** 78:21
**residents** 84:8
**resource** 42:15
**resources** 2:5 21:13 31:13 49:17 59:9 82:21 93:4 96:19
**respect** 5:25 10:1 19:9 25:5 48:22 62:24
**respected** 77:19
**respects** 69:10 76:15
**respond** 29:21 89:7,24
**responding** 86:5
**response** 29:2 57:19,21 59:24 86:13,16 88:7,9, 13 89:2,5,6 91:25
**responsibilities** 23:13,15
**responsible** 22:13 23:14
**rest** 79:15 99:4,16
**restate** 65:10
**restoration** 33:11 37:3,24 76:6
**restored** 37:6
**restrictions** 39:19
**result** 31:11 46:25 65:15
**resulted** 32:22,24
**resulting** 54:18 72:13,14 73:3,15 84:25
**results** 25:24 27:25 47:1 55:20 72:13
**resume** 2:6
**retirement** 93:14
**Retro** 56:14 57:8
**return** 12:7,12 43:1
**returned** 31:1
**revenue** 42:5 50:13

**revenues** 12:17 45:19
**review** 8:17 11:23 25:18 26:19 31:2 66:21 68:7,12,15, 20 72:16 83:16
**reviewed** 27:8,14 28:2,3 78:8
**reviewing** 10:2 13:23 20:17
**reward** 19:13
**rights** 4:7,9 5:13, 14,18,23 6:3,18 7:9 38:1 54:21 67:1 71:20 91:3
**rights-of-way** 26:6
**ring** 20:5 37:11 84:25 92:22
**rings** 18:1 84:23
**ripped** 43:9
**risk** 23:19 24:15 26:19,25 84:13 85:21
**risking** 67:16
**risks** 24:8,9
**roads** 26:5 41:15 77:7 78:4
**roadway** 85:8
**robbing** 81:24
**robust** 11:14 76:13
**rod** 41:12
**role** 22:12 31:12
**roles** 22:8 25:12
**room** 2:4 30:10 31:11 34:12,13 37:25 56:5 73:5, 11 75:23 85:5 90:22
**rough** 7:11
**routinely** 4:1,6 5:15 31:6
**royalty** 41:19 42:18,20 62:7 63:7
**rule** 54:14 75:18 77:3,9,10,24
**rules** 36:1 58:17 61:4 72:4 90:17 96:8
**run** 85:24 91:5 92:19
**running** 20:11
**runs** 76:15

**S**

**S-T-O-C-K-N-E-S-S** 3:5
**sad** 86:22
**safe** 23:13 25:14 31:17 84:21,24 88:5 96:14
**safely** 95:3
**safety** 22:14 23:15,17,18,19 24:8,10 25:16 76:5 81:3,4,8 82:11,23 84:18 85:21 89:3 90:10 96:6
**Salem** 32:4
**sat** 41:24
**Satartia** 84:4,9
**scenario** 25:19 86:25 87:24
**scenarios** 85:2 87:20 88:11
**schedule** 41:3
**scheduled** 77:21
**scheme** 51:4
**school** 64:2 79:4, 11
**scrubbing** 24:4
**seal** 82:17
**seals** 25:19
**secretary** 17:17
**section** 16:23 17:2,4,5,13,24,25 18:4,7,11 74:4
**SEERS** 51:13
**sees** 62:7
**seismograph** 35:18,22 66:18
**sell** 38:9
**seller** 19:16 21:4,8
**senate** 49:16 59:8 78:2 82:20 96:9, 19
**senator** 83:10 95:17
**senators** 84:16
**send** 23:9
**sense** 30:13
**sensitivities** 66:16
**separate** 46:14 85:21
**sequestration** 21:25 43:22 56:15 57:9
**serial** 25:21
**servant** 74:14
**service** 30:18 37:23 46:7 74:23 96:8
**session** 32:12 83:24
**set** 14:22 25:21 41:16 46:13 60:21 91:16
**setback** 31:18 89:11 90:2,4
**setbacks** 35:25 76:5 77:5 78:3,7 96:10
**sets** 89:9
**setting** 7:14 58:24 90:20
**settings** 81:4
**severely** 58:16 91:6
**sham** 55:13 80:17 93:1
**shame** 73:10
**shape** 10:17
**shapes** 16:19
**share** 12:16 34:14, 15 57:16 62:8 82:25
**shared** 27:9 42:3
**sharing** 42:5 50:13
**Sharmaine** 80:12
**sharp** 79:13
**sheet** 99:24
**Shenehon** 2:14 3:8,21,23,24
**Shide** 17:14
**shifting** 81:10
**shining** 39:23 40:4
**shit** 38:5
**shop** 85:3

**shot** 79:8
**show** 65:22 97:4
**showed** 61:22
**showing** 16:17
**shows** 16:13 32:10 50:25 63:7
**shut** 39:12
**sic** 39:17
**sick** 52:22
**sickens** 52:20
**side** 30:20
**sign** 27:16,17 28:1 41:7,10 78:12
**sign-in** 99:23
**signage** 52:5
**signed** 18:10 36:22 72:21 75:14 76:1
**significant** 24:16 30:18 38:20 84:6
**significantly** 42:11,13
**signing** 33:9 35:5 72:14
**signs** 52:8
**silence** 44:8
**silicon** 18:24
**silk-lined** 51:7,16, 22
**silly** 73:9
**Silvernagle** 80:5
**similar** 5:4 31:7 62:6 64:14
**simple** 4:8 22:19 34:4 39:20 45:7 51:2
**simply** 19:14 21:20 33:10 56:2 65:12 71:22 75:23 82:7 90:19
**simultaneous** 67:8
**single** 34:22
**sipping** 40:11
**sit** 21:22 79:13
**sites** 25:8
**sitting** 40:3
**situation** 83:22
**situations** 11:14
**size** 41:12 91:15
**Skaare** 20:17
**skills** 85:14
**skipped** 67:6
**Skjonsby** 47:4
**slightly** 97:12,15 98:3
**small** 91:18
**smaller** 72:13 91:17
**Smith** 80:4,14
**snippet** 70:17
**snow** 79:19
**software** 87:25
**solar** 18:23
**sold** 22:12
**solemnly** 2:20 15:9
**solve** 24:8
**someday** 51:6
**son** 18:5
**son's** 49:3
**song** 93:14
**sons** 79:8
**Sounds** 44:7
**sources** 26:5 36:8
**south** 22:24 23:1 40:3,5
**southeast** 17:1 18:7
**southwest** 15:19 17:24
**space** 6:3,15,18 9:11,16 11:3 12:8 13:15 14:1 17:18 19:1 21:2 41:1 42:16 46:6 53:13, 17 54:4,12,15 56:17 57:6 58:2 60:8,23,24 66:7, 10,12 67:14 69:1, 4 71:6 72:1,10,25 74:3,4,5,8,10 78:13,18,21,22 92:6,7
**speak** 92:1
**spearheaded** 33:12
**special** 24:15 32:6
**specific** 24:9 25:6, 8,21 30:22 68:18 88:10
**specifically** 26:16 27:16 30:14 49:7 74:3 78:17 87:11 96:17
**speed** 87:24
**spell** 3:3 32:13
**spending** 7:12
**spent** 22:9 51:25
**split** 42:6
**springs** 36:4
**square** 84:25
**St** 3:12
**staff** 14:6 94:23
**stages** 6:24
**stakeholders** 7:20
**stale** 10:22
**stand** 37:25
**standard** 34:18 40:18 42:12
**standards** 65:12 82:11 89:9
**standing** 79:20
**stands** 38:1
**stars** 39:25
**start** 11:1 24:6 29:11
**start-up** 22:25 95:4
**started** 3:21 8:14, 15,16 33:18,23 40:25 42:14
**starting** 8:23 75:22
**state** 3:2 4:11,12 5:11,16 15:16 17:17 21:12 31:8 32:1 36:1 37:25 38:1,19 44:17 45:20 46:20 48:11 49:9 50:21 53:1,4, 10,13,20,23 54:5, 10,16 55:3,7 56:10,16 58:25 59:1 60:10 63:5 64:2 66:6,25 71:11,18 72:3 74:13 75:20 82:4, 18 85:22,24 87:1 89:3,16,20 90:1

91:2 92:19 93:1,3

**state's** 31:14 44:20 48:3 58:16 90:17 91:11 93:8

**state-funded** 52:11

**stated** 21:4 33:5 46:4 61:21 73:23 74:19 78:18

**statement** 28:6 39:7 44:15 45:9 46:23 47:25 49:13 50:19 59:16 60:3 94:4,17

**statements** 43:22 44:13 46:16 48:12 74:18

**states** 49:6 55:24 59:9 81:15

**stating** 52:1 67:2

**station** 37:17 39:24 40:10 52:7

**stations** 41:16

**statute** 44:14 56:4, 13 60:9 66:8 76:21 77:22 87:17

**statutorily** 92:5

**statutory** 56:21 82:5

**stay** 99:15

**steel** 47:20

**Stockness** 2:14, 15,18 3:2,4 4:13 5:2 11:13 13:10 14:9,12

**Stone** 40:8

**storage** 5:20 6:19 7:4,9 9:11 12:9 44:16,22 49:20 64:3 67:5 68:14, 19 72:17 74:1,4,5, 11,21 75:2,7,17 76:25 78:6,19,20, 23,24 81:17 85:23 87:13,16 88:11, 14,16,18 91:16,18

**store** 5:23 9:13

**strategies** 26:20

**stratum** 34:13

**streams** 77:8 78:5

**Street** 15:18

**streets** 77:8

**structure** 39:6 40:22

**structured** 64:5

**study** 6:14 8:3,22 9:7 10:5,18 90:5

**stuff** 38:15 70:20

**stupid** 52:2

**subject** 72:20 74:8,18 78:11,23

**subjected** 65:11

**Subjecting** 74:15

**submit** 47:14 98:7, 14,16

**submitted** 70:19 81:23 87:9

**submitting** 30:24

**subservient** 19:19 55:21

**substances** 34:3,4 40:17 84:18

**substantial** 47:6,8 73:19

**substantiate** 55:7 72:7 73:18

**subsurface** 34:13

**suck** 51:23

**sugars** 23:24

**suggestions** 30:4 33:3

**sulfide** 34:3 85:19

**Summers** 80:8

**Summers-butler** 80:7

**Summers-gilmer** 80:8

**Summit** 48:19 67:5 91:2 95:3

**Summit's** 35:8 63:14

**Sunday** 20:10

**supplement** 98:7

**supplements** 98:17

**suppliers** 37:22

**supporting** 52:11

**supports** 87:15

**Supreme** 47:4 53:14,19,20

**surface** 4:8 5:13, 14 19:2 21:3 34:10 36:19,20 38:15 39:7 41:2, 14,16 54:13,14 76:19,20,22 77:6, 23 78:16,25 79:1, 4,7,9,11,16,21,23, 24

**surrounded** 68:8

**surrounding** 9:20 48:10 67:7 68:7, 15

**survey** 37:16

**sustaining** 24:19

**swan** 93:14

**swear** 2:20 15:9 30:23

**swearing** 61:3

**Swenson** 15:6,7,8, 18 16:11 28:24 29:18 30:2 35:6 44:12 56:24 58:10 59:25 67:24 69:15 70:14,22 80:2,3 81:1 83:3,17 87:5 90:13 94:5 97:20

**swindled** 61:5

**switch** 11:13

**system** 25:18

**systems** 23:16,18 25:16

## T

**table** 99:5

**tail** 79:13

**takes** 7:22 8:11 21:4

**taking** 6:25 10:17 12:5 19:14 45:11, 23,24 47:1,5 51:4 53:2,10,11,17,18, 22,23 54:1,9 55:4, 9 59:10,12,14,20, 22 60:2 73:15,20 76:3 92:12

**talk** 20:9,12 28:25 44:3 46:17 81:2,4, 6 84:11 95:24

**talked** 81:2 82:3 95:21

**talking** 64:17

**talks** 34:12

**Tammy** 80:8

**tanked** 42:13
**targeted** 28:12
**task** 43:16
**tax** 42:10 45:19 50:12 51:11,22 61:14 64:14 67:17,22
**taxes** 50:22 52:13, 15
**taxpayer** 19:3,13 50:22 51:4 52:14, 22 90:20 93:5
**taxpayers'** 51:24
**TB** 68:12
**team** 10:20 61:21
**teat** 51:24
**technical** 7:8 49:17
**technology** 31:4 35:22
**telling** 78:1
**tells** 89:6
**temperature** 46:24 87:24
**temporary** 53:21
**tenure** 24:8
**term** 59:2 60:9 74:7
**terminus** 46:9
**terms** 9:10 10:22 11:23 21:21 27:1 29:2 39:3 62:2 72:20
**test** 36:7
**testified** 4:12 46:23 47:12 50:17 54:5 60:20 66:13, 18 67:17 91:13,19
**testimony** 2:21 6:8 13:13 15:10 54:3 56:6 72:11 73:3,21 78:10 91:23 94:11 98:11
**testing** 36:6
**Texas** 9:23 64:3
**thee** 75:19
**theories** 31:5
**thick** 85:4
**thing** 49:15 54:18 58:22 59:5 78:25 85:10
**things** 6:25 10:13, 19,21 14:22 25:1 35:2 37:1 41:17 60:22 62:7 73:9 76:15 77:8 78:4,6 93:6 97:2
**thinking** 28:9 85:14
**Thomas** 3:13
**Thomases** 16:25
**thought** 34:17 36:14 63:10 86:16
**threat** 8:9
**three-sixteenth** 42:20
**three-sixteenths** 64:9
**threshold** 45:15 47:6 50:20 73:14
**tied** 48:5 55:19
**tier** 16:23 17:2,4, 13,25 18:4
**time** 5:18 6:1,2,7 7:7 8:11 14:14,16 22:8,13 23:8 24:6 39:1 41:1,4 42:1, 13 54:20 57:15,17 83:23 86:2 91:6,9 93:4,19 96:4,9 99:5,9,19
**times** 7:21 24:14 62:18 63:2,19 95:5
**title** 35:7
**today** 5:6 6:4,9 10:18,21 12:24 13:16,19 17:22 18:15 21:22 30:23 31:2 40:13 43:2 67:12 69:2 75:16 93:3
**toilet** 33:18 43:9
**told** 45:16 76:8
**ton** 9:4,5,6 61:11, 16 62:18 63:2,8, 16,19
**tone** 94:11
**tons** 24:7 40:16 41:21 51:14
**tool** 85:1,2
**topic** 32:3 87:2
**topics** 33:20,22 35:14
**topographic** 25:22
**topography** 25:8, 22 88:6
**total** 22:13 75:4 77:2
**towers** 41:14
**town** 20:13 33:20
**tractor** 20:14
**traditionally** 24:2
**training** 24:22 25:17 26:18,23
**transaction** 7:21 8:9,11
**transactions** 7:22 8:17,21 11:20 62:16
**transcript** 92:2
**transfer** 51:3 54:7
**transport** 47:11, 18,21
**transportation** 64:3
**travel** 92:17
**treated** 19:15 74:8 77:16
**treatment** 17:23
**treats** 76:14
**treaty** 19:15,20 20:1
**tree** 39:16,17
**tremendous** 93:2, 4
**trespass** 67:19 69:1
**trial** 19:24 55:11 76:3
**truck** 38:14 39:12
**trucks** 35:18 52:6 90:5
**true** 2:22
**trump** 19:21
**trust** 15:6 16:12 33:13,14 38:19 67:2,3 68:18 70:22 75:12,14 85:22
**trustee** 15:7
**trustees** 16:11
**trusting** 82:9
**truth** 15:11

**tub** 40:3
**Tuesday** 35:11
**Tundra** 56:14 57:8
**turned** 20:21 62:8
**TV** 32:10
**Ty** 12:23
**type** 6:11 85:21 86:23
**typed** 57:25
**types** 4:5
**Typical** 75:19
**tyrannical** 54:19

**U**

**U.S.** 53:20
**Ugh** 65:24
**Uh-huh** 97:24
**Ullin** 31:24 32:5
**ultimately** 12:15 30:11 41:25 67:20 70:19 96:8
**unable** 67:14 69:1
**uncle** 17:3 18:8
**uncompensated** 72:9
**unconstitutional** 19:13 32:16 45:11 54:18 55:24 76:4
**undefined** 60:9
**underground** 5:19,24 7:9
**understand** 7:3,24 8:8 9:8 11:2,21,22 14:3 24:22 39:3 52:2 72:19 77:4
**understanding** 13:13 23:20 48:20 69:14,19 75:10,13
**understood** 42:10
**undervalued** 64:24 65:12
**underway** 14:21
**unenforced** 89:20
**unfairness** 77:18
**UNIDENTIFIED** 2:10 49:19 86:1,9, 15,19 93:16 94:25 99:21,25
**unique** 25:3
**uniquely** 25:3
**unit** 22:11
**units** 22:10,15
**University** 3:12 26:24
**unleased** 74:3
**unlike** 23:25 42:16
**unplanned** 82:2
**unproven** 37:10
**unreasonably** 39:22
**unrelated** 10:5
**unrestrained** 18:25
**unrestricted** 36:19,20
**unsubstantiated** 71:20
**untenable** 62:9
**uplift** 42:4 50:14
**upper** 4:2 9:7 68:3
**utilities** 5:15
**utility** 46:1,2
**utilize** 9:21
**utilized** 87:25
**utmost** 25:5

**V**

**vacuum** 24:10
**valuable** 16:4 39:8 44:23
**valuation** 3:15,20, 22,25 5:3,13,18 6:3,8,17 7:7 12:1 64:14
**valuations** 4:4
**values** 41:12
**valuing** 4:6 7:8
**valve** 87:23
**valves** 24:10 82:3 87:21
**vapor** 81:23 84:5, 7,11,15,20 85:11 89:8 90:7 92:15, 21
**vapors** 24:19 84:22
**variation** 8:24 9:1 81:18
**varying** 26:3
**vehicles** 47:19
**verify** 7:23 89:18
**verifying** 8:8
**version** 20:25 27:7 28:20 30:20 43:8 75:16
**versions** 30:25 33:25
**versus** 47:4 63:14 64:8
**vet** 17:3
**veterans** 79:10
**viability** 44:19
**vice** 3:22 23:4
**video** 20:6 49:15 59:15 78:5 96:24
**view** 50:5
**views** 31:21
**virtual** 28:3
**vision** 97:11
**vitae** 4:18,19
**voidance** 72:14
**volume** 9:12 67:21
**vote** 78:2

**W**

**Wade** 22:5
**waited** 30:24
**waiting** 30:25 43:2 79:20
**walk** 16:22 42:24 56:25
**walls** 85:4
**wanted** 16:2,4 20:12 21:18 34:17,21 36:21,22 38:11,21,23 39:6, 18 78:12
**wanting** 18:21,23, 25 33:24
**War** 17:3
**warranties** 35:1
**warranty** 35:7
**Warren** 80:3
**waste** 90:20
**wasted** 91:8
**watch** 79:13

**watched** 96:25
**water** 35:20,23 36:4,5,7
**water-saturated** 50:2
**Wayne** 80:3
**ways** 35:19
**Wazwek** 80:3
**wealth** 51:3
**weather** 25:9,23 87:23
**website** 97:1
**week** 73:6
**weight** 50:24
**well-funded** 32:24
**wells** 36:6 38:2,3 67:8,9 68:24 90:3
**Wes** 49:1
**Wes's** 49:2
**west** 16:24 17:2,4, 12,13,25 18:4 42:11
**wheat** 79:5
**wheel** 91:5
**white** 68:17 97:4, 5,18,23
**Whoa** 93:16,17
**whopping** 61:17
**wide** 23:15 25:23
**wife** 15:21 74:11
**wife's** 17:1
**William** 40:8
**wind** 18:20 40:6 87:24
**windmill** 18:1
**window** 37:18 39:24
**windows** 18:22
**winds** 79:19
**winter** 79:17
**wise** 97:15
**withhold** 39:22
**witness's** 69:9
**witnesses** 99:4
**woke** 39:15
**word** 61:7
**words** 70:22 94:10
**work** 4:6,20 5:3,9 6:1 8:16 14:13 22:6 24:13 26:11, 13 33:3 47:20 49:7,23
**worked** 17:10,20 43:14 75:3 77:1 81:9
**workforce** 93:7
**working** 3:15 5:19, 20 6:17,19,20 7:18 10:10 95:1
**works** 34:23 53:4
**world** 17:3 34:13
**world's** 23:2,6
**worried** 81:9
**worry** 52:2
**worst** 25:19
**worth** 13:16 40:24 41:1
**written** 32:8 57:3 76:6
**wrong** 59:12 86:17,23

Y

**year** 7:14 10:16 24:5 31:6 51:14 79:10
**year's** 24:6
**years** 4:3 10:23 17:9 22:7 26:16, 17 52:15 67:13,21 68:23 75:22 90:4
**yeast** 23:23
**yesterday** 35:9 54:3 66:13,18 82:3 91:20
**Yocumb** 80:11
**young** 22:24
**youth** 79:10

Z

**zilch** 58:24 85:10
**zone** 50:2

## FedEx Express Shipment Summary By Payor Type

**FedEx Express Shipments (Original)**

| Payor Type | Shipments | Rated Weight lbs | Transportation Charges | Special Handling Charges | Ret Chg/Tax Credits/Other | Discounts | Total Charges |
|---|---|---|---|---|---|---|---|
| Shipper | 2 | | 14.84 | 1.04 | | | 15.88 |
| **Total FedEx Express** | **2** | | **$14.84** | **$1.04** | | | **$15.88** |

**TOTAL THIS INVOICE** **USD** **$15.88**

## FedEx Express Shipment Detail By Payor Type (Original)

**Ship Date:** Apr 16, 2024 **Cust. Ref.:** NO REFERENCE INFORMATION **Ref.#2:**
**Payor:** Shipper **Ref.#3:**

Fuel Surcharge - FedEx has applied a fuel surcharge of 17.25% to this shipment.
Distance Based Pricing, Zone 6

| | |
|---|---|
| Automation | INET |
| Tracking ID | 775977926144 |
| Service Type | FedEx Express Saver |
| Package Type | FedEx Envelope |
| Zone | 06 |
| Packages | 1 |
| Rated Weight | N/A |
| Delivered | Apr 18, 2024 09:44 |
| Svc Area | A2 |
| Signed by | E.CHEW |
| FedEx Use | 000000000/46890/_ |

**Sender**
Trudi Hogue
DEPT OF MINERAL RESOURCES
1016 E Calgary Ave
BISMARCK ND 58503 US

**Recipient**
front desk
Bureau of Indian Affairs
1849 C St NW
WASHINGTON DC 20240 US

| | | |
|---|---|---|
| Transportation Charge | | 7.42 |
| Fuel Surcharge | | 0.52 |
| Courier Pickup Charge | | 0.00 |
| **Total Charge** | **USD** | **$7.94** |

### FedEx® Billing Online

FedEx Billing Online allows you to efficiently manage and pay your FedEx invoices online. It's free, easy and secure. FedEx Billing Online helps you streamline your billing process. With all your FedEx shipping information available in one secure online location, you never have to worry about misplacing a paper invoice or sifting through reams of paper to find information for past shipments. Go to fedex.com to sign up today!

FedEx

April 25, 2024

Dear Customer,

The following is the proof-of-delivery for tracking number: 775977926144

**Delivery Information:**

| | | | |
|---|---|---|---|
| **Status:** | Delivered | **Delivered To:** | Mailroom |
| **Signed for by:** | E.CHEW | **Delivery Location:** | |
| **Service type:** | FedEx Express Saver | | |
| **Special Handling:** | Deliver Weekday | | WASHINGTON, DC, |
| | | **Delivery date:** | Apr 18, 2024 09:44 |

**Shipping Information:**

| | | | |
|---|---|---|---|
| **Tracking number:** | 775977926144 | **Ship Date:** | Apr 16, 2024 |
| | | **Weight:** | 0.5 LB/0.23 KG |

**Recipient:**

WASHINGTON, DC, US,

**Shipper:**

BISMARCK, ND, US,

FedEx Express proof-of-delivery details appear below; however, no signature is currently available for this shipment. Please check again later for a signature.

FedEx

| Invoice Number | Invoice Date | Account Number | Page |
|---|---|---|---|
| 8-479-85989 | Apr 23, 2024 | 1145-9344-3 | 3 of 3 |

**Ship Date:** Apr 16, 2024 **Cust. Ref.:** NO REFERENCE INFORMATION **Ref.#2:**
**Payor:** Shipper **Ref.#3:**

Fuel Surcharge - FedEx has applied a fuel surcharge of 17.25% to this shipment.
Distance Based Pricing, Zone 6

| | |
|---|---|
| Automation | INET |
| Tracking ID | 775977947613 |
| Service Type | FedEx Express Saver |
| Package Type | FedEx Envelope |
| Zone | 06 |
| Packages | 1 |
| Rated Weight | N/A |
| Delivered | Apr 18, 2024 09:44 |
| Svc Area | A2 |
| Signed by | E.CHEW |
| FedEx Use | 000000000/46890/_ |

**Sender**
Trudi Hogue
DEPT OF MINERAL RESOURCES
1016 E Calgary Ave
BISMARCK ND 58503 US

**Recipient**
front desk
US Dept of Interior
1849 C St NW
WASHINGTON DC 20240 US

| | | |
|---|---|---|
| Transportation Charge | | 7.42 |
| Fuel Surcharge | | 0.52 |
| Courier Pickup Charge | | 0.00 |
| **Total Charge** | **USD** | **$7.94** |
| **Shipper Subtotal** | **USD** | **$15.88** |
| **Total FedEx Express** | **USD** | **$15.88** |

FedEx

April 25, 2024

Dear Customer,

The following is the proof-of-delivery for tracking number: 775977947613

**Delivery Information:**

| | | | |
|---|---|---|---|
| **Status:** | Delivered | **Delivered To:** | Mailroom |
| **Signed for by:** | E.CHEW | **Delivery Location:** | |
| **Service type:** | FedEx Express Saver | | |
| **Special Handling:** | Deliver Weekday | | WASHINGTON, DC, |
| | | **Delivery date:** | Apr 18, 2024 09:44 |

**Shipping Information:**

| | | | |
|---|---|---|---|
| **Tracking number:** | 775977947613 | **Ship Date:** | Apr 16, 2024 |
| | | **Weight:** | 0.5 LB/0.23 KG |

**Recipient:**

WASHINGTON, DC, US,

**Shipper:**

BISMARCK, ND, US,

FedEx Express proof-of-delivery details appear below; however, no signature is currently available for this shipment. Please check again later for a signature.

# Affidavit of Publication

STATE OF NORTH DAKOTA,
COUNTY OF MERCER, ss.

I, Lori Cox, being first duly sworn, on oath says, that she is the bookkeeper of the THE HAZEN STAR, a weekly newspaper published in Hazen, County of Mercer, and has full and personal knowledge of all the facts herein stated; that said newspaper is a legal newspaper and has a bona fide circulation of at least two hundred copies weekly, and has been published within said county for fifty-two successive weeks next prior to the publication of the notice herein mentioned; that the

Notice Of Hearing Starting Case No. 30869

ND Mineral Resources Oil & Gas Division

a printed copy of which, taken from the paper in which same was published, is attached to this sheet, and is made a part of this Affidavit, was published in said newspaper at least once each week for 2 successive week, on the day of each week on which said newspaper was regularly published to-wit:

3 - Hazen Star: 5/2/2024, 5/9/2024

That the full amount of the fees for the publication of the annexed notice is: $ 641.24

Lori Cox

Subscribed and sworn to before me this 5/10/2024

Arden Pahl

Arden Pahl, Notary Public
State of South Dakota
My commission expires August 1, 2025

ARDEN PAHL
Notary Public
South Dakota
SEAL SEAL

# NOTICE OF HEARING N.D. INDUSTRIAL COMMISSION OIL AND GAS DIVISION

The North Dakota Industrial Commission will hold a public hearing at 9:00 AM CDT Tuesday, June 11, 2024 – Wednesday, June 12, 2024 at N.D. Oil & Gas Division 1000 East Calgary Avenue Bismarck, North Dakota. At the hearing the Commission will receive testimony and exhibits. Persons with any interest in the cases listed below, take notice.

PERSONS WITH DISABILITIES: If at the hearing you need special facilities or assistance, contact the Oil and Gas Division at 701-328-8038 by Tuesday, May 28, 2024.

STATE OF NORTH DAKOTA TO:

Case No. 30869 In the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND pursuant to North Dakota Administrative Code Chapter 43-05-01. View the draft storage facility permit, fact sheet, and storage facility permit application at www.dmr.nd.gov/dmr/oilgas/. Summit Carbon Storage #1, LLC intends to receive carbon dioxide from the Midwest Carbon Express Pipeline and sequester it in the Broom Creek Formation. The Commission will accept and consider written comments on the merits of the application and draft permit if received no later than 5:00 pm CDT June 10, 2024. Submit written comments to the Oil and Gas Division, 1016 East Calgary Ave, Bismarck, ND 58503-5512 or slforsberg@nd.gov. Further draft permit information may be obtained from Tammy Madche, and further hearing information may be obtained from Sara Forsberg, both at the ND Oil and Gas Division, 1016 East Calgary Ave, Bismarck, ND 58503-5512, 701-328-8020. Summit Carbon Storage #1, LLC, 2321 North Loop Dr Suite #221, Ames, IA 50010.

Case No. 30870 In the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation, pursuant to North Dakota Century Code Section 38-22-10.

Case No. 30871 In the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

Case No. 30873 In the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND pursuant to North Dakota Administrative Code Chapter 43-05-01. View the draft storage facility permit, fact sheet, and storage facility permit application at www.dmr.nd.gov/dmr/oilgas/. Summit Carbon Storage #2, LLC intends to receive carbon dioxide from the Midwest Carbon Express Pipeline and sequester it in the Broom Creek Formation. The Commission will accept and consider written comments on the merits of the application and draft permit if received no later than 5:00 pm CDT June 10, 2024. Submit written comments to the Oil and Gas Division, 1016 East Calgary Ave, Bismarck, ND 58503-5512 or slforsberg@nd.gov. Further draft permit information may be obtained from Tammy Madche, and further hearing information may be obtained from Sara Forsberg, both at the ND Oil and Gas Division, 1016 East Calgary Ave, Bismarck, ND 58503-5512, 701-328-8020. Summit Carbon Storage #2, LLC, 2321 North Loop Dr Suite #221, Ames, IA 50010.

Case No. 30872 In the matter of a hearing called on a motion of the Commission to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

Case No. 30873 In the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND pursuant to North Dakota Administrative Code Chapter 43-05-01. View the draft storage facility permit, fact sheet, and storage facility permit application at www.dmr.nd.gov/dmr/oilgas/. Summit Carbon Storage #2, LLC intends to receive carbon dioxide from the Midwest Carbon Express Pipeline and sequester it in the Broom Creek Formation. The Commission will accept and consider written comments on the merits of the application and draft permit if received no later than 5:00 pm CDT June 10, 2024. Submit written comments to the Oil and Gas Division, 1016 East Calgary Ave, Bismarck, ND 58503-5512 or slforsberg@nd.gov. Further draft permit information may be obtained from Tammy Madche, and further hearing information may be obtained from Sara Forsberg, both at the ND Oil and Gas Division, 1016 East Calgary Ave, Bismarck, ND 58503-5512, 701-328-8020. Summit Carbon Storage #2, LLC, 2321 North Loop Dr Suite #221, Ames, IA 50010.

Case No. 30874 In the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation, pursuant to North Dakota Century Code Section 38-22-10.

Case No. 30875 In the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation, pursuant to North Dakota Administrative Code Section 43-05-01-09.1.

Case No. 30876 In the matter of a hearing called on a motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

Signed by,
Doug Burgum, Governor
Chairman, NDIC

(05-02-2024)(05-09-2024)

RECEIVED
APR 30 2024
MINERAL RESOURCES

# Affidavit of Publication

STATE OF NORTH DAKOTA,
COUNTY OF OLIVER, ss.

I, Lori Cox, being first duly sworn, on oath says, that she is the bookkeeper of the CENTER REPUBLICAN, a weekly newspaper published in Center, County of Oliver, and has full and personal knowledge of all the facts herein stated; that said newspaper is a legal newspaper and has a bona fide circulation of at least two hundred copies weekly, and has been published within said county for fifty-two successive weeks next prior to the publication of the notice herein mentioned; that the

Notice Of Hearing Starting Case No. 30869

ND Mineral Resources Oil & Gas Division

a printed copy of which, taken from the paper in which same was published, is attached to this sheet, and is made a part of this Affidavit, was published in said
newspaper at least once each week for 1 successive week, on the day of each week on which said newspaper was regularly published to-wit:

3 - Center Republican: 4/18/2024

That the full amount of the fees for
the publication of the annexed notice is: $ 320.62

Lori Cox

Subscribed and sworn to before me this 4/18/2024

Arden Pahl

Arden Pahl, Notary Public
State of South Dakota
My commission expires August 1, 2025

ARDEN PAHL
Notary Public
South Dakota
SEAL SEAL

# NOTICE OF HEARING N.D. INDUSTRIAL COMMISSION OIL AND GAS DIVISION

The North Dakota Industrial Commission will hold a public hearing at 9:00 AM CDT Tuesday, June 11, 2024 – Wednesday, June 12, 2024 at N.D. Oil & Gas Division 1000 East Calgary Avenue Bismarck, North Dakota. At the hearing the Commission will receive testimony and exhibits. Persons with any interest in the cases listed below, take notice. PERSONS WITH DISABILITIES: If at the hearing you need special facilities or assistance, contact the Oil and Gas Division at 701-328-8038 by Tuesday, May 28, 2024.

STATE OF NORTH DAKOTA TO:

Case No. 30869 In the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND pursuant to North Dakota Administrative Code Chapter 43-05-01. View the draft storage facility permit, fact sheet, and storage facility permit application at www.dmr.nd.gov/dmr/oilgas/. Summit Carbon Storage #1, LLC intends to receive carbon dioxide from the Midwest Carbon Express Pipeline and sequester it in the Broom Creek Formation. The Commission will accept and consider written comments on the merits of the application and draft permit if received no later than 5:00 pm CDT June 10, 2024. Submit written comments to the Oil and Gas Division, 1016 East Calgary Ave, Bismarck, ND 58503-5512 or slforsberg@nd.gov. Further draft permit information may be obtained from Tammy Madche, and further hearing information may be obtained from Sara Forsberg, both at the ND Oil and Gas Division, 1016 East Calgary Ave, Bismarck, ND 58503-5512, 701-328-8020. Summit Carbon Storage #1, LLC, 2321 North Loop Dr Suite #221, Ames, IA 50010.

Case No. 30870 In the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation, pursuant to North Dakota Century Code Section 38-22-10.

Case No. 30871 In the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31; 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation, pursuant to North Dakota Administrative Code Section 43-05-01-09.1.

Case No. 30872 In the matter of a hearing called on a motion of the Commission to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

Case No. 30873 In the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND pursuant to North Dakota Administrative Code Chapter 43-05-01. View the draft storage facility permit, fact sheet, and storage facility permit application at www.dmr.nd.gov/dmr/oilgas/. Summit Carbon Storage #2, LLC intends to receive carbon dioxide from the Midwest Carbon Express Pipeline and sequester it in the Broom Creek Formation. The Commission will accept and consider written comments on the merits of the application and draft permit if received no later than 5:00 pm CDT June 10, 2024. Submit written comments to the Oil and Gas Division, 1016 East Calgary Ave, Bismarck, ND 58503-5512 or slforsberg@nd.gov. Further draft permit information may be obtained from Tammy Madche, and further hearing information may be obtained from Sara Forsberg, both at the ND Oil and Gas Division, 1016 East Calgary Ave, Bismarck, ND 58503-5512, 701-328-8020. Summit Carbon Storage #2, LLC, 2321 North Loop Dr Suite #221, Ames, IA 50010.

Case No. 30874 In the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation, pursuant to North Dakota Century Code Section 38-22-10.

Case No. 30875 In the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation, pursuant to North Dakota Administrative Code Section 43-05-01-09.1.

Case No. 30876 In the matter of a hearing called on a motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

Case No. 30877 In the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND pursuant to North Dakota Administrative Code Chapter 43-05-01. View the draft storage facility permit, fact sheet, and storage facility permit application at www.dmr.nd.gov/dmr/oilgas/. Summit Carbon Storage #3, LLC intends to receive carbon dioxide from the Midwest Carbon Express Pipeline and sequester it in the Broom Creek Formation. The Commission will accept and consider written comments on the merits of the application and draft permit if received no later than 5:00 pm CDT June 10, 2024. Submit written comments to the Oil and Gas Division, 1016 East Calgary Ave, Bismarck, ND 58503-5512 or slforsberg@nd.gov. Further draft permit information may be obtained from Tammy Madche, and further hearing information may be obtained from Sara Forsberg, both at the ND Oil and Gas Division, 1016 East Calgary Ave, Bismarck, ND 58503-5512, 701-328-8020. Summit Carbon Storage #3, LLC, 2321 North Loop Dr Suite #221, Ames, IA 50010.

Case No. 30878 In the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation, pursuant to North Dakota Century Code Section 38-22-10.

Case No. 30879 In the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation, pursuant to North Dakota Administrative Code Section 43-05-01-09.1.

Case No. 30880 In the matter of a hearing called on a motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

Signed by,
Doug Burgum, Governor
Chairman, NDIC

(04-18-2024)

# Affidavit of Publication

STATE OF NORTH DAKOTA,
COUNTY OF OLIVER, ss.

I, Lori Cox, being first duly sworn, on oath says, that she is the bookkeeper of the CENTER REPUBLICAN, a weekly newspaper published in Center, County of Oliver, and has full and personal knowledge of all the facts herein stated; that said newspaper is a legal newspaper and has a bona fide circulation of at least two hundred copies weekly, and has been published within said county for fifty-two successive weeks next prior to the publication of the notice herein mentioned; that the

Notice of Hearing June 11 and 12

ND Mineral Resources Oil & Gas Division

a printed copy of which, taken from the paper in which same was published, is attached to this sheet, and is made a part of this Affidavit, was published in said
newspaper at least once each week for 2 successive week, on the day of each week on which said newspaper was regularly published to-wit:

3 - Center Republican: 5/9/2024, 5/16/2024

That the full amount of the fees for
the publication of the annexed notice is: $ 320.62

Lori Cox

Subscribed and sworn to before me this 5/16/2024

Arden Pahl

Arden Pahl, Notary Public
State of South Dakota
My commission expires August 1, 2025

ARDEN PAHL
Notary Public
South Dakota
SEAL SEAL

# NOTICE OF HEARING N.D. INDUSTRIAL COMMISSION OIL AND GAS DIVISION

The North Dakota Industrial Commission will hold a public hearing at 9:00 AM CDT Tuesday, June 11, 2024 – Wednesday, June 12, 2024 at N.D. Oil & Gas Division 1000 East Calgary Avenue Bismarck, North Dakota. At the hearing the Commission will receive testimony and exhibits. Persons with any interest in the cases listed below, take notice.

PERSONS WITH DISABILITIES: If at the hearing you need special facilities or assistance, contact the Oil and Gas Division at 701-328-8036 by Tuesday, May 28, 2024.

STATE OF NORTH DAKOTA TO:

Case No. 30869 In the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND pursuant to North Dakota Administrative Code Chapter 43-05-01. View the draft storage facility permit, fact sheet, and storage facility permit application at www.dmr.nd.gov/dmr/oilgas/. Summit Carbon Storage #1, LLC intends to receive carbon dioxide from the Midwest Carbon Express Pipeline and sequester it in the Broom Creek Formation. The Commission will accept and consider written comments on the merits of the application and draft permit if received no later than 5:00 pm CDT June 10, 2024. Submit written comments to the Oil and Gas Division, 1016 East Calgary Ave, Bismarck, ND 58503-5512 or sflorsberg@nd.gov. Further draft permit information may be obtained from Tammy Madche, and further hearing information may be obtained from Sara Forsberg, both at the ND Oil and Gas Division, 1016 East Calgary Ave, Bismarck, ND 58503-5512, 701-328-8020. Summit Carbon Storage #1, LLC, 2321 North Loop Dr Suite #221, Ames, IA 50010.

Case No. 30870 In the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation, pursuant to North Dakota Century Code Section 38-22-10.

Case No. 30871 In the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation, pursuant to North Dakota Century Code Section 43-05-01-09.1.

Case No. 30872 In the matter of a hearing called on a motion of the Commission to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

Case No. 30873 In the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND pursuant to North Dakota Administrative Code Section 43-05-01-09.1. View the draft storage facility permit, fact sheet, and storage facility permit application at www.dmr.nd.gov/dmr/oilgas/. Summit Carbon Storage #2, LLC intends to receive carbon dioxide from the Midwest Carbon Express Pipeline and sequester it in the Broom Creek Formation. The Commission will accept and consider written comments on the merits of the application and draft permit if received no later than 5:00 pm CDT June 10, 2024. Submit written comments to the Oil and Gas Division, 1016 East Calgary Ave, Bismarck, ND 58503-5512 or sflorsberg@nd.gov. Further draft permit information may be obtained from Tammy Madche, and further hearing information may be obtained from Sara Forsberg, both at the ND Oil and Gas Division, 1016 East Calgary Ave, Bismarck, ND 58503-5512, 701-328-8020. Summit Carbon Storage #2, LLC, 2321 North Loop Dr Suite #221, Ames, IA 50010.

Case No. 30874 In the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation, pursuant to North Dakota Century Code Section 38-22-10.

Case No. 30875 In the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation, pursuant to North Dakota Administrative Code Section 43-05-01-09.1.

Case No. 30876 In the matter of a hearing called on a motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

Case No. 30877 In the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 88 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 88 West, and Sections 5, 6, 7, 8, 17, 18, 19, and 20, Township 142 North, Range 87 West, Oliver County, ND pursuant to North Dakota Administrative Code Chapter 43-05-01. View the draft storage facility permit, fact sheet, and storage facility permit application at www.dmr.nd.gov/dmr/oilgas/. Summit Carbon Storage #3, LLC intends to receive carbon dioxide from the Midwest Carbon Express Pipeline and sequester it in the Broom Creek Formation. The Commission will accept and consider written comments on the merits of the application and draft permit if received no later than 5:00 pm CDT June 10, 2024. Submit written comments to the Oil and Gas Division, 1016 East Calgary Ave, Bismarck, ND 58503-5512 or sflorsberg@nd.gov. Further draft permit information may be obtained from Tammy Madche, and further hearing information may be obtained from Sara Forsberg, both at the ND Oil and Gas Division, 1016 East Calgary Ave, Bismarck, ND 58503-5512, 701-328-8020. Summit Carbon Storage #3, LLC, 2321 North Loop Dr Suite #221, Ames, IA 50010.

Case No. 30878 In the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 88 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 88 West, and Sections 5, 6, 7, 8, 17, 18, 19, and 20, Township 142 North, Range 87 West, Oliver County, ND, in the Broom Creek Formation, pursuant to North Dakota Century Code Section 38-22-10.

Case No. 30879 In the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 88 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 88 West, and Sections 5, 6, 7, 8, 17, 18, 19, and 20, Township 142 North, Range 87 West, Oliver County, ND, in the Broom Creek Formation, pursuant to North Dakota Administrative Code Section 43-05-01-09.1.

Case No. 30880 In the matter of a hearing called on a motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 88 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 88 West, and Sections 5, 6, 7, 17, 18, 19, and 20, Township 142 North, Range 87 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

Signed by,
Doug Burgum, Governor
Chairman, NDIC

(05-09-2024)(05-16-2024)

The Bismarck Tribune

**AFFIDAVIT OF PUBLICATION**

State of Florida, County of Orange, ss:

Laquansay Nickson Watkins, being first duly sworn, deposes and says: That (s)he is a duly authorized signatory of Column Software, PBC and duly authorized agent of The Bismarck Tribune, and that the publication(s) were made through The Bismarck Tribune on the following dates:

**PUBLICATION DATES:**
Apr. 17, 2024

**NOTICE ID:** IB9WD6SvUFHydXLMmB4c
**PUBLISHER ID:** COL-ND-0004
**NOTICE NAME:** June 11 & 12, 2024 Hearing
**Publication Fee:** $757.62

(Signature) Laquansay Nickson Watkins

**VERIFICATION**

State of Florida
County of Orange

PAMELA BAEZ
Notary Public - State of Florida
Commission # HH 186700
Expires on October 14 2025

Subscribed in my presence and sworn to before me on this: 04/18/2024

Notary Public
Notarized remotely online using communication technology via Proof.

**NOTICE OF HEARING**
N D INDUSTRIAL COMMISSION
OIL AND GAS DIVISION
The North Dakota Industrial Commission will hold a public hearing at 9:00 AM CDT Tuesday, June 11, 2024 – Wednesday, June 12, 2024 at N D Oil & Gas Division 1000 East Calgary Avenue Bismarck, North Dakota At the hearing the Commission will receive testimony and exhibits Persons with any interest in the cases listed below, take notice
PERSONS WITH DISABILITIES: If at the hearing you need special facilities or assistance, contact the Oil and Gas Division at 701-328-8038 by Tuesday, May 28, 2024.
STATE OF NORTH DAKOTA TO:
Case No **30869** In the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23 24, 25 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND pursuant to North Dakota Administrative Code Chapter 43-05-01. View the draft storage facility permit, fact sheet, and storage facility permit application at www.dmr.nd.gov/dmr/oilgas/. Summit Carbon Storage #1, LLC intends to receive carbon dioxide from the Midwest Carbon Express Pipeline and sequester it in the Broom Creek Formation. The Commission will accept and consider written comments on the merits of the application and draft permit if received no later than 5:00 pm CDT June 10, 2024. Submit written comments to the Oil and Gas Division, 1016 East Calgary Ave, Bismarck, ND 58503-5512 or sfarsberg@nd.gov. Further draft permit information may be obtained from Tammy Madche, and further hearing information may be obtained from Sara Farsberg, both at the ND Oil and Gas Division, 1016 East Calgary Ave, Bismarck, ND 58503-5512, 701-328-8020. Summit Carbon Storage #1, LLC, 2321 North Loop Dr Suite #221, Ames, IA 50010.

Case No **30870** In the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #1, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by non-consenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1, LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND in the Broom Creek Formation, pursuant to North Dakota Century Code

Section 38-22-10

Case No **30871** In the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #1, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33 and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND in the Broom Creek Formation, pursuant to North Dakota Administrative Code Section 43-05-01-09.1

Case No. **30872** In the matter of a hearing called on a motion of the Commission to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary

Case No **30873** In the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND pursuant to North Dakota Administrative Code Chapter 43-05-01. View the draft storage facility permit, fact sheet, and storage facility permit application at www.dmr.nd.gov/dmr/oilgas/. Summit Carbon Storage #2, LLC intends to receive carbon dioxide from the Midwest Carbon Express Pipeline and sequester it in the Broom Creek Formation. The Commission will accept and consider written comments on the merits of the application and draft permit if received no later than 5:00 pm CDT June 10, 2024. Submit written comments to the Oil and Gas Division, 1016 East Calgary Ave, Bismarck, ND 58503-5512 or sforsberg@nd.gov. Further draft permit information may be obtained from Tammy Madche, and further hearing information may be obtained from Sara Forsberg, both at the ND Oil and Gas Division, 1016 East Calgary Ave, Bismarck, ND 58503-5512, 701-328-8020. Summit Carbon Storage #2, LLC, 2321 North Loop Dr Suite #221, Ames, IA 50010

Case No. **30874** In the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation, pursuant to North Dakota Century Code Section 38-22-10

Case No **30875** In the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation, pursuant to North Dakota Administrative Code Section 43-05-01-09.1

Case No **30876** In the matter of a hearing called on a motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary

Case No **30877** In the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND pursuant to North Dakota Administrative Code Chapter 43-05-01. View the draft storage facility permit, fact sheet, and storage facility permit application at www.dmr.nd.gov/dmr/oilgas/. Summit Carbon Storage #3, LLC intends to receive carbon dioxide from the Midwest Carbon Express Pipeline and sequester it in the Broom Creek Formation. The Commission will accept and consider written comments on the merits of the application and draft permit if received no later than 5:00 pm CDT June 10, 2024. Submit written comments to the Oil and Gas Division, 1016 East Calgary Ave, Bismarck, ND 58503-5512 or sforsberg@nd.gov. Further draft permit information may be obtained from Tammy Madche, and further hearing information may be obtained from Sara Forsberg, both at the ND Oil and Gas Division, 1016 East Calgary Ave, Bismarck, ND 58503-5512, 701-328-8020. Summit Carbon Storage #3, LLC, 2321 North Loop Dr Suite #221, Ames, IA 50010

Case No **30878** In the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation, pursuant to North Dakota Century Code Section 38-22-10

Case No **30879** In the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation, pursuant to North Dakota Century Code Section 43-05-01-09.1

Case No **30880** In the matter of a hearing called on a motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the applicatio of Summit Carbon Storage #3, LLC for th geologic storage of carbon dioxide in th Broom Creek Formation, and enact suc special field rules as may be necessary

Signed by,

Doug Burgum, Governor

Chairman, NDIC

4/17 - COL-ND-0004

The Bismarck Tribune

AFFIDAVIT OF PUBLICATION

State of Texas, County of Bexar, ss:

Laquansay Nickson Watkins, being first duly sworn, deposes and says: That (s)he is a duly authorized signatory of Column Software, PBC and duly authorized agent of The Bismarck Tribune, and that the publication(s) were made through The Bismarck Tribune on the following dates:

**PUBLICATION DATES:**
May. 1, 2024, May. 8, 2024

**NOTICE ID:** hZZ3do0ZB9xZIHK6HZEb
**PUBLISHER ID:** COL-ND-0053
**NOTICE NAME:** June 11 and 12, 2024 - Legal Ad
**Publication Fee:** $1610.46

(Signed) Laquansay Nickson Watkins

**VERIFICATION**

State of Texas
County of Bexar

NOTARY PUBLIC STATE OF TEXAS
Robert Hollie III
ID NUMBER
133582194
COMMISSION EXPIRES
February 10, 2026

Subscribed in my presence and sworn to before me on this 05/09/2024

Notary Public
Electronically signed and notarized online using the Proof platform.

**NOTICE OF HEARING**
N.D. INDUSTRIAL COMMISSION
OIL AND GAS DIVISION

The North Dakota Industrial Commission will hold a public hearing at 9:00 AM CDT Tuesday, June 11, 2024 – Wednesday, June 12, 2024 at N.D. Oil & Gas Division 1000 East Calgary Avenue Bismarck, North Dakota. At the hearing the Commission will receive testimony and exhibits. Persons with any interest in the cases listed below, take notice.

PERSONS WITH DISABILITIES: If at the hearing you need special facilities or assistance, contact the Oil and Gas Division at 701-328-8038 by Tuesday, May 28, 2024.

STATE OF NORTH DAKOTA TO:

Case No. **30869** In the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #1, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND pursuant to North Dakota Administrative Code Chapter 43-05-01. View the draft storage facility permit, fact sheet, and storage facility permit application at www.dmr.nd.gov/dmr/oilgas/. Summit Carbon Storage #1, LLC intends to receive carbon dioxide from the Midwest Carbon Express Pipeline and sequester it in the Broom Creek Formation. The Commission will accept and consider written comments on the merits of the application and draft permit if received no later than 5:00 pm CDT June 10, 2024. Submit written comments to the Oil and Gas Division, 1016 East Calgary Ave, Bismarck, ND 58503-5512 or sforsberg@nd.gov. Further draft permit information may be obtained from Tammy Madche, and further hearing information may be obtained from Sara Forsberg, both at the ND Oil and Gas Division 1016 East Calgary Ave, Bismarck, ND 58503-5512, 701-328-8020. Summit Carbon Storage #1 LLC, 2321 North Loop Dr Suite #221, Ames, IA 50010.

Case No. **30870** In the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #1, LLC to consider the amalgamation of the storage reservoir pore space in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #1 LLC storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23,

25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation, pursuant to North Dakota Century Code Section 38-22-10

Case No **30871** In the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #1 LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36, Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, in the Broom Creek Formation, pursuant to North Dakota Administrative Code Section 43-05-01-09.1.

Case No **30872** In the matter of a hearing called on a motion of the Commission to consider establishing the field and pool limits for lands located in Sections 31, 32, 33, and 34, Township 142 North, Range 87 West, Sections 1, 11, 12, 13, 14, 15, 22, 23, 24, 25, 26, 35, and 36 Township 141 North, Range 88 West, Sections 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, and 35, Township 141 North, Range 87 West, Sections 1, 2, 3, and 12, Township 140 North, Range 88 West and Sections 4, 5, 6, and 7, Township 140 North, Range 87 West, Mercer, Morton, and Oliver Counties, ND, subject to the application of Summit Carbon Storage #1, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

Case No **30873** In the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #2, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND pursuant to North Dakota Administrative Code Chapter 43-05-01. View the draft storage facility permit, fact sheet, and storage facility permit application at www.dmr.nd.gov/dmr/oilgas/. Summit Carbon Storage #2, LLC intends to receive carbon dioxide from the Midwest Carbon Express Pipeline and sequester it in the Broom Creek Formation. The Commission will accept and consider written comments on the merits of the application and draft permit if received no later than 5:00 pm CDT June 10, 2024. Submit written comments to the Oil and Gas Division, 1016 East Calgary Ave, Bismarck, ND 58503-5512 or sforsberg@nd.gov. Further draft permit information may be obtained from Tammy Madche and further hearing information may be obtained from Sara Forsberg, both at the ND Oil and Gas Division, 1016 East Calgary Ave, Bismarck, ND 58503-5512, 701-328-8020. Summit Carbon Storage #2, LLC, 2321 North Loop Dr Suite #221, Ames, IA 50010

Case No. **30874** In the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #2, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #2, LLC storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation, pursuant to North Dakota Century Code Section 38-22-10

Case No **30875** In the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #2, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, in the Broom Creek Formation, pursuant to North Dakota Administrative Code Section 43-05-01-09.1

Case No **30876** In the matter of a hearing called on a motion of the Commission to consider establishing the field and pool limits for lands located in Sections 27, 28, 29, 32, 33, 34, and 35, Township 143 North, Range 88 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, 35, and 36, Township 142 North, Range 88 West, Sections 5, 6, 7, 8, 17, 18, 19, 20, 29, 30, and 31, Township 142 North, Range 87 West, and Sections 1, 2, and 3, Township 141 North, Range 88 West, Mercer and Oliver Counties, ND, subject to the application of Summit Carbon Storage #2, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary.

Case No. **30877** In the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #3, LLC requesting consideration for the geologic storage of carbon dioxide in the Broom Creek Formation from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND pursuant to North Dakota Administrative Code Chapter 43-05-01. View the draft storage facility permit, fact sheet, and storage facility permit application at www.dmr.nd.gov/dmr/oilgas/. Summit Carbon Storage #3, LLC intends to receive carbon dioxide from the Midwest Carbon Express Pipeline and sequester it in the Broom Creek Formation. The Commission will accept and consider written comments on the merits of the application and draft permit if received no later than 5:00 pm CDT June 10, 2024. Submit written comments to the Oil and Gas Division, 1016 East Calgary Ave, Bismarck, ND 58503-5512 or sforsberg@nd.gov. Further draft permit information may be obtained from Tammy Madche, and further hearing information may be obtained from Sara Forsberg, both at the ND Oil and Gas Division, 1016 East Calgary Ave, Bismarck, ND 58503-5512, 701-328-8020. Summit Carbon Storage #3, LLC 2321 North Loop Dr Suite #221, Ames, IA 50010

Case No **30878** In the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #3, LLC to consider the amalgamation of the storage reservoir pore space, in which the Commission may require that the pore space owned by nonconsenting owners be included in the geologic storage, as required to operate the Summit Carbon Storage #3, LLC storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation, pursuant to North Dakota Century Code Section 38-22-10

Case No **30879** In the matter of a hearing called on a motion of the Commission to consider the application of Summit Carbon Storage #3, LLC for an order of the Commission determining the amount of financial responsibility for the geologic storage of carbon dioxide from the Midwest Carbon Express Pipeline in the storage facility located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver County, ND, in the Broom Creek Formation, pursuant to North Dakota Administrative Code Section 43-05-01-09.1

Case No **30880** In the matter of a hearing called on a motion of the Commission to consider establishing the field and pool limits for lands located in Section 36, Township 143 North, Range 87 West, Sections 19, 20, 21, 28, 29, 30, 31, 32, 33, 34, 35, and 36, Township 143 North, Range 86 West, Sections 1, 2, 11, 12, 13, 14, and 24, Township 142 North, Range 87 West, Sections 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 32, 33, 34, and 35, Township 142 North, Range 86 West, and Sections 6, 7, 17, 18, 19, and 20, Township 142 North, Range 85 West, Oliver county, ND, subject to the application of Summit Carbon Storage #3, LLC for the geologic storage of carbon dioxide in the Broom Creek Formation, and enact such special field rules as may be necessary

Signed by,
Doug Burgum, Governor
Chairman, NDIC
5/1, 5/8 - COL-ND-0053